BEACON POWER MANAGEMENT SYSTEM INSTALLATION MANUAL

This manual includes the following Installation Instructions:

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

Pages 30 – 43: 52-326 PD8(F) INSTALLATION INSTRUCTIONS

This manual is for use with the following AlarmSaf products:

ORDER #	MODEL #
10005	BN 4-002-PD8-UL
10006	BN 4-002-PD8F-UL
10017	BN 6-002-PD8-UL
10018	BN 6-002-PD8F-UL
10053	BN 10-002-PD8F-UL
10054	BN 10-002-PD8-UL
10055	BN 10-003-PD8-UL
10056	BN 10-003-PD8F-UL
10059	BN 1010-004-PD16-UL
10060	BN 8-002-PD8-UL
10062	BN 4-004-PD8F-UL
10074	BN 64-004-PD32-UL
10079	BN 10-004-PD8F-UL
10083	BN 1010-004-PD16F-UL
10089	BN 10-002-PD16F-UL
10090	BN 10-003-PD16F-UL
10093	BN 8-003-PD8-UL
10100	BN 10-004-PD8F-UL-E240

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

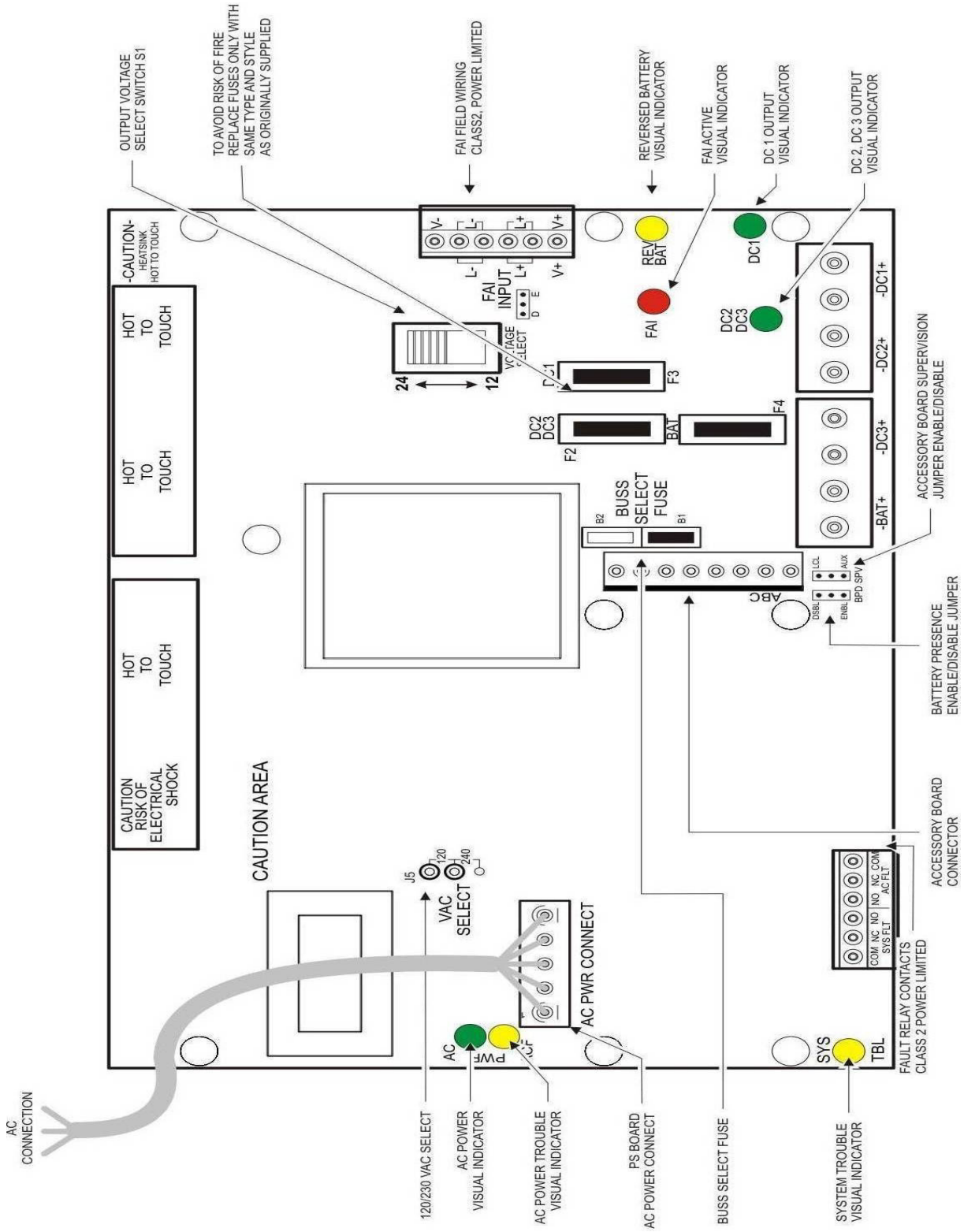


Figure 3.2.1

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).

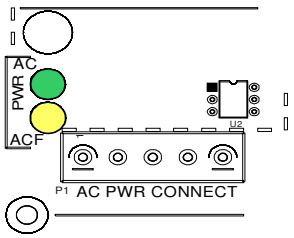


Figure 3.3.1

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).

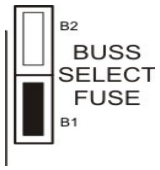


Figure 3.5.1.1

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.

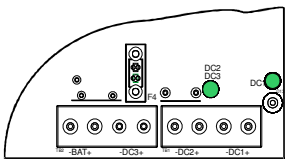


Figure 3.6.1

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.

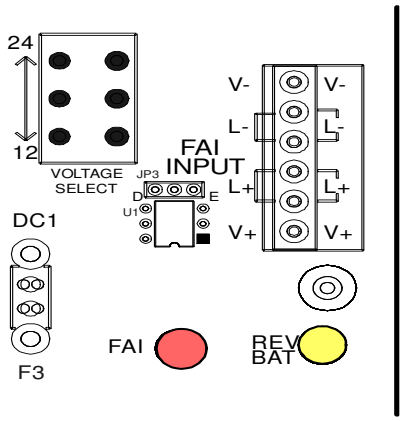


Figure 3.7.1

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)

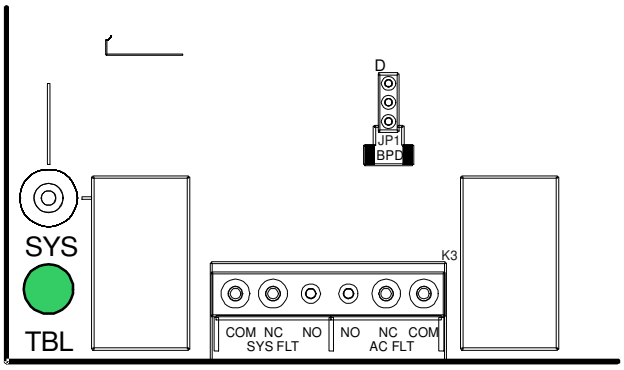


Figure 3.8.1

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

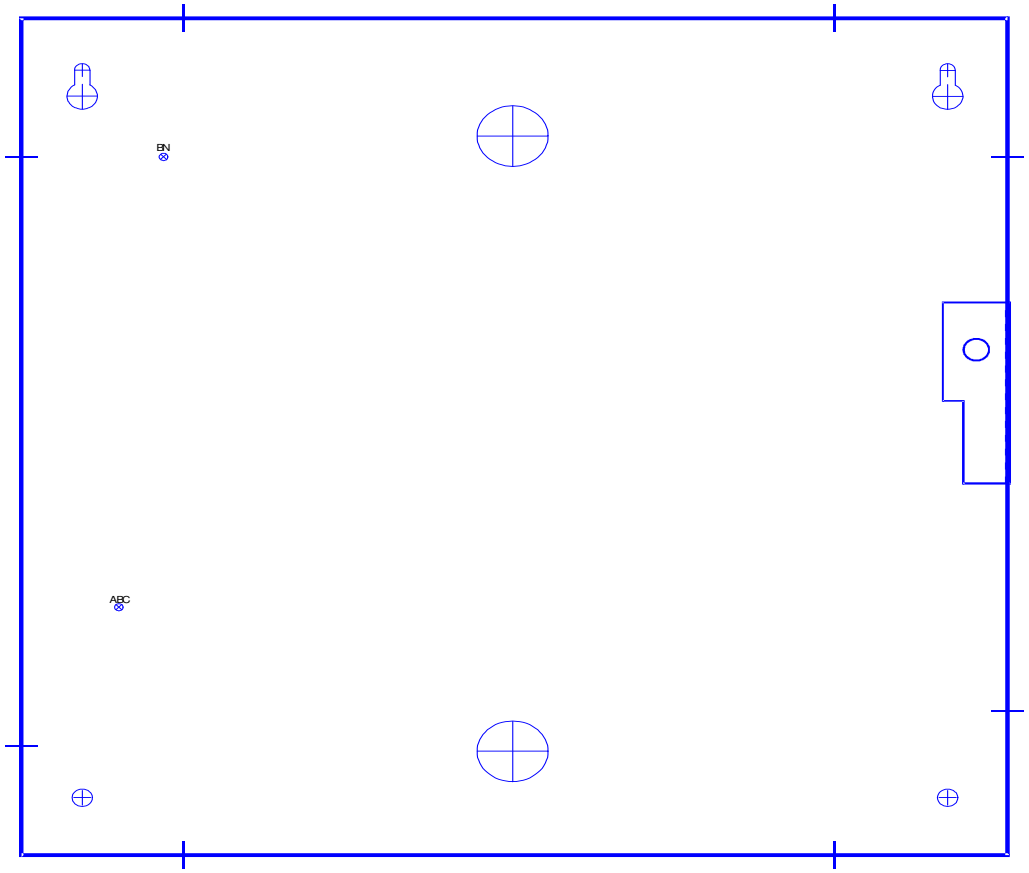


Figure 4.1.1

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).

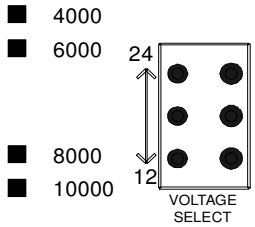


Figure 5.1.1

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	

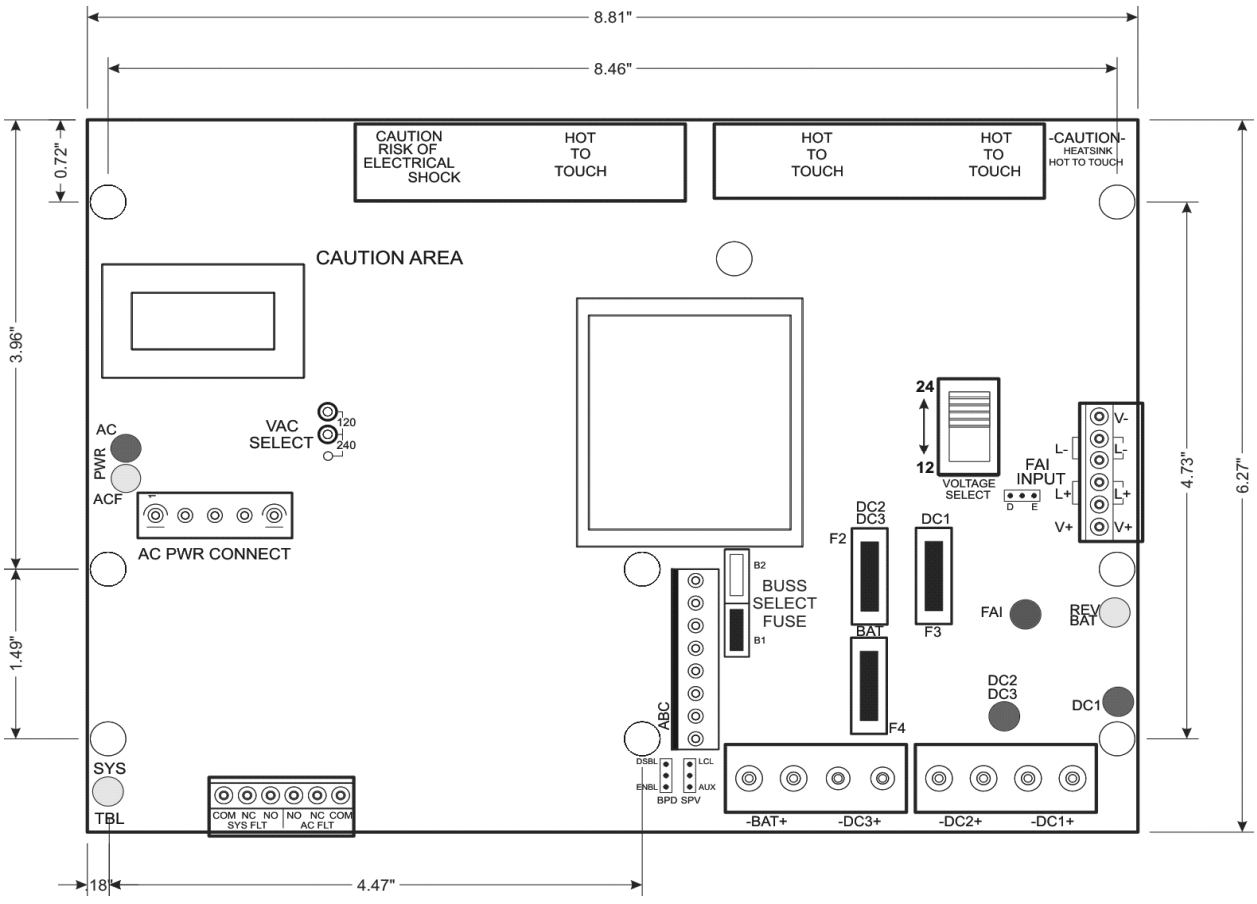


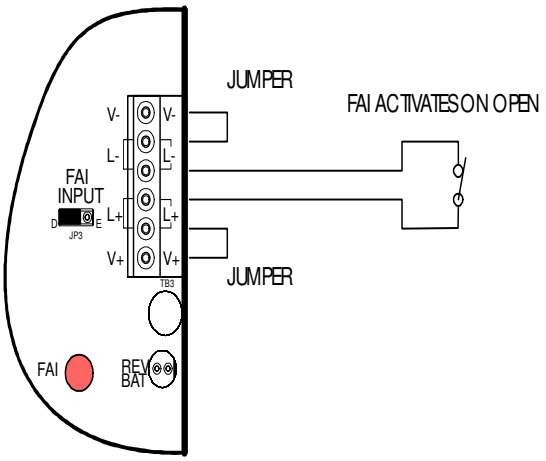
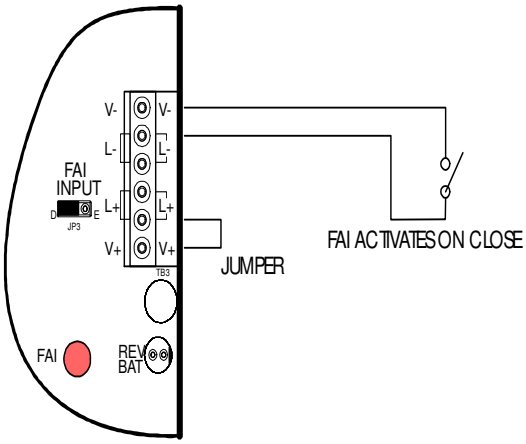
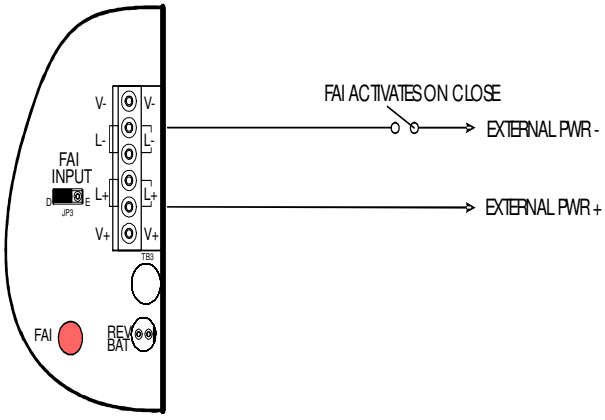
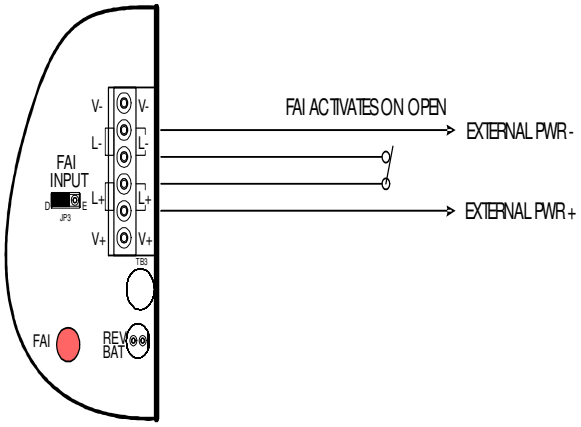
Figure 6.3.1

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:

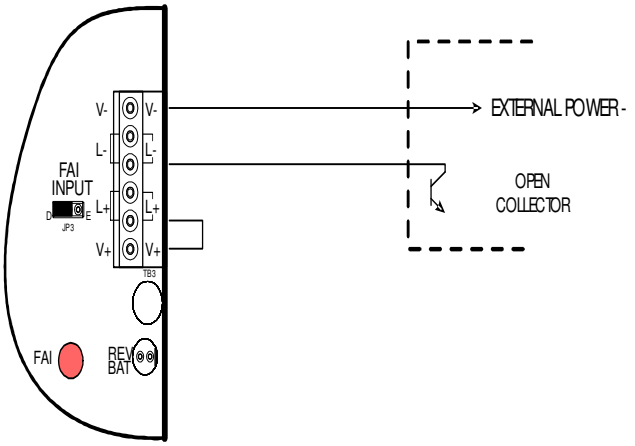
1. Relay contact transfer using internal voltage source:
   a. Normally closed.
   b. Normally open.
2. Power from external voltage source:
   a. Switched positive.
   b. Switched negative.
3. Open collector connection:
   a. Internal voltage source
   b. External voltage.
4. Direct to NAC loop:
   a. 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>

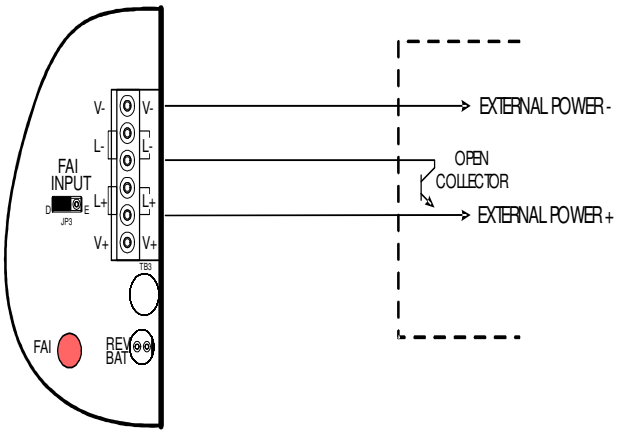
APPENDIX A, PAGE 2

FAI Input Connection Methods (continued)

"Open collector" connection

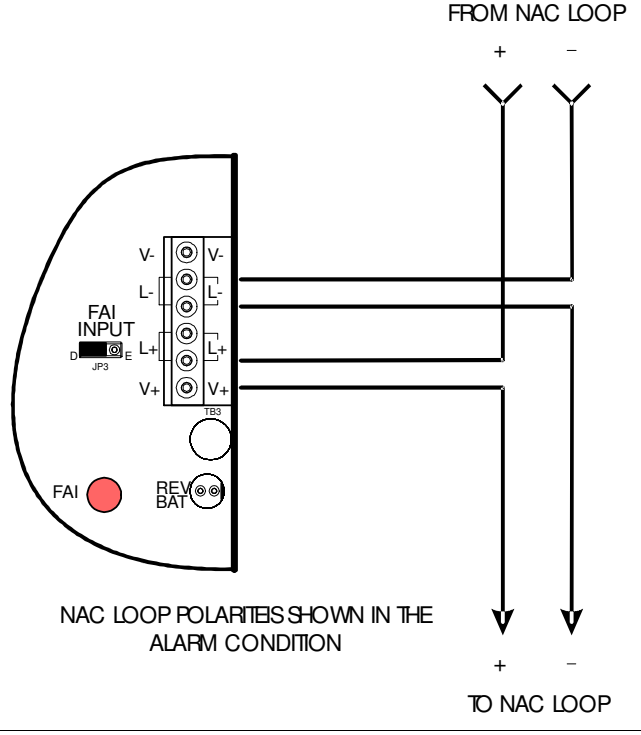


Internal source

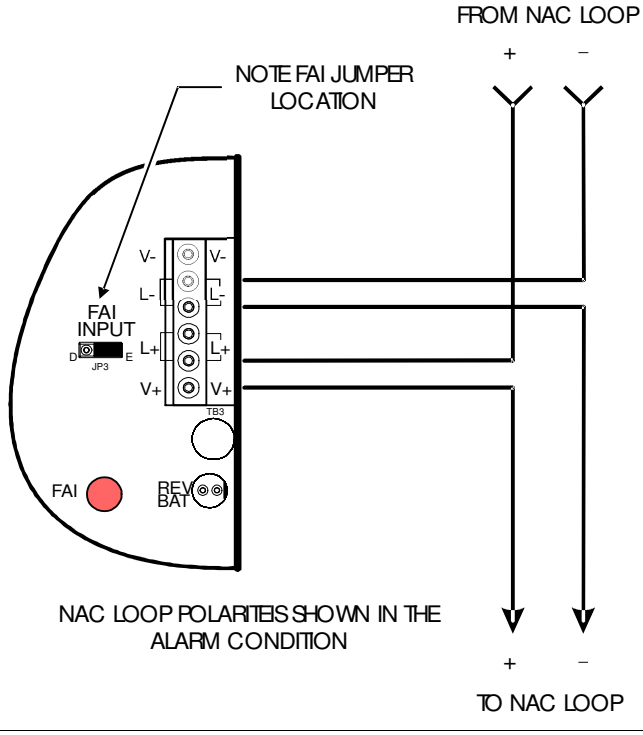


External source

NAC connection



DC polarity reversal



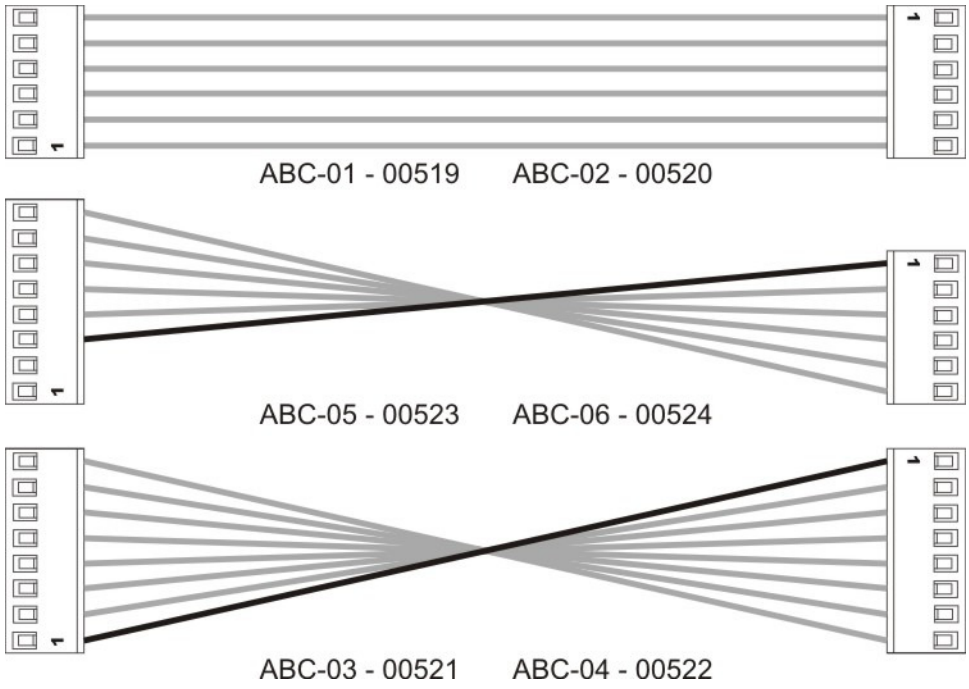
DC polarity reversal with sync

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

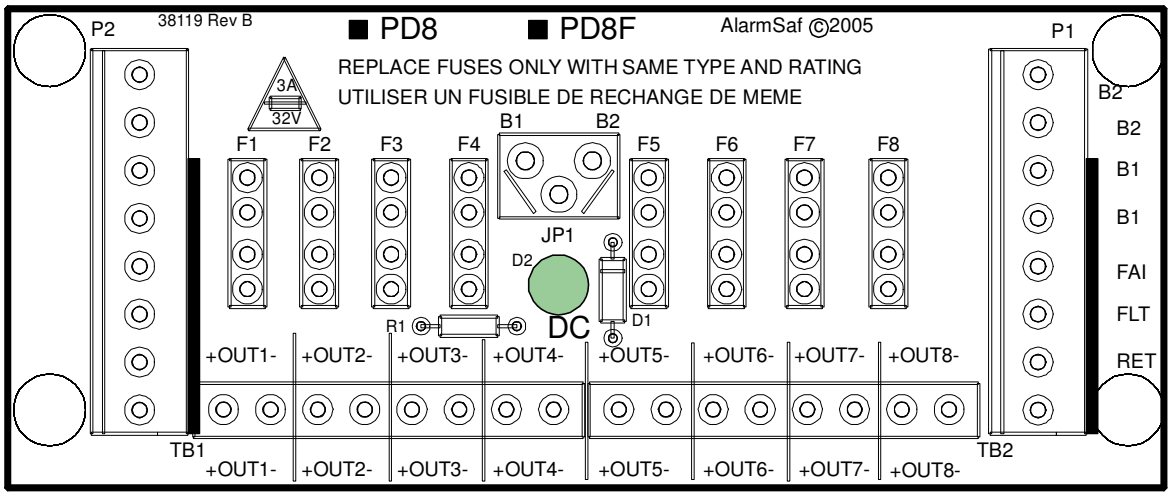
ACCESSORY MODULE		MODULE DESCRIPTION	ABC CABLE	
ORDER	MODEL#		ORDER	MODEL#
10041, 10042	PD8(F)	8 outputs	00521	ABC-03
10067, 10068	MB8(F)	8 outputs w/FAI & voltage selection	00521	ABC-03
10069, 10070	CMB8(F)	8 outputs w/FAI; 4 Relay Controlled	00521	ABC-03
10066	SPS4	Secondary Power Source Module: 5-18V @ 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 PD8(F)

Basic Power Distribution Board

Operating and Installation Instructions

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

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Section 1
Introduction

The PD8(F) Basic Power Distribution board provides eight outputs to any AlarmSaf power supply or accessory board with an ABC expansion port. It accepts inputs from one or two independent voltage sources, either of which is available to ALL outputs by jumper selection.

- Eight individually protected outputs
- Output voltage able to be selected (as a group) from one of two voltage busses
- Available with Class-2 Power Limited outputs (PD8) or Fused (non-power limited) outputs (PD8F)
- Each output is capable of supplying up to 3A (PD8F) or 1.6A (PD8) up to the maximum current capability of each voltage source
- Fused versions use easily obtainable ATM-3 automotive miniature blade fuses

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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
UL 1076 Proprietary Burglar Alarm Units and Systems
UL 2044 Commercal Closed-Circuit Television Equipment

Canadian Standards
ULC S527 Standard for Control Units for Fire Alarm Systems
ULC S318 Standard for Power Supplies for Burglar Alarm Systems
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)

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 01887
Tel: 978 658 6717
800 987 1050
www.alarmsaf.com

Model Numbers

PD8, PD8F

Electrical Ratings

Inputs	Two Inputs: 0 to 24VDC Nominal @ 14 Amps maximum per input
Outputs	Eight Outputs: 1.5A (PD8) or 3A (PD8F) per output up to the maximum capability of the base power supply selected. Output voltage determined by base power supply selected.
Fuse Type (PD8F only)	ATM-3 Automotive Miniature Blade-type

Product Use

When installed in accordance with all standards listed in Section 2 of this document and used with an appropriate listed supply, the PD8(F) provides eight constant outputs, sourced from one of two voltage sources for powering devices such as (but not limited to) Mag Locks, Door Strikes, Card Readers, Smoke Dampers, 4-Wire Smoke detectors, etc.

3.2 PD8(F) Terminal and Connector Descriptions and Electrical Ratings

Terminal / Connector	Description	Rating
P1	ABC Input or Output	0-24V Nominal at 14A per Buss (controlled by base supply selected)
P2	ABC Input or Output	
TB1 - Outputs 1 through 4		
Out1 +	Output 1 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out1 -	Output 1 -	
Out2 +	Output 2 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out2 -	Output 2 -	
Out3 +	Output 3 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out3 -	Output 3 -	
Out4 +	Output 4 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out4 -	Output 4 -	
TB2 - Outputs 5 through 8		
Out5 +	Output 5 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out5 -	Output 5 -	
Out6 +	Output 6 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out6 -	Output 6 -	
Out7 +	Output 7 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out7 -	Output 7 -	
Out8 +	Output 8 +	1.5A (PD8) or 3A (PD8F) maximum - Voltage determined by base supplies and jumper selection
Out8 -	Output 8 -	

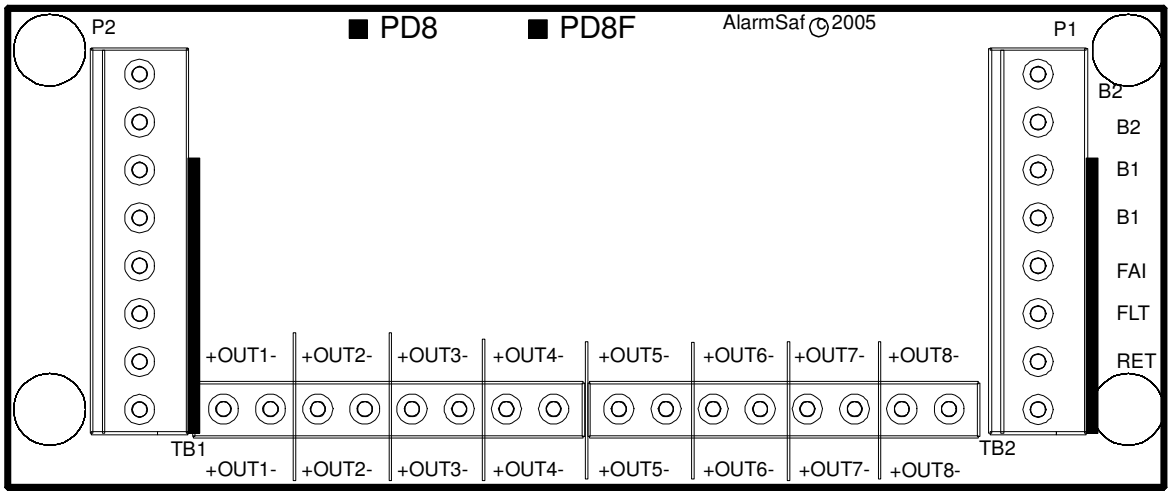

Figure 3.2.1

3.3 ABC Connectors and Harnesses

3.3.1 The ABC buss supplies the voltages (B1 and B2) and FAI control to compatible accessory boards. By using the appropriate cables (see section 3.3.4), one or two independent voltage sources can be connected to accessory boards.

3.3.2 Single Voltage Distribution

A single power source can be connected to the PD8(F) by using the ABC-03 cable,(00521) power supplies with an ABC connector or the ABC-07 cable (#00525) for power supplies with no ABC connector.

3.3.3 Dual Voltage Distribution

This feature is not available with the PD8(F). For dual voltage power distribution use either the MB8(F) or the CMB8(F). Contact AlarmSaf at 800.987.1050 for additional information.

3.3.4 Cable Types

Order #	Model #	Type	Length	Description
00521	ABC-03	8-8	8 in.	Connect Beacon power supply to the first accessory board or interconnect accessory boards
00522	ABC-04	8-8	18 in.	Connect Beacon power supply to the first accessory board or interconnect accessory boards
00523	ABC-05	6-8	8 in.	Connect Beacon power supply to SPS4 Module NOTE: Also used in units manufactured before 2010 and custom products
00524	ABC-06	6-8	18 in.	Connect Beacon power supply to SPS4 Module NOTE: Also used in units manufactured before 2010 and custom products
00525	ABC-07	6-2SP	18 in.	Connect distribution board to terminals on power supplies with no ABC connector

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3.4 Output Terminals

The PD8(F)'s output terminals (TB1 and TB2) provide power distributed from the B1 or B2 (if present) supplies. The voltage source selection is made through the voltage buss jumper (JP1) setting. See Section 5 for configuration jumper settings.

Each output is protected by either an ATM-3 fuse (PD8F) or a 1.6A PTC (PD8). If an output PTC is tripped, remove the output load for 30 seconds.

Caution - Observe the polarity of the PD8(F) output terminals with respect to the load or damage to the load may occur.

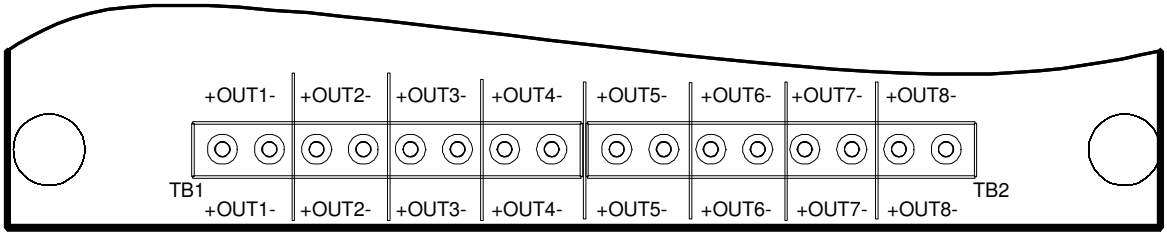

Figure 3.4.1

Section 4
Installation

4.1 Mounting

The PD8(F) mounts either in the accessory board space on the power supply or to the back of a metal enclosure.

4.1.1 Mounting On a Power Supply

1. Remove and save the four mounting screws from the accessory board mounting space on the power supply.
2. Install 6-32 x 1 1/4" Male-Female standoffs in the four locations where the screws were removed (the aluminum standoff, if present, is installed in the top left mounting hole).
3. Mount the PD8(F) to the standoffs using the screws removed in step 1
4. Connect ABC cable(s) appropriately (See section 3.3)

4.1.2 Mounting In a Metal Enclosure

1. Install four 6-32 x 3/4" Female-Female nylon standoffs on the appropriate mounting studs in the enclosure (the aluminum standoff, if present, is installed on the top left mounting stud).
2. Mount the PD8(F) to the standoffs using 6-32 x 3/8" screws.
3. Connect ABC cable(s) appropriately (See section 3.3)

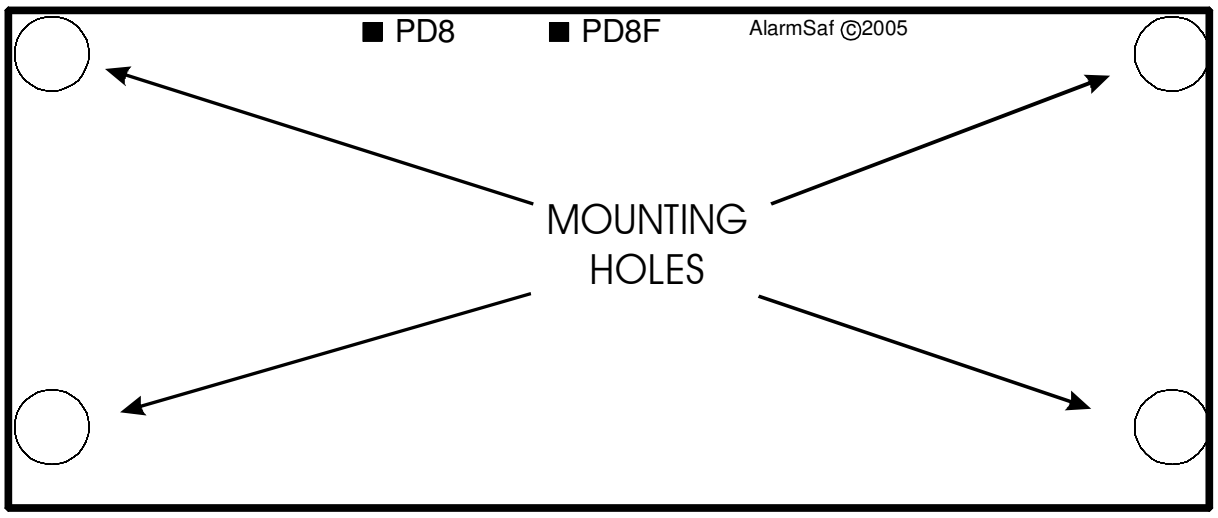

Fig 4.1.1

4.2 Wiring

4.2.1 Wire Routing

All wiring must be installed in accordance with NFPA70 [NEC760], 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. See the enclosure's documentation for complete wire routing instructions.

4.2.2 ABC Connector

See section 3.3

4.2.3 Output Wiring

Locate the output wiring terminal blocks (TB1 and TB2) and remove the terminal block from the header. Connect the wiring for the equipment to be powered to the terminal block. The PC board is labeled with the output numbers and polarity (See also section 3.2). Replace the terminal block on the header.

NOTE: Wire size for these terminals must be 22-14 AWG.

4.3 Labeling

If the PD8(F) was purchased separately from the power supply unit, the supplied label must be applied to the inside cover of the power supply's enclosure. The label shall not cover any ventilation holes or other labeling on the enclosure.

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Section 5
Operating the PD8(F)

5.1 Jumper Configuration

Before powering a system containing a PD8(F), the jumper must be set for proper operation. Failure to do so before applying power could damage the system.

Jumper	Description	Settings	Factory Default
JP1	Voltage Buss Selection	Left (B1) - The PD8(F)'s outputs are supplied from B1 Right (B2) - The PD8(F)'s outputs are supplied from B2	Left (B1)

5.1.1 The Voltage Buss Selection jumper (JP1) is used to select which of the two voltage busses on the ABC connector(s) are to be used to supply the outputs. The jumper selects the source for ALL EIGHT outputs. If individual selection is required, use the MB8(F).

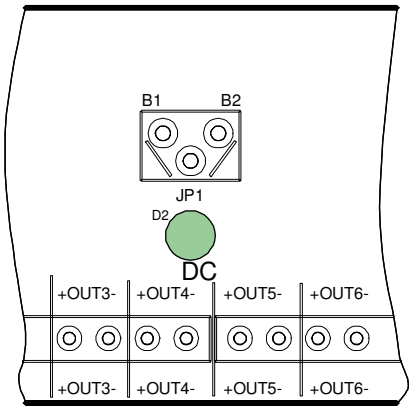


Figure 5.1.1

5.2 Visual Indicators

The PD8(F) has one LED to indicate status of the input voltage selected for the outputs. The LED lights when there is voltage available to the outputs.

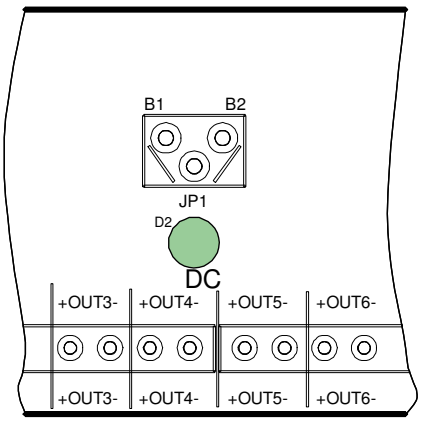


Figure 5.2.1

5.3 Troubleshooting

Condition	Possible Cause	Solution
No voltage on output	Jumper setting incorrect	Verify proper jumper setting
	Missing jumper	Verify jumper present
	No voltage supply	Verify the power supply
	Blown output fuse (PD8F)	Check output wiring and replace fuse
	Tripped output PTC (PD8)	Check output wiring and remove load for 30 seconds to reset
Incorrect voltage on output	Incorrect voltage buss selected	Verify proper jumper setting
	Power supply outputting incorrect voltage	Check power supply
LED not lit	No voltage on the voltage buss selected	Check the selected power supply and ABC cable
	Jumper set improperly	Verify proper setting of jumper JP1
	Jumper missing	Verify jumper JP1 is present and set properly

Section 6
Specifications

6.1 Electrical Specifications

6.1.1 Input Voltage (B1 and B2)	0-24VDC Nominal
6.1.2 Input Current (B1 and B2)	14A maximum per buss
6.1.3 Battery Requirement	The PD8(F) draws 0.01A in addition to the output load

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	0.05 Lbs (Not including hardware or cables)
6.3.2 Size	4.85"L x 2.10"W x 1.00"H *Note: Width includes terminal block overhang of 0.2"*
6.3.3 CAD Drawing	

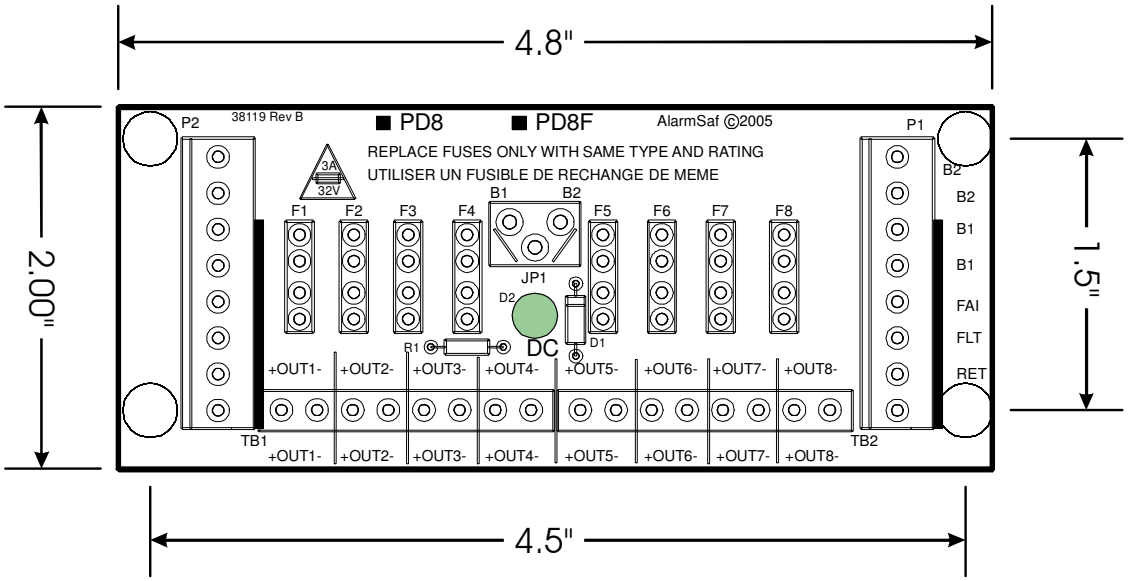
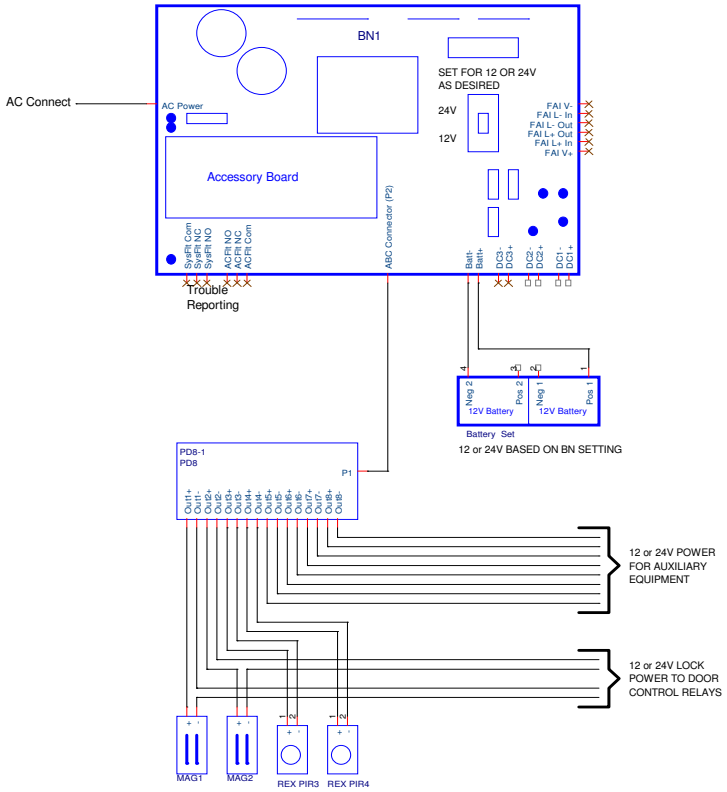


Figure 6.3.1

Appendix A
Sample Applications

A.1 Single Voltage Power Management With The PD8(F)



The BN power supply is configured to provide either 12 or 24 VDC to one PD8(F) power distribution module.

The PD8(F) will split the 12 or 24VDC into eight individually protected outputs for use in powering locks, doorstrikes, or auxiliary equipment such as REX PIRs, keypads, egress timers, or readers.

The diagram illustrates a common eight door system with two maglocks used for the egress doors, six doorstrikes used for internal access control and a mix of auxiliary power needs such as cameras, keypads, and REX PIRs. Emergency access buttons should be used on the maglocks due to FAI not being used.

The PD8 should be used for Class 2 power limited service.

The PD8F should be used if fuse protection is desired.

A single battery set is used to provide standby power to both the locks and the control equipment.

All components as shown will fit within a B02 (12"H X 12"W X 4"D) enclosure , while allowing space for a 12V - 14 Ah or 24V - 7Ah standby battery set.

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