Web-Based Access Control Solution

ACW2-XN

Installation Guide

ACW2XN-902-EN, Rev. A.1
PLT-03474 A.1

1 Introduction

Product Description

HID Global's Web-based Access Control Solution for small businesses, **ACW2-XN**, provides a turnkey solution for small facilities. Meet today's security challenges and benefit from support for state-of-the-art identity management and reliability of an enterprise level hardware at a fraction of the cost.

Reduce risk and response time for lost or stolen credentials. Use a standard web browser to access the intuitive management portal. The web-based portal, **HID Access Manager**, makes it convenient to provision and revoke smart cards without the expense or difficulties of managing physical keys.

In addition to access and identity management, **ACW2-XN** provides valuable built-in business tools. Basic reporting and full audit logs are available at the touch of a button through the web-based portal.

Reliable and backed by a strong warranty, HID Global puts access control from a trusted industry leader within reach.

ACW2-XN can be expanded to support up to eight APB doors with additional **AW2** Wiegand door modules.

2 System Specifications

Hardware Capabilities

Feature	Specification
Max People	1000
Max Cards	3 Cards per Person
Max Logs	100 000 events
# of Doors	2 Doors or 1 APB Door *(*Expandable to 8 doors, or 8 APB Doors)*

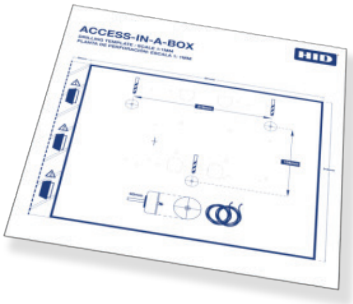
***Note:**

1. Additional ACW2-XN and/or AW2 modules are required.
2. See System Architecture – Best Practices on page 4 for more details.

3 What's in the Packaging

ACW2-XN Contents

ACW2-XN



Drilling Template

Quick Install Guide

http://hid.gl/ac-doc

More Documentation

Spare Labels

Cable Ties & Anchor

Metal-Oxide Varistors

Spare Fuse

4 Installation Preparation

System Requirements

- Compatible browser (See details on page 14)
- Access to a mains power outlet.
- Access to an Ethernet Network point or a router/switch that will allow network connectivity.
- In the absence of any network, HID Access Manager can be set up and administered by connecting a desktop/laptop PC directly to the Controller Module with an (uncrossed) network cable.

Suggested Tools

- Electric drill
- Drill bits (Masonry / steel – to suite the site wall materials)
- Screwdriver, small, flat
- Wire strippers
- Side cutters
- Site plan (to lay out door and reader locations)

Additional Hardware

- Electric strike locks and/or mag locks
- Power supply with sufficient capacity to power the locks (see calculations on page 19)
- Push buttons for Request-to-Exit (REX)
- Door Position Sensor (DPS) switches (if not built into the locks)
- Mains power cable with a plug on one end
- Cable for Wiegand Readers, sufficient for the site (measure the site)
- Cable for Door Position Sensor and Request-to-Exit, sufficient for the site (measure the site)

5 System Architecture – Best Practices

One or two ACW2-XN enclosures?

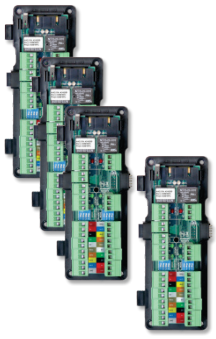
ONE ACW2-XN enclosure

- is sufficient for up to 8 readers
- AND if all doors are within reasonable cabling distance of the enclosure

TWO ACW2-XN enclosures are needed

- for 9 to 16 readers
- OR if a second group of doors is a significant distance away from the first group. The two enclosures are linked with an RS-485 cable, saving on long, multiple-reader cable runs. (Remember that the total door count still cannot exceed the 8-door limit.)

How many AW2 Modules are needed?

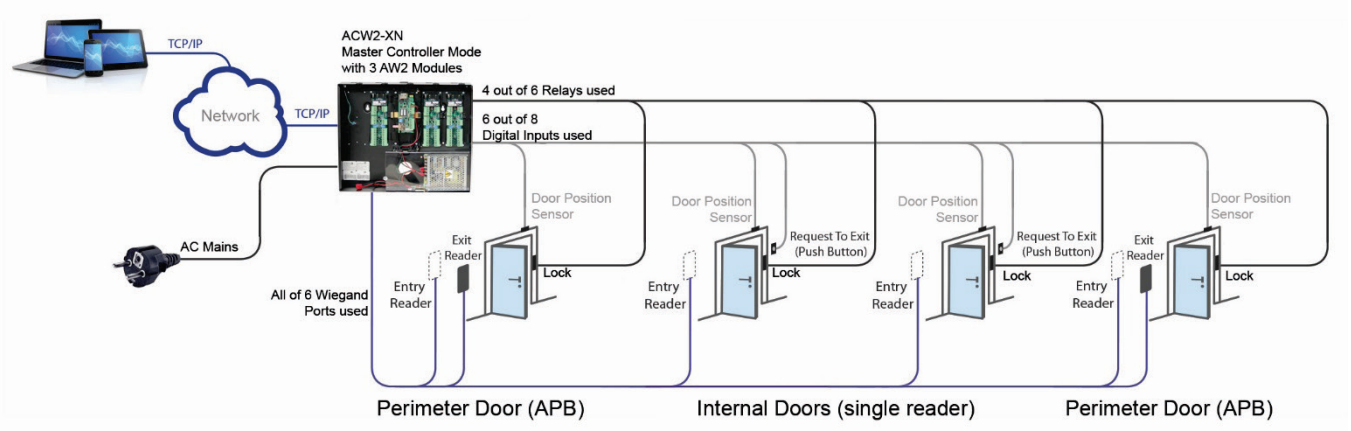


- One AW2 Module is needed for each door that has both entry and exit readers.
- One AW2 Module is needed for every TWO doors that only require entry readers

NOTE:

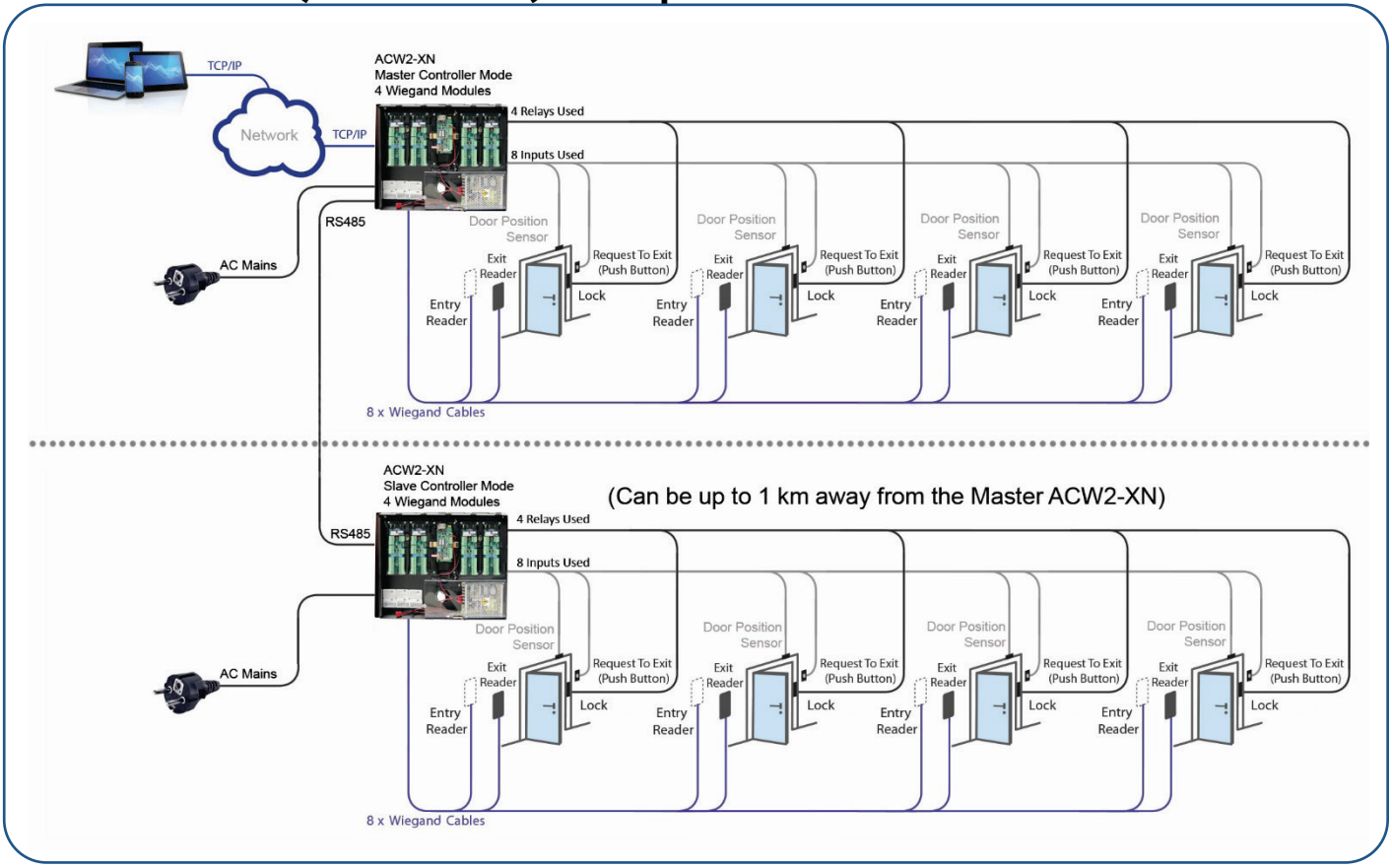
- Any combination of single-readers and two-reader doors is permissible
- Readers may be independently allocated to any door
- Whatever the combination, no more than eight doors are supported

Example using three AW2 Wiegand Modules:



Any combination of single-reader or entry+exit-reader doors is possible

16 Reader (8 APB Door) Example



Master and Slave Controlling eight anti pass-back doors

Note:

- HID Access Manager will only accommodate 8 doors in total.

6 Mounting the ACW2-XN

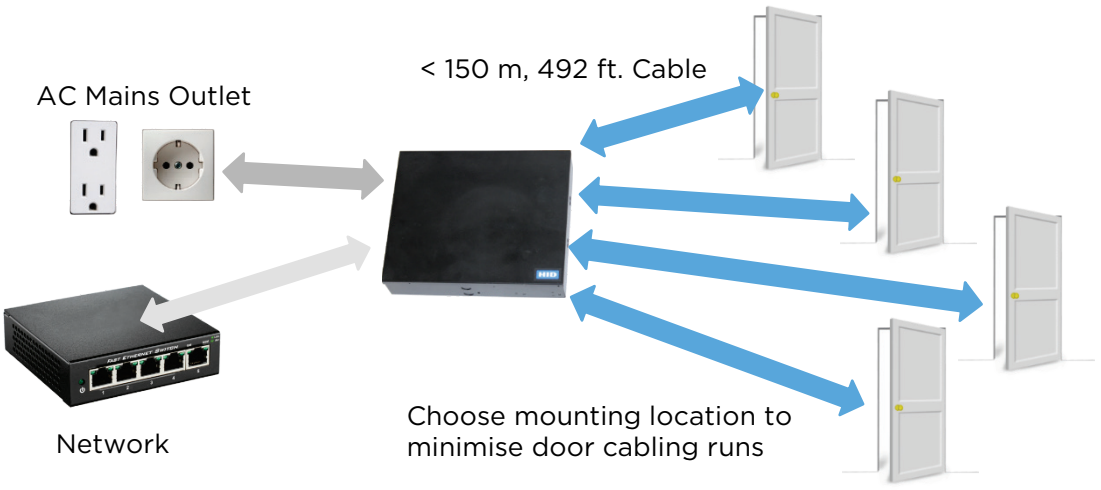
Mounting Location Considerations

Shelter and Security

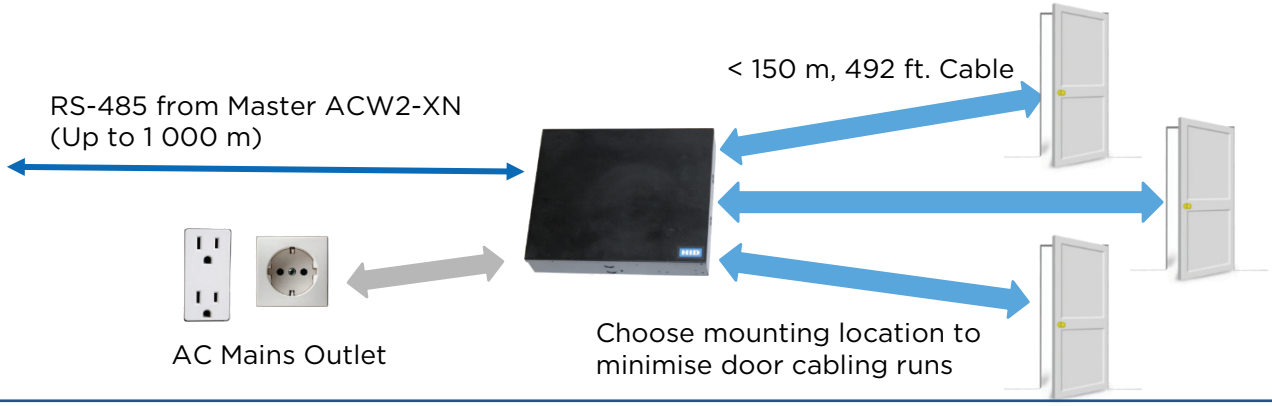
Secure indoor location

Away from the weather

Single ACW2-XN cable run considerations



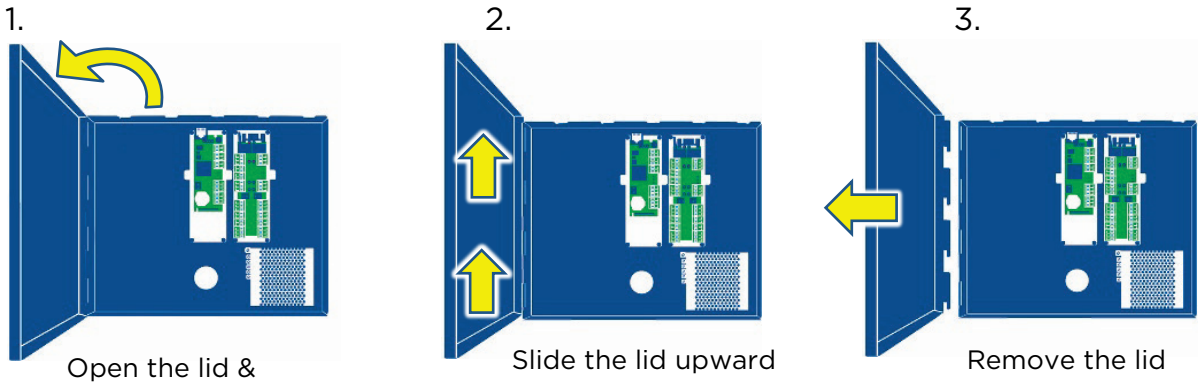
Second/Slave ACW2-XN cable run considerations



NOTE that the Slave ACW2-XN:

- Does NOT connect to the network
- MUST connect via RS-485 to the Master ACW2-XN
- Is able to continue reading cards and controlling its doors in the event of an RS-485 cable break

Removal/Fitting the Lid



Mark Up Mounting Holes Using Drilling Template

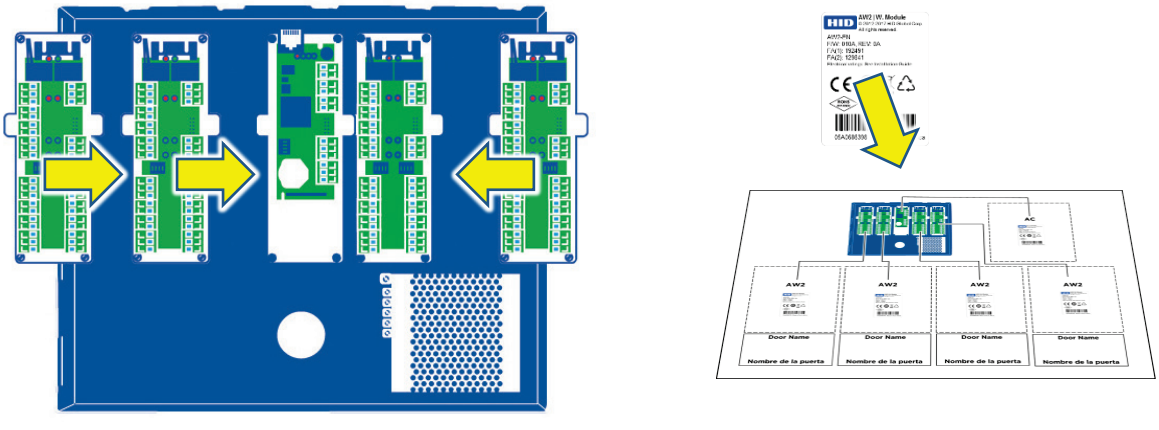
1. Select fasteners that are appropriate for the mounting surface (masonry/wood/ dry wall)
2. Select the drill size appropriate for the fasteners
3. Fix the Drilling Template against the chosen vertical surface (using the supplied double-sided tape), making sure that the top edge is horizontal. (Remember to allow 30 mm clearance on the left of the ACW2-XN enclosure to allow the door to hinge fully open.)
4. Centre punch the two mounting hole locations
5. Drill holes of a diameter that is suitable for the fasteners
6. Remove the lid from the enclosure (as per instructions above)
7. Mount the enclosure to the surface
8. Replace the lid (and plug the lid cable back in) after the system wiring is complete
9. Place the AC and AW2 module labels in the correct positions provided on the back page of the ACW2-XN Quick Install Guide. The information on the labels will be used during the door configuration process via HID Access Manager.

Expanding the controller with more Wiegand Modules

The **ACW2-XN** comes assembled with one AW2 module, and can support another three AW2 modules.

Additional AW2 modules are plugged into the sides of the existing modules, and then fastened in place with the four mounting screws that are included with each AW2 module.

Remember to place the additional AW2 Module labels on the back page of the ACW2-XN Quick Install Guide.



Note:

- **AW2** modules may be added or removed without powering down the system.

7 Wiring the System

AW2 Wiegand Module

AW2 Module Cable Specifications

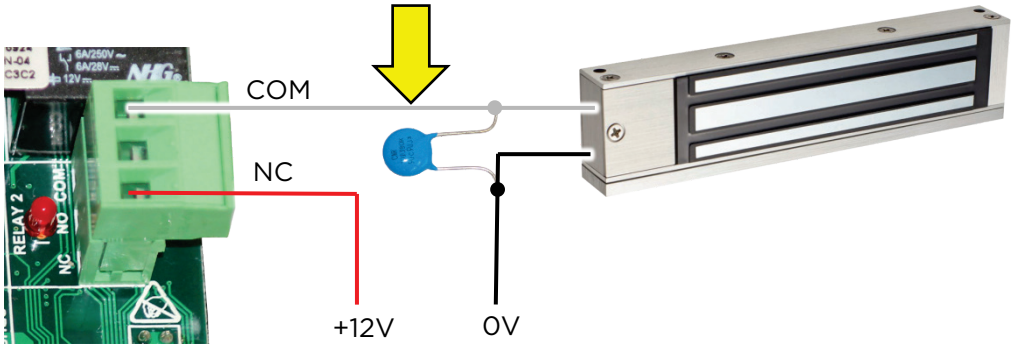
Application	Conductors (# of Wires)	Cross Sectional Area	AWG	Max Cable Length
Door Strike (12V and higher)	2	0.75 mm^2, 0,0012 in^2	18	150 m, 492 ft.
Card Reader	10 (8 used)	0.32 mm^2, 0.0005 in^2	20	150 m, 492 ft.
Door Contact	2	0.32 mm^2, 0.0005 in^2	20	150 m, 492 ft.
Request-to-Exit	4	0.32 mm^2, 0.0005 in^2	20	150 m, 492 ft.

MOV (included in the packaging) Specification

MOV Rating	$25V_{RMS}$ 500A $77V_{Max\ Clamping}$

Where to use the suppled MOVs

The MOVs MUST be connected across 12V inductive loads to prevent sparking at the relay contacts.

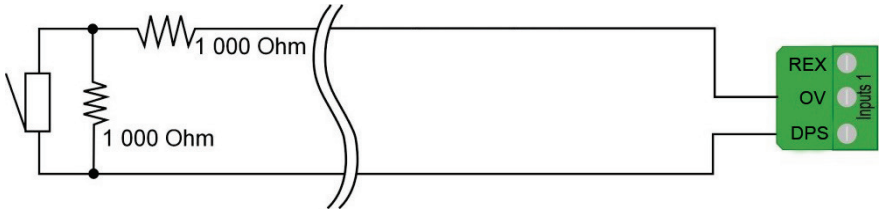


The supplied MOVs are only for 12V applications, and are MANDATORY

Supervised Inputs (Optional)

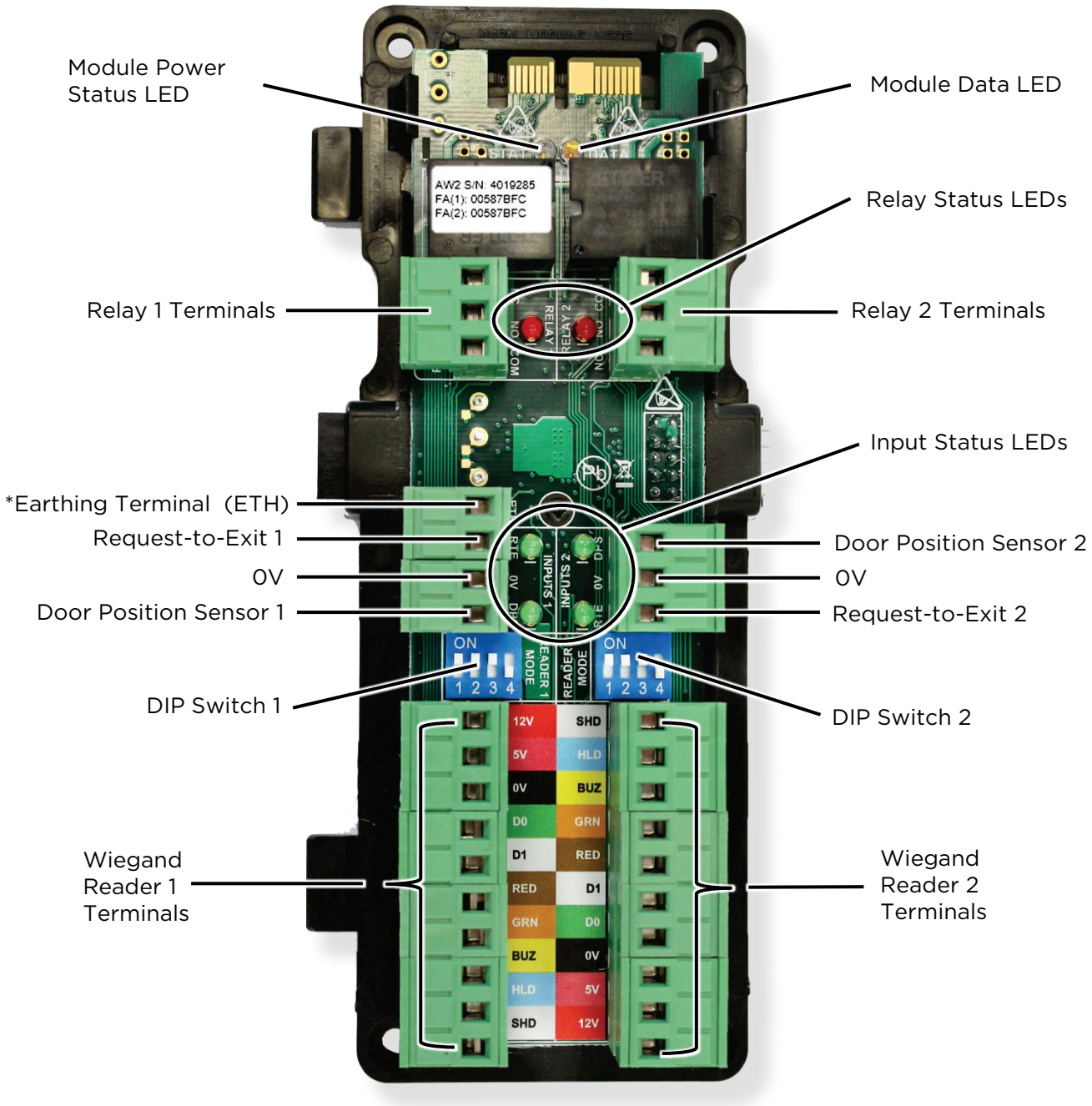
HID Access Manager can monitor the Door Position Sensor (DPS) circuits for tampering when resisters are installed.

Two 1kΩ resistors are required for every sense line. These should be installed in a location where they cannot be accessed without opening the door in question:

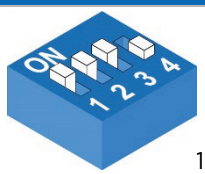


This feature must be activated in HID Access Manager via the door configuration process.

AW2 Key Components Diagram

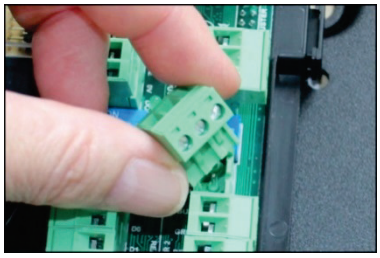


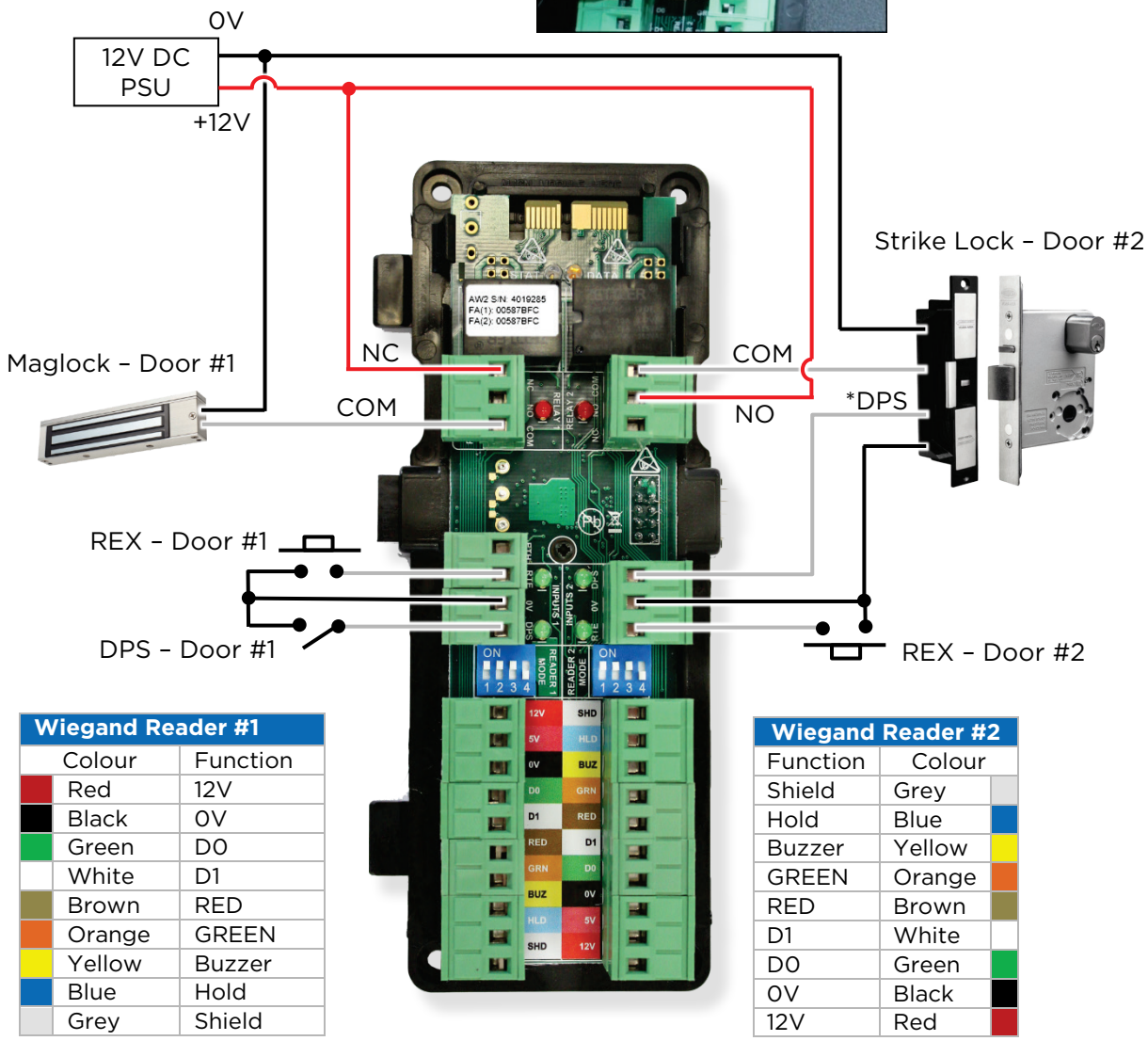
** AW2 Wiegand Modules have spare Earthing Terminals – see page 12 for details*

DIP-switch Position	Function
 1110	*(Factory Set DIP Switch Position)* Wiegand 26-bit, 44-bit, 40-bit, 37-bit and card + PIN-code Mode.

AW2 Wiring Example

Terminal blocks unplug, giving easy access to the terminal screw heads





Wiegand Reader #1	
Colour	Function
Red	12V
Black	0V
Green	D0
White	D1
Brown	RED
Orange	GREEN
Yellow	Buzzer
Blue	Hold
Grey	Shield

Wiegand Reader #2	
Function	Colour
Shield	Grey
Hold	Blue
Buzzer	Yellow
GREEN	Orange
RED	Brown
D1	White
D0	Green
0V	Black
12V	Red

*DPS: Some electric strike locks include Door Position Sense terminals. When they don't, additional sensors should be fitted if door position sensing is required.

Some strike locks and maglocks have built-in arc suppression. Consult the installation information for the locks you are using. It is recommended that the MOVs (supplied with the Wiegand Module) are connected across any inductive loads. **NB: The supplied MOVs are only suitable for 12V applications.**

CAUTION:

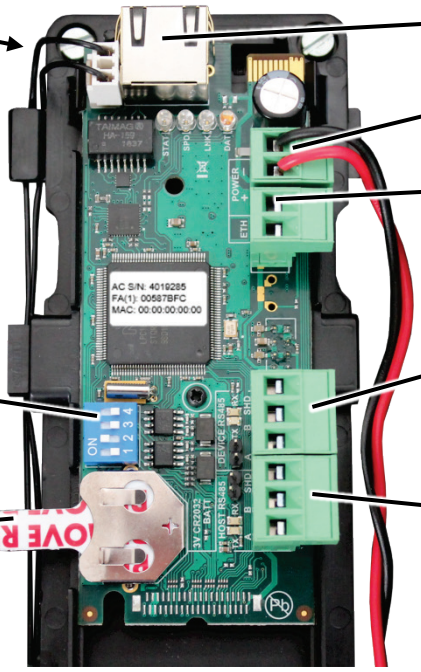
- Inadequate spark suppression can result in early failure of relay contacts – and will void the warranty on the affected AW2 module.

Controller Module

Cable Specifications

Application	Conductors	Cross Section	Max Cable Length
Network	8	>= 0,75 mm^2	150 m
RS-485	Twisted pair, with or without screen	>= 0.51 mm^2	1 000 m

Key Components and Connections



Note:

- Any module that has changes made to its DIP Switch settings while already powered up must be powered down and powered up again. This is because the settings are only read by the module during the power up cycle.

DIP-switch Position	Function MODE
 0000	**Slave Controller Mode**
 0100	**Master Controller Mode**
 1XXX	**Special Function – See the note on the next page.* **Factory Default Mode** Set DIP Switch 1 to **ON**, cycle power to the Module, wait for Controller restart (~20 seconds), and return DIP Switch 1 to **OFF.** (Switches 2, & 4 don't matter)

Note:

- **FACTORY DEFAULT IS AN ABSOLUTE LAST RESORT**
  Defaulting the Controller Module will erase all HID Access Manager data, including any static IP address that was set up – so this address should be noted somewhere safe for future use.

- The most likely reason for choosing to default a Control Module would be when the HID Access Manager IP address is accidentally set outside of the mask, and HID Access Manager becomes inaccessible.

- As long as the IP subnet of the Controller Module is the same as the PC/Laptop, the **Device Discovery Tool** may be used to discover the address and allow you to login and set up an appropriate IP address. The **Device Discovery Tool** is available for download from the "More Documentation" link included on page 2.

Earthing Terminal

The Controller and Wiegand Modules are sensitive to Electrostatic Discharges (ESD). Observe precautions while handling the circuit board assemblies by using proper grounding straps and handling precautions at all times.

To furher protect against the harmful effects of EMC and transients, a functional earth connection point is provided as a screw terminal (see silkscreen marking: ETH).

SYSTEM BACKUP

Always back up the system data using the **Access Manager Utility Tool**. This could save you having to set up the system from scratch again in the event of a system default, as described above. The **Access Manager Utility Tool** is available for download from the "More Documentation" link included on page 2.

Connecting two ACW2-XN units via RS-485

Link the two Controller Modules by connecting their RS-485 Device terminals. Remember to set the DIP Switches on the second Controller Module (in the remote ACW2-XN) to SLAVE (0000) – and remember to cycle the power to the module in question if you have changed the DIP Switch Settings while it is already in the powered up state.

Note:

- The Slave ACW2-XN is NOT connected to the Network
- The total door count (Slave + Master) may not exceed 8 doors

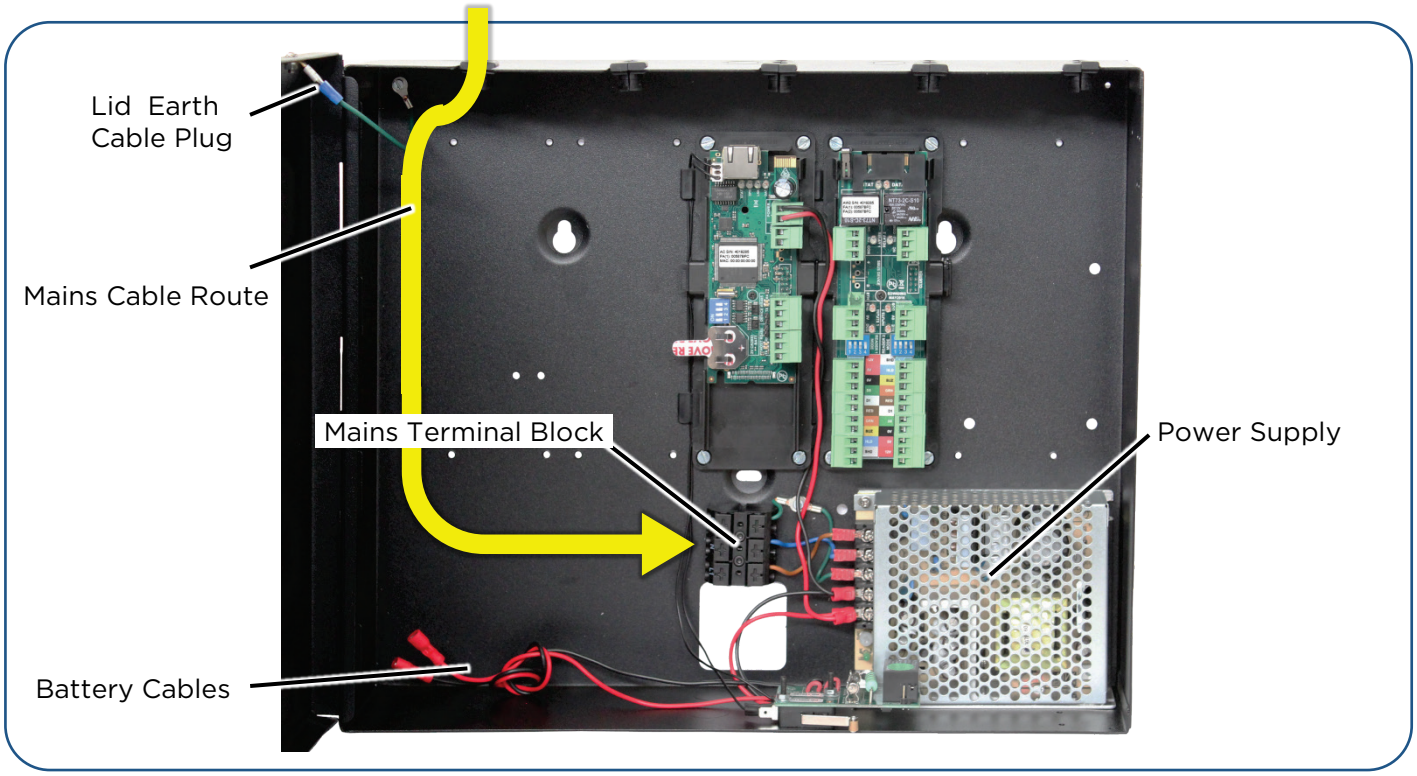
Mains supply connection

Mains Cable Specification

- Use a mains plug that is standard for the region.
- Select cable that is in accordance to National Wiring code best practices of your local authority.

Mains Cable connection

1. Lay the mains cable from the mains outlet to the IPS enclosure, ensuring that in is **NOT** plugged in to the mains outlet.
2. Pass the mains cable through a gland in the enclosure wall and follow the route indicated by the yellow arrow. (It should pass behind the battery, if it were installed)
3. Strip the ends mains cable, exposing 10 mm of the conductors.
4. Press down on the terminal buttons while threading each stripped wire end into its corresponding terminal.
5. Releasing the terminal button will clamp the stripped wire end in place.



6. Take some time to thoroughly inspect all the wiring and correct any mistakes before progressing to the next step.
7. Pull out the plastic tag from under the Lithium Button Cell on the Controller Module's PCB.
8. Plug the mains supply cable into the outlet socket and power up the installation.
9. The STAT (Status) LEDs on the Controller and Wiegand Modules will flash rapidly for approximately one second.
10. After one second the Controller STAT LED will turn off during the booting process. The Wiegand Modules' STAT LEDs will remain on constantly as long as a suitable supply voltage is present.
11. Once satisfied that here are no short circuits it is now safe to connect the recommended 12V battery (not included) using the ACW2-XN's integrated spade terminal plugs.

8 Network Setup

Compatibility

Before commencing network setup, be sure that operating system and browser are supported. At time of writing, HID Access Manager compatibility includes the following full releases (or later):

- Firefox 52.0.2
- Chrome 58.0.3029.110
- IPhone 6 (version 10.1.1)
- Android 6
- Windows 7

DNS Name function

- The DNS Name function only works with a PC

If you wish to use DNS feature with mobile phones then you need to set the DNS setting within your WLAN router. (Note that the DNS setting is router-manufacturer dependent, and not all routers support this.)

First steps:

1. If you have not done so already, remove the plastic tag from under the button cell on the Controller PCB.
2. Power up the **ACW2-XN**. (Allow a minute for it to boot up)

Note:

- Only one instance of the web interface may be opened at a time. Multiple Client connections are not supported

How to connect to HID Access Manager for the first time

First option: You have a Router with an active DHCP server

1. Follow this link: http://HIDaccess/ - or type it into the browser.
2. The HID Access Manager login dialogue will launch.
3. See Logging on, on the next page.

Second option: Switch or Direct connection

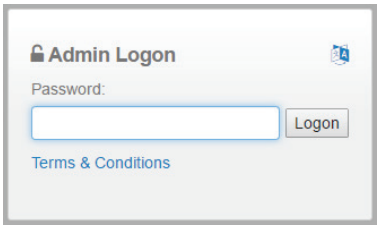
- Connect a PC/Laptop directly to the ACW2-XN network socket using a straight (uncrossed) Ethernet cable – or via a network switch.
- The PC needs to have an IP address in the same range as the ACW2-XN's default address.

1. Click Start>Control Panel.
2. Click the "Network and Sharing Centre icon".
3. Select "Local Area Connection".
4. Click the "Properties button".
5. Double-click "Internet Protocol Version 4 (TCP/IPv4)".
6. Set the IP Address to 192.168.100.X (X being any available number between 2 and 254. Ensure that your chosen number is not the same as the ACW2-XN.
7. Set the Subnet Mask to 255.255.255.0.
8. Click the OK button.
9. Follow this link: 192.168.100.1 (or type it into the browser)
10. The HID Access Manager login dialogue will launch.

Note:
- It is advised to set up a static IP address for future use.
- The DNS name function only works on a PC

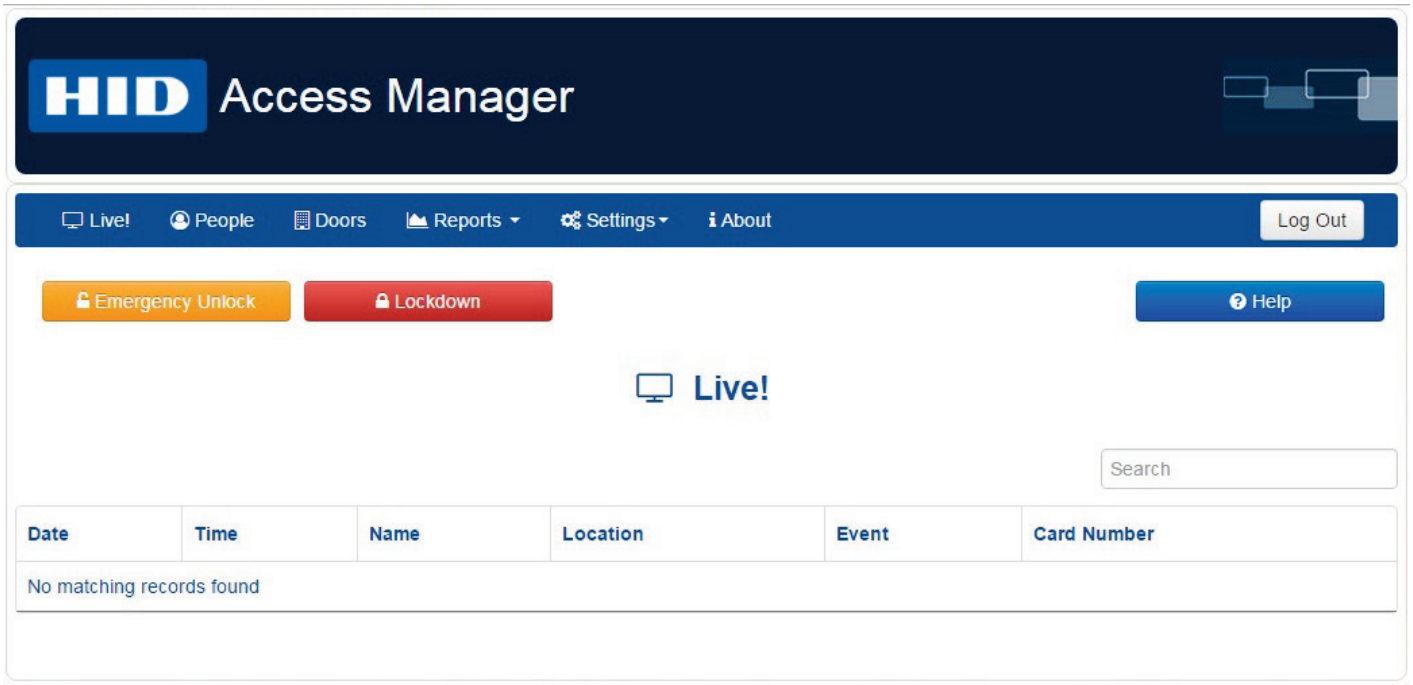
If you wish to use DNS features with Mobile phones then you need to set the DNS setting within your router.
(DNS setting is router manufacturer *dependent.)*

Logging on



1. Enter the default Admin Password: 12345
2. Click Logon

... HID Access Manager will open on the “Live!” Screen:



Required Settings

Using the menu-driven interface (paths shown on the next page) complete these steps:

1. Set the date and time
2. Update the master password
3. Add/Configure doors and readers using the labels and door names on the back page of the ACW2-XN Quick Install Guide.
4. Add/Manage people

Function Paths

The menu headings are displayed in the menu ribbon – these give you access to the functions:

Live!

- Displays transactions in real time, latest on top

People

- Add people and manage their access accounts and their cards

Doors

- Click on **Device Discovery** to search for connected modules
- Add Door
- Reset APB

Reports

- Access Report
- Status Report
- Audit Report
- Hours Worked Report

Settings

- Network Settings
- Date and Time
- Security (Changing the password)
- Special Days (Add public holidays, etc.)
- Language (Change language preference - *Preferencia cambiar idioma*)
- Advanced options:
  - Access Groups
  - UDP output (Destination Address setup)
  - APB Settings
  - Wiegand Settings

About

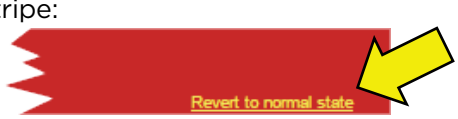
- Controller Module Firmware Version
- Web Application Version

System Overides

These buttons are always available on screen as long as you are logged in.

Button	Function
Emergency Unlock	All controlled doors are UNLOCKED, allowing everybody to pass.
Lockdown	All controlled doors are LOCKED – and no cards will open doors.

Emergency Unlock OR Lockdown will remain active until it is disabled by clicking on "Revert to Normal State" – on the right hand end of the thick red stripe:



9 Electrical Specifications

Power Supply (A-X1)

AC Mains Input	DC Output
100-230 VAC (50/60Hz), 1.3A	12V, 5A

Optional Battery (Strongly recommended)

Not included with the ACW2-XN, this battery must be sourced separately

Note:

- Only connect the battery after all system wiring is complete and tested on the built-in power supply

Battery	Specification
Type	Lead Gel
Voltage	12V
Capacity	7 Ah
Physical Dimensions	65 mm x 101 mm x 151 mm, 2.56” x 3.98” x 5.95” – or smaller
Battery Protection Fuse	**Specification**
Length	20 mm, 0.787”
Type	Slow-blow
Rating	6.3 A

Controller Module (AC)

Power

Conditions	Current	Power
Supply at 12V DC	140 mA	1.7 W

Inter-Module Communications

Connector	Purpose
10-way connectors: female on the left, male on the right	Power and data lines to other modules

Network

Connector	Protocol
RJ45	Ethernet, 10/100 Base T, half or full duplex

Controller module (AC1) continued...

RS-485 Ports (Device & Host)

Interface	Baud Rate	Data Format
RS-485	38 400	8 data bits, no parity, 1 stop bit

Wiegand Module (AW2)

Power (At 12V)

Conditions	Current	Power
Relays idle, No readers Connected	37 mA	0.44 W
Both relays activated, maximum reader load	503 mA	6 W

Relays

Contact Rating	Configuration	Contacts	Operations
[10A, 28VDC] [5A, 220VAC] [12A, 120VAC]	Double Pole Single Throw	NO, NC, COM	> 100 000 (with MOVs installed across 12V inductive loads – see page 8)

Inter-Module Communications

Connector	Purpose
10-way connectors: Female on the left, male on the right	Power and data lines to other modules

Wiegand Reader Port

Connector	Reader Connections
10-way Screw Terminal Plugs	12V, 5V, 0V, D0, D1, LED (Red), LED (Green), Buzzer, Hold, Shield

Battery Charging Circuit

Conditions	Current	Power
Supply at 12V DC, battery flat, max charge current	500 mA	6 W

Calculations

The following calculation must be performed for each additional DC power Supply, together with all locks that are powered from that power supply.

*__Note:__ See individual lock and power supply installation manuals for current consumption and maximum current output.

12 V Power Supply max current output		-
Maximum lock current total		
Margin		

(The margin may not be negative.)

10 FAQ

Fail Safe versus Fail Secure

Electrically controlled locks fall in to one of two categories:

1. Locks that require power to lock (with loss of power, these are unlocked, allowing EVERYBODY access)
2. Locks that require power to unlock (with loss of power, these are locked, allowing NOBODY access)

The first is considered fail SAFE, as people can still escape the building, and help can get in, should some misfortune occur.
The second is considered fail SECURE, as intruders cannot just walk in when power is lost.

Which lock to use

Mag locks are inherently Fail Safe, as they require power to lock.
Strike locks are available in Fail Safe as well as Fail Secure versions, but are most often Fail Secure.

CAUTION:

- There is another level that should also be considered:

What relay terminals to use

The relays on the AW2 module should be switching power from an independent source, and so a similar principle also applies to your choice of Normally Open (NO) or Normally Closed (NC) relay terminals:

Use the NC and COM terminals for switching circuits that you wish to keep energised should power to the AW2 module be lost.

Use the NO and COM terminals for switching circuits that you wish to be cut off in the event that power to the AW2 module is lost.

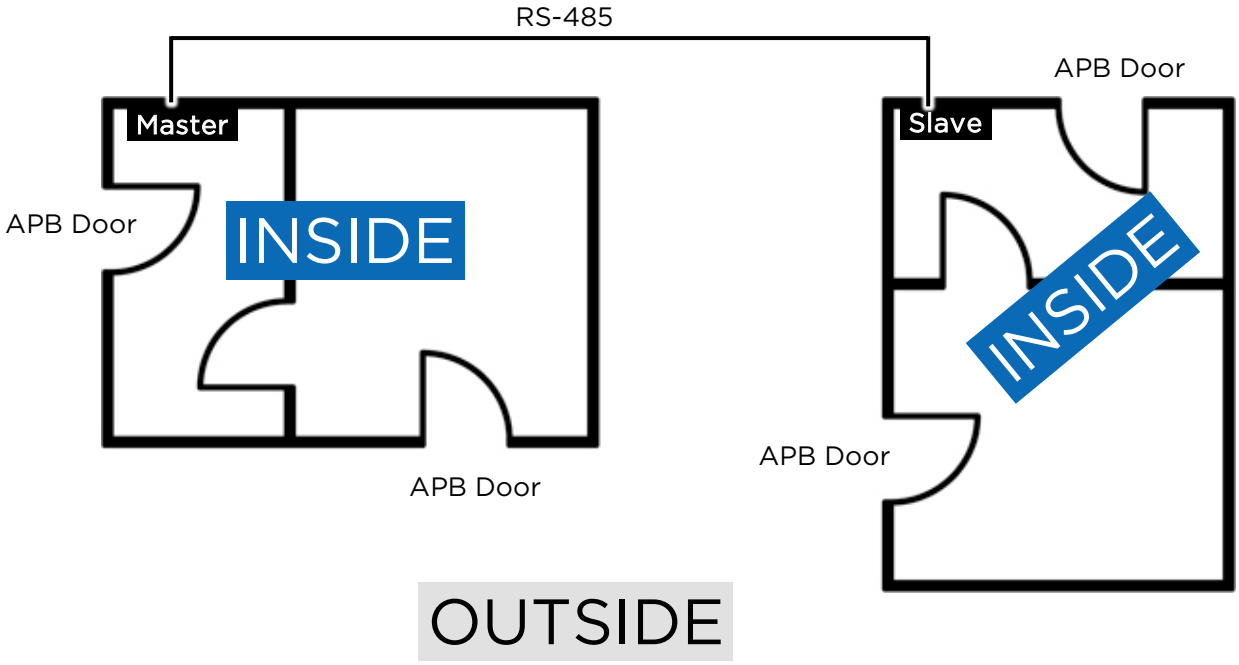
Can HID Access Manager handle separated secure areas?

Yes it can:

All access control administration is performed via the **ACW2-XN Master**.

The **ACW2-XN Slave** is offline capable.

- This means that access control in the remote area will continue to function normally in the event of a break in the RS-485 cable.
- The cable break event will logged on the **ACW2-XN Master.**
- When the RS-485 cable is restored, the HID Access Manager's event log will be updated with any events that happened on the slave side while the cable was broken.
- HID Access Manager system event logs will reveal where a person has been spending their time.



11 End User Licence Agreement

HID GLOBAL CORPORATION
HID Access Manager Embedded Webserver
END USER LICENSE AGREEMENT ("EULA")

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