Product Manual

ABB i-bus® EIB / KNX

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Binary Input Modules for the Room Controller BE/M 4.230.1, BE/M 4.24.1 BE/M 4.12.1

Intelligent Installation Systems

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This manual describes the function of the Binary Input Modules BE/M 4.230.1, BE/M 4.24.1 and BE/M 4.12.1 for operation in the Room Controller Base Unit with the application program “Room Controller modular, 8f/1.2”. Subject to changes and errors excepted.

Exclusion of liability:
Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this. Any necessary corrections will be inserted in new versions of the manual.

1 General

The Binary Input Modules BE/M 4.230.1, BE/M 4.24.1 and BE/M 4.12.1 are snapped into a module slot of the Room Controller Base Unit RC/A 8.1. They are used for reading out contacts such as conventional switches and push buttons. All the modules have four inputs each. The Room Controller Base Unit establishes the connection to the ABB i-bus® EIB / KNX installation bus.

The BE/M 4.230.1 is used to read out 230 V AC signals. The voltage is made available by the module if required.

The BE/M 4.24.1 is used for reading out 12 V or 24 V AC/DC signals. An external 12 or 24 V power source is required.

The BE/M 4.12.1 is used for reading out floating contacts. The scanning voltage is made available by the module.

The devices have screw terminals with a plug-in connection. The comprehensive functionality is defined by programming the Room Controller Base Unit with the EIB Tool Software (ETS2 V1.2a or higher).

It is almost identical for all three devices and enables convenient, user-friendly operation via the ABB i-bus® EIB / KNX.

1.1 Functional overview

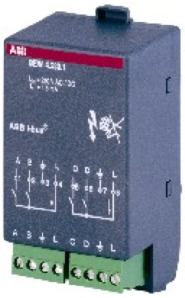
The following operator functions are possible with the devices described here (selection):

- Switching and dimming of lighting (also 1 button operation)
- Operation of blinds and shutters (also 1 button operation)
- Sending of values e.g. temperature values
- Control and storing of lightscenes
- Control of different loads with multiple operation
- Operation of several loads in a defined switching sequence
- Counting of pulses and operations
- Reading out of technical contacts (e.g. relays)

Each input can take over any of the functions described above.

2 Device technology

2.1 BE/M 4.230.1 Binary Input Module, 4-fold, 230 V



The 4-fold Binary Input Module BE/M 4.230.1 is operated in any module slot of the Room Controller Basis Device. It has four inputs for reading out 230 V contacts such as conventional switches and push buttons. The device makes the signal voltage available if required (incoming supply of the Room Controller).

Both the incoming supply and the internal voltage are supplied via the Room Controller Basis Device. Contact is automatically established when the modules are snapped in place.

2.1.1 Technical data

Power supply:	– Internal supply	via the Room Controller Base Unit, contact made via contact system on base of module
Inputs:	– Number	4
	– Signal level	0...120 V AC / DC for 0-signal 180...264 V AC / DC for 1-signal
	– Input current	max. 2 mA
Connections:	– Signal cables (inputs)	2 x 4-pole screw terminals with plug-in connection
	– Max. cable length	50 m
	– Wire ranges	0.2…2.5 mm^2 finely stranded 0.2…4.0 mm^2 single-core
Ambient temperature range:	– Storage	– 25 °C ... 55 °C
	– Transport	– 25 °C ... 70 °C
Design:	– Type of installation	For snapping into the Room Controller Base Unit
	– Housing, colour	Plastic housing, anthracite, halogen-free
	– Housing dimensions (W x H x D)	49 x 42 x 93
	– Weight	0.06 kg
CE norm:	– in accordance with the EMC guideline and low voltage guideline	

Application program	**Number of communication objects**	**Max. number of group addresses**	**Max. number of associations**
Room Controller modular, 8f/1	246	254	255

The programming requires EIB Tool Software ETS2 **V1.3a** or higher.

2.1.2 Circuit diagram

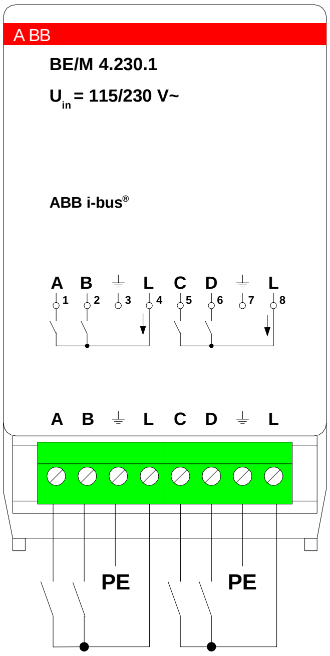


Fig. 1: Circuit diagram of BE/M 4.230.1

The wiring has to be carried out with the same insulation as mains voltage.

2.1.3 Description of the inputs

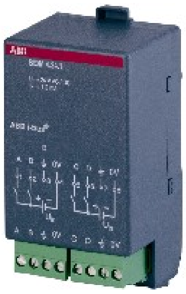
The device has four inputs A – D. The voltage from terminal L has to be used as the scanning voltage.

The PE conductor is brought out from the device to connect the protective conductor.

2.1.4 Assembly and installation

The device is solely intended for operation in the Room Controller Base Unit. It can be snapped into any module slot. The mounting position can be selected as required.

2.2 BE/M 4.24.1 Binary Input Module, 4-fold, 12 / 24 V



The 4-fold Binary Input Module BE/M 4.24.1 is operated in any module slot of the Room Controller Basis Device. It has four inputs for reading out 12 V or 24 V contacts such as conventional switches and push buttons. The signal voltage must be made available externally and linked with the reference potential.

The internal supply is carried out via the Room Controller Basis Device. Contact is established automatically when the module is snapped in place.

2.2.1 Technical data

Power supply:	– Internal supply	via the Room Controller Base Unit, ontact made via contact system on base of module
Inputs:	– Number	4
	– Signal level	0 ... 4 V AC / DC for 0-signal 9 ... 30 V AC / DC for 1-signal
	– Input current	max. 2 mA
Connections:	– Signal cables (inputs)	2 x 4-pole screw terminals with plug-in connection
	– Max. cable length	100 m
	– Wire ranges	0.2…2.5 mm^2 finely stranded 0.2…4.0 mm^2 single-core
Ambient temperature range:	– Storage	– 25 °C ... 55 °C
	– Transport	– 25 °C ... 70 °C
Design:	– Type of installation	For snapping into the Room Controller Base Unit
	– Housing, colour	Plastic housing, anthracite, halogen-free
	– Housing dimensions (W x H x D)	49 x 42 x 93
	– Weight	0.06 kg
CE norm:	– in accordance with the EMC guideline and low voltage guideline	

Application program	**Number of communication objects**	**Max. number of group addresses**	**Max. number of associations**
Room Controller modular, 8f/1	246	254	255

The programming requires EIB Tool Software ETS2 **V1.3a** or higher.

2.2.2 Circuit diagram

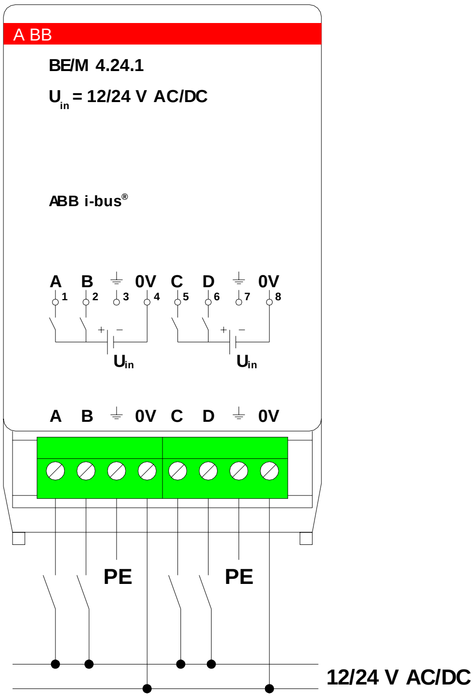


Fig. 2: Circuit diagram of BE/M 4.24.1

The wiring has to be carried out with the same insulation as mains voltage.

2.2.3 Description of the inputs

The device has four inputs A – D. The scanning voltage must be made available by an external power source. The terminal “0 V” must be used as a reference potential. The PE conductor is brought out from the device to connect the protective conductor.

2.2.4 Assembly and installation

The device is solely intended for operation in the Room Controller Base Unit. It can be snapped into any module slot. The mounting position can be selected as required.

2.3 BE/M 4.12.1 Binary Input Module, 4-fold, contact scanning

The 4-fold Binary Input Module is operated in any module slot of the Room Controller Basis Device. It has four inputs for reading out floating contacts such as conventional switches and push buttons. The device makes the pulsed scanning voltage (12 V) available.

The internal supply is carried out via the Room Controller Basis Device. Contact is established automatically when the module is snapped in place.

2.3.1 Technical data

Power supply:	– Internal supply	via the Room Controller Base Unit, ontact made via contact system on base of module
Inputs:	– Number	4
	– Scanning voltage	approx. 12 V (pulsed)
	– Scanning current	0.2 mA, approx. 160 mA for short periods when closing
Connections:	– Signal cables (inputs)	2 x 4-pole screw terminals with plug-in connection
	– Max. cable length	100 m
	– Wire ranges	0.2…2.5 mm^2 finely stranded 0.2…4.0 mm^2 single-core
Ambient temperature range:	– Storage	– 25 °C ... 55 °C
	– Transport	– 25 °C ... 70 °C
Design:	– Type of installation	For snapping into the Room Controller Base Unit
	– Housing, colour	Plastic housing, anthracite, halogen-free
	– Housing dimensions (W x H x D)	49 x 42 x 93
	– Weight	0.06 kg
CE norm:	– in accordance with the EMC guideline and low voltage guideline	

Application program	**Number of communication objects**	**Max. number of group addresses**	**Max. number of associations**
Room Controller modular, 8f/1	246	254	255

The programming requires EIB Tool Software ETS2 **V1.3a** or higher.

2.3.2 Circuit diagram

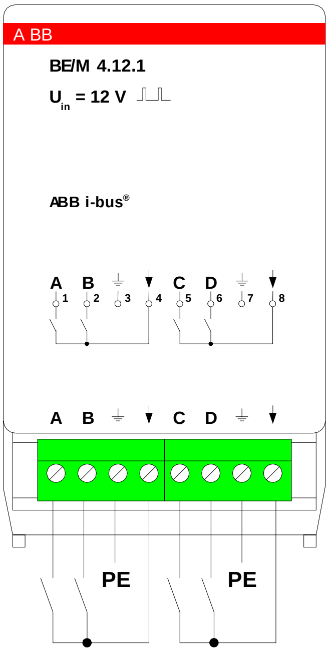


Fig. 3: Circuit diagram of BE/M 4.12.1

The wiring has to be carried out with the same insulation as mains voltage.

2.3.3 Description of the inputs

The device has four inputs A – D. The positive, pulsed scanning voltage is made available by the terminal "↓". The PE conductor is brought out from the device to connect the protective conductor.

2.3.4 Assembly and installation

The device is solely intended for operation in the Room Controller Base Unit. It can be snapped into any module slot. The mounting position can be selected as required.

3 Commissioning

3.1 Overview

The Room Controller has its own application program *"Room Controller modular, 8f/1"*, which is used to set the device function. The programming requires EIB Tool Software ETS2 **V1.3a** or higher. When using the ETS3, a file of the type ".VD3" has to be imported.

The following functions can be set separately for each input:

Switch sensor	For switching the lighting or scanning a floating contact (relay) Distinction between short/long operation and cyclical sending of the contact state are possible.
Switch/dimming sensor	For switching/dimming the lighting Start-stop dimming and stepwise dimming as well as dimming via a single push button are possible.
Shutter sensor	For movement/lamella adjustment of a blind or a shutter Eight preset operating responses are possible in total.
Value / forced operation	For sending values of different data types (e.g. temperature values) It is possible to send different values or data types after a short/long operation. The activation/deactivation of the priority control of actuators is also possible.
Control scene	For recalling and storing the states of several actuator groups The actuator groups can either be controlled via 5 individual objects or (if supported by the actuators) via a special 8-bit scene object.
Switching sequence ("latching relay")	For the operation of several actuator groups in preset sequences
Push button with multiple operation	For triggering various functions depending on the frequency of operation A long operation can be also be detected and trigger a function.
Counter	For counting input pulses Different data types can be set for the counter. An additional differential counter enables the counting of daily values for example. A factor/divider enables different count rates.

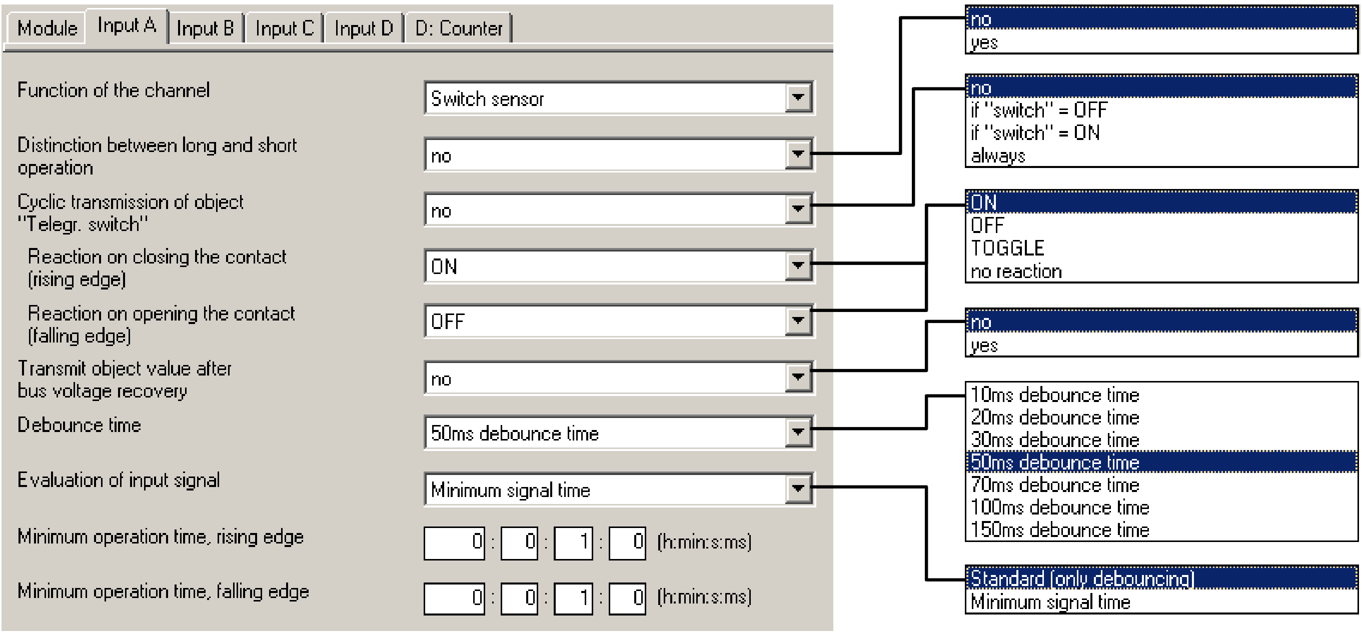
3.2 Switch sensor”

The following parameters and objects are visible if the “Switch sensor” function has been selected.

3.2.1 Parameter window

It can first be set in the parameters whether a distinction should be made between a short and long operation.

Parameter window for “Distinction between long and short operation” = “no”:



Module | Input A | Input B | Input C | Input D | D: Counter

Function of the channel: Switch sensor

Distinction between long and short operation: no (no / yes)

Cyclic transmission of object "Telegr. switch": no (no / if "switch" = OFF / if "switch" = ON / always)

Reaction on closing the contact (rising edge): ON (ON / OFF / TOGGLE / no reaction)

Reaction on opening the contact (falling edge): OFF

Transmit object value after bus voltage recovery: no (no / yes)

Debounce time: 50ms debounce time (10ms debounce time / 20ms debounce time / 30ms debounce time / 50ms debounce time / 70ms debounce time / 100ms debounce time / 150ms debounce time)

Evaluation of input signal: Minimum signal time (Standard (only debouncing) / Minimum signal time)

Minimum operation time, rising edge: 0 : 0 : 1 : 0 (h:min:s:ms)

Minimum operation time, falling edge: 0 : 0 : 1 : 0 (h:min:s:ms)

Parameter: “Distinction between long and short operation”

Defines whether the input distinguishes between a short and long operation. If “yes” is selected, there is a delay after opening/closing the contact to determine whether there is a short or long operation. Only then is a possible reaction triggered. The following diagram illustrates the function:

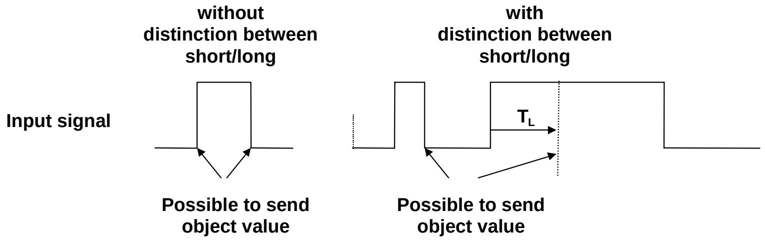


Fig. 7: Distinction between short/long operation for “Switch sensor” function

T_L is the period after which a push button action is recognised as a long operation.

Parameter: “Cyclic transmission of object ‘Telegr. switch’”

Enables the cyclical sending of the object “Telegr. switch”.

Cyclical sending can be used for example to monitor the sensor. If the parameter value is set to “always”, the object sends cyclically on the bus regardless of its value.

If the parameter value “if ‘switch’ = ON” or “if ‘switch’ = OFF” is set, only the corresponding object value is sent cyclically.

Further information about “Cyclical sending” can be found in section 4.4.

Parameter: “Reaction on closing the contact (rising edge)” or “Reaction on opening the contact (falling edge)”

Defines the reaction of the object “Telegr. switch” if a pulse edge is detected at the input.

It can be set for each edge whether the object value should be switched “ON”, “OFF” or toggled or whether there should be no reaction. If cyclical sending is parameterised, it is possible by selecting the parameter value “terminate cyclic transmission” for an operation of the input to end cyclical sending without a new object value being sent. The parameter is visible if there is no distinction between a short and long operation.

Parameter: “Telegram is repeated every (‘transmission cycle time’)”

Defines the intervals at which the object value “Telegr. switch” is sent. The parameter is visible if cyclical sending has been set.

Parameter: “Transmit object value after bus voltage recovery”

Causes the sending of the object “Telegr. switch” after bus voltage recovery. A value is only sent on the bus if the value “TOGGLE” has not been set in either of the two parameters *“Reaction on opening/closing the contact (...)”*. If one of the two parameters has the value “TOGGLE”, no values are generally sent on the bus after bus voltage recovery.

Parameter: “Debounce time”

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

Parameter: “Evaluation of input signal”

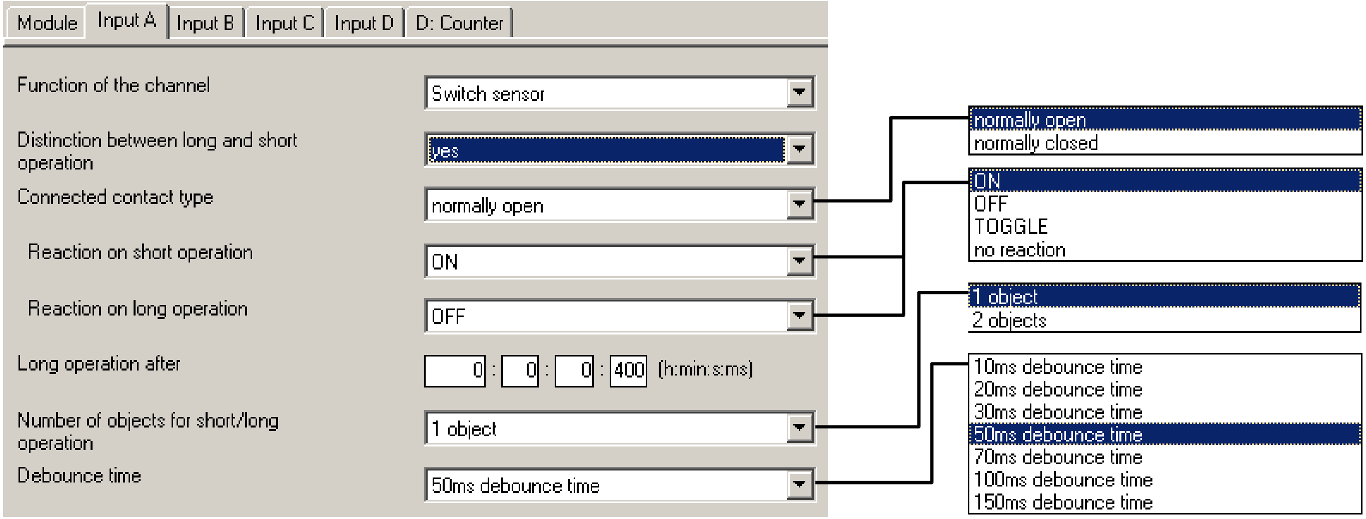
Used for setting a minimum signal time. After a pulse edge, the input waits for the minimum signal time.

Only if no further edge occurs during this period is a change in the pulse edge valid. If a further transition occurs, the minimum signal time restarts.

The minimum signal time can be set separately for the rising and falling edge. Further information can be found in section 4.2.

The parameter is visible if there is no distinction between a short and long operation.

Parameter window for “Distinction between short and long operation” = “yes”:



Function of the channel: Switch sensor
Distinction between long and short operation: yes
Connected contact type: normally open
Reaction on short operation: ON
Reaction on long operation: OFF
Long operation after: 0 : 0 : 0 : 400 (h:min:s:ms)
Number of objects for short/long operation: 1 object
Debounce time: 50ms debounce time

Parameter: "Connected contact type"

Defines whether the contact at the input is "normally open" or "normally closed".

Parameter: "Reaction on short operation" or "Reaction on long operation"

Defines the reaction of the object "Telegr. switch" when a short or long operation is detected at the input.

The object value is updated as soon as it is established whether there is a short or long operation.

Parameter: "Long operation after"

Defines the period T_L after which an operation is interpreted as "long" (see Fig. 1).

Parameter: "Number of objects for short/long operation"

Enables the additional object "Telegr. switch –long".

This object only sends after a long operation while "Telegr. switch" only reacts to a short operation.

Parameter: "Debounce time"

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

3.2.2 Overview of the objects

No	Function	Object name	Data type	Flags
0	Disable	Input A	1 Bit(EIS1)	CW
Disables the function of the input.				
1	Telegr. switch	Input A	1 Bit (EIS1)	CWT
Sends switching commands on the bus.				
2	Telegr. switch –long	Input A	1 Bit (EIS1)	CT
This object sends switching commands after a long operation, provided that this has been enabled in the parameters. The object "Telegr. switch" (see above) then no longer reacts to a long operation.				

3.2.3 Detailed description of the objects

Object: "Telegr. switch": 1 Bit (EIS1)

In accordance with the parameter setting, this object can be switched ON, FF or toggled via an operation of the input.

Object: "Telegr. switch –long": 1 Bit (EIS1)

This object is visible if the parameter "Distinction between long and short operation" = "yes" and the parameter "Number of objects for short/long operation" = "2 objects". This additional object is assigned to the long operation.

Object: "Disable": 1 Bit (EIS1)

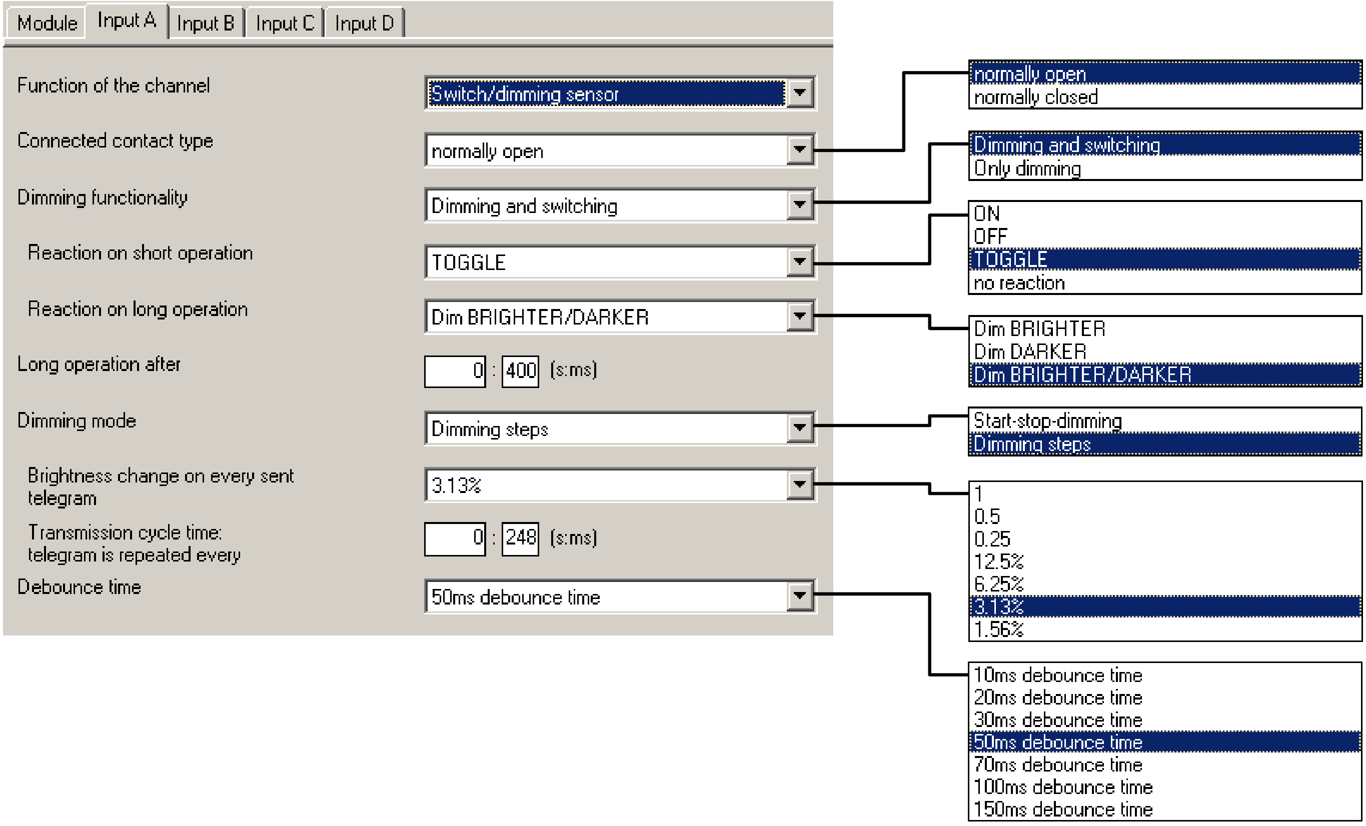
Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

3.3 Function: “Switch/dimming sensor”

The following section describes all the parameters and objects which are visible when the input is operated with the function “Switch/dimming sensor”. The function enables the control of dimmable lighting. 1 button operation is possible.

Further details about the dimming function can be found in section 4.5.

3.3.1 Parameter window



Function of the channel: Switch/dimming sensor

Connected contact type: normally open

Dimming functionality: Dimming and switching

Reaction on short operation: TOGGLE

Reaction on long operation: Dim BRIGHTER/DARKER

Long operation after: 0 : 400 (s:ms)

Dimming mode: Dimming steps

Brightness change on every sent telegram: 3.13%

Transmission cycle time: telegram is repeated every: 0 : 248 (s:ms)

Debounce time: 50ms debounce time

Parameter: “Connected contact type”

Defines whether the contact at the input is “normally closed” or “normally open”.

Parameter: “Dimming functionality”

Defines whether the lighting is only dimmed (“Only dimming”) or whether it should also be switched (“Dimming and switching”). In this case, the lighting is dimmed via a long operation and switched via a short operation. The benefit of the setting “Only dimming” lies in that there is no distinction between a short and long operation. The dimming command is therefore carried out immediately after operation as the device does not first wait to determine whether it is a long push button action.

Parameter: “Reaction on short operation”

Defines how a short operation changes the value of the object “Telegr. switch”. This parameter sets whether the object “Telegr. switch” is toggled after a short operation (typically: 1 button dimming) or only switched OFF or ON (typically: 2 button dimming).

This parameter is visible if the value “Dimming and switching” has been set in the parameter *“Dimming functionality”*.

Parameter: “Reaction on long operation”

Defines how a long operation changes the value of the object “Telegr. dimming”. This parameter sets whether the object “Telegr. dimming” sends a “Dim BRIGHTER” or “Dim DARKER” telegram after a long operation. For 1 button dimming, the parameter value “Dim BRIGHTER/DARKER” must be set. In this case, the opposite dimming command to the last command is sent.

This parameter is visible if the value “Dimming and switching” has been set in the parameter *“Dimming functionality”*.

Parameter: “Reaction on operation”

This parameter sets which value is sent by the object “Telegr. dimming” after an operation. This parameter is visible if the dimming functionality “Only dimming” has been set.

Parameter: “Long operation after”

Defines the period T_L after which an operation is interpreted as “long”. This parameter is visible if the value “Dimming and switching” has been set in the parameter *“Dimming functionality”*.

Parameter: “Dimming mode”

The “Start-stop dimming” or “Dimming steps” dimming mode is selected here.

Normal *“Start-stop dimming”* starts the dimming process with a “Dim BRIGHTER” or “Dim DARKER” telegram and ends the dimming process with a “STOP” telegram. In this case, no cyclical sending of the dimming telegram is necessary.

For *“Dimming steps”*, the dimming telegram is sent cyclically after a long operation. After the end of an operation, a “STOP” telegram ends the dimming process.

Parameter: “Brightness change on every sent telegram”

This parameter is only visible when “Dimming steps” is selected. It can be set which brightness change (in percentage) causes a dimming telegram to be sent cyclically.

Parameter: “Transmission cycle time: telegram is repeated every”

If “Dimming steps” is set, the dimming telegram is sent cyclically during a long operation. The transmission cycle time corresponds to the time interval between two telegrams during the cyclical sending.

Parameter: “Debounce time”

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

3.3.2 Overview of the objects

No	Function	Object name	Data type	Flags
0	Disable	Input A	1 Bit(EIS1)	CW
Disables the function of the input.				
1	Telegr. switch	Input A	1 Bit (EIS1)	CWT
Sends switching commands (ON or OFF) on the bus after a short operation.				
2	Telegr. dimming	Input A	4 Bit (EIS2)	CT
Sends dimming commands (BRIGHTER / DARKER or STOP) after a long operation.				

3.3.3 Detailed descriptionof the objects

Object: “Disable”: 1 Bit (EIS1)

Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

Object: “Telegr. switch”: 1 Bit (EIS1)

This object is visible if the value “Dimming and switching” has been set in the parameter *“Dimming functionality”*. In accordance with the parameter setting, this object can be switched ON, OFF or toggled after a short operation. For 1 button dimming, this object should not be linked with the status feedback of the dimming actuator as a non-sending group address.

The input is thus informed about the current switching state of the dimming actuator.

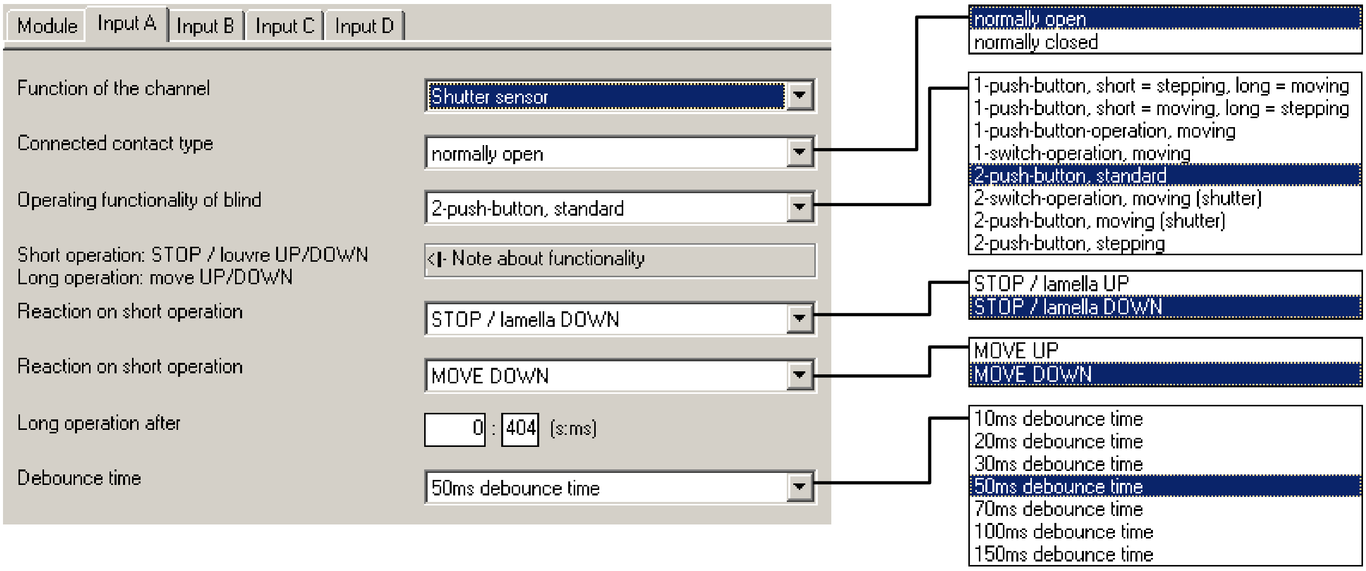
Object: “Telegr. dimming”: 4 Bit (EIS2)

A long operation of the input causes a “Dim BRIGHTER” or “Dim DARKER” command to be sent on the bus. A “STOP” command is sent at the end of the operation.

3.4 Function: “Shutter sensor”

The following section describes all the parameters and objects which are visible if the input is operated with the “Shutter sensor” function. The function enables the operation of blinds and shutters with push buttons or switches. 1 push button operation and 1 switch operation are possible.

3.4.1 Parameter window



Function of the channel: Shutter sensor

Connected contact type: normally open

- normally open
- normally closed

Operating functionality of blind: 2-push-button, standard

- 1-push-button, short = stepping, long = moving
- 1-push-button, short = moving, long = stepping
- 1-push-button-operation, moving
- 1-switch-operation, moving
- 2-push-button, standard
- 2-switch-operation, moving (shutter)
- 2-push-button, moving (shutter)
- 2-push-button, stepping

Short operation: STOP / louvre UP/DOWN
Long operation: move UP/DOWN

<-|- Note about functionality

Reaction on short operation: STOP / lamella DOWN

- STOP / lamella UP
- STOP / lamella DOWN

Reaction on short operation: MOVE DOWN

- MOVE UP
- MOVE DOWN

Long operation after: 0 : 404 (s:ms)

Debounce time: 50ms debounce time

- 10ms debounce time
- 20ms debounce time
- 30ms debounce time
- 50ms debounce time
- 70ms debounce time
- 100ms debounce time
- 150ms debounce time

Parameter: “Connected contact type”

This parameter defines whether the contact at the input is “normally closed” or “normally open”.

Parameter: “Operating functionality of blind”

This parameter defines the type of operation. The following table provides an overview of the operating modes:

1 push button, short = stepping, long = moving	
Short operation	STOP/lamella adjustment; Opposite direction to the last movement command* To return to lamella adjustment, the blind must be raised or lowered briefly.
Long operation	Alternately “MOVE UP” or “MOVE DOWN

1 push button, short = moving, long = stepping	
Short operation	Alternately “MOVE UP” or “MOVE DOWN”
Long operation	STOP/lamella adjustment (cyclical sending); Opposite direction to the last movement or stepping command*

1 push button operation, moving	
On operation	The following commands are sent in sequence: ... → “MOVE UP” → “STOP” → ”MOVE DOWN” → “STOP” → ... *

1 switch operation, moving	
Start of operation	Abwechselnd „Fahren AUF“ bzw. „Fahren AB“
End of operation	STOP*

*** Note** If the actuator is in the limit position (see objects “Upper limit position” or “Lower limit position”), the direction of movement is preselected.

In “1 push button/switch operation”, the last direction of movement is determined via the last update of the object “Telegr. shutter UP/DOWN”.

2 push button, standard	
Short operation	“STOP/lamella UP” or “... DOWN” (parameterisable
Long operation	“MOVE UP” or “MOVE DOWN” (parameterisable)

22 switch operation, moving (shutter)	
Start of operation	“MOVE UP” or “MOVE DOWN” (parameterisable)
End of operation	“STOP” or “... DOWN“ (parameterisable)

2 push button, moving (shutter)	
On operation	The following commands are sent in sequence: ... → “MOVE UP” → “STOP” →”MOVE DOWN” → “STOP” → ... *

2 push button, stepping	
On operation	“Lamella UP” or “... DOWN” (parameterisable)

Parameter: “Reaction on operation”

This parameter is visible if there is no distinction between a short and long operation. It can be set whether the input triggers commands for movement upwards (“UP”) or downwards (“DOWN”).

Parameter: “Reaction on short operation” or “Reaction on long operation”

This parameter is visible in operating modes in which there is a distinction between a short and long operation. It can be set whether the input triggers commands for movement upwards (“UP”) or downwards (“DOWN”).

Parameter: “Long operation after”

This parameter is visible in operating modes in which there is a distinction between a short and long operation. The period after which an operation is interpreted as “long” is defined here.

Parameter: “‘Telegram STOP/lamella adj.’ is repeated every”

This parameter is visible in operating modes in which the object “Telegr. STOP/lamella adj.” is sent cyclically on the bus during a long operation. The interval between two telegrams is set here.

Parameter: “Debounce time”

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

3.4.2 Overview of the objects

No	Function	Object name	Data type	Flags
0	Disable	Input A	1 Bit(EIS1)	CW
Disables the function of the input.				
1	Telegr. shutter UP/DOWN	Input A	1 Bit (EIS7)	CT
Sends a movement command (UP/DOWN).				
2	Telegr. STOP/lamella adj.	Input A	1 Bit (EIS7)	CT
Sends a “Lamella adjustment” command (UP/DOWN). A moving blind is stopped.				
3	Upper limit position	Input A	1 Bit(EIS1)	CW
Receives the information from the shutter actuator about whether it is in the upper limit position.				
4	Lower limit position	Input A	1 Bit(EIS1)	CW
Receives the information from the shutter actuator about whether it is in the lower limit position.				

3.4.3 Detailed description of the objects

Object: “Disable”: 1 Bit (EIS1)

Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

Object: “Telegr. shutter UP/DOWN”: 1 Bit (EIS7)

This communication object sends a shutter movement command (UP or DOWN) on the bus. The device also recognises movement commands of another sensor through the receipt of telegrams.

Telegram value “0” UP
“1” DOWN

Object: “Telegr. STOP/lamella adj.”: 1 Bit (EIS7)

This communication object sends a “STOP” or lamella adjustment command.

Telegram value “0” STOP / lamella UP
“1“ STOP / lamella DOWN

Object: “Upper limit position”: 1 Bit (EIS1)

Via this object, the shutter actuator reports whether it is in the upper limit position. The object is intended for “1 push button operation”.

Telegram value “0” No upper limit position
“1” Blind is in upper limit position

Object: “Lower limit position”: 1 Bit (EIS1)

Via this object, the shutter actuator reports whether it is in the lower limit position. The object is intended for “1 push button operation”.

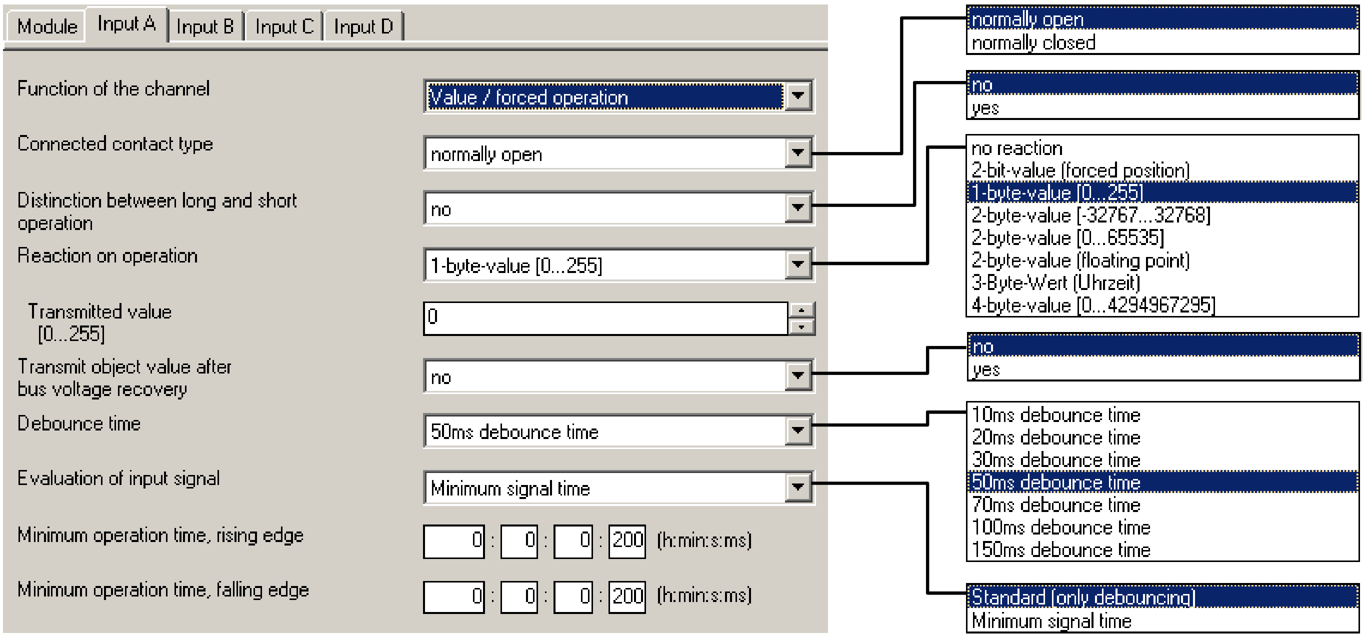
Telegram value “0” No lower limit position
“1” Blind is in lower limit position

3.5 Function: “Value / forced operation”

The following section describes all the parameters and objects which are visible when the input is operated with the function “Value / forced operation”. The function permits the values of any data types to be sent.

3.5.1 Parameter window

Parameter window when there is a distinction between a short and long operation:



Function of the channel: Value / forced operation

Connected contact type: normally open

Distinction between long and short operation: no

Reaction on operation: 1-byte-value [0...255]

Transmitted value [0...255]: 0

Transmit object value after bus voltage recovery: no

Debounce time: 50ms debounce time

Evaluation of input signal: Minimum signal time

Minimum operation time, rising edge: 0 : 0 : 0 : 200 (h:min:s:ms)

Minimum operation time, falling edge: 0 : 0 : 0 : 200 (h:min:s:ms)

Parameter: “Connected contact type”

This parameter defines whether the contact at the input is “normally closed”or “normally open”.

Parameter: “Distinction between long and short operation”

This parameter sets whether the input distinguishes between a short and long operation. If “yes” is selected, there is a delay until it is determined whether there is a long or short operation and then the corresponding reaction is carried out.

Parameter: “Reaction on operation”

This parameter is visible if there is no distinction between a short and long operation. It defines the data type which is sent on operation of the contact.

Parameter: “Reaction on short operation” or “Reaction on long operation”

This parameter is visible if there is a distinction between a short and long operation. It defines the data type which is sent after a short or long operation.

Parameter: “Transmitted value”

This parameter defines the value which is sent on operation. The value range is dependent on the selected data type. When there is a distinction between a short and long operation, two values can be set here.

Parameter: “Long operation after”

The period TL after which an operation is interpreted as “long” is defined here. This parameter is visible if there is a distinction between a short and long operation.

Parameter: “Transmit object value after bus voltage recovery”

This parameter sets whether the object “Telegr. value” is sent on the bus after bus voltage recovery. This parameter is visible if there is no distinction between a short and long operation.

Parameter: “Debounce time”

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

Parameter: “Evaluation of input signal”

Used for setting a minimum signal time.

After a pulse edge, the input waits for the minimum signal time. The change at the pulse edge is only valid if a further transition occurs during this period. If a further pulse edge occurs, the minimum signal time is restarted. The minimum signal time can be set separately for the rising and falling edge. Further information about the function can be found in section 4.2.

This parameter is visible if there is no distinction between a short and long operation.

3.5.2 Overview of the objects

No	Function	Object name	Data type	Flags
0	Disable	Input A	1 Bit(EIS1)	CW
Disables the function of the input.				
1	Telegr. value […]	Input A	1 Bit … 4 Byte	CT
Sends a value on the bus when it is operated. Different data types can be parameterised.				
1	Telegr. value […]	Input A	1 Bit … 4 Byte	CT
Sends a value on the bus when it is operated. Different data types can be parameterised.				
2	Telegr. value […]	Input A	1 Bit … 4 Byte	CT
Sends a value on the bus when it is operated. Different data types can be parameterised.				

3.5.3 Detailed description of the objects

Object: “Disable”: 1 Bit (EIS1)

Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

Object: “Telegr. value (...)” (various data types)

Sends a value on the bus when the contact is opened or closed. The value and data type can be freely selected in the parameters.

Data width, type	Value range	EIS type	Typical application
1 bit	0, 1	EIS 1	Switching command
2 bit	0, 2, 3	EIS 8	Forced position
1 byte, without sign	0...255	EIS 6	Brightness value, positioning value
2 byte, integer value, with sign	-32768...+32767	EIS 10	Counter value
2 byte, integer value, without sign	0...65535	EIS 10	Counter value
2 byte, floating point value*	-100...+100	EIS 5	Temperature values
3 byte, time	0:0:0 ... 23:23:59	EIS 3	Fixed time value
4 byte, integer value, without sign	0...4294967295	EIS 11	Counter value

* Sends values with the fixed exponent of 3

When there is a distinction between a short and long operation, 2 objects are visible per input. One object only sends after a short operation while the other object only sends after a long operation.

Note: By default, the “Write” flag is deleted for the objects (exception: for 1-bit objects). The object value can thus not be modified via the EIB. If this function is required, the “Write” flag must be set in ETS. On bus voltage recovery, the object value is overwritten with the parameterised value.

3.6 Function: “Control scene”

The following section describes all the parameters and objects which are visible when the input is operated with the function “Control scene”.

Two different types of scenes are possible:

Scene via 5 separate objects

Five communication objects control up to 5 actuator groups (e.g. groups of luminaires) directly. Each actuator group can be controlled in a different way. The values of the scene are stored in the input. When recalling the scene, up to 5 objects are sent. Further information can be obtained in section 4.6.

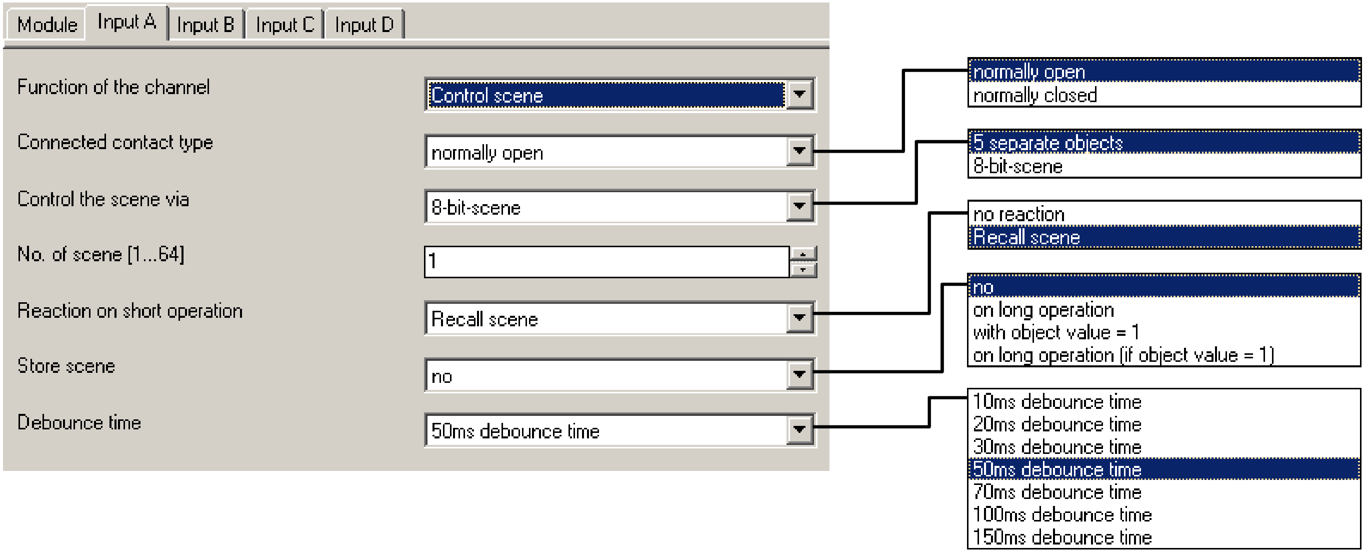
8-bit scene

A communication object sends a scene number. This number is assigned to an unlimited number of actuators. On receipt, the values that are stored in the actuators are recalled. Only one object is therefore sent on retrieval.

Both scene types enable the storing of the current output states of the actuators as new scene values. Further information can be obtained in section 4.6.

3.6.1 Parameter window

Parameter window for scene control via “5 separate objects”:



Function of the channel: Control scene

Connected contact type: normally open

Control the scene via: 8-bit-scene

No. of scene [1...64]: 1

Reaction on short operation: Recall scene

Store scene: no

Debounce time: 50ms debounce time

Parameter: “Connected contact type”

This parameter defines whether the contact at the input is “normally closed” or “normally open”.

Parameter: “Control the scene via”

The way in which the scene is recalled can be set here. This can be carried out via “5 separate objects” or within an “8-bit scene”. The latter recalls scene values which are stored in the actuator. Further information can be found in section 4.6.

Parameter: “Reaction on short operation”

This parameter indicates whether a lightscene is recalled after a short operation of the input or whether no reaction should take place.

Parameter: “Store scene”

This parameter defines in which way the storing of the current scene can be triggered as well as the functionality of the object “Store scene”. This is dependent on the scene control. The following table provides an overview:

Scene control via “5 separate objects”

Parameter value	Behaviour
“on long operation”	As soon as a long operation is detected, the object “Store scene” sends the value “1” on the bus and the object values “Switch/Telegr. value actuator group A..E” are read out via the bus and stored in the object values. During the long operation, it is still possible to modify the objects “Switch/Telegr. value actuator group A..E” via the bus. At the end of the long operation, the object “Store scene” sends the value “0” on the bus and the current object values are stored in the device.
“if object value = 1”	If the object “Store scene” receives the value “1”, the object values “Switch/Telegr. value actuator group A..E” are read out via the bus. As long as the object value is “1”, the objects “Switch/Telegr. value actuator group A..E” can be modified via the bus. On receipt of the object value “0”, the current object values are stored in the device. **Important:** **The storing of the current scene thus requires the object values “1” and “0” to be sent in succession.**
“on long operation (if object value = 1)”	If the object “Store scene” receives the value “1” on the bus, the next long push button action leads to the sending of the value “1” via the object “Store scene”. The scanning of the object values “Switch/Telegr. value actuator group A..E” then takes place via the bus. At the end of the long operation, the object values “Switch/Telegr. value actuator group A..E“ are stored in the device. At the end of the long operation, the object “Store scene” sends the value “0” on the bus and the current object values are stored in the device.

When storing a scene, the parameterised scene values are overwritten by the new values. The restoring of the parameterised values can only be carried out by reprogramming or by switching the supply voltage on and off.

*Scene control via **“8-bit scene”***

Parameter value	Behaviour
“on long operation”	In the event of a long operation, the object “8-bit scene” sends a save command on the bus and thereby triggers the storing of the current scene in the actuators. The object “Store scene” has no function.
“if object value = 1”	If the object “Store scene” receives the value “1”, the object “8-bit scene” sends a save command on the bus.
“on long operation (if object value = 1)”	If the object “Store scene” triggers the value “1” on the bus, the next long push button action triggers the sending of a save command via the object “8-bit scene”. If no “1” has been received at the object “Store scene” since the last save, a long operation is interpreted as a short operation. The same applies if “0” was the last value received.

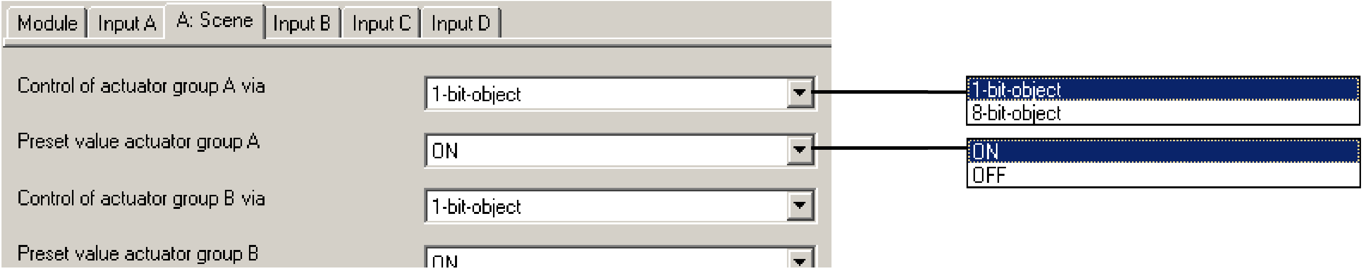
Parameter: “Long operation from”

This parameter is visible if the storing of the scene is possible via a long operation. The period after which an operation is interpreted as “long” is defined here.

Parameter: „Debounce time"

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

Additional parameter window "A: Scene" for scene control via "5 separate objects":



Control of actuator group A via: 1-bit-object

Preset value actuator group A: ON

Control of actuator group B via: 1-bit-object

Preset value actuator group B: ON

Parameter: "Control of actuator group A..E via"

It can be set for each actuator group whether the control is carried out via a "1 bit object" or an "8 bit object". The type of the communication object "Switch actuator group A..E" is set accordingly.

Parameter: "Preset value actuator group A..E"

A value can be preset for each actuator group A..E in this parameter. If a scene has been stored, the current object values of actuator groups A..E are overwritten with the values set here after programming or bus voltage failure and when the scene has been recalled again.

3.6.2 Overview of the objects

Scene via 5 separate objects

No	Function	Object name	Data type	Flags
0	**Disable**	**Input A**	**1 Bit(EIS1)**	**CW**
Disables the function of the input.				
1 **5**	**Switch actuator group A** **…** **Switch actuator group E**	**Input A**	**1 Bit (EIS1)**	**CWT**
Send up to 5 switching commands to up to five different actuators (e.g. groups of luminaires) via the bus, in order to recall a scene.				
1 **5**	**Telegr. value actuator group A** **…** **Telegr. value actuator group E**	**Input A**	**1 Byte (EIS6)**	**CWT**
Send up to 5 values to five different actuators (e.g. groups of luminaires) via the bus, in order to recall a scene. The values can be e.g. brightness values or positions of shutter drives.				
6	**Store scene**	**Input A**	**1 Bit (EIS1)**	**CWT**
Two functions which can be set in the parameters: 1. (Receive) The current values of the actuators are issued and stored as a new scene 2. (Send) Indicates that a scene has just been stored.				

8-bit-scene

No	Function	Object name	Data type	Flags
0	**Disable**	**Input A**	**1 Bit(EIS1)**	**CW**
Disables the function of the input.				
1	**8-bit scene**	**Input A**	**1 Byte (DPT18.001)**	**CT**
Sends a scene number on the bus which recalls or stores a scene in any of the actuators.				
6	**Store scene**	**Input A**	**1 Bit (EIS1)**	**CWT**
Two functions which can be set in the parameters: 1. (Receive) Triggers the sending of a save command via the object "8-bit scene" 2. (Send) Indicates that a scene has just been stored.				

3.6.3 Detailed description of the objects

Object: "Disable": 1 Bit (EIS1)

Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

Objects: "Switch actuator group A ... E": 1 Bit (EIS1)
and "Telegr. value actuator group A ... E": 8 Bit (EIS6)

These objects control several actuators or actuator groups, either via 1-bit or 8-bit values (parameterisable). When storing the scene, the device reads the current value via the bus and stores it in these objects.

On recovery of the supply voltage, the object values are overwritten with the parameterised values.

These objects are visible if the scene is controlled via "5 separate objects".

Object: "8-bit scene": 8 Bit (DPT 18.001)

This object is visible if the control is carried out via an "8-bit scene". It sends a scene number together with the information about whether a scene should be recalled or the current scene should be stored. The storing of the scene takes place in the actuator.

Bitwise telegram code: MxSSSSSS
M: 0 – Scene is recalled
1 – Scene is stored
x: Not used
S: Number of the scene (1...64)

Object: "Store scene": 1 Bit (EIS1)

This object can be used to trigger the storing of a scene via the bus or to indicate that the scene has been saved. The function depends in the way that the scene is stored.

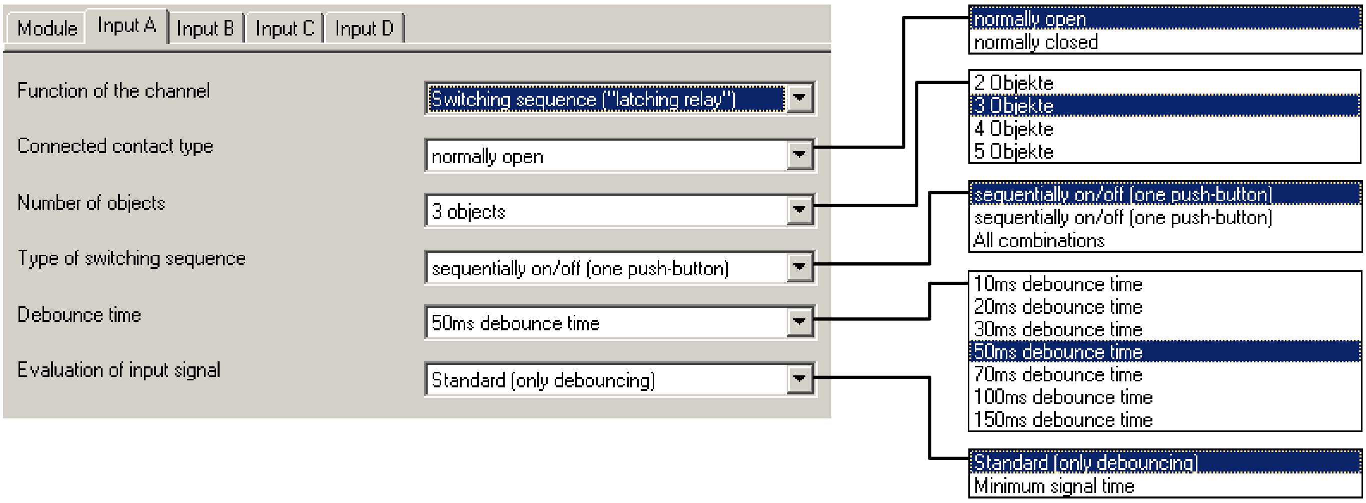
For further information, see under the description of the parameter *"Store scene"*.

3.7 Function "Switching sequence"

The following section describes all the parameters which are visible if the input is operated with the function "Switching sequence". A switching sequence enables the stepwise modification of up to five switching objects via a single input operation. Up to 5 actuators or actuator groups can therefore be switched in a specific sequence. The actuators can for example be switched on or off in succession.

Further information can be found in section 4.7.

3.7.1 Parameter window



Function of the channel: Switching sequence ("latching relay")

Connected contact type: normally open

Number of objects: 3 objects

Type of switching sequence: sequentially on/off (one push-button)

Debounce time: 50ms debounce time

Evaluation of input signal: Standard (only debouncing)

Parameter: "Connected contact type"

This parameter defines whether the contact at the input is "normally closed" or "normally open".

Parameter: "Number of objects"

This parameter defines the number of objects "Telegr. switch 1…n" in the switching sequence.

Parameter: "Type of switching sequence"

The switching sequence can be selected here. Each sequence has different object values for each switching level. The following switching sequences are possible (a detailed description can be found in section 4.7):

Type of switching sequence	Example
"sequentially on/off (one push button)"	...-000-001-011-111-011-001-...
"sequentially on/off (several push buttons)"	000-001-011-111
"All combinations ("Gray code")"	...-000-001-011-010-110-111-101-100-...

The example is based on the status of three objects ("0" = OFF, "1" = ON). A 'Gray code table' can be found in section 5.1.

Parameter: "Function on operation"

Only visible for the switching sequence "sequentially on/off (several push buttons)". It can be set here whether an operation of the push button moves up or down a level.

Parameter: "Debounce time"

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

Parameter: "Evaluation of input signal"

Used for setting a minimum signal time. After a pulse edge, the input waits for the minimum signal time. The change at the pulse edge is only valid if a further transition occurs during this period. If a further pulse edge occurs, the minimum signal time is restarted.

The minimum signal time can be set separately for the rising and falling edge. Further information about the function can be found in section 4.2.

3.7.2 Overview of the objects

No	Function	Object name	Data type	Flags
0	**Disable**	**Input A**	**1 Bit(EIS1)**	**CW**
Disables the function of the input.				
1 **5**	**Telegr. switch 1** **…** **Telegr. switch 5**	**Input A**	**1 Bit(EIS1)**	**CWT**
Send up to 5 switching commands to different actuators or actuator groups via the bus which should be executed in a sequence.				
6	**Level increment/decrement**	**Input A**	**1 Bit(EIS1)**	**CW**
Used to switch up or down a level within the switching sequence. A switching sequence can thus for example be operated by several push buttons.				

3.7.3 Detailed description of the objects

Object: "Disable": 1 Bit (EIS1)

Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

Objects "Telegr. switch 1" to "Telegr. switch 5": 1 Bit (EIS1)

The number of these objects (max. 5) is set in the parameter "Number of objects". The objects represent the values within a switching sequence.

Object: "Level increment/decrement": 1 Bit (EIS1)

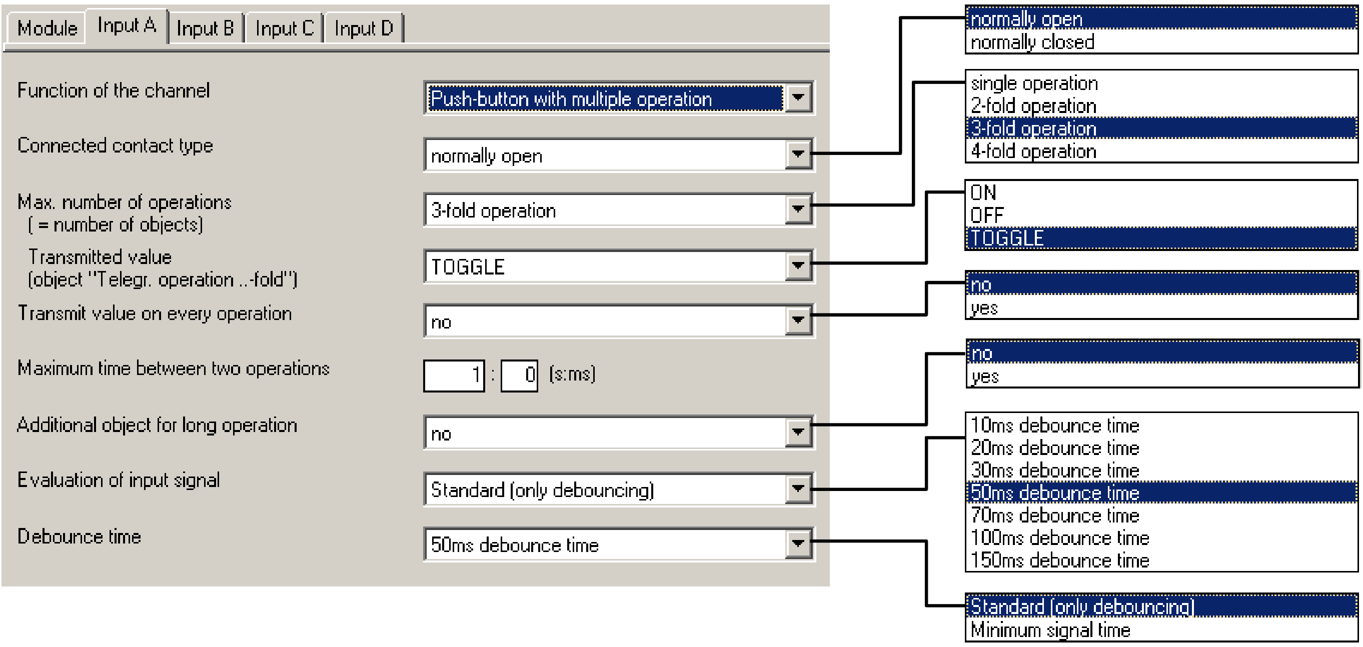
On receipt of an "ON" telegram at this communication object, the input moves up a level in the switching sequence. On receipt of an "OFF" telegram, it moves down one level.

Telegram value:	"0"	Level decrement
	"1"	Level increment

3.8 Function: “Push button with multiple operation”

The following section describes all the parameters and objects which are visible if the input is operated with the function “Push button with multiple operation”. If the input is operated many times in succession, a specific object value can be modified depending on the number of operations. Different lightscenes for example are thus enabled by a multiple push button action.

3.8.1 Parameterfenster



Function of the channel: Push-button with multiple operation

Connected contact type: normally open

Max. number of operations (= number of objects): 3-fold operation

Transmitted value (object "Telegr. operation ..-fold"): TOGGLE

Transmit value on every operation: no

Maximum time between two operations: 1 : 0 (s:ms)

Additional object for long operation: no

Evaluation of input signal: Standard (only debouncing)

Debounce time: 50ms debounce time

Parameter: “Connected contact type”

This parameter defines whether the contact at the input is “normally closed” or “normally open”.

Parameter: “Max. number of operations”

This parameter specifies the maximum number of operations that are possible. This number is identical to the number of communication objects “Telegr. operation x-fold”. If the actual number of operations is greater than the maximum value set here, the input reacts as if the number of operations were identical to the selected maximum value.

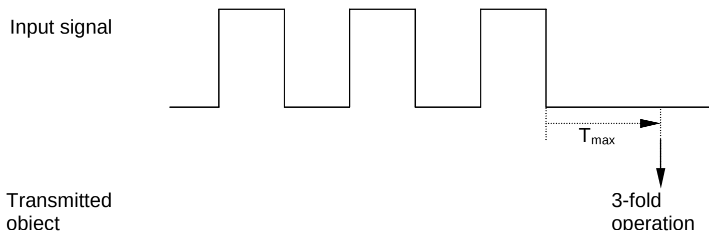
Parameter: “Transmitted value”

It can be set here which object value should be sent. The settings “ON”, “OFF” and “TOGGLE” are possible. If “TOGGLE” is selected, the current object value is inverted.

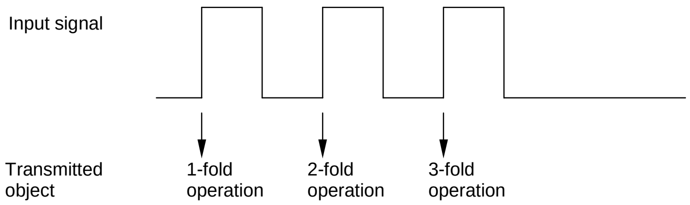
Parameter: “Transmit value on every operation”

In the case of a multiple operation, if this parameter is set to “yes”, the associated object value is updated and sent after each operation. The following examples clarify this:

Transmit value at every operation = no



Transmit value at every operation = yes



Parameter: "Maximum time between two operations"

The period T_{max} which defines how much time can elapse between two operations is set here. After an operation, there is a delay for the time specified here. If there are no further operations within this period, the object "Telegr. switch" is sent and counting starts again with the next operation.

Parameter: "Additional object for long operation"

After a long operation of the input, it is possible for a further function to be executed via the object "Telegr. switch (long)". If a long operation is carried out after one or several short operations within the maximum period, the short operations are ignored.

Parameter: "Long operation after"

This parameter defines the period from which an operation is interpreted as "long".

Parameter: "Transmitted value"

It can be set here whether the object value "Telegr. switch –long" should be switched "ON", "OFF" or toggled after a long operation.

Parameter: "Evaluation of input signal"

Used for setting a minimum signal time.

After a pulse edge, the input waits for the minimum signal time. The change at the pulse edge is only valid if a further edge occurs during this period. If a further pulse edge occurs, the minimum signal time is restarted. The minimum signal time can be set separately for the rising and falling edge. Further information about the function can be found in section 4.2.

The parameter is visible if there is no distinction between a short and long operation.

Parameter: "Debounce time"

Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

3.8.2 Overview of the objects

No	Function	Object name	Data type	Flags
0	**Disable**	**Input A**	**1 Bit(EIS1)**	**CW**
Disables the function of the input.				
1 **4**	**Telegr. operation 1-fold** **…** **Telegr. operation 4-fold**	**Input A**	**1 Bit(EIS1)**	**CWT**
Send up to 5 switching commands to different actuators or actuator groups via the bus which should be executed in a sequence.				
5	**Telegr. operation long**	**Input A**	**1 Bit(EIS1)**	**CWT**
Send up to 5 switching commands to different actuators or actuator groups via the bus which should be executed in a sequence.				

3.8.3 Detailed descriptionof the objects

Object: “Disable”: 1 Bit (EIS1)

Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

Objects: “Telegr. operation 1..4-fold”: 1 Bit (EIS1)

The number of these objects (max. 4) is set in the parameter “Max. number of operations”.

After a multiple operation of an input, the corresponding object is sent according to the number of operations. The telegram value can be set in the parameters.

Object: “Telegr. operation long”: 1 Bit (EIS1)

This object is visible if the value “yes” has been set in the parameter *“Additional object for long operation”.*

This object is sent once a long operation has been detected. The telegram value can be set in the parameters.

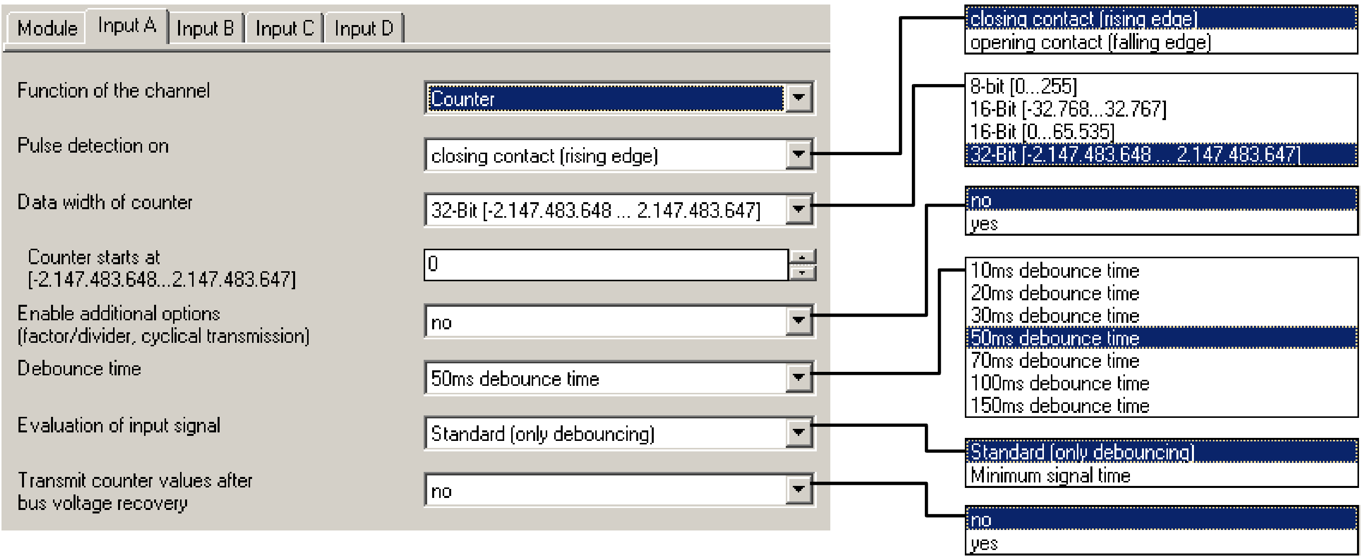
3.9 Function: “Counter”

The following section describes all the parameters and objects which are visible if the input is operated with the “Counter” function.

With the “Counter” function, the device is able to count the number of pulse edges at the input. In addition to the normal “Counter”, a “Differential counter” is made available if required. Both counters are controlled in the same way via the counting pulses but count independently of each other. The differential counter always has the same data width as the counter.

Further information and important notes can be found in section 4.8.

3.9.1 Parameter window



Function of the channel: Counter
Pulse detection on: closing contact (rising edge)
Data width of counter: 32-Bit [-2.147.483.648 ... 2.147.483.647]
Counter starts at [-2.147.483.648...2.147.483.647]: 0
Enable additional options (factor/divider, cyclical transmission): no
Debounce time: 50ms debounce time
Evaluation of input signal: Standard (only debouncing)
Transmit counter values after bus voltage recovery: no

Parameter: “Pulse detection on”

The type of the input signal is defined in this parameter. It can set whether the contact is a “closing contact (rising edge)” or an “opening contact (falling edge)”.

Parameter: “Data width of counter”

The data width of the counter is defined in this parameter. It specifies the counting range that can be used. The data width is identical for the counter and the differential counter.

Parameter “Counter starts at …”

The starting value of the absolute counter is defined in this parameter. The starting value is used when the counter overruns in order to calculate the new counter value.

Parameter: “Enable additional options (...)”

If this parameter is set to “yes”, the parameter window “A: Counter” becomes visible. Additional functions are possible here.

Parameter: “Debounce time”

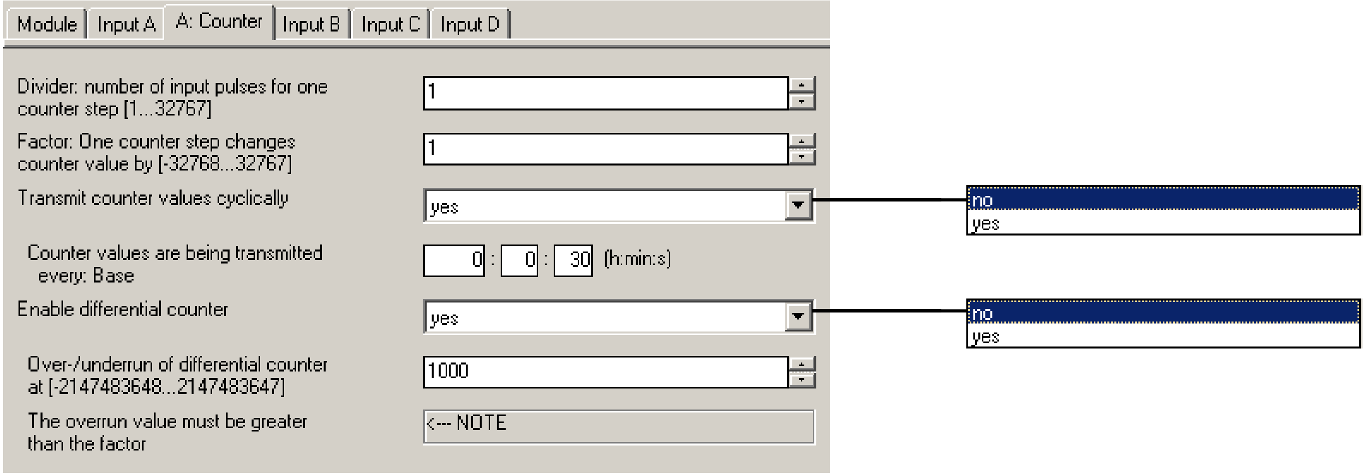
Debouncing prevents unwanted multiple operation of the input e.g. due to bouncing of the contact. Refer to section 4.2 for the precise function of this parameter.

Parameter: “Transmit counter values after bus voltage recovery”

If this parameter is set to “yes”, the current value of the counter is sent on the bus after bus voltage recovery (once the transmission delay has elapsed). If the differential counter has been enabled, it is also sent on the bus.

After a lengthy bus voltage failure, the counter is reset to the starting value. If the differential counter is enabled, it is reset to zero. If no data loss has occurred after a short bus voltage failure, the counter contents are retained.

Additional parameter window for "Enable additional options (...)" = "yes":



Divider: number of input pulses for one counter step [1...32767]: 1

Factor: One counter step changes counter value by [-32768...32767]: 1

Transmit counter values cyclically: yes

Counter values are being transmitted every: Base: 0 : 0 : 30 (h:min:s)

Enable differential counter: yes

Over-/underrun of differential counter at [-2147483648...2147483647]: 1000

The overrun value must be greater than the factor: <--- NOTE

Additional functions for the counter are enabled in this parameter window.

Parameter: "Divider: Number of input pulses for one counter step"

It can be set via this parameter how many input pulses (edges) are necessary for a counting pulse to be generated. It thus acts as a divider and subsequent decimal places are truncated.

Parameter: "Factor: One counter changes counter value by"

It can be set via this parameter by how much the counter and differential counter are increased for a counting pulse. It thus acts as a factor.

Parameter: "Transmit counter values cyclically"

If this parameter is set to "yes", the values of the counter and the differential counter are sent cyclically on the bus.

Parameter: "Counter values are being transmitted every"

This parameter is visible if the parameter "Transmit counter values cyclically" is set to "yes". It can be defined in which intervals the values are sent cyclically on the bus.

Parameter "Enable differential counter"

The object "Differential counter" is made visible via this parameter. The differential counter can adopt e.g. the function of a daily counter.

Parameter: "Overrun/underrun of differential counter at"

This parameter is visible if the parameter *"Enable differential counter"* is set to "yes".

It can be set in this parameter at which value the differential counter generates an overrun. In the case of an overrun, the same rules apply as for the standard counter. The object "Differential counter overflow" is sent following an overrun.

Example: Factor 10 has been set in the parameters. If the overrun value is 47, the following counting sequence is produced:

10 – 20 – 30 – 40 – 3 – 13 – 23 – ...

3.9.2 Overview of the objects

No	Function	Object name	Data type	Flags
0	**Disable**	**Input A**	**1 bit(EIS1)**	**CW**
Disables the function of the input.				
1	**Telegr. counter value ... bytes**	**Input A**	**1 ... 4 byte**	**CWT**
Contains the counter value (absolute value).				
2	**Differential counter ... bytes**	**Input A**	**1 ... 4 Byte**	**CWT**
Contains the status of the differential counter.				
3	**Request counter values**	**Input A**	**1 bit(EIS1)**	**CW**
Requests the object values “Telegr. counter value” and “Differential counter”.				
4	**Differential counter overflow**	**Input A**	**1 bit(EIS1)**	**CW**
Sends a “1” when there is an overrun of the differential counter.				
5	**Reset differential counter**	**Input A**	**1 bit(EIS1)**	**CW**
Resets the differential counter to the starting value.				

3.9.3 Detailed description of the objects

Object: “Disable”: 1 Bit (EIS1)

Blocks the function of the input so that no changes in the input signal are possible. Further information about the object function can be found in section 4.1.

Object: “Telegr. counter value ... bytes”: 1 to 4 Byte

This object contains the absolute counter content of the counter. The counter can have a data width of 1 byte, 2 bytes and 4 bytes. The following table provides an overview of the data types:

Data width	EIS type	Value range
1 byte	EIS 14	0...255
2 bytes	EIS 10	-32.768...32.767
2 bytes	EIS 10	0...65.535
4 bytes	EIS 11	-2.147.483.648...2.147.483.647

Object: “Differential counter ... bytes”: 1 to 4 Byte

This object is visible if the value “yes” has been selected in the parameter *“Enable differential counter”.*

The object contains the content of the differential counter which is identical to the absolute counter in its counting function. In contrast, it can be reset (object “Reset differential counter”) and a counter overrun can be reported on the bus (object “Differential counter overflow”). It is possible to measure e.g. daily consumption values via the differential counter.

As soon as the differential counter has reached, exceeded or fallen below the overrun value specified in the parameter *“Overrun/underrun of differential counter at”,* the overrun value is deducted from the value of the differential counter.

Object: “Request counter values”: 1 Bit (EIS1)

The values of the absolute counter and the differential counter are requested via this object.

Telegram value:	“0”	No reaction
	“1”	Request counter values

Object: “Differential counter overflow”: 1 Bit (EIS1)

This object is visible if the value “yes” has been set in the parameter *“Enable differential counter”.*

As soon as the value of the differential counter has exceeded or fallen below the value defined in the parameter *“Overrun/underrun of differential counter at“,* the object is sent on the bus (telegram value = “1”).

Note: After an overrun, the object receives the value “1”. If the object value should be reset to “0” via the bus, the “Write” flag of the object should be set.

Object: “Reset differential counter”: 1 Bit (EIS1)

This object is visible if the value “yes” has been set in the parameter “Enable differential counter”. The differential counter can be reset to the value “0”.

Telegram value:	“0”	No reaction
	“1” Reset differential counter	

4 Planning and application

Certain features are explained in more detail in this section.

4.1 Disabling the input

Each input can be enabled or disabled via the object “Disable”. A disabled input behaves as if no change in the input signal had taken place. The objects of the input remain available.

When a disabled input is enabled, no telegrams are sent initially on the bus, even if the status of the input has changed while it was deactivated.

If the input is operated once it has been enabled, the input behaves as if the operation had started at the end of the deactivation. If the input is disabled during an operation, the behaviour is undefined.

4.2 Debounce time and minimum signal time

It is possible to set a debounce time or a minimum signal time for each input.

Debounce time

If a pulse edge is detected at the input, the input reacts to it immediately (e.g. by sending a telegram). The debounce time T_D starts simultaneously. The signal at the input is not evaluated within the debounce period.

The following example clarifies this:

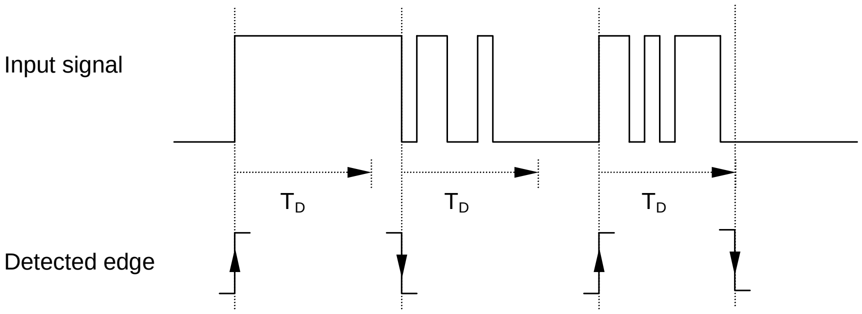


Fig. 4: Debouncing of an input signal

Once a pulse edge has been detected at the input, further edges are ignored for the duration of the debounce time T_D.

Minimum signal time

This function is distinguished from the debounce time in that the telegram is only sent once the minimum signal time has elapsed. The function is as follows:

If a pulse edge is detected at the input, the minimum signal time starts. No telegrams are sent on the bus at this point. The signal at the input is then observed. If a further pulse edge occurs at the input during the minimum signal time, this is interpreted as a new operation and the minimum signal time is restarted if necessary. If the input signal has not changed during the minimum signal time, a pulse edge is detected and a telegram is sent on the bus if necessary.

The following example clarifies this:

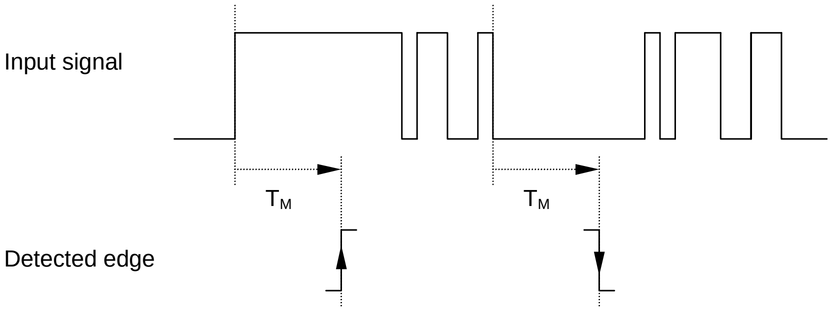


Fig. 5: Processing of a signal with minimum signal time

Since only two pulse edges remain stable for the duration of the minimum signal time T_M, only these pulse edges are recognised as valid.

4.3 Limitation of the telegram rate

A new observation period starts after the end of the previous observation period or – in the event of a bus voltage recovery – after the end of the transmission delay. The transmitted telegrams are counted. As soon as the “Max. number of transmitted telegrams…” has been reached, no further telegrams are sent on the bus until the end of the observation period. With the start of a new observation period, the telegram counter is reset to zero and the sending of telegrams is permitted again.

4.4 Cyclical sending

Cyclical sending is part of the “Switch sensor” function. It enables the “Telegr. switch” object to send automatically at a fixed interval.

If cyclical sending is only carried out for a specific object value (ON or OFF), this condition refers to the value of the communication object. It is therefore possible in principle to start the cyclical sending by sending a value to the “Telegr. switch” object.

If this reaction is unwanted, the “write”-flag of the object “Telegr. switch” has to be deleted.

When the “Telegr. switch” object changes and after bus voltage recovery (once the transmission delay has elapsed), the object value is sent immediately on the bus and the transmission cycle time restarts. The minimum value for the cyclic period is 200 ms. If a smaller value is set in the parameters, the transmission cycle time is equal to the minimum value.

4.5 Dimming

The **“1 button dimming”** function is set as default i.e. switching and dimming functions can be fully controlled via a single push button. A “Dim BRIGHTER” or “Dim DARKER” telegram is therefore sent alternately after each dimming operation. If the “Telegr. switch” object = 0, a “Dim BRIGHTER” telegram is always sent. To enable the evaluation of the status response of the actuator, the “Write” flag of the “Telegr. switch” object is set.

The following table explains the function in detail:

Value of the "Telegr. switch" object	**Value of the last** dimming telegram	**Reaction to the dimming operation** (dimming telegram sent)
OFF	DARKER	BRIGHTER
OFF	BRIGHTER	BRIGHTER
ON	DARKER	BRIGHTER
ON	BRIGHTER	DARKER

Table 1: Dimming function on "1 button dimming"

If **"2 button dimming"** is required, the function of the individual push button must be set in the parameters "Reaction on short operation" or "Reaction on long operation" (e.g. "ON" or "Dim BRIGHTER"). The user thus has complete freedom to choose

- which push buttons are combined with each other in order to dim a group of luminaires
- which function the individual push button has in this case

4.6 Scene control

A scene button regulates actuators (e.g. dimming actuators or shutter actuators) to a preset value via a single operation. For example, it can be used to set appropriate lighting conditions.

Moreover, the push button can store the current actuator values as a new scene via long push button action. A scene can thus be adapted in a simple way.

A scene can be implemented in two different ways:

Scene via 5 separate objects

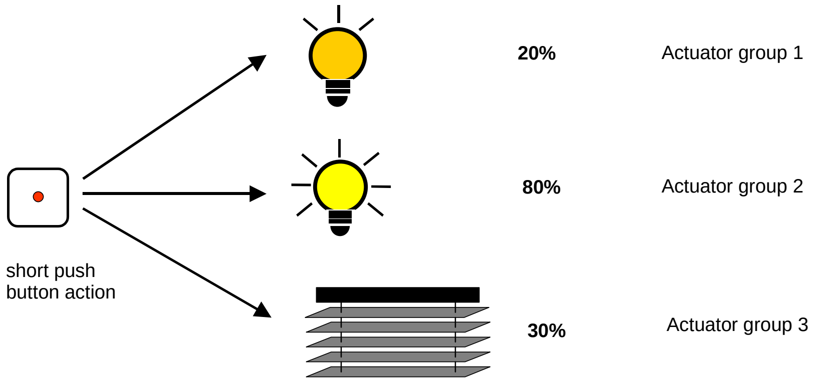


Fig. 6: Recall scene, separate objects

One input recalls up to 5 actuator groups. Up to 5 telegrams can thus be sent.

An actuator group comprises several actuators that are linked with the same group address. It can consist of e.g. switch actuators (1-bit values) or dimming actuators (1-byte values).

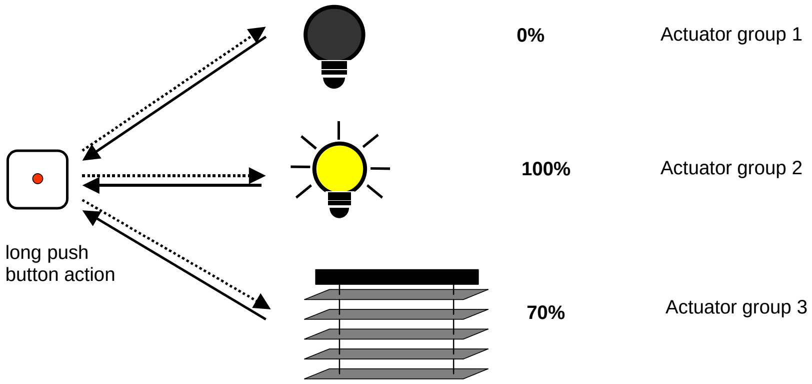


Fig. 7: Store scene, separate objects

The storing of a scene is carried out with a long push button action. The device scans each individual actuator group for the current value and then stores this value as the new scene value.

8-bit-scene

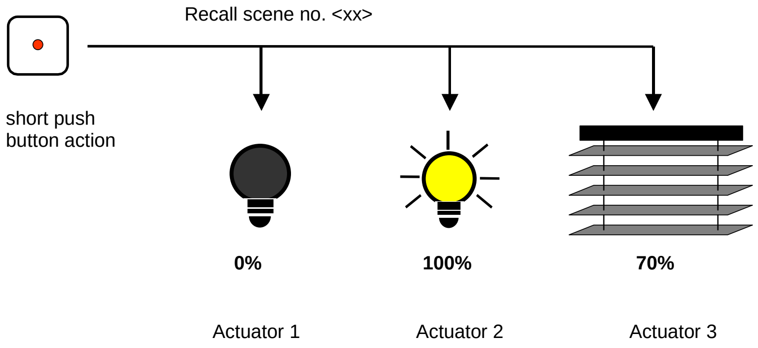


Fig. 8: Recall scene, 8-bit-scene

In the 8-bit scene, the push button gives the actuator the instruction to recall a scene. The scene is stored not in the push button but in the actuator. All the actuators are addressed via the same group address. A single telegram is sufficient to recall the scene.

The telegram value contains a scene number which must match the scene number in the parameters of the actuator.

Up to 64 different scenes are managed via a single group address. An 8-bit scene telegram contains the following information:
– Number of the scene (1...64)
– Recall scene / store scene

After a long push button action, the actuators receive a save command which causes them to store the currently issued value as a new scene value.

4.7 Switching sequence

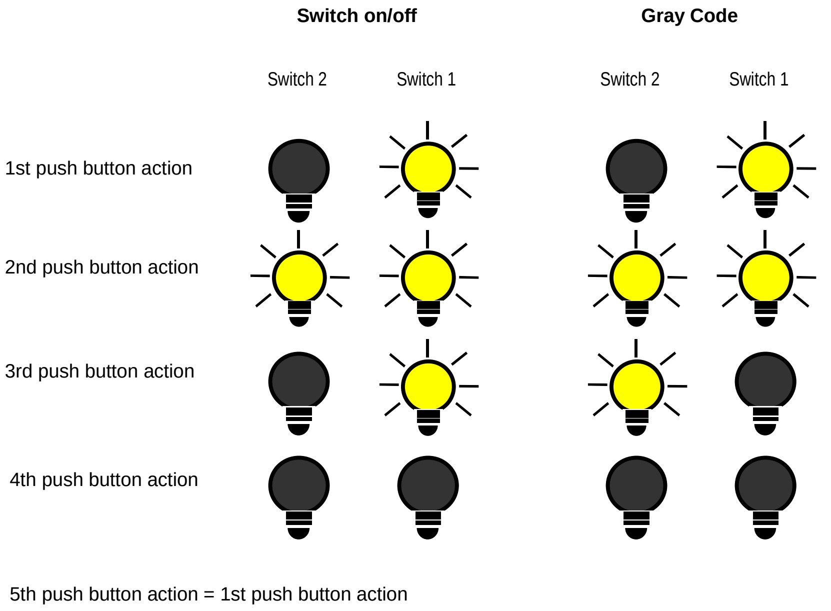


Fig. 9: Example of switching sequence with two objects (corresponds to binary code)

The "Switching sequence" function enables up to five objects (1 bit) to be switched on or off in a defined sequence. The sequence is switched one level further after each operation.

Example: Switching sequence "sequentially on/off (one push button)" with three communication objects

Switching level		Value of the communication objects		
Input operation no.	**Binary code**	**„Switch“**	**„Switch“**	**„Switch“**
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
6	000	OFF	OFF	OFF
7 = 1	001	OFF	OFF	ON
...				

All the switch objects are switched on in succession and switched off again one after the other, starting with the last switch object that was switched on.

Binary code: ...>001>011>111>011>001>000>...

The possible switching sequences are characterised by the fact that only the value of a single communication object changes between two switching levels. The following switching sequences are possible:

"Sequentially on/off (one push button)"

This switching sequence switches on a further communication object in succession after each operation. If all the objects are switched on, they are switched off again one after the other – starting with the last object that was switched on.

“Sequentially on/off, several push buttons”

This switching sequence is only distinguished from the previous one in that the sequence ignores further operations as soon as it has arrived at the end. At least two inputs are therefore required, one of which switches up a level and the other switches down a level in the sequence.

Note: The objects of the inputs must have the same group address assignments.

“All combinations (“Gray code”)”

This switching sequence runs through all the combinations of the communication objects in succession. Only the value of one communication object is changed between two switching levels. A clear application of this switching sequence is e.g. the switching of two groups of luminaires in the sequence 00 – 01 – 11 – 10 – 00 ...

You can find a ‘Gray code table’ in the appendix under section 5.1.

Further options

The switching level can be modified both via the operation of the input and via the communication object “Level increment/decrement”. This object is used for example to switch upwards or downwards with two or more inputs.

Note: The current switching level is always produced from the status of the objects. If e.g. an object is modified by another device, the current switching level can also be changed as a result.

4.8 Counter

The pulse counting function is used to count input pulses. It contains all the important features which are necessary for a high-capacity counter.

The following representation provides an overview:

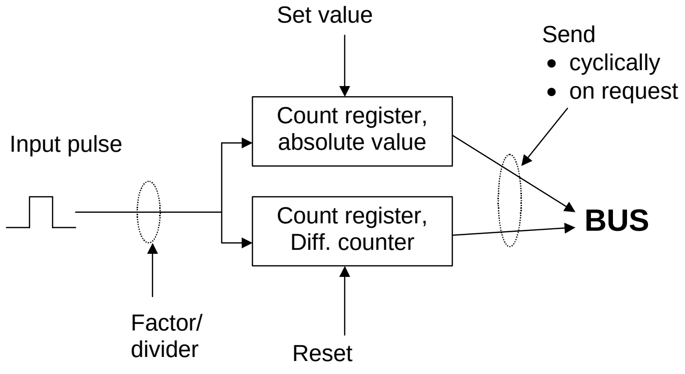


Fig. 10: Functional principle of the counter

In addition to the absolute counter, it is also possible to enable an additional counter which measures differential values (comparable to a daily mileage counter). The differential counter always starts at zero.

To be able to adapt the count rate, a common factor and divider can be set for both counters. Both counter values can either be sent cyclically on the bus or on request.

An overrun value can be defined for the differential counter. A telegram can be sent if an overrun occurs.

Note: The counter values are reset to the starting value on failure of the supply voltage or after programming the device.

Note: The maximum counting frequency may not exceed 1 Hz. The minimum pulse duration is 50 ms. The max. capacitive load at the input is 22nF.

Note: For reading out the signal of an S_0 pulse output (e.g. for an energy meter) a BE/M 4.12.1 is to be used. It has to be ensured, that the S_0 pulse output is electrically isolated from the mains voltage. Depending on the kind of pulse output, also the correct polarity has to be considered.

4.9 Behaviour on voltage failure and recovery

Behaviour on bus voltage failure

On bus voltage failure, the device function is retained provided that the supply voltage of the Room Controller is maintained. The inputs can therefore be used to operate the outputs, provided that the associated actuator modules are mounted in the same Room Controller.

Behaviour after bus voltage recovery

On bus voltage recovery, the inputs are scanned after the initialization period and the object values are updated accordingly, provided that this is permitted in the function or parameters.

The behaviour is dependent on the function of the channel. The following list provides an overview:

Function	Behaviour after bus voltage recovery*
Switch sensor	If a distinction is made between a long and short operation or the value “TOGGLE” has been set in one of the parameters “Reaction on opening/closing the contact”, no telegrams are sent after bus voltage recovery. Otherwise, the behaviour can be set in the parameters.
Switch/dimming sensor	No telegrams are sent on the bus.
Shutter sensor	No telegrams are sent on the bus.
Value / forced operation	Object values are overwritten by the parameterised values.
Control scene	When the scene is controlled via “5 separate objects”, the object values of the scene are overwritten with the parameterised values.
Switching sequence (“latching relay”)	No telegrams are sent on the bus.
Push button with multiple operation	No telegrams are sent on the bus.
Counter	No telegrams are sent on the bus.

*More accurate: Behaviour in connection with the transmission delay

You can find further details about the behaviour after bus voltage recovery in the manual for the Room Controller.

Behaviour on failure of the supply voltage

If the supply voltage of the Room Controller fails, the modules also no longer continue to function. This is the case regardless of whether the bus voltage is applied.

Behaviour after recovery of the supply voltage

If the supply voltage of the Room Controller Base Unit is connected to the system, the device behaves in the same way as after bus voltage recovery.

4.10 Behaviour after programming

After programming, the device behaves as after bus voltage recovery.

5 Appendix

5.1 Gray code table

The switching sequence is characterised by the fact that only one value is changed between two levels. The transition to the next level therefore only requires the sending of a single telegram. The following table describes the gray code when using 5 objects.

Switching level		Value of the communication objects				
No.	Short code	Switch5	Switch4	Switch3	Switch2	Switch1
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

5.2 Ordering information

Description	**Type** **Short code**	**Order no.**	**bbn 40 16779 EAN**	**Price 1 Pc. [EURO]**	**Price-group**	**Unit weight [kg]**	**Pack unit [Pc.]**
Binary Input Module, 4-fold, 230 V	BE/M 4.230.1	2CDG 110 005 R0011	58311 4		26		1
Binary Input Module, 4-fold, 12/24 V	BE/M 4.24.1	2CDG 110 006 R0011	58312 1		26		1
Binary Input Module, 4-fold, contact scanning	BE/M 4.12.1	2CDG 110 007 R0011	58313 8		26		1

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