

# GL8000 Mach 3 Tech Sheet

## Balboa Instruments System PN 55470

System Model # GL8-GL8000M3-RCA-3.0

Software Version # 30

EPN # 2817

Base PCBA – PN 53860-03

PCB GL8000 – PN 22960 Rev B or C

HEX File – 10013930

Base Panels

ML900 – PN 52654-01



# System Revision History

System PN	EPN	Date	Requested By	Changes Made
55470	2817	04.07.2008	Balboa	New system

# Basic System Features and Functions

## Power Requirements

Single Service [3 wires (line, neutral, ground)]

- 230VAC, 50Hz, 1~, 16A/32A, (Circuit Breaker rating = 20A/40A max.)

Dual Service [5 wires (line 1, neutral 1, line 2, neutral 2, ground)]

- 230VAC, 50Hz, 1~, 2x 16A, (Circuit Breaker rating = 20A max each service.)

3-Phase Service [5 wires (line 1, line 2, line 3, neutral, ground)]

- 400VAC, 50Hz, 3N~, 16A, (Circuit Breaker rating = 20A max each phase line.)
- **IMPORTANT** - Service must include a neutral wire, with a line to neutral voltage of 230VAC.

## Setup 1 (As Manufactured)

- 230V Pump 1, 2-Speed
- 230V Pump 2, 2-Speed
- 230V Pump 3, 2-Speed
- 230V Blower, 1-Speed
- 230V Ozone
- 230V Fiber-optic Light
- 10V Spa Light
- 230V Audio\Visual (Stereo)
- 3.0kW Titanium Heater \*

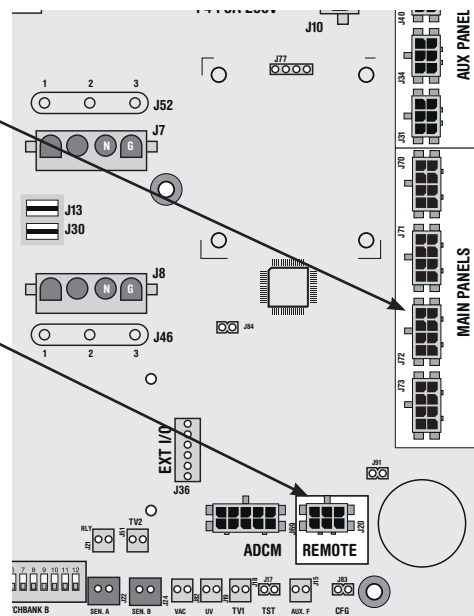
## Optional Devices

- 230V Circ Pump
- 230V Mister

\* Heater wattage is rated at 240V.

## Additional Options

- Full Feature Dolphin Remote and Spa-only Dolphin Remote
- Spa Monitor  
Connects to Main Panel terminal J70, J71, J72, or J73
- IR or RF Dolphin Receiver Modules  
Connects to Remote terminal J20
- Ozone Generator  
Connects to terminal J4
- MoodEFX Lighting  
Connects to Spa Light terminal J10
- FiberEFX Lighting  
Connects to Spa Light terminal J10
- Stereo System  
Connects to A.V. terminal J5



# Persistent Memory and Powering Up

Any time you change DIP Switches or Software Configuration Settings that affect parameters the user can change (any filter settings, set temperature default, Celsius vs Fahrenheit, 12-hour vs 24-hour time, reminders suppression, etc), you must reset Persistent Memory for your DIP Switch or Software Configuration Settings changes to take effect. You should also reset Persistent Memory after loading a new file into a board (using the ESM, purchased separately).

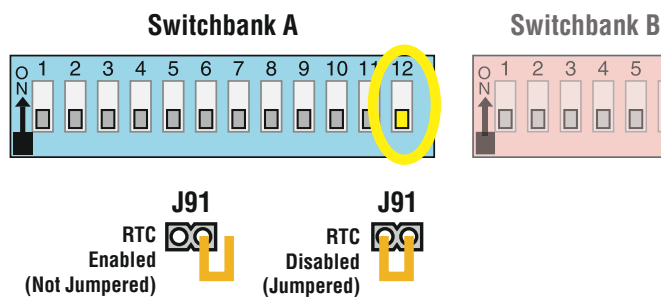
## To reset Persistent Memory:

- Power down.
- Set A12 ON (See illustration below).
- Power up.
- Wait until “P” or “PRIMING MODE” is displayed on your panel.  
Note: If “CFE” appears see section below.
- Set A12 OFF. (This can be done safely with power on if you use a non-conductive tool such as a pencil to push the switch back to the OFF position. Otherwise, power down before setting A12 OFF)
- Power up again (if you powered down in the previous step).
- For all other power ups, leave A12 OFF

## About Persistent Memory and Time of Day Retention:

This system uses memory that doesn't require a battery to store a variety of settings. What we refer to as Persistent Memory stores all the User Preferences, as well as all the filter settings, the set temperature, and the heat mode.

Persistent Memory is not used for Time of Day. Time of Day needs to be “kept running” (not just stored) while the power is off, so a separate Real Time Clock feature (on all models except the EL1000) keeps track of Time of Day while the unit is off. Time of Day Retention, and Time of Day Retention alone, is controlled by the J91 jumper. J91 must be set according to main system panel used.



## CFE message on power up:

If “CFE” appears before (and instead of) “P” or “PRIMING MODE”, you have not configured DIP Switches and/or Software Configuration Settings in a valid manner. This must be corrected before you can reset Persistent Memory.

The switch numbers, jumpers, or configuration settings displayed after “CFE” are ones with which the system has found a configuration problem. For example:

- “CFE A5 B2” would mean that the combination of how you've set A5 and how you've set B2 is not supported on this system.
- “CFE J99” would mean that there is a problem with jumper J99
- “CFE P3 1 BL 1” would mean that the combination of how you've set pump 3 for 1-speed and blower for 1-speed is not supported on this system.
- “CFE P3\_ BL\_” would mean that the combination of how you've set DIP switches which have been assigned to pump 3 and blower is not supported on this system.

## Power Up Display Sequence

Upon power up, you should see the following on the display:

- Three numbers in a row, which are the SSID (the System Software ID). The third display of these numbers is the Software Version, which should match the version of your system. For example, if these three numbers are 100 134 26, that is a Mach 3 EL8000 at version 26.
- If there is a Configuration Error, the CFE message (see above) will appear at this point (and none of the messages below will display). Otherwise what comes next is:
- An indication of either the input voltage detected (EL1000/EL2000), or the heater wattage range supported (EL8000/GL2000/GL8000).
  - Heater wattage display: “1-3” means the system supports a heater from 1 kW to 3 kW. “3-6” means the system supports a heater from 3 kW to 6 kW. “3-3” means the system supports a 3 kW heater only. (These ranges may be modified slightly in the case of special heaters, which the next bullet covers.)
  - Input voltage display: A system showing “240” supports 3 kW to 6 kW heaters. A system showing “120” supports the very same heaters, although at 120V those heaters will function at only 1/4 of their 240V rated wattage. (The system shows only either “240” or “120” as a general indication of input voltage; it does not show the actual input voltage.)
- If your system is using a special type of heater, a display such as “H 6” may appear next. If your system is using the generic Balboa heater, no heater type display will appear.
- “P” or “PRIMING MODE” will appear to signal the start of Priming Mode.

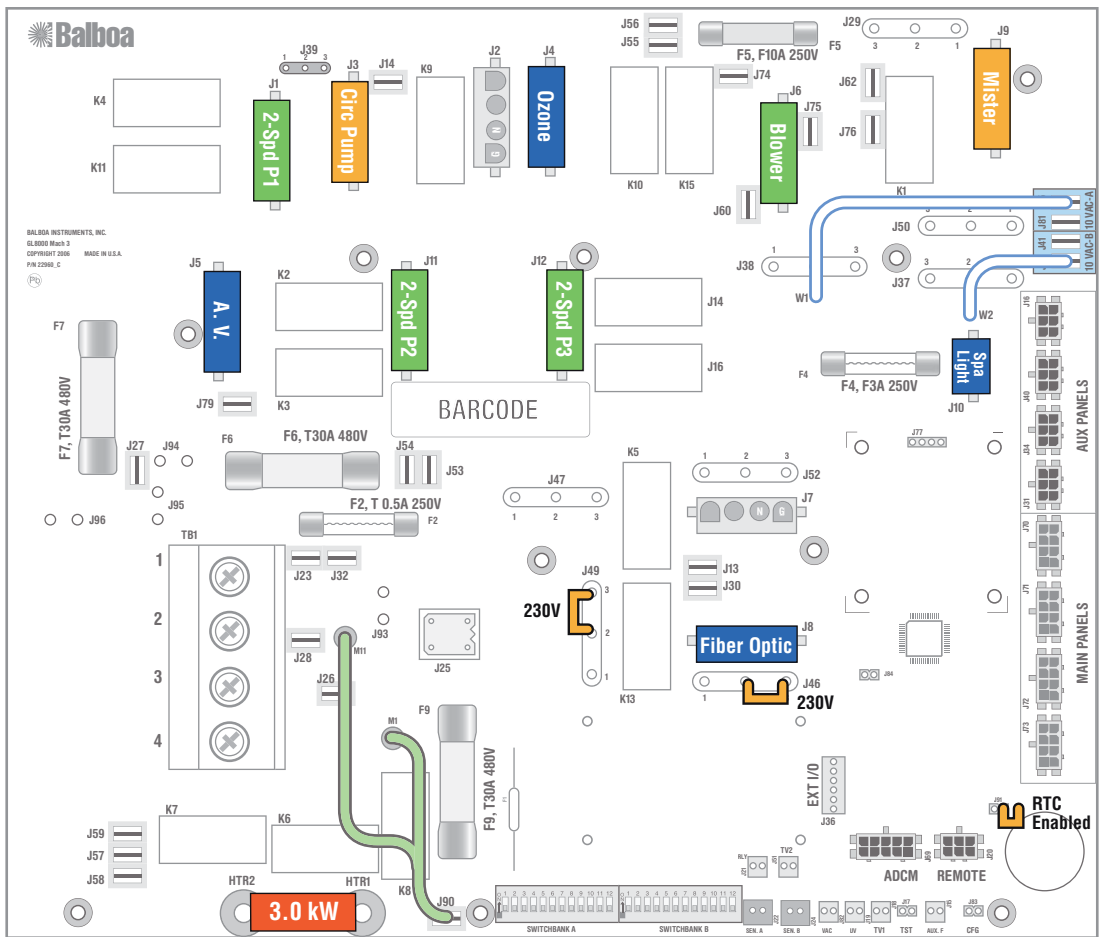
At this point, the power up sequence is complete. Refer to the User Guide for the ML Series panel on your system for information about how the spa operates from this point on.

# Wiring Configuration and DIP Settings

## Setup 1 (As Manufactured)

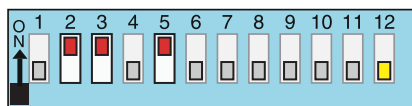
- 230V Pump 1, 2-Speed
- 230V Pump 2, 2-Speed
- 230V Pump 3, 2-Speed
- 230V Blower, 1-Speed
- 10V Spa Light
- 230V Ozone
- 230V Fiber w/Wheel
- 230V A/V (Stereo)
- 3.0kW Titanium Heater
- ML900 Main Panel
- 230V Circ Pump (opt)
- 230V Mist (opt)

**HiPot Testing Note:**  
 Disconnect slip terminal with green wires from J90 prior to performing HiPot test. Failure to disconnect will cause a false failure of the test.  
 Reconnect terminal to J90 after successful completion of HiPot test.



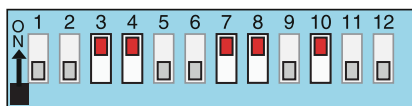
**WARNING:** Main Power to system should be turned OFF BEFORE adjusting DIP switches.  
**WARNING:** Persistent Memory (A12) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

### Switchbank A



- A1, Test Mode OFF
- A2/A3, Four H.S. Pumps w/Heater
- A4, 12 Hour Time
- A5, Degrees C
- A6, Short Timeouts
- A7, Cleanup Cycle OFF
- A8, 1Hr O<sub>3</sub> Disable OFF
- A9/A10, No Circ Pump
- A11, Ozone w/P1 low
- A12, Memory ON**

### Switchbank B



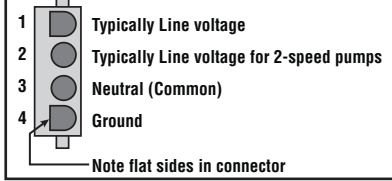
- B1, Pump 2 2-Speed
- B2, N/A
- B3, Blower ON
- B4, F/O Light ON
- B5, Option OFF
- B6, Scrunching OFF
- B7, Spa Light On/Off
- B8, Spa Light Button
- B9, Pump 3 2-speed
- B10, Pump 3 Enabled
- B11, Mister Disabled
- B12, Mist Aux Pnl OFF



### Wiring Color Key

- Neutral (Common) AC Connections
- Special AC Connections
- Line AC Connections
- 10 Volt Connections
- Relay Control Wires

### Board Connector Key



# DIP Switches and Jumper Definitions

**WARNING:**

- Setting DIP switches incorrectly may cause abnormal system behavior and/or damage to system components.
- Refer to Switchbank illustration on Wiring Configuration page for correct settings for this system.
- Contact Balboa if you require additional configuration pages added to this tech sheet.

**DIP Switchbank A Key**

- A1 ..... Test Mode (normally Off)
- A2 and A3 ..... Control amp draw requirements. See **Table 1**
- A4\* ..... In “ON” position, displays time in 24 hours (military\European time)  
 ..... In “OFF” position, displays 12 hour time
- A5\* ..... In “ON” position, displays temperature in Celsius  
 ..... In “OFF” position, displays temperature in Fahrenheit
- \* Sets default for user preferences - only applies when persistent memory is reset (A12 On) during power-up
- A6 ..... In “ON” position, Equipment timeout 30 minutes (4 hours for Pump 1 Low)  
 ..... In “OFF” position, Equipment timeout 15 minutes (2 hours for Pump 1 Low)
- A7 ..... In “ON” position, Cleanup Cycle – 30 minutes after spa use/timeout, Pump 1 Low & Ozone run for 1 hour  
 ..... In “OFF” position, NO Cleanup Cycle
- A8 ..... In “ON” position, Ozone suppressed for 1 hour after pump or blower button press  
 ..... In “OFF” position, NO Ozone suppression
- A9 and A10 ..... Circ Pump Behavior settings. See **Table 2**
- A11 ..... In “ON” position (*non-circ mode operation*) Pump 1 is two-speed, Ozone is ON in Filter & Cleanup Cycles only (*in any circ mode*), Pump 1 is one-speed, Ozone is ON with Circ Pump  
 ..... In “OFF” position (*non-circ mode operation*) Pump 1 is two-speed, Ozone is ON with Pump 1 Low (*in any circ mode*) Pump 1 is two-speed, Ozone is ON with Circ Pump
- A12 ..... Persistent Memory Reset (used when the spa is powering up)

Table 1		# of Hi-Speed Pumps/Blower Before Heat Disabled
A2	A3	
OFF	OFF	0
ON	OFF	1
OFF	ON	2
ON	ON	Up to 4

Table 2		Circ Pump Behavior
A9	A10	
OFF	OFF	No Circ Pump
ON	OFF	24 Hr
OFF	ON	24 Hr w/3°F Shut-Off
ON	ON	Acts like Pump 1 Low (Filter Cycles, Polls)

**DIP Switchbank B Key**

- B1 ..... In “ON” position, single-speed Pump 2  
 ..... In “OFF” position, two-speed Pump 2
- B2 ..... N/A
- B3 ..... In “ON” position, Blower is enabled  
 ..... In “OFF” position, Blower is disabled
- B4 and B8 ..... Fiber Optic and Color wheel control; Spa Light Enable  
 Note: The Light button on an ML900 panel is a SpaLight button. The Light button on most other panels is an EitherLight button.
- B5 ..... In “ON” position, Option is enabled - B11 must be OFF  
 ..... In “OFF” position, Option is disabled
- B6 ..... In “ON” position, Alternate Panel layout (ML900 scrunching enabled; ML550 and ML700 Jets 3 replaces Blower)  
 ..... In “OFF” position, Normal Panel layout
- B7 ..... In “ON” position, Spa Light operation is On/Off  
 ..... In “OFF” position, Spa Light operation is dimmable
- B9 ..... In “ON” position, single-speed Pump 3  
 ..... In “OFF” position, two-speed Pump 3
- B10 ..... In “ON” position, Pump 3 enabled (Jets 3 replaces Light button on Aux panel)  
 ..... In “OFF” position, Pump 3 disabled
- B11 ..... In “ON” position, Mister enabled  
 ..... In “OFF” position, Mister disabled
- B12 ..... In “ON” position, Mister or Option replaces Blower button on Aux panels  
 ..... In “OFF” position, no button replacement on Aux panels

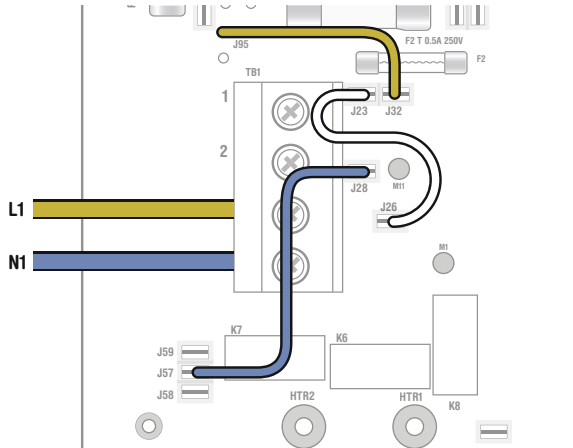
	B8 OFF	B8 ON
B4 OFF	No separately-controlled fiber light; spa light enabled on both SpaLight and EitherLight buttons; fiber light (not wheel) comes on with spa light (at any intensity)	
B4 ON	No separately-controlled spa light; fiber light enabled on both FiberLight and EitherLight buttons; spa light comes on with fiber light	Spa light and fiber light each separately controlled; fiber light enabled on both FiberLight and EitherLight buttons; spa light enabled on SpaLight buttons only

**Jumpers Key**

- J91 ..... Jumper on 1 Pin only enables Real Time Clock function, for use with time capable panels.  
 Jumper on Pins 1 and 2 will disable RTC function, for use with non-time capable panels.

# Electrical Service Configuration Options

## For DIP Switch Configured System



### Single Service (1 x 16 Amp or 1 x 32 Amp)

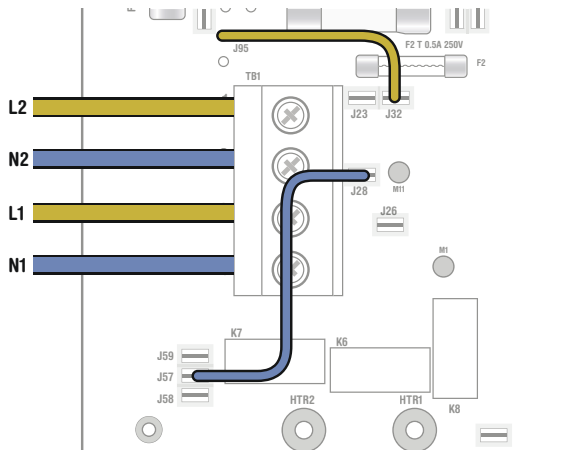
This option is configured and shipped as the default.

For 1 x 32 Amp Service:

DIP Switch A2 and A3 can be ON

For 1 x 16 Amp Service:

DIP Switch A2 and A3 must be OFF

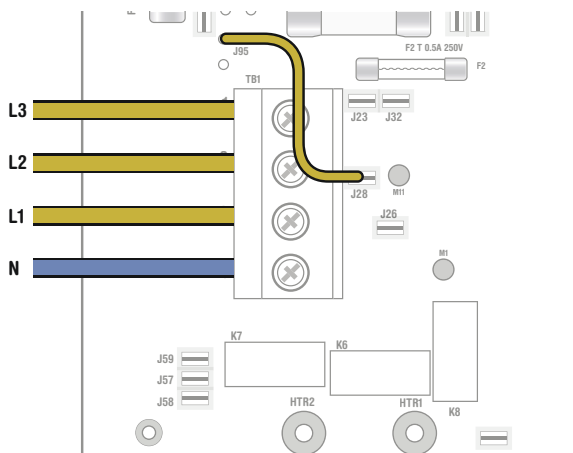


### Dual Service Option (2 x 16 Amp)

Completely remove the white wire from J26 and J32.

*Note: J32 and J23 are electrically identical. The white wire may be attached to either terminal before removal.*

DIP Switch A2 and A3 must be ON



### 3-Phase Service Option

**IMPORTANT** - Service **MUST** include a neutral wire, with a line to neutral voltage of 230VAC.

Completely remove the white wire from J26 and J32.

*Note: J32 and J23 are electrically identical. The white wire may be attached to either of these terminals before removal.*

Completely remove the blue wire from J28 and J57.

*Note: J57, J58 and J59 are electrically identical. The blue wire may be attached to any of these terminals before removal.*

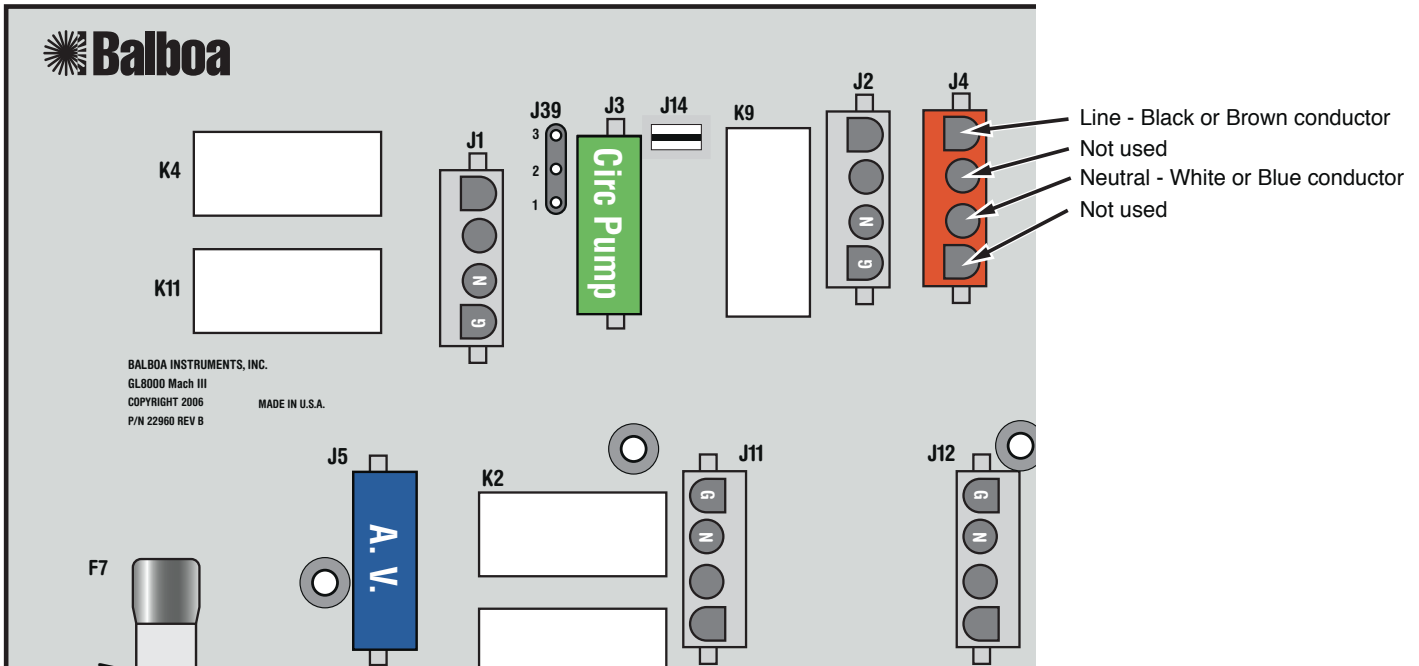
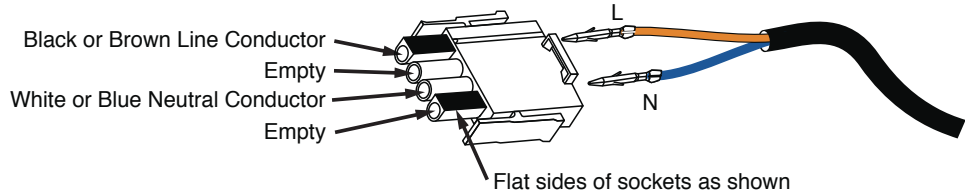
Move the brown wire from J23 or J32 to J28.

DIP Switch A2 and A3 must be ON

# Ozone Connections

*Note: A special tool is required to remove the pins from the connector body once they are snapped in place. Check with your Balboa Account Manager for information on purchasing a pin-removal tool.*

## Balboa Ozone connector configuration for 230VAC 50Hz:





# Panel Configurations

Note: RTC jumper (J91) on Main PCBA must be OFF (1 pin only)



**TIME CAPABLE**

ML900

PN 52654-01 with Overlay PN 40026

- Connects to Main Panel terminal J70, J71, J72, or J73