OPENPATH
ACCESS CONTROL SYSTEM
INSTALLATION GUIDE
V1.5

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Openpath Access Control System Installation Guide

GETTING STARTED

This Installation Guide explains how to install and configure Openpath Smart Hubs (ACUs) and Openpath Smart Readers as part of an Openpath Access Control system.

ADDITIONAL RESOURCES

- Smart Reader Data Sheet
- Smart Hub (ACU) Data Sheet
- Elevator Board Data Sheet

PRIOR TO INSTALLATION

Prior to installing Openpath hardware, it is assumed that you have performed a customer site survey and have determined the following:

- How many entries need to be configured (e.g. doors, gates, and/or elevator floors)
- Whether you're using legacy wiring or new wiring
- What kind of electronic entry mechanisms, Request to Exit (REX) mechanisms, and door contact sensors will be used and their power requirements. If your locking hardware requires 24V, either use the Smart Hub ACU with included 24V power supply (OP-4ESH-24V) or use a separate 24V supply.
  - **NOTE:** The Smart Hub ACU with 12V power supply (OP-4ESH-12V) supports up to 2A for locking hardware.
- Whether you're providing backup batteries for the ACUs. See SELECTING A BACKUP BATTERY.
- Whether you're supporting a legacy access control panel. See WIRING TO LEGACY PANELS.

Installation

NETWORK REQUIREMENTS

An Ethernet connection with DHCP must be used to connect the ACU to the Local Area Network (LAN). You also need to configure firewall settings to communicate with the Openpath system. Openpath uses the following outbound ports:

- TCP port 443
- TCP port 80
- UDP port 123

NOTE: If using an external DNS server, outbound UDP port 53 must also be open.
To support Wi-Fi unlocking from the mobile app, the Smart Hub's inbound TCP port 443 must be available from within the LAN. Inbound port forwarding on the router, firewall, or NAT device is not required.

SELECTING A BACKUP BATTERY

While not required, Openpath recommends having a backup battery in the case of power outages. The size of battery depends on your setup and how long you want to power the system.

Table 1: Power requirements (12V)

Smart Hub ACU	1A
Smart Reader	0.25A
Locking hardware (while engaged)	0.25A–0.5A

Assuming a 12V power supply, a Smart Hub ACU configured with four Openpath readers and locking hardware uses 4 Amps. To keep the system running for 3 hours with all entries engaged, you'd need 4A x 3 hours = 12 AH, so a 12V 12AH sealed lead acid (SLA) or gel cell battery.

NOTE: For a 24V power supply, you need two 12V SLA or gel cell batteries in series.

MOUNTING INSTRUCTIONS

For a UL Listed System, the Smart Hub ACU must be mounted in a LifeSafety Power E1 enclosure with an FPO75 supply.

To mount the enclosure:
1. (Optional) Remove the enclosure's cover.
2. Locate the top keyhole mounting holes in the back of the enclosure.
3. Mark and pre-drill the locations for the keyholes in the mounting surface.
4. Partially install two fasteners appropriate for the surface on which the enclosure is being installed. Leave the heads of the fasteners approximately ¼" out from the surface. Minimum fastener size should be #10 or larger.
5. Hang the enclosure on the two fasteners and mark the locations of the remaining mounting holes.
6. Remove the enclosure and pre-drill the locations for the remaining mounting holes.
7. Re-hang the enclosure on the top mounting fasteners, install the remaining fasteners and tighten all fasteners.

8. Reinstall the enclosure's cover, if removed in step 1.

WARNING: Only connect the Controller Board to 12V. Over voltage can damage the board.

To install a standalone Controller Board with 24V locking hardware:
If you purchased the Controller Board separately and are using 24V locking hardware, we recommend using the LifeSafety Power E1 enclosure, FPO75 power supply (or FPV4 power supply), B100 secondary power supply, and C4 power control module.

1. Follow all LifeSafety Power instructions for installing the FPO75 (or FPV4), B100, and C4 in the enclosure.
2. Mount the Controller Board using the provided back plate.
3. Connect the B100 secondary supply to the Controller Board.
   IMPORTANT: Verify that the jumper on the B100 is set to 12V.
4. Mount the enclosure as detailed above.

12/24V Smart Hub ACU Configuration

openpath
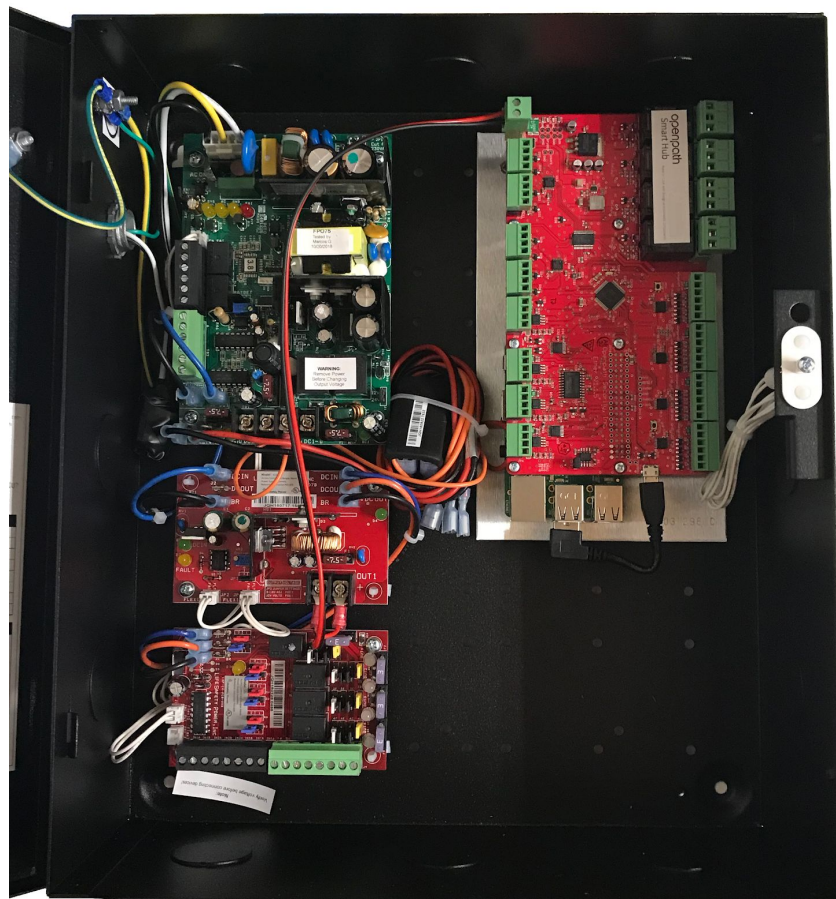
To install a standalone Controller Board with 12V locking hardware:
If you purchased the Controller Board separately and are using 12V locking hardware, we recommend using the FPV4-E1 power supply/enclosure.

1. Follow all LifeSafety Power instructions for installing the power supply in the enclosure.
2. Mount the Controller Board using the provided back plate.
3. Connect the power supply to the Controller Board.
   IMPORTANT: Verify that the jumper on the FPV4 is set to 12V.
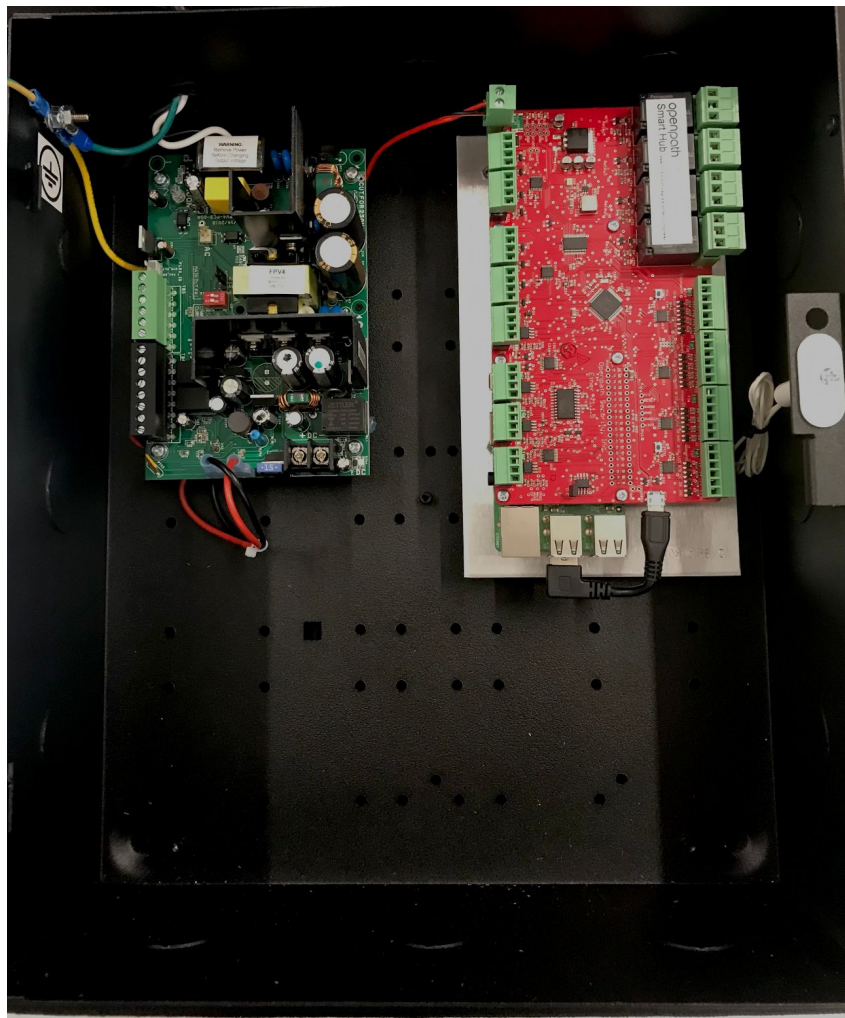4. Mount the enclosure as detailed above.

12V Smart Hub ACU Configuration

RECOMMENDED CONFIGURATION

Openpath readers and ACUs communicate via RS-485. The following wire types are compatible, listed in the order of preference which impacts distance.

- Shielded CAT6A (recommended, additional two pairs can be used for sensors)
- Shielded CAT6
- Shielded RS485 w/22-24AWG (lower gauge, thicker wire is better)
- Shielded CAT5
- Unshielded CAT6
- Unshielded CAT5
- Shielded 22/6
- Unshielded 22/6

Ideally, use one twisted pair for GND and VIN (power) and one twisted pair for +B and -A (data).

For shielded wiring, connect one side of the drain wire (the shield around the wires) to the GND terminal on the ACU. Both the shield and the GND wire can share the same GND terminal. Do not connect the other side of the shield to anything.

For standard reader installation, we recommend that you install a 1-Gang 20 CU box in order to flush-mount the reader. Alternatively, the reader may also be surface mounted with the included back plate.

NOTE: For elevators, all relays and readers must be connected to the same ACU. If you need more than four access controlled floors or readers, add the Openpath Elevator Expansion Module.

WIRING WITH THE 12/24V POWER SUPPLY

24V SUPPLY

FIRE ALARM INTERFACE (FAI) INPUT

AUX OUTPUT

- +

MAIN DC OUTPUT

+ −

UP TO 2A @ 12V DC and 1A @ 24V DC FOR LOCKING HARDWARE
The Main Output can be switched by the Fire Alarm Interface (FAI).
*If FAI control of both door strikes and electromagnetic locks is required, use the C4 Power Control Module.

B100 SECONDARY SUPPLY

12V OUT1

− +

C4 POWER CONTROL MODULE
*See note above

Y Y Y Y

†OUTPUTS 1-4

†The voltage of each C4 output can be selected individually as 12V or 24V using the **yellow** jumper Y (indicated above) corresponding to the output: position 1 on the jumper pins is 24V (this is the default setting) and position 2 is 12V.

REX
NC   NO
        C

DOOR CONTACT

WIEGAND READER

Optional Wiegand Reader Connection

openpath
READER

Orange
Violet
Blue
Gray

+12V ONLY
GND

POWER LEDs

GND IN 4
GND IN 3   REX

GND IN 2
GND IN 1   REX

GND IN 4
GND IN 3   CONTACT

GND IN 2
GND IN 1   CONTACT

12V
A
B   READER 4
GND

12V
A
B   READER 3
GND

12V
A
B   READER 2
GND

12V
A
B   READER 1
GND

STATUS LED

MCU RESET BUTTON

READER POWER LEDs

ADMIN BUTTON

Ethernet (DHCP Required)

Board-to-board USB connector

RELAY 4   NC / C / NO
RELAY 3   NC / C / NO
RELAY 2   NC / C / NO
RELAY 1   NC / C / NO

RELAY LEDs

WIEGAND 4   12V / LED / BZR / D1 / D0 / GND
WIEGAND 3   12V / LED / BZR / D1 / D0 / GND
WIEGAND 2   12V / LED / BZR / D1 / D0 / GND
WIEGAND 1   12V / LED / BZR / D1 / D0 / GND

+ 24V FAIL SECURE DOOR STRIKE -

+ 12V FAIL SAFE MAG LOCK -

FAIL SECURE hardware locks when power is interrupted

FAIL SAFE hardware unlocks when power is interrupted

Please refer to third party locking hardware wiring instructions.

NOTE: If locking hardware uses 12V, use the C4 Power Control Module. Make sure to set the appropriate jumper to 12V.

WIRING THE REX WITH THE DOOR STRIKE

UP TO 2A FOR LOCKING HARDWARE
If any locking hardware requires 24V, use a separate 24V supply.

The Main Output can be switched by the Fire Alarm Interface (FAI). If FAI control of both door strikes and electromagnetic locks is required, an additional output board is required.
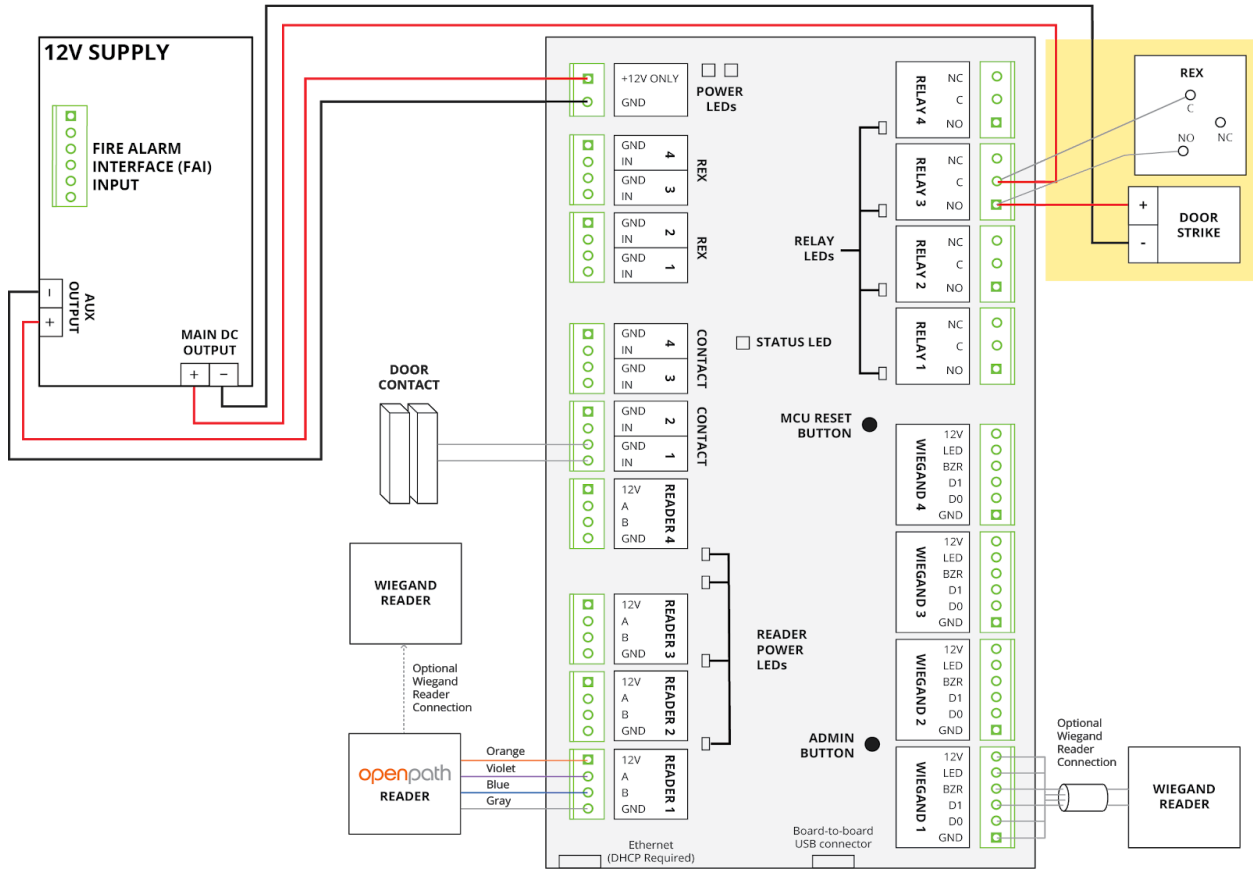
WIRING THE REX WITH THE ELECTROMAGNETIC LOCK

UP TO 2A FOR LOCKING HARDWARE
If any locking hardware requires 24V, use a separate 24V supply.

The Main Output can be switched by the Fire Alarm Interface (FAI). If FAI control of both door strikes and electromagnetic locks is required, an additional output board is required.
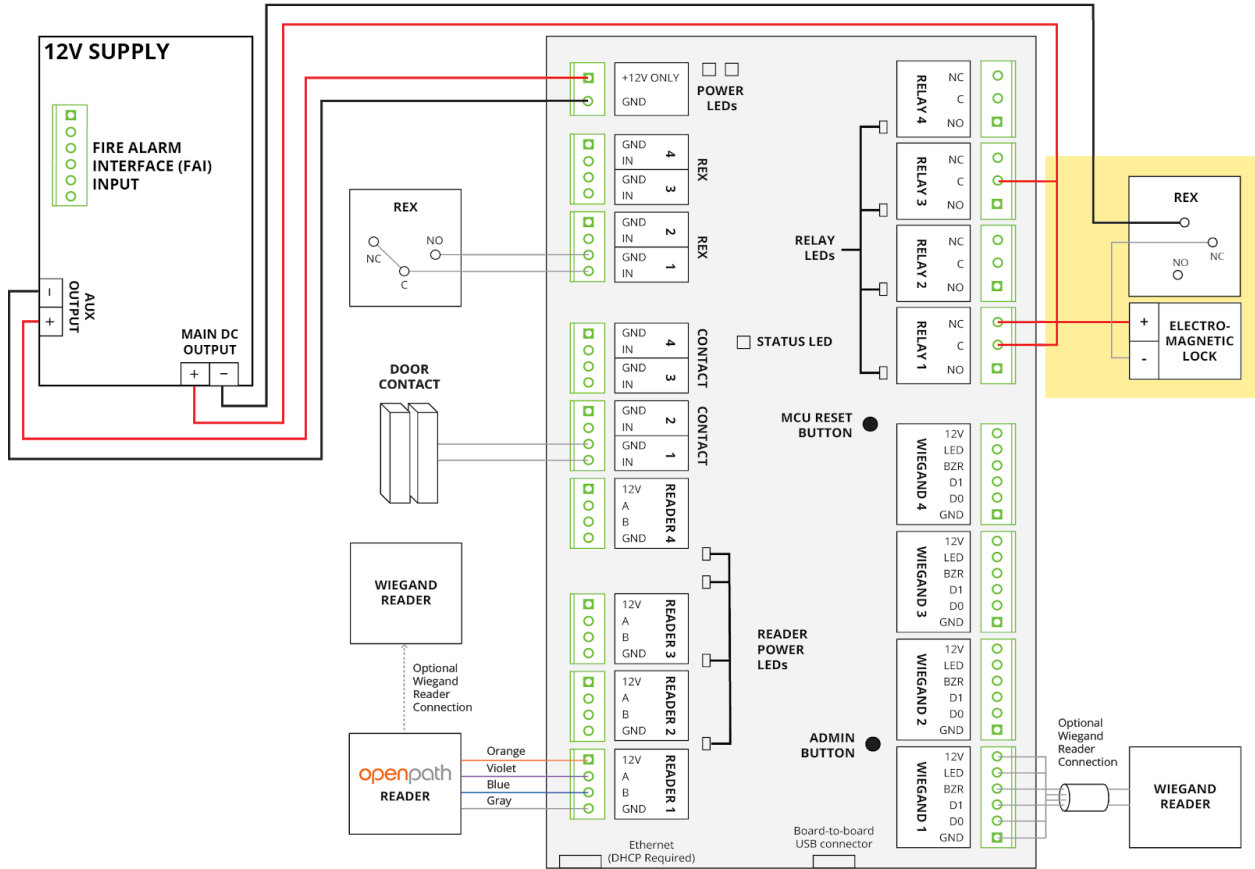
# WIRING FAIL SAFE AND FAIL SECURE LOCKING HARDWARE

Fail safe and fail secure are ways of configuring locking hardware:
- **Fail safe** hardware **unlocks** when power is interrupted
- **Fail secure** hardware **locks** when power is interrupted

UP TO 2A FOR LOCKING HARDWARE
If any locking hardware requires 24V, use a separate 24V supply.
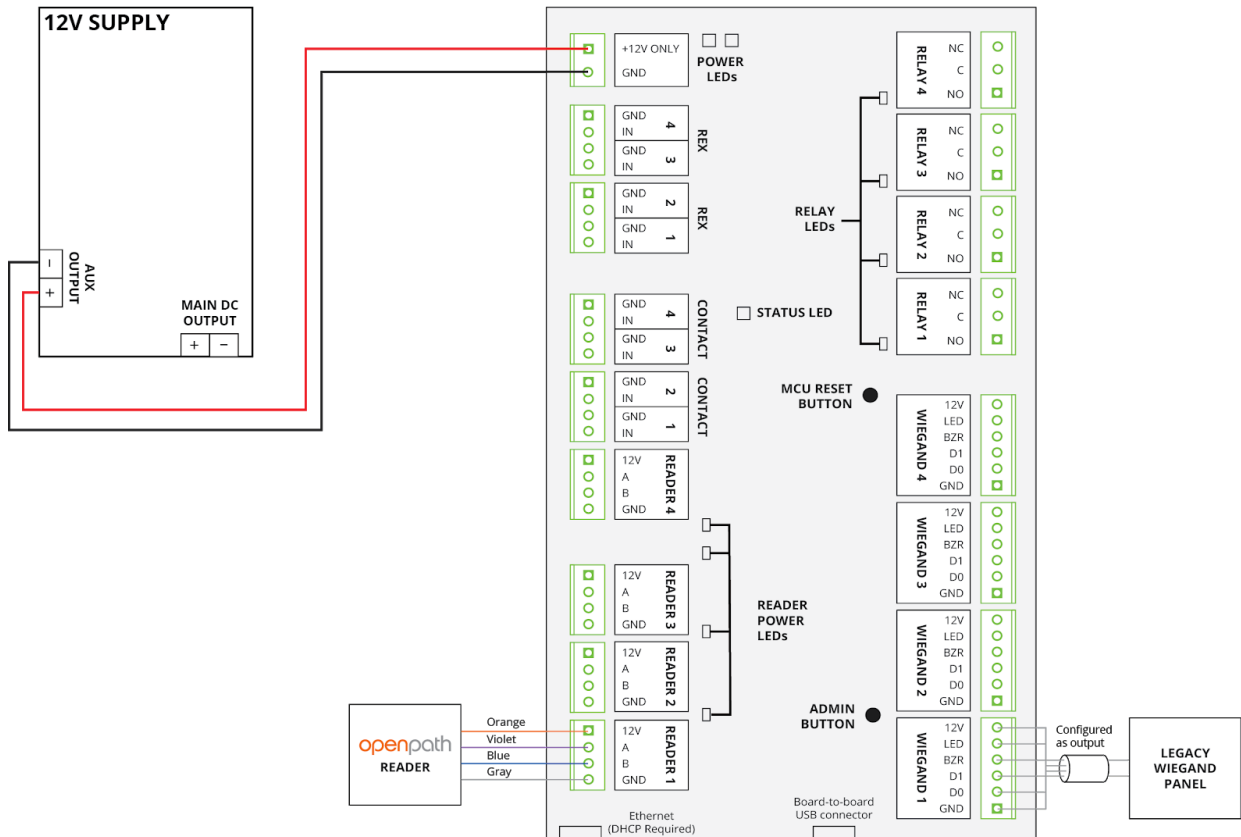
The Main Output can be switched by the Fire Alarm Interface (FAI). If FAI control of both door strikes and electromagnetic locks is required, an additional output board is required.

FAIL SAFE hardware unlocks when power is interrupted

FAIL SECURE hardware locks when power is interrupted

Please refer to third party locking hardware wiring instructions.
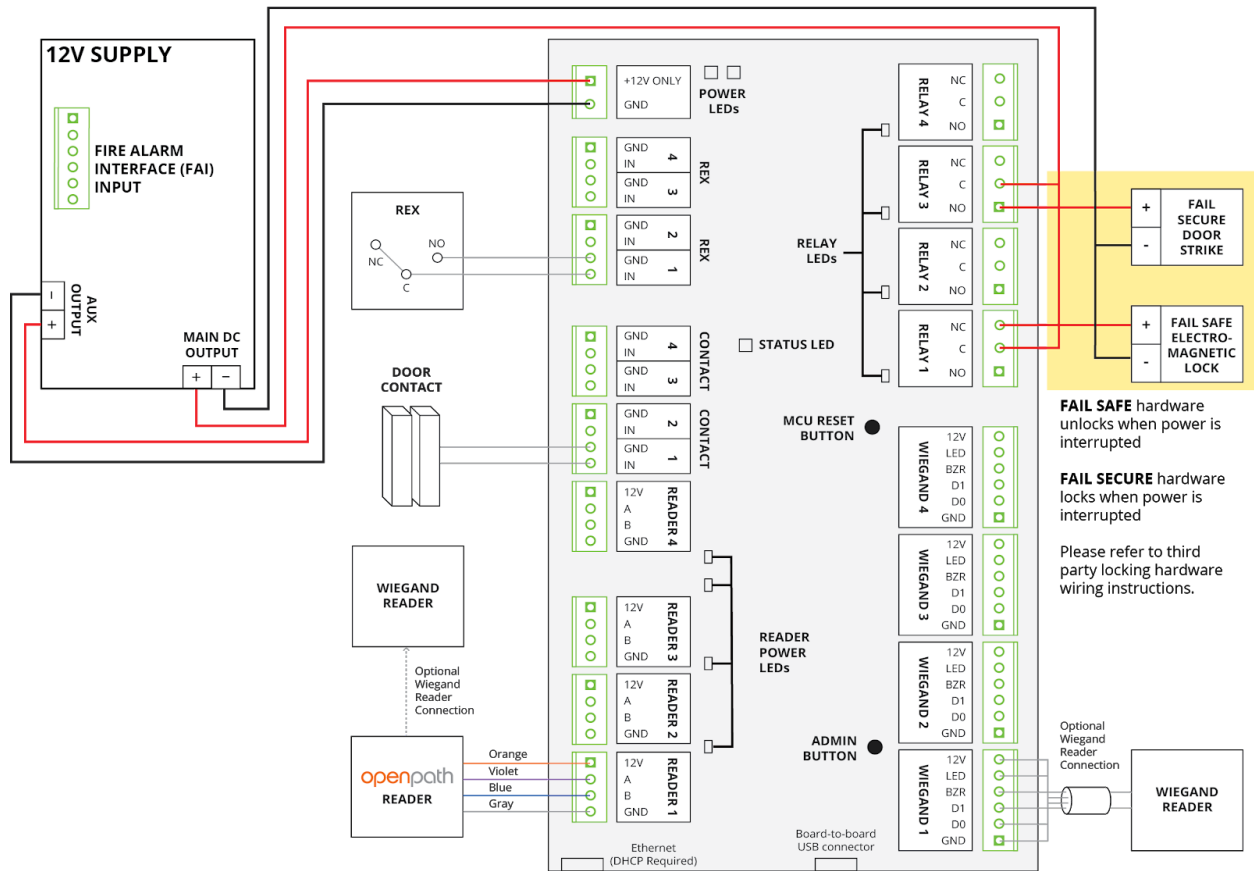
WIRING TO LEGACY PANELS

To support a legacy access control system, install the ACU between the Openpath readers and the legacy panel, with the ACU Wiegand port configured as output to the legacy panel. Replace low frequency (LF) Wiegand readers with LF Openpath readers and high frequency (HF) Wiegand readers with HF Openpath readers. In this setup, the legacy panel controls all locking hardware and entry mechanisms while the Openpath system allows you to use the Openpath mobile app, Smart reader, and Touch functionality.

WIRING THE OPENPATH ELEVATOR EXPANSION MODULE

Connect locking hardware to 12V or 24v as required.

24V SUPPLY

FIRE ALARM INTERFACE (FAI) INPUT

DC2 FAI CONTROLLED OUTPUT + −

DC1 MAIN OUTPUT + −

B100 SECONDARY SUPPLY

12V OUT1 − +

C4 POWER CONTROL MODULE

OUTPUTS 1-4

+12V ONLY
GND

POWER LEDs

GND IN 4
GND IN 3 REX
GND IN 2
GND IN 1 REX

REX
NC NO
C

GND IN 4
GND IN 3 CONTACT
GND IN 2
GND IN 1 CONTACT

DOOR CONTACT

STATUS LED

12V A B GND READER 4

12V A B GND READER 3

12V A B GND READER 2

12V A B GND READER 1

openpath READER

READER POWER LEDs

MCU RESET BUTTON

ADMIN BUTTON

Ethernet (DHCP Required)

Board-to-board USB connector

RELAY 4 NC C NO
RELAY 3 NC C NO
RELAY 2 NC C NO
RELAY 1 NC C NO

RELAY LEDs

FAIL SECURE DOOR STRIKE + −

FAIL SAFE ELECTRO-MAGNETIC LOCK + −

WIEGAND 4 12V LED BZR D1 D0 GND
WIEGAND 3 12V LED BZR D1 D0 GND
WIEGAND 2 12V LED BZR D1 D0 GND
WIEGAND 1 12V LED BZR D1 D0 GND

+12V - +24V GND

RELAY 16 NO C NC
RELAY 15 NO C NC
RELAY 14 NO C NC
RELAY 13 NO C NC
RELAY 12 NO C NC
RELAY 11 NO C NC
RELAY 10 NO C NC
RELAY 9 NO C NC

POWER LED   RELAY LEDs

12V A B GND READER 1
12V A B GND READER 2

READER POWER LEDs

STATUS LED

ADMIN BUTTON

RESET BUTTON

BOARD ID LED

OVERRIDE SWITCH TERMINALS

GND for INPUTS

IN 16
IN 15
IN 14
IN 13
IN 12
IN 11
IN 10
IN 9

IN 8
IN 7
IN 6
IN 5
IN 4
IN 3
IN 2
IN 1

RELAY LEDs

Board-to-board USB connector

RELAY 1 NC C NO
RELAY 2 NC C NO
RELAY 3 NC C NO
RELAY 4 NC C NO
RELAY 5 NC C NO
RELAY 6 NC C NO
RELAY 7 NC C NO
RELAY 8 NC C NO

Troubleshooting

LEGACY WIRING

Sometimes legacy wiring (unshielded and straight through, rather than shielded twisted pair, often 22-6) results in slower connections and dropped packets between the Openpath Reader and Smart Hub. To remedy this, you can switch GND and VIN with +B and -A connections on the ACU and readers to ensure the data pair (+B and -A) are using the alternate pair of legacy wires.

ACU LEDS
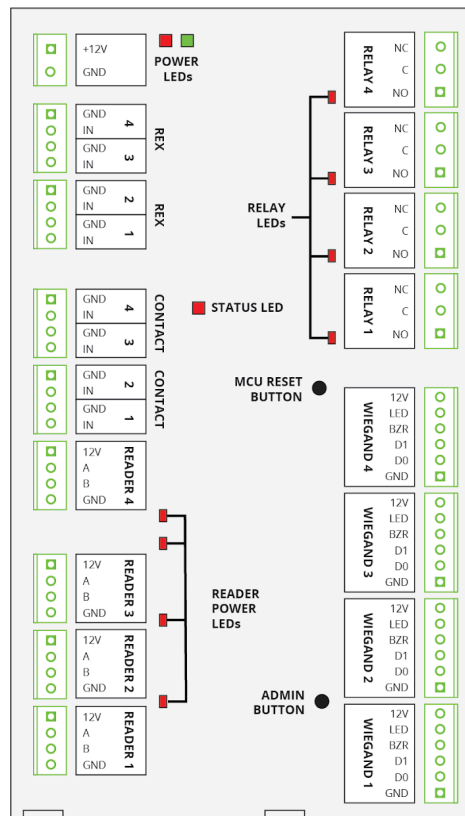
The Openpath ACU has several LEDs that indicate the following:

● POWER LEDs indicate that the ACU is connected to power

- The four RELAY LEDs indicate when the relays are activated
- The STATUS LED in the center of the ACU indicates that the ACU has been configured with firmware. It will flash green when **Identify** is pressed in the Control Center.
- The four READER POWER LEDs indicate that the ACU has output power enabled per reader

READER LEDS

The Openpath Smart Reader's LEDs indicate the following:

- If the center dot is solid white, then the door is locked
- If the outer ring is solid white, then the door is unlocked
- If the center dot quickly switches between multiple colors and outer ring quickly spins once, the reader has just received power
- If all lights are off, the reader is not connected to power (check to see if the power wires are swapped)
- If the center dot is flashing red, the reader is connected to power but cannot communicate with the ACU (check to see if the +B [blue] and -A [violet] lines are swapped)
- If the center dot is solid blue, the reader is connected to power and can communicate with the ACU, but has not been configured as an entry in the Control Center
- If the center dot is solid green, and the outer ring lights up and spins, that means the reader has been **Identified** via the Control Center
- If the center dot is solid purple and the outer ring is solid white, the reader is possibly not receiving enough voltage or current, potentially due to a break in wiring – try connecting the reader directly to the ACU, bypassing any wire runs
- If the center dot is solid pink and the outer ring is solid white, check that +12V IN (orange) hasn't been swapped with +B (blue) or -A (violet)

RESETTING THE ACU

Soft Reset: To soft reset the ACU, disconnect power from the ACU, wait 10 seconds, then reconnect the power.

> **WARNING:** Only hard reset the ACU if absolutely necessary and if instructed by Openpath. This will clear all of the data off of the ACU and will require reprovisioning, which requires having a computer or mobile phone on the same network as the ACU.

Hard Reset: To hard reset the ACU, disconnect power from the ACU, hold down the ADMIN BUTTON, reconnect power to the ACU, wait 20 seconds while still holding the button down, then release the button. Wait 10 minutes before re-provisioning the ACU following the PROVISIONING THE ACU steps below.

PROVISIONING THE ACU

Provisioning the ACU means registering it in the online portal and getting it up and running with the latest firmware. ACUs are shipped already provisioned, but below are instructions for this process in the case of RESETTING THE ACU.

To provision the ACU:

1. Connect the ACU to the Internet via Ethernet
2. Press the ADMIN BUTTON
3. On a computer or mobile phone on the same network as the ACU, go to https://control.openpath.com
4. Log in with your administrative login
5. Go to **Hardware** > **ACU Management**
6. Locate the ACU on the list and click **Register**
7. A new window will open with instructions on registering the ACU. Click **Yes** to proceed.

Regulatory

All national and local electrical codes apply.

UL 294

When the Openpath Smart Hub 4 Door Controller is enclosed in the E1 enclosure and powered by FPO75, the following performance levels are defined for the access control unit as per UL 294:

Attack:	Level I
Endurance:	Level I
Line Security:	Level I
Standby:	Level I
Single Point Locking Device with Key Locks:	Level I

CAN/ULC 60831-11-1-16 GRADE 1

For C-UL Listed applications, the unit shall be installed in accordance with Part 1 of the Canadian Electrical Code.

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm should be maintained between the antenna of Openpath Smart Reader(s) and persons during operation.

NOTE: 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.

IEC 62368-1

- This equipment is intended only for use in a restricted access area.
- Securely fasten the equipment according to LifeSafety Power mounting instructions. See FlexPower Vantage Standard Power System - Installation Manual.
- PROTECTIVE EARTHING: For safety, the Smart Hub must only be plugged into a grounded 3-prong outlet, wired with a minimum of 16 gauge wire to ground.

Warnings

- Disconnect power before servicing
- Do not plug into an outlet controlled by an on/off switch
- Powering power supply with 230V requires jumper modification, see power supply data sheet for more information

Technical Specifications

Smart Hub with 12/24V Supply (OP-SH-24V)	120V, 0.7A or 230V, 0.3A, 50/60 Hz
Smart Readers (OP-RLF-STD, OP-RHF-STD, OP-RLF-MULB, OP-RHF-MULB)	12VDC, 0.25A OP-RLF-STD/MULB: FCC ID: 2APJVOPRLF OP-RHF-STD/MULB: FCC ID: 2APJVOPRHF
Standalone ACU Board (OP-4ECTR)	10-14VDC, 1A
Elevator Board (OP-16EM)	12-24VDC, 0.35A