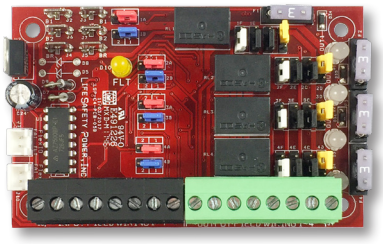
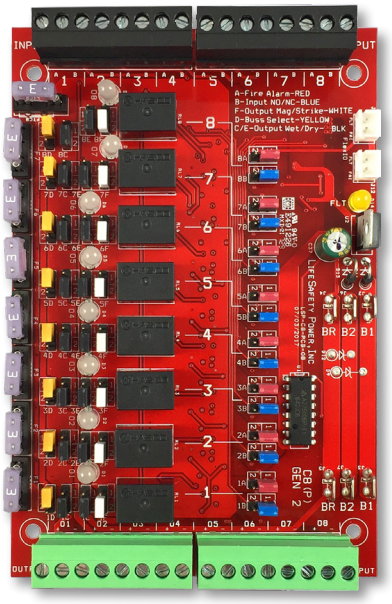
Power is knowledge.™

C4/C4P, C8/C8P Installation Manual

LifeSafety Power®

FLEXPOWER®





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P03-006 Rev A15

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Description

The C4/C4P/C8/C8P power control modules add 4 or 8 zones respectively, to an FPO power supply system. The C4/C4P/C8/C8P accept either one or two voltage sources, either of which are selectable for output on a zone-by-zone basis. Each zone is fully controllable via a zone input which accepts a voltage, relay contact, or open collector input. Each zone output is selectable for FAI operation, fail-safe or fail-secure, and voltage or relay contact output. The suffix "P" added to the model number denotes Class 2 Power Limited outputs.

Specifications

Power Input	Voltage	12 or 24VDC nominal
	Current	12A maximum
	Standby Current	350mA (C4) 700mA (C8) All lock control relays active
Zone Input	Voltage Input	12 or 24VDC
	Max Current	10mA
Zone Output	Voltage	Same as input
	C4/C8 Current	3.0A resistive
	C4P/C8P Current	2.5A resistive (Class 2 Power Ltd)
Fuse	3A	ATM automotive style (C4/C8 only)
Size	C4/C4P	4.00" x 2.50" x 1.0" (102mm x 64mm x 25 mm)
	C8/C8P	6.00" x 4.00" x 1.0" (152mm x 64mm x 25 mm)
Weight	C4/C4P	0.20lb (0.10kg)
	C8/C8P	0.35lb (0.16kg)

Regulatory Information

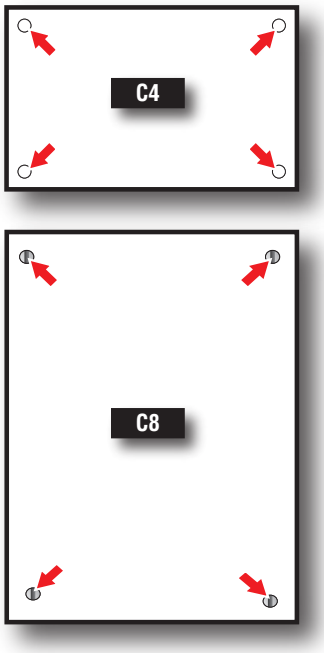
The equipment discussed within this manual has been tested to the following standards:

- UL294, UL603, UL1076
- ULC S318, ULC S319
- CSA C22.2 #205
- CSFM Approved

Mounting the C4/C4P/C8/C8P Power Control Modules

Mounting of the board to an enclosure is via the four snap-in standoffs supplied.

1. Locate the appropriate mounting holes in the enclosure and snap the standoffs into the holes.
2. Align the board mounting holes with the standoffs (be sure the PC board is properly oriented) and snap the board onto the standoffs.



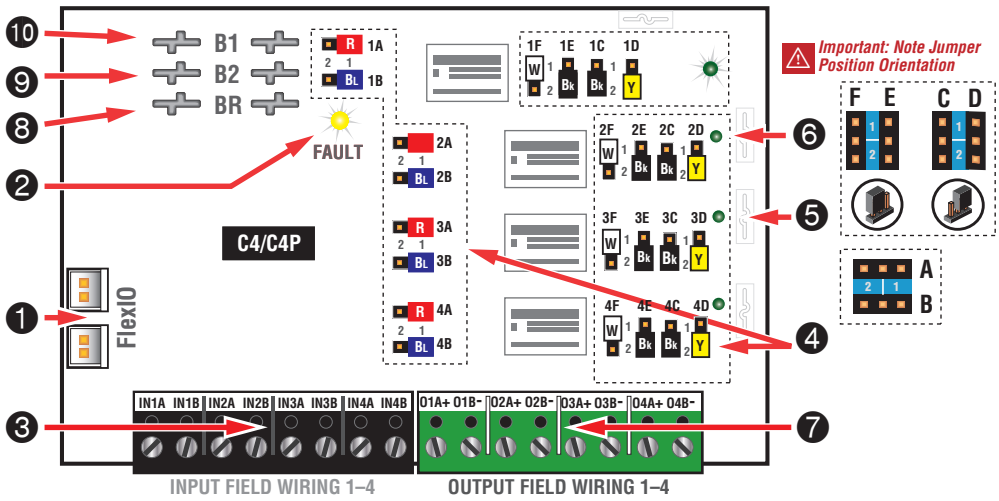
Class 2 power limited wiring must be seperated from non-power limited wiring by a minimum of 1/4 inch and must use seperate knockouts.

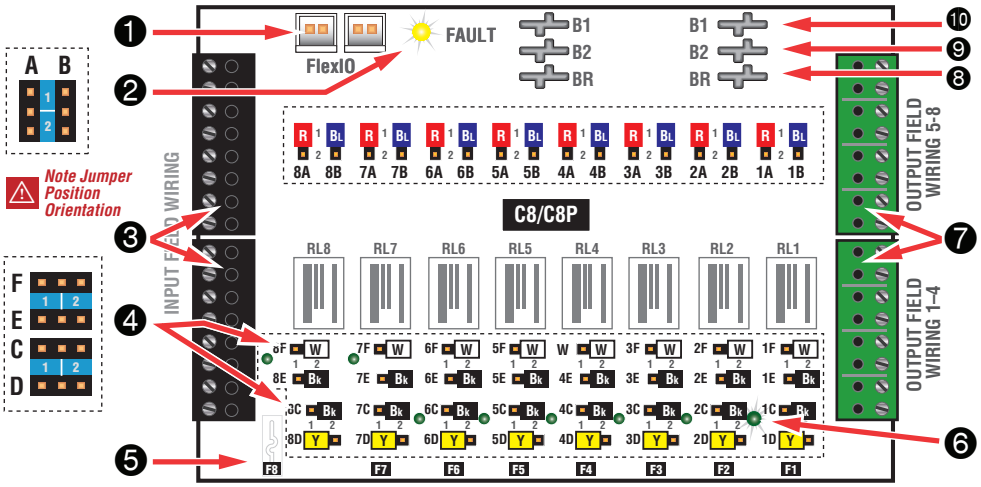
• The installation and all wiring methods shall be in accordance with ANSI/NFPA70 and all local codes.

For ULC compliance, installation and all wiring methods shall be in accordance with the Canadian Electrical Code, C22.1, Part I, Section 32 .

All input wiring to the module shall be located within the same room (3 m).

Power Control Accessory Overview





JUMPER PROGRAMMING

Reference / Jumper Color

A	RED	FAI
B	BLUE	INVERT input
C&E	BLACK	WET/DRY output
D	YELLOW	V SELECT
F	WHITE	INVERT output

Note: The relay contact output has a suppression diode across it, and cannot be used to switch AC voltage.

To switch DC voltage with these contacts, Terminal "B" should be positive, "A" negative."

❶ *FlexIO Connectors*

These connectors pass the FAI and Fault signals to and from the C4/C4P/C8/C8P board and pass the FlexIO buss on to other accessory boards in the system.

❷ *Fault LED (FLT) – Yellow*

This LED lights when the C4/C4P/C8/C8P detects a ruptured output fuse. This fault condition also transmits to the FPO power supply.

❸ *Zone Inputs (IN1 – IN4/IN8)*

These are the zone input terminal strips. These terminal strips are removable and accept wire sizes from AWG14 – AWG22. The terminals are labeled on the PC board near the terminal strip. See the Input Wiring section of this manual for more information.

- When using a relay contact input, the contact is connected across the A and B terminals. When configured for a relay contact input, it is normal to measure a voltage across these two terminals. This voltage is current limited and will not damage the activation contact.
- When using a voltage input, the voltage is connected to the B terminal. The activation voltage must be common grounded with the system voltage. The activation voltage must be between 12 and 24VDC nominal.
- When using an open collector (transistor) input, place a jumper across the A and B terminals and connect the open collector to the B terminal. Note that the input source must be common grounded with the C4/C4P or C8/C8P board's power source.

❹ *Configuration Jumpers (xA–xF)*

These jumpers program the zone's input, output, and FAI operation. Jumpers are color coded for ease of programming and jumper numbers correspond with the zone number (e.g. 1A is jumper A for Zone 1).

OBSERVE JUMPER ORIENTATION CAREFULLY - See the Common Jumper Settings Chart for more information. Jumpers and their possible settings are as follows:

Jumper A - RED (Zone FAI Enable)

This jumper enables or disables FAI for the selected zone. The FAI control input is on the FPO power supply board. *See Appendix A of the FPO manual for more information on the FAI Input.*

Pos. 1 *(FAI Enabled)* When this jumper is placed in position 1, the zone's output will invert when the input is active. This is typically used to drop power to maglocks on a fire alarm condition.

Pos. 2 *(FAI Disabled)* When this jumper is in position 2, FAI will have no effect on the zone's output.

Jumper B - BLUE (Input Invert)

This jumper is used to select a fail-safe or fail-secure input. Adjust this jumper so that the zone's output LED is FLASHING when the door is unlocked.

Pos. 1 *(Fail Safe)* Use this position for a NC contact input (contact OPENS to unlock door) or for a voltage input where the voltage is REMOVED to unlock the door.

Pos. 2 *(Fail Secure)* Use this position for a NO contact input (contact CLOSES to unlock door) or for a voltage input where the voltage is APPLIED to unlock the door.

Jumpers C & E - BLACK (Wet or Dry Output Selection)

These jumpers select whether the output is a relay contact output or a voltage output. **BOTH jumpers must be set to the same position for proper operation.**

⚠ The outputs of the C4 and C8 have built-in reverse protection diodes across each output. If a delay is present on lock release, or when using as a dry relay contact output, the diode can be removed from the circuit. See page 6 for more information.

Pos. 1 *(Relay Contact Output)* By placing both jumpers in Position 1, the zone's output is set as a relay contact output.

Pos. 2 *(Voltage Output)* By placing both jumpers in position 2, the zone's output is set to output the voltage of the buss selected by Jumper D (See below).

Jumper D - YELLOW (Voltage Buss Selection)

The C4 and C8 can each accept up to two power supply inputs connected to B1 and B2. This jumper selects which of the two power supply inputs are used for the zone's output. If only a single power supply is being used, set this jumper for Position 1. (Note: if the zone's output is set as a relay contact output, this jumper has no effect.)

Pos. 1 *(B1 Buss)* This position selects the power supply connected to the B1 input of the C4 or C8 board.

Pos. 2 *(B2 Buss)* This position selects the power supply connected to the B2 input of the C4 or C8 board.

Jumper F - WHITE (Output Invert)

This jumper is used to select a fail-safe or fail-secure output. Adjust this jumper so that the door is UNLOCKED when the zone output LED is flashing (Zone Active).

Pos. 1 *(NO / Voltage when input is activated)* When in Position 1, the output terminals will connect through the NC contact if set for a relay contact output or will output a voltage when the input is activated.

Pos. 2 *(NC / Voltage when input is deactivated)* When in Position 2, the output terminals will connect through the NO contact if set for a relay contact output or will not output a voltage when the input is activated. This position is typically used for Mag Locks.

❺ *Output Fuses (F1 – F8) – Optional*

When using the fused version of the C4/C8, these are the fuses for each zone output. Fuse numbers correspond with the zone number (e.g. F1 is the fuse for OUT1). When using the PTC version of the C4/C8, the fuse will be replaced with a soldered-in PTC. Fuses or PTCs are not in the circuit when the zone is configured as a relay contact output.

❻ *Output LEDs (01 – 08) – Green*

These LEDs indicate the status of the output. LED numbers correspond with the zone number (e.g. O1 is for Output 1).

- ***On Steady*** Door Locked (Fuse or PTC Intact)
- ***Flashing*** Door Unlocked (Either due to Zone Input or FAI)
- ***Off*** Fuse or PTC open

These LEDs are bi-color and indicate the output voltage for each output as follows:

- ***Green*** – 12V Output
- ***Blue*** – 24V Output

⚠**NOTE** LED colors are range based. Voltage Less than 13V will show Green. Voltage above 20V will show Blue. Voltage between 13 and 20 may show either voltage or a combination Green & Blue. Always verify voltage with a voltmeter.

⚠ Note that if an Output LED is operating opposite from expected (flashing in normal state, steady when the input is activated), but the output terminals are behaving as expected, then jumpers B and F should be placed into the opposite position.

❼ *Zone Outputs (01 – 04/08)*

These are the output terminal strips. These terminals are removable and accept wire sizes from AWG14 – AWG22. The terminals are labeled on the PC board near the terminal strip. See the Output Wiring section for more information.

- Relay Contact Outputs are across the A and B terminals. The selection for NO or NC is made by jumper F
- Voltage (Wet) Outputs are across the A and B terminals.
  - Positive is terminal B
  - DC Common is terminal A

⚠The C4 and C8 have reverse protection diodes across each output. If a delay is present on lock release, or when using as a dry relay contact output, the diode can be removed from the circuit. See page 6 for more information.

❽ *BR Connectors (J4 & J5)*

The DC Common buss in the system. All DC boards in the system must have their BR fastons wired together for proper operation.

❾ *B2 Connectors (J6 & J7)*

These are for connection to the B2 buss in the system. The voltage on the B2 buss comes from an FPO power supply or a B100 secondary supply in dual voltage systems. This voltage will be directed to any outputs whose yellow jumper (Jumper D) is set in the B2 position. If the C4/C8 is being used in a single voltage system, these fastons can be left unused.

❿ *B1 Connectors (J2 & J3)*

These are for connection to the B1 buss in the system. The voltage on the B1 buss comes from an FPO power supply. This voltage will be directed to any outputs whose yellow jumper (Jumper D) is set in the B1 position.

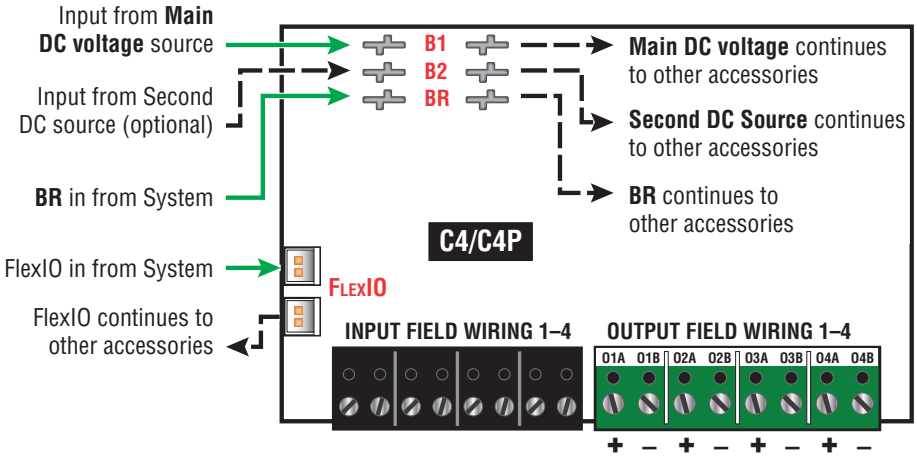
Connecting the Power Control Module

Remove all AC and battery power from the FPO system before adding or replacing a power control board.

Required Connections
Optional Connections

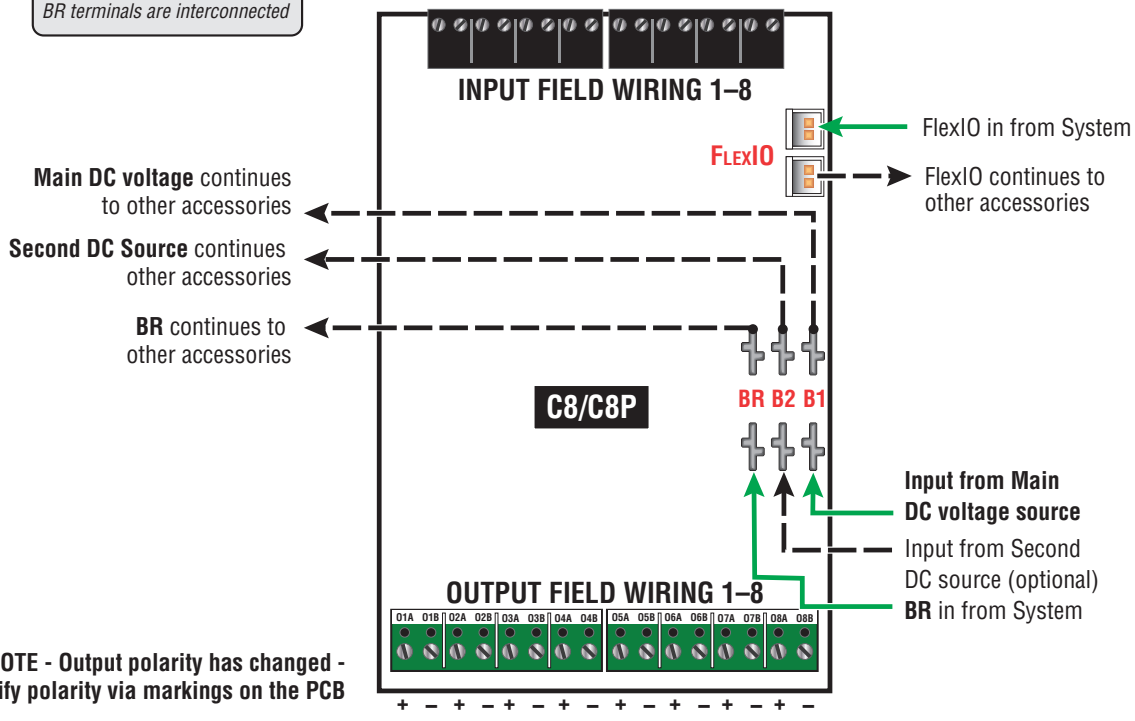
Each of the **B1, B2, BR,** and **FlexIO busses** has *two connectors.* These connectors may be used interchangeably.

For example: **FlexIO** from the power supply may be connected to either of the C4/C8's FlexIO connectors, the Main DC voltage source may connect to either B1 terminal, etc.



Note:
B1 terminals are interconnected
B2 terminals are interconnected
BR terminals are interconnected

NOTE - Output polarity has changed - Verify polarity via markings on the PCB



NOTE - Output polarity has changed - Verify polarity via markings on the PCB

Diode Removal

Reverse Protection Diodes

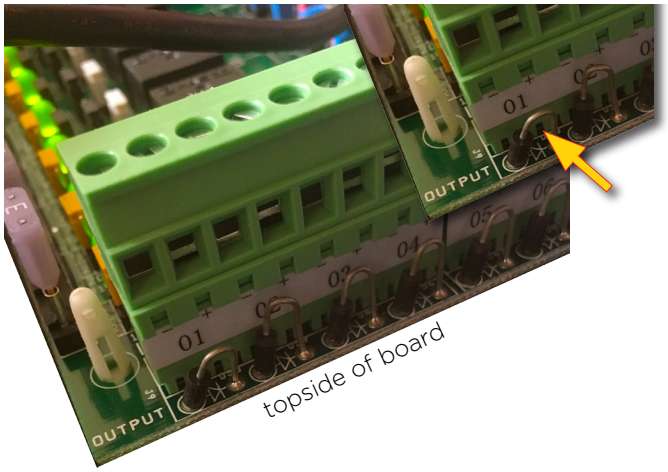
The outputs of the C4/C4P/C8/C8P have built-in reverse protection diodes. If a delay in lock release is present or if the zone is being used as a dry contact output, the diode from that zone may be removed from the circuit as shown below.

⚠ Only remove the diodes from outputs requiring their removal!

C8/C8P Diode Removal

The diodes on the C8/C8P are on the top side of the board between the output terminals and the edge of the board. To remove the diode from the output circuit, simply cut the exposed diode lead for the desired output zone - leave the diode body soldered to the pcb.

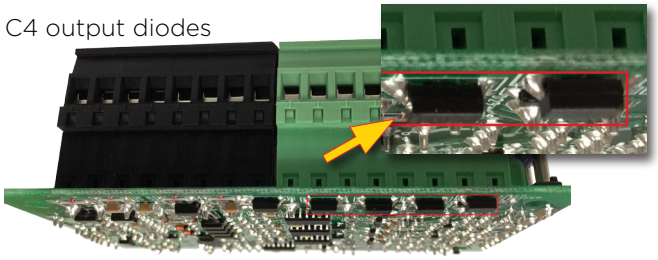
C8 output diodes



C4/C4P Diode Removal

The diodes on the C4/C4P are on the bottom side of the board under the output terminals. To remove the diode from the output circuit, simply cut the body of the diode for the desired output zone.

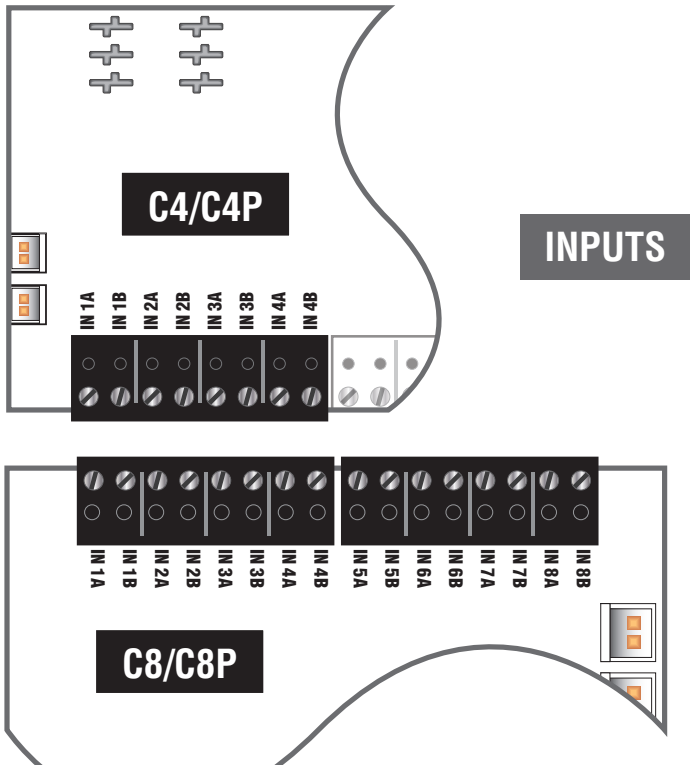
C4 output diodes



underside of board

Input and Output Wiring

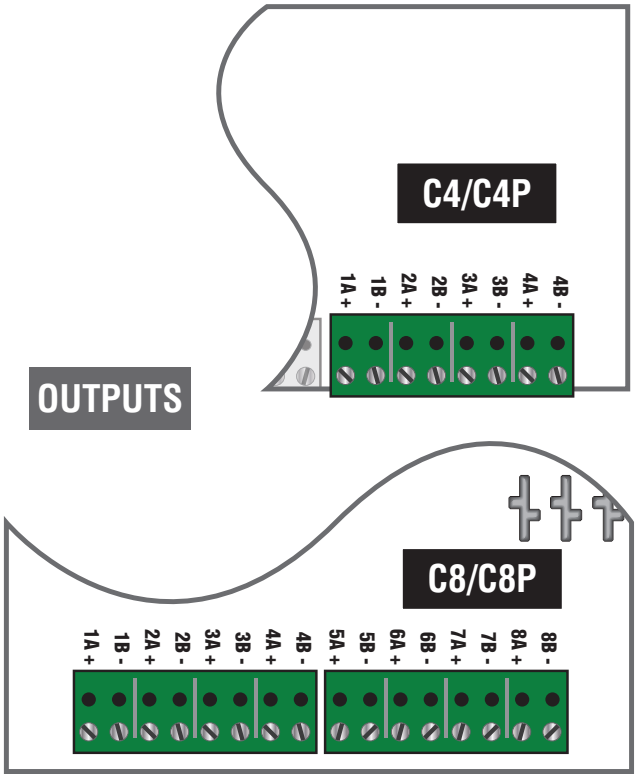
INPUT WIRING



Each input on the **C4/C4P** and **C8/C8P** has an "**A**" terminal and a "**B**" terminal.

- When using a relay contact to activate the input, the contact is placed across these terminals. It is normal to measure a voltage across these terminals when set for a relay contact input.
- When set for a voltage input, the voltage to activate the zone is placed on the "**B**" terminal. The "**A**" terminal is left disconnected. Note that the voltage used to activate the zone must be common grounded with the C8 board's power source.
- To use a DC ground or an open collector (transistor) as an input, place a wire jumper across the "**A**" and "**B**" terminals and connect the ground/open collector to the "**B**" terminal to activate the input. Note that the input source must be common grounded with the C4/C4P or C8/C8P board's power source.

OUTPUT WIRING



NOTE - Output polarity has changed - Verify polarity via markings on the PCB

Each output on the **C4/C4P** and **C8/C8P** has an "**A**" terminal and a "**B**" terminal. The usage of these terminals varies based on the setting of jumpers **C** and **E** for the zone.

- When set for a relay contact output, these terminals are the output of the relay. No voltage is output from these terminals when set for a relay contact output.

Note: The relay contact output has a suppression diode across it, and cannot be used to switch AC voltage. To switch DC voltage with these contacts, the polarity of the voltage being switched should match the terminal markings.

- When set for a wet/voltage output, these terminals provide the output voltage. Observe the polarity markings on the PCB for each output.

⚠ ***CAUTION*** When powering magnetic loads such as maglocks, door strikes, solenoids, etc, each of these loads must have a reverse protection diode either built-in or external to the device.

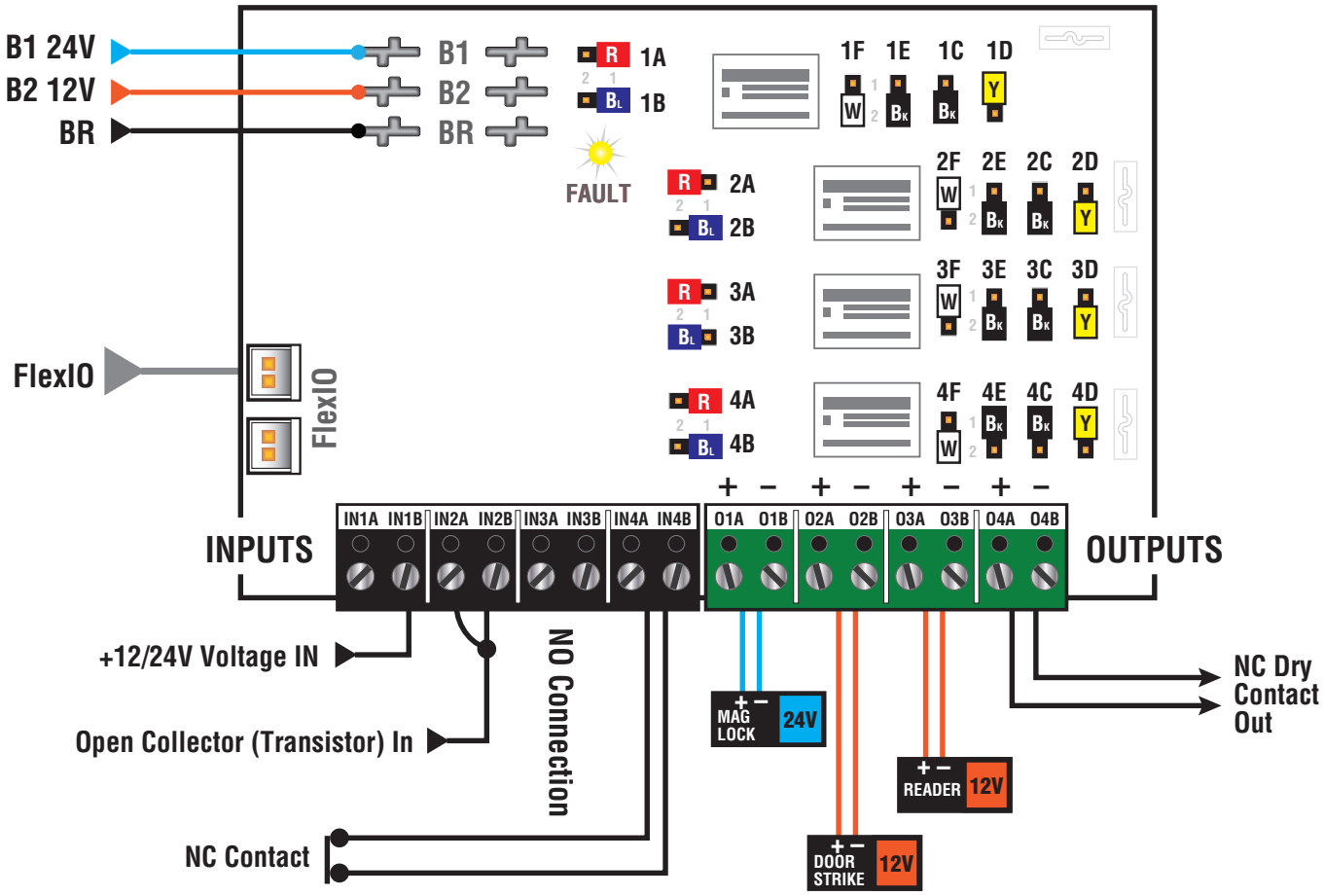
Common Jumper Settings

	Jumper					
	xA (red)	xB (blue)	xC (black)	xD (yellow)	xE (black)	xF (white)
Continuous Auxiliary Output (No zone control input)						
With FAI	1	2	2	*Note 1*	2	2
Without FAI	2	2	2	*Note 1*	2	2
Maglock Output						
NC Contact Input - with FAI	1	1	2	*Note 1*	2	2
NC Contact Input - without FAI	2	1	2	*Note 1*	2	2
NO Contact Input - with FAI	1	2	2	*Note 1*	2	2
NO Contact Input - without FAI	2	2	2	*Note 1*	2	2
Voltage Input - with FAI	1	1	2	*Note 1*	2	2
Voltage Input - without FAI	2	1	2	*Note 1*	2	2
Transistor Input - with FAI	1	1	2	*Note 1*	2	2
Transistor Input - without FAI	2	1	2	*Note 1*	2	2
Door Strike Output						
NC Contact Input - with FAI	1	1	2	*Note 1*	2	1
NC Contact Input - without FAI	2	1	2	*Note 1*	2	1
NO Contact Input - with FAI	1	2	2	*Note 1*	2	1
NO Contact Input - without FAI	2	2	2	*Note 1*	2	1
Voltage Input - with FAI	1	1	2	*Note 1*	2	1
Voltage Input - without FAI	2	1	2	*Note 1*	2	1
Transistor Input - with FAI	1	1	2	*Note 1*	2	1
Transistor Input - without FAI	2	1	2	*Note 1*	2	1
NC Relay Output *(Note 2)*						
NC Contact Input - with FAI	1	1	1	N/A	1	2
NC Contact Input - without FAI	2	1	1	N/A	1	2
NO Contact Input - with FAI	1	2	1	N/A	1	2
NO Contact Input - without FAI	2	2	1	N/A	1	2
Voltage Input - with FAI	1	1	1	N/A	1	2
Voltage Input - without FAI	2	1	1	N/A	1	2
Transistor Input - with FAI	1	1	1	N/A	1	2
Transistor Input - without FAI	2	1	1	N/A	1	2
NO Relay Output *(Note 3)*						
NC Contact Input - with FAI	1	1	1	N/A	1	1
NC Contact Input - without FAI	2	1	1	N/A	1	1
NO Contact Input - with FAI	1	2	1	N/A	1	1
NO Contact Input - without FAI	2	2	1	N/A	1	1
Voltage Input - with FAI	1	1	1	N/A	1	1
Voltage Input - without FAI	2	1	1	N/A	1	1
Transistor Input - with FAI	1	1	1	N/A	1	1
Transistor Input - without FAI	2	1	1	N/A	1	1

Note 1 - Set Jumper D according to which input voltage source (B1/B2) should be directed to the output
Note 2 - Relay OPENS when the input is activated
Note 3 - Relay CLOSES when the input is activated

C4/C4P Application Example

Note: For UL Compliance, any locking device shall be configured for fail safe operation upon occurrence of an alarm as shown with a normally closed relay contact



Zone 1

24V Mag Lock Output, Voltage Input, with FAI

This zone shows a typical 24V Mag Lock application, using a voltage input on the zone. The door will unlock upon an FAI signal being received from the FPO Power Supply.

Jumper Positions: A-1 | B-1 | C-2 | D-1 | E-2 | F-2

Zone 2

12V Door Strike Output, Open Collector (transistor) Input, no FAI

This zone shows a typical 12V Door Strike application, using an open collector (transistor) input on the zone. The door will remain locked during a fire alarm condition.

Jumper Positions: A-2 | B-1 | C-2 | D-2 | E-2 | F-1

Zone 3

12V Reader Power, no control input, no FAI

This zone shows continuous 12V auxiliary power for powering a device such as a reader. Power will remain during a fire alarm condition.

Jumper Positions: A-2 | B-2 | C-2 | D-2 | E-2 | F-2

Zone 4

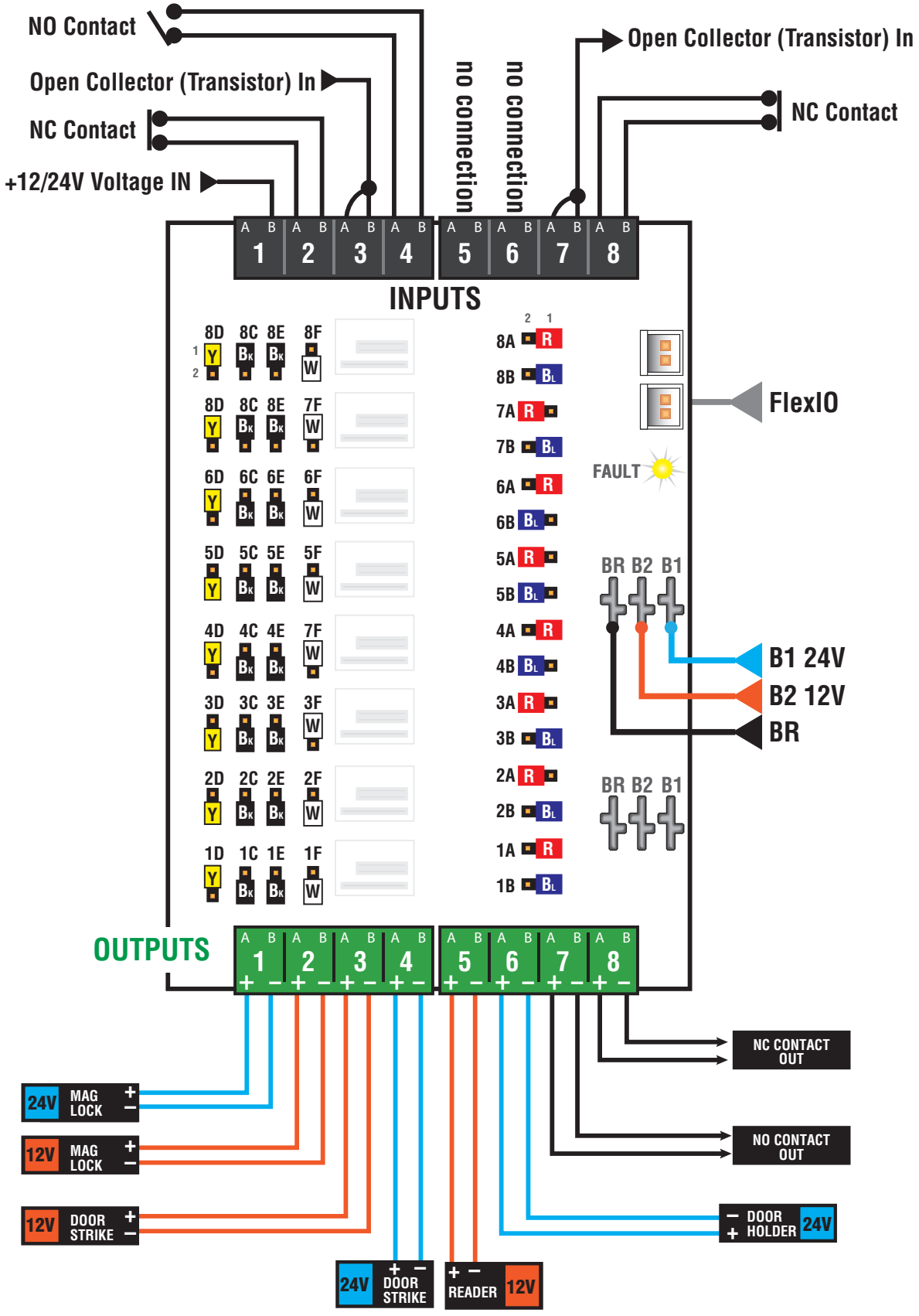
NC Relay Contact Output, NC Relay Contact Input, with FAI

This zone shows a NC relay contact output slaving off of a NC relay contact input. This application can be used to protect the low-current integral relays in an access control panel and instead use the higher current relays on the C4 to control the locks.

Jumper Positions: A-1 | B-1 | C-1 | D-1 | E-1 | F-2

C8/C8P Application Example

Note: For UL Compliance, any locking device shall be configured for fail safe operation upon occurrence of an alarm as shown with a normally closed relay contact



C8/C8P Application Example - continued

Zone 1

24V Mag Lock Output, Voltage Input, with FAI

This zone shows a typical 24V Mag Lock application, using a voltage input on the zone. The door will unlock upon an FAI signal being received from the FPO Power Supply.

Jumper Positions: A-1 | B-1 | C-2 | D-1 | E-2 | F-2

Zone 2

12V Mag Lock Output, NC Relay Contact Input, no FAI

This zone shows a typical 12V Mag Lock application, using a NC relay contact as the input for the zone. The door will remain locked during a fire alarm condition.

Jumper Positions: A-2 | B-1 | C-2 | D-2 | E-2 | F-2

Zone 3

12V Door Strike Output, Open Collector (transistor) Input, no FAI

This zone shows a typical 12V Door Strike application, using an open collector (transistor) input on the zone. The door will remain locked during a fire alarm condition.

Jumper Positions: A-2 | B-1 | C-2 | D-2 | E-2 | F-1

Zone 4

24V Door Strike Output,NO Relay Contact Input, with FAI

This zone shows a typical 24V Door Strike application, using a NO relay contact as the input for the zone. The door will unlock upon an FAI signal being received from the FPO Power Supply.

Jumper Positions: A-1 | B-2 | C-2 | D-1 | E-2 | F-1

Zone 5

12V Reader Power, no control input, no FAI

This zone shows continuous 12V auxiliary power for powering a device such as a reader. Power will remain during a fire alarm condition.

Jumper Positions: A-2 | B-2 | C-2 | D-2 | E-2 | F-2

Zone 6

24V Aux Power, no control input, with FAI

This zone shows continuous 24V auxiliary power for powering devices such as door holders. Power will be removed from the output upon an FAI signal being received from the FPO power supply.

Jumper Positions: A-1 | B-2 | C-2 | D-1 | E-2 | F-2

Zone 7

NO Relay Contact Output, Open Collector (transistor) Input, with FAI

This zone shows a NO relay contact output using an open collector (transistor) input on the zone. The output relay will close upon an FAI signal being received from the FPO power supply.

Jumper Positions: A-2 | B-1 | C-1 | D-1 | E-1 | F-1

Zone 8

NC Relay Contact Output, NC Relay Contact Input, with FAI

This zone shows a NC relay contact output slaving off of a NC relay contact input. This application can be used to protect the low-current integral relays in an access control panel and instead use the higher current relays on the C8 to control the locks.

Jumper Positions: A-1 | B-1 | C-1 | D-1 | E-1 | F-2

FlexPower System Replacement Parts

Board Kits	Order #	Description
FPO250	A01-007	FPO250 replacement board
FPO150	A01-005	FPO150 replacement board
FPO75	A01-003	FPO75 replacement board
B100	A03-009	DC-DC Converter (12VDC or adjustable 5 to 18VDC) replacement board
D8	A02-001	Simple distribution replacement board
D8P	A02-002	Simple distribution (Class 2) replacement board
F8	A02-003	FAI controlled distribution replacement board
F8P	A02-004	FAI controlled distribution (Class 2) replacement board
C4	A02-005	Four zone power control replacement board
C4P	A02-006	Four zone power control (Class 2) replacement board
C8	A02-007	Eight zone power control replacement board
C8P	A02-008	Eight zone power control (Class 2) replacement board
M8	A02-011	Eight zone managed power control replacement board
M8P	A02-012	Eight zone managed power control (Class 2) replacement board
NL2	A11-007	Two Port NetLink network communication board (used in FPO systems)
NL4	A11-004	Four Port NetLink network communication board (used in FPO systems)
RB2	A25-001	2A Relay, 12VDC or 24VDC input range, DP/DT
RB5	A25-002	5A Relay, 12VDC or 24VDC input range, DP/DT
RB8	A25-003	8A Relay, 12VDC or 24VDC input range, DP/DT

Hardware	Order #	Description
DL1	A05-001	DataLink USB cable
BDM	A05-006	Battery Disconnect Module cable
AC Cable	A05-005	AC Input Cable for FPO Power Supply
Battery Cable	A05-002	Battery Harness – 24"
Module Cable - 12"	A05-003	Accessory board cable set – 12"
Module Cable - 18"	A05-004	Accessory board cable set – 18"
Fuse - 3A	A05-201	ATM-3A Fuse – Bag of 25
Fuse - 5A	A05-202	ATM-5A Fuse – Bag of 25
Fuse - 7.5A	A05-203	ATM-7.5A Fuse – Bag of 25
Fuse - 10A	A05-204	ATM-10A Fuse – Bag of 25
Fuse - 15A	A05-205	ATM-15A Fuse – Bag of 25
Fuse - 30A	A05-206	ATM-30A Fuse – Bag of 25
Standoffs	A05-301	Nylon Standoffs – Bag of 25
Camlock Set	A05-302	Key and Lock fits LSP "E" enclosure

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