

Aperio® AH20/AH30 (GEN5) Hub Installation Guide

ASSA ABLOY

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UL294 Listed, Level I Destructive
Attack, Line Security, Standby Power,
Level IV Endurance
ULC-60839-11-1 Listed, Security Grade 2



Conforms to EN 62368-1 and UL/CSA 62368-1

Security Equipment BP7098

AH20/AH30 - FCC and ISCED Canada Statements

FCC Statements

Changes or modifications to the equipment not expressly approved by the party responsible for compliance could void the users authority to operate the equipment.

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.

Note: *This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.*

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of the human body.

ISED Canada Statements

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.

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.

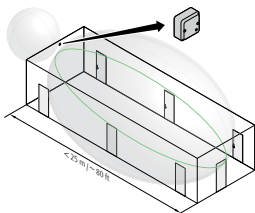
Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, 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 equipment complies with the ICES RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of the human body.

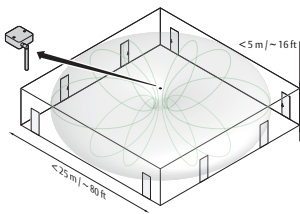
Cet équipement est conforme aux limites d'exposition aux radiations ICES définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et une partie de votre corps.

AH20/AH30 - Placement of Communication Hub

For hubs using the **internal antenna**, it is recommended that the device to hub distance be limited to 25 m (80 ft). The internal antenna has an oblong coverage area and is most appropriate for applications where the hub is directly facing the device(s), e.g. mounting on the wall at the end of a hallway of doors.



For hubs using the **external antenna**, it is recommended that the device to hub distance be limited to 12.5 m (40 ft). The external antenna has a torus shaped coverage area and is most appropriate for applications where the devices are surrounding the hub, e.g. mounting on the ceiling less than 5m/16ft high in a room or hallway.

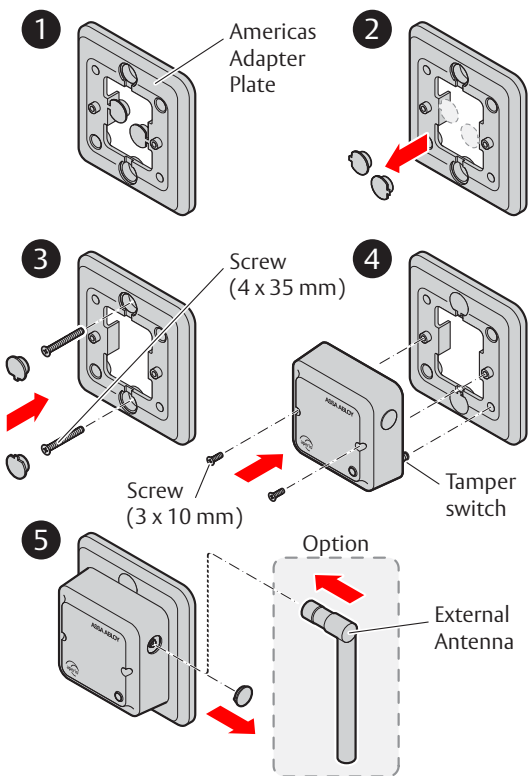


Examples of placement of the Hub with internal and external antenna.

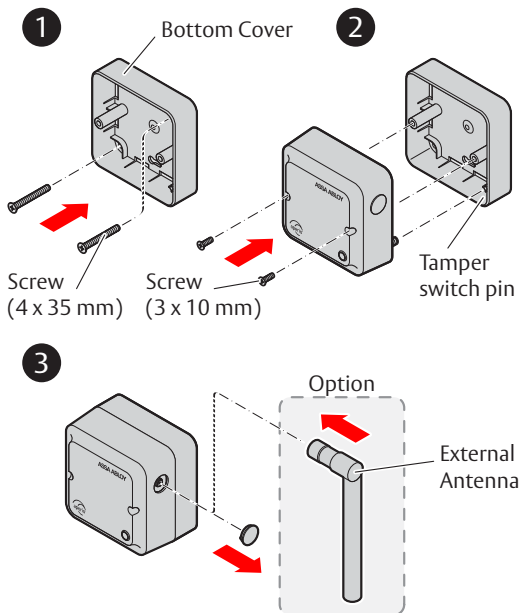
AH30 (RS485 Hub) can manage up to 16 locks,
AH20 and AH30 (1 - 1 mode) can manage 1 lock.

Note: AH20/AH30 must be installed into a junction box ex European 2-Gang, using Aperio bottom cover or Americas adapter plate connected to junction box. AH20/AH30 must be installed by qualified and trained personal. Indoor installation only!

AH20/30 - Mounting, Americas Adapter Plate (US version)



AH20/30 - Mounting, Bottom Cover (EU version)

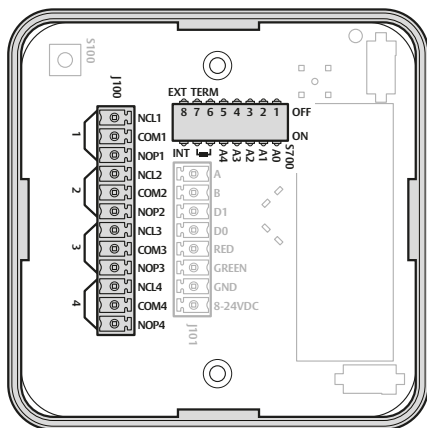


Note: The installation must comply with national wiring regulations.

Communication Hub hardware version AH20 has four Wiegand signals plus power supply. The purpose and connection of these signals are described in the table below.

HUB CONNECTOR	DESCRIPTION
D1	Wiegand Data 1 signal. Output from Communication Hub. Used to transmit credentials.
D0	Wiegand Data 0 signal. Output from Communication Hub. Used to transmit credentials.
RED	Wiegand Red LED signal. Input to Communication Hub. Used for access decision. Leave unconnected if DIP switch 1 is selected "OFF". Signal is active low.
GREEN	Wiegand Green LED signal. Input to Communication Hub. Used for access decision. Signal is active low. See DIP 1 for alternate instructions.
GND	GND = Signal ground. Should be connected to EAC system GND and power supply GND.
8-24 VDC	<p>Power supply input, 8-24 VDC, 2 W (AH20 Advanced) alternatively 0.8 W (AH20 Standard and AH30). The power supply shall be 3 A over current protected. Wire requirements 16-22 AWG.</p> <p>The length of the power supply wiring must ensure compliance at the Hub power terminal to the specified requirements but should not exceed 30 meters/98 ft.</p>

AH20 Advanced Wiegand (J100) - Connections



AH20 Advanced Wiegand Connectors (J100)

RELAYS	DESCRIPTION
Relay 1	DPS (Door Position)
Relay 2	RX (Request to exit)
Relay 3	Battery Alarm Output
Relay 4	Tamper Alarm Output/ Lock Jammed

RELAY CONTACTS	DESCRIPTION
NCL	Normally Closed
COM	Common
NOP	Normally Open

On the AH20 communication hub, four form C relays are available. The purpose of the four relays is to provide door status information to the EAC system.

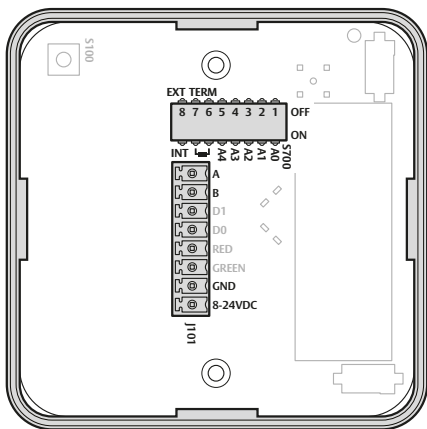
The relays are connected to inputs on the EAC controller/panel.

Relay max voltage: 30 VDC
Relay max power: 15W
resistive load

AH20 - DIP Switch Configuration Table (S700)

DIP SWITCH NUMBER	LABEL	DESCRIPTION
1	A0	Controls use of Red LED signal for access decision. ON => Red LED is used. OFF => Red LED is ignored.
2	A1	Set to OFF by default. Reserved for future use.
3	A2	Controls addition of parity bits if required. ON => Addition of parity bits is enabled. OFF => Addition of parity bits is disabled. Credentials are transmitted as received.
4	A3	Controls byte order of transmitted credentials. ON => The byte order is reversed on the Wiegand interface compared to what is received from the Aperio® lock. OFF => The byte order is left as is.
5	A4	Used in "Pairing Mode".* ON => Starts in pairing mode. OFF => Normal use. Note: If the DIP switch is moved from ON to OFF within 10 seconds from boot up and the Hub LED is lit, all paired devices will be unpaired. *Not supported in Aperio Installer mode.
6-7		Not applicable (only used for AH30).
8	INT/EXT	Internal/External Antenna Use, ON = Internal

AH30 (J101) - Connections



AH30 (J101) Connectors

HUB CONNECTOR	DESCRIPTION
A	RS485 Data A.
B	RS485 Data B.
GND	GND = Signal ground. Should be connected to EAC system GND and power supply GND.
8-24 VDC	Power supply input, 8-24 VDC, 2 W (AH20 Advanced) alternatively 0.8 W (AH20 Standard and AH30).

Note: The installation must comply with national wiring regulations.

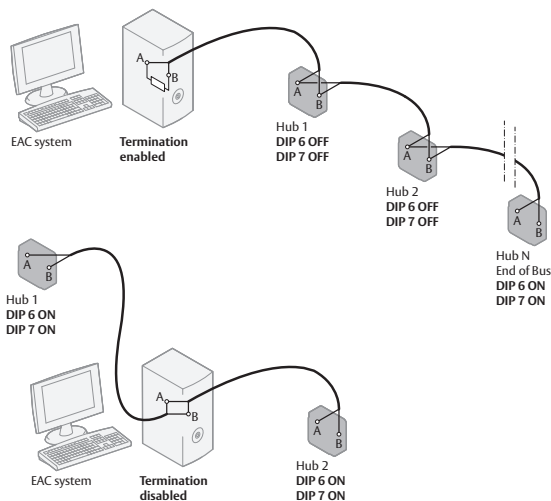
AH30 - DIP Switch Configuration Table (S700)

DIP SWITCH NUMBER	LABEL	DESCRIPTION
1-5	A0-A4	Controls RS485 addressing BIT 0-BIT 4. ON => Address bit set. OFF => Address bit NOT set. See AH30 - RS485 Addressing Reference on page 15.
6-7	TERM	Control use of termination resistor between RS485 A and RS485 B. For termination to be enabled, both switches must be set to ON. ON => 120 Ohm termination resistor connected/ enabled. OFF => 120 Ohm termination resistor disconnected/ disabled.
8	INT/EXT	Controls use of external antenna if required. ON => Selects use of internal antenna. OFF => Selects use of external antenna.

AH30 - RS485 Bus Connection

Here are examples of connection of multiple Communication Hubs to a single RS485 bus of an EAC system. Termination should be enabled to the last Hub on the bus.

The Daisy chain is the recommended connection scheme, Star network should be avoided to ensure RS-485 signal integrity.



Communication Hub Connections, examples

Note: The RS485 bus cable should be of type twisted pair. The maximum cable length of 1000 meters should not be exceeded.

AH30 - RS485 Addressing

ADDRESS	A0	A1	A2	A3	A4*
0	Pairing Active*				
1	ON				
2		ON			
3	ON	ON			
4			ON		
5	ON		ON		
6		ON	ON		
7	ON	ON	ON		
8				ON	
9	ON			ON	
10		ON		ON	
11	ON	ON		ON	
12			ON	ON	
13	ON		ON	ON	
14		ON	ON	ON	
15	ON	ON	ON	ON	

Address examples

*) **Note:** If any of the A0-A4 DIP switches are moved from OFF to ON within 10 seconds from boot up and the Hub LED is lit, all paired devices will be unpaired. Not supported in Aperio Installer mode.

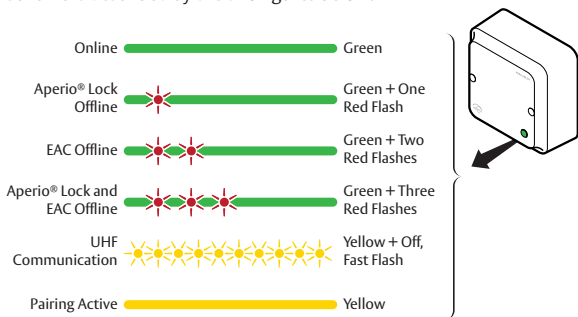
ADDRESS	A0	A1	A2	A3	A4*
16					ON
17	ON				ON
18		ON			ON
19	ON	ON			ON
20			ON		ON
21	ON		ON		ON
22		ON	ON		ON
23	ON	ON	ON		ON
24				ON	ON
25	ON			ON	ON
26		ON		ON	ON
27	ON	ON		ON	ON
28			ON	ON	ON
29	ON		ON	ON	ON
30		ON	ON	ON	ON
31	ON	ON	ON	ON	ON

Address examples

*) A4 is only supported on AH30 in 1 - 1 mode.

AH20/AH30 - Communication Hub LED Indication

The Communication Hub has a single LED that supports an optical scheme with red, green and yellow. The indication scheme is described by the two figures below:



Note: With the software tool *Aperio® Programming Application* and a USB radio dongle or *Aperio Installer* software, further system installation parameters can be set. Test the system for operation upon completion of the installation.

AH20/AH30 - Technical Data

Physical Dimensions	82 mm x 82 mm x 37 mm (H x W x T)
Power Supply	8-24 VDC
Power Rating	The power supply shall be able to deliver minimum 2 W (AH20 Advanced) alternatively 0.8 W (AH20 Standard and AH30) and be 3 A over current protected. Wire requirements 16-22 AWG. The length of the power supply wiring must ensure compliance at the Hub power terminal to the specified requirements but should not exceed 30 meters/98 ft.
Radio	ISM-band (2400 – 2483,5 MHz) AES 128 bit encryption
Receiver Sensitivity	-100 dBm
Wireless Transmit Power	10 dBm/MHz. Peak value from average detector according to EN ETSI 300 328 Maximum spectral density.
Wireless Operating Range	Indoors up to 25 m depending upon installed environment.
Internal Antenna	Two cross polarized dipoles.
External Antenna	One reverse polarity SMA external antenna connector. AH20/30 is certified to be used with ASSA ABLOY external antenna AH-ANTENNA-1. If other external antenna is used it must be of same type (dipole) and not have larger antenna gain than 2.15 dBi.
Operating Temperature	5 °C to 35 °C (41°F to 95°F).
Humidity	< 95 % non-condensing.
IP Classification	IP20
Safety, Radio and EMC	IEC 62368-1:2014 EN 62368-1:2014 + A11:2017 UL/CSA 62368-1:2014 EN 301 489-1 V2.1.1 EN 301 489-17 V3.2.0 EN 300 328 V2.2.2 EN 50130-4:2011 + A1:2014 EN 62311 FCC 47CFR Part 15 subpart B and subpart C ISED RSS-247 and ICES-003 AS/NZS 4268
Number of supported locks/sensors	AH20: 1 AH30:16

UL294 Disclaimer

Note: *The below statements are only applicable for UL294 and Americas.*

Applicable Standards

UL294 Listed, Level I Destructive
Attack, Line Security, Standby Power,
Level IV Endurance

UL294 compliance with FW version 1.2.0 or higher.

AH20/AH30 - Placement of Communication Hub

For additional installation details, see the “Aperio Online Mechanical Installation Manual - Document No D000732079.

AH20 (J101) - Connections

J101 is not evaluated by UL/ULC.

The installation must comply with NFPA 70, National Electrical Code and CSA C22.1, Canadian Electrical Code, where applicable.

Power supply 8-24V:

For UL294 applications, the power supply shall be UL294 Listed, Class 2. For ULC-60839-11-1 applications, the power supply shall be ULC-60839-11-1 (Security Grade Level 2 or better) Listed Class 2, or ULC-S319 (Security Grade Level 2 or better) Listed Class 2, or ULC-S318 Listed, Class 2.

AH20 Advanced Wiegand (J100) - Connections

All circuits are Power Limited/Class 2

AH30 (J101) - Connections

Power supply 8-24V: All circuits are Power Limited/Class 2.

The installation must comply with NFPA70, National Electrical Code and CSA C22.1, Canadian, Electrical Code, where applicable.

AH30 - RS485 Bus Connection

For UL294/ULC60839-11-1 applications, the RS485 bus cable must be shielded with the shield connected to the host side.

AH20/AH30 - Technical Data

UL294/ULC60839-11-1 testing is done under the following conditions:
Operating temperature 0 °C to 49 °C (32°F to 120.2°F). Humidity 93% RH, 32 °C. IP classification according to IP4X, Indoor Dry Use.

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