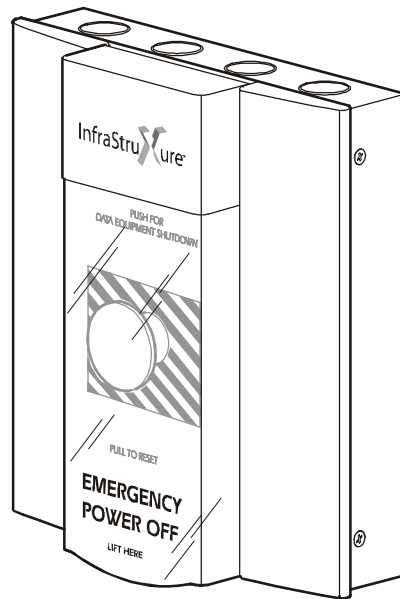


Emergency Power-Off System

The Emergency Power-Off (EPO) System consists of one or more wall-mounted, push-button EPO boxes. Each EPO box provides a single point of equipment shutdown for up to eight APC InfraStruXure devices and one third-party device (such as an upstream breaker), using normally open (NO) contact closure connections. An EPO box may be cascaded with other EPO boxes to support multiple points of equipment shutdown. See page 13 for a listing of InfraStruXure Devices that are currently compatible with this system.



Note

Although designed specifically for InfraStruXure products, the EPO system can be used for tripping any devices that fall within its parameters. See “Specifications” on page 16 to confirm proper application, and install according to the instructions in this manual.



See also

For more information about emergency power-off, see white paper #22, *Understanding Emergency Power Off (EPO)*, on the APC Web site (www.apc.com).

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Overview

Safety

Save these instructions. This manual contains important instructions that should be followed during installation and maintenance of the system.

Safety instructions for North America and Canada



Only a certified electrician can install the system and the wiring to the products it controls.



Wiring from the system to the products it controls can either be installed in conduit or installed without conduit if the wires are in accordance with Article 725 of the National Electrical Code (NFPA 70) and Section 16 of the Canadian Electrical Code (C22.1).



Only Class 2 circuits rated 30 V or less shall be connected to terminals 1–8. Class 2 circuits are defined in Article 725 of the National Electrical Code (NFPA 70) and Section 16 of the Canadian Electrical Code (C22.1). A Class 2 circuit is a source having limited voltage and energy capacity as follows:

- a. If an Inherently Limited Power Source, voltage is limited to 30 VAC or 30 VDC, and energy is limited to 8 A.
- b. If not an Inherently Limited Power Source, voltage is limited to 30 VAC or 30 VDC, energy is limited to 250 VA, and current is limited to $1000/V_{max}$. The fuse is limited to 5 A if maximum voltage is 20 V, or $100/V_{max}$ if voltage is greater than 20 V but less than 30 V.

Safety instructions for Europe, Middle East, and Africa



Only a certified electrician can install the system and the wiring to the products it controls.



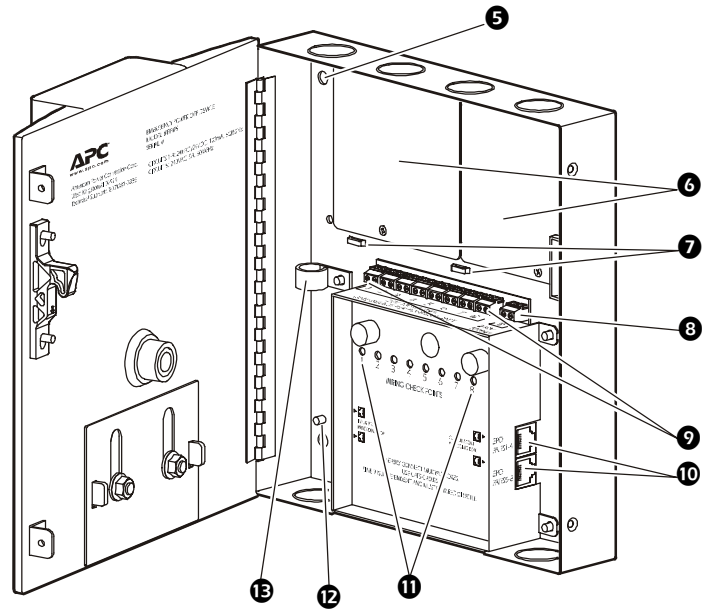
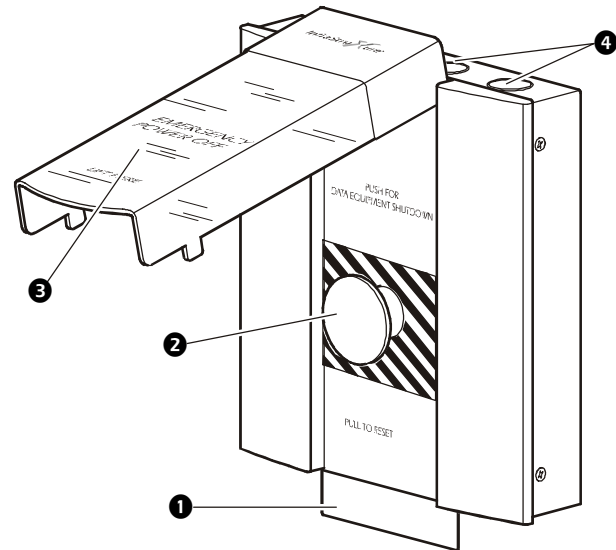
Wiring from the system to the products it controls can either be installed in conduit or without conduit if the wires are in accordance with IEC/EN 60364-5-52 or equivalent local electric code.



EPO can be achieved with either a contact closure or application of an external 24VAC or 24VDC from a SELV or PELV source. It is important to note that hazardous voltage from the Mains voltage must be isolated from the contact closure or 24VAC, 24VDC. The EPO circuit contact closure, the 24VAC, or the 24VDC are considered a SELV circuit as defined in EN60950 “Safety of Information Technology Equipment” or PELV circuit as defined in IECDD 60364-4-41 “Electrical Installations of Buildings Protection for Safety—Protection Against Electric Shock.” SELV is an abbreviation for Safety Extra Low Voltage. PELV is an abbreviation for Protective Extra Low Voltage. SELV and PELV circuits are isolated from the Mains through a safety isolating transformer, and designed so that under normal conditions the voltage is limited to 42.4V_{peak} or 60VDC.

EPO box components

- ❶ Flag
- ❷ Button
- ❸ Shield
- ❹ Knock-outs
- ❺ Mounting holes
- ❻ Blanking panels
- ❼ Wire anchors
- ❽ Auxiliary device terminal
- ❾ InfraStruXure device terminal block
- ❿ Cascading jacks
- ⓫ Wiring check points
- ⓬ Ground stud
- ⓭ Cable clamps



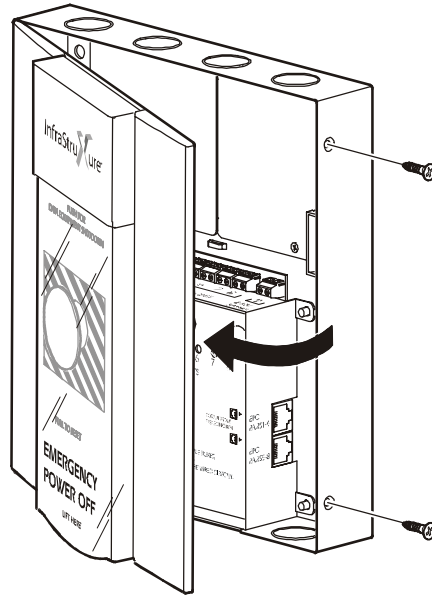
Note

Wiring, conduit, and mounting hardware are not provided.

Installation

Open the EPO System box

Remove the screws on the side of the box and open. Keep the screws for after the system is installed. The box will not close securely without the screws in place.



Mount the system on a wall

Mount the system in a readily-accessible area, on a wall near the principal entrance doors, according to NEC articles 645.10 and 645.11, IEC/EN 60354-5-537, or equivalent local regulation. There are two different procedures for mounting the system, depending on if you are running conduit along the wall (page 4) or behind the wall (page 5).



Note

In countries where conduit is not used, run the cables from the connected devices or the cascaded EPO boxes directly to the EPO using Shielding Troughs and Cable Ladders.

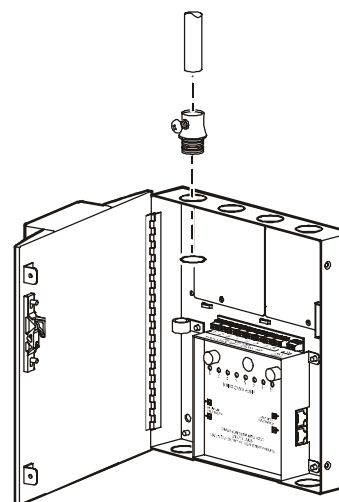
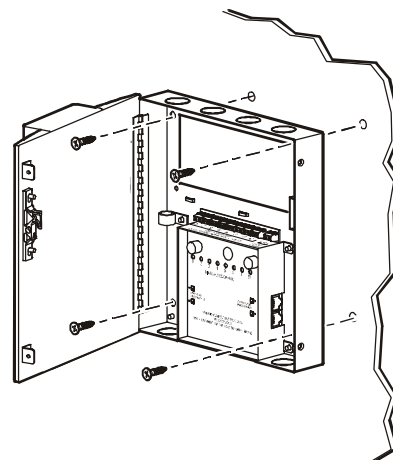
If you are running conduit (or cables) along the wall.

1. Use four ¼-inch (6.35-millimeter) screws and fasten the screws through the four mounting holes at each corner of the EPO box and into the wall. (See page 14 for a template.)
2. Run the conduit (or cables for the connected devices) to the EPO box. The conduit will contain all wiring from the connected devices and all cascading cables. The knockouts in the top and bottom of the EPO box accept ½- (13-) and ¾-(19-) inch (millimeter) conduit or clusters of cables. Remove the knockouts required for your installation.

**Note**

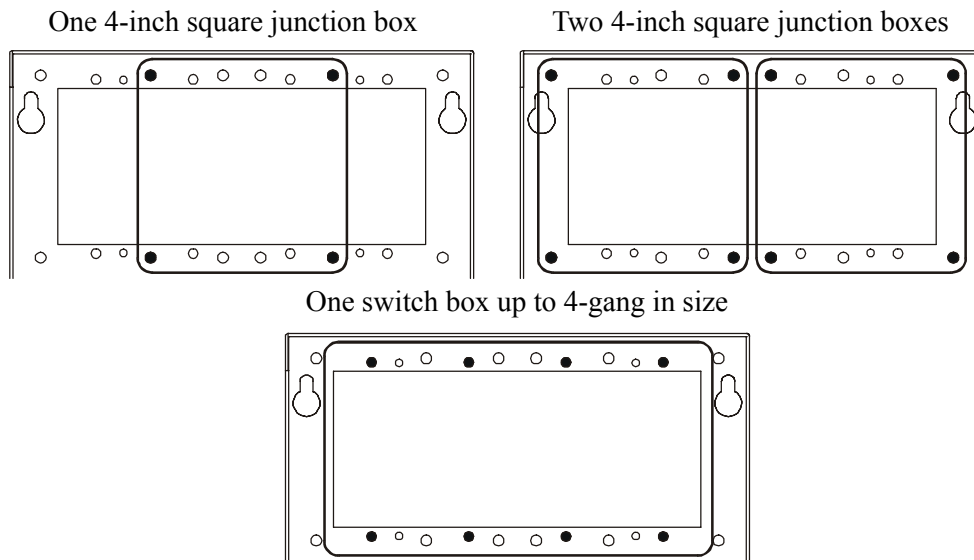
When planning your conduit requirements, consider that two cascading cables will fit in ½-inch (13-millimeter) conduit and four cascading cables will fit in ¾-inch (19-millimeter) conduit. See “Cascading multiple EPO boxes” on page 8 for more information.

3. Install an appropriate fitting with a lock-nut for each knockout that you are using.
4. Connect your conduit (or cables) to the fittings.



If you are running conduit (or cables) behind the wall.

1. Install a junction box behind the wall. The EPO box will fasten directly to the junction box. You can use one of the following options:

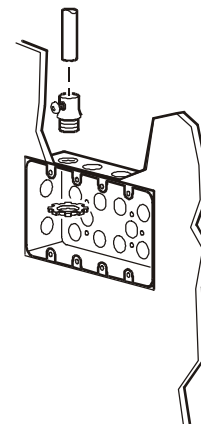


2. Run the conduit (or cables from the connected devices) to the junction or switch box. The conduit will contain all wiring from the connected devices and all cascading cables. Remove the knockouts required for your installation.

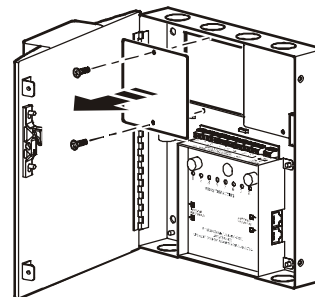


Note

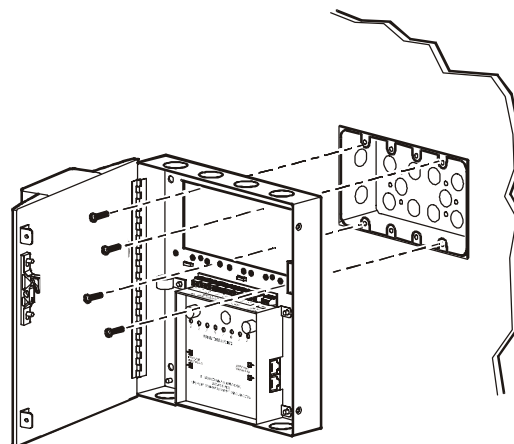
When planning your conduit requirements, consider that two cascading cables will fit in $\frac{1}{2}$ -inch (13-millimeter) conduit and four cascading cables will fit in $\frac{3}{4}$ -inch (19-millimeter) conduit. See “Cascading multiple EPO boxes” on page 8 for more information.



3. Install an appropriate fitting with a lock-nut for each knockout that you are using.
4. Connect your conduit (or cables) to the fitting.
5. Remove one or both of the blanking panels covering the window in the back of the box, as required.



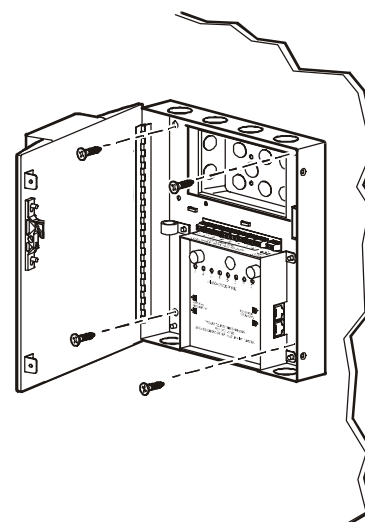
- Secure the EPO box directly to the junction or switch box with the appropriate number of 6-32 screws around the access window.



- Reinforce the EPO box with $\frac{1}{4}$ -inch (6.35-millimeter) screws in the corner mounting holes. (See page 14 for a schematic of the EPO box mounting holes.)

**Note**

The top two $\frac{1}{4}$ -inch (6.35-millimeter) mounting holes may be blocked by some junction boxes. In this instance, use only the bottom two $\frac{1}{4}$ -inch (6.35-millimeter) mounting holes for reinforcement.



Connect devices to the EPO box

Terminals 1–8 are for connecting to APC InfraStruXure devices. Terminal 9 is for connecting to an auxiliary device. Connect only one wire pair (24–18 AWG) to each terminal block.

1. Attach EPO circuits to each InfraStruXure device according to the specific instructions for that device. Use the normally open (NO) contact option.
2. Run suitable wire (24–18 AWG) from the InfraStruXure devices through the conduit to terminals 1–8 on the EPO box terminal block.



Note

Make the connections to the terminal block in numerical order (terminal 1, and then terminal 2, etc.).

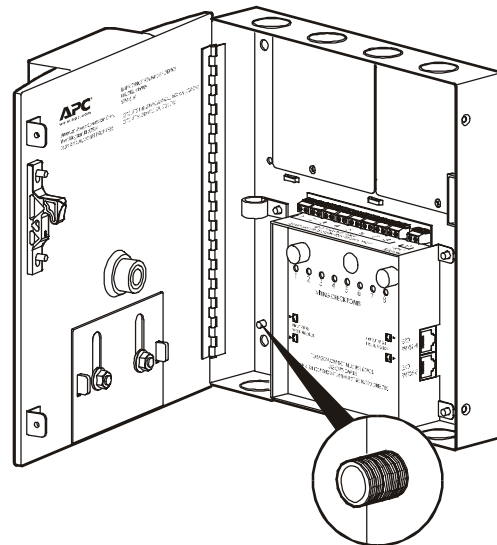
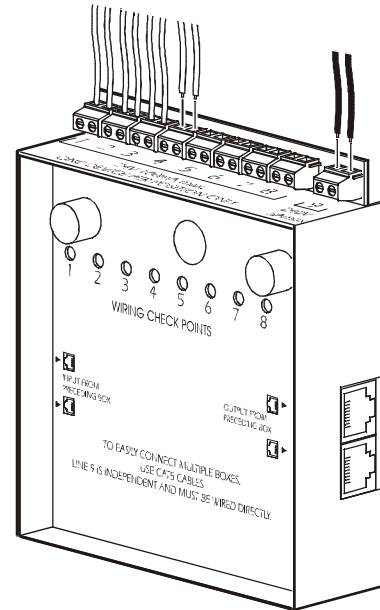
3. Run suitable wire (22–18 AWG) from the contact closure points for any auxiliary device through the conduit to terminal 9 on the EPO box terminal block.



Note

The auxiliary circuit is rated 1 A at 48 VDC/240 VAC.

4. If necessary, secure wires inside the box using the releasable wire ties (provided). Thread the wire ties through the square wire anchors in the box.
5. Connect a suitable ground or PE wire to the #8-32 ground stud in the lower left corner of the EPO box.

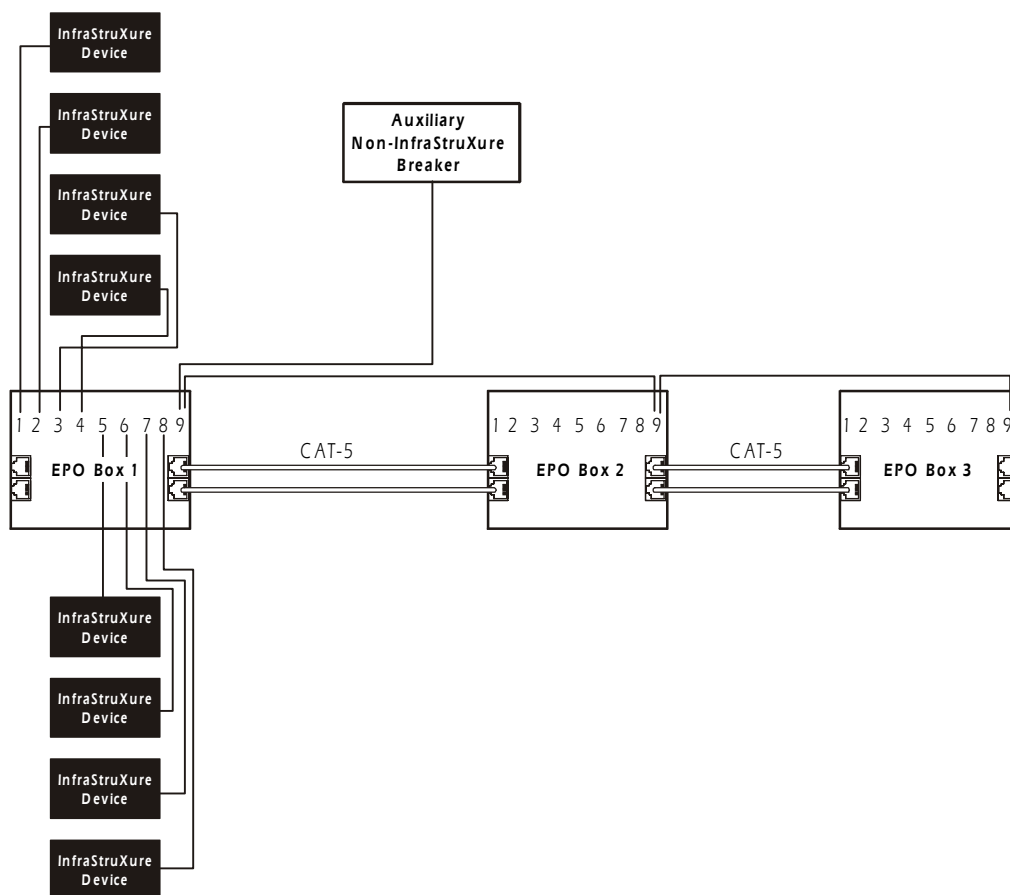


Mount additional EPO boxes

To mount additional EPO boxes at other exit doors, follow the instructions in “Mount the system on a wall” on page 3. You have two alternatives for wiring your additional EPO boxes. You can cascade the boxes so that you only wire devices to one box (see page 8), or you can wire devices directly to each EPO box (see page 10).

Cascading multiple EPO boxes

When cascading EPO boxes, connect a wire pair from each device to the first EPO box according to the procedure in “Connect devices to the EPO box” on page 7. Jumper the subsequent EPO boxes with cascading cables (standard Cat-5 cable)—this will join the EPO boxes in parallel.

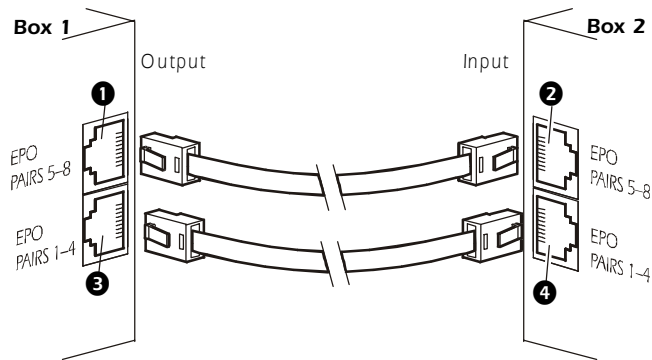


Note

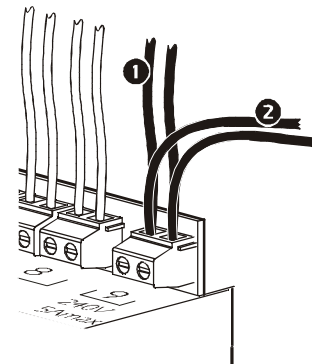
The recommended maximum total distance of wire you can run per circuit is 1000 feet (300 meters).

Cascade the InfraStruXure devices with Cat-5 cables. Connect the Cat-5 cables to the jacks inside the EPO box. Each cable can support up to four InfraStruXure device wire pairs. Follow these guidelines when connecting Cat-5 cables:

- Use only the bottom jacks (③ and ④) if you are cascading four or fewer InfraStruXure devices.
- Use both the bottom and the top jacks (①, ②, ③, and ④) if you are cascading five or more InfraStruXure devices.
- Connect the output jacks (① and ③) of the first EPO box to the input jacks (② and ④) of the second EPO box.
- Continue until all boxes are connected.
- If necessary, use the white cable clamps to secure the Cat-5 cables.



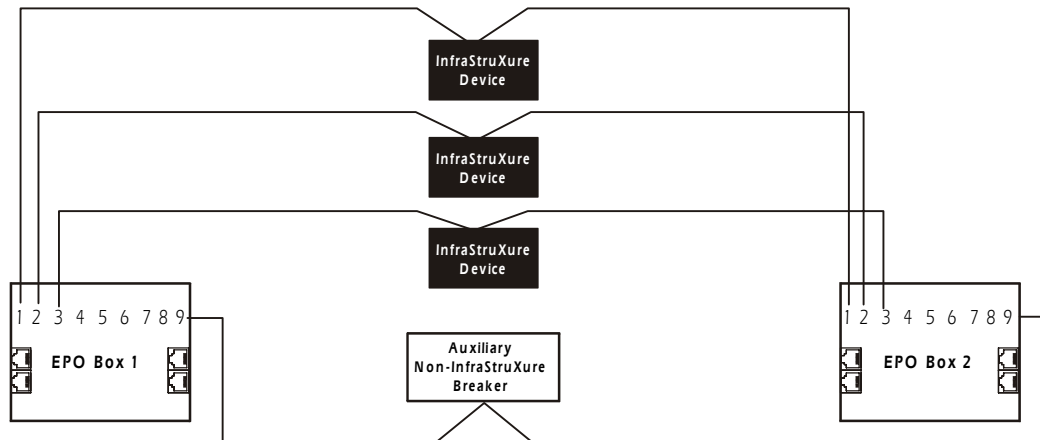
Cascade the auxiliary device with wire pairs. After you have ran wires from your auxiliary device (①) to terminal block position 9, run a second set of wires (②) from terminal block position 9 on the first EPO box to terminal block position 9 on the second EPO box. Continue until all boxes are connected. (See the diagram on page 8 for reference.)



Direct wiring alternative

If the InfraStruXure devices are centrally located between exit doors, it may be more practical to run separate wire pairs from the devices to each EPO box. This requires terminal block connections in every EPO box, rather than cascading cables between boxes.

Connect wire pairs from the Normally Open (NO) contacts on the InfraStruXure devices to each EPO box. Because this alternative results in multiple wire pairs at the terminals of the InfraStruXure devices, it is not recommended for use with more than three EPO boxes.



Verify connections at each EPO box

1. Verify that the wiring is correct before attaching critical load devices to your InfraStruXure devices:

- a. With the devices powered ON, use a small tool to press each check point, one at a time.



Warning

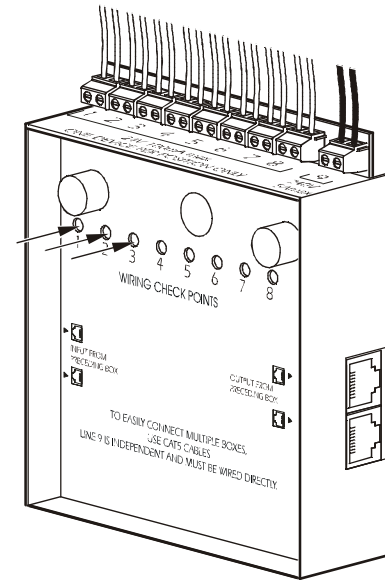
Pressing the check point will shut down the connected device and any load it is supporting.



Note

If you have an APC FM Series Precision Air Conditioning System connected, pressing the check point will shut off functionality to the unit, but it will still be powered.

- b. After you have verified the wiring, close the system box, making sure not to pinch wires or disturb connections, and secure with the screws you previously removed.
- c. As a final test, apply power to all InfraStruXure and auxiliary devices, and then press the EPO button. All connected devices should power OFF immediately. Repeat this final test at every EPO box in your system.

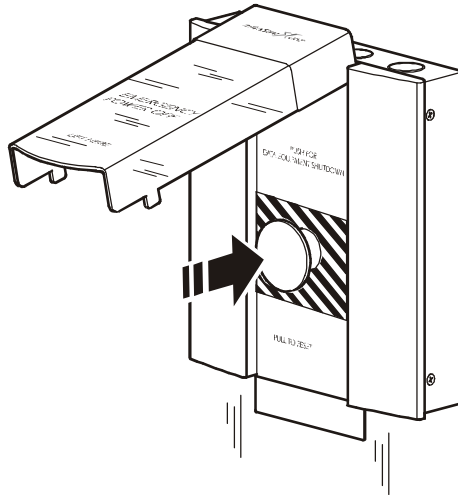


See also

The InfraStruXure PDUs have an EPO test feature that verifies EPO operation without shutting down the connected loads. Refer to your PDU operation manual for details.

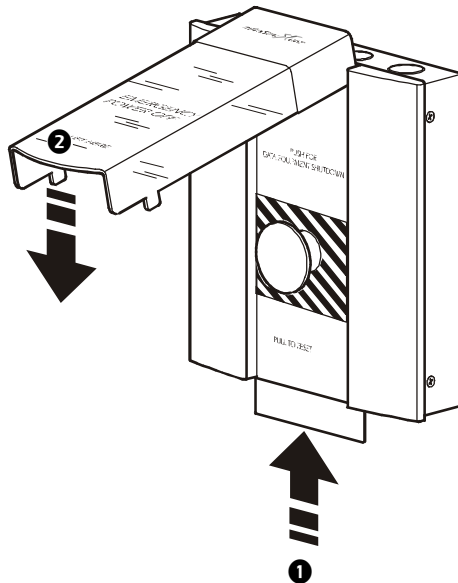
Operation

To engage the system: Lift the shield on any of the boxes that are installed and press the button. When you lift the shield, a red flag drops down from the box to indicate that the shield on the EPO box has been opened, so that if the button is engaged, you will have an easy visual mark as to which EPO box in your room has been activated.



To reset the EPO system: Pull the button toward you. Pulling the button does not bring power back to connected equipment; it only resets the EPO system.

To close the shield: Push the flag (1) back up into the box and snap the shield tight (2).



To reset your equipment: Apply power to your devices according to the procedures for each device.

APC InfraStruXure Devices

The list below is a selection of compatible APC InfraStruXure devices that you can connect to the EPO system.

InfraStruXure for Computer Rooms and Wiring Closets

Smart-UPS 3000/5000 RM

Symmetra RM UPS

InfraStruXure for Medium Data Centers

Symmetra PX UPS[†]

InfraStruXure PDU

InfraStruXure for Large Data Centers

Symmetra MW UPS

InfraStruXure PDU

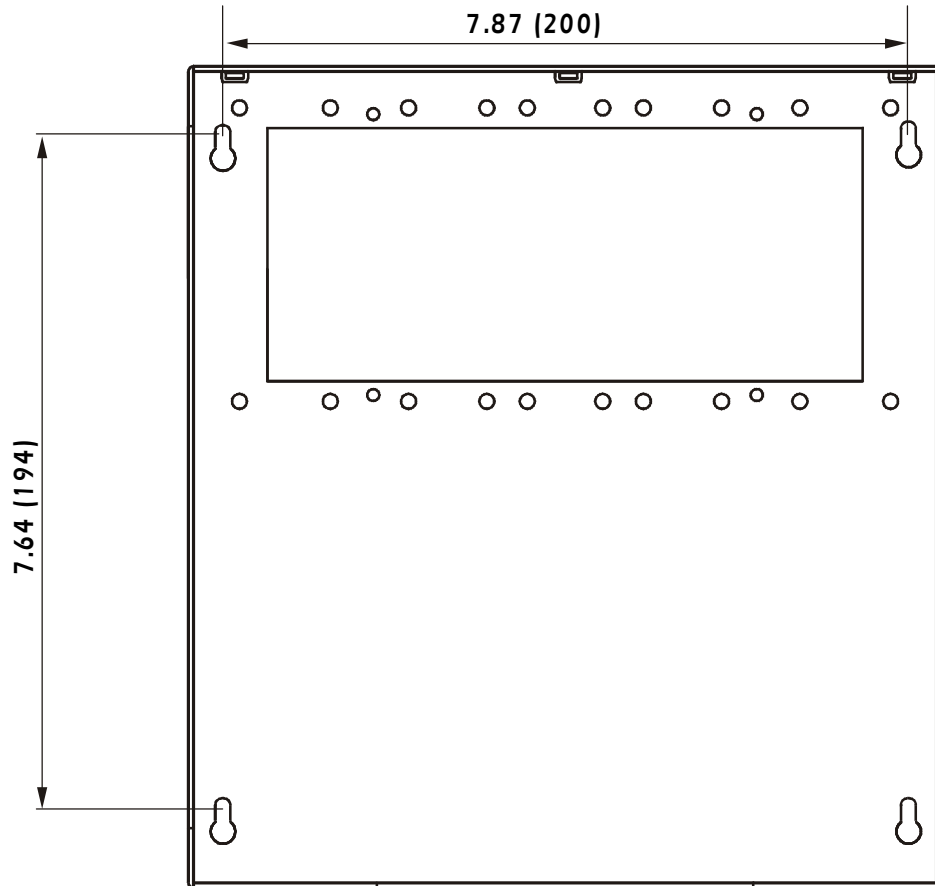
Precision Air Products

NetworkAIR™ FM

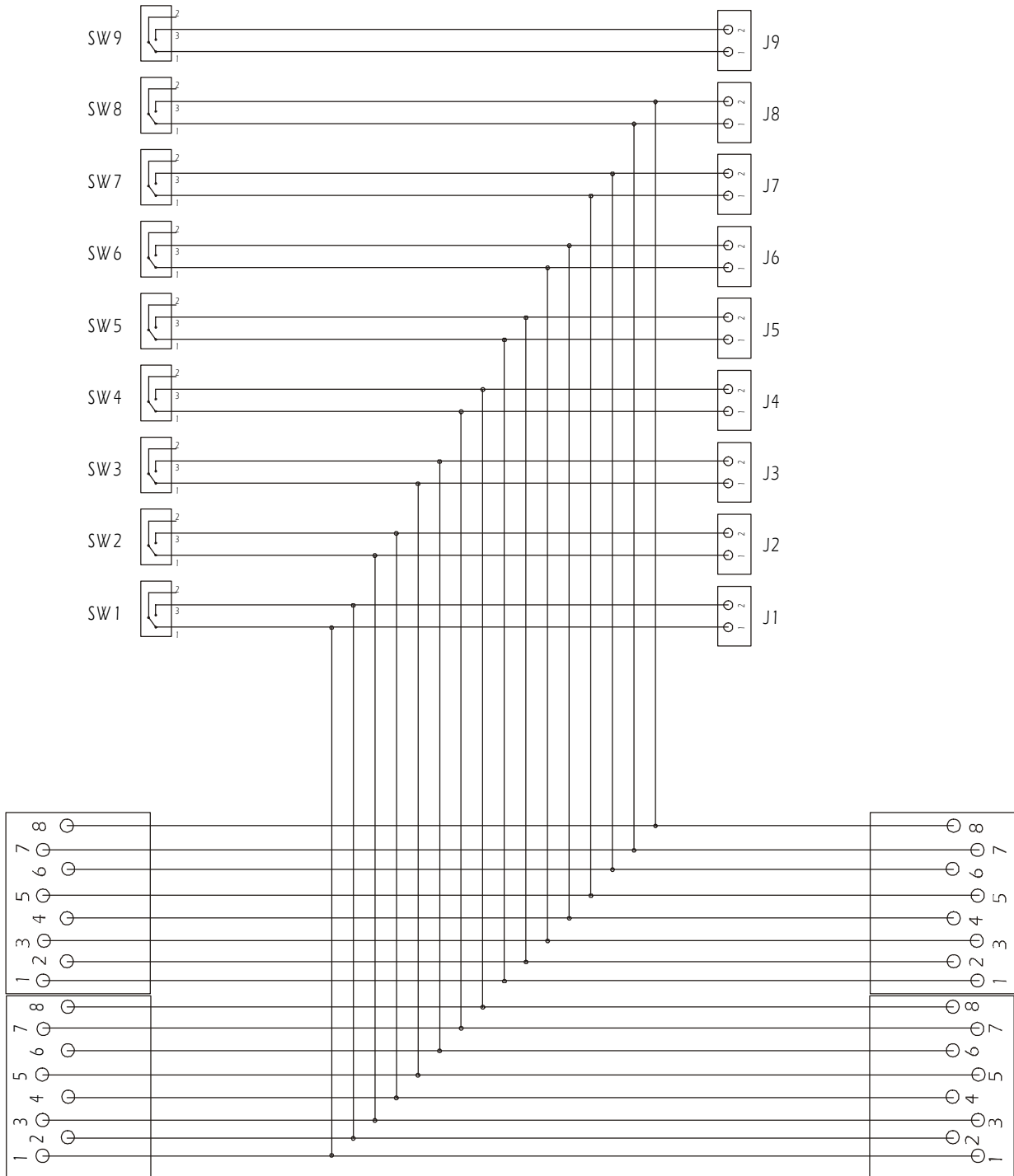
[†] The EPO system connects to the InfraStruXure PDU, unless the UPS is sold alone.

Mounting Hole Template

The following illustration shows the location of the mounting holes on the rear of the EPO box. The measurements are in inches (millimeters).



Wiring Diagram



Specifications

Electrical

Input/Output

Voltage	24VDC (InfraStruXure circuits) 48VDC/240VAC (External circuit)
Current	1 A at 24VDC (InfraStruXure circuits) 1 A at 48VDC (External circuit)
Frequency	50/60Hz
Circuits (qty)	9
Contact state	Normally open (NO)

Physical

Dimensions (W×L×D)

EPO box	8.9×9.9×2.6 in (226×251×66mm)
Shipping	12×12×5.5 in (305×305×140mm)

Weight

EPO box	6.4 lb (2.9kg)
Shipping	6.9 lb (3.1kg)

Mounting Surface mount

Connection Removable panels in rear, 1/2-in and 3/4-in knockouts on top and bottom

Push button Standard, 22-mm metallic body; 40-mm mushroom head; Push/pull

Wire connections #24 to 18 AWG wire ground stud for #8 ring lug

Environmental

Temperature	23 to 113°F (–5 to 45°C)
Humidity	5 to 95% RH, non-condensing
Elevation	10000ft (3000m) above MSL

Compliance

Standards	NFPA 70, NFPA 75, NEC Article 645, 29 CFR 1910.36, 29 CFR 1910.306
Approvals	UL, C-UL, CE

Warranty and Service

Limited warranty

APC warrants the Emergency Power Off (EPO) System to be free from defects in materials and workmanship for a period of 2 years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser.

Warranty limitations

Except as provided herein, APC makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights, which vary according to jurisdiction.

Obtaining service

To obtain support for problems with your Emergency Power Off (EPO) System:

1. Note the serial number and date of purchase.
2. Contact Customer Support at the phone number on the back of this document. A technician will try to help you solve the problem by phone.
3. If you must return the product, the technician will give you a return material authorization (RMA) number. If the warranty expired, you will be charged for repair or replacement.
4. Pack the unit carefully. The warranty does not cover damage sustained in transit. Enclose a letter with your name, address, RMA number and daytime phone number; a copy of the sales receipt; and a check as payment, if applicable.
5. Mark the RMA number clearly on the outside of the shipping carton.
6. Ship by insured, prepaid carrier to the address provided by the Customer Support technician.

APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to access documents in the APC Knowledge Base and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
 - Connect to localized APC Web sites for specific countries, each of which provides customer support information.
 - **www.apc.com/support/**
 - Global support searching APC Knowledge Base and using e-support.
- Contact an APC Customer Support center by telephone or e-mail.
 - Regional centers:

Direct InfraStruXure Customer Support Line	(1)(877)537-0607 (toll free)
APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Australia	(61) (2) 9955 9366
China	(86) (10) 8529 9888
India	(080) 5737497

- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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