



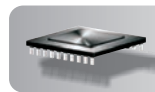
- **Multiple sensor option (3)**  
(Using individual and/or dual sensor assemblies)
- **Sensor Redundancy**  
(Higher temperature of two operating sensors used)
- **Easy remote sense**  
(Electronic sensors, wired to control)
- **Smart manual reset**  
(Manual reset only if operating limit doesn't open)
- **Serviceman reset protection**  
(Latch-up after three consecutive lockouts <sup>(1)</sup>)
- **Power-independent lockout**  
(Power cycling won't reset from lockout or latch-up)
- **Diagnostic LED's**  
(Call for heat, and lockout/latchup)
- **SMC Technology** <sup>(2)</sup>

(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 90320 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<sup>™</sup>

## MODEL 90320




Microprocessor  
Temperature Controls

*with Sensor Redundancy*

Data sheet

### Specifications

- Carlin's Model 90320 microprocessor-operated, multiple-contact temperature limit controls are available as described below. The model provides two contacts — one for operating limit and one for 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.

	<b>90320B</b>	<b>Dual limit temperature control</b> <ul style="list-style-type: none"> <li>• operating and high limit action</li> <li>• smart manual reset on high limit</li> <li>• operating limit sensors, redundant</li> <li>• high limit sensor</li> <li>• operating and limit contacts in series</li> </ul>
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<b>Control model</b>	<b>B</b>	
<b>Control power input</b> (red-white wire)	240 VAC, 50/60 hz, 12 VA	
<b>Contacts</b>	2 in series	
<b>Contact rating</b>	Motor load	240 VAC, 50/60 hz, 1 HP
	General	120/240 VAC, 50/60 hz, 15 AMPS
<b>Wires</b>	Quantity	3
	240 VAC Hot / Neutral	red-white / white
	Limits <b>OUT</b>	black
<b>Adjustable oper. limit range</b>	Any range between 50°F to 240°F	
<b>Fixed high limit temperature</b>	Any value from 160°F to 240°F	
<b>Fixed differential (subtractive)</b>	Any value from 5°F to 100°F	
<b>Operating temperature limits</b>	+32°F to +140°F	
<b>Storage temperature limits</b>	-40°F to +185°F	
<b>Agencies</b>	—	

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**Model 90320 Diagnostic LED's**



		Power Off
		Power On
		No Call for Heat
		Call for Heat
		Lockout
		Latchup, red flashes every 2 seconds
		Primary Relay Warning, red flashes every 5 seconds

**Button Press Instructions**

Up	Reset	Down		
			<b>Display Mode</b>	Quickly press the UP or DOWN button to display temperature.
			<b>Set Temp Mode</b>	Press and hold UP and DOWN buttons for 5 seconds to enter "Set Temperature" mode. Press the UP or DOWN button to increase or decrease the "Set Temperature". Do not press any buttons for 5 seconds to exit the "Set Temperature" mode and save the new temperature.
			<b>Diagnostic Mode</b>	Press and hold UP and DOWN buttons during power up to enter "Diagnostic Mode" mode. Press the DOWN button to move to the next error recorded in the 16 deep error log. When you see an "E --" displayed, you have reached the end of the log. If you press the DOWN button again, you will cycle back to the beginning of the log. Press and hold RESET for 3 seconds to clear all recorded logs.
			<b>Lockout Mode</b>	Press and hold RESET for 5 seconds to exit Lockout.
			<b>Latchup Mode</b>	Press and hold RESET for 30 seconds to exit Latchup.

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

**Operation Modes**

**Power, Off** – (How to enter = No power is applied to the red-white wire)  
 • All lights and screen will be off.

**Power, On** – (How to enter = Power applied to red-white wire)  
 • System will power on and enter NORMAL OPERATION MODE

**Self-test** – When power is applied, the 90320 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 90320 continues diagnostic checking during the operating cycle as well. Any self-check failure causes a lockout (see below). **Call for Heat/High Fire** – When the temperature at the operating sensor is at or below setpoint minus fixed differential, the control powers the limit relay.

**Stand By** – When operating sensor reaches setpoint temperature or above, temp control will turn off the limit relay.

**Normal Operation (Mode)** – (How to enter = Initial starting mode)  
 • The EZ-Temp will display the User Set Temperature.

**Display** – (How to enter = Pressing UP or DOWN key in NORMAL MODE)  
 • In DISPLAY MODE, the EZ-Temp will display current temperature reading for 5 seconds, then return to NORMAL OPERATION

**Setting** – (How to enter = Hold up and down buttons for 3 seconds while in NORMAL OPERATION)  
 • In SETTING MODE, the user is able to adjust the operating limit (via setting the set temperature). Once in this mode, the display will begin flashing the current set temperature. The display will increase one degree per UP or DOWN button push or 10 degrees per second the button is held.

**Diagnostic** – (How to enter = Power up the system with the UP and DOWN buttons depressed. Once buttons are released, the system will move into diagnostic mode)  
 • DIAGNOSTIC MODE displays recorded error codes. When powered in this mode, the display will show the newest recorded error code. As the DOWN key is pressed, the system will display error codes from newest to the oldest. When there are no more codes to display, the

EZ-Temp will show a "—" to indicate end of error codes. If the user continues to push the down button, the system will go back to the newest error code and begin displaying the error codes again from newest to oldest. The only way to exit this mode is to power cycle the system To clear error codes (while in diagnostic mode), push and hold RESET button for 3 seconds.

**High Limit Test** – (How to enter = In NORMAL OPERATION, hold RESET, UP and DOWN buttons for 3 seconds)  
 • During this operation, EZ-Temp will display a flashing 180 (or your current high temp). Pressing the DOWN button adjusts the high limit temperature The high temp will decrease one degree for each press of the DOWN button. If the DOWN button is not pressed for a period of 10 seconds, the unit will return to normal operation. When the high limit is reached, the unit goes into hard lockout and displays the error code. Lockup will follow. Holding the RESET for 3 seconds clears the lockout and returns the high limit to default (180°). If the lockout condition has driven the unit into latchup, the RESET must be held for 30 seconds.

**Soft Lockout** – (How to Enter = When any temperature sensor goes out of range or the system has detected a high temp condition and the primary and safety relays are still operational)  
 • When in this state, it will display the error code but will leave the lockout LED off. If the condition that caused the soft lockout clears, the system will return to normal operation.

**Lockout** – (How to Enter = Numerous Error Codes)  
 • The EZ-Temp will enter this state when an unsafe condition has occurred and the user must intervene and put the system in a safe state. Lockout can be cleared by pressing the RESET button for 3 seconds.

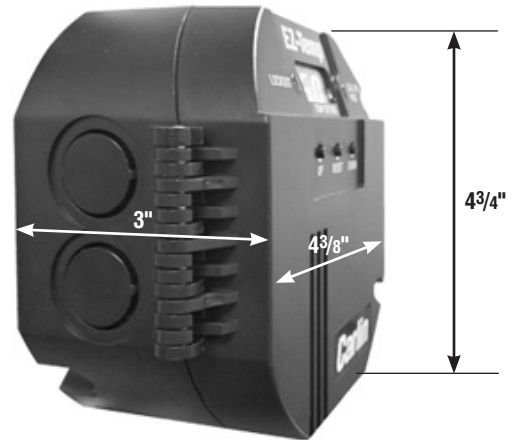
**Latchup** – (How to Enter = Occurs after 3 LOCKOUTS have been detected)  
 • The system will enter a safe mode and will not exit the mode without user intervention. You can exit latchup mode by depressing the RESET button for thirty seconds. By exiting this way, the system will reset the lockout count back to zero.

### Configurations

**Mounting** – 90320 controls mount to any standard well. Mount the 90320 directly to a well (new or existing) with hardware supplied in the separate well mounting kit.

**Well Kits** – Wells for 90320 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 separately for the 90320.



### Error Codes

Error Code	Reason
01	Primary (K2) relay is welded on. <b>Note:</b> If the control is reset from error code 01, the red LED will flash every 5 seconds indicating the control must be replaced.
02	Primary & Safety relays (K1 and K2) on. The control cannot be reset from error code 02 and must be replaced.
03	Primary & Safety relays (K1 and K2) are off. <b>Note:</b> If this error is detected, the control will show error code 03 and enter soft lockout two times to try and resolve the issue. If the problem persists the control will enter hard lockout.
05	Simulated High Temp lockout
06	Temp is above set high temp but below thermistor high (250°F)

Error Code	Reason
20	Temp sensor 1 out of range failure
21	Temp sensor 2 out of range failure
22	High limit temp sensor out of range failure
23	Temp sensor 1 pin is open
24	Temp sensor 2 pin is open
25	High limit temp sensor is open

10, 11, 12, 13, 14, 15	Internal hardware safety failure – unit should be replaced. Contact customer service for additional information. 1-800-989-2275
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# Model 90320 Microprocessor Temperature Controls — Data sheet

