

Beckett

PARTS & ACCESSORIES

# GeniSys®

## Model 7590

Gas Power Burner Control



## Description / Applications

The Beckett GeniSys Gas Power Burner Control is a safety control designed for use on gas power burners. This control is intended for use in residential and light commercial gas heating applications. Applications may include boilers, furnaces, water heaters, space heating and commercial cooking equipment. The 7590 provides supervision of a separate 120 Vac igniter, a 120 Vac combustion blower motor, a 24 Vac gas valve and 24 Vac connections for an air proving switch (on 7590C, D). The control uses flame rectification principles to prove the presence of the burner flame. Basic diagnostic information is provided through 3 LEDs. Additional diagnostic information and control setup will be available through a separate diagnostic tool.

GeniSys®

# Contents

Features.....	3
Specifications .....	4
Electrical Ratings .....	4
Electrical Connections.....	4
Environmental Ratings.....	4
Approvals .....	4
Lockout Sequence Options .....	4
Timings .....	4
Control Cycling Rate .....	4
Installation.....	6
Mounting .....	7
Transformer Sizing.....	7
Spark Gap.....	7
Wiring .....	7
Operation .....	8
7590T .....	9
Status & Diagnostics .....	9
Flame Signal Strength Indication .....	9
Lockout.....	9
Lockout with Limited or No Retry .....	9
Lockout with Retry.....	10
Reset from Lockout .....	10
Stop/Hold Button .....	10
Safety Check.....	10
Check Safety Timings .....	11
Check for Normal Operation .....	11
Simplified Sequence of Operation.....	12
Troubleshooting .....	14
Troubleshooting Sequence .....	16
Limited Warranty Information .....	20

## Hazard Definitions:



Indicates a hazardous situation that, if not avoided, will result in **death or serious injury**.



Indicates a hazardous situation that, if not avoided, could result in **death or serious injury**.



Indicates a hazardous situation that, if not avoided, could result in **minor or moderate injury**.



Used to address practices not related to physical injury.



Safety instructions signs indicate specific safety-related instructions or procedures.

# Features

- For use in Natural Gas or LP gas applications.
- Controls 120 Vac spark igniter, motor/blower and 24 Vac gas valve, 50/60 HZ
- Provides proof of flame through flame rectification using a separate flame rod
- Checks combustion air proving switch contacts (24 Vac) on 7590C and 7590D models to prove moving combustion air and guard against welded contacts.
- Field selectable for either lockout or recycle on loss of combustion air
- Field selectable relight or recycle operation on loss of flame (may be factory locked)
- Field selectable single or multiple trials for ignition on some models (may be locked)
- Field selectable ignition timing on some models (may be factory locked)
- Field selectable pre-purge timing (may be factory locked)
- The microprocessor is checked for proper operation prior to each ignition cycle
- Check for welded valve relays on each cycle
- Mounts on standard 4 x 4 junction box
- 3 status LEDs supply basic diagnostics, additional diagnostic information and field configuration will be available through a separate diagnostic tool
- An optional separate alarm module provides alarm contacts (dry contacts)
- A reset button is standard on all controls, non-volatile manual reset logic is available on specific models (7590C).
- Communication Port to connect diagnostic tool and alarm module

**Table 1 - Ignition Model Numbers**

Model Line	Model Description	Part Number	Feature			
			120 volt Igniter and blower motor output	24 volt gas valve output	2 Pin- connector for pressure switch	Non-volatile lockout*
Gas Power Burner	Standard	7590DYYYY	X	X	X	
	No Pressure Switch	7590TYYYY	X	X		
	Non-volatile Manual Reset	7590CYYYY	X	X	X	X

The standard model 7590 is designed for use on applications below 400,000 BTUs. For applications above 400,000 BTUs, contact Beckett’s Engineering Group.

\*Non-volatile lockout cannot be cleared by removing power from the control. The control must be reset by pressing the Status/Reset button when the control is powered.

# Specifications

## Electrical Ratings

- *Voltage:* 120 volts 50/60 Hz (igniter, motor) 24 volts (18-30 Vac) 50/60Hz (gas valve and air proving switch)
- *Current Draw (run):* 0.2 Amps (control only)
- *Main Valve Rating:* 5.0 Amps
- *Motor Relay Rating:* 7.4 Amps (120V)
- *Igniter Relay Rating:* 1.0 Amp (120V)
- *Minimum Flame Current Required:* 1.0  $\mu$ A
- *Flame Failure Response Time:* 0.8 Seconds (Max.)
- Control is not polarity sensitive
- *Heat Anticipator Setting:* 0.2 amp + gas valve current draw

## Electrical Connections

- Two T-T screw terminals (on top) (see **Figure 1**)
- 1/4" Quick Connects (6 total on bottom)
  - Igniter, L2
  - Motor, L2
  - L1, L2
- 3/16" Remote Sense quick connect terminal (on bottom)
- 6-Pin (24V) connector (on bottom) 24 Volt Input, Gas Valve, Burner Ground
- 2-Pin (24 V) connector (on bottom) Air Pressure Switch
- Micro-USB Communications Port (on side of control) for diagnostic tool and alarm module (COM1).
- **Additional Features**
- 3 Diagnostic LEDs; Status (red), Flame (yellow), MV (green)
- Alarm Contacts (optional module)

## Environmental Ratings

- Operating Temperature Range: -40°F to +175°F (-40°C to +79.4°C).
- Relative Humidity Operating Range 5% - 95% (non-condensing).

Not intended for outdoor use unless mounted in appropriate enclosure.

## Approvals

UL listed per ANSI Z21.20, UL372, and CSA C22.2#199

## Lockout Sequence Options

- Sequence is usually factory selected
- Lockout after single try for ignition
- Lockout with retrial every 1-8 hours
- Lockout after 3 trials for ignition
- Manual Reset logic: shutdown after failure to light during trial for ignition timing or after flame failure, (no relight attempt), after 5 minute minimum waiting time, 1 retry attempt allowed, then non-volatile lockout. Lockout must be manually reset.

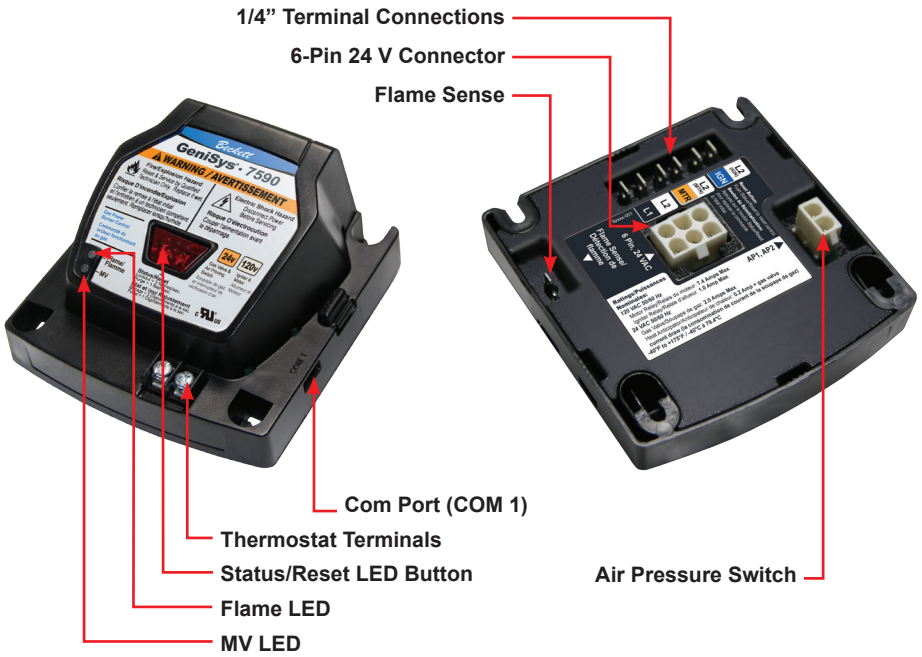
## Timings

- *All timings can be factory locked. Timings below may be field selectable on some models.*
- Ignition Timing: 4-15 seconds (4 seconds if Manual Reset)
- Pre-purge timing: 1-240 seconds
- Inter-purge timing: 90-300 seconds

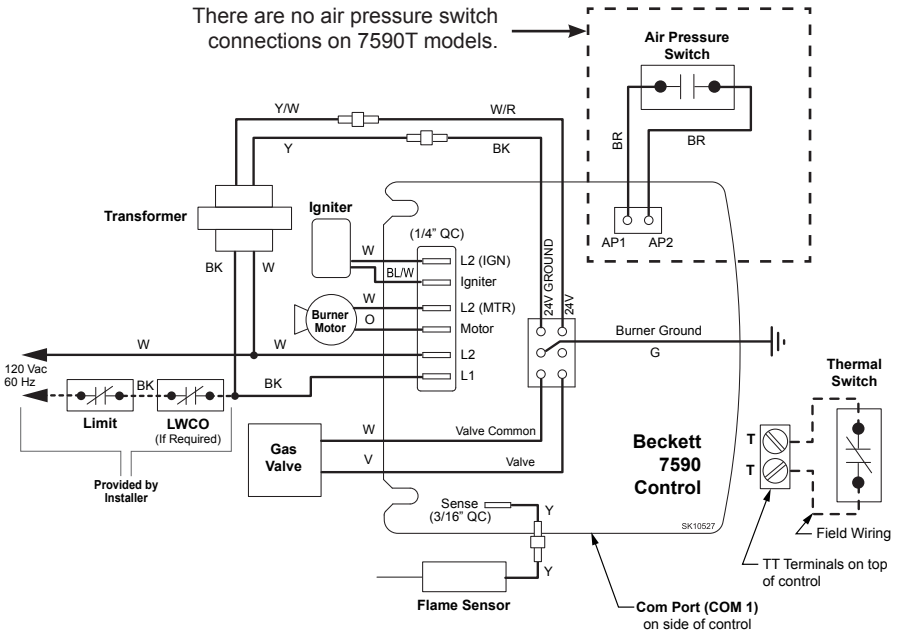
## Control Cycling Rate

The 7590 is designed for use in typical heating applications which cycle a few times per hour during the heating season. More rapid cycling of the control will shorten the useful life of the control. Controls in rapid cycling applications should be checked monthly for proper operation. All controls should be checked at least annually for proper operation.

**Figure 1 - Getting to know the control**



**Figure 2 - Gas Conversion Burner Hookup Drawing**



# Installation

## **WARNING**

### Professional Service Required



***Incorrect installation or misuse of this control could result in severe personal injury, death, or substantial property damage from explosion or fire.***

Read and understand this manual. This control must be installed, configured and put into operation only by a qualified individual or service agency that is:

- Licensed or certified to install and provide technical service to gas heating systems.
- Experienced with all applicable codes, standards and ordinances.
- Responsible for the correct installation and commissioning of this equipment.

The installation must strictly comply with all applicable codes and authorities having jurisdiction and the latest revision of the National Fire Protection Association Standard or CSA Standard for the installation of gas controls in the appropriate gas appliance.

Regulation by these authorities take precedence over the general instructions provided in this installation manual.

## **WARNING**

### Fire or Explosion Hazard



***Can cause severe injury, death, or property damage.***

If You Smell Gas or Believe a Leak May Exist

- Turn off the manual gas valve to the appliance.
- Leave the building.
- Do not try to light the appliance.
- Do not touch any electrical switch.
- Do not use a telephone within the building.
- Leave the building before calling the appropriate gas organization

## **WARNING**

### Explosion, Fire, Scald, and Burn Hazard



***Can cause severe injury, death, or property damage.***

- The control can malfunction if it gets wet, leading to an accumulation of explosive gas vapors.
- Never install where water can flood, drip or condense on the control.
- Never use a control that has been wet - replace it.

***All heating appliances must have HIGH LIMIT protection to interrupt electrical power and shutdown the burner if operating or safety controls fail and cause a runaway condition.***

- Follow the appliance manufacturer's wiring diagrams and note all required safety controls.
- Typical safety controls include high temperature or pressure limits, low water cutoffs, pressure relief valves and blocked flue sensing switches.
- Verify all limit and safety controls are installed and functioning correctly, as specified by the manufacturer, applicable safety standards, codes and all authorities having jurisdiction.
- Ensure that gas or gas vapors have not accumulated in the appliance before starting or resetting the burner.

## **WARNING**

### Electrical Shock Hazard



***Electrical shock can cause severe personal injury or death.***

- Disconnect ALL electrical power to the appliance/burner circuit before installing or servicing this control.
- Provide ground wiring to the appliance and burner.
- Perform wiring in compliance with the National Electrical Code ANSI/NFPA 70 (Canada CSA C22.1).

**NOTICE****No User Serviceable Parts**

- Do not open control.
- Do not attempt to replace any components.

## Wiring

Reference **Figure 2** for wiring diagram.

### Mounting

The control should be mounted in accordance with the burner manufacturer's or appliance manufacturer's instructions. If this is a replacement application, mount the control in the same location as the existing control. The 7590 control is designed to mount on a 4" x 4" junction box on the burner. Avoid mounting locations where water could drip on the control. Mounting location must remain within the -40°F (-40°C) to +175°F (79.4°C) operating temperature range.

Mounting location should protect against moisture, corrosive chemicals, excessive dust or water. If any of the above elements are present, control should be mounted in a NEMA 4 rated enclosure.

### Transformer Sizing

A transformer with a 24 volt secondary is required to power the control and gas valve. To calculate the minimum VA transformer needed:

Voltage X Amperage = VA rating needed  
 Voltage = 24 Vac  
 Amps (0.2 amps + gas valve current draw)

Example:  
 $0.2A (7590) + 0.5A (gas\ valve) = 0.7 A$   
 $0.7A \times 24V = 16.8 VA\ needed, use\ 20\ VA\ transformer.$

### Spark Gap

Follow appliance manufacturer's or burner manufacturer's instructions for setting the proper ignition electrode spark gap.

**WARNING****Electrical Shock Hazard**

**Electrical shock can cause severe personal injury or death.**

Make sure all wiring is securely installed on the control. Failure to secure the wiring properly can lead to electrical shock.

**CAUTION****To Prevent Shock or**

**Damage to the Appliance or the Control, Remove Power Before Making Any Wiring Connections.**

Do not short out gas valve or control terminals during testing. Shorting could cause damage to the thermostat or control and could cause personal injury or property damage.

**NOTICE****Incorrect Wiring Will Result in**

**Improper Control Operation**

- Label all wires prior to disconnection when servicing controls
- GeniSys wiring order and colors may not match the wire order and colors of the appliance or other manufacturers' controls.
- The GeniSys Control should be wired according to the appliance manufacturer's instructions.

**NOTICE****DO NOT connect any cell phone,**

**tablet or computer to the communications port. Any device connected to the port will be damaged.**

Wiring must comply with all national and local codes. Wiring must follow appliance and burner manufacturer's instructions. Follow the appropriate hook up drawing for the application in which the control is being installed.

**NOTICE** The ignition cable length should be 3 feet or less, or meet igniter manufacturer's specified length. Avoid placing the ignition cable in direct contact with metal surfaces as reduced spark voltage could result. Use plastic or ceramic standoffs if necessary.

**NOTICE** The control, electrode and flame sensor must have a common ground with the main burner for proper operation. Failure to provide proper ground for the control, electrode and sensor may result in a failure to sense the presence of flame. Failure to sense flame will result in lockout or continued cycling of the ignition sequence.

**NOTICE** On models with Air Pressure Switch terminals (7590C, D), do not place a jumper on the Air Pressure Switch terminals. Placing a jumper on the terminals will prevent the control from starting the burner motor.

**CAUTION** **Frozen Plumbing and Water Damage Hazard**

*If the residence is unattended in severely cold weather, burner primary control safety lockout, heating system component failures, power outages or other electrical system failures could result in frozen plumbing and water damage in a matter of hours.*

For protection, take preventive actions such as having a security system installed that operates during power outages, senses low temperature and initiates an effective action. Consult with your heating contractor or a home security agency.

## Operation

**WARNING** **Fire or Explosion Hazard**



**Can cause severe injury, death, or property damage.**

Replacement control must be configured to match all timings, settings, and pre-purge of the control being replaced.

- DO NOT USE A TRIAL FOR IGNITION TIMING LONGER THAN THE TIMING ON THE ORIGINAL CONTROL. Severe injury, death, or substantial property damage could result from a longer trial for ignition timing.
- MATCH THE LOCKOUT LOGIC SEQUENCE TO THE ORIGINAL CONTROL. If the original control is a single trial for ignition or allows three trials for ignition before lockout, the replacement control must match the number of ignition trials.

**WARNING** **Fire or Explosion Hazard**



**Can cause severe injury, death, or property damage.**

- Be sure that gas or gas vapors have not built up in or around the appliance before starting or resetting the burner.
- Turn thermostat or controller off and wait 5 minutes before attempting to start or reset burner.



## 7590T

The 7590T may replace some existing burner controls designed for 24 volt gas valves. The 7590T cannot be used to replace controls designed for use with line voltage (120 Vac) gas valves or controls with pressure switch connections. **Settings are locked after 4 hours of burner operation.**

### Status & Diagnostics

The 7590 module has 3 LED lights that help provide status and diagnostic information. Reference **Figure 1**. The three LEDs are Status, Flame, and MV (main valve). The LEDs use 4 modes; On, Off, Slow Flash, Fast Flash.

- Flame (yellow) = Flame Sense, Flame Strength
- MV (green) = Gas Valve On/Off
- Status/Reset (red) = Power, Lockout, Pre-Purge, or Waiting

The tables on Normal LED Sequence, LED Diagnostic Help and Troubleshooting describe the information available through the LEDs.

### Flame Signal Strength Indication

The 7590 uses flame rectification to prove the presence of the burner flame. For reliable operation, a strong flame current is needed. The yellow Flame LED provides a reliable indication of the flame current strength.

When the burner is lit;

- A continuously on Flame LED indicates a strong flame current.
- A slowly flashing Flame LED indicates a marginal flame current strength. Consider adjusting the electrode or flame rod to improve the flame signal.

If the Flame LED is off, no flame is being detected. Refer to the Troubleshooting Section to resolve the issue.

### Lockout

The 7590 control can be configured for two different types of Lockout:

- Lockout with Limited or No Retry
- Lockout with Retry

The control operation will be different depending on which type of lockout is used.

All 7590C models have Manual Reset Logic and are configured with Limited Retry. The 7590C control will allow one attempt to relight after 5 minute waiting period. The 7590C controls will follow the operation outlined under Lockout with Limited or No Retry.

The 7590D and T models can be configured for either Lockout with Retry or for Lockout with Limited or No Retry. The lockout configuration will normally be fixed by the burner or appliance manufacturer.

### Lockout with Limited or No Retry

If the red Status/Reset button is flashing rapidly (3 times per second), the control is in Lockout with Limited or No Retry. All control outputs are turned off and the control will not respond to a call for heat until it is reset. Controls setup for Lockout with Limited or No Retry will enter lockout when:

- The control fails to prove flame during the trial for ignition period (or repeatedly loses flame after flame has been proved)
- The control fails the gas valve relay check
- The air pressure switch is closed (stuck) at the beginning of the ignition sequence
- The air pressure switch fails to close after the motor/blower starts (or repeatedly opens during the same call for heat)

If the control is programmed for 3 trials for ignition, the control will lockout after the 3rd unsuccessful attempt. The 7590C will allow the initial trial for ignition and one retrial, after a 5 minute waiting period, before locking out (Limited Retry).

## **Lockout with Retry**

Lockout with Retry is designed to help in situations where the gas supply has been interrupted. Interruptions in the gas supply can prevent the burner from lighting during the trial for ignition and cause the control to lockout. If the house or building is unoccupied for long periods during cold weather, a lockout can lead to low temperatures or freezing in the structure. This configuration may help by allowing periodic ignition retries until the gas supply is restored. Only the 7590D and T models can be configured for Lockout with Retry.

Lockout with Retry is identified by the red Status/Retry button flashing slowly (1 time per second) with the burner/blower motor off. The control is in the 1-8 hour waiting period between ignition trials.

Controls will enter Lockout with Retry when:

- The control fails to prove flame during the trial for ignition period (or repeatedly loses flame after flame has been proved)
- The air pressure switch is closed (stuck) at the beginning of the ignition sequence
- The air pressure switch fails to close after the motor/blower starts (or repeatedly opens during the same call for heat)

Even when the 7590 D or T is programmed for Lockout with Retry, if the control fails the gas valve relay check, the control will still enter Lockout with No Retry (red Status/Reset button flashing 3 times per second). No retry will happen. This is the only situation that will cause a control programmed for Lockout with Retry to flash the Status/Reset button LED rapidly.

For the ignition retries to happen during Lockout with Retry, there must be power to the burner and there must be a call for heat from the controller or thermostat. The control will not allow a retry if the lockout was caused by a failed gas valve relay check. The retrial feature will not be available if this feature was locked at the factory. The retrial feature is not available in the 7590C model.

## **Reset from Lockout**

*With Retry—Red LED Flashing 1 time per second, motor off*

When the red LED is flashing slowly and the motor is off, the control can only be reset by removing power from the control, waiting 5 seconds and restoring power.

*With Limited or No Retry—Red LED Flashing 3 times per second*

Push the red Status/Reset button when there is power to the control. Unlike GeniSys oil controls, the button does not need to be held down for the control to reset.

Following reset, if a call for heat is present, the control will restart the ignition sequence (including pre-purge).

## **Stop/Hold Button**

Holding the Status/Reset button down for more than 1 second will interrupt the ignition sequence. The control will enter a hold mode and all control functions will stop. When the Status/Reset button is released, the control will start the ignition sequence over (including pre-purge).

## **Safety Check**

Before starting appliance, make sure that all wiring is correct and secure. Repair or

replace any loose connections or damaged wire. Use only wire rated for the application.

- Use UL approved wire of the gauge and temperature rating specified by the appliance or burner manufacturer for any replacement wiring.
- Use UL approved solid conductor ignition cable. Cable must meet the temperature and voltage ratings specified by the manufacturer. Use insulated boots or terminals, if needed, to prevent sparking to burner parts.

#### **SAFETY INSTRUCTIONS**

Perform a visual inspection of all system components including the gas supply system. Check for any leaks in the gas supply system using a soap and water solution or electronic detection.

### **Check Safety Timings**

- Turn off gas supply to appliance.
- Restore power to the appliance.
- Turn the thermostat or controller up to call for heat. Status LED should be powered. Motor should start.
- Following pre-purge, the control will energize the separate igniter, spark should be present at the burner head. MV LED should light and gas valve should open.
- Spark should stay on for the entire ignition timing.
- Spark should switch off at the end of the ignition timing. Gas valve and MV LED should turn off.
- If the control is programmed for single trial for ignition, the Status LED will flash rapidly to indicate lockout.
- For controls programmed for multiple trials for ignition, allow the control to

continue retrials until lockout occurs. Status LED will flash slowly during waiting period between ignition cycles.

### **Check for Normal Operation**

- Restore power to the appliance.
- If control is in lockout push Status/Reset button.
- Turn manual gas cock to on position.
- Turn gas valve to on position using either the manual gas knob or the electrical switch on the valve.
- Turn the thermostat or controller up to call for heat. Status LED should be powered. Motor should start.
- Following pre-purge, the igniter will be turned on and spark should be present at the burner head. The MV LED should turn on and the gas valve should open. Motor continues running.
- When the burner is lit by spark, ignition will shut off and the main gas valve will remain open.
- Multiple ignition trials may be needed to establish gas flow on new installations or if burner has been out of use. If control locks out, push Status/Reset button to restart ignition sequence.
- When the burner lights, the Flame LED should be on continuously.
- Check burner for proper combustion per burner or appliance instructions.
- Remove call for heat by turning the thermostat or controller down.
- The MV LED, Flame LED and Status LED should go off. The valve should close. Motor should turn off.
- The burner should turn off quickly.

## Simplified Sequence of Operation

(Reference **Table 2**)

- Call for heat, Status LED is turned on.
- Control performs safe-start check.
- If safe-start fails, control will flash all 3 LEDs.
- If safe-start passes, control checks for presence of flame.
- If flame is present, control will enter hold state until flame is no longer present. Flame LED and Status LED will flash until flame is no long present.
- If flame is not present, control will check status of air proving switch. If switch is closed (indicating the air proving switch is stuck) control will enter Lockout No Retry or Lockout with Retry.
- If the air proving switch is open, the motor will start. Once the air proving switch closes, pre-purge will begin (1-240 seconds). Pre-purge or ignition timings will not start until the air proving switch closes.
- The air proving switch must close to prove combustion air is present. If switch fails to close during the specified period, the control will enter Lockout No Retry or Lockout with Retry.
- When pre-purge is completed, the control checks the gas valve relay. If the relay test fails, the control will restart or lock out. If the relay test is passed, the control turns on the igniter and the gas valve. MV LED will turn on.
- Spark continues until flame is proved or until the end of ignition timing.
- The spark is off when flame is sensed. The Flame LED is turned on when flame is sensed. The gas valve and MV LED remain energized.
- If flame is not proved, the control will enter Lockout No Retry, Lockout with Retry or the inter-trial waiting period. The Status LED will:
  - Flash rapidly for Lockout with No Retry
  - Flash slowly with the motor on for inter-trial waiting
  - Flash slowly with the motor off for Lockout with Retry





**Table 2 - Operating Sequence**

	<b>SEQUENCE</b>					
<b>LEDs</b>	<b>Call for Heat</b>	<b>Motor Start</b>	<b>Pre-purge</b>	<b>Ignition</b>	<b>Run</b>	<b>End Call for Heat</b>
	 Status LED turns on	 Status LED ON	 Status LED Flashes	 Status, MV LEDs On	 Status, MV, Flame LEDs On	 LEDs Off
Timers & Timings			Pre-purge Timer 1 - 240 Seconds	Ignition Trial Timer 4 - 15 Seconds		
Flame Check	On	On	On	On	On	
Motor/Blower		Blower Starts	On	On	On	Off
Air Switch Check	On	Air Switch Closes	On	On	On	
Igniter				On	Off	Off
Gas Valve				On	On	Off






**LED Key:** ○ = OFF ● = ON ☀ = FLASHING

For below charts, "Troubleshooting" & "Troubleshooting Sequence" sections.

**Table 3 - Normal LED Sequence**

LED	LED STATE	CONTROL STATE
FLAME ○  MV ○ STATUS ○	All LEDs off	No call for heat or no power to appliance
<p><b>Note:</b> On a call for heat, after the motor/blower starts, the air proving switch must close before pre-purge or trial for ignition timers can start. The Status LED may turn on momentarily while waiting for the air pressure switch to close. If pre-purge is set for 1 second, once the air pressure switch closes, the control will move directly to trial for ignition without flashing the Status LED for pre-purge.</p>		
FLAME ○  MV ○ STATUS ○	Status LED flashes slowly (once per second) but only if control is set up for pre-purge of 2 seconds or more	Pre-purge or waiting period between trials for ignition, motor should be running
FLAME ○  MV ● STATUS ○	Status and MV LEDs on continuously	Trial for Ignition, motor should be running and ignition should be sparking
FLAME ●  MV ● STATUS ○	Status, Flame and MV LEDs all on continuously	Main flame has been proved, Control is in run mode and will continue in run mode until call for heat ends

**Table 4 - Additional LED Diagnostic Help**

LED	LED STATE	CONTROL STATE
FLAME ○  MV ○ STATUS ○	Status LED is flashing quickly, 3 times per second	Control is in lockout no retry, follow reset steps under troubleshooting box "If the red Status LED is flashing quickly"
FLAME ○  MV ○ STATUS ○	Status LED is flashing slowly (once per second) and burner motor is <u>off</u>	Control is in lockout with retry, control is in 1-8 hour waiting period between ignition trials, follow troubleshooting under "If the red Status LED is flashing slowly"
FLAME ☀  MV ● STATUS ○	Status, Flame and MV LEDs all flashing	Control failure - internal error, try resetting the control once, if problem reoccurs, replace the control
FLAME ☀  MV ○ STATUS ○	Status and Flame LEDs flashing	Flame has been sensed when flame should not be present, follow troubleshooting under "If the red Status and yellow Flame LEDs are both flashing"
FLAME ☀  MV ● STATUS ○	Status and MV LEDs on continuously, Flame LED flashing	Flame signal is weak, follow troubleshooting steps under "Is the yellow Flame LED on?"

# Troubleshooting

Check LEDs First - Find the box on the left that matches the LED display you are seeing. When all three LEDs are on continuously and the burner is lit, the system is operating normally. The troubleshooting information is intended as a guide and may not cover all possibilities in every application.

Table 5 - Troubleshooting










	<p><b>If the red Status LED is off:</b></p> <ul style="list-style-type: none"> <li>No power to the control.</li> <li>Check that the thermostat or controller is calling for heat.</li> <li>Check for power to the appliance.</li> <li>Check that limit is closed, check that the thermal (blocked vent) switch is closed.</li> <li>Check for power to the system transformer.</li> <li>Check all wiring and secure all connections</li> <li>With the controller calling for heat, use a volt meter to measure 24 volts to the control. Place one probe on the right thermostat terminal and the other probe on an unpainted portion of the burner. If no voltage is measured, there is no power to the control. If 24 volts is measured, move the first probe from the right thermostat terminal to the left thermostat terminal. If 24 volts is measured on the left terminal and the red Status LED is off, replace the control. If no voltage is measured on the left terminal, the thermal switch is open.</li> </ul>
	<p><b>If only the red Status LED is on steadily:</b></p> <ul style="list-style-type: none"> <li>If motor is off—air pressure switch is closed (stuck), will wait for switch to open.</li> <li>If motor is on—waiting for air pressure switch to close.</li> <li>If switch fails to open or close within a specified time, control will lockout.</li> <li>If switch opens and closes properly, control will move to pre-purge.</li> </ul>
	<p><b>If the red Status LED is flashing quickly (3 times per sec.)</b></p> <ul style="list-style-type: none"> <li>Control is in Lockout with Limited or No Retry</li> <li>Check the air pressure switch. If the air pressure switch is stuck in the closed position or if the air pressure switch has been jumpered, the control could lockout. The control could also lockout if the air pressure switch fails to close when the motor/blower starts.</li> <li>Push reset button or remove power from control for 10 seconds and restart ignition sequence with a call for heat. If control is a non-volatile lockout model (7590C), the control can only be reset using the reset button while the module is powered. If the motor/blower is off and the red Status LED remains on steadily, the air pressure switch is stuck in the closed position. If the motor/blower is running and the red Status LED remains on steadily for more than a few seconds, it is likely the issue is with the air pressure switch or the air blower (or a blockage).</li> <li>If the control completes pre-purge and locks out at the beginning of the trial for ignition, the control has likely failed the gas valve relay check, replace the control.</li> <li>If the control completes the trial for ignition and the burner does not light properly, follow the troubleshooting sequence.</li> </ul>

Table 5 continued on next page ►

**Table 5 (continued)**

	<p><b><i>If the red Status LED is flashing slowly (1 time per sec.)</i></b></p> <ul style="list-style-type: none"> <li>▪ <b>If motor/blower is running</b>, control is in pre-purge or control is in a waiting period between trials for ignition. If motor is not running, control is in Lockout with Retry waiting to retry in 1-8 hours (reset control).</li> <li>▪ The pre-purge period is 1-240 seconds, depending on setting.</li> <li>▪ The control waiting period is 90 seconds to 5 minutes, depending on setting.</li> <li>▪ Either wait for pre-purge/waiting period to finish, <b>OR</b></li> <li>▪ Turn thermostat or controller off for 5 minutes to let accumulated gas disperse, (LED should turn off) then turn thermostat or controller back on to restart ignition sequence. Allow the control to go through pre-purge, if any, and complete the trial for ignition sequence.</li> <li>▪ <b>If motor is not running</b>, control is in lockout with retry and is waiting to retry in 1-8 hours. Allow time for gas to disperse. Reset control by removing power for 10 seconds and restart ignition sequence with a call for heat. If the motor/blower is off and the red Status LED remains on steadily, the air pressure switch is stuck in the closed position. If the motor blower is running and the red Status LED remains on steadily for more than a few seconds, it is likely the issue is with the air pressure switch or the air blower (or a blockage).</li> <li>▪ If burner does not light properly, follow the troubleshooting sequence.</li> </ul>
	<p><b><i>If the red Status LED and green MV LED are on continuously</i></b></p> <ul style="list-style-type: none"> <li>▪ Call for heat is active.</li> <li>▪ Control is powered.</li> <li>▪ Igniter should be energized and sparking at the burner head, gas valve should be open, motor should be running.</li> <li>▪ If no sparking at the burner, follow the troubleshooting sequence.</li> </ul>
	<p><b><i>If the Status and MV LEDs are on continuously and the Flame LED is flashing</i></b></p> <ul style="list-style-type: none"> <li>▪ The flame signal is weak</li> <li>▪ Try to improve flame signal strength by following steps in the Troubleshooting Sequence under "Is the yellow Flame LED on?"</li> </ul>
	<p><b><i>If the red Status and yellow Flame LEDs are both flashing</i></b></p> <ul style="list-style-type: none"> <li>▪ The control is sensing flame when no flame should be present.</li> <li>▪ The control enters a hold state, this is not a lockout.</li> <li>▪ Control will remain in hold state until flame is no longer present.</li> <li>▪ Check for flame in the burner.</li> <li>▪ Check gas valve for leakage through the valve, replace valve if leaking.</li> <li>▪ Measure gas pressure to make sure pressure does not exceed valve rating.</li> <li>▪ Maximum gas pressure rating will often be listed on gas valve.</li> <li>▪ If pressure is too high, adjust gas pressure at system regulator or contact gas utility for help.</li> <li>▪ High gas pressure can damage gas valves, if gas pressure exceeding the rating of the valve is measured, the gas valve should be replaced.</li> </ul>
	<p><b><i>If all the LEDs are flashing</i></b></p> <ul style="list-style-type: none"> <li>▪ An internal error has been detected, try resetting the control once, if the problem reoccurs, replace the control</li> </ul>
	<p><b><i>If all the LEDs are on continuously and the burner is lit</i></b></p> <ul style="list-style-type: none"> <li>▪ The control is in the run mode and is functioning properly.</li> </ul>

# Troubleshooting Sequence

*Start with gas supply off and set thermostat or controller to call for heat.*



NO



- No power to the module.
- Check to make sure thermostat or controller is calling for heat and limit is closed.
- See instructions in troubleshooting box "If the red Status LED is off".

YES

## Pre-Purge



- If red Status LED is flashing slowly (1 time per second) and the motor is running, control is in pre-purge or between ignition trials. If the motor is off, the control is in lockout with retry. See instructions "If the red Status LED is flashing slowly".
- If red Status LED is flashing quickly (3 times per second) control is in lockout with no retry. Check the air pressure switch and follow steps under troubleshooting box "If the red Status LED is flashing quickly".
- If red Status LED is on steadily, the control is waiting for the air pressure switch. See instructions "If the red Status LED is on steadily".



NO

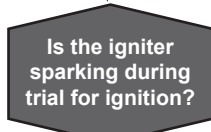
- Status LED will flash approximately once per second during pre-purge. Burner motor should be running.
- Wait for the control to complete the pre-purge timing.
- **Note:** Status LED does not flash for a 1 second pre-purge.

YES

## Trial for Ignition



- If both Status and MV LEDs are lit, control is in trial for ignition, the igniter should be sparking and motor running.
- Check incoming line voltage to burner and control (120 V)
- With power off, check all wiring and connections to igniter.
- Check for correct spark gap on ignition electrode.
- Check ignition cable and ground wire for continuity, replace if necessary.
- If ignition cable shows signs of melting or wear, replace and reroute or shield cable.
- Check ceramic insulator around the electrode for cracking or chipping, replace if needed.
- With power off, loosen 7590 from junction box, carefully remove female quick connect terminals from Igniter and L2 male terminals. Restore power and start ignition sequence. With the Status and MV LEDs on, carefully measure the voltage between male Igniter and L2 terminals. Voltage should be 120 Vac. If no voltage, replace control.
- If voltage between Igniter and L2 terminals is 120 volts and all connections to igniter, electrode and ground are good, replace igniter.



NO

YES

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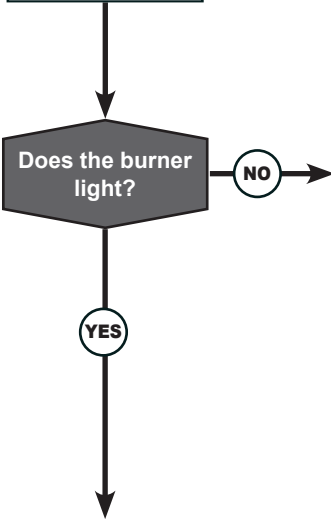
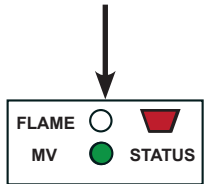


## Troubleshooting Sequence (continued)

- ▶ Turn the thermostat or controller off to end the call for heat.
- ▶ Turn on the gas supply.
- ▶ Turn the thermostat or controller back on to call for heat.

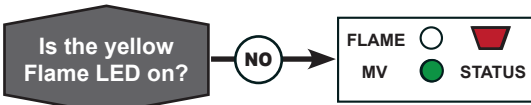
The ignition sequence will start over.

Repeat the steps above and proceed to lighting the burner.



- If burner fails to light, control will lockout or enter waiting period.
- If gas was flowing, wait for gas to disperse.
- Reset the control and repeat the ignition sequence.
- It may take more than one ignition cycle for gas to reach the burner after being off. Reset the control if needed.
- Make sure the gas supply and all manual shutoffs are open.
- With the MV LED on, check for 24 volts at the gas valve.
- If 24 volts is not present at the valve, check any safety device in gas valve wiring.
- Turn off power and check all wiring for continuity between the control module and the gas valve. Turn power back on.
- If all wiring is good and still no voltage is present at the gas valve with MV LED on, replace the control module.
- Check gas supply for any leaks using a soap and water solution or electronic detection.
- Measure gas pressure for low input pressure. Pressure must match gas input pressure listed on rating plate.
- High gas pressure can damage gas valves. If gas pressure exceeding the rating of the valve is measured, the pressure must be adjusted and the gas valve should be replaced.
- Adjust gas pressure at system regulator if necessary or contact gas utility for help.
- If there is gas pressure at the valve inlet and 24 volts is present at the gas valve but no gas flow through the valve, replace the gas valve

**Continued on  
next page**



- Flame is not being proven, control will lockout or enter waiting period.
- With power off, check the electrical connections from the control to the flame rod.
- Make sure all connections are clean and free of corrosion or build up.
- Check the continuity of the ground wire and the sense wire.
- The control, electrode and flame sensor must have a common ground with the burner for proper operation.
- Check the ceramic on the flame rod for any chips or cracks, replace if needed.
- Check the flame rod for build up and clean or replace if needed.
- Make sure the electrode and flame rod are covered with a steady, stable flame, adjust flame rod or electrode if needed.
- Restore power, if flame is still not being proven, replace the control.



**Note:** If Flame LED is flashing slowly, follow these same steps to improve flame signal strength and reliability.

**Normal run mode**



- When the burner lights successfully, turn the thermostat or controller off to end the call for heat.
- The burner should go out quickly. All LEDs on the control should go out.
- If the burner remains lit for more than a few seconds, and the MV LED is out, replace the gas valve.
- If the LEDs remain lit, there is still power to the control, check the thermostat or controller for proper operation.
- Repeat the ignition sequence several times to make sure the system is operating properly.

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3. Write to: R. W. Beckett Corporation, P. O. Box 1289, Elyria, OH 44036

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