

FIRE

4007ES and 4007ES Hybrid Fire Alarm Systems



Installation
Manual

579-1102
Rev. E

 Simplex

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SULFURIC ACID WARNING- Battery contains sulfuric acid, which can cause severe burns to the skin and eyes and can destroy fabric. Replace any leaking or damaged battery while wearing appropriate protective gear. If you come in contact with sulfuric acid, immediately flush skin or eyes with water for 15 minutes and seek immediate medical attention.

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 NFPA-72, 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.

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Chapter 1

Overview

Introduction

The 4007ES fire alarm control panel provides audible and visible indication of alarms, troubles, and supervisory conditions. The 4007ES panels supports addressable notification and initiating devices and the 4007ES Hybrid panels supports non-addressable notification devices and addressable initiating devices*. The panel can be configured by using a panel programmer.

*From this point on, the 4007ES and the 4007ES hybrid will be referred to as 4007ES, unless stated otherwise.

4007ES operator instructions are described in the *4007ES Operator's Manual*, 579-1165.
4007ES programming instructions are described in the *4007ES Programmer's manual*, 579-1167.

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4007ES Product List

Part Number	Base Panels	
4007-9101	4007ES Hybrid, Red	
4007-9201	4007ES, Red	
4007-9102	4007ES Hybrid, Platinum	
4007-9202	4007ES, Platinum	
Part Number	Optional Modules: Field Installed	Manual
4007-9801	Zone/Relay Module	579-1103
4007-9802	25V Regulator Module	579-812
4007-9803	IDNet+ Loop Expansion Module	579-1106
4007-9804	Dual Class A Module	579-1029
4007-9805	LED Module	579-1105
4007-9806	DACT Module	579-954
4007-9807	City Circuit with Disconnect Module	579-955
4007-9808	City Circuit without Disconnect Module	579-955
4007-9809	Relay Module	579-955
4190-6106	TrueInsight Remote Service Gateway and Programming	579-953

Overview, Continued

Glossary

Term	Definition
Aux	Abbreviation for Auxiliary; typically used to describe Auxiliary Power.
EOL	End-of-Line (typically in reference to an end-of-line resistor or EOL resistor).
FACP	Fire Alarm Control Panel.
Hybrid	In this document, "Hybrid" the 4007ES Hybrid models that provide both addressable and conventional initiation with conventional non-addressable Notification Appliance Circuits.
IDC	Initiating Device Circuit.
IDNet	Addressable SLC for up to 250 addressable devices.
IDNet+	IDNet which is electrically isolated from internal panel electronics.
IDNAC	Individual Device Notification Appliance Circuit (Addressable).
NAC	Notification Appliance Circuit (formerly called signal circuit).
Regulated 24 DC	Notification appliance operation that meets the minimum listing requirements; inrush currents typically require power supply and NAC rating.
RUI	Remote Unit Interface; SLC for communications with remote annunciators.
Simple NAC	A Reverse Polarity Supervised Notification Appliance Circuit that is capable of on steady or coded operation. Sync or SmartSync operation is not supported.
SLC	Signaling Line Circuit
SmartSync	A reverse polarity monitored NAC capable of synchronizing and controlling both horns and strobes on the same circuit via a proprietary signaling protocol. Used as the protocol for TrueAlert Non-Addressable Devices.

User Interface

The user interface is a 4.3" (109mm) diagonal color LCD with a built-in resistive touch panel and 12 indicating LEDs. The color LCD provides system status and access to perform system functions and to change the system configuration.

Figure 1-1 shows an inside view of the 4007ES panel with the optional LED module (4007-9805) installed.



Figure 1-1. 4007ES Panel Inside View

Chapter 2

Installation

Introduction

This chapter describes how to install the 4007ES panel. It can be semi-flush or surface mount.

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Mounting the 4007ES Panels

- Due to the danger of metal fragments falling into electronics when drilling the holes for the conduits, remove the electronics in the system:
 - To remove the electronics, unscrew the ten screws. Remove the power supply and store it in a safe, clean, and dry location until the panel installation is completed, see Figure 2-1.
 - If installing a 4007ES hybrid panel, also remove the Zone/Relay card (three screws).
- Use a suitable punch where conduit entrance is required. Knockouts are not provided. Locate and create on-site as required during installation.

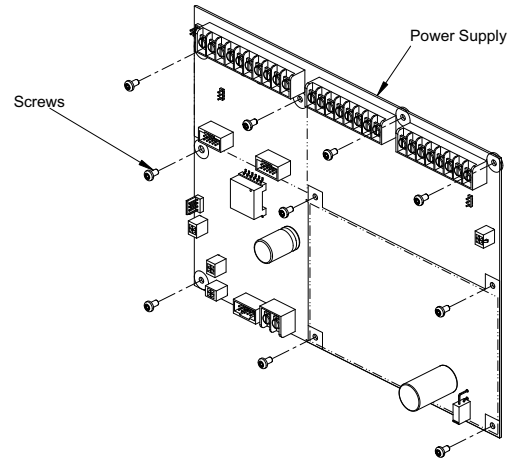


Figure 2-1 Screws location

- For surface or semi-flush mounting to a wooden wall structure, the panel must be attached with four 1-1/2-inch-long (38 mm) lag bolts and four 1/2-inch-diameter (13 mm) washers (supplied by others).
- For surface mounting, secure the box to the wall using the tear-drop mounting holes on the back surface. For semi-flush mounting, secure the box (along the sides) to the wall studs. Note that the front surface of the back box must protrude at least 1-1/2 inch (38mm) from the wall surface for semi-flush installation. A trim kit is supplied for semi-flush mounting. Refer to the Trim Kit Application section for more information.
- To install the panel refer to Figure 2-2 for the dimensions and use the holes in the back box to secure it to the wall.

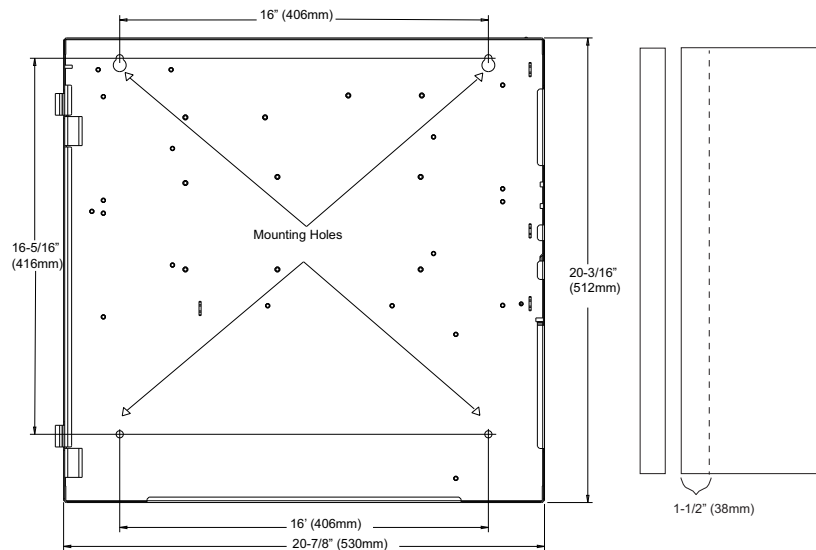


Figure 2-2. Back Box Installation dimensions and Semi-Flush Mounting (Right)

Trim Kit

Trim Kit Application

Trim kits are used to cosmetically cover wall openings when boxes are mounted semi-flush into the wall. The kit includes:

- Two top trim bands (shorter)
- Two side trim bands (longer)
- Four corner pieces.

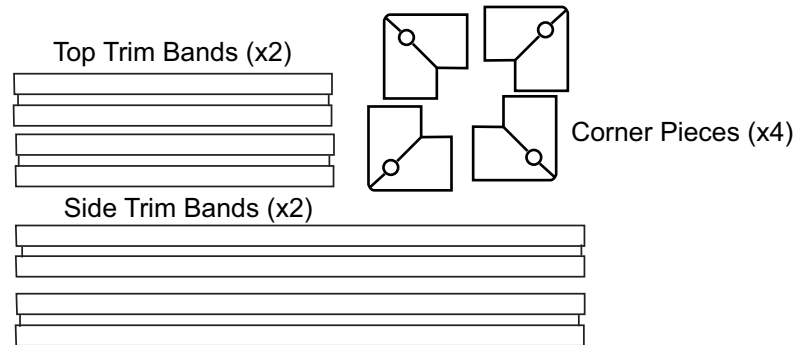


Figure 2-3 Semi-Flush Trim Kit

After mounting the box semi-flush to the wall, attach the trim per the following procedure:

1. The strips need to be cut before being attached. Carefully cut them to length using a hacksaw or sharp utility knife. Cut the strips approximately 1" (25 mm) shorter than the box dimension. The box is 20-7/8" (530 mm) wide and 20-3/16" (512 mm) high.
2. Attach the strips one at a time. Peel off the adhesive tape release and center the strip on the box placing the edge of the strip against the box surface, then press down solidly to assure adhesion.
3. Each corner piece overlaps the trim strip slightly less than 3/4" (19 mm). Align the corner pieces tight to the box corner and attach with a drywall or similar screw, suitable for the wall material (screws are not supplied).

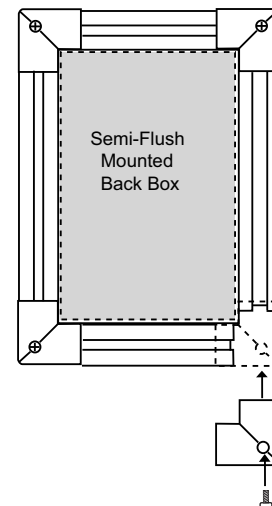


Figure 2-4. Applying the Trim

Wiring

Wiring Guidelines Follow these guidelines when connecting Power-Limited (PL) systems. For more information about these guidelines, contact your authorized Simplex Product supplier.

- Non-Power Limited (NPL) field wiring (AC power, batteries, City connection, DACT) must be installed and routed in the shaded areas shown in Figure 2-5.
- A minimum of 0.25 inches space must be maintained between NPL and PL field wiring.
- The AC Harness is pre-wired (tied to back of the box).

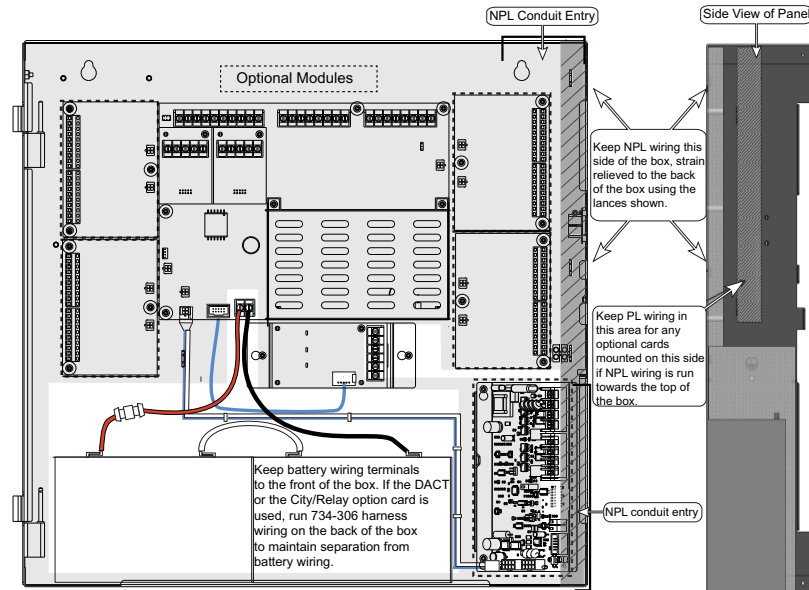


Figure 2-5. Field Wiring Guidelines (NAC Power Supply Shown as Reference)

- Conductors must test free of all grounds.
- A system ground must be provided for earth detection and lightning protection devices. This connection must comply with approved earth detection per NFPA780.
- Splicing is permitted. All spliced connections must either be soldered (resin-core solder), crimped in metal sleeves, or encapsulated with an epoxy resin. When soldering or crimped metal sleeves are used, the junction must be insulated with a high-grade electrical tape that is as sound as the original insulating jacket. Shield continuity must be maintained throughout.
- Excess slack should be kept to a minimum inside the back box enclosure. The wiring should be neatly dressed and bundled together using wire ties.
- All wiring must be done using copper conductors only, unless noted otherwise.
- For IDNet, shielded wire is not recommended. If shielded wires are present, cut and tape off the shield at each end in the panel to prevent it from coming in contact with other components. Metallic continuity of the shield must be maintained and insulated throughout the entire length of the cable.
- If shielded wire is used, the metallic continuity of the shield must be maintained throughout the entire cable length and the entire length of the cable must have a resistance greater than 1 megohm to earth ground. Underground wiring must be free of all water.
- In areas of high lightning activity, or in areas that have large power surges, the 2081-9027 or the 2081-9044 Transient Suppressor should be used on monitor points.

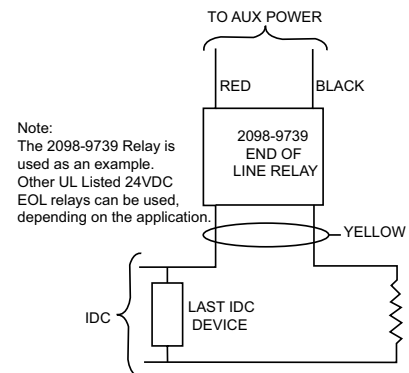


Figure 2-6. EOL Relay Diagram

Wiring

- Wiring Guidelines**
- Wires must not be run through elevator shafts.
 - Only system wiring can be run together in the same conduit.
When powering remote units through relay contacts, power for these circuits must be provided by a PL power supply listed for fire-protective signaling use. An end-of-line (EOL) relay must be used to supervise the auxiliary power circuit.
 - Connect the output of the EOL Relay to cause a trouble. Wire in series with the EOL resistor on an available Initiating Device Circuit (IDC) or Individual Addressable Module (IAM).
-

Safety Ground Proper operation and protection against transient energy per UL 864 and ULC-S527 requires connection of safety ground wire to cabinet chassis. Connect safety ground before wiring any other circuits to the panel.

- AC Supply Wiring** Adhere to the following guidelines when wiring AC Power.
- AC power must be wired from a dedicated circuit breaker or fuse, rated no more than 20 A, per NFPA-72, NEC, and local codes.
 - Before handling AC feed, verify that it is not live using a voltmeter. Make sure the circuit is de-energized and tagged to prevent injury.
 - AC supply wiring must be 14 AWG minimum to 12 AWG maximum.
 - Connect a 12 AWG copper ground wire from safety ground in the electrical distribution panel to the panel safety ground stud.
 - Input voltage:
 - 120 VAC, 50/60 Hz
 - 240 VAC, 50/60 Hz
 - No configuration settings required to select.
-

- Battery Guidelines**
- A fused harness (harness 734-304 for NAC power supply and 734-303 for IDNAC power supply) is required to connect the backup batteries. That harness is shipped with the panel. The mating spade lug on the battery should be 0.250" X 0.032". If another size is needed, you will need to replace the battery terminal connectors on the supplied battery harness.
 - The 4007ES battery charger supports up to 33 Ah batteries (maximum) within UL864 and ULCS527 guidelines.
 - 18 Ah batteries can fit inside the box.
 - 25 Ah and 33 Ah batteries use 2081-9282 (red 25 Ah or 33 Ah) or 4009-9801 (beige 25 Ah)
 - To minimize the power losses due to wiring from the external battery box to the 4007ES, use at least a 12 AWG wire. Mount the battery box within 20 feet of the panel in accordance with the mounting instruction label in the box. All interconnecting wiring must be enclosed in conduit.
 - Seismic battery brackets can be used internal to the 4007ES box (2081-9401 (12.7 Ah bracket), 2081-9402 (18 Ah bracket)). For more information on how to install the seismic brackets, refer to *Battery Bracket installation instructions 579-944*.

Power

Final Installation

To finalize the installation:

1. Reinstall the power supply and the electronics.
2. Follow the steps below to install the batteries:

- a. Place the first battery on the left side of the panel to avoid interference with the DACT (if installed).

Note:

The battery terminals should face the front of the box.

- b. Insert the second battery and make sure it is snugly positioned beside the first battery.
- c. Wire the batteries in series such that you have 24 V. Use the white wire provided to bridge the batteries together. (see Figure 2-7).



IMPORTANT:
Verify all field wiring before applying any power to the panel.

Power up the system:

1. Connect the negative lead to the battery.
2. Apply AC.
3. Connect the positive to the battery.

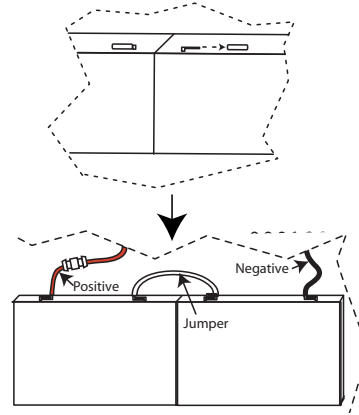
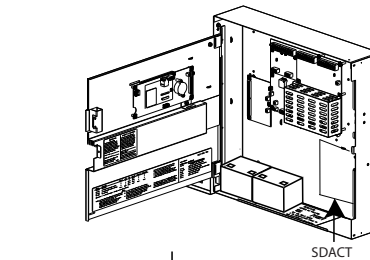
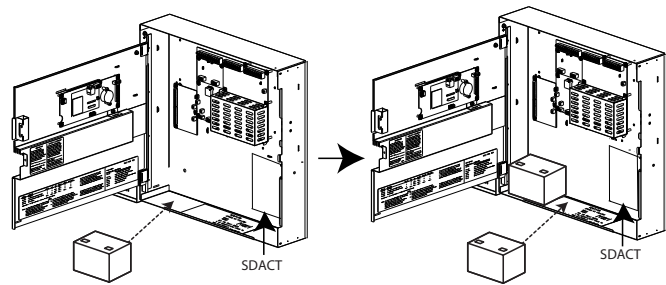


Figure 2-7. Power Supply

Chapter 3

NAC Power Supply

Introduction

A conventional reverse polarity NAC power supply is used in a 4007ES hybrid panel. It provides 6A and can support:

- Non-addressable notification devices
- Addressable initiating devices

Refer to Figure 3-1 and Table 3-1 for the main components of the NAC power supply.

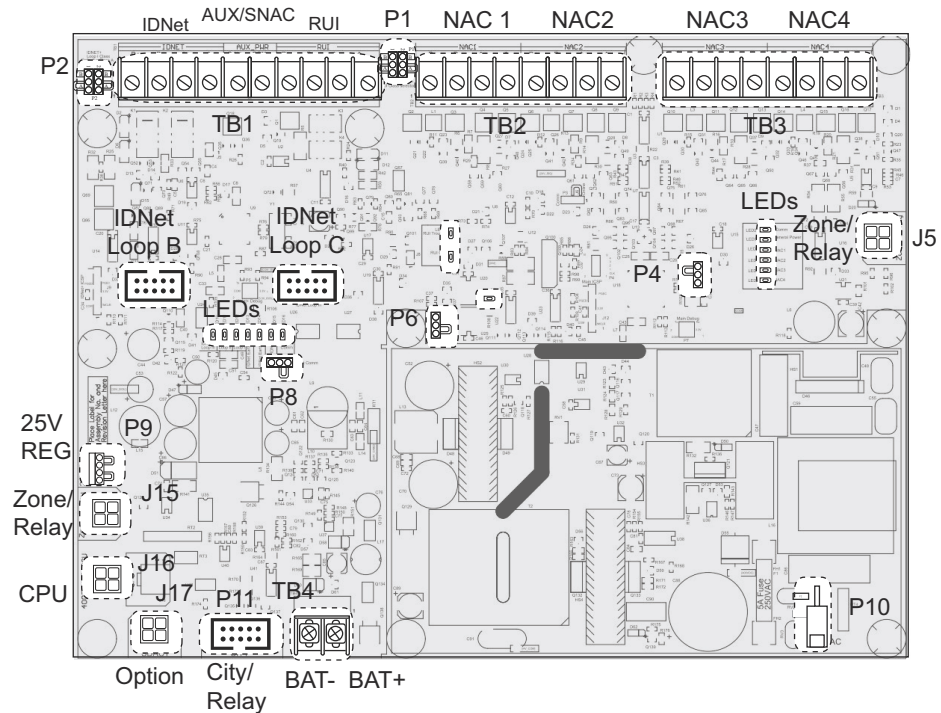


Figure 3-1. NAC Power Supply

Table 3-1. Main Components Information

P1	RUI Class A/B jumpers	P2	IDNet Class A/B jumper
TB4	Battery connection	TB2	NAC 1 and NAC 2
P10	AC Power Connection	TB3	NAC 3 and NAC 4
J5 and J15	Zone / Relay	J7	IDNet Loop B
J16	CPU Connection	J8	IDNet Loop C
J17	Option Connection	P4	NAC Power Supply Card On-line
P11	City/Relay Connection	P6	Battery Depleted Jumper
TB1	IDNet Loop 1, Aux Power, RUI Connection	P8	1-2 (default) / IDNet card on line
		P9	25V Regulator Jumpers 1-2, 3-4 default. Power is fed to the zone/relay card. No jumpers. Using 4007-9802, 25V Regulator Module.

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NAC Power Supply Specifications

Power Supply Specifications

The NAC Power Supply can supply 6A of 24V power in addition to the base draw of the CPU/Power Supply cards. The current draw taken from optional cards, IDNet Devices, Aux Power, and NACs must be subtracted from 6A.



IMPORTANT: Refer to the 4007-9801 8-Point Zone/Relay Card Installation Instruction, manual 579-1103, to determine the draw of the pre-installed Zone/Relay card.

Table 3-2. 4007ES Hybrid System Current Draw

Maximum AC Input	2 A at 120 VAC, 50/60Hz 1 A at 240 VAC, 50/60Hz
Standby Conditions	Current (Battery Standby 24 V)
No alarms (NACs normal). No IDNet devices connected.	145 mA
Add to above for each additional IDNet device in standby.	0.8 mA
Total current for fully loaded IDNet channel in standby.	345 mA
Alarm Conditions	Current (Battery Alarm 24 V)
4 NACs ON: TBL Relay Activated: IDNet LED On. No IDNet devices connected.	190 mA
Add to above for each IDNet device in alarm.	1 mA
Add to above for each IDNet LED On (20 maximum IDNet devices LEDs On).	2 mA
Total current for fully loaded IDNet channel in alarm.	480 mA

NAC Section

NAC Section Overview

The NAC power supply allows connection to up to four Class A NAC circuits. Notification appliances within the 4007ES system are synchronized including any attached 4009 series NAC extenders. Do not mix Wheelock and Simplex branded devices in the same system, they will not be synchronized. The following TrueAlert non-addressable appliances are Special Application compatible with the NAC power supply:

- 4098-9772 Sensor Base with 520 Hz Sounder
- 4098-9773 CO Sensor Base with 520 Hz Sounder
- 4901-series Horn
- 4903-series A/V
- 4903-series S/V
- 4904-series V/O
- 4906-Multicandela series
- 49CMT series Horn
- 49CMTV series A/V
- Wheelock Series: AS, HS, NS, ZNS, RSS, RSSP, STR, ZRS, MT, AMT, MTWP, ET, CH, E50, E60, E70, E80, E90, S8, SA

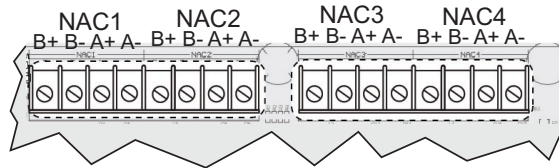


Figure 3-2. NAC Terminal on NAC Power Supply

Specifications

Maximum Appliances	70 per circuit*
* Each 49CMT series appliance counts as 5 regular appliances for the maximum 70 appliances that can be supported per NAC. As the earth fault sensitivity with thirteen MT appliances drops from 10 K to 9.6K ohms, no more than thirteen 49CMT series appliances may be placed on one circuit.	
Electrical Specifications:	
Voltage	24 VDC nominal
Alarm Current	The maximum alarm current is 3 A per circuit.
Supervisory Current	Refer to Table 3-4
Special Application Appliances (TrueAlert Non-Addressable)	6 A total
Note: When NACs are used for Regulated 24DC appliances, maximum current per NAC is reduced to 2 A and total power supply notification current rating is reduced to 3 A. Current used by modules powered from the 4007ES power supply must be deducted from the total current.	

Wiring

Wiring Parameters

The NAC Power Supply is supervised and power-limited. Refer to Table 3-4 for the NACs' supported EOL resistors and the related supervisory current and to Table 3-3 for the wiring parameters.

Note: If a shielded wire is used, cut it and tape it at both ends.

Table 3-3. Wiring Parameters

Maximum wiring distance	
Maximum cable load	10,000 ft (3,048m) per channel
Maximum wire length from panel to any device	4,000ft (762m)
Maintain correct polarity on terminal connections. Do not loop wires under terminals.	

Table 3-4. Supported EOLR and Supervisory Current

EOLR	Current
3.9 k	5.7 mA
4.7 k	4.8 mA
5.1 k	4.4 mA
5.6 k	4.0 mA
10 k	2.2 mA
15 k	1.4 mA

Continued on next page

NAC Section, *Continued*

Wiring

Wiring Distances

Table 3-5 lists the maximum distances from the NAC terminal block to the last appliance in a Class A configuration, depending on wire gauge and current. Use Table 3-5 to calculate wire distances for your application if you are using Class A wiring. Table 3-6 gives the values for a Class B configuration.

Table 3-5. Class A Wiring Distances

Alarm Current	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
1.00 A	105 ft (32m)	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
2.00 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
3.00 A	35 ft (11 m)	56 ft (17 m)	89 ft (27 m)	141 ft (43 m)	0.50 Ohm

Table 3-6. Class B Wiring Distances

Alarm Current	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
1.00 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
2.00 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
3.00 A	70 ft (21 m)	111 ft (34 m)	177 ft (54 m)	282 ft (86 m)	1 Ohm

Note:

- Max Distance = distance from the power supply to last appliance.
- This table is calculated at 49 °C (120 °F). 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 wire is used instead of housing cable in a fire rated enclosure, reduce wiring distances by 38 ft (12 m) for every 10 ft (3 m) of potential exposure.

Continued on next page

NAC Section, *Continued*

Wiring

Class A Wiring

Note: The Class A wiring style is set up in the programmer. Refer to the 4007ES Programmer's manual, 579-1167, for more information.

To connect the power supply to reverse-polarity, non-addressable notification appliances using Class A wiring:

1. Route wire from the "B+" and "B-" outputs of the power supply to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, NAC3 or NAC4 (2.).
2. Route wire from the first appliance to the next one. Repeat for each appliance.

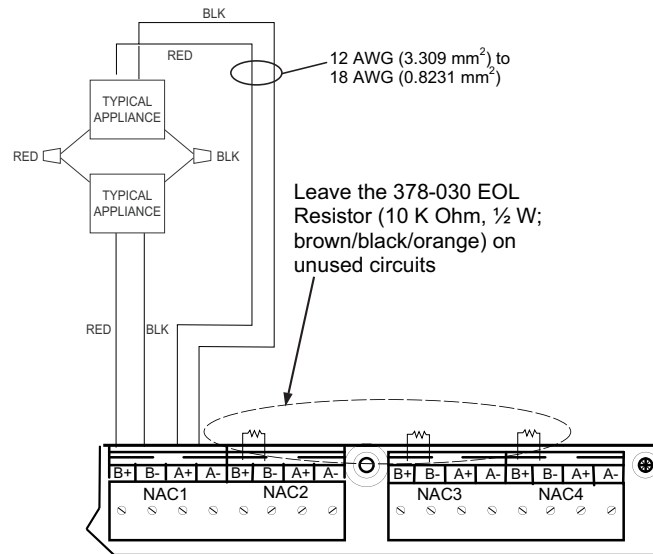


Figure 3-3. Class A NAC Wiring

3. Route wire from the last appliance to the A+ and A- inputs on the same NAC circuit of the power supply.
4. Repeat steps 1 through 3 for each NAC output you want to use.
5. Leave the 10 KOhms, 1/2 W, brown/black/orange resistor (378-030) on each unused circuit. No external end-of-line resistor is needed for circuits in use.

Class B Wiring

Note: The Class B wiring style is set up in the programmer. Refer to the 4007ES Programmer's manual, 579-1167, for more information.

To connect the power supply to appliances using Class B wiring:

1. Route wire from the B+, B- outputs on TB2 and TB3 of the power supply to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, NAC3, or NAC4.
2. Route wire from the first appliance to the next one. "T" tapping is not allowed. Repeat for each appliance.

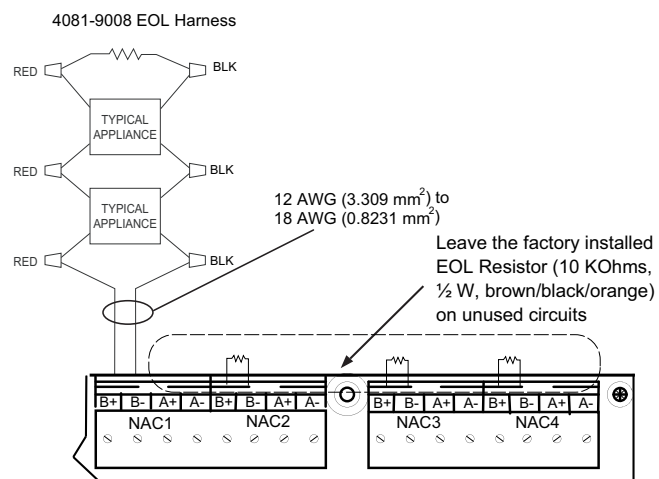


Figure 3-4 Class B NAC Wiring

3. Route wire from the last appliance to the EOLR harness (10KOhms, 1/2 W: P/N 733-894).
4. Repeat steps 1 through 3 for each NAC output you want to use.
5. Leave the factory installed EOL Resistor (10 KOhms*, 1/2 W; brown/black/orange) on each unused circuit. The circuit must connect "B+" to "B-" terminals.
6. Document EOL value in panel per circuit.

*If using a 4007ES hybrid panel, keep the original value and set the programmer accordingly.

Troubleshooting

Troubleshooting Table 3-7 gives the LED definition for the NAC power.

Table 3-7. 4007ES Hybrid Indicator LEDs

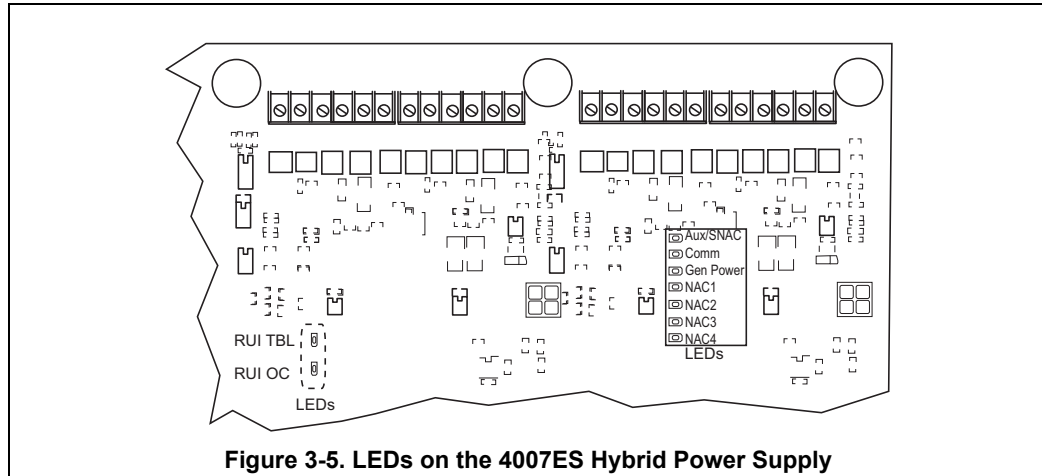


Figure 3-5. LEDs on the 4007ES Hybrid Power Supply

LED10	AC	Green. Off on AC failure
LED2	RUI Trouble	Yellow. On for Class A RUI trouble
LED6	RUI OC	Yellow. Indicates a short (overcurrent)
LED3	Comm	Yellow. Indicates that the communication between the NAC power supply and the CPU is lost
LED 4	Gen Power	Steady On, yellow. Indicates AC power loss, earth fault, overcurrent and battery trouble
LED5, 7, 8, and 9	NAC 1, 2, 3, 4	Steady On, yellow. Used to signal overcurrent, short, and open circuit.
LED1	Aux/SNAC	Steady On, yellow. Use to signal overcurrent, short, and open circuit.

Chapter 4

IDNAC Power Supply

Introduction

An IDNAC power supply is used in the 4007ES (non Hybrid) panel. It provides 4 A and can support:

- Addressable notification devices
- Addressable initiating devices

Refer to Figure 4-1 and Table 4-1 for the main components of the IDNAC power supply.

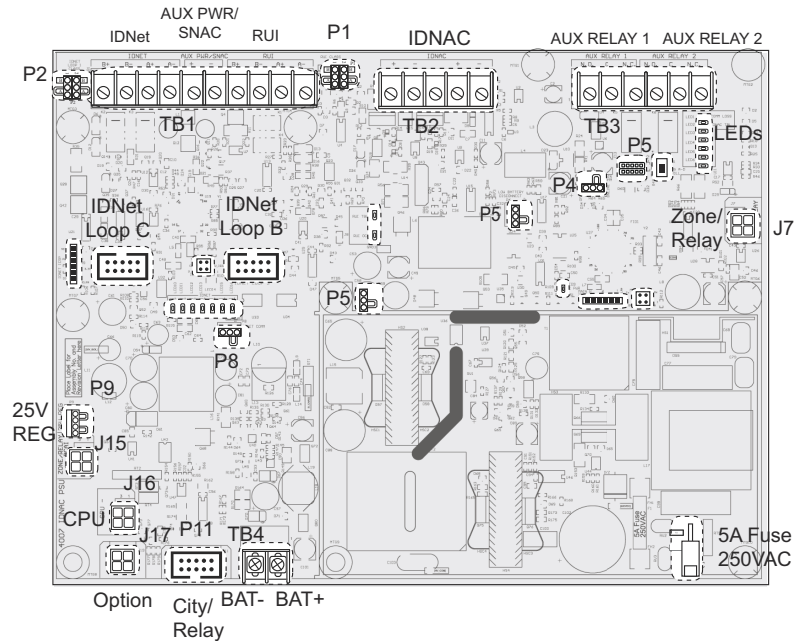


Figure 4-1. IDNAC Power Supply

Table 4-1. Main Components Information

P1	RUI Class A/B jumpers	P2	IDNet Class A/B jumper
TB4	Battery connection	TB2	IDNAC
P10	AC Power Connection	TB3	Aux Relay 1 and 2
J15	DCAI Zone/Relay Connection	J10	IDNet Loop 2
J7	Zone/Relay	J11	IDNet Loop 3
J16	CPU Connection	P5	Battery Depleted Jumper
J17	Option Connection	P8	1-2 (default) / IDNet card on line
P11	City Circuit Connection	P9	25V Regulator Jumpers 1-2, 3-4 default. Power is fed to the zone/relay card. No jumpers. Using 4007-9802, 25V Regulator Module
TB1	IDNet Loop 1, Aux Power, RUI Connection		

In this Chapter

Power Supply Specifications	4-2	IDNAC Section Overview	4-3
Specifications	4-3	Wiring	4-3
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IDNAC Power Supply Specifications

Power Supply Specifications

The IDNAC Power Supply can supply 4A of 24V power in addition to the base draw of the CPU/Power Supply cards. The current draw taken from optional cards, IDNet Devices, Aux Power, and NACs must be subtracted from 4A.

Table 4-2. 4007ES System Current Draw

Maximum AC Input	2 A at 120 VAC, 50/60 Hz 1 A at 240 VAC, 50/60 Hz
Standby Conditions (see Note 1)	Current (see Note 1) (Battery Standby 24 V)
No alarms (NACs normal). IDNet devices connected	180 mA
Add to above for each additional IDNet or IDNAC device in standby	0.8 mA
Total current for fully loaded IDNet or IDNAC channel in standby	431 mA
Alarm Conditions (see Note 1)	Current (see Note 1) (Battery Alarm 24 V)
IDNAC ON: No IDNet LED On. No IDNet devices connected	185 mA
Add to above for each IDNet device in alarm (see note 2)	1 mA
Add to above for each IDNet LED On (20 maximum IDNet devices LEDs On)	2 mA
Total current for fully loaded IDNet channel in alarm (20 LEDs On) (see note 2)	475 mA

Notes:

1. Add an additional 9 mA per active auxiliary relay (Alarm or Standby)
2. IDNAC Alarm current depends on the IDNAC device used. Refer to the device's manual for more information on currents.

IDNAC Section

IDNAC Section Overview

The IDNAC power supply has a single SLC for connecting addressable IDNAC devices. The power supply is compatible with TrueAlertES and TrueAlert Addressable product lines (both multi and fixed candela). The IDNAC output is Class B only. Class A operation requires use of optional module 4007-9804, IDNAC dual Class A isolator. The output is duplicated on the terminal block to facilitate “T” tapping on the circuit at the panel. EOL resistors are not required. All wiring is supervised and power-limited.

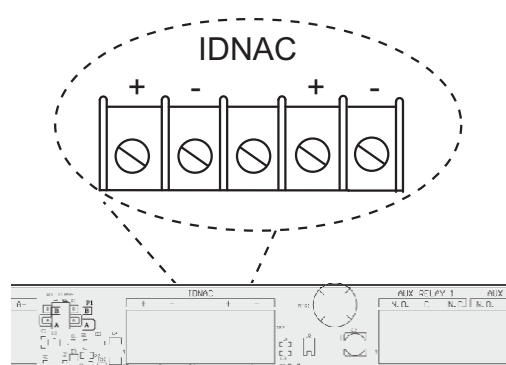


Figure 4-2. IDNAC Terminal

Specifications

Table 4-3. IDNAC Specifications

Supports	<ul style="list-style-type: none"> - Up to 12 4905-9929 remote TrueAlert Addressable Isolators per IDNAC Circuit. - Up to 30 devices connected directly to any isolator terminal pair*. - Up to six isolators between any appliance and the IDNAC SLC terminals. All wiring is 20 AWG to 12 AWG. <p>*For more information on the isolator, refer to the <i>4905 Isolator+ Installation Instructions</i>, 574-769.</p>
Electrical Specifications:	
Channel Voltage	29.5 VDC nominal.
Circuit Requirements	The maximum alarm current is 3 A per circuits.
Isolator	
Isolator (DCAI)	To wire an IDNAC as a Class A circuit, the DCAI modules (4007-9804) is required (2 Class A circuits with fault isolation). For more information on Dual Class A isolator and on how to calculate Class B wiring with isolation, refer to the <i>DCAI Installation Instructions</i> 579-1029.

Wiring

Wiring Parameters

Table 4-4 identifies the IDNAC wiring parameters that must be considered.

Table 4-4. IDNAC Wiring Parameters

IDNAC Wiring Limits	
Channel Loading	127 devices (IDNAC devices or other compatible devices). Refer to the Compatible Devices and Appliances section for more details.
Max. wiring distance	
Max. cable load	10,000 ft (3,048m) per channel.
Max. wire length from panel to any device	4,000ft (762m).

Note: If a shielded wire is used, cut it and tape it.

IDNAC Section, *Continued*

Wiring

IDNAC Class B Wiring Tables

Use the following tables to calculate the wiring distance to farthest appliance.
Maximum wiring distance is the shorter of the distance limits as calculated by alarm current voltage drop or by reaching the communications distance limit.

Table 4-5. Wiring Limit Based on Alarm Current

Alarm Current	Distance to the Last Appliance				
	20 AWG	18 AWG	16 AWG	14 AWG	12 AWG
0.050	4000 ft	4000 ft	4000 ft	4000 ft	4000 ft
0.100	2644 ft	4000 ft	4000 ft	4000 ft	4000 ft
0.150	1763 ft	2802 ft	4000 ft	4000 ft	4000 ft
0.200	1322 ft	2102 ft	3342	4000 ft	4000 ft
0.250	1058 ft	1681 ft	2674 ft	4000 ft	4000 ft
0.300	881 ft	1401 ft	2228 ft	3542 ft	4000 ft
0.350	755 ft	1201 ft	1910 ft	3036 ft	4000 ft
0.400	661 ft	1051 ft	1671 ft	2657 ft	4000 ft
0.450	588 ft	934 ft	1485 ft	2362 ft	3756
0.500	529 ft	841 ft	1337 ft	2125 ft	3380
0.750	353 ft	560 ft	891 ft	1417 ft	2254 ft
1.000	264 ft	420 ft	668 ft	1063 ft	1690 ft
1.250	212 ft	336 ft	535 ft	850 ft	1352 ft
1.500	176 ft	280 ft	446 ft	708 ft	1127 ft
1.750	151 ft	240 ft	382 ft	607 ft	966 ft
2.000	132 ft	210 ft	334 ft	531 ft	845 ft
2.250	118 ft	187 ft	297 ft	472 ft	751 ft
2.500	106 ft	168 ft	267 ft	425 ft	676 ft
2.750	96 ft	153 ft	243 ft	386 ft	615 ft
3.000	88 ft	140 ft	223 ft	354 ft	563 ft
Wiring distance must not exceed 4000 ft					

Table 4-7. Ohms per 1000 ft

Gage	Ohms/1000 ft
20 AWG	11.347
18 AWG	7.137
16 AWG	4.488
14 AWG	2.8230
12 AWG	1.7750

Table 4-6. Wiring Limit Based on Communication

Line Impedance (Ohms)	Devices	Distance to the Last Appliance				
		20 AWG	18 AWG	16 AWG	14 AWG	12 AWG
14.54	1	1252 ft	2038 ft	3241 ft	4000 ft	4000 ft
12.96	5	1142 ft	1815 ft	2887 ft	4000 ft	4000 ft
11.38	10	1003 ft	1595 ft	2536 ft	4000 ft	4000 ft
10.14	15	893 ft	1420 ft	2258 ft	3590 ft	4000 ft
9.12	20	804 ft	1278 ft	2033 ft	3231ft	4000 ft
8.28	25	730 ft	1160 ft	1845 ft	2934 ft	4000 ft
7.58	30	668 ft	1061 ft	1688 ft	2683 ft	4000 ft
6.97	35	614 ft	977 ft	1553 ft	2469 ft	3928 ft
6.45	40	568 ft	904 ft	1437 ft	2285 ft	3634 ft
6.00	45	528 ft	840 ft	1336 ft	2124 ft	3378 ft
5.60	50	493 ft	784 ft	1247 ft	1982 ft	3152 ft
5.24	55	462 ft	734 ft	1168 ft	1856 ft	2952 ft
4.92	60	434 ft	690 ft	1097 ft	1744 ft	2774 ft
4.75	63	419 ft	665 ft	1058 ft	1682 ft	2675 ft
4.64	65	409 ft	650 ft	1034 ft	1643 ft	2613 ft
4.38	70	386 ft	614 ft	976 ft	1552 ft	2468 ft
4.15	75	366 ft	581 ft	924 ft	1469 ft	2337 ft
3.94	80	347 ft	551 ft	877 ft	1394 ft	2217 ft
3.74	85	330 ft	524 ft	833 ft	1325 ft	2107 ft
3.56	90	314 ft	499 ft	794 ft	1262 ft	2006 ft
3.40	95	299 ft	476 ft	757 ft	1203 ft	1913 ft
3.24	100	286 ft	454 ft	723 ft	1149 ft	1827 ft
3.10	105	273 ft	435 ft	691 ft	1099 ft	1748 ft
2.97	110	262 ft	416 ft	662 ft	1052 ft	1673 ft
2.85	115	251 ft	399 ft	634 ft	1009 ft	1604 ft
2.73	120	241 ft	383 ft	609 ft	968 ft	1539 ft
2.58	127	228 ft	362 ft	576 ft	915 ft	1456 ft
Wiring distance must not exceed 4000 ft						

IDNAC Section, *Continued*

Wiring

IDNAC Class B Wiring

To connect the power supply to appliances using Class B wiring:

1. Route the wire from the “+” and the “-” outputs on the IDNAC terminal block (TB2) to the appropriate inputs on a peripheral notification appliance.
2. Route wire from the first appliance to the next one. “T” tapping is allowed. Repeat for each appliance.
3. Repeat steps 1 and 2 for each IDNAC output you want to use.

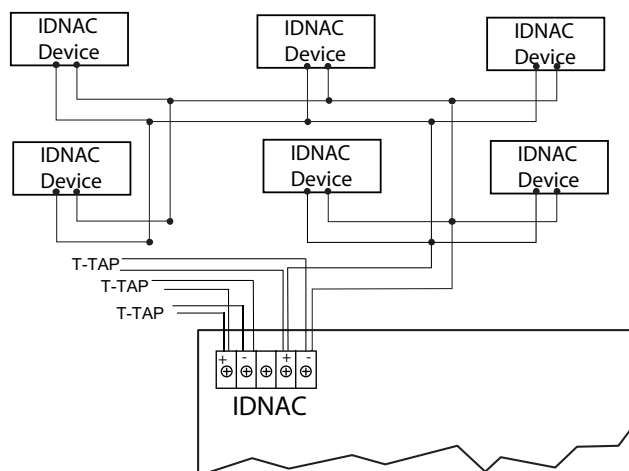


Figure 4-3. Class B Wiring

- Notes:**
1. Notification appliances are rated per individual nameplate label. Maintain correct polarity on terminal connections.
 2. Each IDNAC + and - terminal is rated for 2 identical wires. This allows up to 4 Class B T-TAP circuits directly from each IDNAC terminal block. See Figure 4-3.

IDNAC Section, *Continued*

Compatible Devices and Appliances

The devices and appliances listed in Table 4-8 are compatible with the IDNAC power supply. Notification devices are synchronized within the 4007ES system, including any attached 4009 series NAC extenders.

Table 4-8. Compatible Devices and Appliances

Addressable Device Description		Model Numbers			
4009 IDNAC Repeater		4009-9601 (platinum) 4009-9602 (red)			
Dual Class A Isolator (DCAI)		4007-9804			
TrueAlert Addressable Isolator+ module		4905-9929			
Addressable Device Appliance Description	TrueAlert ES Appliance Model Numbers			TrueAlert Appliance Model Numbers	
Audible Only Horn notification appliances	49AO-WRF	49AO-WWF	49MT-WRS-BA ¹	4901-9850	4901-9853
	49AO-WRF-BA	49AO-WWF-BA	49MT-WWS-BA ¹		
	49AO-WRS-BA	49AO-WWS-BA	49MT-WWF-BA ¹		
	49AO-WRS	49MT-WRF ¹	49MT-APPLW ¹		
	49AO-WRQ	49MT-WRF-BA ¹			
Audible/Visible notification appliances	49AV-WRF	49AV-WWF-BA	49MTV-WRF-BA ²	4906-9227	4906-9229
	49AV-WWF	49AV-WWS-BA	49MTV-WRS-BA ²		
	49AV-WRF-BA	49AV-WRS	49MTV-WWF ²		
	49AV-WRQ-BA	49AV-WRQ	49MTV-WWF-BA ²		
	49AV-WRS-BA	49MTV-WRF ²	49MTV-WWS-BA ²		
		49MTV-APPLW ²			4906-9230
Visible Only notification appliances	49VO-WRF	49VO-WRS-BA	49VO-WRS	4906-9201	4906-9203
	49VO-WWF	49VO-WWA-BA	49VO-WWS		
	49VO-WRA-A	49VO-WWF-BA	49VO-WWA		
	49VO-WWA-A	49VO-WWS-BA	49VO-WWQ		
	49VO-WRA-BA	49VO-WRA-A-BA	49VO-WRA		
	49VO-WRF-BA	49VO-WWA-A-BA	49VO-WRQ		
	49VO-WRQ-BA	49VO-WWS-A-BA	49VO-APPLWE		
Speaker/Visible notification appliances (visible/strobe)				4906-9251	4906-9254
				4906-9253	
Audible/Visible Weatherproof notification appliances	49AV-WRFO	49AV-WWFO-BA	49AV-WRQO-C	N/A	
	49AV-WRFO-BA	49AV-APPLW-CO	49AV-WRFO-C		
Visible Only Weatherproof notification appliances	49VO-WRFO	49VO-WWFO-BA	49VO-WRQO-C	N/A	
	49VO-WRFO-BA	49VO-APPLW-CO	49VO-WRQO-C		
	49VO-WRSO-BA	49VO-WRFO-C	49VO-WRSO		
TrueAlert Adapter	N/A			4905-9816	
LED Visible Only Wall Mount	59VO-WRF	59VO-WRFAB	59VO-WWFAB-BA		
	59VO-WRF-BA	59VO-WRFAB-BA	59VO-APPLWR		
	59VO-WWF	59VO-WWFAB	59VO-APPLWW		
	59VO-WWF-BA				
LED Visible Only High Candela Wall Mount	59VO-WRFH-BA	59VO-WRFABH-BA	59VO-APPLWRH		
	59VO-WWFH-BA	59VO-WWFABH-BA	59VO-APPLWWH		
LED Visible Only Wall Mount Weatherproof	59VO-WRFO	59VO-WRFABO	59VO-APPLWR-O		
	59VO-WRFO-BA	59VO-WRFABO-BA	59VO-APPLWW-O		
	59VO-WWFO-BA	59VO-WWWFABO-BA			
LED Visible Only High Candela Wall Mount Weatherproof	59VO-APPLWRH-O				
	59VO-APPLWWH-O				
LED Audible/Visible Wall Mount	59AV-WRF	59AV-WRFAB	59AV-WWFAB-BA		
	59AV-WRF-BA	59AV-WRFAB-BA	59AV-APPLWR		
	59AV-WWF	59AV-WWFAB	59AV-APPLWW		
	59AV-WWF-BA				

Table 4-8. Compatible Devices and Appliances

LED Audible/Visible Wall Mount High Candela	59AV-WRFH 59AV-WRFH-BA 59AV-WWFH-BA	59AV-WRFABH 59AV-WRFABH-BA 59AV-WWFABH-BA	59AV-APPLWRH 59AV-APPLWWH		
LED Audible/Visible Wall Mount Weatherproof	59AV-WRFO 59AV-WRFO-BA 59AV-WWFO-BA	59AV-WRFABO 59AV-WRFABO-BA 59AV-WWFABO-BA	59AV-APPLWR-O 59AV-APPLWW-O		
LED Audible/Visible Wall Mount High Candela Weatherproof	59AV-APPLWRH-O 59AV-APPLWWH-O				
Audible Only Wall Mount	59AO-WRS 59AO-WRS-BA	59AO-WWS 59AO-WWS-BA	59AO-APPLWR 59AO-APPLWW		
Audible Only Wall Mount Weatherproof	59AO-WRSO 59AO-WRSO-BA	59AO-WWSO-BA 59AO-APPLWR-O	59AO-APPLWW-O		
Plate	59AP-EUROBB				
Notes: 1. Maximum thirty-two (32) 49MT appliances per circuit. 2. Maximum twenty-one (21) 49MTV appliances per circuit.					

Auxiliary Relays Section

Table 4-9. Auxiliary Relays Specifications

Auxiliary Relays Section Overview

Electrical Specifications:	
Relay circuit rated to switch:	2 A at 30 VAC or 30 VDC, resistive load.
Contacts:	Relay contacts are Form C dry contacts. Transorbs provide suppression to Earth. Do not switch voltages greater than rating, or damage may result.
Power	
When power through auxiliary contacts is provided by the power supply, wiring is power-limited.	
When power through auxiliary contacts is not provided by the power supply, use in-line fuse holder 208-165 with 208-183, 1A fuse with attached cap (supplied separately). If the power source is not power-limited to the requirements of UL864, wiring is to be segregated to the non-power-limited spaces of the cabinet.	
<p>Note: The Aux Relays terminals on the IDNAC power supply are controlled by two on-board programmable relays. The relay circuits are not supervised</p>	

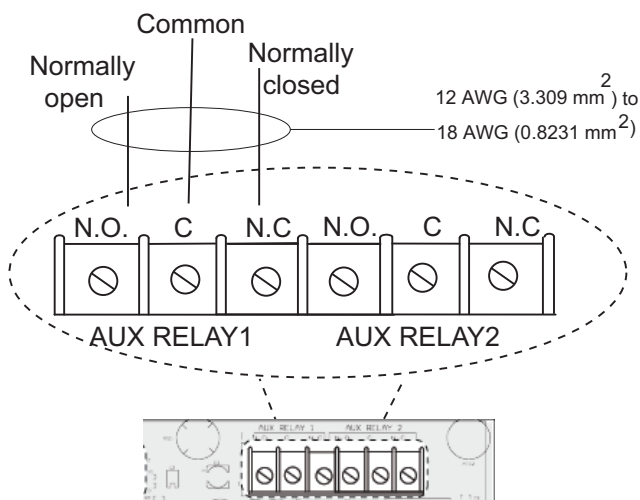


Figure 4-4. Aux Relay Terminals

Troubleshooting

Troubleshooting The code produced by the lit yellow indicator LEDs corresponds to a trouble that is either occurring on the System or on the SLC Channels. See Table 4-10 for the 4007ES LED definitions and Table 4-11 for the LEDs and their codes.

IDNAC Channel troubles are indicated by yellow LEDs labeled IDNAC TBL and letters A to D. When the IDNAC TBL LED is lit, the IDNAC Channel is experiencing a trouble. Refer to Table 4-1 for the trouble codes for LEDs A to D. The LED SCROLL pushbutton can be used to scroll through multiple trouble indicators.

Table 4-10. 4007ES Indicator LEDs.

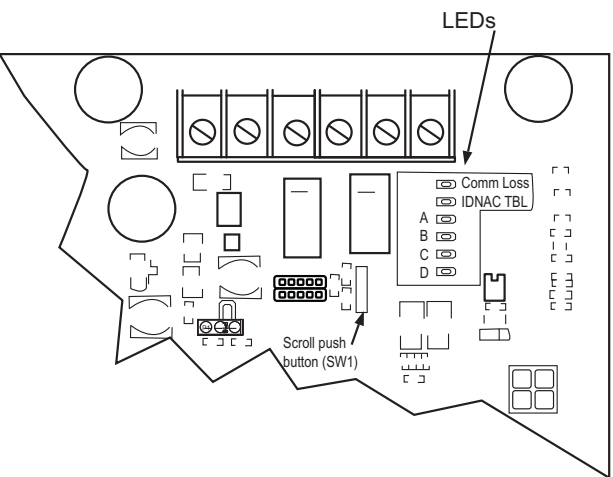
LED: A, B, C, D	Signal various trouble conditions on the 4007ES and its SLC. Refer to Table 4-11 and Table 4-12 for troubles details	
IDNAC TBL	When On steady, refer to Table 4-11 for detailed troubles indicated by LEDs A-D	
LED COMM Loss	Indicates that the communication between the IDNAC power supply and the CPU is lost	
Scroll Push Button (SW1)	Used to scroll through multiple troubles, since only one trouble can be displayed at a time.	

Figure 4-5. LEDs on the 4007ES Power Supply

SLC Channel Trouble LED Codes

SLC Channel troubles are indicated by LEDs A to D, as well as IDNAC. Refer to Table 4-11 for the description of the LEDs.

Table 4-11. SLC Channel Trouble LED Codes

































































IDNAC	A	B	C	D	Description:
					IDNAC Channel Fail: The channel is not responding.
					IDNAC Short Circuit: There is a short circuit on the channel.
					IDNAC Duplicate Device: There are 2 devices on the channel that have the same address.
					IDNAC Missing device: There is a device programmed on the channel that it cannot detect.
					IDNAC Extra Device: The channel is detecting the address of a device that has not been programmed.
					IDNAC Wrong Device: The channel is detecting a device that had been programmed as the wrong "type".
					IDNAC Controller Fail: The channel can no longer detect the controller.
					IDNAC Address Out of Range: There is a device with an unsupported address on the channel.
					IDNAC Isolator Trouble: An isolator on the channel is open.
					IDNAC Overcurrent: A device on the Channel is drawing too much current.
					IDNAC Earth Trouble: There is a positive or a negative earth fault on the channel.

Troubleshooting, Continued

System Trouble LED Codes

System troubles are indicated by LEDs A to D.

Table 4-12. System Trouble LED Codes

A	B	C	D	Description:
				No Trouble: There are no troubles detected on the system.
				AC Fail: The AC power is disconnected but the battery is working.
				Low Battery: The battery voltage is under 22.8 V.
				Battery Cutout: The Battery voltage is below 19.4 V. At this point, if jumper P16 is set to "battery disconnect when depleted", the system will shut down.
				Depleted/Missing Battery: If jumper P16 is not set to "battery disconnect when depleted", this trouble will appear when the battery voltage is below 19.4 V. This code will also appear if the system cannot detect the battery.
				Charger Trouble: There is a trouble with the battery charger.
				Card Overcurrent: The module is drawing too much current.
				Negative Earth: The circuit is shorted to ground on the negative wire.
				Positive Earth: The circuit is shorted to ground on the positive wire.
				Negative Earth on RUI: The RUI circuit is shorted to ground on the negative wire.
				Positive Earth on RUI: The RUI circuit is shorted to ground on the positive wire.
				City Circuit 1 Trouble: The trouble configured on the City Card's circuit one has been triggered.
				City Circuit 2 Trouble: The trouble configured on the City Card's circuit two has been triggered.
				AuxNAC Open: Depending on the chosen configuration, either the Aux circuit or the NAC circuit is open.
				AuxNAC Short: Depending on the chosen configuration, either the Aux circuit or the NAC circuit is experiencing a short circuit.
				AuxNAC Overcurrent: Depending on the chosen configuration, either the Aux circuit or the NAC circuit is drawing too much current.

Chapter 5

4007ES Power Supplies

Introduction This chapter describes the common sections of both the 4007ES Hybrid NAC power supply and the 4007ES IDNAC power supply.

In this chapter

Power Supplies Specifications.....	5-1	Wiring Guidelines	5-1
IDNet Section Overview.....	5-2	Specifications	5-2
Device Addressing (Class A and Class B).....	5-2	Wiring	5-3
AUX PWR/SNAC Overview.....	5-5	RUI Overview.....	5-7
Troubleshooting	5-8		

Power Supplies Specifications

Operating Conditions:	
Operating Temperature Range	32°F - 120°F (0°C-49°C).
Operating Humidity Range	Up to 93% relative humidity at 90°F (32°C), non-condensing.

Wiring Guidelines **Class A** wiring allows devices to communicate with the FACP even in the event of a single open circuit somewhere on the loop. Class A wiring requires that two wires are routed from the power supply to each device, and then back again to the power supply.

Class B wiring allows “T” tapping, and therefore requires less cable distance per installation than Class A.

Auxiliary power only: Supervision must be provided if the auxiliary power circuit is to be wired as a power-limited circuit. In order to connect a circuit using PL wiring, the devices being powered must all be addressable, or a UL Listed EOL relay must be used to supervise the circuit.

IDNet Section

IDNet Section Overview

The power supply provides an isolated IDNet channel. This section is compatible with IDNet communicating initiating devices and allows the system CPU to communicate with up to 250 peripheral devices, such as smoke detectors and pull stations.

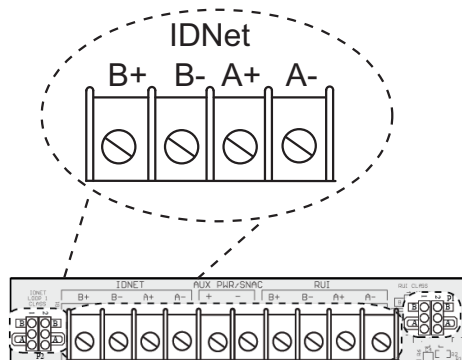


Figure 5-1. IDNet on the Power Supply

Specifications

Table 5-1. IDNet Specifications

Supports:	Up to 250 addressable IDNet devices and up to 43 coded piezo sounders may be coded by the IDNet channel. Base panel supports 100 points, with 75 additional points per additional IDNet+ Loop Expansion Module (refer to manual 579-1106).
Electrical Specifications:	
Channel Voltage to Remote Devices	30 VDC (normal); 35 VDC Alarm. Data rate is 3333 bps. Output circuits are supervised and power-limited.
Earth Detection Threshold:	10k ohms minimum from either positive or negative terminals.
Circuit Requirements:	Refer to Table 3-2 for the IDNet current on a NAC power supply. Refer to Table 4-2 for the IDNet current on a IDNAC power supply.
LEDS:	
For detailed information on LEDs troubleshooting, refer to Table 5-7 and Table 5-8 in the Troubleshooting section.	

Device Addressing (Class A and Class B)

The IDNet section can be wired as a Class A circuit or a Class B circuit.

Class A wiring provides an alternate communication path that allows communication to all devices to be maintained when a single open circuit fault occurs. Class A wiring requires two wires to be routed from the IDNet Primary Terminals (B+, B-) to each device, and then back to the IDNet Secondary Terminals (A+, A-). Wiring is in/out, “T” tapping is not allowed.

Class B wiring allows “T” tapping. IDNet wiring is inherently supervised due to individual device level communications. EOL resistors are not required.

IDNet Section, *Continued*

- Device Addressing (Class A and Class B)**
- If no remote isolators or isolator bases are on the loops, device addressing can be assigned without concern for sequence.
 - **If remote isolators or isolator bases are on the loops**, the required addressing approach is to start from the “B” side and assign each successive isolator a higher address than the isolator it precedes.
 - **For Class B wiring only**, the “A” output and “B” output per loop are connected together in parallel via a jumper.

Wiring

Wiring Parameters

Table 5-2 identifies the IDNet wiring parameters that must be considered when installing this card. For additional wiring information, refer to document 900-408, Simplex Addressable Fire Alarm Panels Field Wiring Specifications.

Table 5-2. IDNet Wiring Parameters

IDNet Wiring Capacitance Parameters		
Parameter	Value	
Maximum Supported Channel Capacitance	The sum of line-to-line capacitance, plus the capacitance of either line-to-shield (if shield is present) = 0.6 μ F	
IDNet Wiring Class A and Class B Limits		
Channel Loading	Up to 125 devices	126 to 250 devices
Max. resistance to compatible devices. (Include the 2081-9044 Overvoltage Protector resistance when applicable)	50 ohms maximum	35 ohms maximum
Maximum wiring distance*: (18 AWG, 16 AWG, 14 AWG, 12 AWG)	4000 ft (1219 m)	2500 ft (762 m)
<p>*Notes:</p> <ul style="list-style-type: none"> • The "maximum wiring distance" is the maximum distance from both the IDNet control terminals (primary and return) to the farthest device on the circuit. See Figure 5-2. • Maximum wiring distance is determined by either reaching the maximum resistance, the maximum capacitance, or the stated maximum distance, whichever occurs first. • The total circuit cable load (amount of cable used) must not exceed 12,500ft (3,8km). 		
<div style="text-align: center;"> </div> <p style="text-align: center;">Figure 5-2. Maximum Wiring Distance</p>		
IDNet Wiring Considerations using 2081-9044 Overvoltage Protectors (2081-9044 is UL listed to Standard 1459, <i>Standard for Telephone Equipment</i>)	External wiring must be shielded (for lightning suppression) and 2081-9044 Overvoltage Protectors must be installed at building exit and entrance locations. For more information, refer to the <i>Model 2081-9044 Overvoltage Protector Installation Instructions</i> , 579-832.	
	Capacitance; each protector adds 0.006 μ F across the connected line.	
	Resistance; each protector adds 3 ohms per line of series resistance; both IDNet wires are protected; 6 ohms per protector will be added to total loop resistance.	
	Maximum distance of a single protected wiring run is 3270 ft (1 km).	
	Refer to document number 574-832, <i>2081-9044 Overvoltage Protector Installation Instructions</i> , for additional information.	

IDNet Section, *Continued*

Wiring

Class A Wiring

To wire IDNet section as a Class A circuit.

1. Make sure the jumpers on P2 are set to positions 3-5 and 4-6.
2. Route the wiring from the IDNet Circuit Primary Terminals (B+, B-) on TB1 of the IDNet to the corresponding inputs on the first device.
3. Route wiring from the first device to the next as in/out. See Figure 5-3. Repeat for each device.
4. Route the wiring from the last device to the terminals A+, A- to the panel, maintaining polarity.
5. Shielded wire is not recommended. If shielded wires are present, cut and tape off the shield at each end in the panel to prevent it from coming into contact with other components. Metallic continuity of the shield must be maintained and insulated throughout the entire length of the cable.

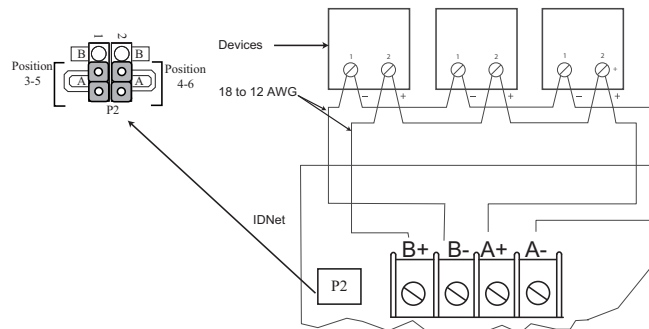


Figure 5-3. IDNet Class A Wiring

Class B Wiring

When wiring the circuit as Class B, both the B+, B- and A+, A- terminals are available for parallel connections. Within the IDNet circuitry, A+ is connected to B+, and A- is connected to B- so circuits can stem from either one. Additionally, two wires can be connected to each screw terminal.

To wire IDNet as a Class B circuit:

1. Set the jumpers on P2 to positions 1-3 and 2-4.
2. Route wiring from the IDNet Circuit Primary Terminals (B+, B-) to the corresponding inputs on the first device.
It is possible to add up to 4 circuits on the terminal block when using Class B wiring. See Figure 5-4 for the diagram.
3. Route wiring from the first device to the next as in/out as shown in Figure 5-4. Repeat for each device.
4. Shielded wire is not recommended. If shielded wires are present, cut and tape off the shield at each end (in the panel and at the last device in each run) in the panel to prevent it from coming into contact with other components. Metallic continuity of the shield must be maintained and insulated throughout the entire length of the cable.

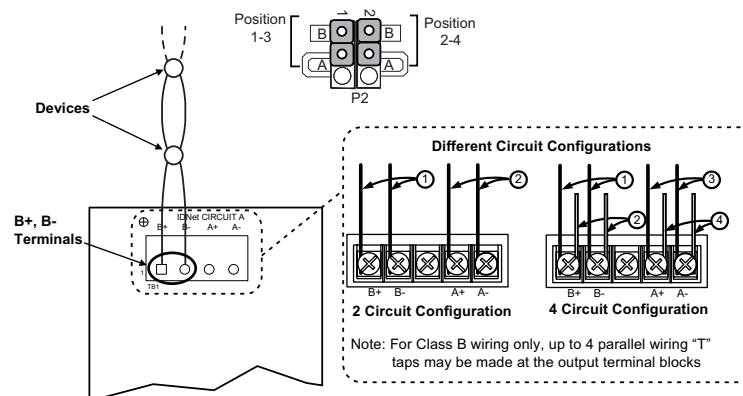


Figure 5-4. IDNet Class B Wiring

Auxiliary Power Section

AUX PWR/SNAC Overview

The AUX PWR/SNAC terminal block is located on the top left corner of the power supply. Through the ES Panel Programmer, this point can be configured as either a 24V Auxiliary (AUX) power or as a simple reverse polarity Notification Appliance Circuit (NAC). This circuit does not support TrueAlert addressable devices nor non-addressable smartsync appliances. The AUX PWR/SNAC is rated 2 A maximum. Current used is deducted from the total available power supply current.

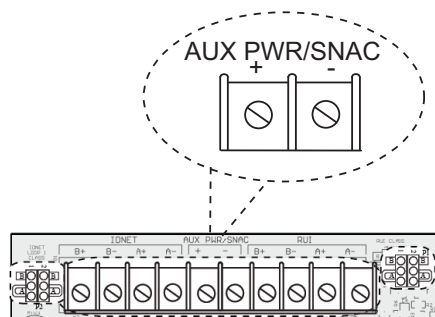


Figure 5-5. AUX/SNAC Terminal

Table 5-3. AUX/SNAC Wiring Specification

Output rating:	29.5 V maximum
Current Rating:	2 A, maximum.
Earth Detection Threshold	10K ohms minimum from either positive or negative terminals.
Wiring Gauge:	18 AWG (min.) to 12 AWG (max.).

- Wiring Notes:**
1. All wiring from the AUX/SNAC is power limited.
 2. Conductors must test free of all grounds and stray voltages before connection to appliances and panel.
 3. Terminate Class B NACs as shown using 733- 894 EOL. For Canadian applications, mount end-of-line resistor to TEPG-US Model 431537 EOL plate in accordance with ULC-S527.

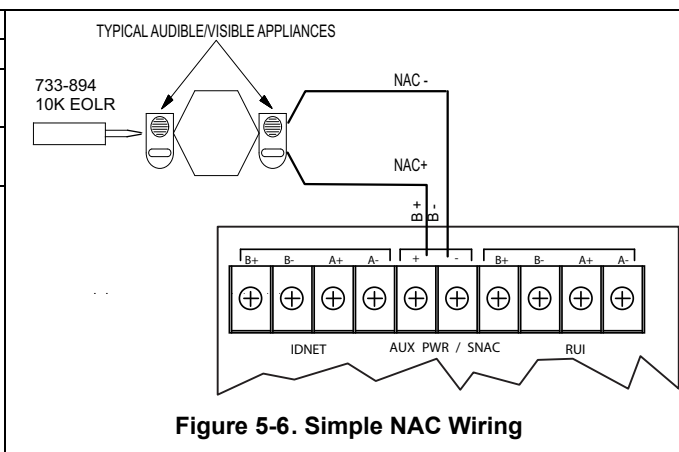


Figure 5-6. Simple NAC Wiring

4. If wiring is routed outside the building, use of a listed secondary protector is required. Use Simplex 2081-9028 (rated 5 A) or 2081-9044 (rated 0.2 A). A protector must be installed at each building exit/entrance. Each 2081-9028 adds 0.2 ohms wiring resistance. 2081-9044 adds 6 ohms wiring resistance, and will greatly reduce wiring distance.

Table 5-4. Simple NAC Wiring Limits

Alarm Current	20 AWG	18 AWG	16AWG	14 AWG	12 AWG	Line Resistance (Ohms)
0.25	617 ft	981 ft	1560 ft	2480 ft	3944 ft	14.00
0.50	308 ft	490 ft	780 ft	1240 ft	1972 ft	7.00
0.75	206 ft	327 ft	520 ft	827 ft	1315 ft	4.67
1.00	154 ft	245 ft	390 ft	620 ft	986 ft	3.50
1.25	123 ft	196 ft	312 ft	496 ft	789 ft	2.80
1.50	103 ft	163 ft	260 ft	413 ft	657 ft	2.33
1.75	88 ft	140 ft	223 ft	354 ft	563 ft	2.00
2.00	77 ft	123 ft	195 ft	310 ft	493 ft	1.75

Note: This Chart indicates the maximum distance for 1/4 -2A loads. Wiring distance is from the panel terminals to the last appliance. Use of a 2081-9044 protector reduces wiring distance.

Auxiliary Power Section, *Continued*

AUX PWR/SNAC Overview

Output of AUX or NAC is 24V nominal. Minimum voltage is 19.5 @ minimum battery; maximum is 29.5V. Aux Loads include the compatible 4007ES Annunciators series, 4090 series of IDNet ZAMs and IAMs and any listed device operating within the output limits of the AUX. Calculate wiring loss for actual devices used. Compatible Appliances include 4904 series of free-run strobes, 4901 series non-smartsync horns, 4098 series TrueAlarm Sounder Base and 4009 NAC extenders, used in reverse-polarity activation mode.

Table 5-5. Compatible Devices with 24V Aux. Power

2088-series relays	2098-series four-wire smoke detectors
4098-series four-wire smoke detectors	4190-9050/9051 4-20mA ZAMs
4090-series IDNet ZAMs	4100-7401, -7402 Graphic Annunciator Modules
4602-6001, 4602-7001, 4602-7101, and 4602-9150 RCU/SCU Modules	

RUI Section

RUI Overview

The 4007ES RUI channel supports the following devices:

- 4100-7401, 7402 Graphic Modules
- 4602-6001, -7001, 7101, 9150 RCU/SCU Modules

Wire from the power supply's RUI channel on terminal block TB1 to each RUI device. The wiring may be Class A or Class B.

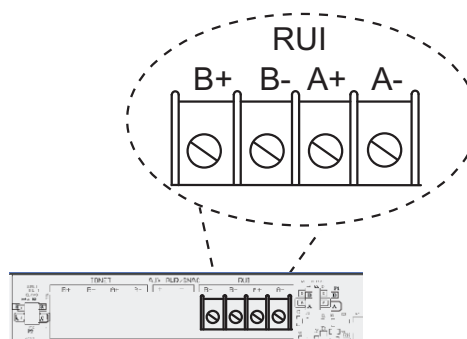


Figure 5-7 . Location of the RUI Terminal Block

Table 5-6. RUI Specifications

Supports:	up to 10 RUI devices.
Electrical Specifications:	
Channel Voltage	29.5 V nominal.
Earth Detection Threshold	10K ohms minimum from either positive or negative terminals.
Capacitance	The maximum allowed line-to-line capacitance (“+” to “-” terminals) is 0.58uF. For applications with shielded wire, be sure that the total capacitance from line-to-line plus the shield to either line is not more than 0.58uF.
Wiring	
Maximum wiring distance: (18 AWG, 16 AWG, 14 AWG, 12 AWG)	2,500 feet (762 m) to device from PSU card.
Maximum “T” tapping length	10,000 feet (3,048 m).
Notes: Maintain correct polarity on terminal connections. Do not loop wires under terminals. If Class A is not used, configure jumpers P1 accordingly. Shield wire is not required. Twisted wire is recommended for improved noise immunity.	

Figure 5-8 depicts Class A and Class B wiring.

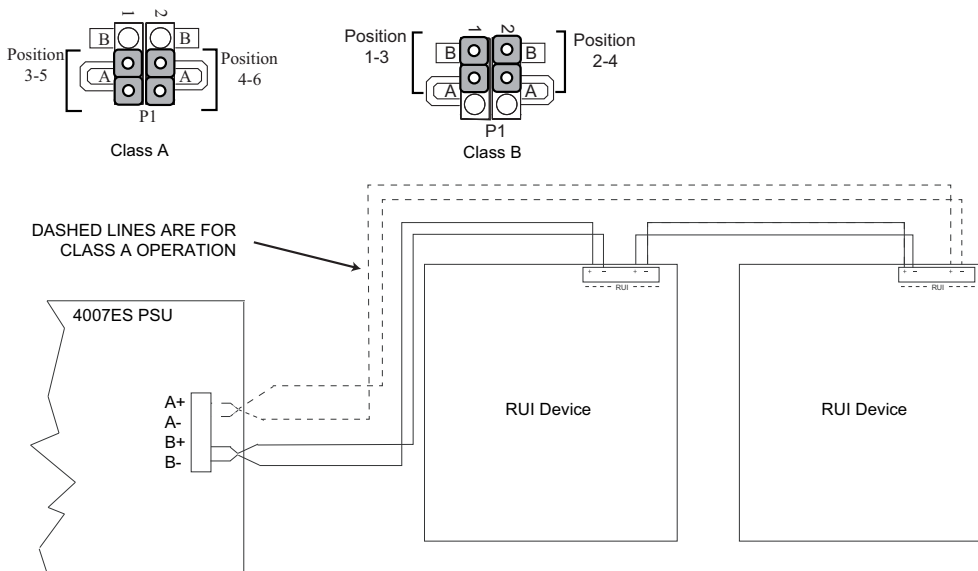


Figure 5-8. RUI Wiring to the Host Panel

Troubleshooting

Troubleshooting The code produced by the lit indicator LEDs corresponds to a trouble occurring on the system. See Table 5-7 for the IDNet LED definitions and Table 5-8 the 4007ES trouble messages.

Table 5-7. 4007ES System Indicator LEDs

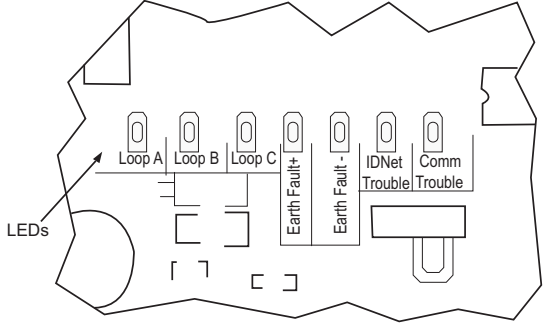
Comm Trouble	Normally off. Turns on steady if the IDNet is not communicating with the FACP CPU.	
IDNet trouble	Normally off. Illuminates to indicate a problem with the IDNet channel: <ul style="list-style-type: none"> • Channel failure. • Line short. • Class A failure or an open line. 	
Earth fault+	Illuminates to indicate a positive earth fault.	
Earth fault -	Illuminates to indicate a negative earth fault.	
IDNet LEDs: A, B, and C	Steady ON: Indicates an open or short condition on indicated loop.	

Figure 5-9. LEDs on the 4007ES Power Supplies

Table 5-8. 4007ES System Trouble Messages

Message	Definition
AC Fail	AC power is not present or is too low for proper system operation.
Low Battery	The battery voltage is below the 22.8 V nominal level by 10% or more.
Depleted/Missing Battery	The battery is either below 19.4 V or completely undetected.
Card Overcurrent	The module is drawing more current than it should. Check for faults on the circuit.
Charger Trouble	The battery charger is either defective or being heavily loaded by batteries. Read charger current at front panel, if charger current is approximately 1.4 A, batteries are likely loading the charger. Remove battery connection and measure the output. If the output is 27.6 (or close, temperature dependent), there is a possibility of depleted batteries or a bad set of batteries. Allow batteries to charge or replace them if they do not take a charge. If the current is ~1.4 A with batteries and charger voltage below 20 V, remove the batteries and recheck the charger voltage. If the voltage is around ~27.3 V, then the batteries are heavily depleted.
Extra Device	Appears if one or more extra devices (i.e., devices that have not been configured for the IDNAC or IDNet channel) are on the system. Only one message appears, regardless of the number of extra devices found.
Earth Fault Search	Comes up during the Earth Fault Search diagnostic function. Once the search is initiated, the front panel display indicates how far along the search process has progressed (10%, 25%...75%), and then shows the results of the search. The result either identifies the offending circuit or indicates that the earth fault could not be found. During the search of circuits (IDNet, NAC, IDNAC, and aux power), system alarm and trouble processing is suspended.
Positive Earth	Appears when a positive earth fault is detected.
Negative Earth	Appears when a negative earth fault is detected.
Short Circuit	Appears when a short is detected on the IDNAC/NAC channel. This status clears automatically when the short circuit is removed.
Channel Fail	Appears when each device on the IDNet channel has been configured, and when none of the devices are communicating on the channel. This message does not appear if there are no configured devices on the IDNAC channel.

Chapter 6

Optional Modules and Cards

Introduction The 4007ES can be ordered with a variety of optional cards and modules, depending on the needs.

In this chapter	8-point Zone/Relay Card 6-1 25V Regulator Module..... 6-1 IDNet+ Loop Expansion Card 6-1 LED Module 6-1 SDACT Card..... 6-1 City Circuit..... 6-1 Alarm Relay Card 6-2 TrueInsight Service Gateway 6-2 Dual Class A Isolator 6-2 Example of Combinations..... 6-2
------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

8-point Zone/Relay Card The 8-point zone/relay card (4007-9801) mounts in the 4007ES panel. Up to four cards can be added. Each card allows the monitoring of up to eight Class B or four Class A zones, or eight relay contacts.
 For more information on the 8-point zone/relay card, refer to manual 579-1103.

25V Regulator Module The 25V regulator module (4007-9802) regulates the panel power supply output received from the NAC power supply (4007ES) or the IDNAC power supply (4007ES hybrid) to a 25VDC level. The 25VDC regulated output is isolated from the panel and complies with power-limited requirements.
 For more information on the 25V regulator module, refer to manual 579-812.

IDNet+ Loop Expansion Card The IDNet+ loop expansion card (4007-9803) mounts directly on the IDNAC/NAC power supply. Up to two cards can be added. Each card adds a single Class A/Class B IDNet+ loop and increases the device capacity by 75 points.
 For more information on the IDNet+ loop expansion card, refer to manual 579-1106.

LED Module The LED module (4007-9805) allows the operator to view the simultaneous signaling of an alarm and trouble conditions on up to 24 zones. All the LEDs have configurable colors, red or yellow, except the LEDs in the last column, which are configurable as red or green.
 For more information on the LED module, refer to manual 579-1105.

SDACT Card The SDACT card (4007-9806) can be mounted in the 4007ES panel. It is used to notify a central station when an event occurs, to report changes to a specific point, to be connected to a transmitter for connection to a central station.
 For more information, refer to manual 579-954.

City Circuit The city circuit card with disconnect switches (4007-8907) and without disconnect switches (4007-9808) are used to annunciate alarms and other urgent indications to remote facilities. Each city circuit module has two configurable circuits (alarm, trouble, or supervisory reporting) and supports Reverse Polarity and Local Energy Master Box Applications. Only one city card can be installed per system. It is not available when an alarm relay is used.
 For more information on city circuits cards, refer to manual 579-955.

Optional Modules and Cards, *Continued*

Alarm Relay Card The Alarm relay card (4007-9809) is used to provide common unsupervised control functions or indications for devices. Each relay module has three circuits (alarm, trouble, and supervisory signals). It is not available when a city circuit card is used.
For more information on alarm relay card, refer to manual 579-955.

TrueInsight Service Gateway The remote service gateway (4190-6104) sends data to a remote service monitoring facility to detail troubles in the panel. When the data reaches the monitoring facility, a qualified technician is notified via e-mail and can then begin diagnostic process remotely.
For more information on the remote service gateway, refer to manual 579-953.

Dual Class A Isolator The Dual Class A Isolator (DCAI) (4007-9804) card converts the Class B output of the IDNAC SLC into two isolated Class A outputs.
For more information on the DCAI, refer to manual 579-1029.

Example of Combinations Figure 6-1, Figure 6-2, and Figure 6-3 are examples of some of the combinations that can be made in a 4007ES with the available optional cards and modules.

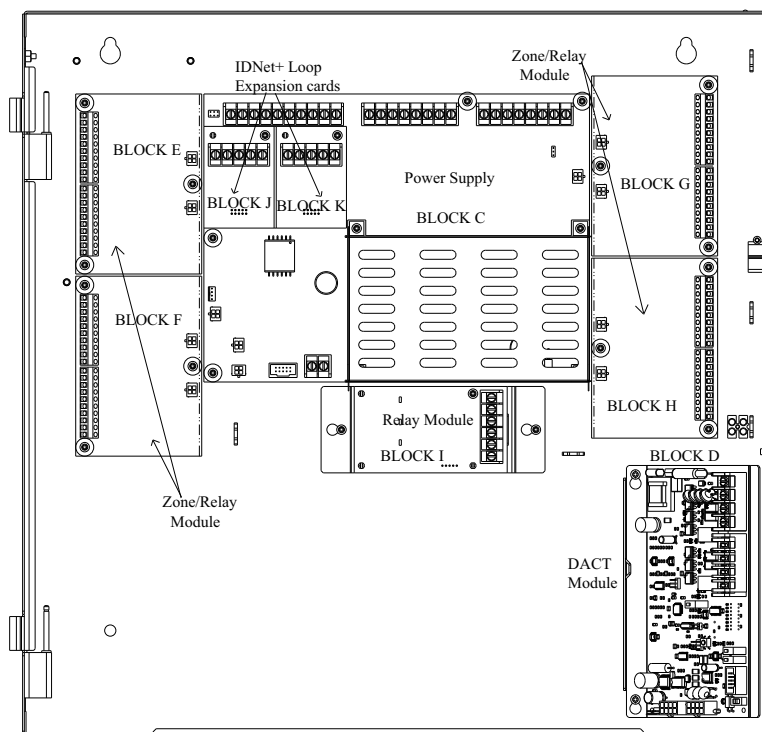


Figure 6-1. Example 1

Optional Modules and Cards, *Continued*

Example of Combinations

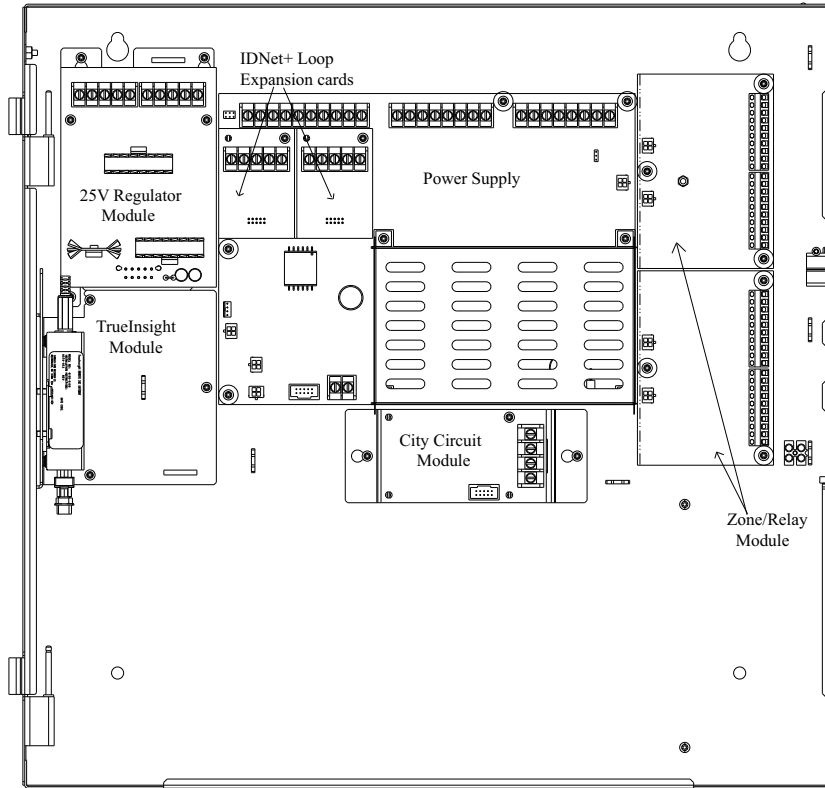


Figure 6-2. Example 2

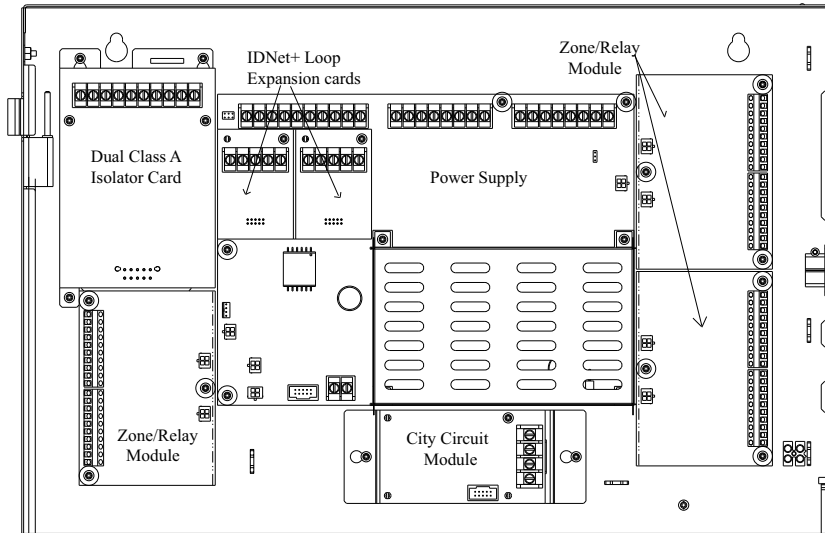


Figure 6-3. Example 3

Appendix A

ULC Programming Requirements

Common Earth Fault Ground and Common Trouble Indicator

This application monitors a system pseudo that counts the number of ground faults or troubles that occur on the system. Each time this counter increments (i.e. a ground fault or trouble occurs), a yellow LED on the operator interface panel illuminates.

Step 1. Add a Custom Control equation to monitor all ground faults:

1. Click on the Custom Control Tab
2. Add a new Equation
3. Paste the following equation:

```
[INPUTS]
STATUS ON
  A112 | ANALOG | COUNTER | GROUND TROUBLE COUNTER
OR STATUS ON
  2-0-8 | CARDSTAT | CSP | IDNET+ EARTH TROUBLE
[END INPUTS]
[OUTPUTS]
TRACK ON PRI=9,9
  P535 | DIGITAL | UTILITY |
[END OUTPUTS]
```

Note: P535 is shown as an example; use any digital point.

ULC Programming Requirements

Common Earth Fault Ground and Common Trouble Indicator

Step 2. Open Color User Interface Card Properties Dialog

1. Click on the Hardware Tab and expand the Unit 0, Box 1, Bay 1 icons to display the Color User Interface Card. (Click on the + signs to the left of the Unit 0, Box 1, and Bay 1 icons to expand them.)

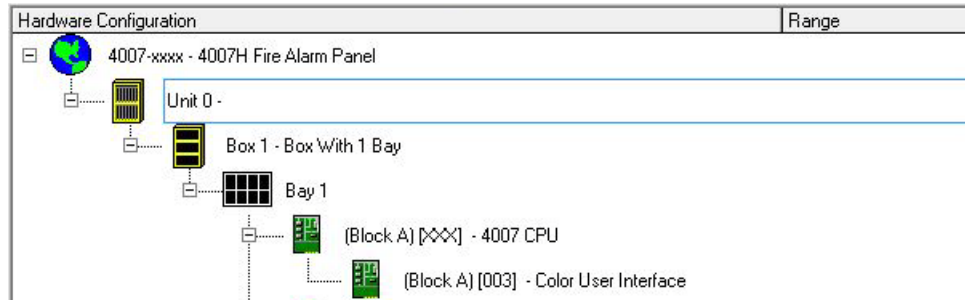


Figure A-1. Selecting the Color User Interface Card

2. Right click on the Color User Interface card icon and select **Properties**.
3. Click on the **Point Editing** tab (see figure Figure A-2)

The screenshot shows the 'Card Properties' dialog with the 'Point Editing' tab selected. It contains two tables: 'Control Keys' and 'Associated LEDs'. Below the tables are property fields for the selected point.

HW Ref	Sw Mode	Ref. Address	Ref. Label	Point Name	Poir
I0	3-1-1	SMPL		3-1-1	SW
I0	3-1-2	SMPL		3-1-2	SW
I0	3-1-3	SMPL		3-1-3	SW

HW Ref	LED Mode	Ref. Address	Ref. Label	Point Name
I0	3-2-1	SMPL		3-2-1
I0	3-2-2	SMPL		3-2-2
I0	3-2-3	SMPL		3-2-3

Properties:

HW Ref : 3-1-1
 Mode : SMPL
 Reference Address :
 Reference Label :
 Point : 3-1-1
 Point Type : SWITCH

Figure A-2. The Display Tab: Display Checkbox

Step 3. Program the LED

1. Select one of the multicolor LEDs (3-2-1, 3-2-2, or 3-2-3) to program (Figure A-3).
2. Click on the Point Type drop down list box and select LEDYELLOW.
3. Click on the Mode drop down list box and select ON.
4. Enter P535 (or your chosen digital point number from the equation) (no spaces) in the Reference Address field to program the LED for ground faults. OR
5. Enter A2 (no spaces) in the Reference Address field to program the LED to illuminate whenever a general system trouble is present.

579-1102
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