Specification Toolbox 2.0

ABB i-bus KNX in Residential Buildings
Functional Specification – Premium

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1. General Requirements

- The Intelligent Building Control System shall be designed and developed in accordance with the multi-vendor KNX standard and also in conformity to the following standards:
  - European Standard (CENELEC EN 50090 and CEN EN 13321-1)
  - International Standard (ISO/IEC 14543-3)
  - Chinese Standard (GB/T 20965)
  - US Standard (ANSI/ASHRAE 135)
- Systems which are single vendor based and run on proprietary protocols shall not be accepted. The system shall ensure that devices from different manufacturers are interoperable and compatible thus providing a future proof and flexible installation.
- The system should cover residential control requirements of one or more applications, such as lighting, HVAC, shading, etc.
- The system shall be completely decentralized and programmable. Each device will have its own intelligence. The parameters are configured using PC or notebook computer located anywhere in the system topology. Systems using centralized controllers or processors will not be accepted. In case of power failure all the configuration and status information have to be stored and retained in a non-volatile storage. This data shall be pushed back to the device once electrical current is back. System with additional built-in or external battery that needs to be changed periodically for information storage shall not be accepted.
- The communication cable that links all the devices shall have data and power residing on the same medium. It shall also be possible to lay the cable along the power mains. Systems requiring different communication cables for signal transmission and control power between the devices are not acceptable.
- The bus connection terminal of all the devices should have 4 bus connection possibilities for looping or branching of bus cable. The bus cable shall be laid in the building in all possible configurations, i.e. linear, star or tree architecture similar to the power mains. Systems requiring fixed wiring configurations shall not be acceptable. It is thereby possible to disconnect the devices without interrupting the bus line. Systems requiring special tools for crimping, lagging or special installation connectors, e.g. RJ45 bus connections, shall not be acceptable.
- Online programming of any device of the system should be possible without affecting the other devices on the system as well as offline programming prior to dispatching of the material to site. In the event of failure of a device in one line, only the control functions controlled by that device shall be affected and all other devices shall continue to operate normally.
- Each device shall operate via the 21…30 V DC made available on the KNX bus line. The power supply unit should deliver a 640 mA/320 mA/160 mA version depending upon the bus network density.
- The system shall communicate through CSMA/CA with parity checks in order to avoid collision in the bus thereby increasing the system flexibility and bandwidth allocation. Systems which work on polling or master-slave configurations shall not be accepted.

1.1. System Description

- The KNX system shall be programmed to provide the following applications:
  - Switching and dimming of lighting
  - Advanced HVAC control
  - Curtain/blind control
  - Security
  - Advanced scene and time-based control
  - Control of all functions via smartphones and tablets
  - Operation via advanced touch screen device
  - Audio/Video control
  - Video door communication system
  - Metering
  - Load control
  - Further upgrades in terms of functionality shall be possible at any time

1.2. Control Devices

- Dedicated integrated controllers shall be provided in individual rooms for controlling lighting, curtain/blinds, etc.
  The controllers shall have decentralized intelligence and shall be independent of any centralized controllers/software.
  For each application, such as HVAC/lighting/curtain control, dedicated controllers or channels need to be used.

1.3. KNX Control Elements

- KNX control elements shall be used to control various loads and scenes in the building. They shall include a bus coupler as part of the delivery, if applicable. The control elements shall be appropriately designed and located wherever necessary.
  All control elements shall be connected to the bus system. Furthermore, a touch screen control device connected to the bus system shall be available in order to allow the control of the building from a single control station. If desired, there shall be also the possibility to connect conventional push-buttons to the bus system by means of appropriate binary inputs.

2. Residential Buildings – Premium Configuration

2.1. Switching of Lighting

- The lighting shall be controlled via appropriate actuators. This allows a flexible switching from any location due to the group addressing via the bus system. Furthermore, the lighting circuits shall be integrated into various applications, e.g. security with predefined scene control. The lighting circuits shall be optionally operated by a manual override directly on the control unit/actuator.
- Lighting shall be also controllable by means of a presence or movement detector, as per the requirement of the customer. The detectors shall be directly interfaced to the bus system.

2.2. Dimming of Lighting

- Dimmable lighting circuits shall also be controlled via an actuator device. There shall be three different dimming possibilities available dependent on the used actuator which is connected to the bus system:
  - Universal dim actuators: Load is directly connected to the dimmer; incandescent lamps, low voltage halogen lamps (on conventional or electronic transformers) or 230 V halogen lamps can be operated. Outputs automatically recognize the connected load. Additionally, the operating mode can be selected manually.
  - 1…10 V switch/dim actuator: Dimming control is achieved via 1…10 V ballasts connected to the appropriate outputs of the switch/dim actuator. Switching on/off the light is done via floating contacts controlling the mains power supply of the 1…10 V ballast.
  - DALI Gateway: The dimming control system shall be based on DALI (Digital Addressable Lighting Interface) according to the technical standard IEC 62 386 in combination with KNX. To control DALI equipment, such as ballasts, transformers, LED converters, etc., a KNX/DALI Gateway shall be used. DALI allows the addressing of 64 ballasts which can be freely assigned to 16 DALI lighting control groups. The DALI control line can be installed together with the mains cable (e.g. by using a 5 wire standard cable). Functionalities achieved by DALI: light scenes, day light control, feedback regarding the connected DALI equipment (e.g. lamp or ballast failure), light scenes, etc.

2.3. HVAC Control

- KNX shall be used for room-oriented temperature control or individual room temperature control. By detecting the actual temperature value and specifying a respective temperature setpoint with a control algorithm, the thermostat sends a control value to the actuator. This actuator controls a heating or cooling unit that changes the room temperature.
  The prerequisite is a water-based heating and cooling system. The following control types shall be available:
  - Heating radiator control with electrothermal or electromotor valve drive
  - Fan coil unit control
  - Blower/Fans
- The room temperature controller shall be fully integrated into the Intelligent Building Control system in order to control the shutter/blind system as well. If a room is unoccupied, the blinds can be driven down in cooling operation to prevent heating of the room due to sun radiance. In heating operation (e.g. during wintertime) the blinds shall be driven up in order to support a cost-efficient heating of the room.
- The HVAC control system shall be interfaced to presence detectors, if applicable. Therefore, the presence detectors used for controlling lighting shall control the heating/cooling setpoint as well. If the room is not occupied, the setpoint value can be decreased (heating operation) in order to reduce the energy consumption.
- Windows shall be equipped with magnetic reed contacts in order to set the heating/cooling control system to a standby mode when a window is opened. In the standby mode the setpoint is decreased in heating operation, during cooling operation the setpoint shall be increased. Therefore, the magnetic reed contacts connected to the security system shall be utilized.

2.4. Curtain and Blind Control

Curtain and blind control shall be possible via the bus control elements. Motors are interfaced to the appropriate actuators. Furthermore, the integration into scenes shall be possible. The system shall also be capable of integrating values of the Weather Station (e.g. in order to react to wind alarms). Additionally, dependent on the outside brightness level measured by appropriate sensors, an automatic control mode according to the current position of the sun shall be available. Therefore, a shutter control unit (please see 6.4) shall contain functions of anti-glare protection and daylight redirection for up to 4 facades. Shadow objects can be taken into consideration. Please note that therefore, a Weather Station as defined in 6.3 shall be used allowing to connect separate sensors for each facade direction.

2.5. Advanced Scene and Time-Based Control

- It shall be possible to call scenes via any bus control device. This can be a bus control element, the touch screen display or a smartphone/tablet running a bus remote application. A scene shall be able to integrate all functions of the Intelligent Building Control system, including an interface to the security solution.
- Time-based control shall be possible via the touch screen device.
- Presence simulation shall be provided by the touch screen device. In this operation mode, predefined operations are called in order to simulate presence of the property owner.

2.6. Security Functionality

- The security system shall comply to the requirements given in 7.1. The security system shall be connectable to the following detector groups:
  - Motion Detector
  - Magnetic Reed Contact
  - Lock Bolt Switching Contact
  - Glass Break Sensor
  - Panic Detector
  - Water Detector
  - Heat/Smoke Detector
  - Setting Device
- The security system shall be fully integrated into the KNX bus system. Therefore, an uninterruptible KNX power supply as defined in 3.2 shall be used.

2.7. Audio/Video System

- By means of a proper bus/IR Gateway, it shall be possible to integrate an audio and video system via scenes into the Intelligent Building Control system. A typical application for this is a “TV” scene, switching the light off or dimming it to a certain level, closing the curtains and enabling the TV and the appropriate sound system (not part of this specification).

2.8. Door Communication

- It shall be possible to connect up to 99 appartments (audio and video units) to a door communication system. Every appartment shall be equiped with up to 4 audio or video indoor stations.
- Additionally, a telephone Gateway shall be integrated for connecting the system with the analog inputs of a private branch exchange (PBX) and therefore permitting the use of telephones as indoor communication stations.
- An IP Gateway integrated in the door communication system shall permit the use of smartphones or tablets as mobile indoor communication stations via an installed app. The IP Gateway shall facilitate the use of a KNX touch screen device as a stationary indoor communication station. Through the use of internet services, the worldwide transmission of door calls onto smartphones shall be possible.

2.9. Bus Control Elements

- Bus control elements shall be used to control various building applications, such as lighting control including dimming, curtain and blind control, room temperature control and security. Furthermore, these bus control elements shall be used to call and save scenes.

2.10. Touch Screen Device and Control via Smartphone/Tablet

- The touch screen device shall provide a comprehensive control of the building applications. Therefore, it shall have a capacitive and colored touch screen TFT display allowing the control of lighting, curtains/blinds and further facilities, as well as displaying the status of weather values, for example. Furthermore, the device shall be able to control multimedia equipment and shall provide a connection to the internet in order to access e-mails, RSS feeds etc. The touch screen device shall also be used to define time-based scenarios which can be easily adjusted by the end user directly on the device. A presence simulation which records the typical use of building's functions shall be also available.
- The touch screen device shall also provide an interface to a mobile application for iOS and Android devices for both, smartphones and tablets. The mobile application allows the comprehensive control of the functions realized with the touch screen device. The app shall be connectable via local Wi-Fi network as well as via an internet connection.

2.11. Metering

- The Intelligent Building Control system shall be capable of providing metering values to any displaying facility in order to have a transparent view on energy consumption in the building. For example, this can be the touch screen device or the smartphone/tablet app which is connected to the touch screen device.
- Specialized switch actuators with an inbuilt metering feature available for each channel shall be used in order to measure the power consumption directly at the switched circuits and to enhance transparency.
- If the measurement of energy consumption is required only for the main feeder circuits, for example, there shall also be the possibility to connect meters via a proper IR Gateway/interface to the bus system. This is applicable for circuits with higher rated currents. If a low current rating is sufficient, an energy module directly connected to the bus system can also be used.

2.12. Load Control

- Certain socket/load circuits shall be controlled by a switch actuator with current detection to monitor the current consumption and thereby ensuring a proper operation of the connected devices. For energy saving purposes, circuits can be switched off after leaving the building. This scene can be started, e.g. by setting the security system.

3. Control Devices – System Components

3.1. KNX Power Supply with Enhanced Diagnostics (320 mA/640 mA)

- Produces and monitors the KNX system voltage
- With diagnostic function via KNX or ABB i-bus® Tool
- The voltage output is short-circuit- and overload-proof. The LEDs indicate the bus current consumption and the status of the line or device.
- Diagnostic functions via KNX: Bus voltage U_N, bus current I, bus current I > rated current I_N, overload I > I_{max}, trigger bus reset
- Supply voltage: U_S 85…265 V AC, 50/60 Hz
- KNX voltage output: 1 line with integrated choke
  - Rated voltage: U_N 30 V DC +1/-2 V, SELV
- Power consumption:
  - < 30 W (320 mA)
  - < 55 W (640 mA)
- Nominal power loss:
  - < 2.5 W (320 mA)
  - < 4 W (640 mA)
- Output voltage: 30 V DC +1/-2 V, SELV
- Nominal current: 320 mA/640 mA, short-circuit-proof
- Sustained short-circuit current:
  - < 0.8 A (320 mA)
  - < 1.4 A (640 mA)
- Mains failure back-up time: 200 ms
- Rated current: I_N 320 mA or 640 mA
- Connection:
  - Bus connection: Bus connection terminal
  - Supply connection: Screw terminals
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 modules at 18 mm
- Manufacturer: ABB
- Product type (dependent on current): SV/S 30.320.2.1, SV/S 30.640.5.1

3.2. Uninterruptible KNX Power Supply, 640 mA

- Generates and monitors the KNX system voltage. With integrated choke for decoupling the bus line from the power supply and reset pushbutton for isolating the bus line and resetting the bus devices connected to it. Bus connection is made via a bus connection terminal. With connections for 12 V DC sealed lead acid batteries for buffering the KNX voltage supply in case of a mains breakdown as well as for a PTC temperature sensor for monitoring the charging voltage. Includes a potential-free changeover contact to transmit fault information, e.g. mains failure, battery fault, overload/short-circuit.
- Power supply: 230 V AC, 50...60 Hz
- Output nominal voltage: 30 V DC +1/-2 V, SELV
- Output nominal current: 640 mA, short-circuit-proof
- Nominal voltage accumulator: 12 V DC
- Nominal voltage potential-free changeover contact: 230 V AC, 12/24 V DC
- Nominal current potential-free changeover contact: 6 A AC/4 A DC
- Connection:
    - KNX: Bus connection terminal
    - 230 V AC: Screw terminals
    - Battery: Screw terminals
    - Changeover contact: Screw terminals
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 8 modules at 18 mm
- Manufacturer: ABB
- Product type: SU/S 30.640.1

3.3. Line Coupler

- The Line Coupler electrically isolates lines/areas from one another. With an activated filter table, it only allows data telegrams which are intended for bus devices on other lines. The device can be parameterized as a line or area coupler as well as a line repeater using ETS software. With ETS version 4.1.2 or higher, the entire group address range (main group 0…13 and 14…31) can be filtered.
- Operating and display elements:
  - LED, green: ON
  - LED, yellow: Main line
  - LED, yellow: Line
- Connection:
  - Main line: Bus connection terminal
  - Line: Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 2 modules at 18 mm
- Manufacturer: ABB
- Product type: LK/S 4.2

3.4. IP Router

- The IP Router connects the KNX bus with the Ethernet network. The device uses the KNXnet/IP protocol for communication (Routing and Tunneling). It can be used as a fast line and area coupler and can utilize the local network (LAN) for fast exchange of telegrams between the lines/areas. KNX devices can be programmed via the LAN using ETS. The IP address can be fixed or can be received from a DHCP server. The power supply range is from 10…30 V DC.
- Supply voltage: 10...30 V DC
- Display elements:
  - LED green: Operating mode display
  - LED yellow: Network connection indicator
  - LED yellow: KNX telegram traffic indicator
- Connection:
  - Plug-in terminal
  - RJ45 socket
  - Bus connection terminal
- Interfaces:
  - 1 x KNX
  - 1 x LAN
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 2 modules at 18 mm
- Manufacturer: ABB
- Product type: IPR/S 2.1

3.1. IP Router Advanced

- The IP Interface connects the KNX bus with the Ethernet network.The device uses the KNXnet/IP protocol for communication (Routing and Tunneling).
- Auxiliary voltage: 12 ... 30 V DC (+10% / -15%) or PoE (IEEE 802.3 af class 1)
- Relocated RJ45 socket for better radius of bend
- KNX devices can be programmed via the LAN using ETS
- Visualizations can send and receive telegrams via the tunneling servers
- The IP address can be fix or can be received from a DHCP server
- 5 tunneling servers available
- 8k filter table available (main groups 0...31)
- Standard multicast communication can be switched to unicast. In this case up to 10 ABB IPR/S3.1.1 can communicate via unicast
- Supports bus monitor and group monitor
- Diagnosis and commissioning tool available (incl. firmware update)
- Power dissipation: Max. 1,8 W
- Display elements:
  - LED green: Operating mode display
  - LED yellow: LAN/LINK
  - LED yellow: KNX telegram
- Housing: Halogen free
- Connections:
  - LAN: Plug-in terminal, RJ45 socket
  - KNX: Bus connection terminal
- Interfaces:
  - 1 x KNX
  - 1 x LAN
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Mounting position: As required
- Width: 2 modules at 18 mm
- Manufacturer: ABB
- Product type: IPR/S 3.1.1

3.2. System Controller Door Entry System

- Supply device and controller of the door communication system
- For connecting the indoor and outdoor stations
- For connecting an electronic door opener
- For switching the light or connecting a light relay
- Switching duration of the door opener and the light is adjustable
- Rated voltage: 230 V DC, ±10 %
- Output voltage: 28 V
- Rated frequency: 50…60 Hz
- Rated power: 42 W
- Type of protection: IP 20, IEC/EN 60 529
- Temperature range: -5 °C to 45 °C
- Dimensions (L x W x D): 90 mm x 216 mm x 65 mm
- Width: 12 modules at 18 mm
- Manufacturer: ABB
- Product type: 83300

3.3. IP Gateway Door Communication System

- For connection to a touch screen device or app
- Configuration interface for telephone Gateway and access control module
- With Ethernet connection (RJ-45)
- Type of protection: IP 20, IEC/EN 60 529
- Temperature range: -5 °C to 45 °C
- Dimensions (L x W x D): 90 mm x 180 mm x 65 mm
- Width: 10 modules at 18 mm
- Manufacturer: ABB
- Product type: 83342

3.4. Telephone Gateway

- For connecting a door communication system to the analog inputs of an existing telephone system
- Permits the use of a telephone (e.g. DECT, ISDN, mobile telephone) as indoor door communication station
- Taking door calls, opening the door and switching the light via the telephone keypad (DTMF)
- Switching between the freely-programmable target numbers via the telephone keypad (DTMF)
- PIN protection for all configuration settings
- Programming via the telephone keypad (DTMF) or via web browser
- 2 screw-type terminals for the analog a'/b' connection towards the private branch exchange (PBX)
- Type of protection: IP 20, IEC/EN 60 529
- Temperature range: -5 °C to 45 °C
- Dimensions (L x W x D): 90 mm x 72 mm x 65 mm
- Width: 4 modules at 18 mm
- Manufacturer: ABB
- Product type: 83350

4. Control Devices – Switching and Dimming

4.1. Switch Actuator 6 A/10 A

- Uses potential-free contacts to independently switch electrical current loads via KNX
- Manual operation and display of the switching status is possible. No separate supply voltage necessary. Especially suitable for switching of resistive, inductive and capacitive loads including fluorescent lighting loads according to IEC/EN 60 669.
- With only one application program the following functions for each output can be set separately:
    - Time functions, on/off delay
    - Staircase lighting function with preliminary warning and changeable staircase lighting time
    - Recall scenes/presets over 8-bit/1-bit commands
    - Logic functions AND, OR, XOR
    - Status response
    - Forced control and safety function
    - Reaction to threshold values
    - Control of electrothermal valve drives (continuous controller)
    - Selection of default position on bus voltage failure and recovery
    - Inversion of outputs
    - Parameterization of single outputs can be exchanged or copied
- Outputs: 2-12 potential-free floating contacts possible
- Rated current: 6 AX or 10 AX
- Switching capacity:
    - According to IEC/EN 60 947-4-1:
      6 A/AC3 (6 A actuator); 10 A/AC1 (10 A actuator); 8 A/AC3 (on 230/400 V AC, 10 A actuator)
    - According to IEC/EN 60 669:
      6 AX (6 A actuator); 10 AX (10 A actuator), max. capacitive load 140 µF
- Operation: Actuating levers for displaying the switch position and manual operation for each channel
- Connection:
    - Load side: Screw terminals with combination head screws for lines, 0.2…6.0 mm² unifilar
    - KNX: Screwless bus connector
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 2-12 modules at 18 mm
- Manufacturer: ABB
- Product type (dependent on number of channels):
    - 6 A actuator: SA/S 2.6.2.1, SA/S 4.6.2.1, SA/S 8.6.2.1, SA/S 12.6.2.1
    - 10 A actuator: SA/S 2.10.2.1, SA/S 4.10.2.1, SA/S 8.10.2.1, SA/S 12.10.2.1

4.2. Switch Actuator 16/20 AX

- Uses potential-free contacts to independently switch 2, 4, 8 or 12 electrical loads via KNX
- Manual operation and display of the switching status. No separate voltage supply necessary. Especially suitable for switching from loads with high surge current, such as lighting with compensatory capacitor or fluorescent lighting loads according to IEC/EN 60 669.
- With only one application program the following functions for each output can be set separately:
    - Current recognition, current value sending and reaction to current threshold values
    - Time functions, on/off delay
    - Staircase lighting function with preliminary warning and changeable staircase lighting time
    - Recall scenes/presets over 8-bit/1-bit commands
    - Logic functions AND, OR, XOR
    - Status response
    - Forced control and safety function
    - Reaction to threshold values
    - Control of electrothermal valve drives (continuous controller)
    - Selection of default position on bus voltage failure and recovery
    - Inversion of outputs
    - Parameterization of single outputs can be exchanged or copied
- Outputs: 2-12 potential-free floating contacts
- Rated current: 16/20 AX - C-Load (50/60 Hz)
- Switching capacity:
    - According to IEC/EN 60 947-4-1:
      16/20 A/AC1 (16 A actuator); 16 A/AC3 (on 230/400 V AC, 16 A actuator)
    - According to IEC/EN 60 669:
      16/20 AX (16 A actuator), max. capacitive load 200 µF
- Operation: Actuating levers for displaying the switch position and manual operation
- Connection:
    - Load side: Screw terminals with combination head screws for lines, 0.2…6.0 mm² unifilar
    - KNX: Screwless bus connector
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 1 module at 18 mm per output channel
- Manufacturer: ABB
- Product type (dependent on number of channels): SA/S 2.16.5.1, SA/S 4.16.5.1, SA/S 8.16.5.1, SA/S 12.16.5.1

4.3. Switch Actuator 16/20 AX with Current Detection

- Uses potential-free contacts to independently switch 2, 4, 8 or 12 electrical loads via KNX
- With integrated load current detection and without separate supply voltage
- Manual operation and display of the switching status. Especially suitable for switching from loads with high surge current, such as lighting with compensatory capacitor or fluorescent lighting loads according to IEC/EN 60 669.
- With only one application program the following functions for each output can be set separately:
    - Current recognition, current value sending and reaction to current threshold values
    - Detected current can be sent on KNX via 2-byte (counter value) or 4-byte (float value) object
    - Time functions, on/off delay
    - Staircase lighting function with preliminary warning and changeable staircase lighting time
    - Recall scenes/presets over 8-bit/1-bit commands
    - Logic functions AND, OR, XOR
    - Status response
    - Forced control and safety function
    - Reaction to threshold values
    - Control of electrothermal valve drives (continuous controller)
    - Selection of default position on bus voltage failure and recovery
    - Inversion of outputs
    - Parameterization of single outputs can be exchanged or copied
- Outputs: 2-12 potential-free floating contacts
- Rated current: 16/20 AX - C-Load (50/60 Hz)
- Switching capacity:
    - According to IEC/EN 60 947-4-1:
      16/20 A/AC1 (16 A actuator); 16 A/AC3 (on 230/400 V AC, 16 A actuator)
    - According to IEC/EN 60 669:
      16/20 AX (16 A actuator), max. capacitive load 200 µF
- Operation: Actuating levers for displaying the switch position and manual operation
- Connection:
    - Load side: Screw terminals with combination head screws for lines, 0.2…6.0 mm² unifilar
    - KNX: Screwless bus connector
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 1 module at 18 mm per output channel
- Manufacturer: ABB
- Product type (dependent on number of channels): SA/S 2.16.6.1, SA/S 4.16.6.1, SA/S 8.16.6.1, SA/S 12.16.6.1

4.4. Universal Dim Actuator

- KNX multichannel universal dimming actuator for controlling incandescent lamps, 230 V incandescent halogen lamps, low-voltage halogen lamps with conventional or electronic transformers, and dimmable energy-saving halogen lamps
- For dimmable retrofit LED lamps (LEDi)
- Parallel switching of channels for increasing the loads through wire bridges possible
- The outputs can be switched parallel in any combination
- Outputs automatically recognize the connected load
- In addition, the operating mode can be selected manually, with local operation.
- Status indication via LED
- The following applications are provided for the outputs:
    - Switching
    - Dimming
    - Value
    - Error message
    - Enable object
    - Light scene actuator
    - Sequence actuator
    - Staircase lighting
    - Delay
    - Preset
    - Cyclical telegram
    - Flashing
    - Logics (AND, OR, XOR, XNOR, NAND, NOR)
    - GATE
    - Min/max value transducers
    - Set value/hysteresis
    - PWM inverter
    - Priority
- Power supply: 230 V AC ± 10 %, 50/60 Hz
- Connection:
    - Outputs: Screw terminals, 0.2…6.0 mm²
    - Multiple-wire: 0.5…2.5 mm²
    - KNX: Bus connection terminal control element: Manual operation of ON brighter/Off darker and channel selection

- Display elements: Outputs status indication via LED
- Outputs: 4 or 6
- Rated power: Max. 210 W/VA, 315 W/VA, 600 W/VA per channel (dependent on used dim actuator type)
- Operating temperature range: -5° C to + 45° C
- Protection: Electronic short-circuit and overload protection
- Mounting: 35 mm mounting rail, IEC/EN 60715
- Width: 8 or 12 modules at 18 mm (dependent on rated power)
- Manufacturer: ABB
- Prodcut type (dependent on number of channels and rated power):
  6197/12-101-500, 6197/13-101-500, 6197/14-101-500, 6197/15-101-500

4.5. Switch/Dim Actuator 16 A

- Device for switching and dimming of 2/4/8 independent groups of luminaries with electronic ballasts, dimmers or transformers with 1…10 V control input. The dimming control per outputs carried out with two control wires. Maximum control load per channel is 100 mA. The Switch/Dim Actuator needs only KNX bus voltage for normal function.
  With 2/4/8 potential-free relays the supply voltage of the ballasts and consequently the luminaries can be switched on and off over KNX or manually without any auxiliary supply. Contact position is displayed.
- The following functions can be set separately for each channel:
  - Switching and dimming of lighting
  - Feedback of switching state and brightness value
  - Different adjustable dimming speeds for dimming and setting brightness
  - Adjustable upper and lower dimming limits
  - Recall and set of up to 18 light scenes (8-bit commands) per channel
  - 4 presets (1-bit commands) per channel
  - Integration in constant lighting control (“slave mode”)
  - Forced operation with higher priority
  - Staircase lighting function with adjustable staircase lighting time
  - Warning before switching off
  - Disable function to prevent unauthorized operation
  - Characteristic curve adjustment to adapt ballast brightness characteristic
- Outputs (channels):
  - 2/4/8, floating contacts for switching power supply of ballasts
  - 2/4/8, control channel 1…10 V passive
  - Nominal voltage: 230/440 V AC
  - Switching capacity:
    - 16 A/AC1 (ohmic load, IEC/EN 60 947)
    - 10 AX (fluorescent lighting load, IEC/EN 60 669)
  - Control current max.: 100 mA per channel
- Connection:
  - Outputs: Screw terminals
  - Bus connection: Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4/6/8 modules at 18 mm
- Manufacturer: ABB
- Product type (dependent on number of channels): SD/S 2.16.1, SD/S 4.16.1, SD/S 8.16.1

4.6. DALI Gateway with Group Control

- The group-oriented KNX DALI Gateway (DALI = Digital Addressable Lighting Interface) is used for controlling DALI equipment (ballasts, transformers, LED converters, etc. using the DALI interface to IEC/EN 62 386/60 929) via KNX.
- Up to 64 DALI devices can be connected to a DALI output. The 64 DALI devices can be individually addressed and allocated as required in up to 16 lighting groups. Overlapping groups are possible. Control using KNX is implemented exclusively via 16 lighting groups. Furthermore, setting of 14 light scenes is possible which can be recalled or stored via 8-bit or 1-bit scene telegrams. The lighting group can be integrated into a lighting control using slave mode. Furthermore, a staircase lighting function and a sequencer mode are available for the programming of running lights and color effects without additional logic or timer modules.
- The 64 DALI devices of the DALI output can also be read or controlled together in broadcast mode. Information relating to a lamp and ballast fault is available individually for a lamp group or for a DALI device. Error messages can be inhibited on the KNX allowing the Gateway to operate together with emergency lighting systems, which disconnect the DALI from the Gateway during emergency lighting tests.
- Programming of the DG/S 1.16.1 is implemented with the Engineering Tool Software (ETS).
- Manual switching of all DALI devices with a test button on the device is possible.
- Additionally, the correct operating voltage of the Gateway and the fault state of the DALI devices are indicated via two status LEDs. The brightness value (0…100 %) of the ballast (power-on level) after ballast operating voltage recovery is programmable.
- The DALI address assignment is implemented automatically on the Gateway. It can however be suppressed by a parameter in the application program.
- Readdressing of the DALI device and the assignment of the 64 DALI devices into 16 lighting groups is implemented in an ETS independent software tool (ABB i-bus® Tool), so that for example, a facility manager without ETS knowledge is capable of exchanging and reassigning DALI devices, should maintenance be required. Furthermore, the fault states of the individual DALI devices and/or lighting groups are represented graphically with this tool.
- The DALI power source for the 64 DALI devices is integrated into the Gateway.
- Output DALI: Output for max. 64 DALI devices
- Operating voltage: 85…265 V AC, 45…65 Hz, 110…240 V DC
- Connection:
  - Outputs: Screw terminal
  - Bus connection: Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 modules at 18 mm
- Manufacturer: ABB
- Product type: DG/S 1.16.1

5. Control Devices – HVAC

5.1. Standard Room Thermostat with Display

- For single-room temperature control in heating and air-conditioning technology
- With illuminated display for showing the actual room temperature and external actual-value default
- Comfort, standby, night operation or frost/heat protection operation can be selected via KNX. The set values can be parameterized.
- Display of the operation statuses with symbols
- Display of the date and time is possible
- The controller is a constant room temperature controller for ventilator convectors (fan coils) in 2-pipe and 4-pipe systems and conventional heating or cooling systems.
- The fan stage can be switched manually or in automatic mode.
- Setpoint adjustment using upper switch cover is possible.
- Comfort/standby switchover using lower switch cover is possible.
- The control output can optionally emit a continuous (PI control) or switching position signal (2-point or PWM).
- Support of KNX functions through innovative LED-color concept (yellow = lighting, blue = blind, orange = RTC, magenta = scene and white = neutral/no function assigned) or standard illumination red/green
- Color and function of the LED can be changed via ETS.
- Removal protection is possible with screw-on installation.
- With a maximum of 10 logic channels (logic gate, time delay, sequences, etc.). The logic functions of the channel can be freely selected.
- For flush-mounted bus coupler
- The following functions are provided for the application module:
    - Inputs: Switching, Continuous, Heating, Cooling, Time, Date
    - Outputs: Fan control, Light scene actuator, Sequence actuator, Staircase lighting, Delay, Preset, Cyclical telegram, Flashing, Logics (AND, OR, XOR, XNOR, NAND, NOR), GATE, Min/max value transducers, Set value/hysteresis, PWM inverter, Priority
- Room thermostat:
    - Connection:
        - Power supply: 10-pole multi-point connector
    - Control element: Switch contacts left/right for selecting setpoint and mode of operation
    - Display elements: LCD showing operation modes
    - Type of protection: IP 20, IEC/EN 60 529
    - Temperature range: -5 °C to 45 °C
    - Dimensions (L x W x D): 63 mm x 63 mm
    - Manufacturer: ABB
    - Product type: 6128/28

- Bus coupler:
    - For combining the installation bus KNX and the different application modules
    - For installation in surface-mounted or flush-mounted boxes
    - Connection:
        - KNX line: Bus connection terminal
    - Rated voltage: 24 V
    - Outputs:
        - Rated current: 24 mA
    - Type of protection: IP 20, IEC/EN 60 529
    - Temperature range: -5 °C to 45 °C
    - Dimensions (L x W x D): 50 mm x 45 mm x 23 mm
    - Manufacturer: ABB
    - Product type: 6120/12

5.2. Multi-Function Room Thermostat with Display and Control Elements

- For single-room temperature control in heating and air-conditioning technology
- With illuminated display for showing the actual room temperature
- With external actual-value default
- Comfort, standby, night operation or frost/heat protection operation can be selected via KNX. The set values can be parameterized.
- Display of the operation statuses with symbols
- Display of the date and time is possible
- The controller is a constant room temperature controller for ventilator convectors (fan coils) in 2-pipe and 4-pipe systems and conventional heating or cooling systems.
- The fan stage can be switched manually or in automatic mode.
- Setpoint adjustment using upper switch cover is possible.
- Comfort/standby switchover using lower switch cover is possible.
- The control output can optionally emit a continuous (PI control) or switching position signal (2-point or PWM).
- For transmitting switching, push-button, dimming and blind commands to KNX actuator
- Support of KNX functions through innovative LED-color concept (yellow = lighting, blue = blind, orange = RTC, magenta = scene and white = neutral/no function assigned) or standard illumination red/green
- Color and function of the LEDs can be changed via ETS.
- Removal protection is possible with screw-on installation.
- With a maximum of 10 logic channels (logic gate, time delay, sequences, etc.). The logic functions of the channel can be freely selected.
- For flush-mounted bus coupler
- The following functions are provided for the application module:
    - Inputs: LED
    - Outputs: Switching, Dimming, Blinds, Value, Push-button, Light scene extension unit, Step switch, Short/long operation, RTC operating mode switchover, Push-button switching, Push-button dimming, Push-button blind, Push-button value sender, Push-button step-type switch, Push-button multiple functions (max. 5 channels), Push-button value sender, 2 objects, Light scene actuator, Sequence actuator, Staircase lighting, Delay, Preset, Cyclical telegram, Flashing, Logics (AND, OR, XOR, XNOR, NAND, NOR), GATE, Min/max value transducers, Set value/hysteresis, PWM inverter, Priority, Continuous, Heating, Cooling, Fan control

- Room thermostat:
    - Connection:
        - Power supply: 10-pole multi-point connector
    - Control element: Switch contacts left/right, also for selecting setpoint and mode of operation
    - Display elements: LCD showing operation mode, temperature, time and date
    - Type of protection: IP 20, IEC/EN 60 529
    - Temperature range: -5 °C to 45 °C
    - Dimensions (L x W x D): 63 mm x 63 mm
    - Manufacturer: ABB
    - Product type: 6128/28
- Bus coupler:
    - For combining the installation bus KNX and the different application modules
    - For installation in surface-mounted or flush-mounted boxes
    - Connection:
        - KNX line: Bus connection terminal
    - Rated voltage: 24 V
    - Outputs:
        - Rated current: 24 mA
    - Type of protection: IP 20, IEC/EN 60 529
    - Temperature range: -5 °C to 45 °C
    - Dimensions (L x W x D): 50 mm x 45 mm x 23 mm
    - Manufacturer: ABB
    - Product type: 6120/12

5.3. Room Thermostat with Control Elements

- Top end strip with display, room temperature controller, IR receiver and proximity sensor:
  - The following functions are provided for the application module:
    - Inputs: Switching, Dimming, Flank, Blind, Scenes switching/value, Value, Light scene multi-way extension switching/value
    - Outputs: Switching, Continuous, Heating, Cooling, Fan control
  - Connection:
    - Power supply: Integrated pressure contacts
  - Detection range: Frontal: 0.5 m; Lateral: 0.5 m
  - Detection angle: 100 °
  - Type of protection: IP 20, IEC/EN 60 529
  - Temperature range: -5 °C to 45 °C
  - Dimensions (L x W x D): 33.4 mm x 106.6 mm x 15.5 mm
  - Mounting height: 1.1 m
  - Manufacturer: ABB
  - Product type: 6351/08
- Control element 3-/6-fold:
  - Control element with three replaceable backlit marking symbols for 1-fold, 2-fold and 3-fold carrier for displaying the KNX color concept with integrated logic function.
  - The following functions are provided for the application module:
    - Inputs: LED
    - Outputs: Switching, Dimming, Blinds, Value, Push-button, Light scene extension unit, Step switch, Short/long operation, RTC operating mode switchover, Push-button switching, Push-button dimming, Push-button blind, Push-button value sender, Push-button step-type switch, Push-button multiple functions (max. 5 channels), Push-button value sender, 2 objects
  - Connection:
    - Power supply: Integrated pressure contacts
  - Temperature range: -5 °C to 45 °C
  - Dimensions (L x W x D): 71 mm x 106.6 mm x 11 mm
  - Manufacturer: ABB
  - Product type: 6342
- Bottom end strip with lettering:
  - Bottom end strip for carrier, 1-fold to 3-fold
  - Dimensions (L x W x D): 12.5 mm x 106.6 mm x 15.5 mm
  - Manufacturer: ABB
  - Product type: 6349

5.4. Valve Drive Actuator

- To control thermoelectric valve drives (24…230 V AC) in heating/cooling systems via 6/12 independent semiconductor outputs
- General device functions:
  - Supply via bus voltage
  - Protection against overload and short-circuit
  - Manual operating keys and displaying LEDs for each channel
  - Block/enable manual operation, deactivation after time and status
  - Copy and exchange channels
  - Cyclical monitoring of the device
  - Sending and switching delay after bus voltage recovery
  - Request status values
  - Limited number of telegrams
- Software functionality for each channel:
  - Reaction on bus voltage recovery
  - Status message overload/short-circuit
  - Selection of valve drive (normally closed/normally open)
  - Control of outputs: Switching (1-bit) or continuous (1-byte, pulse width modulation)
  - Status message control value (1-bit or 1-byte)
  - Cyclic monitoring of control value (room temperature controller)
  - Preferred position and status message at controller fault
  - Security functions: Blocking and forced operation
  - Valve purge: Activation via object, adjustable duration, cyclic purge and status
  - Characteristic curve correction
  - Status byte
- Outputs: 6/12 semiconductor outputs
- Power consumption KNX: < 250 mW
- Operating voltage: 21…30 V DC via KNX
- U_N rated voltage: Max. 24…230 V AC, 45…65 Hz
- I_N rated current: Max. 160 mA
- Operating and displaying elements:
  - LED and push-button (ON/OFF) for each channel
  - LED overload/short-circuit and push-button reset
- Connection:
  - Outputs: Screw terminals with combination head screws
  - KNX: Screwless bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 or 8 modules at 18 mm
- Manufacturer: ABB
- Product type (dependent on number of channels): VAA/S 6.230.2.1, VAA/S 12.230.2.1

5.5. Thermoelectric Valve Drive

- The thermoelectric valve drive is used to open and close valves in heating, cooling and air conditioning systems.
- The snap-on mounting on valves or in heating circuit distributors will be established by valve adapters.
- Version normally closed (NC)
- Voltage supply: 230 V AC, 50/60 Hz
- Type of protection: IP 54, IEC/EN 60 529
- Protection class: II
- Mounting: Snap-on mounting in all installation positions
- Connection cable: Pluggable, 2 x 0.75 mm², 1m
- Display elements: Function display
- Housing: White, RAL 9003
- Dimensions: 60 mm x 44 mm x 49 mm
- Manufacturer: ABB
- Product type: TSA/K 230.2

5.6. Blower Actuator 6 A

- The Blower Actuator switches one or two 1- to 3-speed fan/s, controlled via KNX, by means of floating contacts.
  - Switching of one/two multi-level resistive, inductive or capacitive loads
  - Contacts of the fan connection with common foot point
  - Second fan connection alternatively as 3 switching outputs (2-fold version only)
  - One/two additional floating switching output
  - Speed switching or changeover switching can be parameterized
  - Direct selection of fan speed
  - Increase and decrease fan speed
  - Control fan speed via up to 2 control values
  - Control value selection by switchover or maximum selection
  - Threshold value with hysteresis for fan speeds
  - Forced operation
  - Limitation
  - Selection of fan speed on bus voltage failure
  - Selection of fan speed on bus voltage recovery
  - Start-up behavior can be parameterized
  - Switchover pause between fan speeds can be parameterized
  - Fan run-on can be individually parameterized for every speed
  - Control value monitoring can be parameterized
  - Switching output can be parameterized as N/O contact or N/C contact
  - Switching output with staircase lighting function
  - Status feedback
  - Reaction of outputs on bus voltage failure can be parameterized
  - Reaction of outputs on bus voltage recovery can be parameterized
  - Sending delay after bus voltage recovery
  - "In Operation" object (cyclic alive signal)
- Outputs:
  - 1-fold device: 4 (3+1)
  - 2-fold device: 8 (2 x 3 + 2 x 1)
  - Rated current per output: 6 AX (250/440 V AC)
  - Max. power consumption of device: 1.5 W (1-fold), 2 W (2-fold)
  - Switching capacity:
    - To IEC/EN 60 947-4-1: 6 A/AC3
    - To IEC/EN 60 669: 6 AX
    - Max. capacitive load: 140 µF
    - Max. peak inrush current (150 µs): 400 A
- Connection:
  - Screw terminals with universal head screw
  - KNX: Screwless bus connection terminal
- Load circuit: For 0.2…6.0 mm² cables
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 or 6 modules at 18 mm
- Manufacturer: ABB
- Product type (dependent on number of channels): FCL/S 1.6.1.1, FCL/S 2.6.1.1

5.7. Fan Coil Actuator PWM

- Fan Coil Actuator for the usage with KNX bus. It controls via toggle switch and switch control up to three fan speeds. The fan speeds are locked against each other. With electronic outputs, the actuator controls 2 electromotor or 4 electrothermal valves for cooling and heating circuit loops. A further potential-free output is available, e.g. for an additional electrical heater. Furthermore, 3 inputs are available, for contactable temperature sensors or potential-free contacts.
- Manual operation:
    - All contacts, inputs and outputs can be operated manually.
- Commissioning without KNX:
    - Manual operation is optionally possible by connecting an auxiliary voltage to the bus connection terminal (separate KNX device).
- Fan speeds: 3, locked against each other
    - Nominal current: 6 A
- Valve outputs: 4
    - Electronic: 0.5 A
- Additional contact: 1
    - Nominal current: 20 AX (16 A C-Load, AC3)
- Inputs: 3
- Connection:
    - Screw terminal with combination head screws
    - Torque: Max. 0.6 Nm
    - KNX: Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 6 modules at 18 mm
- Manufacturer: ABB
- Product type: FCA/S 1.1.1.2 (without manual operation), FCA/S 1.1.2.2 (with manual operation)

5.8. Fan Coil Actuator 0-10V

- Fan Coil Actuator for the usage with KNX bus. It controls via toggle switch and switch control up to three fan speeds. The fan speeds are locked against each other. With analog outputs, the actuator controls 2 motor-driven valves for cooling and heating circuits loops. A further potential-free output is available, e.g. for an additional electrical heater. Furthermore, 3 inputs are available, for contactable temperature sensors or potential-free contacts.
- Manual operation:
    - All contacts, inputs and outputs can be operated manually.
- Commissioning without KNX:
    - Manual operation is optionally possible by connecting an auxiliary voltage to the bus connection terminal (separate KNX device)
- Fan speeds: 3, locked against each other
    - Nominal current: 6 A
- Valve outputs: 2
    - Analog: 0…10 V
- Additional contact: 1
    - Nominal current: 20 AX (16 A C-Load, AC3)
- Input: 3
- Connection:
    - Screw terminal with combination head screws
    - Torque: Max. 0.6 Nm
    - KNX: Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 6 modules at 18 mm
- Manufacturer: ABB
- Product type: FCA/S 1.2.1.2 (without manual operation), FCA/S 1.2.2.2 (with manual operation)

6. Control Devices – Curtain and Blind Control

6.1. Blind/Curtain/Shutter Control Actuator with Travel Detection and Manual Operation

- To control up to 2/4/8 independent blind and roller shutter drives or ventilation flaps (230 V AC)
  - Automatic travel detection via identification of end positions for each channel
  - Manual operation and displaying LEDs for each channel
  - Mutually mechanically interlocked outputs
  - Power supply only via KNX bus voltage
- Software functionality:
  - Copy and change channels
  - Time-delayed switching of drives
  - Sending and switching delay after bus voltage recovery
  - Request status values via object
  - Limited number of telegrams
  - Preferred position on bus voltage failure, recovery, programming and reset
  - Disable/enable manual operation, deactivation by time
  - Travel detection (automatically or triggered by object) or manual setting of travel times
  - Safety function (3 x wind alarm, rain alarm, frost alarm with cyclical monitoring, block and forced operation) and reaction on reset of safety function
  - Direct commands available for UP/DOWN, STOP/Slat Adjustment
  - Move to position height/slat 0…255
  - Move to/set preset position 1…4 and 8-bit scene
  - Dead times of blind/shutter adjustable
  - Tensioning function available (for awning and flap adjustment)
  - Limited travel range (adjustable for direct and/or automatic commands)
  - Change on direction and delay times for drives adjustable
  - Automatic sun protection (position height/slat at sun) and sun tracking
  - Heating/cooling automatic with overheat control
  - Status messages: Height/slat 0…255, upper/lower end position, operability, automatic, status information (2-byte, including motor error), controlling ventilation flaps, switch mode with staircase lighting function
- Outputs: 2/4/8 (2 relay outputs UP/DOWN for each channel)
- Power consumption: < 250 mW
- Operating voltage: 21…30 V DC
- U_N rated voltage: Max. 230 V AC, 45…65 Hz
- I_N rated current: Max. 6 A
- Operating and displaying elements: 2 LEDs and push-buttons for each channel
- Connection:
  - Outputs: Screw terminals (combination heads)
  - KNX: Screwless bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 or 8 modules at 18 mm
- Manufacturer: ABB
- Product type (dependent on number of channels): JRA/S 2.230.5.1, JRA/S 4.230.5.1, JRA/S 8.230.5.1

6.2. KNX Weather System

- A weather system shall comprise of 2 units:
    - Weather Sensor: The Weather Sensor is used with the Weather Unit installed in KNX systems. The Weather Sensor allows the measurement of wind, brightness in three directions, rain incl. heating, temperatures, GPS-based date and time. The integrated power supply of the Weather Unit directly supplies power to the Weather Sensor.
    - Weather Unit: The Weather Sensor is connected to the Weather Unit. The Weather Unit collects and elaborates data from the Weather Sensor. The Weather Sensor provides data on wind speed, brightness in three directions, twilight, rain, temperature, as well as information about day/night, date and time. The Weather Sensor is directly supplied with power through the integrated power supply. A temperature sensor, type PT1000 is connectable.
- The Weather Unit and the Weather Sensor are synchronized. An additional heat transformer is not required.
- Blinds and sunblinds (awnings) can be retracted in the event of strong wind, or skylights and fanlights can be closed when it starts to rain.
- Functions of the application program:
    - The weather system is time-synchronized, with options for summer/winter schedules.
    - The Weather Sensor records wind velocity (0...24.0 m/s), rain and brightness in three directions (left, right and center), (0...999 Lux), twilight, temperatures (-30...+ 50 °C), date and time (GPS radio receiver). It only functions in combination with the Weather Unit.
    - Measured value for the unit: Adjustable as 1-bit values or 2-byte values depending on the type
    - Threshold: 2 per sensor, each with upper and lower limit
    - Logical functions: AND/OR, inversion, each with 4 inputs
    - Memory: 4 memories, 24 values per memory can be stored according to FiFo principle
- Weather Sensor:
    - Connection:
        - 1, 2 power supply: 2-pole, 1 plug-in terminals each for solid conductors 0.4 to 1.5 mm Ø, color: black
        - A, B data communication: 2-pole, 4 plug-in terminals each for solid conductors 0.6 to 0.8 mm Ø, color: white/yellow
    - Type of protection: IP 44, IEC/EN 60 529
    - Mounting: Wall mounted
    - Dimensions (H x W x D): 109 mm x 121 mm x 227 mm
    - Manufacturer: ABB
    - Product type: WES/A 3.1
- Weather Unit:
    - Power supply: 85...265 V AC, 50/60 Hz, 110…240 V DC
    - Output: Voltage supply, data communication
    - Input: Temperature sensor (PT1000)
    - Connection: Screw terminals
    - Tightening torque: Max. 0.6 Nm
    - KNX: Bus connection terminal
    - Type of protection: IP 20, IEC/EN 60 529
    - Mounting: 35 mm mounting rail, IEC/EN 60 715
    - Width: 4 modules at 18 mm
    - Manufacturer: ABB
    - Product type: WZ/S 1.3.1.2

6.3. KNX Weather Station

- The Weather Station allows the detection and processing of four output signals. All conventional sensors, e.g. wind velocity sensor, wind direction sensor, rain sensor, rainfall sensor, brightness sensor, pyranometer (light intensity), twilight sensor, air pressure sensor, humidity sensor and temperature sensor, can be connected. An integrated power supply unit provides the sensors with 24 V DC voltage.
- Functions of the application program:
  - Sensor output: Freely adjustable sensor output signals
  - Measured value: Can be represented as 1-bit, 1-byte, 2-byte or 4-byte value
  - Filtering: Generation of average via 4/16/64 measurements
  - Threshold value: 2 per input, each with upper and lower limit
  - Calculation: Comparison/arithmetic functions, generation of average
  - Logic functions: AND/OR, inversion, each with 4 inputs
- Mains voltage: 85...265 V AC, 50/60 Hz
- Inputs:
  - 4 sensor signals in accordance with IEC/EN 60 381
  - Connection of sensor output signals: 0…1 V, 0…5 V, 0…10 V, 1…10 V, 0…20 mA, 4…20 mA, 0…1,000 ohm, PT100, PT1000, KT/KTY, user-defined input and floating contact
- Output:
  - 1 auxiliary voltage output to supply the sensors
  - Nominal voltage: 24 V DC
  - Nominal current: 300 mA, over the entire mains voltage
- Connection:
  - Screw terminals
  - Bus connection: Via bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 modules at 18 mm
- Manufacturer: ABB
- Product type: WS/S 4.1.1.2

6.4. Shutter Control Unit

- The shutter control unit controls shutter actuators with dazzle protection and daylight control functions via the KNX. The sun’s position is constantly calculated and updated and then logically combined with a threshold value for the sun’s intensity, so that the venetian blind is only moved into the calculated position if the sun is really shining. The shadow effect of shade generators (e.g. buildings opposite) is taken into account. Up to 200 windows or window groups can be activated individually.
- Connection: Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 2 modules at 18 mm
- Manufacturer: ABB
- Product type (dependent on number of channels): JSB/S 1.1

7. Control Devices – Security System Components

7.1. KNX Security Panel

- The KNX Security Panel is used to manage up to 5 logical areas with up to 344 detector groups, of which 8 detector groups are integrated. Via the security bus S-Bus 1 zone modules, motion detectors and setting devices can be directly connected. The number of detector groups via the security bus S-Bus 1 is dependent on the current requirement (max. 800 mA) of the connected system components, cable length and cross-section. The security bus S-Bus 3 allows the connection for up to 5 keypads of the BT/A series. The KNX interface is used to exchange information of the whole system and allows operations via the KNX. An additional 128 detector groups can be integrated via KNX.
  The commissioning of the KNX is done via the ETS software. The network connection is used for parameterization, operation and display via the existing web server. The panel possesses 4 outputs for signal encoders and 4 outputs for potential-free switching (12...24 V DC/AC). The integrated modem is used for private remote alarms using spoken messages, text messages (SMS center) and e-mail. In addition, a system interface (ATS) allows the connection of an external ABB transmission device of the comXline series, for connection to a security company. It is possible to connect 2 x 18 Ah rechargeable batteries as critical power for up to 60 hours, in accordance with VdS, IEC/EN and ISO/IEC.
  The device can be used in systems with increased security requirements according to VdS Class A, B and C, DIN VDE 0833 Level 1, 2 and 3 and IEC/EN 50 131/IEC 62 642 Level 1, 2 and 3.
- Functions:
  - Connection of bus compatible zone modules, motion detectors and 8 entrance doors via SafeKey setting devices incl. 1,000 events each door via the security bus (S-Bus 1)
  - Connection of max. 5 keypads via the security bus (S-Bus 3)
  - Internal, external and delayed setting optional via SafeKey setting device, keypad, web interface or KNX
  - Freely programmable input function for connection of security sensors (door/window contacts, magnetic reed contacts, technical sensors, hold-up detectors and tamper contacts)
  - Freely selectable monitoring of the sensors (N/C contacts, N/O contacts with/without end of line resistor, setting input with tamper detection, N/C contacts with alarm and tamper detection)
  - 20 disable groups for detector groups switchable via keypad, web interface and KNX
  - Different alarm types (Intrusion, hold-up, tamper alarm and 2 different technical alarms)
  - Freely programmable relay outputs
  - 128 KNX detector groups
  - Each detector group as 1-bit state information via KNX
  - Alarms, system state as 1-bit state information via KNX
  - 14-byte text messages via KNX (system state, alarms, triggered detector groups)
  - 10,000 events via web interface available and exportable as CSV file
  - Connectable ABB system components: Keypad, Zone Module, Motion Detector, Magnetic Reed Contact, Lock Bolt Switching Contact, Glass Break Sensor, Panic Detector, Water Detector, Setting Device

- Technical data:
  - Mains supply: 85…265 V AC, 50/60 Hz
  - Output voltage: 13.2 V DC ± 0.5
  - Power consumption: Max. 51 W
  - Power loss: Max. 9 W
  - Critical power (rechargeable battery): 2 x 18 Ah from type SAK17
  - KNX bus voltage (KNX): 21...31 V DC
  - Input numbers (detector groups): 8 on-board
    - Open-circuit voltage: 13 V DC
    - Short-circuit current: 6 mA
    - Line resistance: Max. 200 Ohm
    - Cable length: Max. 500 m
  - Number of outputs (12 V DC): 1
    - Output voltage: 13.2 V DC ± 0.5
    - Output current: 400 mA
    - Short-circuit current: 425 mA
  - Number of outputs (relay): 4
    - Type: Bistable relays
    - Rated current: Max. 2 A
    - Rated voltage: 12…24 V DC
  - Number of outputs (signalling devices): 4
    - Output voltage:13.2 V DC + 0.5
    - Output current: Each 350 mA (siren 1, siren 2, strobe), 50 mA (internal siren)
    - Short-circuit current: Each 375 mA (siren 1, siren 2, strobe), 55 mA (internal siren)
  - PSTN: 1
    - Type: analog
  - S-Bus 1 (system components): 1
    - Output voltage: 13.2 V DC ± 0.5
    - Output current: 800 mA
    - Short-circuit current: 850 mA
  - S-Bus 3 (keypads): 1
    - Output voltage: 13.2 V DC ± 0.5
    - Output current: 300 mA
    - Short-circuit current: 325 mA
    - End of line resistor: 120 Ohm
  - Ethernet (LAN): 1
    - Type: 10/100 BaseT, IEEE 802.3
    - Terminal: RJ-45

  - ATS-Bus: 1
    - Output voltage: 13.2 V DC ± 0.5
    - Output current: 125 mA
    - Short-circuit current: 290 mA
  - Connection type: Screw plug terminals
    - Connecting capacity: 0.2…2.5 mm² rigid/flexible
    - Multi-wire connecting capacity: 0.2…1 mm² rigid, 0.2…1.5 mm² flexible
    - Tightening torque: Max. 0.6 Nm
- Type of protection: IP 30, IEC/EN 60 529
- Dimensions (H x W x D): 466.5 mm x 427 mm x 112.5 mm
- Weight: 9 kg
- Housing, color: Sheet steel, RAL 9016 (traffic white)
- Manufacturer: ABB
- Product type: GM/A 8.1

8. Control Devices – Operation

8.1. Multi-Function Control Element with Rockers

- For transmitting switching, push-button, value, dimming and blind commands to a KNX actuator
- Support of KNX functions through innovative LED-color concept (yellow = lighting, blue = blind, orange = RTC, magenta = scene and white = neutral/no function assigned) or standard illumination red/green
- Color and function of the LEDs can be changed via ETS.
- Removal protection is possible with screw-on installation.
- With a maximum of 10 logic channels (logic gate, time delay, sequences, etc.). The logic functions of the channel can be freely selected.
- The following functions are provided for the application module:
- Connection:
    - Inputs: LED
    - Outputs: Switching, Dimming, Blinds, Value, Push-button, Light scene extension unit, Step switch, Short/long operation, RTC operating mode switchover, Push-button switching, Push-button dimming, Push-button blind, Push-button value sender, Push-button step-type switch, Push-button multiple functions (max. 5 channels), Push-button value sender, 2 objects, Light scene actuator, Sequence actuator, Staircase lighting, Delay, Preset, Cyclical telegram, Flashing, Logics (AND, OR, XOR, XNOR, NAND, NOR), GATE, Min/max value transducers, Set value/hysteresis, PWM inverter, Priority
- Control element:
    - Power supply: 10-pole multi-point connector
    - Control element: Rocker switch left/right
    - Display elements: Two LED per rocker via separate communication object for status (Red/Green/OFF) or orientation light
    - Type of protection: IP 20, IEC/EN 60 529
    - Temperature range: -5 °C to 45 °C
    - Dimensions (L x W x D): 63 mm x 63 mm
    - Manufacturer: ABB
    - Product type (dependent on number of rockers): 6125/02, 6126/02, 6127/02
- Bus coupler:
    - For combining the installation bus KNX and the different application modules
    - For installation in surface-mounted or flush-mounted boxes
    - Connection:
        - KNX line: Bus connection terminal
    - Rated voltage: 24 V
    - Outputs:
        - Rated current: 24 mA
    - Type of protection: IP 20, IEC/EN 60 529
    - Temperature range: -5 °C to 45 °C
    - Dimensions (L x W x D): 50 mm x 45 mm x 23 mm
    - Manufacturer: ABB
    - Product type: 6120/12

8.2. Multi-Function Control Element with Push-Buttons

- The following functions are provided for the application module:
- Inputs: LED
- Outputs: Switching, Dimming, Blinds, Value, Push-button, Light scene extension unit, Step switch, Short/long operation, RTC operating mode switchover, Push-button switching, Push-button dimming, Push-button blind, Push-button value sender, Push-button step-type switch, Push-button multiple functions (max. 5 channels), Push-button value sender, 2 objects, Light scene actuator, Sequence actuator, Staircase lighting, Delay, Preset, Cyclical telegram, Flashing, Logics (AND, OR, XOR, XNOR, NAND, NOR), GATE, Min/max value transducers, Set value/hysteresis, PWM inverter, Priority
- Connection:
    - Power supply: 10-pole multi-point connector
- Control element: Switch contacts
- Display elements: LED to indicate the function
- Type of protection: IP 20, IEC/EN 60 529
- Temperature range: -5 °C to 45 °C
- Dimensions (L x W x D): 53 mm x 44 mm
- Manufacturer: ABB
- Product type (dependent on number of push-buttons): 6125/20, 6126/20, 6127/20

8.3. TFT Color Display with Rotary or 3-fold Control Element

- Color display with rotary control element:
  - Backlit color display with 320 x 240 pixels
  - For display and operation of up to 120 KNX functions and display of the KNX color concept
  - Device can be commissioned via micro SD card or via bus
  - Can be combined with power bus/mains adapter
  - Outputs: Switching, Dimming, Blinds, Value, Push-button, Light scene extension unit, Step switch, Short/long operation, RTC operating mode switchover, Push-button switching, Push-button dimming, Push-button blind, Push-button value sender, Push-button step-type switch, Push-button multiple functions (max. 5 channels), Push-button value sender, 2 objects
  - Connection:
    - Power supply: Integrated pressure contacts
  - Control element: Freely programmable control panels
  - Display elements: TFT Display
  - Type of protection: IP 20, IEC/EN 60 529
  - Temperature range: -5 °C to 45 °C
  - Dimensions (L x W x D): 142 mm x 106.6 mm x 11 mm
  - Manufacturer: ABB
  - Product type: 6344
- 3-fold control element:
  - Control element with three replaceable backlit marking symbols for 1-fold, 2-fold and 3-fold carrier for displaying the KNX color concept with integrated logic function
  - The following functions are provided for the application module:
    - Inputs: LED
    - Outputs: Switching, Dimming, Blinds, Value, Push-button, Light scene extension unit, Step switch, Short/long operation, RTC operating mode switchover, Push-button switching, Push-button dimming, Push-button blind, Push-button value sender, Push-button step-type switch, Push-button multiple functions (max. 5 channels), Push-button value sender, 2 objects
  - Connection:
    - Power supply: Integrated pressure contacts
  - Temperature range: -5 °C to 45 °C
  - Dimensions (L x W x D): 71 mm x 106.6 mm x 11 mm
  - Manufacturer: ABB
  - Product type: 6342

8.4. Touch Screen Device

- Programmable IP/KNX touch display for room comprehensive control, infotainment and entertainment centre
- With a closed capacitative glass surface and a design strip made of stainless steel (brushed)
- With integrated camera
- Easy control using intuitive navigation concept
- House control: Switching, dimming, blinds, RTC, scene/sequences, timed controls
- Entertainment: Multimedia, remote control RC5 and B&O
- Infotainment: IP telephony, RSS reader, intercom with picture, e-mail, voice and graphic memo, consumption data monitoring
- Door communication: Indoor station for the ABB Welcome system in combination with IP Gateway 83341.
- Safety: Video surveillance with IP cameras, alarm function, message function, presence simulation
- Representation from individual floor plans, room images and operation pages
- 23 cm (9") (or 31 cm/12.1”) touch display with 800 x 480 pixels (or 1,280 x 800 pixels)
- Maintenance via remote control over IP
- Control with smartphones and tablets via the ComfortTouch App (Apple iOS /Google Android from Version 4)
- Connection:
    - Inputs: RJ 45 (LAN)
- Control element: Freely programmable touch surfaces
- Display elements: Capacitive touchdisplay 480 x 800 pixel
- Type of protection: IP 20, IEC/EN 60 529
- Temperature range: 0 °C to 45 °C
- Dimensions (L x W x D): 210 mm x 315 mm x 29 mm (or 270 mm x 400 mm x 29 mm)
- Position for installation: Horizontal
- Mounting depth: 60 mm
- Manufacturer: ABB
- Product type (dependent on display size): 8136/09, 8136/12

8.5. Universal Interface

- The device has 2/4/12 channels that can be parameterized as inputs or outputs. It is possible to connect conventional push-buttons, floating contacts or LEDs. The scanning voltage for the contacts and the supply voltage for the LEDs are provided by the device. Series resistors for external LEDs are integrated into the device. The Universal Interface is a flush-mounted device and a low cost solution designed in such a way to fit inside conventional electrical back boxes.
- The following functions can be set for each channel separately:
    - Switching and dimming of lighting
    - Operation of blinds and roller shutters
    - Sending of arbitrary values, e.g. temperature values
    - Control and storing of light scenes
    - Triggering an electronic relay for control of electrothermal valve drive for heating valves
    - Control/flashing of an LED for feedback of an operation
    - Operation of different loads by multiple push-button actions
    - Operation of several loads in a fixed switching sequence
    - Reading out of technical contacts (e.g. relays)
- Input:
    - Scanning voltage: 20 V pulses
    - Input current: 0.5 mA
- Output:
    - Output voltage: 3.3 V DC
    - Output current: Max. 2 mA, limited by series resistor
- Connection:
    - Inputs/Outputs:
        - 4 cables approx. 30 cm long (for 2-fold)
        - 6 cables approx. 30 cm long (for 4-fold)
        - 18 cables approx. 30 cm long (for 12-fold)
        - Each cable can be extended to a maximum of 10 m
    - Bus connection:
        - Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: Flush-mounted, combined wall and joint box, 60 mm
- Manufacturer: ABB
- Product type (dependent on number of channels): US/U 2.2, US/U 4.2, US/U 12.2

8.6. Presence Detector

- With integrated bus coupler
- Targeted for connection and disconnection of light bands depending on the room brightness
- Applicable as presence or movement detector
- Control also possible depending on movement
- Constant light switch with up to 2 independet channels
- Constant light switch with max. 2 outputs for brightness-dependent switching of two light bands in the room
- Detector operation with 2 power off stages
- Detector operation with integrated monitoring function
- Configurable as master or slave
- Configurable operating modes: Automatic, automatic activation or deactivation
- Activation text can be changed using an external communication object
- Switch-off delay can be changed using an external communication object
- Ceiling mounting in false ceilings with spring clamps or in solid ceilings in surface-mounting boxes 6131/29-xxx(-500)
- 4 PIR sensors, integrated brightness sensor
- The device can be updated through the bus
- The presence detector is not suited for alarm indications in VdS-compliant alarm systems.
- Detection range (for mounting height 2.5 m, 3 m and 4 m): circular
    - Seated persons Ø: Max. 5 m (8 m), max. 6.5 m (10 m), and max. 9 m (14 m)
    - Walking persons Ø: Max. 6.5 m (10 m), max. 8 m (12 m), and max. 10.5 m (16 m)
- Visible height: 16 mm (23 mm)
- Inputs: External brightness sensor, external movement
- Outputs: Movement detector, constant light switch
- Power supply: Via KNX
  KNX line: Bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Temperature range: -5 °C to 45 °C
- Brightness limit value: 1…1,000 Lux
- Dimensions (L x W x D): 80 mm x 80 mm x 45 mm (91 mm x 91 mm x 45 mm)
- Mounting depth: 29 mm (22 mm)
- Mounting height: 2…4 m
- Manufacturer: ABB
- Product type: 6131/20, 6131/30

8.7. KNX Movement Detector Sensor, Comfort 180°

- For the automatic transmission of switch-on or switch-off commands depending on movement and brightness
- Parallel operation of several movement detectors possible
- With message function and twilight switch function via KNX
- Twilight sensor and delay time adjustable per ETS or potentiometer on the device
- Surveillance density: 18 sectors with 72 switching segments
- With integrated selector switch for ON/AUTOMATIC/OFF (lockable)
- The following functions are provided for the application module:
    - Outputs: Switching, Value, Light scene actuator, Sequence actuator, Staircase lighting, Delay, Preset, Cyclical telegram, Flashing, Logics (AND, OR, XOR, XNOR, NAND, NOR), GATE, Min/max value transducers, Set value/hysteresis, PWM inverter, Priority
- Connection:
    - Power supply: 10-pole multi-point connector
- Control element: Sliding switch for manual operation ON/AUTOMATIC/OFF (lockable)
- Type of protection: IP 20, IEC/EN 60 529
- Temperature range: -5 °C to 45 °C
- Detection range: Frontal: 15 m; Lateral: 5 m
- Brightness limit value: 5 Lux - Up to daytime operation
- Detection angle: 180 °
- Dimensions (L x W x D): 63 mm x 63 mm x 28 mm
- Position for installation: Vertical
- Mounting height: 0.8…1.2 m, alternative: 2.5 m
- Manufacturer: ABB
- Product type: 6122/02

8.8. Outdoor Video Station

- For flush- and surface-mounting
- Video camera with automatic day/night switchover and infrared LEDs to illuminate the night shots
- Vertical/horizontal detection angle: 86°/67°
- Setting angle horizontal/vertical: +/-15°, mechanically adjustable
- Communication unit and key module are backlit
- Front plate made of 3 mm stainless steel, surface is brushed or white coated
- Type of protection: IP 44, IEC/EN 60 529
- Temperature range: -25 °C to 55 °C
- Dimensions (L x W x D): 277 mm x 135 mm x 43 mm (349 mm x 135 mm x 43 mm)
- Manufacturer: ABB
- Product type (dependent on number of units): 83121, 083122

8.9. Indoor Video Station

- For surface-mounting
- Display size: 17.8 cm (7")
- Display resolution: 800 x 480
- Display of the video image of the outdoor station. During the conversation a picture of the visitor can be taken and stored in the picture memory.
- For door calls during absence, three pictures of the visitor are automatically stored in the picture memory.
- Hands-free function, hands-free volume is adjustable.
- Different bell sounds are adjustable for door and floor ringing; five polyphone bell sounds are available.
- Volume of bell sounds is adjustable.
- SD card slot for extension of the picture memory
- Quick-access buttons for door openers, mute function and light
- Type of protection: IP 30, IEC/EN 60 529
- Temperature range: -5 °C to 40 °C
- Dimensions (L x W x D): 155 mm x 218 mm x 29 mm
- Manufacturer: ABB
- Product type: 83220 AP

9. Control Devices – Metering and Load Management

9.1. Meter Interface Module

- This device receives data and values from energy meters and converts them into system telegrams used for visualization, energy monitoring, billing, cost allocation and optimization. Suitable for ABB Electricity Meters of A/B series.
- Application areas: This device is a comfortable and economic energy management device, and can thus be part of green building solutions. No separate approvals required for installation and usage.
- Functions of the application program:
    - IR communication is automatically established by supplying bus voltage
    - Send/reset power fail counter and switch tariff via bus
    - Status byte available for: Internal or hardware error, IR communication error, no voltage or overvoltage, current out of specification, negative power, installation error or end value for active/reactive register is reached
    - Energy values import: Active energy, Reactive energy, Active energy tariff 1…4, Total Reactive energy tariff 1…4, Total Active energy resettable energy register (OD1365)
    - Energy values export: Active energy, Reactive energy, Active energy tariff 1…4, Total
    - Reactive energy tariff 1…4
    - Instrument values used:
        - Active, Reactive and Apparent Power (L1, L2, L3, Total)
        - Voltage (L1-N, L2-N, L3-N) and (L1-L2, L2-L3, L1-L3)
        - Current (L1, L2, L3, N) , Quadrant andFrequency
        - Power factor, Phase Angle Power and Voltage, Phase Angle Current (L1, L2, L3, Total)
        - Other values used: Transformer ratio (CT and VT), Power fail counter, Tariffs Status information
- Power supply: 21…30 V DC via bus
- Connection:
    - Bus connection: Bus connecting terminal
    - Interface: Infrared port
- Display: LEDs for status and telegrams
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 2 modules at 18 mm
- Manufacturer: ABB
- Product type: ZS/S 1.1

9.2. Energy Actuator

- Switch Actuator that records the energy consumption of the connected electrical load (Main Meters and Intermediate Meters available). Consumption per output and total consumption. Measures active power, current, voltage, apparent power, power factor, crest factor and frequency. Outputs can be switched depending on thresholds, meter readings and time. All values are available on KNX. Uses potential-free contacts to independently switch 3 electrical loads via KNX. Manual operation and display of the switching status. Especially suitable for switching of loads with high surge current, such as lighting with compensatory capacitor or fluorescent lighting loads according to IEC/EN 60 669.
- Software (ABB i-bus® Tool) is available for diagnostic purposes (commissioning) and is used to display the measured values and the status objects.
- Additional functions:
  - Load Control (Master/Slave system)
  - Time functions, on/off delay
  - Staircase lighting with preliminary warning and changeable duration
  - Recall scenes over 8-bit commands
  - Logical functions AND, OR, XOR, GATE
  - Forced operation and safety functions
  - Reaction to threshold values
  - Selection of default position on bus voltage failure and recovery
  - The parameterization of single outputs can be exchanged or copied
- Outputs: 3 potential-free floating contacts
  - Rated voltage: 250/440 V AC (50/60 Hz)
  - Rated current: 16/20 AX - C-Load
  - Switching capacity
    - According to IEC/EN 60 947-4-1: 16/20 A/AC1; 16 A/AC3 (at 230/400 V AC)
    - According to IEC/EN 60 669: 16/20 AX, max. capacitive load 200 µF
- Active consumption/Active Power:
  - Measuring range: 5.7 W…4,600 W (U_N = 230 V)
  - Measuring range: 2.8 W…2,300 W (U_N = 115 V)
  - Accuracy (250…500 mA): ± 6 % measuring value
  - Accuracy (500 mA…5 A): ± 3 % measuring value
  - Accuracy (5 A…20 A): ± 2 % measuring value
  - Starting current: 25 mA
- Current:
  - Measuring range (AC): 0.025…20 A
  - Accuracy: ± 1 % of actual value and ± 10 mA
- Voltage:
  - Measuring range (AC): 95…265 V
  - Accuracy: ± 1 % of actual value
- Frequency:
  - Measuring range: 45…65 Hz
  - Accuracy: ± 1 % of actual value

- Operation: 2 actuating levers for displaying the switch position and manual operation
- Connection: Screw terminals with combination head screws
    - Load side: For lines 0.2 to 6.0 mm² unifilar
    - KNX: Screwless bus connector
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 Modules at 18 mm
- Manufacturer: ABB
- Type: SE/S 3.16.1

9.3. Energy Module

- KNX device with recording of the energy consumption (Watt hours) in the end circuit (main and intermediate meter). Consumption per phase and total. Detection of current, voltage, active power, apparent power, crest factor, power factor and frequency. Reaction (warning message) to thresholds, meter readings and time. All values can be transferred to KNX. Load control (master functionality). No switching functionality available.
- The parameterization of individual inputs can be exchanged or copied into other inputs.
- Software (ABB i-bus® Tool) is available for diagnostic purposes (commissioning) and is used to display the measured values and the status objects.
- Inputs: 3 floating contacts
- Rated voltage: 250/440 V AC (50/60 Hz)
- Rated current: 16/20 A
- Measuring range:
  - Active consumption/active power:
    - 5.7 W…4,600 W (Un = 230 V)
    - 2.8 W…2,300 W (Un = 115 V)
  - Current (AC): 0.025…20 A
  - Voltage (AC): 95…265 V
  - Frequency: 45…65 Hz
- Accuracy:
  - Active consumption/active power (250…500 mA): ± 6 % of actual value
  - Active consumption/active power (500 mA… 5 A): ± 3 % of actual value
  - Active consumption/active power (5…20 A): ± 2 % of actual value
  - Current (0.025…20 A): ± 1 % of actual value and ± 10 mA
  - Voltage (95…265 V): ± 1 % of actual value
  - Frequency (45…65 Hz): ± 1 % of actual value
- Starting current: 25 mA
- Connection:
  - Load circuit:
    - Screw terminal with universal head screw
    - For 0.2 to 6.0 mm² single core conductors
  - KNX: Screwless bus connection terminal
- Type of protection: IP 20, IEC/EN 60 529
- Mounting: 35 mm mounting rail, IEC/EN 60 715
- Width: 4 modules at 18 mm
- Manufacturer: ABB
- Product type: EM/S 3.16.1

Order Number 2CDC500115N0202

Note:

The information in this Document contains best practice solutions to prescribe KNX installations in a specific application segment, but is of an exemplary nature only. The information may not represent the exact functional requirements with regard to specific local electrical installation requirements. Please note the Document also does not include the specification of legally required primary electrical protection devices i.e., circuit breakers, earth fault devices, etc., as these are highly dependent on national installation regulations.

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