# ABB i-bus® KNX
# Switch Actuator, x-fold, 16/20 A, MDRC
# SA/S x.16.6.1, 2CDG 110 1xx R0011



2CDC 071 006 S0010

**SA/S 8.16.6.1**

The 16/20 A Switch actuators SA/S x.16.6.1 are modular installation devices in Pro *M* Design for installation in the distribution board. The devices are especially suitable for switching loads with high peak inrush currents such as lighting equipment with compensation capacitors or fluorescent lamp loads (AX) to EN 60 669.

The Switch actuators feature one load current detection per output. The maximum load current per output is 20 A.

Manual actuation of the switch actuator is possible using a button. This simultaneously indicates the switching state.

The Switch actuators can switch up to 12 independent electrical loads via floating contacts. The maximum load current per output is 20 A. The connection of the outputs is implemented using universal head screw terminals.

Each output is controlled separately via the KNX.

Individual outputs can be copied or exchanged to reduce the programming effort withn the SA/S x.16.6.1 devices.

The device does not require an additional power supply and is ready for immediate use, after the bus voltage has been applied. The Switch actuators are parameterized via the ETS. The connection to the KNX is implemented using the bus connection terminal on the front.

## Technical data

| Supply | | | | | |
|---|---|---|---|---|---|
| | KNX bus voltage | 21...31 V DC | | | |
| | Current consumption via bus | < 12 mA | | | |
| | Power consumption via bus | Maximum 250 mW | | | |
| **Output nominal values** | SA/S type | 2.16.6.1 | 4.16.6.1 | 8.16.6.1 | 12.16.6.1 |
| | Current detection | yes | yes | yes | yes |
| | Number (floating contacts 2 per group) | 2 | 4 | 8 | 12 |
| | $U_n$ rated voltage | 250/440 V AC (50/60 Hz) | | | |
| | $I_n$ rated current | 16/20 AX, C-Load | | | |
| | Leakage loss per device at max. load 16 A | 2.0 W | 4.0 W | 8.0 W | 12.0 W |
| | Leakage loss per device at max. load 20 A | 3.0 W | 5.5 W | 11.0 W | 16.0 W |
| **Output switching current** | AC3[1] operation (cos φ = 0.45) EN 60 947-4-1 | 16 A/230 V AC | | | |
| | AC1[1] operation (cos φ = 0.8) EN 60 947-4-1 | 16/20 A/230 V AC | | | |
| | Fluorescent lighting load AX to EN 60 669-1 | 16/20 AX/250 V (200 µF) [2] | | | |
| | Minimum switching power | 100 mA/12 V AC 100 mA/24 V AC | | | |
| | DC current switching capacity (resistive load) | 20 A/24 V AC | | | |
| **Output service life** | Mechanical service life | > 10[6] | | | |
| | Electronic endurance to IEC 60 947-4-1 | | | | |
| | AC1[1] (240 V/cos φ = 0.8) | > 10[5] | | | |
| | AC3[1] (240 V/cos φ = 0.45) | > 3 x 10^{4} | | | |
| | AC5a[1] (240 V/cos φ = 0.45) | > 3 x 10^{4} | | | |

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| | | | | | |
|---|---|---|---|---|---|
| **Current detection (load current)** | Detection range (sine effective value) | 0.02…20 A | | | |
| | Accuracy | +/- 2 % of actual current value (sine) and +/- 20 mA | | | |
| | Frequency | 50/60 Hz | | | |
| | 2 byte representation (figure value, DTP 7.012) or 4 byte representation (floating value, DTP 14.019) | in mA | | | |
| | Measurement speed<br>- Low-pass filter transient response with τ<br>- Scanning frequency of the current value | 300 ms<br>320 ms | | | |
| **Output switching times** [3] | | 2.16.6.1 | 4.16.6.1 | 8.16.6.1 | 12.16.6.1 |
| | Maximum relay position change of output and minute if all relays are switched simultaneously.<br>The position changes should be distributed equally within the minute. | 30 | 15 | 7 | 5 |
| | Maximum relay position change per output and minute if only one relay is switched. | 60 | 60 | 60 | 60 |
| **Connections** | KNX | Via bus connection terminals 0.8 mm Ø, solid | | | |
| | Load current circuits (2 terminal per relay) | Universal head screw terminal (PZ 1)<br>0.2…4 mm² stranded, 2 x 0.2…2.5 mm²<br>0.2…6 mm² solid, 2 x 0.2…4 mm² | | | |
| | Ferrules without/with plastic sleeves | 0.25...2.5/4 mm² | | | |
| | TWIN ferrules | 0.5...2.5 mm²<br>Contact pin length min. 10 mm | | | |
| | Tightening torque | Maximum 0.6 Nm | | | |
| **Operating and display elements** | Programming button/LED | For assignment of the physical address | | | |
| | Switch position display | Relay operator | | | |
| **Enclosure** | IP 20 | To EN 60 529 | | | |
| **Safety class** | II | To EN 61 140 | | | |
| **Insulation category** | Overvoltage category | III to EN 60 664-1 | | | |
| | Pollution degree | 2 to EN 60 664-1 | | | |
| **KNX safety extra low voltage** | SELV 24 V DC | | | | |
| **Temperature range** | Operation | -5 °C…+45 °C | | | |
| | Storage | -25 °C…+55 °C | | | |
| | Transport | -25 °C…+70 °C | | | |
| **Ambient conditions** | Maximum air humidity | 95 %, no condensation allowed | | | |
| **Design** | Modular installation device (MDRC) | Modular installation device, Pro *M* | | | |
| | SA/S type | 2.16.6.1 | 4.16.6.1 | 8.16.6.1 | 12.16.6.1 |
| | Dimensions | 90 x W x 64.5 mm (H x W x D) | | | |
| | Width W in mm | 36 | 72 | 144 | 216 |
| | Mounting width in space units (modules at 18 mm) | 2 | 4 | 8 | 12 |
| | Mounting depth in mm | 64.5 | 64.5 | 64.5 | 64.5 |
| **Weight** | in kg | 0.2 | 0.34 | 0.64 | 0.75 |
| **Installation** | On 35 mm mounting rail | To EN 60 715 | | | |
| **Mounting position** | as required | | | | |
| **Housing/colour** | Plastic housing, grey | | | | |
| **Approvals** | KNX to EN 50 090-1, -2 | Certification | | | |
| **CE mark** | In accordance with the EMC guideline and low voltage guideline | | | | |

[1] Further information concerning electronic endurance to IEC 60 947-4-1 can be found at in the product manual: AC1, AC3, AX, C-Load specifications.

[2] The maximum peak inrush current may not be exceeded, see product manual: Lamp load output.

[3] The specifications apply only after the bus voltage has been applied to the device for at least 30 seconds. Typical delay of the relay is approx. 20 ms.

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**Output lamp load 16/20 A**

| Lamps | Incandescent lamp load | 3680 W | |
|---|---|---|---|
| **Fluorescent lamps T5/T8** | Uncorrected | 3680 W | |
| | Parallel compensated | 2500 W | |
| | DUO circuit | 3680 W | |
| **Low-voltage halogen lamps** | Inductive transformer | 2000 W | |
| | Electronic transformer | 2500 W | |
| | Halogen lamps 230 V | 3680 W | |
| **Dulux lamps** | Uncorrected | 3680 W | |
| | Parallel compensated | 3000 W | |
| **Marcury-vapour lamps** | Uncorrected | 3680 W | |
| | Parallel compensated | 3680 W | |
| **Switching capacity (switching contact)** | Maximum peak inrush current $I_p$ (150 µs) | 600 A | |
| | Maximum peak inrush current $I_p$ (250 µs) | 480 A | |
| | Maximum peak inrush current $I_p$ (600 µs) | 300 A | |
| **Number of electronic ballasts (T5/T8, single element)[1]** | 18 W (ABB EVG 1 x 18 CF) | 26[2] | |
| | 24 W (ABB EVG-T5 1 x 24 CY) | 26[2] | |
| | 36 W (ABB EVG 1 x 36 CF) | 22 | |
| | 58 W (ABB EVG 1 x 58 CF) | 12[2] | |
| | 80 W (Helvar EL 1 x 80 SC) | 10[2] | |

[1] For multiple element lamps or other types, the number of electronic ballasts must be determined using the peak inrush current of the electronic ballasts, see product manual: Ballast calculation.

[2] The number of ballasts is limited by the protection with B16 circuit-breakers.

| Device type | Application program | Max. number of communication objects | Max. number of group addresses | Max. number of associations |
|---|---|---|---|---|
| **SA/S 2.16.6.1** | Switch 2f 16CS/…* | 40 | 254 | 254 |
| **SA/S 4.16.6.1** | Switch 4f 16CS/…* | 76 | 254 | 254 |
| **SA/S 8.16.6.1** | Switch 8f 16CS/…* | 148 | 254 | 254 |
| **SA/S 12.16.6.1** | Switch 12f 16CS/…* | 220 | 254 | 254 |

* … = current version number of the application program. **Please observe the software information on our homepage for this purpose.**

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| **Note** |
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| For a detailed description of the application program see the "*Switch Actuator SA/S*" product manual. It is available free-of-charge at *www.abb.com/knx*. |
| The ETS and the current version of the device application program are required for programming. |
| The current application program is available for download on the internet at *www.abb.com/knx*. After import in the ETS, it is available in the ETS under *ABB/Output/Binary output xf 16CS/…* * (x = 2, 4, 8 or 12). |
| The device does not support the locking function of a KNX device in the ETS. If you inhibit access to all devices of the project with a *BCU code*, it has no effect on this device. Data can still be read and programmed. |

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| Important |
| --- |
| The Switch actuator types SA/S x.16.6.1 differentiate from the predecessor types SA/S x.16.5S by new hardware and software. While there have been few changes to the functions of the software, the hardware has been redesigned for load currents up to 20 A. Furthermore, the current detection has been optimised and its accuracy has been enhanced by a factor of four.<br><br>Existing projects can be converted to ensure operation with the new hardware / software.<br><br>For further information refer to the product manual: Conversion of previous application program versions.<br><br>For faster and simpler commissioning, it is also possible to copy the parameter settings of the outputs to others or to exchange them with another output.<br><br>For further information refer to the product manual: Copying and exchanging parameter settings. |

| Note |
| --- |
| Only load currents with a sine wave characteristic can be detected correctly. On other signal types, e.g. phase angle or inverse phase angle control signals, the detected current value is distorted. In this case, the measured value is meaningless.<br><br>Current values less than 20 mA are indicated as a 0 mA value on the KNX. For small load currents that are just above the minimum detection threshold of 20 mA, it is possible that a value of 0 mA is displayed due to the inaccuracies, even though a current is flowing.<br><br>Example: A current of 25 mA is flowing. The Switch Actuator detects 5 mA due to the tolerances. This value is less than the minimum current detection limit of 20 mA and is thus sent as a 0 mA value on the KNX. |

| Important |
| --- |
| The function current detection and monitoring should not be used for safety-relevant applications. The Switch actuator cannot assume the function of a circuit-breaker or RCD (earth-leakage circuit breaker).<br><br>If the load current detection is used for equipment fault detection that only causes a slight change of under 30 mA, mains voltage and current fluctuations due to ambient influences, e.g. temperature, natural ageing of the device or a non-sinusoidal current, play a significant role. Even when the current changes are detected by the Switch actuator, the detected current changes do not necessarily mean that a device has malfunctioned. |

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**Circuit diagram**

**SA/S x.16.6.1**
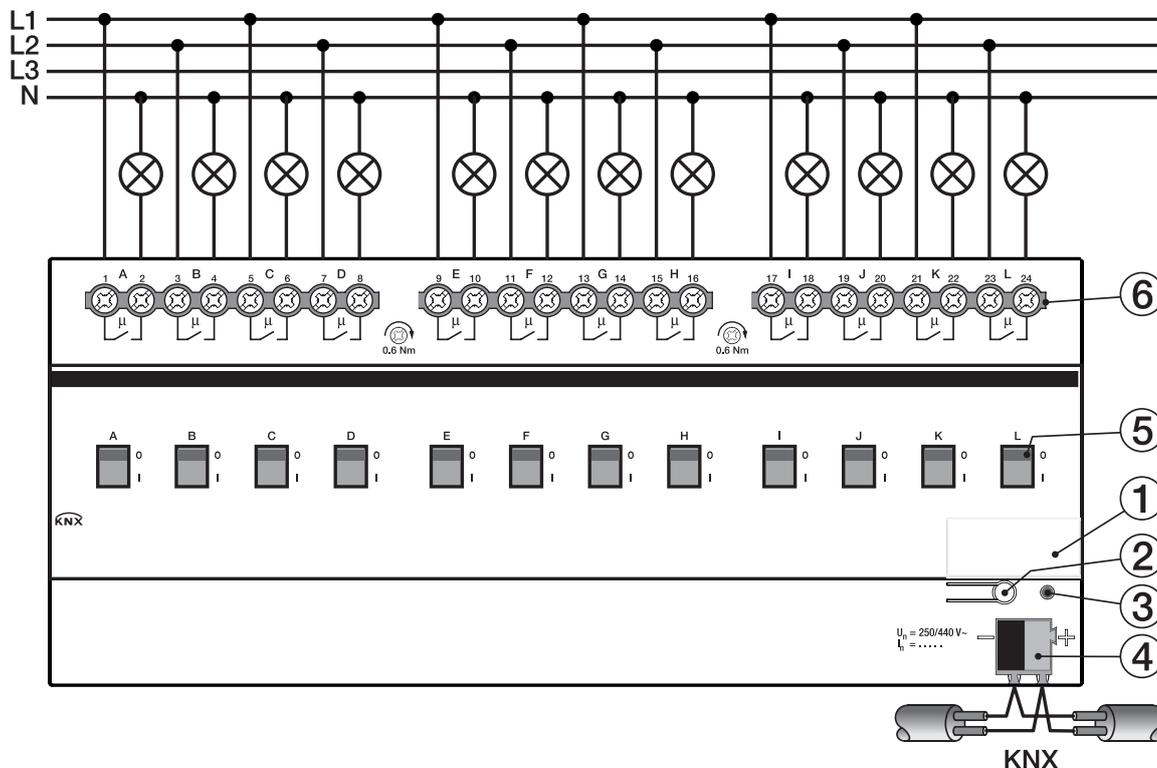


1 Label carrier
2 Button *Programming* ⬜○
3 LED *Programming* ● (red)
4 Bus connection terminal
5 Switch position display and manual operation
6 Load current circuits, for every 2 connection terminals

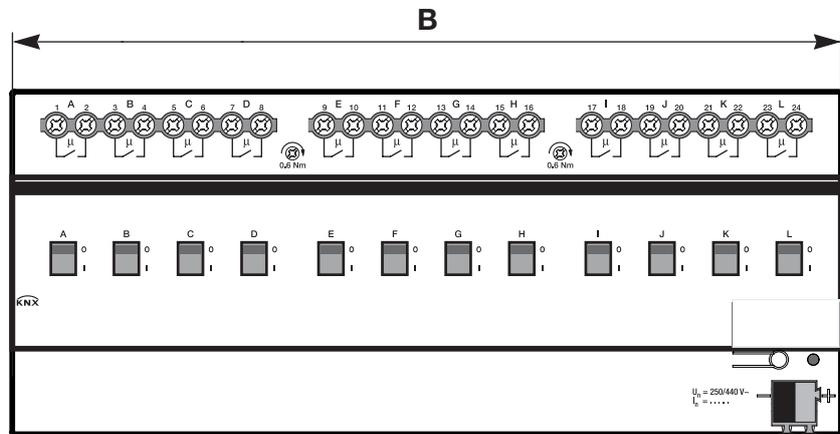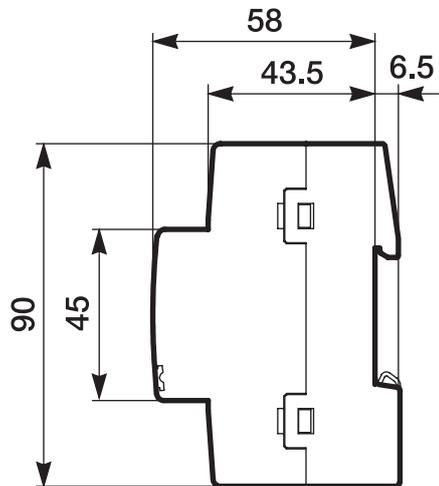| ⚠ ⚡ **Danger** |
|---|
| Touch voltages. |
| Danger of injury. |
| Observe all-pole disconnection. |

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**Dimension drawing**

SA/S x.16.6.1



2CDC 072 087 F0011

| | SA/S 2.16.6.1 | SA/S 4.16.6.1 | SA/S 8.16.6.1 | SA/S 12.16.6.1 |
|---|---|---|---|---|
| Width W | 36 mm | 72 mm | 144 mm | 216 mm |
| Mounting width (modules at 18 mm) | 2 space units | 4 space units | 8 space units | 12 space units |