

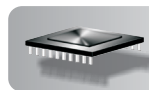


- **Multiple sensor option (1 or 2)**
(Using individual and/or dual sensor assemblies)
- **Easy remote sense**
(Electronic sensors, wired to control)
- **Smart manual reset**
(Manual reset only if operating limit doesn't open)
- **Serviceman reset protection**
(Latch-up after three consecutive lockouts ⁽¹⁾)
- **Power-independent lockout**
(Power cycling won't reset from lockout or latch-up)
- **Diagnostic LED's**
(Power, call for heat, and lockout/latchup)
- **SMC Technology** ⁽²⁾

- (1) Latch-up mode shuts down the control after three consecutive lockouts, and requires a special procedure to reset. This ensures the owner will call in a licensed technician to troubleshoot and correct burner problems.
- (2) The 90000 provides two limit relays. Carlin's patented SMC technology (Safety Monitoring Circuit) monitors the contacts of both relays. Lockout occurs if a limit relay contact is found closed when it should be open.

EZ-Temp[™]

MODEL 90000



Microprocessor
Temperature Controls

Data sheet

Specifications

- Carlin's Model 90000 microprocessor-operated, multiple-contact temperature limit controls are available in four configurations, described below. Each model provides two contacts — one for operating limit and one from high limit.
- Refer to separate product listing sheets for pre-defined models, or request a control to meet your specifications, within the available ranges listed below.

	90000A 90000AL	Dual limit temperature control <ul style="list-style-type: none"> Operating and high limit action Smart manual reset on high limit 2 electronic sensors (operating and high limit) Independent operating limit contact Independent high limit contact
	90000B 90000BL	Temperature limit control <ul style="list-style-type: none"> Operating and high limit action Smart manual reset on high limit 1 electronic sensor Operating and limit contacts in series
	90000C 90000CL	Redundant limit temperature control <ul style="list-style-type: none"> Operating and high limit action Smart manual reset on high limit 2 electronic sensors (operating and high limit) Operating and limit contacts in series
	90000CE 90000CEL	Combination operating limit and manual reset high limit control <ul style="list-style-type: none"> Independent operating and high limit contacts in series 2 electronic sensors (operating and high limit) Lockout on diagnostic failure and limit action Manual reset from lockout High limit test function

Control model		A/AL	B/BL	C/CL	CE/CEL
Control power input (red-white wire)		120 VAC, 11 VA			
Contacts		2 independent	2 in series		
Contact rating		Full load 120 VAC, 10 AMPS Locked rotor 120 VAC, 60 AMPS			
Wires	Quantity	6	3		
	120 VAC Hot / Neutral	red-white / white			
	High limit IN / OUT	black-red / black-yellow	N/A		
	Oper. limit IN / OUT	black-green / black	N/A		
	Limits OUT	NA	black		
Adjustable oper. limit range		Any range between 50°F to 240°F			
Fixed high limit temperature		Any value from 160°F to 240°F			Any value from 160°F to 250°F
Fixed differential (subtractive)		Any value from 5°F to 100°F			
Operating temperature limits		+32°F to +140°F			
Storage temperature limits		-40°F to +185°F			
Agencies		UL Recognized & Listed United States & Canada			

Model 90000A, B, C, & CE diagnostic LED's

GREEN — OFF — ON Power — FLASHING (Slow) Latch-up — FLASHING (Fast) Hi-Test

RED — OFF — ON Lockout

AMBER — OFF — ON Control call for heat

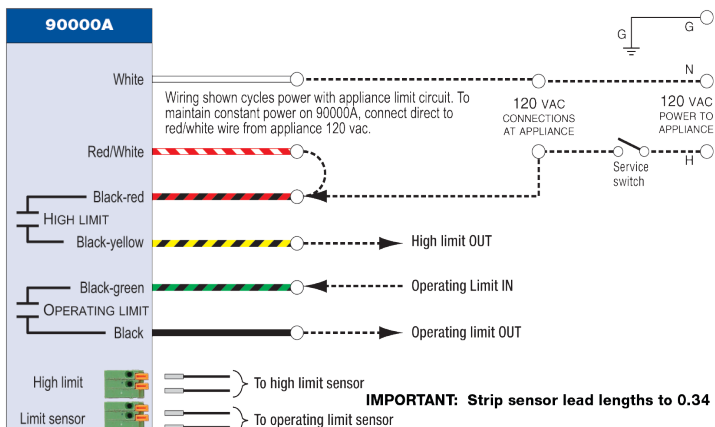
WARNING Electrical shock hazard: Disconnect power to appliance when wiring or servicing any electrical component.

Operation

(See wiring diagrams below for wiring connections.)

- Power OFF** With no power applied to the red-white wire, all lights are off. Power can be wired directly from appliance 120 vac terminal to maintain power at all times. Or jumper red-white wire and black-green wire to cycle power with the appliance limit circuit.
- Power ON** When power is applied to the red-white wire, the green LED turns on.
- Self-test** When power is applied, the 90000 performs a self-test, checking sensor(s) and microprocessor and verifying limit contacts are open. The power-up test lasts from 3 to 5 seconds. The 90000 continues diagnostic checking during the operating cycle as well. Any self-check failure causes a lockout (see below).
- Operate** If the temperature at the operating sensor(s) is below setpoint by at least the fixed differential, the control closes the operating limit contacts. The amber LED turns on.
- Stand-by** When the operating sensor(s) see setpoint temperature or above, the 90000 opens the operating limit contact. The amber LED turns off.
- Limit action** 90000A, B or C: If the high limit sensor(s) see a temperature above high limit setting, the control opens the high limit contacts, turns on the red LED and checks the operating limit contacts. If the operating limit contacts are open, the control will automatically reset when temperature drops below high limit setting minus differential. The high limit contacts close and the red LED turns off. Diagnostic failures invoke "limit action" until cause is cleared.
- Lockout** If the high limit sensor(s) sees a temperature above high limit setting and the 90000A, B, or C model finds the operating limit contacts closed, the high limit contact opens, the red LED turns on and lockout occurs. If the high limit sensor on the 90000CE sees a temperature above the high limit setting, the high limit contact opens, the red LED turns on and lockout occurs. When the temperature drops below high limit setting minus differential, reset the control by pressing the manual reset button. The control will not reset by cycling power off and on.
- Latch-up** If the 90000 locks out three consecutive times, it enters latch-up. Reset from latch-up requires a special procedure, intended to require *licensed serviceman intervention*. During latch-up, the red LED stays on and the green LED flashes slow. Reset as follows:
- Temperature is less than high limit setting minus differential:
- Hold reset button at least 10 seconds. The green LED flashes faster.
- Continue holding button another 20 seconds. The control resets and the red LED turns off.
- "Hi-Test" mode (90000CE ONLY), used to test "High Limit Reset" at operating boiler temperature. Start test with system operational and calling for heat. Turn setpoint full clockwise to Hi-Test position. Green LED flashes fast. The setpoint now adjusts both the high and operating limits. Turn setpoint slowly counter clockwise until Lockout occurs. Now the setpoint temperature equals the hi-limit sensor temperature. Test is complete, adjust setpoint to the desired operating limit. Remove from lockout.

NOTICE Power must flow through the contacts in the direction shown. Changing flow direction will cause the control to lockout or fail to operate.



Configurations

- Control kits** — 90000 controls mount to a standard 4x4 J-box, supplied with the control. Mount the box directly to a well (new or existing) with hardware supplied, or panel mount. See below for dimensions.
- Well kits** — Wells for 90000 sensors are available in the sizes shown below. Well kits include sensor mounting hardware designed to hold sensor securely in position.
- Sensors** — Sensors are available in single and dual configurations.
- Notice: UL-Listed control** — UL-Listed controls are supplied complete with control, J-Box, well, sensor, and mounting hardware.

