BEACON POWER MANAGEMENT SYSTEM
INSTALLATION INSTRUCTION MANUAL

This manual includes the following Installation Instructions:

Pages 2 – 29: 52-296 BEACON POWER SUPPLY INSTALLATION INSTRUCTIONS

Pages 30 – 53: 52-254 APD8 INSTALLATION INSTRUCTIONS

This manual is for use with the following AlarmSaf products:

ORDER #	MODEL #
10007	BN 4-003-APD8-UL
10008	BN 4-004-APD8-UL
10009	BN 4-003-APD8F-UL
10010	BN 4-004-APD8F-UL
10019	BN 6-003-APD8-UL
10020	BN 6-004-APD8-UL
10021	BN 6-003-APD8F-UL
10022	BN 6-004-APD8F-UL
10028	BN 8-004-APD16-UL
10029	BN 8-004-APD16F-UL
10030	BN 8-003-APD8-UL
10031	BN 8-003-APD8F-UL
10037	BN 10-004-APD16-UL
10038	BN 10-004-APD16F-UL
10039	BN 10-003-APD8-UL
10040	BN 10-003-APD8F-UL
10058	BN 4-004-APD16-UL
10061	BN 10-004-APD8-UL
10077	BN 64-013-APD16-UL
10078	BN 64-013-APD16F-UL
10097	BN8-004-APD8F-UL

AlarmSaf 6 Omni Way, Chelmsford, MA 01824-4141, 978.658.6717, www.alarmsaf.com

Beacon Power Supply Operating and Installation Instruction Manual

Model: BNx000

AlarmSaf 6 Omni Way, Chelmsford, MA 01824-4141, 978.658.6717, www.alarmsaf.com

I. Warnings and Notices

I. WARNING - To reduce the risk of fire or electric shock, do not expose this product to rain or moisture.

II. WARNING – Risk of electric shock. Installation and service should be made by qualified service personnel and should conform to all local codes.

III. WARNING – Read the instruction manual to avoid personal injury or property damage

IV. NOTICE - This equipment shall be installed in a manner which prevents unintentional operation from employees or other personnel working about the premises, by falling objects, by building vibration and by similar causes

V. NOTICE - This equipment is not intended for use within the patient care areas of a Health Care Facility

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Section 1
Introduction

The Beacon Line of power supplies (BNx000) is an of off-line switching power supply product line designed for use in the access control and fire industries by the Systems Integrator. They accept several accessory boards designed to increase the functionality of the basic power supply.

- Field selectable output voltage of 12V or 24VDC
- Units provide twice the current capability when set to 12VDC as at 24VDC. This is to compensate for the typically double current draw of 12V devices such as mag locks.
- Expandable with accessory boards via the ABC connector
- All units can charge up to 38AH of battery while supplying full rated load
- Full fault detection, including battery presence detection, and reporting via two form-C relay contacts; AC fault and System Fault
- Flexible FAI input for egress control or other functions. Accepts contact closure (NO or NC), voltage input, reverse polarity voltage, or open collector input
- FAI activation is transmitted to ABC connector for activation of FAI on compatible accessory boards
- Fault conditions monitored include:
    - Low or missing AC
    - High or low output / battery
    - Blown fuse
    - Missing battery
    - Reversed Battery
    - Internal Power Supply failure
- Visual indicators include:
    - AC Presence (Green)
    - DC Output Presence (Green)
    - FAI Activated (Red)
    - Reversed Battery Fault (Yellow)
    - AC Fault (Yellow)
    - System Trouble (Yellow)

Section 2
Applicable Standards / Documents

NFPA Standards
NFPA 72 National Fire Alarm Code
NFPA 70 National Electrical Code
NFPA 731 Standard for the Installation of Electronic Premises Security Systems

US Standards
UL 294 Access Control System Units
UL 1481 Power Supplies for Fire Protective Signaling System

Other Standards
MEA Listed
California State Fire Marshal (CSFM) Listed
Applicable Local and State Building Codes
Requirements of the Local Authority Having Jurisdiction (LAHJ)

Other Applicable AlarmSaf Documents
52-351: CMB8(F) Accessory Board Installation Manual
52-352: MB8(F) Accessory Board Installation Manual
52-254: APD8(F) Accessory Board Installation Manual
52-326: PD8(F) Accessory Board Installation Manual
52-350: SPS4 Accessory Board Installation Module

Listing Compliance Note

This product carries an ETL Listing from Intertek for one or more of the standards listed above. Intertek is recognized by the Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL) and accredited by the Standards Council of Canada as a Testing Organization and Certifying Body. The ETL Listed Mark is recognized, acknowledge and accepted by local inspectors and Authorities Having Jurisdiction (AHJs) throughout North America as an accepted alternative to UL and as proof of product compliance. For more information about the NRTL program, we encourage you to visit the OSHA Web site at www.osha.gov.

Section 3
System Overview

3.1 Electrical Ratings and Specifications

Manufactured By
AlarmSaf
6 Omni Way
Chelmsford, MA 01824-4141
Tel: 978.658.6717; 800.987.1050
www.alarmsaf.com

Model Numbers (Board Only) BN4000, BN6000, BN8000, BN10000 Full product list available at www.alarmsaf.com

Electrical Ratings

Input Voltage	All Models: 120VAC or 240VAC nominal (with proper jumper selection, see page 18)
Input Power	BN4000: 125W maximum BN6000: 190W maximum BN8000: 250W maximum BN10000: 330W maximum
Output	12 or 24VDC nominal at: BN4000: 4A (24V out) or 8A (12V out); 110W BN6000: 6A (24V out) or 12A (12V out); 165W BN8000: 8A (24V out) or 16A (12V out); 220W BN10000: 10A (24V out) or 20A (12V out); 276W
Efficiency	~90%
Ripple	<0.5% @ 12V output
Output Fuse Type	BN4000: ATC10 (10 Amp) BN6000: ATC15 (15 Amp) BN8000: ATC20 (20 Amp) BN10000: ATC25 (25 Amp)
Buss Select Fuse Type	ATM15 (15 Amp) Miniature Automotive Blade Fuse

Product Use
When installed in accordance with all standards listed in Section 2 of this document, the Beacon Line provides power for use with (but not limited to) fire or access control equipment such as mag locks, door strikes, door holders, smoke dampers, four wire smoke detectors, card readers, keypads, etc.

3.2 BNx000 Connector Descriptions and Electrical Ratings

Terminal / Connector	Description	Rating
P1	5-Pin AC Line connector AC PWR CONNECT	102-138VAC (120VAC Nominal) or 240VAC Nominal with appropriate jumper setting (see page 18)
P2	Accessory Board Connector (ABC) Output	12 or 24VDC @ 14A Maximum or to maximum rating of power supply
TB1 - DC1 and DC2 Outputs		
DC1+	DC1 Positive Output	Full output current of supply - See Section 3.1 for ratings. Output is constant, regardless of FAI input state
DC1-	DC1 Common Output	
DC2+	DC2 Positive Output	Full output current of supply - See Section 3.1 for ratings. Output deactivates upon FAI Activation
DC2-	DC2 Common Output	
TB2 - DC3 and BAT Outputs		
DC3+	DC3 Positive Output	Full output current of supply - See Section 3.1 for ratings. Output activates upon FAI Activation
DC3-	DC3 Common Output	
BAT+	Battery Positive Connection	12 or 24VDC nominal - 38AH Maximum
BAT-	Battery Common Connection	
TB3 - FAI Input		
V+	Auxiliary Voltage Output	12VDC Nominal @ 15mA Maximum
L+	Positive FAI Activation Terminals	9-33VDC @ 15mA Maximum
L+		
L-	Common FAI Activation Terminals	
L-		
V-	Auxiliary Voltage Common	System DC Common
TB4 - Fault Contacts		
SYS FLT - COM	System Fault Relay - Common	1A @ 24VDC 0.5A @ 120VAC
SYS FLT - NC	System Fault Relay - Normally Closed	
SYS FLT - NO	System Fault Relay - Normally Open	
AC FLT - NO	AC Fault Relay - Normally Open	1A @ 24VDC 0.5A @ 120VAC
AC FLT - NC	AC Fault Relay - Normally Closed	
AC FLT - COM	AC Fault Relay - Common	

3.2.1 BNx000 Terminal and Connector Illustration

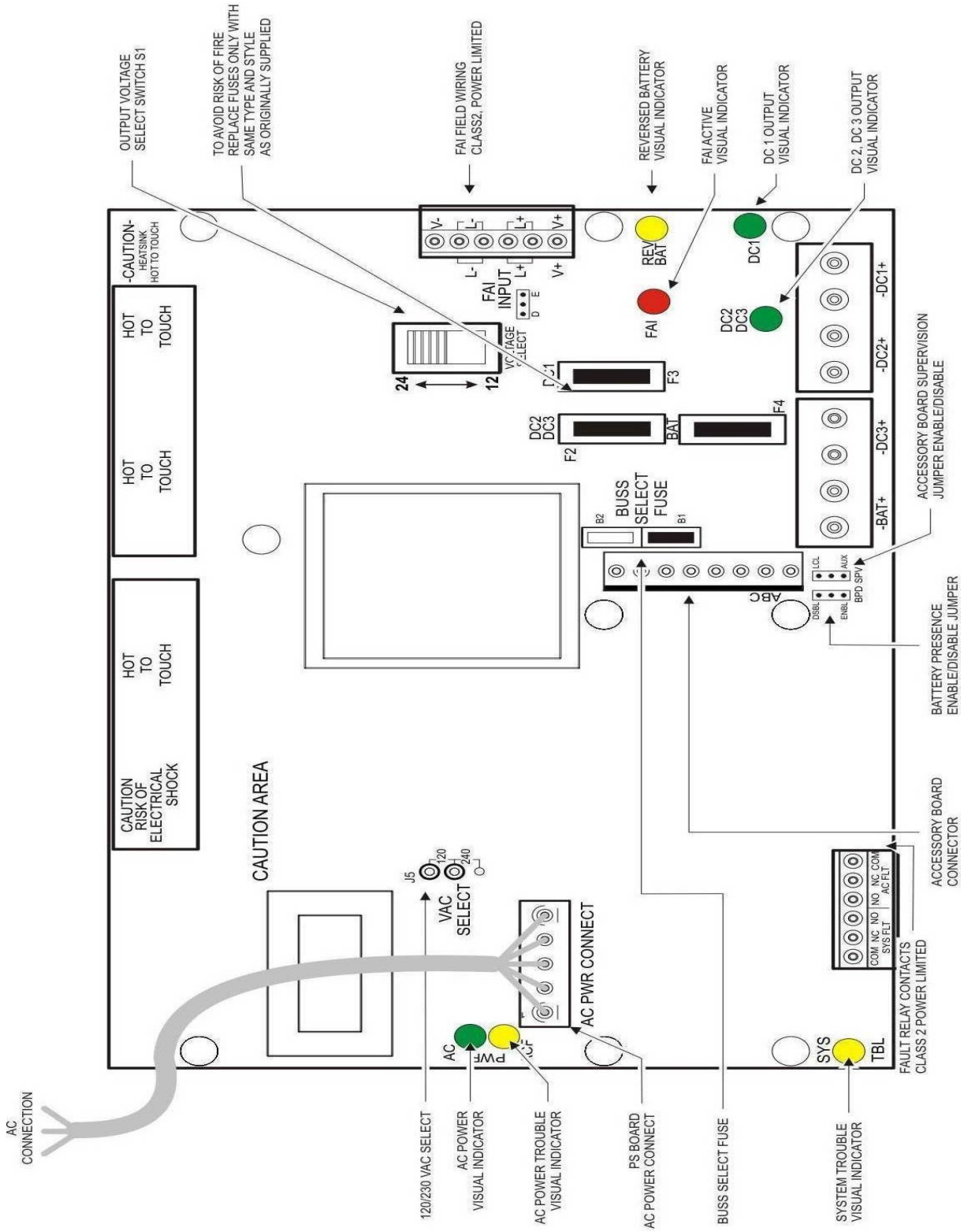


Figure 3.2.1

3.3 AC Input Connection

The AC input for the BNx000 is made through a fully shrouded pluggable cable which plugs into the AC PWR CONNECT plug (P1). The cable allows connection to either 120 VAC or 240 VAC nominal input. The BNx000 power supply must be configured for proper VAC input prior to connection or damage to the system will occur (see section 3.3.3, AC Input Safety Precautions).

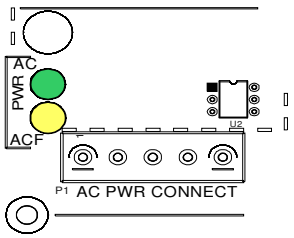


Figure 3.3.1

3.3.1 Configuring VAC Input

All BNx000 power supplies are factory set for 120 VAC input (102-138VAC at 50 or 60Hz). To verify **120 VAC** input setting:

- ➔ Locate the **VAC SELECT** jumper (**J5**)
- ➔ Verify that **J5** is in the **UP** position for **120 VAC** input

The BNx000 will also operate with a 240 VAC (195-264VAC at 50 or 60Hz) input. For **240 VAC** input:

- ➔ Reposition the **VAC SELECT** jumper (**J5**) in the **DOWN** position or remove it before energizing the power supply.

3.3.2 Wiring the AC Input Power Cable:

The AC Input Power Cable (part #00518) is included. Connection to the harness should be made via wire nut to an appropriate power source. AC mains wiring should be no smaller than 14 AWG. Wire the cable as follows:

WIRE	FOR 120 VAC	FOR 240 VAC
Black	Line	Line 1
White	Neutral	Line 2
Green or Green/Yellow	Earth Ground	Earth Ground

3.3.3 AC Input Safety Precautions

1. **CAUTION:** Verify that the main AC power is **not** energized prior to connecting the BNx000.
2. **CAUTION:** Verify VAC Select jumper (J5) is set properly on the power supply for either 120 VAC or 240 VAC input prior to connecting the cable and energizing the power supply or damage to the system or personal property and/or injury will occur**.**
3. **CAUTION:** The Green or Green/Yellow earth ground wire should always be connected first or disconnected last for safety.
4. The AC input connector is a convenient and safe means for AC disconnect as the connector is fully shrouded when disconnected.
5. All wiring should be installed in accordance with NEC760, NFPA70, NFPA72, and all local code requirements. See section 4.2 for more information.

3.4 Accessory Board Connector (P2)

3.4.1 General Information

The Accessory Board Connector (ABC) supplies the output voltage and FAI control to compatible accessory boards for increased functionality including additional voltage(s), power distribution and/or power management and control for access control and fire applications. See page 26 for a list of available accessory modules. For more detailed information on the ABC expansion port, see Appendix B, "About the Accessory Board Connector".

3.4.2 ABC Cable Types

Order #	Model #	Description	Used With/Notes
00519	ABC-01	6 PIN – 6 PIN, 8"	**1.** Used with BNx000 Power Supply, REV AO2 or earlier **2.** Used to interconnect EDB-10 & LDB-8 accessory boards in certain proprietary systems
00520	ABC-02	6 PIN – 6 PIN, 18"	**1.** Used with BNx000 Power Supply, REV AO2 or earlier **2.** Used to interconnect EDB-10 & LDB-8 accessory boards **3.** Increased length for connection over longer distance
00521	ABC-03	8 PIN – 8 PIN, 8"	**1.** Used with BNx000 Power Supply, REV A03A or later for connection to PD8(F), MB8(F) & CMB8(F) accessory modules
00522	ABC-04	8 PIN – 8 PIN, 18"	**1.** Used with BNx000 Power Supply, REV A03A or later for connection to PD8(F), MB8(F) & CMB8(F) accessory modules **2.** Increased length for connection over longer distance
00523	ABC-05	8 PIN – 6 PIN, 8"	**1.** Used with Bx000 Power Supply, REV A03A or later for connection to SPS4, EDB-10 & LDB-8 accessory modules
00524	ABC-06	8 PIN – 6 PIN, 18"	**1.** Used with Bx000 Power Supply, REV A03A or later for connection to SPS4, EDB-10 & LDB-8 accessory modules **2.** Increased length for connection over longer distance

CAUTION: The ABC-01 and ABC-02 cables are used on older BNx000 boards (PCB#: 38-118 REV A02 or earlier) that have a 6-pin ABC connector. ***DO NOT USE*** these cables on newer BNx000 boards (PCB # 38-118 REV A03A or later) that have an 8-pin ABC connector or damage to the system could occur.

3.5 ABC Voltage Selection

The output voltage of the BNx000 must be carried through the Accessory Board Connector (P2) when using the BN x000 power supply with Beacon Accessory Modules that connect to P2 using ABC cables. The Buss Select Fuse (See Figure 3.5.1.1) determines if the voltage is available on the Accessory Board Connector (P2).

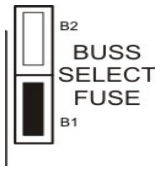


Figure 3.5.1.1

3.5.1 Adjusting the Buss Select Fuse

The Buss Select Fuse is factory set for proper operation. The Fuse setting options are:

SETTING/POSITION	DESCRIPTION
B1 – DOWN	Makes the power supply voltage available on the Accessory Board Connector (P2). This is the required setting when connecting a Beacon Accessory Module.
B2 - UP	Removes voltage from the Accessory Board Connector (P2).

Because older BNx000 boards (PCB#: 38-118 **REV A02** or earlier) do not have a Buss Select Fuse, always check the position of this fuse setting when installing a new BNx000 Board (PCB # 38-118 **REV A03A** or later) into an existing system.

3.6 Output Terminals

The BNx000 has three sets of output terminals:

- The DC1 output provides constant power, regardless of the state of the FAI input
- The DC2 output provides power which DROPS upon activation of the FAI input
- The DC3 output provides power ONLY upon activation of the FAI input

All three sets of output terminals on the BNx000 provide the same output voltage, 12VDC or 24VDC, as selected by the voltage select switch (S1). See Section 5.1 for more information.

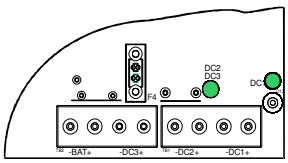


Figure 3.6.1

CAUTION: Observe polarity of the BNx000 output terminals as indicated on the board with respect to the load or damage to the load may occur.

3.7 FAI Input Terminals

The FAI input connection for the BNx000 is made through TB3. The FAI input allows complete flexibility in connection options:

- Normally Open Contact (switching positive voltage)
- Normally Open Contact (switching DC common)
- Normally Closed Contact (Fail-Safe)
- Open collector
- Isolated or non-isolated voltage input
- Reverse Polarity voltage input
- Latching Input

There are six terminals on the BNx000 FAI input:

Terminal	Description	Use
V+	Auxiliary Voltage Output	An internal voltage source for use with dry contacts or open collectors
L+	Positive FAI Activation Terminals	These terminals are the positive input/return for the FAI loop. Only one is required for activation of the BNx000. The second is for continuing the loop for activating other devices or BNx000 supplies. Polarity is shown for activation of the
L+		
L-	Common FAI Activation Terminals	These terminals are the common input/return for the FAI loop
L-		
V-	Auxiliary Voltage Common	Common or return for the internal voltage source

See Appendix A for FAI input connection examples.

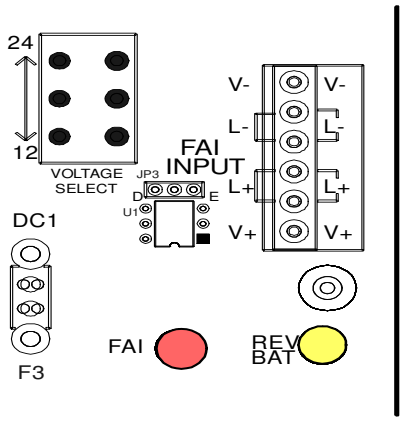


Figure 3.7.1

3.8 Fault Reporting Terminals

The Fault Reporting relay connection is made through TB4. Separate Form C relays are provided for AC Faults and System Faults. Connections are marked on the PCB. Six Fault terminals are available:

1. SYS FLT Common (COM)
2. SYS FLT Normally Closed (NC)
3. SYS FLT Normally Open (NO)
4. AC FLT Normally Open (NO)
5. AC FLT Normally Closed (NC)
6. AC FLT Common (COM)

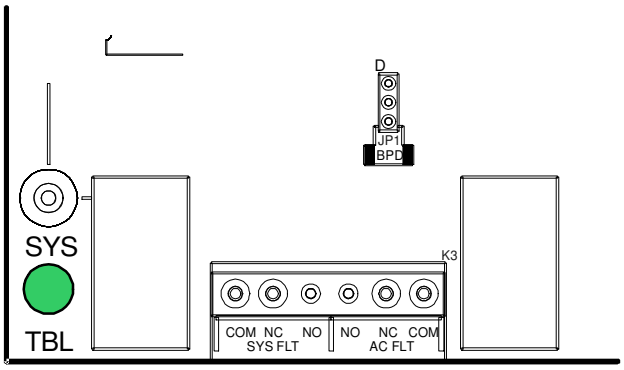


Figure 3.8.1

Fault Condition	SYS FLT Relay Output	AC FLT Relay Output
Normal Condition - No Faults	No Fault	No Fault
Loss of / Low AC - Battery Charged	No Fault	Fault
Loss of / Low AC - Battery Low	Fault	Fault
Missing Battery (Battery Presence Enabled)	Fault	No Fault
High or Low Battery	Fault	No Fault
High or Low Output Voltage	Fault	No Fault
Blown AC Fuse - Battery Charged	No Fault	Fault
Blown AC Fuse - Battery Low	Fault	Fault
Blown DC1, DC2/DC3, or Battery Fuse	Fault	No Fault
Blown Buss Select Fuse	Fault	No Fault
Reversed Battery Connection	Fault	No Fault
Internal Fault	Fault	No Fault / Fault

Section 4
Installation

4.1 Mounting

The BNx000 is for wall mounting only, using #8 hardware minimum in four locations. Use an appropriate fastening system for the mounting surface.

CAUTION: Remove all power from the system before installation

Cabinet Mounting:

1. Mark and pre-drill two holes for the top keyhole mounting screws
2. Install two fasteners in the mounting wall leaving screw heads protruding approx. ¼ inch
3. Using the two upper keyholes, mount the cabinet over the two screws
4. Mark the two lower holes, remove the cabinet and drill the lower mounting holes
5. Mount the cabinet, install the remaining fasteners, and tighten all fasteners

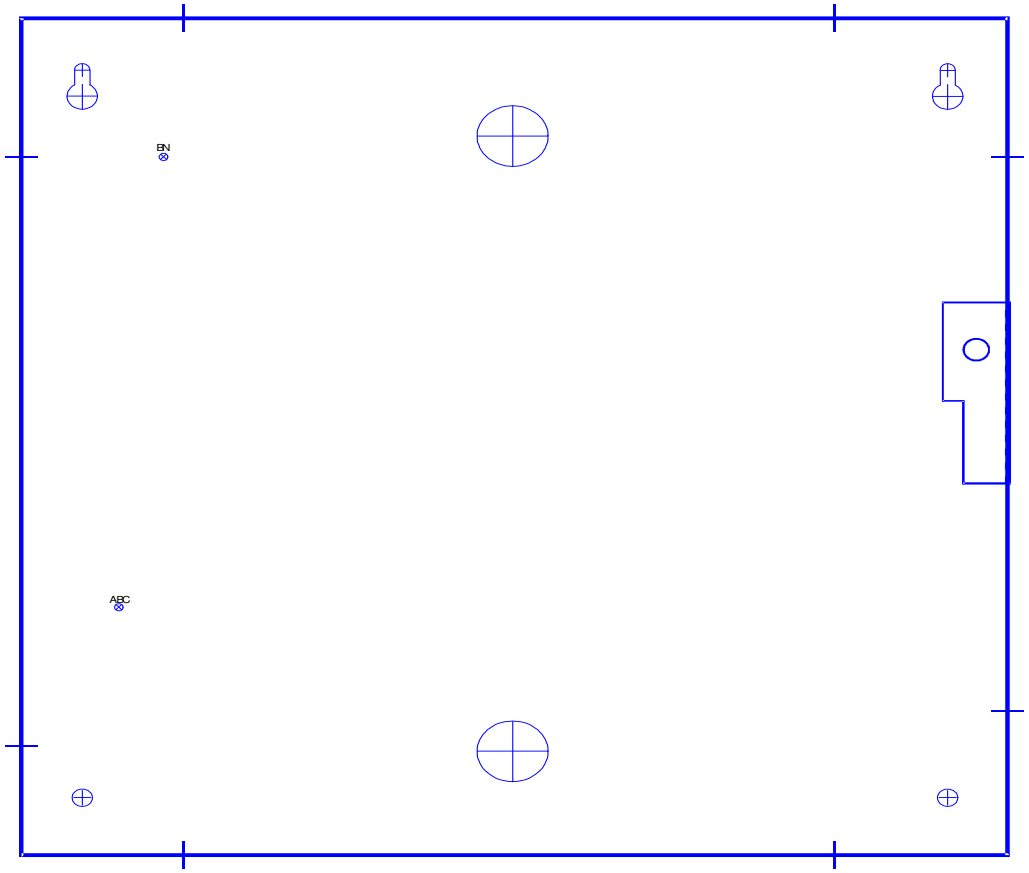


Figure 4.1.1

4.2 Wiring

4.2.1 Wire Routing

Wiring must be installed in accordance with NFPA70, NFPA72, and all local code requirements.

Power Limited wiring requires that power limited and non-power limited wiring remain physically separated. Any power limited circuit entering the enclosure must remain at least one quarter inch (¼") away from any non-power limited circuit wiring. Any power limited circuit wiring must enter and exit the enclosure through different knockouts than non-power limited circuit wiring.

Wiring within the enclosure should be routed around the perimeter of the cabinet. It should not be routed across the circuit boards.

4.2.2 AC Input

Connection should be made via wire nut. AC mains wiring should be no smaller than 14 AWG. See Section 3.3 for details.

4.2.3 ABC Connector

See section 3.4

4.2.4 Output Wiring

Locate the output terminals to be used (DC1, DC2, or DC3). These terminals are non-removable and accept wire sizes between #12 and #22 AWG. Polarity is indicated on the PCB.

4.2.5 Battery Wiring

Locate the battery terminals. These terminals are non-removable and accept wire sizes between #12 and #22 AWG. Polarity is indicated on the PCB.

- For 12VDC connect one battery to the terminals
- For 24VDC connect two batteries in series to the terminals

Note: Connecting batteries in parallel does not allow the BNx000 to supervise the entire battery set for presence.

CAUTION: A lead-acid battery has the capability of producing extremely high current. Personal or property damage can occur if the batteries are shorted or improperly connected.

4.2 Wiring (continued)

4.2.6 FAI Wiring

Locate the FAI Input terminal block (TB3) and remove the terminal block from the header. Connect the wiring for the FAI input to the terminal block. The PC board is labeled with the connections and polarity (See also section 3.2). Replace the terminal block on the header.

4.2.7 Fault Relay Wiring

Locate the Fault Relay Output terminal block (TB4) and remove the terminal block from the header. Connect the wiring for the fault outputs to the terminal block. The PC board is labeled with the connections for each relay (See also section 3.2). Replace the terminal block on the header.

Note: The relay is labeled in the non-powered (fault) state. Under a no-fault condition, the relay is powered (i.e. Common to Normally Open connected).

Section 5
Operating the BNx000

5.1 Output Voltage Selection

Before powering a system containing a BNx000, the output voltage switch (S1 - Voltage Select) must be set for the proper output voltage or damage to the system could occur. Do not change the switch setting while the unit is powered or damage to the system may occur. Set the switch UP for 24V, DOWN for 12V (the PC board is labeled with the voltage settings).

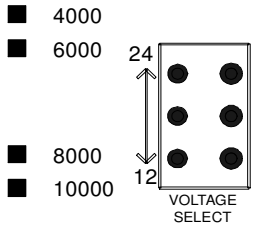


Figure 5.1.1

5.2 Jumper Settings

For proper operation, the jumpers on the BNx000 should be set appropriately. All jumpers should be verified or set before powering the unit.

Jumper	Description	Settings	Default
JP1 (BPD)	Battery Presence	Up (D) - Disable Down - Enable	Down - Enable
JP2 (SPV)	N/A	Up	Up
JP3 (D/E)	FAI Filtering	Left (D) - Disable Right (E) - Enable	Left (D) - Disable
J5 (VAC SELECT)	Input Voltage Configuration	Up (120) - 120VAC Input Down (240) or Removed- 240 Input	Up (120) - 120VAC
Note: *Jumper positions are referenced with the output wiring terminal blocks (TB1&2) on the bottom*			

5.2.1 JP1 (BPD) - Battery Presence

Allows disabling of the battery presence detection for applications where no backup battery set is used.

5.2.2 JP2 (SPV)

This jumper serves no user function and, if present, should be left in the up position.

5.2 Jumper Settings (continued)

5.2.3 JP3 (D/E)

This jumper enables or disables FAI input filtering. FAI input filtering is used if the FAI input is connected to a coded source (i.e. pulsing input).

5.2.4 J5 (VAC SELECT)

This jumper selects the AC input voltage to be used to power the BNx000. The power supply is factory set for 120 VAC input (J5 in the ***UP*** position). Move the jumper to the ***DOWN*** position or remove it to operate the power supply with 240 VAC input.

CAUTION: J5 MUST be set properly before powering the unit or damage to the system will occur.

5.3 Visual Indicators

The BNx000 contains seven visual status indicators:

LED	Description	Color	Conditions
AC PWR (D20)	AC Power	Green	Lights when AC Power Present
ACF (D50)	AC Fault	Yellow	Lights on low / missing AC Power
SYS TBL (D33)	System Trouble	Yellow	Lights when a system trouble present
REV BAT (D27)	Reverse Battery	Yellow	Lights when battery connection reversed
DC1 (D13)	DC1 Available	Green	Lights when DC1 output is available
DC2 / DC3 (D24)	DC2 & DC3 Available	Green	Lights when DC2 & DC3 output is available
FAI (D4)	FAI Active	Red	Lights when a valid FAI input signal is received

5.3.1 AC PWR (D20)

For safety reasons, this LED lights any time there is AC voltage present at the AC input, regardless of the AC fault status, battery state of charge, or power supply condition.

CAUTION: Always check for AC presence with a volt meter before servicing

5.3.2 ACF (D50)

This LED lights when AC power is low or missing. It does not necessarily indicate that the power supply is not operating. See the chart in Section 5.3.

5.3 Visual Indicators (continued)

5.3.3 SYS TBL (D33)

This LED lights whenever a fault condition (except AC Faults) occurs. See the chart in Section 5.3. Fault conditions detected include:

- High or Low battery voltage
- High or Low output voltage
- Internal Power Supply Fault
- Blown Fuse (F2, F3, F4)
- Missing battery (If Battery Presence is enabled)

5.3.4 REV BAT (D27)

This LED lights when a battery set is connected to the BNx000 in a reverse polarity. This LED will be accompanied by the SYS TBL LED and a blown battery fuse (F4 - BAT)

5.3.5 DC1 (D13)

This LED lights when there is DC power available at the DC1 output.

5.3.6 DC2 / DC3 (D24)

This LED lights when there is DC power available to the DC2 and DC3 outputs.

5.3.7 FAI (D4)

This LED lights when a valid FAI activation signal is received at the FAI input. When lit, the DC2 output switches OFF, the DC3 output switches ON, and the FAI buss on the ABC connector is activated for activation of compatible accessory boards.

5.4 Troubleshooting

Condition	Possible Cause	Solution
The output voltage of the BNx000 is incorrect	Incorrect switch setting	Verify proper switch setting
	Excessive loading on output	Verify that output current is less than rated current
	AC trouble	Verify presence of AC voltage
	Bad / Incorrect Battery Set	Verify that a good battery set of the proper voltage is connected to the BNx000
The yellow "SYS TBL" LED (D33) is lit	Blown output or battery fuse (F2, F3, or F4))	Verify all fuses are intact - Check wiring integrity before replacing fuse(s)
	Excessive loading on output	Verify that output current is less than the rated current
	Improper ABC cable connection	Verify proper connection of the ABC cable(s)
	Bad, Incorrect, or Missing Battery Set	Verify that a good battery set of the proper voltage is connected to the BNx000
	Internal problem with BNx000	Contact AlarmSaf
The yellow "ACF" LED (D50) is lit	Low or Missing AC	Verify the presence of at least 102VAC
	Blown AC fuse	This fuse in not replaceable in field - Contact AlarmSaf
FAI LED is lit	An FAI activation signal was received at the FAI input	This is normal
No battery presence detection	BPD Jumper (JP1) set incorrectly	Verify correct setting of BPD jumper
	No Problem	Detection of a missing battery takes 3-5 seconds
	Internal problem with BNx000	Contact AlarmSaf
DC2 / DC3 has no output	Check FAI Input	DC2 supplies power ONLY when the FAI input is not active. DC3 supplies power ONLY when the FAI input is active.
	Blown Fuse	Check F2
No voltage on ABC and/or accessory board	Incorrect Buss Select Fuse Setting	Verify proper fuse setting as described in section 3.5, page 10-11
	Blown Buss Select Fuse	Replace fuse with fuse of same type and rating

UL 294 Performance Levels:
Line Security: I
Endurance: I
Attack: I
Standby: IV

Section 6
Specifications

6.1 Electrical Specifications

6.1.1 Input Voltage	120VAC or 240VAC Nominal @ 50-60Hz
6.1.2 Input Power	Model dependent - See Sec. 3.1
6.1.3 Output Voltage	12 or 24VDC Nominal
6.1.4 Output Current	Model dependent - See Sec. 3.1

6.2 Temperature Specifications

6.2.1 Ambient Temperature Range	0ºC to 49ºC (32ºF to 120ºF)
6.2.2 Ambient Humidity	93% at 32ºC (90ºF) Maximum

6.3 Mechanical Specifications

6.3.1 Weight (PCB Only)	2.52lbs.
6.3.2 Size (PCB Only)	8.85”L x 6.45”W x 3.10”H Max.
6.3.3 CAD Drawing	

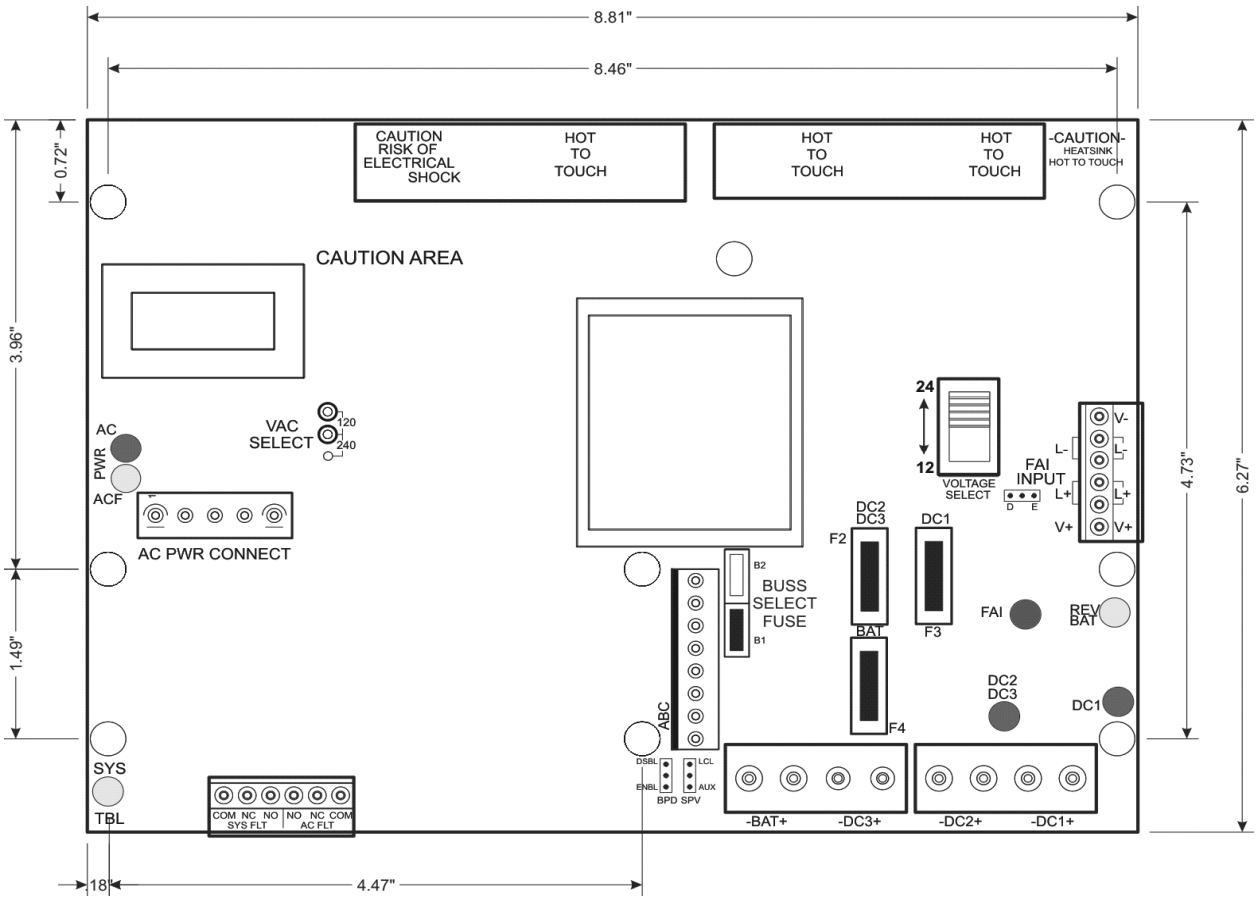


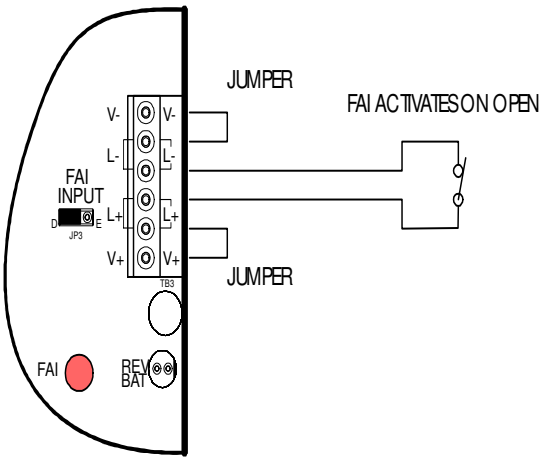
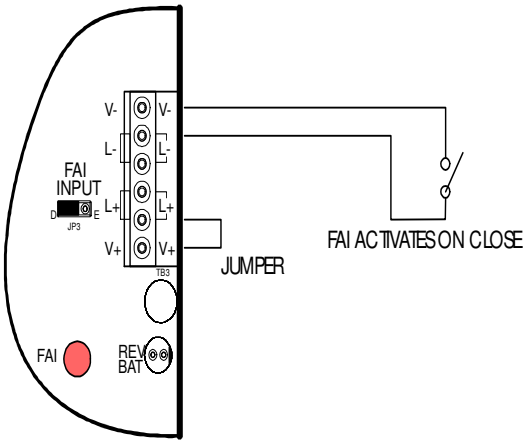
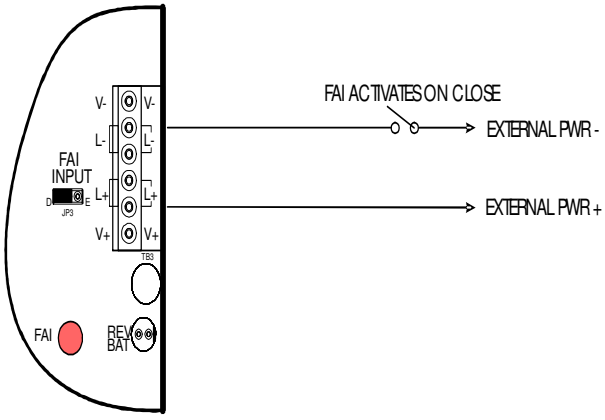
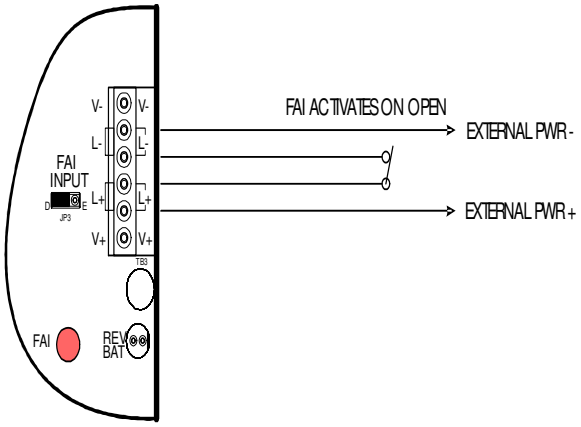
Figure 6.3.1

APPENDIX A, PAGE 1

FAI Input Connection Methods

The Beacon FAI input is the most flexible we have yet seen in the industry. It may be activated by any common means found in the access and fire industry.
When activated, this input will **disable** the Beacon DC2 output and **enable** the DC3 output.
The MB8 and CMB8 accessory boards will follow the Beacon FAI input.
Methods of activation include:

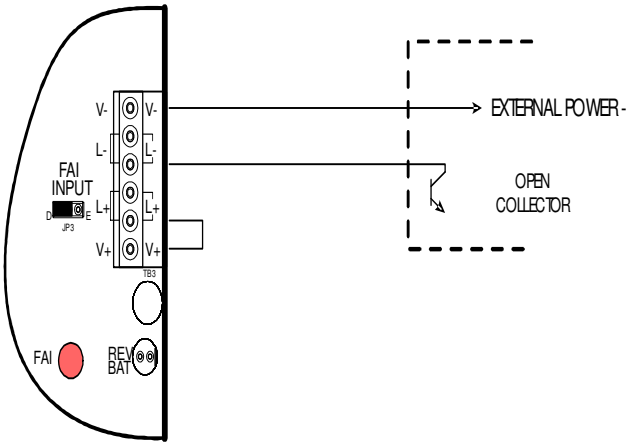
1. Relay contact transfer using internal voltage source:
   a. Normally closed.
   b. Normally open.
2. Power from external voltage source:
   a. Switched positive.
   b. Switched negative.
3. Open collector connection:
   a. Internal voltage source
   b. External voltage.
4. Direct to NAC loop:
   a. DC polarity reversal
   b. DC polarity reversal with horn/strobe synchronization

<table>
<tr><td colspan="2">Relay contact using internal voltage source</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Normally closed</td><td>Normally open</td></tr>
<tr><td colspan="2">Power from External voltage source</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Normally open</td><td>Normally closed</td></tr>
</table>

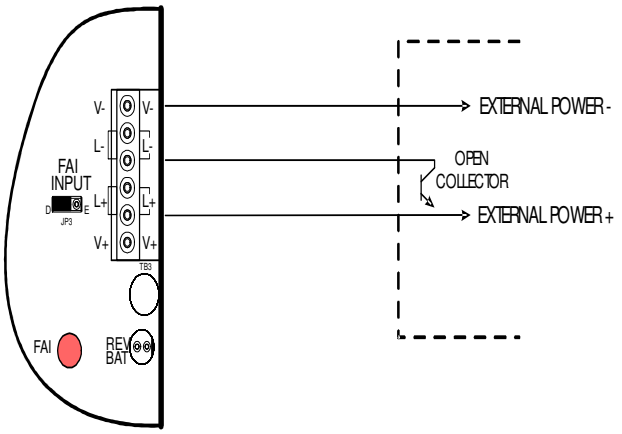
APPENDIX A, PAGE 2

FAI Input Connection Methods (continued)

"Open collector" connection

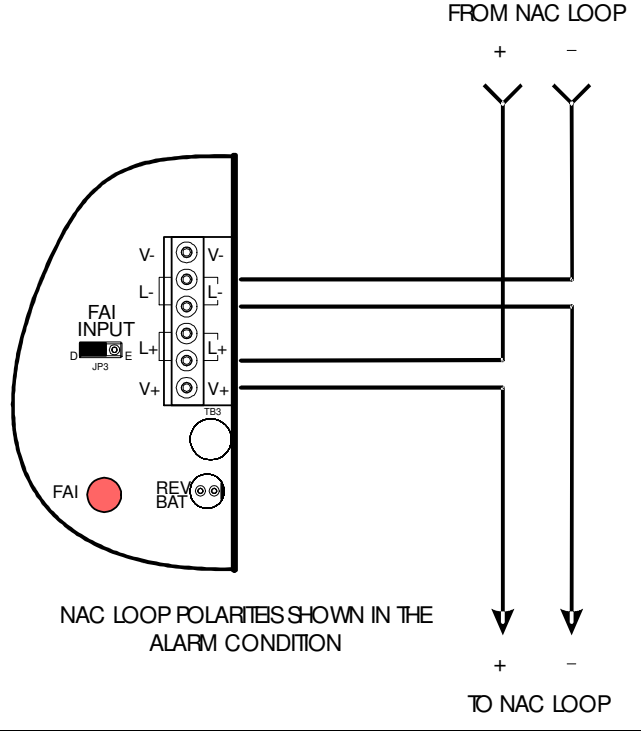


Internal source

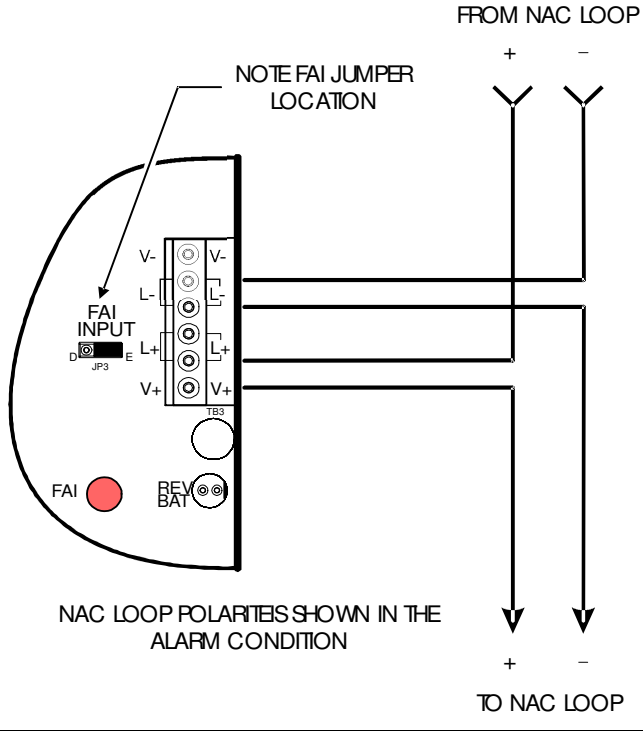


External source

NAC connection



DC polarity reversal



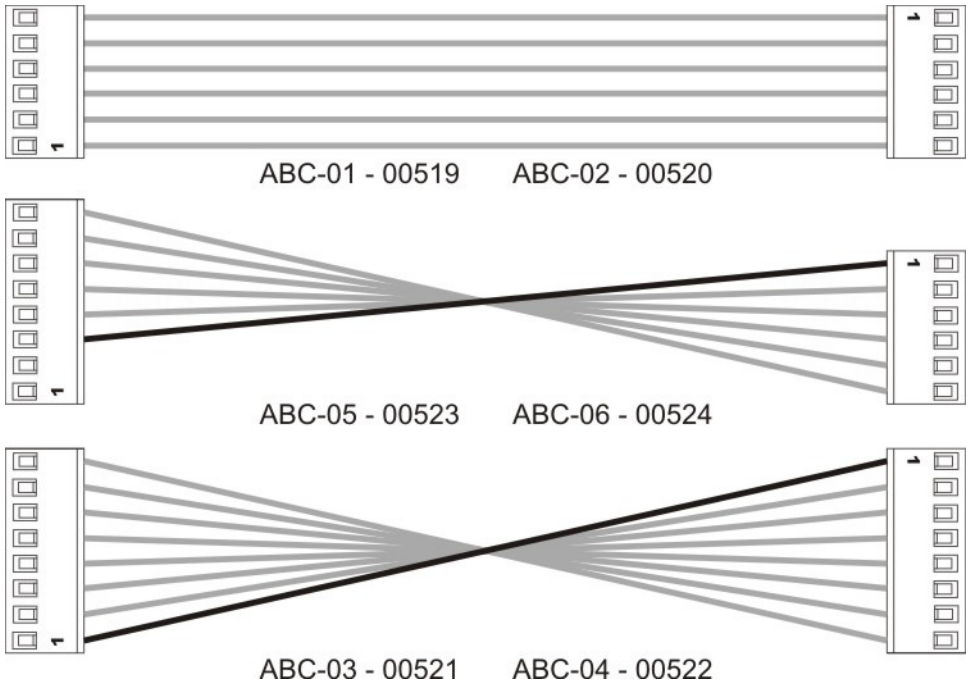
DC polarity reversal with sync

APPENDIX B, PAGE 1

About the Accessory Board Connector

The AlarmSaf Accessory Board Connector (ABC) allows plug-in system expansion using compatible AlarmSaf accessory boards. The ABC is capable of carrying both primary and secondary voltages (if applicable), DC common, fault status, and fire alarm interface status. Products can be daisy-chained together, maintaining voltage, fault, FAI, and DC common continuity throughout the chain.

NOTE: There are 6-pin and 8-pin versions of the ABC. The 6-pin version carries ONLY a single voltage while the 8-pin version can carry two independent voltages for dual voltage systems.



6-Pin and 8-Pin Accessory Board Connectors

CAUTION: The ABC-01 and ABC-02 cables are used on the older Beacon Power supply boards (PCB#: 38-118 REV A02 or earlier) that have a 6-pin ABC connector. ***DO NOT USE*** these cables on newer Beacon Power supply boards (PCB # 38-118 REV A03A or later) that have an 8-pin ABC connector or damage to the system could occur.

APPENDIX B, PAGE 2

About the Accessory Board Connector (continued)

Voltage Busses (B1 and B2)

The voltage busses (B1 and B2) are carried on pins 5-8 of the ABC. B1 is the primary voltage, and should typically be the higher of the two voltages in a dual voltage system. The B1 and B2 (if used) voltages are distributed through the accessory boards connected to the ABC. See the documentation for the particular accessory boards being used for details on how to utilize the B1 and/or B2 voltages. Note that 6-pin ABC connectors can carry only the B1 voltage, while 8-pin ABC connectors can carry both B1 and B2. In order for the B2 voltage to be present, a second power supply must be included in the system (AC to DC or DC to DC).

CAUTION: If more than one power supply is connected to any of the voltage busses, the system will not operate properly and damage to the system could occur. Verify that only one power supply is connected to each voltage buss before powering the system.

Fault Status Buss

The fault status buss carries the DC Fault status between accessory boards and power supplies. Any product with fault detection and/or reporting capability can report a fault to or from the ABC chain. Unless otherwise noted in a product's documentation, AC faults are not transmitted through the fault status buss.

Some accessory boards have a jumper to split the fault buss. This allows the separation of faults between two power supplies in some dual voltage systems. If the buss is not split, any fault on either power supply or any accessory board will show on both power supplies. If the buss is split, faults on each side of the jumper will go to their respective power supply only, allowing easier troubleshooting fault conditions, but requiring monitoring of the fault outputs of both power supplies. Note that only one split should be used in the fault status buss. See the documentation for the accessory boards in the system to determine which, if any, have a fault buss split jumper.

NOTE: Not all accessory boards have fault detection or reporting capability; however the fault status is still carried through these accessory boards to maintain continuity through the chain.

APPENDIX B, PAGE 3

About the Accessory Board Connector (continued)

Fire Alarm Interface (FAI) Status Buss

The FAI status buss carries FAI activation signals on systems utilizing a Fire Alarm Interface. This buss is used to control outputs on compatible accessory boards. See the documentation for the accessory boards in the system to determine FAI capability.

Some accessory boards have a jumper to split the FAI buss, allowing independent control of groups of accessory boards and power supplies with multiple FAI input sources. If the buss is not split, all power supplies and accessory boards with FAI capability will change state upon activation of *any* FAI input source in the chain. If the buss is split, FAI activation of any FAI input source will only activate accessory boards or power supplies up to the split. Products after the split require their own FAI input source.

Note: Not all accessory boards have FAI capability; however the FAI status is still carried through these accessory boards to maintain continuity through the chain.

DC Common

The DC Common (ground) for the system is maintained through the entire ABC chain. Any power supplies or accessory boards connected to the chain are common grounded through the ABC.

Accessory Boards

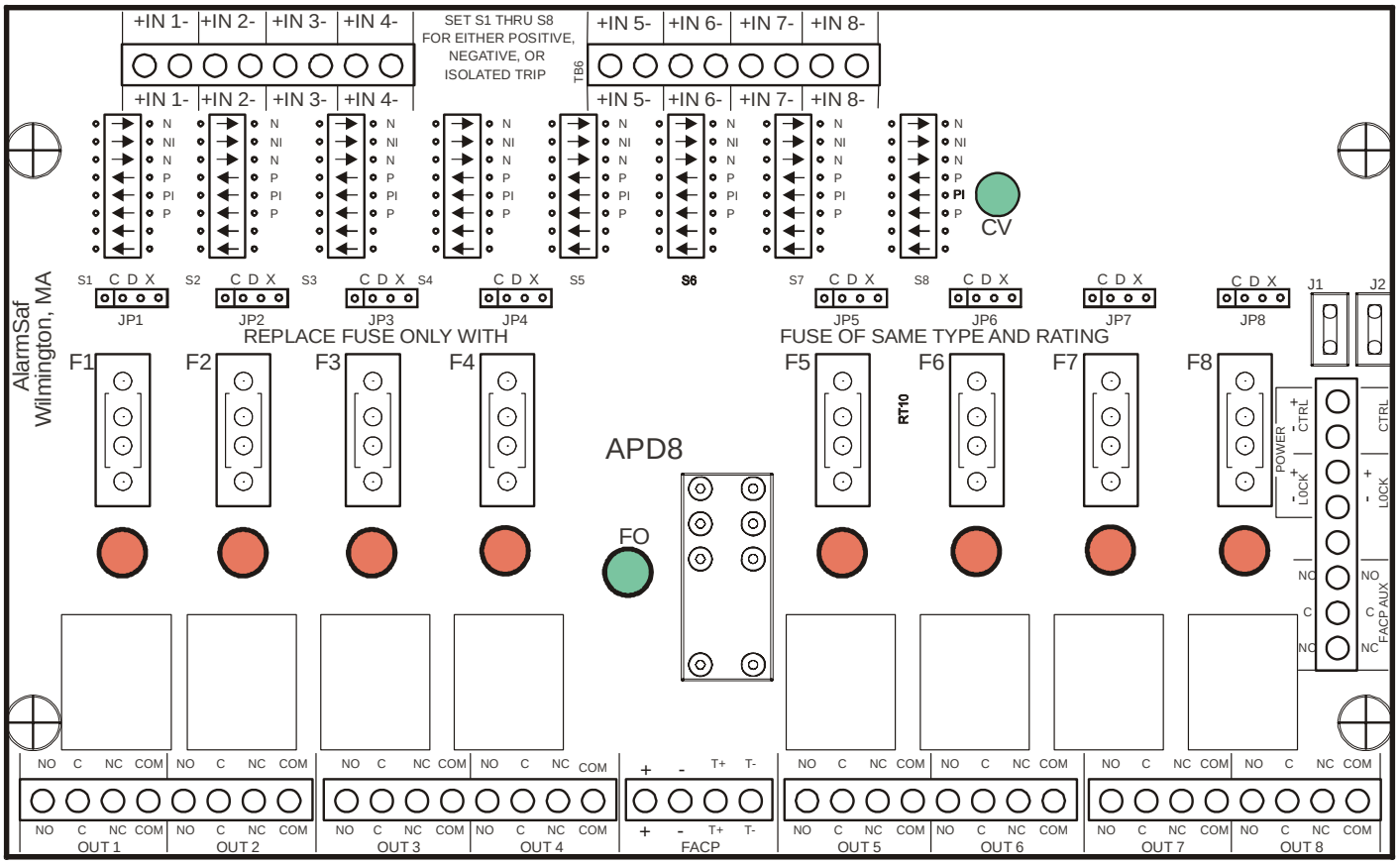
ACCESSORY MODULE		MODULE DESCRIPTION	ABC CABLE	
ORDER	MODEL#		ORDER	MODEL#
10041, 10042	PD8(F)	8 outputs	00521	ABC-03
10067, 10068	MB8(F)	8 outputs w/FAI & voltage selection	00521	ABC-03
10069, 10070	CMB8(F)	8 outputs w/FAI; 4 Relay Controlled	00521	ABC-03
10066	SPS4	Secondary Power Source Module: 5-18V @ 4A	00523	ABC-05
03207	FAIM	Fire Alarm Input Module (used w/PS5-M)	00521	ABC-03
97471	EDB-10	Power Distribution Module for proprietary systems	00523	ABC-05
97472	LDB-8	Power Distribution Module for proprietary systems	00523	ABC-05

Glossary

ABC	See "Accessory Board Connector"
Accessory Board Connector	Connector present on some AlarmSaf power supplies and accessory boards, allowing plug-in expansion of the system
Accessory Board	An AlarmSaf product for use with AlarmSaf power supplies containing an ABC connector. These boards allow plug-in expansion of the functionality of the system. Examples of accessory boards include, but are not limited to, voltage distribution (simple and controlled), secondary DC-DC power supplies, and NAC Circuit expanders.
AC-DC Converter	A DC power supply whose voltage input is either direct from the AC line or though a step-down AC transformer
Buss 1 (B1)	The primary DC voltage in a system. Typically the higher of the two voltages in dual voltage systems
Buss 2 (B2)	The secondary DC voltage in a system. Only dual voltage systems use this voltage.
Class 2 Power Limited	A voltage output or wiring which conforms to NEC Article 725.
Controlled Distribution	Voltage distribution providing on/off control for the outputs. Control can be from FAI, an access control panel, card reader, or other device. The MB8(F) and CMB8(F) accessory boards, and the APD8(F) are examples of controlled distribution.
DC-DC Converter	A DC power supply whose voltage input comes from another DC source. DC-DC converters allow multi-voltage system backup with a single battery set.
FAI	See "Fire Alarm Interface"
Fire Alarm Interface	Input present on some AlarmSaf products allowing control of output(s) in the system. Typically used for dropping power to mag locks on egress doors during a fire alarm condition, but can also be used for other control functions, such as resetting smoke detectors
Negative Trip	An input which is activated upon the switching of a DC Common to its terminals. The DC Common may either be from an external (common grounded) source, or may be provided as one of the terminals of the input, depending on the product. This input type is used with a dry contact or open collector input.
Positive Trip	An input which is activated upon the switching of a positive DC voltage to its terminals. The positive voltage may either be from an external (common grounded) source, or may be provided as one of the terminals of the input, depending on the product. This input type is used with a dry contact or voltage input.
Power Limited	A voltage output or wiring which conforms to NEC Article 725.
PTC	A resettable overcurrent protection device, similar to a fuse or circuit breaker.
Rack Mount	A product which has an enclosure that allows mounting in a standard 19 inch equipment rack
Simple Distribution	Voltage distribution without any control function for the distributed outputs. Power is always available to the outputs. The PD8(F) accessory board is an example of simple distribution.
Voltage Distribution	Splitting a bulk power supply output into multiple, current limited outputs to prevent a single circuit failure from talking down an entire system. The multiple terminal outputs also simplify wiring by providing a pair of terminals for each circuit, rather than wiring several circuits to a single pair of terminals.

The following Fire devices have been determined to be compatible with the AlarmSaf Beacon Line of power supplies. Access Control devices used must be verified for a compatible voltage range.

Manufacturer	Model	Device Type	Nominal Voltage (VDC)	Voltage Range (VDC)
Fire-Lite	2424	4-Wire Smoke	24	20-29
Fire-Lite	2424AIT	4-Wire Smoke	24	20-29
Fire-Lite	2424AT	4-Wire Smoke	24	20-29
Fire-Lite	2424TH	4-Wire Smoke	24	20-29
Fire-Lite	DH100ACDC	4-Wire Duct Smoke	24	20-29
Siemens	SDH-2D	Door Holder	24	17-31
Siemens	SDH-3D	Door Holder	24	17-31
Siemens	SDH-4D	Door Holder	24	17-31
Siemens	SDH-5D	Door Holder	24	17-31
Siemens	SDH-6D	Door Holder	24	17-31
Siemens	SDH-7D	Door Holder	24	17-31
Siemens	SDH-8D	Door Holder	24	17-31
Fire Control Instruments	FC-72 Series	Fire Alarm Control Panel	24	24



Model APD8(F)

Eight-Zone Advanced Power Distribution

Operating and Installation Instructions

52-254 Rev B02

I. Warnings and Notices

- WARNING - To reduce the risk of fire or electric shock, do not expose this product to rain or moisture

- WARNING - This installation and all servicing should be made by qualified service personnel and should conform to all local codes

- NOTICE - This equipment shall be installed in a manner which prevents unintentional operation from employees or other personnel working about the premesis, by falling objects, by building vibration and by similar causes

- NOTICE - This equipment is not intended for use within the patient care areas of a Health Care Facility

Symbol Definitions

WARNING - Read the instruction manual to avoid personal injury or property damage

WARNING - Risk of electric shock. Service to be performed by a qualified service person

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Section 1
Introduction

The APD8(F) is an access control power distribution system providing eight relay controlled, individually protected outputs. The ADP8 provides Class-2 power limited outputs via PTC protection, while the APD8F uses fuse protected outputs. Either system can be operated from 12V or 24V AC or DC and features independently programmable outputs, a variety of input option modes, Fire Alarm Interface and visual status indication.

Systems Integrator applications include mag lock and door strike control, reader power, request to exit device power, and system power. The diversity, flexibility and level of system isolation provided by the APD8(F) make this unit a universal toolbox for access control applications.

- Eight outputs - each individually programmable for fail-safe, fail-secure, form-C dry contact, continuous output voltage, and FAI controlled
- Eight inputs - each individually programmable for negative trip, positive trip, open collector / dry contact trip, or isolated trip
- Fire Alarm Interface - latching or non-latching
- Available with Class-2 Power Limited outputs
- Output voltage can be isolated from control voltage
- Visual status indication
  - Input Activation (Red)
  - Control Voltage Present (Green)
  - FAI Status (Red)
- Removable field wiring terminal strips

Section 2
Applicable Standards / Documents

NFPA Standards
NFPA 72 National Fire Alarm Code
NFPA 70 National Electrical Code
NFPA 731 Standard for the Installation of Electronic Premises Security Systems

US Standards
UL 294 Access Control System Units

Canadian Standards
CAN/CSA-C22.2 No. 107.1-01 General Use Power Supplies

Other
Applicable Local and State Building Codes
Requirements of the Local Authority Having Jurisdiction (LAHJ)

UL 294 Performance Levels:
Line Security: I
Destructive Attack: N/A
Endurance: N/A
Standby Power: N/A

Section 3
System Overview

3.1 Electrical Ratings and Specifications

Manufactured By

AlarmSaf
6 Omni Way
Chelmsford, MA 01824-4141

Tel: 978.658.6717
Tel: 800.987.1050
Fax: 978.658 8638
www.alarmsaf.com

Model Numbers (Board-Level)

APD8, APD8F

Electrical Ratings

Input Voltage	10 - 30V AC or DC
Input Power	0.4A@12VDC/0.2A@24VDC maximum control current + 8A maximum output current
Total Output Current	8A maximum output current or rating of power source - whichever is less
	APD8 - 1.6A maximum ; APD8F - 3.0A maximum
Zone Output Voltage	Dependant on input voltage
Input Trip Current	0.03A per input
FAI Trip Current	0.01A @ 24VDC

Product Use

When installed in accordance with all standards listed in Section 2 of this document, the APD8(F) provides power distribution for use with typical 12 or 24VDC devices used in the access control or security industries such as, but not limited to, mag locks, door strikes, door holders, card readers, keypads, etc.

3.2 APD8(F) Connector Descriptions and Electrical Ratings

Terminal / Connector	Description	Rating
TB7 - Power Inputs and FACP AUX Output		
CTRL+	Control Power Positive Input	10V-30V AC or DC - 0.4A at 12VDC, 0.2A at 24VDC Maximum
CTRL-	Control Power Common Input	
LOCK+	Lock Power Positive Input	10V-30V AC or DC - 8A Maximum - depending on output current and voltage rating of power source
LOCK-	Lock Power Common Input	
FACP AUX NO	FACP Relay Output - Normally Open	1A @ 24VDC Maximum
FACP AUX C	FACP Relay Output - Common	
FACP AUX NC	FACP Relay Output - Normally Closed	
TB8 - FACP Input		
FACP +	FAI Voltage Input Positive	9VDC-30VDC - 0.01A @ 24VDC
FACP -	FAI Voltage Input Common	
FACP T+	FAI Dry Contact Input Positive	0.01A @ 12VDC Nominal
FACP T-	FAI Dry Contact Input Common	
TB5 & TB6 - Zone Inputs		
IN x +	Zone x Positive Input	12VDC Nominal @ 0.03A
IN x -	Zone x Common Input	
TB1, TB2, TB3, & TB4 - Zone Outputs		
OUT x NO	Zone x Output Normally Open	Output voltage determined by Lock Input Voltage APD8 - 1.6A per zone maximum APD8F - 3.0A per zone maximum
OUT x C	Zone x Output Relay Common	
OUT x NC	Zone x Output Normally Closed	
OUT x COM	Zone x Output Power Common	

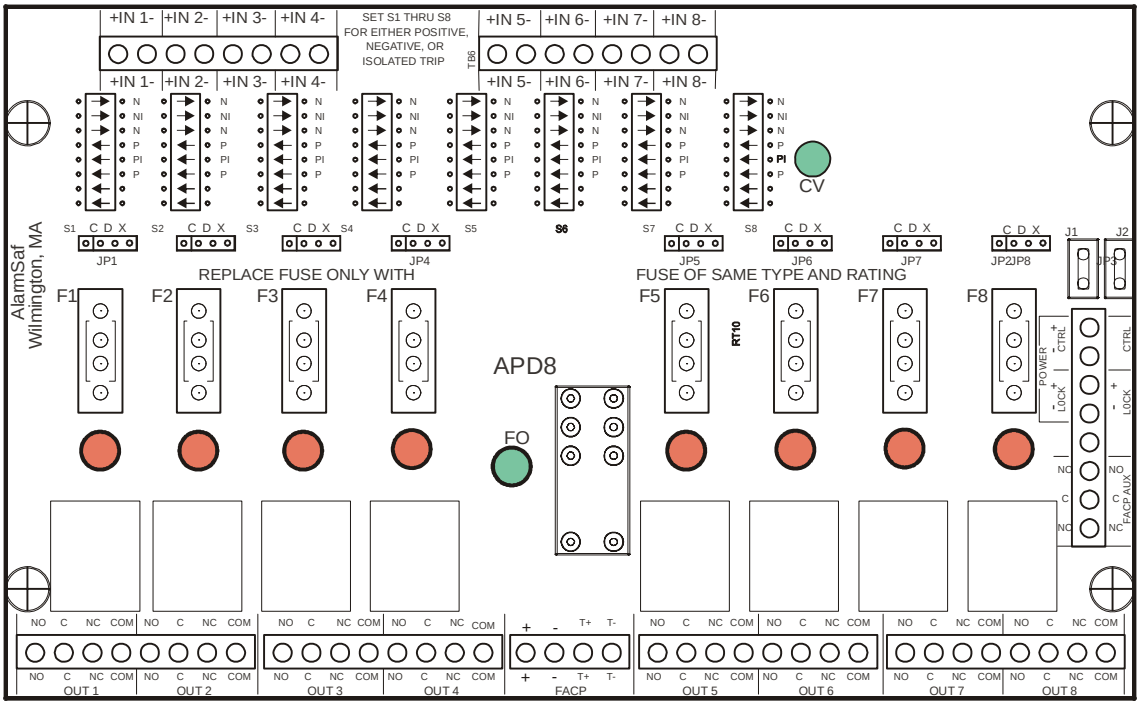


Figure 3.2.1

Note - *Wire should be sized appropriately for voltage drop and current carrying capability. All terminals are labelled for polarity where appropriate.*

3.3 Control Power and Lock Power Input Connections

The APD8(F) has two separate power inputs - a control power input, and a lock power input. Using two separate power inputs allows total separation of lock and control power sources. Typically, this is not required, and jumpers J1 and J2 should remain in. See Section 5.1 for more information on configuring the APD8(F) for using separate power inputs.

Note - *If J1 and J2 are out, BOTH power inputs must be wired to a power source. If J1 and J2 are in place, either the control input or the power input may be used.*
Note - *If J1 and/or J2 are missing, the control power and lock power inputs can be connected together with wire jumpers if isolated power sources are not required.*

3.3.1 Control Power Input

If J1 and J2 are removed, this input provides power to the internal relays and related circuitry of the APD8(F). The Control Power common is tied to the zone input common connections (unless the zone input is set as an insolated input). If J1 and J2 are removed, the Control Power input or Zone Inputs have NO connection to the Lock Power input or the Zone Outputs.

3.3.2 Lock Power Input

If J1 and J2 are removed, this input provides power to the zone outputs of the APD8(F). The Lock Power common is tied to the zone output common connections. If J1 and J2 are removed, the Lock Power input or Zone Outputs have NO connection to the Control Power input or Zone Inputs.

Note - *All wiring should be installed in accordance with (NEC760) NFPA70, NFPA72, and all local code requirements. Power limited wiring requires that power limited and non-power limited wiring remain physically separated. All power limited circuits must remain at least one quarter inch (¼") away from any non-power limited circuit wiring. All power limited circuit wiring must enter and exit the cabinet through different knockouts than non-power limited wiring.*

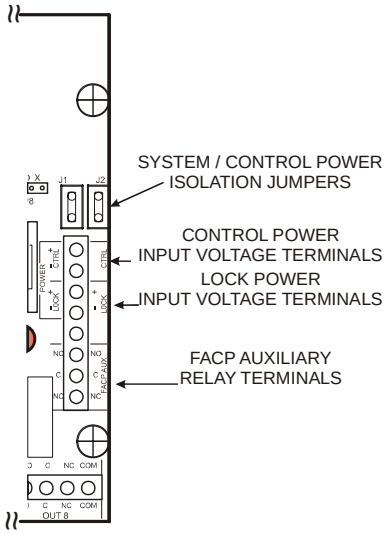


Fig. 3.3.1

3.4 Zone Inputs

Each Zone Output has a corresponding Zone Input. Each Zone Input provides on/off control for its associated output. Inputs are programmable for a variety of input types, including:

- Normally Open Dry Contact - Positive Switching
- Normally Open Dry Contact - Negative Switching
- Non-Isolated Negative Trip
- Isolated Voltage Trip
- Normally Closed Dry Contact - Positive Switching
- Normally Closed Dry Contact - Negative Switching
- Non-Isolated Positive Trip
- Open Collector Input

See Appendix A for specific information and example wiring diagrams for connecting the Zone Inputs.

3.5 Zone Outputs

Each Zone Output of the APD8(F) can be used as a dry contact output, or as either a fail-safe or fail-secure voltage output. Jumpers JP1 through JP8 select the type of output for each zone (see Section 5.1 for jumper information). See Appendix B for more information on the Zone Outputs.

3.5.1 If the Zone Output is configured as a dry contact output, the following connections apply:

- NO Normally Open relay contact
- C Relay Common
- NC Normally Closed relay contact

3.5.2 If the Zone Output is configured as a voltage output, the following connections apply:

- NO Outputs voltage when the zone relay is active
- C Always outputs voltage, regardless of relay condition
- NC Outputs voltage when the zone relay is incative
- COM This terminal is the DC common associated with the output

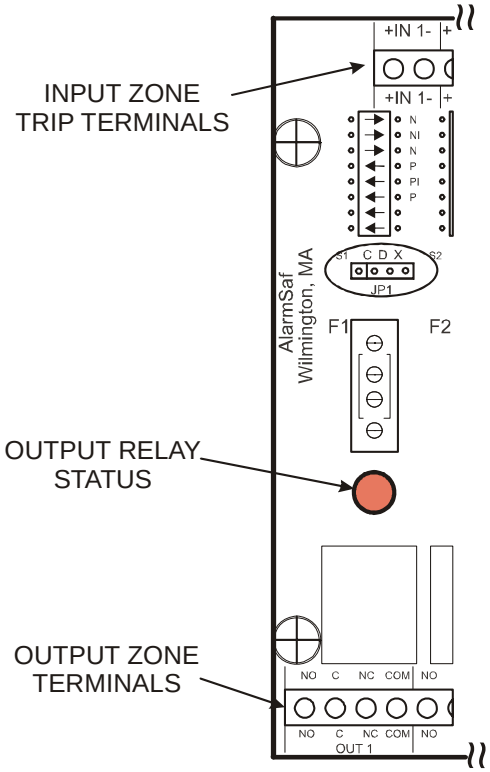


Fig. 3.4

3.6 FACP Input

The APD8(F) has two FAI inputs, one which accepts a voltage input, and one that accepts a dry contact input. Consult the appropriate section below for Terminal Connections for the type of connection being used. See Appendix C for more information and specific wiring diagrams for the FACP Input.

3.6.1 Voltage FACP Input

- FACP + FACP Input Positive
- FACP - FACP Input Common

3.6.2 Dry Contact FACP Input

- FACP T+ One leg of the FACP Dry Contact Input (This terminal is positive with respect to DC Common)
- FACP T- The other leg of the FACP Dry Contact Input

NOTE - If the APD8(F) is being used with a power supply which has its own FAI Input, the supply's FAI input may be used to control the APD8(F) board. See Appendix D for more information.

3.7 FACP AUX Output

The FACP AUX output is a relay output which follows the FACP Input state. Typically, this output is used to activate the FACP Input on additional APD8(F) boards. See Appendix C and Appendix D for wiring details.

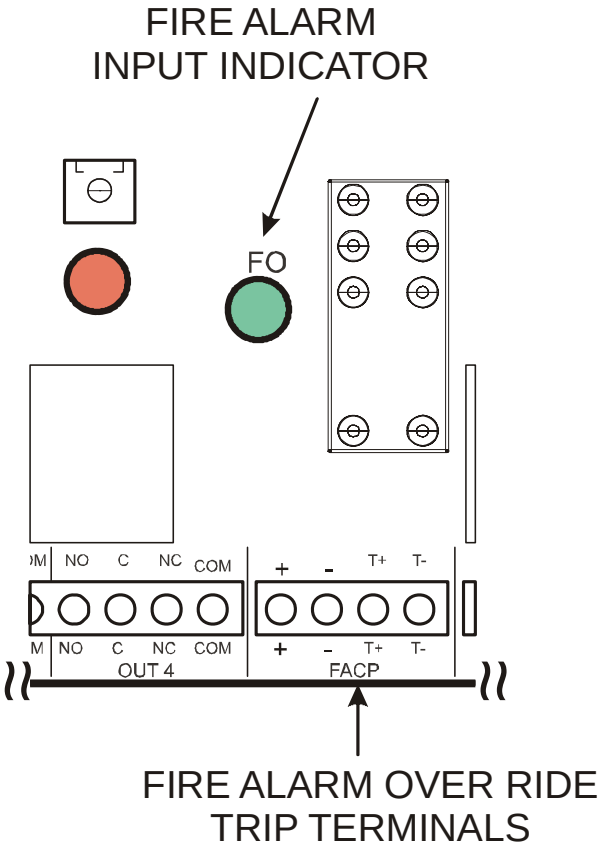


Fig. 3.6

3.8 Fusing

The APD8F contains eight replacable fuses - one for each output zone. When replacing these fuses, only the equivalent type and rating are to be used. The APD8F utilizes commonly available automotive blade-type fuses (Type ATC). All fuses are rated at 3A (ATC-3).

Only the APD8F contains fuses. The APD8 uses output PTCs.

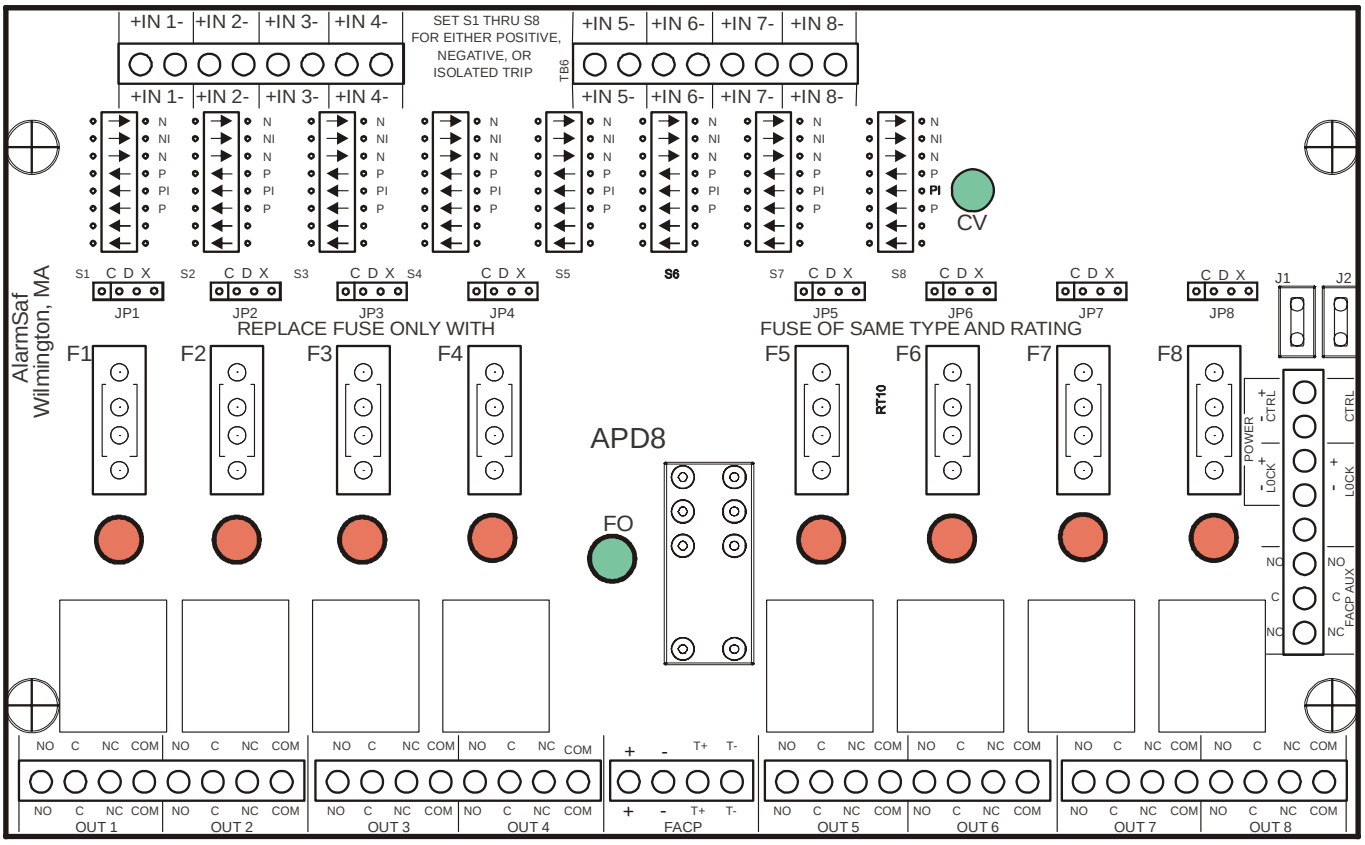


Fig. 3.8

Section 4
Installation

4.1 Mounting

The APD8(F) line is available in either board-level or cabinet level versions.

NOTE - For UL compliance, if the APD8(F) is mounted in an unprotected area, a Tamper Switch must be used.

4.1.1 Mounting a Cabinet-Level Version

If the APD8(F) is provided in a wall mount enclosure, use #8 hardware minimum in four locations. Use an appropriate fastening system for the mounting surface.

Cabinet Mounting:

1. Mark and predrill two holes for the top keyhole mounting screws
2. Install two fasteners in the mounting wall leaving screwheads protruding approximately ¼ inch
3. Using the two upper keyholes, mount the cabinet over the two screws
4. Mark the two lower holes, remove the cabinet and drill the lower mounting holes
5. Mount the cabinet, install the remaining fasteners, and tighten all fasteners

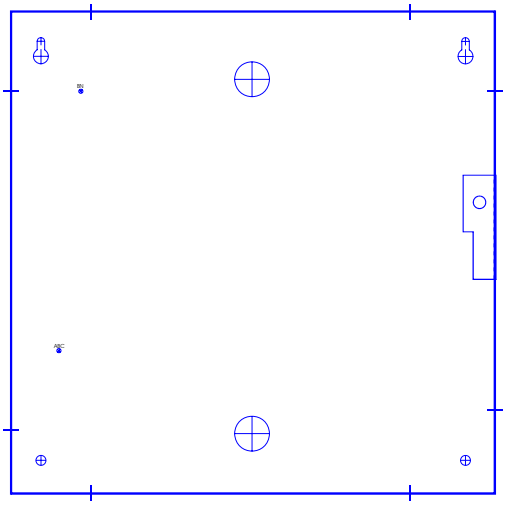


Figure 4.1.1

4.1.2 Mounting a Board-Level Version

Board-level units can be mounted either with the provided double-sided tape or by using nylon standoffs and hardware (not included). Replacement boards for a listed unit must reuse the existing hardware to maintain the listing.

4.2 Wiring

4.2.1 Wire Routing

All wiring must be installed in accordance with NFPA70, NFPA72, and all local code requirements.

Power Limited wiring requires that power limited and non-power limited wiring remain physically separated. Any power limited circuit entering the enclosure must remain at least one quarter inch (¼") away from any non-power limited circuit wiring. Any power limited circuit wiring must enter and exit the enclosure through different knockouts than non-power limited circuit wiring. Wiring within the enclosure should be routed around the perimeter of the cabinet. It should not be routed across the circuit boards.

4.2.2 Control and Lock Power Inputs

Locate the power input terminal block (TB7) and remove the terminal block from the header. Connect one or both power inputs as appropriate for the settings of J1 and J2 (See Sections 3.3 and 5.1). Power input wiring should be sized appropriately for the total current draw from the outputs of the APD8(F). See Section 3.3 for details. Replace the terminal block on the header.

4.2.3 Zone Input Wiring

Locate the terminal block for the zone input to be wired and remove the terminal block from the header. Connect the input in the manner appropriate for the type of input signal being applied. See section 3.4 and Appendix A for more information. Replace the terminal block on the header.

4.2.4 Zone Output Wiring

Locate the terminal block for the zone output to be wired and remove the terminal block from the header. Connect the output in the manner appropriate for the application. See section 3.5 and Appendix B for more information. Zone Output wiring should be sized appropriately for the total current draw from the output. Replace the terminal block on the header.

4.2.5 FACP Input

Locate the FACP Input terminal block (TB8) and remove the terminal block from the header. Connect the proper input in the manner appropriate for the type of input signal being applied. See Section 3.6 and Appendix C for more information. Replace the terminal block on the header.

4.2.6 FACP AUX Output

Locate the FACP AUX Output terminal block (TB7) and remove the terminal block from the header. Connect the FACP AUX Output as needed. See Section 3.7, Appendix C, and Appendix D for more information. Replace the terminal block on the header.

Section 5
Operating the APD8(F)

5.1 Power Separation Jumper Settings

The APD8(F) gives the installer the ability to electrically isolate the Control power from the Zone Output power. This can be helpful in installations where noise-sensitive devices would be affected by lock noise.

To isolate the LOCK power input from the CTRL power input, jumpers J1 and J2 must BOTH be removed.

Note - *If J1 and J2 are out, BOTH power inputs must be wired to a power source. If J1 and J2 are in place, either the control input or the power input may be used.*
Note - *If J1 and/or J2 are missing, the control power and lock power inputs can be connected together with wire jumpers if power isolation is not required.*

5.2 Zone Input Configuration Switch Settings

Each zone of the APD8(F) has a set of DIP switches associated with its input. These switches configure the input for use with a variety of signal types, however three basic configurations will cover a majority of applications. See Appendix A for information on configuring additional input types.

Note - Only switches 1 through 6 are used for each input - switches 7 & 8 are unused.

Note - The factory configuration of these switches (Negative Trip Mode) should work for most applications.

5.2.1 Negative Trip Mode

Negative Trip Mode will cover applications including Dry Contact (NO or NC) and Open Collector (including Casi-Rusco). To set the APD8(F) for Negative Trip Mode, Switches 1, 2, and 3 should be ON (Closed), and all other switches should be OFF (Open).

5.2.2 Positive Trip Mode

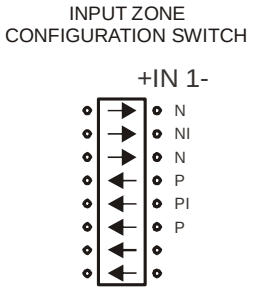
Positive Trip Mode covers applications where a positive voltage is applied to the input for activation. To set the APD8(F) for Positive Trip Mode, Switches 4, 5, and 6 should be ON (Closed), and all other switches should be OFF (Open).

5.2.3 External 12VDC Trip (Isolated)

External Trip Mode covers applications with a completely isolated 12V source as an activation source. The source may or may not be common-grounded with the rest of the system. To set the APD8(F) for External Trip Mode, Switches 2 and 5 should be ON (Closed), and all other switches should be OFF (Open).

Switch #	Neg. Trip	Pos. Trip	Ext. Trip
1 (N)	ON (Closed)	OFF (Open)	OFF (Open)
2 (NI)	ON (Closed)	OFF (Open)	ON (Closed)
3 (N)	ON (Closed)	OFF (Open)	OFF (Open)
4 (P)	OFF (Open)	ON (Closed)	OFF (Open)
5 (PI)	OFF (Open)	ON (Closed)	ON (Closed)
6 (P)	OFF (Open)	ON (Closed)	OFF (Open)

Table 5.2



5.3 Output Configuration Jumper Settings

Each Zone Output has a configuration jumper which must be set for one of three modes for proper operation.

- 'C' Position - The output is '**C**'onstant, regardless of the FACP input. Only the Zone Input can change the state of the output.
- 'D' Position - The output will '**D**'rop power when a valid FACP input is received, regardless of the state of the Zone Input.
- 'X' Position - The output is set as a dry contact output.

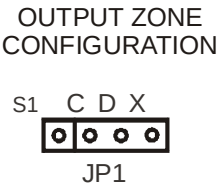


Figure 5.3

5.4 Visual Indicators

The APD8(F) contains ten visual status indicators as described below.

LED	Description	Color	Conditions
CV (D33)	Control Voltage	Green	Lights when the internal power source is present
FO (D1)	Fire Override	Green	Lights when there is ***no*** FACP input present
(D10-D17)	Zone Relay	Red	Each LED lights when its associated Zone Output relay is powered.

5.4.1 CV (D33)

This LED lights when the APD8(F)'s internal power source is operating properly.

5.3.2 FO (D1)

This LED illuminates there is not a valid FACP signal being received. This LED extinguishes when an FACP signal is received and output power is dropped to zones set for 'D'.

5.3.3 Zone Output Relay LEDs (D10-D17)

Each Zone Output relay has an associated LED which lights when the relay is activated.

5.5 Troubleshooting

Condition	Possible Cause	Solution
No power on output(s)	J1 and J2 set incorrectly	See Section 5.1
	No power input	Verify power is present on the power input terminals. If J1 and J2 are removed, BOTH power inputs must be powered.
	Zone Input in the wrong state	Verify the input is configured properly
	Zone Output wired incorrectly	Verify the output is configured properly
	Output Configuration Jumper set incorrectly	See Section 5.3
	Blown Fuse / Tripped PTC	Verify output integrity and replace fuse, or remove output load to reset PTC.
	FACP Input active	Verify that the FACP input is not activated.
	Other Problem	Contact AlarmSaf
Output not dropping power on a FACP input	Output Configuration Jumper set incorrectly	See Section 5.3
	FACP Input wired incorrectly	Verify the FACP Input configuration
	Zone Output wired incorrectly	Verify the Zone Output wiring

Section 6
Specifications

6.1 Electrical Specifications

6.1.1 Input Voltage	10-30V AC or DC
6.1.2 Input Power	0.4A@12VDC / 0.2A@24VDC maximum control current + 8A maximum output current
6.1.3 Output Voltage	Dependent on Input Voltage
6.1.4 Total Output Current	8A Maximum
6.1.5 Zone Output Current	APD8 - 1.6A Maximum APD8F - 3.0A Maximum
6.1.6 Input Trip Current	0.03A per input
6.1.7 FAI Trip Current	0.01A at 24VDC

6.2 Temperature Specifications

6.2.1 Ambient Temperature Range	0ºC to 49ºC (32ºF to 120ºF)
6.2.2 Ambient Humidity	85% at 30ºC (86ºF) Maximum

6.3 Mechanical Specifications

6.3.1 Weight (PCB Only)	0.70lbs.
6.3.2 Size (PCB Only)	7.75”L x 4.75”W x 1.25”H Max.
6.3.3 CAD Drawing	

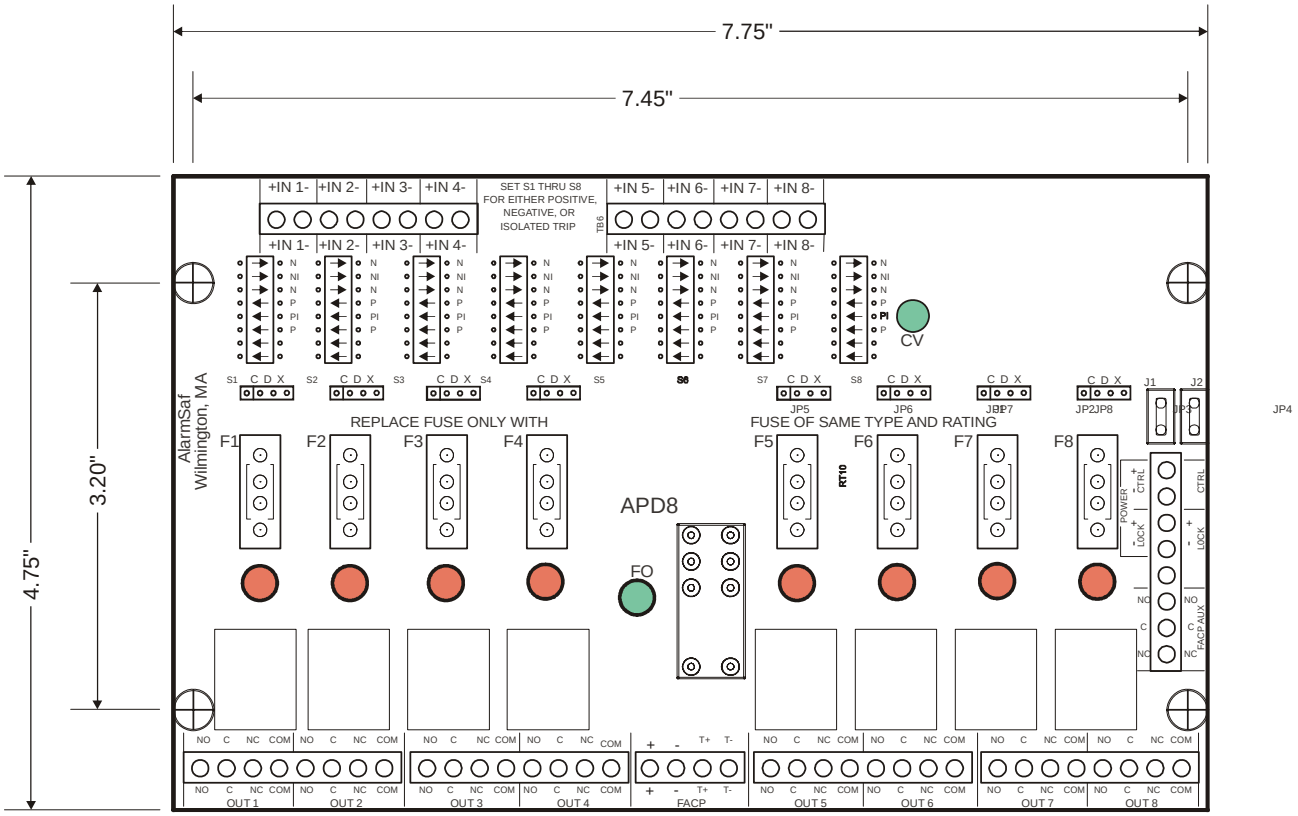


Figure 6.3.1

Appendix A
Configuring The Zone Inputs For Any Application

Each zone of the APD8(F) has a set of DIP switches associated with its input. These switches configure the input for use with a variety of signal types, including:

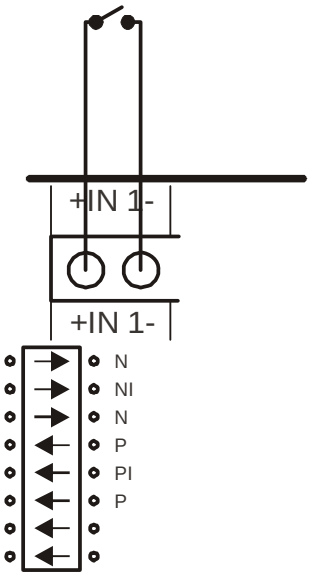
- Normally Open Dry Contact - Positive Switching
- Normally Open Dry Contact - Negative Switching
- Non-Isolated Negative Trip
- Isolated Voltage Trip
- Normally Closed Dry Contact - Positive Switching
- Normally Closed Dry Contact - Negative Switching
- Non-Isolated Positive Trip
- Open Collector Input

Note - Only switches one through 6 are used for each input - switches 7 & 8 are unused.

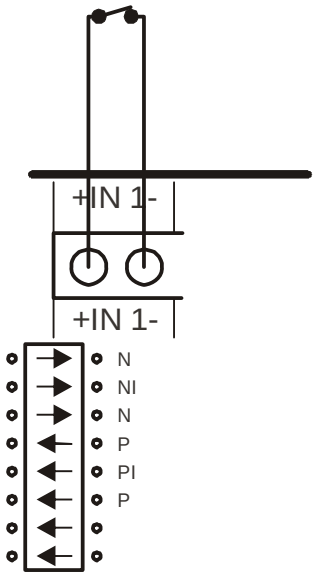
	NO Dry Contact Positive	NO Dry Contact Negative	NC Dry Contact Positive	NC Dry Contact Negative	Non Isolated Negative Trip	Non Isolated Positive Trip	Isolated Voltage Trip	Open Collector Input
Switch 1	Off (Open)	On (Closed)	Off (Open)	On (Closed)	On (Closed)	Off (Open)	Off (Open)	On (Closed)
Switch 2	Off (Open)	On (Closed)	Off (Open)	On (Closed)	On (Closed)	Off (Open)	On (Closed)	On (Closed)
Switch 3	Off (Open)	On (Closed)	Off (Open)	On (Closed)	On (Closed)	Off (Open)	Off (Open)	On (Closed)
Switch 4	On (Closed)	Off (Open)	On (Closed)	Off (Open)	Off (Open)	On (Closed)	Off (Open)	Off (Open)
Switch 5	On (Closed)	Off (Open)	On (Closed)	Off (Open)	Off (Open	On (Closed)	On (Closed)	Off (Open)
Switch 6	On (Closed)	Off (Open)	On (Closed)	Off (Open)	Off (Open)	On (Closed)	Off (Open)	Off (Open)

- **NO Dry Contact Positive** - This configuration will activate the zone's output relay when the normally open contact connected to the input closes. The NO contact is in series with the positive leg of the internal zone output relay coil.
- **NO Dry Contact Negative** - This configuration operates the same as the NO Dry Contact Positive configuration, except that the NO contact is in series with the ground side of the internal zone output relay coil. This is the most common configuration.
- **NC Dry Contact Positive** - This configuration holds the zone output relay active. The zone output relay deactivates when the NC contact opens. The NC contact is in series with the positive leg of the internal zone output relay coil.
- **NC Dry Contact Negative** - This configuration operates the same as the NC Dry Contact Positive configuration, except that the NC contact is in series with the ground side of the internal zone output relay coil.
- **Non-Isolated Negative Trip** - The positive source for the zone output relay coil is provided internally. A DC common connected to the input's '-' terminal will activate the zone output relay. No connection is required to the input's '+' terminal. The DC common used to activate the zone must be common grounded with the control power input's DC common.
- **Non-Isolated Positive Trip** - The DC common for the zone output relay coil is provided internally. A positive 12VDC voltage connected to the input's '+' terminal will activate the zone output relay. No connection is required to the input's '-' terminal. The positive voltage used to activate the zone must be common grounded with the control power input's DC common. Do not use a 24V source to activate the input or damage to the zone output relay will occur.
- **Isolated Voltage Trip** - Connection of a 12VDC source across the input's '+' and '-' terminals will activate the zone output relay. When used in this mode, the zone input is completely isolated from the control power input and the lock power input. Do not use a 24V source to activate the input or damage to the zone output relay will occur.
- **Open Collector Input** - This configuration is identical to the "NO Dry Contact Negative configuration, except that the dry contact is replaced with the open collector output.

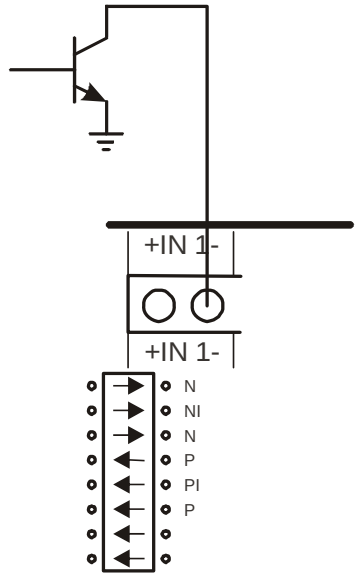
NO Contact



NC Contact

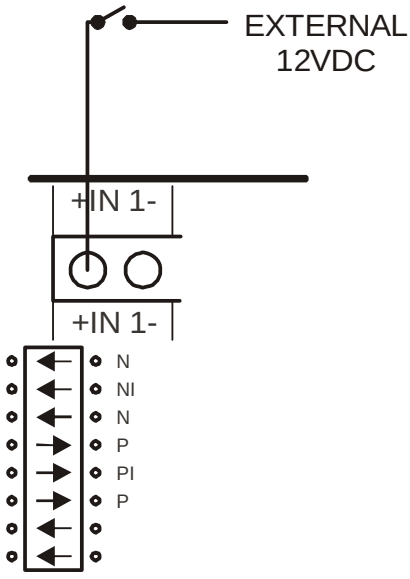


Open Collector



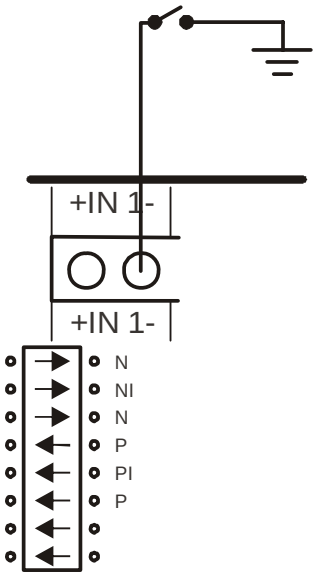
The trip source MUST be common grounded to the APD8(F)'s control power source.

Positive Trip



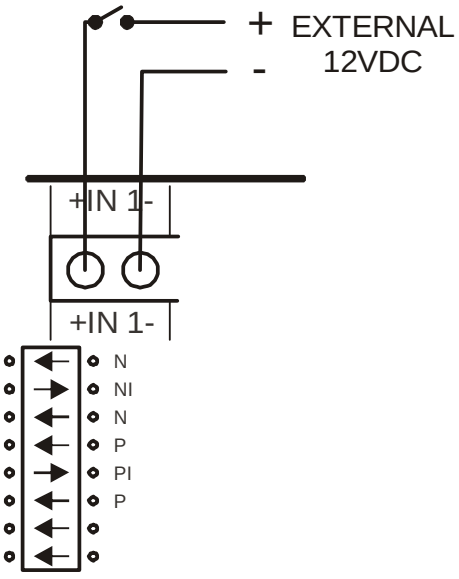
The trip source MUST be common grounded to the APD8(F)'s control power source.

Negative Trip



The trip source MUST be common grounded to the APD8(F)'s control power source.

Isolated Voltage Trip



The power source does *not* need to be common grounded to the APD8(F)'s control power source.

Appendix B
Using The Zone Outputs

The APD8(F)'s outputs can be used in a variety of configurations, allowing flexibility and compatability with virtually any application. Each output can individually be set up for disconnect on FAI, no action on FAI, or Dry Contact Output (no action on FAI) by setting the Zone Output Configuration jumpers for each zone (See Section 5.3). In addition to the jumper settings, each output may be wired in a variety of configurations to suit the required application.

- **Dry Contact Output** - 'X' - When the zone output configuration jumper is set in the 'X' position, the zone output is disconnected from all voltage sources and acts as a dry contact output. The C, NC, and NO terminals act as a normal relay which is controlled by the zone's input terminals. The terminal labelled 'COM' is connected internally to the DC common of the Lock Power Input. When used as a dry contact output, the rating of the output is 3A.

  Note - When configured as a dry contact output, the zone output protection (fuse / PTC) is not in the output circuit***.***
  Note - The FACP input has no effect on a dry contact output.

- **Voltage Output - Constant** - 'C' - When the zone output configuration jumper is set in the 'C' position, the zone output will supply the voltage applied to the Lock Power Input. Internally, the Lock Input voltage is connected to the zone output relay's C terminal. Depending on the state of the zone output relay, the voltage is output via the NC or NO terminal as follows:
  - NO - Voltage is output on this terminal when the zone output relay is activated
  - C - Voltage is always present on this terminal, regardless of the state of the zone output relay
  - NC - Voltage is output on this terminal when the zone output relay is NOT active
  - COM - This terminal is the DC common ('-')for the zone output. It is connected internally to the Lock Input '-' terminal.

  Note - The FACP input has no effect on an output whose zone output configuration jumper is set for 'C'.

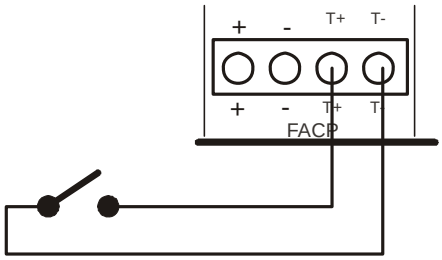
- **Voltage Output - Disconnect** - 'D' - When the zone output configuration jumper is set in the 'D' position, the zone output will function exactly the same as when it is set for 'C', with the exception that power will be removed from the NO, C, and NC terminals when a valid input is received at the FACP input.

Appendix C
Using The FACP Input and FACP AUX Output Terminals

The APD8(F) has two FACP inputs which can be used to drop power to selected outputs when activated. One of the FACP inputs is for connection to a voltage source trip, while the other is for connection to a NO contact trip or open collector trip. See Section 3.6 for more information. The FACP voltage input incorporates an on-board blocking diode for connection to a polarity-reversing source.

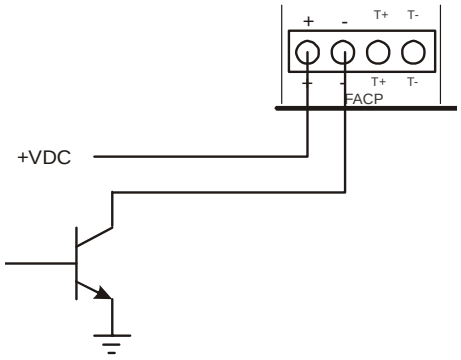
The FACP AUX relay output follows the FACP input and can be used to activate additional APD8(F) FACP inputs, to latch the FACP input on, or for other functions. See Section 3.7 and Appendix D for more information.

NO Contact



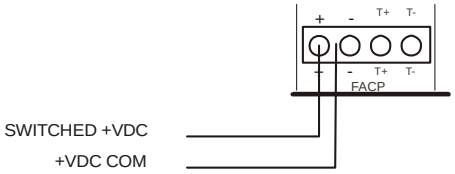
Closure of the NO contact will activate the FACP input.

Open Collector



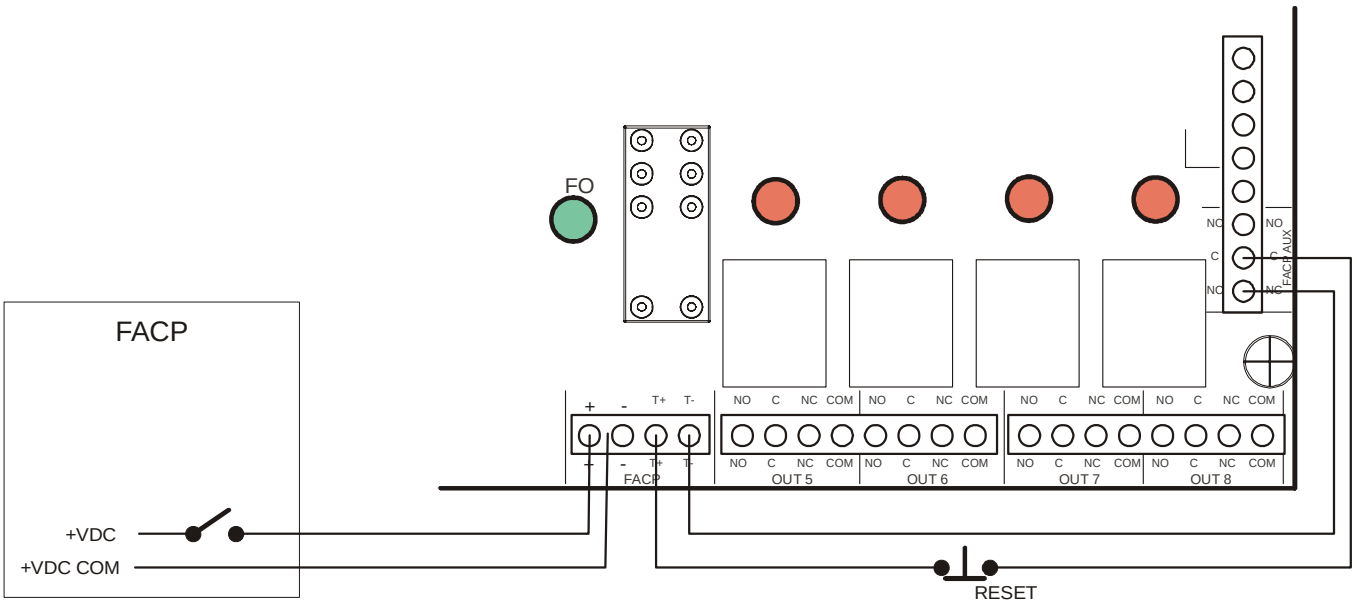
Activation of the open collector output will activate the FACP input.

Isolated Voltage



Applying voltage in the polarity shown will activate the FACP input.

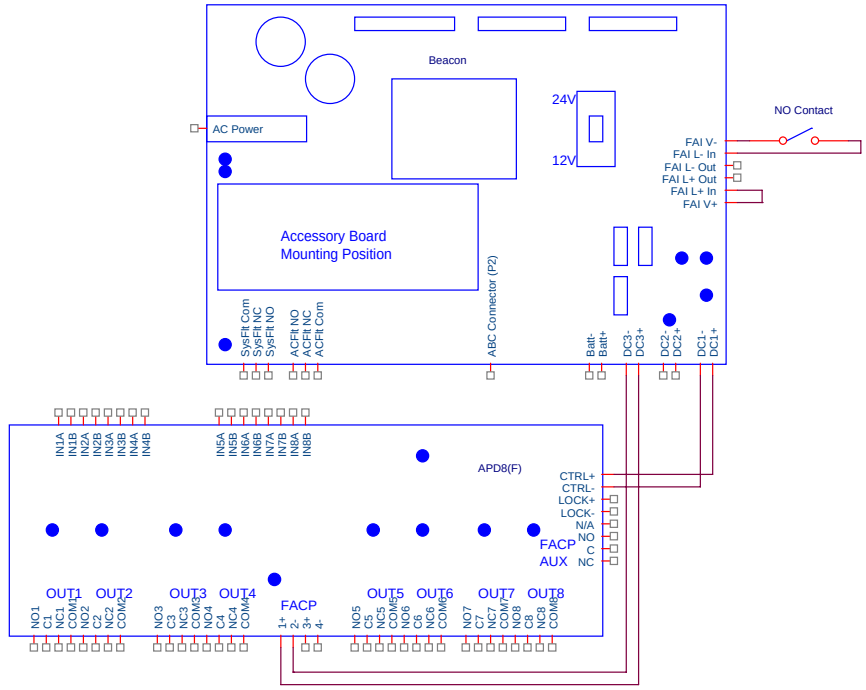
Latching the FACP for Canadian Applications



Activation of the FACP's output causes the APD8(F)'s FACP voltage input to be activated. This causes the APD8(F)'s FACP AUX relay to activate, which provides a closure across the APD8(F)'s FACP dry contact input, holding the APD8(F) in FACP mode. Opening the reset contact will unlatch the FACP mode as long as the FACP's output is deactivated.

Appendix D
Sample Applications

Using a Beacon Power Supply's FAI Input to activate the APD8(F)'s FACP Input



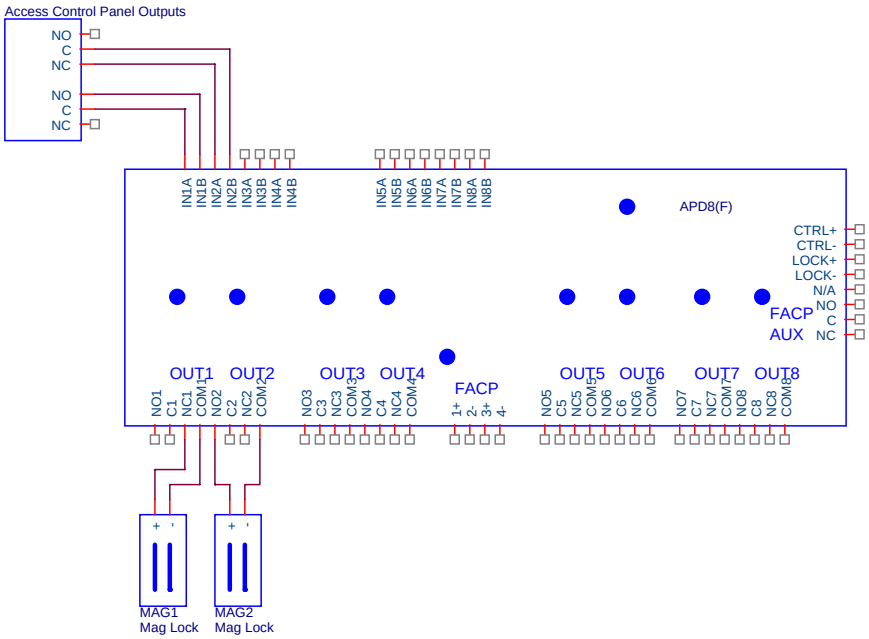
To provide greater flexibility of options for FAI trip options, the APD8(F) can be slaved to a Beacon Power Supply's FAI action.

Any acceptable method of FAI connection can be used on the Beacon power supply. Consult the Beacon Power Supply's installation manual for acceptable connection methods.

Activating the FAI terminals of the Beacon power supply causes the Beacon's DC3 output to activate, which in turn activates the APD8(F)'s FACP voltage input.

The APD8(F)'s FACP AUX terminals may be used to daisychain to the next APD8(F), if used.

Using a NO or NC contact to control a Maglock

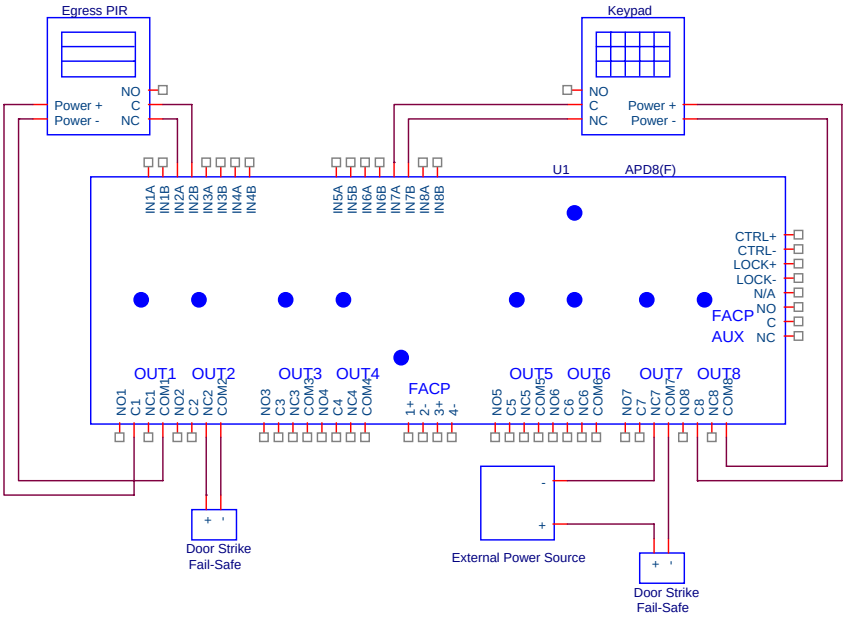


Zone 1 is configured to maintain power to a maglock. Release is by *closure* of the access control panel's NO relay contact, activating the Zone Output relay.

Zone 2 is also configured to maintain power to a maglock. Release is by the *opening* of the access control panel's NC relay contact, deactivating the Zone Output relay.

Setting the Zone Output Configuration jumper to the 'D' position will also allow the FACP input to release the outputs when used for egress.

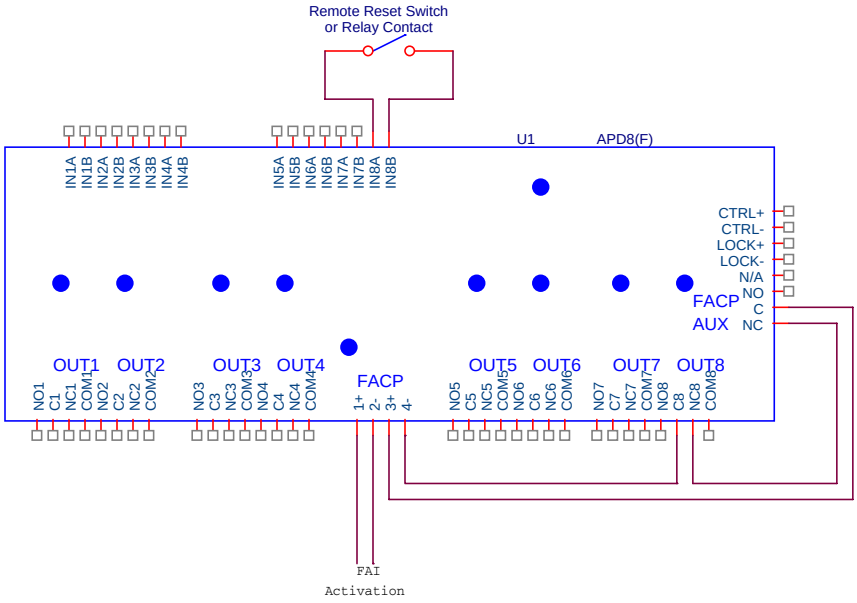
Using an output as a constant power source



Zone 2 is connected to release a doorstrike when an egress PIR sees a valid target. Zone 1 provides constant power to the egress PIR through the 'C' terminal. The Zone Input is set for NC Dry Contact Negative (See Appendix A) and the Zone Output Configuration jumper is set for 'C', since fire override is not required for a failsafe doorstrike.

Output 7 is used to control a doorstrike powered from an external power source on command by the keypad connected to Zone Input 7 and powered by Zone Output 8. The Zone Output Configuration jumper is set for 'X', for a dry contact output.

Latching FAI Input with Remote / Flexible Reset

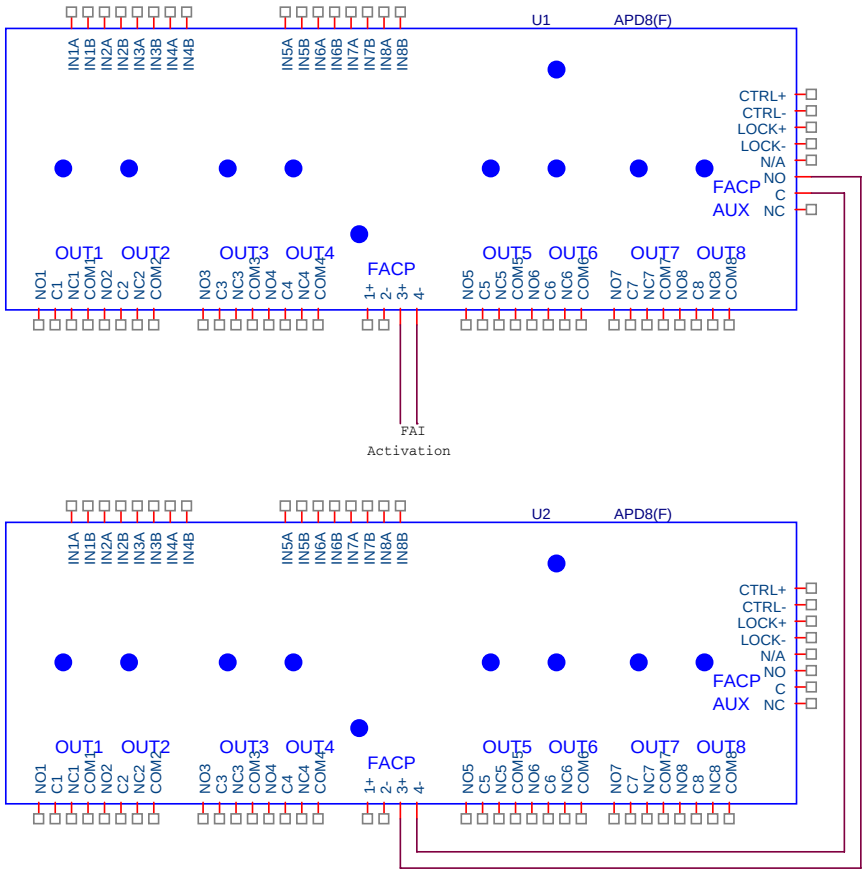


In this application, FAI latch release is provided via Zone Input 8. Configuring the Fire Override in this manner is preferred in installations where the reset switch is located far away from the APD8(F) board.

This configuration also allows any type of input source to reset the FAI latch, including, NC contact, NO contact, open collector, and voltage source.

The zone input should be configured along with the zone output for the type of input being used (See Appendix A).

"Daisy-Chaining" FACP Inputs Between Multiple APD8(F) boards

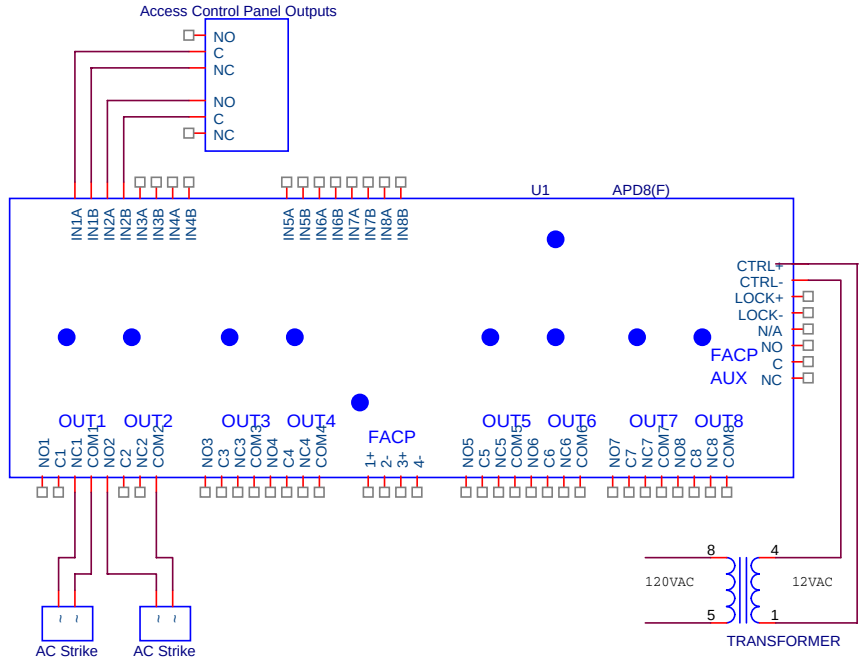


Activating the FACP input of the top APD8(F) transfers its FACP AUX output. These contacts then activate the FACP dry contact input of the bottom APD8(F).

Any valid FACP Input activation method can be used on the top APD8(F). See Appendix C for more information.

If there are more than two APD8(F) boards which need to activate on FAI, the FACP AUX output of the second APD8(F) board would be connected to the next APD8(F)'s FACP dry contact input. This can be repeated for as many APD8(F) boards as necessary.

Powering and Controlling AC Devices



A little known application for the APD8(F) is for powering and controlling AC devices. This application shows an APD8(F) controlling two AC strikes in an apartment complex. Zone 1's input is configured to accept a NC contact, while Zone 2's input is configured for a NO contact. Note the different output wiring for each application.

If the strikes are not failsafe, the FACP input may be used with a zone output configuration jumper setting of 'D'.

Also note that the APD8(F) has an internal rectifier and regulator for it's own relay power, eliminating the need for a separate DC power source for powering the APD8(F).