LifeSafety Power®

HID Pre-Wired Product Companion

Wiring Convention and Supplemental Guide to
HID Aero and VERTX ProWire™ Power Management Systems

P03-075 Rev A04 12/24

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Introduction

Traditional wiring for access control systems is time consuming and labor intensive. ProWire™ systems take LifeSafety Power's award-winning Unified Power™ solutions to a new higher level of service by pre-wiring all lock and system power connections to Authentic HID Global™ terminal strips for easy plug-and-play installation.

Prewired features of ProWire™ Systems include access control or system power, lock power, auxiliary power distribution, lock control, system communications loop, and optional remote management.

The access control modules are powered from a D8P, SD4P, or SD16 power distribution module providing a Class 2, Power Limited source with individual protection for each access control board and a dedicated power supply configured for 12VDC. Each D8P module provides eight protected outputs capable of 2.5A per output and a configuration jumper to select which power supply is applied to a specific output in dual voltage systems. SD4P modules provide four outputs capable of 2.5A each. SD16 modules provide 16 outputs electronically limited to 1A each.

The field connected locks are powered and controlled from either a C8 or M8 lock control module with a separate dedicated power supply typically configured for 24VDC. Each C8 or M8 module provides either jumpers or software programmability to configure each individual output for 12 or 24VDC, FAI operation, and failsafe or failsecure operation of the lock when triggered by the access control.

Optional remote management provides the system with the ability to generate email or SNMP alert messages on a scheduled or event driven basis, monitor and control power remotely, test standby batteries over the network, and maintain a historical record of system performance.

Units from four to sixteen door capacity are available with wire tie or wire duct wire management.

Standard Conventions

The following section presents the conventions used within this document for board labeling and placement, output usage, and wire coloring.

HID Board Numbering

HID board locations are numbered as V1, V2, etc. in sequence, from top to bottom, left to right or in a clockwise order, depending on enclosure and available open locations.

Configurations using an X1100 or V1000 controller will always have the controller located in the V1 location.

See Typical Enclosure Configurations starting on page 5 for examples.

LSP Board Numbering

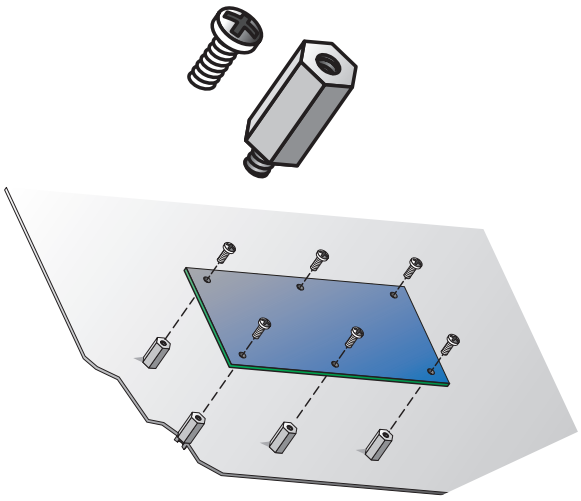
LifeSafety Power board locations are numbered with the board type and a number to indicate individual boards. Locations with multiple designations may have either board or may have both boards stacked, depending on configuration.

FPO-1 Lock Power, or System Power in Single Voltage Systems
FPO-2 System Power in large Dual Voltage Systems
B100 or B150 System Power in small Dual Voltage Systems
D8-1 to D8-n Power Distribution
SD4-1 to SD4-n Network Managed Power Distribution
SD16-1 to SD16-n Network Managed Power Distribution, Class 2 Power Limited
C8-1 / M8-1 Lock Control for locks 1 - 8
C8-2 / M8-2 Lock Control for locks 9 - 16

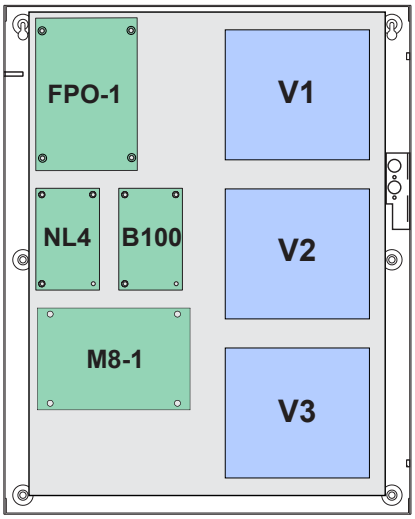
HID Board Mounting

Mounting of the HID Aero or VERTX sub-assemblies are by means of the supplied 6-32 SEMS screws using the preinstalled hex standoffs.

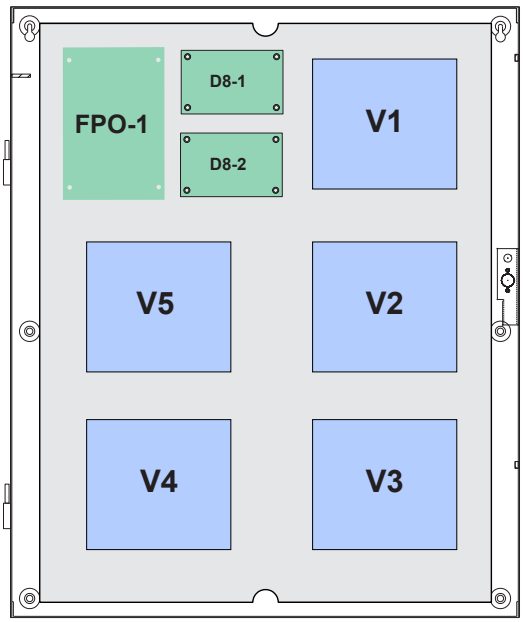
⚠ Do not overtighten the hardware during the install process.



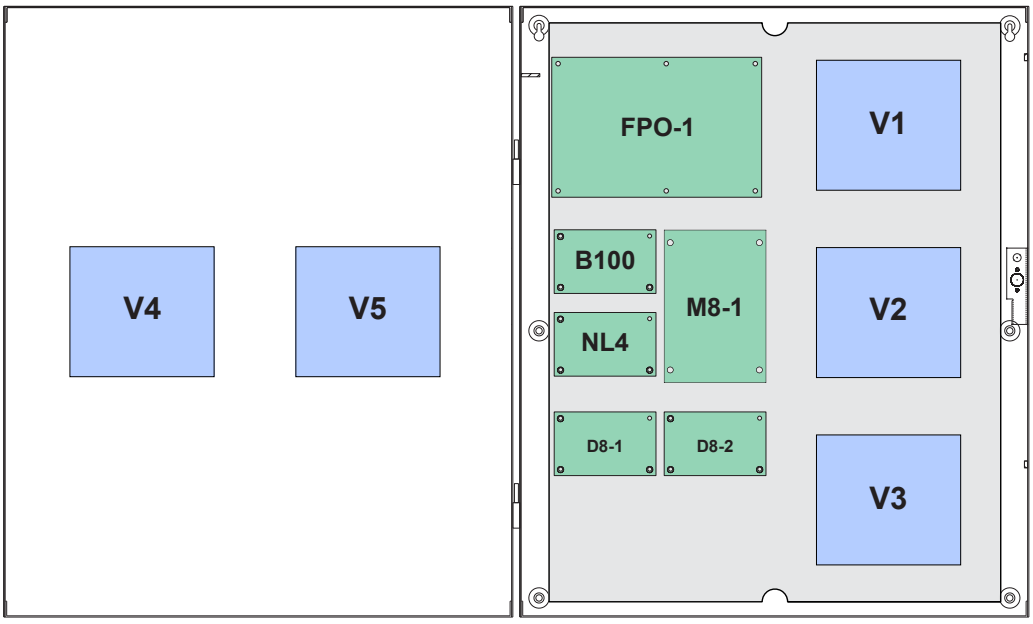
Typical System Configurations



4 Door - E2V

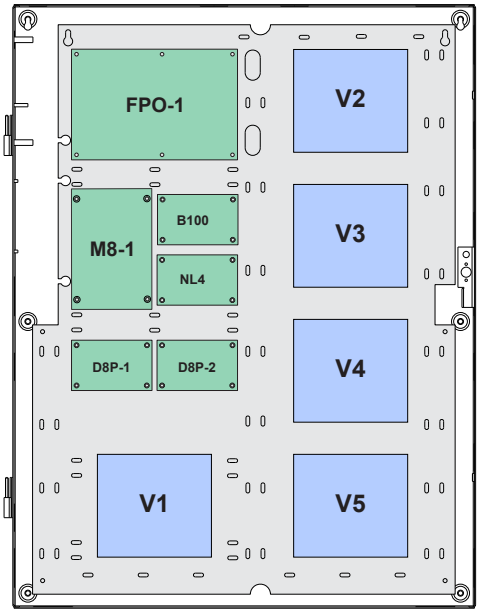


8 Door - E4V
Single Voltage

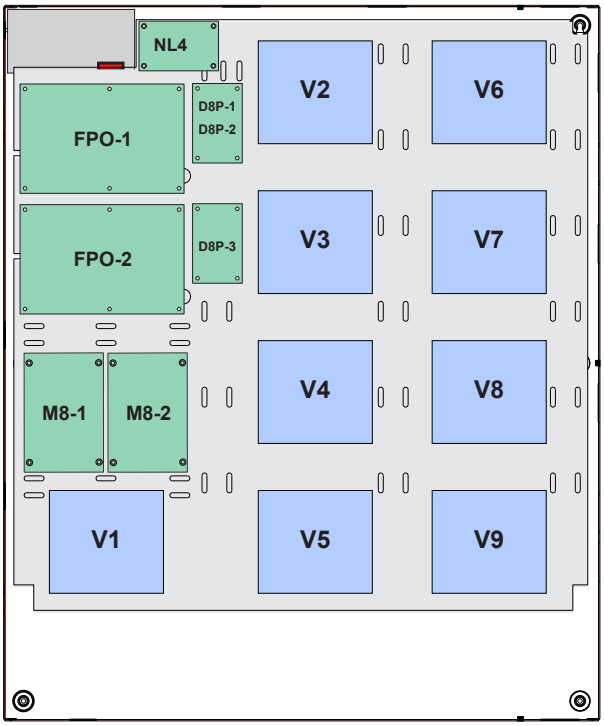


8 Door - E4V1
Dual Voltage

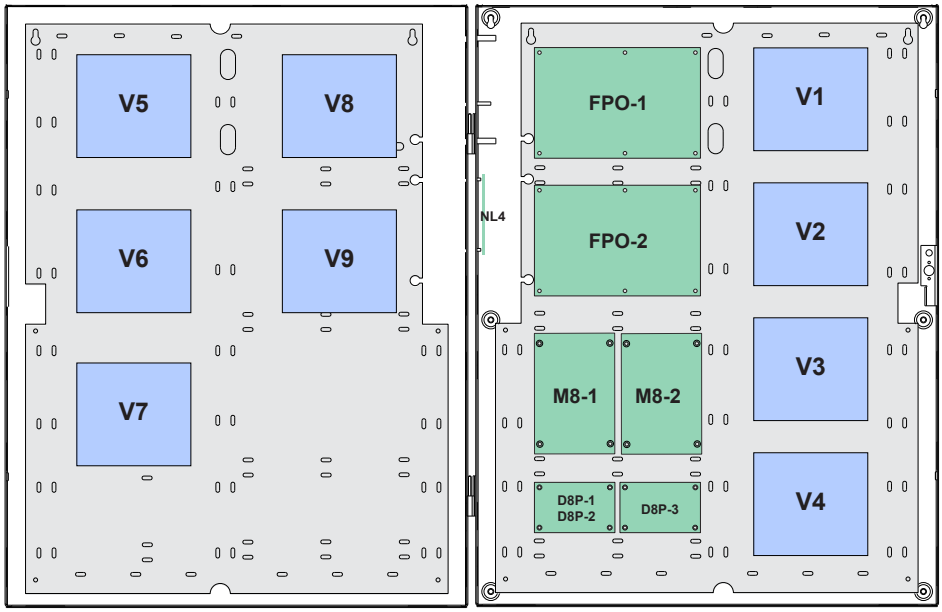
Typical System Configurations



8 Door - E6V



16 Door - E8V



16 Door - E6V1

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Wiring Conventions

Wiring within the enclosure uses a consistent method and wire coloring as detailed below.

HID Board Power Connections

HID Board power originates from the 12V supply (FPO-2, B100, or B150) in Dual Voltage systems, or from FPO-1 in Single Voltage systems. Power is supplied to the HID boards from D8-1, providing fused outputs. HID Board V1 is powered from D8-1 output 1, V2 from D8-1 output 2, etc. HID power wiring uses twisted 22AWG wire.

Red: +12VDC
Black: Ground (-)

HID RS-458 Communications

The HID RS-485 communications wiring is daisy chained from Board V1, to V2, etc. HID RS-485 wiring uses jacketed, twisted 20AWG wire with shield.

White: A
Black: B
Shield: SHIELD

Lock Control Input Color Code to C8/M8 from HID Outputs

The wiring between the HID board output and the C8 or M8 Lock Control board inputs uses twisted 22AWG wire with the following color convention:

Output 1: Brown / Black
Output 2: Red / Black
Output 3: Orange / Black
Output 4: Yellow / Black
Output 5: Green / Black
Output 6: Blue / Black
Output 7: Violet / Black
Output 8: Gray / Black
Wire coloring repeats for inputs 9-16 on C8-2/M8-2

ProWire™
Standard Conventions
Quick Reference

HID Board Numbering

- V1 ... V2
- V3 ... V4
- V5 ... V6
- V7 ... V8
- Controller location - V1

LSP Board Numbering

- FPO1 - Lock power
- FPO2 - System power
- D8-1 to D8-n - D8 power distribution
- SD4-1 to SD4-n - Power distribution
- SD16-1 to SD16-n - Power distribution
- C8-1/M8-1 Lock control for locks 1 - 8
- C8-2/M8-2 Lock control for locks 9 - 16

HID Board Power

- 12VDC, Fused
- Red +12VDC
- Black GND
- Twisted 22 AWG
- From D8-1

RS-485 Communications

- Daisy chained from V1.....Vn
- Jacketed, twisted, with shield, 20 AWG
- White - A
- Black - B
- Shield - SHIELD

Lock Control Input Color Code to C8 /M8 from Access Control

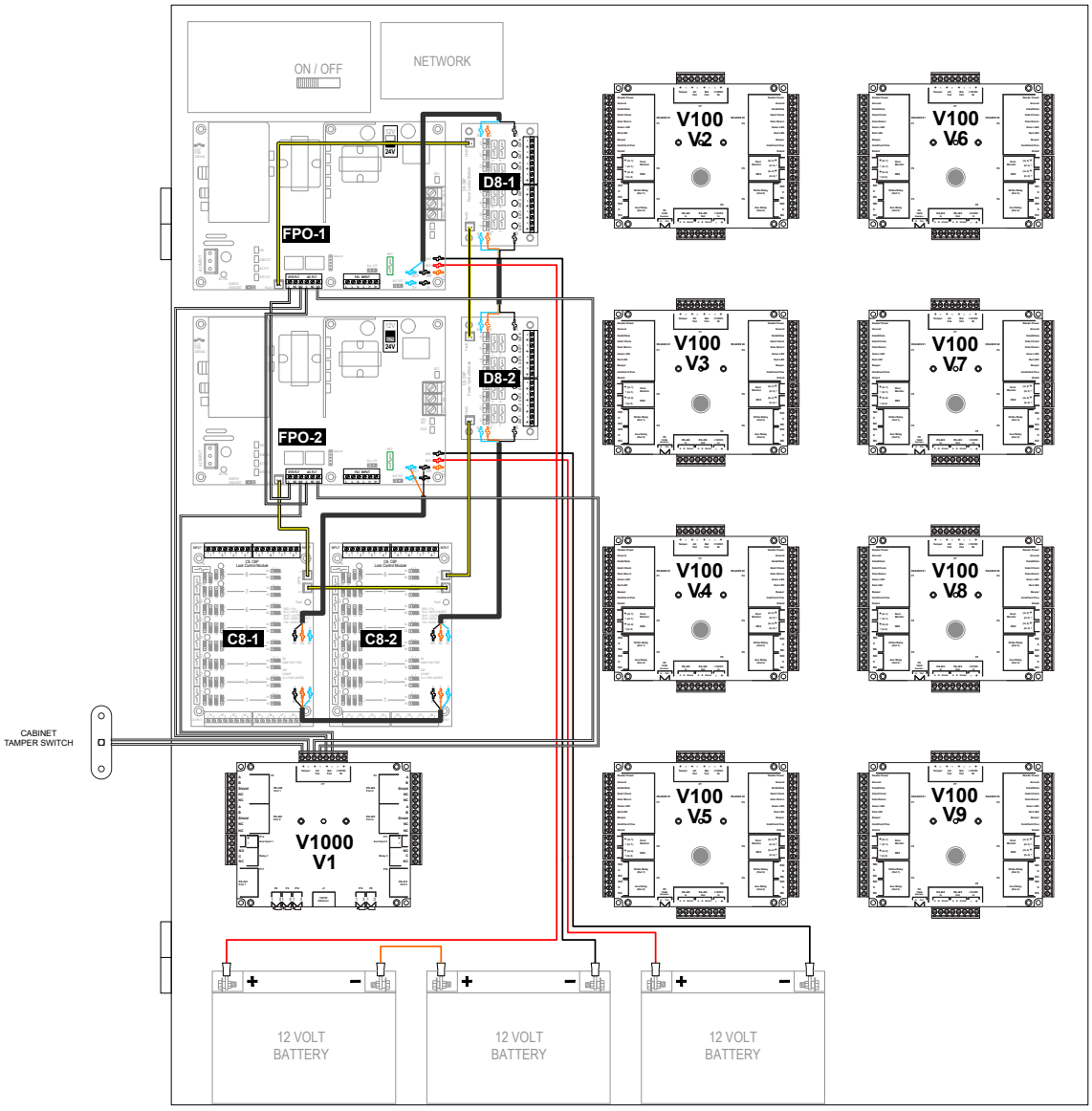
- 1 - Brown / Black twisted 22 AWG
- 2 - Red / Black twisted 22 AWG
- 3 - Orange / Black twisted 22 AWG
- 4 - Yellow / Black twisted 22 AWG
- 5 - Green / Black twisted 22 AWG
- 6 - Blue / Black twisted 22 AWG
- 7 - Violet / Black twisted 22 AWG
- 8 - Gray / Black twisted 22 AWG
- Repeat for inputs 9 - 16 on C8-2/M8-2

System Wiring Example

The following pages show an overview of wiring for a typical prewired system. Details of the wiring for each board are in later sections. All drawings show an "A" configuration (using VERTX controllers). Aero configurations are similar - see page 14 for HID module wiring.

LifeSafety Power Board, Fault, and Tamper Switch Wiring

The LifeSafety Power boards are prewired for power, Fault, and FlexIO. FPO-1 is wired to the B1 buss, and FPO-2 is wired to the B2 buss. FlexIO daisychains between all of the LSP boards to provide fault and FAI throughout the system. Fault wiring uses the FPO's NO contacts for System and AC fault and connects to the V1 fault input. See AN-19 for more information on the Dual Buss architecture used for accessory power.



System Wiring Example

HID Board Power Wiring

The HID controllers are prewired for power to D8-1. HID board V1 is wired to output 1, V2 to output 2, etc. Wiring is red/black twisted pair. All drawings show an "A" configuration (using VERTX controllers). Aero configurations are similar - see page 14 for HID module wiring.

System Wiring Example

HID Board Communication Wiring

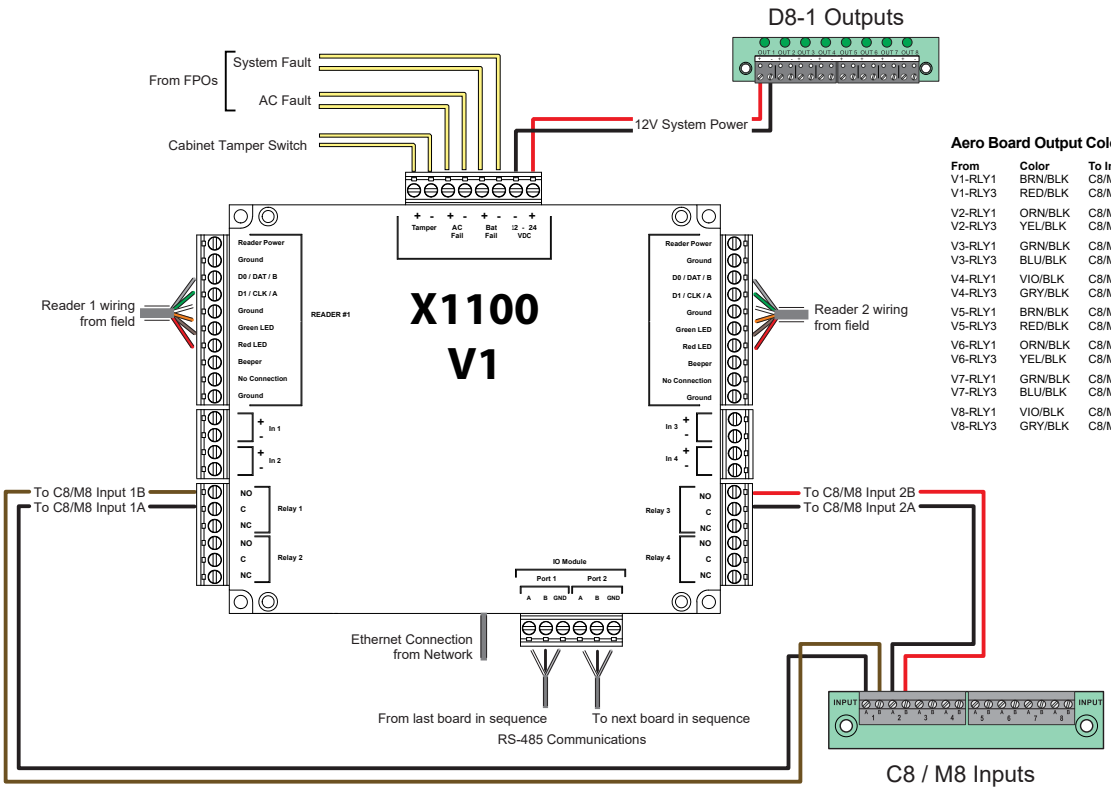
The HID controller RS-485 communication between boards is prewired from V1 in order to the last board in the chain. Wiring is jacketed and twisted with shield. Black and white wires are for A and B, while the shield is used for Shield. All drawings show an "A" configuration (using VERTX controllers). Aero configurations are similar - see page 14 for HID module wiring.

System Wiring Example

HID Board Output Relay Wiring

The output lock relays of the HID controllers are prewired to the inputs of the C8 or M8 lock control boards. Wiring is twisted pair and is color coded. All drawings show an "A" configuration (using VERTX controllers). Aero configurations are similar - see page 14 for HID module wiring.

Typical Wiring - X1100 - Aero



Aero Board Output Color Code

From	Color	To Input
V1-RLY1	BRN/BLK	C8/M8-1 INPUT 1
V1-RLY3	RED/BLK	C8/M8-1 INPUT 2
V2-RLY1	ORN/BLK	C8/M8-1 INPUT 3
V2-RLY3	YEL/BLK	C8/M8-1 INPUT 4
V3-RLY1	GRN/BLK	C8/M8-1 INPUT 5
V3-RLY3	BLU/BLK	C8/M8-1 INPUT 6
V4-RLY1	VIO/BLK	C8/M8-1 INPUT 7
V4-RLY3	GRY/BLK	C8/M8-1 INPUT 8
V5-RLY1	BRN/BLK	C8/M8-2 INPUT 1
V5-RLY3	RED/BLK	C8/M8-2 INPUT 2
V6-RLY1	ORN/BLK	C8/M8-2 INPUT 3
V6-RLY3	YEL/BLK	C8/M8-2 INPUT 4
V7-RLY1	GRN/BLK	C8/M8-2 INPUT 5
V7-RLY3	BLU/BLK	C8/M8-2 INPUT 6
V8-RLY1	VIO/BLK	C8/M8-2 INPUT 7
V8-RLY3	GRY/BLK	C8/M8-2 INPUT 8

The X1100 intelligent controller provides decision making, event reporting, and database storage for the Aero hardware platform. The X1100 can accept data from readers with clock/data, OSDP, Wiegand or RS-485 signaling, and provide LED and buzzer control.

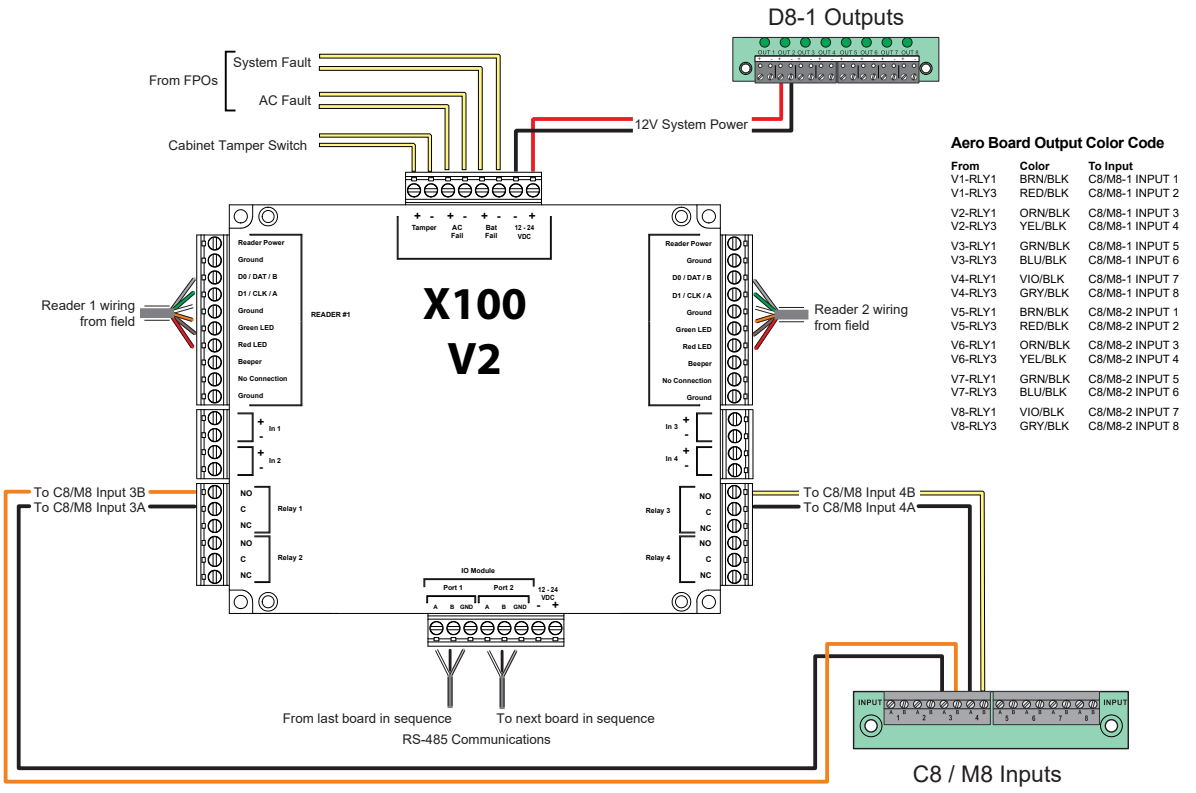
Communication between connected boards is by means of RS-485. Two pairs of RS-485 ports provides connection for up to 32 connected modules.

The X1100 requires 12-24VDC for power and is connected to 12VDC supplied from an LSP D8, SD4, or SD16 power distribution module.

Mechanical mounting is by four, supplied, 1/2" metal standoffs threaded into the enclosure backplate with the board secured to the standoffs with eight 6-32 x 3/8" machine screws.

For electrical connection, remove the appropriate terminal strips from the board and replace with the supplied, pre-wired and identified terminal strips.

Typical Wiring - X100 - Aero



Aero Board Output Color Code

From	Color	To Input
V1-RLY1	BRN/BLK	C8/M8-1 INPUT 1
V1-RLY3	RED/BLK	C8/M8-1 INPUT 2
V2-RLY1	ORN/BLK	C8/M8-1 INPUT 3
V2-RLY3	YEL/BLK	C8/M8-1 INPUT 4
V3-RLY1	GRN/BLK	C8/M8-1 INPUT 5
V3-RLY3	BLU/BLK	C8/M8-1 INPUT 6
V4-RLY1	VIO/BLK	C8/M8-1 INPUT 7
V4-RLY3	GRY/BLK	C8/M8-1 INPUT 8
V5-RLY1	BRN/BLK	C8/M8-2 INPUT 1
V5-RLY3	RED/BLK	C8/M8-2 INPUT 2
V6-RLY1	ORN/BLK	C8/M8-2 INPUT 3
V6-RLY3	YEL/BLK	C8/M8-2 INPUT 4
V7-RLY1	GRN/BLK	C8/M8-2 INPUT 5
V7-RLY3	BLU/BLK	C8/M8-2 INPUT 6
V8-RLY1	VIO/BLK	C8/M8-2 INPUT 7
V8-RLY3	GRY/BLK	C8/M8-2 INPUT 8

The X100 reader interface provides a solution for interfacing to readers and door hardware for the Aero hardware platform. The X100 can accept data from readers with clock/data, OSDP, Wiegand or RS-485 signaling, and provide LED and buzzer control.

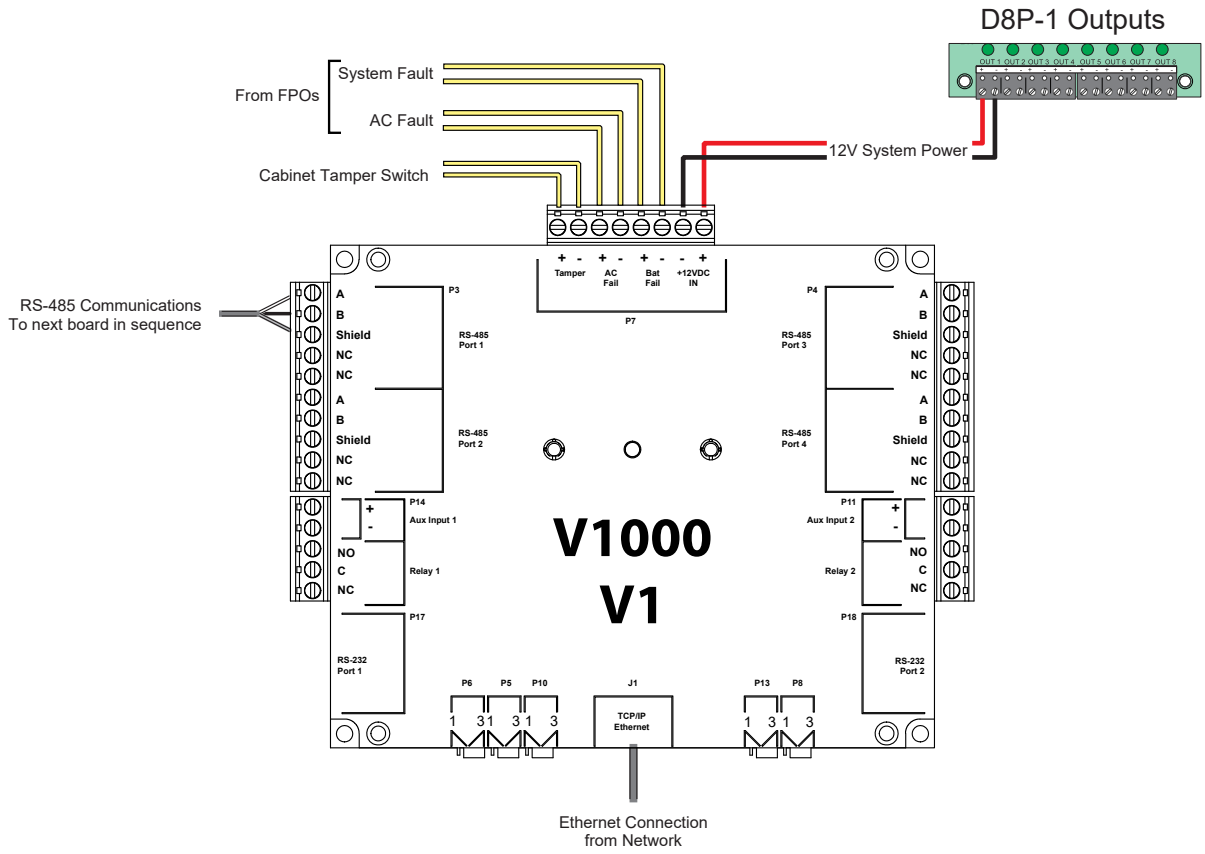
Communication between connected boards is by means of RS-485. Two pairs of RS-485 ports provides connection for up to 32 connected modules.

The X100 requires 12-24VDC for power and is connected to 12VDC supplied from an LSP D8, SD4, or SD16 power distribution module.

Mechanical mounting is by four, supplied, 1/2" metal standoffs threaded into the enclosure backplate with the board secured to the standoffs with eight 6-32 x 3/8" machine screws.

For electrical connection, remove the appropriate terminal strips from the board and replace with the supplied, pre-wired and identified terminal strips.

Typical Wiring - V1000 - VERTX



The V1000 intelligent controller provides decision making, event reporting, and database storage for the VERTX hardware platform.

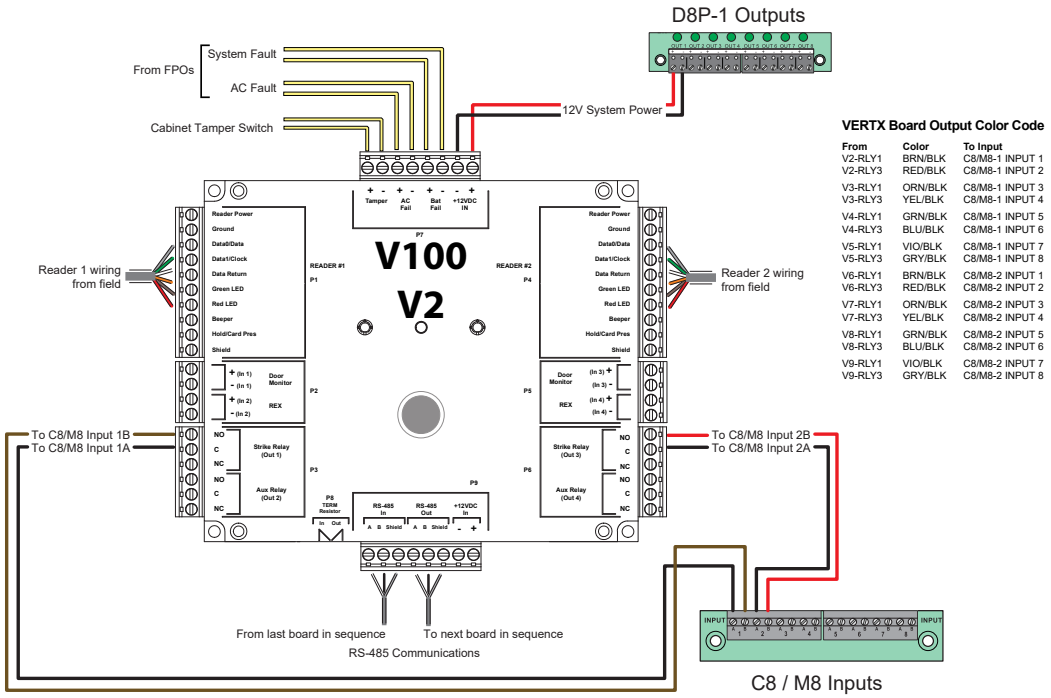
Communication between connected boards is by means of RS-485. Two pairs of RS-485 ports provides connection for up to 32 connected modules.

The V1000 requires 12-24VDC for power and is connected to 12VDC supplied from an LSP D8, SD4, or SD16 power distribution module.

Mechanical mounting is by four, supplied, 1/2" metal standoffs threaded into the enclosure backplate with the board secured to the standoffs with eight 6-32 x 3/8" machine screws.

For electrical connection, remove the appropriate terminal strips from the board and replace with the supplied, pre-wired and identified terminal strips.

Typical Wiring - V100 - VERTX



VERTX Board Output Color Code

From	Color	To Input
V2-RLY1	BRN/BLK	C8/M8-1 INPUT 1
V2-RLY3	RED/BLK	C8/M8-1 INPUT 2
V3-RLY1	ORN/BLK	C8/M8-1 INPUT 3
V3-RLY3	YEL/BLK	C8/M8-1 INPUT 4
V4-RLY1	GRN/BLK	C8/M8-1 INPUT 5
V4-RLY3	BLU/BLK	C8/M8-1 INPUT 6
V5-RLY1	VIO/BLK	C8/M8-1 INPUT 7
V5-RLY3	GRY/BLK	C8/M8-1 INPUT 8
V6-RLY1	BRN/BLK	C8/M8-2 INPUT 1
V6-RLY3	RED/BLK	C8/M8-2 INPUT 2
V7-RLY1	ORN/BLK	C8/M8-2 INPUT 3
V7-RLY3	YEL/BLK	C8/M8-2 INPUT 4
V8-RLY1	GRN/BLK	C8/M8-2 INPUT 5
V8-RLY3	BLU/BLK	C8/M8-2 INPUT 6
V9-RLY1	VIO/BLK	C8/M8-2 INPUT 7
V9-RLY3	GRY/BLK	C8/M8-2 INPUT 8

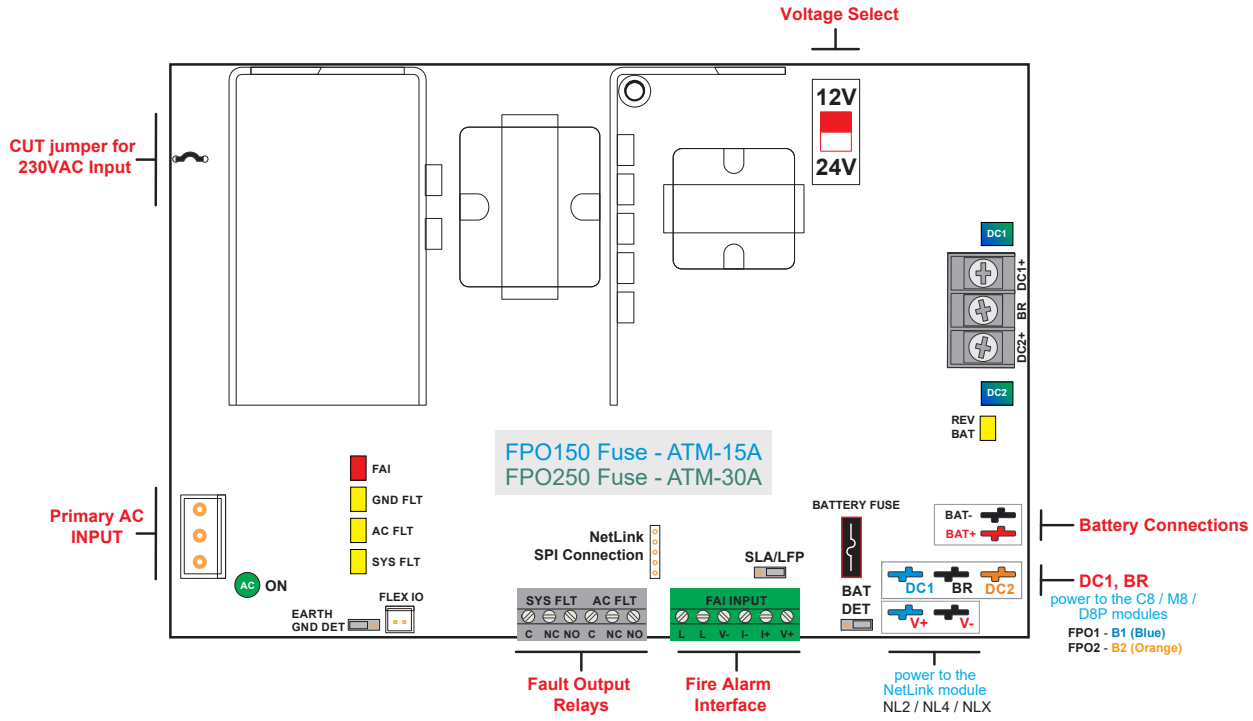
The V100 reader interface provides a solution for interfacing to readers and door hardware for the VERTX platform. The V100 can accept data from readers with clock/data, Wiegand or RS-485 signaling, and provide LED and buzzer control.

Four form-C relay outputs may be used for door control or alarm signaling. Four supervised inputs are provided for monitoring the door contact, and exit push button.

Communication to the V100 is accomplished via a 2-wire RS-485 interface.

The V100 requires 12VDC for power and is connected to 12VDC supplied from an LSP D8 power distribution module.

Typical Wiring - FPO150 / FPO250



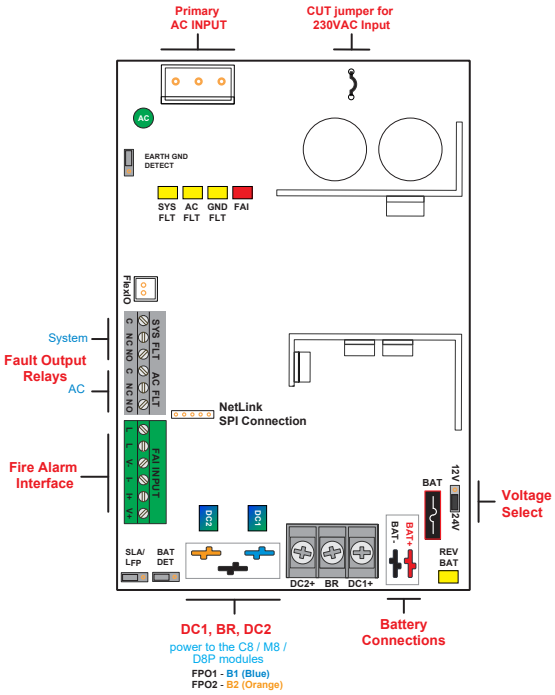
The FPO150 will provide 12V @ 12A or 24V @ 6A and the FPO250 will provide 12V @ 20A or 24V @ 10A. The output voltage is selectable by the slide switch in the upper right corner of the unit. Either unit will charge 4 to 80 Ah of battery capacity.

Voltage from this device is available throughout the system from the C8/M8 lock control boards and the D8P, SD4P, or SD16 power distribution boards.

AC and System Fault output relays of the FPO are wired to the HID hardware, and a fire alarm interface is available for lock over ride in the event of a fire condition. The fire over ride is applied to the C8/M8 lock control boards as needed and programmed.

See the supplied FPO manual for more information.

Typical Wiring - FPO75



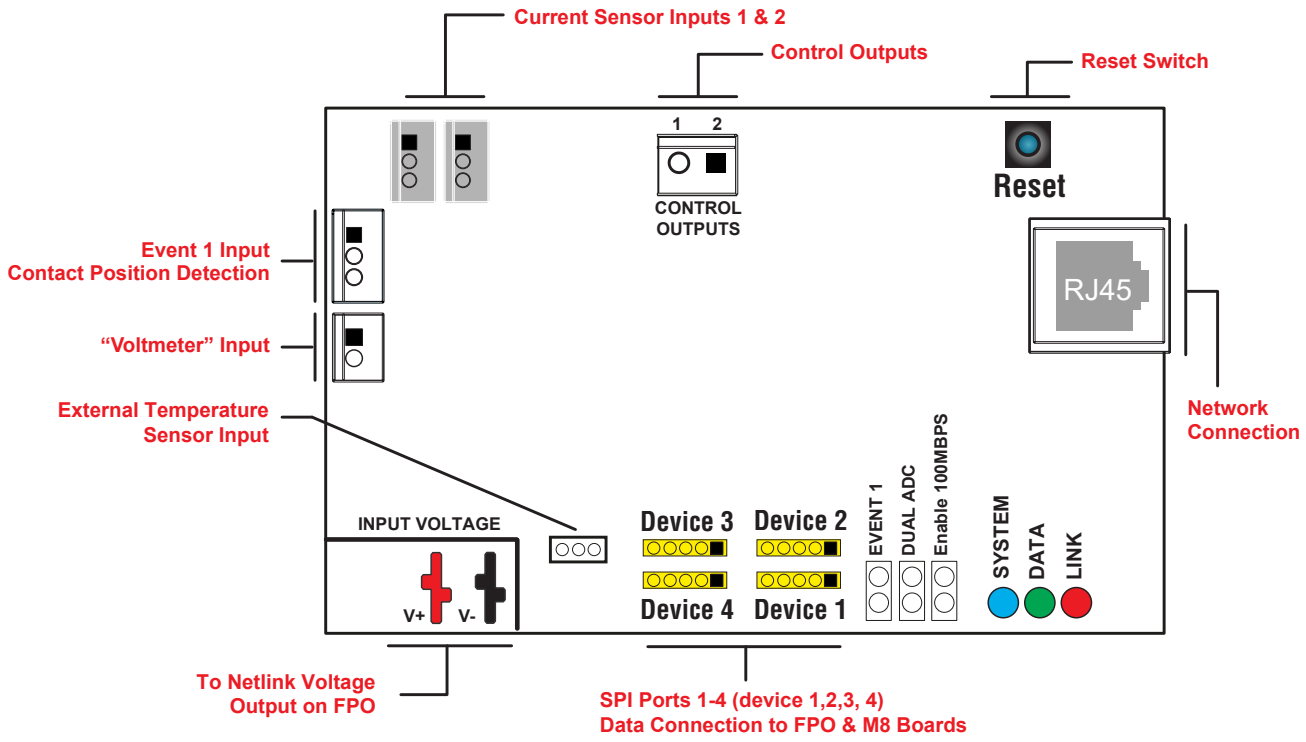
The FPO75 will provide 12V @ 6A or 24V @ 3A. The output voltage is selectable by the two position jumper in the center of the unit. The FPO75 will charge 4 to 40 Ah of battery capacity.

Voltage from this device is available throughout the system from the C8/M8 lock control boards and the D8P, SD4P, or SD16 power distribution boards.

AC and System Fault output relays of the FPO are wired to the HID hardware, and a fire alarm interface is available for lock over ride in the event of a fire condition. The fire over ride is applied to the C8/M8 lock control boards as needed and programmed.

See the supplied FPO manual for more information.

Typical Wiring - NL4



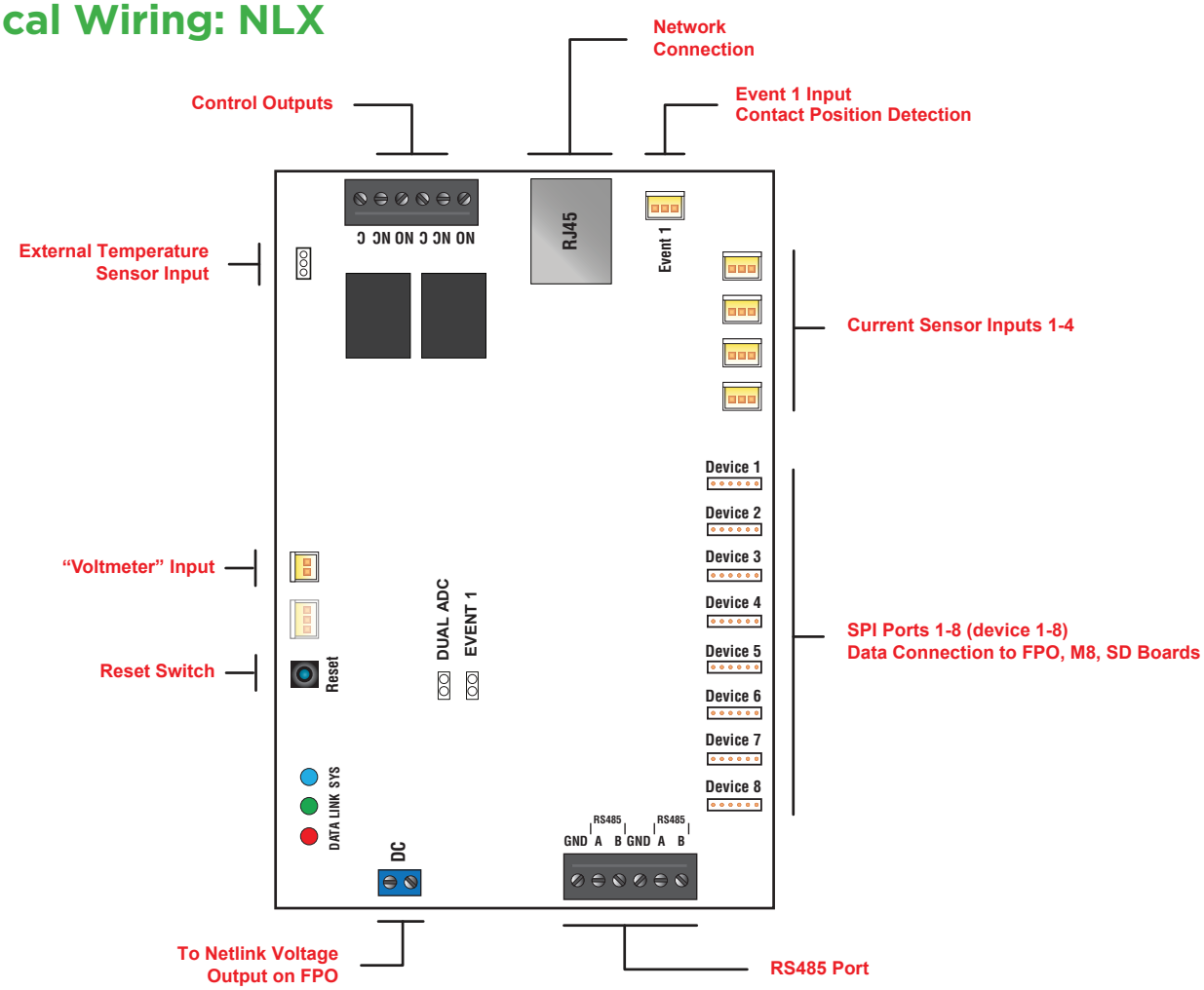
The NL4 is a network module that allows status communication and power control over a local or wide area network. The NL4 provides four device ports for connection to other FlexPower devices. Data monitored includes fault status, power supply output voltage, battery voltage and charging current, and FAI status. When used with an M8, SD4, or SD16 output board, the NL4 allows control, along with the ability to view voltage and current for each output.

In addition to the four device ports, the NL4 also includes two current sensors, a voltmeter input, an external temperature sensor, and a contact monitor input. Upper and lower limits can be set for these inputs to provide an alert if the sensor goes out of range.

A 1000 point history data log updates at the selected interval and is emailed on a status change. The data log can also be set to send on a selected schedule.

See the provided NL4 manual and Application notes AN-20, AN-23, AN-24, and AN-25.

Typical Wiring: NLX



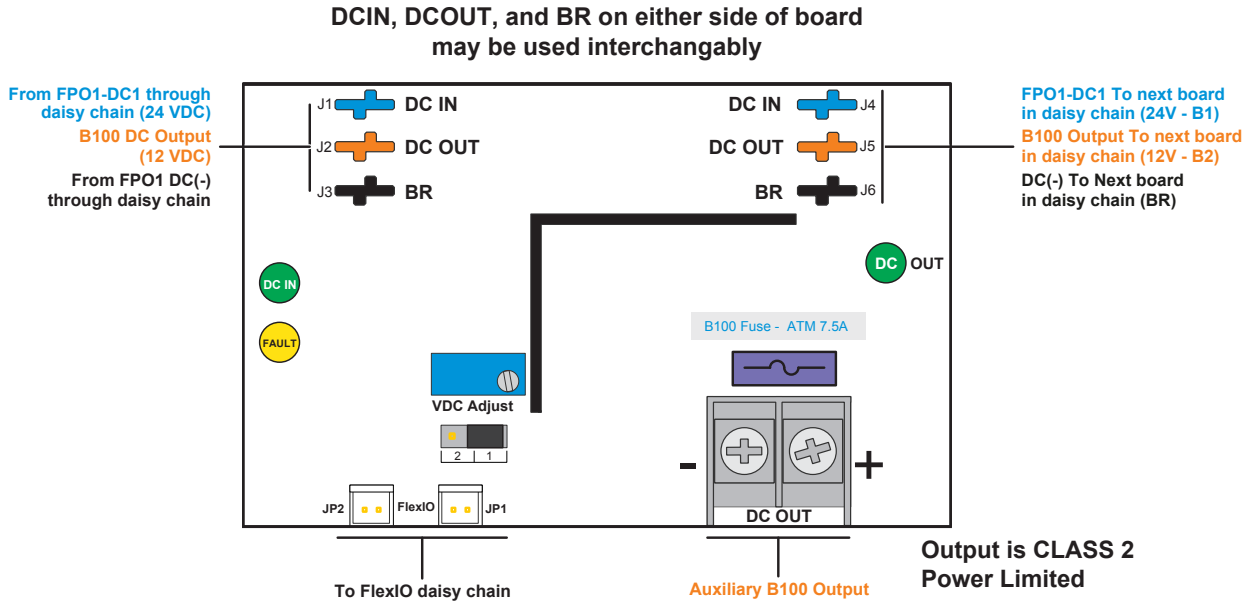
The NLX is a network module that allows status communication and power control over a local or wide area network. The NLX provides eight SPI device ports for connection to local FlexPower devices, and an RS485 port for connection to remote devices. Data monitored includes fault status, power supply output voltage, battery voltage and charging current, and FAI status. When used with an M8, SD4, SD16, or B150 board, the NLX allows control, along with the ability to view voltage and current for each output.

In addition to the SPI and RS485 ports, the NLX also includes four current sensors, a voltmeter input, an external temperature sensor, and a contact monitor input. Upper and lower limits can be set for these inputs to provide an alert if the value goes out of range.

A 1000 point history data log updates at the selected interval and is emailed on a status change. The data log can also be set to send on a selected schedule.

See the NLX Installation manual and Application notes AN-20, AN-23, AN-24, and AN-25.

Typical Wiring - B100



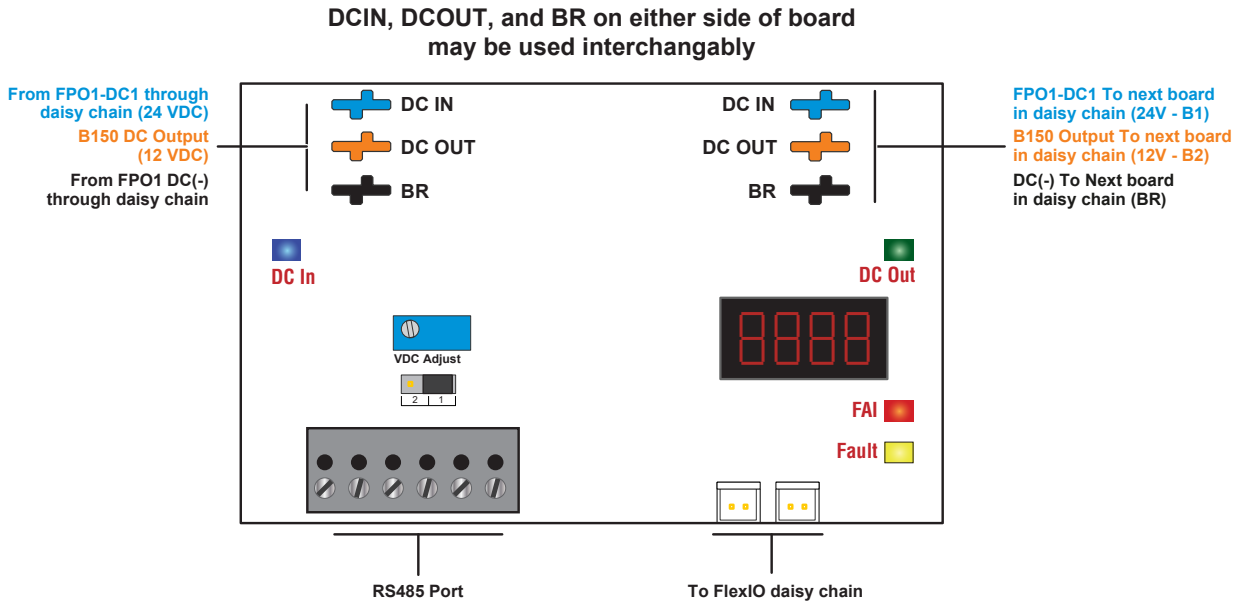
The B100 is used to provide 12V system power when the necessary current is less than 4A. The advantages of using the B100 over an FPO are that the B100 is physically smaller for more effective space utilization, more economical, and does not require a separate standby battery for 12V backup. Input power for the B100 is derived from FPO-1, which is set for 24V, rather than the AC line.

The B100 provides onboard visual indication of an operational or output fault and will transmit that fault condition to the host FPO in the system for activation of the FPO system fault relay. A system fault alert will be provided by the NL4 if installed in the system.

The B100 is rated as a Low Voltage, Class 2, power Limited unit.

For more information, see the provided B100 manual and Application Note AN-07.

Typical Wiring: B150

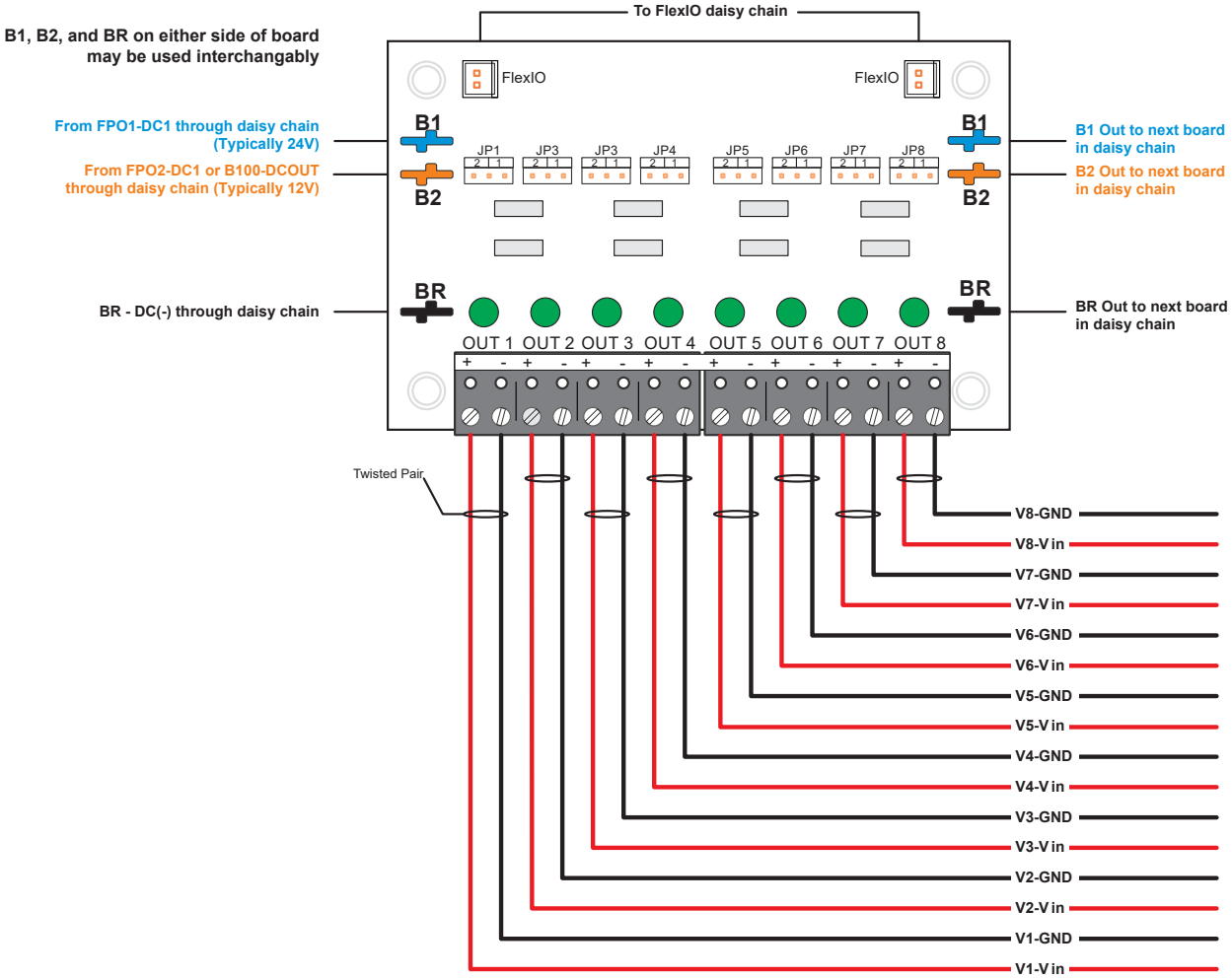


The B150 is used to provide 12V system power when the necessary current is less than 6A. The advantages of using the B150 over an FPO are that the B150 is physically smaller for more effective space utilization, more economical, and does not require a separate standby battery for 12V backup. Input power for the B150 is derived from FPO-1, which is set for 24V, rather than the AC line.

The B150 provides onboard visual indication of an operational or output fault and will transmit that fault condition to the host FPO in the system for activation of the FPO system fault relay. A four digit LED display shows total input power, output voltage, and output current.

An optional RS485 port allows connection of the B150 to the RS485 port of an NLX module to allow control and the ability to view the voltage and current of the output.

Typical Wiring - D8



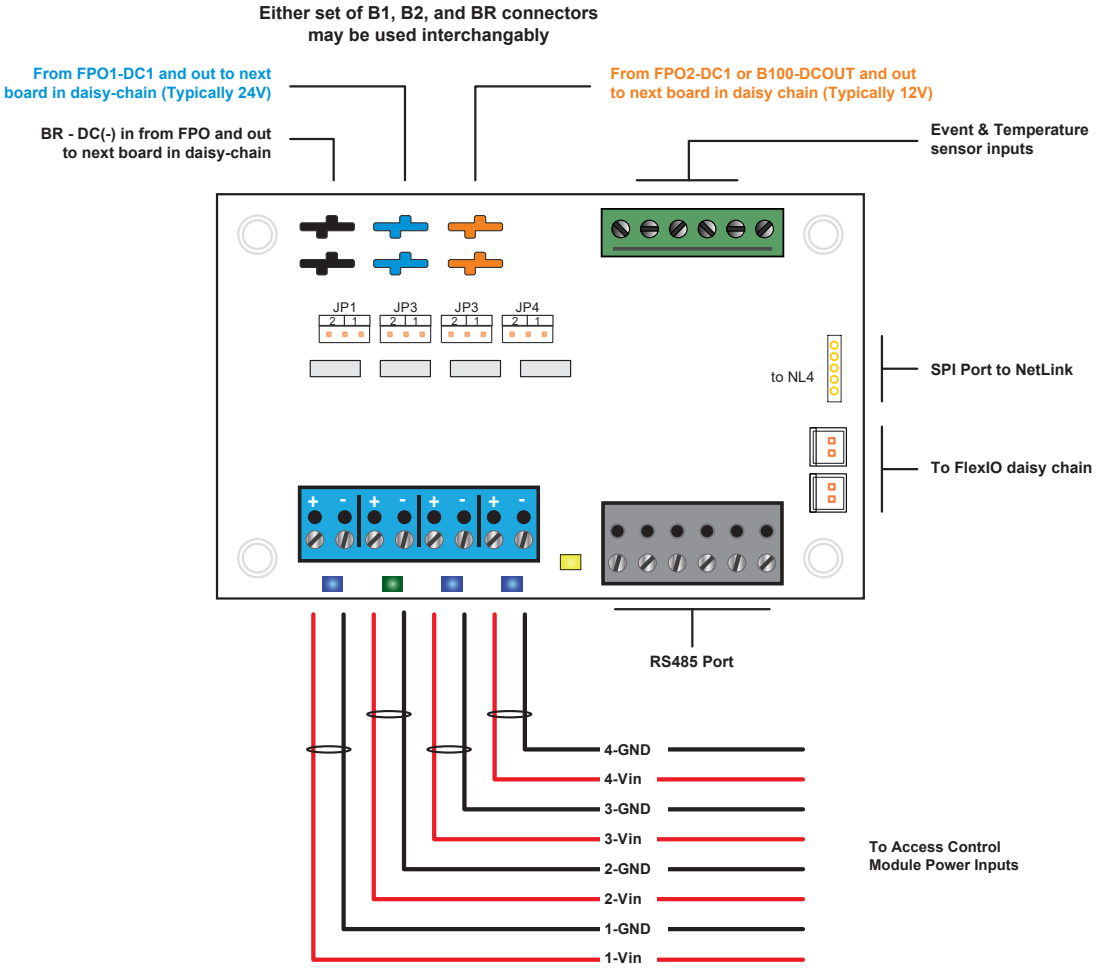
The D8 provides continuous auxiliary outputs. D8-1 is prewired for power to the HID controllers. One or more additional D8 boards may be provided for external auxiliary power. The terminal strips on these additional D8 boards will be empty.

Jumpers JP1 through JP8 are used to select the output voltage for each output in dual voltage systems. Position 1 selects the voltage connected to the B1 buss, while position 2 selects the voltage on the B2 buss. Single voltage systems should leave these jumpers in position 1.

In B100 dual voltage systems, B1 is 24V and B2 is 12V, as set from the factory.

See the D8 manual provided for more information.

Typical Wiring: SD4

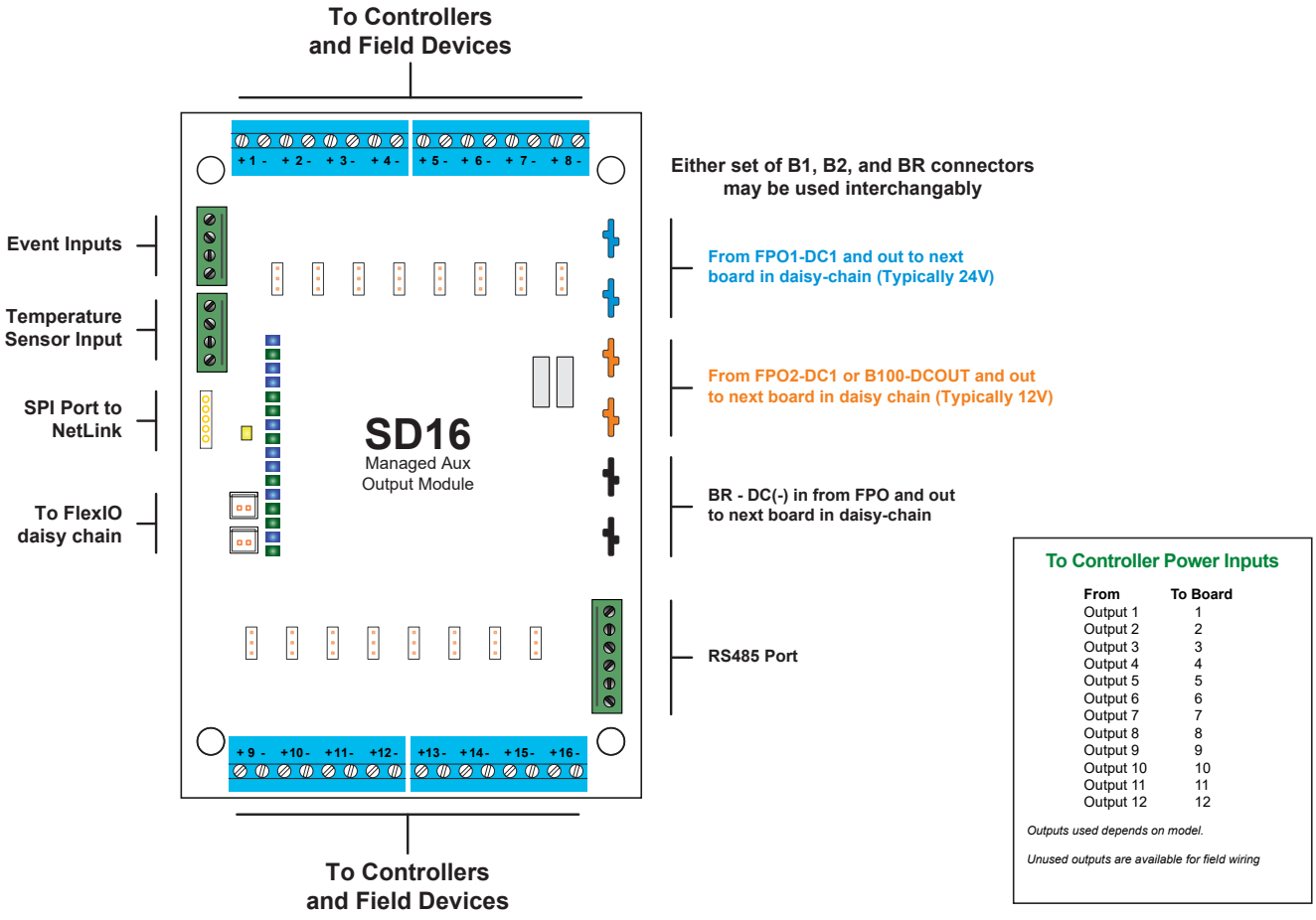


The SD4 provides network managed continuous auxiliary outputs. SD4-1 is prewired for power to the HID controllers. One or more additional SD4 boards may be provided for external auxiliary power. The terminal strips on these additional SD4 boards will be empty.

System configuration, FAI Operation, and fault setpoints are selectable through the embedded browser interface of the required NL4 or NLX. Outputs may be individually power cycled remotely. One jumper per zone is provided for voltage selection in dual voltage systems.

See the SD4 and NL4/NLX Installation manuals for more information.

Typical Wiring: SD16



To Controller Power Inputs

From	To Board
Output 1	1
Output 2	2
Output 3	3
Output 4	4
Output 5	5
Output 6	6
Output 7	7
Output 8	8
Output 9	9
Output 10	10
Output 11	11
Output 12	12

Outputs used depends on model.

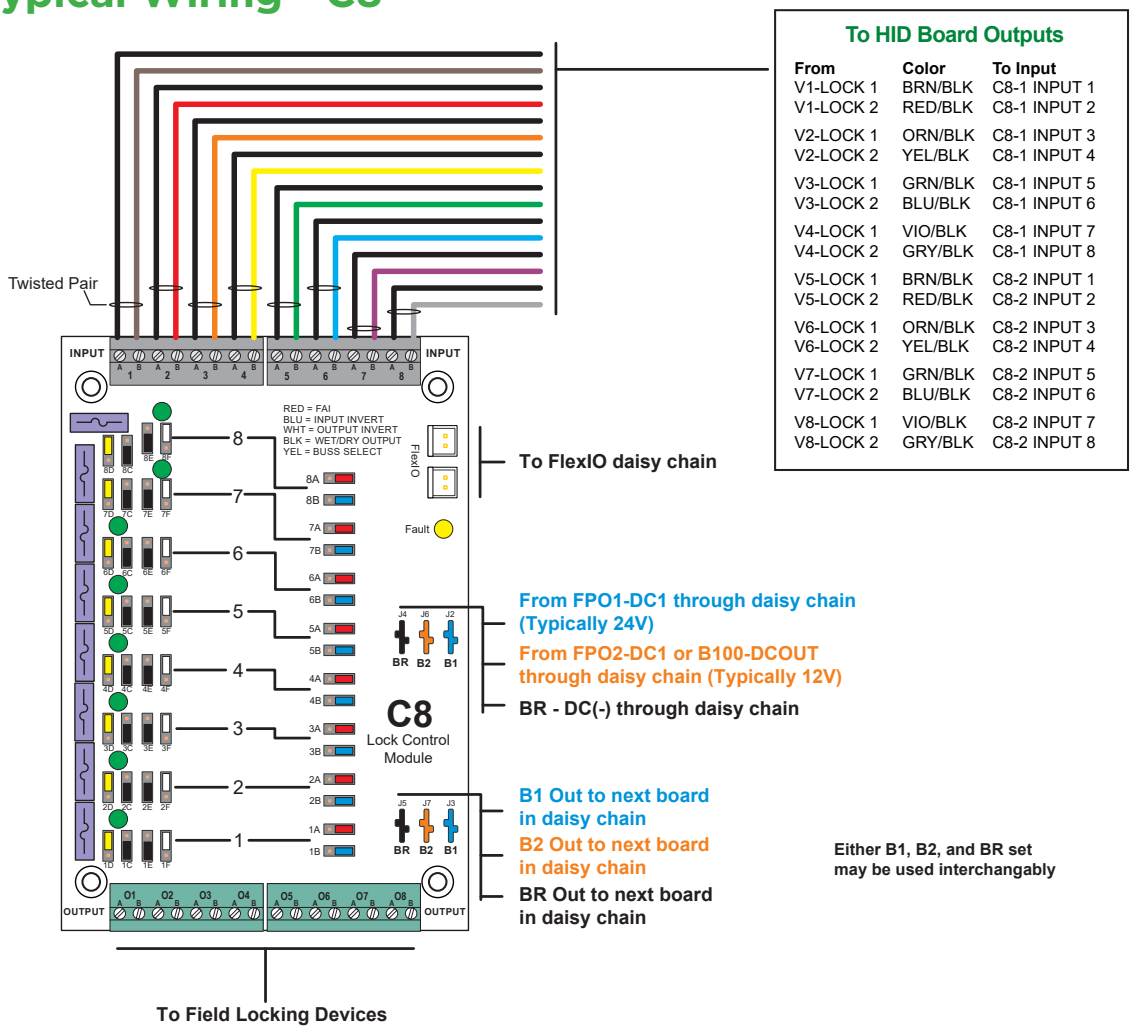
Unused outputs are available for field wiring

The SD16 provides network managed continuous auxiliary outputs. SD16-1 is prewired for power to the HID controllers. One or more additional SD16 boards may be provided for external auxiliary power. The terminal strips on these additional SD16 boards will be empty.

System configuration, FAI Operation, and fault setpoints are selectable through the embedded browser interface of the required NL4 or NLX. Outputs may be individually power cycled remotely. One jumper per zone is provided for voltage selection in dual voltage systems.

See the SD16 and NL4/NLX Installation manuals for more information.

Typical Wiring - C8



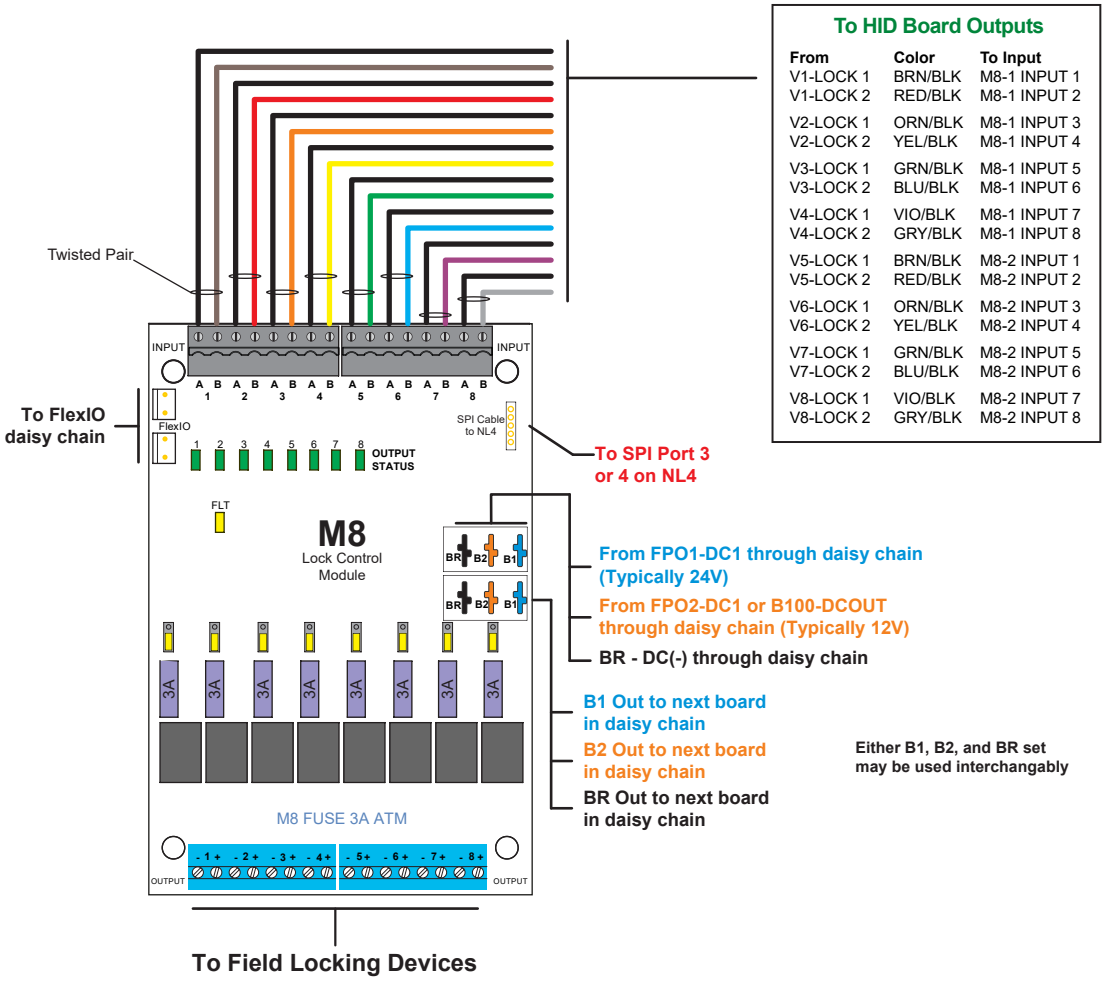
The C8 provides a protective and operational buffer between the access control boards and field induced problems or issues.

Eight trigger inputs are pre-wired to the access control lock outputs with color-coded, twisted-pair wires and eight relay controlled outputs are provided for lock control. Each output is capable of 3A of current and is selectable for either voltage in dual voltage systems.

The blue and black jumpers are pre-set from the factory. The jumpers below need to be set by the installer. See the included C8 manual and Application Note AN-29 for more information.

Color	Function	Position 1	Position 2
Red	FAI	Enabled	Disabled
Yellow	Voltage Select	B1	B2
White	Lock Type	Maglock (Fail Safe)	Strike (Fail Secure)

Typical Wiring - M8



The M8 provides a protective and operational buffer between the access control boards and field induced problems or issues. This unit is used for lock control when a network managed system is desired with remote control, reporting, and diagnostics.

Eight trigger inputs are pre-wired to the access control lock outputs with color-coded, twisted-pair wires and eight relay controlled outputs are provided for lock control. Each output is capable of 3A of current and is selectable for either voltage in dual voltage systems.

System configuration, FAI Operation, and lock operation are selectable through the embedded browser interface of the required NL4. One jumper per zone is provided for voltage selection in dual voltage systems. See the included M8 and NL4 manuals for more information.

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For more information about the ProWire™ System:
www.lifesafetypower.com
PH 888.577.2898