12 S2 On-off-toggle/Dim/Shu 220703

Use of the application program

Product family: Input
Product type: Binary input, 4-fold
Manufacturer: Siemens

Name: Push button interface UP 220
Order no.: 5WG1 220-2AB01

Name: Binary input N 260
Order no.: 5WG1 260-1AB01

Name: Binary input N 260 PL
Order no.: 5WG1 260-1PB01

Name: Binary input GE 260
Order no.: 5WG1 260-4AB02

Name: Binary input N 261
Order no.: 5WG1 261-1AB01

Name: Binary input GE 261
Order no.: 5WG1 261-4AB02

Name: Binary input GE 262
Order no.: 5WG1 262-4AB02

Functional description

This application program makes it possible to use conventional sensors (normally closed or normally open contacts) e.g. push buttons, switches and floating contacts via the 4-fold binary inputs or the push button interface UP 220 for functions such as switching, push button, value sending, shutter control, dimming and cyclical dimming. Each input (A, B, C, D) can be configured for switching and sending values and is therefore assigned a switching object. Dimming and shutter control functions require 2 inputs per function. The two input pairs A/B and C/D are available for this. The application program can be programmed with the following functionality:

Switch (Input A, B, C, D)

- Switch (rising edge) On-Off-Toggle: In the event of a rising edge at the input, depending on the setting selected, "On" or "Off" telegrams are generated or the stored object value is inverted and sent immediately.
- Switch (rising and falling edge) On-Off: If there is a rising and falling edge at the input, according to the setting, either "On" or "Off" telegrams are generated and sent immediately (push button or bell function). The object value that is sent can be assigned separately for the rising and falling edge.

- Switch (short/long push button action) On-Off: An evaluation of the operating time is carried out. If there is a short or a long push button action at the input, either "On" or "Off" telegrams are generated and sent, depending on the setting selected. The object value that is sent can be assigned separately for a short or long push button action.

If the setting "normally closed contact" is selected as the contact type for the "Switch" function, the terms "rising edge" and "falling edge" are reversed.

Send value (Input A, B, C, D)

This function enables 1 byte telegrams to be generated. Each input can be assigned a value object (8 bit). It is therefore possible for example to assign brightness values between 0 and 100% to a lighting system that is operated via switch/dim actuators. When evaluating the rising or rising and falling edge of a push button or a conventional brightness sensor, up to 2 values are produced per input. The operating time is not evaluated in this case.

Dimming (Inputs A/B, C/D)

The inputs can be combined into pairs (A/B and C/D) in order to carry out dimming functions.
A short operation of the pair of push buttons switches on and off while a longer push button action dims brighter and darker. If the function "Toggle" is selected, an "On" or "Off" telegram is generated at input A or B (or input C or D). The functions of "Dimming" (with stop telegram) and "Dimming cyclically" (with cyclical sending) are available. In the setting "Dimming", a long push button action sends a dimming telegram for dimming 100% brighter or darker. A "Stop" telegram is sent when the push button is released. The setting "Dimming cyclically" generates dimming telegrams according to an adjustable transmission frequency for the duration of the push button action. When the push button is released, the cyclical sending stops.

Shutter (Inputs A/B, C/D)

The inputs can be combined into pairs (A/B and C/D) in order to carry out shutter control functions.
After a long push button action (the duration of which can be set), the shutters are raised (input A/B) or lowered (input C/D). If the push button is pressed briefly again (short push button action) while the shutter is moving, the shutter actuator interprets this as a stop command and the shutter stops moving. Otherwise a short push button action only causes the louvres to be rotated in the corresponding direction.

Maximum number of group addresses: 27
Maximum number of associations: 27

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Parameters

General

Parameters	Settings
Long push button action min.	0.3 seconds 0.4 seconds **0.5 seconds** 0.6 seconds 0.8 seconds 1.0 seconds 1.2 seconds 1.5 seconds 2.0 seconds 2.5 seconds 3.0 seconds 4.0 seconds 5.0 seconds 6.0 seconds 7.0 seconds
This parameter defines the time limit for short/long push button actions for all 4 inputs. If a push button is pressed for longer than the set duration, the software detects a long push button action. Telegrams are then generated according to the selected function – "Dimming", "Shutter" or "Switch (short/long push button action)".	
Interval for cyclical sending (for dimming with cyclical sending)	0.3 seconds 0.4 seconds **0.5 seconds** 0.6 seconds 0.8 seconds 1.0 seconds 1.2 seconds 1.5 seconds 2.0 seconds 2.5 seconds 3.0 seconds 4.0 seconds 5.0 seconds 6.0 seconds 7.0 seconds
This parameter is only displayed for the function "Dimming cyclically". The transmission frequency or rather the cyclic time is set here. Dimming telegrams are continually sent for the duration of the push button action according to the value that is selected. The transmission frequency together with the step width produces the dimming period. This must match the dimming time in the actuator.	

Parameters	Settings
Debounce time	10 ms 30 ms **50 ms** 100 ms
When a push button is operated, a short bounce occurs where by the contact closes and opens several times until it finally remains closed. The duration of the contact bounce depends on the push button action that is used. Due to the fact that the application software is able to scan the inputs rapidly, any multiple push button operations would be detected and several switching telegrams are therefore sent. The debounce time prevents this as after the initial detection of a change in the status at the input, there is a delay for the set time and the current status is then used for further processing.	

Communication objects

Switch On/Off/Toggle

Note:

The view of the objects can be arranged individually i.e. this view can vary.
All objects that correspond with a user operation have to be assigned to a group address.

Obj	Function	Object name	Type	Flag
0	On/Off/Toggle	Switch, Input A	1 Bit	CWTU
1	On/Off/Toggle	Switch, Input B	1 Bit	CWTU
2	On/Off/Toggle	Switch, Input C	1 Bit	CWTU
3	On/Off/Toggle	Switch, Input D	1 Bit	CWTU
The switching telegrams of inputs A-D are sent via the group address in this object. It is possible to select which signal status at the individual inputs generate "On" or "Off" telegrams via the corresponding parameters. If the setting "Toggle" is selected, the central addresses that are also contained in the actuator must be entered in order to synchronise the sensor.				

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Switch (rising edge) parameters

Input A/B

The parameters of the input pairs A/B and C/D are identical for the function "Switch (rising edge)".

Parameters	Settings
Function of input A/B	**Switch, push buttons, send value** Shutter Up / Down Dimming Dimming cyclically
This parameter defines the basic function of input A/B. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of the respective input are modified.	
Input A	**Switch (rising edge)** Switch (short / long push button action) Switch (rising and falling edge) Send value (rising edge) Send value (rising and falling edge)
The switching characteristic of input A is set here. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of input A are modified.	
"Switch (rising edge)": In the event of a rising edge at the input, the object value (On or Off) that is selected in the "Value" parameter is sent immediately. If "Toggle" is selected, the value that is stored in the object is inverted. For this reason, it is also possible to assign several group addresses to each object so that the object value can be updated by other bus devices. The operating time is not evaluated in this case.	

Parameters	Settings
Value	**On** Off Toggle
This parameter determines which switching value is sent when a rising edge is detected at input A. "On": An "On" telegram is sent when a rising edge is detected at the input. "Off": An "Off" telegram is sent when a rising edge is detected at the input. "Toggle": Each rising edge causes toggling which means that the first rising edge generates an "On" telegram, the next generates an "Off" telegram and so on.	
Contact type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter. "normally open contact": The push button contact is operated when it is closed and not operated when it is open. "normally closed contact": The push button is operated when it is open and not operated when it is closed. When assigning parameters to the inputs, it should be noted that when the contact type "normally closed contact" is used, the terms "rising edge" and "falling edge" are reversed.	

Input B can be assigned switch or value sending functions separately to input A.

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Switch (short/long push button action) parameters

Input A/B

The parameters of the two input pairs A/B and C/D are identical for the function "Switch (short/long push button action)".

Parameters	Settings
Function of input A/B	**Switch, push buttons, send value** Shutter Up / Down Dimming Dimming cyclically
This parameter defines the basic function of input A/B. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of the respective input are modified.	
Input A	Switch (rising edge) **Switch (short/long push button action)** Switch (rising and falling edge) Send value (rising edge) Send value (rising and falling edge)
The switching characteristic of input A is set here. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object type of input A is modified.	

Parameters	Settings
"Switch (short/long push button action)": A timer is started in the event of a rising edge at the input. If the input drops off again within the period set in the parameter "Long push button action min.", the corresponding switching value for a short push button action (On/Off) is sent immediately. If the signal is applied at the input for longer than the set period, the corresponding switching value for a long push button action (On/Off) is sent immediately. The operating time that distinguishes between a short and long push button action is set in the "General" parameter window.	
Value on short push button action	**On** Off
This parameter specifies the switching value for a short push button action at input A.	
Value on long push button action	On **Off**
This parameter specifies the switching value for a long push button action at input A.	
Contac type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter. "normally open contact": The push button contact is operated when it is closed and not operated when it is open. "normally closed contact": The push button is operated when it is open and not operated when it is closed. When assigning parameters to the inputs, it should be noted that when the contact type "normally closed contact" is used, the terms "rising edge" and "falling edge" are reversed.	

Input B can be assigned switch or value sending functions separately to input A.

Switch (rising and falling edge)

Input A/B

The parameters of the two input pairs A/B and C/D are identical for the function "Switch (rising and falling edge)".

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Parameters	Settings
Function of input A/B	**Switch, push buttons, send value** Shutter Up / Down Dimming Dimming cyclical
This parameter defines the basic function of input A/B. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of the respective input are modified.	
Input A	Switch (rising edge) Switch (short/long push button action) **Switch (rising and falling edge)** Send value (rising edge) Send value (rising and falling edge)
The switching characteristic of input A is set here. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of input A are modified. "Switch (rising and falling edge)": In the event of a rising edge at the input, the switching value (On or Off) that is set in the parameter "Value on rising edge" is sent immediately. If the input drops off again, the switching value (On or Off) that is set in the parameter "Value on falling edge" is sent. The operating time is not evaluated.	
Value on rising edge	**On** Off
This parameter determines which switching value is sent when a rising edge is detected at input A. "On": An "On" telegram is sent when a rising edge is detected at the input. "Off": An "Off" telegram is sent when a rising edge is detected at the input.	
Value on falling edge	On **Off**
This parameter determines which switching value is sent when a falling edge is detected at input A. "On": An "On" telegram is sent when a falling edge is detected at the input. "Off": An "Off" telegram is sent when a falling edge is detected at the input.	

Parameters	Settings
Contact type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter. "normally open contact": The push button contact is operated when it is closed and not operated when it is open. "normally closed contact": The push button is operated when it is open and not operated when it is closed. When assigning parameters to the inputs, it should be noted that when the contact type "normally closed contact" is used, the terms "rising edge" and "falling edge" are reversed.	

Input B can be assigned switch or value sending functions separately to input A.

Communication objects

Send value

Note:

The view of the objects can be arranged individually i.e. this view can vary.
All objects that correspond with a user operation have to be assigned to a group address.

Obj	Function	Object name	Type	Flag
0	8 – bit Value	Value, Input A	1 Byte	CWTU
1	8 – bit Value	Value, Input B	1 Byte	CWTU
2	8 – bit Value	Value, Input C	1 Byte	CWTU
3	8 – bit Value	Value, Input D	1 Byte	CWTU
The value telegrams of inputs A-D are sent via the group addresses in this object. Each input is thus assigned a value object (8 bit). In the event of a rising edge at the input, the corresponding value (0...255) is sent immediately.				

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Send value (rising edge) parameters

Input A/B

The parameters of the two input pairs A/B and C/D are identical for the function "Send value (rising edge)".

Parameters	Settings
Function of input A/B	**Switch, push buttons, send value** Shutter Up / Down Dimming Dimming cyclical
This parameter defines the basic function of input A/B. The parameter window of the input pair changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of the respective input are modified.	
Input A	Switch (rising edge) Switch (short/long push button action) Switch (rising and falling edge) **Send value (rising edge)** Send value (rising and falling edge)
The switching characteristic of input A is set here. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of input A are modified. "Send value (rising edge)": In the event of a rising edge at the input, the value (0-255) set in the parameter "Value on rising edge" is sent immediately. Neither a falling edge nor the operating time are evaluated here.	
Value on rising edge (0-255)	**255**
The value that is sent on a rising edge at input A is entered here. It can range between 0 (0%) and 255 (100%).	

Parameters	Settings
Contact type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter. "normally open contact": The push button contact is operated when it is closed and not operated when it is open. "normally closed contact": The push button is operated when it is open and not operated when it is closed. When assigning parameters to the inputs, it should be noted that when the contact type "normally closed contact" is used, the terms "rising edge" and "falling edge" are reversed.	

Input B can be assigned switch or value sending functions separately to input A.

Send value (rising and falling edge) parameters

Input A/B

The parameters of the two input pairs A/B and C/D are identical for the function "Send value (rising and falling edge)".

Parameters	Settings
Function of input A/B	**Switch, push buttons, send value** Shutter Up / Down Dimming Dimming cyclical
This parameter defines the basic function of input A/B. The parameter window of the input pair changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of the respective input are modified.	

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Parameters	Settings
Input A	Switch (rising edge) Switch (short/long push button action) Switch (rising and falling edge) Send value (rising edge) **Send value (rising and falling edge)**
The switching characteristic of input A is set here. The parameter window of the input changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of input A are modified. "Send value (rising and falling edge)": In the event of a rising edge at the input, the corresponding value (0-255) is sent immediately. If the input drops off again, another set value is sent. The operating time is not evaluated.	
Value on rising edge (0-255)	**255**
The value that is sent on a rising edge at input A is entered here. It can range between 0 (0%) and 255 (100%).	
Value on falling edge (0-255)	**255**
The value that is sent on a falling edge at input A is entered here. It can range between 0 (0%) and 255 (100%).	
Contact type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter. "normally open contact": The push button contact is operated when it is closed and not operated when it is open. "normally closed contact": The push button is operated when it is open and not operated when it is closed. When assigning parameters to the inputs, it should be noted that when the contact type "normally closed contact" is used, the terms "rising edge" and "falling edge" are reversed.	

Input B can be assigned switch or value sending functions separately to input A.

Communication objects

Dimming "On/Off"

Phys.Addr.	Program		
no.	**Function**	**Object name**	**Type**
01.01.006	12 S2 On-off-toggle/Dim/Shu 220703		
0	On / Off	Dimming On / Off, Input A / B	1 Bit
1	Brighter / Darker	Dimming, Input A / B	4 Bit
2	On / Off	Dimming On / Off, Input C / D	1 Bit
3	Brighter / Darker	Dimming, Input C / D	4 Bit

Note

The view of the objects can be arranged individually i.e. this view can vary.
All objects that correspond with a user operation have to be assigned to a group address.

Obj	Function	Object name	Type	Flag
0	On / Off	Dimming On/Off, Input A/B	1 Bit	CWTU
The switching telegrams of inputs A and B are sent via the group address in this object. It is specified via a parameter which of the two inputs generates "On" or "Off" telegrams after a short push button action. If the setting "Toggle / toggle" is selected, all the central addresses that are also in the actuator should be entered in order to synchronise the sensor.				
1	Brighter / Darker	Dimming, Input A/B	4 Bit	CWTU
The dimming telegrams of inputs A and B are sent via the group address in this object. A long push button action at input A produces "Dim brighter" telegrams while a long push button action at input B generates "Dim darker" telegrams.				
2	On / Off	Dimming On/Off, Input C/D	1 Bit	CWTU
The switching telegrams of inputs C and D are sent via the group address in this object. It is specified via a parameter which of the two inputs generates "On" or "Off" telegrams after a short push button action. If the setting "Toggle / toggle" is selected, all the central addresses that are also in the actuator should be entered in order to synchronise the sensor.				
3	Brighter / Darker	Dimming, Input C/D	4 Bit	CWTU
The dimming telegrams of inputs C and D are sent via the group address in this object. A long push button action at input C produces "Dim brighter" telegrams while a long push button action at input D generates "Dim darker" telegrams.				

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Parameters

Dimming (with stop telegram)

The parameters of the two input pairs A/B and C/D are identical for the function "Dimming (with stop telegram).

Parameters	Settings
Function of input A/B	Switch, push button, send value Shutter up / down **Dimming** Dimming cyclically
This parameter defines the basic function of input A/B. The parameter window of the input pair changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of the respective input are modified.	
"Dimming": A short push button action at input A or B generates a switching telegram via object 0. A long push button action at input A produces a "Dim brighter" telegram via object 1. When the push button is released, a stop command is sent. Input B operates according to the "Dim darker" dimming direction.	
Input A/B	**On / Off** Toggle / Toggle
This parameter defines the value that is sent after a brief operation of input A/B.	
"On / Off": A short push button action at input A produces "Off" telegrams while a brief operation at input B generates "On" telegrams. It is also possible to reverse the function by reconnecting the inputs.	
"Toggle / Toggle": After each short push button action at input A or B, the current value of the switch object is inverted and then sent (toggling).	
Contact type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter.	
"normally open contact": The push button contact is operated when it is closed and not operated when it is open.	
"normally closed contact": The push button is operated when it is open and not operated when it is closed.	

Parameters

Dimming cyclically

The parameters of the two input pairs A/B and C/D are identical for the function "Dimming cyclically".

Parameters	Settings
Function of input A/B	Switch, push button, send value Shutter up / down Dimming **Dimming cyclically**
This parameter defines the basic function of input A/B. The parameter window of the input pair changes according to the function that is selected here and the necessary parameters are displayed with default values. The objects required for the setting are displayed in the object list and the object types of the respective input are modified.	
"Dimming cyclically": A short push button action at input A or B generates an "On" or "Off" telegram via input object 0. A long push button action at input A produces "Dim brighter" telegrams via object 3 according to the setting "Interval for cyclical sending" for the duration of the push button action. When the push button is released, the cyclical sending stops. Input B operates according to the "Dim darker" dimming direction.	
Input A/B	**On / Off** Toggle / Toggle
This parameter defines the value that is sent after a brief operation of input A/B.	
"On / Off": A short push button action at input A produces "Off" telegrams while a brief operation at input B generates "On" telegrams. It is also possible to reverse the function by reconnecting the inputs.	
"Toggle / Toggle": After each short push button action at input A or B, the current value of the switch object is inverted and then sent (toggling).	

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Parameters	Settings
Long push button action	**adjust by 100%** adjust by 1/2 adjust by 1/4 adjust by 1/8 adjust by 1/32 adjust by 1/64
This parameter specifies the dimming step width of the tele-grams after a long push button action. In the configuration "Dimming cyclically", the dimming step width is set together with the parameter "Interval for cyclical sending" (see "General" parameter window) to the dimming time of the actuator. For example, if the dimming time of 0 to 100% in the switch/dim actuator is set to 4 seconds, a trans-mission frequency of 0.5 seconds with an adjustment of 1/8 is selected. This means that a dimming command of 12.5% brighter or darker is sent every 0.5 seconds. With an adjust-ment of 8 x 12.5% and 8 x 0.5 seconds, this concurs with the dimming speed in the actuator of 100% in 4 seconds.	
Contact type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter. "normally open contact": The push button contact is operated when it is closed and not operated when it is open. "normally closed contact": The push button is operated when it is open and not operated when it is closed.	

The function and the parameters of the input pairs A/B and C/D are identical for the function "Dimming cycli-cally".

Communication objects

Shutter

Phys.Addr.	Program			
	no.	Function	Object name	Type
01.01.006		12 S2 On-off-toggle/Dim/Shu 220703		
	0	Open / Closed	Louvres, Input A / B	1 Bit
	1	Up / Down	Shutter, Input A / B	1 Bit
	2	Open / Closed	Louvres, Input C / D	1 Bit
	3	Up / Down	Shutter, Input C / D	1 Bit

Note:

The view of the objects can be arranged individually i.e. this view can vary.
All objects that correspond with a user operation have to be assigned to a group address.

Obj	Function	Object name	Type	Flag
0	Open / Closed	Louvres, Input A/B	1 Bit	CWTU
In the setting "Shutter Up / Down", the commands for louvre adjustment for inputs A and B are sent via the group address in this object. A short push button action at input A produces telegrams for opening the louvres while a brief operation at input B generates telegrams for closing the louvres.				
1	Up / Down	Shutter, Input A/B	1 Bit	CWTU
In the setting "Shutter Up / Down", shutter control commands for inputs A and B are sent via the group address in this object. A long push button action at input A produces tele-grams for raising the shutters while a long operation at input B generates telegrams for lowering the shutters.				
2	Open / Closed	Louvres, Input C/D	1 Bit	CWTU
In the setting "Shutter Up / Down", the commands for louvre adjustment for inputs C and D are sent via the group address in this object. A short push button action at input C produces telegrams for opening the louvres while a brief operation at input D generates telegrams for closing the louvres.				
3	Up / Down	Shutter, Input C/D	1 Bit	CWTU
In the setting "Shutter Up / Down", shutter control commands for inputs C and D are sent via the group address in this object. A long push button action at input C produces tele-grams for raising the shutters while a long operation at input D generates telegrams for lowering the shutters.				

Parameters

Shutter up/down

The parameters of the two input pairs A/B and C/D are identical for the function "Shutter up / down".

Parameters	Settings
Function of input A/B	**Switch, push buttons, send value** **Shutter Up / Down** Dimming Dimming cyclically
This parameter defines the basic function of input A/B. The parameter window of the input pair changes according to the function that is selected here and the necessary parameters are displayed with default values.	

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12 S2 On-off-toggle/Dim/Shu 220703

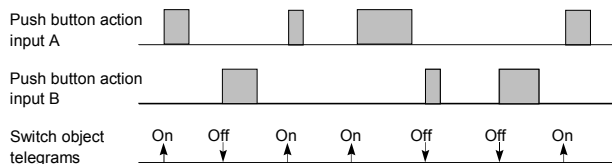| Parameters	Settings
The objects required for the setting are displayed in the object list and the object types of the respective input are modified. "Shutter Up / Down": After a short push button action, a switching command is sent for louvre adjustment. Whether a command is sent to open or close the louvres is dependent on whether input A or input B is operated. This function can also be used for controlling skylights and security gates in both directions. In this case the "Open" command (EIS 7) corresponds to the "Off" command (EIS 1) and the "Close" command to the "On" command. After a long push button action (the duration of which can be set), the shutter is raised (input A) or lowered (input B). If the push button is operated briefly (short push button action) while the shutter is moving, the shutter actuator interprets this as a stop command and the shutter is brought to a stop. Otherwise only the louvres are rotated in the corresponding direction in the event of a short push button action.	
Contact type channel A	**normally open contact** normally closed contact
The contact type for input A is defined in this parameter. "normally open contact": The push button contact is operated when it is closed and not operated when it is open. "normally closed contact": The push button is operated when it is open and not operated when it is closed.	

The input pair C/D can be assigned switch, value sending, dimming or shutter control functions separately to the input pair A/B.
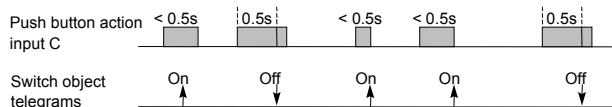
Examples of timing diagrams

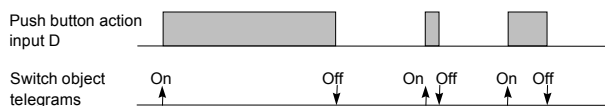### 1. Configured for: "Switch, push button, send value"

Function of input A/B: Switch (rising edge)
Input A = On, Input B = Off

Function: Switch (short/long push button action)
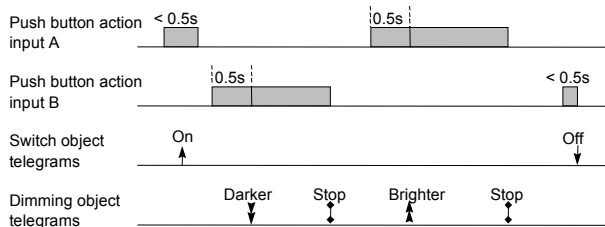Value on short push button action: On; value on long push button action: Off

Function: Switch (rising and falling edge)
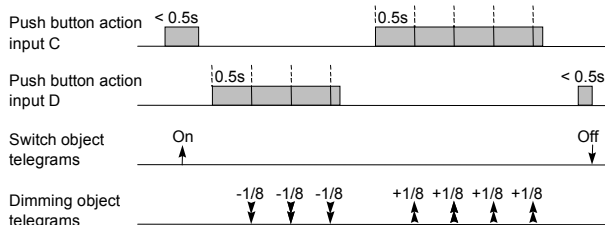Value on rising edge: On; value on falling edge: Off

2. Configured for: "Dimming"

Function of input A/B: Dimming
Input A/B: On / off

Function: Dimming cyclically
Input A/B: On / off

3. Configured for: "Shutter"

Function: Shutter up / down