SIEMENS

Symaro™

Indoor air quality multi-sensor

QNA2..D

Indoor air quality multi-sensor

- RESET certified, compliant with building certification WELL LEED for well-being of people
- 7 in 1 measurement: Temperature, relative humidity, CO_2, TVOC, particulate matter (PM2.5 & PM10), sound pressure, and illuminance
- Value display and indoor air quality indication
- Output signal supporting BACnet (IP and MSTP) and LoRaWAN
- Power supply (by product version):
  - BACnet IP: PoE IEEE802.3af (37…57 V) or USB Type C (5 V, 2 A)
  - BACnet MSTP: AC/DC 12...24 V or USB Type C (5 V, 2 A)
  - LoRaWAN: USB Type C (5 V, 2 A) or AC/DC 12...24 V

Use

IAQ multi-sensors can be used in rooms and buildings to monitor the indoor air quality status. It is compliant with WELL, LEED building certification in terms of well-being of people.

The sensors are used as a measuring sensor for building automation and control systems or display units.

Typical application:

- Commercial office building
- Public infrastructure

Functions

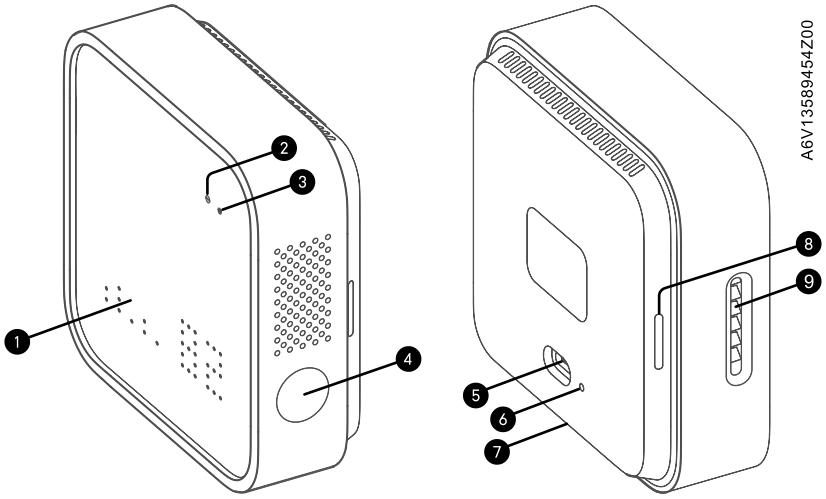
IAQ multi-sensors acquire the following values:

Five environmental sensors

- Temperature
- Relative humidity
- CO_2 concentrations
- TVOC concentrations
- Particulate matter: PM2.5 concentrations and estimated PM10 value (LoRaWAN only)

Two complementary parameters

- Sound pressure
- Illuminance



Number	Description	Number	Description	Number	Description
①	LED matrix display for environmental sensors	②	Ambient light sensor	③	Air quality index indicator
④	Power / Display button *	⑤	Power connector (type C)	⑥	Reset button
⑦	Reserve (unavailable)	⑧	Accessory snap	⑨	Air intake vent for PM2.5 sensor

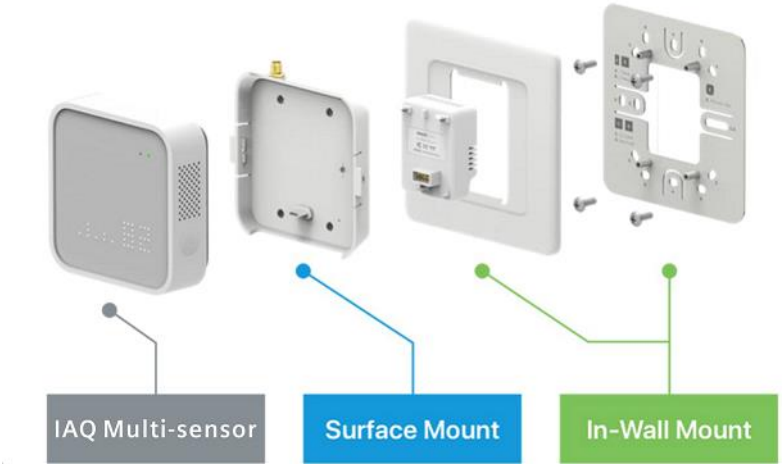
* Single click the button to trigger circular display of five environmental sensor measurements twice, in order: temperature ⇒ humidity ⇒ CO_2 ⇒ TVOC ⇒ PM2.5 ⇒ clock ⇒ battery level. Once click again during circular display, sensor keeps current display and returns to initial state after several seconds.

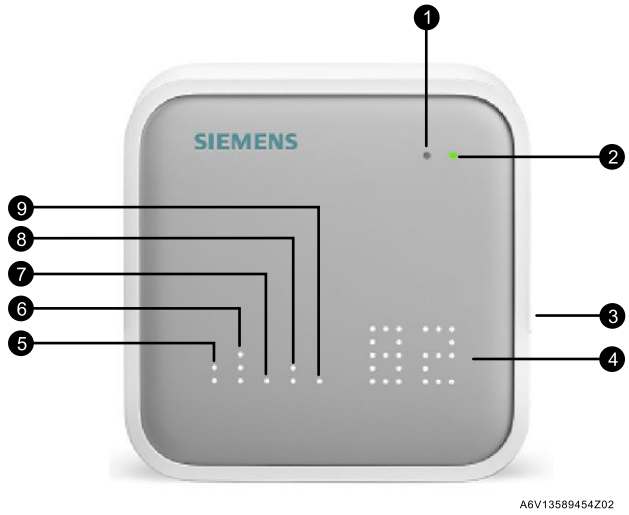
Mechanical design

Multi-sensors are designed for wall mounting. They are suitable for use with most commercially available recessed conduit boxes.

The device has 3 parts:

- Sensor module: Measurement
- Surface mount: Data conversion / communication
- In-wall mount: Wiring and mounting





Number	Description	Number	Description	Number	Description
①	Ambient light sensor	②	Air quality index indicator ●: Poor ●: Fair ●: Good	③	Ambient noise sensor
④	Air quality score	⑤	Temperature	⑥	Relative humidity
⑦	CO_2	⑧	Total VOC (TVOC)	⑨	Particulate matter (PM2.5)

Air quality index

IAQ Multi-sensor and proprietary algorithms determine a real-time score that immediately notifies you of the air quality.

80...100	60...80	0...60
: Good	: Fair	: Poor

Temperature (°C/°F)

Temperature has an obvious impact on comfort, but can also impact health. Being either hot or cold can cause difficulty concentrating and a loss of productivity.

Note

LoRaWAN: Temperature only displays and transmits in °C.

18...25/64...77	17...18/63...64 25...26/77...79	11...17/52...63 26...32/79...90	9...11/48...52 32...34/90...93	<9/<48 >34/>93
: Healthy	: Fair	: Moderate	: Unhealthy	: Poor

Relative humidity (%)

A dry environment can cause dry and irritated skin, while high humidity combined with high temperature breeds bacteria and mold.

40...50	35...40 50...60	20...35 60...65	15...20 65...80	<15 >80
: Healthy	: Fair	: Moderate	: Unhealthy	: Poor

TVOC (ppb)

VOC, volatile organic compounds, are found in common building materials and cleaning products that can cause skin and respiratory irritation. Protect health by maintaining a toxic compound-free environment.

0...333	333...1000	1000...3333	3333...8333	>8333
: Healthy	: Fair	: Moderate	: Unhealthy	: Poor

CO_2 (ppm)

As more people occupy a space, CO_2 levels spike increasing the likelihood of drowsiness and lethargy as well as impacting productivity, concentration, and decision making.

400...600	600...1000	1000...1500	1500...2500	>2500
: Healthy	: Fair	: Moderate	: Unhealthy	: Poor

PM2.5 (µg/m^3)

Dust, fungi, pollen, and smoke are common examples of particulate matter. These small particles can travel deeply into your lungs and trigger health problems like asthma and allergies.

0...15	15...35	35...55	56...75	>75
: Healthy	: Fair	: Moderate	: Unhealthy	: Poor

Type summary

Version	Product number	SSN NO.	Power options
BACnet IP	QNA2700D.BA1	S55720-S572	PoE IEEE802.3af (37…57 V) or USB Type C (5 V, 2 A)
BACnet MSTP	QNA2700D.BA2	S55720-S573	AC/DC 12...24 V or USB Type C (5 V, 2 A)
LoRaWAN EU	QNA2820D.EU	S55720-S574	USB Type C (5 V, 2 A) or AC/DC 12...24 V
LoRaWAN US	QNA2820D.US	S55720-S575	
LoRaWAN Australia	QNA2820D.AU	S55720-S576	

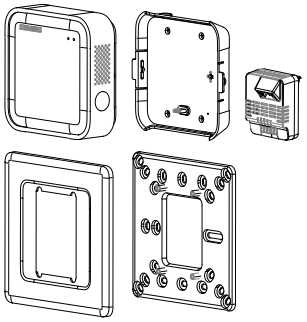
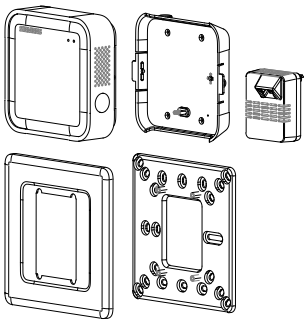
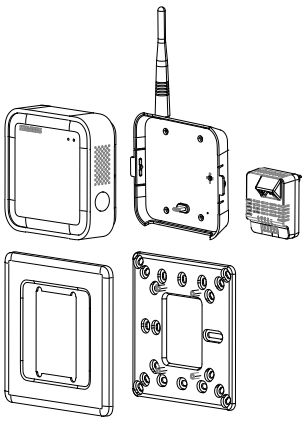
Sensor module has a built-in battery and it backups battery for short time power interruption (max. 4 h).

Delivery

When ordering, specify both product number / stock number and name: e.g.: **QNA2700D.BA1 / S55720-S572 IAQ multi-sensor**.

Spare parts need to be ordered separately.

Inbox items

Product	Package item	Name
QNA2700D.BA2 BACnet MSTP		• Sensor module • Surface mount BACnet MSTP version • In-wall mount – Backpack with terminals – Conduit box cover, mounting plate – Set of screws and plastic insert
QNA2700D.BA1 BACnet IP		• Sensor module • Surface mount BACnet IP version • In-wall mount – Backpack POE only – Conduit box cover, mounting plate – Set of screws and plastic insert
QNA2820D.xx LoRaWAN		• Sensor module • Surface mount, antenna • In-wall mount – Backpack with terminals (optional) – Conduit box cover, mounting plate – Set of screws and plastic insert

Region of supported conduit box	Description
Germany *	VDE conduit box, distance between screw holes is 60 mm
Italy	Distance between screw holes is 83.5 mm
UK *	Distance between screw holes is 60 mm
North American	Distance between screw holes is 83.5 mm or 122 mm

Note: * The conduit box is only suitable for surface mounting of LoRaWAN versions.

Equipment combinations

It is recommended to use Siemens LoRaWAN gateway (Connect Box: CWG.BOX-EU, CWG.BOX-NA, CWG.BOX-A) for setting up LoRaWAN network.

Product number	SSN NO.	Description	Datasheet
CWG.BOX-EU	S55813-Y100	Connect box, region Europe, including Germany	A6V13605416
CWG.BOX-NA	S55813-Y110	Connect box, region Americas, Australia, New Zealand	A6V13605416
CWG.BOX-A	S55813-Y120	Connect box, region Middle East, Asia and Pacific, excl. Australia	A6V13605416

Firmware version of connect box is 5.6.2 or later.

When ordering, specify both product number / stock number and name: e.g.: **CWG.BOX-EU / S55813-Y100 connect box**.

For supported 3rd party LoRaWAN gateway, contact support team for further info.

Product documentation

Title	Product type	Document ID
Mounting instruction	All	A6V13562246
Commissioning	All	A6V13589457
CE declarations	QNA2700D.BA1, QNA2700D.BA2	A5W00287987A
	QNA2820D.EU	A5W00287993A
RCM	QNA2700D.BA1, QNA2700D.BA2	A5W00287989A
	QNA2820D.AU	A5W00287998A
UKCA	QNA2700D.BA1, QNA2700D.BA2	A5W00287988A
	QNA2820D.EU	A5W00287994A

Title	Product type	Document ID
Environmental product declaration	All	A5W00274475A

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

Notes

Safety

⚠ CAUTION	
	**National safety regulations** Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations.

⚠ WARNING	
	**Explosion due to fire or short-circuit, even with discharged batteries** Risk of injury due to flying parts ● Prevent the batteries from coming in contact with water. ● Do not heat batteries over 60 °C.

⚠ WARNING	
	**Risk of explosion** Personal injury and property damage ● In case of a leakage, avoid contact with skin, eyes and mucous membranes. ● Remove leaking battery from the battery compartment with a cloth.

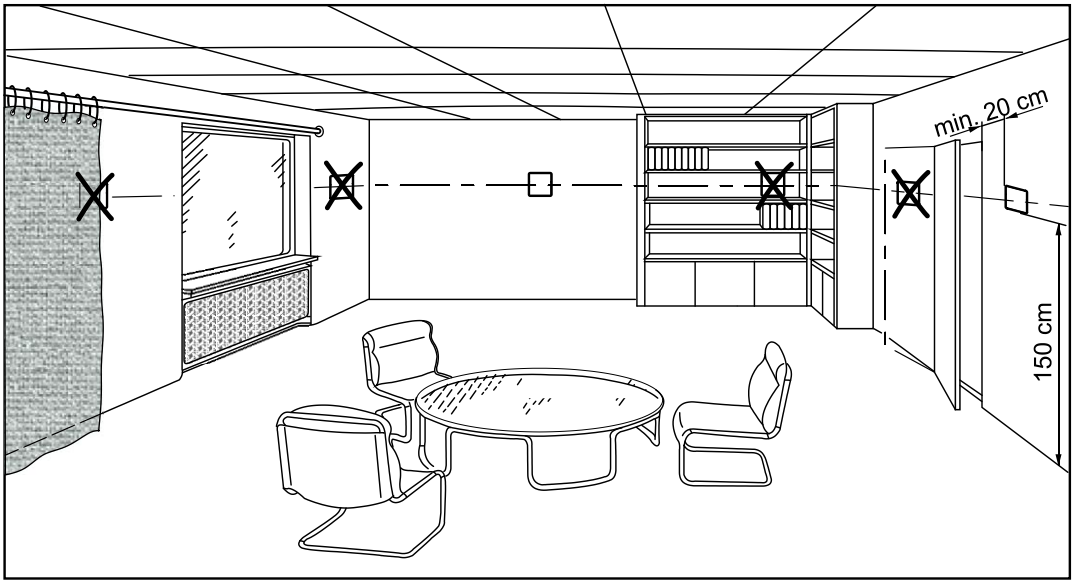
The device contains lithium-ion battery. Lithium-ion batteries are hazardous materials. Observe the following requirements:

- Always follow national and international regulations for transport.
- If needed, consult an expert for hazardous materials.
- Damage of the battery modules by discharge!
  If they reach too low of a charge, the batteries can be damaged or destroyed.
- When in storage, the batteries discharge. Charge the batteries to minimum 85 % before storing them.
- Make sure that the device is completely turned off before storing.

NOTICE	
!	**Radio frequency energy** Interference to radio communications • Install and use equipment in accordance with installation guide. • Read all regulatory compliance information.

Mounting

Location



- The devices are suitable for drywall mounting, conduit box mounting and surface mounting.
- Recommended height: 1.5 m (4 feet) above the floor. If the recommended height cannot be met, it should not be lower than 0.9 m (3 feet).
- Do not mount the devices in recesses, shelves, behind curtains or doors, or above or near heat sources.
- Avoid direct solar radiation and drafts.
- Avoid unheated (uncooled) building area such as outside walls.
- Seal the conduit box or the installation tube if any, as air currents can affect sensor readings.
- Adhere to allowed ambient conditions.
- Devices should be mounted at least 5 m (16 feet) away from operable windows, air filters, and fresh air diffusers.
- In areas where this is impossible, center your device between windows and place your monitor closer to air return than air diffusers.

Calibration and maintenance

In standard indoor environment, sensors are maintenance-free within 36 months. Front sensor module can be replaced as needed.

Disposal

	This symbol or any other national label indicate that the product, its packaging, and, where applicable, any batteries may not be disposed of as domestic waste. Delete all personal data and dispose of the item(s) at separate collection and recycling facilities in accordance with local and national legislation. For additional details, refer to Siemens information on disposal.

Regulatory compliance information

FCC Statement

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 or more 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.

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

FCC Caution: Changes or modifications not expressly approved by Siemens Switzerland Ltd. could void user authority to operate the equipment. United States representative https://new.siemens.com/us/en/products/buildingtechnologies/home.html

Radiofrequency radiation exposure statement

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

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

United Kingdom conformity assessed

Contact for regulatory topics: (GB) Siemens plc, Sir William Siemens House, Princess Road, Manchester, M20 2UR

Radio equipment directive

Simplified EU Declaration of Conformity

Hereby, Siemens Switzerland Ltd declares that the radio equipment type QNA2700D.BA1, QNA2700D.BA2 and QNA2820D.EU are in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: https://siemens.com/bt/download.

Open source software (OSS)

Open Source Software (OSS)

All open source software components used within the product (including their copyright holders and the license conditions) can be found from the website http://www.siemens.com/download?A6V13659703.

Cyber security disclaimer

Siemens provides a portfolio of products, solutions, systems and services that includes security functions that support the secure operation of plants, systems, machines and networks. In the field of Building Technologies, this includes building automation and control, fire safety, security management as well as physical security systems. In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art security concept. Siemens' portfolio only forms one element of such a concept.

You are responsible for preventing unauthorized access to your plants, systems, machines and networks which should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place. Additionally, Siemens' guidance on appropriate security measures should be taken into account. For additional information, please contact your Siemens sales representative or visit:

https://www.siemens.com/global/en/home/company/topic-areas/future-of-manufacturing/industrial-security.html

Siemens' portfolio undergoes continuous development to make it more secure. Siemens strongly recommends that updates are applied as soon as they are available and that the latest versions are used. Use of versions that are no longer supported, and failure to apply the latest updates may increase your exposure to cyber threats. Siemens strongly recommends to comply with security advisories on the latest security threats, patches and other related measures, published, among others, here:

https://www.siemens.com/cert/ => 'Siemens Security Advisories'

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Power supply	
Operating voltage ● QNA2700D.BA1 ● QNA2700D.BA2 ● QNA2700D.BA2, QNA2820D.EU, QNA2820D.US, QNA2820D.AU	● PoE IEEE802.3af (37…57 V) or USB Type C (5 V, 2 A) ● AC/DC 12...24 V or USB Type C (5 V, 2 A) ● USB Type C (5 V, 2 A) or AC/DC 12...24 V
Backup battery Capacity and Voltage Runtime	Rechargeable Lithium-Ion battery 2000 mAh @ 3.7 V 4 hours for sensor module power supply
Power consumption Operating Total	 1.76 W (max. 2.6 W, 6.5 W with battery charging) Less than 1.3 kWh per month (operating for 30 days)

Communication protocol (no data buffer and COV)	
BACnet IP	10/100 Full-Duplex w/ In-Wall Mount, 10 s transmission rate
BACnet MSTP	MS/TP & Ethernet IP w/ In-Wall Mount, 10 s transmission rate
LoRaWAN	LoRaWAN 1.0.2, class C, 1 min transmission rate

Functional data of sensor	
Humidity sensor	
Type	Complementary metal oxide-semiconductor (CMOS) sensor
Measuring range	0…100 % r.h.
Measuring accuracy	±3 % r.h. within comfort range (30...70 %) ±5 % full range
Resolution	0.01 % r.h.
Temperature sensor	
Type	Complementary metal oxide-semiconductor (CMOS) sensor
Measuring range	0...90 °C (32...194 °F)
Measuring accuracy	±1 °C
Resolution	0.015 °C
CO_2 sensor	
Type	Non-dispersive infrared sensor with automatic baseline calibration (ABC)
Measuring range	400...5000 ppm
Measuring accuracy	±75 ppm or ±10 % of reading (whichever is greater)
Resolution	1 ppm
TVOC sensor	
Type	Multi-pixel metal-oxide semiconductor sensor
Measuring range	20...36000 ppb
Measuring accuracy	±15 % of reading
Resolution	1 ppb

Functional data of sensor	
PM2.5 & PM10 sensor	
Type	Optical laser, light scattering sensor
Measuring range	0...1000 µg/m³
Measuring accuracy	±15 µg/m³ (0...100 µg/m³), ±15 % of reading (100...1000 µg/m³
Resolution	1 µg/m³
Ambient light sensor	
Type	Photodiode, integrated ambient and infrared light to digital converter
Measuring range	0.96...64000 lux
Measuring accuracy	±10 %
Resolution	0.1 lux
Ambient noise sensor	
Type	Analog MEMS microphone
Measuring range	48...90 dBA
Measuring accuracy	±3 dBA Leq
Resolution	0.1 dBA
Sensitivity	-26 dBFS
Signal noise ratio (SNR)	Typical 61 dBA (20 Hz...20 kHz)
Sample rate	46.875 KHz
Recordings	1 x 44 ms (no more than 44 ms of data is sampled)

Ambient conditions and protection classification	
Protection degree of housing	IP30 according to EN60529
Environmental conditions	
Storage	
Climatic conditions	
Temperature	-20...+60 °C
Humidity	0…95 % r. h. (non-condensing)
Mechanical conditions	Class 1M2
Transport	
Climatic conditions	
Temperature	-20...+60 °C
Humidity	<95 % r.h.
Mechanical conditions	Class 2M2
Operation	
Climatic conditions	
Temperature (housing with electronics)	-5...+40 °C
Humidity	0…95 % r. h. (non-condensing)
Mechanical conditions	Class 3M2

Directives and approvals	
Sensor certification	RESET Air Accredited Indoor Monitor & Data Provider: https://www.reset.build/directory/monitors/RM-034
EU conformity (CE) ● QNA2700D.BA1, QNA2700D.BA2 ● QNA2820D.EU	 ● A5W00287987A *) ● A5W00287993A *)
RCM conformity ● QNA2700D.BA1, QNA2700D.BA2 ● QNA2820D.AU	 ● A5W00287989A *) ● A5W00287998A *)
UKCA conformity ● QNA2700D.BA1, QNA2700D.BA2 ● QNA2820D.EU	 ● A5W00287988A *) ● A5W00287994A *)
RoHS	Directive 2011/65/EU restriction of the use of certain hazardous substances in electronic equipment
Environmental compatibility	The product environmental declaration (A5W00274475A *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

General	
Colors Panel Frame	 Grey White
Packaging	Corrugated cardboard
Weight including package ● QNA2700D.BA1 ● QNA2700D.BA2 ● QNA2820D.EU ● QNA2820D.US ● QNA2820D.AU	 ● 0.677 kg ● 0.677 kg ● 0.692 kg ● 0.692 kg ● 0.692 kg

*) The documents can be downloaded from http://siemens.com/bt/download.

Data sharing services

ID	BIBB	Description
K1.2	DS-RP-B	Data sharing read property-B
K1.4	DS-RPM-B	Data sharing read property multiple-B

Device and network management services

ID	BIBB	Description
K5.2	DM-DDB-B	Device management-dynamic device binding-B
K5.4	DM-DOB-B	Device management-dynamic object binding-B

Standard object type supported

Object type	Supported	Properties supported
Analog input	✓	Description Reliability
Device	✓	Description Max master Max info frames

Supported object type description

Sensor values:

The IAQ multi-sensor supports 9 analog input objects (AI [0] to AI [8]) through which the various environmental quality parameter measurements can be read out by a BACnet client. These AI objects are as defined below.

Object type/ Object instance	Name	Description	Parameter value range	BACnet unit
Analog Input/0	Temperature	Indoor air temperature	0...90	Degrees-Celsius
Analog Input/1	Relative humidity	Indoor relative humidity	0...100	%-relative-humidity
Analog Input/2	Carbon dioxide	Indoor carbon dioxide level	400...5000	parts-per-million
Analog Input/3	TVOC	Indoor total volatile organic compounds	20...60000	parts-per-billion
Analog Input/4	PM2.5	Indoor particulate matter PM2.5	0...1000	micrograms-per-meter-cubed

Object type/ Object instance	Name	Description	Parameter value range	BACnet unit
Analog Input/5	Light	Indoor light level	0...64000	lux
Analog Input/6	Noise	Indoor sound pressure level - decibels A-weighted	48...90	decibels-A-weighted
Analog Input/7	Air quality score	Proprietary air quality score	0...100	n/a
Analog Input/8	Temperature Fahrenheit	Indoor air temperature (Fahrenheit)	32...194	Degrees-Fahrenheit

Data link layer options:

- BACnet IP, (Annex J)
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200

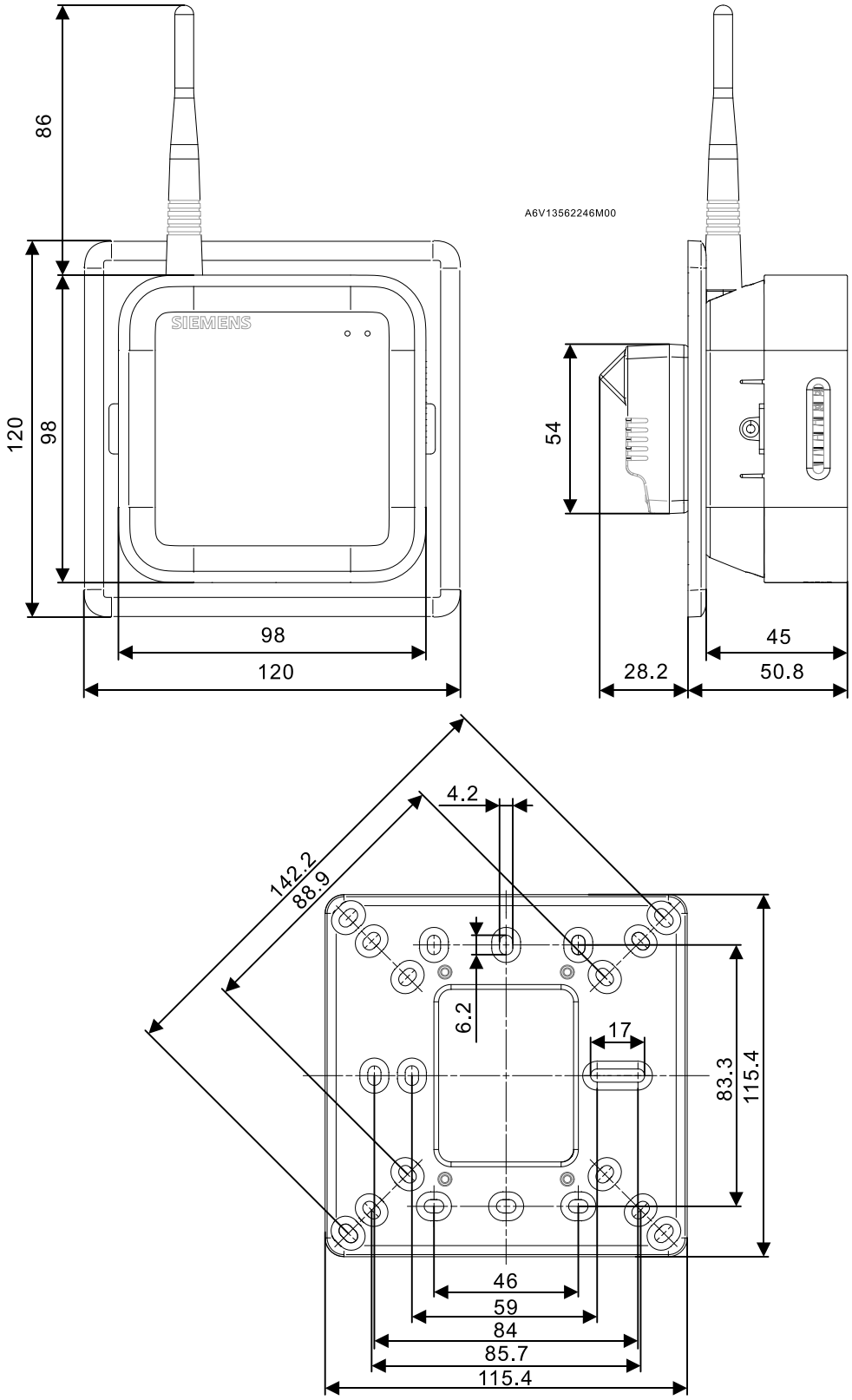
Character sets supported:

- Indicating support for multiple character sets does not imply that they can all be supported simultaneously.
  - ANSI X3.4

LoRaWAN PICS

Radio/Wireless	
Wireless technology	LoRaWAN 1.0.2
Wireless security	LoRaWAN end-to-end encryption (AES)
LoRaWAN device type	Class C end-device
Supported LoRaWAN features	OTAA
Supported LoRaWAN regions	US902-928: Uplink only 902.3-914.2 EU863-870: ● 125 KHz bandwidth: 863.1...869.9 MHz ● 250 KHz bandwidth: 863.2...869.8 MHz AU915-928: 915.6 – 927.4 MHz
Frequency sub band	2
Link budget	122.5 dBm (SF7)
RF transmit power	14 dB / 20 dB
Data rate	3 (Fixed)

Dimensions



Dimensions in mm

Issued by
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Document ID A6V13589454_en--_e

Edition 2023-07-06