ABB i-bus® KNX
Energy Actuator, 3F, 16/20 A, MDRC
SE/S 3.16.1, 2CDG 110 136 R0011

The Energy Actuator is a modular installation device in Pro M design for installation in the distribution board. The device is 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.

Manual operation is possible using a keypad on the device. This simultaneously indicates the switching state.

The Energy Actuator can switch up to 3 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.

The parameterization is undertaken via the ETS. The connection to the KNX is implemented using the bus connection terminal on the front.

### Technical data

<table>
<thead>
<tr>
<th>Supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus voltage</td>
<td>21…30 V DC</td>
</tr>
<tr>
<td>Current consumption via bus</td>
<td>&lt; 12 mA</td>
</tr>
<tr>
<td>Power consumption via bus</td>
<td>Maximum 250 mW</td>
</tr>
<tr>
<td>Power consumption on mains</td>
<td>≤ 0.7 W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated output value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of switch outputs (floating)</td>
<td>3</td>
</tr>
<tr>
<td>(U_n) rated voltage</td>
<td>250/440 V AC (50/60 Hz)</td>
</tr>
<tr>
<td>(I_n) rated current</td>
<td>16/20 AX, C-Load</td>
</tr>
<tr>
<td>Leakage loss per device at max. load 3 x 16 A</td>
<td>3.0 W</td>
</tr>
<tr>
<td>Leakage loss per device at max. load 3 x 20 A</td>
<td>4.2 W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switching current</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AC³ operation ((\cos \phi = 0.45)) to EN 60 947-4-1</td>
<td>16 A/230 V AC</td>
</tr>
<tr>
<td>AC¹ operation ((\cos \phi = 0.8)) to EN 60 947-4-1</td>
<td>16/20 A/230 V AC</td>
</tr>
<tr>
<td>C-Load switching capacity</td>
<td>20 A</td>
</tr>
<tr>
<td>Fluorescent lighting load to EN 60 669-1</td>
<td>16/20 AX/250 V AC (200 μF)</td>
</tr>
<tr>
<td>Minimum switching power</td>
<td>100 mA/12 V AC</td>
</tr>
<tr>
<td></td>
<td>100 mA/24 V AC</td>
</tr>
<tr>
<td>DC current switching capacity</td>
<td>20 A/24 V DC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relay service life</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical service life</td>
<td>&gt; 10⁶ switching operations</td>
</tr>
<tr>
<td>Electrical endurance to IEC 60 947-4-1</td>
<td>&gt; 10⁶ switching operations</td>
</tr>
<tr>
<td>AC¹ (240 V/(\cos \phi = 0.8))</td>
<td>&gt; 3 x 10⁶ switching operations</td>
</tr>
<tr>
<td>AC³ (240 V/(\cos \phi = 0.45))</td>
<td>&gt; 3 x 10⁶ switching operations</td>
</tr>
<tr>
<td>AC³a (240 V/(\cos \phi = 0.45))</td>
<td>&gt; 3 x 10⁶ switching operations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring range</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Active consumption/active power</td>
<td>5.7 W...4,600 W ((U_n = 230 V))</td>
</tr>
<tr>
<td></td>
<td>2.8 W...2,300 W ((U_n = 115 V))</td>
</tr>
<tr>
<td>Current (AC)</td>
<td>0.025…20 A</td>
</tr>
<tr>
<td>Voltage (AC)</td>
<td>95…265 V</td>
</tr>
<tr>
<td>Frequency</td>
<td>45…65 Hz</td>
</tr>
</tbody>
</table>
### Accuracy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active consumption/active power (250…500 mA)</td>
<td>± 6 % measuring value</td>
</tr>
<tr>
<td>Active consumption/active power (500 mA… 5 A)</td>
<td>± 3 % measuring value</td>
</tr>
<tr>
<td>Active consumption/active power (5…20 A)</td>
<td>± 2 % measuring value</td>
</tr>
<tr>
<td>Current (0.025…20 A)</td>
<td>± 1 % of actual value</td>
</tr>
<tr>
<td>Voltage (95…265 V)</td>
<td>± 1 % of actual value</td>
</tr>
<tr>
<td>Frequency (45…65 Hz)</td>
<td>± 1 % of actual value</td>
</tr>
</tbody>
</table>

### Starting current

- 25 mA

### Relay switching times

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum relay position changes per output per minute if all relays are switched simultaneously. The position changes should be distributed evenly over the minute.</td>
<td>15</td>
</tr>
<tr>
<td>Maximum relay position changes per output per minute if only one relay is switched.</td>
<td>60</td>
</tr>
</tbody>
</table>

### Connections

- **KNX**
  - Via bus connection terminals
  - 0.8 mm Ø, single core
- **Load current circuits (1 terminal per contact)**
  - Universal head screw terminal (PZ 1)
  - 0.2… 4 mm² stranded, 2 x 0.2…2.5 mm²
  - 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
  - Contact pin length min. 10 mm
- **Tightening torque**
  - Maximum 0.8 Nm

### Operating and display elements

- **Button/LED**
  - For assignment of the physical address
- **Switch position display**
  - Relay operating element

### Enclosure

- **IP 20**
  - To EN DIN EN 60 529

### Safety class

- **II, in the installed state**
  - To EN DIN EN 61 140

### Insulation category

- **Overvoltage category**
  - III to EN DIN EN 664-1
- **Pollution degree**
  - 2 to DIN EN 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**
  - 93 %, no condensation allowed

### Design

- **Modular installation device (MDRC)**
  - Pro M modular installation device
- **Dimensions**
  - 90 x 72 x 64.5 mm (H x B x T)
- **Mounting width in space units (modules at 18 mm)**
  - 4
- **Mounting depth in mm**
  - 64.5

### Weight

- **in kg**
  - 0.26

### 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 Certificate**

### CE mark

- In accordance with the EMC and Low Voltage Directive

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1) Further information concerning electronic endurance to IEC 60 947-4-1 can be found at: AC1, AC3, AX, C-Load specifications, page 15.

2) The maximum peak inrush current may not be exceeded, see Lamp load output, page 9.

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.

4) The stated values apply only if no DC components are present. A DC component causes additional distortion of the measurement result.
### Lamp load output

<table>
<thead>
<tr>
<th>Lamps</th>
<th>Incandescent lamp load</th>
<th>Leuchstofflampen T5/T8</th>
<th>Uncorrected</th>
<th>Parallel compensated</th>
<th>DUO circuit</th>
<th>Low-voltage halogen lamps</th>
<th>Inductive transformer</th>
<th>2000 W</th>
<th>2500 W</th>
<th>3680 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halogen lamps 230 V</td>
<td></td>
<td></td>
<td>Uncorrected</td>
<td>3680 W</td>
<td></td>
<td>Electronic transformer</td>
<td>2500 W</td>
<td>3680 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duxl lamps</td>
<td></td>
<td></td>
<td>Uncorrected</td>
<td>3680 W</td>
<td></td>
<td></td>
<td>3680 W</td>
<td>3680 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury-vapour lamps</td>
<td></td>
<td></td>
<td>Uncorrected</td>
<td>3680 W</td>
<td></td>
<td></td>
<td>3680 W</td>
<td>3680 W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Switching performance (switching contact)

- Maximum peak inrush-current $I_p$ (150 $\mu$s) $600$ A
- Maximum peak inrush-current $I_p$ (250 $\mu$s) $480$ A
- Maximum peak inrush-current $I_p$ (600 $\mu$s) $300$ A

#### Number of electronic ballasts (T5/T8, single element)

- 18 W (ABB EVG 1 x 18 SF) $26^{(1)}$
- 24 W (ABB EVG-T5 1 x 24 CY) $26^{(1)}$
- 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) $10^{(2)}$

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#### Note

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 Ballast calculation, page 14.

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

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#### Note

Current values less than 25 mA are indicated as a 0 mA value on the KNX (starting current). For small load currents that are just above the minimum detection threshold of 25 mA, it is possible that a value of 0 mA is displayed due to the inaccuracies, even though a current is flowing.

The Energy Actuator is only suitable for recording measured values of Loads, i.e., the meters only record positive energy. Negative power values are discarded with load control, and negative instrument and power values (feedback) cannot be monitored with thresholds.
Important

Threshold value monitoring should not be used for safety-relevant applications. The Energy Actuator cannot assume the function of a circuit-breaker or RCD (earth-leakage circuit breaker).

With communication objects that can be written via the bus (e.g. threshold value limits), the range of values is not limited, i.e. even if the values that can be entered in the ETS for a threshold value or load limit can only be entered within defined limits, any value can be written to the communication object over the bus. It is therefore necessary to ensure that only permitted and useful values can be written to the communication object.

If the threshold value monitoring is to be used for equipment fault detection that only causes a slight change of less than 30 mA (7 W), mains voltage and current fluctuations due to ambient influences (e.g. temperature) and natural ageing of the load play a significant role. Even when the current changes are detected by the Energy Actuator, the detected current changes do not necessarily mean that a device has failed.

The outputs are electrically isolated from each other, i.e. they can be connected to different phase conductors within the voltage ranges permitted in the technical data. There may not be potential differences between the neutral conductor connection of the load and the neutral conductor connection on the Energy Actuator to ensure that useful measured values are delivered.

Danger

In order to avoid dangerous touch voltages, which originate through feedback from different phase conductors, all-pole disconnection must be observed when extending or modifying the electrical connections.
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Circuit diagram

1. Label carrier
2. Button *Programming*
3. LED *Programming* (red)
4. Bus terminal connection
5. Switch position display and ON/OFF actuation
6. Load circuits (A...C) each with 2 screw terminals, neutral conductor (N)

**Important**

Mains voltage must be present on at least one output, and the neutral conductor must be connected for supplying power to the measurement section.

No load currents may be conducted via the N terminal on the device. The switched load must be connected directly to the N rail.

Terminals 7 or 8 should be connected directly to the N busbar.

The second N terminal can be used to loop to further Energy Actuators.
If the outputs of the Energy Actuator are to be individually protected against residual currents, the RCD (earth-leakage circuit breaker) must be connected as follows.

Connection example

Dimension drawing