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## **AMAG Pre-Wired Product Companion**

Wiring Convention and Supplemental Guide to ProWire™  
AMAG M2150 and M4000 Power Management Systems



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## Introduction

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

Prewired features of ProWire<sup>™</sup> 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 D8, SD4, or SD16 power distribution module with individual protection for each access control board and a dedicated power supply configured for 12VDC. Each D8 module provides eight protected outputs capable of 3A per output and a configuration jumper to select which power supply is applied to a specific output in dual voltage systems. SD4 modules provide four outputs capable of 3A 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. **ProWire systems accomodate AMAG M2150 or M4000 series controllers.**

## Standard Conventions

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

### AMAG Board Numbering

AMAG board locations are numbered as A1 to A4 from top to bottom, left to right. Configurations using M2150 series boards will always have the 8DBC controller located in the A1 location. In M4000 configurations, the A1 location will hold the door controller with the Database Board.

See Typical Enclosure Configurations starting on page 6 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

**D8P-1 to D8P-n** Power Distribution, Class 2 Power Limited

**SD4P-1 to SD4P-n** Network Managed Power Distribution, Class 2 Power Limited


**SD16-1 to SD16-n** Network Managed Power Distribution, Class 2 Power Limited

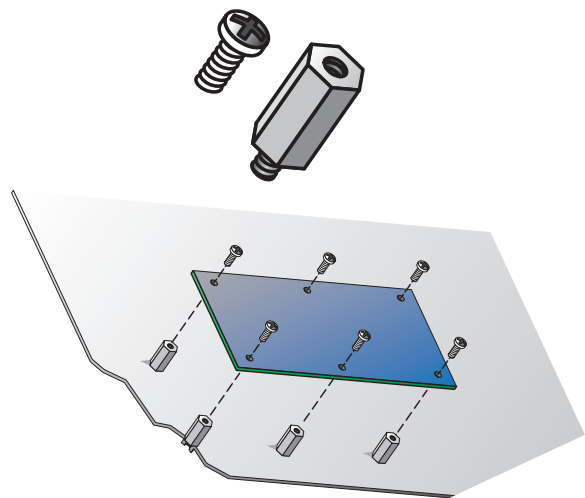
**C8-1 / M8-1** Lock Control for locks 1 - 8

**C8-2 / M8-2** Lock Control for locks 9 - 16

### AMAG Board Mounting

Mounting of the AMAG subassemblies are by means of the supplied 6-32 SEMS screws using the preinstalled hex stand-offs.

 Do not overtighten the hardware during the install process.





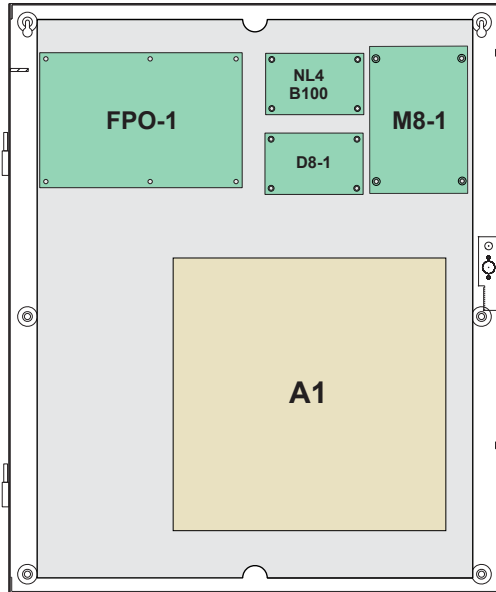
Power is knowledge.™

**LifeSafety Power®**

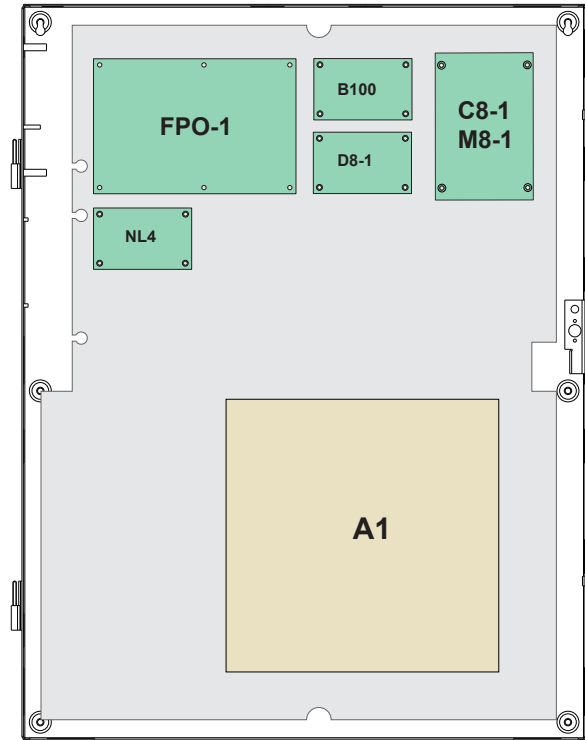
LSP /  
AMAG  
PROWIRE®

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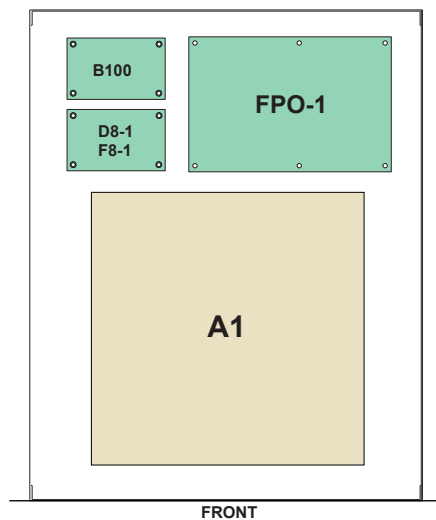
## Typical System Configurations - M2150



8 Door - E4A

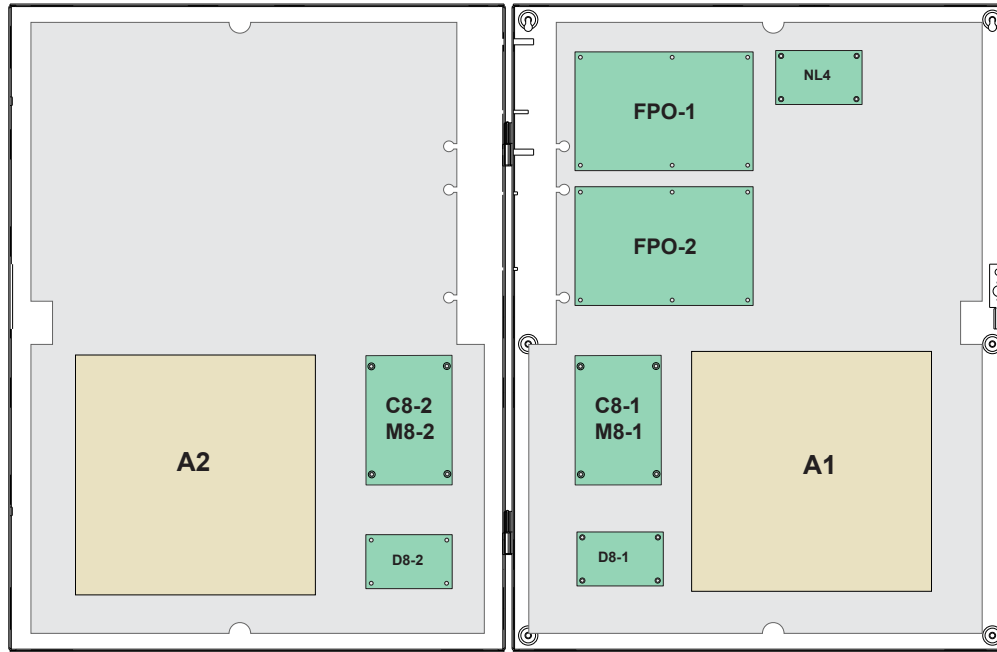


8 Door - E6A

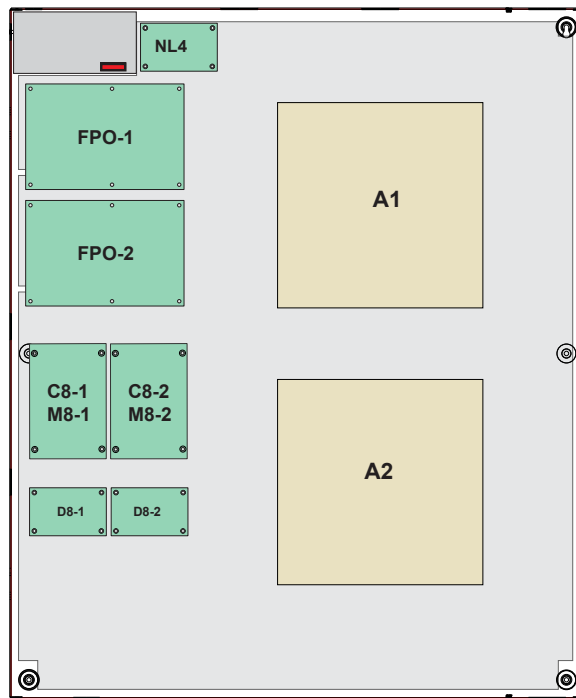


8 Door - 8DBC/8DC  
 RGA Rack Mount Drawer

## Typical System Configurations - M2150

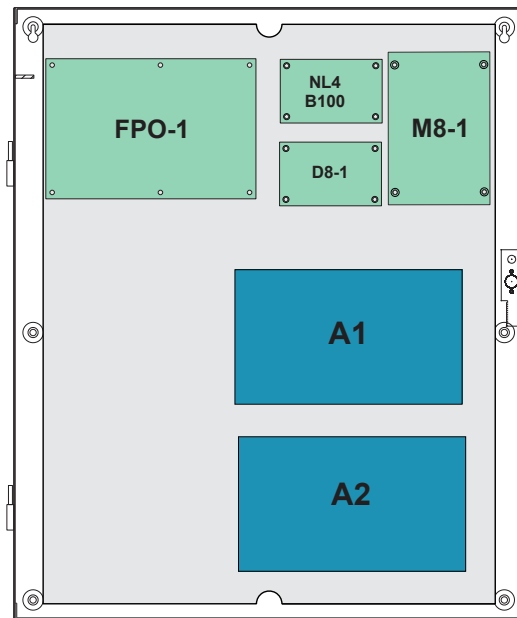


16 Door - E6A1 - 8DBC & 8DC

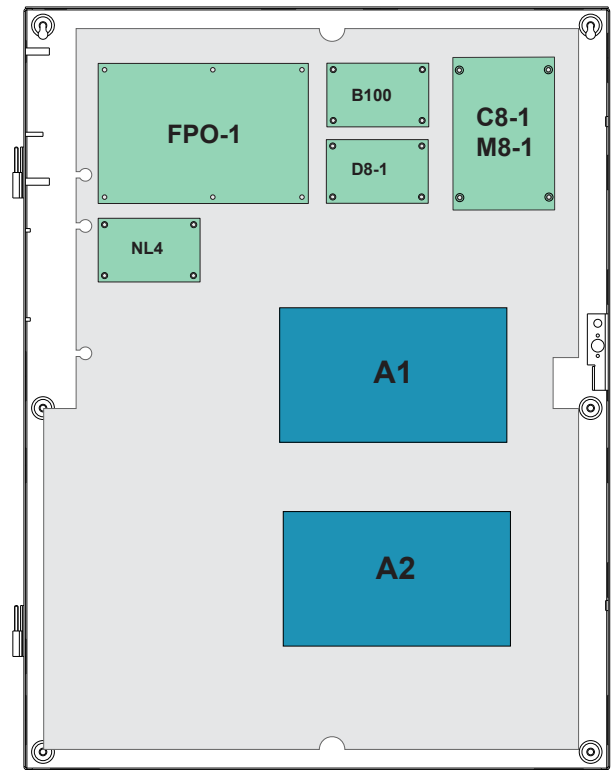


16 Door - E8A

## Typical System Configurations - M4000



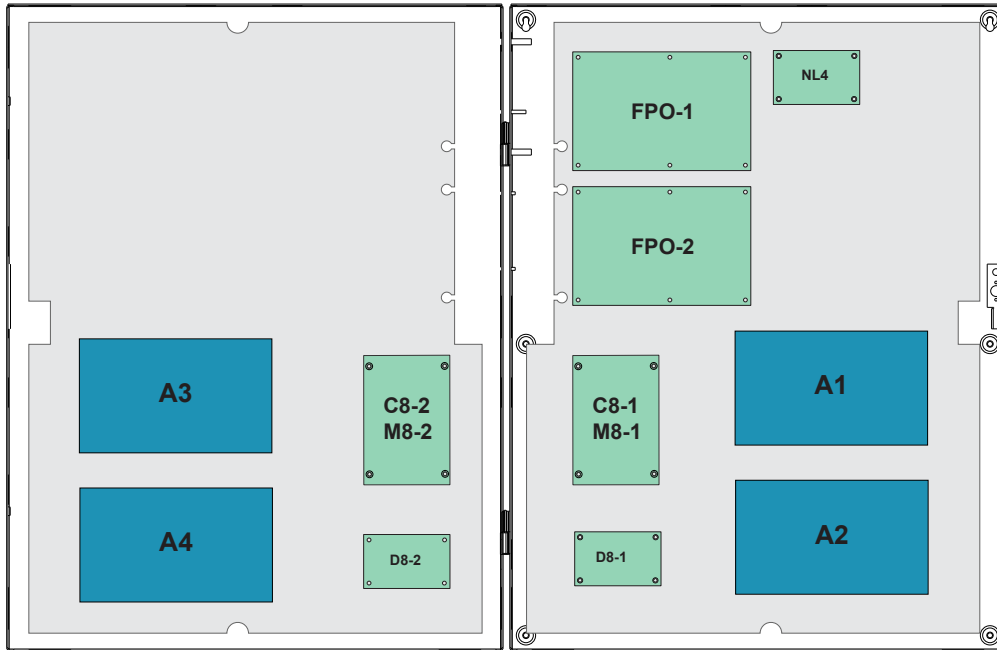
8 Door - M4000 - E4A



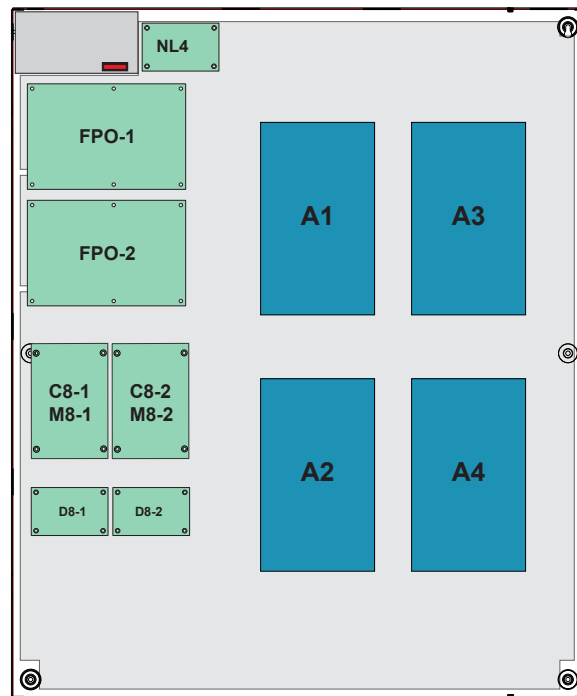
8 Door - M4000 - E6A



## Typical System Configurations - M4000



16 Door - E6A1 - M4000



16 Door - E8A - M4000

## Wiring Conventions

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

### AMAG Board Power Connections

AMAG board power originates from the 12V supply (FPO-2 or B100/B150). Power is supplied to the AMAG boards from D8-1, SD4-1, or SD16-1. AMAG Board A1 is powered from output 1, A2 from output 2, etc. AMAG power wiring uses twisted 18AWG wire.

**Red:** +12VDC

**Black:** Ground (-)

### AMAG Communications

The AMAG communications wiring is daisy chained in order from AMAG Board A1, to A2, etc. AMAG communication wiring uses jacketed, twisted 20AWG wire with shield.

#### M2150 COMMS+ / COMMS-

**White:** COMMS+

**Black:** COMMS-

**Shield:** 0V/GND

#### M4000 SN Bus TX/RX

**White:** TX+

**Black:** TX-

**Shield:** Connect to Earth Ground at Backplate

### Lock Control Input Color Code to C8/M8 from AMAG Outputs

The wiring between the AMAG board output and the C8 or M8 Lock Control board inputs uses twisted 18AWG 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<sup>™</sup> Standard Conventions Quick Reference

### AMAG Board Numbering (Typical)

- A1 ... A2
- A3 ... A4

### LSP Board Numbering

- FPO1 - Lock power
- FPO2 - System power
- D8P-1 to D8P-n - Power distribution
- SD4P-1 to SD4P-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
- 

### AMAG Board Power

- 12VDC Class 2, Power Limited
- Red +12VDC
- Black GND
- Twisted 18 AWG
- From D8-1, SD4-1, or SD16-1

### AMAG Communications

- Daisy chained from A1 to A2 etc.
- Jacketed, twisted, with shield, 20 AWG

### M2150 COMMS+ / COMMS-

**White:** COMMS+

**Black:** COMMS-

**Shield:** OV/GND

### M4000 SN Bus TX/RX

**White:** TX+

**Black:** TX-

**Shield:** Connect to Earth Ground at Back-plate

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

- 1 - Brown / Black twisted 18 AWG
- 2 - Red / Black twisted 18 AWG
- 3 - Orange / Black twisted 18 AWG
- 4 - Yellow / Black twisted 18 AWG
- 5 - Green / Black twisted 18 AWG
- 6 - Blue / Black twisted 18 AWG
- 7 - Violet / Black twisted 18 AWG
- 8 - Gray / Black twisted 18 AWG
- Repeat for inputs 9 - 16 on C8-2/M8-2

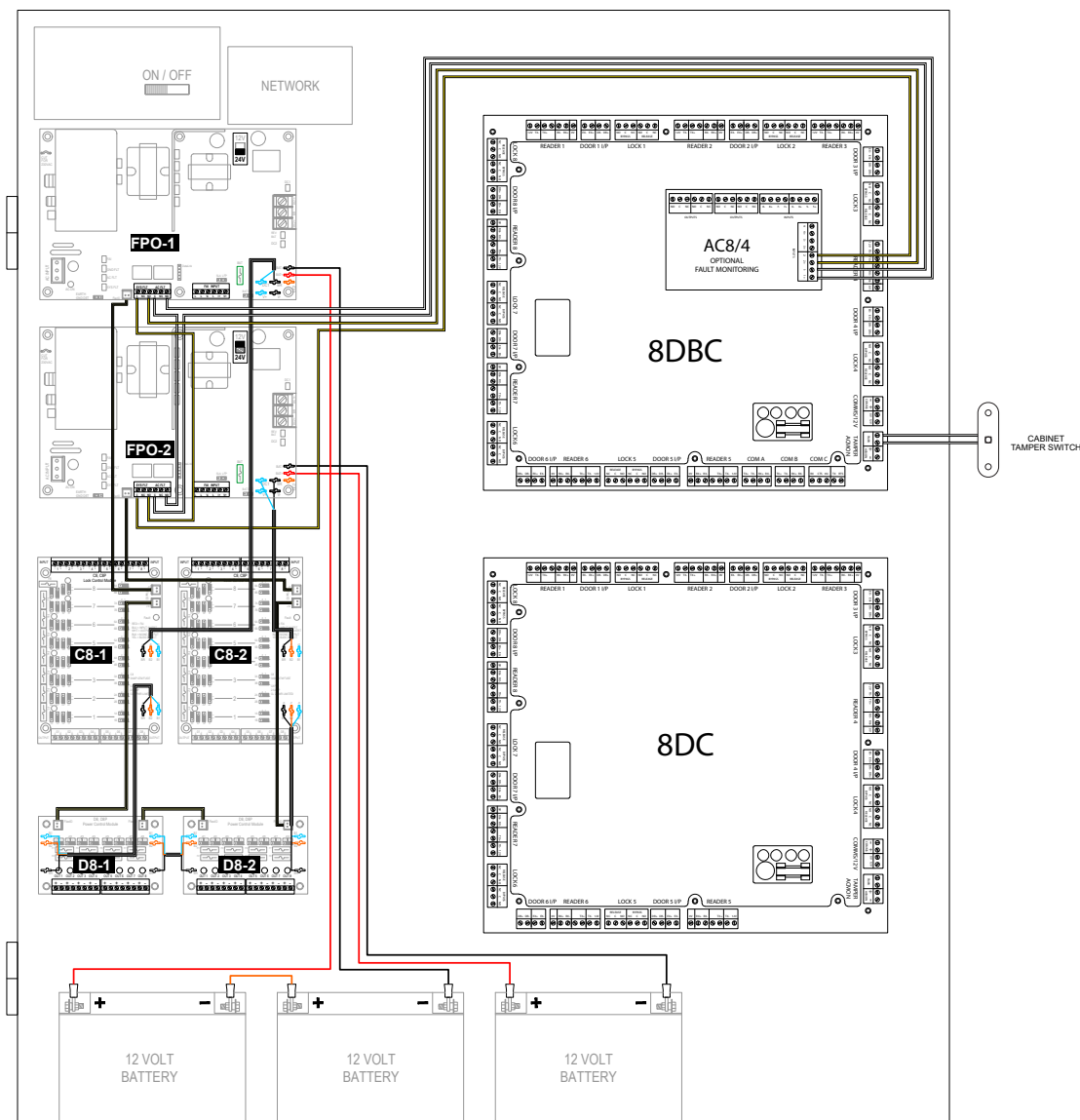


## System Wiring Example

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 a non-managed 16 door “A” configuration (using M2150 controllers). Wiring for other configurations is similar - See page 16 for terminal locations of the M2150 or M4000 controllers.

### LifeSafety Power Board, Fault, and Tamper Switch Wiring

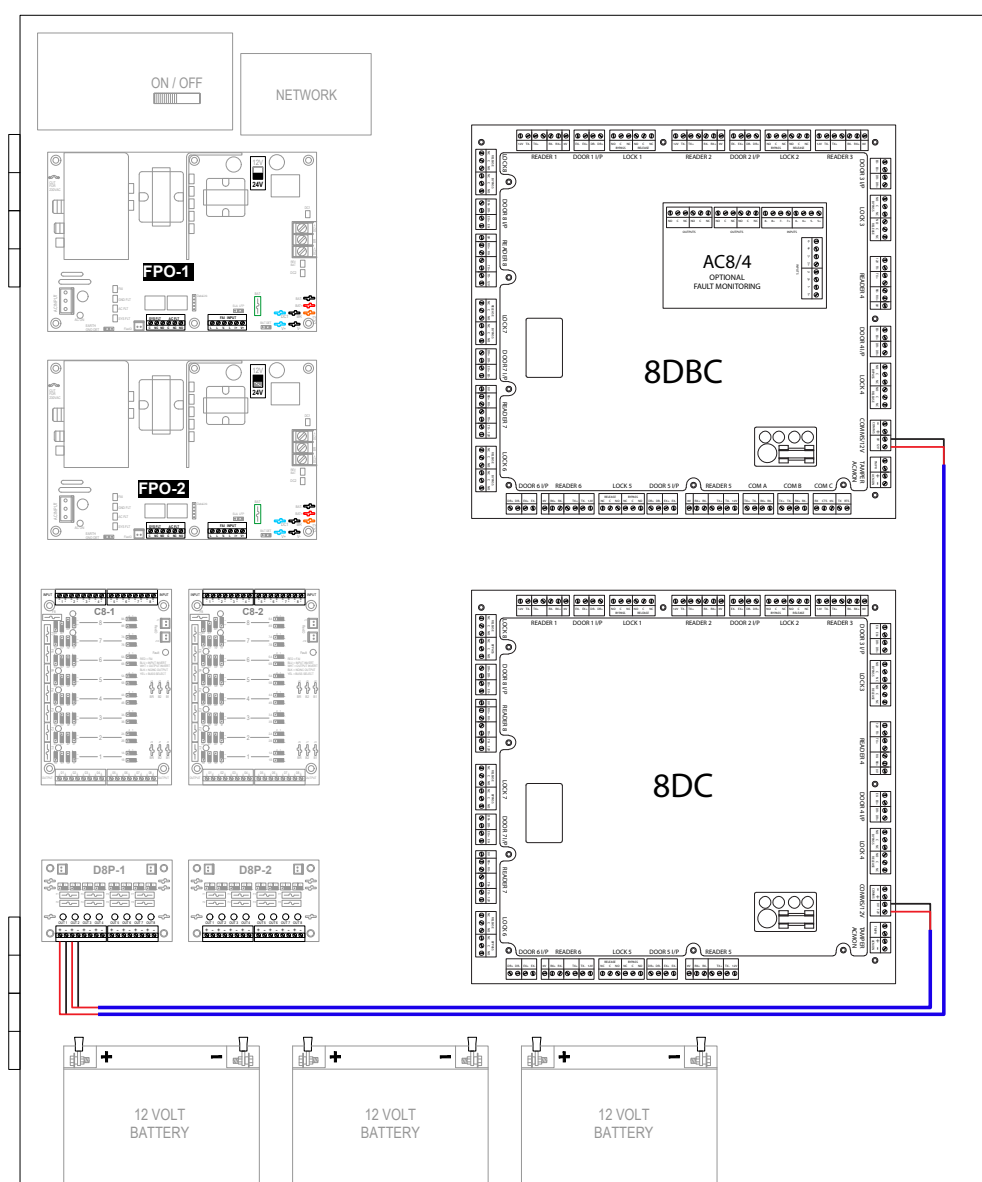
The LifeSafety Power boards are prewired for power, Fault, and FlexIO. FPO-1 is wired to the B1 buss, and FPO-2 or the B100/B150 is wired to the B2 buss. FlexIO daisychains between all of the LSP boards to provide fault and FAI throughout the system. Fault wiring uses the FPO’s NO contacts for AC and System Fault and connect to Monitor Points 1 and 2 of an optional AC8/4 on M2150 configurations or to Monitor Points 1 & 2 on an M4000. See AN-19 for more information on the Dual Buss architecture used for accessory power.



## System Wiring Example

### AMAG Board Power Wiring

The AMAG controllers are prewired for power to D8-1, SD4-1, or SD16-1. AMAG board A1 is wired to output 1, A2 to output 2, etc. Wiring is red/black twisted pair. All drawings show a non-managed 16 door “A” configuration (using M2150 controllers). Wiring for other configurations is similar - See page 16 for terminal locations of the M2150 or M4000 controllers.

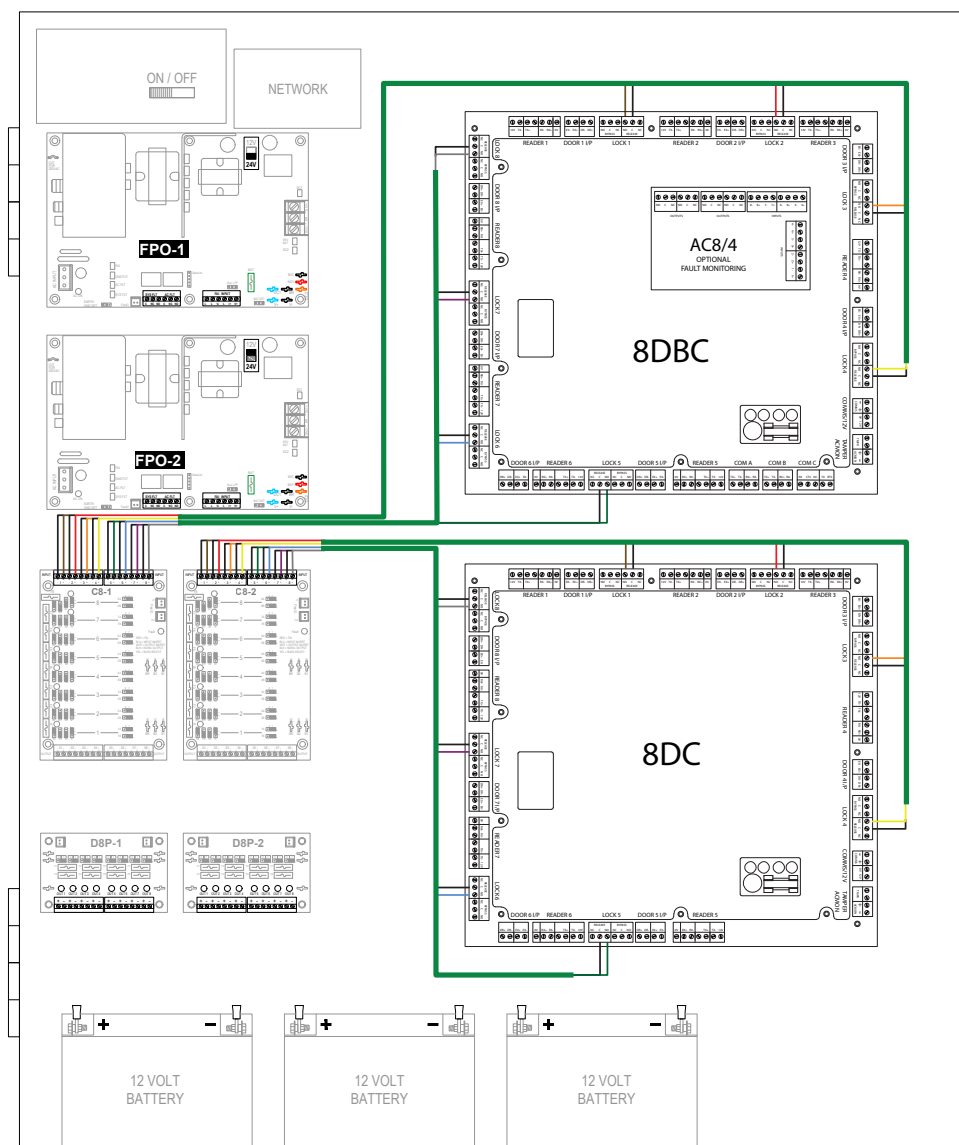




## System Wiring Example

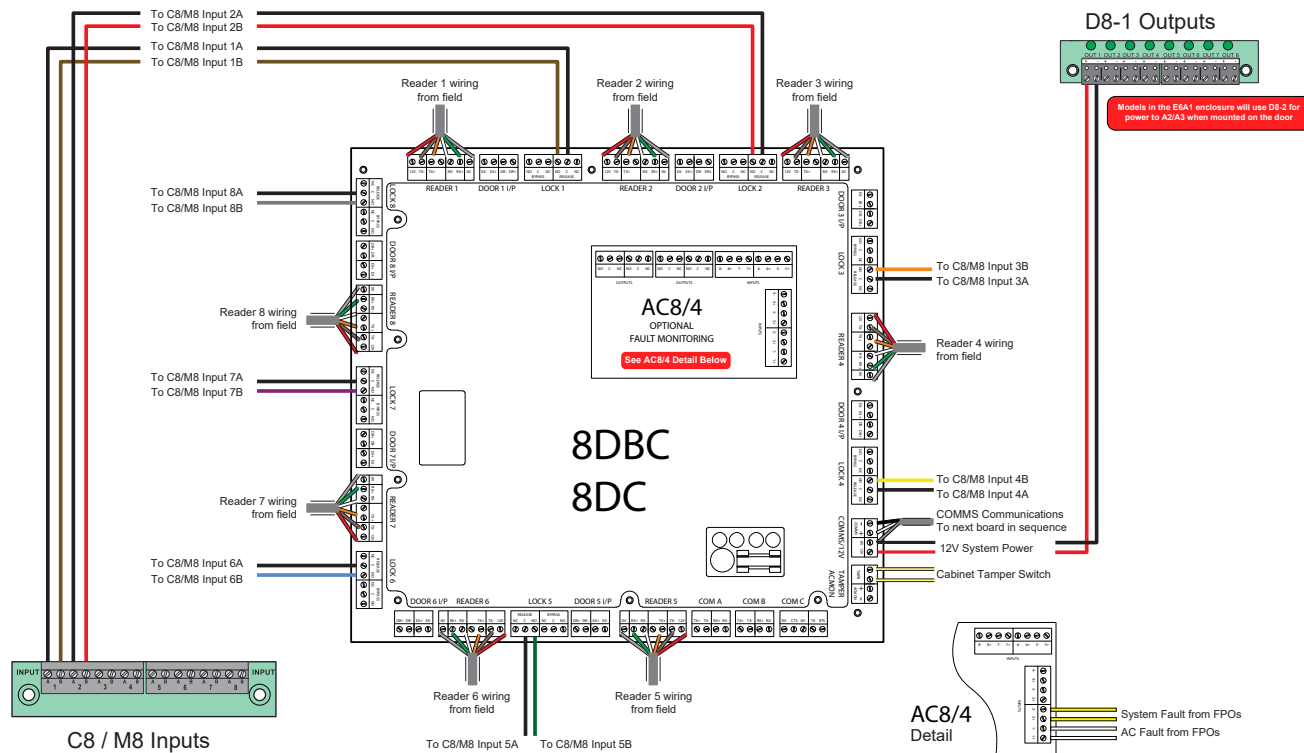
### AMAG Board Output Relay Wiring

The output lock relays of the AMAG 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 a non-managed 16 door “A” configuration (using M2150 controllers). Wiring for other configurations is similar - See page 16 for terminal locations of the M2150 or M4000 controllers.





## Typical Wiring - 8DBC / 8DC / 8DBC-OSDP / 8DC-OSDP



The 8DBC intelligent controllers provide decision making, event reporting, and database storage for the AMAG hardware platform. The 8DC expands the platform by 8 additional doors. Eight reader interfaces provide control for eight doors on each 8DBC or 8DC.

Communication between connected boards is by means of COMMS+ & COMMS-.

Eight physical barriers can be controlled with the 8DBC or 8DC. Each reader port can support multiNODE 20mA current loop protocol (MCLP) readers. Weigand reader support is accomplished by adding an optional WIM interface module. 8DBC-OSDP and 8DC-OSDP add OSDP reader capability.

The relay outputs are used to interface with the C8 or M8 lock control board input terminals. These wires are color coded to denote the specific input connection.

The 8DBC and 8DC require 12VDC power which is supplied from an LSP D8, SD4, or SD16 power distribution module. Power supply fault reporting to the 8DBC requires an AC8/4 I/O module and is optional.

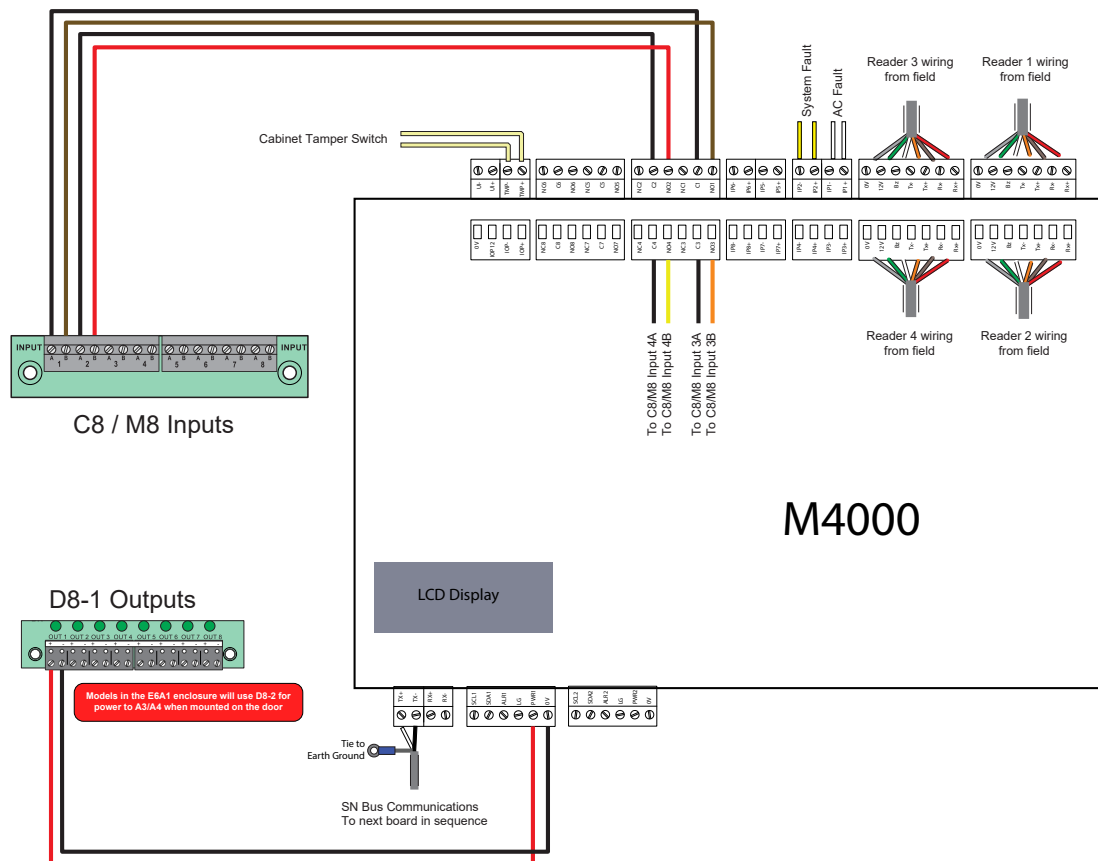
Mechanical mounting is by eight, supplied, 1/2" metal standoffs threaded into the enclosure backplate with the board secured to the standoffs with eight 6-32 x 3/8" machine screws.

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





## Typical Wiring - M4000



The M4000 Door Entry Controller expands the AMAG M4000 hardware platform by 4 doors. Four reader interfaces provide control for four doors. Adding a Database Board (DBB) allows the Door Entry Controller to store the access control rules and manage the other Door Entry Controllers.

Communication between connected boards is by means of the SN Bus.

Four physical barriers can be controlled with the Door Entry Controller. The relay outputs are used to interface with the C8 or M8 lock control board input terminals. These wires are color coded to denote the specific input connection.

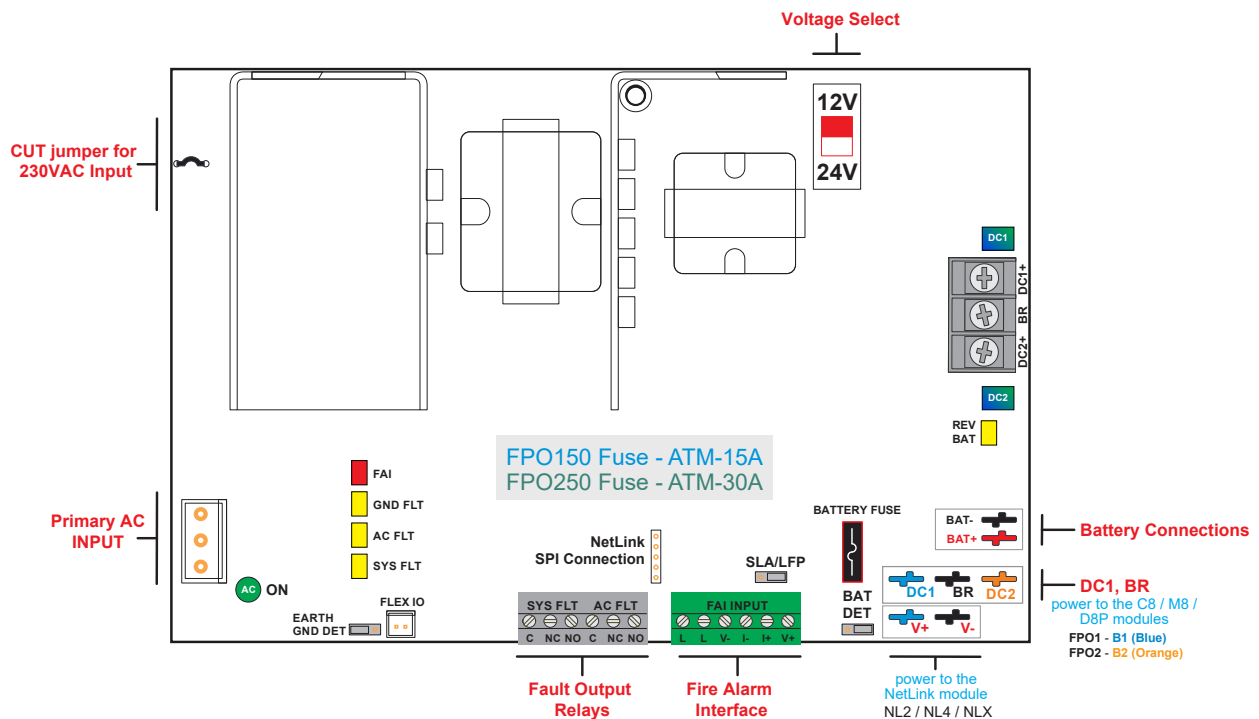
The M4000 requires 12VDC or 24VDC power which is supplied from an LSP D8, SD4, or SD16 power distribution module.

Mechanical mounting is by eight, 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 - FPO150 / FPO250



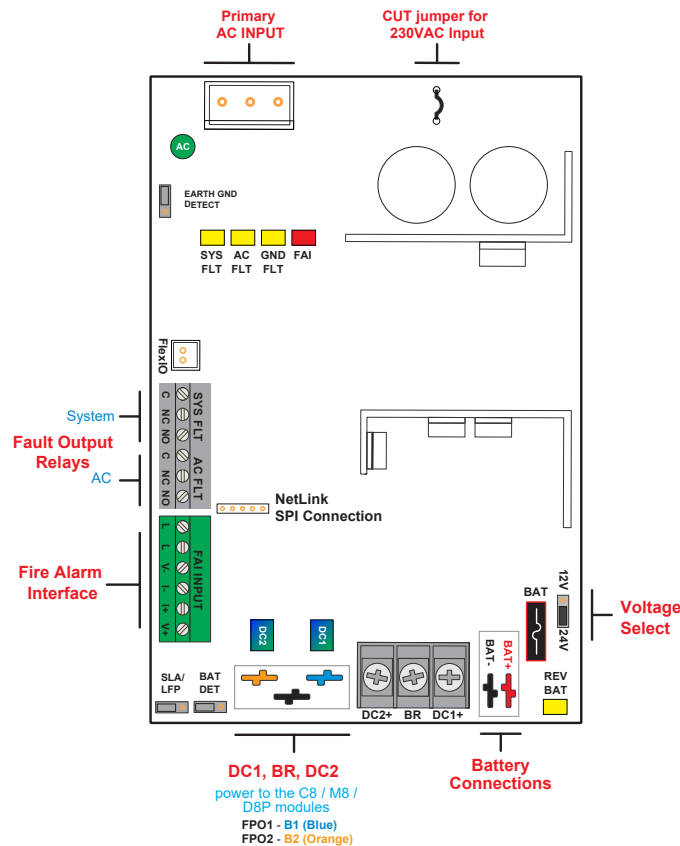
The FPO150 will provide 12V @ 12A or 24V @ 6A and the FPO250 will provide 12V @ 20A or 24V @ 10A. The output voltage is selectable by the slide switch in the upper right corner of the unit. Either unit will charge 4 to 80 Ah of battery capacity.

Voltage from this device is available throughout the system from the C8/M8 lock control boards and the D8, SD4, or SD16 power distribution boards.

In M2150 systems, AC and System Fault relays of the FPO are wired to the AMAG AC8/4 I/O module, if present. In M4000 systems, the AC and System Fault relays are wired to Monitor Points 1 & 2. A fire alarm interface is available for lock override 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



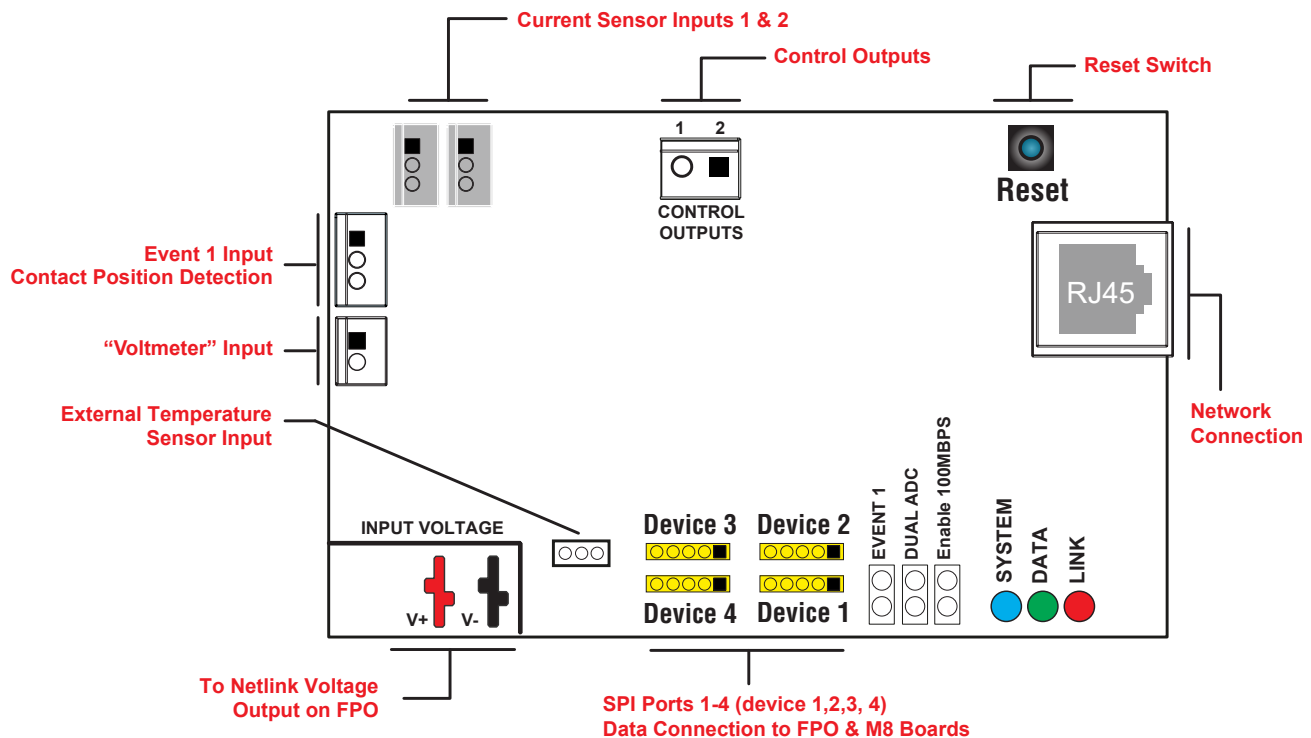
The FPO75 will provide 12V @ 6A or 24V @ 3A. The output voltage is selectable by the two position jumper in the center of the unit. The FPO75 will charge 4 to 40 Ah of battery capacity.

Voltage from this device is available throughout the system from the C8/M8 lock control boards and the D8, SD4, or SD16 power distribution boards.

In M2150 systems, AC and System Fault relays of the FPO are wired to the AMAG AC8/4 I/O module, if present. In M4000 systems, the AC and System Fault relays are wired to Monitor Points 1 & 2. A fire alarm interface is available for lock override 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



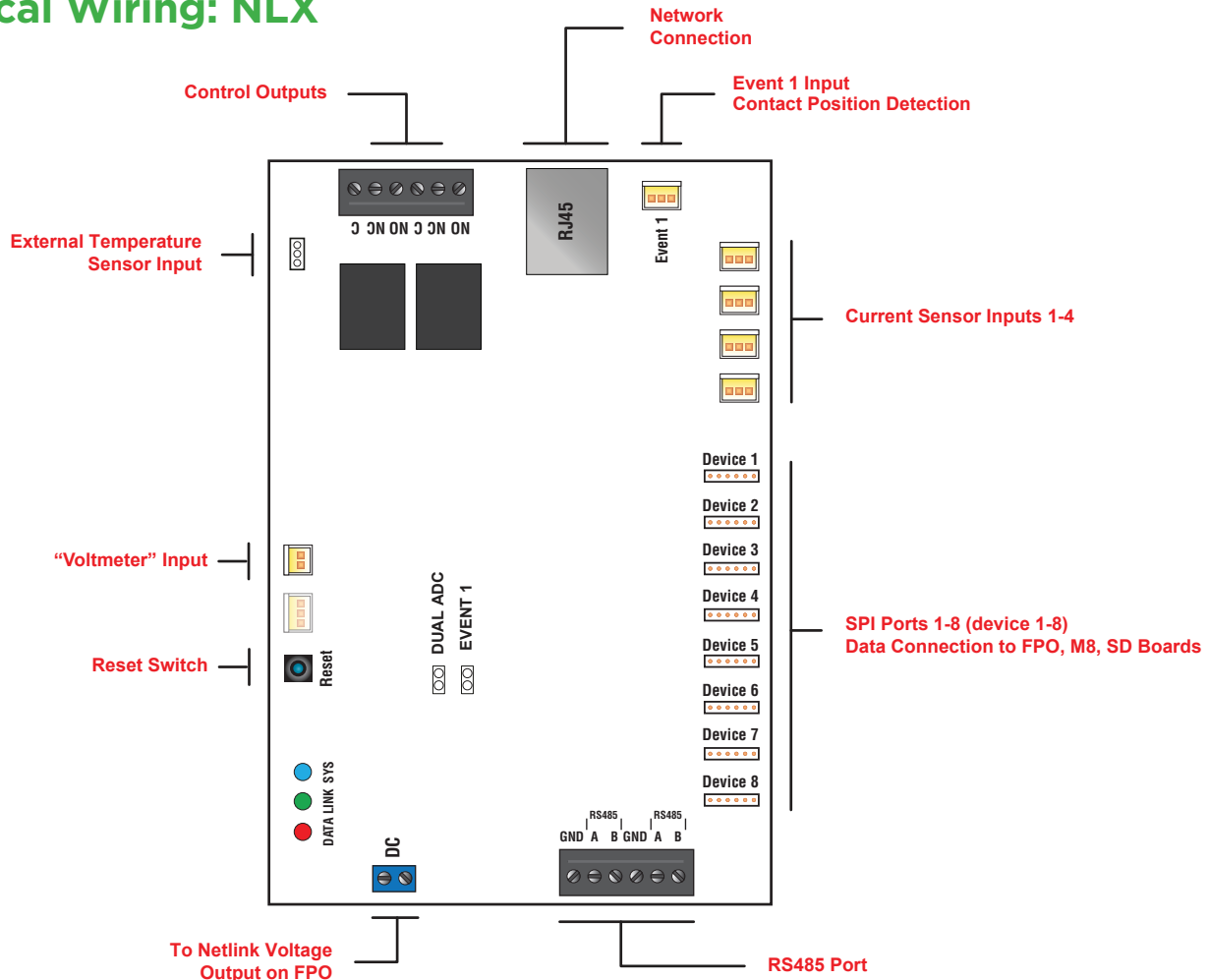
The NL4 is a network module that allows status communication and power control over a local or wide area network. The NL4 provides four device ports for connection to other FlexPower devices. Data monitored includes fault status, power supply output voltage, battery voltage and charging current, and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

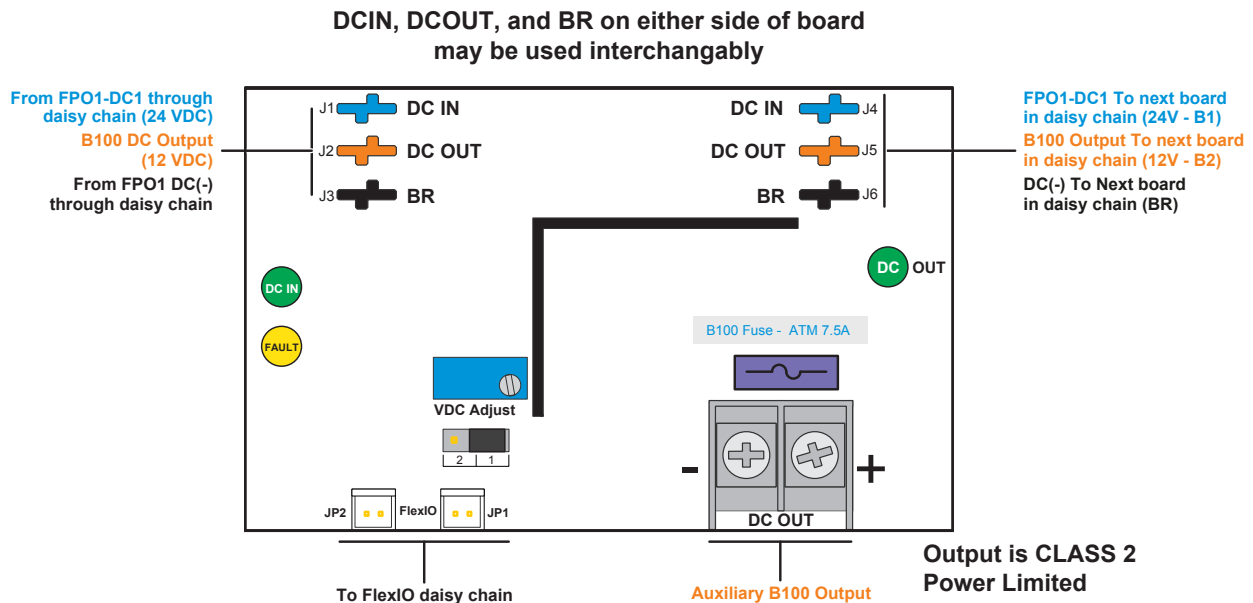
In addition to the SPI and RS485 ports, the NLX also includes four current sensors, a voltmeter input, an external temperature sensor, and a contact monitor input. Upper and lower limits can be set for these inputs to provide an alert if the value goes out of range.

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



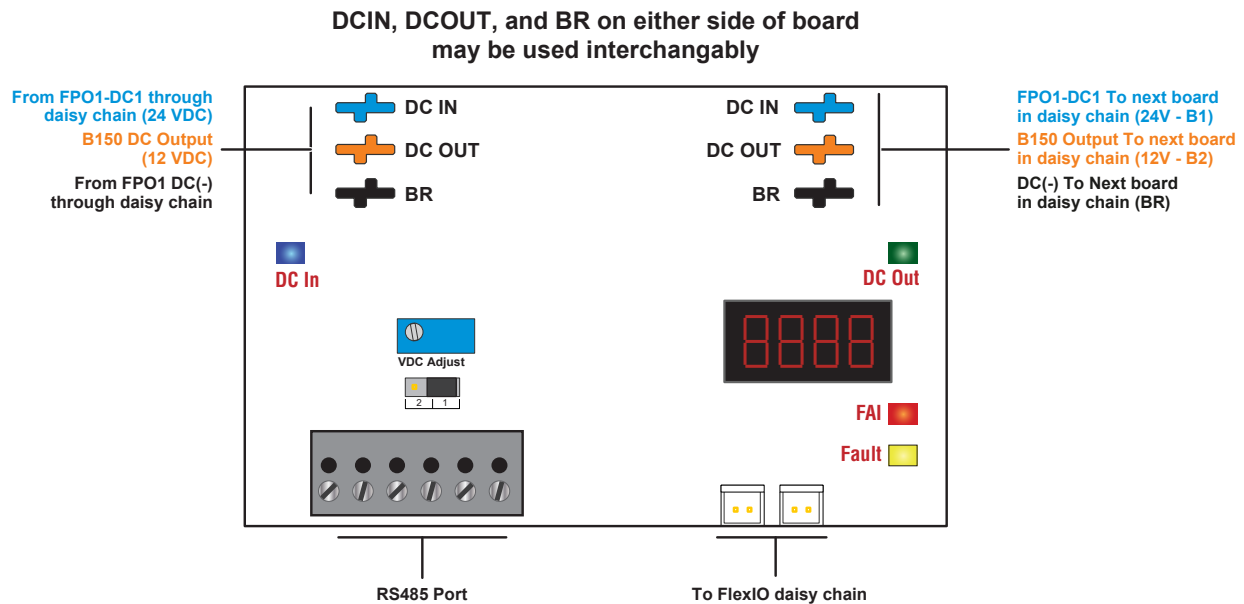
The B100 is used to provide 12V system power when the necessary current is less than 4A. The advantages of using the B100 over an FPO are that the B100 is physically smaller for more effective space utilization, more economical, and does not require a separate standby battery for 12V backup. Input power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

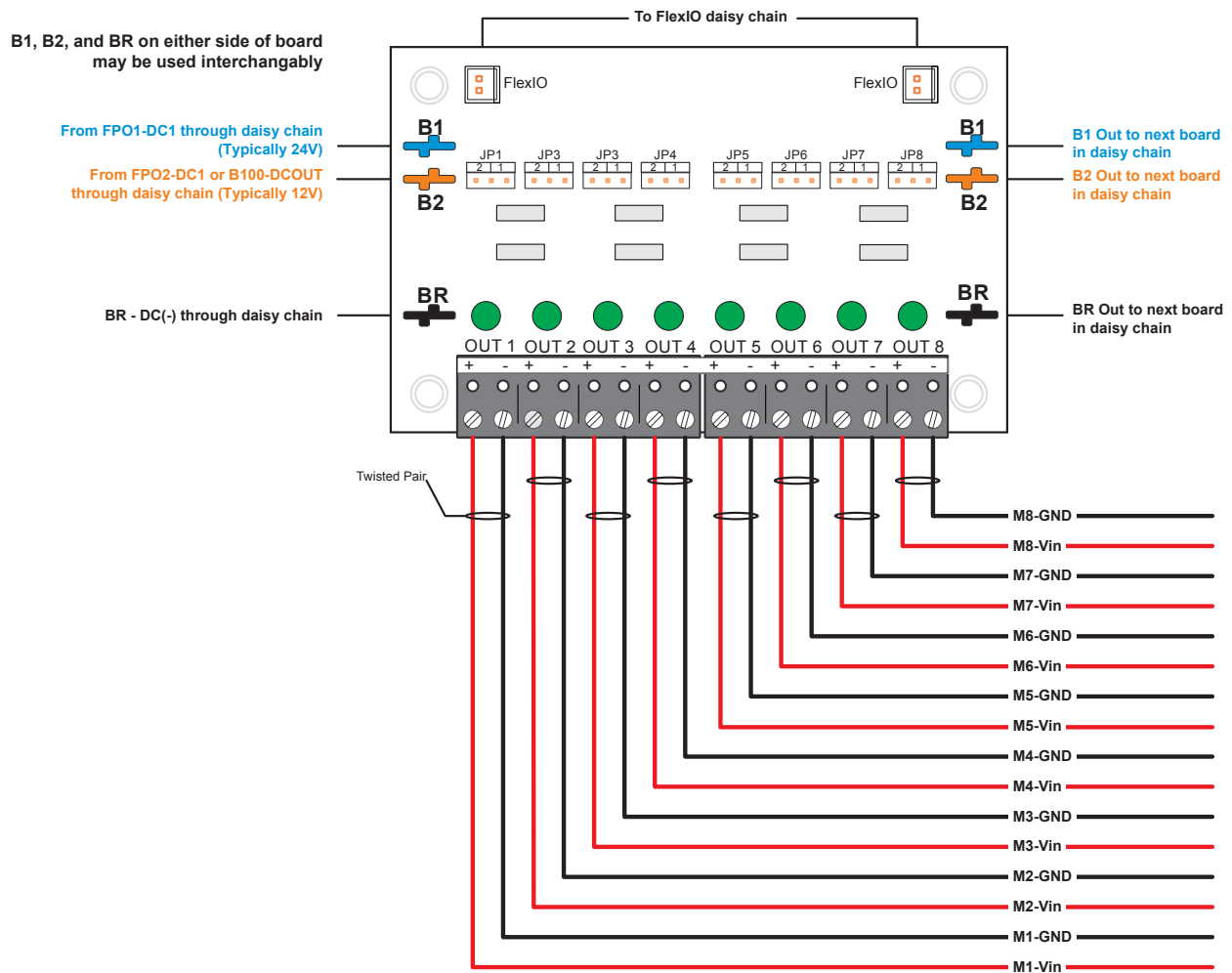


The B150 is used to provide 12V system power when the necessary current is less than 6A. The advantages of using the B150 over an FPO are that the B150 is physically smaller for more effective space utilization, more economical, and does not require a separate standby battery for 12V backup. Input power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

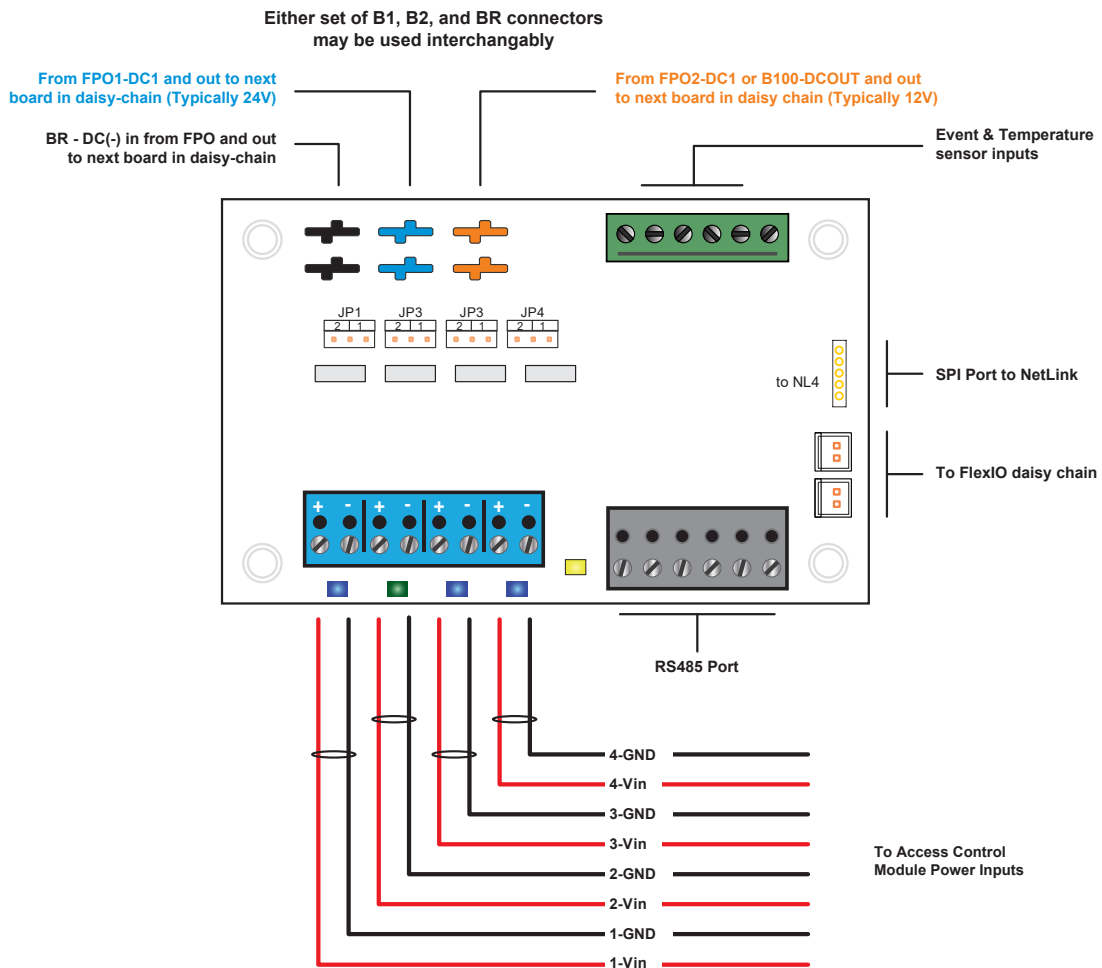
Jumpers JP1 through JP8 are used to select the output voltage for each output in dual voltage systems. Position 1 selects the voltage connected to the B1 buss, while position 2 selects the voltage on the B2 buss. Single voltage systems should leave these jumpers in position 1.

See the D8 manual provided for more information.





## Typical Wiring: SD4P

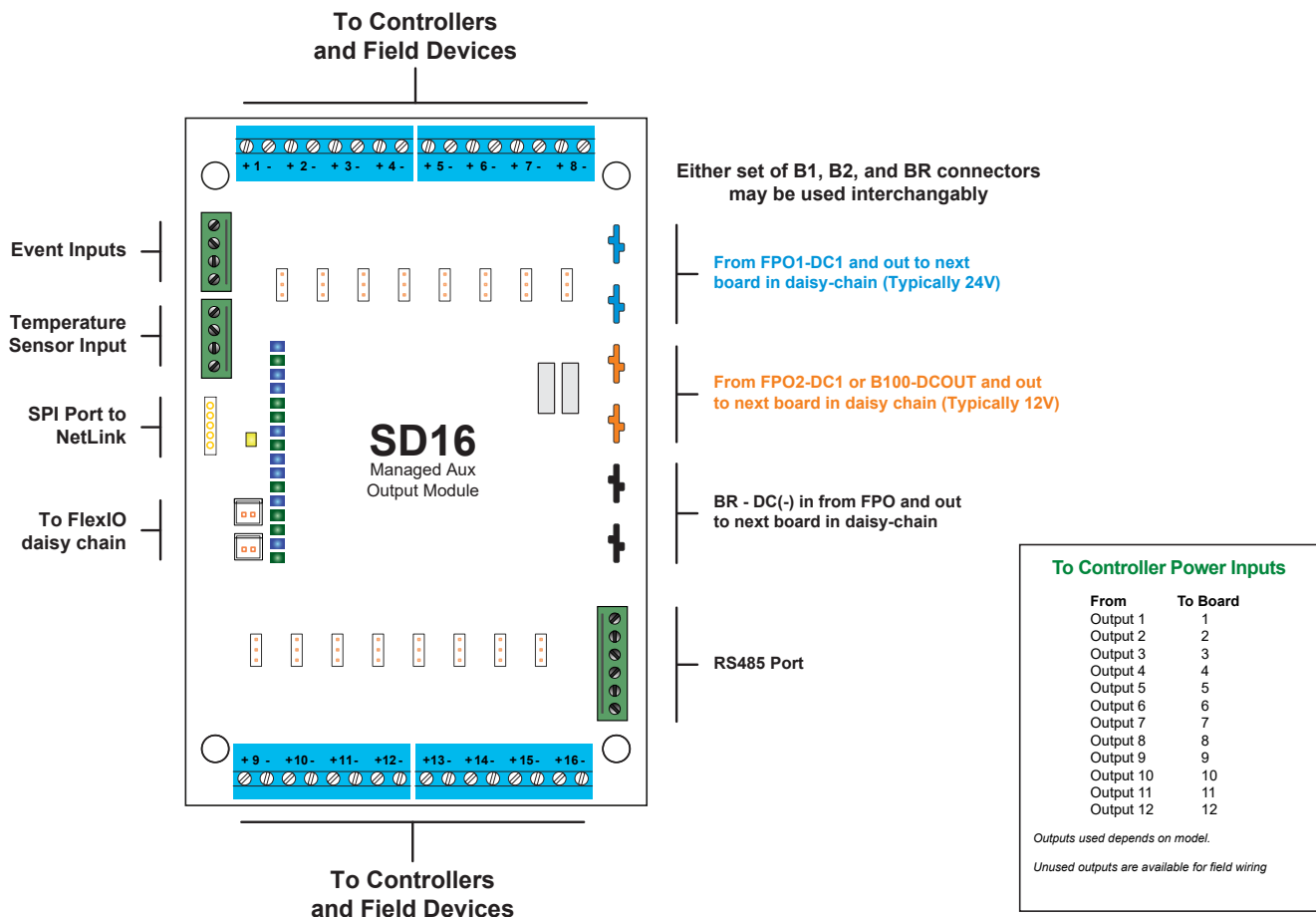


The SD4P provides network managed continuous auxiliary outputs. SD4P-1 is prewired for power to the AMAG controllers. One or more additional SD4P boards may be provided for external auxiliary power. The terminal strips on these additional SD4P boards will be empty.

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



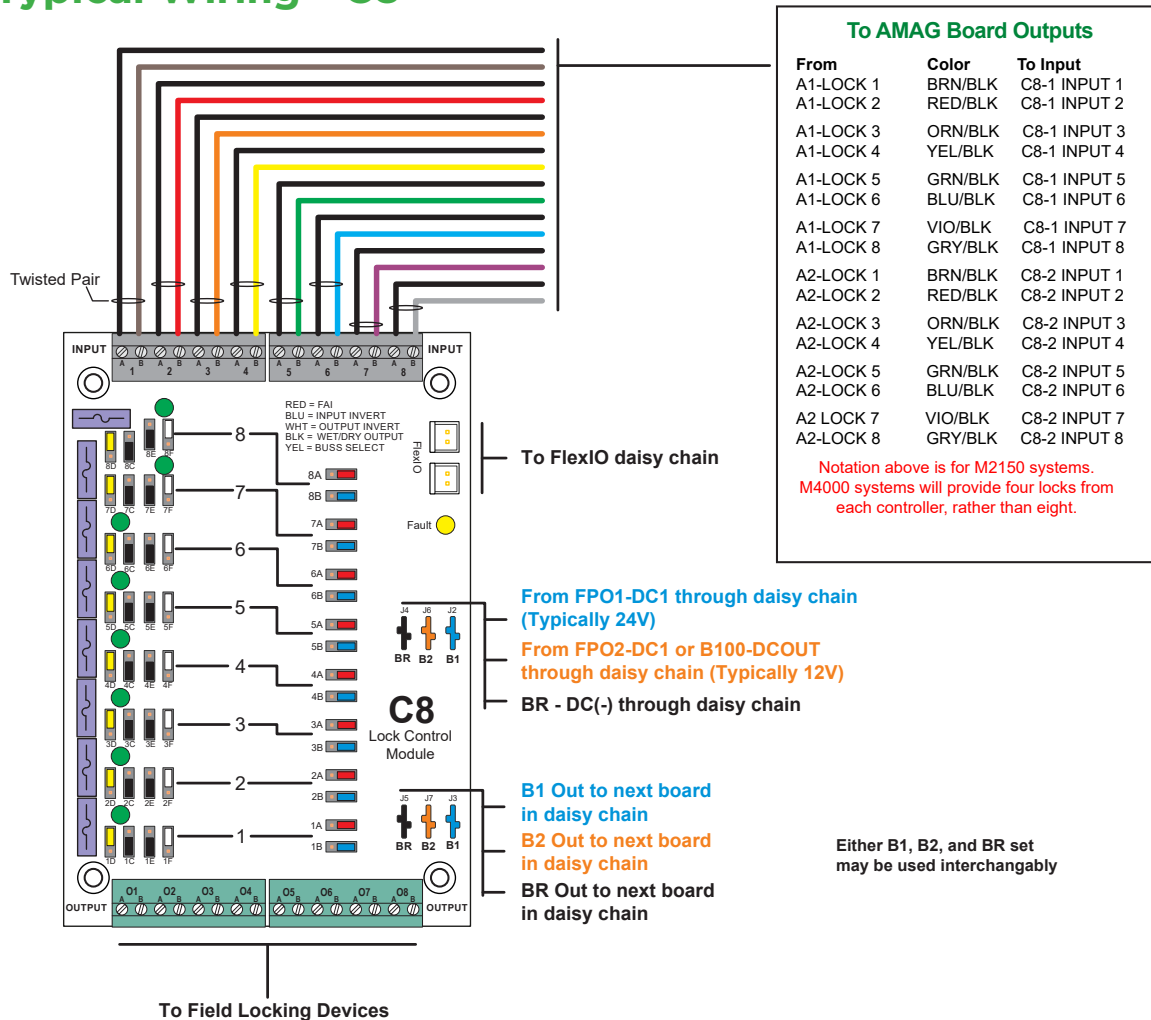
The SD16 provides network managed continuous auxiliary outputs. SD16-1 is prewired for power to the AMAG controllers. One or more additional SD16 boards may be provided for external auxiliary power. The terminal strips on these additional SD16 boards will be empty.

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.

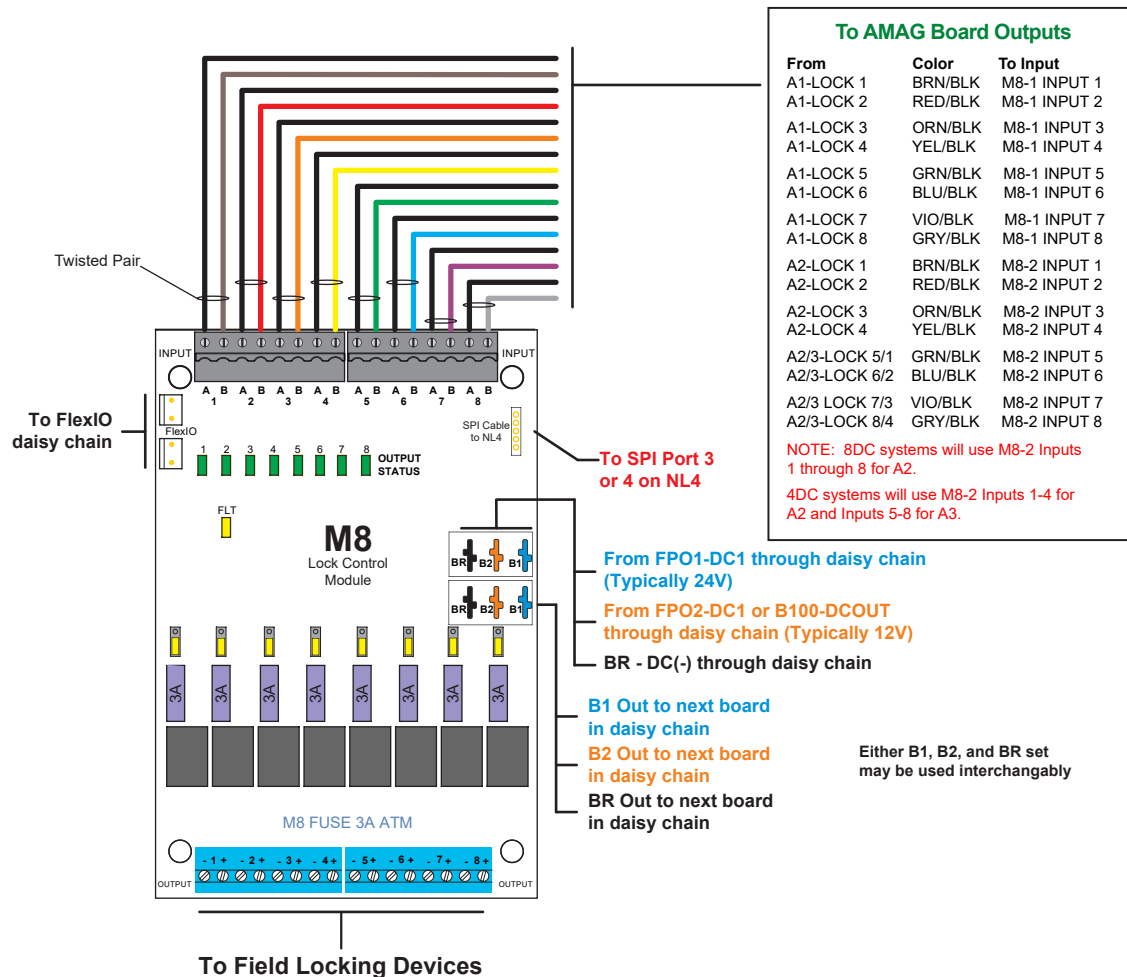
The blue and black jumpers are pre-set from the factory. The jumpers below need to be set by the installer.

See the C8 Installation 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 or NLX. One jumper per zone is provided for voltage selection in dual voltage systems.

See the M8 and NL4/NLX Installation manuals for more information.



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