15370 Barranca Parkway
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USA

EDGE EVO®

Standard Networked Controller

EH400-K / ESH400-K

INSTALLATION GUIDE

82000-921, Rev D.1

October 2012

EDGE EVO is the next evolution in access control hardware solutions. A true IP solution that meets the demands of open architecture, IP-centric environments, EDGE EVO provides fully distributed intelligence and decision making right to the door, leveraging the IT infrastructure to the maximum extent possible. Leveraging Power-over-Ethernet (PoE), EDGE EVO reduces door installation costs by not requiring a separate local power supply under many circumstances.

The Standard Networked Controller is a fully integrated single-door controller offering discrete I/O and Wiegand/Clock-and-Data interfaces to readers. Additionally, connect native Hi-O devices (readers, locks, pushbuttons) and EDGE EVO Hi-O Modules to the Hi-O bus, providing secure communication around the door. Hi-O involves devices with built-in intelligence and a CANbus that links all the devices together. Password protect or encrypt Hi-O CANbus data traffic. Each Hi-O device (such as the REX switch, electric strike, card reader and door operator) is connected to the CANbus by a single, four-wire cable. Two of the wires supply power and the other two are used for data communication.

Specifications

	CONDITIONS			VOLTAGE DC (VDC)	CURRENT (Amp)	POWER (W)	OPERATING TEMPERTURE	CABLE LENGTH	UL REF NUMBER
Input	DC Input (NSC)			+12VDC	0.18Amp	2.16	32° - 122°F (0° - 50° C)	Hi-O CAN Bus: Total Length 100 ft (30 m) - 22 AWG ● 0.65mm ● 0.33mm² Maximum between drops 30 ft (10 m) 22 AWG ● 0.65mm ● 0.33mm² RJ45: 328 ft (100 m) - Category 5 K	KE400CX$_1$X$_2$N
				+24VDC	0.14Amp	3.36			
				PoE (+48VDC NOM)	.085Amp	4.08			
	DC Input (MAX)			+12VDC	1.5Amp	18.00			
				+24VDC	1.5Amp	36.00			
				PoE (+48VDC NOM)	0.3Amp	14.40			
	Supervised inputs (AC, Batt, REX, Door Mon) (MAX)			0-+5VDC Reference	0.005Amp (sink)	0.025			
	Data 1/CLK , Data 0 / Data (MAX)			0-+5VDC Reference	N/A	N/A			
Output	GRN LED, RED LED, Beep, Hold (MAX)			0-+5VDC reference	0.005Amp (sink)	0.025			
	External Tamper (MAX)			+5VDC (NOM)	0.02	0.100			
	CAN DC Output (MAX)	AUX 12 / 24VDC Input		+10.8 to +24VDC	1.2Amp *	28.80			
		PoE Input		+ 24VDC (NOM)	0.4Amp *	9.60			
	Reader DC PWR Output (MAX)	AUX 12 VDC		+9.8 to +12.25VDC	0.32Amp *	3.92			
		AUX 24VDC		+9.8 to +12.25VDC	0.60Amp *	7.35			
		PoE Input		+9.8 to +12.25VDC	0.58Amp *	7.11			
	Strike*** / AUX Relays NC or NO DC Output (MAX)	AUX 12VDC Input	Unregulated (Wet) Jumpers	+10 to +12VDC	0.70Amp *	8.40			
		AUX 24VDC Input	Unregulated (Wet) Jumpers	+23 to +24VDC	0.70Amp *	16.80			
			Regulated (Wet) Jumpers - 12VDC	+10 to +12VDC	0.70Amp *	8.40			
		PoE Input	Unregulated (Wet) Jumpers	+16.5 to +24VDC	0.36Amp *	8.64			
			Regulated (Wet) Jumpers - 12VDC	+10 to +12VDC	0.58Amp *	6.96			
		AUX / PoE Input	Jumpers Set to Dry	+12 to +24VDC External	2.00Amp **	48.00			

NSC = Normal Standby Condition

* Combined output rating not to exceed V*I = W
1.2 Amp (+24VDC AUX Input, 28.8 W)
1.2 Amp (+12VDC AUX Input, 12.96 W)

** Each relay

*** Shared between relays.

X_1 = K for Black, G for Gray

X_2 = N for non-Solo, S for Solo

1 Power Analysis

Before starting installation, determine which components will be used in the system and analyze the power requirements to avoid over-loading the EDGE EVO Hi-O Networked Controller & Reader (EH400-K).

The steps that follow illustrate sizing power requirements for the system.

Step 1 - Identify System Components

Identify the components that will be used in the system. A typical installation may include the following components:

- Door Position Switch – Detects when the door is open or closed.
- Magnetic Lock – Holds the door locked.
- Request to Exit (REX) Switch – Unlocks the door when exiting the secured area.
- EDGE EVO Hi-O Standard Networked Controller (EH400-K) – Provides access control and manages all peripherals around the door.
- iCLASS Wiegand Reader – Provides entry into the secured area.

Step 2 - Create System Layout

Using the components identified in “Step 1 - Identify System Components” on page 2, create the system layout.

In this example, the EH400-K is connected to the remote server through an Ethernet connection and manages door peripherals over the Hi-O bus. Controlling downstream door peripherals, the EH400-K is a fully integrated single-door controller offering discrete I/O and Wiegand/Clock-and-Data interfaces to external readers. The EH400-K receives inputs from the Door Position Switch and REX Switch to drive the Magnetic Lock output.

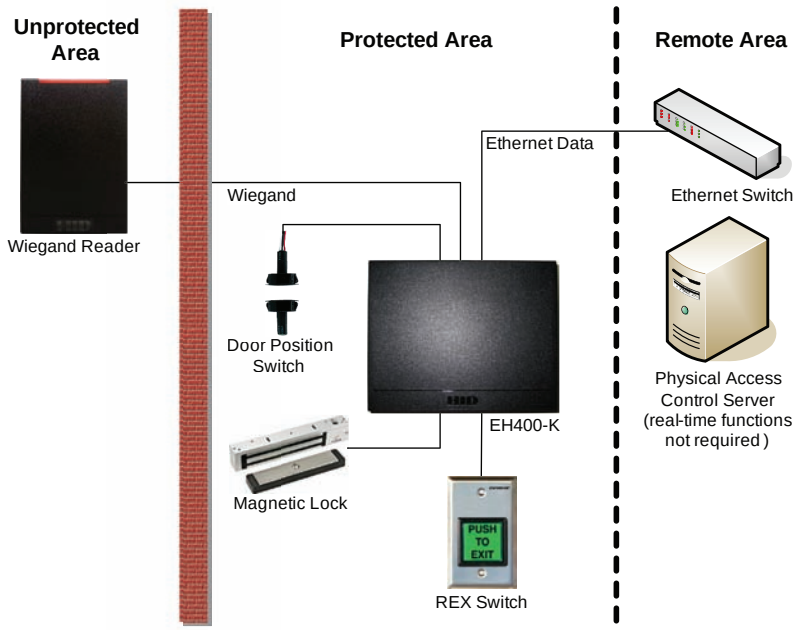


Figure 1 - System Layout Example

Step 3 - Analyze Power Requirements

A - Door Peripheral Operational Currents

For the door peripherals identified in “Step 1 - Identify System Components” on page 2, consult the vendor data sheets to determine the operational current draw. Typical operational current draw is provided below.

Note: See individual peripheral data sheets for actual operational current draw.

Device	Conditions	Typical Operational Current
Door Position Switch	V_{IN} = 12VDC	15mA
(For example, Securitron MSS)	V_{IN} = 24VDC	15mA
Mag Lock	V_{IN} = 12VDC	300mA
(For example, Securitron M32)	V_{IN} = 24VDC	150mA
REX Switch	V_{IN} = 12VDC	28mA
(For example, Securitron EEB)	V_{IN} = 24VDC	38mA
iCLASS Wiegand Reader	V_{IN} = 12VDC	150mA

B - Match I/O Requirements to the Hi-O Interface Device

For the door peripherals identified in “Step 1 - Identify System Components” on page 2, the system requires direct connection to I/O interface and Wiegand/Clock-and-Data ports of the EH400-K. A separate Hi-O Interface Device is not required.

C - Compute and Compare Overall Current Draw

Calculate the total current draw for all door peripherals and the attached Wiegand readers with the following equation, adding terms as required.

$$I_{total} = I_{dps} + I_{mag} + I_{rex} + \ldots + I_{iCLASS\ reader}$$

The following calculations provide load current computations.

I_{total} @ 12VDC = 15mA + 300mA + 28mA + 150mA = 493mA

I_{total} @ 24VDC = 15mA + 150mA + 38mA + 150mA = 353mA

Compare the required current draw (I_{total}) to the output current capacity of the EH400-K (see Specification table, pg 1) to select the EH400-K power scheme. The CAN DC PWR Output represents the entire power output capacity of the EH400-K.

Device	Port	Conditions	Vout	I out
Standard Networked Controller	CAN DC PWR Output (MAX)	AUX 12-24VDC Input	+10.8 to +24VDC	1.2Amp
(EH400-K)		PoE input	+24VDC (NOM)	0.4Amp

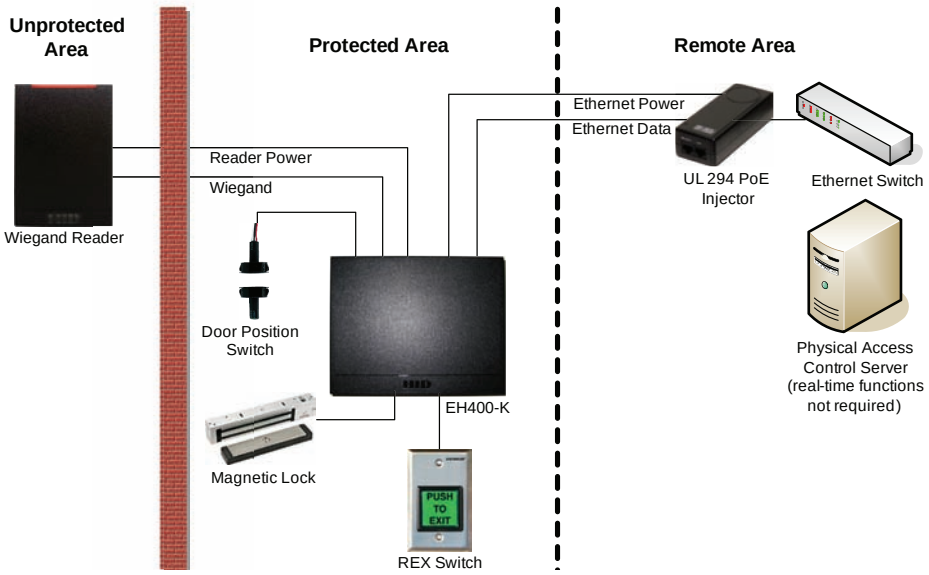
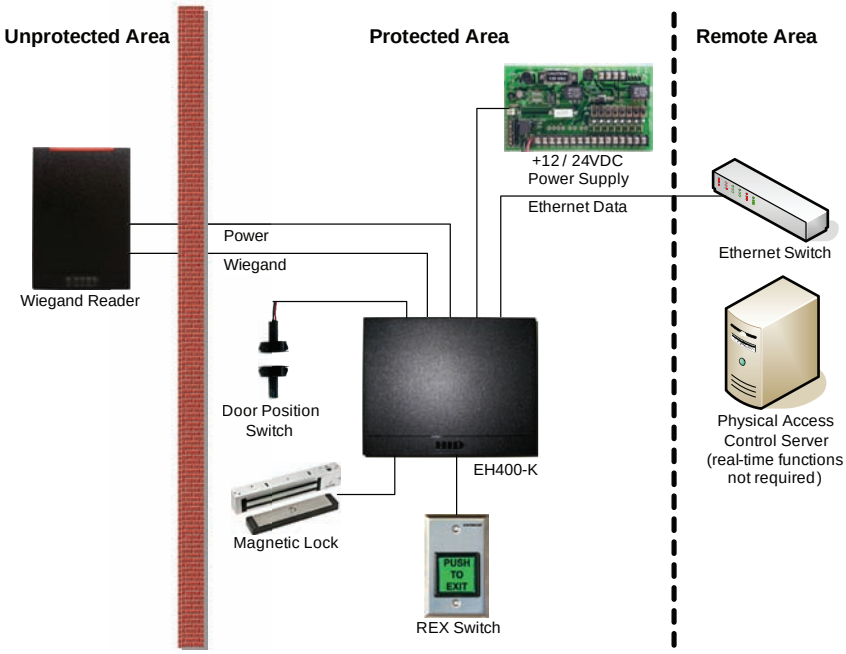
In this example, the EH400-K provides sufficient power when operated with a PoE injector, or +12/24VDC auxiliary power supplies.

Directly connect the door peripherals identified in “Step 1 - Identify System Components” on page 2 to the EH400-K I/O ports per the “Specifications” on page 1 for the selected input power scheme.

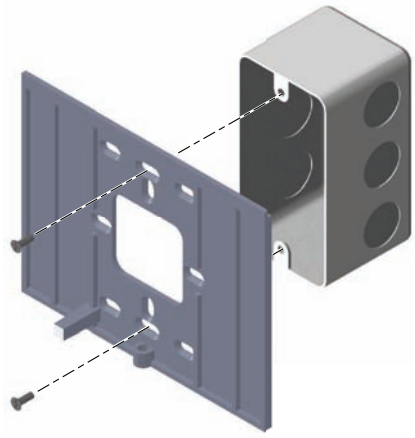
Ensure all door peripherals connected to the Strike/AUX relays and the Reader DC PWR Output or both do not exceed 1.2Amps (AUX Input) or 0.4Amps (PoE Input), combined. Alternatively, the door peripherals may be connected to the Strike/AUX relays configured for Dry contact up to 2Amps per relay.

Step 4 - Select Power Scheme

Select the appropriate power scheme to meet overall current draw. Using the analyses from the previous sections equates to the following power scheme possibilities.

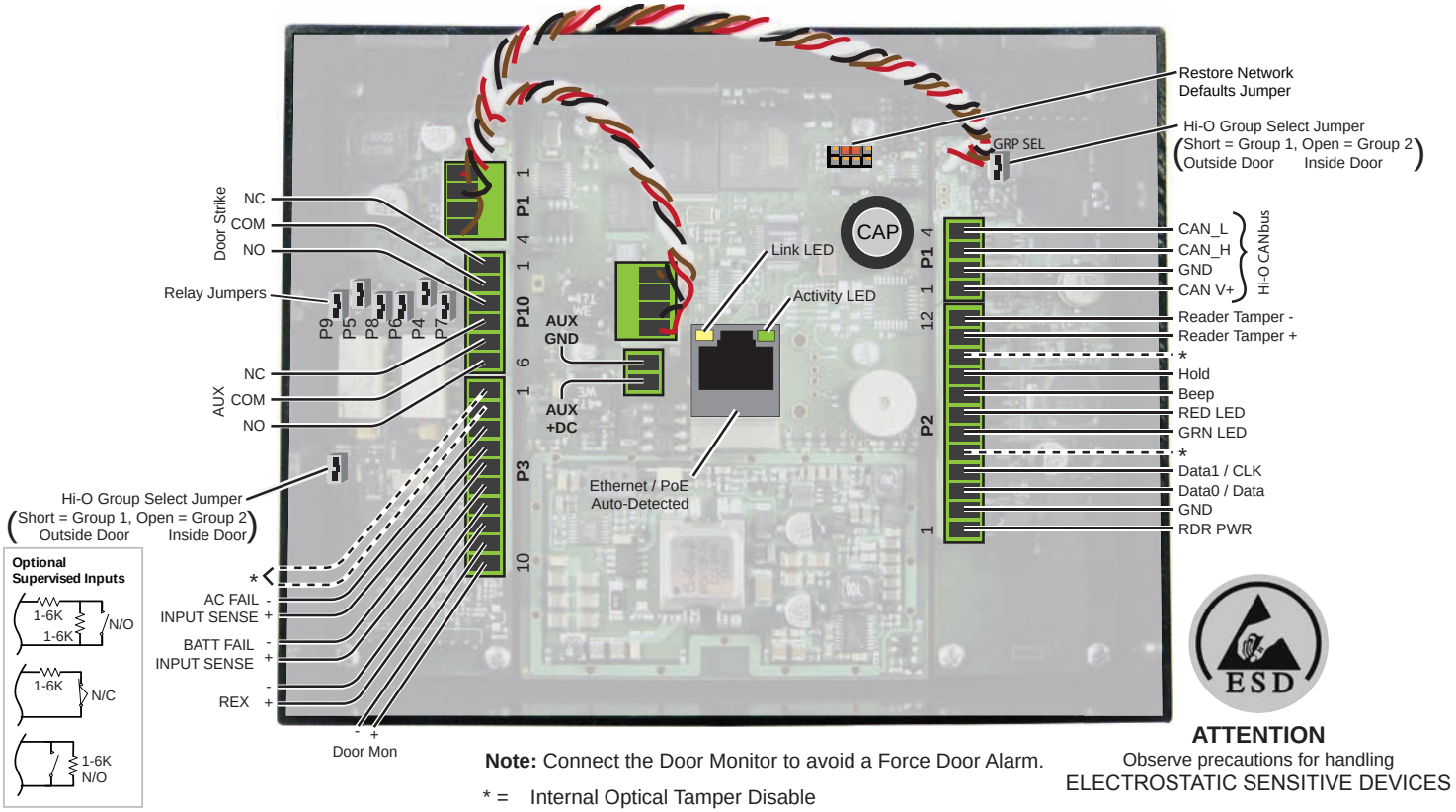
Power Scheme	Details
1	Standard Networked Controller power derived from PoE. • Insert a UL294 Listed PoE Injector in the Ethernet line to power the Standard Networked Controller. 
2	Standard Networked Controller power derived from an external +12VDC or +24VDC power supply. • The Standard Networked Controller is connected directly to the Ethernet switch without a PoE injector. 

2 Mounting



Junction box not included.

3 Wiring



Note: Connect the Door Monitor to avoid a Force Door Alarm.

* = Internal Optical Tamper Disable

ATTENTION
Observe precautions for handling
ELECTROSTATIC SENSITIVE DEVICES

CAUTION: Some magnetic locks exhibit both high inrush current when activated and a high instantaneous break voltage when de-energized due to magnetic field collapse. It is recommended you use of a snubber circuit across the controlling relay terminals to protect the controlling relay contacts. Go to support.hidglobal.com, see Solution 891 - How do I wire a High In-Rush Current locking device to VertX/EDGE EVO. Not evaluated by UL.

3.1 Network Defaults Jumper

The Network Defaults Jumper requires physical access to the EDGE EVO controller. Physical access provides the necessity to place a jumper over the debug port prior to the controller rebooting. The controller reconfigures the network settings to the factory defaults when the jumper is on the debug port during a reboot. From this point, configuration (or re-configuration) proceeds normally.

Use the Network Defaults Jumper to correct potential errors in an EDGE EVO controller Network Configuration or if the admin password is forgotten.

A jumper is supplied with the EDGE EVO for the Hi-O termination; borrow this jumper to perform this process. Replace the jumper to the Hi-O termination after restoring network defaults.

1. Remove the back plate on the EDGE EVO.
2. Loosen the Mylar cover.
3. Reboot the controller and place the supplied jumper over pins 3 and 5 of the Debug port after the beep. The Debug port is an eight pin header, located above and to the right of the Ethernet connector, underneath the Mylar.

   Note: The network reset opportunity occurs for 30 seconds, while rebooting the controller. On an EDGE EVO, a second beep occurs to signal the end of the 30 second period.
4. After 30 seconds, the beeper stays on constantly to indicate success. When an error occurs, you receive a single beep.
5. Remove the jumper; return it to the Hi-O termination header and cycle power. The controller resets in approximately 60-seconds. Once the reset is complete, you hear the single beep. After the 30-second window, you hear the second beep. The controller is fully functional during this time.

   CAUTION: During the controller rebooting process, all network configuration information is overwritten and returned to the original defaults.
6. Configure the controller for your installation parameters.
7. Reinstall the back plate of the EDGE EVO.

3.2 Internal Optical Tamper

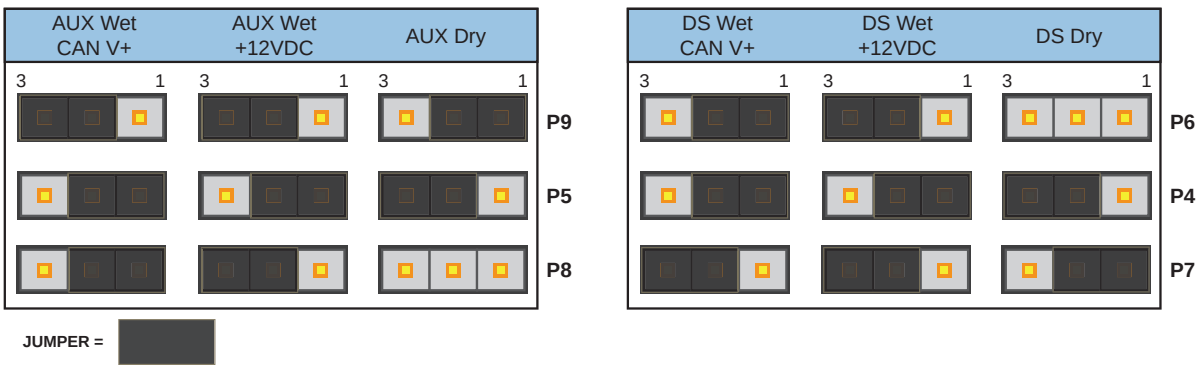
To disable the internal optical tamper sensor for the right side PCB (reader interface board), attach a jumper wire from P2 pin 10 to P2 pin 5.

To disable the internal optical tamper sensor for the left side PCB (door interface board), attach a jumper wire from P3 pin 1 to P3 pin 2.

CAUTION: The EH400-K ships from HID with these jumpers pre-installed on the connectors. Removing these jumpers causes false tampers to trigger.

Note: If desiring an external tamper, wire an unsupervised Normally Closed contact, replacing one of the pre-installed jumpers.

3.3 Relay Jumpers



3.4 Tamper (Reader Interface Board)

The Reader Tamper + and - are implemented allowing a connection for an open collector external tamper from a reader, such as iCLASS.

Note: Connect P2, Pin 2 (GND) from the Reader Interface Board to the same ground as the reader power, if the reader is not powered by the units 12 VDC output port.

3.5 Door Interface Board Groups 1 and 2

3.5.1 Group 1

Following are the inputs when the unit is configured for Group 1.

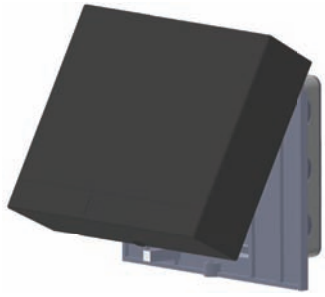
Input	Port	Pin
AC -	P3	Pin3
AC +	P3	Pin 4
BATT -	P3	Pin 5
BATT +	P3	Pin 6
REX -	P3	Pin 7
REX +	P3	Pin 8
Door Mon -	P3	Pin 9
Door Mon +	P3	Pin 10

3.5.2 Group 2

Following are the inputs when the unit is configured for Group 2.

Input	**Port**	**Pin**
Input 4 -	P3	Pin3
Input 4 +	P3	Pin 4
Input 3 -	P3	Pin 5
Input 3 +	P3	Pin 6
Input 2 -	P3	Pin 7
Input 2 +	P3	Pin 8
Input 1 -	P3	Pin 9
Input 1 +	P3	Pin 10

4 Install to Backplate



5 Contact

Contact EDGE EVO through one of the following methods.

5.1 Direct Connect

If EDGE EVO will be connected to a network using static IP addressing or if the Discovery GUI is not installed on the PC, use this method.

Note: The computer must be running Windows 2000 or XP and be configured for DHCP.

1. Disconnect the computer from the network and directly connect EDGE EVO to the computer with an Ethernet cable.
2. Click **Start > Run.** Enter **ipconfig /renew** ↵
3. Access a web browser and enter **169.254.242.121** into the **Address field** ↵

5.2 Discovery GUI (for DHCP networks)

With a DHCP network, use the HID Discovery GUI on the PC to locate and connect the Controller.

Note: The Controller must be connected to the network before power is applied for DHCP to function.

1. With the PC connected to the same network as the Controller, double-click **hid-discovery.exe**.
2. Select the device from the list.
3. Click **Browser**.

If the Discovery GUI is not on the PC, download the application from www.hidglobal.com/downloads/DiscoveryClient.zip.

Note: Java is required for the Discovery GUI.

6 Configure

The web browser will prompt for login information. From the **Login** screen enter **admin**, leaving the **Password** field empty. Follow the instructions on the web browser screen to configure EDGE EVO.

For EDGE EVO Solo, reference the EDGE EVO Solo User Guide, 83000-902, rev B.x.

7 Power & Testing

Test the system once per year using the web Graphical User Interface to ensure all wiring and configuration is correct.

For additional installation information, such as PIR and other active Request-to-Exit (REX) devices, as well as connecting fire relays, see http://www.hidglobal.com/edgesupport.

Hi-O Interface Modules

Hi-O interface modules are used to expand functionality of the EDGE EVO Networked Controller. Hi-O interface modules connect the native Hi-O bus with additional components around and behind doors and other access points.

For Hi-O interface module wiring, see their prospective Installation Guides.

Go to www.hidglobal.com > **Support** > **Document Library**.
Search the document type as a **Installation Guide**.

Model	Description	Part Number
EDM-M	EDGE EVO Door Module	82342
EIM-M	EDGE EVO Input Module	82340
EWM-M	EDGE EVO Reader Module	82360
EDWM-M	EDGE EVO Door & Reader Module	82363AM
ELM	EDGE EVO Lock Module	82301
EVM	EDGE EVO Voltage Module	82365

Glossary

Acronym	Description	Acronym	Description
AC Fail	AC Power Failure Input	GND	Ground
AUX	Auxillary Output	GRN LED	Green LED Output
BATT Fail	Battery Failure Input	GRP SEL	Group Select
CAN_H	Hi-O CANbus High	NC	Normally Closed
CAN_L	Hi-O CANbus Low	NO	Normally Open
CLK	Clock	PIR	Passive Infared device
COM	Common	PoE	Power over Ethernet
Data0	Wiegand Data 0 Input	RED LED	Red LED Output
Data1	Wiegand Data 1 Input	REX	Request-to-Exit Input
Door Mon	Door Monitor Input	RLY	Relay
DS	Door Strike		

Regulatory

UL

Connect only to a Listed Access Control / Burglary power-limited power supply, or Listed Access Control / Burglary PoE (Power-over-Ethernet) adapter.

All National and local Electrical codes apply. Install in accordance with NFPA70 (NEC), Local Codes, and authorities having jurisdiction. Host-based security, Ethernet / Host Communication, has not been evaluated by UL. Ethernet port has been evaluated for supplemental use only.

Indoor use only.

The EDGE EVO family has been evaluated for standalone Access Control.

Mount onto UL Listed Single-Gang electrical box.

Standard Networked Controller and EDGE EVO Modules are UL Listed for installation within the protected area.

All panic and alarm hardware and equipment shall be UL Listed.

All cabling and wire shall be UL Listed or Recognized and suitable for the application.

All splices and connections shall be mechanically secure and bonded electrically.

EDGE EVO was evaluated for use with all Listed HID Global Wiegand models: iCLASS, Indala Prox, HID Prox, bioCLASS, SmartID, SmartTRANS, and Mag Stripe series (with and without keypad), up to 128-bit formats. EDGE EVO was evaluated for use with all HID Global Hi-O iCLASS readers.

The Standard Networked Controller is UL Listed for installation in the unprotected area, as well as within the protected area.

CAUTION: Any changes or modifcations to this devise not explicitly approved by the manufacturer could void your authority to operate this equipment.

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.

Canada Radio Certification

This device complies with Industry Canada license-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.

CE MARKING

HID Global hereby declares that these proximity readers are in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Por el presente, HID Global declara que estos lectores de proximidad cumplen con los requisitos esenciales y otras disposiciones relevantes de la Directiva 1999/5/EC.

HID Global déclare par la présente que ces lecteurs à proximité sont conformes aux exigences essentielles et aux autres stipulations pertinentes de la Directive 1999/5/CE.

A HID Global, por meio deste, declara que estes leitores de proximidade estão em conformidade com as exigências essenciais e outras condições da diretiva 1999/5/EC.

HID Global bestätigt hiermit, dass die Leser die wesentlichen Anforderungen und anderen relevanten Bestimmungen der Richtlinie 1999/5/EG erfüllen.

HID Global dichiara che i lettori di prossimità sono conformi ai requisiti essenziali e ad altre misure rilevanti come previsto dalla Direttiva europea 1999/5/EC.

Download copies of the R&TTE Declaration of Conformity (DoC) at http://certifications.hidglobal.com.

JAPAN MIC

この装置は認証済みです。

TAIWAN NCC

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

According to «Administrative Regulations on Low Power Radio Waves Radiated Devices» without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic as well as performance to an approved low power radio-frequency devices. The low power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, the user shall cease operating immediately until no interference is achieved. The said legal communications means radio communications is operated in compliance with the Telecommunications Act.

The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/).

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).

ACCESS experience.

hidglobal.com

82000-921 Rev D.1
Patent Pending

Check reader label for current regulatory approvals.

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