

# MS5000E Mach 3 Hot Sheet

## Master Spas System PN 55062

System Model # GL2-MS5000E-RCA-3.0k

Software Version # 21

EPN # 1804

Base PCBA - PN 55063

PCB GL2000 – PN 22898 Rev B

Base Panels

MP700 – PN 53251-01



# Basic System Features and Functions

## Power Requirements

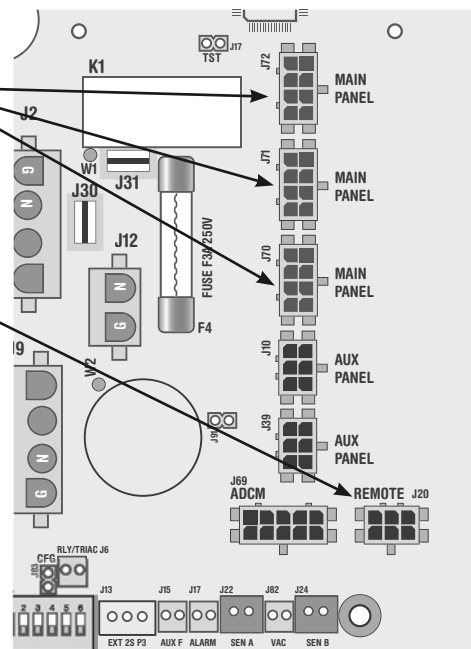
- 230VAC, 1~, 16A or 32A, 50Hz
- 3 wires (line, neutral, ground)

## System Outputs (As Configured)

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

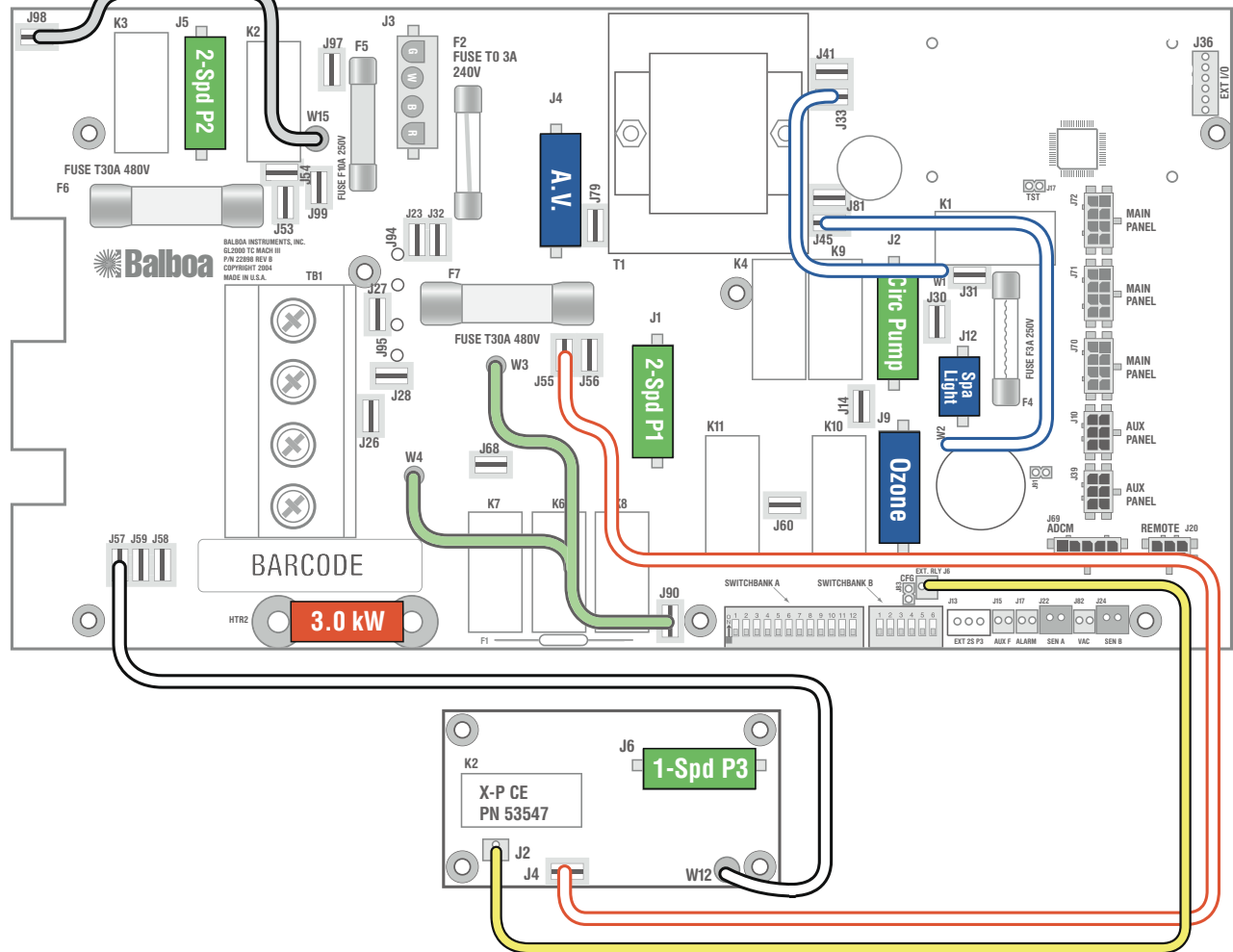
## Additional Options

- Full Feature Dolphin Remote and Spa-only Dolphin Remote
- Spa Monitor  
Connects to Main Panel terminal J70 or J71 or J72
- IR or RF Dolphin Receiver Module  
Connects to Remote terminal J20
- Ozone Generator  
Connects to terminal J9
- MoodEFX Lighting  
Connects to Spa Light terminal J12
- FiberEFX Lighting  
Connects to Spa Light terminal J12
- Stereo System  
Connects to A.V. terminal J4



# Wiring Configuration

Use X-B CE Expander for Blower With 2-Speed P2



## Wiring Color Key

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

## Connector Key

- Typically Line voltage
  - Typically Line voltage for 2-speed pumps
  - Neutral (Common)
  - Ground
- Note flat sides in connector

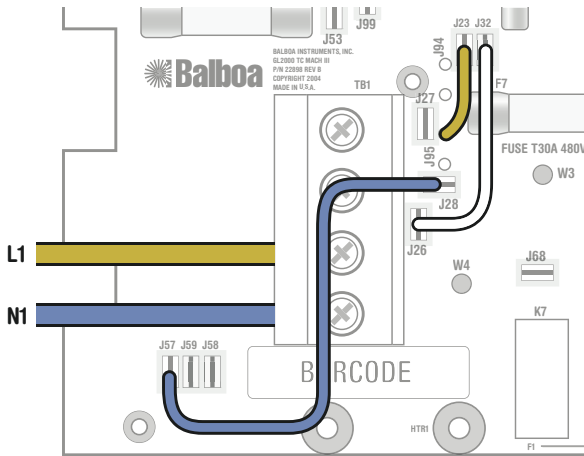
## HiPot Testing Note:

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.

PCB Revision	History
B	Production Release

# Electrical Service Configuration Options



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

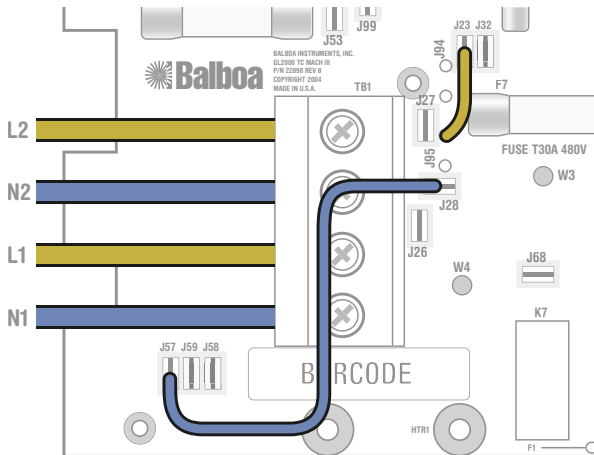
This option is configured and shipped as the default.

For 1 x 32 Amp Service:

DIP Switch A2 can be ON

For 1 x 16 Amp Service:

DIP Switch A2 must be OFF

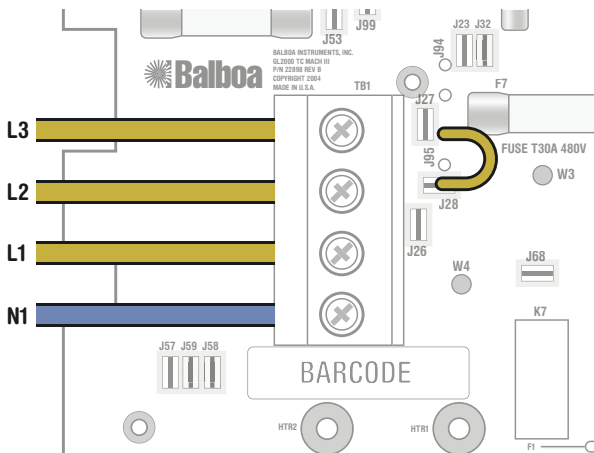


## Dual Service Option (2 x 16 Amp)

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 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.*

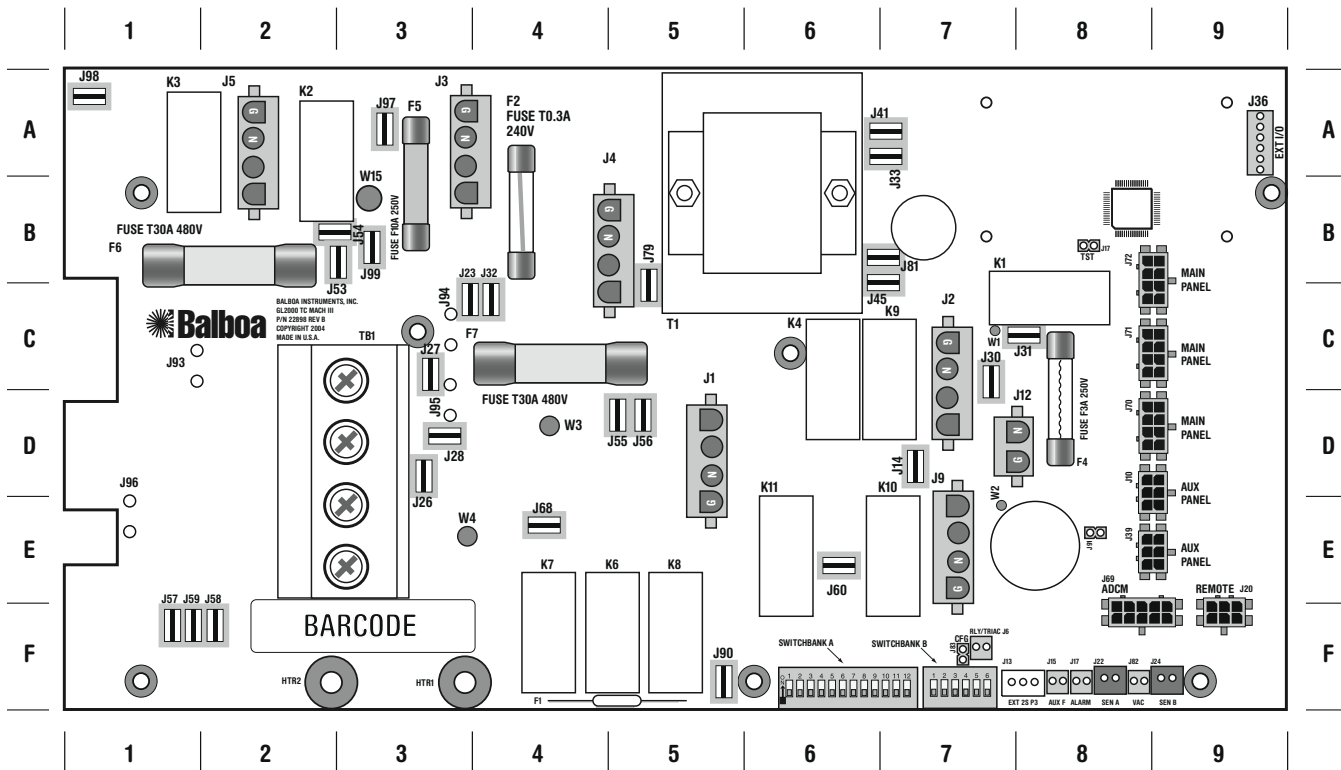
Completely remove the blue wire from J28 and J57.

*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 must be ON

# Configuration Options

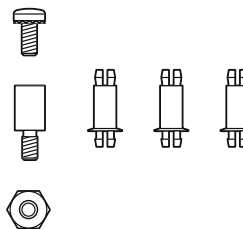


## Output Features

- J1 2-Speed Pump 1
- J2 Circ Pump (Separate Relay)  
OR Fiber Optic Light
- J3 1-Speed Blower (with 1-speed Pump 2) W15 to J97  
OR 1-Speed Pump 3 (with 1-speed Pump 2) W15 to J99
- J4 Audio Visual (always hot - no relay)
- J5 2-Speed Pump 2 (with NO Blower on J3) W15 to J98  
OR 1-Speed Pump 2 (See J3 and W15)
- J9 Ozone (Separate Relay)
- J12 Spa Light (10V or 230V)

## Quadrant

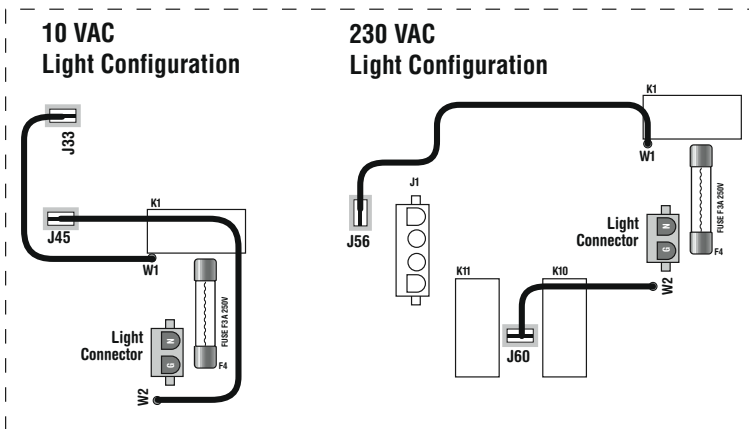
- 5-D
- 7-C
- 3-A
- 5-B
- 2-A
- 7-E
- 8-D



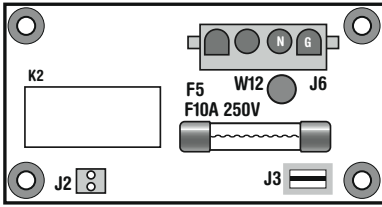
## X-Mount P

PN 53933

Used for mounting any Expander Board in a plastic enclosure. Standoffs attach to heater mounting bracket.

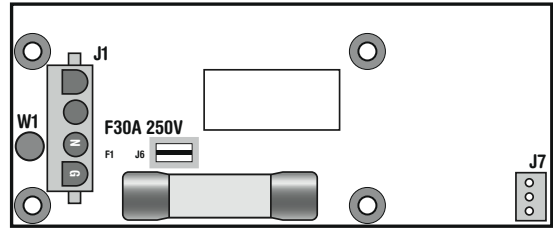


# Expander Options



**X-B CE** **PN 53311**

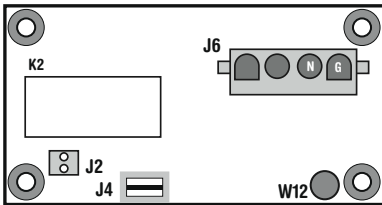
Used for a Blower output ONLY when Pump 2 (J5) is a 2-speed pump. (W15 connected to J98)



**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 (4-C) on the main PCBA.

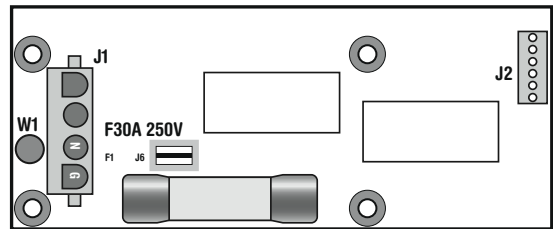
- J6 on X-P632 CE connects directly to Line AC Use J27, J32, or J26 on the main GL2000 PCBA, depending on AC Service Configuration.



**X-P CE** **PN 53547**

Used for a 1-speed Pump 3 output when Pump 2 (J5) is a 1-speed pump and a blower is connected to J3. (W15 connected to J97)

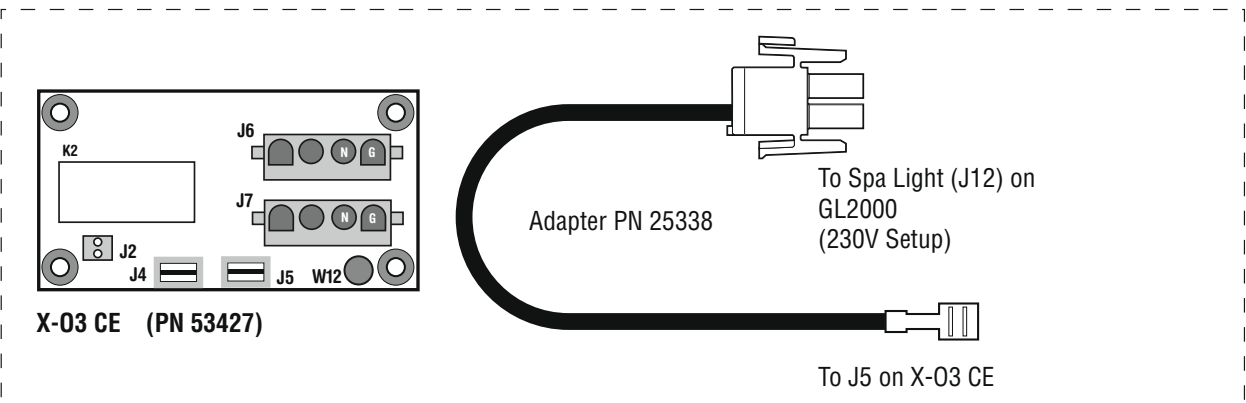
Also used for a 1-speed Pump 4 when Pump 3 replaces a Blower on J3



**X-P632 CE** **PN 55026**

Used for a 2-speed Pump 3 output when Pump 2 at J5 (2-A) is a 2-speed pump or when Pump 2 is a 1-speed pump and a blower are on main PCBA.

- J6 on X-P632 CE connects directly to Line AC Use J27, J32, or J26 on the main GL2000 PCBA, depending on AC Service Configuration.

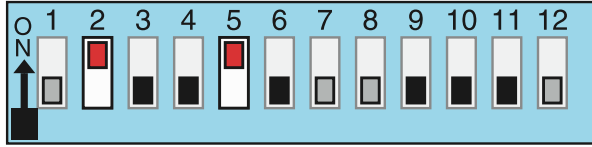


**X-FOW CE Kit** **PN 53976**

Special setup with X-03 CE and Adapter PN 25338 to operate a fiber-optic light and color wheel.

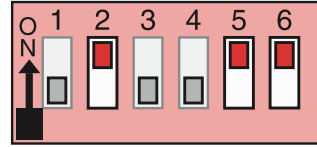
# DIP Switches and Jumpers

## Switchbank A



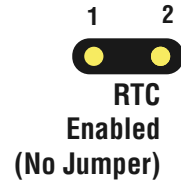
- A1, Test Mode OFF
- A2, High Amp
- A3, Filter by Time
- A4, 12 Hr Time
- A5, Degrees C
- A6, Short Timeouts
- A7, Cleanup Cycle OFF
- A8, 1Hr O<sub>3</sub> Supress OFF
- A9/A10, No Circ Pump
- A11, O<sub>3</sub> w/ P1 Low and P1 is 2-Spd

## Switchbank B



- B1, Pump 2 2-Speed
- B2, Pump 2 Enabled
- B3, Blower Disabled
- B4, No Fiber/Wheel
- B5, Pump 3 Enabled
- B6, Panel Scrunching ON

## J91



### 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 - dual 16A service, single 32A service, or 3-phase)  
 .... In "OFF" position, heater is disabled while any high-speed pump or blower is running (Low amperage - single 16A service)
- 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/European 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 minutes (4 hours for Pump 1 Low)  
 .... In "OFF" position, Equipment timeout 15 minutes (2 hours for Pump 1 Low)
- A 7. .... In "ON" position, Cleanup Cycle – 30 minutes after spa use/timeout, Pump 1 Low & Ozone or Circ Pump & 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  
 .... In "OFF" position, no Ozone suppression
- 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 single-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 (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 Hour
OFF	ON	24 Hr w/3°F Shut-Off
ON	ON	Acts like Pump 1 Low (Filter Cycles, Polls)

# DIP Switches and Jumpers

## DIP Switchbank B Key

- 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 and ML700 Jets 3 replaces Blower)  
..... In "OFF" position, Normal Panel layout

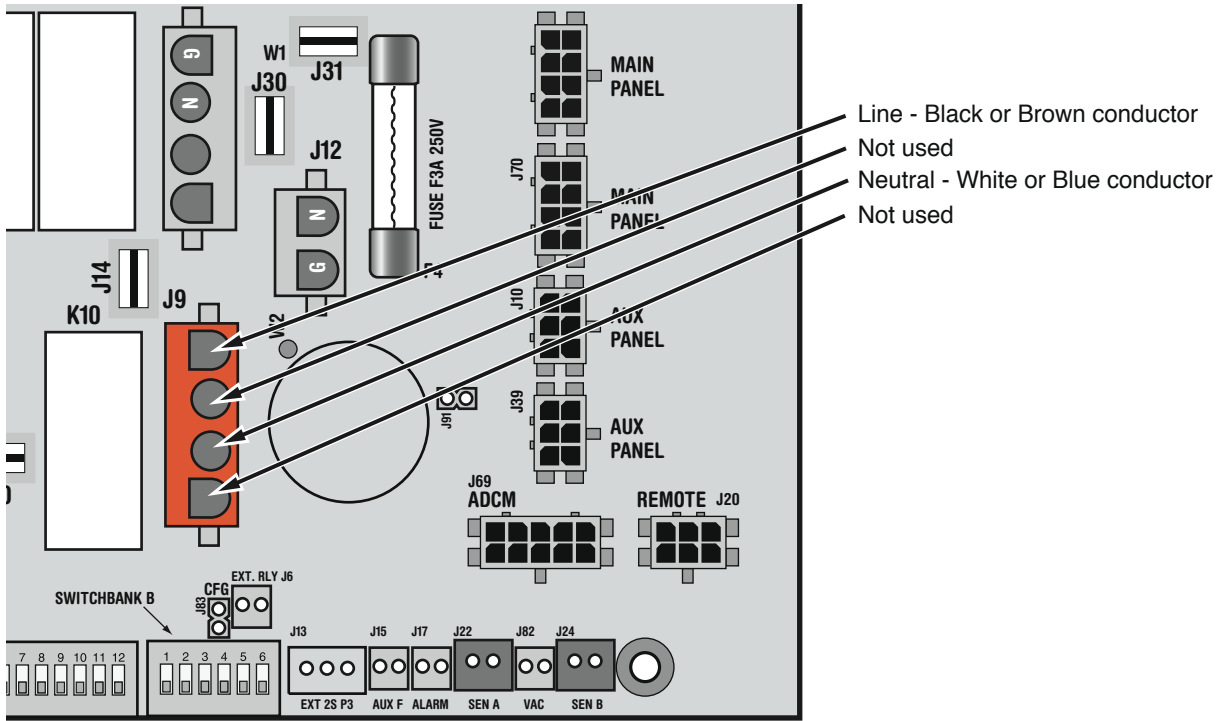
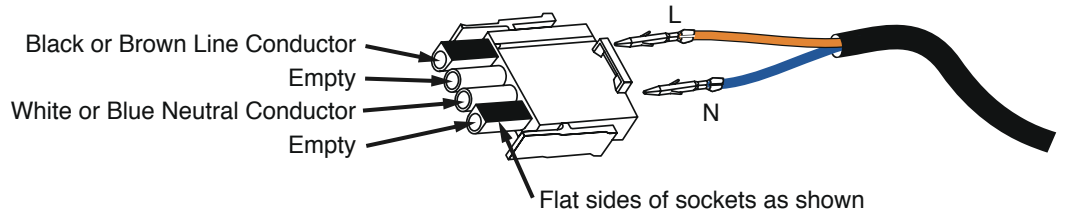
- J91** Jumper on 1 Pin only enables Real Time Clock function, for use with time capable panels.  
Jumper on Pin 1 and 2 disable RTC function for use with non-time capable panels (not included).



# 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



MP700

PN 53251-01 with No Overlay (Customer supplied)

- Connects to Main Panel terminal J70, J71, or J72
- J91 on Main PCBA must be OFF (1 pin only)