MS1700 Tech Sheet

Master Spas
System PN 56156

System Model # VSP-MS1700-DCAH

Software Version # 46

EPN # 3416

Base PCBA - PN 56157
PCB VS500Z - PN 22972 Rev E

Base Panels
VP280S – PN 55176

BALBOA
water group

System Revision History

System PN	EPN	Date	Requested By	Changes Made
56156	3416	03-21-11	Customer	Replacement for MS1600JPL and MS1600 to work with the latest version of the the Swim Number Panel.

Note:

If Heat Disable input is shorted at power-up, SSID, etc, will be skipped and "Pr" will display immediately.

If the SSID is skipped on power-up, either there is a problem with what is connected to J22, or there is a circuit board failure.

Power Requirements

- 240VAC, 60Hz, 40A, Class A GFCI-protected service (Circuit Breaker rating = 50A max.)
- 4 wires [hot, hot, neutral, ground]

System Outputs

Setup 1 (As Manufactured)

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Ozone
- 12V Spa Light
- 120V AV (Stereo)
- 240V 5.5kW Heater **

Setup 2

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Pump 3, 1-Speed
- 240V Ozone
- 12V Spa Light
- 120V AV (Stereo)
- 240V 5.5kW Heater **

Setup 3

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Circ Pump *
- 240V Ozone *
- 12V Spa Light
- 120V AV (Stereo)
- 240V 5.5kW Heater **

Setup 4

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Pump 3, 1-Speed
- 240V Circ Pump *
- 240V Ozone *
- 12V Spa Light
- 120V AV (Stereo)
- 240V 5.5kW Heater **

* Ozone and Circ Pump must be same voltage.

** Heater wattage is rated at 240V. When running 120V to heater, output is approximately 25%.

Additional Options

- Full Feature Dolphin Remote and Spa-only Dolphin Remote

- IR Receiver Module
  Connects to terminal J1 or J2

- MoodEFX Lighting
  Connects to Spa Light terminal J20

- FiberEFX Lighting
  Connects to Spa Light terminal J20
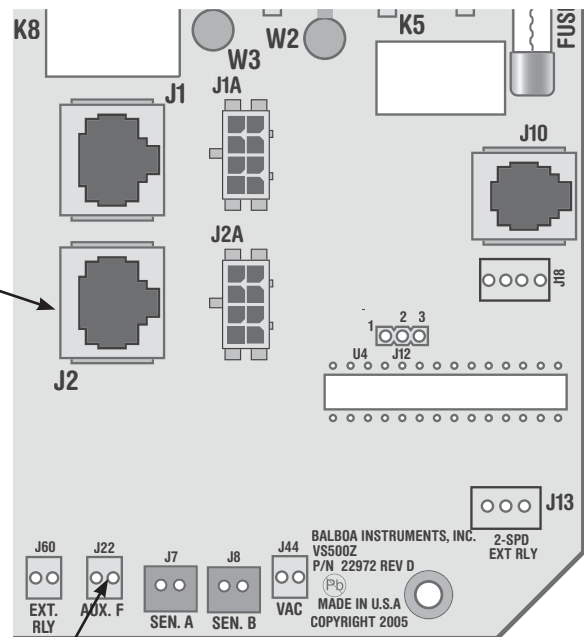
- Heat Disable cable from Swim Number Panel

Any time you change a DIP Switch, other than A1, you must reset Persistent Memory for your new DIP Switch Settings changes to take effect. If you do not reset Persistent Memory, your system may function improperly.

To reset Persistent Memory:

- Power down by disconnecting power source from spa.
- Put a jumper across J43, covering both pins. (See illustration below)
- Power up by connecting power source to spa.
- Wait until "Pr" is displayed on your panel.
- Power down again.
- Remove jumper from J43 (May also move to cover 1 pin only)
- Power up again.

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 the filter settings, the set temperature, and the heat mode.
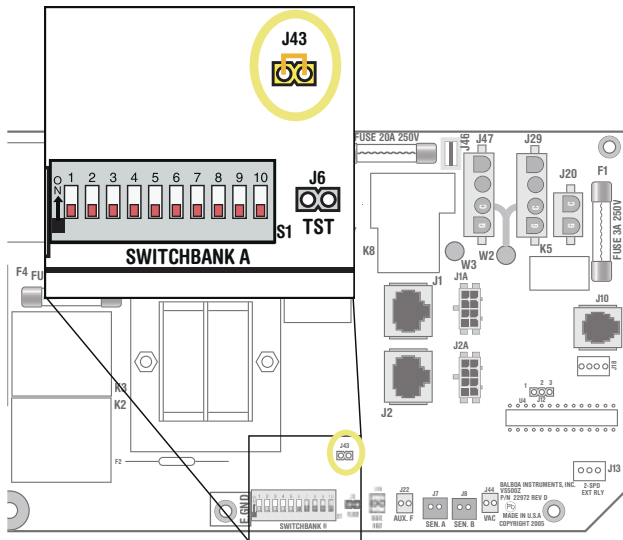
Persistent Memory is not used for Time of Day. Only models with a Serial Deluxe panel installed (VS5xxDZ and GS5xxDZ) can display the time. However, during power loss to the spa, the system will lose the correct time, and reset to 12:00 PM when power is restored.

J43 on VS5xxZ and VS300 Series Main Board Shown.

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 $100\ 67\ 38$, that is a VS511SZ at version 38.
- Displayed next is: "24" (indicating the system is configured for a heater between 3 and 6 kW) or "12" (indicating the system is configured for a heater effectively* between 1 and 3 kW). "24" should appear for all VS models running at 240VAC. "12" should appear for all VS models running at 120VAC, as well as all GS models. (*A heater which is rated at 4 kW at 240VAC will function as a 1 kW heater at 120VAC.)
- "Pr" will appear to signal the start of Priming Mode.

At this point, the power up sequence is complete. Refer to the Reference Card for the VS or GS System model of your spa for information about how the spa operates from this point on, including how to adjust the Time of Day if using a Serial Deluxe style panel.
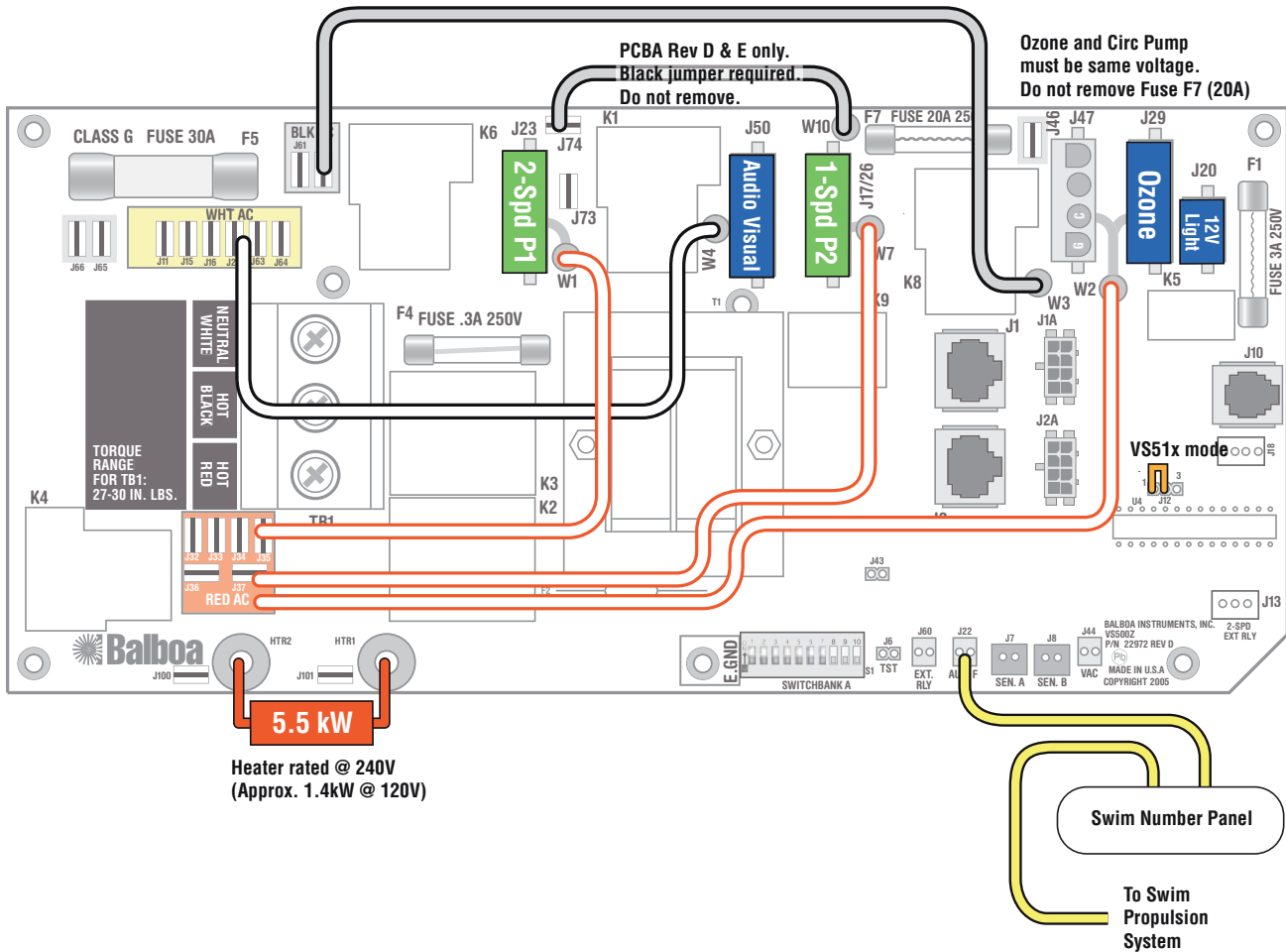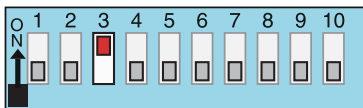
Setup 1 (As Manufactured)

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Ozone

- 12V Spa Light
- 120V AV (Stereo)
- 240V 5.5kW Heater

- VP280S Main Panel

PCBA Rev D & E only.
Black jumper required.
Do not remove.

Ozone and Circ Pump
must be same voltage.
Do not remove Fuse F7 (20A)

CLASS G FUSE 30A F5

BLK J61

K6 J23 J74 K1 J50 W10 F7 FUSE 20A 250 J46 J47 J29 J20 F1

2-Spd P1 Audio Visual 1-Spd P2 Ozone 12V Light

WHT AC

J66 J65 J11 J15 J16 J2 J63 J64

NEUTRAL WHITE
HOT BLACK
HOT RED

TORQUE RANGE FOR TB1: 27-30 IN. LBS.

F4 FUSE .3A 250V

FUSE 3A 250V

Heater rated @ 240V
(Approx. 1.4kW @ 120V)

5.5 kW

Swim Number Panel

To Swim Propulsion System

SWITCHBANK A

BALBOA INSTRUMENTS, INC.
VSS00Z
P/N 22972 REV D
MADE IN U.S.A
COPYRIGHT 2005

VS51x mode

WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.

WARNING: Persistent Memory (J43) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

SSID #
71
93
46

Switchbank A

ON 1 2 3 4 5 6 7 8 9 10

A1, Test Mode OFF
A2, See Table 1
A3, J17/26 Pump Enabled
A4, Must be OFF
A5, 2-speed P1

A6, 60 Hz
A7, Exp Board Equip Disabled
A8, Degrees F
A9, Non-Circ Mode
A10, See Table 1

VS51x/VS5xxS/VS5xxD Compatible

J12

1 2 3

J43

Memory Reset

Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
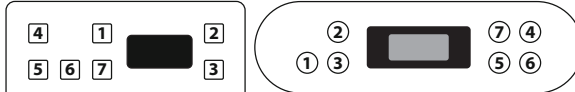- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

Board Connector Key

1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground

Note flat sides in connector

Panel Button Assignments

1=Mode   5=Pump 1
2=Temp Up   6=Pump 2
3=Temp Down   7=Light
4=Exp Board with A7 ON

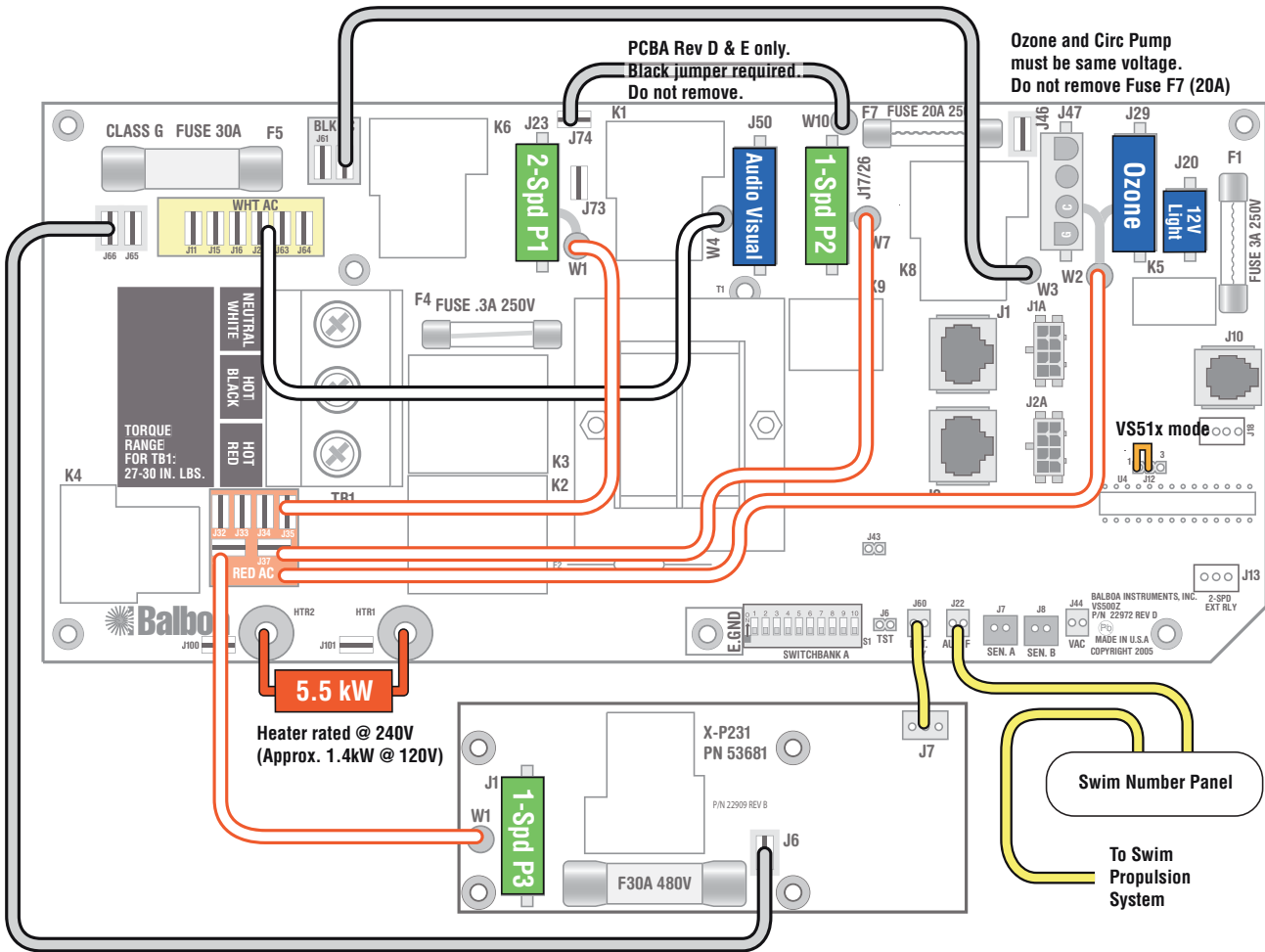### Panel Button Positions

Setup 2

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Pump 3, 1-Speed

- 240V Ozone
- 12V Spa Light
- 120V AV (Stereo)

- 240V 5.5kW Heater
- VP280S Main Panel

WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.
WARNING: Persistent Memory (J43) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

SSID
71
93
46

Switchbank A

ON 1 2 3 4 5 6 7 8 9 10

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A9, Non-Circ Mode
A10, See Table 1

VS51x/VS5xxS/VS5xxD Compatible

J12
1 2 3

J43
Memory Reset

Wiring Color Key

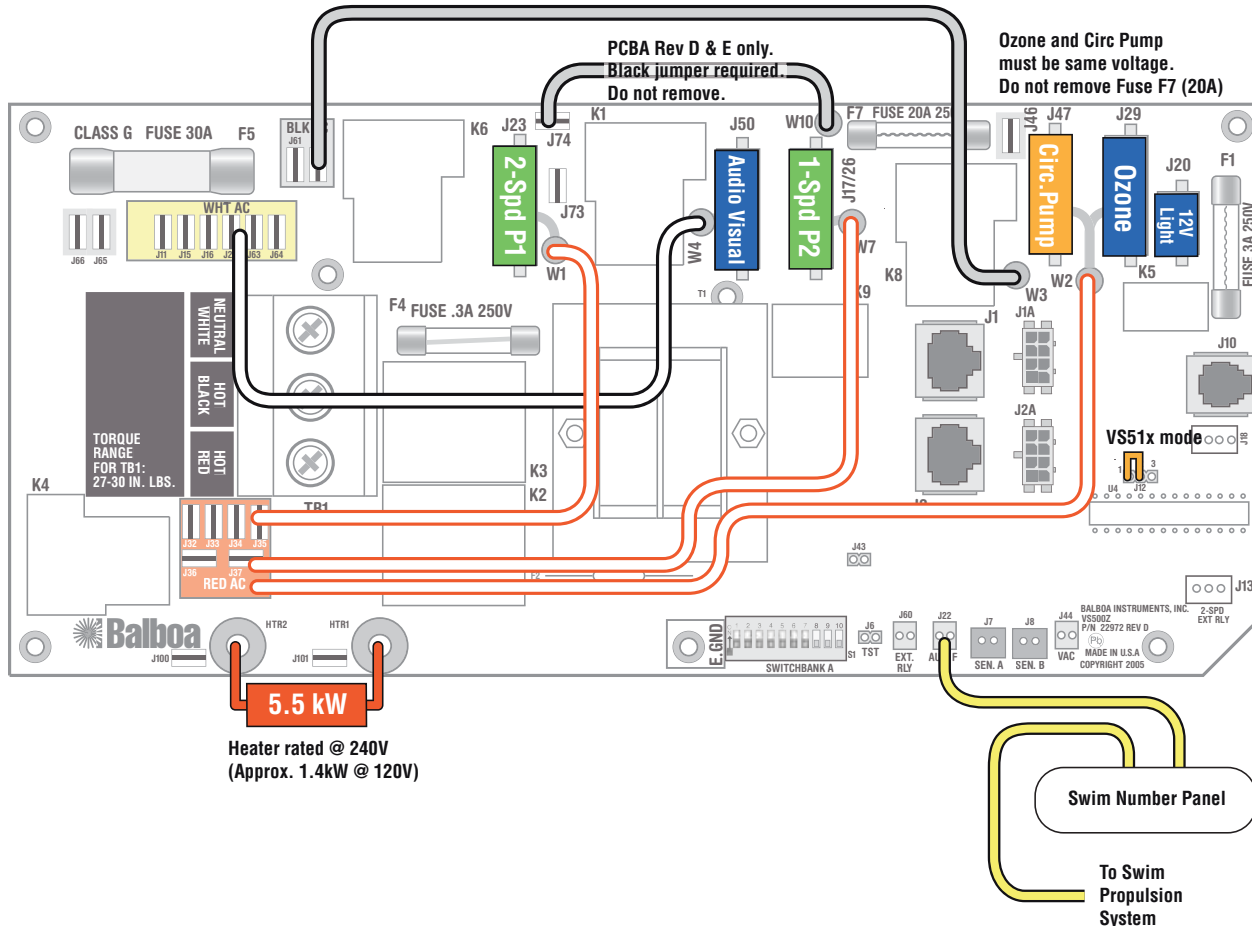|	
———	120 Volt Connections
———	240 Volt Connections
———	Black AC Jumpers
———	12 Volt Connections
———	Relay Control Wires

Board Connector Key

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

Panel Button Assignments

1=Mode   5=Pump 1
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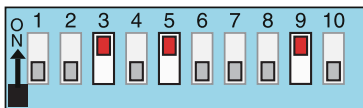
Panel Button Positions

Setup 3

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Circ Pump *

- 240V Ozone *
- 12V Spa Light
- 120V AV (Stereo)

- 240V 5.5kW Heater
- VP280S Main Panel

WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.
WARNING: Persistent Memory (J43) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

SSID #

71
93
46

Switchbank A

A1, Test Mode OFF
A2, See Table 1
A3, J17/26 Pump Enabled
A4, Must be OFF
A5, 2-speed P1

A6, 60 Hz
A7, Exp Board Equip Disabled
A8, Degrees F
A9, 24 Hour 3ºF Circ Pump
A10, See Table 1

VS51x/VS5xxS/VS5xxD Compatible

J12

1   2   3

J43   Memory Reset

Wiring Color Key

- 120 Volt Connections
- 240 Volt Connections
- Black AC Jumpers
- 12 Volt Connections
- Relay Control Wires

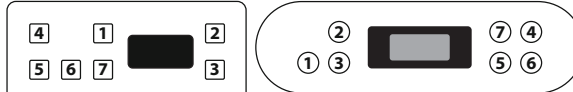### Board Connector Key

1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground

Note flat sides in connector

Panel Button Assignments

1=Mode   5=Pump 1
2=Temp Up   6=Pump 2
3=Temp Down   7=Light
4=Exp Board with A7 ON

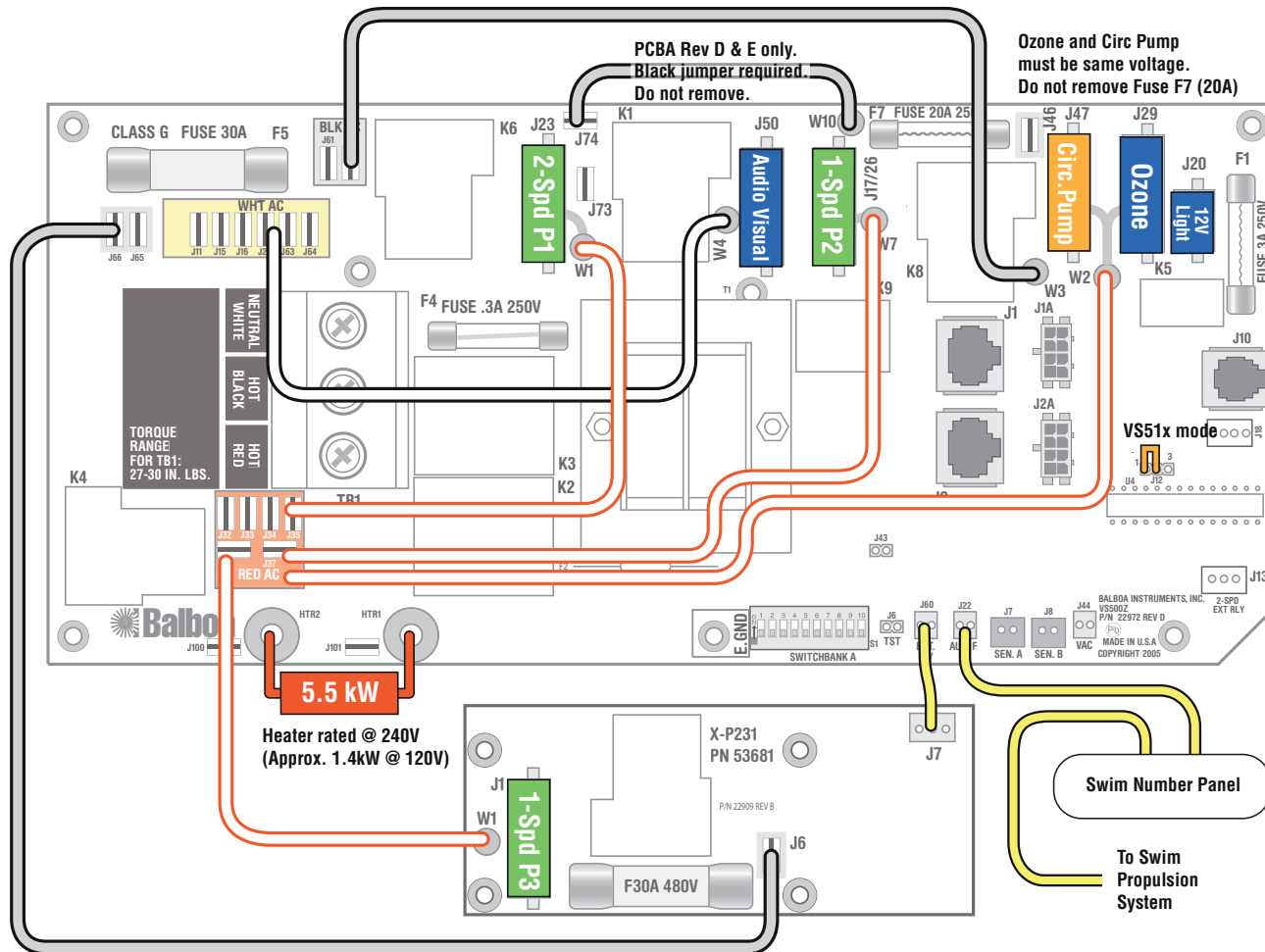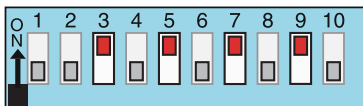### Panel Button Positions

Setup 4

- 240V Pump 1, 2-Speed
- 240V Pump 2, 1-Speed
- 240V Pump 3, 1-Speed

- 240V Circ Pump *
- 240V Ozone *
- 12V Spa Light

- 120V AV (Stereo)
- 240V 5.5kW Heater
- VP280S Main Panel

PCBA Rev D & E only.
Black jumper required.
Do not remove.

Ozone and Circ Pump
must be same voltage.
Do not remove Fuse F7 (20A)

CLASS G FUSE 30A F5
BLK J61
WHT AC
J11 J15 J16 J2 J63 J64
J66 J65
NEUTRAL WHITE
HOT BLACK
HOT RED
TORQUE RANGE FOR TB1: 27-30 IN. LBS.
K4
TB1
J32 J33 J34 J35
J37
RED AC
Balboa
HTR2 HTR1
J100 J101
5.5 kW
Heater rated @ 240V
(Approx. 1.4kW @ 120V)

K6 J23
J74
2-Spd P1
J73
W1
F4 FUSE .3A 250V
K3
K2
E. GND
1 2 3 4 5 6 7 8 9 10
S1
SWITCHBANK A

K1
J50
Audio Visual
W4
T1
J6 TST
J60
J22
ALT
J7 J8
SEN. A SEN. B
J44
VAC

W10
1-Spd P2
J17/26
W7
K9
K8
J1A
J2A
VS51x mode
U4 J12
J43
J9

F7 FUSE 20A 250V
J47 J29
Circ.Pump
W2
W3
J1

Ozone
J20
12V Light
K5
F1
FUSE 3A 250V
J10
J13
BALBOA INSTRUMENTS, INC.
VS500Z
P/N 22972 REV D
MADE IN U.S.A.
COPYRIGHT 2005
2-SPD EXT RLY

X-P231
PN 53681
P/N 22909 REV B
J1
W1
1-Spd P3
J6
F30A 480V

J7
Swim Number Panel
To Swim Propulsion System

WARNING: Main Power to system should be turned OFF BEFORE adjusting DIP switches.
WARNING: Persistent Memory (J43) must be RESET to allow new DIP switch settings to take effect. (See Persistent Memory page)

SSID #
71
93
46

Switchbank A

ON 1 2 3 4 5 6 7 8 9 10

A1, Test Mode OFF
A2, See Table 1
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A4, Must be OFF
A5, 2-speed P1
A6, 60 Hz
A7, Exp Board Equip Enabled
A8, Degrees F
A9, 24 Hour 3ºF Circ Pump
A10, See Table 1

VS51x/VS5xxS/VS5xxD Compatible
J12
1 2 3

J43
Memory Reset

Wiring Color Key

	120 Volt Connections
	240 Volt Connections
	Black AC Jumpers
	12 Volt Connections
	Relay Control Wires

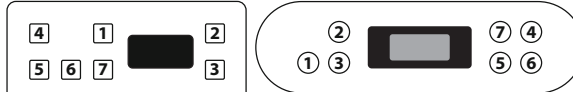**Board Connector Key**

1 Typically Line voltage
2 Typically Line voltage for 2-speed pumps
3 Neutral (Common)
4 Ground

Note flat sides in connector

Panel Button Assignments

1=Mode   5=Pump 1
2=Temp Up   6=Pump 2
3=Temp Down   7=Light
4=Exp Board with A7 ON

Panel Button Positions

4 1 2
5 6 7 3

2
1 3
7 4
5 6

SSID 71 93 46   Base Model VS503SZ-VS504SZ-VS514SZ

DIP Switch Key

A1   Test Mode (normally OFF)

A2+A10   Control amp draw requirements (See Table 1)

A3   "ON" position: J17/26 Enabled for 1-speed Pump only.

   "OFF" position: J17/26 Disabled.

A4   Heat Disable (must be OFF)

A5+A9   Pump 1 speeds and Circ Modes:

A5	A9	Circ Mode	Pump 1 Speed
OFF	OFF	Non-circ	2-speed
ON	OFF	Circ "acts like Pump 1 low" (filters/polls/ect)	1-speed
OFF	ON	24 hours with 3°F shut-off	1-speed
ON	ON	24 hours with 3°F shut-off	2-speed

Table 1		# of Hi-Speed Pumps/Blower Before Heat Disabled
A2	**A10**	
OFF	OFF	0
ON	OFF	1
OFF	ON	2
ON	ON	3

A6   "ON" position: 50Hz operation

   "OFF" position: 60Hz operation

A7   "ON" position: Expander Board Enabled for Blower or 1-speed Pump.

   "OFF" position: Expander Board Disabled

A8   "ON" position: temperature is displayed in degrees Celsius

   "OFF" position: temperature is displayed in degrees Fahrenheit

When using a Blower, use X-B expander board. When using a 1-speed Pump 3, use X-P or X-P231, depending on amperage requirements.

* Panel with button layout is not compatible.

Jumper Key

J12   **Factory set. DO NOT MOVE.**

   Jumper must be on Pins 1 and 2 for VS51xZ/VS52xZ/VS5xxSZ/VS5xxDZ software.

   Jumper must be on Pins 2 and 3 for VS50xZ software.

J43   When jumper is placed on 2 pins during power-up, system will reset persistent memory.

   Leave on 1 pin only to enable persistent memory feature.

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.

Panel Button Positions
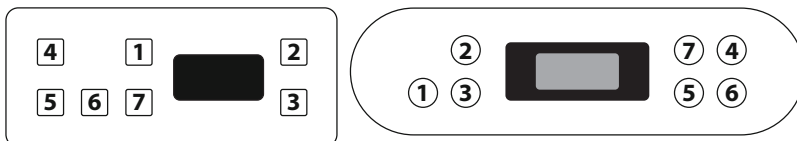
Aux Panel Information

Supports 2-button aux panel

VX20   [5]   [6]   When A3 is ON

VX20   [5]   [7]   When A3 is OFF

Panel Button Assignments

1=Mode   5=Pump 1
2=Temp Up   6=Pump 2 (when A3 is ON)
3=Temp Down   7=Light
4=Exp Board when A7 is ON

Supports 4-button aux panel

VX40S   [5] [6]   [4] [7]

Ozone Connector Voltage: The VS500Z circuit board is factory configured to deliver a preset voltage (120V or 240V) to the on-board ozone connector (J29). See the ratings table on the wiring diagram attached to the cover of the enclosure for the configured voltage. For 240V output W2 connects to Red AC and for 120V output W2 connects to White AC.

The voltage to the ozone connector can be changed in the field if required. W2 just needs to be set for the required voltage.

WARNING: Changing the voltage of the ozone connector also effects the voltage supplied to the circ pump connector (J47). Any equipment controlled by that connector may be damaged if the wrong voltage is selected.

Balboa Ozone Generator: 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.

Balboa Ozone connector configuration for 120V 60Hz

Line - Black conductor
Use this slot for the leftover Red conductor
Common - Install the White conductor here for 120V ozone
Ground (Green) conductor

B

G

Flat sides of sockets as shown
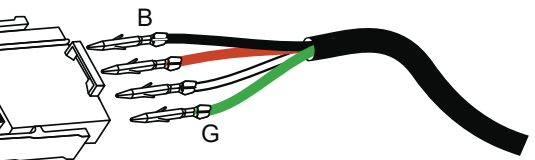
Balboa Ozone connector configuration for 240V 60Hz

Line - Black conductor
Use this slot for the leftover White conductor
Common - Install the Red conductor here for 240V ozone
Ground (Green) conductor

B

G
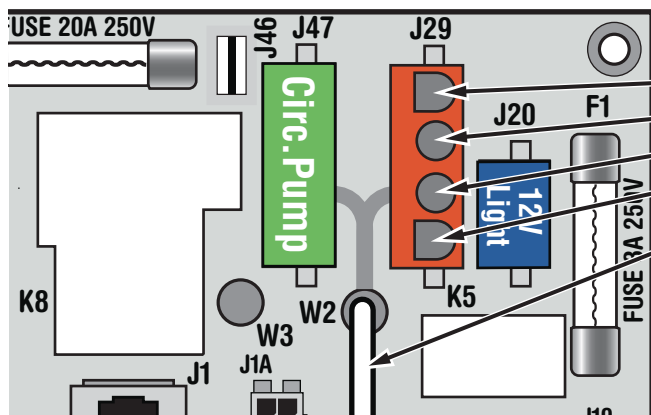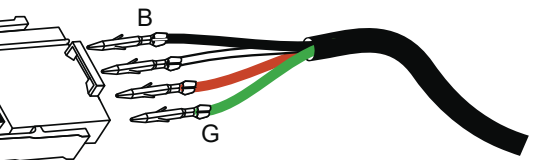
Line - Black conductor
Use this slot for the leftover conductor
Common - Red for 240V or White for 120V ozone (See W2 wire)
Ground (Green) conductor
W2 wire determines voltage

FUSE 20A 250V
J46
J47
J29
J20
F1
Circ.Pump
12V Light
FUSE 3A 250V
K8
K5
W2
W3
J1
J1A

VP280S
PN 55176 with customer-applied Overlay PN 12137
• Connects to Main Board terminal J1 only*

*** Panels with back-lighting (bulbs installed) should never be plugged into J2. Use J1 only.
   If the backlight bulbs are removed, then both J1 and J2 may be used.**