

EL2000 Hot Sheet

System PN 59002_02 (Mach 2)

Balboa Instruments

System Model # EL2-EL2000-YCAH

Base PCBA PN

EL2000 – 59003 (PCB 21862 Rev B)

Base Panels

ML 900 – PN 52654

ML 700 – PN 52649

ML550 – PN 53392

The ML 200 and ML 400 Panels are compatible, but may require Aux panels for adequate functionality.



59002_02-97.pdf 05/19/2005

Manufacturer Settings EL2000

INPUT

- 240V; 4 wires (hot, hot, neutral, ground)

OUTPUTS

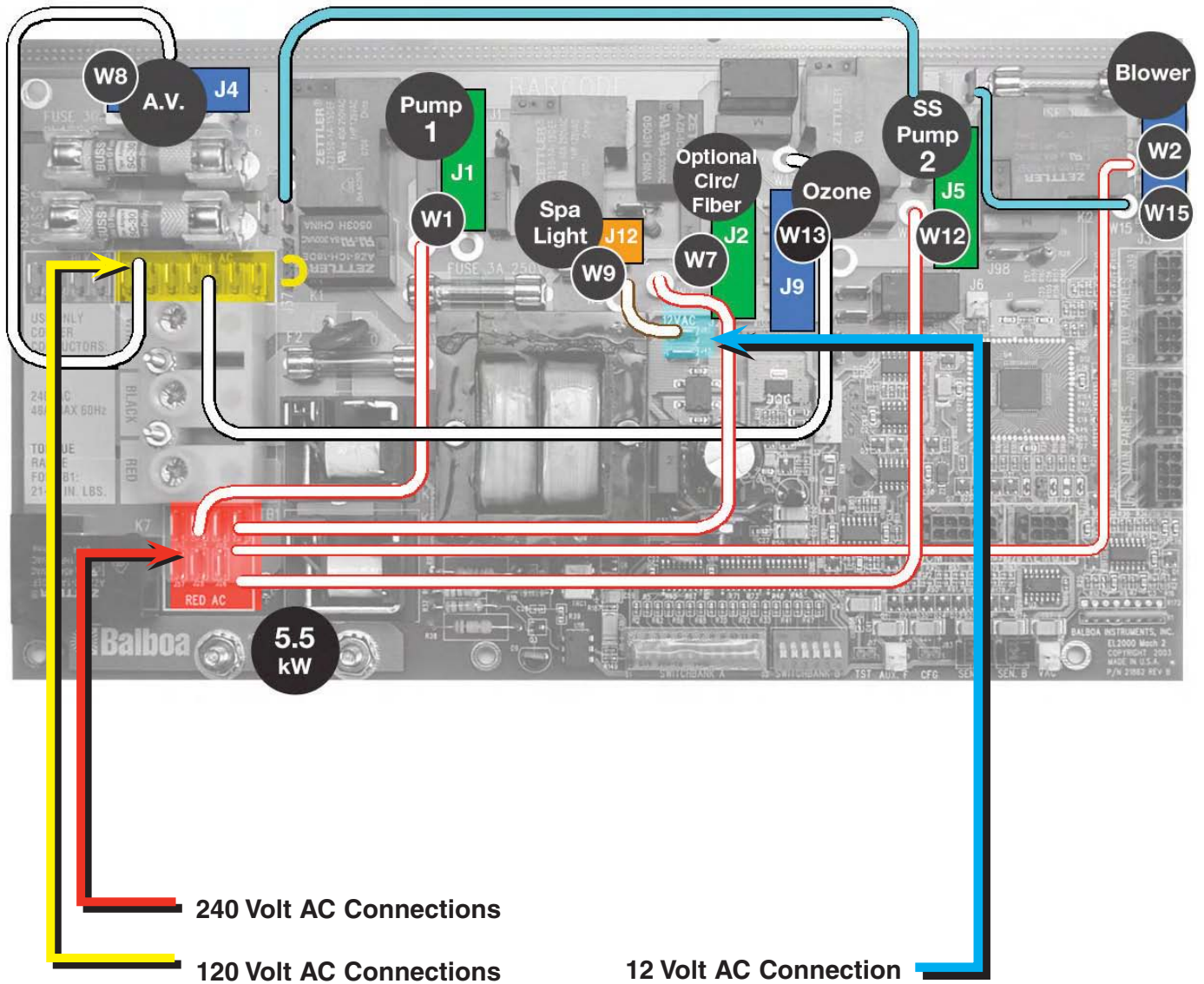
- 240V Pump 1, dual speed (high speed: 15-minute timeout; low-speed; 2-hour timeout)
- 240V Pump 2, single speed (15-minute timeout; 5-minute for purge cycle w/filter)
- 240V Blower, single speed (15-minute timeout; low-speed; 30-second for purge cycle w/filter)
- 120V Ozone (ozone runs with filter)
- 12V Spa Light (4-hour timeout)
- 120V Fiber-Optic Light only (optional) (fiber-optic light w/wheel when spa light disabled)
- 120V AV (stereo)
- Heater: 5.5kw @ 240V

FEATURES

- See ML900 panel reference card (pages 9-12 of this document)
- See ML700 panel reference card (pages 13-16 of this document)
- See ML550 panel reference card (pages 17-20 of this document)
- See ML400/ML200 panel reference card (pages 21-24 of this document)



Circuit Board Configuration



Optional Circulation Pump

Review function and interaction of DIP switches A9, A10 and A11.

Optional Fiber Light & Wheel (spa light not used)

Review function and interaction of DIP switches A9, A10 and B4.

Blower and Pump 2 Options

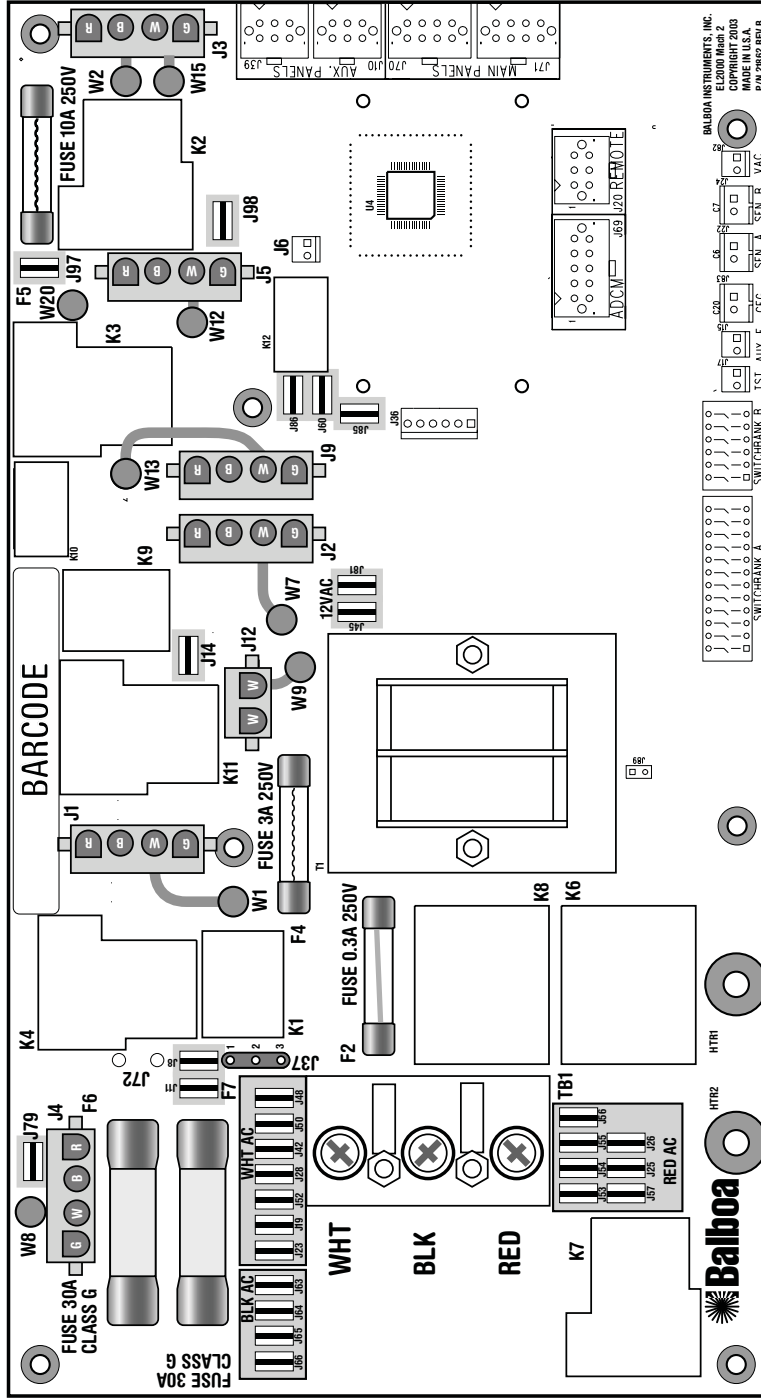
If a Blower is used, Pump 2 can only be one-speed. (W15-J97)

If NO Blower is used, Pump 2 can be two-speed. (W15-J98)

Review function and interaction of DIP switches B1, B2, and B3.

Circuit Board Layout

EL2000 – MACH 2, REV B – CIRCUIT BOARD LAYOUT



J1 & W1 .. Pump 1

J5 & W12 . Pump 2
(W15)

J3 & W2 .. Blower
(W15-J97)

J2 & W7 .. Circ Pump/
Fiber Optic

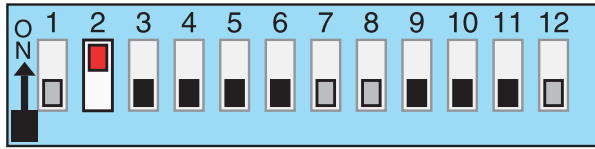
J9 & W13 .. Ozone

J12 & W9/J37.. Spa
Light

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EL2000 Mach 2
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P/N 28822 REV B

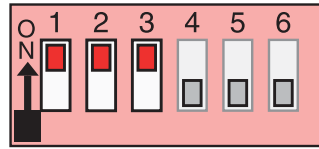
DIP Switches and Jumpers

Switchbank A



- A1, Test Mode OFF
- A2, High Amp
- A3, Filter by Time
- A4, 12 Hr Time
- A5, Degrees F
- A6, Short Timeouts
- A7, Cleanup Cycle OFF
- A8, 1Hr O₃ Disable OFF
- A9/A10, No Circ Pump
- A11, O₃ w/P1 low
- A12, Memory Retained

Switchbank B



- B1, Pump 2 1-Speed
- B2, Pump 2 Enabled
- B3, Blower Enabled
- B4, No Fiber/Wheel
- B5, N/A
- B6, Panel Scrunching OFF

J37



DIP Switch Key

- A 1 Test Mode (normally Off)
- A 2 In "ON" position, heater can run while any/all high-speed pumps or blowers are running. (High amperage)
..... In "OFF" position, heater is disabled while any high-speed pump or blower is running. (Low amperage)
- A 3 In "ON" position, filter cycles are programmed by duration
..... In "OFF" position, filter cycles are programmed to start and end times
- A 4 In "ON" position, displays time in 24 hours (military time)
..... In "OFF" position, displays 12 hour time
- A 5 In "ON" position, displays temperature in Celsius
..... In "OFF" position, displays temperature in Fahrenheit
- A 6 In "ON" position, Equipment timeout 30 min (4 hrs for Pump 1-Low)
..... In "OFF" position, Equipment timeout 15 min (2 hrs for Pump 1-Low)
- A 7 In "ON" position, Cleanup Cycle – 30 min after spa use/timeout, P1-Low & Ozone run for 1 hour.
..... In "OFF" position, no Cleanup Cycle
- A 8 In "ON" position, Ozone suppression for one hour after pump/blower button press
- A9 and A10. See **Figure 2** for Circ Pump Behavior settings
- A 11 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
- A 12 Persistent memory reset (normally off)
(used when spa is powering up)

A9	A10	Circ Pump Behavior
OFF	OFF	No Circ Pump or Circ Pump not plumbed w/heater
ON	OFF	24 Hr
OFF	ON	24 Hr w/3° Shut-Off
ON	ON	Acts like P1 low (Filter Cycles, Polls)

J37 Jumper on Pin 1 and 2 will power one leg of J12 (Spa Light) at 120 Volts AC.

Jumper on Pin 2 and 3 will power one leg of J12 (Spa Light) at 12 Volts AC.

Note: W9 controls voltage on the other leg of J12 and must be set for the same voltage.

DIP Switches

- B 1 In "ON" position, single-speed Pump 2
..... In "OFF" position, two-speed Pump 2
- B 2 In "ON" position, Pump 2 enabled
..... In "OFF" position, Pump 2 disabled
- B 3 In "ON" position, Blower enabled with Pump 2 low relay
..... In "OFF" position, Blower disabled
- B 4 In "ON" position, Fiber and Wheel instead of Spa Light
..... (on circ relay if A9, A10 off, external relay otherwise)
..... In "OFF" position, Spa light enabled
- B 5 In "ON" position, Pump 3 enabled (Jets 3 replaces Blower on Aux panel)
..... In "OFF" position, Pump 3 disabled
- B 6 In "ON" position, Alternate Panel layout
..... (ML900 scrunching enabled - ML550 / 700 Jets 3 replaces Blower)
..... In "OFF" position, Normal Panel layout

Ozone Connections

First, configure the EL Circuit Board to deliver the desired voltage to the on-board connector (J9). Connect the W13 wire to either White AC (120V) or Red AC (240V) to set the voltage.

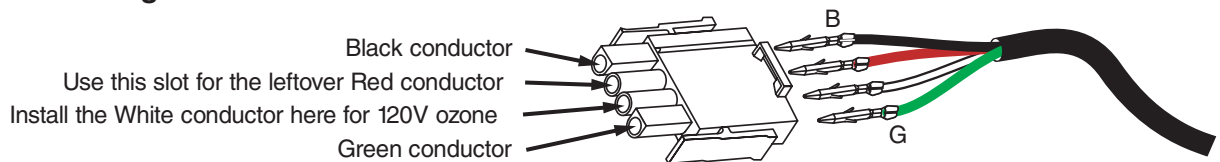
The pin next to the bottom (ground) pin of J9 is fed by W13 and sets the voltage in the connector.

If the board is set up to operate a 120V ozone generator, the connector on the ozone generator is likely to be configured correctly, but should be compared to the illustration below.

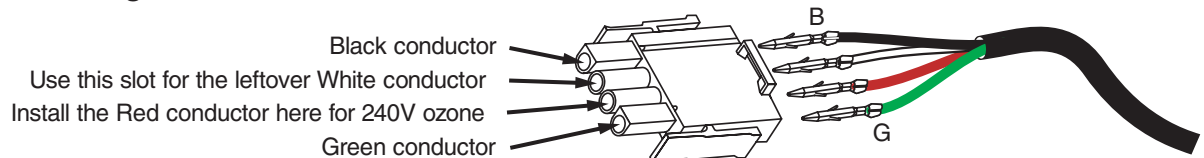
If a 240V ozone generator is required, be sure the red wire in the ozone cord is positioned in the connector next to the green ground wire as described below.

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.

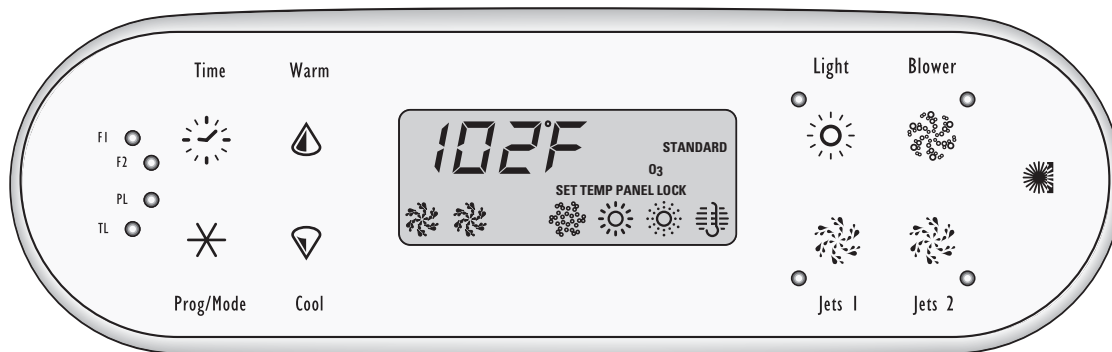
Ozone connector configuration for 120V 60Hz



Ozone connector configuration for 240V 60Hz



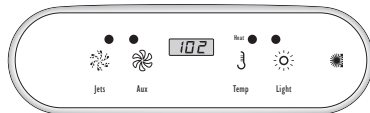
Panel Configuration



ML 700
PN 53649



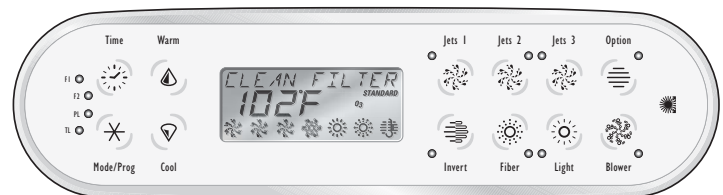
ML 550
PN 53392



ML 400
PN 52684



ML 200
PN 52958



ML 900
PN 52654

Auxiliary panels are available in the following configurations:

Infrared Remote (Dolphin) which has a separate connector on the board.

- 4-Button
- 2-Button
- 1-Button

Configuration of the 4-Button and 2-Button Aux Panels can be done for custom applications.

1-button Aux panels are available in 4 different versions.

There are two Aux Panel connectors on the board.

Panel "Scrunching" on the ML 900 (requires custom panel overlays)

With DIP switch B6, unused buttons on an ML 900 can be "scrunched" in a custom configuration or the unused positions can be left blank.

Scrunching moves the buttons in a counter-clockwise direction from the bottom row to the top row, on the right side of the display. The result is that all missing buttons or gaps appear on the bottom row, just to the right of the display.

Note: Some button positions MUST be used in order to perform certain functions. For instance, the Jets 2 button and the Blower button are used in certain button press combinations, and need to be available to a user, even if they are labeled with a different name.

See reference cards for details.