RAYPAK REPLACEMENT INSTRUCTIONS

P.C. BOARD, TEMPERATURE CONTROL & SENSOR (KIT #010253F) FOR ALL DIGITAL GAS POOL HEATERS (SEE “SCOPE” FOR APPLICABLE MODELS)

IMPORTANT NOTICE
These instructions are intended primarily for use by qualified personnel specifically trained and experienced in the installation of this type of heating equipment and related system components. Installation and service personnel may be required to be licensed in some states. Persons not qualified shall not attempt to install this equipment nor attempt repairs according to these instructions.

DANGER - SHOCK HAZARD
Make sure electrical power to the heater is disconnected to avoid potential serious injury or damage to components.

DANGER - PROPANE HAZARD
Make sure to determine if unit is propane and see special instructions on page 6.

SCOPE:
This version of the temperature control board has the capability of an integrated ignition module plus 3-wire temperature sensor. The kit includes a gasket and a plastic shield that is mounted to the back side of the control panel to eliminate moisture accumulation on the LCD display. It is a direct replacement for the following models: 185A, 185B, 206A, 207A, 265A, 265B, 266A, 267A, 335A, 335B, 336A, 337A, 405A, 405B, 406A, 407A.

DANGER - PROPANE HAZARD
Make sure to determine if unit is propane and see special instructions on page 6.

This kit includes

<table>
<thead>
<tr>
<th>(1) P.C. control board</th>
<th>(1) PC board plastic shield</th>
<th>(2) Brackets</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Temperature sensor</td>
<td>(6) Plastic #8 washer</td>
<td>(1) LCD Gasket</td>
</tr>
<tr>
<td>(1) Remote wire harness</td>
<td>(1) Hi tension wire extension</td>
<td>(4) Screws #6 X 3/8&quot;</td>
</tr>
<tr>
<td>(6) Screws #8 X 1/2&quot;</td>
<td>(2) Screws #10 X 1/2&quot;</td>
<td>(1) Instructions</td>
</tr>
</tbody>
</table>

MODELS

**MODELS**

### 185A, 265A, 335A, 405A

Serial #9811 to #0310

### 185B, 265B, 335B, 405B

Serial #0310 to #0410


Produced Oct. 2004-Current
Serial #0410 - Current

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Technical support is available M-F, 5:30 AM to 5:00 PM PST, at 800-947-2975 or 800-627-2975
ACCESSING THE BOARD - MODELS 185A/B, 265A/B, 335A/B, 405A/B:
1. Turn off the power to the heater.
2. Turn off the gas to the heater.
3. Remove front door.
4. Remove the four screws on the side of the heater holding the control panel. See Fig. 1 and Fig. 2.
5. Lay control panel forward toward you to access the back of the temperature control board.

1. Turn off the power to the heater.
2. Turn off the gas to the heater.
3. Remove front door by removing the large door screw shown in Fig. 3.
4. Remove the four screws on the side of the control panel. See Fig. 5 and Fig. 6.
5. Lay control panel forward toward you to access the back of the temperature control board.
REMOVING THE CIRCUIT BOARD - MODELS 185A/B, 265A/B, 335A/B, 405A/B:
Make sure the power and gas are off.
1. Unplug all connectors from old circuit board. Fig. 7.
2. Unplug keypad ribbon from old circuit board.
3. Remove four screws as shown in Fig. 8.
4. Remove old circuit board.

![Diagram of circuit board showing connectors, keypad ribbon, and screws to be removed.](image-url)
Make sure the power and gas are off.
1. Unplug all connectors from old circuit board. Fig. 9.
2. Unplug keypad ribbon from old circuit board.
3. Remove screws as shown in Fig. 10.
4. Remove old circuit board.
DISCONNECTING IGNITION CONTROL - MODELS 185A, 265A, 335A, AND 405A ONLY:

Make sure the power and gas are off.

1. Unplug all wires and connectors from ignition control. (See Fig. 11.)

Note: The ignition control is now part of the new control circuit board. Old module can be left in place but not used.
PROPANE HEATERS ONLY:

Make sure the power and gas are off.

1. Locate the propane tab on the board as shown in Fig. 12.
2. Break off tab with pliers as shown in Fig. 13 & Fig. 14.
MODELS 185, 265, 335 & 405, A & B SERIES, LOW NOX ONLY:

Make sure the power and gas are off.

1. **DO NOT** break tab See Fig. 15 and Fig.16.
2. No additional wiring or connections are necessary.

Fig. 15

![Diagram showing DO NOT break tab]

Fig. 16

![Diagram showing area of interest]
LOW NOX MODELS 207A, 267A, 337A & 407A:

Make sure the power and gas are off.

1. Locate Lo Nox tab and P-10 air switch terminal on the board as shown in Fig. 17 and Fig. 18.
2. Break off tab shown in Fig. 19 with pliers.
3. Attach the wire from the air switch to the P-10 location shown in Fig. 20.
NEW CIRCUIT BOARD & GASKET INSTALLATION USING OLD BEZEL - MODELS 185, 265, 335 & 405, A & B SERIES:

Make sure the power and gas are off.

**Note:** Disregard window gasket installation if already present.

1. Remove backing on gasket and install adhesive side on the control panel bezel as shown in Fig. 21.
2. Re-assemble with new board to plastic bezel using the three mounting screws as shown in Fig. 22 & Fig. 23.

Make sure the power and gas are off.

**Note:** Disregard window gasket installation if already present.

1. Remove backing on gasket and install adhesive side on the control panel bezel as shown in Fig. 24 & Fig. 25.
2. Re-assemble with new board to plastic bezel using the three mounting screws as shown in Fig. 26.
REMOVING & REPLACING SENSOR - MODELS 185, 265, 335 & 405, A & B SERIES:

Make sure the power and gas are off.

1. Loosen drain plug to relieve pressure in heat exchanger. See Fig. 27.
2. Remove five screws and in/out access panel as shown in Fig. 28.
3. Re-route the 2-wire sensor connector from the board (P1) back towards the in/out header.
4. Unscrew compression nut and loosen compression fitting to replace old sensor with new sensor. See Fig. 29.
5. Install new sensor and tighten compression fitting and compression nut.
6. Re-route the new 3-wire sensor connector back to the board.
7. Plug the 3-wire sensor connector to its correct location, P1, shown in Fig. 30 and close up in Fig. 31.
PLASTIC SHIELD & BRACKET INSTALLATION - MODELS 185, 265, 335 & 405, A & B SERIES:

Make sure the power and gas are off.

1.  Note that the plastic shield is installed under the front bracket as pictured.  
    Install the shield brackets and plastic shield using the existing screws on the control panel as shown in Fig. 32.

2.  Reconnect the wire harnesses to the board.  
    (Note the location of the clear plastic strip with the thin connector. This is sometimes disconnected when there is a remote control in the system.  
    Refer to the remote wiring instructions for further details.)  
    Note: Make sure 3-wire sensor plug is connected.

3.  Install the plastic shield over the board and attach to the brackets using the screws and washers provided in the kit.  See Fig. 33 and Fig. 34.

4.  Re-install the sheet metal panel holding the board back into the heater.

5.  Go to remote operation instructions.

   OR

   Return the control panel to the upright position and re-attach using the screws previously removed.

Fig. 32

Fig. 33

Fig. 34
INSTALLING PILOT HI TENSION: 206 TO 267A:

Ensure the power and the gas has been shut off.
1. Re-connect pilot wire (side B) to new board. See Fig. 35.

INSTALLING PILOT HI TENSION WIRE EXTENSION SIZES 335A TO 407A:

Ensure the power and the gas has been shut off.
1. Re-connect pilot wire (side B) to new board with new extension Fig. 36 & Fig. 37.
2. Connect side ‘A’ to existing pilot wire and center protective sleeve over connection.
DIGITAL THERMOSTAT CONTROLS

Thermostat operation
Your heater is equipped with a microprocessor-controlled thermostat that controls the pool or spa temperature by measuring the temperature of the water coming back through the heater. It will then monitor the water temperature and turn the heater back on when it senses that the water temperature is falling below the set point. It is normal to experience small fluctuations in the return water temperature during the operation of the heater. The thermostat is calibrated with a very narrow tolerance to ensure accuracy of the set temperature. Thus, slight fluctuations in water temperature may cause your heater to cycle on and off frequently. This is not a problem. It will not harm the heater nor interfere with the thermostat's ability to precisely control the temperature of the pool or spa.

THERMOSTAT CONTROL OPERATION
The pool heater thermostat, located on the upper front panel of the heater, controls the pool/spa water temperature. This control center contains a mode button, up and down temperature adjustment buttons, and an LCD display.

Mode Button
The MODE button functions as a means to turn the heater off or on in either the POOL or SPA setting. The LCD display indicates the mode the heater is in and the actual water temperature.

Temp Buttons
If the heater is in POOL or SPA mode, the desired water temperature (SETPOINT) will also be displayed and may be changed using the UP or DOWN buttons. A manual toggle switch is also provided right below the MODE button to allow the heater to be turned off.

Operation
In the POOL or SPA modes, the actual water temperature is displayed along with the desired water temperature (SETPOINT). If the heater is firing, a flame icon will be visible.

To adjust the setpoint temperature, make sure the control is in the appropriate mode (POOL or SPA) and push the UP or DOWN buttons.
Program Button
1) To access the program screen, press the Mode button until the display reads OFF. Remove the four screws holding the control cover on. Swing control panel down so the back side of the board is visible (see page 30). Locate the Program Mode button as shown in the figure on pg. 32. Press the program button (5-7 seconds) until SETdef appears on the digital display. Release the program button.

2) Press the Mode button sequentially until the desired program event is reached. There are 5 different events that can be programmed. They appear in the sequence listed below:

- **SET def**
  - Resets board to factory default settings.

- **RES FL**
  - Resets faults in the History File.

- **F/C FFF**
  - Change from Fahrenheit to Celsius.

- **SET SP**
  - SPA setpoint maximum adjustment.

- **SET POOL**
  - POOL setpoint maximum adjustment.

SET def – Default Settings
Refer to step one above to access the program screen. SET def should appear on the screen. If not, press the Mode button until SET def appears on the digital display. Press and hold both “UP” and “DOWN” buttons for 5-7 seconds until 3 dashes (---) appear. This operation resets the operating program to its factory default values. Both the POOL and SPA setpoints will revert to 65°F (18.5°C) and both POOL and SPA maximum temperature settings will be 104°F (40.0°C). Once this is done, reassemble the control panel.

F/Cff – Fahrenheit to Celsius
Refer to step one above to access the program screen. Press the Mode button until F/Cff appears on the digital display. The digital display is capable of displaying Celsius as well as Fahrenheit temperatures. The “UP” or “DOWN” buttons will select “F” or “C” on the temperature display. Choose the desired temperature scale. Once this is done, reassemble the control panel.

SETspa 104 – SPA Set Point Maximum Adjustment
Refer to step one above to access the program screen. Press the Mode button until SETspa 104 appears on the digital display. Using the “UP” and “DOWN” buttons will change the Maximum Temperature Setting to your desired value. The control can be set for a maximum of 107°F. Once this is done, reassemble the control panel.

SETpool 104 – POOL Set Point Maximum Adjustment
Refer to step one above access into the program screen. Press the Mode button until SETpool 104 appears on the digital display. Using the “UP” and “DOWN” buttons will change the Maximum Temperature Setting to your desired value. The control can be set for a maximum of 107°F. Once this is done, reassemble the control panel.

RESfl – Reset Fault History
Refer to step one above to access the program screen. Press the Mode button until RESfl appears on the digital display. Press and hold both “UP” and “DOWN” buttons for 5-7 seconds until 2 dashes (--) appear. This operation resets the Fault History file to “0” and clears all the stored faults. Once this is done, reassemble the control panel.
NOTE: The LCD temperature display may not agree with the temperature reading of your pool or spa thermometer. The heater reads the water temperature at the inlet. Due to the circulation characteristics of any pool or spa, the water temperature at the inlet to the heater may differ from that observed at a given location in the pool or spa.

### DIAGNOSTICS
The digital thermostat models are equipped with onboard diagnostic controls. If there is a safety fault, a fault code will be displayed along with a service indication.

If the PRS fault code is displayed, it indicates there is insufficient water flow through the heater. Make sure the pool filter and pump strainer are clean before calling a service representative.

### READING A FAULT
The word “SERVICE” will flash on and off if the PC board detects a known fault. The fault will be displayed in three big letters on the lower left of the display.

### STATUS CODES

<table>
<thead>
<tr>
<th>Display</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFH</td>
<td>Call for heat</td>
</tr>
<tr>
<td>CLK</td>
<td>Time clock</td>
</tr>
<tr>
<td>EOL</td>
<td>End of line test (Factory Use Only)</td>
</tr>
<tr>
<td>LON</td>
<td>Low NOx Unit</td>
</tr>
<tr>
<td>LOW</td>
<td>Caution low water temperature</td>
</tr>
<tr>
<td>OFF</td>
<td>Off mode</td>
</tr>
<tr>
<td>PRO</td>
<td>Propane gas configured</td>
</tr>
<tr>
<td>REM</td>
<td>Remote control activated</td>
</tr>
<tr>
<td>SPK</td>
<td>Spark</td>
</tr>
<tr>
<td>SPR</td>
<td>Spare fault code indicator</td>
</tr>
</tbody>
</table>

### PROGRAM MODES

<table>
<thead>
<tr>
<th>Display</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCC</td>
<td>Celsius setting</td>
</tr>
<tr>
<td>F/C</td>
<td>Change from Fahrenheit to Celsius</td>
</tr>
<tr>
<td>FFF</td>
<td>Fahrenheit setting</td>
</tr>
<tr>
<td>RES</td>
<td>Reset defaults</td>
</tr>
<tr>
<td>SET</td>
<td>Set point max adjustment</td>
</tr>
</tbody>
</table>

### FAULT CODES

<table>
<thead>
<tr>
<th>Display</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD1</td>
<td>Board failure</td>
</tr>
<tr>
<td>EEP</td>
<td>Microprocessor error</td>
</tr>
<tr>
<td>FAN</td>
<td>Blower pressure failure</td>
</tr>
<tr>
<td>FFL</td>
<td>Flame sensing when pilot and gas valves are closed</td>
</tr>
<tr>
<td>GVC</td>
<td>Gas valve closed</td>
</tr>
<tr>
<td>GVO</td>
<td>Gas valve open</td>
</tr>
<tr>
<td>HL1</td>
<td>High limit switch #1 open</td>
</tr>
<tr>
<td>HL2</td>
<td>High limit switch #2 open</td>
</tr>
<tr>
<td>IGN</td>
<td>Ignition failure</td>
</tr>
<tr>
<td>ILO</td>
<td>Ignition lockout</td>
</tr>
<tr>
<td>PLT</td>
<td>Pilot failure</td>
</tr>
<tr>
<td>PRS</td>
<td>Water pressure switch open</td>
</tr>
<tr>
<td>ROL</td>
<td>Heat roll-out safety switch open</td>
</tr>
<tr>
<td>SNS</td>
<td>Sensor failure</td>
</tr>
<tr>
<td>VNT</td>
<td>Vent switch open</td>
</tr>
</tbody>
</table>
**REMOTE CONTROL INSTALLATION AND OPERATION**

**CAUTION:** Before installing remote controls to the digital thermostat model heaters read the following:

The digital thermostat model is remote-ready in most cases. The digital liquid crystal display (LCD) shows the actual pool temperature, operating status, and service codes (See examples below). The touch pad on the control panel allows you to select the desired pool or spa temperature. It also indicates when a remote system is controlling the heater by displaying REM in the display. When connecting the heater to a remote system, identify whether it is a two- or three-wire remote system. Select the appropriate instruction listed below to properly install the remote to the heater.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>Heating in the POOL Mode</td>
</tr>
<tr>
<td>SPA</td>
<td>Heating in the SPA Mode</td>
</tr>
<tr>
<td>REM</td>
<td>Remote Mode</td>
</tr>
</tbody>
</table>

**ACTIVATING THE REMOTE**

The digital thermostat heaters have the ability to disconnect from the remote if it is wired to. To activate or deactivate the remote follow these steps:

Press and hold all three buttons for 5 to 7 seconds.

The digital display format will change and indicate REMoFF or REMon.

**NOTE:** When in remote operation, the keypad mode and temp buttons are disabled. Remote will flash even when the unit is off.

**ATTENTION**

**OBSERVE PRECAUTIONS ELECTROSTATIC SENSITIVE DEVICES**

*Note:* Electrostatic Discharge (ESD) damage can be caused by direct or indirect contact with the wiring or circuit board. When one walks to the heater area, an electrostatic charge accumulates on the body. Contact of a finger allows the body to discharge, possibly causing device damage. This damage can be limited if the service person discharges himself, following ESD preventive/removal practices, and holds on to the heater enclosure for 5 seconds before proceeding.
**REMOTE CONTROL WIRING**

**Important Installation Notes for Remote or External Wiring Configuration**

- Remote wiring must be run in a separate conduit.
- Remote wiring must not be run parallel to high voltage lines.
- For runs of under 30 feet, remote wiring should have stranded conductors with a minimum of 22 AWG, 600V, cable twisting 1.5 to 2.5 in. lay and jacketed.
- For runs over 30 feet, the conductors should be a minimum of 20 AWG, 600V, cable twisting 1.5 to 2.5 inch lay that is shielded and jacketed.
- Maximum cable length is 200 feet.
- For both two- and three-wire remote systems, the provided 7-pin wiring connector must be utilized. Please refer to the wiring instructions.

**Note:** The remote wires must be connected to the 7-pin connector **before** the connector is plugged into the board.

### 2-Wire Remote Control (On-Off)

This application assumes that only one heating function (pool or spa) is required.

1. Turn on power to the heater.
2. For a 2-Wire Remote Control from a remote **without** its own sensor, push the mode button to the “POOL” or “SPA” mode and set the desired setpoint (eg. 102°F for spa).
3. For a 2-Wire Remote Control from a remote **with** its own sensor, push the mode button “POOL” or “SPA” mode and set the temperature to the highest setting available on the control. The actual setpoint will be controlled by the remote control.
4. Turn the mode button to “OFF” and remove power from the heater.
5. On the “Remote Interface Harness”, connect the BLUE wire to one side of the “REMOTE” switch and connect the other side to either the ORANGE/BLACK wire for “SPA” operation or the BLACK/ORANGE wire for “POOL” operation.
6. Attach wire nut on unused wire to the “Remote Interface Harness.”
7. Install the “7-Pin Remote Interface Harness” to the P8 connector and turn power “On” to the heater.

**See instructions on previous page to activate the remote control.**

### 3-Wire Remote Control Using Three-Position Switch (Pool-Off-Spa, or Low-Off-High)

This application assumes that both heating functions (pool and spa) are required.

1. Turn on power to the heater.
2. Push the mode button to the “POOL” or “SPA” mode and set the desired temperature for each (eg. 80°F for Pool and 102°F for Spa).
3. Turn the mode button to “OFF” and remove power from the heater.
4. On the “Remote Interface Harness” connect the BLUE wire to one side of the “REMOTE” switch and connect the ORANGE/BLACK wire for “SPA” operation and the BLACK/ORANGE wire for the “POOL” operation.
5. Install the “Remote Interface Harness” to the P8 connector and turn power “ON” to the heater.

**See instructions on previous page to activate the remote control.**