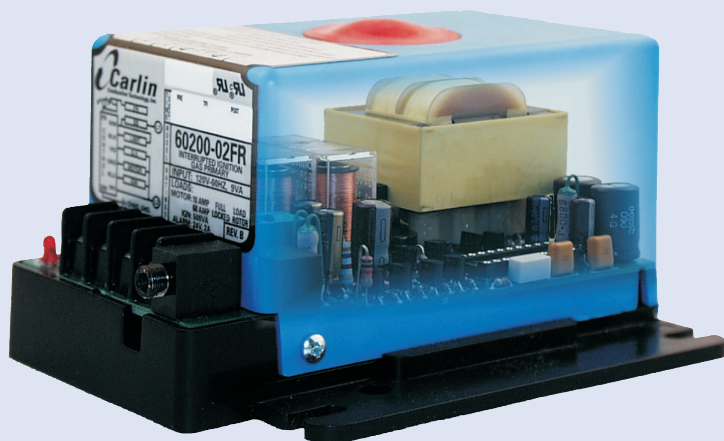


Microprocessor Gas primary control

Data sheet

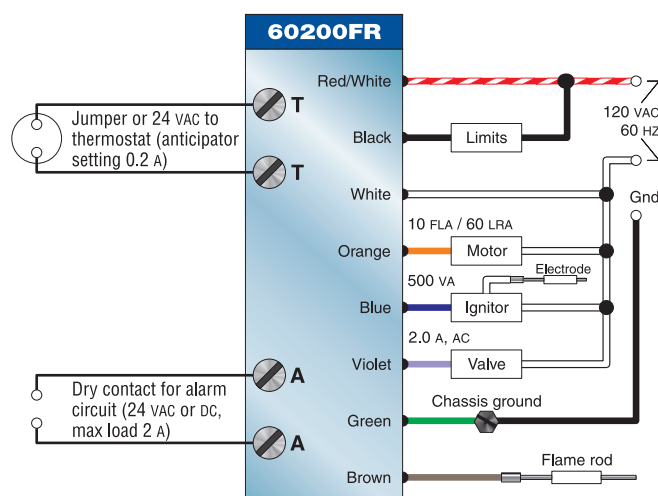


- Interrupted duty ignition
- Recycle on flame failure
(flame failure lockout version also available)
- Serviceman reset protection
(Latch-up after three consecutive lockouts ⁽¹⁾)
- Diagnostic & flame indicator LED's
- Pre-purge and post-purge
(contact Carlin for available timings)
- 2-second ignition establishment period
- 4-second TFI (trial for ignition)(other timings available)
(1.3-second flame failure response time (FFRT))
- Alarm contacts
- Flame signal test jack
- Thermostat/aquastat compatible
- **SMC Technology** ⁽²⁾

Power input (red/white wire)	120 VAC, 60 HZ, 9 VA
Limit circuit input (black wire)	120 VAC, 60 HZ
Motor load	120 VAC, 60 HZ, 10 FLA, 60 LRA
Ignitor load	120 VAC, 60 HZ, 500 VA
Valve load	120 VAC, 60 HZ, 2.0 A
Alarm contacts	24 V, AC/DC, 2.0 A
Operating temperature limits	+32°F to +140°F
Storage temperature limits	-40°F to +185°F
Thermostat anticipator current	0.2 A, AC
Flame current, minimum	0.8 MICROAMP DC
Agencies	UL/CUL recognized

(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 technician to troubleshoot burner problems.

(2) The 60200FR provides two motor relays. Carlin's patented **SMC** technology (*Safety Monitoring Circuit*) monitors the contacts of both motor relays and the gas valve relay. No start-up is allowed if a motor relay contact is found closed when it should be open — or — if the gas valve relay contact shows power when the control starts up. The second motor relay ensures motor shutdown even if the first motor relay fails.



Installing and wiring

Warning — The 60200FR control must be installed and serviced only by a qualified service technician.

1. Always disconnect power source before wiring to avoid electrical shock or damage to the control. All wiring must comply with applicable codes and ordinances.
2. Thermostat terminals (T-T) provide a current source. Never apply external power to these terminals under any circumstances.
3. Alarm terminals provide a 24 vac-rated dry contact, suitable for use with security/fire alarm systems such as Carlin SecureHeat™.

Mounting

- The control may be mounted on a 4" x 4" junction box in any convenient location on the burner, furnace or wall. The location must not exceed the ambient temperature limit, 140°F.

Wiring

- Wiring must comply with local and national electrical codes, and in accordance with the wiring diagram above.

Field checks

1. **Safety timing (TFI) test** — Disconnect flame rod wire from control. Start burner. After the pre-purge period, the control activates ignitor. Control should lockout within TFI timing plus 2 seconds. Replace wire after test.
2. **Flame failure/recycle test** — Start burner. After flame is established (after TFI period), close the gas supply hand valve. This will cause a flame failure sequence as described on the reverse side of this Data sheet. The control should recycle (restart after 65 seconds).
3. If control does not operate as described, check the wiring.

Start-up & operation

WARNING

Do not start the burner if the combustion chamber contains residual gas. Allow gas to disperse.

NOTICE

Per UL requirements, the control will not turn on if the flame rod senses flame during the self-test. If the flame rod senses flame, the green LED turns on. The control will remain in self-test mode until the flame rod no longer senses flame. The amber LED will remain on, but blink off momentarily **A** every 3 to 4 seconds.

NOTICE

Check 60200FR control label for trial for ignition (TFI), pre-purge and post-purge timings.

A R Power ON	Open all manual gas line valves. Close the line switch. (If Red LED turns on constant R , control is in lockout. See below to reset.)
A R Self-test 1	The control performs a “boot-up” test to verify internal operation each time power is applied to the red/white wire. About 4 seconds after power application, the amber LED turns on. The test continues for about 6 more seconds. If the test fails, the control turns the amber LED off and repeats this test sequence until successful.
A R Stand-by	(No call for heat) If Self-test 1 is successful, amber LED turns off and control waits for heat call.
A R Call for heat	Set thermostat (or limit) to call for heat. Thermostat circuit must be closed and power coming to black wire from limit circuit.
Self-test 2	The amber LED turns on. For the first 3 to 4 seconds, the control performs a self-test. If the flame rod senses flame, the green LED turns on. The control repeats the self-test until flame is no longer detected (green LED would turn off). During this time, the amber LED will remain on, but blink off momentarily A every 3 to 4 seconds. If the control detects motor contacts closed, no start-up is allowed.
A R Burner on	After the self-test, the amber LED turns off. The <i>motor</i> starts.
A R Pre-purge	The <i>ignitor</i> starts after the pre-purge period. Two seconds later, the <i>gas valve</i> opens. The 2-second delay (ignition establishment period) helps ensure a stable spark is in place when the gas valve opens (to compensate for sluggish response of some AC ignition transformers).
A R TFI	After gas valve opens, the flame rod must sense flame within the TFI time limit (trial for ignition). The green LED turns on G at the end of the TFI if the flame rod senses flame.
A R G Run	The burner continues firing during call for heat if the flame rod senses flame. Amber and red LED's are off during normal running.
A R G Lockout	If flame rod does not sense flame within the TFI time limit after gas valve activation (TFI), lockout occurs. The control turns the red LED on constant, and closes the <i>alarm</i> contact. Green LED is off.
To Reset	Push in and hold reset button for 1 second, then release.
A R G Latch-up	If the control locks out 3 times during a single call for heat, latch-up occurs. The control turns on both the amber and red LED's constant. You must use the special procedure below to reset the control after latch-up.
WARNING	Reset after latch-up — Only a qualified service technician should attempt to reset the control after latch-up. The problem that caused the repeated burner problems must be corrected before returning the burner to normal operation.
A R G	Push in and hold the reset button for about 10 seconds. The amber and red LED's will begin to flash alternately.
A R G	After the LED's begin flashing, continue to hold the reset button for about another 20 seconds. The LED's will turn off. Release the reset button and the control will restart. (Releasing the button before the LED's turn off will cause the control to remain in latch-up.)
NOTICE	The 60200FR control will not reset from lockout or latch-up if power is interrupted.
A R Flame failure	If the flame rod loses flame signal during operation (after the TFI), the red LED flashes. The <i>gas valve</i> closes within 2 seconds. The <i>motor</i> remains on for the motor delay off period, then shuts off. Recycle: Control waits for 65 seconds (with red LED flashing), then begins again at Self-test 2 . Red LED goes off R . (NOTE: Controls with non-recycle feature will lockout on flame failure. Model 60200FRN only.)
A R Post-purge	Set thermostat (or aquastat) to stop call for heat. The <i>gas valve</i> will turn off within 2 seconds. The <i>motor</i> remains on for the post-purge period, then turns off.
A R Stand-by	Control remains in stand-by mode until limit circuit sends power to the black wire and thermostat circuit closes (call for heat).

Model 60200 diagnostic LED's

A – Amber OFF

R – Red OFF

G – Green OFF

A – Amber ON

R – Red ON

G – Green ON

A – Amber FLASHING

R – Red FLASHING

A – Amber BLINKING (blinks off momentarily every 3 to 4 seconds)

Service & Troubleshooting

Burner (control) will not come on

A R

No power to control

- Check line voltage to the control (at least 95 vac).
- Check all electrical connections.

A R

Control is in lockout

- Red LED will be on. Press the reset button for 1 second.
- If the control returns immediately to lockout: Use a voltmeter to check power to the gas valve. (Also check the power to the valve after resetting control and attempting another start.) The control may have detected power on the valve relay contact. If the gas valve wire shows 120 vac, check wiring to make sure wiring is correct and there is no external power feed to the valve. Correct wiring if needed. If the voltmeter shows no power to the valve, the circuit may have an internal control problem. Replace the control.

A R G

Flame rod sensing flame

- Amber LED blinks off each 3 to 4 seconds; green LED on. Remove flame rod lead from rod.

If the amber LED **remains on** **A** with a wire detached, the control is defective.

If amber and green LED's **go off** **A**, control is OK, and either the rod is defective or there is a problem with the rod wiring.

To troubleshoot:

- Check flame rod by using an ohmmeter to check resistance from flame rod to ground — should be at least 1 MEGOHM.
- Connect a flame simulator to the control flame rod lead. If green LED turns on, flame rod assembly is defective. Replace assembly.

Repeated flame failures (**A R** flashing red LED)

Check for:

- Defective flame rod assembly
- Excessive airflow or draft causing flame to leave burner head — Check for proper air band setting and draft.
- Excessive back pressure causing flame to be erratic — Check appliance and flue for sooting/plugging.

Control locks out after TFI (**A R** red LED on)

Check for:

- No gas to burner — Check gas supply and lines. Verify gas pressure is no higher than allowed for gas valve (usually ½ psig maximum).
- Shorted electrode — Inspect for cracked porcelain and replace as needed.
- Poor spark — Check electrode spacing and condition per burner manual. Replace or realign if necessary.
- Airflow too high — Check air band setting.
- Ignitor module defective — Replace if no spark.
- Flame rod defective or shorted to burner chassis.
- Gas valve stuck in closed position. Check wiring connections. Replace as necessary.
- Reversed 120 vac polarity — Make sure the hot and neutral lines are not reversed at power entrance.