NBP2100H Tech Sheet

Customer:	NanTong					
Part Number:	56749	800 Incoloy 3kW				
Custom Roy Quarlay						
Custom Box Overlay						
Box Overlay Part Number	N/A					
CE System Model:	BP21-NBP2	100H-RCA3.0K				
Software Version ID:	M100_225	V27.0				
Software Version:	27.0					
File Name:	BP2100_27	.0_NBP2100H_SW.hex				
Configuration Signature:	09D86769					
Eng. Project Number:	4459					

Control Panels:

TP800 version 3.1* or later (Version 3.13 or later required for bba[™])

* TP800 version 4.2 or later (or spaTouch[™] version 2.2 or later) required for new reminders to display correctly.





System Revision History

Part #	EPN	Date	Originator	Changes Made
ZT000084	4248	04-10-14	BWG	New generic BP2100 with 4 Pumps plus optional blower and/or Circ.
56625,	4248	05-01-14	BWG	Released to production.
56626,				
56627				
ZT000147	4459	03-02-15	Customer	Custom BP2100 system with heater on its own service (except in 4-pump setups).
56749	4459	04-08-15	Customer	Approved for production.

bba™ (Balboa Bluetooth Amp) connection is documented seperately.

bba[™] is only integrated into graphic display panels (TP800, TP900 and spaTouch[™]). With TP600 the Aux button operation of bba[™] must be used.



Basic Functions Setup 1-8

Power Requirements:

Single Service [3 wires (line, neutral, ground)] – RESTRICTED OPERATIONS (See page 5) 230VAC, 50/60Hz^{*}, 1þ, 32A, (Circuit Breaker rating = 40A max.)

Dual Service N/A

3-Service [5 wires (line 1, line 2, line 3, neutral, ground)] 400VAC, 50/60Hz*, 3b, 16A, (Circuit Breaker rating = 20A max each phase line.)

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

*BP systems automatically detect 50Hz vs 60Hz.

In 3x16A Service:

Pump 2 and Pump 3 (if any) are on one service.

Pump 4 and the heater are on another service.

Everything else is on the remaining service. (Note: When using Blower, wiring must be changed for Blower to not be on the heater service.)

HiPot Testing Note:

Disconnect slip terminal with green wires from J11 prior to performing HiPot test. Failure to disconnect may cause a false failure of the test. Reconnect terminal to J11 after successful completion of HiPot test.



System Ouputs:

Pump 1		2-Speed 1-Speed in S eater pump in 20 GPM thron	n Setups 1-4	15-minute timer for High Speed, 15-Minute timer for Low Speed
Pump 2	230VAC	1-Speed	8A max**	15-minute timer
Pump 3	230VAC	1-Speed Unused in Se	8A max etups 4, 8, 9	15-minute timer & 10
Pump 4	230VAC		10A max 1ps 1, 5, 9 &	15-minute timer 10 only
Blower	230VAC	1 Speed Unused in Se	4A max etups 1, 2, 5,	15-minute timer 6, 9 & 10
Circ Pump		1-Speed eater pump in 20 GPM thron	•	Programmable Filtration Cycles + Polling
Ozone	230VAC		.5A max	Slaved to Circ Pump in Setups 5-8 Independent in Setups 1-4, 9 & 10
Spa Light	10VAC	0n/0ff	1A max	240-minute timer.
A/V (Stereo)	230VAC	Hot	2A max*	Always on
Heater	3.0kW @ 24	OVAC max		

In Setups 9 & 10 *only*: Pumps 1, 2 & 4 can be 12A max each.

* See restrictions on next page.

** When there is no Pump 3 (ie. in Setups 4 & 8 only), Pump 2 can be 10A max.



Basic Functions Setup 1-8

Restrictions:

In 3x16A, all equipment (if within the individual maximums listed on page 4) can run together, except the heater turns off with any high-speed pump or blower, when running 4 pumps (Setup 1 or Setup 5). (DIP switch A5 must be OFF.)

In 1x32A, DIP switch A5 must be ON. With DIP Switch A5 ON, only 3 pumps (any 3 pumps) can be ON at high speed at any one time, and the blower will not run when 3 pumps are ON at high speed.

In 1x40A, with DIP switch A5 ON, it works just like at 1x32A.

To be able to use 1x40A with DIP switch A5 OFF (ie, no restrictions except for the heater), all the 230V equipment used in the spa (except for the heater) must add up to no more than 39.5 Amps. This means all pumps, the blower (if any), the circ pump (if any), the ozone, and A/V (if any). (There is 0.5 Amps at 230V reserved for board and panel power as well as 10V equipment including the spa lights. That is why the 230V equipment must add up to 39.5 Amps rather than 40.0 Amps.)

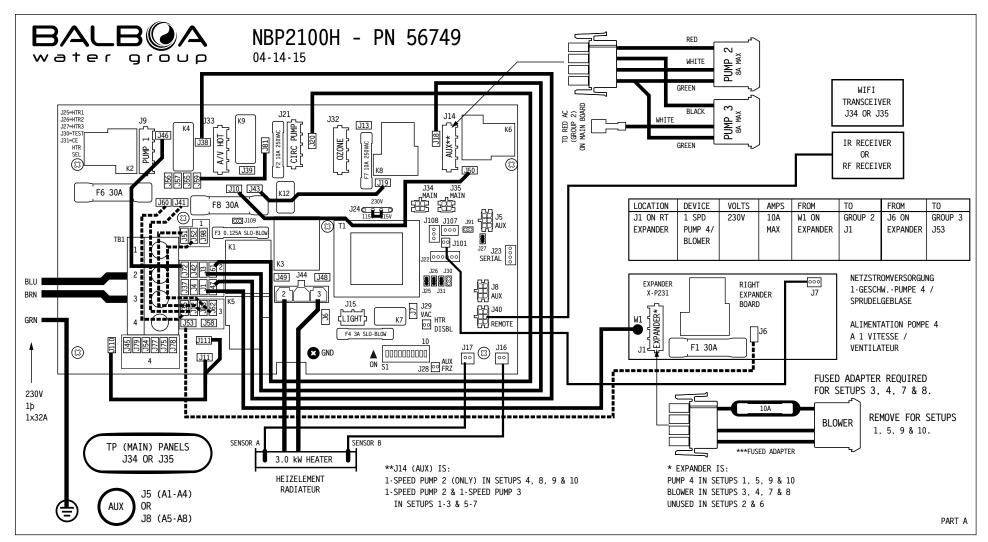
See this chart for some 1x40A examples:

Pump 1	10A	10A
Pump 2	8A	8A
Pump 3	8A	8A
Pump 4	10A	None
Blower	None	4A
Circ	2A	2A
Ozone	0.5A	0.5A
A/V	None	2A
Total	38.5A	34.5A
Will it work?	Yes	Yes



Hardware Setup

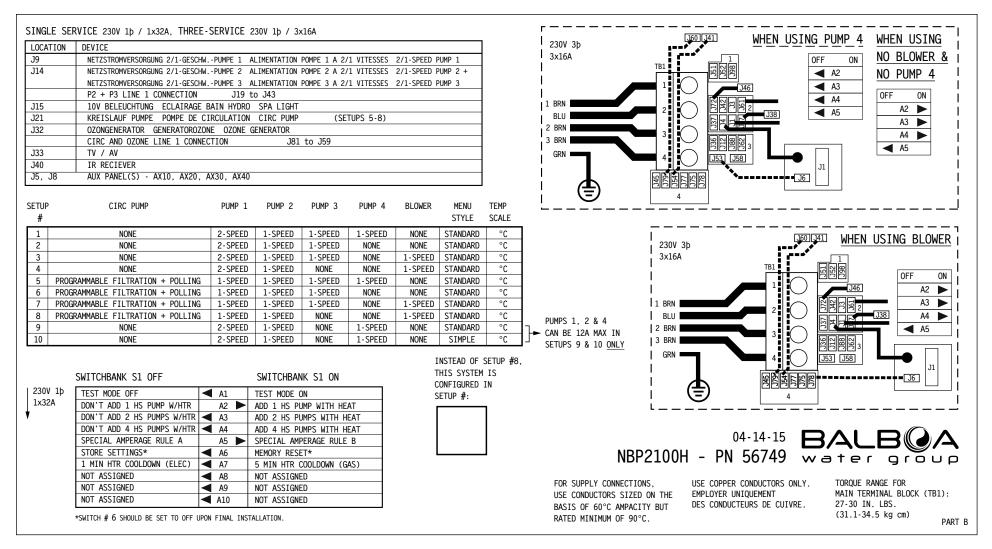
Wiring Diagram





Hardware Setup

Settings





Setup Reference Table

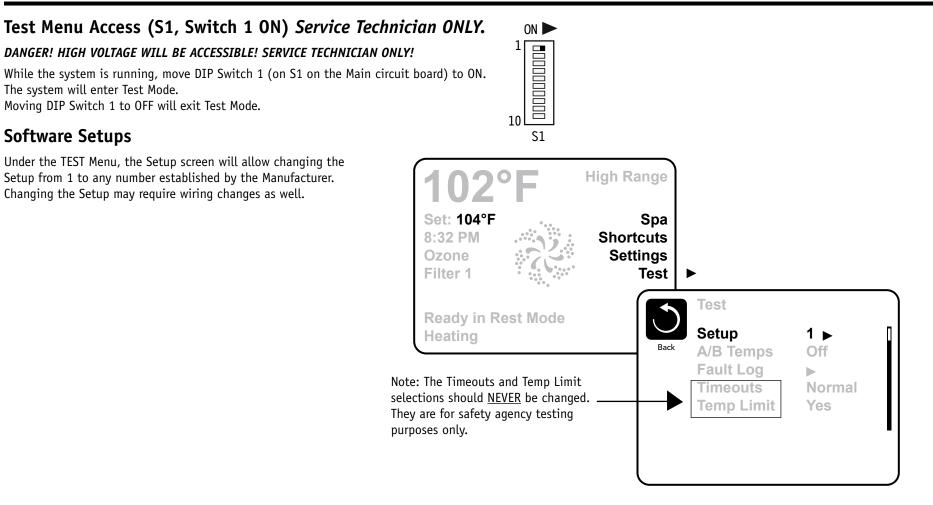
Setup #	Circ Pump	Pump 1	Pump 2	Pump 3	Pump 4	Blower	Menu Style	Temp Scale
1	None	2-Speed	1-Speed	1-Speed	1-Speed	None	Standard	°C
2	None	2-Speed	1-Speed	1-Speed	None	None	Standard	°C
3	None	2-Speed	1-Speed	1-Speed	None	1-Speed	Standard	°C
4	None	2-Speed	1-Speed	None	None	1-Speed	Standard	°C
5	Programmable Filtration + Polling	1-Speed	1-Speed	1-Speed	1-Speed	None	Standard	°C
6	Programmable Filtration + Polling	1-Speed	1-Speed	1-Speed	None	None	Standard	°C
7	Programmable Filtration + Polling	1-Speed	1-Speed	1-Speed	None	1-Speed	Standard	°C
8	Programmable Filtration + Polling	1-Speed	1-Speed	None	None	1-Speed	Standard	°C
9	None	2-Speed	1-Speed	None	1-Speed	None	Standard	°C
10	None	2-Speed	1-Speed	None	1-Speed	None	Simple	°C

System (and any replacement board) is shipped in Setup 8

Color	Output										
Кеу											
	XP231										
	XP231 and in-line Blower fuse										
	J14 (Aux) on Main Board										



Changing Software Setups with TP800 / TP900 / spaTouch™ Menued Panel





Equipment Expansion

Expansion Features Control Connection

DefaultFuseUndefinedNoneSee Below30A1-Speed Pump 4OR1-Speed Blower (with Fused Adapter)UndefinedNoneNone

Relay 9/10 (J108)

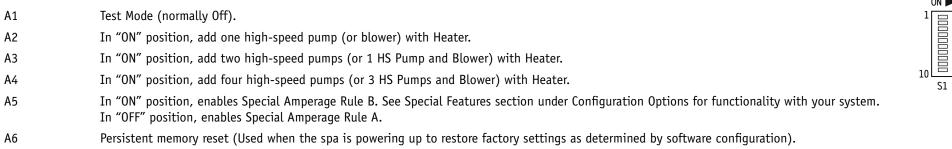
Relay 1 (J101)

Relay 7/8 (J107)



DIP Switch Functions

Fixed-fuction DIP Switches



A2, A3, and A4 work in combination to determine the number of high-speed devices and blowers that can run before the heat is disabled. i.e. A2 and A3 in the ON position and A4 in the OFF position will allow the heater to operate with up to 3 high-speed pumps (or two HS Pumps and Blower) running at the same time. Heat is disabled when the fourth high-speed pump or blower is turned on.

Note: A2/A3/A4 all off = No heat with any high-speed pump or blower.

Assignable DIP Switches

Α7 In "ON" position, enables a 5-minute cooldown for some gas heaters (Cooling Time B). In "OFF" position, enables a 1-minute cooldown for electric heaters (Cooling Time A).

Undesignated switches are not assigned a function.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. © Copyright 2012 Balboa Water Group.



ON 🕨

S1

Jumper Definitions

J109	Non Applicable on CE models	J109 🖸
J91	Real Time Clock Enable/Disable	J91 🖾 🖬
	<i>Note:</i> This Jumper should NOT be shorted when the Control Panel can display time of day.	
J30	Do Not Use	
J31	Jumper on 1 pin with 2.0kW or smaller heater	J31
	Jumper on 2 pins with a 3.0kW or higher heater	J31
J29	Heater Disable Switch Connection. If J29 is shorted by any means, the heater will not run until J29 is no longer shorted.	J29 💍
	If J29 is shorted during power-up "J29" will appear on the panel.	023 0
	The message can be dismissed with a button press, and is the only control panel notification of J29 being shorted. No message is displayed if J29 is shorted after power-up, but the heater will not run until J29 is no longer shorted.	
	J29 expects a switch closure (not a voltage) as the command signal.	
	In some areas, a local power company may offer discounts based on voluntary "power shedding" devices that may be installed	in conjunction with the spa.
J25, J26, J27	Heater Type Settings.	3 127
	Note: Factory Configured do not change.	J25 🚰 🎦 J26
J24	Jumper on center two pins (230V) when heater is running at 240V.	230V
	Two Jumpers installed; one on left 2 pins and one on right 2 pins (115V) when heater is running at 120V.	J24 0 0 0 0 115 15V
Warning!		
Se	tting DIP switches or jumpers incorrectly may cause abnormal system behavior and/or damage to system components.	

Contact Balboa if you require additional configuration pages added to this tech sheet.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.



Replacement Parts

10A

PCBA: Main PCBA: Expander PCBA:		56750 55137
HEATER(s): Plug + Click Heater Kit:		58300
Temp Sensor:		30344
CABLES:		25739 Y-Adapter P2+P3 25681 Adapter Blower
FUSES: Part Number	Amperage	Location
30136	30A	F6, F8, F1 (Expander)
20600	3A	F4
26397	1/8A	F3

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. © Copyright 2012 Balboa Water Group.

F2, F7



30122

General Features	
Feature	Default
Pump 1 in Filter Cycle (Circ Only)	No
Pump 1 Low Timer	30 Minutes
General Pump Timer	15 Minutes
Blower Timer	15 Minutes
Mister Timer	15 Minutes
Light Timer	240 Minutes
Circ (when enabled)	Programmable + Polling
Cleanup Cycle	30 Minutes
Cleaup as Preference setting	Yes
Ozone	With Heater Pump*
Ozone Suppression	OFF
Pump Purge	60 Seconds
Blower Purge	30 Seconds
Mister Purge	5 Seconds
Purge Type	Serial - Pumps at lowest speed

* The heater Pump can be either a Circ Pump or Pump 1 Low.



Temperature Features

Feature	Default
Temperature Display	°C

All temperatures must be specified in °F. The system converts °F to °C dynamically. If Celsius is required for default settings, choose a desired °C value that (after rounding) corresponds to a Fahrenheit value.

c	С	4	5	6	7	8	9	10	11	12	13	14	15	<i>16</i>	17	18	19	20	21	22
c	F	39	41	43	45	46	48	50	52	54	55	57	59	61	63	64	66	68	70	72
c	С	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
c	F	73	75	77	79	81	82	84	86	88	90	91	93	95	97	99	100	102	104	
ŀ	Hi-Range Min. Set Temp 80°F								80°F											
Hi-Range Max. Set Temp								104°												
Hi-Range Default Temp*								100°F												
L	Lo-Range Min. Set Temp							50°F												
L	Lo-Range Max. Set Temp							99°F												
L	Lo-Range Default Temp*							70°F												
Freeze Threshold							44°F													
F	Freeze Type								Rotating - Pumps at Lowest Speed											
Temp Lock Type							Temp) + Set	tings			-								
	•								•											

*May be changed by end-user (if enabled)



Time Features

Feature	Default
Time Format*	24 Hour
Filter 1 Start Hour*	20:00 (8:00 PM)
Filter 1 Duration*	2 Hours
Filter Cycle 2 Default*	OFF
Filter 2 Start Hour*	08:00 (8:00 AM)
Filter 2 Duration*	15 Minutes
Light Cycle	Disabled
Light Cycle Default*	OFF
Light Cycle Start Hour*	21:00 (9:00 PM)
Light Cycle Duration*	15 Minutes
Cooling Time A	1 Minute
Cooling Time B	5 Minutes

*May be changed by end-user (if enabled)



Reminder Features

Feature	Default
Reminders Shown*	Yes
Check pH	7 Days
Check Sanitizer	7 Days
Clean Filter	7 Days
Test GFCI	60 Days
Drain Water	90 Days
Change Cartridge	OFF
Clean Cover	90 Days
Treat Wood	OFF
Change Filter	120 Days
Check Ozone (E047**)	365 Days
Service Check-up (E048**)	240 Days

** On TP panels that have not been updated to display these new reminders, they will display as these numeric codes.

*May be changed by end-user (if enabled)



Special Features	
Feature	Default
Special Amperage Rule A	No Limitation
Special Amperage Rule B	3 high-speed pumps max. Blower turns off with 3 high speed pumps
Drain Mode	Disabled
Demo Mode	Disabled
GFCI Trip	Not Applicable for CE Models
Ozone Slaved to Heater Pump	Yes in circ setups No in non-circ setups
Dual Voltage Heater	Always Input Voltage
Safety Suction	Disabled
Menu Style	Standard in Setups 1 - 9 Simple in Setup 10



TP800 Panel Configuration

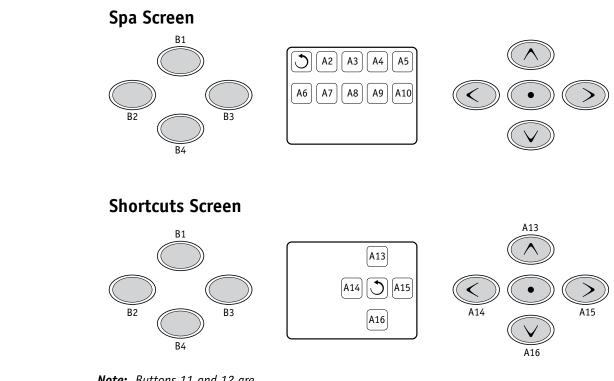
Button Layout Table

Feature #	4 Pumps & Circ	4 Pumps & No Circ	NO Blower & Jets 3	Blower & Jets 3	Blower & NO Jets 3	NO Blower & Jets 3 & Circ	Blower & Jets 3 & Circ	Blower & NO Jets 3 & Circ	Pumps 1, 2 & 4, NO Circ
	Setup 5	Setup 1	Setup 2	Setup 3	Setup 4	Setup 6	Setup 7	Setup 8	Setup 9
A1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A2	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1
A3	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2
A4	Jets 3	Jets 3	Jets 3	Jets 3	Blower	Jets 3	Jets 3	Blower	Jets 4
A5	Jets 4	Jets 4	Light 1	Blower	Light 1	Light 1	Blower	Light 1	Light 1
A6	Light 1	Light 1	Invert	Light 1	Invert	Invert	Light 1	Invert	Invert
A7	Invert	Invert	Undefined	Invert	Undefined	Undefined	Invert	(Circ Icon)	Undefined
A8	(Circ Icon)	Undefined	Undefined	Undefined	Undefined	Undefined	(Circ Icon)	Undefined	Undefined
A9	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A10	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A13	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A14	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A15	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
A16	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
B1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1	Jets 1
B2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2	Jets 2
B3	Jets 3	Jets 3	Jets 3	Jets 3	Blower	Jets 3	Jets 3	Blower	Jets 4
B4	Jets 4	Jets 4	Light 1	Blower	Light 1	Light 1	Blower	Light 1	Light 1

TP800 is not supported in Simplified Menu Setup 10.



TP800 Panel Configuration



Note: Buttons 11 and 12 are not used in this configuration.

Button 1 is fixed.

A Circ Icon will appear when a Circ Pump is configured.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending. © Copyright 2012 Balboa Water Group.



TP600 Panel Configuration

Button Layout Table

Button #	Setups 9 & 10	
1	Jets 1	
2	Jets 2	
3	Jets 3	
4	Up	
5	Light 1	
6	Down	
LED 1	Jets 1	
LED 2	Jets 2	
LED 3	Light 1	
LED 4	Heat On	

TP600 is not supported in Setups 1 - 8.





Auxilliary Panel Features on Bank 1*

Feature	Default
Aux Button A1	Jets 1
Aux Button A2	Jets 2
Aux Button A3	Blower
Aux Button A4	Light

Auxilliary Panel Features on Bank 2*

Feature	Setups 1, 5, 9 & 10	Setups 2 & 6	Setups 3 & 7	Setups 4 & 8
Aux Button A5	Jets 1	Jets 1	Jets 1	Jets 1
Aux Button A6	Jets 2	Jets 2	Jets 2	Jets 2
Aux Button A7	Jets 3	Jets 3	Jets 3	Blower
Aux Button A8	Jets 4	Light	Blower	Light

*Bank 1 consists of J5 on the Main Circuit Board. Bank 2 consists of J8 on the Main Circuit Board. Aux Connection Splitter PN25257 may be required.

Buttons that are assigned to equipment that is not defined in a Setup will not do anything in that Setup.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.



Template 56377 10-05-12

Auxilliary Panel Features

AX10 Panels on Bank 1*

 A1, AX10A1
 No 0/L
 52803

 A2, AX10A2
 No 0/L
 52804

 A3, AX10A3
 No 0/L
 52805

 A4, AX10A4
 No 0/L
 52806

AX10 Panels on Bank 2*

A5, AX10A1	No O/L	52803
A6, AX10A2	No O/L	52804
A7, AX10A3	No O/L	52805
A8, AX10A4	No O/L	52806

No 0/L

No 0/L

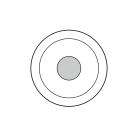
No 0/L

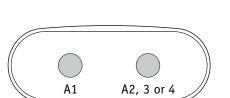
52800

52801

52802

52799





Call Customer Service for additional information about Auxiliary Panels.

*Bank 1 consists of J5 on the Main Circuit Board. Bank 2 consists of J8 on the Main Circuit Board. Aux Connection Splitter PN25257 may be required.

AX20 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 or A4. AX20 Auxiliary Panel plugged into Bank 2 will operate A5 + A6, A7 or A8.

AX40

AX20

AX20 A1A2

AX20 A1A3

AX20 A1A4

AX40 No 0/L

A1 A2 A3 A4

AX40 Auxiliary Panel plugged into Bank 1 will operate A1 + A2, A3 and A4. AX40 Auxiliary Panel plugged into Bank 2 will operate A5 + A6, A7 and A8.

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.



Template 56377 10-05-12

Remote Panel Features

Feature	Setups 1, 5, 9 & 10	Setups 2 & 6	Setups 3 & 7	Setups 4 & 8
Remote Button A1	Jets 1	Jets 1	Jets 1	Jets 1
Remote Button A2	Jets 2	Jets 2	Jets 2	Jets 2
Remote Button A4	Jets 3	Jets 3	Jets 3	Blower
Remote Button A5	Jets 4	Light	Blower	Light

Remote buttons A3, A6, A7 and A8 are Undefined.

Buttons that are assigned to equipment that is not defined in a Setup will not do anything in that Setup.

Remote Panel Part Number

Overlay Part Number

Manufactured under one or more of these patents. U.S. Patents: 5332944, 5361215, 5550753, 5559720, 5,883,459, 6253227, 6282370, 6590188, 6976052, 6965815, 7030343, 7,417,834 b2, Canadian Patent: 2342614, Australian patent: 2373248 other patents both foreign and domestic applied for and pending.

