

Introduction

This publication describes the installation procedure for the following 4100-Series System Power Supplies (SPS) and Remote Power Supplies (RPS):

- 4100-5111/5112 SPS (120 VAC) (mounts to expansion bays only)
- 4100-5125/5126 RPS (120 VAC)

- 4100-5113 SPS (220/230/240 VAC) (mounts to expansion bays only)
- 4100-5127 RPS (220/230/240 VAC)

These products are compatible with 4100U and 4100ES Fire Alarm Control Panels (FACP).

IMPORTANT:



- **The SPS described in this document are not physically the same as the SPS used in the CPU bay.**
- **Verify FACP System Programmer, Executive, and Slave Software compatibility when installing, or replacing system components. Refer to the Technical Support Information and Downloads website for compatibility information.**

In this Publication

This publication discusses the following topics:

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Related Documentation

City and relay connections can be made from the SPS (the RPS supports relay connections only). Refer to the *City and Relay Card Installation Instructions (574-839)* to install a relay card to the SPS, or a city card to the SPS or RPS.

To find out more about the CPU bay version of the SPS, which operates in the same way as the expansion bay version of the SPS but mounts differently, refer to the *4100ES Fire Alarm System Installation Guide (574-848)*.

For information on Expansion Power Supplies (XPS), refer to *XPS and XNAC Installation Instructions (574-772)*.

Cautions and Warnings

READ AND SAVE THESE INSTRUCTIONS- Follow the instructions in this installation manual. These instructions must be followed to avoid damage to this product and associated equipment. Product operation and reliability depend upon proper installation.



DO NOT INSTALL ANY SIMPLEX® PRODUCT THAT APPEARS DAMAGED- Upon unpacking your Simplex product, inspect the contents of the carton for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify an authorized Simplex product supplier.



ELECTRICAL HAZARD - Disconnect electrical field power when making any internal adjustments or repairs. All repairs should be performed by a representative or authorized agent of your local Simplex product supplier.



STATIC HAZARD - Static electricity can damage components. Handle as follows:

- Ground yourself before opening or installing.
- Prior to installation, keep components wrapped in anti-static material at all times.

FCC RULES AND REGULATIONS – PART 15 - This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

SYSTEM REACCEPTANCE TEST AFTER SOFTWARE CHANGES - To ensure proper system operation, this product must be tested in accordance with NFPA72 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

All components, circuits, system operations, or software functions, known to be affected by a change, must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

Introduction to the SPS and RPS

Overview

The System Power Supply (SPS) and Remote Power Supply (RPS) are both intended to be placed in remote cabinets that require a 24 VDC signal power, as well as battery charging capabilities. The SPS and RPS receive battery and AC power from the Power Distribution Module (PDM).

The SPS and RPS provide 24 VDC to three notification appliance circuits. NACs can be Class B (Style Y) or Class A (Style Z). They are power-limited according to UL 864. The NACs support non-addressable TrueAlert and conventional reverse-polarity operation. SmartSync operation allows separate audible/visible control on the same pair of wires. NACs are monitored for short and open circuits. If a short circuit occurs, the affected NAC is not energized. During initialization, the system checks to see if any NACs are shorted together.

The Notification Appliance Circuits on these modules can be used as Regulated 24 DC circuits, or Special Application circuits. When used as 24 VDC Regulated circuits, only 4Amps of current is available across the 3 circuits, and any 24 VDC appliance may be attached. When used as Special Applications NACs, the full 9Amps of current is available at the 3 circuits, and only the compatible appliances listed in Table 7 may be connected to these circuits. The SPS/RPS can synchronize compatible appliances across all 3 circuits when those circuits are used as Special Applications NACs.

Auxiliary power, relay, and relay module functions are also supported.

The SPS and RPS perform standard fire alarm functions, such as brownout detect, battery transfer, battery recharge, and Earth fault detection. The detection circuits signal an earth fault trouble when system field wiring is connected to earth via a resistance of 10K ohms minimum.

Additionally, the SPS provides an IDNet channel that supports initiating devices and some notification appliances, such as the 4009-9201 and -9301 IDNet NAC Extender (see Table 7 for compatible devices). The RPS does **not** provide an IDNet channel. A relay option module may be connected to either the SPS or RPS.

It mounts in the same location as the city module on the SPS. The city module is **not** supported by the RPS.

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Introduction to the SPS and RPS, *Continued*

Overview

The figure below details the SPS. The only difference in physical appearance between the SPS and the RPS is that the SPS contains IDNet screw terminals.

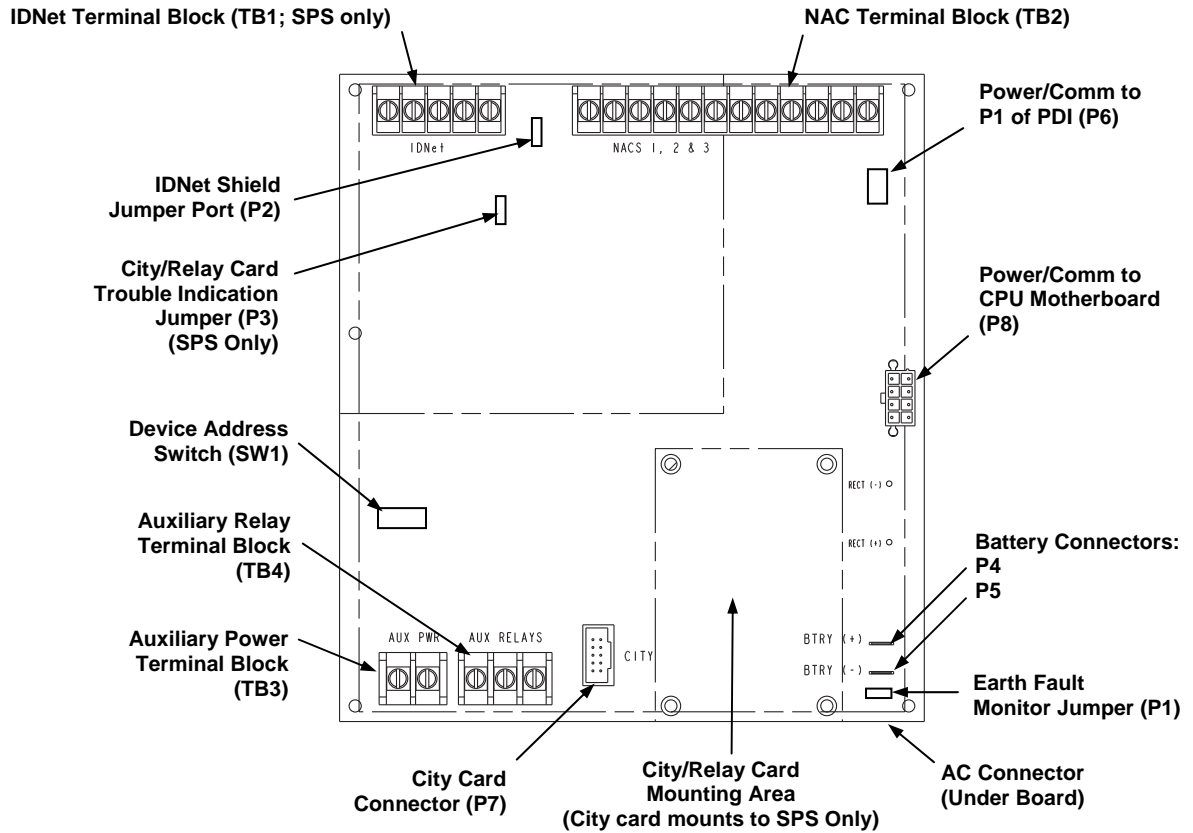


Figure 1. The System Power Supply (SPS)

The SPS and RPS have the following LEDs:

- LED 1 (Yellow):** Illuminates when NAC 1 is in Alarm or Trouble.
- LED 2 (Yellow):** Illuminates when NAC 2 is in Alarm or Trouble.
- LED 3 (Yellow):** Illuminates when NAC 3 is in Alarm or Trouble.
- LED 4 (Yellow):** Illuminates to indicate a communications loss with the system CPU; normally OFF. If this LED is blinking, try re-loading the software to FLASH.
- LED 5 (Yellow):** Indicates IDNet status.
 - Slow blink: Class A or open circuit trouble.
 - Fast blink: Short circuit trouble.
 - ON steady: No devices detected/ channel failure.
 - Normally OFF.
- LED 6 (Yellow):** Indicates power supply status.
 - Single blink: Positive Earth fault.
 - Double blink: Negative Earth fault.
 - Triple blink: Battery trouble.
 - Quadruple blink: Charger trouble.
 - ON steady: Overcurrent fault.
 - Normally OFF.
- LED 7 (Green):** Illuminates when the power supply is powered from the AC line. OFF when the power supply is de-energized, or when it is using battery backup power

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Introduction to the SPS and RPS, *Continued*

Input/Output/Battery Specifications

The table below summarizes the specifications for the SPS and RPS.

Table 1. Input and Output Specifications

| AC Input Specifications | |
|--|--|
| 4100-5111/5112 SPS 4100-5125/5126 RPS | 4 A Maximum 120 VAC @ 60 Hz, nominal |
| 4100-5113 SPS 4100-5127 RPS | 2 A Maximum 220/230/240 VAC @ 50 or 60 Hz |
| DC Output Specifications | |
| All SPSs/RPSs | Minimum: 19.5 VDC Maximum: 32 VDC Ripple: 2 VDC p-p @ full load (9 A) |
| SPS IDNet Output (see note) | 30 V or 35 V |
| Battery Charger Specifications | |
| Input Voltage Range | 21-33 VDC |
| Output Float Voltage | 27.4 VDC \pm 500 mV @ 20° C, temperature compensated at -24 mV/° C (32° F to 120° F or 0° C to 50° C) |
| High Voltage Output | 29.1 V @ 3.3 A |
| Output Current Limit | 1.4 A (For 6.2 – 18 Ah battery) 3.3 A (Default; for 18-50 Ah battery – Canadian; for 18-110 Ah battery – U.S.) |

Notes:

- The battery circuit is supervised.
- When it is necessary to activate large numbers of output devices on IDNet peripherals (such as piezo sounders), the output voltage is increased to 35 V to provide sufficient voltage at the end of line to activate the piezo. The higher voltage state is an alarm condition for the purpose of standby battery calculation. The 30 V output is the normal condition and is used to prolong battery standby. The system CPU activates the boost feature when 10 LED, Piezo or other outputs are activated.
- AC power must be provided to the Power Supply from a dedicated branch circuit.

Continued on next page

Introduction to the SPS and RPS, *Continued*

SPS Current Consumption

The table below summarizes battery standby capabilities for the SPS. Voltage assumed is 24 V, which is the rated battery voltage for lead-acid type batteries.

Table 2. SPS Current Specifications

| Standby Conditions | Current |
|---|---------|
| <ul style="list-style-type: none"> No alarms (NACs normal) IDNet LED ON, no IDNet devices connected | 175 mA |
| Add to above for each additional set of 50 IDNet devices in standby, with IDNet at 30 V | 40 mA |
| Total current for fully loaded IDNet channel (250 devices) in standby | 375 mA |
| Alarm Conditions | Current |
| <ul style="list-style-type: none"> 3 NACs ON IDNet LED ON, no IDNet devices connected | 185 mA |
| Add to above for each set of 50 IDNet devices in alarm, 20 LEDs ON | 80 mA |
| Add to above for each set of 50 IDNet devices in alarm, LEDs OFF | 50 mA |
| Total current for a fully loaded IDNet channel (250 devices) in alarm, 20 LEDs ON | 475 mA |

Notes:

- Additional standby conditions:** Trouble relay activated, power trouble LED ON, IDNet LED ON, battery charger OFF, auxiliary power load = 0 mA
- Additional alarm conditions:** Trouble relay activated, power trouble LED ON, IDNet LED ON, battery charger OFF, auxiliary power load = 0 mA, NAC alarm load = 0 mA, IDNet = 35 V

RPS Current Consumption

The table below summarizes battery standby capabilities for the RPS. Voltage assumed is 24 V, which is the rated battery voltage for lead-acid type batteries.

Note: The ratings given below do not include notification appliance or auxiliary power loads. Add the alarm load for each NAC and any auxiliary power loads to the RPS board rating shown in the table.

Table 3. RPS Current Specifications

| Conditions | Current |
|----------------------------------|---------|
| Standby; no alarms (NACs normal) | 150 mA |
| Alarm; 3 NACs ON | 185 mA |

Environmental Operating Range

The modules are rated to operate at ambient temperatures between 0° C (32° F) and 49° C (120° F).

The modules are rated for operation at 90° F (32° C), 93% non-condensing relative humidity.

Mounting

Overview

The SPS and RPS mount onto the right side of an expansion box, and connect to the PDI. Use this section to mount the SPS or RPS assembly to the box.

Mounting

Use the following directions and the figure below to mount the SPS or RPS to an expansion cabinet.

1. Slide the two tabs on the bottom of the SPS or RPS into the rightmost two slots in the expansion cabinet.
2. Push the SPS or RPS assembly against the back of the expansion box.
 - Connect to the PDI as shown below.
 - Three PDI headers, as shown below, must be pushed through three open slots in the back of the SPS/RPS assembly.
 - Correctly align the two screw holes at the top of the SPS/RPS assembly with the holes in the cabinet backplane.
3. Use two #6 torx screws to secure the assembly to the expansion box.

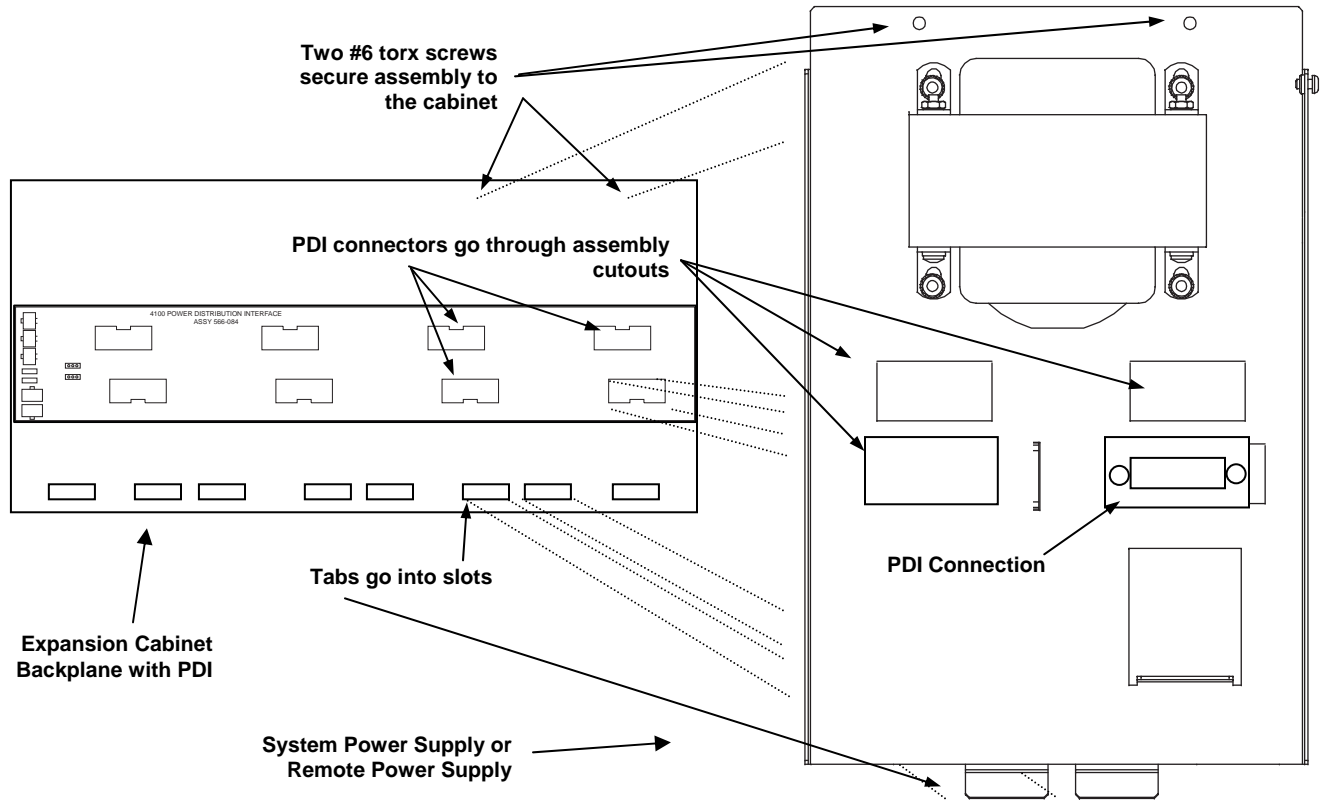


Figure 2. SPS/RPS Mounting

Configuring the SPS and RPS

Overview

The SPS and RPS have jumper ports (see Figure 1) for the IDNet shield connection, Earth ground monitoring, and for city or relay module trouble activation. The SPS and RPS also require an address setting via DIP switch SW1. This section describes each setting.

Jumper Settings

- P1:** Earth Fault Monitor jumper. Position 1-2 enables Earth fault monitoring; Position 2-3 disables Earth fault monitoring. Set for [1-2] in all systems except those with TrueAlert Power Supply (TPS, 4100-5120/5121/5122) modules. Set for [2-3] in systems with TPS.
- P2:** (SPS only). IDNet Shield Connection Jumper. If the SPS IDNet outputs are being used, you may change P2 to configure the IDNet shield connection. Position 1-2 connects the shield to 0 V (default); Position 2-3 connects the shield to Earth ground.
- P3** City/Relay Hardwired Trouble Jumper. Position 1-2 removes trouble monitoring on Relay 3 (default) of the 4100-6033 Alarm Relay Card; Position 2-3 activates the 4100-6031/6032 City Cards or the 4100-6033 Alarm Relay Card when the system microprocessor fails. Always use Position 2-3 for 4100-6031/6032 City Cards.

Setting the Address

The SPS or RPS device address is set via DIP switch SW1, which is a bank of eight switches. From left to right (see below) these switches are designated as SW1-1 through SW1-8. The function of these switches is as follows:

- **SW1-1:** This switch sets the baud rate for the internal 4100 communications line running between the card and the 4100 CPU. Set this switch to ON.
- **SW1-2 through SW1-8:** These switches set the card's address within the 4100 FACP. Refer to Table 4 for a complete list of the switch settings for all of the possible card addresses.

Note: You must set these switches to the value assigned to the card by the Programmer.

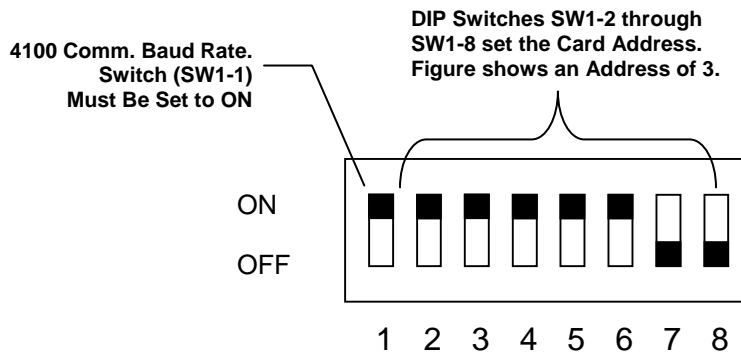


Figure 3. DIP Switch SW1

The model 4100-5112 (SPS) and 4100-5126 (RPS) are required in jurisdictions, such as Canada, where depleted battery conditions are required, by local code, to result in power-down of the unit until AC power is restored. The system must also be programmed for depleted battery cutout, for each power supply.

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Configuring the SPS and RPS, *Continued*

Setting the Address

Table 4. Card Addresses

| Address | SW 1-2 | SW 1-3 | SW 1-4 | SW 1-5 | SW 1-6 | SW 1-7 | SW 1-8 | Address | SW 1-2 | SW 1-3 | SW 1-4 | SW 1-5 | SW 1-6 | SW 1-7 | SW 1-8 |
|---------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|
| 1 | ON | ON | ON | ON | ON | ON | OFF | 61 | ON | OFF | OFF | OFF | OFF | ON | OFF |
| 2 | ON | ON | ON | ON | ON | OFF | ON | 62 | ON | OFF | OFF | OFF | OFF | OFF | ON |
| 3 | ON | ON | ON | ON | ON | OFF | OFF | 63 | ON | OFF | OFF | OFF | OFF | OFF | OFF |
| 4 | ON | ON | ON | ON | OFF | ON | ON | 64 | OFF | ON | ON | ON | ON | ON | ON |
| 5 | ON | ON | ON | ON | OFF | ON | OFF | 65 | OFF | ON | ON | ON | ON | ON | OFF |
| 6 | ON | ON | ON | ON | OFF | OFF | ON | 66 | OFF | ON | ON | ON | ON | OFF | ON |
| 7 | ON | ON | ON | ON | OFF | OFF | OFF | 67 | OFF | ON | ON | ON | ON | OFF | OFF |
| 8 | ON | ON | ON | OFF | ON | ON | ON | 68 | OFF | ON | ON | ON | OFF | ON | ON |
| 9 | ON | ON | ON | OFF | ON | ON | OFF | 69 | OFF | ON | ON | ON | OFF | ON | OFF |
| 10 | ON | ON | ON | OFF | ON | OFF | ON | 70 | OFF | ON | ON | ON | OFF | OFF | ON |
| 11 | ON | ON | ON | OFF | ON | OFF | OFF | 71 | OFF | ON | ON | ON | OFF | OFF | OFF |
| 12 | ON | ON | ON | OFF | OFF | ON | ON | 72 | OFF | ON | ON | OFF | ON | ON | ON |
| 13 | ON | ON | ON | OFF | OFF | ON | OFF | 73 | OFF | ON | ON | OFF | ON | ON | OFF |
| 14 | ON | ON | ON | OFF | OFF | OFF | ON | 74 | OFF | ON | ON | OFF | ON | OFF | ON |
| 15 | ON | ON | ON | OFF | OFF | OFF | OFF | 75 | OFF | ON | ON | OFF | ON | OFF | OFF |
| 16 | ON | ON | OFF | ON | ON | ON | ON | 76 | OFF | ON | ON | OFF | OFF | ON | ON |
| 17 | ON | ON | OFF | ON | ON | ON | OFF | 77 | OFF | ON | ON | OFF | OFF | ON | OFF |
| 18 | ON | ON | OFF | ON | ON | OFF | ON | 78 | OFF | ON | ON | OFF | OFF | OFF | ON |
| 19 | ON | ON | OFF | ON | ON | OFF | OFF | 79 | OFF | ON | ON | OFF | OFF | OFF | OFF |
| 20 | ON | ON | OFF | ON | OFF | ON | ON | 80 | OFF | ON | OFF | ON | ON | ON | ON |
| 21 | ON | ON | OFF | ON | OFF | ON | OFF | 81 | OFF | ON | OFF | ON | ON | ON | OFF |
| 22 | ON | ON | OFF | ON | OFF | OFF | ON | 82 | OFF | ON | OFF | ON | ON | OFF | ON |
| 23 | ON | ON | OFF | ON | OFF | OFF | OFF | 83 | OFF | ON | OFF | ON | ON | OFF | OFF |
| 24 | ON | ON | OFF | OFF | ON | ON | ON | 84 | OFF | ON | OFF | ON | OFF | ON | ON |
| 25 | ON | ON | OFF | OFF | ON | ON | OFF | 85 | OFF | ON | OFF | ON | OFF | ON | OFF |
| 26 | ON | ON | OFF | OFF | ON | OFF | ON | 86 | OFF | ON | OFF | ON | OFF | OFF | ON |
| 27 | ON | ON | OFF | OFF | ON | OFF | OFF | 87 | OFF | ON | OFF | ON | OFF | OFF | OFF |
| 28 | ON | ON | OFF | OFF | OFF | ON | ON | 88 | OFF | ON | OFF | OFF | ON | ON | ON |
| 29 | ON | ON | OFF | OFF | OFF | ON | OFF | 89 | OFF | ON | OFF | OFF | ON | ON | OFF |
| 30 | ON | ON | OFF | OFF | OFF | OFF | ON | 90 | OFF | ON | OFF | OFF | ON | OFF | ON |
| 31 | ON | ON | OFF | OFF | OFF | OFF | OFF | 91 | OFF | ON | OFF | OFF | ON | OFF | OFF |
| 32 | ON | OFF | ON | ON | ON | ON | ON | 92 | OFF | ON | OFF | OFF | OFF | ON | ON |
| 33 | ON | OFF | ON | ON | ON | ON | OFF | 93 | OFF | ON | OFF | OFF | OFF | ON | OFF |
| 34 | ON | OFF | ON | ON | ON | OFF | ON | 94 | OFF | ON | OFF | OFF | OFF | OFF | ON |
| 35 | ON | OFF | ON | ON | ON | OFF | OFF | 95 | OFF | ON | OFF | OFF | OFF | OFF | OFF |
| 36 | ON | OFF | ON | ON | OFF | ON | ON | 96 | OFF | OFF | ON | ON | ON | ON | ON |
| 37 | ON | OFF | ON | ON | OFF | ON | OFF | 97 | OFF | OFF | ON | ON | ON | ON | OFF |
| 38 | ON | OFF | ON | ON | OFF | OFF | ON | 98 | OFF | OFF | ON | ON | ON | OFF | ON |
| 39 | ON | OFF | ON | ON | OFF | OFF | OFF | 99 | OFF | OFF | ON | ON | ON | OFF | OFF |
| 40 | ON | OFF | ON | OFF | ON | ON | ON | 100 | OFF | OFF | ON | ON | OFF | ON | ON |
| 41 | ON | OFF | ON | OFF | ON | ON | OFF | 101 | OFF | OFF | ON | ON | OFF | ON | OFF |
| 42 | ON | OFF | ON | OFF | ON | OFF | ON | 102 | OFF | OFF | ON | ON | OFF | OFF | ON |
| 43 | ON | OFF | ON | OFF | ON | OFF | OFF | 103 | OFF | OFF | ON | ON | OFF | OFF | OFF |
| 44 | ON | OFF | ON | OFF | OFF | ON | ON | 104 | OFF | OFF | ON | OFF | ON | ON | ON |
| 45 | ON | OFF | ON | OFF | OFF | ON | OFF | 105 | OFF | OFF | ON | OFF | ON | ON | OFF |
| 46 | ON | OFF | ON | OFF | OFF | OFF | ON | 106 | OFF | OFF | ON | OFF | ON | OFF | ON |
| 47 | ON | OFF | ON | OFF | OFF | OFF | OFF | 107 | OFF | OFF | ON | OFF | ON | OFF | OFF |
| 48 | ON | OFF | OFF | ON | ON | ON | ON | 108 | OFF | OFF | ON | OFF | OFF | ON | ON |
| 49 | ON | OFF | OFF | ON | ON | ON | OFF | 109 | OFF | OFF | ON | OFF | OFF | ON | OFF |
| 50 | ON | OFF | OFF | ON | ON | OFF | ON | 110 | OFF | OFF | ON | OFF | OFF | OFF | ON |
| 51 | ON | OFF | OFF | ON | ON | OFF | OFF | 111 | OFF | OFF | ON | OFF | OFF | OFF | OFF |
| 52 | ON | OFF | OFF | ON | OFF | ON | ON | 112 | OFF | OFF | OFF | ON | ON | ON | ON |
| 53 | ON | OFF | OFF | ON | OFF | ON | OFF | 113 | OFF | OFF | OFF | ON | ON | ON | OFF |
| 54 | ON | OFF | OFF | ON | OFF | OFF | ON | 114 | OFF | OFF | OFF | ON | ON | OFF | ON |
| 55 | ON | OFF | OFF | ON | OFF | OFF | OFF | 115 | OFF | OFF | OFF | ON | ON | OFF | OFF |
| 56 | ON | OFF | OFF | OFF | ON | ON | ON | 116 | OFF | OFF | OFF | ON | OFF | ON | ON |
| 57 | ON | OFF | OFF | OFF | ON | ON | OFF | 117 | OFF | OFF | OFF | ON | OFF | ON | OFF |
| 58 | ON | OFF | OFF | OFF | ON | OFF | ON | 118 | OFF | OFF | OFF | ON | OFF | OFF | ON |
| 59 | ON | OFF | OFF | OFF | ON | OFF | OFF | 119 | OFF | OFF | OFF | ON | OFF | OFF | OFF |
| 60 | ON | OFF | OFF | OFF | OFF | ON | ON | | | | | | | | |

Internal Wiring

Overview

The SPS and RPS get their power from the Power Distribution Module (PDM). The PDM takes power directly from a dedicated AC line and the two backup batteries, and distributes power to each bay in the cabinet.

Power Distribution Module Connections

The power distribution module (PDM) connects to the SPS, RPS, or XPS in each bay. One PDM is used per back box. Use the instructions below to properly connect the PDM to each bay.

1. Route the Black and White AC power wires to the supplied ferrite bead. Loop the wires twice through the bead as shown below:

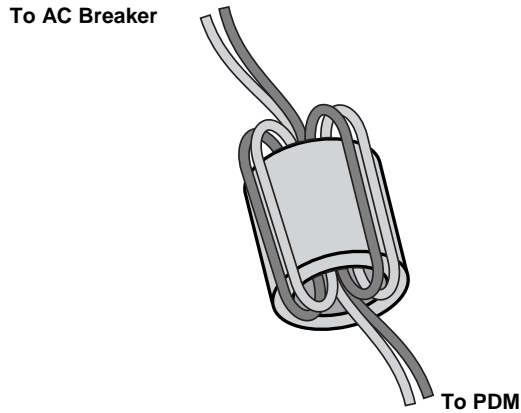


Figure 4. Wire Loops through Ferrite Bead

2. Wire 120/220/230/240 VAC to the PDM, keeping AC wires at least one inch away from all other wires. AC power must stay in the right side of the cabinet, in the non-power-limited area.
3. Connect batteries to P5 on the PDM using Harness 734-015.

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Internal Wiring, *Continued*

Power Distribution Module Connections

4. Connect the PDM to the SPS or RPS using Harness 734-012 (734-013 for 220/230/240VAC versions).
 - Feed Red and Black wires through the side rail to the front of the SPS or RPS to prevent wire damage when the front panel is inserted.
 - Connect the separate Red and Black wires (with Yellow female terminations) to plugs P5 (Black) and P4 (Red) on the SPS or RPS.
 - Connect the White and Black wires, which terminate together in a White snap-on connector, to the bulkhead connector at the bottom of the SPS or RPS assembly, as shown below.

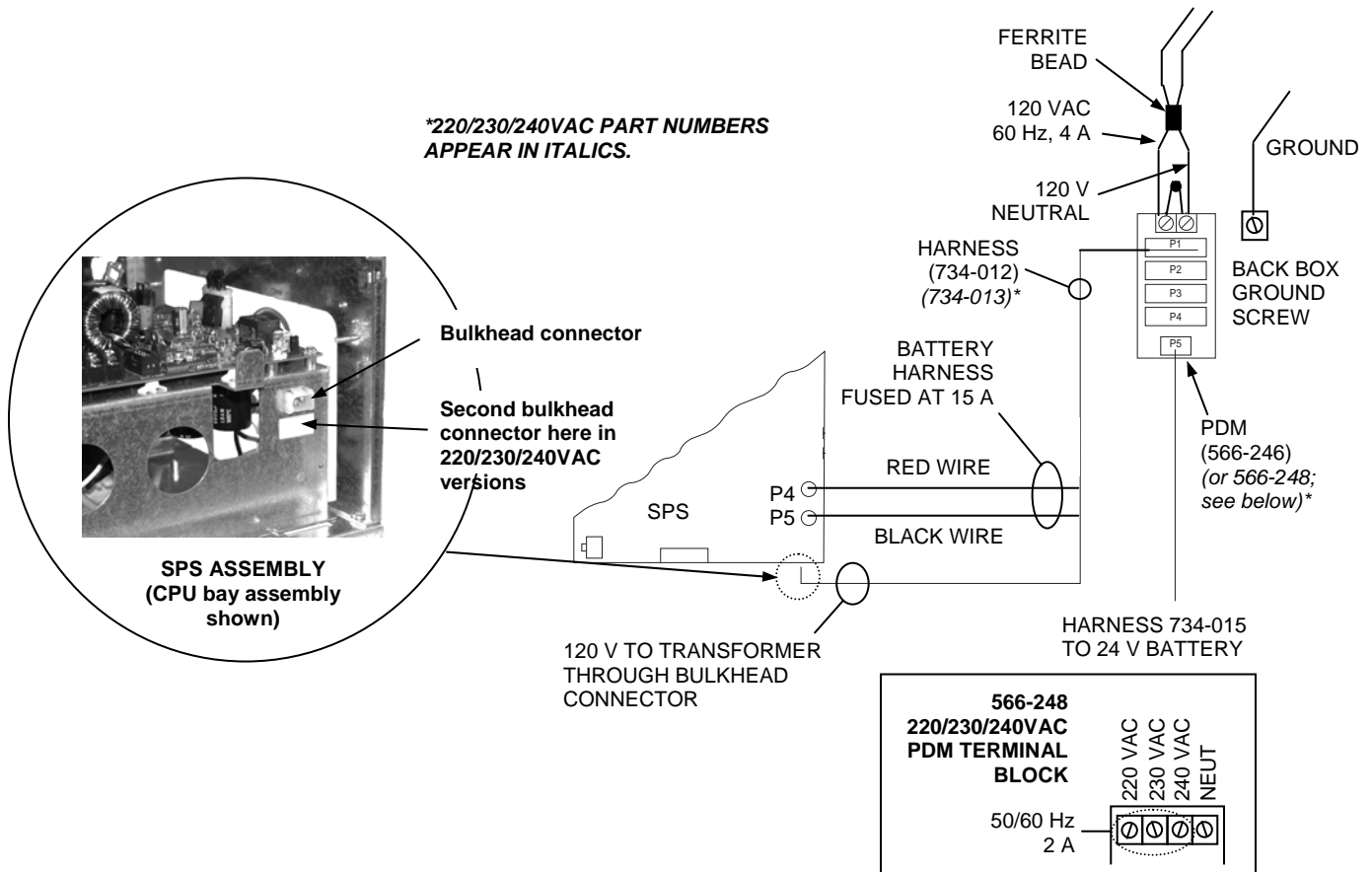


Figure 5. SPS Assembly Connector

NAC Field Wiring

Overview

The SPS and RPS provide three outputs for reverse-polarity notification appliance circuits. This section describes basic NAC wiring from the SPS and RPS to 4100-compatible appliances.

NAC Wiring Styles

The SPS and RPS supports both Class A and Class B NAC wiring. Class A wiring allows appliances to communicate with the SPS or RPS even in the event of an open circuit somewhere in the loop. Class A wiring requires that two wires are routed from the SPS/RPS to each appliance, and then back again to the SPS or RPS.

Class A NAC Wiring Table

The table below lists the maximum distances from the SPS or RPS to the last appliance in a Class A configuration, depending on wire gauge and current. Use this table to calculate wire distances for your application if you are using Class A wiring.

Table 5. Class A Wiring Distances

| Alarm Current @ 24 V | Max Distance w/ 18 AWG (0.8231 mm ²) | Max Distance w/ 16 AWG (1.309 mm ²) | Max Distance w/ 14 AWG (2.081 mm ²) | Max Distance w/ 12 AWG (3.309 mm ²) | DC Resistance |
|----------------------|--|---|---|---|---------------|
| 0.25 A | 420 ft. (128 m) | 667 ft. (203 m) | 1,063 ft. (324 m) | 1,691 ft. (515 m) | 6 Ohms |
| 0.50 A | 210 ft. (64 m) | 334 ft. (102 m) | 532 ft. (162 m) | 845 ft. (258 m) | 3 Ohms |
| 0.75 A | 140 ft. (43 m) | 222 ft. (68 m) | 354 ft. (108 m) | 564 ft. (172 m) | 2 Ohms |
| 1 A | 105 ft. (32 m) | 167 ft. (51 m) | 266 ft. (81 m) | 423 ft. (129 m) | 1.5 Ohms |
| 1.25 A | 84 ft. (26 m) | 133 ft. (41 m) | 213 ft. (65 m) | 338 ft. (103 m) | 1.2 Ohms |
| 1.50 A | 70 ft. (21 m) | 111 ft. (34 m) | 177 ft. (54 m) | 282 ft. (86 m) | 1 Ohm |
| 1.75 A | 60 ft. (18 m) | 95 ft. (29 m) | 152 ft. (46 m) | 242 ft. (74 m) | 0.86 Ohm |
| 2 A | 53 ft. (16 m) | 83 ft. (25 m) | 133 ft. (41 m) | 211 ft. (64 m) | 0.75 Ohm |
| 2.25 A | 47 ft. (14 m) | 74 ft. (23 m) | 118 ft. (36 m) | 188 ft. (57 m) | 0.67 Ohm |
| 2.50 A | 42 ft. (13 m) | 67 ft. (20 m) | 106 ft. (32 m) | 169 ft. (51 m) | 0.60 Ohm |
| 2.75 A | 38 ft. (12 m) | 61 ft. (19 m) | 97 ft. (30 m) | 154 ft. (47 m) | 0.55 Ohm |
| 3 A | 35 ft. (11 m) | 56 ft. (17 m) | 89 ft. (27 m) | 141 ft. (43 m) | 0.50 Ohm |

Notes:

- Max Distance = distance from SPS/RPS to last appliance.
- This table is calculated at 50 degrees Centigrade (120 degrees Fahrenheit). If you are installing in locations that could be exposed to higher temperatures, refer to National Electrical Code (NEC) Table 8.
- Distances are based on a 3V drop and take into account the worst-case panel output voltage.
- If Circuit Integrity (CI) cable is used instead of housing cable in a fire rated enclosure, reduce wiring distances by 38 feet (12 m) for every 10 feet (3 m) of potential fire exposure. The direct exposure of the CI cable to flames increases the resistance of the cable. Therefore, you must reduce the cable distance to account for the potential exposure of the CI cable to fire.
- If Wheelock appliances employing EZ Mount SNAP bases are used, reduce the wiring distance and wiring resistance by:
 - 12 gauge wire: 3.5 feet per appliance, 0.0125 Ohms per appliance
 - 14 gauge wire: 2.2 feet per appliance, 0.0125 Ohms per appliance
 - 16 gauge wire: 1.4 feet per appliance, 0.0125 Ohms per appliance
 - 18 gauge wire: 0.9 feet per appliance, 0.0125 Ohms per appliance

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NAC Field Wiring, *Continued*

Class B NAC Wiring Table

The table below lists the maximum distances from the SPS or RPS to the last appliance in a Class B configuration, depending on wire gauge and current. Use this table to calculate wire distances for your application if you are using Class B wiring.

Table 6. Class B Wiring Distances

| Alarm Current @ 24 V | Max Distance w/ 18 AWG (0.8231 mm ²) | Max Distance w/ 16 AWG (1.309 mm ²) | Max Distance w/ 14 AWG (2.081 mm ²) | Max Distance w/ 12 AWG (3.309 mm ²) | DC Resistance |
|-------------------------|--|---|---|---|------------------|
| 0.25 A | 840 ft. (256 m) | 1,335 ft. (407 m) | 2,126 ft. (648 m) | 3,382 ft. (1,031 m) | 12 Ohms |
| 0.50 A | 420 ft. (128 m) | 667 ft. (203 m) | 1,063 ft. (324 m) | 1,691 ft. (515 m) | 6 Ohms |
| 0.75 A | 280 ft. (85 m) | 445 ft. (136 m) | 709 ft. (216 m) | 1,127 ft. (344 m) | 4 Ohms |
| 1 A | 210 ft. (64 m) | 334 ft. (102 m) | 532 ft. (162 m) | 845 ft. (258 m) | 3 Ohms |
| 1.25 A | 168 ft. (51 m) | 267 ft. (81 m) | 425 ft. (130 m) | 676 ft. (206 m) | 2.4 Ohms |
| 1.50 A | 140 ft. (43 m) | 222 ft. (68 m) | 354 ft. (108 m) | 564 ft. (172 m) | 2 Ohms |
| 1.75 A | 120 ft. (37 m) | 191 ft. (58 m) | 304 ft. (93 m) | 483 ft. (147 m) | 1.71 Ohms |
| 2 A | 105 ft. (32 m) | 167 ft. (51 m) | 266 ft. (81 m) | 423 ft. (129 m) | 1.5 Ohms |
| 2.25 A | 93 ft. (28 m) | 148 ft. (45 m) | 236 ft. (72 m) | 376 ft. (115 m) | 1.33 Ohms |
| 2.50 A | 84 ft. (26 m) | 133 ft. (41 m) | 213 ft. (65 m) | 338 ft. (103 m) | 1.2 Ohms |
| 2.75 A | 76 ft. (23 m) | 121 ft. (37 m) | 193 ft. (59 m) | 307 ft. (94 m) | 1.09 Ohms |
| 3 A | 70 ft. (21 m) | 111 ft. (34 m) | 177 ft. (54 m) | 282 ft. (86 m) | 1 Ohm |

Notes:

- Max Distance = distance from SPS or RPS to last appliance.
- This table is calculated at 50 degrees Centigrade (120 degrees Fahrenheit). If you are installing in locations that could be exposed to higher temperatures, refer to NEC Table 8.
- Distances are based on a 3 V drop, and take into account the worst-case panel output voltage.
- If Circuit Integrity (CI) cable is used instead of housing cable in a fire rated enclosure, reduce wiring distances by 38 feet (12 m) for every 10 feet (3 m) of potential fire exposure. The direct exposure of the CI cable to flames increases the resistance of the cable. Therefore, you must reduce the cable distance to account for the potential exposure of the CI cable to fire.

Continued on next page

NAC Field Wiring, *Continued*

Guidelines

- All wiring is 18 AWG (0.8231 mm²) (minimum) to 12 AWG (3.309 mm²) (maximum).
- All wiring is supervised and power-limited.
- The maximum alarm current is 3 A per circuit. The supervisory current is 2.03 mA at 24 VDC.
- The nominal voltage rating is 24 VDC, 2 V p-p ripple (maximum).
- The total available current from the SPS or RPS is 9 A unless it is used for regulated 24 VDC notification appliances, where the SPS/RPS is rated for 4 Amps notification current and 1Amp for other uses. Total auxiliary power current is 5 A (1 Amp for regulated 24 VDC), and rated at 2 A per circuit. Any current used for card power by modules plugged into the PDI, as well as any auxiliary 24 VDC current, must be deducted from the total available current.

All wiring that leaves the building requires overvoltage protection. Install module 2081-9044 (3 A) or 2081-9028 (1/4 A) inside a UL-Listed electrical box wherever wire enters or exits the building. When using the 2081-9044, the maximum alarm current is reduced to 1/4 A for that part of the circuit downstream of the module. Refer to 574-805 for installation instructions of 2081-9028 modules or to 574-832 for installation instructions of 2081-9044 modules.

- Terminal designations “+” and “-” are for the alarm state.
- A maximum of 70 appliances can be supported per circuit.
- For CE systems, use ferrite beads as shown in each figure. 4100-5129 includes three ferrite beads, order as needed. Loop wires once through the ferrite bead(s) as shown below:



Figure 6. Loop through Ferrite Bead

- If Wheelock appliances employing EZ Mount SNAP bases are used, reduce the wiring distance and wiring resistance by:
 - 12 gauge wire: 7 feet per appliance, 0.025 Ohms per appliance
 - 14 gauge wire: 4.4 feet per appliance, 0.025 Ohms per appliance
 - 16 gauge wire: 2.8 feet per appliance, 0.025 Ohms per appliance
 - 18 gauge wire: 1.8 feet per appliance, 0.025 Ohms per appliance

Continued on next page

NAC Field Wiring, *Continued*

Guidelines

- Compatible appliances for NACs are shown in Table 7:

Table 7. Compatible Appliances and Accessories (for Special Application NACs)

| P/N | Description | P/N | Description | P/N | Description |
|-----------|--------------------------------|-----------|---------------------------------|-----------|----------------------------|
| 4904-9168 | V/O 15CD RED FREE-RUN TNA | 4906-9102 | V/O 15/30/75/110cd C/M RED TNA | 4903-9253 | A/V 24VDC 30CD RED HOR F/S |
| 4904-9171 | V/O 15CD WHITE FREE-RUN TNA | 4906-9103 | V/O 15/30/75/110cd W/M WHT TNA | 4903-9254 | A/V 24V 110CD RED HOR F/S |
| 4904-9176 | V/O 24VDC 15CD RED VER F/S | 4906-9104 | V/O 15/30/75/110cd C/M WHT TNA | 4903-9255 | A/V 24VDC 15CD RED VER F/S |
| 4904-9177 | V/O 24VDC 15CD WHT VER F/S | 4903-9356 | S/V 15CD RED 25/70V TNA | 4903-9256 | A/V 24V 110CD RED VER F/S |
| 4904-9178 | V/O 24VDC 15CD RED HORIZ F/S | 4903-9359 | S/V 15CD WHITE 25/70V TNA | 4903-9257 | A/V 24VDC 15CD WHT HOR F/S |
| 4904-9183 | V/O 24VDC 15CD RED CEIL F/S | 4903-9150 | S/V 24VDC 15CD RED HORIZ F/S | 4903-9258 | A/V 24VDC 30CD WHT HOR F/S |
| 4904-9331 | V/O 15CD RED SYNC TNA | 4903-9153 | S/V 24VDC 15CD RED VER F/S | 4903-9417 | A/V 15CD RED SYNC TNA |
| 4904-9342 | V/O 15CD WHITE SYNC TNA | 4903-9193 | S/V 24VDC 15CD WHT HORIZ F/S | 4903-9418 | A/V 75CD RED SYNC TNA |
| 4904-9345 | V/O 24VDC 15CD WHT PLAIN F/S | 4903-9196 | S/V 15CD RND | 4903-9419 | A/V 110CD RED SYNC TNA |
| 4904-9174 | V/O 24VDC 30CD RED VER F/S | 4903-9148 | S/V 24VDC 30CD RED HORIZ F/S | 4903-9425 | A/V 15CD RED STD TNA |
| 4904-9180 | V/O 24VDC 30CD RED HORIZ F/S | 4903-9194 | S/V 24VDC 30CD WHT HORIZ F/S | 4903-9426 | A/V 75CD RED STD TNA |
| 4904-9184 | V/O 24VDC 30CD RED CEIL F/S | 4903-9197 | S/V, 30CD, RND TNA | 4903-9427 | A/V 110CD RED STD TNA |
| 4904-9346 | V/O 24VDC 30CD WHT PLAIN F/S | 4903-9357 | S/V 75CD RED 25/70V TNA | 4903-9428 | A/V 15CD WHITE SYNC TNA |
| 4904-9169 | V/O 75CD RED FREE-RUN TNA | 4903-9360 | S/V 75CD WHITE 25/70V TNA | 4903-9429 | A/V 75CD WHITE SYNC TNA |
| 4904-9172 | V/O 75CD WHITE FREE-RUN TNA | 4903-9358 | S/V 110CD RED 25/70V TNA | 4903-9430 | A/V 110CD WHITE SYNC TNA |
| 4904-9332 | V/O 75CD RED SYNC TNA | 4903-9361 | S/V 110CD WHITE 25/70V TNA | 4903-9431 | A/V 15CD WHITE STD TNA |
| 4904-9343 | V/O 75CD WHITE SYNC TNA | 4903-9198 | S/V 110CD, RND TNA | 4903-9432 | A/V 75CD WHITE STD TNA |
| 4904-9170 | V/O 110CD RED FREE-RUN TNA | 4906-9151 | S/V 15/30/75/110cd W/M RED TNA | 4903-9433 | A/V 110CD WHITE STD TNA |
| 4904-9173 | V/O 110CD WHITE FREE-RUN TNA | 4906-9153 | S/V 15/30/75/110cd W/M WHT TNA | 4906-9127 | A/V 15/30/75/110cd W/M RED |
| 4904-9175 | V/O 24VDC 110CD RED VER F/S | 4906-9154 | S/V 15/30/75/110cd C/M WHT TNA | 4906-9129 | A/V 15/30/75/110cd W/M WHT |
| 4904-9181 | V/O 24VDC 110CD WHT VER F/S | 4901-9820 | HORN 24VDC RED TNA | 4906-9128 | A/V 15/30/75/110cd C/M RED |
| 4904-9182 | V/O 24VDC 110CD RED HOR F/S | 4901-9822 | HORN 24VDC RED | 4906-9130 | A/V 15/30/75/110cd C/M WHT |
| 4904-9185 | V/O 24VDC 110CD RED CEIL F/S | 4009-9201 | NAC EXTENDER 120VAC, IDNET | 4905-9815 | SMARTSYNC ADAPTER, TNA |
| 4904-9333 | V/O 110CD RED SYNC TNA | 4009-9301 | NAC EXTENDER, 240VAC, IDNET | 4905-9938 | SMARTSYNC CTL MODULE |
| 4904-9344 | V/O 110CD WHITE SYNC TNA | 4009-9401 | 4009 T/A ADDR CONTROLLER | 4090-9005 | SRP |
| 4906-9101 | V/O 15/30/75/110cd W/M RED TNA | 4903-9252 | A/V 24VDC 15CD RED HOR F/S | 4090-9006 | SRP w/ENCLOSURE |
| 4906-9105 | V/O Weatherproof W/M, RED | 4906-9113 | V/O Weatherproof W/M, (Can) RED | 4906-9132 | A/V Weatherproof, W/M, WHT |
| 4906-9106 | V/O Weatherproof W/M, WHT | 4906-9131 | A/V Weatherproof, W/M, RED | 4906-9143 | A/V Weatherproof, W/M, RED |
| 4906-9109 | HiCandela W/M V/O, RED | 4906-9139 | HiCandela W/M A/V, RED | 4906-9140 | HiCandela C/M A/V, RED |
| 4906-9111 | HiCandela W/M V/O, WHITE | 4906-9141 | HiCandela W/M A/V, WHITE | 4906-9142 | HiCandela C/M A/V, WHITE |
| 4906-9110 | HiCandela C/M V/O, WHITE | 4906-9112 | HiCandela C/M V/O, RED | | |

Continued on next page

NAC Field Wiring, *Continued*

Table 8. COOPER WHELOCK APPLIANCES
(Compatible with 4100U/4100ES SPS/RPS Wheelock Protocol for Special Applications)

| SYNCHRONIZING HORN STROBES | |
|-----------------------------------|---|
| AS-241575W | AS Series Horn Strobe. 24V, 15/75Cd, Wall Mount |
| AS-24MCW | AS Series Horn Strobe. 24V, Multi-Cd, Wall Mount |
| AS-24MCC | AS Series Horn Strobe. 24V, Multi-Cd, Ceiling Mount |
| AS-24MCWH | AS Series Horn Strobe. 24V, Multi-High-Cd, Wall Mount |
| AS-24MCCH | AS Series Horn Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| ASWP-2475W, | AS Series WP Horn Strobe. 24V, 30Cd, Wall or Ceiling Mount |
| ASWP-24MCWH | AS Series WP Horn Strobe. 24V, Multi-High-Cd, Wall Mount |
| ASWP-24MCCH | AS Series WP Horn Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| ASA-24MCW, ASB-24MCW | AS Series Horn Strobe. 24V, Multi-Cd, Wall Mount. Amber/Blue |
| ASA-24MCC, ASB-24MCC | AS Series Horn Strobe. 24V, Multi-Cd, Ceiling Mount. Amber/Blue |
| HSR | HN STR, Red, 2-wire, Wall, 12/24V, 3dB, 8CD, 5 Mount |
| HSW | HN STR, White, 2-wire, Wall, 12/24V, 3dB, 8CD, 5 Mount |
| HSRS | HN STR, Silver Red, 2-wire, Wall, 12/24V, 3dB, 8CD, 5 Mount |
| HSWS | HN STR, Silver White, 2-wire, Wall, 12/24V, 3dB, 8CD, 5 Mount |
| HSRC | HN STR, Red, 2-wire, Ceiling Mount, 12/24V, 3dB, 8 Cd, 5 Mount |
| HSWC | HN STR, White, 2-wire, Ceiling Mount, 12/24V, 3dB, 8 Cd, 5 Mount |
| HSRCS | HN STR, Silver red, 2-wire, Ceiling Mount, 12/24V, 3dB, 8 Cd, 5 Mount |
| HSWCS | HN STR, Silver white, 2-wire, Ceiling Mount, 12/24V, 3dB, 8 Cd, 5 Mount |
| HS4-241575W | HS4 Series Horn Strobe. 24V, 15/75Cd, Wall Mount |
| HS4-24MCW | HS4 Series Horn Strobe. 24V, Multi-Cd, Wall Mount |
| HS4-24MCWH | HS4 Series Horn Strobe. 24V, Multi-High-Cd, Wall Mount |
| HS4-24MCC | HS4 Series Horn Strobe. 24V, Multi-Cd, Ceiling Mount |
| NS-241575W | NS Series Horn Strobe. 24V, 15/75Cd, Wall Mount |
| NS-24MCW | NS Series Horn Strobe. 24V, Multi-Cd, Wall Mount |
| NS-24MCC | NS Series Horn Strobe. 24V, Multi-Cd, Ceiling Mount |
| NS-24MCCH | NS Series Horn Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| ZNS-MCW | ZNS Series Horn Strobe. 24V, Multi-Cd, Wall Mount |
| ZNS-MCWH | ZNS Series Horn Strobe. 24V, Multi-High-Cd, Wall Mount |
| ZNS-24MCC | ZNS Series Horn Strobe. 24V, Multi-Cd, Ceiling Mount |
| ZNS-24MCCH | ZNS Series Horn Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| SYNCHRONIZING STROBES | |
| RSS-241575W | RSS Series Strobe. 24V, 15/75Cd, Wall Mount |
| RSSP-241575W | RSSP Series Strobe. 12V or 24V, 15/75Cd, Wall Mount |
| RSS-24MCW, RSSP-24MCW | RSS/RSSP Series Strobe. 24V, Multi-Cd, Wall Mount |
| RSS-24MCWH, RSSP-24MCWH | RSS/RSSP Series Strobe. 24V, Multi-High-Cd, Wall Mount |
| RSS-24MCC, RSS-24MCCR | RSS Series Strobe. 24V, Multi-Cd, Ceiling Mount (R=Round) |
| RSS-24MCCH, RSS-24MCCHR | RSS Series Strobe. 24V, Multi-High-Cd, Ceiling Mount (R=Round) |
| RSSR-2415W, RSSR-2415C | RSS Series Strobe. 24V, 15Cd, Red, Wall or Ceiling Mount |
| RSSR-2475W, RSSR-2475C | RSS Series Strobe. 24V, 75Cd, Red, Wall or Ceiling Mount |
| RSSR-24110C | RSS Series Strobe. 24V, 110Cd, Red, Ceiling Mount |
| RSSA-24110W, RSSB-24110W, | |
| RSSG-24110W, RSSR-24110W | RSS Series Strobe. 24V, 110Cd, Wall Mount. Amber/Blue/Green/Red. |
| RSSA-24MCC, RSSB-24MCC, | |
| RSSG-24MCC, RSSR-24MCC | RSS Series Strobe. 24V, Multi-Cd, Ceiling Mount. Amber/Blue/Green/Red. |
| RSSA-24MCCH, RSSB-24MCCH, | |
| RSSG-24MCCH, RSSR-24MCCH | RSS Series Strobe. 24V, Multi-High-Cd, Ceiling Mount. Amber/Blue/Green/Red. |
| RSSPA-24MCC | RSSP Series Strobe. 24V, Multi-Cd, Ceiling Mount. Amber |

NAC Field Wiring, *Continued*

Table 8. COOPER WHEELOCK APPLIANCES
(Compatible with 4100U/4100ES SPS/RPS Wheelock Protocol for Special Applications)

| | |
|---|---|
| RSSWPA-2475W | RSS Series WP Strobe. 24V, Wall Mount. Amber |
| RSSWPA-24MCCH, | |
| RSSWPB-24MCCH, | |
| RSSWPG-24MCCH, | |
| RSSWPR-24MCCH | RSS Series WP Strobe. 24V, Multi-High-Cd, Ceiling Mount.Amber/Blue/Green/Red. |
| RSSWP-2475W, RSSWP-2475C | RSS Series WP Strobe. 24V, 30Cd, Wall or Ceiling Mount |
| RSSWP-24MCWH | RSS Series WP Strobe. 24V, Multi-High-Cd, Wall Mount |
| RSSWP-24MCCH | RSS Series WP Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| STR | STR, red, 2-wire, Wall, 12/24V, 8CD, 5 Mount |
| STW | STR, white, 2-wire, Wall, 12/24V, 8CD, 5 Mount |
| STRS | STR, silver red, 2-wire, Wall, 12/24V, 8CD, 5 Mount |
| STWS | STR, silver white, 2-wire,Wall, 12/24V, 8CD, 5 Mount |
| STRC | STR, Red, 2-wire, Ceiling Mount, 12/24V, 8 Cd, 5 Mount |
| STWC | STR, White, 2-wire, Ceiling Mount, 12/24V, 8 Cd, 5 Mount |
| STRCS | STR, Silver red, 2-wire, Ceiling Mount, 12/24V, 8 Cd, 5 Mount |
| STWCS | STR, Silver white, 2-wire, Ceiling Mount, 12/24V, 8 Cd, 5 Mount |
| ZRS-MCW | ZRS Series Strobe. 24V, Multi-Cd, Wall Mount |
| ZRS-MCWH | ZRS Series Strobe. 24V, Multi-High-Cd, Wall Mount |
| ZRS-24MCC | ZRS Series Strobe. 24V, Multi-Cd, Ceiling Mount |
| ZRS-24MCCH | ZRS Series Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| APPLIANCES WITH SYNCHRONIZING STROBES | |
| (Only Strobe portion compatible with 4008 Wheelock Protocol for Special Applications) | |
| | |
| AMT-241575W,AMT-241575W-NYC | AMT Series Multi-Tone Horn Strobe. 24V, 15/75Cd, Wall Mount |
| AMT-24MCW | AMT Series Multi-Tone Horn Strobe. 24V, Multi-Cd, Wall Mount |
| MT-241575W | MT Series MT Horn Strobe. 24V, 15/75Cd, Wall Mount. |
| MT-24MCW | MT Series Multi-Tone Horn Strobe. 24V, Multi-Cd, Wall Mount |
| MTWP-2475W,MTWP-2475C | MTWP Series MT Horn Strobe. 24V, 30Cd, Wall or Ceiling Mount |
| MTWP-24MCWH | MTWP Series MT Horn Strobe. 24V, Multi-High-Cd, Wall Mount |
| MTWP-24MCCH | MTWP Series MT Horn Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| MTWPA-2475W,MTWPB-2475W | |
| MTWPG-2475W,MTWPR-2475W | MTWP Series Multi-Tone Horn Strobe. 24V, Wall Mount. |
| Amber/Blue/Green/Red | |
| MTA-24MCCH,MTB-24MCCH, | |
| MTG-24MCCH,MTR-24MCCH | MT Series Multi-Tone Horn Strobe. 24V, Multi-High-Cd, Wall Mount |
| Amber/Blue/Green/Red | |
| MTWPA-24MCCH, | |
| MTWPB-24MCCH, | |
| MTWPG-24MCCH, | |
| MTWPR-24MCCH | MTWP Series Multi-Tone Horn Strobe. 24V, Multi-High-Cd, Wall Mount.Amber/Blue/Green/Red |
| ET70WP-2475W,ET70WP-2475C | ET70WP Series Speaker Strobe. 24V, 30Cd, Wall or Ceiling Mount |
| ET70WP-24185W | ET70WP Series Speaker Strobe. 24V, 185Cd, Wall Mount |
| ET70WP-24177C | ET70WP Series Speaker Strobe. 24V, 177Cd, Ceiling Mount |
| ET70WPA-2475 | ET70WP Series Speaker Strobe. 24V, Wall or Ceiling Mt. Amber |
| CH70-241575W | CH70 Series Chime Strobe. 24V, 15/75Cd, Wall Mount |
| CH70-24MCW | CH70 Series Chime Strobe. 24V, Multi-Cd, Wall Mount |
| CH90-24MCC | CH90 Series Chime Strobe. 24V, Multi-Cd, Ceiling Mount |
| CH70-24MCWH | CH70 Series Chime Strobe. 24V, Multi-High-Cd, Wall Mount |

NAC Field Wiring, *Continued*

Table 8. COOPER WHELOCK APPLIANCES
(Compatible with 4100U/4100ES SPS/RPS Wheelock Protocol for Special Applications)

| | |
|-----------------------------|--|
| CH90-24MCCH | CH90 Series Chime Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| E50-241575W | E50 Series Speaker Strobe. 24V, 15/75Cd, Wall Mount |
| E50-24MCW | E50 Series Speaker Strobe. 24V, Multi-Cd, Wall Mount |
| E50-24MCWH | E50 Series Speaker Strobe. 24V, Multi-High-Cd, Wall Mount |
| E50A-24MCC,E50B-24MCC | E50 Series Speaker Strobe. 24V, Multi-Cd, Ceiling Mt. Amber/Blue |
| E60-24MCW | E60 Series Speaker Strobe. 24V, Multi-Cd, Wall Mount |
| E60-24MCWH | E60 Series Speaker Strobe. 24V, Multi-High-Cd, Wall Mount |
| E60-24MCC | E60 Series Speaker Strobe. 24V, Multi-Cd, Ceiling Mount |
| E60-24MCCH | E60 Series Speaker Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| E70-241575W | E70 Series Speaker Strobe. 24V, 15/75Cd, Wall Mount |
| E70-24MCW | E70 Series Speaker Strobe. 24V, Multi-Cd, Wall Mount |
| E70-24MCWH | E70 Series Speaker Strobe. 24V, Multi-High-Cd, Wall Mount |
| E70-24MCC,E90-24MCC | E70/E90 Series Speaker Strobe. 24V, Multi-Cd, Ceiling Mount |
| E90-24MCCH | E90 Series Speaker Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| E60A-24MCC,E70A-24MCC, | |
| E70B-24MCC,E90A-24MCC, | |
| E90B-24MCC | E60/E70/E90 Series Speaker Strobe. 24V, Multi-Cd, Ceiling Mount.Amber/Blue |
| ET70-241575W,ET90-241575W | ET70/ET90 Series Speaker Strobe. 24V, 15/75Cd, Wall Mount |
| ET70-24MCW | ET70 Series Speaker Strobe. 24V, Multi-Cd, Wall Mount |
| ET70-24MCWH | ET70 Series Speaker Strobe. 24V, Multi-High-Cd, Wall Mount |
| ET70-24MCC,ET90-24MCC | ET70/ET90 Series Speaker Strobe. 24V, Multi-Cd, Ceiling Mount |
| ET70WPG-2475,ET70WPG-2475, | |
| ET70WPG-2475,ET70WPB-2475W, | |
| ET70WPG-2475W,ET70WPR-2475W | ET70WP Series Speaker Strobe. 24V, Wall or Ceiling Mt. Green, Blue, Red |
| ET90-24MCCH | ET90 Series Speaker Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| ET80-241575W | ET80 Series Speaker Strobe. 24V, 15/75Cd, Wall Mount |
| ET80-24MCW | ET80 Series Speaker Strobe. 24V, Multi-Cd, Wall Mount |
| ET80-24MCWH | ET80 Series Speaker Strobe. 24V, Multi-High-Cd, Wall Mount |
| S8-24MCC | S8 Series Speaker Strobe. 24V, Multi-Cd, Ceiling Mount |
| S8-24MCCH | S8 Series Speaker Strobe. 24V, Multi-High-Cd, Ceiling Mount |
| SA-S70-24MCW | SA-S70 Series Amp-Speaker Strobe. 24V, Multi-Cd, Wall Mount |
| SA-S90-24MCC | SA-S90 Series Amp-Speaker Strobe. 24V, Multi-Cd, Ceiling Mount |
| | |
| SYNCHRONIZING HORNS | |
| AH-24 | AH Series Horn. 24V |
| AH-24WP | AH Series Weatherproof Horn. 12V or 24V |
| HNR | Horn, red, 2-wire, Wall, 12/24V, 3dB, 5 Mount |
| HNW | Horn, white, 2-wire, Wall, 12/24V, 3dB, 5 Mount |
| HNRS | Horn, silver red, 2-wire, Wall, 12/24V, 3dB, 5 Mount |
| HNWS | Horn, silver white, 2-wire, Wall, 12/24V, 3dB, 5 Mount |
| HS-24 | HS Series Horn. 24V |
| HNRC | Horn, Red, 2-wire, Ceiling Mount, 12/24V, 3dB, 5 Mount |
| HNWC | Horn, White, 2-wire, Ceiling Mount, 12/24V, 3dB, 5 Mount |
| HNRCs | Horn, Silver red, 2-wire, Ceiling Mount, 12/24V, 3dB, 5 Mount |
| HNWCS | Horn, Silver white, 2-wire, Ceiling Mount, 12/24V, 3dB, 5 Mount |
| MIZ-24S | MIZ Series Horn. 24V |
| NH-12/24, NH-12/24R | NH Series Horn. 12/24V (R=Round) |
| ZNH | ZNH Series Horn. 12/24V |

NAC Field Wiring, *Continued*

Table 8. COOPER WHEELOCK APPLIANCES
(Compatible with 4100U/4100ES SPS/RPS Wheelock Protocol for Special Applications)

| | |
|-------------------------------------|--|
| | |
| CODED AUDIBLE APPLIANCES | |
| AMT-12/24, AMT-12/24-NYC | AMT Series, Multi-tone horn, 12/24V, Wall or Ceiling Mount |
| CH70, CH90 | CH70/CH90 Series chime, 24V, Wall or Ceiling Mount |
| CSX10-24-DC, CSXG10-24-DC | CSX SeriesBell, 24V, Wall Mount |
| MT-12/24, MT4-12/24 | MT Series Multi-tone horn, 12/24V, Wall or Ceiling Mount |
| | |
| NON-SYNCHRONIZING APPLIANCES | |
| MB-G6-24, MB-G10-24 | MB SeriesBell, 24V, Wall Mount |

NAC Field Wiring, *Continued*

Guidelines

The Notification Appliance Circuits on the SPS or RPS are rated for Special Application and for regulated 24Vdc operation per UL864, 9th Edition.

When used with the Notification Appliances listed in Table 7 or Table 8, each NAC is rated for 3A, and total SPS capacity is rated at 9A. This rating is the UL864 Special Application rating. Appliances listed in Table 7 and in Table 8 are synchronized per UL864, between all NACs on the SPS, and any NACs on an SPS, RPS or XPS within the same 4100U/4100ES system. This does not apply if appliances are mixed from both tables. Appliances from Table 7 will be 1/2 second out of audible sync with appliances from table 8 in the same system. All appliances any given SPS, RPS or XPS must be from either Table 7 or Table 8, mixing of appliances from both tables is not possible within a power supply.

For use with Notification Appliances not listed in Table 7 or Table 8, each circuit is rated for 2A maximum, with a total Notification Appliance load of 4A per SPS. This rating is the UL 864 Regulated 24Vdc rating. Synchronization of strobes and other appliances requires use of the associated, Listed, compatible Synchronization Module. Consult supplier of Notification Appliances for synchronization limits and details.

Non-pulsing, linear-type Notification Appliances, such as horns or bells may be used up to the full rating (3A for each NAC, 9A total for the SPS).

NAC Field Wiring, *Continued*

Class A NAC Wiring

To connect the RPS or SPS to reverse-polarity, non-addressable notification appliances using Class A wiring, read the following instructions and refer to the figure below.

1. Route wire (between 12 [3.309 mm²] and 18 AWG [0.8231 mm²]) from the “B+” and “B-” outputs on TB2 of the SPS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, or NAC3.
2. Route wire from the first appliance to the next one. Repeat for each appliance.
3. Route wire from the last appliance to the A+ and A- inputs on the same NAC circuit of TB1 of the SPS or RPS.
4. Repeat Steps 1 through 3 for each NAC output you want to use.
5. Leave the factory-installed 10 K, 1/2 W, brown/black/orange resistor on each unused circuit. The circuit must connect “B+” to “B-” terminals. No external end-of-line resistor is needed for circuits in use.

IMPORTANT: Conductors must test free of all grounds.

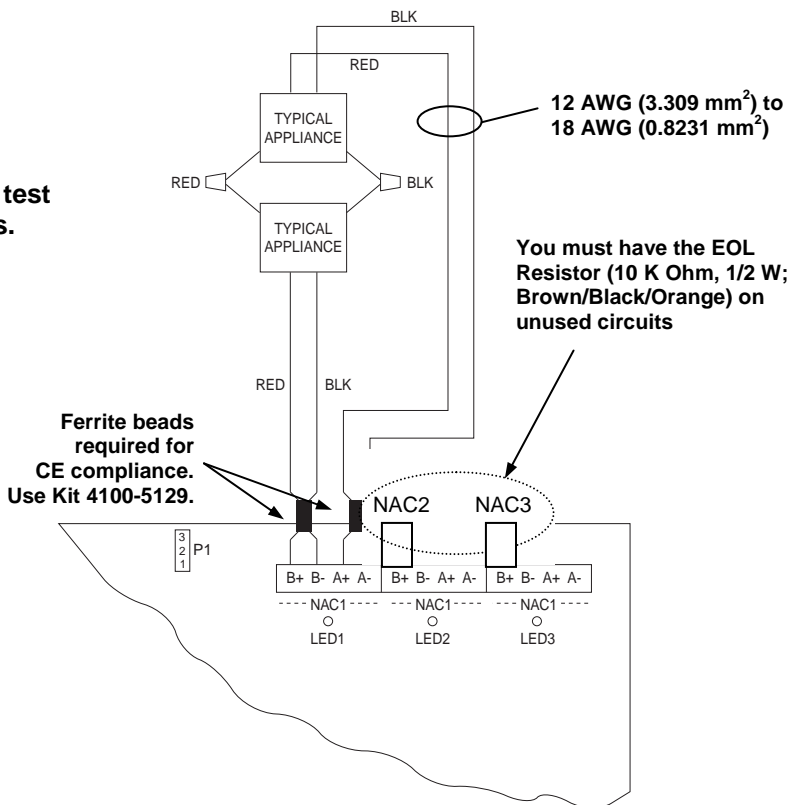


Figure 7. Class A NAC Wiring

Continued on next page

NAC Field Wiring, *Continued*

Class B NAC Wiring

To connect the SPS to appliances using Class B wiring, read the following instructions and refer to the figure below.

1. Route wire (between 12 [3.309 mm²] and 18 AWG [0.8231 mm²]) from the “B+” and “B-” outputs on TB2 of the SPS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, or NAC3.
2. Route wire from the first appliance to the next one. **“T” tapping is not allowed.** Repeat for each appliance.
3. Route wire from the last appliance to the EOLR harness (10K ohm, 1/2W: P/N 733-894, PID# 4081-9008).
4. Repeat Steps 1 through 3 for each NAC output you want to use.
5. Leave the factory-installed 10 K, 1/2 W, brown/black/orange resistor on each unused circuit. The circuit must connect “B+” to “B-” terminals.

The illustration below shows Class B wiring.

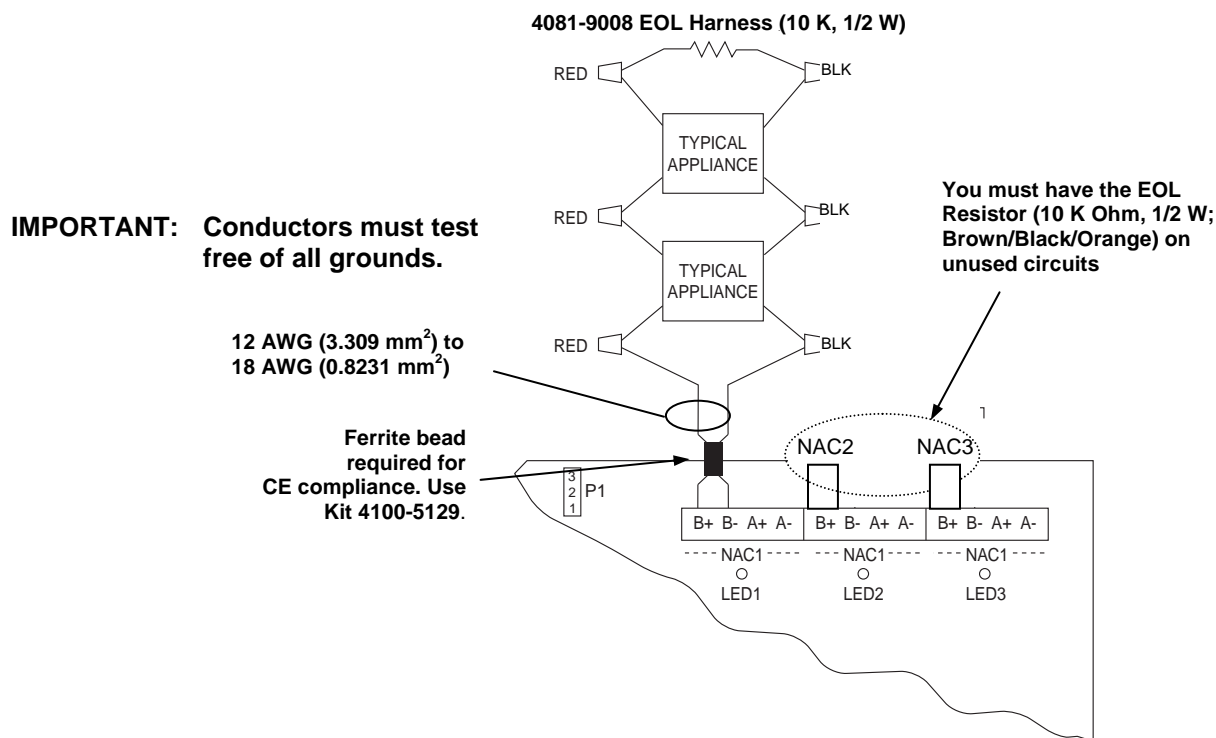


Figure 8. Class B Wiring

Notes:

- Notification appliances are rated per individual nameplate label.
- Maintain correct polarity on terminal connections. Do not loop wires under terminals.

IDNet Field Wiring (SPS only)

Overview

Much of the field wiring on any system is routed from the SPS to remote devices and appliances. Which inputs on the SPS are used depends on the type of communications being used. This section describes how the SPS connects to IDNet initiating devices. The RPS does not support IDNet circuits.

General Information

Up to 250 IDNet initiating devices are supported on the SPS IDNet channel. The SPS supports both Class A and Class B wiring.

Class A wiring allows IDNet appliances to communicate with the SPS even in the event of an open circuit somewhere in the loop. Class A wiring requires that two wires are routed from the SPS to each IDNet appliance, and then back again to the SPS.

Class B wiring allows “T” tapping, and therefore requires less wiring distance per installation than Class A. Additionally, Class B wiring does not require end-of-line resistors, because each IDNet appliance communicates directly to the SPS.

Guidelines

Review these guidelines before wiring the SPS for IDNet.

- All wiring is 18 AWG (0.8231 mm²) (minimum) to 12 AWG (3.309 mm²) (maximum).
- All wiring is supervised and power-limited.
- IDNet communications power is 36.25 V (maximum) at 0.5 A, 3333 BPS.
- All wiring that leaves the building requires overvoltage protection. Install module 2081-9044 (3 A) or 2081-9028 (1/4 A) inside a UL-Listed electrical box wherever wire enters or exits the building. A maximum of four 2081-9044 Modules may be connected to one channel. When using the 2081-9044, the maximum alarm current is reduced to 1/4 A for that part of the circuit downstream of the module. Refer to 574-805 for installation instructions of 2081-9028 modules or to 574-832 for installation instructions of 2081-9044 modules.
- For Style 4 operation:
 - The maximum distance
 - “T” taps are allowed.
 - Maximum allowed line-to-line capacitance (“+” to “-” terminals) is 0.58 μF to any device is 2,500 feet (762 m). For applications with shielded wire, ensure that the total capacitance from line to line plus the shield to either line is less than 0.58 μF (reduce the cable length if capacitance exceeds 0.58 μF).
 - Maximum allowable wire load is 10,000 feet total or 0.58 μF line-to-line capacitance. Maximum distance to any device is 2500 ft (126-250 devices) or 4000 feet (up to 125 devices).
- For Style 6, the maximum loop distance is 2,500 feet (762 m). “T” taps are not allowed.
- Use the supplied ferrite beads as shown in each figure. Loop wires once through the supplied ferrite bead(s) as shown below:



Figure 9. The Ferrite Bead for IDNet Circuits

Continued on next page

IDNet Field Wiring (SPS only), *Continued*

Class A Wiring

To connect the SPS to IDNet appliances using Class A wiring, read the following instructions.

1. Route wire (between 12 [3.309 mm²] and 18 AWG [0.8231 mm²]) from the B+, B-, and SHIELD outputs on TB1 of the SPS to the appropriate inputs on a peripheral IDNet appliance.
2. Route wire from the first IDNet appliance to the next one. Repeat for each appliance.
3. Route wire from the last IDNet appliance to the A+ and A- inputs on TB1 of the SPS.

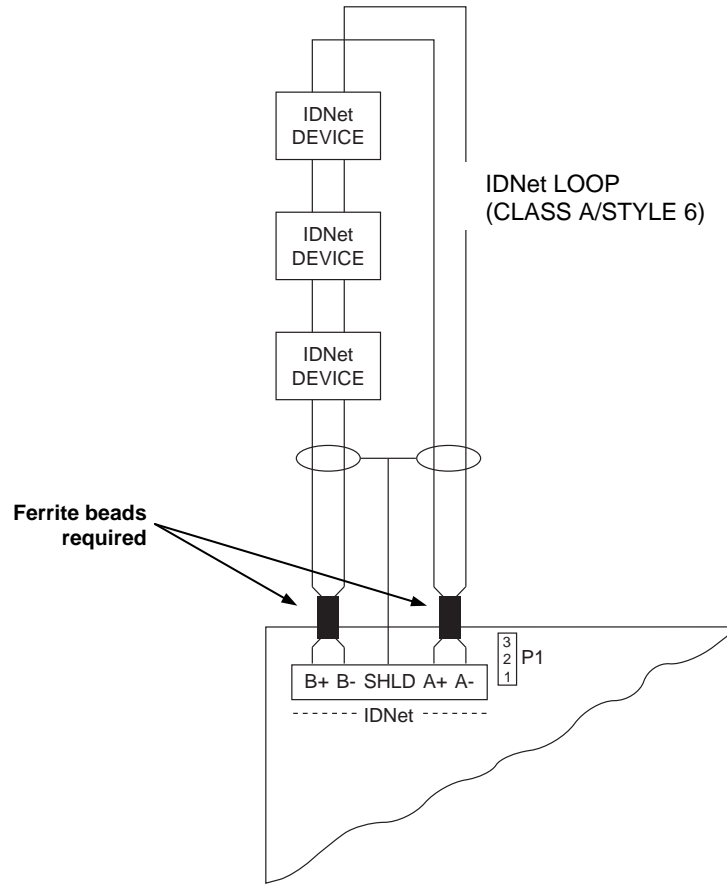


Figure 10. Class A Wiring

Continued on next page

IDNet Field Wiring (SPS only), Continued

Class B Wiring

To connect the SPS to IDNet appliances using Class B wiring, read the following instructions.

1. On TB1, jumper B+ to A+, and jumper B- to A-. If the jumper is absent, a Class A Trouble is indicated on LED 5.
2. Route wire (between 12 [3.309 mm²] and 18 AWG [0.8231 mm²]) from the A+, A-, and SHIELD outputs on TB1 of the SPS to a junction box. Begin "T" tapping at the junction box. The maximum distance between the SPS and the last IDNet appliance is 2,500 feet (762 m) for 250 devices, or 4,000 feet (1,219 m) for 127 devices. For IDNet circuits, the total allowable distance for cables is 10,000 feet maximum or 0.58 μF line-to-line capacitance, including all "T" taps.

The illustration below shows Class B wiring.

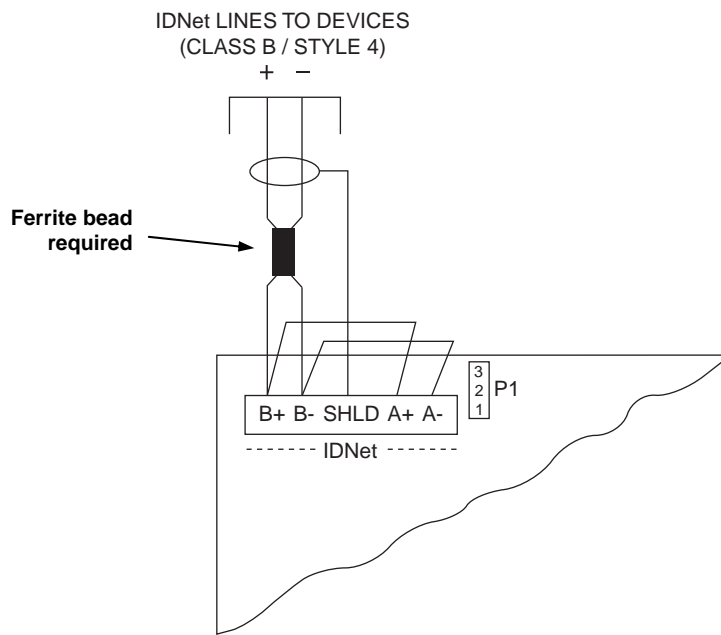


Figure 11. Class B Wiring

Notes:

- Notification appliances are rated per individual nameplate label.
- Maintain correct polarity on terminal connections. Do not loop wires under terminals.

Auxiliary Power Wiring

Guidelines

The SPS and RPS can connect to auxiliary power appliances via the dedicated auxiliary power tap (TB3). If more power is needed, any of the three NAC outputs can be used for auxiliary power.

- All wiring must be between 18 AWG (0.8231 mm²) and 12 AWG (3.309 mm²).
- All wiring is power-limited.
- Auxiliary power may be taken from the dedicated auxiliary power tap or from an unused NAC.
- Total available auxiliary power current is 1A for regulated 24 VDC NAC applications, 5A otherwise. AUX power is rated up to 2 A per circuit. The total current available is 5A for regulated 24 VDC, 9A otherwise, including NAC, auxiliary, and card power.
- Remove end-of-line resistors from circuits that are used for auxiliary power.
- External wiring is not supervised unless an end-of-line relay is wired coil to auxiliary power, and Normally Open contacts are monitored by a system power point. Relay current must be considered as part of the load.
- All wiring that leaves the building requires overvoltage protection. Install module 2081-9044 (3 A) or 2081-9028 (1/4 A) inside a UL-Listed electrical box wherever wire enters or exits the building. A maximum of four 2081-9044 Modules may be connected to one channel. When using the 2081-9044, the maximum alarm current is reduced to 1/4 A for that part of the circuit downstream of the module. Refer to 574-805 for installation instructions of 2081-9028 modules or to 574-832 for installation instructions of 2081-9044 modules
- The nominal voltage rating is 24 VDC, 2 V p-p ripple (maximum).
- The following devices connect to 2 A aux power:
 - 2088-Series relays and door holders
 - 2098-Series four-wire smoke detectors
 - 2190-Series monitor and signal ZAMs
 - 4090-Series IDNet ZAMs
 - 4098-Series four-wire smoke detectors and duct detectors
 - 2190-9039 Printer
 - 4190-9050/9051 4-20 mA ZAMs
 - 4603-9101 LCD Annunciator
- When powering remote units or switching power through relay contacts, power for these circuits must be provided by a UPS-style power supply, the 4100-1108 Power Supply (8 A), or a power-limited power supply that listed for fire-protective signaling use.

Continued on next page

Auxiliary Power Wiring, *Continued*

Guidelines

- **Auxiliary power only:** In order to connect a circuit using power-limited wiring, the devices being powered must all be addressable, or a UL-Listed EOL relay must be used to supervise the circuit. Refer to the figure below for wiring directions for the EOL relay.

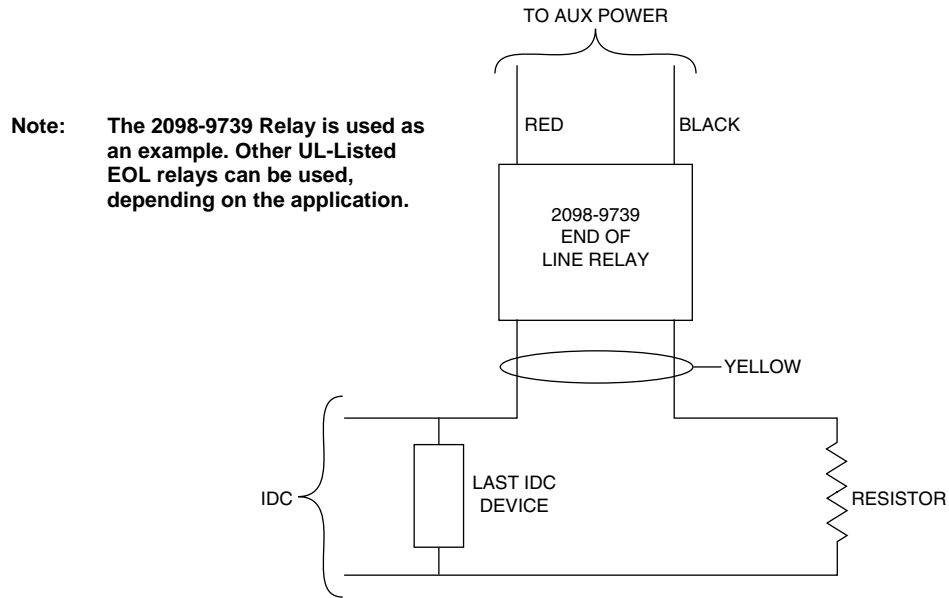


Figure 12. The EOL Relay

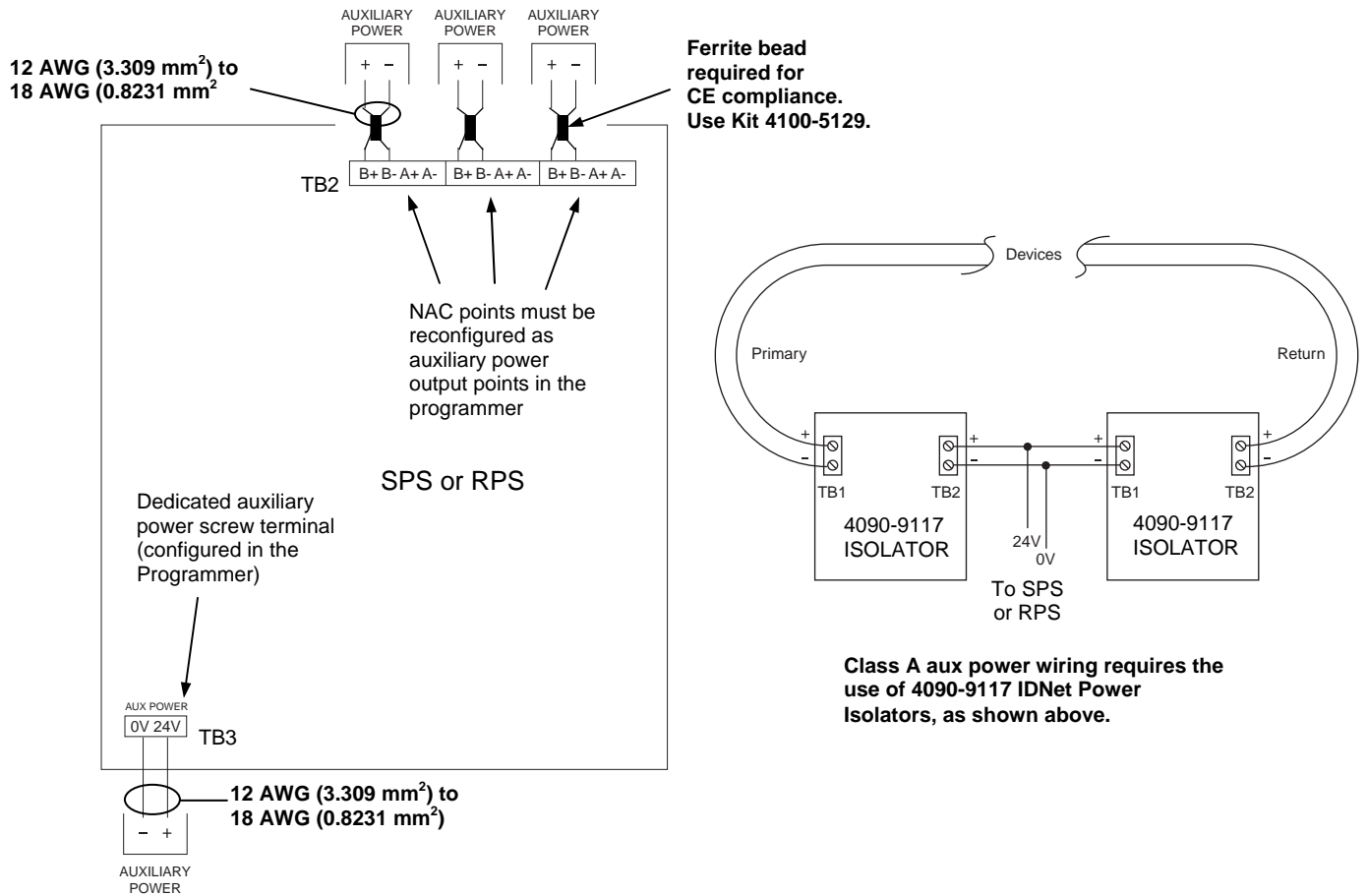
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Auxiliary Power Wiring, Continued

Wiring

The figure below shows how the SPS or RPS is wired for auxiliary power at any given terminal.

Note: To program relay contacts, refer to the *ES Panel Programmer's Manual* (574-849).



- Class A wiring requires a 4090-9117 Power Isolator is used.
- CE compliant systems require ferrite beads. Use Kit 4100-5129.

Figure 13. Auxiliary Power Wiring

Auxiliary Relay Wiring

Overview

The SPS includes one on-board, programmable relay.

Guidelines

- All wiring must be between 18 AWG (0.8231 mm²) and 12 AWG (3.309 mm²).
 - When power through auxiliary contacts is provided by the SPS or RPS, wiring is power-limited.
 - When power through auxiliary contacts is *not* provided by the SPS or RPS, use an in-line fuse (208-165). If the power source is not power-limited to the requirements of UL 864, wiring is to be segregated to the non-power-limited spaces of the cabinet.
 - The relay circuit is not supervised.
 - The relay circuit is rated to switch 2 A at 32 VDC, resistive load.
 - Relay contacts are Form C dry contacts. Suppression is provided to Earth. Do not switch voltages greater than rating, or damage may result.
-

Continued on next page

Auxiliary Relay Wiring, *Continued*

Wiring

The figure below shows SPS/RPS auxiliary relay wiring.

Note: To program relay contacts, refer to the *ES Panel Programmer's Manual* (574-849).

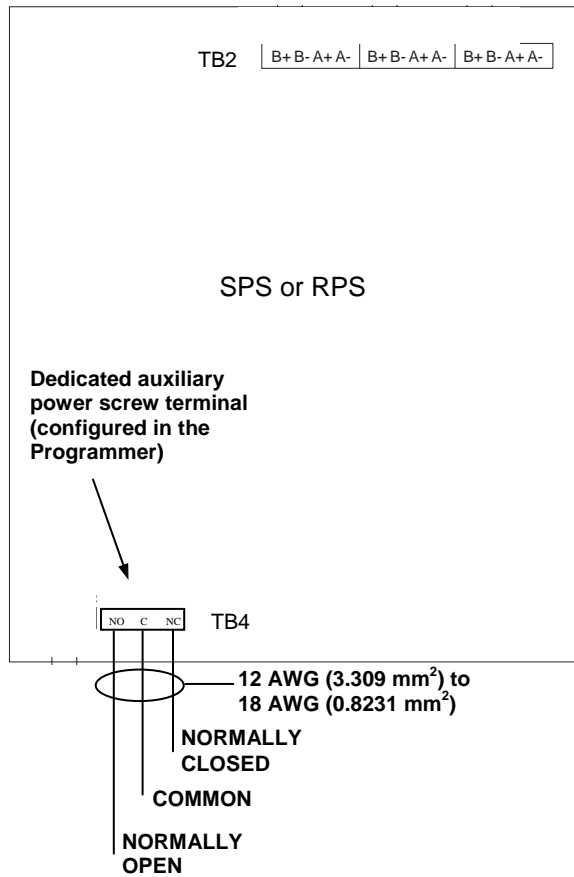


Figure 14. Auxiliary Relay Wiring

Troubleshooting

| | |
|---|--|
| Overview | This section describes the messages that may appear on the 4100 display when using the SPS or RPS. Trouble messages appear on the left as titles, and possible causes are listed to the right in the text. |
| AC Power Loss | Indicates AC power to the system is absent or is lower than 85% of nominal (102 VAC for a 120 VAC system). |
| NAC Miswired Trouble | This Trouble is active when a NAC-to-NAC short is detected. The NACs that are shorted are also indicated. Any combination of NACs can be mis-wired together. The panel will display up to four NAC miswiring faults. |
| Positive Earth Fault | There is a wiring fault to Earth on a positive polarity signal. Possible wires are +IDNet, +24 V, NAC + (Alarm), NAC - (Standby), and AUX+. |
| Negative Earth Fault | There is a wiring fault to Earth on a negative polarity signal. Possible wires are -IDNet, 0 V, NAC - (Alarm), NAC + (Standby), and AUX-. |
| Overcurrent Trouble | This signal indicates that the overcurrent circuit is tripped and latched OFF. A reset from the master control unit is required to recover. |
| IDNet Power | IDNet power has failed. This usually requires changing the SPS. |
| Battery Not Connected/ Battery Depleted/ Battery Low | Indicates that battery voltage has fallen to 22.4 VDC (low) or 19.6 VDC (depleted). |
