# ABB i-bus® KNX
# Binary Inputs BE/S
# Product Manual

Power and productivity
for a better world™

## Contents

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# 1 General

All ABB i-bus® KNX devices are as easy and intuitive to operate as possible. Accordingly, a clear and comfortable intelligent building installation can be easily realized.

The Binary Inputs BE/S fulfil the individual needs both in functional buildings as well as in the private residential sector.

## 1.1 Using the product manual

This manual provides you with detailed technical information relating to the Binary Inputs, their installation and programming.
The application of the device is described using examples.

This manual is divided into the following sections:

| | |
|---|---|
| Chapter 1 | General |
| Chapter 2 | Device technology |
| Chapter 3 | Commissioning |
| Chapter 4 | Planning and application |
| Chapter A | Appendix |

### 1.1.1 Structure of the product manual

All parameters are described in chapter 3.

**Note**

In this product manual, both 4-fold and 8-fold Binary Inputs are described. These devices each have four or eight binary inputs. However, as the functions for all binary inputs are identical, only the functions of input A will be described.

Should the details in the product manual refer to all binary inputs, 4-fold corresponds to inputs A…D and 8-fold corresponds to inputs A…H and the designation inputs A…X is used.

### 1.1.2 Notes

Notes and safety instructions are represented as follows in this product manual:

**Note**

Tips for usage and operation

**Examples**

Application examples, installation examples, programming examples

**Important**

These safety instructions are used as soon as there is danger of a malfunction without risk of damage or injury.

**Caution**

These safety instructions are used if there is a danger of damage with inappropriate use.

⚠ **Danger**

These safety instructions are used if there is a danger for life and limb with inappropriate use.

⚠ ⚡ **Danger**

These safety instructions are used if there is a danger to life with inappropriate use.

## 1.2 Product and functional overview

The binary inputs serve as interfaces for operation of KNX systems via conventional buttons/switches or for coupling of binary signals (signal contacts).

The devices feature a push button for manual operation for each input. Input states can be simulated during manual operation, so that the conventional push buttons, switches or floating contacts do not need to be connected for commissioning purposes.

The inputs are modular installation devices with a module width of 2 and 4 space units in Pro *M* design for installation in a distribution board. The connection to the ABB i-bus® is established using the front side bus connection terminal. The assignment of the physical addresses as well as the parameterization is carried out with Engineering Tool Software ETS3.

| Note |
|---|
| The illustrations of the parameter windows in this manual correspond to the ETS3 parameter windows. The application program is optimised for ETS3. |

The processing of the binary signals is carried out in the corresponding application program

- Binary 4f 23021/1.0, Binary 4f 2021/1.0,
- Binary 8f 23021/1.0, Binary 8f 2021/1.0

### 1.2.1 Short overview

| Application possibilities | BE/S 4.x.2.1 | BE/S 8.x.2.1 |
|---|---|---|
| **Inputs** | **4** | **8** |
| Switch sensor/Fault monitoring input | ■ | ■ |
| Switch/Dim sensor | ■ | ■ |
| Blind sensor | ■ | ■ |
| Value/Forced operation | ■ | ■ |
| Control scene | ■ | ■ |
| Switching sequences | ■ | ■ |
| Multiple operation | ■ | ■ |
| Counter | ■ | ■ |

| Parameterization options | BE/S 4.x.2.1 | BE/S 8.x.2.1 |
|---|---|---|
| **Inputs** | **4** | **8** |
| Switching and dimming of lighting (also for 1-button operation) | ■ | ■ |
| Operation of shutters and blinds (also for 1-button operation) | ■ | ■ |
| Sending of arbitrary values, e.g. temperature values | ■ | ■ |
| Control and saving of light scenes | ■ | ■ |
| Operation of different consumers by repeated actuation | ■ | ■ |
| Operation of several loads in a defined switching sequence | ■ | ■ |
| Counting from impulses and actuations | ■ | ■ |
| Reading of floating contacts | ■ | ■ |
| Each Binary Input of a device can assume one of the functions described beforehand. | ■ | ■ |

# 2 Device technology

## 2.1 Binary Input with manual operation, 4-fold, 230 V AC/DC, MDRC

2CDC 071 010 F0010

BE/S 4.230.2.1

The 4-fold Binary Input BE/S 4.230.1 with manual operation is a rail mounted device for installation in the distribution board. The device is suitable for reading out 10…230 V AC/DC signals.
Inputs A and B are independent of inputs C and D.

Buttons located on the front of the device can be used to manually simulate the input state. The status of the inputs is displayed by yellow LEDs.

The device is ready for operation after connecting the bus voltage.
The Binary Input is parameterized via ETS. The connection to the KNX is implemented using the bus connection terminal on the front.

### 2.1.1 Technical data

| | | |
|---|---|---|
| **Supply** | Bus voltage | 21…32 V AC |
| | Current consumption, bus | Maximum 5 mA |
| | Power consumption, bus | Maximum 100 mW |
| | Leakage loss, bus | Maximum 800 mW at AC operation<br>Maximum 1.6 W at DC operation |
| **Inputs** | Number | 4 |
| | Permitted voltage range $U_n$ | 0…265 V AC/DC |
| | Input current $I_n$ | Maximum 1 mA |
| | Signal level for 0 signal | 0…2 V AC/DC |
| | Signal level for 1 signal | 7…265 V AC/DC |
| | Permissible cable length | Maximum 100 m at 1.5 mm² |
| **Connections** | KNX | Via bus connection terminals |
| | Inputs | Via slotted head screw terminals |
| **Connection terminals** | Screw terminals | 0.2…2.5 mm² stranded<br>0.2…4.0 mm² solid |
| | Tightening torque | Maximum 0.6 Nm |
| **Operating and display elements** | Button/LED *Programming* | For assignment of the physical address |
| | Button ✋/LED ●✋ | For toggling between manual operation/operation via ABB i-bus® and displays |
| | Button Ⓐ/LED ●A (applies for all binary inputs, A…D) | For switching and display |
| **Enclosure** | IP 20 | To EN 60 529 |
| **Safety class** | II | To EN 61 140 |

## Device technology

| | | |
|---|---|---|
| **Isolation category** | Overvoltage category | III to DIN 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 | 93 %, no condensation allowed |
| **Design** | Modular installation device (MDRC) | Modular installation device, Pro *M* |
| | Dimensions | 90 x 36 x 67.5 mm (H x W x D) |
| | Mounting width in space units | 2 modules at 18 mm |
| | Mounting depth | 67.5 mm |
| **Installation** | On 35 mm mounting rail | To EN 60 715 |
| **Mounting position** | As required | |
| **Weight** | 0.1 kg | |
| **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 | |

| **Device type** | **Application program** | **Maximum number of communication objects** | **Maximum number of group addresses** | **Maximum number of associations** |
|---|---|---|---|---|
| **BE/S 4.230.2.1** | Binary 4f 23021/…* | 43 | 254 | 254 |

* … = current version number of the application program

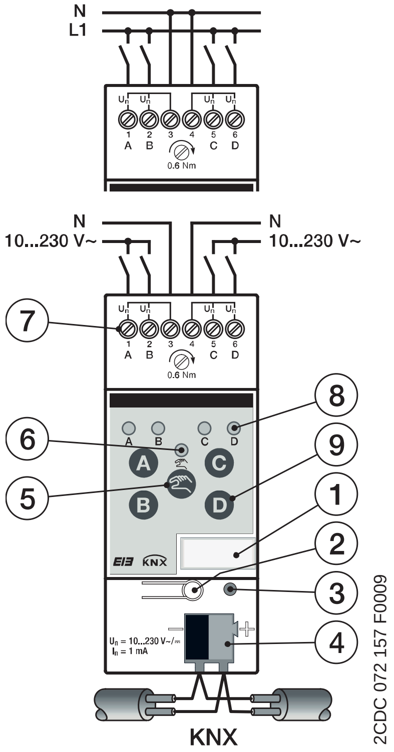
**Note**

The ETS and the current version of the device application program are required for programming.

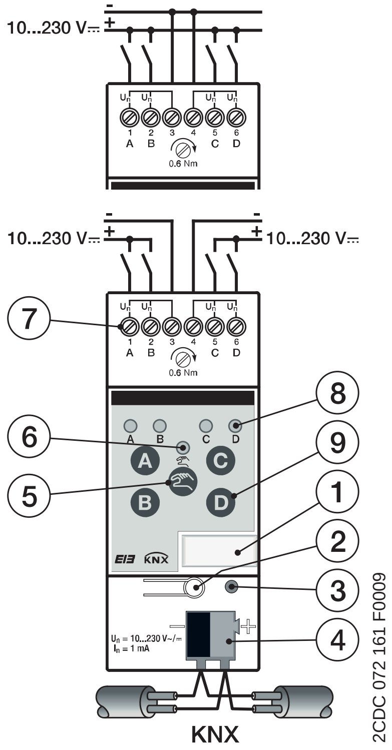
The current version of the application program is available for download on the Internet at *www.abb.com/knx*. After import it is available in the ETS under *ABB/Input/Binary input 4-fold*.

The device does not support the closing 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.

### 2.1.2 Connection schematic BE/S 4.230.2.1



Connection of AC voltage



Connection of DC voltage

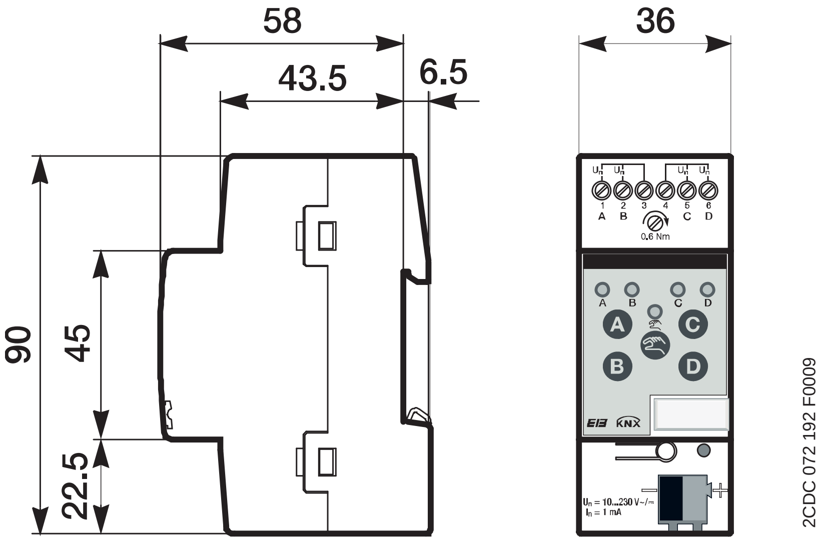
**1** Label carrier
**3** LED *Programming*
**5** Button *Manual operation*
**7** Connection terminals
**9** Button *Binary input* Ⓓ

**2** Button *Programming*
**4** Bus connection terminal
**6** LED *Manual operation*
**8** LED *Binary input*

| Important | Important |
|---|---|
| When connecting AC voltage, two separate RCD (earth-leakage circuit breaker) circuits can be connected to terminals 1, 2, 3 and 4, 5, 6. | Correct polarity must be observed when the DC voltage is connected.<br>If incorrectly connected, the input cannot be read out and processed. |

| Important |
|---|
| Use of switch or a push-in inserts with N terminals, in conjunction with the BE/S 4.230.2.1 series Binary Inputs are absolutely necessary to ensure malfunction free operation and sufficient illumination of glow lamps on illuminated switches or plug-in inserts. |

### 2.1.3 Dimensional drawing BE/S 4.230.2.1



## 2.2 Binary input with manual operation, 4-fold, contact scanning, MDRC

2CDC 071 009 F0010

BE/S 4.20.2.1

The 4-fold Binary Input BE/S 4.20.2.1 with manual operation is a rail mounted device for installation in the distribution board. The device is suitable for reading floating contacts. The pulsed scanning voltage is generated internally.

Buttons located on the front of the device can be used to manually simulate the input state. The status of the inputs is displayed by yellow LEDs.

The device is ready for operation after connecting the bus voltage.
The Binary Input is parameterized via ETS. The connection to the KNX is implemented using the bus connection terminal on the front.

### 2.2.1 Technical data

| | | |
|---|---|---|
| **Supply** | Bus voltage | 21…32 V DC |
| | Current consumption, bus | Maximum 6 mA |
| | Power consumption, bus | Maximum 130 mW |
| | Leakage loss, bus | Maximum 130 mW |
| **Inputs** | Number | 4 |
| | Scanning voltage $U_n$ | 35 V, pulsed |
| | Scanning current $I_n$ | 0.1 mA |
| | Scanning current $I_n$ at switch on | Maximum 355 mA |
| | Permissible cable length | Maximum 100 m at 1.5 $mm^2$ |
| **Connections** | KNX | Via bus connection terminals |
| | Inputs | Via screw terminals |
| **Connection terminals** | KNX | Via bus connection terminals |
| | Inputs | Via slotted head screw terminals |
| **Operating and display elements** | Button/LED *Programming* | For assignment of the physical address |
| | Button ✋/LED 💡 | For toggling between manual operation/operation via ABB i-bus® and displays |
| | Button Ⓐ/LED 💡 (applies for all binary inputs, A…D) | For switching and display |
| **Enclosure** | IP 20 | To EN 60 529 |
| **Safety class** | II | To EN 61 140 |
| **Isolation category** | Overvoltage category | III to DIN EN 60 664-1 |
| | Pollution degree | 2 to EN 60 664-1 |
| **KNX safety extra low voltage** | SELV 24 V DC | |

## Device technology

| | | |
|---|---|---|
| **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) | Modular installation device, Pro *M* |
| | Dimensions | 90 x 36 x 67.5 mm (H x W x D) |
| | Mounting width in space units | 2 modules at 18 mm |
| | Mounting depth | 67.5 mm |
| **Installation** | On 35 mm mounting rail | To EN 60 715 |
| **Mounting position** | As required | |
| **Weight** | 0.1 kg | |
| **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 | |

| **Device type** | **Application program** | **Maximum number of communication objects** | **Maximum number of group addresses** | **Maximum number of associations** |
|---|---|---|---|---|
| **BE/S 4.20.2.1** | Binary 4f 2021/…* | 43 | 254 | 254 |

* … = current version number of the application program

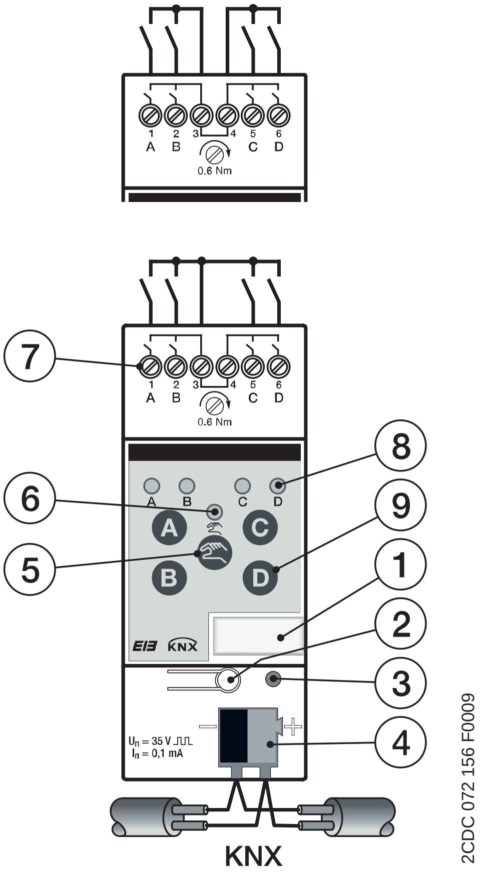
**Note**

The ETS and the current version of the device application program are required for programming.

The current version of the application program is available for download on the Internet at *www.abb.com/knx*. After import it is available in the ETS under *ABB/Input/Binary input 4-fold*.

The device does not support the closing 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.

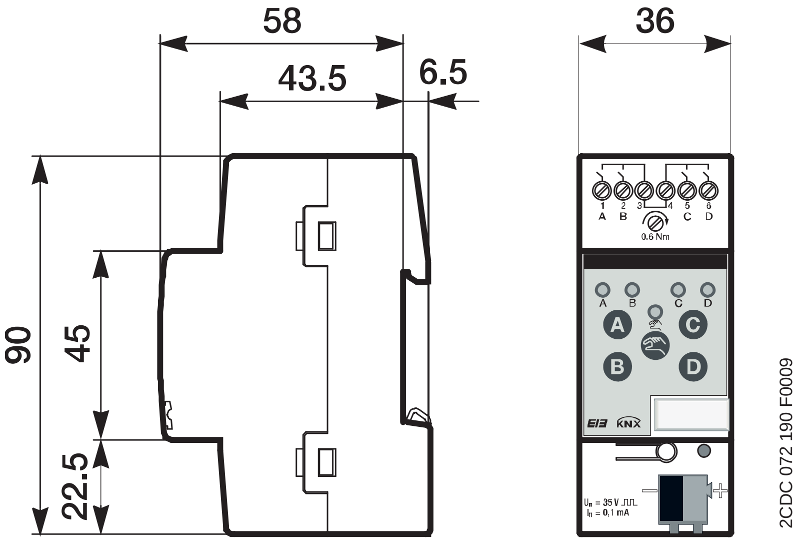
### 2.2.2 Connection schematic BE/S 4.20.2.1



**1** Label carrier
**2** Button *Programming*
**3** LED *Programming*
**4** Bus connection terminal
**5** Button *Manual operation*
**6** LED *Manual operation*
**7** Connection terminals
**8** LED *Binary input*
**9** Button *Binary input* Ⓓ

| Note |
|---|
| An external voltage connection to the Binary Input BE/S 4.20.2.1 is not permitted.<br>Terminals 3 and 4 are internally interconnected to one another. |

### 2.2.3 Dimensional drawing BE/S 4.20.2.1



## 2.3 Binary Input with manual operation, 8-fold, 230 V AC/DC, MDRC

2CDC 071 012 F0010

**BE/S 8.230.2.1**

The 8-fold Binary Input BE/S 8.230.2.1 with manual operation is a rail mounted device for installation in the distribution board. The device is suitable for reading out 10…230 V AC/DC signals.

Buttons located on the front of the device can be used to manually simulate the input state. The status of the inputs is displayed by yellow LEDs.

The device is ready for operation after connecting the bus voltage.
The Binary Input is parameterized via ETS. The connection to the KNX is implemented using the bus connection terminal on the front.

### 2.3.1 Technical data

| | | |
|---|---|---|
| **Supply** | Bus voltage | 21…32 V DC |
| | Current consumption, bus | Maximum 6 mA |
| | Power consumption, bus | Maximum 120 mW |
| | Leakage loss, bus | Maximum 1.5 W at AC operation<br>Maximum 3.0 W at DC operation |
| **Inputs** | Number | 8 individual |
| | Permitted voltage range $U_n$ | 0…265 V AC/DC |
| | Input current $I_n$ | Maximum 1 mA |
| | Signal level for 0 signal | 0…2 V AC/DC |
| | Signal level for 1 signal | 7…265 V AC/DC |
| | Permissible cable length | Maximum 100 m at 1.5 mm² |
| **Connections** | KNX | Via bus connection terminals |
| | Inputs | Using universal head screw terminals (PZ 1) |
| **Connection terminals** | Screw terminal | Screw terminals with universal head (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 | Without: 0.25…2.5 mm²<br>With: 0.25…4 mm² |
| | TWIN ferrules | 0.5…2.5 mm²<br>Contact pin length at least 10 mm |
| | Tightening torque | Maximum 0.8 Nm |
| | Grid | 6.35 |
| **Operating and display elements** | Button/LED *Programming* | For assignment of the physical address |
| | Button ✋/LED ●✋ | For toggling between manual operation/operation via ABB i-bus® and displays |
| | Button Ⓐ/LED ●A<br>(applies for all binary inputs, A…H) | For switching and display |

## Device technology

| | | |
|---|---|---|
| **Enclosure** | IP 20 | To EN 60 529 |
| **Safety class** | II | To EN 61 140 |
| **Isolation category** | Overvoltage category | III to DIN 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 | 93 %, no condensation allowed |
| **Design** | Modular installation device (MDRC) | Modular installation device, Pro *M* |
| | Dimensions | 90 x 72 x 67.5 mm (H x W x D) |
| | Mounting width in space units | 4 modules at 18 mm |
| | Mounting depth | 67.5 mm |
| **Installation** | On 35 mm mounting rail | To EN 60 715 |
| **Mounting position** | As required | |
| **Weight** | 0.2 kg | |
| **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 | |

| Device type | Application program | Maximum number of communication objects | Maximum number of group addresses | Maximum number of associations |
|---|---|---|---|---|
| **BE/S 8.230.2.1** | Binary 8f 23021/…* | 83 | 254 | 254 |

* … = current version number of the application program

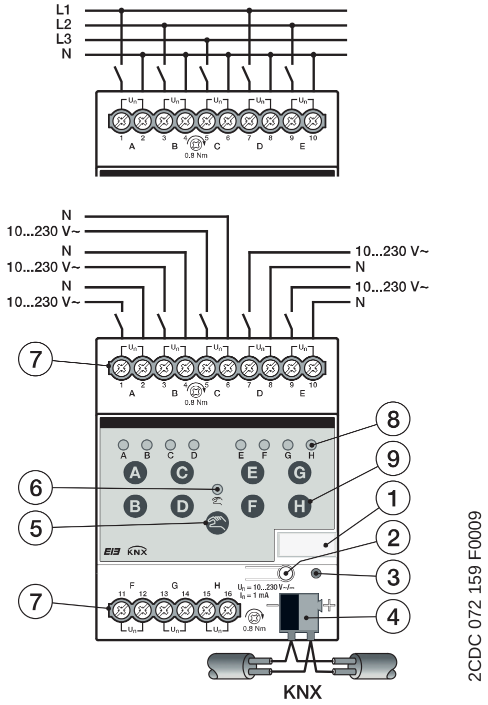
**Note**

The ETS and the current version of the device application program are required for programming.

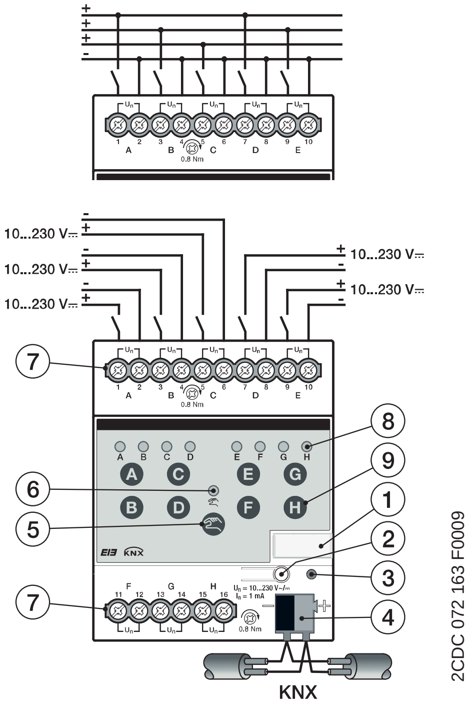
The current version of the application program is available for download on the Internet at *www.abb.com/knx*. After import it is available in the ETS under *ABB/Input/Binary input 8-fold*.

The device does not support the closing 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.

### 2.3.2 Connection schematic BE/S 8.230.2.1



Connection with AC voltage



Connection with DC voltage

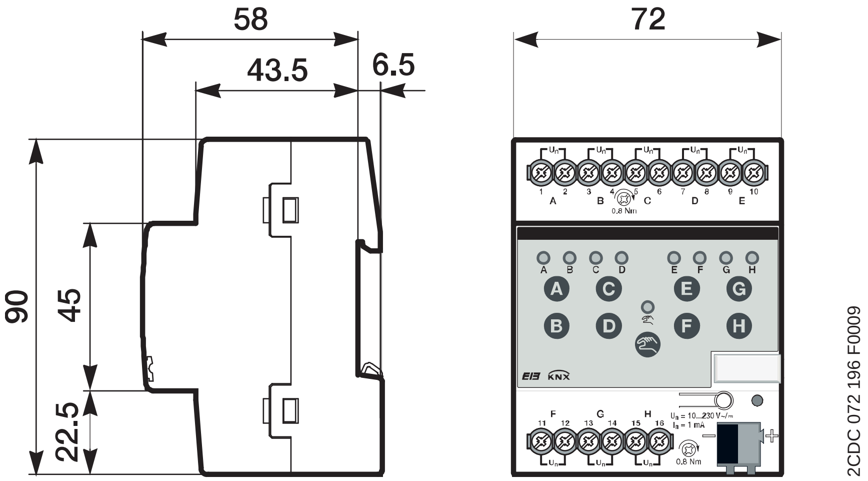
**1** Label carrier
**3** LED *Programming*
**5** Button *Manual operation*
**7** Connection terminals
**9** Button *Binary input* Ⓓ

**2** Button *Programming*
**4** Bus connection terminal
**6** LED *Manual operation*
**8** LED *Binary input*

| Important | Important |
|---|---|
| When connecting AC voltage, up to eight separate RCD (earth-leakage circuit breaker) circuits can be connected. | Correct polarity must be observed when the DC voltage is connected.<br>If incorrectly connected, the input cannot be read out and processed. |

| Important |
|---|
| Use of switch or a push-in inserts with N terminals, in conjunction with the BE/S 8.230.2.1 series Binary Inputs are absolutely necessary to ensure malfunction free operation and sufficient illumination of glow lamps on illuminated switches or plug-in inserts. |

### 2.3.3 Dimensional drawing BE/S 8.230.2.1



## 2.4 Binary Input with manual operation, 8-fold, contact scanning, MDRC

2CDC 071 011 F0010

**BE/S 8.20.2.1**

The 8-fold Binary Input BE/S 8.20.2.1 with manual operation is a rail mounted device for installation in the distribution board. The device is suitable for reading floating contacts. The pulsed scanning voltage is generated internally.

Buttons located on the front of the device can be used to manually simulate the input state. The status of the inputs is displayed by yellow LEDs.

The device is ready for operation after connecting the bus voltage.
The Binary Input is parameterized via ETS. The connection to the KNX is implemented using the bus connection terminal on the front.

### 2.4.1 Technical data

| | | |
|---|---|---|
| **Supply** | Bus voltage | 21…32 V DC |
| | Current consumption, bus | Maximum 7 mA |
| | Power consumption, bus | Maximum 150 mW |
| | Leakage loss, bus | Maximum 150 mW |
| **Inputs** | Number | 8 |
| | Scanning voltage $U_n$ | 35 V, pulsed |
| | Scanning current $I_n$ | 0.1 mA |
| | Scanning current $I_n$ at switch on | Maximum 355 mA |
| | Permissible cable length | Maximum 100 m at 1.5 mm² |
| **Connections** | KNX | Via bus connection terminals |
| | Inputs | Using universal head screw terminals (PZ 1) |
| **Connection terminals** | Screw terminal | Screw terminals with universal head (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 | Without: 0.25…2.5 mm²<br>With: 0.25…4 mm² |
| | TWIN ferrules | 0.5…2.5 mm²<br>Contact pin length at least 10 mm |
| | Tightening torque | Maximum 0.8 Nm |
| | Grid | 6.35 |
| **Operating and display elements** | Button/LED *Programming* | For assignment of the physical address |
| | Button ✋/LED ● | For toggling between manual operation/operation via ABB i-bus® and displays |
| | Button Ⓐ/LED ● A<br>(applies for all binary inputs, A…H) | For switching and display |

## Device technology

| | | |
|---|---|---|
| **Enclosure** | IP 20 | To EN 60 529 |
| **Safety class** | II | To EN 61 140 |
| **Isolation category** | Overvoltage category | III to DIN 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 | 93 %, no condensation allowed |
| **Design** | Modular installation device (MDRC) | Modular installation device, Pro *M* |
| | Dimensions | 90 x 72 x 67.5 mm (H x W x D) |
| | Mounting width in space units | 4 modules at 18 mm |
| | Mounting depth | 67.5 mm |
| **Installation** | On 35 mm mounting rail | To EN 60 715 |
| **Mounting position** | As required | |
| **Weight** | 0.2 kg | |
| **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 | |

| Device type | Application program | Maximum number of communication objects | Maximum number of group addresses | Maximum number of associations |
|---|---|---|---|---|
| **BE/S 8.20.2.1** | Binary 8f 2021/…* | 83 | 254 | 254 |

* … = current version number of the application program

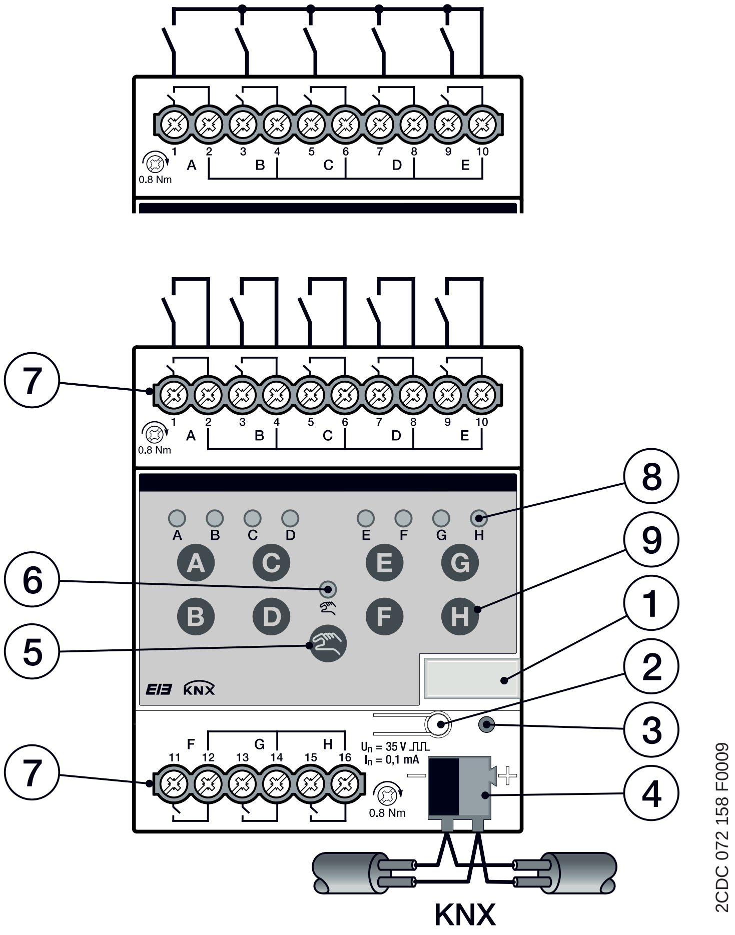
**Note**

The ETS and the current version of the device application program are required for programming.

The current version of the application program is available for download on the Internet at *www.abb.com/knx*. After import it is available in the ETS under *ABB/Input/Binary input 8-fold*.

The device does not support the closing 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.

### 2.4.2 Connection schematic BE/S 8.20.2.1



**1** Label carrier

**2** Button *Programming*

**3** LED *Programming*

**4** Bus connection terminal

**5** Button *Manual operation*

**6** LED *Manual operation*

**7** Connection terminals

**8** LED *Binary input*

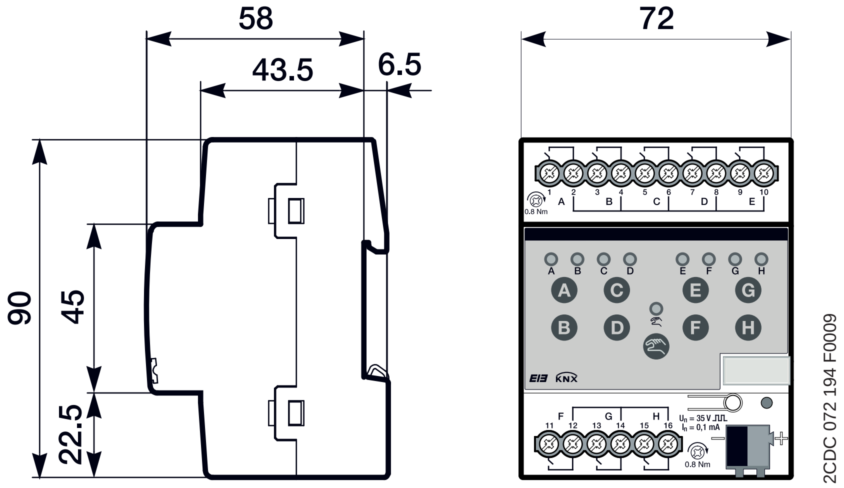
**9** Button *Binary input* Ⓓ

**Note**

An external voltage connection to the Binary Input BE/S 4.20.2.1 is not permitted.

Terminals 2, 4, 6, 8, 10, 12, 14 and 16 are internally interconnected to one another.

### 2.4.3 Dimensional drawing BE/S 8.20.2.1



## 2.5 Assembly and installation

The Binary Input is a modular installation device for fast installation in the distribution board on 35 mm mounting rails to EN 60 715.

The mounting position can be selected as required.

The connection to the bus is implemented using the supplied bus connection terminal.

The device is ready for operation after connection of the bus voltage and, if required, the auxiliary voltage.

The terminal designation is located on the housing.

Accessibility to the device for the purpose of operation, testing, visual inspection, maintenance and repair must be provided compliant to VDE 0100-520.

**Commissioning requirements**

In order to commission the device, a PC with Engineering Tool Software (ETS) and an interface, e.g. USB or IP are required.

The installation and commissioning may only be carried out by qualified electrical specialists. The appropriate norms, guidelines, regulations and specifications of your country should be observed when planning and setting up electrical installations.

Protect the device from damp, dirt and damage during transport, storage and operation.

Only operate the device within the specified technical data limits!

The device should only be operated in an enclosed housing (distribution board)!

The voltage supply to the device must be switched off before mounting work is performed.

⚠ ⚡ **Danger**

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

**Supplied state**

The device is supplied with the physical address 15.15.255.
The application program is pre-installed. It is therefore only necessary to load group addresses and parameters during commissioning.

However, the complete application program can be reloaded if required. The entire application program is loaded after a change of the application program, after a discontinued download or after discharge of the device. The process takes significantly longer than loading parameters and group addresses.

### Download behaviour

Depending on the PC, which is used, the progress bar for the download may take up to one and a half minutes, before it appears, due to the complexity of the device.

### Assignment of the physical address

The assignment and programming of the physical address is carried out in the ETS.

The device features a programming button for assignment of the physical device address. The red programming LED lights up, after the button has been pushed. It switches off as soon as the ETS has assigned the physical address or the programming button is pressed again.

### Cleaning

If devices become dirty, they can be cleaned using a dry cloth or a cloth dampened with a soapy solution. Corrosive agents or solutions should never be used.

### Maintenance

The device is maintenance-free. No repairs should be carried out by unauthorised personnel if damage occurs, e.g. during transport and/or storage.

### Foil keypad

The manual pushbuttons may not be operated with pointed or sharp-edged objects, e.g. screwdrivers or pens. This may damage the keypad.

## 2.6 Manual operation

### Function of manual operation

After connection to the bus, the device is in *KNX operation*. The LED 💡 is off. All *LEDs* indicate the actual input state. The respective *Buttons* are non-functional. It is possible to switch between *Manual operation* and *KNX operation* by pressing the ● button.

Should *Manual operation* be activated, the current input states remain set. The inputs can only be operated via the foil keypad. If group addresses have been assigned, telegrams will be sent on the bus. Any signal changes from the installed system will not be considered. If *Manual operation* is deactivated, switchover to *KNX operation* and the respective LED again indicates its current input state. The communication objects are updated and telegrams are sent. The programmed input states thus set themselves.

**Note**

If button ● is released again before two seconds have elapsed, the LED 💡 reverts to its old state and there is no reaction.
If *Manual operation* is not enabled via the application program, there is no reaction and the device remains in the *KNX operation*. If it has been disabled, LED 💡 is switched on or over, after it has flashed for three seconds.

**Note**

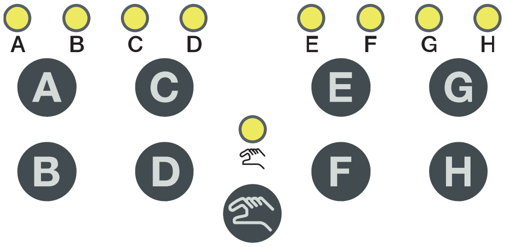
If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.

Using the communication object *Block* (No. 10), the physical input as well as the communication object *Event 0/1* are disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

The communication object *Block* (No.10) has no influence on manual operation.

### 2.6.1 Display elements

The indicator LEDs are located on the front of the Binary Inputs, e.g. on the BE/S 8.20.2.1 eight LEDs *Input X* (X = A…H), one LED *Manual operation*:



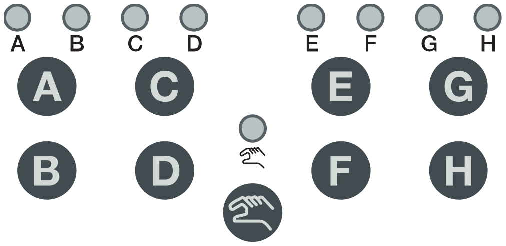
All *Input X* LEDs indicate the current input state. In *KNX operation,* the LED is off.

The behaviour of the display elements dependent on the operating states, *KNX operation* and *Manual operation* is described in the following table:

| LED | KNX operation | Manual operation |
|---|---|---|
| A<br>**Input A…X** | The LED display is independent of the programming. It can be set separately for each Binary Input.<br>• *normal:* Contact is closed => LED on<br>Contact is open => LED off<br>• *Block:* The LED cannot be changed and remains disabled.<br>• *inverted:* Contact is closed => LED off<br>In this way, the LED display can be adapted to the input state for closed and opened contacts.<br>For fault alarms, e.g. both normally closed and normally opened contacts can be used. | The LED display is independent of the programming. It can be set separately for each Binary Input.<br>• *normal:* Contact is closed => LED on<br>Contact is open => LED off<br>• *Block:* The LED cannot be changed and remains disabled.<br>• *inverted:* Contact is closed => LED off<br>In this way, the LED display can be adapted to the input state for closed and opened contacts.<br>For fault alarms, e.g. both normally closed and normally opened contacts can be used. |
| **Manual operation** | • *Off:* BE/S is in *KNX operation*<br>• *Flashes (for about 3 seconds):* Changeover to *Manual operation*.<br>• *Flashes continuously:* Manual operation is software-inhibited via KNX. The LED flashes until button is pressed. The LED switches off when released. | • *Flashes (for about 3 seconds):* Changeover to *KNX operation*.<br>• *On:* BE/S is in *Manual operation*. |

### 2.6.2 Operating controls

The buttons for manual operation are located on the front of the Binary Inputs, e.g. on the BE/S 8.20.2.1, eight buttons for *Input X* (X = A…H), one button for *Manual operation*:



The operating controls are enabled or disabled by button *Manual operation* ✋. The button must be pushed for at least 1.5 seconds for this purpose. This prevents unintentional actuation of the operating controls.

Switch on of manual operation:
Press button ✋ until the yellow LED 💡 lights continuously.

Switch off of manual operation:
Press button ✋ until LED 💡 no longer lights.

| Note |
|---|
| Using the communication object *Block*, the physical input as well as the communication object *Event 0/1* are disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.<br>The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here. |

| Note |
|---|
| Manual operation can be inhibited via the KNX using communication object *Enable/block manual operation*. In this case, it is not possible to changeover to manual operation using button *Manual operation*. The block can be removed by sending a telegram with the value 0 on the communication object *Enable/block manual operation*. The block is also removed after a download and bus voltage recovery. The communication object again assumes the value 0. |

The behaviour of the operating elements dependent on the operating states, *KNX operation* and *Manual operation,* is described in the following table:

| Button | KNX operation | Manual operation |
|---|---|---|
| **Manual operation** | • *Long button operation (about 3 Sec.):* Switch to *Manual operation* provided that *Manual operation* is not blocked by a parameter setting.<br>• *Short button push:* LED *Manual operation* flashes and switches off again. BE/S continues in *KNX operation*. | • *Long button operation (about 3 Sec.):* Changeover to the *KNX operation*. The inputs are scanned again, and the input states are updated accordingly.<br>Reset of *Manual operation* to *KNX operation* can occur within a programmed time depending on the parameterization. |
| Ⓐ<br>**Input A…X** | No reaction | The behaviour of button Input A is dependent on the parameterization under *Enable/block buttons*:<br>• *Block:* The binary input is disabled.<br>• *Switch:* With every actuation, the states of the input and the LED are changed.<br>• *Button:* Push the button<br>=> Input closed => LED on<br>Release the button<br>=> Input opened => LED off<br>**Note**<br>By pressing button Ⓐ, binary input A is simulated.<br>The display indicates the current input state. The parameterized features are executed. |

# 3 Commissioning

## 3.1 Overview

The application programs *Binary 4f 23021/1.0, Binary 4f 2021/1.0, Binary 8f 23021/1.0* and *Binary 8f 2021/1.0* are available for the binary inputs. Programming requires ETS. A maximum of 10 communication objects per Binary Input, 254 group addresses and 254 associations can be linked. The following operating modes are available for each binary input

| | |
|---|---|
| **Switch sensor/Fault monitoring input** | For scanning conventional inputs.<br>Distinction between short/long operation and cyclical sending of the contact state is possible.<br>Blocking of a binary input is possible.<br>The operating mode can be used as fault monitoring input.<br>Up to three communication objects can be programmed differently and can be sent on the KNX. |
| **Switch/Dim sensor** | For control/dimming of lighting via a 1 button and 2 button operation.<br>Start-stop dimming and stepwise dimming as well as switching and dimming via a single push button are possible. |
| **Blind sensor** | For control/slat adjustment of a blind or a shutter in 1 button operation and 2 button operation.<br>Eight preset operating responses are possible in total. |
| **Value/Forced operation** | For sending of arbitrary values of different data types, e.g. temperature values.<br>It is possible to send different values or data types after a short/long operation. Activation/deactivation of the forced operation of actuators is also possible. |
| **Control scene** | For calling and storing the states of up to six actuator groups. The actuator groups can be controlled via six individual communication objects. |
| **Switching sequences** | For the operation of several actuator groups in preset sequences. |
| **Multiple operation** | For triggering of different functions depending on the frequency of actuation.<br>Even a long actuation can be detected and a function triggered. |
| **Counter** | For counting input pulses.<br>Different data types can be set. An additional differential counter enables counting of daily values for example. Different count rates can be set.<br>The main and differential counters can be reset. |

| Note |
|---|
| Each binary input of a device can be blocked separately by a communication object. |

### 3.1.1 Conversion

For ABB i-bus® KNX devices from ETS3 or higher, it is possible to assume the parameter settings and group addresses from previous application program versions.

Furthermore, conversion can be implemented to transfer the existing parametrization of a device to another device.

| Note |
|---|
| When the term "channels" is used in the ETS, inputs and/or outputs are meant. In order to ensure that the ETS language generally applies for as many ABB i-bus® devices as possible, the word channels is used here. |

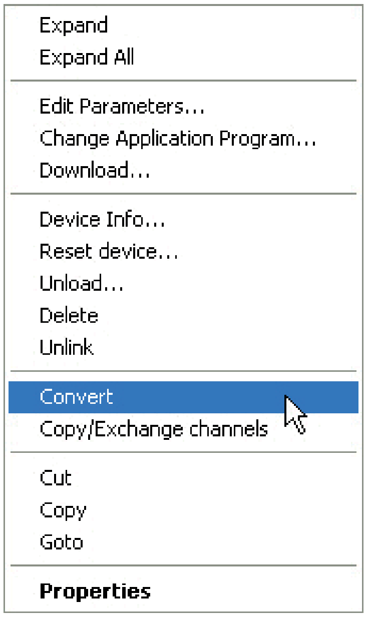
The following application programs can be completely converted:

- Binary 4f 2021/1.0
- Binary 4f 23021/1.0
- Binary 8f 2021/1.0
- Binary 8f 23021/1.0
- Binary 4f 2021/1.1
- Binary 4f 23021/1.1
- Binary 8f 2021/1.1
- Binary 8f 23021/1.1

| Note |
|---|
| If the number of channels of the target device is larger than the number of inputs/outputs of the source device, only the first inputs/outputs of the target device are written with the converted data of the source device. The remaining inputs/outputs retain the default values or are reset to the default values.<br>Default values are set for newly added parameters after conversion. |

#### 3.1.1.1 Procedure

- Import the current VD3 file into ETS3 and add a product with the current application program to the project.
- After you have parameterized a device, you can transfer the settings to a second device.



- Right click on the product and select *Convert* in the context menu for this purpose.

- Then follow the instructions of the *Convert* wizard.
- Finally, exchange the physical address and delete the old device.

Should you wish to only copy individual channels within a device, use the function Copy and exchange, page 33.

### 3.1.2 Copy and exchange parameter settings

Parameterization of devices can take a lot of time depending on the complexity of the application program and the number of device inputs/outputs. To keep the commissioning work to the minimum possible, using the function *Copy/Exchange channels*, parameter settings of an input/output can be copied or exchanged with freely selectable inputs/outputs. Optionally, the group addresses can be retained, copied or deleted in the target input/output.

| **Note** |
|---|
| When the term “channels” is used in the ETS, inputs and/or outputs are meant. In order to ensure that the ETS language generally applies for as many ABB i-bus® devices as possible, the word channels is used here. |

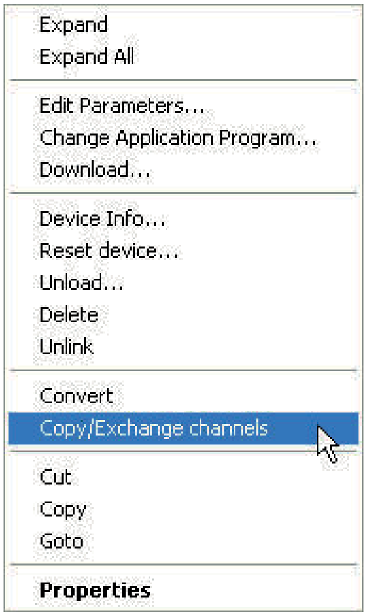
The copy function for inputs/outputs is particularly useful with devices having the same parameter settings for several outputs, inputs or groups.

For example, lighting in a room is frequently controlled in an identical manner. In this case, the parameter settings from input/output X can be copied to all other inputs/outputs or to a special input/output of the device. Thus the parameters for this input/output must not be set separately, which significantly shortens the commissioning time.

The exchange of parameter settings is useful, e.g. should the inputs/outputs be swapped when wiring the terminals. The parameter settings of the incorrectly wired inputs/outputs can be simply exchanged saving the requirement for time-consuming rewiring.

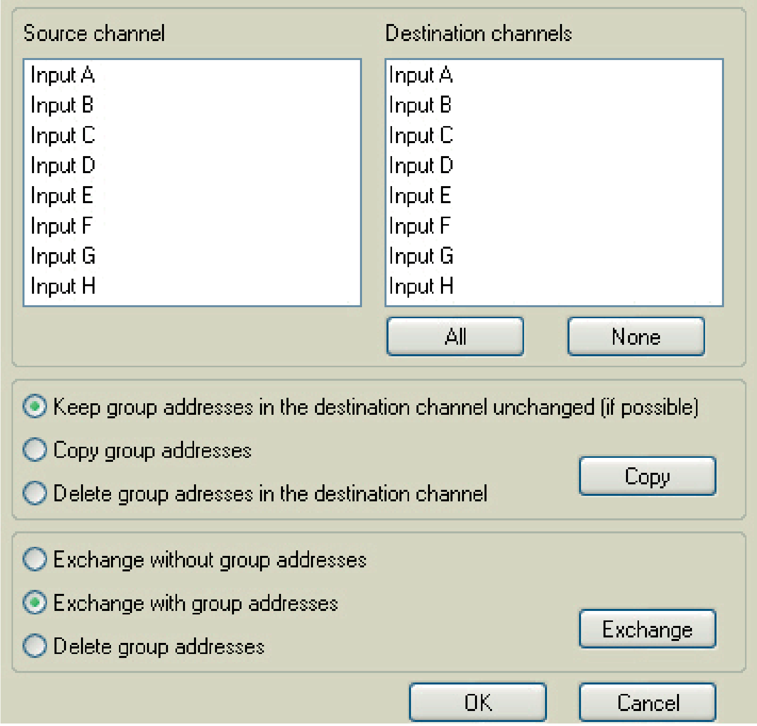
### 3.1.2.1 Procedure

- Import the application program into ETS and add a product with the current application program to the project.
- Click with the right mouse button on the product, whose inputs/outputs you wish to copy or exchange, and select the context menu *Copy/Exchange channels*.



Thereafter, undertake the required settings in the *Copy/Exchange channels* dialog.

### 3.1.2.2 Copy/Exchange channels dialog



Source channel

Input A
Input B
Input C
Input D
Input E
Input F
Input G
Input H

Destination channels

Input A
Input B
Input C
Input D
Input E
Input F
Input G
Input H

● Keep group addresses in the destination channel unchanged (if possible)
○ Copy group addresses
○ Delete group adresses in the destination channel

○ Exchange without group addresses
● Exchange with group addresses
○ Delete group addresses

At the top right, you will see the source channel selection window for marking the source channel. Beside is located the selection window for the target channel or channels for marking the target channel or channels.

**Source channel**

With the selection of the source channel, you define which parameter settings should be copied or exchanged. Only one source channel can be selected at a time.

**Target channels**

With the selection of the target channels, you define which channel/channels are to assume the parameter settings of the source channel.

- For the function *Exchange*, only one target output can be selected at a time.
- For the function *Copy*, different target channels can be selected simultaneously. For this purpose, press the Ctrl key and mark the required channels with the mouse cursor, e.g. channels B and C.

All With this button, you select **all** available target channels, e.g. A…C.

None Reset the selection of the target channels with this button.

### Copy

The following options can be selected before copying the parameter settings:

- Leave the group addresses unchanged (if possible) in the target channel
- Copy group addresses
- Delete group addresses in the target channel

With this button, copy the settings of the source channel into the target channel or channels.

### Exchange

The following options can be selected before exchanging the parameter settings:

- Retain group addresses
- Exchange of group addresses
- Deletion of group addresses

With this button, exchange the settings of the source channel with the target channel.

Confirm your selection with this button, and the window closes.

Using this button, the window closes without accepting the changes.

## 3.2 Parameters

The parameterization of the binary inputs is implemented using the Engineering Tool Software ETS. The application program is available in the ETS under *ABB/Input/Binary input 4/8-fold*.

The following chapter describes the parameters of the binary input using the parameter window. The parameter window features a dynamic structure, so that further parameters may be enabled depending on the parameterization and the function.

The default values of the parameters are underlined,
e.g.:

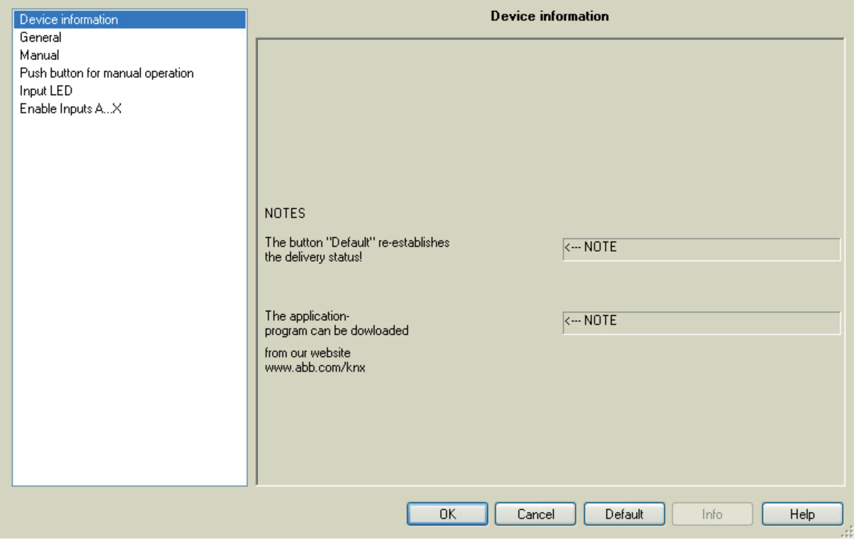
Options: yes
<u>no</u>

| **Note** |
|---|
| In this product manual, both 4-fold and 8-fold Binary Inputs are described. These devices each have four or eight binary inputs. However, as the functions for all binary inputs are identical, only the functions of input A will be described.<br>Should the details in the product manual refer to all binary inputs, 4-fold corresponds to inputs A…D and 8-fold corresponds to inputs A…H, and the designation inputs A…X is used. |

### 3.2.1 Parameter window *Device information*

This parameter window contains important information about the BE/S and the respective application program.

| Important |
|---|
| Observe the important notes in the device information.<br>They differ for the different device variants.<br>Here for example, the device information for the BE/S 8.20.2.1 is shown. |



NOTES

The button "Default" re-establishes the delivery status! <--- NOTE

The application-program can be dowloaded <--- NOTE

from our website www.abb.com/knx

**NOTES**

**The button "Standard" re-establishes the delivery status!**

<––– NOTE

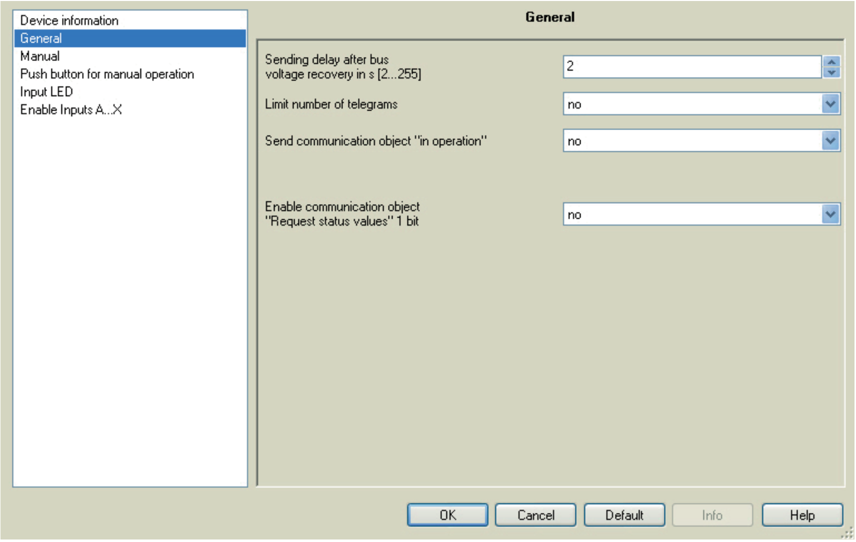
**The application program can be downloaded**

**from our website www.abb.com/knx.**

<––– NOTE

### 3.2.2 Parameter window *General*

Higher level parameters can be set in the *General* parameter window.



General

Sending delay after bus voltage recovery in s [2...255]: 2

Limit number of telegrams: no

Send communication object "in operation": no

Enable communication object "Request status values" 1 bit: no

**Sending delay after bus voltage recovery in s [2…255]**

Options: 2…255

Telegrams are only received during the send delay.
However, the telegrams are not processed. No telegrams are sent on the bus.

Telegrams are sent, after the send delay has been completed.

If communication objects are read out via the bus during the send delay, e.g. from the visualisations, these requests are stored and if necessary answered, after the send delay has been completed.

An initialisation time of about two seconds is included in the delay time. The initialisation time is the reaction time that the processor requires to be functional.

**How does the device behave with bus voltage recovery?**

After bus voltage recovery, the device always waits for the send delay time to elapse before sending telegrams on the bus.

### Limit number of telegrams

Options: no
yes

The load on the bus generated by the device can be limited with the limitation on the number of telegrams sent. This limit relates to all telegrams sent by the device.

- *yes:* The following parameters appear:

  **Max. number of sent telegrams in s [1…255]**

  Options: 1…20…255

  **in period**

  Options: 50 ms/100 ms…1 s…30 s/1 min

  These parameters determine the number of telegrams, which can be sent by the device within a period. The telegrams are sent as quickly as possible at the start of a period.

### Send communication object “in operation”

Options: no
send value 0 cyclically
send value 1 cyclically

The *in operation* communication object indicates the presence of the device on the bus. This cyclic telegram can be monitored by an external device.
If a telegram is not received, the device may be defective or the bus cable to the transmitting device may be interrupted.

- *no:* The communication object *In operation* is not enabled.
- *send value 0/1 cyclically:* The communication object *In Operation* is sent cyclically on the KNX.
  An additional parameter appears:

  **Sending cycle time in s [1…65,535]**

  Options: 1…60…65,535

  Here the time interval, at which the *In operation* communication object cyclically sends a telegram, is set.

| **Note** |
|---|
| After bus voltage recovery, the communication object sends its value after the set sending and switching delay. |

**Enable communication object**
**"Request status values" 1 bit**

Options: no
yes

- *yes:* A 1 bit communication object *Request status values* is enabled.

Via this communication object, all status messages can be requested provided that they have been parameterized with the option *after a change or request*.

With option *yes,* the following parameters appear:

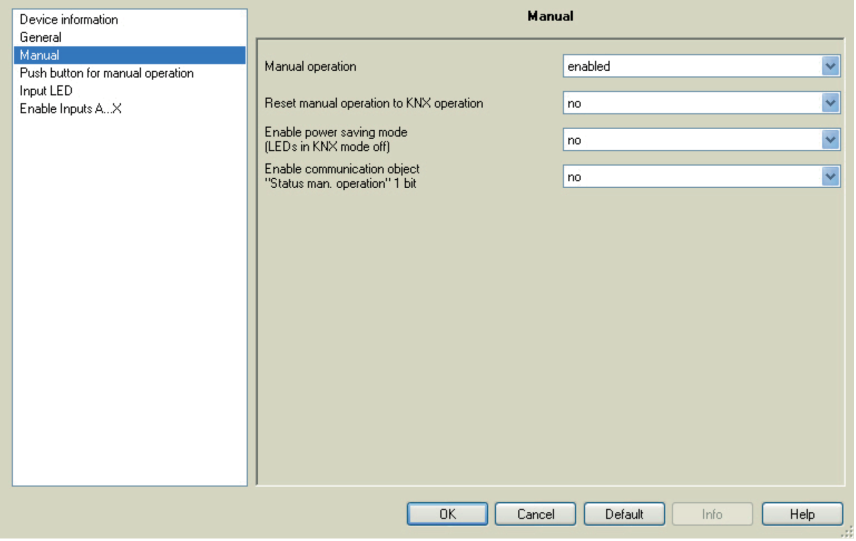
**Recall with object value**

Options: 0
1
0 or 1

- *0:* Sending status messages is requested with the value 0.
- *1: Sending status messages is requested with the value 1.*
- *0 or 1:* Sending of the status messages is requested with the values 0 or 1.

### 3.2.3 Parameter window *Manual*

All the settings for manual operation are made in this parameter window.



| | |
|---|---|
| Manual operation | enabled |
| Reset manual operation to KNX operation | no |
| Enable power saving mode (LEDs in KNX mode off) | no |
| Enable communication object "Status man. operation" 1 bit | no |

**Manual operation**

| | |
|---|---|
| Options: | enable/disable via communication object<br>enabled<br>disabled |

This parameter defines if the switch over between the operating states *Manual operation* and *KNX operation* is enabled or disabled via the button ✋ on the device.

- *enable/disable via communication object:* The communication object *Enable/block manual operation* (No. 2) appears.

| | |
|---|---|
| Telegram value | 0 = button ✋ enabled<br>1 = button ✋ disabled |

**Note**

In manual operation, the applied input states can be overwritten.

**Note**

Using the communication object *Block* (No. 10), the physical input as well as the communication object *Event 0/1* are disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

The communication object *Block* (No.10) has no influence on manual operation.

### Reset manual operation to KNX operation

Options: no<br>
after 1/3/10/30 minute(s)

This parameter determines how long the Binary Input remains in the *Manual operation* mode after pressing the ✋ button.

- *no:* The Binary Input remains in *Manual operation,* until the button ✋ is pressed again.
- *after X minutes:* The Binary Input remains in *Manual operation* after the last button push, until either button ✋ is pushed again or the programmed time has timed out.

### Enable power saving mode (LEDs in KNX mode off)

Options: no<br>
after 1/3/10/30 minute(s)

This parameter determines whether the yellow LEDs for manual operation in KNX mode should be switched off after a parameterized time.
The device and the channels are still controlled via the bus; however, the current status of the channels is not displayed via the yellow LEDs.

When any button is pressed, the power saving mode is interrupted and the status of the inputs is shown even if manual operation is inhibited. If no other button is pressed, the power saving mode is reactivated after the parameterized time and the LEDs switch off.

| Note |
|---|
| All options to reset a device, e.g. via a download, an ETS reset or bus voltage recovery are treated with the same priority in power saving mode. |

- *no:* LED display is activated.
- *after 1/3/10/30 minute(s):* The power saving mode is activated after the time parameterized here. The power saving mode is interrupted with the following actions, and the status is displayed.
  - Switch-over to KNX mode
  - Interruption of power saving mode by pressing a button
  - Programming, download or ETS reset

### Enable communication object "Status man. operation" 1 bit

Options: no<br>
yes

- *yes:* The communication object *Status man. operation* (No. 3) is enabled. An additional parameter appears:

**Send object value**

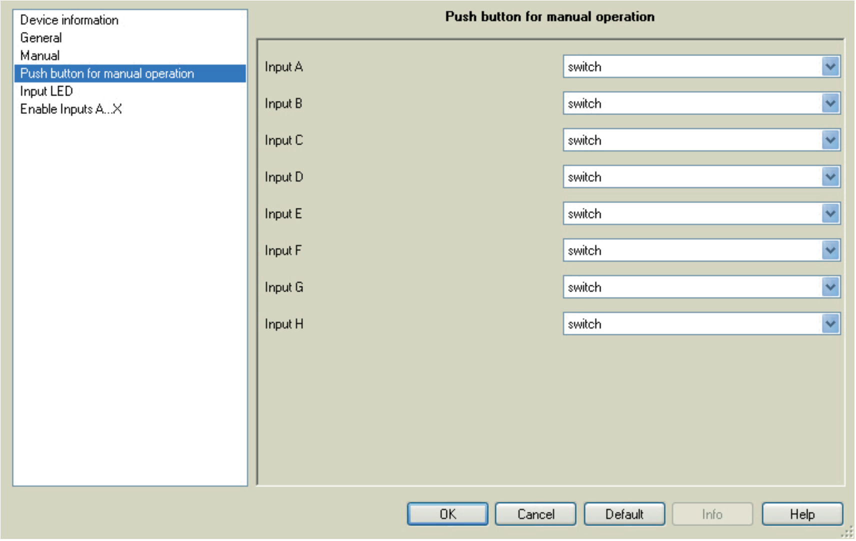
Options: no, update only
after a change
after request
after a change or request

- *no, update only:* The status is updated but not sent.
- *after a change:* The status is sent after a change.
- *after request:* The status is sent after a request.
- *after a change or request:* The status is sent after a change or a request.

***For further information see: Manual operation, page 26***

### 3.2.4 Parameter window *Push button for manual operation*

In this parameter window, the binary inputs are enabled or blocked and the configuration (switch, button) is determined.



Push button for manual operation

| | |
|---|---|
| Input A | switch |
| Input B | switch |
| Input C | switch |
| Input D | switch |
| Input E | switch |
| Input F | switch |
| Input G | switch |
| Input H | switch |

**Input A**

Options: diasble
<u>switch</u>
push button

With this parameter, input A can be disabled or enabled as a switch or push button.

- *disable:* The binary input is disabled.
- *switch:* With every actuation, the states of the input and the LED are changed.
- *push button:* Press button => input closed, LED on
  Release button => input opened, LED off

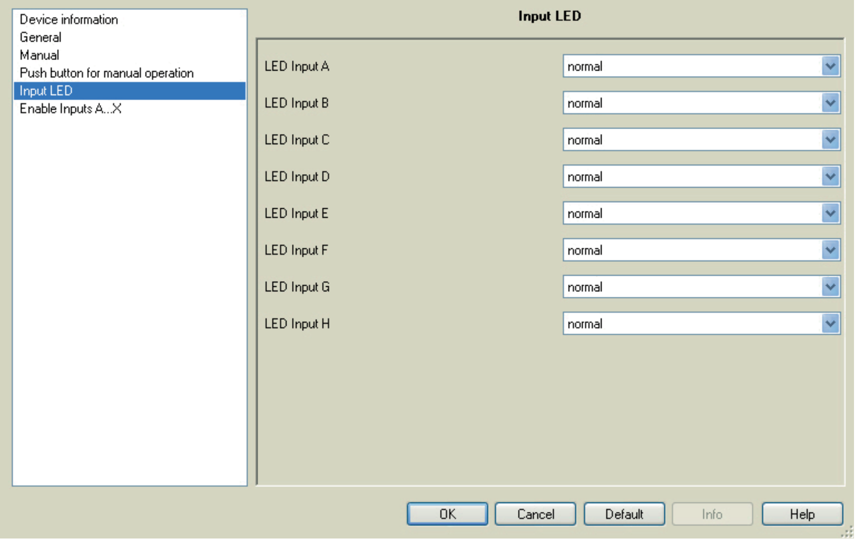
| **Note** |
|---|
| By pressing button Ⓐ, binary input A is simulated.<br>The display 💡 indicates the current input state. The parameterized features are executed. |

**Input B…X**

The operation of input A does not differ from the operation of inputs B…X.

### 3.2.5 Parameter window *Input LED*

The settings for the LED of the binary input can be undertaken in this parameter window.



Input LED

| | |
|---|---|
| LED Input A | normal |
| LED Input B | normal |
| LED Input C | normal |
| LED Input D | normal |
| LED Input E | normal |
| LED Input F | normal |
| LED Input G | normal |
| LED Input H | normal |

**LED input A**

Options: normal
disabled
inverted

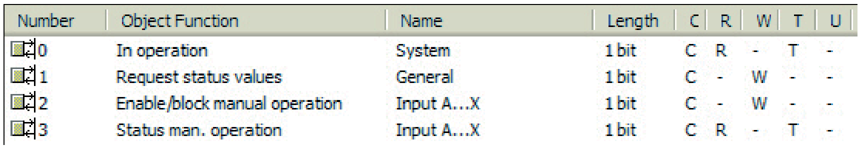
This parameter defines whether the LED display is normal or inverted. It is set separately for each Binary Input.

- *normal:* Contact is closed => signal present => LED on
  Contact is open => no signal => LED off
- *disabled:* The LED cannot be changed and remains disabled.
- *inverted:* Contact is closed => signal present => LED off
  Contact open => no signal => LED on

In this way, the LED display can be adapted to the input state for closed and opened contacts.

For fault alarms, e.g. both normally closed and normally opened contacts can be used.

### 3.2.6 Communication objects *General*



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 0 | In operation | System | 1 bit | C | R | - | T | - |
| 1 | Request status values | General | 1 bit | C | - | W | - | - |
| 2 | Enable/block manual operation | Input A...X | 1 bit | C | - | W | - | - |
| 3 | Status man. operation | Input A...X | 1 bit | C | R | - | T | - |

<table>
<tr><td>No.</td><td>Function</td><td>Object name</td><td>Data type</td><td>Flags</td></tr>
<tr><td><b>0</b></td><td><b>In operation</b></td><td><b>System</b></td><td><b>1 bit</b><br><b>DPT 1.002</b></td><td><b>C, R, T</b></td></tr>
<tr><td colspan="5">The communication object is enabled if the parameter <i>Send communication object "in operation"</i> in the parameter window <i>General</i> has been selected with <i>yes</i>.<br>In order to regularly monitor the presence of the device on the KNX, an in operation monitoring telegram can be sent cyclically on the bus.<br>As long as the communication object is activated, it sends a programmable in operation telegram.</td></tr>
<tr><td><b>1</b></td><td><b>Request status values</b></td><td><b>General</b></td><td><b>1 bit</b><br><b>DPT 1.017</b></td><td><b>C, R, T</b></td></tr>
<tr><td colspan="5">If a telegram with the value x (x = 0/1/0 or 1) is received in the communication object, all status objects are sent on the bus, as long as these have not been programmed with the option <i>after a change or request</i>.<br>The following function results for the option x = 1:<br>Telegram value: 1 = all status messages are sent, provided they are programmed with the option <i>after a change or request.</i><br>0 = no reaction</td></tr>
</table>

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **2** | **Enable/block manual operation** | **Manual operation** | **1 bit**<br>**DPT 1.003** | **C, R, T** |

Manual operation is enabled or disabled via this communication object.

> **Note**
>
> If this communication object is assigned to a group address, manual operation is disabled after each download, ETS reset or bus voltage recovery.

If the value 0 is in this communication object, then the binary input can be switched to *Manual operation* using the ✋ button on the device.
If this communication object has a 1, the Binary Input is in KNX operation.

| | |
|---|---|
| Telegram value: | 0 = button ✋ enabled |
| | 1 = button ✋ disabled |

> **Note**
>
> Using the communication object *Block* (No. 10), the physical input as well as the communication object *Event 0/1* are disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.
>
> The communication object *Block* (No.10) has no influence on manual operation.

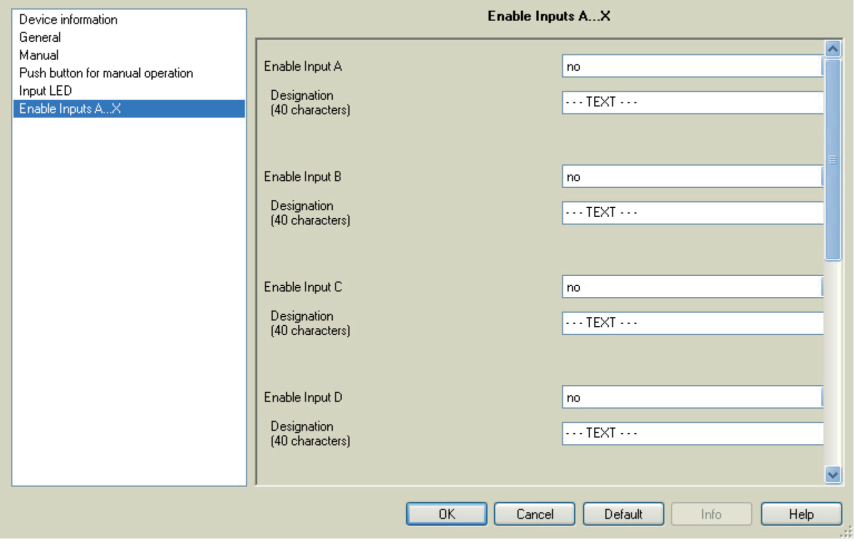
| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **3** | **Status man. operation** | **Manual operation** | **1 bit**<br>**DPT 1.003** | **C, R, T** |

On this communication object, the binary input sends the information regarding whether it is in *Manual operation* or *KNX operation*.
The status is sent after a change.

| | |
|---|---|
| Telegram value: | 0 = KNX operation |
| | 1 = manual operation |

### 3.2.7 Parameter window *Enable Inputs A…X*

In this parameter window, all the settings for *Enabl Inputs A…X* are undertaken.



Enable Inputs A...X

Enable Input A: no
Designation (40 characters): --- TEXT ---

Enable Input B: no
Designation (40 characters): --- TEXT ---

Enable Input C: no
Designation (40 characters): --- TEXT ---

Enable Input D: no
Designation (40 characters): --- TEXT ---

**Note**

In the following, the setting possibilities of *Inputs A…X* are explained using input A as an example.

The setting possibilities are identical for all inputs.

**Enable Input A**

Options: no
yes

- *yes:* An additional parameter appears:

**Operating mode**

Options: Switch sensor/Fault monitoring input
Switch/Dim sensor
Blind sensor
Value/Forced operation
Control scene
Switching sequences
Multiple operation
Counter

The operating mode of the input is defined with this parameter. The respective parameter window *A: xxx* also becomes visible with the selection of an operating mode.

**Designation (40 characters)**

Options: - - - TEXT - - -

With this parameter, it is possible to enter a text of up to 40 characters in length for identification in the ETS.

| Note |
|---|
| This entered text is used to assist in providing a quick and simple overview of the assignment and function of the inputs.<br>The text is purely for informative purposes and has no further function. |

**Inputs B…X**

| Note |
|---|
| The parameter descriptions should be taken from the description of input A! |

### 3.2.8 Operating mode *Switch sensor/Fault monitoring input*

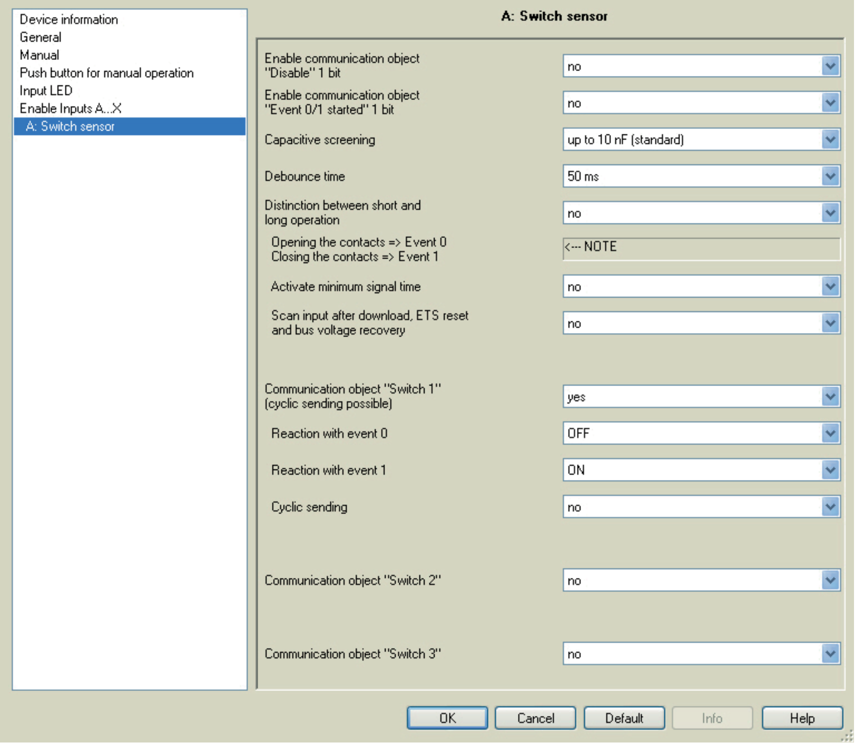
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Switch sensor/Fault monitoring input*.

| **Note** |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

### 3.2.8.1 Parameter window *A: Switch sensor*

In this parameter window, all settings are undertaken for parameter window *A: Switch sensor*. The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Switch sensor/Fault monitoring* input has been selected in parameter Input A.



A: Switch sensor

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Enable communication object "Event 0/1 started" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Distinction between short and long operation | no |
| Opening the contacts => Event 0<br>Closing the contacts => Event 1 | <--- NOTE |
| Activate minimum signal time | no |
| Scan input after download, ETS reset and bus voltage recovery | no |
| Communication object "Switch 1" (cyclic sending possible) | yes |
| Reaction with event 0 | OFF |
| Reaction with event 1 | ON |
| Cyclic sending | no |
| Communication object "Switch 2" | no |
| Communication object "Switch 3" | no |

**Enable communication object "Disable" 1 bit**

Options: <u>no</u>
yes

- *yes:* The 1 bit *Block* communication object is enabled. The input can be enabled or disabled.

**Note**

If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.

Using the communication object *Block* (No. 10), the physical input as well as the communication object *Event 0/1* are disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

The communication object *Block* (No.10) has no influence on manual operation.

### Enable communication object "Event 0/1 started" 1 bit

Options: no
yes

- *yes:* The 1 bit communication object *Event 0/1 started* is enabled. As a result, the same events, such as those of the push button/switch connected to the binary input, can also be triggered by the receipt of a telegram on the communication object *Event 0/1 started*. A set *Minimum signal time* or *Distinction between short and long operation* is not taken into consideration, i.e. the event is implemented immediately. Also refer to the block diagram *Switch sensor*, page 139.

> **Note**
>
> If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.
>
> Using the communication object *Block* (No. 10), the physical input as well as the communication object *Event 0/1* are disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.
>
> The communication object *Block* (No.10) has no influence on manual operation.

### Capacitive screening

Options: up to 10 nF (standard)
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening. Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 $mm^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

### Debounce time

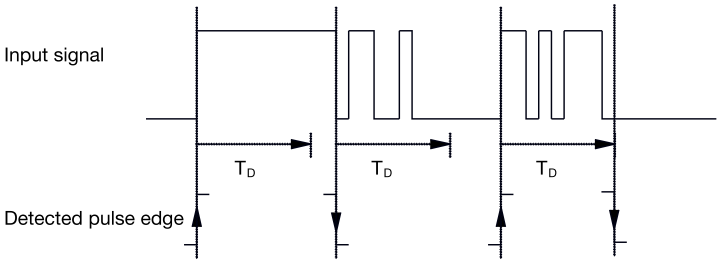
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

**What is the debounce time?**

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

**Example: Debounce time of the input signal for a detected edge:**



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

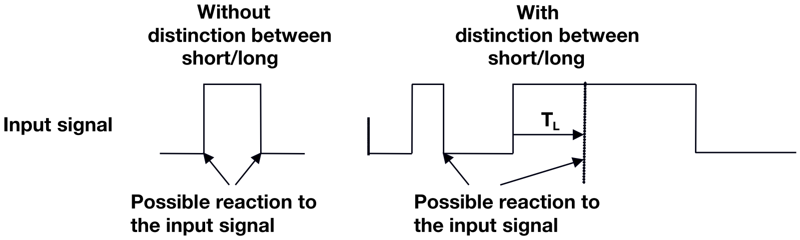
### Distinction between short and long operation

Options: yes
<u>no</u>

Using this parameter, you set if the input differentiates between short and long operation.

- *yes:* After opening/closing of the contact, first of all it is necessary to ascertain whether a short or long operation has occurred here. Only thereafter will a possible reaction be triggered.

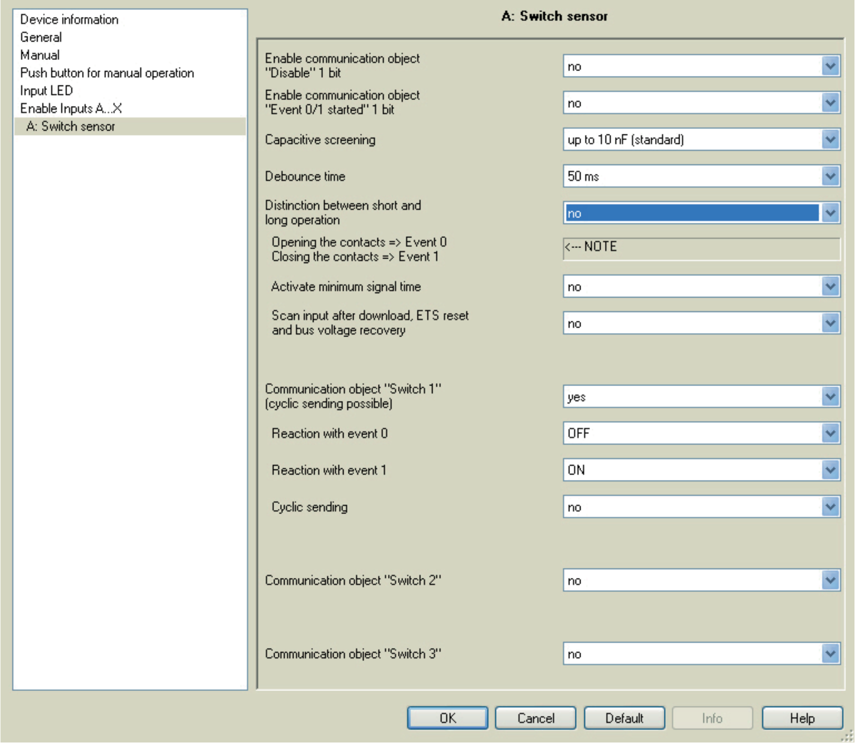
The following drawing shows the function in detail:


Without distinction between short/long
With distinction between short/long
Input signal
$T_L$
Possible reaction to the input signal
Possible reaction to the input signal

$T_L$ is the time duration from where a long operation is detected.

### 3.2.8.1.1 Parameter *Distinction between short and long operation – no*

If the option *no* is selected with the parameter *Distinction between short and long operation*, the following parameters in the parameter window *A: Switch sensor*, page 53, are visible.



A: Switch sensor

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Enable communication object "Event 0/1 started" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Distinction between short and long operation | no |
| Opening the contacts => Event 0<br>Closing the contacts => Event 1 | <--- NOTE |
| Activate minimum signal time | no |
| Scan input after download, ETS reset and bus voltage recovery | no |
| Communication object "Switch 1" (cyclic sending possible) | yes |
| Reaction with event 0 | OFF |
| Reaction with event 1 | ON |
| Cyclic sending | no |
| Communication object "Switch 2" | no |
| Communication object "Switch 3" | no |

**Opening the contacts => Event 0**
**Closing the contacts => Event 1**

<--- NOTE

**Activate minimum signal time**

Options: <u>no</u>
yes

- *yes:* The following parameters appear:

**On closing the contact in value x 0.1 s [0…65,535]**

Options: 1…<u>10</u>…65.535

**On opening the contact in value x 0.1 s [0…65,535]**

Options: 1…<u>10</u>…65.535

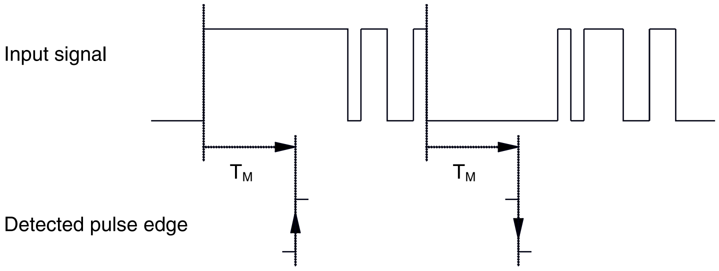
### What is the minimum signal time?

In contrast to the debounce time, a telegram is only sent, after the minimum signal duration has elapsed.

The individual functions are:

If an edge is detected on the input, the minimum signal duration will commence. No telegram is sent on the bus at this time. The signal on the input is observed within the minimum signal duration. If a further edge appears at the input during the minimum signal duration, it will be interpreted as a new operation, and the minimum signal duration restarts.
If no further edges occur after the start of the minimum signal duration, a telegram is sent on the bus, after the minimum signal duration has timed out.

**Example: Minimum signal time of the input signal for a detected edge:**



In only two cases, no further edge changes occur within the minimum signal duration $T_M$ after a change of edge. For this reason, only both of these are detected as valid.

### Scan input after download, ETS reset and bus voltage recovery

Options: no
yes

- *yes:* The value of the communication object is scanned after a download, ETS reset and bus voltage recovery.
- *no:* The value of the communication object is not scanned after a download, ETS reset and bus voltage recovery.

With option yes, the following additional parameters appear in the parameter:

**Inactive wait state after bus voltage recovery in s [0…30,000]**

Options: 0…30,000

Here the waiting time after a bus voltage recovery is set. After the waiting time has elapsed, the state on the input terminals is scanned. The input reacts as if the state on the input terminals has just changed.

**Note**

The inactive waiting time does not add to the actual, adjustable send delay time. This can be set separately.

**Communication object "Switch 1" (cyclic sending possible)**

Options: no
yes

- *yes:* The communication object *Switch 1* appears.
  In addition, the following parameters appear:

**Reaction with event 0**

Options: ON
OFF
TOGGLE
no reaction
terminate cyclic sending

**Reaction with event 1**

Options: ON
OFF
TOGGLE
no reaction
terminate cyclic sending

The behaviour of the communication object is determined here. If the option *yes* has been selected with the parameter *Distinction between short and long operation*, the reaction occurs with a short or long operation. With the option *no* it occurs with each edge change.

**Important**

If the option *terminate cyclic sending* is set, it is important to note that this is only effective if the option *yes* has only been selected in the following *Cyclic sending* parameter.

**Cyclic sending**

Options: no
yes

**What is cyclic sending?**

Cyclic sending enables the communication object *Switch* to send automatically at a fixed interval. If cyclic sending is only carried out for a specific communication object value (ON or OFF), this condition refers to the value of the communication object. It is therefore possible in principle to start cyclic sending by sending a value to the communication object *Switch*. As this behaviour is unwanted, the flags *Write* and *Update* of the communication object are deleted in the preliminary setting, so that they cannot be changed via the bus. If this functionality is still required however, these flags should be set accordingly. When the communication object *Switch* changes and after bus recovery (after the send delay time has elapsed), the communication object value is sent immediately on the bus, and the sending cycle time restarts.

- *yes:* Other parameters appear:

**Telegram is repeated every in s [1...65,535]**

Options: 1…60…65,535

This parameter determines the time intervals, at which telegrams are repeated.

**on object value**

Options: 0
1
0 or 1

- *0:* Cyclic sending is requested with the value 0.
- *1:* Cyclic sending is requested with the value 1.
- *0 or 1:* Cyclic sending is requested with the values 0 or 1.

**Communication object “Switch 2”**

**Communication object “Switch 3”**

Options: no
yes

- *yes:* The communication object *Switch 2* becomes visible. Additional parameters appear:

**Reaction with event 0**

Options: ON
OFF
TOGGLE
no reaction

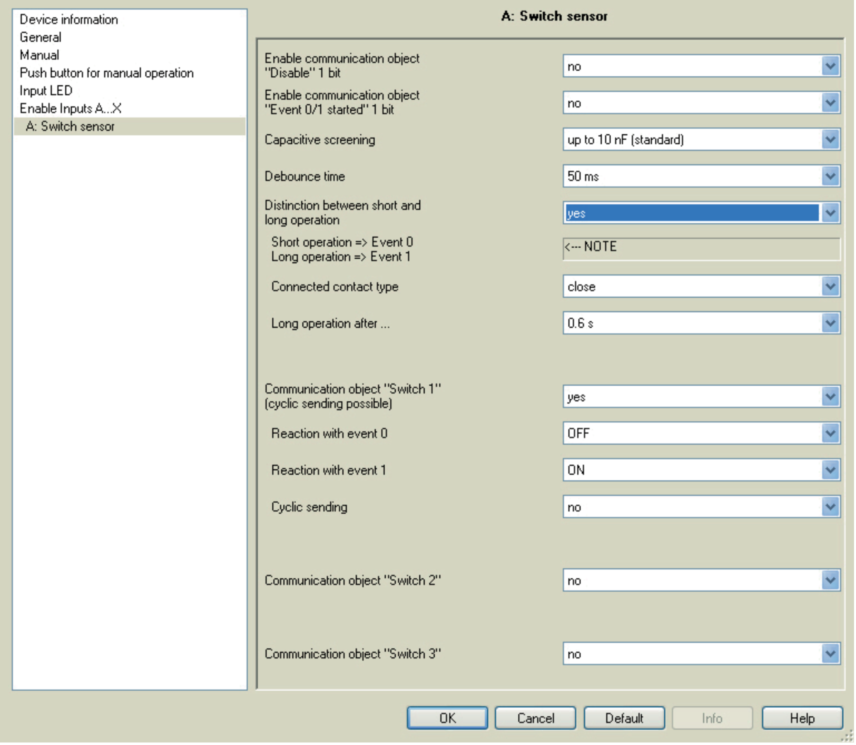
**Reaction with event 1**

Options: ON
OFF
TOGGLE
no reaction

The behaviour of the communication object is determined here. If the option *yes* has been selected with the parameter *Distinction between short and long operation*, the reaction occurs with a short or long operation. With the option *no* it occurs with each edge change.

### 3.2.8.1.2 Parameter *Distinction between short and long operation – yes*

If the option *yes* is selected with the parameter *Distinction between short and long operation*, the following parameters in the parameter window *A: Switch sensor*, page 53, are visible.



A: Switch sensor

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Enable communication object "Event 0/1 started" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Distinction between short and long operation | yes |
| Short operation => Event 0<br>Long operation => Event 1 | <--- NOTE |
| Connected contact type | close |
| Long operation after ... | 0.6 s |
| Communication object "Switch 1" (cyclic sending possible) | yes |
| Reaction with event 0 | OFF |
| Reaction with event 1 | ON |
| Cyclic sending | no |
| Communication object "Switch 2" | no |
| Communication object "Switch 3" | no |

**Short operation => Event 0**
**Long operation => Event 1**

<--- NOTE

**Connected contact type**

Options: closed
open

- *closed:* The input is closed with actuation.
- *open:* The input is opened with actuation.

If a normally open contact is connected to the input, the option *closed* should be selected; on a normally closed contact, the option *open* should be selected.

**Long operation after …**

Options: 0.3/0.4/0.5/0.6/0.8 s
1/1.2/1.5 s
2/3/4/5/6/7/8/9/10 s

Here the time period $T_L$, after which an actuation is considered a “long” operation, is defined.

| **Note** |
|---|
| The remaining parameter descriptions can be found in the parameter *Distinction between short and long operation – no*,<br>page 55. |

### 3.2.8.1.3 Special function *Fault monitoring input*

**Note**

For the operating mode *Fault monitoring input* the, options must be adapted in comparison to the standard settings.
The options for *Fault monitoring input* are listed separately in the following.

In this chapter, only the parameters, which are relevant for optimum *Fault monitoring input* performance, are listed.

All descriptions of the parameter should be taken from parameter window *A: Switch sensor*, page 53.

**Debounce time**

| Options: | Fault monitoring option: |
|---|---|
| 10/20/30/50/70/100/150 ms | 50 ms |

**Distinction between short and long operation**

| Options: | Fault monitoring option: |
|---|---|
| yes/no | no |

**Activate minimum signal time**

| Options: | Fault monitoring option: |
|---|---|
| yes/no | yes |

**On closing the contact in value x 0.1 s [1…65,535]**

| Options: | Fault monitoring option: |
|---|---|
| 1…10…65,535 | 2 |

**On opening the contact in value x 0.1 s [1…65,535]**

| Options: | Fault monitoring option: |
|---|---|
| 1…10…65,535 | 2 |

**Note**

Depending on the system type, a minimum signal duration setting of, e.g. two seconds is recommended. With the evaluation for example of coupling switches, generator switches or incoming circuit-breakers from switchgear systems, a smaller minimum signal time of 100 ms, for example, may be necessary.

It is essential to co-ordinate the switching times with the operator! Smaller signal/switch times may be required depending on the system.

**Scan input after download, ETS reset and bus voltage recovery**

| Options: | Fault monitoring option: |
|---|---|
| yes/no | yes |

**Inactive wait state after bus voltage recovery in s [0…30,000]**

| Options: | | Fault monitoring option: |
|---|---|---|
| 0…30,000 | 0 | |

**Communication object "Switch 1" (cyclic sending possible)**

| Options: | Fault monitoring option: |
|---|---|
| no | yes |
| yes | |

**Reaction with event 0**

| Options: | Fault monitoring option: |
|---|---|
| ON | partly adjustable |
| OFF | |
| TOGGLE | |
| no reaction | |
| terminate cyclic sending | |

**Reaction with event 1**

| Options: | Fault monitoring option: |
|---|---|
| ON | partly adjustable |
| OFF | |
| TOGGLE | |
| no reaction | |
| terminate cyclic sending | |

**Cyclic sending**

| Options: | Fault monitoring option: |
|---|---|
| yes/no | yes |

**on object value**

| Options: | Fault monitoring option: |
|---|---|
| 0 | 0 or 1 |
| 1 | |
| 0 or 1 | |

**Telegram is repeated every in s [1...65,535]**

| Options: | Fault monitoring option: |
|---|---|
| 1…60…65,535 | 30 |

**Communication object "Switch 2"**
**Communication object "Switch 3"**

| Options: | Fault monitoring option: |
|---|---|
| no | no |
| yes | |

**Note**

Fault messages are generally passed onto the main bus.
With 500 fault messages, the option 30 s means that every 60 ms a telegram is sent on the main line. For this reason, it is essential to ensure that the send delay time is set, so that no telegram is lost if the bus voltage fails.

### 3.2.8.2 Communication objects *Switch sensor*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

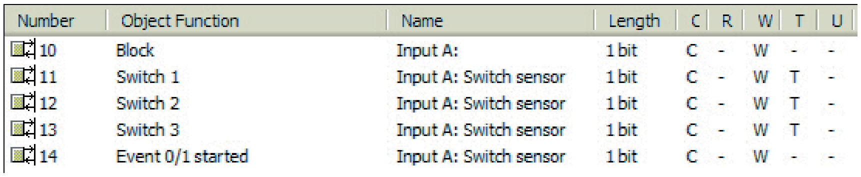
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | Switch 1 | Input A: Switch sensor | 1 bit | C | - | W | T | - |
| 12 | Switch 2 | Input A: Switch sensor | 1 bit | C | - | W | T | - |
| 13 | Switch 3 | Input A: Switch sensor | 1 bit | C | - | W | T | - |
| 14 | Event 0/1 started | Input A: Switch sensor | 1 bit | C | - | W | - | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Switch sensor* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input as well as the communication object *Event 0/1* can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

**Note**

When the input is disabled, there is fundamentally no reaction to a signal change on the input, but:

– Waiting for a long button operation or a minimum signal time is suspended.
– Parameterized *Cyclic sending* is not interrupted.
– The description of the communication object *Switch x* is still possible.

If the input state changes during the blocked phase, this leads to immediate sending of the new communication object value after enabling. If the input state remains the same during the blocking phase, the communication object value is not sent.

The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

| | |
|---|---|
| Telegram value: | 0 = enable input A<br>1 = disable input A |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **11** | **Switch 1** | **Input A:**<br>**Switch sensor** | **1 bit**<br>**DPT 1.001** | **C, W, T** |
| This communication object is enabled if in the parameter window *Enable Inputs A…X*, the parameter *Input A* has been selected with the option *Switch sensor/Fault monitoring input*.<br>In accordance with the parameter setting, this communication object can be switched by actuation of the input to *ON, OFF* or *TOGGLE*.<br>With toggle the previous value, e.g. 1, is toggled directly to the value 0.<br>The communication object can be sent cyclically, e.g. for life sign monitoring of the sensor.<br>**Note**<br>The communication object can be written to externally. Thus cyclic sending is interrupted or may not even be possible depending on the parameter setting.<br>No further communication objects are visible with the setting.<br>Telegram value: 0 = OFF<br>1 = ON | | | | |
| **12** | **Switch 2** | | | |
| See communication object 11. | | | | |
| **13** | **Switch 3** | | | |
| See communication object 11. | | | | |
| **14** | **Event 0/1 started** | **Input A:**<br>**Switch sensor** | **1 bit**<br>**DPT 1.001** | **C, W** |
| This communication object is enabled if in parameter window *A: Switch sensor* the parameter *Enable communication object "Event 0/1 started" 1 bit* has been selected with option *yes*.<br>The 1 bit communication object *Event 0/1 started* is enabled. As a result, the same events except those of the push button/switch connected to the binary input can also be triggered by the receipt of a telegram on the communication object *Event 0/1 started*.<br>Telegram value: 0 = start event 0<br>1 = start event 1 | | | | |
| **15…**<br>**19** | | | | |
| Not assigned in this operating mode. | | | | |

### 3.2.9 Operating mode *Switch/Dim sensor*

This operating mode allows the operation of dimmable lighting.

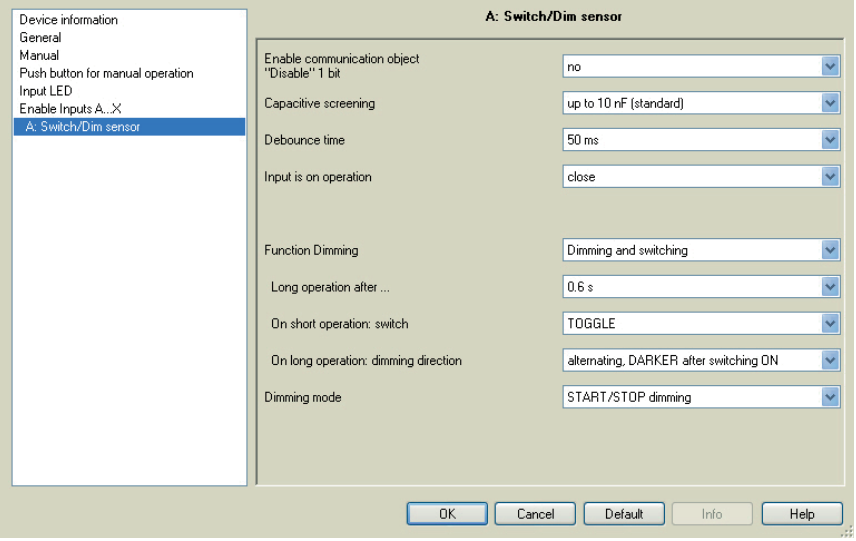
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Switch/Dim sensor*.

| **Note** |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

### 3.2.9.1 Parameter window *A: Switch/Dim sensor*

In this parameter window, all settings are undertaken for parameter window *A: Switch/Dim sensor*. The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enabe Inputs A…X*, page 50, the option *Switch/Dim sensor* has been selected in parameter *Input A*.



A: Switch/Dim sensor

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Input is on operation | close |
| Function Dimming | Dimming and switching |
| Long operation after ... | 0.6 s |
| On short operation: switch | TOGGLE |
| On long operation: dimming direction | alternating, DARKER after switching ON |
| Dimming mode | START/STOP dimming |

**Enable communication object "Disable" 1 bit**

Options: <u>no</u>
yes

- *yes:* The 1 bit *Block* communication object is enabled.
  This can be used to block the input.

| Note |
|---|
| If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.<br>Using the communication object *Block* (No. 10), the physical input can be disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.<br>The communication object *Block* (No. 10) has no influence on manual operation. |

#### Capacitive screening

Options: <u>up to 10 nF (standard)</u>
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening. Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 mm$^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

#### Debounce time

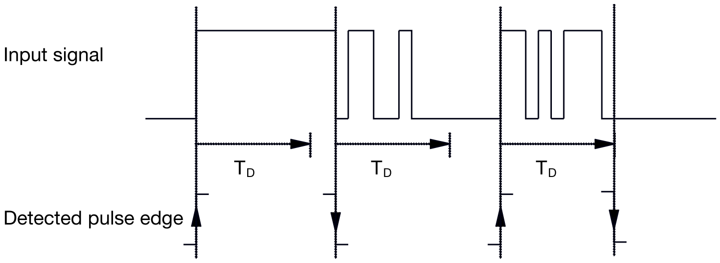
Options: 10/20/30/<u>50</u>/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

**What is the debounce time?**

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

#### Connected contact type

Options: <u>closed</u>
open

- *closed:* The input is closed with actuation.
- *open:* The input is opened with actuation.

**Function Dimming**

Options: <u>Dimming and switching</u>
Only dimming

With this parameter, you define if the lighting can only be dimmed (*Only dimming*) or if additional switching is also permitted (*Dimming and switching*). In this case, a long button push dims and a short button push switches.

**How does 1 button dimming function?**

Switch and dim functions can be controlled completely using a single push button. With each long operation, alternate BRIGHTER or DARKER dimming occurs, or with short operation alternate switch on or off occurs.

If the communication object *Switch* = 0, a BRIGHTER telegram is sent at all times. In order to evaluate the switch feedback of the actuator, the write flag of the communication object *Switch* is set.

The following table shows the function in detail:

| **Value of the communication object Switch** | **Value of the last dimming telegram** | **Reaction to dimming actuation (sent dimming telegram)** |
|---|---|---|
| OFF | DARKER | BRIGHTER |
| OFF | BRIGHTER | BRIGHTER |
| ON | DARKER | BRIGHTER |
| ON | BRIGHTER | DARKER |

The advantage of the *Only dimming* function is that no distinction is made between short and long actuation. The dimming telegram is initiated immediately after actuation in this way. It is not necessary to wait for a long operation.

**How does 2 button dimming function?**

If *2 button dimming* is required, the functions of the individual buttons should be set with the parameters *Reaction on short operation* or *Reaction on long operation*, e.g. ON or BRIGHTER.

The user thus has the choice of the buttons to be combined with one another, e.g. to dim a lighting group or the function that the individual buttons should perform in this case.

Furthermore, two inputs are required for 2 button dimming, e.g. *Input A* with short operation for switch ON and long operation for BRIGHTER dimming. *Input B* with short operation for switch OFF and long operation for DARKER dimming.

If the option *Dimming and switching* is selected with the parameter *Function Dimming*, the parameters *Long operation after…, On short operation*: *switch* and *On long operation*: *dimming direction* in parameter window A: *Switch/Dim sensor* are visible.

### Long operation after …

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

Here the time period $T_L$, after which an actuation is considered a “long” operation, is defined.

### On short operation: switch

Options: ON
OFF
TOGGLE
no reaction

This parameter defines if the communication object *Telegram switch* TOGGLEs with short operation (typical: 1 button dimming) or only switches *OFF* or *ON* (typically: 2 button dimming).

- *TOGGLE:* A short operation changes the value of the communication object *Telegram switch*.
- *ON:* On short operation the value 1 is sent.
- *OFF:* On short operation the value 0 is sent.

### On long operation: dimming direction

Options: BRIGHTER
DARKER
alternating
alternating, BRIGHTER after switching ON
alternating, DARKER after switching ON:

With this parameter, you set what the communication object *Dimming* should send on the bus with a long operation.
A long operation changes the value of the communication object *Telegram Dimming*.
With 1 button dimming the parameter *alternating* should be set for Dimming here. In this case, the dimming telegram, which is diametrically opposed to the last dimming telegram, is sent.

- *BRIGHTER*: The communication object sends a BRIGHTER telegram.
- *DARKER*: The communication object sends a DARKER telegram.
- *alternating*: The communication object alternately sends a BRIGHTER and a DARKER telegram.
- *alternating, BRIGHTER after switching ON* The communication object at the first time sends a BRIGHTER telegram after an ON telegram; thereafter, it alternately sends BRIGHTER and DARKER telegrams.
- *alternating, DARKER after switching ON*: The communication object at the first time sends a DARKER telegram after an ON telegram, thereafter, it alternately sends BRIGHTER and DARKER telegrams.

| **Note** |
|---|
| If the option *Only dimming* is selected in the *Function Dimming*, only the parameter *On operation*: *dimming direction* is visible. |

**Dimming mode**

Options: START/STOP dimming:
Dimming steps

- *START/STOP dimming:* The dimming process starts with a telegram BRIGHTER or DARKER and ends with a STOP telegram.

4 bit dimming telegram:

| Decimal | Hexadecimal | Binary | Dimming telegram |
|---|---|---|---|
| 0 | 0 | 0000 | STOP |
| 1 | 1 | 0001 | 100 % DARKER |
| 8 | 8 | 1000 | STOP |
| 9 | 9 | 1001 | 100 % BRIGHTER |

***For further information see: Input 4 bit dimming telegram, page 149***

- *Dimming steps:* Dimming telegrams are sent cyclically during a long operation. Cyclic sending is terminated after the end of actuation.

Both of the next parameters only appear if in the parameter *Dimming mod*e the option *Dimming steps* has been set.

**Brightness change on every sent telegram**

Options: 100/50/25/12.5/6.25/3.13/1.56 %

Using this parameter, you set the brightness change in percent, which is cyclically sent with every dim telegram.

**Telegram is repeated every in s**

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

This parameter determines the time intervals, at which telegrams are repeated.

## Caution

With dimming steps, ensure that the set time duration for telegram repetition is matched on the dimming actuator to facilitate a smooth dimming process.
Should the input be disabled during the dimming step, the dimming telegrams will continue to run until the end of the blocking period.

### 3.2.9.2 Operating mode *Switch/Dim sensor*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

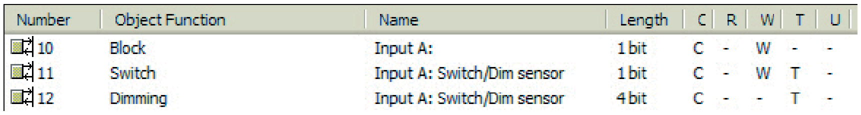
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | Switch | Input A: Switch/Dim sensor | 1 bit | C | - | W | T | - |
| 12 | Dimming | Input A: Switch/Dim sensor | 4 bit | C | - | - | T | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A:** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Switch/Dim sensor* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

**Note**

When the input is disabled, there is fundamentally no reaction to a signal change on the input, but:

– Waiting for a long button operation or a minimum signal time is suspended.
– Parameterized *Cyclic sending* is interrupted with dimming steps.
– Writing to communication object *Switch* is still possible.

When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:

– The minimum actuation or detection of a long/short button push starts.
– Communication objects send their value if necessary.

The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

Telegram value: 0 = enable input A
1 = disable input A

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **11** | **Switch** | **Input A:**<br>**Switch/Dim sensor** | **1 bit**<br>**DPT 1.001** | **C, W, T** |
| This communication object is enabled if in the parameter window *Enable Inputs A…X*, the parameter *Input A* has been selected with the option *Switch/Dim sensor*.In accordance with the parameter setting, this communication object can be switched by actuation of the input to *ON, OFF* or *TOGGLE*.<br>With toggle the previous value, e.g. 1, is toggled directly to the value 0.<br>With parameter setting *TOGGLE*, the communication object as the non-sending group address should be linked with the switch feedback of the dimming actuator (updating of the switching state).<br>**Note**<br>The communication object can be written to externally. Thus cyclic sending is interrupted or may not even be possible depending on the parameter setting.<br>No further communication objects are visible with the setting.<br>Telegram value: 0 = OFF<br>1 = ON | | | | |
| **12** | **Dimming** | **Input A:**<br>**Switch/Dim sensor** | **4 bit**<br>**DPT 3.007** | **C, T** |
| This communication object is enabled if in the parameter window *Enable Inputs A…X*, the parameter *Input A* has been selected with the option *Switch/Dim sensor*.<br>A long operation at the input has the effect that BRIGHTER or DARKER dim telegrams are sent via this communication object on the bus. A STOP telegram is sent and the cyclic sending of dim telegrams is stopped at the end of actuation with START-STOP-DIMMING. | | | | |
| **13…**<br>**19** | | | | |
| Not assigned in this operating mode. | | | | |

### 3.2.10 Operating mode *Blind sensor*

This operating mode allows the operation of blinds and roller shutters with buttons or switches.

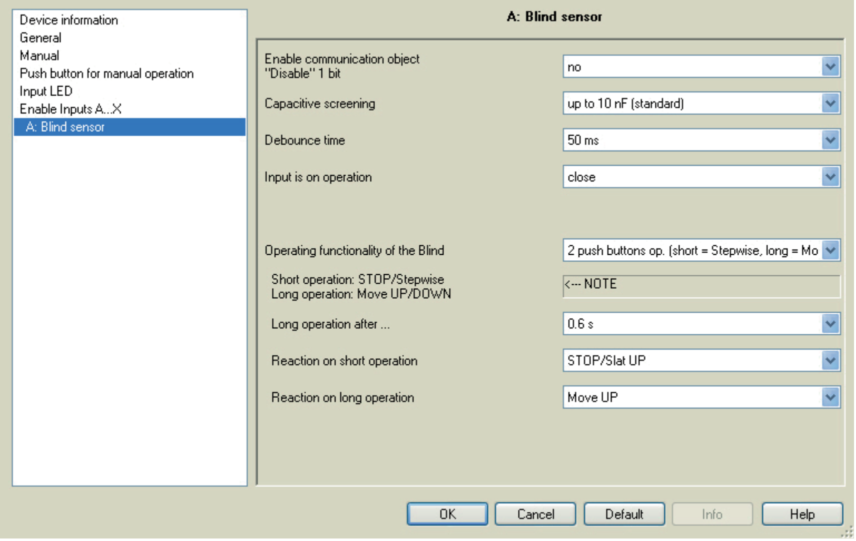
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Blind sensor*.

| **Note** |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

### 3.2.10.1 Parameter window *A: Blind sensor*

In this parameter window, all settings are undertaken for parameter window *A: Blind sensor*. The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Blind sensor* has been selected in parameter *Input A*.



A: Blind sensor

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Input is on operation | close |
| Operating functionality of the Blind | 2 push buttons op. (short = Stepwise, long = Mo |
| Short operation: STOP/Stepwise<br>Long operation: Move UP/DOWN | <--- NOTE |
| Long operation after ... | 0.6 s |
| Reaction on short operation | STOP/Slat UP |
| Reaction on long operation | Move UP |

**Enable communication object "Disable" 1 bit**

Options: <u>no</u>
yes

- *yes:* The 1 bit *Block* communication object is enabled. This can be used to block the input.

**Note**

If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.

Using the communication object *Block* (No. 10), the physical input can be disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

The communication object *Block* (No. 10) has no influence on manual operation.

### Capacitive screening

Options: up to 10 nF (standard)
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening.
Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 mm$^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

### Debounce time

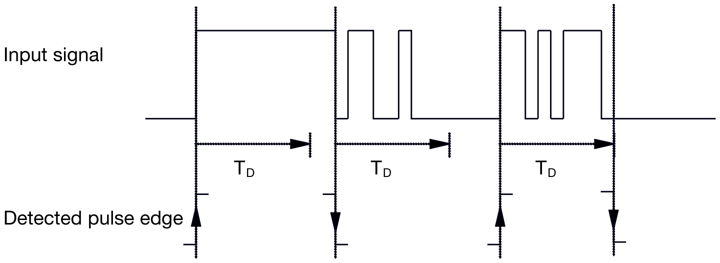
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

**What is the debounce time?**

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

### Connected contact type

Options: closed
open

- *closed:* The input is closed with actuation.
- *open:* The input is opened with actuation.

### Operating functionality of the Blind

Options: 1 push buttons op. (short = Stepwise, long = Move)
1 push button op. (short = Move, long = Stepwise)
1 push button operation (Move only - STOP)
1 switch operation (Move only)
2 push buttons op. (short = Stepwise, long = Move)
2 switches/push buttons operation (Move only)
2 push buttons operation (Move only)
2 push buttons operation (only Slat)

The following table provides an overview of the different blind operating modes:

| | |
|---|---|
| **1 push buttons op. (short = Stepwise, long = Move)** | |
| Short operation | STOP/stepwise<br>Opposite direction to the last movement telegram*<br>To return to slat adjustment, the blind must be moved UP or DOWN briefly. |
| Long operation | *Move UP* or *Move DOWN* |
| **1 push button op. (short = Move, long = Stepwise)** | |
| Short operation | *Move UP* or *Move DOWN* |
| Long operation | STOP/stepwise (Cyclic sending);<br>Opposite direction to the last movement telegram |
| **1 push button operation (Move only - STOP)** | |
| On operation | The following telegrams are sent in sequence:<br>…► *Move UP* ► *STOP/stepwise* ►<br>*Move DOWN* ► *STOP/stepwise* ► ... * |
| **1 switch operation (Move only)** | |
| On operation | *Move UP* or *Move DOWN* |
| End of operation | STOP/Stepwise* |
| **2 push buttons op. (short = Stepwise, long = Move)** | |
| Short operation | *STOP/Slat UP/CLOSE* (programmable) |
| Long operation | *Move UP* or *Move DOWN* (programmable) |
| **2 switches/push buttons operation (Move only)** | |
| On operation | *Move UP* or *Move DOWN* (programmable) |
| End of operation | *STOP/Slat UP/CLOSE* (programmable) |
| **2 push buttons operation (Move only)** | |
| On operation | *Move UP* or *Move DOWN* (programmable) |
| Next operation | *STOP* |
| **2 push buttons operation (only Slat)** | |
| On operation | *STOP/Slat UP or CLOSE* (programmable) |

* If the actuator indicates the limit position, in 1 button operation the communication object Blind UP/DOWN can be synchronized. If the actuator is in a limit position (see communication object Upper limit position or Lower limit position), the direction of movement is predefined. In 1 push button/switch operation, the last direction of movement is determined via the last update of the object Blind UP/DOWN. .

Depending on the selection made in the parameter *Operating functionality of the Blind*, different parameters will appear.

All parameters are described in the following:

**Long operation after …**

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

Here the time period $T_L$, after which an actuation is considered a "long" operation, is defined.

**Telegram "Slat" is repeated every**

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1,5/2/3/4/5/6/7/8/9/10 s

The time duration, at which the *Slat* telegram is to be repeated, is defined here.

**Reaction on short operation**

Options: STOP/Slat UP
STOP/Slat DOWN

**Reaction on long operation**

Options: Move UP
Move DOWN

It can be set whether the input triggers telegrams for movement upwards (UP) or downwards (DOWN).

**Reaction on operation**

Options: Move UP
Move DOWN

You can set whether the input triggers telegrams for movement upwards (Move UP) or downwards (Move DOWN).

### 3.2.10.2 Communication objects *Blind sensor*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

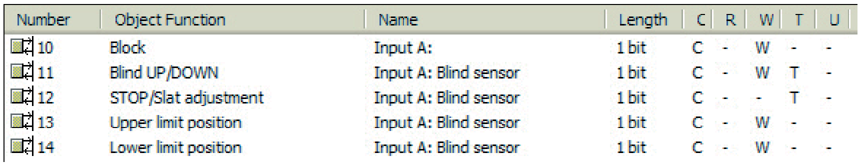
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | Blind UP/DOWN | Input A: Blind sensor | 1 bit | C | - | W | T | - |
| 12 | STOP/Slat adjustment | Input A: Blind sensor | 1 bit | C | - | - | T | - |
| 13 | Upper limit position | Input A: Blind sensor | 1 bit | C | - | W | - | - |
| 14 | Lower limit position | Input A: Blind sensor | 1 bit | C | - | W | - | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A:** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Blind sensor* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

**Note**

When the input is disabled, there is fundamentally no reaction to a signal change, but:

– Waiting for a long button operation or a minimum signal time is suspended.
– Parameterized *Cyclic sending* is interrupted.
– Communication objects continue to be updated and sent if necessary.

When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:

– The minimum actuation or detection of a long/short button push starts.
– Communication objects send their current value if necessary.

The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

| Telegram value: | 0 = enable input A<br>1 = disable input A |
|---|---|

<table>
<tr><td>No.</td><td>Function</td><td>Object name</td><td>Data type</td><td>Flags</td></tr>
<tr><td><b>11</b></td><td><b>Blind UP/DOWN</b></td><td><b>Input A:<br>Blind sensor</b></td><td><b>1 bit<br>DPT 1.008</b></td><td><b>C, W, T</b></td></tr>
<tr><td colspan="5">This communication object is enabled if in the parameter window <i>Enable Inputs A…X</i>, the parameter <i>Input A</i> has been selected with the option <i>Blind sensor</i>.<br>This communication object sends a blind motion telegram UP or DOWN on the bus.<br>By receiving telegrams, the device also recognises movement telegrams of another sensor, e.g. parallel operation.<br>Telegram value: 0 = UP<br>1 = DOWN</td></tr>
<tr><td><b>12</b></td><td><b>STOP/Slat adjustment</b></td><td><b>Input A:<br>Blind sensor</b></td><td><b>1 bit<br>DPT 1.007</b></td><td><b>C, T</b></td></tr>
<tr><td colspan="5">This communication object is enabled if in the parameter window <i>Enable Inputs A…X</i>, the parameter <i>Input A</i> has been selected with the option <i>Blind sensor</i>.<br>This communication object sends a STOP telegram or slat adjustment.<br>Telegram value: 0 = STOP/Slat adjustment<br>1 = STOP/Slat adjustment DOWN</td></tr>
<tr><td><b>13</b></td><td><b>Upper limit position</b></td><td><b>Input A:<br>Blind sensor</b></td><td><b>EIS1, 1 bit<br>DTP 1.002</b></td><td><b>C, W</b></td></tr>
<tr><td colspan="5">This communication object is enabled if in the parameter window <i>Enable Inputs A…X</i>, the parameter <i>Input A</i> has been selected with the option <i>Blind sensor</i>.<br>With this communication object, the feedback of a blind actuator, which indicates whether the blind is located in the upper end position, can be integrated.<br><b>Note</b><br>The communication object is important for 1-button operation (synchronisation).<br>Telegram value: 0 = blind is not in upper end position.<br>1 = blind has reached the upper end position.</td></tr>
<tr><td><b>14</b></td><td><b>Lower limit position</b></td><td><b>Input A:<br>Blind sensor</b></td><td><b>EIS1, 1 bit<br>DTP 1.002</b></td><td><b>C, W</b></td></tr>
<tr><td colspan="5">This communication object is enabled if in the parameter window <i>Enable Inputs A…X</i>, the parameter <i>Input A</i> has been selected with the option <i>Blind sensor</i>.<br>With this communication object, the feedback of a blind actuator, which indicates whether the blind is located in the lower end position, can be integrated.<br><b>Note</b><br>The communication object is important for 1-button operation (synchronisation).<br>Telegram value: 0 = blind is not in lower end position.<br>1 = blind has reached the lower end position.</td></tr>
</table>

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **15…<br>19** | | | | |
| Not assigned in this operating mode. | | | | |

### 3.2.11 Operating mode *Value/Forced operation*

This operating mode allows the sending of values of any data types.

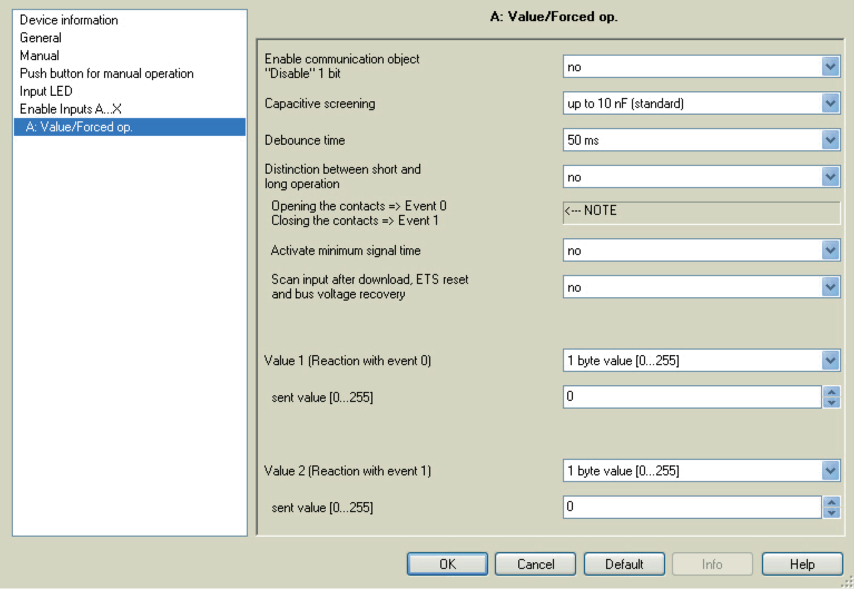
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Value/Forced operation*.

| **Note** |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

### 3.2.11.1 Parameter window *A: Value/Forced op.*

In this parameter window, all settings are undertaken for parameter window *A: Value/Forced operation.* The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Switch/Dim sensor* has been selected in parameter *Input A*.



A: Value/Forced op.

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Distinction between short and long operation | no |
| Opening the contacts => Event 0<br>Closing the contacts => Event 1 | <--- NOTE |
| Activate minimum signal time | no |
| Scan input after download, ETS reset and bus voltage recovery | no |
| Value 1 (Reaction with event 0) | 1 byte value [0...255] |
| sent value [0...255] | 0 |
| Value 2 (Reaction with event 1) | 1 byte value [0...255] |
| sent value [0...255] | 0 |

**Enable communication object "Disable" 1 bit**

Options: <u>no</u>
yes

- *yes:* The 1 bit *Block* communication object is enabled.
  This can be used to block the input.

**Note**

If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.

Using the communication object *Block* (No. 10), the physical input can be disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

The communication object *Block* (No.10) has no influence on manual operation.

### Capacitive screening

Options: up to 10 nF (standard)
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening.
Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 $mm^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

### Debounce time

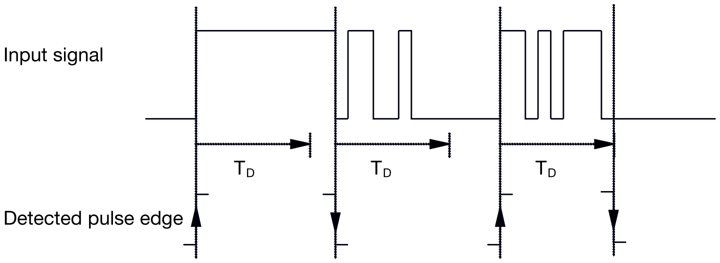
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

#### What is the debounce time?

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

**Distinction between short and long operation**

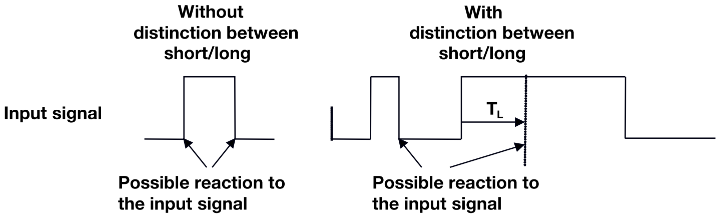
Options: yes
<u>no</u>

Using this parameter, you set if the input differentiates between short and long operation.

- *yes:* After opening/closing of the contact, first of all it is necessary to ascertain whether a short or long operation has occurred here. Only thereafter will a possible reaction be triggered.

| **Note** |
|---|
| With *Distinction between short and long operation*, two communication objects are visible for each input. One communication object only transmits during short operation, the other communication object only during a long operation. |

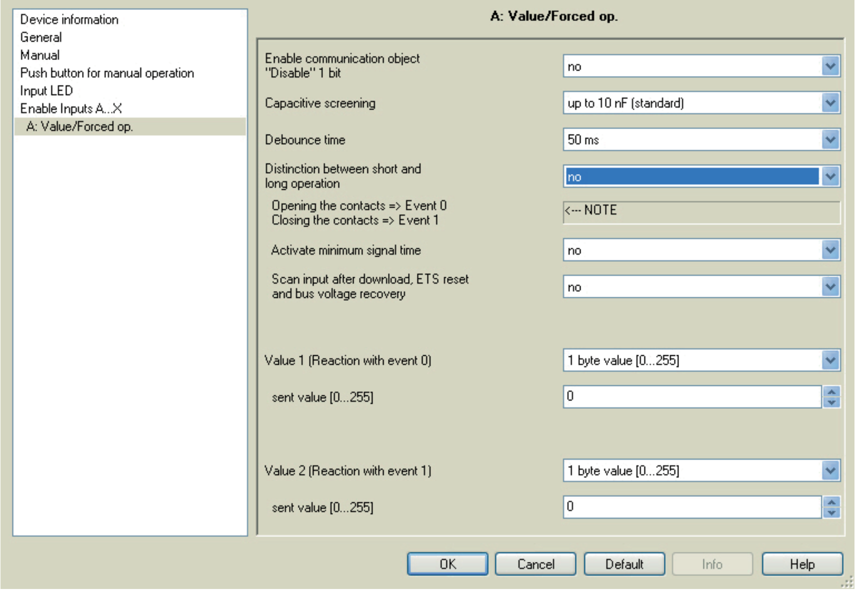
The following drawing shows the function in detail:


Without distinction between short/long
With distinction between short/long
Input signal
$T_L$
Possible reaction to the input signal
Possible reaction to the input signal

$T_L$ is the time duration, from which a long operation is detected.

### 3.2.11.1.1 Parameter *Distinction between short and long operation – no*

If the option *no* is selected with the parameter *Distinction between short and long operation*, the following parameters in the parameter window *A: Value/Forced op.*, page 84, are visible.



Enable communication object "Disable" 1 bit: no
Capacitive screening: up to 10 nF (standard)
Debounce time: 50 ms
Distinction between short and long operation: no
Opening the contacts => Event 0
Closing the contacts => Event 1: <--- NOTE
Activate minimum signal time: no
Scan input after download, ETS reset and bus voltage recovery: no
Value 1 (Reaction with event 0): 1 byte value [0...255]
sent value [0...255]: 0
Value 2 (Reaction with event 1): 1 byte value [0...255]
sent value [0...255]: 0

**Opening the contacts => Event 0**
**Closing the contacts => Event 1**

<––– NOTE

**Activate minimum signal time**

Options: <u>no</u>
yes

- *yes:* The following parameters appear:

  **On closing the contact in value x 0.1 s [0…65,535]**

  Options: 1…<u>10</u>…65,535

  **On opening the contact in value x 0.1 s [0…65,535]**

  Options: 1…<u>10</u>…65,535

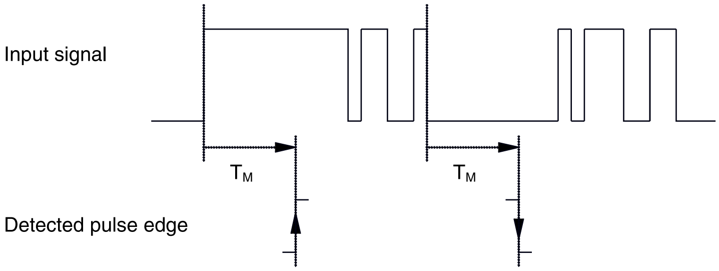
**What is the minimum signal time?**

In contrast to the debounce time, a telegram is only sent, after the minimum signal duration has elapsed.

The individual functions are:

If an edge is detected on the input, the minimum signal duration will commence. No telegram is sent on the bus at this time. The signal on the input is observed within the minimum signal duration. If a further edge appears at the input during the minimum signal duration, it will be interpreted as a new operation, and the minimum signal duration restarts.
If no further edges occur after the start of the minimum signal duration, a telegram is sent on the bus, after the minimum signal duration has timed out.

**Example: Minimum signal time of the input signal for a detected edge:**



In only two cases, no further edge changes occur within the minimum signal duration $T_M$ after a change of edge. For this reason, only both of these are detected as valid.

### Scan input after download, ETS reset and bus voltage recovery

| | |
|---|---|
| Options: | <u>no</u><br>yes |

- *yes:* The value of the communication object is scanned after a download, ETS reset and bus voltage recovery.
- *no:* The value of the communication object is not scanned after a download, ETS reset and bus voltage recovery.

With option yes, the following additional parameters appear in the parameter:

**Inactive wait state after bus voltage recovery in s [0…30,000]**

Options: 0…30,000

Here the waiting time after a bus voltage recovery is set. After the waiting time has elapsed, the state on the input terminals is scanned. The input reacts as if the state on the input terminals has just changed.

| Note |
|---|
| The inactive waiting time does not add to the actual, adjustable send delay time. This can be set separately. |

**Value 1 (Reaction with event 0)**

Options: do not send
1 bit value [0/1]
2 bit value [forced operation]
1 byte value [-128…127]
1 byte value [0…255]
1 byte value [8 bit scene]
2 byte value [-32,768…32,767]
2 byte value [0…65,565]
2 byte value [EIB floating point]
3 byte value [time of day, weekday]
4 byte value [-2,147,483,648…2,147,483,647]
4 byte value [0…4,294,967,295]

This parameter serves for defining the data type, which is sent when the contact is actuated.

Depending on the selection made in parameter *Value 1* (*rising edge / short operation*), different parameters appear. All parameters are described in the following:

**sent value [X]**

Options: ON/OFF/TOGGLE
0/1
-128…0…127
0…255
-32,768…0…32,767
0…65,535
-100…20…100
-2,147,483,648…0…2,147,483,647
0…4,294,967,295

This parameter defines the value, which is sent on actuation.
The value range is dependent on the set data type of the value X.

**sent value**

Options: ON, activate forced operation
OFF, activate forced operation
Disable forced operation

This parameter defines the value, which is sent on actuation.

In the following table, the forced operation function is explained:

| Bit 1 | Bit 0 | Acces | Description |
|---|---|---|---|
| 0 | 0 | Free | The switch output is enabled via the communication object *Forced operation* of the actuator. In this way, it is possible to switch the actuator directly via the communication object *Switch*. |
| 0 | 1 | Free | |
| 1 | 0 | Off | The switch output is disabled via the communication object *Forced operation* of the actuator. Now it is no longer possible to switch the actuator directly via the communication object *Switch*. |
| 1 | 1 | On | The switch output is enabled via the communication object *Forced operation* of the actuator. Now it is no longer possible to switch the actuator directly via the communication object *Switch*. |

**8 bit scene**

Options: 1…64

This parameter defines the KNX scene number, which is sent on actuation.

**Store/Call scene**

Options: call
save

This parameter defines whether the scene is to be called or saved.

**Hour [0…23]**

Options: 0…23

**Minute [0…59]**

Options: 0…59

**Seconds [0…59]**

Options: 0…59

With these parameters, the hours, minutes and seconds, which are to be sent when actuated are set.

**Weekday [1 = Mo, 2…6 , 7 = Su]**

|  |  |
|---|---|
| Options: | <u>0 = no day</u> |
|  | 1 = Monday |
|  | 2 = Tuesday |
|  | 3 = Wednesday |
|  | 4 = Thursday |
|  | 5 = Friday |
|  | 6 = Saturday |
|  | 7 = Sunday |

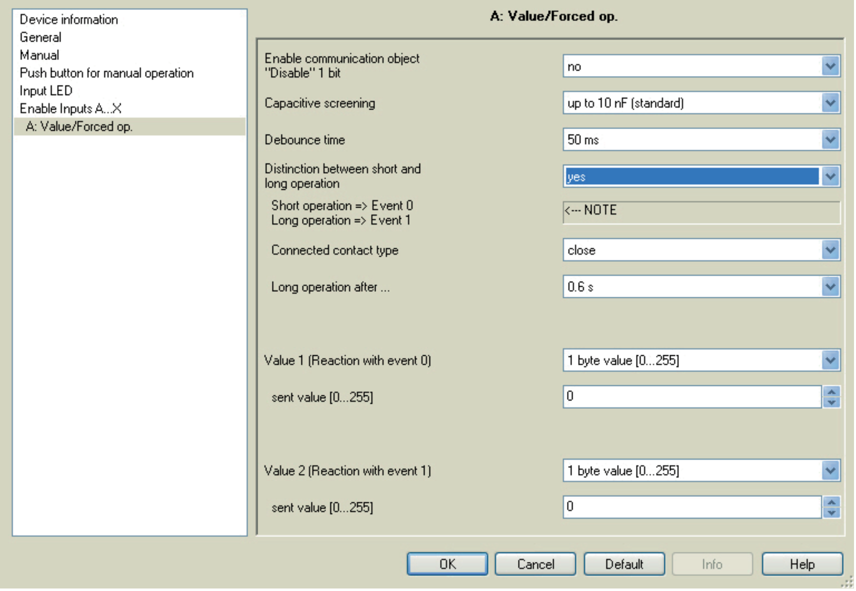
Using these parameters, the weekday, which is sent on actuation, is set.

**Value 2 (Reaction with event 1)**

| Note |
|---|
| The parameter descriptions of the parameter *Value 2 (Reaction with event 1)* correspond to those of the parameter *Value 1 (Reaction with event 0)*. |

### 3.2.11.1.2 Parameter *Distinction between short and long operation – yes*

If the option *yes* is selected with the parameter *Distinction between short and long operation*, the following parameters appear:



A: Value/Forced op.

Enable communication object "Disable" 1 bit: no
Capacitive screening: up to 10 nF (standard)
Debounce time: 50 ms
Distinction between short and long operation: yes
Short operation => Event 0
Long operation => Event 1: <--- NOTE
Connected contact type: close
Long operation after ...: 0.6 s
Value 1 (Reaction with event 0): 1 byte value [0...255]
sent value [0...255]: 0
Value 2 (Reaction with event 1): 1 byte value [0...255]
sent value [0...255]: 0

**Connected contact type**

Options: closed
open

*closed:* The input is closed with actuation.

*open:* The input is opened with actuation.

**Long operation after …**

Options: 0.3/0.4/0.5/0.6/0.8 s
1/1.2/1.5 s
2/3/4/5/6/7/8/9/10 s

Here the time period $T_L$, after which an actuation is considered a “long” operation, is defined.

**Note**

The remaining parameter descriptions can be found in the parameter *Distinction between short and long operation – no*, page 87.

### 3.2.11.2 Communication objects *Value/forced operation*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

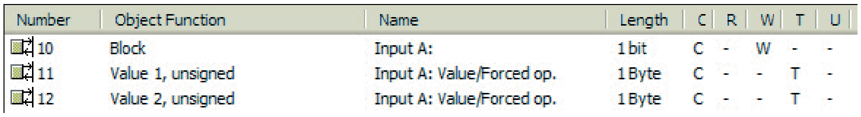
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | Value 1, unsigned | Input A: Value/Forced op. | 1 Byte | C | - | - | T | - |
| 12 | Value 2, unsigned | Input A: Value/Forced op. | 1 Byte | C | - | - | T | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A:** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Value/Forced operation* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

**Note**

When the input is disabled, there is fundamentally no reaction to a signal change, but:

– Waiting for a long button operation or a minimum signal time is suspended.

– The parameter setting *8 bit scene* is ended with saving.

– Communication objects continue to be updated and sent if necessary.

When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:

– The minimum actuation or detection of a long/short button push starts.

– Communication objects send their current value if necessary.

The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

Telegram value: 0 = enable input A
1 = disable input A

<table>
<tr><td>No.</td><td>Function</td><td>Object name</td><td>Data type</td><td>Flags</td></tr>
<tr><td>**11**</td><td>**Value 1, unsigned**</td><td>**Input A:**<br>**Value/Forced operation**</td><td>**variable**<br>**DPT variable**</td><td>**C, T**</td></tr>
<tr><td colspan="5">This communication object is enabled if in the parameter window *Enable Inputs A…X*, the parameter *Input A* has been selected with the option *Value/Forced operation*.<br>This communication object sends a value on the bus with short operation when opening or closing of the contact. The value and data type can be freely set in the parameters.</td></tr>
<tr><td colspan="3">1 bit value [0/1]</td><td colspan="2">DPT 1.001 switch telegram</td></tr>
<tr><td colspan="3">2 bit value [0…3]</td><td colspan="2">DPT 2.001 forced operation</td></tr>
<tr><td colspan="3">1 byte value [-128…127]</td><td colspan="2">DPT 6.010 value</td></tr>
<tr><td colspan="3">1 byte value [0…255]</td><td colspan="2">DPT 5.010 value</td></tr>
<tr><td colspan="3">1 byte value [8 bit scene]</td><td colspan="2">DPT 18.001 control scene</td></tr>
<tr><td colspan="3">2 byte value [-32.768…32.767]</td><td colspan="2">DPT 7.001 value</td></tr>
<tr><td colspan="3">2 byte value [0…65.535]</td><td colspan="2">DPT 8.010 value</td></tr>
<tr><td colspan="3">2-byte value [EIB floating point]</td><td colspan="2">DPT 9.001 temperature</td></tr>
<tr><td colspan="3">3 byte value [time of day, weekday]</td><td colspan="2">DPT 10.001 time of day, weekday</td></tr>
<tr><td colspan="3">4 byte value [0…4,294,967,295]</td><td colspan="2">DPT 12.010 value</td></tr>
<tr><td colspan="3">4 byte value [-2.147.483.648…2.147.483.647]</td><td colspan="2">DPT 13.010 value</td></tr>
<tr><td>**12**</td><td>**Value 2, unsigned**</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">See communication object 11.</td></tr>
<tr><td>**13…**<br>**19**</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Not assigned in this operating mode.</td></tr>
</table>

### 3.2.12 Operating mode *Control scene*

This operating mode enables calling and saving the states of several actuator groups. An actuator group consists of several communication objects that are associated by the same group address. It can, for example, consist of switching actuators (1 bit values) or dimming actuators (1 byte values). The data types can be parameterized.

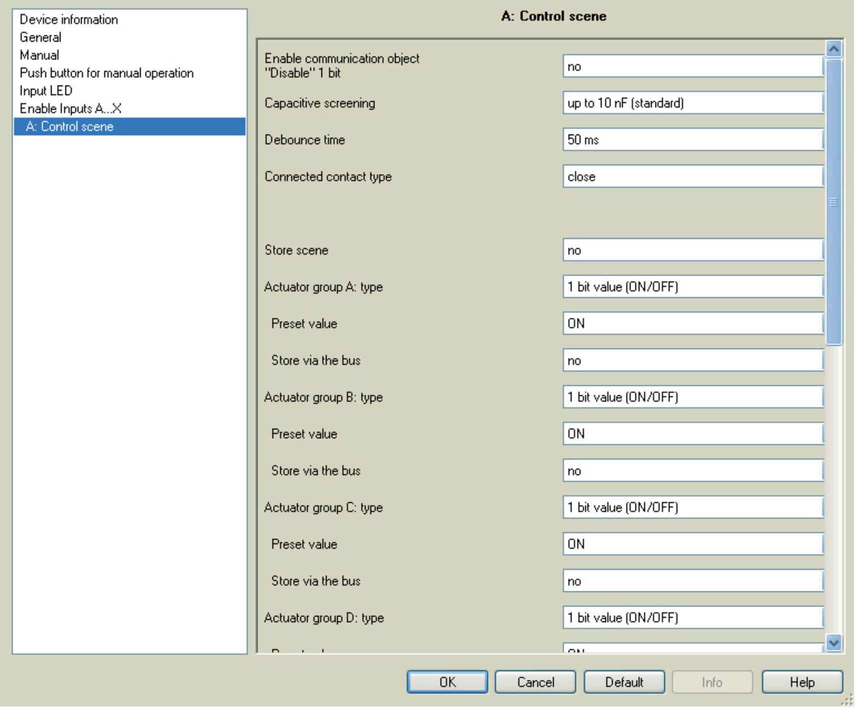
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Control scene*.

| **Note** |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

### 3.2.12.1 Parameter window *A: Control scene*

In this parameter window, all settings are undertaken for parameter window *A: Control scene*.
The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Control scene* has been selected in parameter *Input A*.



A: Control scene

Enable communication object "Disable" 1 bit: no
Capacitive screening: up to 10 nF (standard)
Debounce time: 50 ms
Connected contact type: close

Store scene: no
Actuator group A: type: 1 bit value (ON/OFF)
Preset value: ON
Store via the bus: no
Actuator group B: type: 1 bit value (ON/OFF)
Preset value: ON
Store via the bus: no
Actuator group C: type: 1 bit value (ON/OFF)
Preset value: ON
Store via the bus: no
Actuator group D: type: 1 bit value (ON/OFF)

**Enable communication object "Disable" 1 bit**

Options: no
yes

- *yes:* The 1 bit *Block* communication object is enabled.
  This can be used to block the input.

**Note**

If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.

Using the communication object *Block* (No. 10), the physical input can be disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

The communication object *Block* (No.10) has no influence on manual operation.

**Capacitive screening**

Options: <u>up to 10 nF (standard)</u>
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening.
Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 mm$^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

**Debounce time**

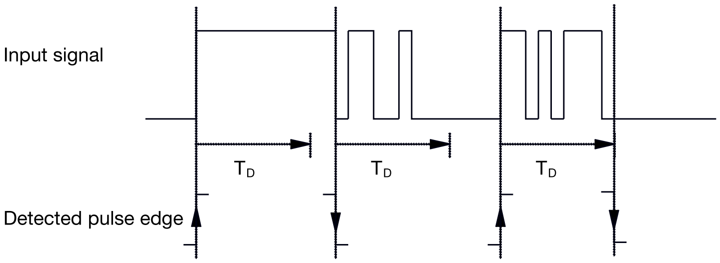
Options: 10/20/30/<u>50</u>/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

**What is the debounce time?**

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

**Example: Debounce time of the input signal for a detected edge:**



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

**Connected contact type**

Options: <u>closed</u>
open

- *closed:* The input is closed with actuation.
- *open:* The input is opened with actuation.

**Store scene**

Options: no
on long operation
with object value = 1
on long operation and object value = 1

This parameter determines the way in which saving the current scene is triggered and which function the communication object *Store scene* has. This is dependent on the control of the scene.

- *on long operation:* Saving is activated as soon as a long operation has been detected.
- *object value = 1:* If the communication object *Store scene* receives the value 1, saving is activated.
- *on long operation and object value = 1*: Saving is activated as soon as a long operation has been detected and the communication object *Enable storing* has the value 1.

**What happens on the bus when *Store scene* has been triggered?**

The scene is simply adapted by saving the current actuator values.

The communication object *Store scene* indication sends the value 1 if all feedbacks from the communication objects have been received. (Start of scene saving)

The values of the communication objects concerned are read via the bus.

The communication object *Store scene* indication sends the value 0, if not all feedbacks from the communication objects have been received should the button be released prematurely. Saving is not undertaken if the button is released prematurely.

If the option *on long operation* or *on long operation and object value = 1* have been selected in the parameter *Store scene*, the following parameter appears.

**Long operation after…**

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

Here the time period $T_L$, after which an actuation is considered a “long” operation, is defined.

**Actuator group A: type**

Options: 1 bit value (ON/OFF)
1 byte value [0…100 %]
1 byte value [0…255]
2 byte value [temperature]

The different data types can be selected for each of the 6 actuator groups A…F.

| Note |
|---|
| The setting options of actuator groups B…F do not differentiate from those of actuator group A. For this reason, only actuator group A will be explained here. |

Depending on the data type set for the actuator groups, various options will be visible in the following *Preset value* parameter.

**Preset value**

Options: ON/OFF
0/10/20/30/40/50/60/70/80/90/100 %
0…255
-100,00…20,00…100,00

This parameter defines the value which is sent on actuation. The value range is dependent on the set data type of the value X.

| Note |
|---|
| If a scene has been saved via the bus and the preset value should now be restored, the communication object *Restore scene to default* must be written with the value 1. This is implemented via a download of the preset values or via an ETS reset. |

**Store via the bus**

Options: yes
no

This parameter defines whether the scene is to be saved via the bus. The parameter is only active if the option has not been set to *no* in the parameter *Store scene*.
If reading of a communication object is not possible, the setting should be left at *no* (see parameter *Store scene*), otherwise, it may not be possible to save the entire scene.

### 3.2.12.2 Communication objects *Control scene*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

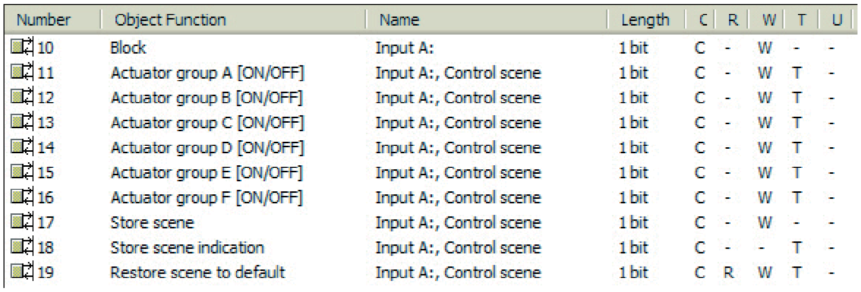
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | Actuator group A [ON/OFF] | Input A:, Control scene | 1 bit | C | - | W | T | - |
| 12 | Actuator group B [ON/OFF] | Input A:, Control scene | 1 bit | C | - | W | T | - |
| 13 | Actuator group C [ON/OFF] | Input A:, Control scene | 1 bit | C | - | W | T | - |
| 14 | Actuator group D [ON/OFF] | Input A:, Control scene | 1 bit | C | - | W | T | - |
| 15 | Actuator group E [ON/OFF] | Input A:, Control scene | 1 bit | C | - | W | T | - |
| 16 | Actuator group F [ON/OFF] | Input A:, Control scene | 1 bit | C | - | W | T | - |
| 17 | Store scene | Input A:, Control scene | 1 bit | C | - | W | - | - |
| 18 | Store scene indication | Input A:, Control scene | 1 bit | C | - | - | T | - |
| 19 | Restore scene to default | Input A:, Control scene | 1 bit | C | R | W | T | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A:** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Control scene* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

**Note**

When the input is disabled, there is fundamentally no reaction to a signal change, but:

– Waiting for a long button operation or a minimum signal time is suspended.

– The parameter setting *8 bit scene* is ended with saving.

– Communication objects continue to be updated and sent if necessary.

When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:

– The minimum actuation or detection of a long/short button push starts.

– Communication objects send their current value if necessary.

The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

| | |
|---|---|
| Telegram value: | 0 = enable input A |
| | 1 = disable input A |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **11** | **Actuator group A[variable]** | **Input A:**<br>**Control scene** | **variable**<br>**DPT variable** | **C, W, T** |

Depending on the setting, this communication object sends the following values on the bus.

| | |
|---|---|
| 1 bit value (ON/OFF) | DPT 1.001 switch value |
| 1 byte value [0…100] | DPT 5.001 percentage value |
| 1 byte value [0…255] | DPT 5.010 counter value |
| 2 byte value [temperature] | DPT 9.001 temperature |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **12** | **Actuator group B[ variable]** | **Input A:**<br>**Control scene** | **variable**<br>**DPT variable** | **C, W, T** |

Depending on the setting, this communication object sends the following values on the bus.

| | |
|---|---|
| 1 bit value (ON/OFF) | DPT 1.001 switch value |
| 1 byte value [0…100] | DPT 5.001 percentage value |
| 1 byte value [0…255] | DPT 5.010 counter value |
| 2 byte value [temperature] | DPT 9.001 temperature |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **13** | **Actuator group C**<br>**[variable]** | **Input A:**<br>**Control scene** | **Variable**<br>**DPT variable** | **C, W, T** |
| Depending on the setting, this communication object sends the following values on the bus.<br>1 bit value (ON/OFF) DPT 1.001 switch value<br>1 byte value [0…100] DPT 5.001 percentage value<br>1 byte value [0…255] DPT 5.010 counter value<br>2 byte value [temperature] DPT 9.001 temperature | | | | |
| **14** | **Actuator group D**<br>**[variable]** | **Input A:**<br>**Control scene** | **Variable**<br>**DPT variable** | **C, W, T** |
| Depending on the setting, this communication object sends the following values on the bus.<br>1 bit value (ON/OFF) DPT 1.001 switch value<br>1 byte value [0…100] DPT 5.001 percentage value<br>1 byte value [0…255] DPT 5.010 counter value<br>2 byte value [temperature] DPT 9.001 temperature | | | | |
| **15** | **Actuator group E**<br>**[variable]** | **Input A:**<br>**Control scene** | **Variable**<br>**DPT variable** | **C, W, T** |
| Depending on the setting, this communication object sends the following values on the bus.<br>1 bit value (ON/OFF) DPT 1.001 switch value<br>1 byte value [0…100] DPT 5.001 percentage value<br>1 byte value [0…255] DPT 5.010 counter value<br>2 byte value [temperature] DPT 9.001 temperature | | | | |
| **16** | **Actuator group F**<br>**[variable]** | **Input A:**<br>**Control scene** | **Variable**<br>**DPT variable** | **C, W, T** |
| Depending on the setting, this communication object sends the following values on the bus.<br>1 bit value (ON/OFF) DPT 1.001 switch value<br>1 byte value [0…100] DPT 5.001 percentage value<br>1 byte value [0…255] DPT 5.010 counter value<br>2 byte value [temperature] DPT 9.001 temperature | | | | |
| **17** | **Store scene** | **Input A:**<br>**Control scene** | **1 bit**<br>**DPT 1.003** | **C, W** |
| This communication object appears only with the option *Object value = 1*. This object can be set in the parameter *Store scene*. This communication object is used to enable saving of a scene via the bus. The function depends on the method of storing the scene. | | | | |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **17** | **Enable storing** | **Input A:**<br>**Control scene** | **1 bit**<br>**DPT 1.003** | **C, W** |
| This communication object appears only with the option *on long operation and object value = 1*. This object can be set in the parameter *Store scene*. This communication object is used to trigger saving of a scene via the bus. The function depends on the method of storing the scene. | | | | |
| **18** | **Store scene indication** | **Input A:**<br>**Control scene** | **1 bit**<br>**DPT 1.003** | **C, T** |
| This communication object is used to indicate saving of a scene, e.g. by an LED. The function depends on the method of storing the scene. | | | | |
| **19** | **Restore scene to default** | **Input A:**<br>**Control scene** | **1 bit**<br>**DPT 1.003** | **C, R, W, T** |
| This communication object is used to restore a scene to the default settings. | | | | |

### 3.2.13 Operating mode *Switching sequences*

A switching sequence facilitates a step-by-step change of up to five switching objects with just a single input actuation. In this way, up to 5 actuators or actuator groups can be switched in a defined switching sequence.

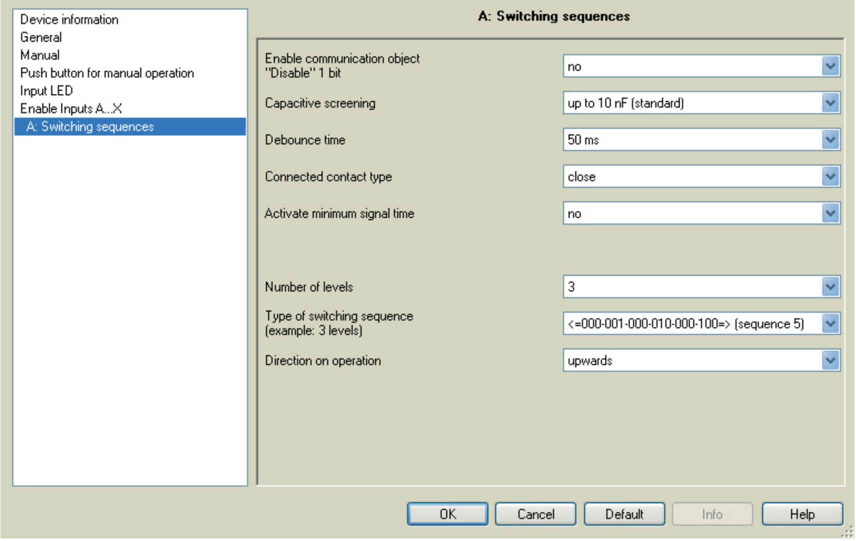
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Switching sequences*.

| **Note** |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

### 3.2.13.1 Parameter window *A: Switching sequences*

In this parameter window, all settings are undertaken for parameter window *A: Switching sequences*.
The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Switching sequences* has been selected in parameter *Input A*.



A: Switching sequences

Enable communication object "Disable" 1 bit: no
Capacitive screening: up to 10 nF (standard)
Debounce time: 50 ms
Connected contact type: close
Activate minimum signal time: no
Number of levels: 3
Type of switching sequence (example: 3 levels): <=000-001-000-010-000-100=> (sequence 5)
Direction on operation: upwards

**Enable communication object "Disable" 1 bit**

Options: <u>no</u>
yes

- *yes:* The 1 bit *Block* communication object is enabled.
  This can be used to block the input.

| Note |
|---|
| If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.<br>Using the communication object *Block* (No. 10), the physical input can be disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.<br>The communication object *Block* (No. 10) has no influence on manual operation. |

### Capacitive screening

Options: up to 10 nF (standard)
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening.
Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 mm$^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

### Debounce time

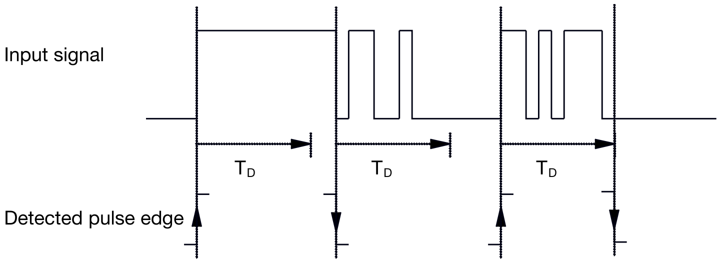
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

**What is the debounce time?**

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

### Connected contact type

Options: closed
open

- *closed:* The input is closed with actuation.
- *open:* The input is opened with actuation.

**Activate minimum signal time**

Options: <u>no</u>
yes

- *yes:* The following parameters appear:

**for rising edge**
**in value x 0.1 s [1…65,535]**

Options: 1…<u>10</u>…65,535

| **Note** |
|---|
| A rising edge corresponds to a normally opened contact function. |

**for falling edge**
**in value x 0.1 s [1…65,535]**

Options: 1…<u>10</u>…65,535

| **Note** |
|---|
| A falling edge corresponds to a normally closed contact function. |

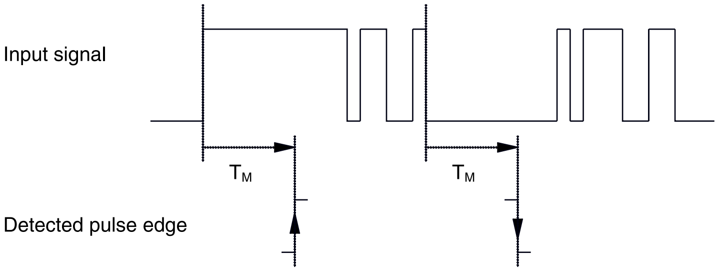
**What is the minimum signal time?**

In contrast to the debounce time, a telegram is only sent, after the minimum signal duration has elapsed.

The individual functions are:

If an edge is detected on the input, the minimum signal duration will commence. No telegram is sent on the bus at this time. The signal on the input is observed within the minimum signal duration. If a further edge appears at the input during the minimum signal duration, it will be interpreted as a new operation, and the minimum signal duration restarts.
If no further edges occur after the start of the minimum signal duration, a telegram is sent on the bus, after the minimum signal duration has timed out.

**Example: Minimum signal time of the input signal for a detected edge:**



In only two cases, no further edge changes occur within the minimum signal duration $T_M$ after a change of edge. For this reason, only both of these are detected as valid.

**Number of levels:**

Options: 2/3/4/5

The number of levels (maximum 5) corresponds to the number of communication objects: The communication objects *Value 1* to *Value 5* are enabled accordingly.

**Type of switching sequence (example: 3 levels)**

Options: =>000-001-011-111 (sequence 1)
Gray code (sequence 2)
<=000-001-011-111-011-001=> (sequence 3)
<=000-001-011-111=> (sequence 4)
<=000-001-000-010-000-100=> (sequence 5)

The switching sequences correspond to the states of three communication objects (0 = OFF, 1 = ON).

The type of switching sequences can be chosen here. Each sequence has different communication objects for each level.

The switching sequences allow switch on or off of up to five communication objects (1 bit) in a defined sequence. Every time the button is switched, one further step in the sequence occurs.

**Switching sequences <=000-001-011-111=> (sequence 1)**

With this switching sequence, a further group address is sent via another communication object (value x) after each successive actuation. If all group addresses have been sent in one direction via the communication objects (value x), further actuations are ignored. For this reason, at least two binary inputs are required, where one switches upwards and the other switches downwards.

| **Note** |
|---|
| The group addresses must be different for separate upward and downward switching.<br>A synchronization for the switching sequences for up and down is implemented using the number of the switching sequence operation. The same group address must be used here. |

| Number of operation | Switching sequence | Value of the communication objects | | |
|---|---|---|---|---|
| | | Switch 3 | Switch 2 | Switch 1 |
| 0 | 000 | OFF | OFF | OFF |
| 1 | 001 | OFF | OFF | ON |
| 2 | 011 | OFF | ON | ON |
| 3 | 111 | ON | ON | ON |
| … | … | … | … | … |

### Gray code (sequence 2)

In this sequence, all communication object combinations are undertaken successively. Only the value of one communication object changes between two switching levels. A good example of this switching sequence, for example, is switching of two lighting groups in the sequence 00 – 01 – 11 – 10 – 00 ...

***For further information see: Gray code, page 151***

### Switching sequence <=000-001-011-111-011-001=> (sequence 3)

This switching sequence switches on a further communication object with each successive actuation. If all communication objects are switched on, they are switched off successively commencing with the last one to be switched on.

| Number of operation | Switching sequence | Value of the communication objects | | |
|---|---|---|---|---|
| | | Switch 3 | Switch 2 | Switch 1 |
| 0 | 000 | OFF | OFF | OFF |
| 1 | 001 | OFF | OFF | ON |
| 2 | 011 | OFF | ON | ON |
| 3 | 111 | ON | ON | ON |
| 4 | 011 | OFF | ON | ON |
| 5 | 001 | OFF | OFF | ON |
| … | … | … | … | … |

### Switch sequence <=000-001-011-111-000=> (sequence 4)

This switching sequence switches on a further communication object with each successive actuation. If all communication objects are switched on, they are all switch off together.

| Number of operation | Switching sequence | Value of the communication objects | | |
|---|---|---|---|---|
| | | Switch 3 | Switch 2 | Switch 1 |
| 0 | 000 | OFF | OFF | OFF |
| 1 | 001 | OFF | OFF | ON |
| 2 | 011 | OFF | ON | ON |
| 3 | 111 | ON | ON | ON |
| … | … | … | … | … |

### Switch sequence <=000-001-010-000-100-000=> (sequence 5)

This switching sequence switches on with the actuation of a communication object and then off again. Thereafter, other communication objects are switched on or off.

| Number of operation | Switching sequence | Value of the communication objects | | |
|---|---|---|---|---|
| | | Switch 3 | Switch 2 | Switch 1 |
| 0 | 000 | OFF | OFF | OFF |
| 1 | 001 | OFF | OFF | ON |
| 2 | 011 | OFF | OFF | OFF |
| 3 | 111 | OFF | ON | OFF |
| 4 | 011 | OFF | OFF | OFF |
| 5 | 001 | ON | OFF | OFF |
| … | … | … | … | … |

### Further possibilities

In addition to actuation of the binary input, the switching sequence can be changed by using communication object *Level increment/decrement*.

This is used, for example, to switch two or more binary inputs upwards and/or downwards.

| Note |
|---|
| The current switching sequence results from the value of the *Number of operation* of the switching sequences. |

### Direction on operation

Options: upwards
downwards

This parameter determines, whether the level is switched upwards or downwards, when the button is pushed.

### 3.2.13.2 Communication objects *Switch sequences*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

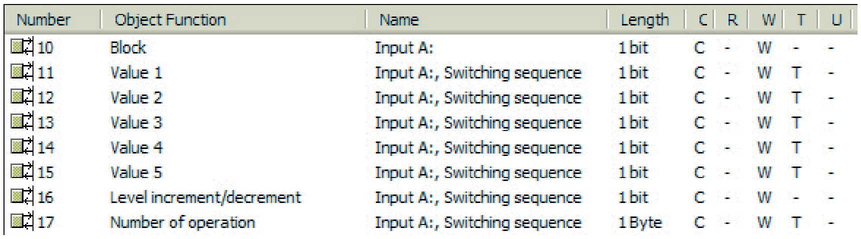
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | Value 1 | Input A:, Switching sequence | 1 bit | C | - | W | T | - |
| 12 | Value 2 | Input A:, Switching sequence | 1 bit | C | - | W | T | - |
| 13 | Value 3 | Input A:, Switching sequence | 1 bit | C | - | W | T | - |
| 14 | Value 4 | Input A:, Switching sequence | 1 bit | C | - | W | T | - |
| 15 | Value 5 | Input A:, Switching sequence | 1 bit | C | - | W | T | - |
| 16 | Level increment/decrement | Input A:, Switching sequence | 1 bit | C | - | W | - | - |
| 17 | Number of operation | Input A:, Switching sequence | 1 Byte | C | - | W | T | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A:** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Switching sequences* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

> **Note**
>
> When the input is disabled, there is fundamentally no reaction to a signal change, but:
>
> – Waiting for a long button operation or a minimum signal time is suspended.
>
> – The parameter setting *8 bit scene* is ended with saving.
>
> – Communication objects continue to be updated and sent if necessary.
>
> When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:
>
> – The minimum actuation or detection of a long/short button push starts.
>
> – Communication objects send their current value if necessary.
>
> The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

| | |
|---|---|
| Telegram value: | 0 = enable input A<br>1 = disable input A |

| | | | | |
|---|---|---|---|---|
| **11** | **Value 1** | **Input A:**<br>**Switching** | **1 bit**<br>**DPT 1.001** | **C, W, T** |

The number of these maximum of 5 communication objects is set in parameter *Number of levels*. The communication objects represent the values within the switching sequence.

| | | | | |
|---|---|---|---|---|
| **12** | **Value 2** | **Input A:**<br>**Switching sequences** | **1 bit**<br>**DPT 1.001** | **C, W, T** |

The number of these maximum of 5 communication objects is set in parameter *Number of levels*. The communication objects represent the values within the switching sequence.

| | | | | |
|---|---|---|---|---|
| **13** | **Value 3** | **Input A:**<br>**Switching sequences** | **1 bit**<br>**DPT 1.001** | **C, W, T** |

The number of these maximum of 5 communication objects is set in parameter *Number of levels*. The communication objects represent the values within the switching sequence.

| | | | | |
|---|---|---|---|---|
| **14** | **Value 4** | **Input A:**<br>**Switching sequences** | **1 bit**<br>**DPT 1.001** | **C, W, T** |

The number of these maximum of 5 communication objects is set in parameter *Number of levels*. The communication objects represent the values within the switching sequence.

<table>
<tr><td>No.</td><td>Function</td><td>Object name</td><td>Data type</td><td>Flags</td></tr>
<tr><td><b>15</b></td><td><b>Value 5</b></td><td><b>Input A: Switching sequences</b></td><td><b>1 bit</b><br><b>DPT 1.001</b></td><td><b>C, W, T</b></td></tr>
<tr><td colspan="5">The number of these maximum of 5 communication objects is set in parameter <i>Number of levels</i>. The communication objects represent the values within the switching sequence.</td></tr>
<tr><td><b>16</b></td><td><b>Level increment/decrement</b></td><td><b>Input A: Switching sequences</b></td><td><b>1 bit</b><br><b>DPT 1.001</b></td><td><b>C, W</b></td></tr>
<tr><td colspan="5">Telegram value: 0 = switch level downwards<br>1 = switch level upwards<br>When a telegram is received with the value 1 on the communication object, the input of a stage in the switching sequence switches up. If a telegram with the value 0 is received, it switches down.</td></tr>
<tr><td><b>17</b></td><td><b>Number of operation</b></td><td><b>Input A: Switching sequences</b></td><td><b>1 byte</b><br><b>DPT 5.010</b></td><td><b>C, W, T</b></td></tr>
<tr><td colspan="5">This communication object includes the number of operation of the respective switching sequence. With synchronization of several binary inputs, the respective communication object should be linked with the same group address.<br><b>Note</b><br>Ensure that the number of communication objects is equal to the inputs to be synchronised, e.g. 3 stages.</td></tr>
<tr><td><b>18…</b><br><b>19</b></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Not assigned in this operating mode.</td></tr>
</table>

### 3.2.14 Operating mode *Multiple operation*

This operating mode ensures that the number of actuations assigned to a communication object value is set and sent via an assigned group address in dependence on the number of button operations. In this way, it is possible, e.g. that different light scenes can be implemented depending on the number of multiple operations.

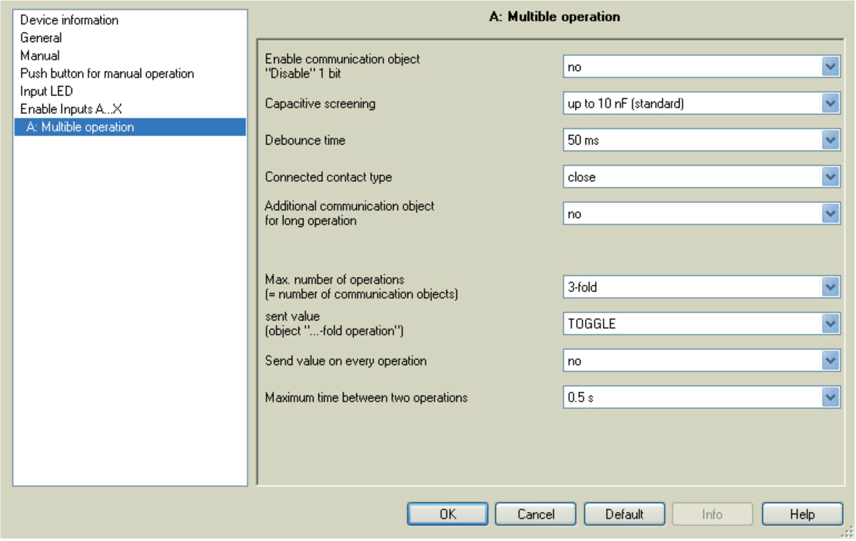
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Multiple operation*.

| **Note** |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

### 3.2.14.1 Parameter window *A: Multiple operation*

In this parameter window, all settings are undertaken for parameter window *A: Switching sequences*.
The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Switching sequences* has been selected in parameter *Input A*.



A: Multible operation

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Connected contact type | close |
| Additional communication object for long operation | no |
| Max. number of operations (= number of communication objects) | 3-fold |
| sent value (object "...-fold operation") | TOGGLE |
| Send value on every operation | no |
| Maximum time between two operations | 0.5 s |

**Enable communication object "Disable" 1 bit**

Options: <u>no</u>
yes

- *yes:* The 1 bit *Block* communication object is enabled.
  This can be used to block the input.

**Note**

If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.

Using the communication object *Block* (No. 10), the physical input can be disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

The communication object *Block* (No.10) has no influence on manual operation.

### Capacitive screening

Options: up to 10 nF (standard)
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening.
Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 mm$^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

### Debounce time

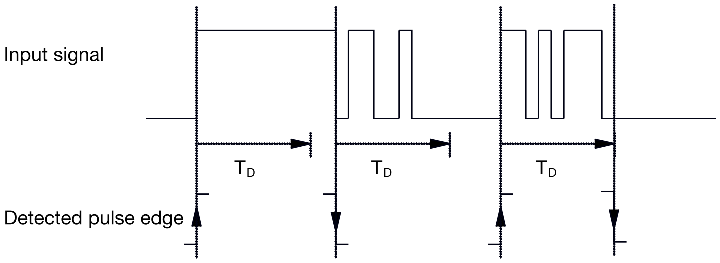
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

**What is the debounce time?**

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

### Connected contact type

Options: closed
open

- *closed:* The input is closed with actuation.
- *open:* The input is opened with actuation.

**Additional communication object for long operation**

Options: yes
no

A further function can be carried out with long operation of the input via the communication object *Long operation*. If a long operation is undertaken within the maximum time after one or more short operations, the short operations are ignored.

- *yes:* The communication object *Long operation* is enabled.
  An additional parameter appears:

  **Long operation after …**

  Options: 0.3/0.4/0.5/0.6/0.8 s
  1/1.2/1.5 s
  2/3/4/5/6/7/8/9/10 s

  Here the time period $T_L$, after which an actuation is considered a “long” operation, is defined.

**Max. number of operations ( = number of communication objects)**

Options: 1-fold
2-fold
3-fold
4-fold

This parameter defines the maximum number of operations that are possible. The number is equal to the number of communication objects *x-fold operation*. If the button is actuated more often, the maximum value set here, the binary input responds in accordance with the set maximum value.

**sent value (object "...-fold operation"**

Options: ON
OFF
TOGGLE

This parameter defines the value of the communication object that should be sent. The settings *ON*, *OFF* and *TOGGLE* are possible. The current value of the communication object is inverted using TOGGLE.

**Send value on every operation**

Options: yes
no

- *yes:* The respective value of the communication object is updated and sent with each actuation.

| **Example** |
|---|
| With three button actuations, the communication objects<br>*1-fold operation* (after the 1st operation),<br>*2-fold operation* (after the 2nd operation) and<br>*3-fold operation* (after the 3rd operation) are sent successively immediately after the respective operation. |

- *no:* The physical input counts the number of operations that occur successively within the allowed time interval. Thereafter, the corresponding number of communication objects, e.g.: three counted operations = CO *3-fold operation* is sent.

**Maximum time between two operations**

Options: 0.3/0.4/0.5/0.6/0.8/1/1.2/1.5/2/3/4/5/6/7/8/9/10 s

This parameter determines the time that can elapse between two operations. After an operation, it will wait for the time entered here. If there are no further operations within this period, the communication object *x-fold operation* is sent. With a further operation, the time set here restarts.

If in parameter *Additional communication object for long operation* the option *yes* is selected, the following parameter appears:

**sent value**
**(object "Telegr. operation long")**

Options: ON
OFF
TOGGLE

A further function can be carried out with long operation of the button via the communication object *Long operation*. If a long operation of the button is undertaken within the maximum time after one or more short operations, the short operations are ignored.

### 3.2.14.2 Communication objects *Multiple operation*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

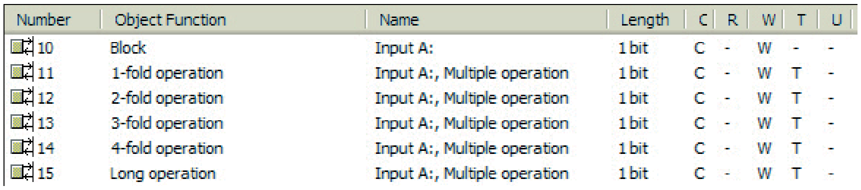
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | 1-fold operation | Input A:, Multiple operation | 1 bit | C | - | W | T | - |
| 12 | 2-fold operation | Input A:, Multiple operation | 1 bit | C | - | W | T | - |
| 13 | 3-fold operation | Input A:, Multiple operation | 1 bit | C | - | W | T | - |
| 14 | 4-fold operation | Input A:, Multiple operation | 1 bit | C | - | W | T | - |
| 15 | Long operation | Input A:, Multiple operation | 1 bit | C | - | W | T | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A:** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Multiple operation,* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

> **Note**
>
> When the input is disabled, there is fundamentally no reaction to a signal change, but:
>
> – Waiting for a long button operation or a minimum signal time is suspended.
>
> – The parameter setting *8 bit scene* is ended with saving.
>
> – Communication objects continue to be updated and sent if necessary.
>
> When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:
>
> – The minimum actuation or detection of a long/short button push starts.
>
> – Communication objects send their current value if necessary.
>
> The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

| | |
|---|---|
| Telegram value: | 0 = enable input A<br>1 = disable input A |

| | | | | |
|---|---|---|---|---|
| **11** | **1-fold operation** | **Input A:**<br>**Multiple operation** | **1 bit**<br>**DPT 1.001** | **C, W, T** |

After multiple operations of an input, the respective communication object is sent to suit the number of operations.
The telegram value can be set in the parameters.

| | | | | |
|---|---|---|---|---|
| **12** | **2-fold operation** | **Input A:**<br>**Multiple operation** | **1 bit**<br>**DPT 1.001** | **C, W, T** |

After multiple operations of an input, the respective communication object is sent to suit the number of operations.
The telegram value can be set in the parameters.

| | | | | |
|---|---|---|---|---|
| **13** | **3-fold operation** | **Input A:**<br>**Multiple operation** | **1 bit**<br>**DPT 1.001** | **C, W, T** |

After multiple operations of an input, the respective communication object is sent to suit the number of operations.
The telegram value can be set in the parameters.

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **14** | **4-fold operation** | **Input A:**<br>**Multiple operation** | **1 bit**<br>**DPT 1.001** | **C, W, T** |
| After multiple operations of an input, the respective communication object is sent to suit the number of operations.<br>The telegram value can be set in the parameters. | | | | |
| **15** | **Long operation** | **Input A:**<br>**Multiple operation** | **1 bit**<br>**DPT 1.001** | **C, W, T** |
| This communication object is visible if the parameter *Additional communication object for long operation* has been set to the value *yes*. The communication object is sent after a long operation has been detected. The interval after which an operation is interpreted as “long” can be set. | | | | |
| **16…**<br>**19** | | | | |
| Not assigned in this operating mode. | | | | |

### 3.2.15 Operating mode *Counter*

In the operating mode *Counter*, the device is able to count the number of edges received on the binary input. If required, a differential counter is provided in addition to the normal counter. Both are controlled via the same counting pulses, but count independently of one another.

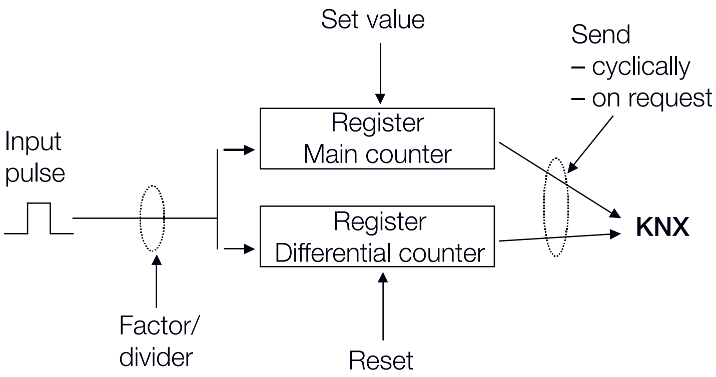
In this chapter, you will find all descriptions for the parameter windows and the corresponding communication objects for operating mode *Counter*.

| Note |
|---|
| The inputs B…X do not differ from input A.<br>The descriptions of the parameter setting possibilities and the adjustable communication objects for the inputs B…X should be taken from the descriptions from parameter window *Enable Inputs A…X*, page 50! |

#### 3.2.15.1 Counting pulses

The *Counter* function is used for counting input pulses. In the parameter window *Counter* a main counter is provided. It is possible to enable a differential counter (comparable with an odometer counting daily mileage) to record differential values. The starting point of the differential counter is programmable. The settings for the differential counter can be found in the additional parameter window *A: Differential Counter*.

The following illustration provides an overview of the *Counter* function.



Which preconditions must be fulfilled on the main counter to set the value?

1. Set the write flag.
2. Thereafter, it is possible to set the value via KNX.

In order to adapt the counter speed, the number of input pulses per counting pulse can be set. Furthermore, a counter level change can be set for each counting pulse. Both counter values can either be sent on the bus cyclically or on request.

Limit values can be defined for the counter. Telegrams are sent after the limit values are exceeded.

| Note |
|---|
| The maximum counter frequency may not exceed 5 Hz.<br>The minimum pulse duration is 50 ms. The maximum capacitive load on the input is 22 nF. |

### 3.2.15.2 Behaviour of the counter readings after a download

The counter readings are not deleted after a download.

### 3.2.15.3 Behaviour of the counter readings bus voltage failure

The counter readings are saved after a bus voltage failure. The counter readings can be sent after bus voltage recovery.

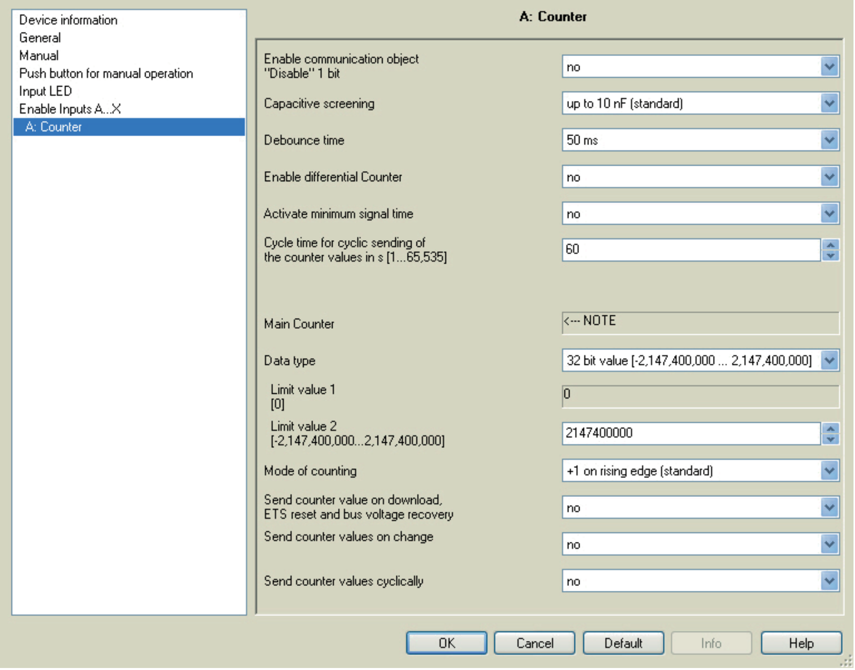
### 3.2.15.4 Specific feature differences between main counter and differential counter

| Description | Main Counter | Differential counter |
|---|---|---|
| Block | yes | yes |
| Data type can defined | yes | yes |
| Start value is the smallest limit value when counting upwards | yes | yes |
| Start value is the largest limit value when counting downwards | yes | yes |
| The communication object *XZ: Limit value reached* sends a 1 as soon as the counter pulse has exceeded the smaller or larger limit value. | yes | yes |
| If the option *continue circular counting* is set, the counter reading is set to the start value and any possible overflow is added to the start value. | Cannot be set | yes |
| If the option *stop until ETS reset* is set, this and all following counter pulses are ignored until the differential counter is reset by the communication object *DC: reset*. | Cannot be set | yes |
| Counts up/down | adjustable | adjustable |
| Limit value 1 preset to zero | yes | adjustable |
| Circular count | yes | adjustable |
| Reset the counter | no | yes |

### 3.2.15.5 Parameter window *A: Counter*

In this parameter window, all settings are undertaken for parameter window *A: Counter*.
The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Counter* has been selected in parameter *Input A*.



A: Counter

| | |
|---|---|
| Enable communication object "Disable" 1 bit | no |
| Capacitive screening | up to 10 nF (standard) |
| Debounce time | 50 ms |
| Enable differential Counter | no |
| Activate minimum signal time | no |
| Cycle time for cyclic sending of the counter values in s [1...65,535] | 60 |
| Main Counter | <--- NOTE |
| Data type | 32 bit value [-2,147,400,000 ... 2,147,400,000] |
| Limit value 1 [0] | 0 |
| Limit value 2 [-2,147,400,000...2,147,400,000] | 2147400000 |
| Mode of counting | +1 on rising edge (standard) |
| Send counter value on download, ETS reset and bus voltage recovery | no |
| Send counter values on change | no |
| Send counter values cyclically | no |

**Enable communication object "Disable" 1 bit**

Options: no
yes

- *yes:* The 1 bit *Block* communication object is enabled. This can be used to block the input.

**Note**

If the input is disabled and the option *yes* is selected with parameter *Cyclic sending*, the last state is still sent regardless of the block.

Using the communication object *Block* (No. 10), the physical input can be disabled, but internal sending continues, i.e. the input terminals are physically disconnected from the application program.

If the input is disabled, the main counter and the differential counter will not count pulses.

The communication object *Block* (No. 10) has no influence on manual operation.

**Capacitive screening**

Options: up to 10 nF (standard)
up to 20 nF
up to 30 nF
up to 40 nF

This parameter defines the degree of capacitive screening.
Transmission errors can occur on extended cable lengths under certain conditions, e.g. in a 5 x 1.5 mm$^2$ cable, where two conductors are used as a signal line and one conductor is used for switching loads, it may result in mutual interference. If this proves to be the case in an installation, the sensitivity of the input is increased. It should be noted that the signal evaluation also slows down.

**Debounce time**

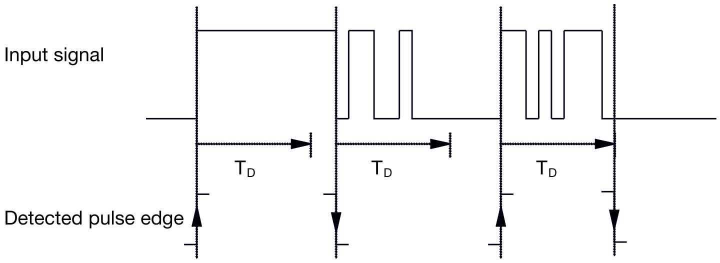
Options: 10/20/30/50/70/100/150 ms

Debouncing prevents unwanted multiple operations of the input, e.g. due to bouncing of the contact.

**What is the debounce time?**

If an edge is detected at an input, the input will react immediately to this edge, e.g. by sending a telegram. At the same time, the duration of the debounce time $T_D$ starts. The signal on the input is not evaluated within the debounce time duration.

The following example clarifies this:



After detection of an edge on the input, further edges are ignored for the debounce time $T_D$.

**Enable differential Counter**

Options: yes

no

- *yes:* The parameter window *Differential counter* is enabled.

**Activate minimum signal time**

Options: no
yes

- *yes:* The following parameters appear:

**for rising edge**
**in value x 0.1 s [1…65,535]**

Options: 1…10…65,535

| Note |
|---|
| A rising edge corresponds to a normally opened contact function. |

**for falling edge**
**in value x 0.1 s [1…65,535]**

Options: 1…10…65,535

| Note |
|---|
| A falling edge corresponds to a normally closed contact function. |

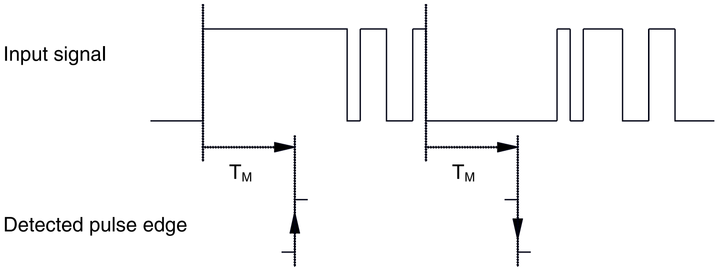
**What is the minimum signal time?**

In contrast to the debounce time, a telegram is only sent, after the minimum signal duration has elapsed.

The individual functions are:

If an edge is detected on the input, the minimum signal duration will commence. No telegram is sent on the bus at this time. The signal on the input is observed within the minimum signal duration. If a further edge appears at the input during the minimum signal duration, it will be interpreted as a new operation, and the minimum signal duration restarts.
If no further edges occur after the start of the minimum signal duration, a telegram is sent on the bus, after the minimum signal duration has timed out.

**Example: Minimum signal time of the input signal for a detected edge:**



In only two cases, no further edge changes occur within the minimum signal duration $T_M$ after a change of edge. For this reason, only both of these are detected as valid.

**Main Counter**

<−−− NOTE

**Data type**

Options: 8 bit value [-128…127]
8 bit value [0…255]
16 bit value [-32,768…32,767]
16 bit value [0…65,535]
32 bit value [-2,147,485,648…2,147,483,647]

This parameter defines the data type of the counter.

This parameter defines the data type of the differential counter.

Both of the following parameters are dependent on the parameter *Data type*. Depending on the *Data type* selected, different limit values are preset. The input fields can be freely edited.

**Note**

The first reset counter pulse that exceeds or falls below the limit value sets the counter to the opposite limit value. With the next counter pulse, the new counter reading (set according to the respective counter value) continues to count in the parameterized counting direction.

**Example**

Mode of main counter counting

Limit value 1 [0] of the limit value is set to zero.

Limit value 2 [255] of the limit value is set, for example to 10

For each counter pulse 1 is added commencing at 0.

0=>1=>2=>3=>4=>5=>6=>7=>8=>9=>10 with 10 counter pulses (=>) the upper limit is reached. With the next counter pulse, the counter is set to the opposite limit value, i.e. to 0, and then continues again up to 10. In order to implement a circular count, 11 counter pulses are required here.

**Note**

It is necessary to ensure that both limit values are set to different values. If the same limit values are defined, the behaviour of the counter is undefined.

The limit values can be set to any value, i.e. limit value 1 can be greater than or less than limit value 2. The application program automatically chooses, for example, the largest limit value from both set limits and starts counting upwards or downwards to suit the direction of counting.

**Limit value 1**
**[0]**

Limit value 1 is preset to 0 for every data type.

**Limit value 2**
**[X]**

| | | |
|---|---|---|
| Options: | 127 | [-128…127] |
| | 255 | [0…255] |
| | 32,767 | [-32,768…32,767] |
| | 65,565 | [0…65,535] |
| | 2,147,400,000 | [-2,147,400,000…2,147,400,000] |

**Mode of counting**

Options: +1 on rising edge (standard)
adapt…:

This parameter defines the mode of counting of the counter.

- *+1 on rising edge (standard):* The counter value is incremented by one with every rising edge.
- *adapt…*: Three further parameters appear:

**Create input pulse**

Options: only on rising edge:
only on falling edge:
on both edges:

With this parameter, you set how the input pulse is to be generated.

- *only on rising edge:* The pulse is generated with a rising edge.
- *only on falling edge:* The pulse is generated with a falling edge.
- *on both edges:* The pulse is generated with a rising and falling edge.

**Number of input pulses**
**for one counter step [1...10,000]**

Options: 1…10,000

This parameter defines the number of input pulses required to generate a counter pulse for the main and differential counter.

| **Example** |
|---|
| After every 10 input pulses the counters are incremented by 1. |

**Change of counter for every counter step [-10,000...10,000]**

Options: -10,000…<u>1</u>…10,000

This parameter defines by how much the counter is changed for a counter pulse.

Negative values, e.g. -1, define the downward counter direction, e.g. 200…0.

Positive values, e.g. 10, define the upward counter direction, e.g. 10…200.

**Send counter value on download, ETS reset and bus voltage recovery**

Options: yes
<u>no</u>

- *yes:* After bus voltage recovery and after the send delay time has timed out, the device sends the communication object *Counter value* on the bus.

**Send counter values on change**

Options: yes
<u>no</u>

This parameter defines whether a change of the counter value is to be sent.

**Send counter level cyclically**

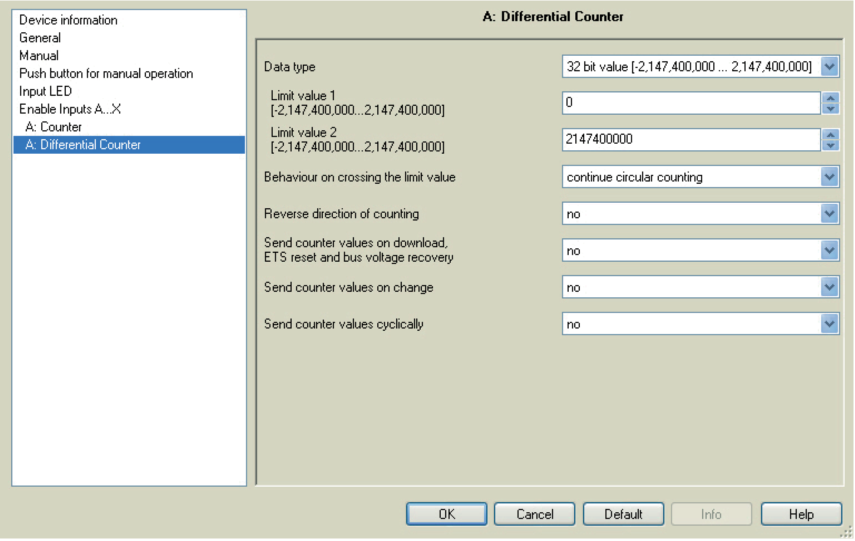
Options: yes
<u>no</u>

Using this parameter, you determine if the counter value is sent cyclically on the bus.

### 3.2.15.6 Parameter window *A: Differential counter*

In this parameter window, all settings are undertaken for parameter window *A: Differential Counter*.
The explanations also apply for the *Inputs B…X*.

This parameter window is visible if in parameter window *Enable Inputs A…X*, page 50, the option *Counter* in parameter *Input A* and in parameter window *A: Counter*, page 126, the option *yes* has been selected in parameter *Enable differential Counter*.



A: Differential Counter

Data type: 32 bit value [-2,147,400,000 ... 2,147,400,000]

Limit value 1 [-2,147,400,000...2,147,400,000]: 0

Limit value 2 [-2,147,400,000...2,147,400,000]: 2147400000

Behaviour on crossing the limit value: continue circular counting

Reverse direction of counting: no

Send counter values on download, ETS reset and bus voltage recovery: no

Send counter values on change: no

Send counter values cyclically: no

#### Data type

Options: 8 bit value [-128…127]/
8 bit value [0…255]/
16 bit value [-32,768…32,767]/
16 bit value [0…65,535]
<u>32 bit value [-2,147,485,648…2,147,483,647]</u>

This parameter defines the data type of the differential counter.

Both of the following parameters are dependent on the parameter *Data type*. Depending on the *Data type* selected, different limit values are preset. The input fields can be freely edited.

| **Note** |
|---|
| The first reset counter pulse that exceeds or falls below the limit value sets the counter to the opposite limit value. With the next counter pulse, the new counter reading (set according to the respective counter value) continues to count in the parameterized counting direction. |

**Example**

Mode of main counter counting

Limit value 1 [0] of the limit value is set to zero.

Limit value 2 [255] of the limit value is set, for example to 10

For each counter pulse 1 is added commencing at 0.

0=>1=>2=>3=>4=>5=>6=>7=>8=>9=>10 with 10 counter pulses (=>) the upper limit is reached. With the next counter pulse, the counter is set to the opposite limit value, i.e. to 0, and then continues again up to 10. In order to implement a circular count, 11 counter pulses are required here.

**Note**

It is necessary to ensure that both limit values are set to different values. If the same limit values are defined, the behaviour of the counter is undefined.

The limit values can be set to any value, i.e. limit value 1 can be greater than or less than limit value 2. The application program automatically chooses, for example, the largest limit value from both set limits and starts counting upwards or downwards to suit the direction of counting.

**Limit value 1**
**[X]**

| | | |
|---|---|---|
| Options: | 0 | [-128…127] |
| | 0 | [0…255] |
| | 0 | [-32,768…32,767] |
| | 0 | [0…65.535] |
| | 0 | [-2,147,400,000…2,147,400,000] |

**Limit value 2**
**[X]**

| | | |
|---|---|---|
| Options: | 127 | [-128…127] |
| | 255 | [0…255] |
| | 32,767 | [-32,768…32,767] |
| | 65,565 | [0…65,535] |
| | 2,147,400,000 | [-2,147,400,000…2,147,400,000] |

### Behaviour on crossing the limit value

Options: continue circular counting
stop until ETS reset

This parameter defines the reaction to reaching a limit value.

- *continue circular counting:* The counter continues with circular counting. When the counter drops below the lower limit value (only possible with a downward counter), the counter is set to the value of the larger limit value and the downward pulse count continues from this value.
  When the larger limit value is exceeded, the counter is set to the lower limit value and pulse counting continues.
- *stop until ETS reset:* The counter stops and waits for an ETS reset.

| **Note** |
|---|
| After an ETS reset, circular counting continues. |

### Mode of counting like main counter

<--- Note

The direction of counting of the differential counter is the same as for the main counter.

### Reverse direction of counting

Options: yes
no

This parameter is used for reversing the direction of counting of the differential counter in comparison to the main counter.

### Send counter value on download, ETS reset and bus voltage recovery

Options: yes
no

- *yes:* After bus voltage recovery and after the send delay time has timed out, the device sends the communication object *DC: counter value* on the bus.

### Send counter values on change

Options: yes
no

This parameter defines whether a change of the counter value is to be sent.

### Send counter level cyclically

Options: yes
no

Using this parameter, you set if the counter value is sent cyclically on the bus.

### 3.2.15.7 Communication objects *A: Counter*

The communication objects of all *Inputs* do not differentiate from one another and are explained using *Input A*. The descriptions of the parameter setting options of *Inputs A…X* are described from parameter window *Enable Inputs A…X*, page 50.

The communication objects *Input A* have the nos. 10…19.

The communication objects *Input B* have the nos. 20…29.

The communication objects *Input C* have the nos. 30…39.

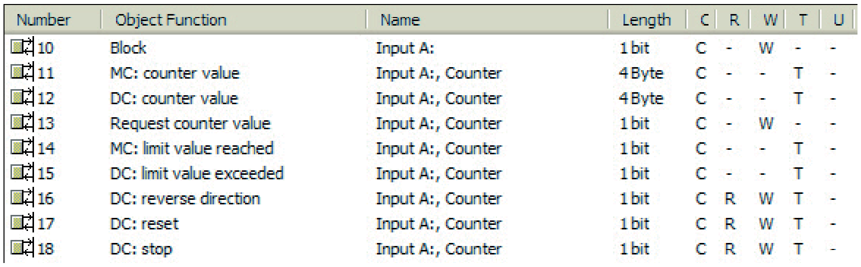
The communication objects *Input D* have the nos. 40…49.

The communication objects *Input E* have the nos. 50…59.

The communication objects *Input F* have the nos. 60…69.

The communication objects *Input G* have the nos. 70…79.

The communication objects *Input H* have the nos. 80…89.



| Number | Object Function | Name | Length | C | R | W | T | U |
|---|---|---|---|---|---|---|---|---|
| 10 | Block | Input A: | 1 bit | C | - | W | - | - |
| 11 | MC: counter value | Input A:, Counter | 4 Byte | C | - | - | T | - |
| 12 | DC: counter value | Input A:, Counter | 4 Byte | C | - | - | T | - |
| 13 | Request counter value | Input A:, Counter | 1 bit | C | - | W | - | - |
| 14 | MC: limit value reached | Input A:, Counter | 1 bit | C | - | - | T | - |
| 15 | DC: limit value exceeded | Input A:, Counter | 1 bit | C | - | - | T | - |
| 16 | DC: reverse direction | Input A:, Counter | 1 bit | C | R | W | T | - |
| 17 | DC: reset | Input A:, Counter | 1 bit | C | R | W | T | - |
| 18 | DC: stop | Input A:, Counter | 1 bit | C | R | W | T | - |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **10** | **Block** | **Input A:** | **1 bit**<br>**DPT 1.003** | **C, W** |

This communication object is enabled if in parameter window *A: Counter* the parameter *Enable communication object "Disable" 1 bit* has been selected with option *yes*.

Using the communication object *Block*, the input can be disabled or enabled. With activated communication object *Block*, the inputs are disabled.

> **Note**
>
> When the input is disabled, there is fundamentally no reaction to a signal change, but:
>
> – Waiting for a long button operation or a minimum signal time is suspended.
>
> – The parameter setting *8 bit scene* is ended with saving.
>
> – Communication objects continue to be updated and sent if necessary.
>
> When enabling an input, a change of the signal states (as opposed to before the block) leads to immediate processing, e.g.:
>
> – The minimum actuation or detection of a long/short button push starts.
>
> – Communication objects send their current value if necessary.
>
> The communication object *Block* has no influence on manual operation. The status of the simulated input signal continues to be sent here.

| | |
|---|---|
| Telegram value: | 0 = enable input A<br>1 = disable input A |

| | | | | |
|---|---|---|---|---|
| **11** | **MC: counter value** | **Input A:**<br>**Counter** | **Variable**<br>**DPT variable** | **C, T** |

The counter reading of the main counter (MC) can be read out using this communication object.

| | |
|---|---|
| 1 byte value [0…255] | DPT 5.010 counter value |
| 1 byte value [-128…+127] | DPT 6.010 counter value |
| 2 byte value [0…+65,535] | DPT 8.001 counter value |
| 2 byte value [-32,768…+32,767] | DPT 7.001 counter value |
| 4 byte value [-2,147,483,648…2,147,483,647] | DPT 13.001 counter value |

| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **12** | **DC: counter value** | **Input A:<br>Counter** | **Variable<br>DPT variable** | **C, T** |
| This communication object is enabled if in parameter window *A:* Counter the parameter *Enable differential Counter* has been selected with option *yes*.<br>The counter reading of the main counter (MC) can be read out using this communication object.<br>1 byte value [0…255] DPT 5.010 counter value<br>1 byte value [-128…+127] DPT 6.010 counter value<br>2 byte value [0…+65,.535] DPT 8.001 counter value<br>2 byte value [-32,768…+32,767] DPT 7.001 counter value<br>4 byte value [-2,147,483,648…2,147,483,647] DPT 13.001 counter value | | | | |
| **13** | **Request counter value** | **Input A:<br>Counter** | **1 bit<br>DPT 1.003** | **C, W** |
| The counter reading can be modified using this communication object.<br>Telegram value: 0 = do not request counter value<br>1 = request counter value | | | | |
| **14** | **MC: limit value exceeded** | **Input A:<br>Counter** | **1 bit<br>DPT 1.002** | **C, T** |
| With this communication object you can indicate if a limit value of the main counter (MC) has been exceeded.<br>Telegram value: 1 = limit value exceeded | | | | |
| **15** | **DC: limit value exceeded** | **Input A:<br>Counter** | **1 bit<br>DPT 1.002** | **C, T** |
| This communication object is enabled if in parameter window *A: Counter* the parameter *Enable differential counter* has been selected with the option *yes*.<br>With this communication object you can indicate if a limit value of the differential counter (DC) has been exceeded.<br>Telegram value: 1 = limit value exceeded | | | | |
| **16** | **DC: reverse direction** | **Input A:<br>Counter** | **1 bit<br>DPT 1.002** | **C, R, W, T** |
| This communication object is enabled if in parameter window *A: Counter* the parameter *Enable differential Counter* has been selected with option *yes*.<br>The counting direction of the differential counter (DC) can changed via the bus using this communication object.<br>Telegram value: 0 = count direction as parameterized<br>1 = count direction counter to parameterization | | | | |

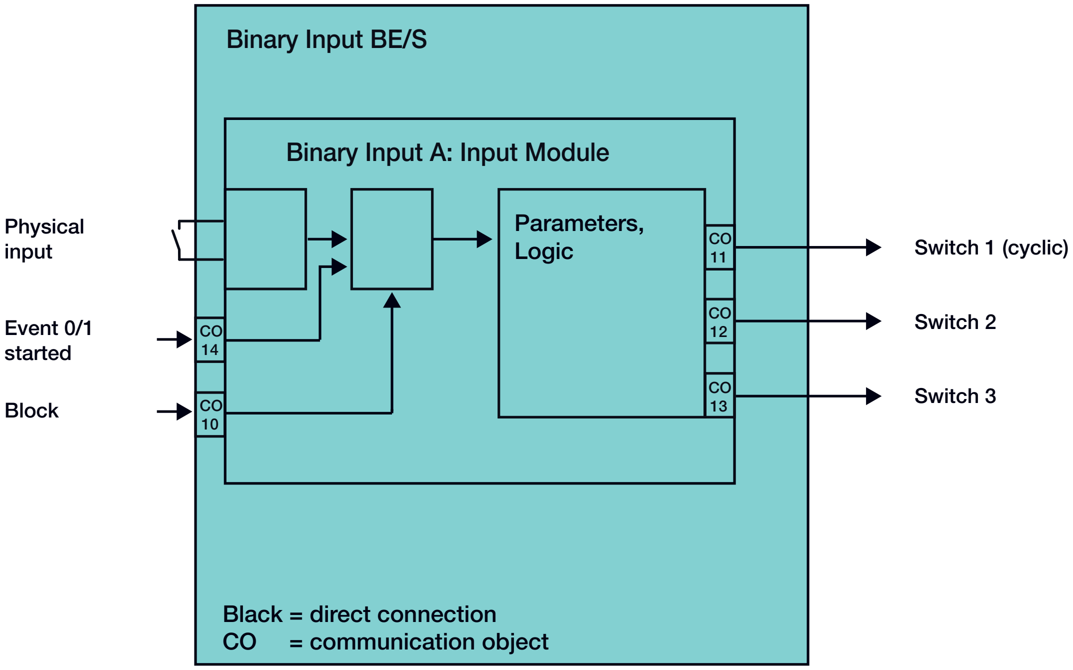
| No. | Function | Object name | Data type | Flags |
|---|---|---|---|---|
| **17** | **DC: reset** | **Input A:<br>Counter** | **1 bit<br>DPT 1.002** | **C, R, W, T** |
| This communication object is enabled if in parameter window *A: Counter* the parameter *Enable differential Counter* has been selected with option *yes*.<br>The differential counter (DC) can be reset to the start value using this communication object.<br>Telegram value: 0 = do not reset differential counter value<br>1 = reset differential counter value | | | | |
| **18** | **DC: stop** | **Input A:<br>Counter** | **1 bit<br>DPT 1.002** | **C, R, W, T** |
| This communication object is enabled if in parameter window *A: Counter* the parameter *Enable differential Counter* has been selected with option *yes*.<br>The differential counter (DC) can be stopped using this communication object.<br>Telegram value: 0 = do not stop differential counter value<br>1 = stop differential counter value | | | | |
| **19** | | | | |
| Not assigned in this operating mode. | | | | |

# 4 Planning and application

In this chapter, you will find descriptions relating to the special characteristics of the switch sensor and blind sensor operating modes.

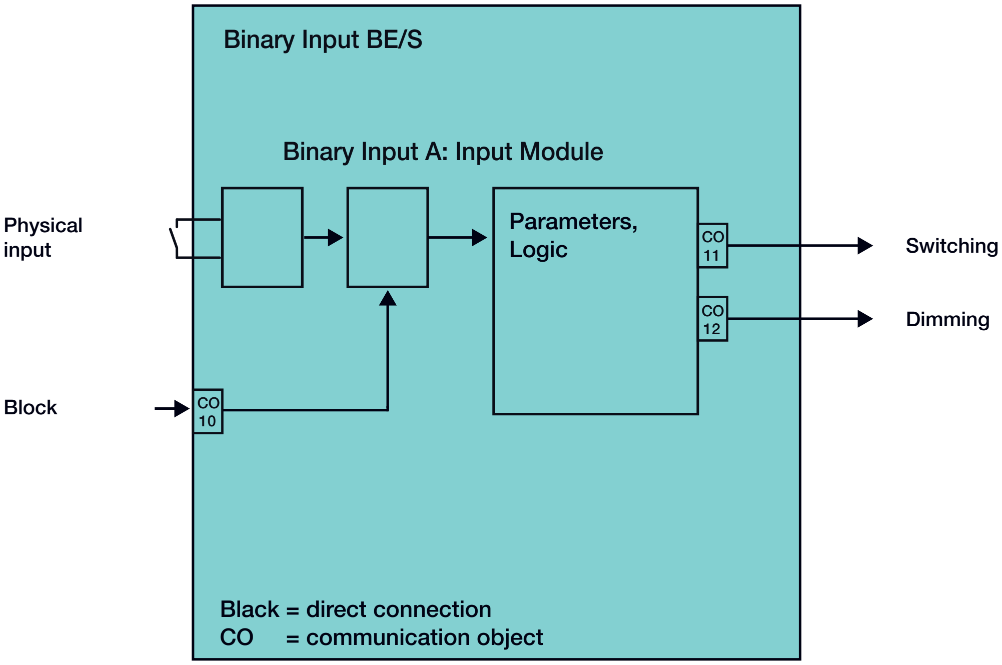
## 4.1 Block diagram *Switch sensor*

This block diagram shows the internal structure of the switch sensor.



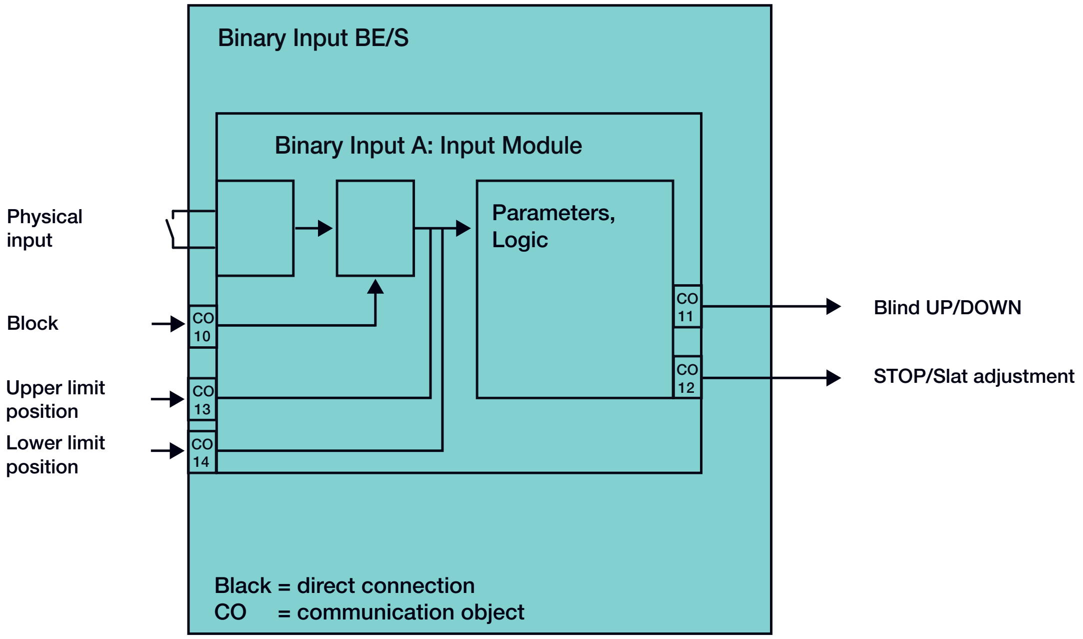
## 4.2 Block diagram
*Switch/Dim sensor*

This block diagram shows the internal structure of the switch/dim sensor.



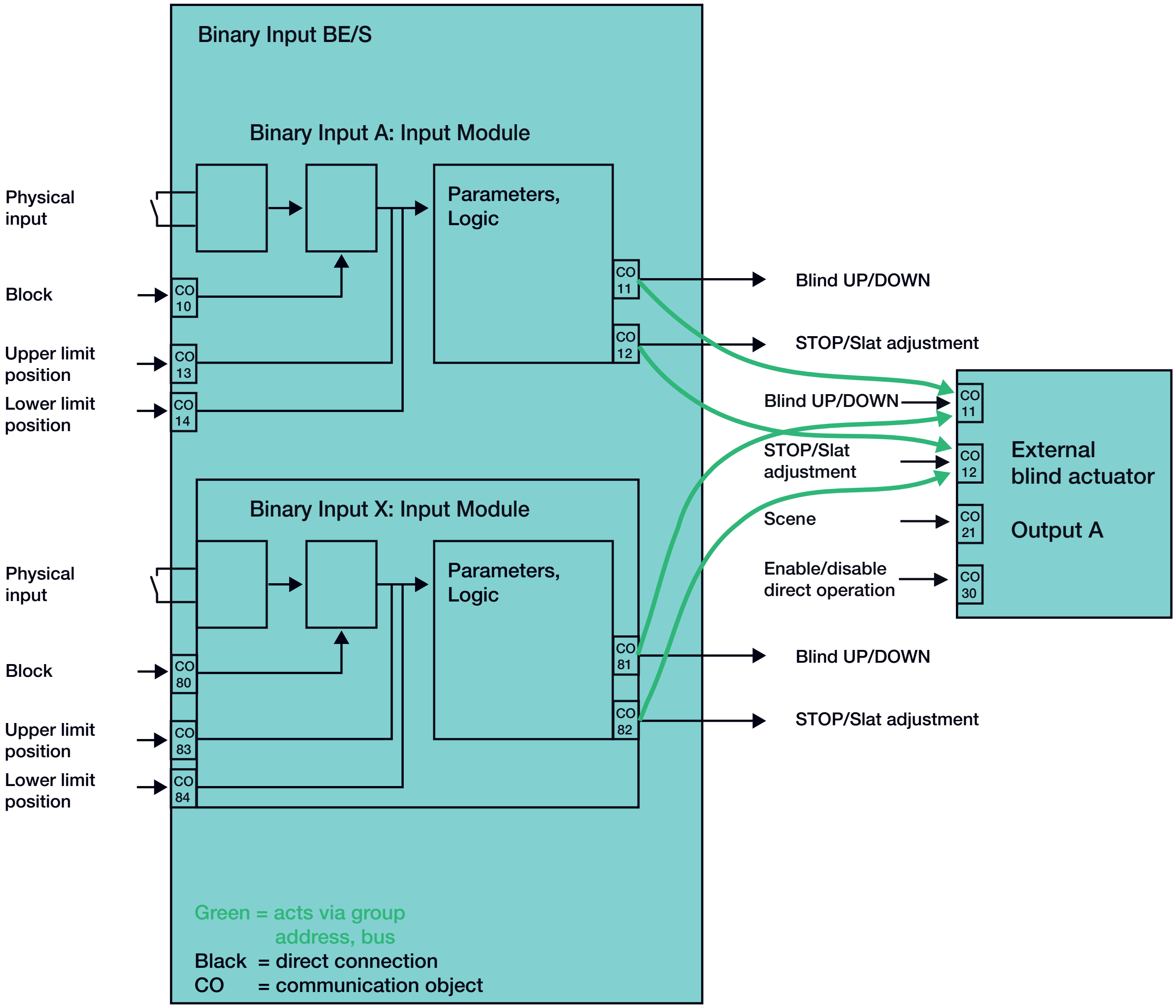
## 4.3 Block diagram
### *Blind sensor*

This block diagram shows the internal structure of the blind sensor.



### 4.3.1 Block diagram *Blind sensor* with external *Blind actuator*

This block diagram shows the internal structure of the blind sensor with an external blind actuator.



**Parameterization of the binary input x:**

2 push button operation

Short operation = STOP/Slat UP
Long operation = Move UP

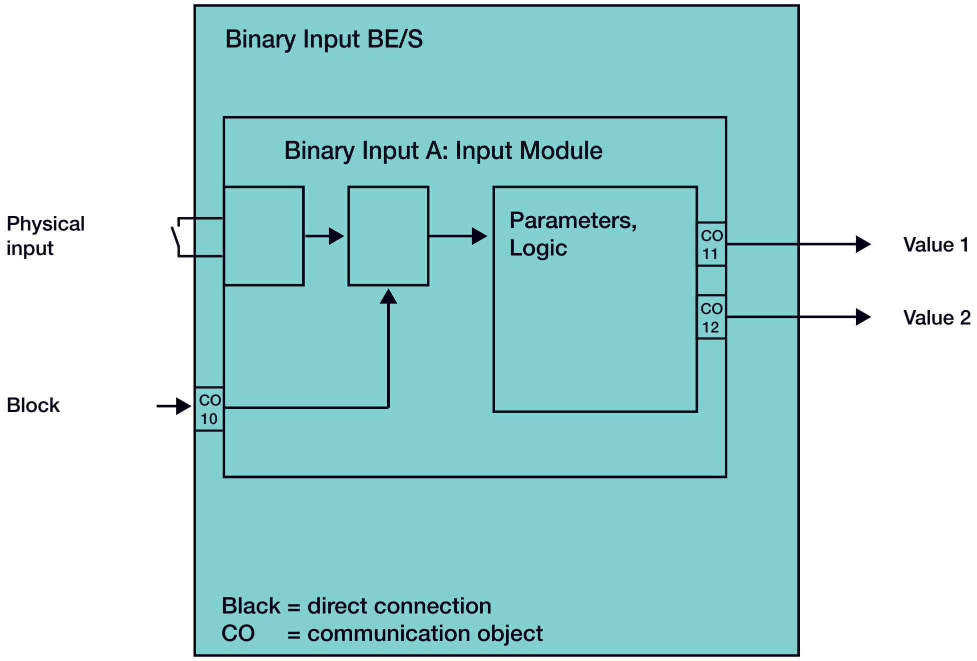
**Parameterization of the binary input y:**

2 push button operation

Short operation = STOP/Slat DOWN
Long operation = Move DOWN

## 4.4 Block diagram
*Value/Forced operation*

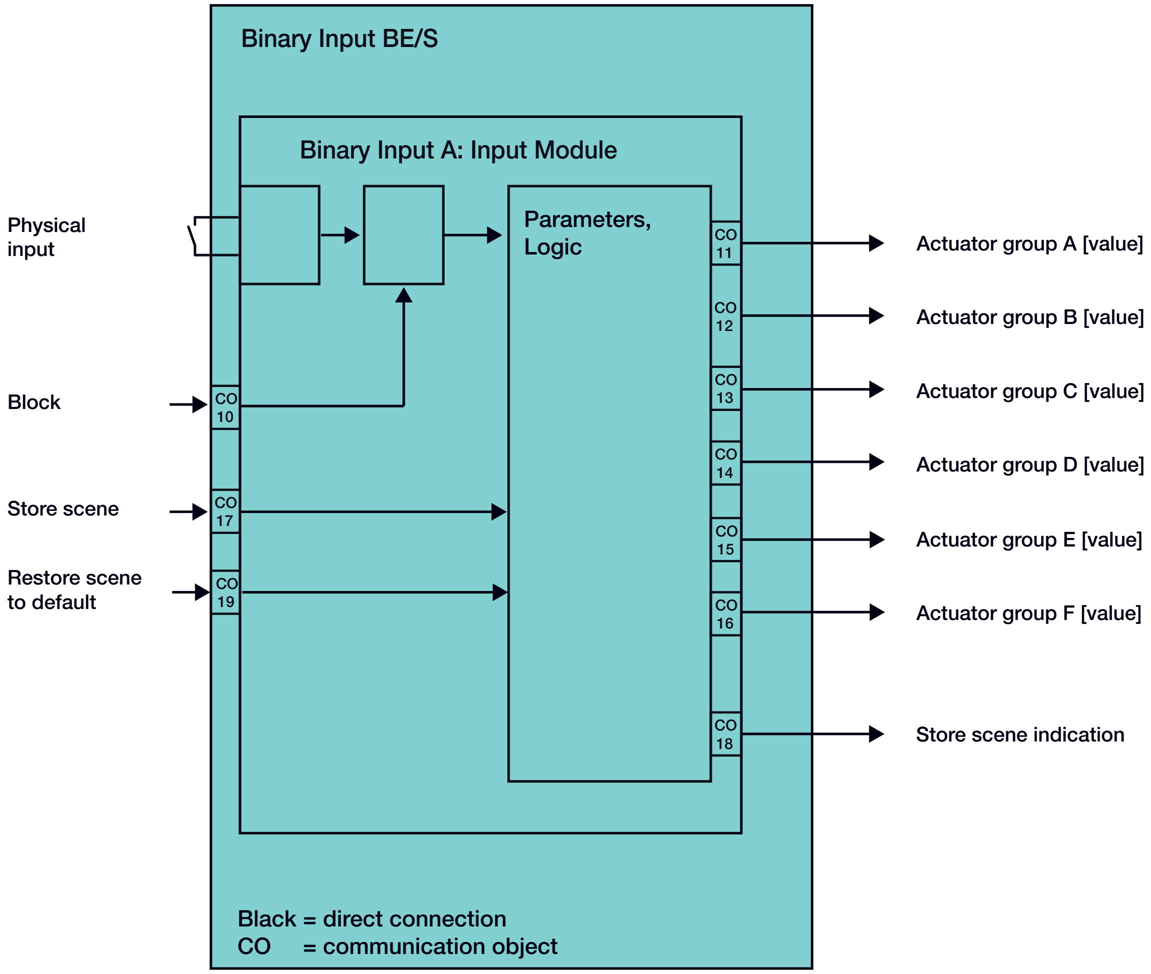
This block diagram shows the internal structure for value/forced operation.



## 4.5 Block diagram

### *Control scene*

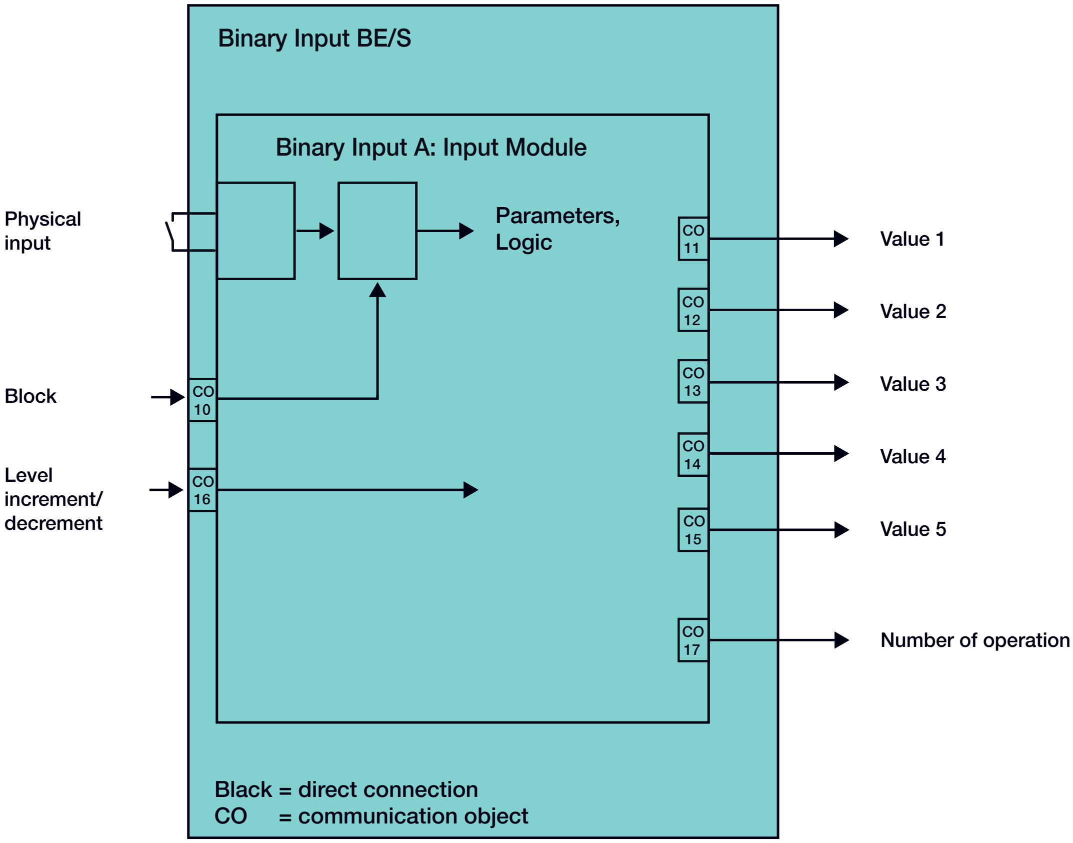
This block diagram shows the internal structure for the scene control.



## 4.6 Block diagram

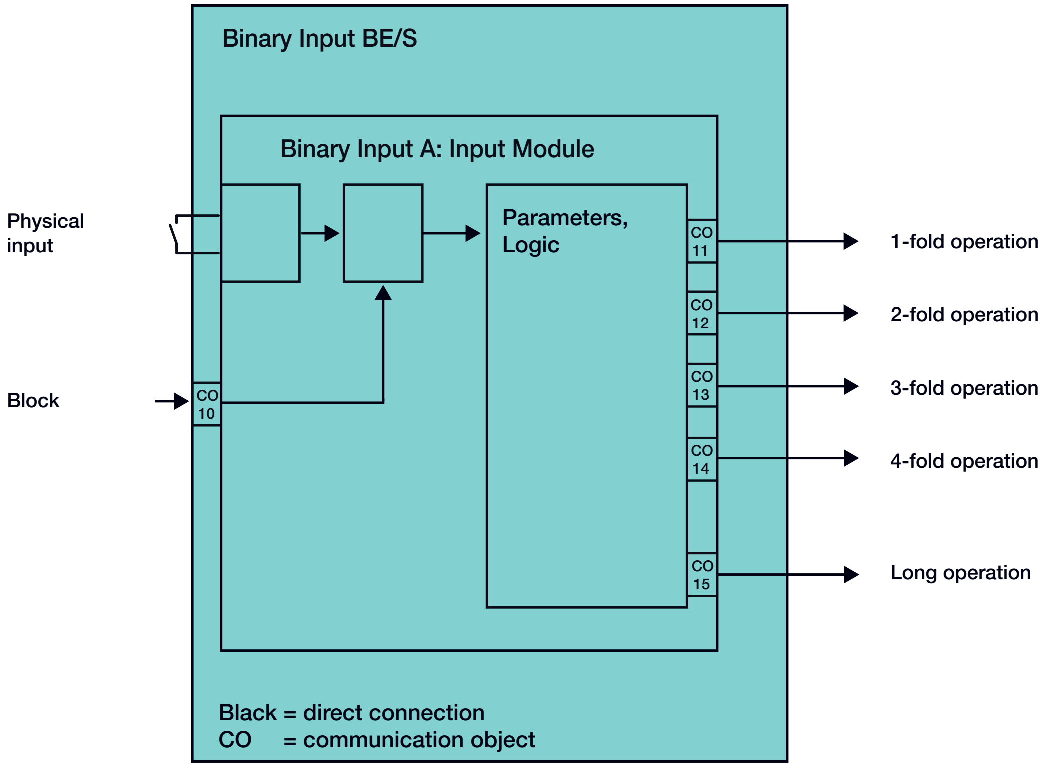
### *Switching sequences*

This block diagram shows the internal structure for the switching sequences.



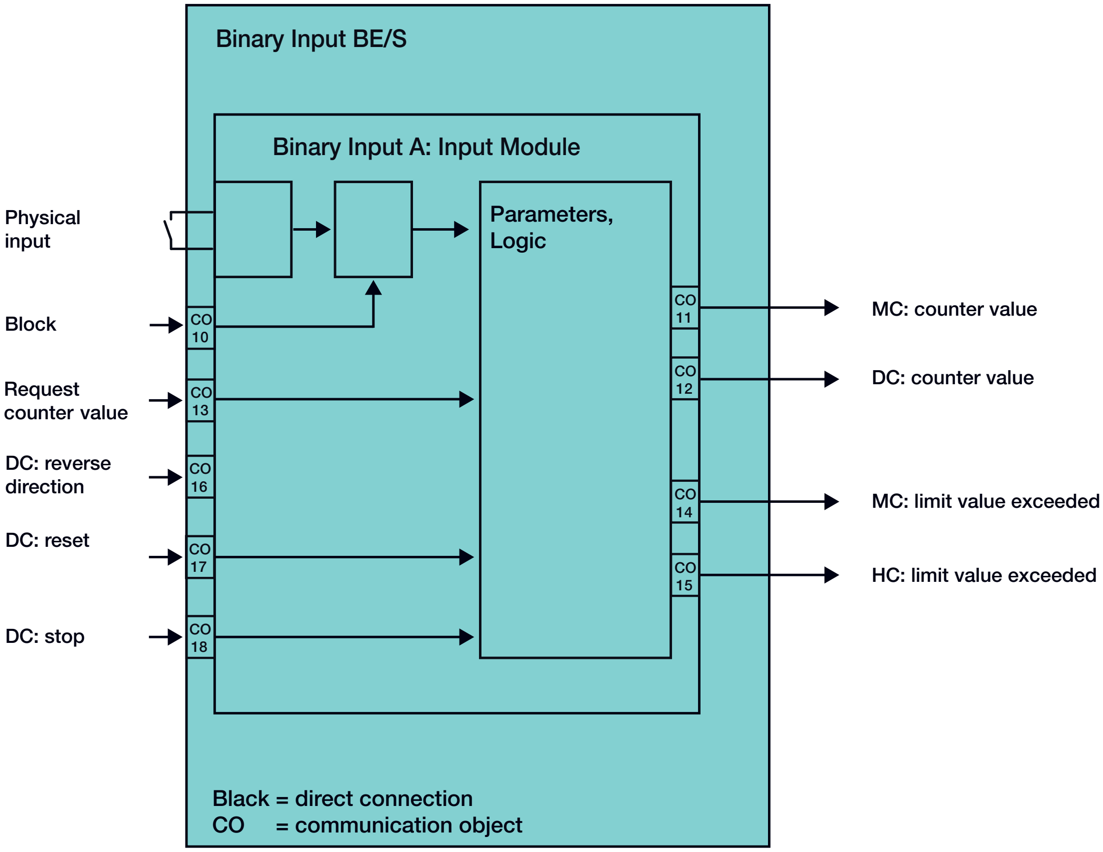
## 4.7 Block diagram
*Multiple operation*

This block diagram shows the internal structure for multiple operation.



## 4.8 Block diagram
*Counter*

This block diagram shows the internal structure of the counter.



# A Appendix

## A.1 Scope of delivery

The Binary Input is supplied together with the following components. Please check the items received using the following list.

1 pc. BE/S x.x.1, Binary Input, x-fold, MDRC

1 pc. Installation and operating instructions

1 pc. Bus connection terminal (red/black)

## A.2 Input 4 bit dimming telegram:

The following table describes the 4 bit dimming telegram:

| Dec. | Hex. | Binary | Dimming telegram |
|---|---|---|---|
| 0 | 0 | 0000 | STOP |
| 1 | 1 | 0001 | 100 % DARKER |
| 2 | 2 | 0010 | 50 % DARKER |
| 3 | 3 | 0011 | 25 % DARKER |
| 4 | 4 | 0100 | 12.5 % DARKER |
| 5 | 5 | 0101 | 6.25 % DARKER |
| 6 | 6 | 0110 | 3.13 % DARKER |
| 7 | 7 | 0111 | 1.56 % DARKER |
| 8 | 8 | 1000 | STOP |
| 9 | 9 | 1001 | 100 % BRIGHTER |
| 10 | A | 1010 | 50 % BRIGHTER |
| 11 | B | 1011 | 25 % BRIGHTER |
| 12 | C | 1100 | 12.5 % BRIGHTER |
| 13 | D | 1101 | 6.25 % BRIGHTER |
| 14 | E | 1110 | 3.13 % BRIGHTER |
| 15 | F | 1111 | 1.56 % BRIGHTER |

## A.3 Gray code

The sequence of the switching stage is characterized by the fact that there is only a single change of value between two stages. Thus, the transition to the next stage only requires sending a single telegram.

The following table describes Gray code when applied to 4 communication objects:

| Switching stage | | Value of the communication objects | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Short designation** | **Value 5** | **Value 4** | **Value 3** | **Value 2** | **Value 1** |
| 0 | 00000 | OFF | OFF | OFF | OFF | OFF |
| 1 | 00001 | OFF | OFF | OFF | OFF | ON |
| 2 | 00011 | OFF | OFF | OFF | ON | ON |
| 3 | 00010 | OFF | OFF | OFF | ON | OFF |
| 4 | 00110 | OFF | OFF | ON | ON | OFF |
| 5 | 00111 | OFF | OFF | ON | ON | ON |
| 6 | 00101 | OFF | OFF | ON | OFF | ON |
| 7 | 00100 | OFF | OFF | ON | OFF | OFF |
| 8 | 01100 | OFF | ON | ON | OFF | OFF |
| 9 | 01101 | OFF | ON | ON | OFF | ON |
| 10 | 01111 | OFF | ON | ON | ON | ON |
| 11 | 01110 | OFF | ON | ON | ON | OFF |
| 12 | 01010 | OFF | ON | OFF | ON | OFF |
| 13 | 01011 | OFF | ON | OFF | ON | ON |
| 14 | 01001 | OFF | ON | OFF | OFF | ON |
| 15 | 01000 | OFF | ON | OFF | OFF | OFF |
| 16 | 11000 | ON | ON | OFF | OFF | OFF |
| 17 | 11001 | ON | ON | OFF | OFF | ON |
| 18 | 11011 | ON | ON | OFF | ON | ON |
| 19 | 11010 | ON | ON | OFF | ON | OFF |
| 20 | 11110 | ON | ON | ON | ON | OFF |
| 21 | 11111 | ON | ON | ON | ON | ON |
| 22 | 11101 | ON | ON | ON | OFF | ON |
| 23 | 11100 | ON | ON | ON | OFF | OFF |
| 24 | 10100 | ON | OFF | ON | OFF | OFF |
| 25 | 10101 | ON | OFF | ON | OFF | ON |
| 26 | 10111 | ON | OFF | ON | ON | ON |
| 27 | 10110 | ON | OFF | ON | ON | OFF |
| 28 | 10010 | ON | OFF | OFF | ON | OFF |
| 29 | 10011 | ON | OFF | OFF | ON | ON |
| 30 | 10001 | ON | OFF | OFF | OFF | ON |
| 31 | 10000 | ON | OFF | OFF | OFF | OFF |

## A.4 Code table Scene (8 bit)

| Bit No. | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 bit value | Hexadecimal | Call | Not defined | Scene number | Scene number | Scene number | Scene number | Scene number | Scene number | Scene number | Call (C) |
| 0 | 00 | | | | | | | | | 1 | C |
| 1 | 01 | | | | | | | | ■ | 2 | C |
| 2 | 02 | | | | | | | ■ | | 3 | C |
| 3 | 03 | | | | | | | ■ | ■ | 4 | C |
| 4 | 04 | | | | | | ■ | | | 5 | C |
| 5 | 05 | | | | | | ■ | | ■ | 6 | C |
| 6 | 06 | | | | | | ■ | ■ | | 7 | C |
| 7 | 07 | | | | | | ■ | ■ | ■ | 8 | C |
| 8 | 08 | | | | | ■ | | | | 9 | C |
| 9 | 09 | | | | | ■ | | | ■ | 10 | C |
| 10 | 0A | | | | | ■ | | ■ | | 11 | C |
| 11 | 0B | | | | | ■ | | ■ | ■ | 12 | C |
| 12 | 0C | | | | | ■ | ■ | | | 13 | C |
| 13 | 0D | | | | | ■ | ■ | | ■ | 14 | C |
| 14 | 0E | | | | | ■ | ■ | ■ | | 15 | C |
| 15 | 0F | | | | | ■ | ■ | ■ | ■ | 16 | C |
| 16 | 10 | | | | ■ | | | | | 17 | C |
| 17 | 11 | | | | ■ | | | | ■ | 18 | C |
| 18 | 12 | | | | ■ | | | ■ | | 19 | C |
| 19 | 13 | | | | ■ | | | ■ | ■ | 20 | C |
| 20 | 14 | | | | ■ | | ■ | | | 21 | C |
| 21 | 15 | | | | ■ | | ■ | | ■ | 22 | C |
| 22 | 16 | | | | ■ | | ■ | ■ | | 23 | C |
| 23 | 17 | | | | ■ | | ■ | ■ | ■ | 24 | C |
| 24 | 18 | | | | ■ | ■ | | | | 25 | C |
| 25 | 19 | | | | ■ | ■ | | | ■ | 26 | C |
| 26 | 1A | | | | ■ | ■ | | ■ | | 27 | C |
| 27 | 1B | | | | ■ | ■ | | ■ | ■ | 28 | C |
| 28 | 1C | | | | ■ | ■ | ■ | | | 29 | C |
| 29 | 1D | | | | ■ | ■ | ■ | | ■ | 30 | C |
| 30 | 1E | | | | ■ | ■ | ■ | ■ | | 31 | C |
| 31 | 1F | | | | ■ | ■ | ■ | ■ | ■ | 32 | C |
| 32 | 20 | | | ■ | | | | | | 33 | C |
| 33 | 21 | | | ■ | | | | | ■ | 34 | C |
| 34 | 22 | | | ■ | | | | ■ | | 35 | C |
| 35 | 23 | | | ■ | | | | ■ | ■ | 36 | C |
| 36 | 24 | | | ■ | | | ■ | | | 37 | C |
| 37 | 25 | | | ■ | | | ■ | | ■ | 38 | C |
| 38 | 26 | | | ■ | | | ■ | ■ | | 39 | C |
| 39 | 27 | | | ■ | | | ■ | ■ | ■ | 40 | C |
| 40 | 28 | | | ■ | | ■ | | | | 41 | C |
| 41 | 29 | | | ■ | | ■ | | | ■ | 42 | C |
| 42 | 2A | | | ■ | | ■ | | ■ | | 43 | C |
| 43 | 2B | | | ■ | | ■ | | ■ | ■ | 44 | C |
| 44 | 2C | | | ■ | | ■ | ■ | | | 45 | C |
| 45 | 2D | | | ■ | | ■ | ■ | | ■ | 46 | C |
| 46 | 2E | | | ■ | | ■ | ■ | ■ | | 47 | C |
| 47 | 2F | | | ■ | | ■ | ■ | ■ | ■ | 48 | C |
| 48 | 30 | | | ■ | ■ | | | | | 49 | C |
| 49 | 31 | | | ■ | ■ | | | | ■ | 50 | C |
| 50 | 32 | | | ■ | ■ | | | ■ | | 51 | C |
| 51 | 33 | | | ■ | ■ | | | ■ | ■ | 52 | C |
| 52 | 34 | | | ■ | ■ | | ■ | | | 53 | C |
| 53 | 35 | | | ■ | ■ | | ■ | | ■ | 54 | C |
| 54 | 36 | | | ■ | ■ | | ■ | ■ | | 55 | C |
| 55 | 37 | | | ■ | ■ | | ■ | ■ | ■ | 56 | C |
| 56 | 38 | | | ■ | ■ | ■ | | | | 57 | C |
| 57 | 39 | | | ■ | ■ | ■ | | | ■ | 58 | C |
| 58 | 3A | | | ■ | ■ | ■ | | ■ | | 59 | C |
| 59 | 3B | | | ■ | ■ | ■ | | ■ | ■ | 60 | C |
| 60 | 3C | | | ■ | ■ | ■ | ■ | | | 61 | C |
| 61 | 3D | | | ■ | ■ | ■ | ■ | | ■ | 62 | C |
| 62 | 3E | | | ■ | ■ | ■ | ■ | ■ | | 63 | C |
| 63 | 3F | | | ■ | ■ | ■ | ■ | ■ | ■ | 64 | C |

| Bit No. | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 bit value | Hexadecimal | Save | Not defined | Scene number | Scene number | Scene number | Scene number | Scene number | Scene number | Scene number | Save (S) |
| 128 | 80 | ■ | | | | | | | | 1 | S |
| 129 | 81 | ■ | | | | | | | ■ | 2 | S |
| 130 | 82 | ■ | | | | | | ■ | | 3 | S |
| 131 | 83 | ■ | | | | | | ■ | ■ | 4 | S |
| 132 | 84 | ■ | | | | | ■ | | | 5 | S |
| 133 | 85 | ■ | | | | | ■ | | ■ | 6 | S |
| 134 | 86 | ■ | | | | | ■ | ■ | | 7 | S |
| 135 | 87 | ■ | | | | | ■ | ■ | ■ | 8 | S |
| 136 | 88 | ■ | | | | ■ | | | | 9 | S |
| 137 | 89 | ■ | | | | ■ | | | ■ | 10 | S |
| 138 | 8A | ■ | | | | ■ | | ■ | | 11 | S |
| 139 | 8B | ■ | | | | ■ | | ■ | ■ | 12 | S |
| 140 | 8C | ■ | | | | ■ | ■ | | | 13 | S |
| 141 | 8D | ■ | | | | ■ | ■ | | ■ | 14 | S |
| 142 | 8E | ■ | | | | ■ | ■ | ■ | | 15 | S |
| 143 | 8F | ■ | | | | ■ | ■ | ■ | ■ | 16 | S |
| 144 | 90 | ■ | | | ■ | | | | | 17 | S |
| 145 | 91 | ■ | | | ■ | | | | ■ | 18 | S |
| 146 | 92 | ■ | | | ■ | | | ■ | | 19 | S |
| 147 | 93 | ■ | | | ■ | | | ■ | ■ | 20 | S |
| 148 | 94 | ■ | | | ■ | | ■ | | | 21 | S |
| 149 | 95 | ■ | | | ■ | | ■ | | ■ | 22 | S |
| 150 | 96 | ■ | | | ■ | | ■ | ■ | | 23 | S |
| 151 | 97 | ■ | | | ■ | | ■ | ■ | ■ | 24 | S |
| 152 | 98 | ■ | | | ■ | ■ | | | | 25 | S |
| 153 | 99 | ■ | | | ■ | ■ | | | ■ | 26 | S |
| 154 | 9A | ■ | | | ■ | ■ | | ■ | | 27 | S |
| 155 | 9B | ■ | | | ■ | ■ | | ■ | ■ | 28 | S |
| 156 | 9C | ■ | | | ■ | ■ | ■ | | | 29 | S |
| 157 | 9D | ■ | | | ■ | ■ | ■ | | ■ | 30 | S |
| 158 | 9E | ■ | | | ■ | ■ | ■ | ■ | | 31 | S |
| 159 | 9F | ■ | | | ■ | ■ | ■ | ■ | ■ | 32 | S |
| 160 | A0 | ■ | | ■ | | | | | | 33 | S |
| 161 | A1 | ■ | | ■ | | | | | ■ | 34 | S |
| 162 | A2 | ■ | | ■ | | | | ■ | | 35 | S |
| 163 | A3 | ■ | | ■ | | | | ■ | ■ | 36 | S |
| 164 | A4 | ■ | | ■ | | | ■ | | | 37 | S |
| 165 | A5 | ■ | | ■ | | | ■ | | ■ | 38 | S |
| 166 | A6 | ■ | | ■ | | | ■ | ■ | | 39 | S |
| 167 | A7 | ■ | | ■ | | | ■ | ■ | ■ | 40 | S |
| 168 | A8 | ■ | | ■ | | ■ | | | | 41 | S |
| 169 | A9 | ■ | | ■ | | ■ | | | ■ | 42 | S |
| 170 | AA | ■ | | ■ | | ■ | | ■ | | 43 | S |
| 171 | AB | ■ | | ■ | | ■ | | ■ | ■ | 44 | S |
| 172 | AC | ■ | | ■ | | ■ | ■ | | | 45 | S |
| 173 | AD | ■ | | ■ | | ■ | ■ | | ■ | 46 | S |
| 174 | AE | ■ | | ■ | | ■ | ■ | ■ | | 47 | S |
| 175 | AF | ■ | | ■ | | ■ | ■ | ■ | ■ | 48 | S |
| 176 | B0 | ■ | | ■ | ■ | | | | | 49 | S |
| 177 | B1 | ■ | | ■ | ■ | | | | ■ | 50 | S |
| 178 | B2 | ■ | | ■ | ■ | | | ■ | | 51 | S |
| 179 | B3 | ■ | | ■ | ■ | | | ■ | ■ | 52 | S |
| 180 | B4 | ■ | | ■ | ■ | | ■ | | | 53 | S |
| 181 | B5 | ■ | | ■ | ■ | | ■ | | ■ | 54 | S |
| 182 | B6 | ■ | | ■ | ■ | | ■ | ■ | | 55 | S |
| 183 | B7 | ■ | | ■ | ■ | | ■ | ■ | ■ | 56 | S |
| 184 | B8 | ■ | | ■ | ■ | ■ | | | | 57 | S |
| 185 | B9 | ■ | | ■ | ■ | ■ | | | ■ | 58 | S |
| 186 | BA | ■ | | ■ | ■ | ■ | | ■ | | 59 | S |
| 187 | BB | ■ | | ■ | ■ | ■ | | ■ | ■ | 60 | S |
| 188 | BC | ■ | | ■ | ■ | ■ | ■ | | | 61 | S |
| 189 | BD | ■ | | ■ | ■ | ■ | ■ | | ■ | 62 | S |
| 190 | BE | ■ | | ■ | ■ | ■ | ■ | ■ | | 63 | S |
| 191 | BF | ■ | | ■ | ■ | ■ | ■ | ■ | ■ | 64 | S |

empty = value 0

■ = value 1, applicable

**Note**

All combinations not listed or indicated are invalid.

## A.5 Ordering Information

| Short description | Description | Order code | bbn 40 16779 EAN | Price group | Weight 1 pcs [kg] | Packaging [pc.] |
|---|---|---|---|---|---|---|
| **BE/S 4.20.2.1** | Binary Input, 4-fold,<br>20 V, MDRC, Contact Scanning | 2CDG 110 090 R0011 | **71078 7** | P2 | 0.1 | 1 |
| **BE/S 4.230.2.1** | Binary Input, 4-fold<br>230 V AC/DC, MDRC | 2CDG 110 091 R0011 | **71106 7** | P2 | 0.1 | 1 |
| **BE/S 8.20.2.1** | Binary Input, 8-fold,<br>20 V, MDRC, Contact Scanning | 2CDG 110 092 R0011 | **71076 3** | P2 | 0.2 | 1 |
| **BE/S 8.230.2.1** | Binary Input, 8-fold<br>230 V AC/DC, MDRC | 2CDG 110 093 R0011 | **71077 0** | P2 | 0.2 | 1 |

## A.6 Notes

### A.7 Notes

## A.8 Notes

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