

# Aperio® AH20/AH30 (GEN5) Hub Installation Guide

**ASSA ABLOY**

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

## AH20/AH30 - FCC and ISCED Canada Statements

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### 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. The device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

### ISCED Canada Statements

This radio transmitter [IC:9504A-AH20R03] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna type	Maximum antenna gain (dBi)	Impedance (ohm)
Internal antenna	3.6	50
AH-ANTENNA-1	2.15	50

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*This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:*

*(1) This device may not cause interference.*

*(2) This device must accept any interference, including interference that may cause undesired operation of the device.*

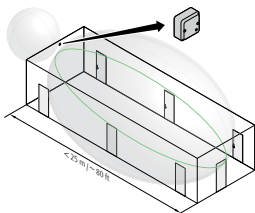
*Le présent émetteur radio [IC:9504A-AH20R03] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.*

<b>Type d'antenne</b>	<b>Gain d'antenne maxima (dBi)</b>	<b>Impédance (ohm)</b>
Antenne interne	3.6	50
AH-ANTENNA-1	2.15	50

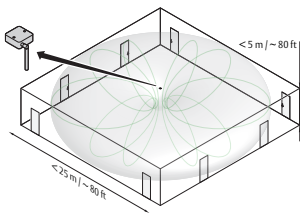
*L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :*

## 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.*

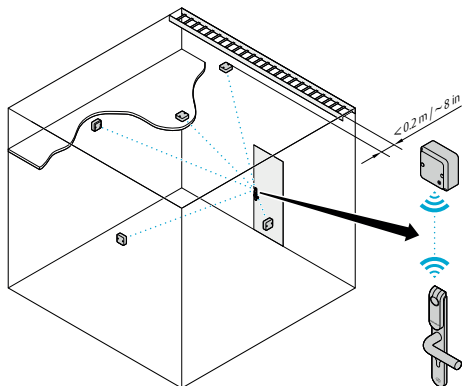
AH30 (RS485 Hub) can manage up to 16 locks,  
AH20 and AH30 (1 - 1 mode) can manage 1 lock.





**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 position

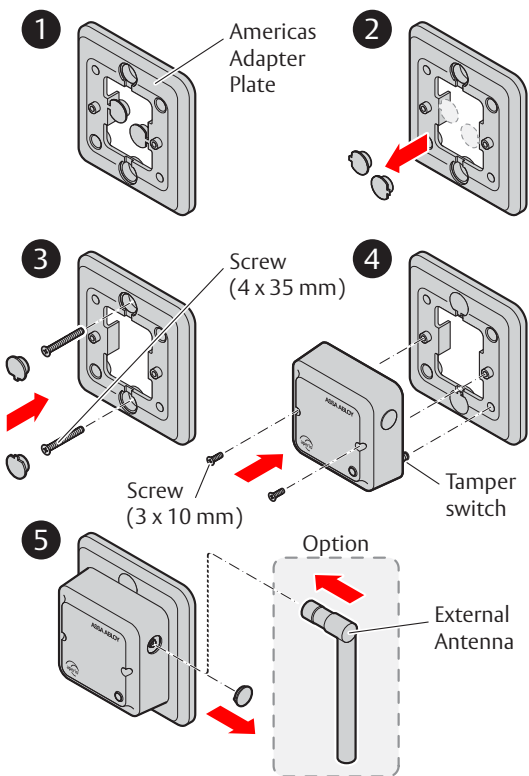
The AH20/30/40 communication hub is designed so that it can establish a reliable radio link regardless of the mounting position (horizontal or vertical) of the communication hub and the type of lock being used.

Maximum Aperio hub to reader distances stated are based on typical applications with the signal between Aperio hub and reader going through a maximum of two standard inner walls. Line of sight without obstruction may provide longer range but cannot be guaranteed. The AH20/30/40 communication hub can be mounted according to the following figure.

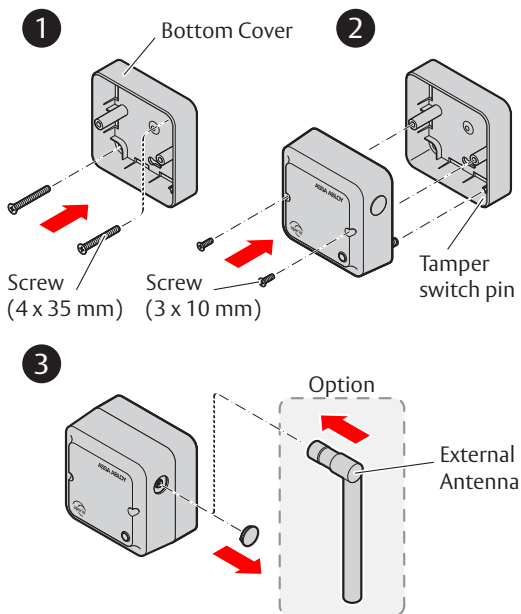


	AH20/30 Communication hub with internal antenna, installed on a wall.		AH20/30 Communication hub with external antenna, installed in the ceiling.
	AH20/30 Communication hub with internal antenna, installed in the ceiling.		Door with Aperio lock

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

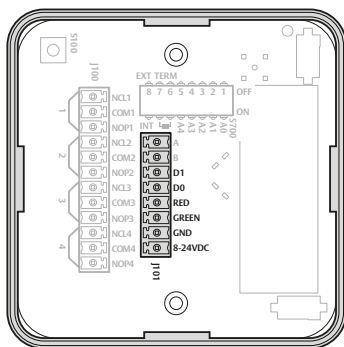


## AH20/30 - Mounting, Bottom Cover (EU version)

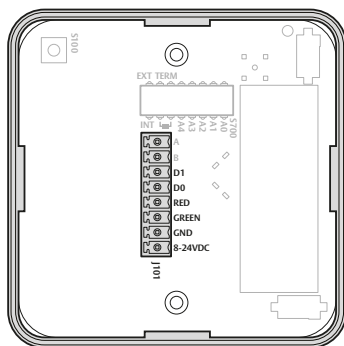




## AH20 (J101) - Connections



AH20 Advanced Wiegand Connectors (J101)



AH20 Standard Wiegand Connectors (J101)

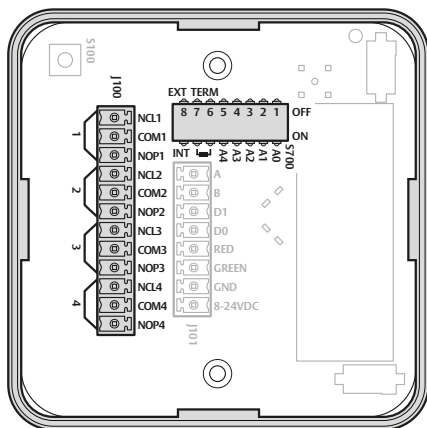
**Note:** The installation must comply with national wiring regulations.

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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	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.

## 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

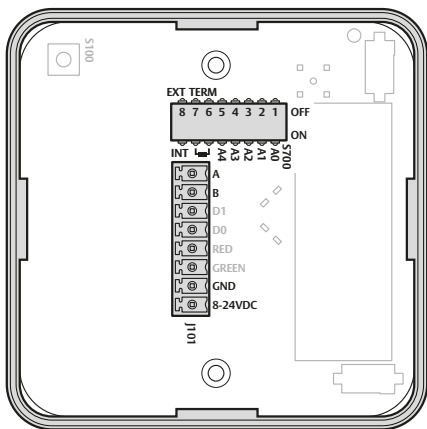
On the AH20 advanced Wiegand communication hub, four form C relays are available. The purpose of the four relays is to provide door status information to the EAC system.

**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.  <b>Note:</b> 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.
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.

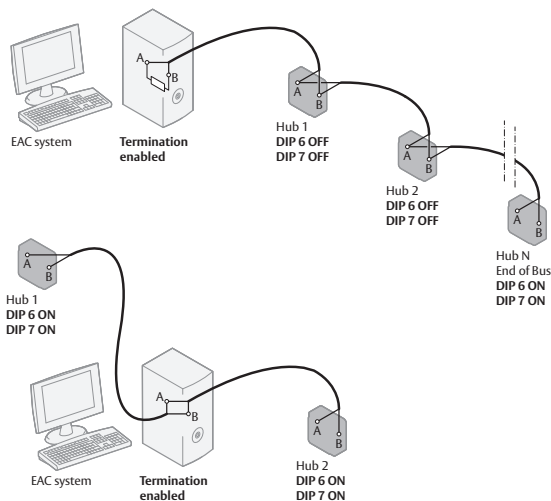
## AH30 - DIP Switch Configuration Table (S700)

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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 13.
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.



### 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.



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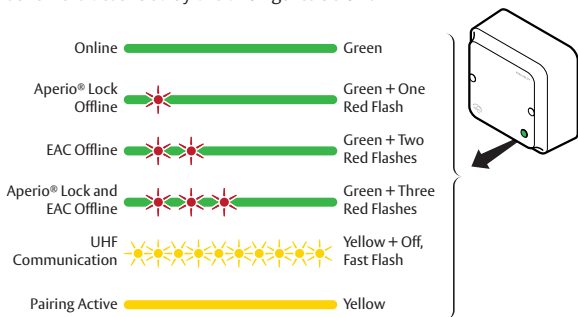
ADDRESS	A0	A1	A2	A3	A4*
16					ON
17	ON				ON
18		ON			ON
19	ON	ON			ON
20			ON		ON
21	ON		ON		ON
22		ON	ON		ON
23	ON	ON	ON		ON
24				ON	ON
25	ON			ON	ON
26		ON		ON	ON
27	ON	ON		ON	ON
28			ON	ON	ON
29	ON		ON	ON	ON
30		ON	ON	ON	ON
31	ON	ON	ON	ON	ON

### *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, further system installation parameters can be set.

## 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.
Radio Standard	IEEE 802.15.4 (2400 – 2483,5MHz) 16 channels (11-26) 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 3.6 dBi.
Operating Temperature	5 °C to 35 °C.
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

The ASSA ABLOY Group is the global leader in access solutions. Every day we help people feel safe, secure and experience a more open world.

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