GL8000 Mach 3 Hot Sheet

Balboa Instruments
System PN 53859-02

System Model # GL8-GL8000M3-RCA-3.0K
Software Version # 28
EPN # 2130

Base PCBA - PN 53860-02
PCB GL8000 – PN 22960 Rev B or C

Base Panels
ML900 – PN 52654

Balboa Instruments Incorporated

Template used: 40598-v28_A.pdf 11/22/2006
53859-02_97_A.pdf 02/22/2007

Basic System Features and Functions

Power Requirements

- 230VAC, 1~, 16A or 32A, 50Hz, or 230VAC (Line to Neutral), 3~, 16A, 50Hz

System Outputs

Setup 1 (As Manufactured)

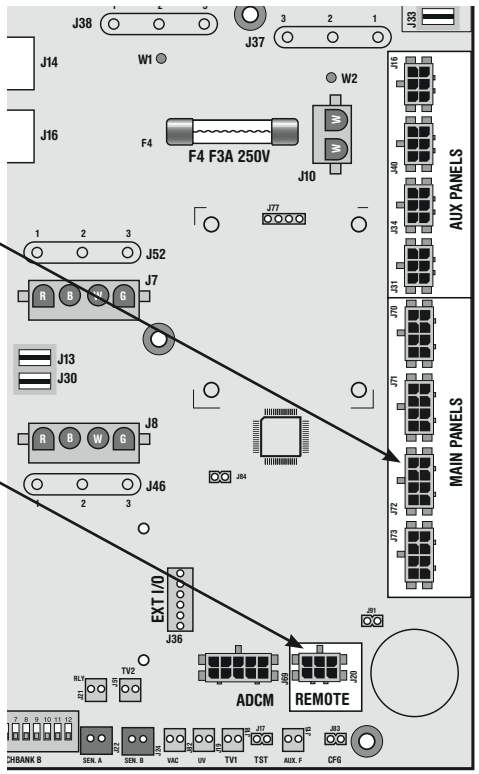
- 230V Pump 1, 2-Speed
- 230V Pump 2, 2-Speed
- 230V Pump 3, 2-Speed
- 230V Blower
- 230V Ozone
- 230V Fiber-optic Light
- 10V Spa Light
- 230V Audio\Visual (Stereo)
- 230V 3.0kW Heater

Additional Outputs (Disabled by Default)

- 230V Circ Pump
- 230V Mister

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 seperately).

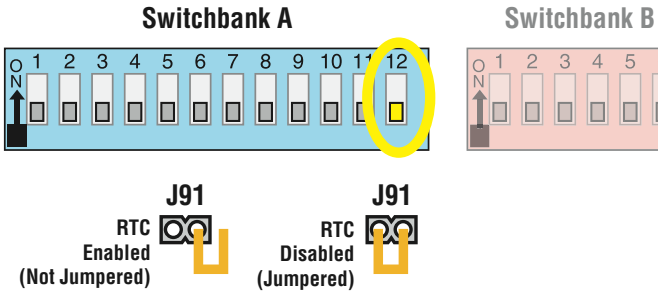
To reset Persistent Memory:

- Power down.
- Set A12 ON (See illustration below).
- Power up.
- Wait until "Pr" 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) "Pr" 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:
- "3-6" (indicating the system is configured for a heater between 3 and 6 kW) or "1-3" (indicating the system is configured for a heater effectively* between 1 and 3 kW). "3-6" should appear for all EL models running at 240VAC. "1-3" should appear for all EL models running at 120VAC, as well as all GL models. (*A heater which is rated at 4 kW at 240VAC will function as a 1 kW heater at 120VAC.)
- 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.
- "Pr" 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

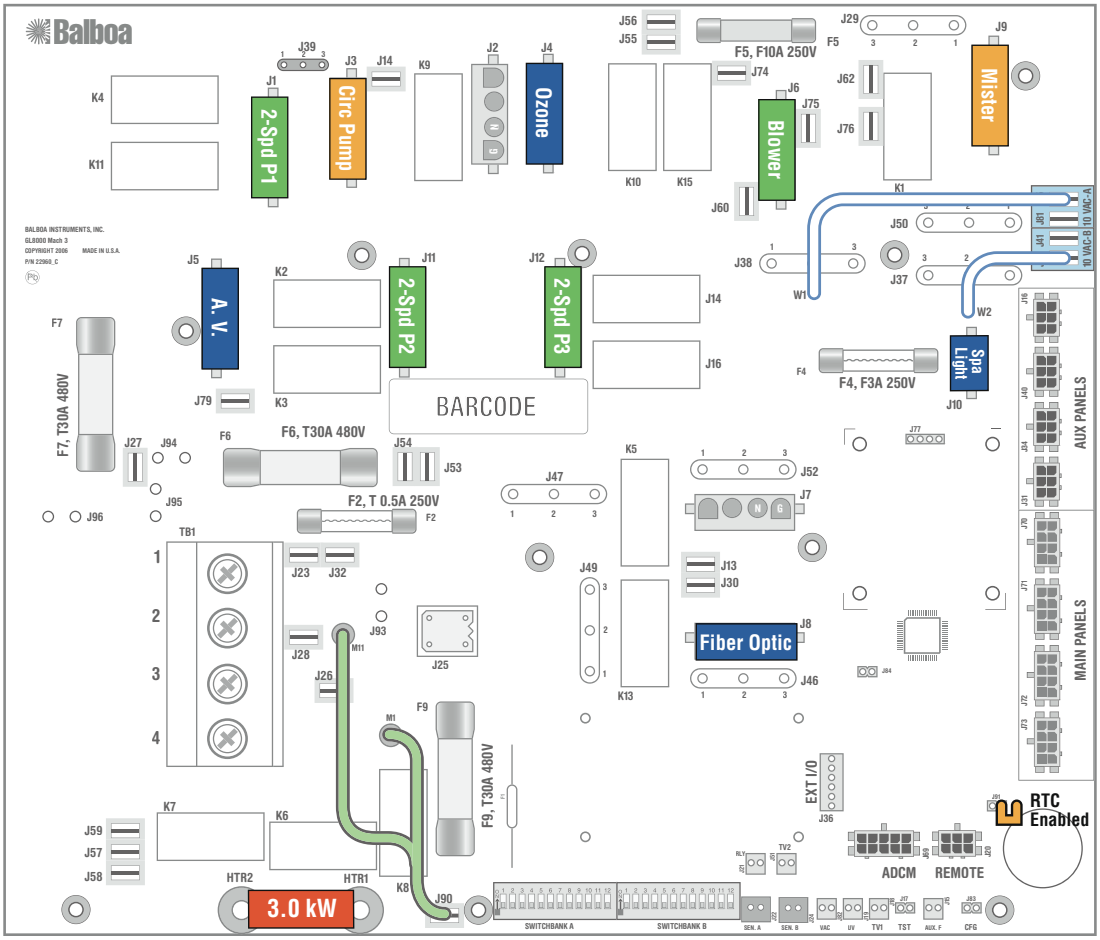
Setup 1 (As Manufactured)

- 230V Pump 1, 2-Speed
- 230V Pump 2, 2-Speed
- 230V Pump 3, 2-Speed
- 230V Blower
- 230V Ozone
- 230V Fiber Optic
- 10V Spa Light
- 230V A\V (Stereo)
- 230V 3.0kW Heater
- ML900 Main Panel

HiPot Testing Note:

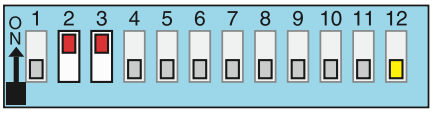
Disconnect slip terminal with green wires from J90 prior to performing HiPot test. Failure to disconnect will cause a false failure of the test.

Reconnect terminal to J90 after successful completion of HiPot test.



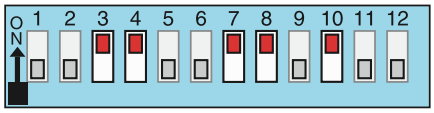
WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.
WARNING: Persistent Memory (A12) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

Switchbank A



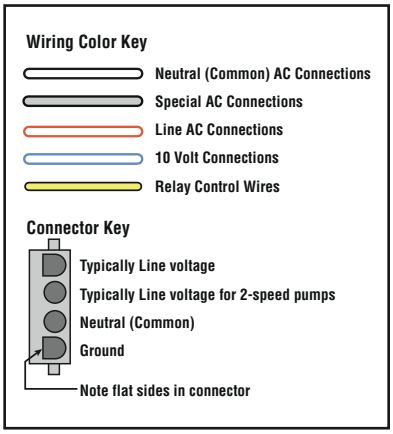
A1, Test Mode OFF
A2/A3, Four H.S. Pumps w/Heater
A4, 12 Hour Time
A5, Degrees F
A6, Short Timeouts
A7, Cleanup Cycle OFF
A8, 1Hr O_3 Disable OFF
A9/A10, No Circ Pump
A11, Ozone w/P1 low
A12, Memory ON

Switchbank B



SSID #
100
139
28

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



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 hot 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

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

Table 2

A9	A10	Circ Pump Behavior
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 enabled - B11 must be OFF

. . . . . In "OFF" position, Option 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

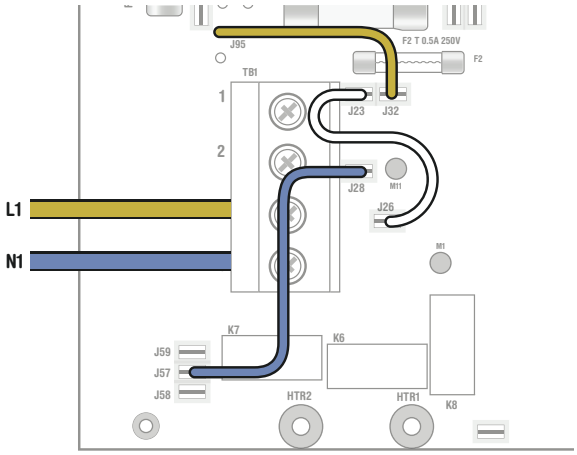
. . . . . In "OFF" position, no button replacement on Aux panels

	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

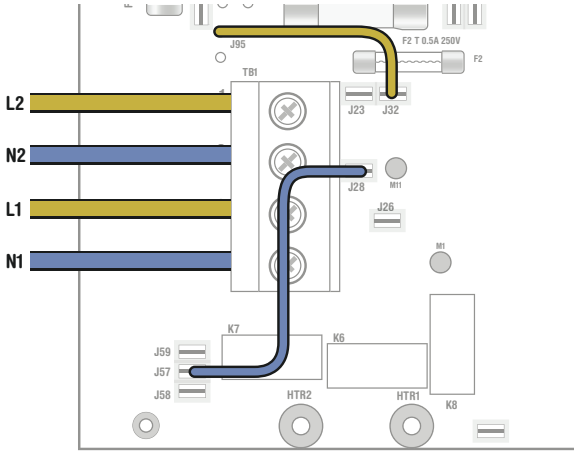
J91 . . . . . Jumper on 1 Pin only enables Real Time Clock function, for use with time capable panels.
Jumper on Pins 1 and 2 will disable RTC function, for use with non-time capable panels.

Electrical Service Configuration Options



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

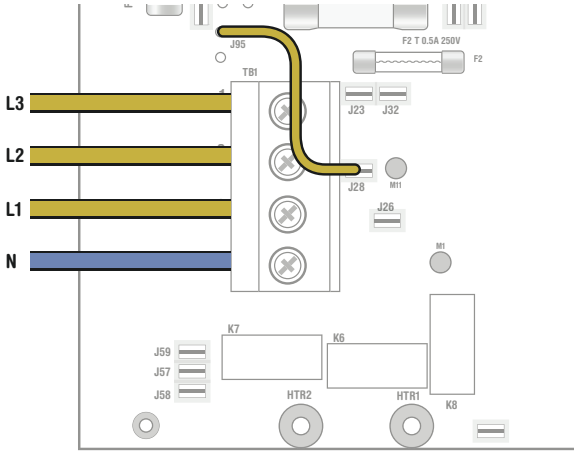


Dual Service Option (2 x 16 Amp)

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.

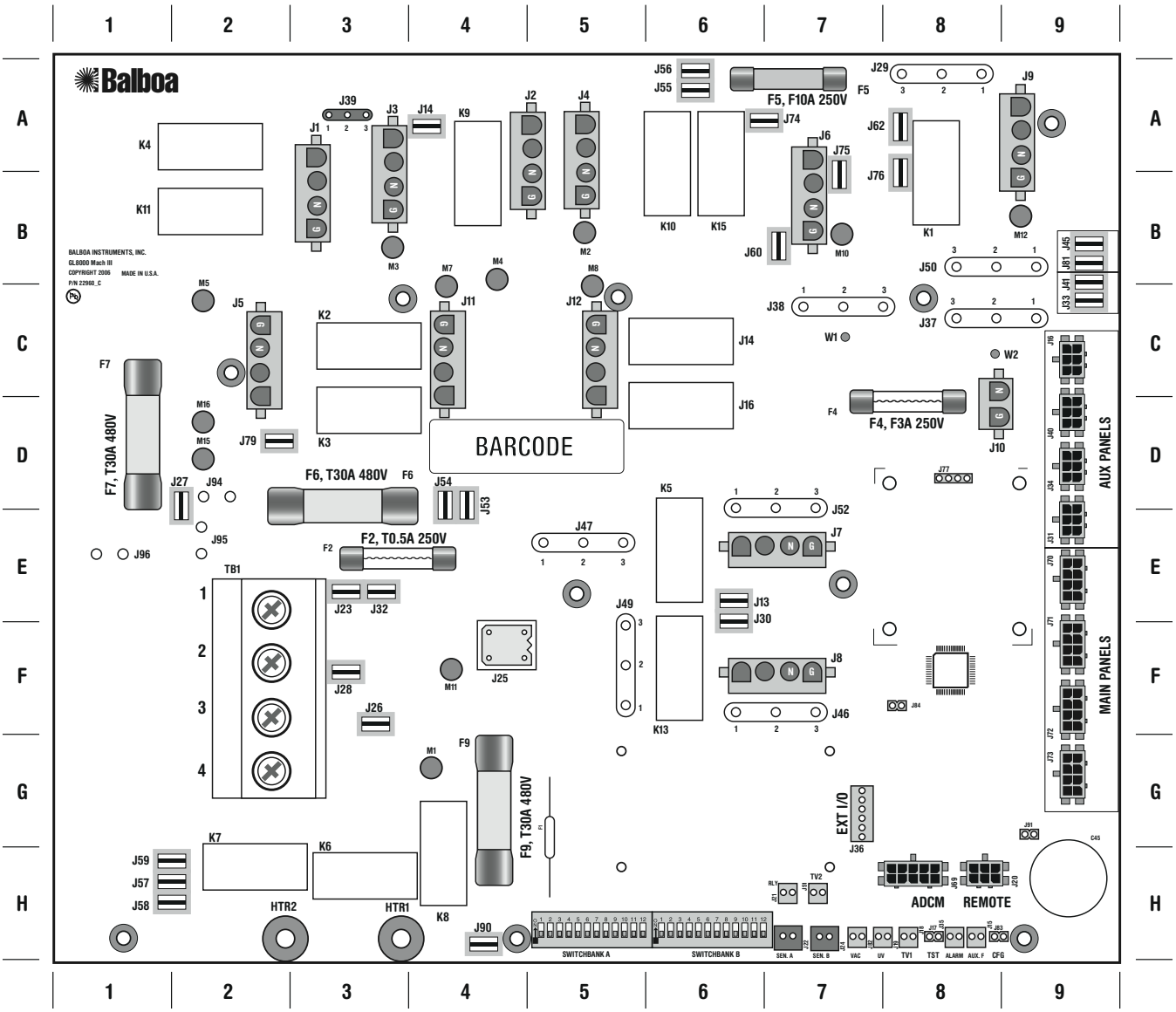
Completely remove the blue wire from J28 and J57.

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

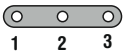
Move the brown wire from J23 or J32 to J28.

DIP Switch A2 and A3 must be ON

Configuration Options



Soldered-In Jumper Configuration

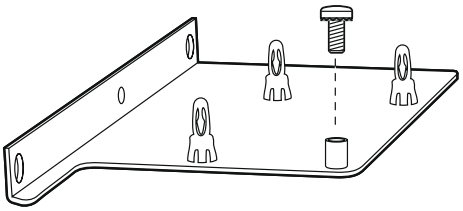


Locations 1 & 2 determine 10VAC, Locations 2 & 3 determine 230VAC.

Soldered-In Jumper Application			Quadrants
J29	+ J50	Determine Voltage for J9 (Mist)	8-A, 8-B
J37	+ J38	Determine Voltage for J10 (Spa Light) Light Votage is determined with W1 & W2	Unused
J47	+ J52	Determine Voltage for J7 (Misc.)	5-E, 7-E
J49	+ J46	Determine Voltage for J8 (Fiber Optic)	5-F, 7-F

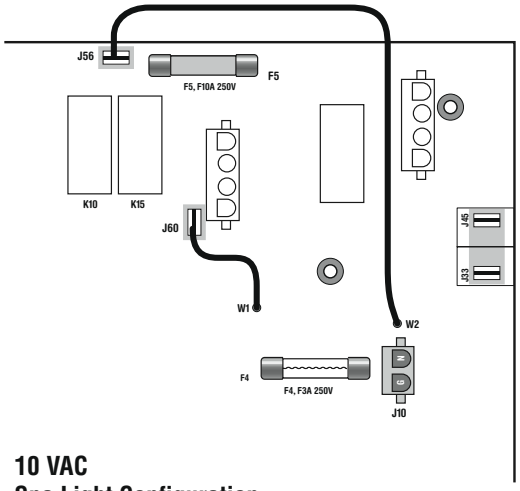
Output Features		Quadrant
J1	2-Speed Pump 1	3-A
J2	Output tied to Pump 1 Low – OR output tied to Circ Pump (Set with J39)	4-A
J3	Circ Pump	3-A
J4	Ozone	5-A
J5	A.V.	2-C
J6	Blower	7-B
J10	Spa Light (10V or 230V)	8-C
J7	Misc (Separate Relay 10V or 230V)	7-E
J8	Fiber Optic (10V or 230V)	7-F
J9	Mister (10V or 230V)	9-A
J11	2-Speed Pump 2	4-C
J12	2-Speed Pump 3	5-C

Expander Options

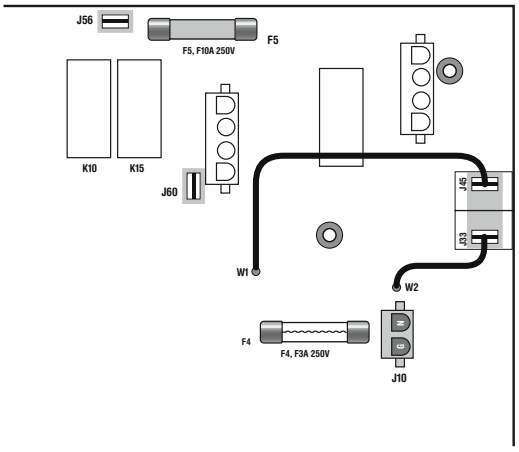


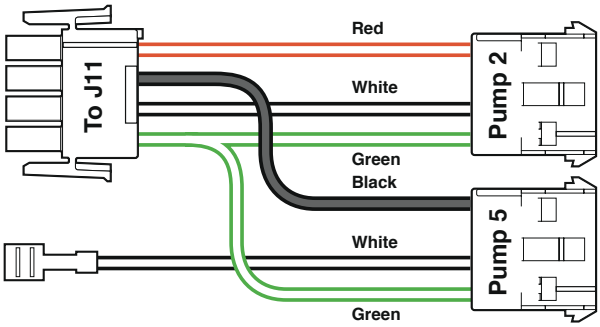
X-Mount M **PN 53914**
Used for mounting any Expander Board in a metal enclosure.
Bracket attaches to heater mounting straps

230 VAC
Spa Light Configuration



10 VAC
Spa Light Configuration

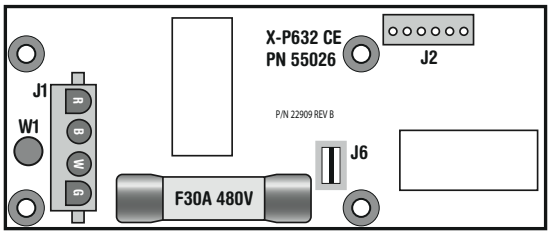




PS-25 **PN 25094**
Used to split the output from the Pump 2 Connector (J11) into a single-speed Pump 2 and single-speed Pump 5.
White wire quick connect goes to Main PCB at J59.

PS-34 **PN 25093**
Used to split the output from the Pump 3 Connector (J12) into a single-speed Pump 3 and single-speed Pump 4.
White wire quick connect goes to Main PCB at J58.

ELS-VALVE **PN 22934**
Used to split the output from a single-speed Pump to allow a Valve Sequencer to be powered by the pump's output.



X-P632 CE **PN 55026**
Used for an additional 2-speed Pump output.
Relay control J2 plugs into the EXP I/O connector J36 on the Main PCBA (Quadrant 7-G).

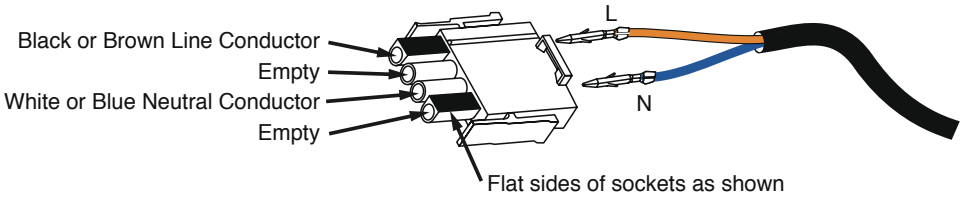
X-P231 CE **PN 55025**
Can replace the X-P CE in cases where branch circuit protection is needed for high amperage devices that would over-burden power input fuse F6 or F7 (3-D) on the main PCBA.

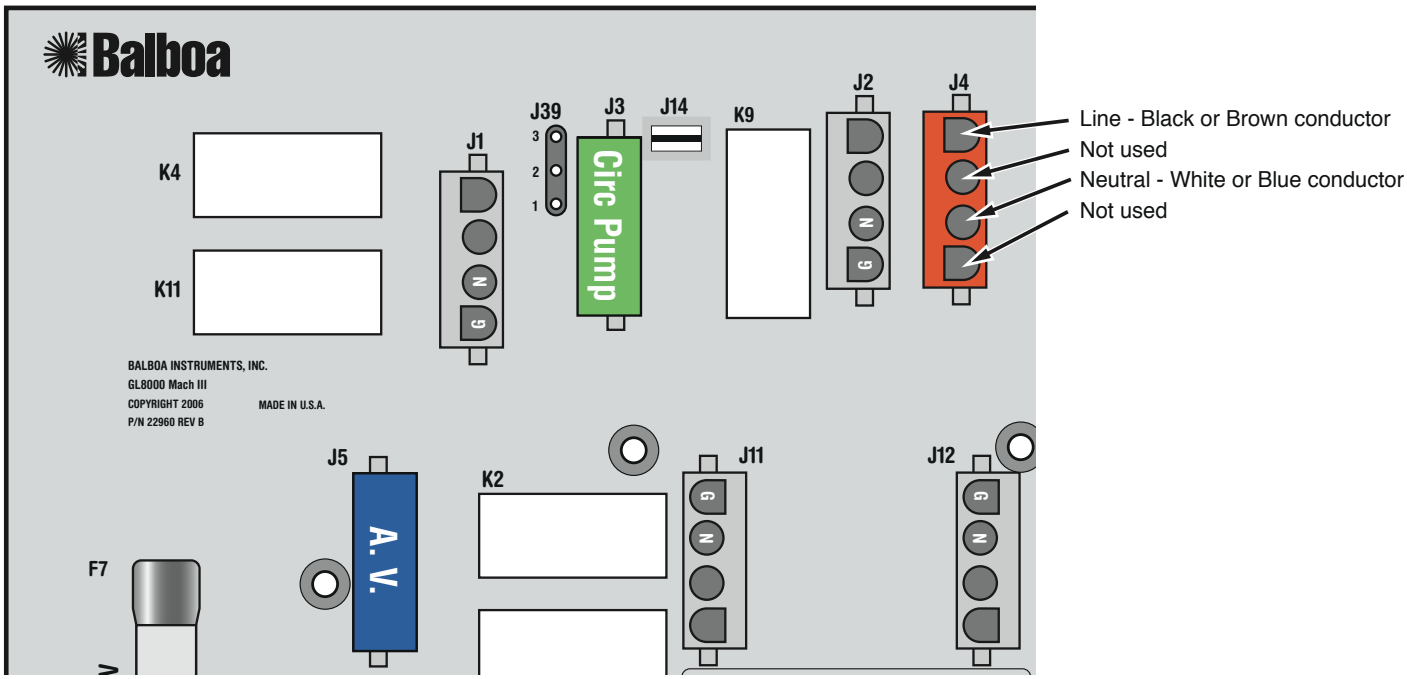
X-P CE **PN 53547**
Used add a additional 1-speed Pump output when all main board pump connections are used.

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

TIME CAPABLE

ML900
PN 52654 with Overlay PN 40026
- Connects to Main Panel terminal J70, J71, J72, or J73
- RTC jumper (J91) on Main PCBA must be OFF (1 pin only)