

Product Manual | 13.02.2023 | V 1.5

ABB Ability™

BECL/D.200.16

Building Edge Control



Table of Contents

| | | |
|-------|--|----|
| 1 | Notes on the instruction manual | 3 |
| 2 | Safety | 4 |
| 2.1 | Intended use | 5 |
| 2.2 | Improper use | 5 |
| 2.3 | Target group / Qualifications of personnel | 5 |
| 2.4 | Cyber security | 6 |
| 2.4.1 | Ports and services for supporting the main functionality | 7 |
| 2.4.2 | Anti-Malware Software | 8 |
| 2.5 | Safety instructions | 9 |
| 3 | Information on protection of the environment | 10 |
| 3.1 | Environment | 10 |
| 4 | Product description | 11 |
| 4.1 | Scope of delivery | 11 |
| 4.2 | Device overview | 12 |
| 4.3 | Functions | 13 |
| 4.3.1 | Description of functions | 13 |
| 4.4 | LED Functions | 15 |
| 5 | Technical data | 16 |
| 5.1 | Dimensional drawings | 18 |
| 6 | Connection, installation / mounting | 19 |
| 6.1 | Safety instructions | 19 |
| 6.2 | Mounting | 20 |
| 6.3 | Electrical connection | 21 |
| 7 | Maintenance | 22 |
| 8 | Notes | 23 |
| 9 | Index | 24 |

1 Notes on the instruction manual

Please read the manual carefully and observe the instructions and information it contains.

Please keep this manual in a safe place.

ABB accepts no liability for errors and safety problems due the failure to observe the manual.

If you require additional information or have questions about the Building Ecosystem and its applications, please contact ABB or visit our Internet site at:

<https://buildings.ability.abb>



Notice

Depending on the user rights, system configuration and equipment, certain functions and settings cannot be made available.

2 Safety

The device has been constructed according to the latest valid regulations governing technology and is operationally reliable. It has been tested and left the factory in a technically safe and reliable state.

However, residual hazards remain. Read and adhere to the safety instructions to prevent hazards of this kind.

ABB accepts no liability for damages due to the failure to observe the safety instructions.

The following Instructions point to particular hazards involved in the use of the device or provide practical instructions:



Danger

Risk of death / serious damage to health

- The respective warning symbol in connection with the signal word "Danger" indicates an imminently threatening danger which leads to death or serious (irreversible) injuries.



Warning

Serious damage to health

- The respective warning symbol in connection with the signal word "Warning" indicates a threatening danger which can lead to death or serious (irreversible) injuries.



Caution

Damage to health

- The respective warning symbol in connection with the signal word "Caution" indicates a danger which can lead to minor (reversible) injuries.



Attention

Damage to property

- This symbol in connection with the signal word "Attention" indicates a situation which could cause damage to the product itself or to objects in its surroundings.



Notice

This symbol in connection with the word "Notice" indicates useful tips and recommendations for the efficient handling of the product.



This symbol alerts to electric voltage.

2.1 Intended use

The Smart Edge Gateway BECL/D.200.16 serves as protected, local network node between bus system, such as BACnet, Modbus or KNX and the IP building network.

The device embeds openBOS®, the ABB operating system for Smart Buildings: a software platform that establishes the link between any connected equipment of a building and any software applications that will be used by building managers and/or building occupants.

Building edge connects any device of any brand having open and interoperable IP protocol such as Modbus, KNX, BACnet and MQTT. It includes an embedded Edge Editor Tool to create the database of your multiprotocol site.

The BECL/D.200.16 also serves as access point for Cloud platform ABB Ability™ as well as Clouds of third-party suppliers via openBOS as a Service (oBaaS).

The BECL/D.200.16 is a modular DIN-Rail component (MDRC) in Pro M-Design. The device is intended for mounting in installation distributors on 35 mm mounting rails.

The intended use also includes adherence to all specifications in this manual.

2.2 Improper use

Each use not listed in Chapter 2.1 "Intended use" on page 5 is deemed improper use and can lead to personal injury and damage to property.

ABB is not liable for damages caused by use deemed contrary to the intended use of the device. The associated risk is borne exclusively by the user or operator.

The device is not intended for the following:

- Unauthorized structural changes
- Repairs
- Outdoor use
- Use in bathroom areas

2.3 Target group / Qualifications of personnel

Installation, commissioning and maintenance of the device must only be carried out by trained and properly qualified installer or system integrator.

The installer or system integrator must have read and understood the manual and follow the instructions provided.

The installer or system integrator must adhere to the valid national regulations in his/her country governing the installation, functional test, repair and maintenance of electrical products.

The installer or system integrator must be familiar with and correctly apply the "five safety rules" (DIN VDE 0105, EN 50110):

1. Disconnect
2. Secure against being re-connected
3. Ensure there is no voltage
4. Connect to earth and short-circuit
5. Cover or barricade adjacent live parts;

2.4 Cyber security

Industry faces intensifying cyber security risks. In order to increase stability, safety and robustness in its solutions, ABB has formally established cyber security robustness testing as part of the product development process.

The following measures are prerequisite for the safe operation of your system. ABB accepts no liability for non-observance.

Access control and limitation

The careful isolation of the system against unauthorized access is the basis for every protective concept. Only authorized persons (fitter, caretaker, tenant) are allowed physical access to the IP network or bus system and its components. This also includes the device described in the instruction manual.

The best possible protection of the IP or network media (LAN/WLAN) and the transfer node must be guaranteed already during planning. Sub-distributions with fieldbus devices must be lockable or be in rooms to which only authorized persons have access.

Bus cabling

- The ends of the bus cables must not be visible, i.e., they must not project out of walls or channels, either inside or outside of the building.
- Bus cables in outdoor areas or in areas with limited protection represent an increased safety risk. The physical access should be made exceptionally difficult.

IP Network

The local network represents a sensitive component for secure communication. That is why unauthorized access to the local network should be prevented. The normal security mechanisms for IP networks are to be used, e.g.:

- Secure encryption of wireless networks
- Use of complex passwords and protection of these against unauthorized persons
- Physical access to network interfaces (Ethernet interfaces) and network components (router, switches) should only be possible in protected areas.
- MAC filter (table with certified device addresses)

Connection to the Internet or the local IP network

To prevent improper use, no router ports from the Internet into the building network or home network are to be opened to the Smart Edge device. A VPN tunnel is suitable for safe remote control.

The stable and reliable function of the device also depends on the reliability of the local IP network to which the server is connected. For this reason, additional network components are to be used to repel the DoS attacks (denial of service) from the Internet. Such attacks can overload the local IP network or the individual components and make them inaccessible.

Safety of user accounts

Set a strong access password during initial commissioning. Use passwords that you have received from the administrator only for the first login.

Keep passwords secret and use a password manager with two-factor login as memory aid, e.g., Keypass.

2.4.1 Ports and services for supporting the main functionality

To support the main functionalities of the device, communication via specific ports and services must be possible in your local network. Contact your network administrator to set up, if necessary, the appropriate port sharing.



Attention!

Enabling the port increases the risk of cyber attacks.

- Assign only necessary enabling.
- Regularly check which ports are enabled for which purpose.

In the following table the TCP and UDP services listed on the device are summarized. That is pure information and is what we are delivering with a new Building edge.

Nevertheless, installer or system integrator must check these standard ports are used locally and update if any change. Edge Editor embeds all the functions to perform these actions.

| Port | Service | Purpose |
|-----------|---------|--|
| 80/TCP | HTTP | Communication via unencrypted web server (disabled as standard). There is the risk that third parties can read the transmitted data. |
| 443/TCP | HTTPS | Communication via encrypted web server |
| 1883/TCP | MQTT | Communication with building fieldbus devices Is activated only when MQTT communication is required |
| 3671 | KNX | Communication with building fieldbus devices Is activated only when KNX communication is required |
| 502 | Modbus | Communication with building fieldbus devices Is activated only when Modbus communication is required |
| 47808/UDP | BACnet | Communication with building fieldbus devices Is activated only when BACnet communication is required |
| 68/UDP | DHCP | Assigning the network configuration to clients |

Special caution is required when using the fieldbus protocols Modbus, KNX and BACnet. If possible, use only the BACnet routers that support the BACnet Secure Connect (BACnet/SC). Modbus/TCP currently offers no safety or encryption functions.

Establish remote connections only via a VPN tunnel.

2.4.2 Anti-Malware Software

ABB recommends the following applications for repelling and removing malware.

| Building Ecosystem Configuration Tool |
|--|
| McAfee https://www.mcafee.com |
| Microsoft Security Essentials https://de.wikipedia.org/wiki/Microsoft_Security_Essentials |
| Avira https://www.avira.com |
| Clamscan for Win/Mac/OS2/Linux systems https://de.wikipedia.org/wiki/ClamAV |
| Calmwin https://de.wikipedia.org/wiki/ClamAV |
| MetaDefender (used by EPPC) https://www.opswat.com/products/metadefender |
| AVG Anti-Virus https://www.avg.com |

2.5 Safety instructions



Danger - Electric voltage!

Electric voltage! Risk of death and fire due to electric voltage of 100 to 240 V. Dangerous currents flow through the body when coming into direct or indirect contact with live components. This can result in electric shock, burns or even death.

- Work on the 100 to 240 V mains may only be performed by authorized and qualified electricians.
- Disconnect the mains voltage before mounting or dismantling.
- Never use the device with damaged connecting cables.
- Do not open covers that are firmly bolted to the housing of the device.
- Use the device only if it is in a technically faultless state.
- Do not make changes to or perform repairs on the device, its components or its accessories.
- Keep the device away from water and wet surroundings.



Attention! – Risk of damage to the device due to external factors!

Moisture and contamination can damage the device.

- Protect the device against humidity, dirt and damage during transport, storage and operation.

3 Information on protection of the environment

3.1 Environment



Consider the protection of the environment!

Used electric and electronic devices must not be disposed of with household waste.

- The device contains valuable raw materials that can be reused. Therefore, dispose of the device at the appropriate collecting facility.

All packaging materials and devices bear the markings and test seals for proper disposal. Always dispose of the packing materials and electric devices or their components via an authorized collection facility or disposal company.

The products meet the legal requirements, in particular the laws governing electronic and electrical devices and the REACH ordinance.

(EU Directive 2012/19/EC WEEE and 2011/65/EC RoHS)

(EU REACH ordinance and law for the implementation of the ordinance (EC) No.1907/2006)

4 Product description



Fig. 1: Product overview

The BECL/D.200.16 is a modular DIN-Rail component (MDRC) in Pro *M*-Design. It is intended for mounting in installation distributors on 35 mm mounting rails. To operate, the device requires a supply voltage U_S (9 - 14 V DC), which is supplied via an external SELV power adapter. The device can be configured after the direct current supply and at least one LAN cable is connected.

4.1 Scope of delivery

Included in the scope of delivery are:

- MDRC device (4 MW)
- Connecting terminal for the power supply

The power adapter for the power supply (12 V DC, SELV) must be ordered separately.

4.2 Device overview

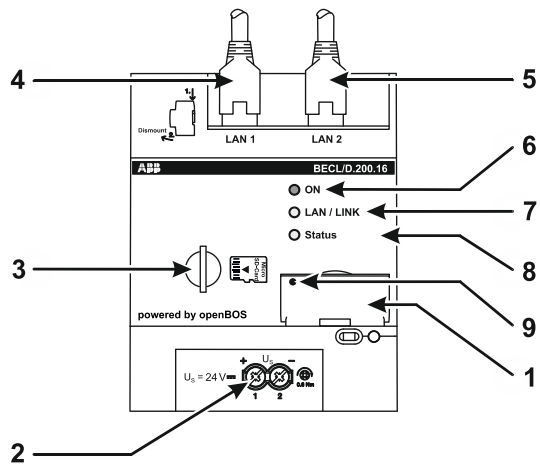


Fig. 2: Overview of devices

- [1] Label holder
- [2] Connection of supply voltage U_s
- [3] Micro SD card slot
- [4] LAN 1 connection (Ethernet)
- [5] LAN 2 connection (Ethernet)
- [6] LED ON (green)
- [7] LED LAN / Link (yellow)
- [8] LED status (yellow)
- [9] Reset button (behind label holder)

4.3 Functions

4.3.1 Description of functions

The BECL/D.200.16 is a gateway that offers a safe and local access point via its publication level to the field devices and to the Cloud platform ABB Ability™ as well as to Clouds of third-party suppliers.

The device includes openBOS® that establishes a direct communication between different bus systems (e.g., BACnet, KNX, Modbus and MQTT) and consolidate the data from one or several network devices into a single site ontology contextualizing information by buildings, floors, roofs, façade, offices, All information is grouped in assets (Lamp, fan coil, ...) and assets are contextualized in Zones

openBOS® also includes basic automation function inside a building: scheduling, trending, and alarming. The device is the used to program schedules on zones or assets, to parameter trend logs and set alarm parameters on points.

The device basically makes possible the use of ABB or 3rd party software applications dedicated to building execution or building occupants. It also makes possible the connection to a secure Web API to get the building ontology and control command the equipment of the building, manage the scheduling, trending, and alarming.

It embeds a Web software configuration tool to build the building ontology: the edge editor. More information on the configuration can be found in the system manual.

Additional product features:

- Compatible with any product and manufacturer as long it uses a standard protocol such as KNX net/IP, BACnet/IP, Modbus TCP/IP or MQTT
- Compatible with all above protocols and manages these protocols as a data server
- Manages schedules, alarms, and saves trend logs independent of protocol
- Includes the openBOS operating system and organizes information in a building ontology based on rooms and zones
- offers a REST/JSON API of the entire function (openBOS as a Service: oBaaS) via a secure and authenticated cloud connection to ABB Ability™

Building Operating System (BOS)

Most modern buildings have indeed an existing smart potential but are not unified. Designed with sensor-rich environments, they have the capacity to run more efficiently and sustainably than ever before while responding in real time to the needs of inhabitants. Current building systems are operating in silos, solving tasks independently within their own systems and building data models and APIs.

openBOS® ontology solves that problem by unifying the information and publishing it in a simple and structured way. No need to parse several APIs of several building systems: openBOS® offers a unified Cloud services API that describes a property, meaning one or a collection of buildings in a single location.

The connection to the ontology is cyber-secure, API endpoints are self-explanatory, and objects are non-technical and usage-oriented: you navigate in buildings, floors, offices, lamps, ... you manage physical devices, physical points, assets of the building, ... you control the command automation of the property: alarms, schedule and trending values. You also define the user ecosystem, and everything is based on templates.

openBOS consists of three software layers: middleware(s), ontology and publication(s).

Use of middleware:

- Uniformize data and independent of technology available for the ontology level
- Link with the field layer: a multi-protocol data server to read/write and subscribe to changes of datapoint values coming from the networks
- Performs automation functions on the top of that data server: define schedules, alarms and trend logs
- Embeds a unified datatype dictionary and is capable to convert from any type to the other
- Is fully localized and auto adjust units depending on user location

The middleware contains a development kit to develop one's own data recording drivers compatible with openBOS.

Use of ontology:

- Ontology is Combining data from one or several middleware levels
- Consolidation of data in a structured information model that is designated as ontology of the building. This part is the central repository for the information.
- A site is composed of several buildings. Each building has roof(s), floor(s), facades, parking(s), basements,
- Define the description of the assets in the building: the lamps, the buttons, the fan coils, the sensors,
- Define the collection of users: property owner, property managers, facility managers, tenants, visitors, ... with their role and rights
- All information is tagged and explained with a published dictionary

Use of publication:

- Calling up information from the ontology and offers a Web API
- Can be local in the Product or in the Cloud
- Several ways to authenticate
- Extension with possible publication modules, e.g., Azure IoT, Brick, etc.

4.4 LED Functions

The three LEDs on the front of the device have the following functions:

| LED | LED colour | Function |
|---------------------|---------------|---|
| LED ON | Green | Display of operational readiness <ul style="list-style-type: none"> ▪ Off, when there is no supply voltage ▪ Flashes slowly during the system startup (1 Hz) ▪ Lights up permanently, when the startup of the system was successful ▪ Flashes quickly during device startup (4 Hz) ▪ Flashes when the device is reset (3 Hz) ▪ Flashes when the IP address is reset (3 Hz) ▪ Flashes when resetting to factory settings (10 Hz) |
| LED LAN/LINK | Yellow | Display of network connection. <ul style="list-style-type: none"> ▪ Off, when there is no network connection or no LAN port is connected with an IP router/switch ▪ Lights up permanently when the device is ready for operation and when at least one LAN port is connected with an IP router/switch ▪ Flickers during traffic on the LAN ports ▪ On when resetting the device ▪ Flashes when the IP address is reset (3 Hz) ▪ Flashes when resetting to factory settings (10 Hz) |
| LED status | Yellow | Display of device status <ul style="list-style-type: none"> ▪ On when the device is in programming mode ▪ Flashes fast (4 Hz) when an error was detected during the bootup, e.g. when the bootloader has not found a signed root image or the system is in secured mode ▪ Flashes during resetting to the factory settings (10 Hz) |

5 Technical data

| Power supply | |
|---|--|
| Supply voltage (Power adapter not in scope of delivery) | 9 - 14 V DC \pm 10% (class 2 SELV) or standard 12 V DC / 2 A (class 2 SELV) |
| Power consumption | Max. 5 W |
| Surge voltage | 800 V |
| Supply terminals | |
| Screw type | Combi-head PZ 1 |
| Cable cross-section | AWG 24 – AWG 10 Single-wire: 0.5 - 2.5 mm ² (2 x 0.5 - 1.5 mm ²) Fine-wire: 0.5 - 2.5 mm ² (2 x 0.5 - 1.5 mm ²) |
| Wire end sleeve | Without/with plastic sleeve <ul style="list-style-type: none"> ▪ 1 wire without: 0.5 - 2.5 mm² ▪ 1 wire with: 0.5 - 1.5 mm² ▪ 2 wire without: 0.5 - 0.75 mm² ▪ 2 wire with: 0.5 - 0.75 mm² |
| Tightening torque | Max. 0.6 Nm |
| LAN connections | |
| Ethernet LAN 1 connection LAN 2 connection | 10/100/1.000 BaseT, IEEE 802.3 via RJ45 plug 10/100 BaseT, IEEE 802.3 via RJ45 plug |
| Number | 2 |
| Cable type | Shielded network cable, at least CAT 5e S/UTP, F/UTP |
| Micro SD card reader | |
| Card types | Up to 2 TB, microSD, microSDHC, microSDXC (memory card not included in the scope of delivery) |
| Design | |
| Dimensions | 3.54 x 2.76 x 25 inch (H x B x D) 90 x 70 x 63.5 mm (H x B x D) |
| Housing | Flame-resisting PC injection moulded plastic |
| Mounting | Individually mountable on DIN rail (TH 35) |
| Environmental characteristics | |
| Operating temperature | + 23 °F - +113 °F (-5 °C - +45 °C) |
| Storage temperature | -13 °F - +131 °F (-25 °C - +55 °C) |
| Transport temperature | -13 °F - +158 °F (-25 °C - +70 °C) |
| Humidity | 0% - 90% rh, without condensation |
| Air pressure | Atmosphere up to 6560 ft (2000 m) |
| Pollution degree | 2 |

| Classification/approval | |
|--------------------------------|--|
| Protection type | IP20 |
| Mode of operation | Type 1 (IEC 60730) |
| Approvals | <ul style="list-style-type: none"> ▪ UL-listed (CDN & US) UL 60730-1 - Automatic electric regulating and control devices - reference number E499524 ▪ CE conformity according to EC guidelines |

Table 1: Technical data

5.1 Dimensional drawings

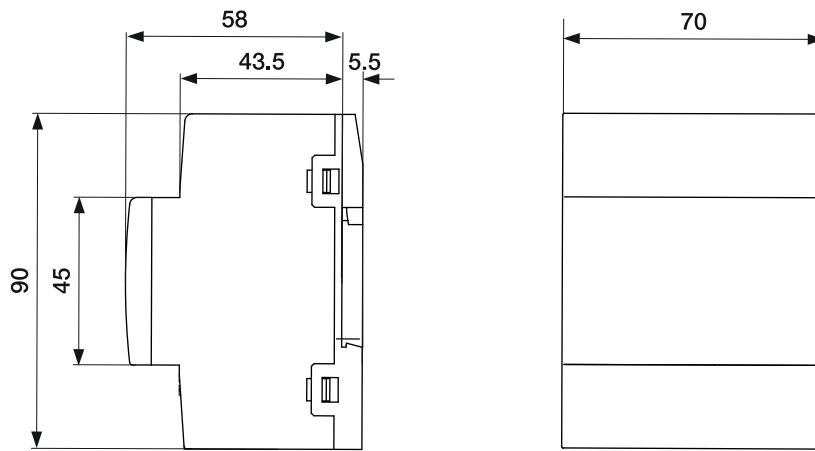


Fig. 3: Dimensional drawing (all dimensions are in millimeters)

6 Connection, installation / mounting

6.1 Safety instructions



Danger - Electric shock due to short-circuit!

Risk of death due to electrical voltage of 100 to 240 V during short-circuit in the low-voltage line.

- Low-voltage and 100 - 240 V lines must not be installed together in a flush-mounted box!
- Observe the spatial division during installation (> 10 mm) of SELV electric circuits to other electric circuits.
- If the minimum distance is insufficient, use electronic boxes and insulating tubes.
- Observe the correct polarity.
- Observe the relevant standards.



Danger - Electric voltage!

Install the device only if you have the necessary electrical engineering knowledge and experience.

- Incorrect installation endangers your life and that of the user of the electrical system.
- Incorrect installation can cause serious damage to property, e.g. due to fire.

The minimum necessary expert knowledge and requirements for the installation are as follows:

- Apply the "five safety rules" (DIN VDE 0105, EN 50110):
 1. Disconnect
 2. Secure against being re-connected
 3. Ensure there is no voltage
 4. Connect to earth and short-circuit
 5. Cover or barricade adjacent live parts.
- Use suitable personal protective equipment.
- Use only suitable tools and measuring devices.
- Check the voltage supply mains type (TN system, IT system, TT system) to guarantee the following connection conditions (classic connection to earth, protective earthing, necessary additional measures, etc.).

6.2 Mounting

The modular DIN rail component must only be installed on mounting rails according to DIN EN 500022 / DIN 60715 TH 35 (including industrial version).

Installation

To install the device, perform the following steps:

- Latch the modular DIN rail component onto the mounting rail.

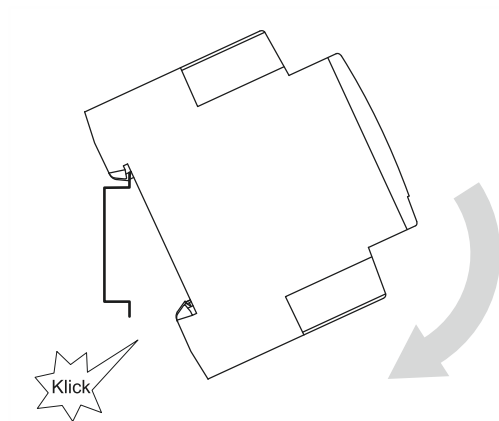


Fig. 4: Installation on mounting rails

Dismantling

To dismantle the device, perform the following steps:

- Press the device down [1] and then fold it toward the front [2].

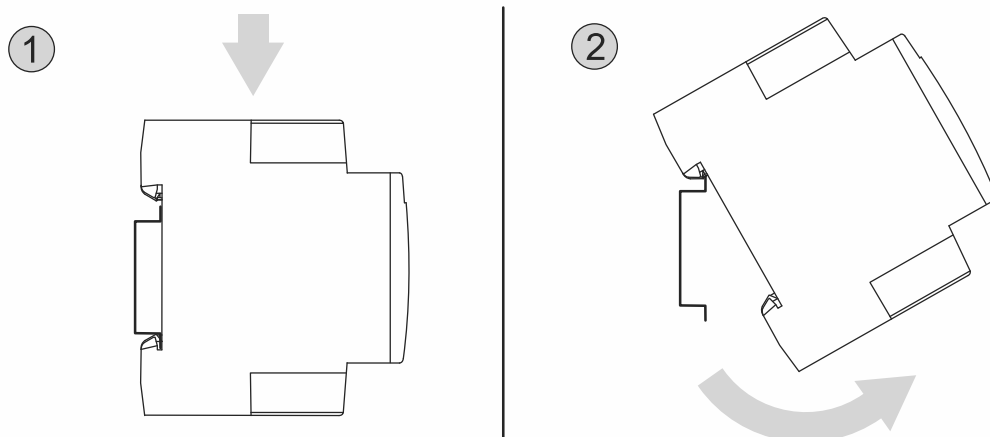


Fig. 5: Removal from the mounting rails

6.3 Electrical connection

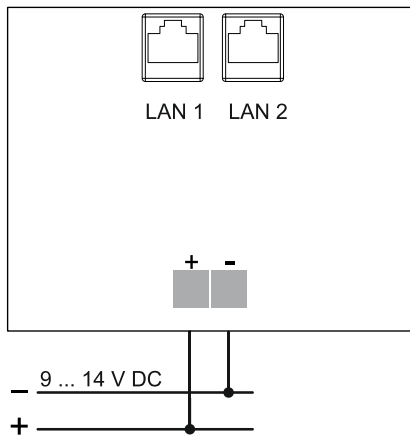


Fig. 6: Electrical connection

| Designation of connection | Function |
|------------------------------|--|
| U _s + (1) / - (2) | Supply voltage U _s (external SELV power adaptor necessary) |
| LAN 1 / LAN 2 | <ul style="list-style-type: none"> ▪ Connection to the IP network via Twisted-Pair cable with RJ45 plug ▪ Connection to a standard IP switch or router of the building ▪ Communication with the field devices via BACnet or modbus ▪ Makes Cloud communication possible where the interface is available |



Notice

The terminal designation is located on the housing.

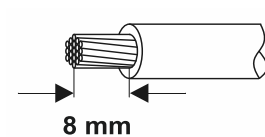


Fig. 7: Skinning length

Skinning length: 8 mm

7 Maintenance

The device is maintenance-free. In case of damage, e.g. during transport or storage, do not perform repairs. Once the device is opened, the warranty is void.

Access to the device must be guaranteed for operation, testing, inspection, maintenance and repairs (according to DIN VDE 0100-520).

8 Notes

9 Index

| | |
|---|-------|
| A | |
| Anti-malware software | 8 |
| C | |
| Connection, installation / mounting | 19 |
| D | |
| Description of functions | 13 |
| Device overview | 12 |
| Dimensional drawings | 18 |
| E | |
| Electrical connection | 21 |
| Electrical installer | 5 |
| Environment | 10 |
| F | |
| Functions | 13 |
| I | |
| Improper use | 5 |
| Information on protection of the environment | 10 |
| Intended use | 5 |
| L | |
| LED Functions | 15 |
| Liability | 3, 4 |
| M | |
| Maintenance | 22 |
| Mounting | 20 |
| N | |
| Notes | 23 |
| notes on the instruction manual | 3 |
| P | |
| Ports and services for supporting the main functionality | 7 |
| Product description | 11 |
| Q | |
| Qualification of the staff | 5 |
| S | |
| Safety | 4 |
| Safety instructions | 9, 19 |
| Scope of delivery | 11 |
| T | |
| Target group | 5 |
| Technical data | 16 |



Sales Support

Phone: +1 (877) 226-4822

Hours: 8:30 am to 5:00 pm (ET), Monday to Friday

us-sbs.insidesales@abb.com

Technical Support

Phone: +1 (877) 226-7767

Hours: 8:30 am to 5:00 pm (ET), Monday to Friday

us-sbs.support@abb.com

Postal address

ABB Inc.

2018 Powers Ferry Road

Atlanta, GA 30339, USA

new.abb.com/buildings