

AVIGILON™

Smart Reader v2

Installation guide | OP-R2X-STND, OP-R2X-MULL

Contents

Before you start 4
Overview 4
What's included 5
Conducting site surveys 5
Network requirements for Alta Access devices 6
Ethernet connection and firewall configuration 6
Installation 7
Specifications and dimensions 7
Avigilon reader wiring requirements 9
Legacy wiring 10
Mounting 11
Standard Smart Reader 11
Mullion Smart Reader 13
Wiring 14
Prerequisites 14
Connect from Avigilon ACU to Avigilon reader 14
Connect to third-party Wiegand reader (optional) 14
Advanced configuration 15
Wiring to legacy panels and mobile gateway 15
Provisioning 16
LED indicator 17
Maintenance 18
Selecting a backup battery 18
Troubleshooting Avigilon Smart Readers 20
Regulatory notice 21
More information 23
Post-installation — Device, entry, and PIN credential setup 23

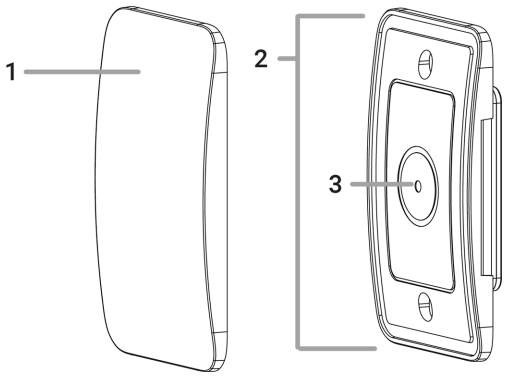
Technical support 23
Product documentation 23
Avigilon warranty 23
Revisions 24

Before you start

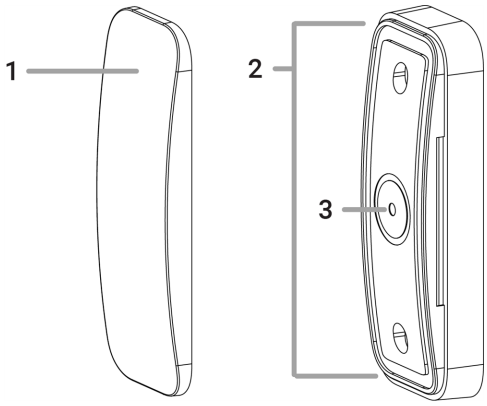
This guide describes how to install and configure the Avigilon Standard Smart Reader and Mullion Smart Reader, as part of the Alta access control system.

Overview

Standard Smart Reader:



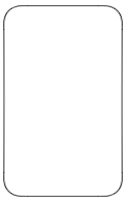
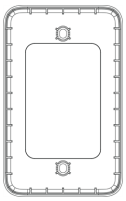
Mullion Smart Reader:



1	Front cover
2	Keycard and fob reader, mobile credential reader
3	Power and status LED indicator

What's included

OP-R2X-STND model:

Standard Smart Reader	Surface mount bracket	Avigilon DESFire EV3 card	#2-32 x ¾" screws
			

OP-R2X-MULL model:

Mullion Smart Reader	Avigilon DESFire EV3 card	#2-32 x ¾" screws
		

Conducting site surveys

Before installing Avigilon hardware, conduct a customer site survey to determine the following:

- The number of entries that need to be configured (for example, doors, gates, and elevator floors)
- The legacy wiring or new wiring to be installed
- The electronic entry mechanisms, Request to Exit (REX) mechanisms, and door contact sensors to be used and their power requirements

  If your locking hardware requires 24V, either use a Smart Hub with a 24V power supply or use a separate 24V supply.
- Any backup batteries for a Smart Hub (see Selecting a backup battery on page 18)
- The support of a legacy access control panel for mobile gateway (see Wiring to legacy panels and mobile gateway on page 15)

Network requirements for Alta Access devices

Ethernet connection and firewall configuration

Connection to LAN

- Use an Ethernet connection with DHCP to connect the Smart Hub ACU.

Firewall settings

- Configure firewall settings to communicate with Alta Access.
- Required outbound ports:
    - TCP port 443
    - UDP port 123 - Add pool.ntp.org to the allow list for the NTP port

Additional firewall considerations

- Fortinet firewalls have anti-virus software that blocks AWS traffic by default. AWS must be on an allowlist.
- If using an external DNS, outbound UDP 53 must be open.
- Inbound port forwarding on the router, firewall, or NAT device is unnecessary.
- HTTPS certificate rewriting or TLS/SSL inspection is not allowed.

IP address and network segregation

- Alta Access does not provide an IP range or FQDN list of hostnames for Basic and Premium licenses. Most hostnames resolve to dynamic IPs and change during provisioning and configuration updates.
- To segregate traffic from Alta Access controllers, enable a DMZ for the controllers.

Static Cloud IPsetting — for Enterprise licenses

- Alta Access offers Static Cloud IP for organizations with strict firewall network policies. This simplifies opening a few IP addresses to allow the ACUto connect to the cloud.

  For more information about Static Cloud IP, see the Alta Access web app guide.
- The latest version of the Alta Access mobile app supports provisioning ACU devices behind restricted firewalls.

Installation

Specifications and dimensions

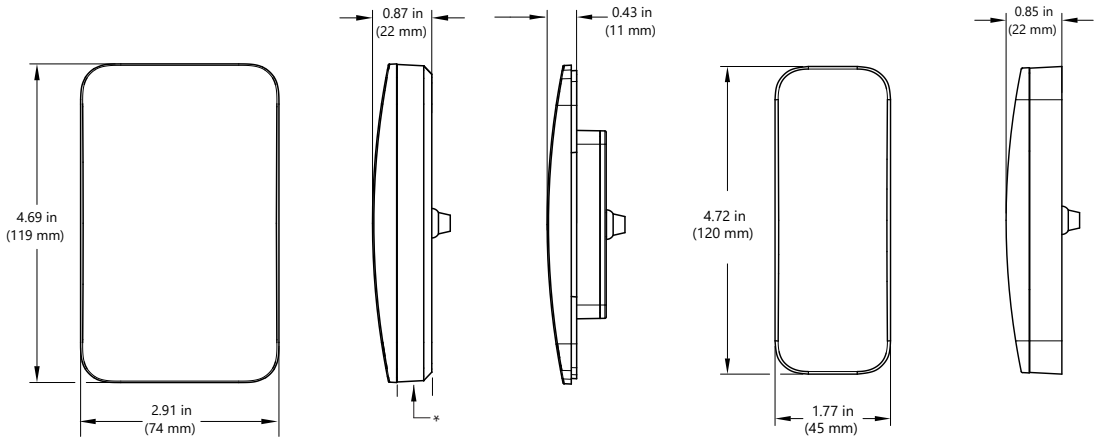
NOTE: All national and local electrical codes apply when installing this device.

Compatibility	
Mobile Credential	Bluetooth LE NFC (Android only) Auto Proximity Unlock Wave to Unlock
	Supported on iOS and Android™ compatible devices
High-Frequency (13.56 MHz) Card and Fob*	Avigilon DESFire® EV3 Smart Card and Fob MIFARE Classic, DESFire, Ultralight (ISO14443A) CSN
Low-Frequency (125 kHz) Card and Fob	Avigilon Proximity Card and Fob HID® Proximity™, ProxCard®, LenelProx®

The discontinued Avigilon MIFARE Classic 1K Fob, and Openpath EV1 and EV2 cards, are still compatible. The EV3-A card is still referred to as the Openpath DESFire EV3 Smart Card.

General	
LED Indicators	Reader power on or off, user access granted or denied, entry or door locked or unlocked, provisioning and connection status to access control system
Wiring	RS-485 to connect to Avigilon expansion boards and Wiegand inputs for third-party devices Pigtail Length: 12 in (305 mm) Encryption to access control cloud service uses TLS 1.2+

General	
Power	0.25A @ 12VDC 0.12A @ 24VDC

Dimensions	OP-R2X-STND	OP-R2X-MULL
Device Only	With surface mount bracket* 	
	Flush mount in US gang box (recommended)	Surface mount on wall or door frame

Environmental	
Temperature	Operating Temperature: -30°C (-22°F) to 60°C (140°F)
Humidity	Operating Humidity: 5% to 85% relative, non-condensing
IP Rating	Indoor and Outdoor: IP65 (IEC 60529)

Operating temperature must not be exceeded.

Regulatory	
Certifications	FCC (United States), IC (Canada), CE (Europe), UKCA (United Kingdom), NOM (Mexico), BIS (India), RCM (Australia, New Zealand), ANATEL (Brazil), UL 294*, RoHS, CAN/ULC 60839-11-1 *Performance Levels: Attack Level I, Endurance Level I, Line Security

Regulatory	
	Level I, Standby Power Level I
Compliance	NDAA, TAA

Avigilon reader wiring requirements

Compatible wire types

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

- Shielded CAT6A (recommended; additional two pairs can be used for sensors)
- Shielded Cat 6
- Shielded RS-485 with 18-24 AWG (lower gauge, thicker wire is better)
- Shielded Cat 5
- Unshielded Cat 6
- Unshielded Cat 5
- Shielded 22/6
- Unshielded 22/6

NOTE: Use one twisted pair for GND and VIN (power) and one twisted pair for +B and -A (data).

Recommended maximum cable length

- 300 ft (91 m) with CAT6 or 500 ft (152 m) if two wire pairs are used for GND and VIN (power)

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.

WARNING: Always remove power from the ACU and locking hardware when wiring Avigilon readers and other devices. Failure to do so can damage the ACU.

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 Avigilon reader and ACU. 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.

Mounting

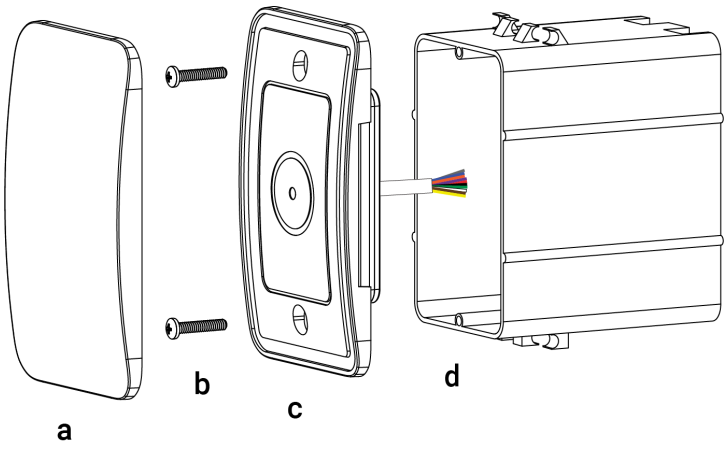
- Standard Smart Reader below
    - Flush mount (recommended) below
    - Surface mount on the next page
- Mullion Smart Reader on page 13

Standard Smart Reader

The Smart Reader can be flush mounted on a single-gang box or surface mounted using the provided back plate.

Flush mount (recommended)

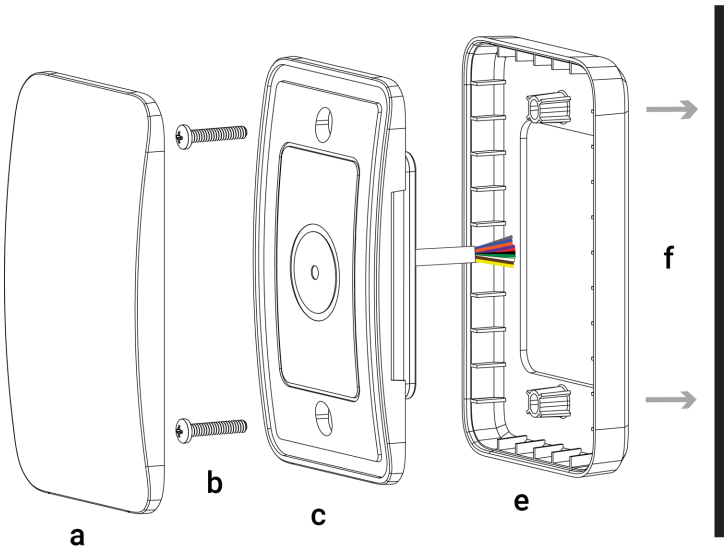
1. Install a recessed single-gang box (d) into the wall.
2. Strip and connect the wires.
3. Use the provided screws (b) to attach the reader (c) to the gang box. Do not use the provided surface mount bracket for flush mount installations.
4. Snap on the front cover (a).



Surface mount

1. Place the reader (c) inside the surface mount bracket (e).
2. Strip and connect the wires.
3. Use wall anchors and the appropriate screws (not included) to attach the reader (c and e) to the wall.
4. Snap on the front cover (a).

> **NOTE:** Do not use adhesive.

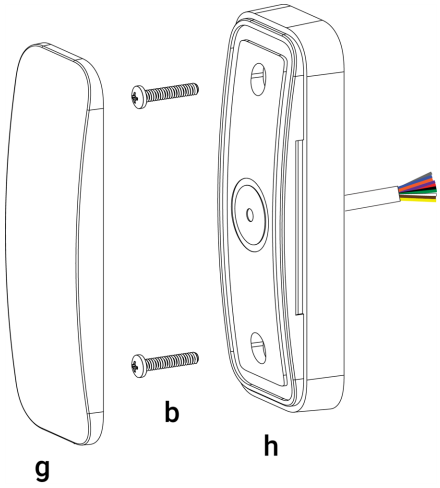


Mullion Smart Reader

The Smart Reader can be surface mounted where space is limited, such as on a door frame.

1. Strip and connect the wires.
2. If installing on a metal surface, drill and tap to use the provided #6-32 screws (b). Or, use self-tapping screws (not included). Attach the reader (g) to the wall (f).
3. Snap on the front cover (g).

> **NOTE:** Do not use adhesive.



Wiring

WARNING: Always remove power from the ACU and locking hardware when wiring readers and other devices. Failure to do so can damage the ACU.

Prerequisites

- Wiring requirements

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 Avigilon Elevator Board.

Connect from Avigilon ACU to Avigilon reader

Pigtail color	Short name	Full name
Gray	GND	Ground (RTN)
Blue	+B	RS485-B
Violet	-A	RS485-A
Orange	VIN	+12V IN

Connect to third-party Wiegand reader (optional)

Pigtail color	Short name	Full name
Red	VO	Wiegand Voltage
Black	GND	Wiegand RTN
Green	WD0	Wiegand Data 0
White	WD1	Wiegand Data 1
Brown	LED	Wiegand LED
Yellow	BUZZER	Wiegand Buzzer

NOTE: Operating temperature must not be exceeded. Operating Temperature: -30°C (-22°F) to 60°C (140°F)

Advanced configuration

Wiring to legacy panels and mobile gateway

In this configuration, the legacy panel controls all locking hardware and entry mechanisms while the Alta access control system lets you use the Alta Open mobile app, Smart Reader, and Wave to Unlock functionality.

To add mobile credential features (see 6 below) to a legacy access control system:

1. Install the Avigilon ACU (see 4) between the Avigilon Smart Readers (see 5) and the legacy access control system panel (see 2) that is connected to legacy software (see 1). See Change input and output types on page 1 to configure the ACU as output to the legacy panel and Configure Wiegand devices in the Alta Access on page 1.
2. If existing Wiegand readers use a proprietary card format, they can be wired to new Smart Readers. Otherwise, replace existing readers with Smart Readers.

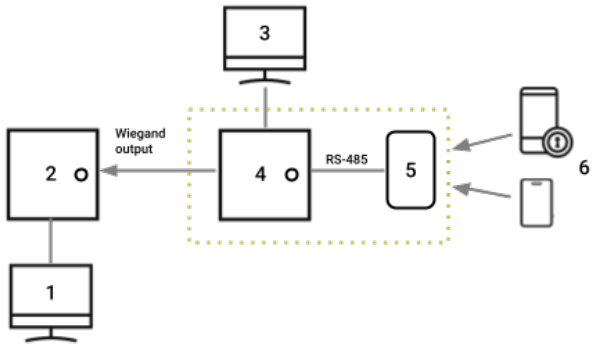


Figure 1 Wiring ACUs to legacy panels and legacy software

1	Legacy access control system software	**4a**	Smart Hub ACU installed between the Smart Reader and legacy panel **NOTE:** The Pro series reader does not require a controller, however, a Smart Hub is required to support locking hardware.
2	Legacy panel	**4b**	Wiegand port configured as output to the legacy panel For more information, see advanced wiring configuration.
3	Alta Access	**5**	Smart Readers — If existing Wiegand readers use a proprietary card format, they can be wired to new Smart Readers. Otherwise, replace existing readers with Smart Readers.
		6	Alta Open mobile app, Cloud Key credentials and Wave to unlock functionality — Avigilon credential with default gateway number or Wiegand ID

Provisioning

For information about provisioning the Avigilon ACU that connects to the Smart Reader, see the Access Control Core installation guide.

Before an Access Control Core can be used, it must be provisioned. Provisioning the Access Control Core means registering it in the Alta Access web app and running the latest firmware.

LED indicator

The power and status LED on the Smart Reader indicates the following:

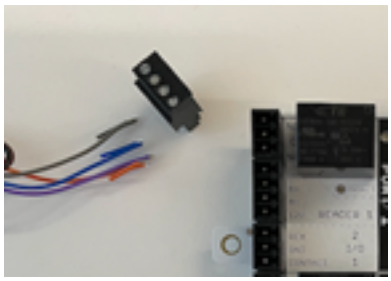
Status LED		Description
	Center dot is solid white.	The entry or door is locked.
	Outer ring is solid white.	The entry or door is unlocked.
	Center dot blinks multiple colors. Outer ring quickly spins once.	The reader has just received power.
	Off.	The reader is not connected to power. Check if power wires are swapped.
		The reader firmware is being updated.
	Center dot is blinking red.	The reader is connected to power, but cannot communicate with the ACU. Check if the +B (blue) and -A (violet) lines are swapped.
		An expansion board issue has occurred, expansion board firmware is being updated, or a general communication error has occurred between the reader and expansion board.
	Center dot is solid blue.	The reader is connected to power and can communicate with the ACU. The reader is not configured as an entry in Alta Access.
	Center dot is solid green. Outer ring is solid.	The reader is identified by Alta Access.
	Center dot is solid purple. Outer ring is solid white.	The reader might not be receiving enough voltage or current, potentially due to a break in wiring. Try connecting the reader directly to the ACU, bypassing any wire runs.
	Center dot is solid pink. Outer ring is solid white.	The wires might be swapped. Check that +12V IN (orange) is not swapped with +B (blue) or -A (violet).

Maintenance

TIP: To prevent damage to your Avigilon equipment, follow these guidelines:

- Always disconnect power. Whenever possible, turn off the power to the expansion board before connecting or disconnecting any wires. This is the safest way to prevent electrical shorts.
- If power cannot be disconnected:
  - Instead of removing individual wires, detach the entire terminal block from the board.
  - Connect or disconnect wires from the terminal block's screw connectors while it's detached.
  - Once wiring is complete, plug the terminal block back onto the board.

  For example:



Selecting a backup battery

While not required, a backup battery is recommended in case of power outages. 12V supplies require one 12V backup battery. 24V supplies require two 12V batteries in series. The size of battery depends on your setup and how long you want to power the system.

Table 1 Example power requirements for Core Series Smart Hubs (24V)

Access Control Core	0.4A
4-Port Board	0.3A
Standard Smart Reader Mullion Smart Reader Embedded USB Smart Reader	0.14A
Locking hardware (while engaged)	0.12A – 0.25A

Assuming a 24V power supply and a Core Series Smart Hub configured with four Avigilon readers and locking hardware using about 2 Amps, to keep the system running for 3 hours with all entries powered, you need 2A x 3 hours = 6AH, so two 12V 6AH sealed lead acid (SLA) or gel cell batteries wired in series.

Troubleshooting Avigilon Smart Readers

WARNING:
Disconnect power before servicing.

See LED indicator on page 17.

If your Avigilon controller or Smart Reader is experiencing issues, go to the Alta Access to diagnose the issue and restart the device, if necessary. For information on using the Device dashboard, see the Alta Access web app guide.

Regulatory notice

NOTE: All national and local electrical codes apply when installing this device.

UL 294

The following performance levels are defined for the Smart Reader as per UL 294:

Attack:	Level I
Endurance:	Level I
Line Security:	Level I
Standby:	Level I

CAN/ULC 60839-11-1-16 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 Avigilon 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.

OP-R2X-MULL: FCC ID:2APJVOPR2LHF
OP-R2X-STND: FCC ID:2APJVOPR2LHF

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.
- 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.

RF Radiation Hazard Warning

To ensure compliance with FCC and Industry Canada RF exposure requirements, Smart Hubs device must be installed in a location where the antennas of the device will have a minimum distance of at least 20 cm from all persons. Using higher gain antennas and types of antennas not certified for use with this product is not allowed. The device shall not be co-located with another transmitter.

Installez l'appareil en veillant à conserver une distance d'au moins 20 cm entre les éléments rayonnants et les personnes. Cet avertissement de sécurité est conforme aux limites d'exposition définies par la norme CNR-102 at relative aux fréquences radio.

Industry Canada Notice and Marking

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other Users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC Company Number: 25142

OP-R2X-MULL: IC ID: 25142-OPR2LHF
OP-R2X-STND: IC ID: 25142-OPR2LHF

More information

Post-installation — Device, entry, and PIN credential setup

After installing the Smart Reader, see reader creation, entry management, and PIN credential creation.

Technical support

For Avigilon support documentation, see support.avigilon.com.

Product documentation

For the cloud-native Avigilon Alta product documentation, see docs.avigilon.com.

Avigilon warranty

Warranty terms for Avigilon products are provided at avigilon.com/support/warranty.

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Revisions

Guide	Description
October 2024	Control Center portal renamed to Alta Access