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ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

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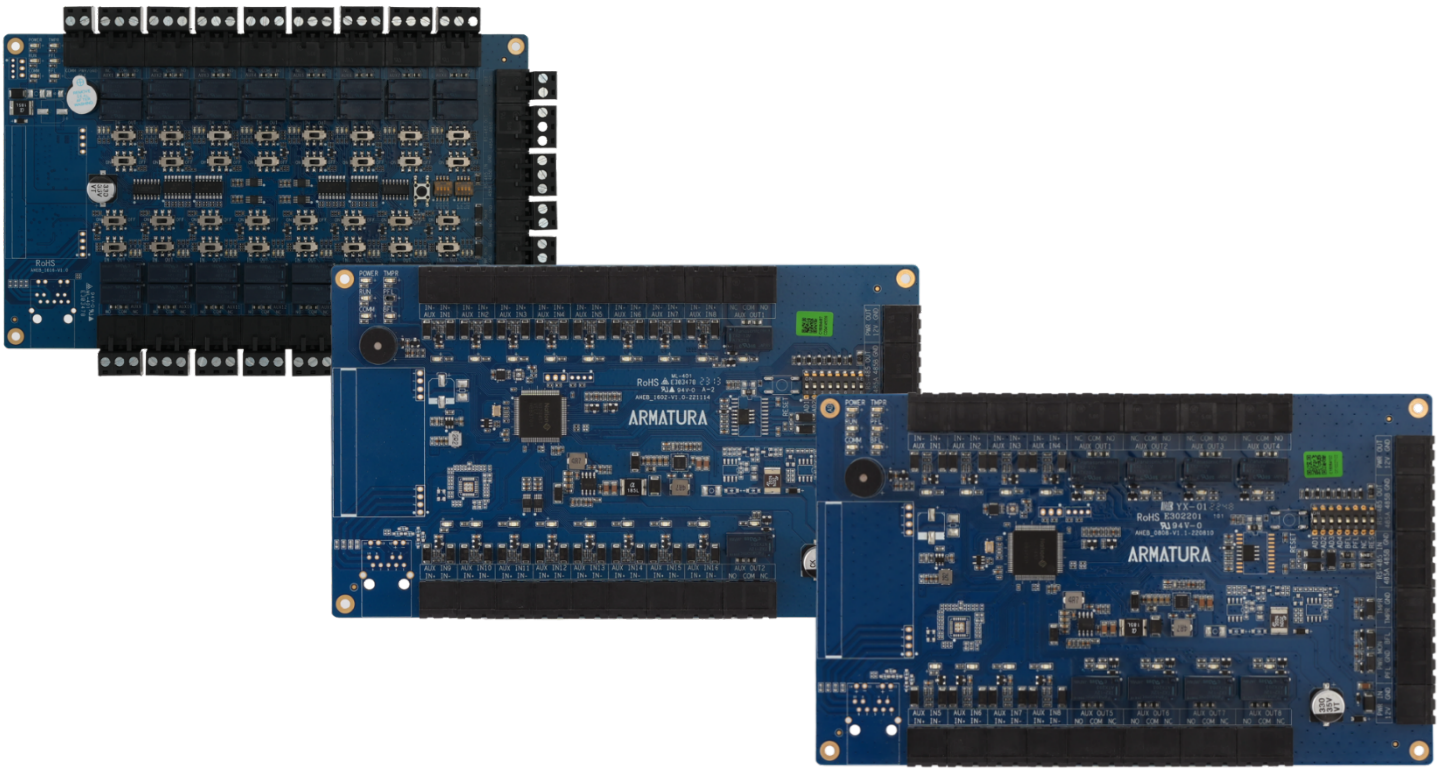
AHEB Series IO Expansion Board



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Version 1.2

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Section 1

1. Purpose

The architectural and engineering specifications document (A&E) outlines the minimum requirements for the design, supply, installation, and commissioning of the AHEB Series I/O Expansion Board..

2. Goals and Objectives

This A&E specifications of AHEB Series I/O Expansion Board aims to achieve the following goals and objectives:

- Provide a highly secure and reliable I/O Expansion Board capabilities.
- Ensure scalability and flexibility to accommodate system requirements. Supports up to 388 inputs or 196 outputs under a single AHDU controller and ultimately supports up to 12,801 inputs or outputs.
- Meet or exceed relevant industry standards and regulations.
- Provide a clear and detailed specifications for the design, supply, installation, and commissioning of the AHEB Series I/O Expansion Board.

3. Key Features and Requirements

The AHEB Series I/O Expansion Board shall have the following key features and requirements:

- The AHEB Series should communicate with AHSC1000 or AHDU series controller through OSDP v2.2 over RS485 and secured with AES 128/ TLS 1.2 (with AES256) encryption. Also, it utilizes the EAL6+ standard certified crypto chip to enhance data encryption.

- Support elevator mode and enhances building control systems with configurable relay ports that can be adapted as inputs or outputs to meet diverse operational

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needs. While all boards in the series ensure seamless and secure integration via OSDP over RS-485, the AHEB-1616 model distinctively supports advanced elevator control functions and multi-story elevator management, including the automatic floor selection and history logging.

- High scalability and supports up to 388 inputs and 196 outputs under a single AHDU controller and ultimately supports up to 12,801 inputs or outputs under a combination of AHSC-1000 and AHDU series controllers. All communication is secured by AES128 encryption.
- Shall be monitored and updated via encrypted RS-485 communication from the AHSC-1000 and AHDU series controllers' on-board web server. And support communication with the Armatura One security system and Cielo365 (coming soon) through AHSC-1000 and AHDU Series controller.
- Supports third-party integration with various relay inputs and outputs, making it suitable for different security devices. The Armatura One system offers a RESTful API for the third-party software integration.
- The supervised inputs shall consist of four-state-supervised inputs, which gradually avoids short circuit attacks. It can detect abnormal changes as low as 5% Ohms in the circuits and filter out all possible attacks. Isolated microchips independently manage REX inputs and dedicated fire alarm inputs to ensure these can normally work under extreme situations.
- Supports 9 to 24VDC inputs, which makes it the perfect choice for universal deployment, eliminating the need for extra power adaptors.

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- Programmable input states with time zone management. It provides the supervised and programmable Inputs states (In-Active, Active, Short, Open) and input time can be configured by the Armatura One security platform.

4. Design and Implementation Constraints

The AHEB Series I/O Expansion Board shall be designed to comply with industry standards and regulations, including:

- The design shall be scalable and flexible to accommodate varying user and system requirements.
- The implementation shall be done by trained installers who have been certified by the manufacturer.
- Regulatory compliance with data protection laws requires strict adherence to encryption standards and user access controls.
- The implementation shall ensure high-level cybersecurity should be designed to comply with industry standards.

5. Existing Standards and Regulations

The AHEB Series I/O Expansion Board shall comply with the following standards and regulations.

- FCC Standards
- CE Standards
- RoHS Standards
- UL294 Standards

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6. Submittals

The following submittals shall be provided.

- Product datasheets
- Installation guide
- Operation manuals
- Test reports

7. Qualifications

The manufacturer of the AHEB Series I/O Expansion Board shall have the following qualifications.

- ISO 9001, ISO27001, ISO27701, ISO27017, CMMI5 certification.
- Minimum of 5 years' experience in producing access control equipment.

8. Warranty

The manufacturer shall provide a limited 36-month warranty for the product to be free of defects in material and workmanship.

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Section 2

1. Key Features and Requirements

1.1 key Features

The AHEB Series I/O Expansion Board shall have the following key features and requirements:

i. The AHEB Series I/O Expansion Board can communicate with AHSC1000 or AHDU series controller through OSDP V2.2 over RS-485. The communications between the AHEB I/O expansion board is secured with AES128/ TLS 1.2 (with AES256) encryption. Communications between the Armatura One server and web client are protected by HTTPS / TLS1.2 (AES256) or above. Enhanced encryption levels are provided by an additional crypto chip (Certified EAL6+ standard), providing dedicated storage and cryptographic functionality for all Armatura controllers.

ii. The AHEB Series I/O Expansion Board is equipped with 4 state supervised inputs, which gradually avoids short circuit attacks. The AHEB Series can detect abnormal changes as low as 5% Ohms in the circuits and filter out all possible attacks. Also, the isolated microchips independently manage REX inputs and dedicated fire alarm inputs to ensure these can normally work under extreme situations.

iii. Supports up to 384 inputs and 385 outputs under a single AHDU controller and ultimately supports up to 12,801 inputs or outputs under a combination of AHSC-1000 and AHDU series controllers. All communication is secured by AES128 encryption.

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iv. The AHEB Series I/O Expansion Board can be monitored and updated by the AHSC-1000 and AHDU controller series via an onboard webserver using encrypted RS-485 communication. It supports integration with the Armatura One security system and Cielo365 (coming soon), through the AHSC-1000 and AHDU controllers. Additionally, the universal voltage range of 9 to 24VDC makes it ideal for versatile deployment, eliminating the need for extra power adapters.

v. Supports various relay inputs and outputs. Suitable for most kinds of security sensors. Armatura One system provides a RESTful based API for 3rd Party Software Integration.

vi. Supports various relay inputs and outputs. Suitable for most kinds of security sensors. Armatura One system provides a RESTful based API for 3rd Party Software Integration.

vii. Supporting 12VDC to 24VDC inputs, this system is the optimal choice for versatile deployment, removing the necessity for extra power adapters.

viii. Time Zone Management, this system offers supervised and customizable input states Inactive, Active, Short, Open, that can be configured via the Armatura One security platform and Cielo365 (coming soon).

ix. Features a primary power support of 12VDC to 24 VDC ± 20% with a maximum current of 550 mA, accompanied by on-board firmware for added functionality and control.

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x. The dual function firmware facilitates both Access Control Mode and Elevator Control Mode, automatically swapping operation modes based on AHSC-1000/AHDU Series Controller settings, all managed by the on-board firmware.

xi. RS-485 connectivity dedicated for AHSC-1000/ AHDU series controller communication, enabling the input via RS-485 (standard) or OSDP V2.2.

xii. RS-485 connectivity dedicated for AHEB series I/O expansion board communication, enabling the input via RS-485 (standard) or OSDP V2.2.

xiii. AHEB-0808 consists of 1*RS-485, 8*supervised input (AUX IN), 8*relay output (AUX OUT), 1* power Input (PWR IN), 1*power output (PWR OUT), 1*power detection (AC Fail), 1* backup battery detection (BAT Fail) and 1*tamper input (TMPR).

xiv. AHEB-1602 consists of 1*RS-485, 16*supervised input (AUX IN), 2*relay output (AUX OUT), 1* power Input (PWR IN), 1*power output (PWR OUT), 1*power detection (AC Fail), 1* backup battery detection (BAT Fail) and 1*tamper input (TMPR).

xv. AHEB-1616 consists of 1*RS-485, 16*configurable I/O ports (AUX IN/OUT), 1* power Input (PWR IN), 1*power output (PWR OUT), 1*power detection (AC Fail), 1* backup battery detection (BAT Fail), 1*tamper input (TMPR), 1*Reset BUTTON.

xvi. AHEB-0808 consists of 8 inputs with 4 state supervision, resistor values (5% tolerance), Normally open contact: use 1.2k, 2.2k. 4.7k or 10k ; Normally closed contact: use 1.2k, 2.2k. 4.7k or 10k.

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xvii. AHEB-1602 consists of 16 inputs with 4 state supervision, resistor values (5% tolerance), Normally open contact: use 1.2k, 2.2k. 4.7k or 10k ; Normally closed contact: use 1.2k, 2.2k. 4.7k or 10k.

xviii. AHEB-1616 consists of 16 inputs (configurable) with 4 state supervision, resistor values (5% tolerance), Normally open contact: use 1.2k, 2.2k. 4.7k or 10k ; Normally closed contact: use 1.2k, 2.2k. 4.7k or 10k.

xix. AHEB-0808 outputs encompass 8 relays with 8* Form-C with dry contacts.

xx. AHEB-1602 outputs encompass 2 relays with 2*Form-C with dry contacts.

xxi. AHEB-1616 outputs encompass a maximum of 16 relays with 16*Form-C with dry contacts.

xxii. Tailored for AHSC-1000 and AHDU series controllers in access control and elevator control modes, the AHEB series expansion board employs RS-485 protocol with AES-128 encryption and utilizes the OSDP V2 secure channel.

xxiii. Customized for AHSC-1000 and AHDU series controllers in access control and elevator control modes, the AHEB series expansion board implements OSDP mode over a range of 9600-115200 bps, incorporating OSDP V2.2, asynchronous communication, half-duplex operation, with 1 start bit, 8 data bit, and 1 stop bit.

xxiv. Customized for AHSC-1000 and AHDU series controllers in access control and elevator control modes, the AHEB series expansion board supports a maximum 128 floors management, upon combination. The suggested configuration consists of 1pcs of AHDU-1260 Controller with 8pcs*AHEB-1616 (direct connection through Armatura RS-485 connection). Note: All the Relay Ports

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(exclude the Fire Alarm Port) of AHSC-1000 & AHDU Series Controller can be utilized for floor management.

xxv. AHEB-0808 and AHEB-1602 do not support advanced elevator control functions.

xxvi. AHEB-1616 provide advanced elevator control functions with automatic floor selection and floor selection history logging.

xxvii. AHEB-0808, AHEB-1602 and AHEB-1616 provide general elevator control functions.

xxviii. AHEB-0808, AHEB-1602 and AHEB-1616 uses OSDP standards for data inputs. The maximum cable length is 3937ft. (1200m).

xxix. The cable requirement of AHEB-0808, AHEB-1602, and AHEB-0216 for power and relays should be 12 to 24 VDC ± 20%, with a maximum current draw of 550 mA.

xxx. The cable requirement of AHEB-0808, AHEB-1602, and AHEB-0216 for RS-485 port shall be One twisted pair with drain wire and shield, 120 ohm resistance, 22-18 AWG. The maximum cable length reaches 3937ft (1200m).

xxxi. The dimensions of AHEB-0808, AHEB-1602 and AHEB-1616 is 7.6” in width, 4.6” in length and 0.7” in height which is equivalent to 193mm in width, 116mm in length and 17.5mm in height.

xxxii. The installation of AHEB-0808, AHEB-1602 and AHEB-1616 shall be wall mounting.

xxxiii. The optimal operating and storage temperature for AHEB-0808, AHEB-1602 and AHEB-1616 is at –4°F to 131°F, which is equivalent to -20°C to 55°C.

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xxxiv. The optimal operating humidity for AHEB-0808, AHEB-1602 and AHEB-1616 ranges from 0% to 95% RH (non-condensing).

xxxv. AHEB-0808, AHEB-1602 and AHEB-1616 shall attain the CE, FCC, RoHS and UL294 certifications standards.

xxxvi. AHEB-0808, AHEB-1602 and AHEB-1616 shall have data storage encrypted with certified EAL6+ crypto chipset.

xxxvii. AHEB-0808, AHEB-1602 and AHEB-1616 shall compatible with the Armatura One Security system.

2. Maintenance and Support

The AHEB Series I/O Expansion Board shall be supported by a comprehensive maintenance and support program, which shall include the following.

- Regular software updates and security patches.
- Technical support via phone and email.
- Spare parts availability.
- Training for system administrators and end-users.

3. Documentation

The supplier shall provide the following documentation for the AHEB Series I/O Expansion Board:

- User manual
- Installation guide
- Technical specifications
- Software release notes
- Warranty terms and conditions

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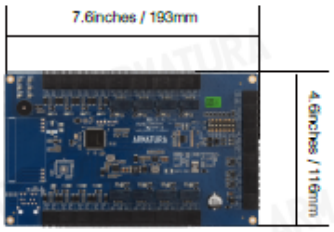
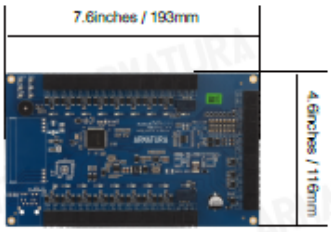
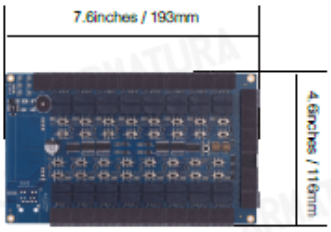
4. Technical Specifications



AHEB-0808



AHEB-1602



AHEB-1616

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Product Specification

General Information			
	AHEB-0808	AHEB-1602	AHEB-1616 (coming soon)
Primary Power	12 - 24 VDC ± 20%, 550 mA maximum		
On-Board Firmware	Dual Function Firmware for Access Control Mode & Elevator Control Mode (Automatic Operation Mode Swapping According to AHSC-1000 / AHDU Series Controller Settings)		
RS-485 Connectivity	Input: RS-485 standard / OSDP V2.2 (Dedicated for AHSC-1000/ AHDU series controller communication) Output: RS-485 standard / OSDP V2.2 (Dedicated for AHEB series I/O expansion board communication)		
Number of Ports	1*RS-485 8*supervised input (AUX IN) 8*relay output (AUX OUT) 1* power input (PWR IN) 1*power output (PWR OUT) 1*power detection (AC Fail) 1* backup battery detection (BAT Fail) 1*tamper input (TMPR)	1*RS-485 16*supervised input (AUX IN) 2*relay output (AUX OUT) 1* power input (PWR IN) 1*power output (PWR OUT) 1*power detection (AC Fail) 1* backup battery detection (BAT Fail) 1*tamper input (TMPR)	1*RS-485 16*configurable I/O ports (AUX IN/OUT) 1* power input (PWR IN) 1*power output (PWR OUT) 1*power detection (AC Fail) 1* backup battery detection (BAT Fail) 1*tamper input (TMPR) 1*Reset BUTTON
Inputs	8 inputs 4 state supervision, resistor values (5% tolerance), Normally open contact: use 1.2k, 2.2k, 4.7k or 10k Normally closed contact: use 1.2k, 2.2k, 4.7k or 10k	16 inputs 4 state supervision, resistor values (5% tolerance), Normally open contact: use 1.2k, 2.2k, 4.7k or 10k Normally closed contact: use 1.2k, 2.2k, 4.7k or 10k	Max.16 inputs (Configurable) 4 state supervision, resistor values (5% tolerance), Normally open contact: use 1.2k, 2.2k, 4.7k or 10k Normally closed contact: use 1.2k, 2.2k, 4.7k or 10k
Outputs	8 relays 8* Form-C with dry contacts	2 relays 2* Form-C with dry contacts	Max.16 relays (Configurable) 16* Form-C with dry contacts*

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AHSC/ AHDU Interface (Access Control Mode and Elevator Control Mode)			
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RS-485 Protocol	AES-128, OSDP V2 Secure Channel		
OSDP Mode	9600-115200 bps, OSDP V2.2, asynchronous, half-duplex, 1 start bit, 8 data bits, and1 stop bit.		
Max. Supported Floor (Elevator Control Mode)	Max.128 floors Management, Upon Combination Suggested Configuration: 1pcs of AHDU-1260 Controller with 8pcs*AHEB-1616 (direct connection through Armatura RS-485 connection) Note: All the Relay Ports (exclude the Fire Alarm Port) of AHSC-1000 & AHDU Series Controller Can be Utilized for Floor Management		
Advanced Elevator Control Functions	N/A	N/A	YES Support: Automatic Floor Selection, Floor Selection History Logging
General Elevator Control Functions	YES		
Data Inputs	OSDP standards supported. Maximum cable length: 3937ft. (1200m)		

Cable Requirement			
	AHEB-0808	AHEB-1602	AHEB-1616 (coming soon)
Power & Relays	12 - 24 VDC ± 20%, 550 mA maximum		
RS-485 Port	One twisted pair with drain wire and shield, 120 ohm resistance, 22-18 AWG, Maximum cable length: 3937ft (1200m)		

Mechanical			
	AHEB-0808	AHEB-1602	AHEB-1616 (coming soon)
Dimensions	7.6" W x 4.6" L x 0.7" H (193 x 116 x 17.5mm)		
Weight	162g (5.71oz)	130.5g (4.6oz)	224.5g (7.9oz)
Mounting	Wall Mount		

Environmental			
	AHEB-0808	AHEB-1602	AHEB-1616 (coming soon)
Temperature	-4°F-131°F (-20°C-55°C), Operating & Storage		
Humidity	0-95% RHNC		
Certification(s)	CE, FCC, RoHS, UL294		
Security Rating	Data Storage Encrypted with Certified EAL5+ Crypto Chipset		

Software Interface			
	AHEB-0808	AHEB-1602	AHEB-1616 (coming soon)
Supported Software	Armatura One Security System		

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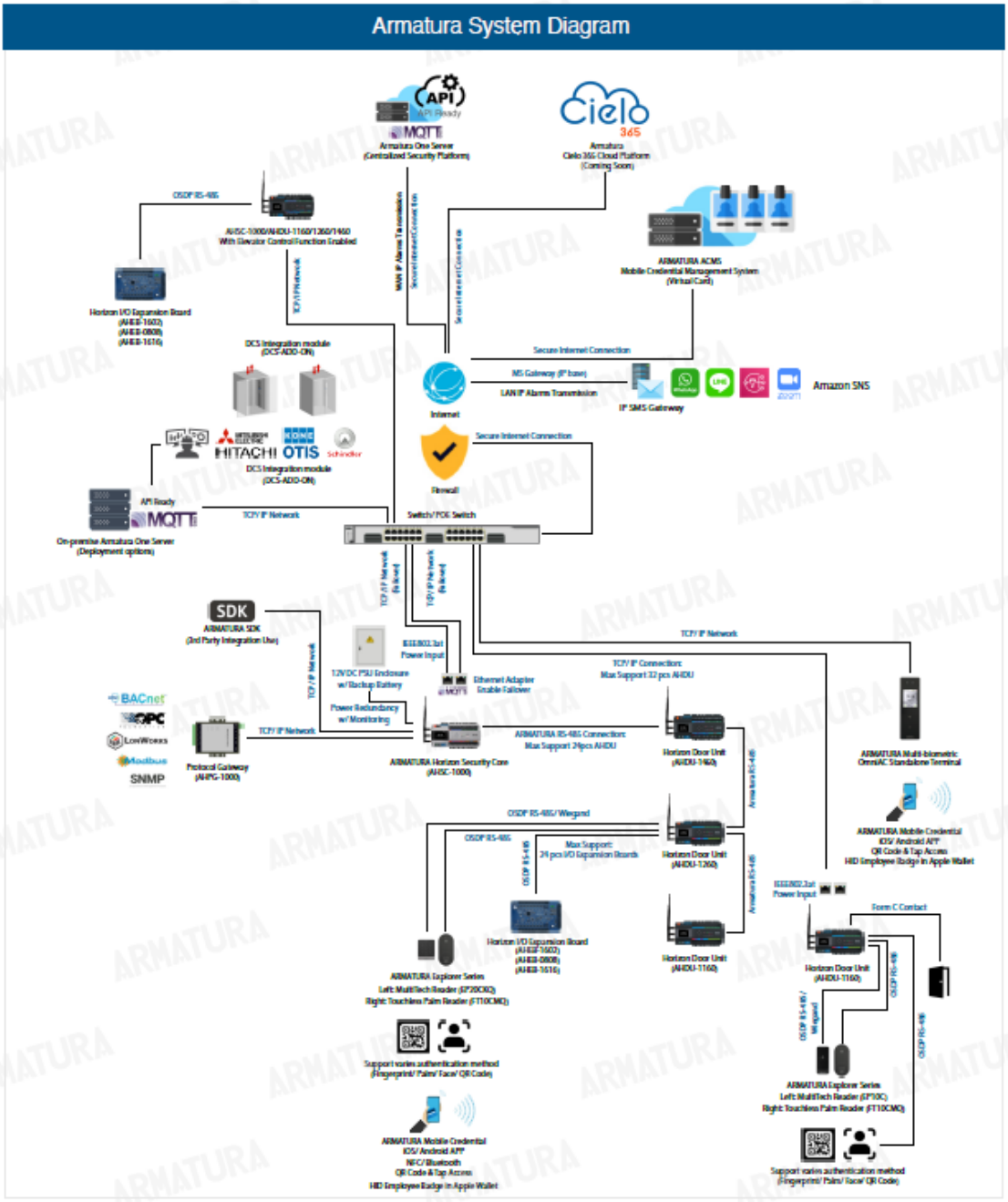

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6. Installation and Configuration

The AHEB Series I/O Expansion Board shall be installed and configured in accordance with the following requirements:

- The installation shall be carried out by qualified and experienced personnel in accordance with applicable codes, standards, and regulations.
- The I/O Expansion Board shall be configured using the on-board webserver or through software provided by the manufacturer.
- The configuration shall include setting up access levels, user accounts, time schedules, and other relevant parameters.
- The I/O Expansion Board shall be tested and commissioned to ensure proper operation and compliance with the specified requirements.

7. Warranty and Support

The AHEB Series I/O Expansion Board shall be covered by a minimum of 36 month manufacturer's warranty that covers defects in materials and workmanship. The manufacturer shall provide remote technical support and assistance to the installer and end-user during the installation and operation of the I/O Expansion Board.

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8. Integration and Interoperability

The AHEB Series I/O Expansion Board shall support the following integration and interoperability requirements:

- The I/O Expansion Board shall be able to integrate with third-party access control systems, security systems, and building automation systems using open protocols such as BACnet, OPC, Modbus, and RESTful APIs.
- The I/O Expansion Board shall be able to interoperate with other AHSC-1000 controllers and AHDU controllers in a distributed architecture for large-scale access control systems.
- The I/O Expansion Board shall be able to communicate with mobile devices running iOS or Android operating systems for mobile credential verification.
- The I/O Expansion Board shall support integration with LDAP and Active Directory for user authentication and management.
- The I/O Expansion Board shall be able to integrate with elevator control systems for floor access control.
- The I/O Expansion Board shall support remote software updates and firmware upgrades through the on-board webserver or through software provided by the manufacturer.
- The I/O Expansion Board shall provide real-time monitoring and reporting of access events, system status, and performance metrics through the on-board webserver or through software provided by the manufacturer.

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9. Training and Documentation

The manufacturer shall provide the following training and documentation for the AHEB Series I/O Expansion Board.

- User manuals and technical documentation for installation, configuration, and operation of the I/O Expansion Board.
- Online training courses and videos for system administrators and operators.
- On-site or remote training sessions for system integrators and installers.
- Technical support and assistance for system integrators, installers, and end-users.

*Note Certifications may vary by region and country. Please consult the manufacturer for specific certifications applicable to your location.

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