Instruction manual

art. 01521

Installation manual

WELL-CONTACT PLUS

VIMAR

Contents

For all the details about the Well-contact Plus system, refer to the installer manual that can be downloaded from the Software ➡ Product Software ➡ Well-contact Plus section on the website www.vimar.com.

General features and functionality

Actuator with 12 relay outputs NO for fluorescent lamps 10 A 250 V~, 50/60 Hz, KNX standard, installation on DIN rails (60715 TH35), occupies 12 modules size 17.5 mm.

The actuator 01521 is able to activate electrical applications (alternating or three-phase current) via 12 independent potential-free contacts; control is via the bus or via the dedicated manually operated switches. The devices are powered by the KNX bus and do not require an external power supply.

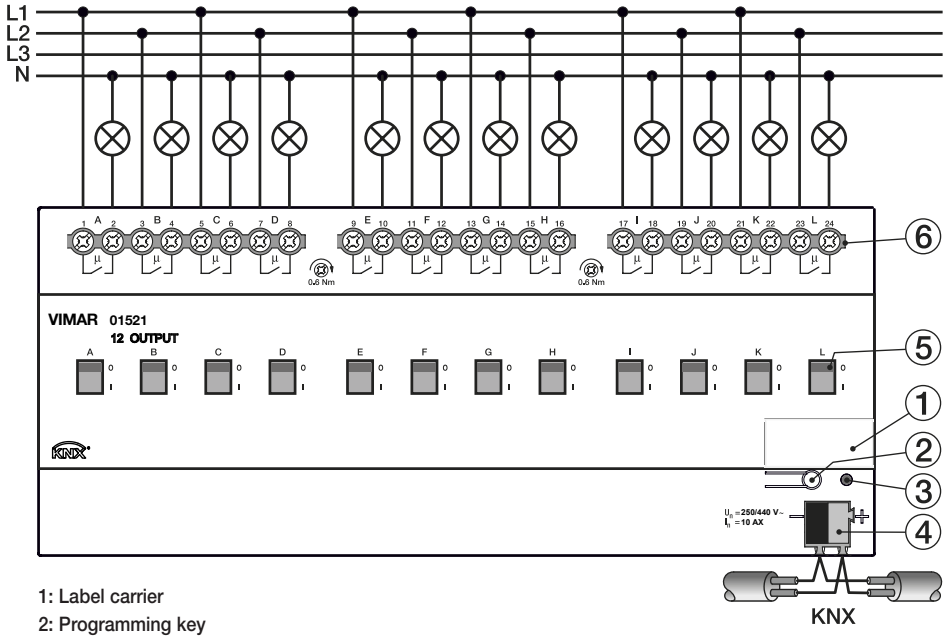
Features

- BUS output voltage: 30 V d.c. SELV.
- Consumption on the bus: 12 mA
- Power outputs: 12 Floating contacts
- Switch voltage: 250/440 V ~
- Rated current: 10AX EN 60669; 10A (AC1) EN 60947-4
- Operating temperature: -5 °C - + 45 °C (inside)
- Protection rating: IP20
- 12 modules of 17.5 mm.

Connections

The connection to the bus and to the applications is made directly from the terminals on the front of the actuator 01521.

FRONT VIEW AND CONNECTIONS



1: Label carrier
2: Programming key
3: Programming LED, red
4: Connecting terminal KNX
5: Switch position display and ON/OFF operation
6: Load current circuit, each with 2 screw terminals

Operation

The physical address and the parameter settings are set using the Engineering Tool Software ETS

Programming LED Lights up red when the device is operated in programming mode (after pressing the Programming button).

Manual management

The actuator enables manual control of applications via the switch associated with each of the relay outputs.

Position 0 = Load deactivated and relay contact open.

Position I = Load activated and relay contact closed.

General features and functionality

Overview of switching performance

The following table shows the switching capacities, lamp loads and/or the number of lamps that can be connected to each contact.

I_n rated current (A)	10 AX
U_n rated voltage (V)	250/440 V AC
AC1 operation (cos φ = 0.8) EN 60 947-4-1	10 A
AC3 operation (cos φ = 0.45) EN 60 947-4-1	8 A
C-load switching capacity	-
Fluorescent lighting load AX to EN 60 669-1	10 AX (140 µF)[2]
Minimum switching capacity	100 mA/12 V
DC current switching capacity (ohmic load)	10 A/24 V =
Mechanical lifetime	> 3 x 10^6
Electrical endurance to IEC 60947-4-1: – Rated current AC1 (240V/0.8) – Rated current AC3 (240V/0.45) – Rated current AC5a (240V/0.45)	 100.000 30.000 30.000
Incandescent lamp load at 230 V AC	2500 W
Fluorescent lamps T5/T8: – Uncompensated – Parallel compensated – DUO circuit	 2500 W 1500 W 1500 W
Low-voltage halogen lamps – inductive transformer – electronic transformer	 1200 W 1500 W
Halogen lamps 230 V	2500 W
Dulux lamps (energy-saving lamps): – Uncompensated – Parallel compensated	 1100 W 1100 W
Mercury-vapor lamps: – Uncompensated – Parallel compensated	 2000 W 2000 W
Sodium vapor lamps: – Uncompensated – Parallel compensated	 2000 W 2000 W
Max. peak inrush current Ip (150 µs) Max. peak inrush current Ip (250 µs) Max. peak inrush current Ip (600 µs)	400A 320A 200A
Number of electronic ballasts (T5/T8, single element)[1]: 18 W (ABB EVG 1 x 18 CF) 24 W (ABB EVG 1 x 24 CY) 36 W (ABB EVG 1 x 36 CF) 58 W (ABB EVG 1 x 58 CF) 80 W (Helvar EL 1 x 80 SC)	 23 EBUs 23 EBUs 14 EBUs 11 EBUs 10 EBUs

[1] For multiple element lamps or other types the number of electronic ballasts must be determined using the peak inrush current of the ballasts.

[2] The maximum inrush current peak may not be exceeded.

ETS parameters and communication objects

1. Communication objects, operating mode *Switch Actuator*

1.1 Communication objects, *General*

Number	Object Function	Name	Length	C	R	W	T	U
0	In Operation	General	1 bit	C	R	-	T	-
1	Safety Priority 1	General	1 bit	C	-	W	-	U
2	Safety Priority 2	General	1 bit	C	-	W	-	U
3	Safety Priority 3	General	1 bit	C	-	W	-	U

No.	Function	Object name	Data type	Flags
0	**In Operation**	**General**	**1 bit** **DPT 1.002**	**C, R, T**
To regularly monitor the presence of the Switch Actuator on the KNX bus, a monitoring telegram can be sent cyclically via the bus. This communication object is always enabled. Telegram value: 1 = system in operation 0 = send inactive				
1	**Safety Priority 1**	**General**	**1 bit** **DPT 1.005**	**C, W, U**
This communication object is enabled if in the General parameter window, parameter *Function Safety Priority 1* is set to *enabled by object value "0" or enabled by object value "1"*. The Switch Actuator can receive a 1 bit telegram via this communication object, which another KNX device, e.g. diagnostics module or wind sensor, sends cyclically. On receipt of the telegram, the communication capability of the bus or the sensor (signaling device) can be monitored. If the Switch Actuator does not receive a telegram on the communication object *Safety Priority 1* within a certain time (value can be parameterized), a fault is assumed and a response, as parameterized in parameter window *A: Safety*, is implemented. The Switch Actuator output goes into a safety state and does not process any telegrams. Only after communication object *Safety Priority 1* receives a 1 or 0 again (depending on the parameterization) will incoming telegrams be processed again and the contact position changed. The monitoring period can be adjusted in the parameter *Monitoring time* in seconds in the A: *General* parameter window. Safety Priority 1 is also triggered if a telegram with the parameterizable trigger value is received. With the exception of the reaction on bus voltage failure and recovery, the *Safety Priority 1* function takes highest priority in the Switch Actuator.				
2	**Safety Priority 2**	**General**	**1 bit** **DPT 1.005**	**C, W, U**
See communication object 1				
3	**Safety Priority 3**	**General**	**1 bit** **DPT 1.005**	**C, W, U**
See communication object 1				
4... 9				
Not assigned.				

ETS parameters and communication objects

1.2 Communication objects, *Output A*

Number	Object Function	Name	Length	C	R	W	T	U
10	switch	Output A	1 bit	C	-	W	-	-
11	Permanent ON	Output A	1 bit	C	-	W	-	-
12	Disable time function	Output A	1 bit	C	-	W	-	-
13	Duration of staircase lighting	Output A	2 Byte	C	R	W	-	-
14	warning stair lighting	Output A	1 bit	C	-	-	T	-
14	Forced operation	Output A	1 bit	C	-	W	-	-
15	Call preset 1/2	Output A	1 bit	C	-	W	-	-
16	Set preset 1/2	Output A	1 bit	C	-	W	-	-
17	8 bit scene	Output A	1 Byte	C	-	W	-	-
18	Logical connection 1	Output A	1 bit	C	-	W	-	-
19	Logical connection 2	Output A	1 bit	C	-	W	-	-
20	Forced Positioning	Output A	1 bit	C	-	W	-	-
21	Threshold input	Output A	1 Byte	C	-	W	-	-
22	Change Threshold value 1	Output A	1 Byte	C	-	W	-	-
29	Status Switch	Output A	1 bit	C	R	-	T	-

No.	Function	Object name	Data type	Flags
10	**Switch**	**Output A**	**1 Bit** **DPT 1.001**	**C, W**

This communication object is used for switching the output ON/OFF.
The device receives a switch telegram via the switch object.

N/O:
Telegram value: 1 = switch ON
0 = switch OFF

N/C:
Telegram value: 1 = switch ON
0 = switch OFF

Please note

With logical connections or forced operations, modifying communication object ***Switch*** does not necessarily result in a changed contact position.

The Switch Actuator does not monitor manual actuation electrically, and therefore cannot react discretely to a manual operation.

From a power engineering point of view, the relay is only actuated with a switching pulse if the last known relay position set by the bus has changed. As a consequence, after a one-off manual switching operation, a switch telegram received via the bus triggers no contact changeover because the switch actuator assumes that no changeover has taken place and that the correct contact position is still set.

An exception to this situation is after bus voltage failure and recovery. In both cases, the relay position is recalculated based on the parameterization and set independently of the contact position.

ETS parameters and communication objects

No.	Function	Object name	Data type	Flags
11	**Permanent ON**	**Output A**	**1 Bit DPT 1.001**	**C, W**
This communication object is enabled if the yes option is selected for parameter ***Enable time functions*** in the ***A: Function*** parameter window. The output can be forcibly switched on with this communication object. If communication object ***Permanent ON*** is assigned the value 1, the output is switched on irrespective of the value of communication object ***Switch*** and remains switched on until ***Permanent ON*** has the value 0. After ending the permanent ON state, the state of ***Switch*** is used. ***Permanent ON*** only switches ON and “masks” the other functions. This means that the other functions, e.g. Staircase lighting, continue to run in the background but do not initiate a switching action. When ***permanent ON*** ends, the contact position which would result without the ***permanent ON*** function becomes active. For the Staircase lighting function, the response after ***permanent ON*** can be parameterized in **Parameter window A: Time**. This communication object can be used, for example, to allow service or maintenance and cleaning personnel to initiate a permanent ON. The device receives a switch telegram via the switch object. ***Permanent ON*** becomes inactive after a download or bus voltage recovery. Telegram value: 1 = activates Permanent ON mode 0 = deactivates permanent ON mode				
12	**Disable time function**	**Output A**	**1 bit DPT 1.003**	**C, W**
This communication object is enabled if the yes option is selected for parameter ***Enable time functions*** in the ***A: Function*** parameter window. ***In parameter window A: Function, after bus voltage recovery you can set the parameter Value for object "Disable time function" on bus voltage recovery.*** If the Time function is disabled, the output can only be switched on or off; the functions ***Staircase lighting, Delay and Flashing*** are not triggered. Telegram value: 1 = time function disabled 0 = time function enabled The contact position at the time of disabling and enabling is retained and will only be changed with the next switch telegram to communication object ***Switch***.				
13	**Duration of staircase lighting**	**Output A**	**2 byte DPT 7.005**	**C, R, W**
This communication object is enabled if the option yes has been selected for parameter ***Duration of staircase lighting can be changed by object*** in parameter window ***A: Time***. The duration of staircase lighting is set here. The time is entered in seconds. After bus voltage recovery, the communication object value is set by the parameterized value, and the value set via the bus is overwritten.				
14	**Warning stair lighting**	**Output A**	**1 bit DPT 1.005**	**C, T**
This communication object is enabled if the Staircase lighting function is selected in parameter window ***A: Time*** and if ***via object or via object and switching ON/OFF*** have been selected in parameter ***Warning before end of staircase lighting***.				
15	**Call preset 1/2**	**Output A**	**1 bit DPT 1.022**	**C, W,**
This communication object recalls a stored contact position. Through a recall of Preset 1/2 with the corresponding parameterization, you can restore the contact position before the recall of Preset 2 or reset it to the parameterized value before Preset 2. Telegram value: 0 = Recalls the parameterized value (contact position) of Preset 1. 1 = Recalls the parameterized value (contact position) of Preset 2.				
16	**Set preset 1/2**	**Output A**	**1 bit DPT 1.022**	**C, W**
This communication object is enabled if the yes option is selected for parameter ***Enable function "presets"*** in the ***A: Function*** parameter window. Using this communication object, the current contact position can be stored as the new preset value. Telegram value: 0 = Stores the current contact position as Preset 1. 1 = Stores the current contact position as Preset 2.				

ETS parameters and communication objects

No.	Function	Object name	Data type	Flags
17	**8 bit scene**	**Output A**	**1 byte DPT 18.001**	**C, W**

This communication object is enabled if the *yes* option is selected for parameter *Enable function "scene (8 bit)"* in the *A: Function* parameter window.
Using this 8 bit communication object, a scene telegram can be sent using a coded telegram. The telegram contains the number of the scene concerned as well as the information on whether the scene is to be recalled or if the current contact position is to be assigned to the scene.

Telegram format (1 byte): MXSSSSSS
(MSB) (LSB)
M: 0 – Recalls the scene
1 – Stores the scene (if allowed)
X: Not used
S: Scene number (1-64: 00000000 … 00111111)

KNX 1 byte telegram value		Meaning
Decimal	Hexadecimal	
00 or 64	00h or 40h	Recall scene 1
01 or 65	01h or 41h	Recall scene 2
02 or 66	02h or 42h	Recall scene 3
…	…	…
63 or 127	3Fh or 7Fh	Recall scene 64
128 or 192	80h or B0h	Store scene 1
129 or 193	81h or B1h	Store scene 2
130 or 194	82h or B2h	Store scene 3
…	…	…
191 or 255	AFh or FFh	Store scene 64

No.	Function	Object name	Data type	Flags
18	**Logical connection 1**	**Output A**	**1 bit DPT 1.002**	**C, W**

This communication object is enabled if the yes option is selected for parameter *Enable function "logic"* in parameter window A: *Function.*
Using this communication object, the output of the first of two logic objects can be assigned. The logical connection is defined in the parameter window A: *Logic*.
Initially this links the switch object logically with communication object *Logical connection 1*. The result of this is then linked with communication object *Logical connection 2*.

Please note
The values of communication objects *Logical connection 1/2* are stored on bus voltage failure. The values are set again after bus voltage recovery
If values are not assigned for the communication objects *Logical Connection 1/2*, they will be deactivated.
On reset via the bus, the values of communication objects Logical Connection 1/2 remain unchanged.

No.	Function	Object name	Data type	Flags
19	**Logical connection 2**	**Output A**	**1 bit DPT 1.002**	**C, W**

See communication object 18.

No.	Function	Object name	Data type	Flags
20	**Forced operation**	**Output A**	**1 bit DPT 1.003**	**C, W**

This communication object is enabled if in parameter window A: *Function* the yes option has been selected for parameter *Enable functions "priority and safety operation"* and *1 bit object* is selected for parameter *Contact position if forced operation*.

If the communication object receives the value 1, the output is forcibly set to the parameterized contact position, which has been set in the *A: Safety* parameter window. The forced positioning of the contact remains until forced operation is ended when communication object *Forced operation* receives a 0.

Please note that the function *Safety Priority 1* and a bus failure have a higher priority on the contact position.

ETS parameters and communication objects

No.	Function	Object name	Data type	Flags
20	**Forced Positioning**	**Output A**	**2 bit DPT 2.001**	**C, W**
This communication object is enabled if in parameter window *A: Function* the *yes* option has been selected for parameter *Enable functions* "*priority and safety operation*" and *2 bit object* is selected for parameter *Contact position if forced operation*. The output can be forcibly operated via this communication object (e.g. by a higher-level control). The communication object value directly defines the forced position of the contact: 0 or 1 = The output is not forcibly operated. 2 = The output is forcibly switched off. 3 = The output is forcibly switched on. At the end of the forced operation, a check is performed to see if one of the three *Safety Priority x* functions (x = 1, 2 and 3) is active. If necessary, the contact position is set by the active safety priorities. If no *Safety Priority x* is active, the parameter used is the one set in parameter window A: *Safety*, for parameter *Reaction when forced operation and all Safety Priority x end*. Please note that the function *Safety Priority 1* and a bus failure have a higher priority on the contact position.				
21	**Threshold input**	**Output A**	**1 byte 2 byte DPT 5.010 DPT 7.001**	**C, W**
This communication object is enabled if the yes option is selected for parameter *Enable function* "*threshold*" in the *A: Function* parameter window. Depending on the selection made in parameter window A: *Threshold*, a 1 byte (integer value) or 2 byte (counter value) communication object is enabled. If the threshold value parameterized in window A: *Threshold* is overshot, a switching action can be performed.				
22	**Change Threshold value 1**	**Output A**	**1 byte 2 byte) DPT 5.010 DPT 7.001**	**C, W**
This communication object is enabled if the yes option has been selected for parameter *Change Threshold 1 over bus* in parameter window A: *Threshold*. Depending on the selection made in parameter window A: *Threshold*, a 1 byte (integer value) or 2 byte (counter value) communication object is enabled. If the communication object *Change Threshold value 1* is enabled, the threshold value can be changed via the bus.				
23... 28				
Not assigned.				
29	**Status Switch**	**Output A**	**1 bit DPT 1.001**	**C, R, T**
This communication object is enabled if the options *only after changing* or *always* are selected for parameter *Status response of switching state Object* "*Status Switch*" response in parameter window A: *General*. The communication object value directly indicates the current contact position of the switching relay. The status value can be inverted. Telegram value: 1 = relay ON or OFF depending on the parameterization 0 = relay OFF or ON depending on the parameterization				

ETS parameters and communication objects

2. Communications objects, operating mode *Heating Actuator*

2.1 Communication objects, *General*

Number	Object Function	Name	Length	C	R	W	T	U
0	In Operation	General	1 bit	C	R	-	T	-
1	Safety Priority 1	General	1 bit	C	-	W	-	U
2	Safety Priority 2	General	1 bit	C	-	W	-	U
3	Safety Priority 3	General	1 bit	C	-	W	-	U

No.	Function	Object name	Data type	Flags
0	**In Operation**	**General**	**1 bit DPT 1.002**	**C, R, T**
To regularly monitor the presence of the Switch Actuator on the KNX bus a monitoring telegram can be sent cyclically via the bus. This communication object is always enabled. Telegram value: 1 = system in operation 0 = send inactive				
1	**Safety Priority 1**	**General**	**1 bit DPT 1.005**	**C, W, U**
This communication object is enabled if the option *enabled by object value "0" or enabled by object value "1"* is selected for parameter *Function Safety Priority 1* in the *General* parameter window. The Switch Actuator can receive a 1 bit telegram via this communication object, which another KNX device, e.g. diagnostics module or wind sensor, sends cyclically. On receipt of the telegram, the communication capability of the bus or the sensor (signaling device) can be monitored. If the Switch Actuator does not receive a telegram on the communication object *Safety Priority 1* within a certain time (value can be parameterized), a fault is assumed and a response, as parameterized in parameter window *A: Safety*, is implemented. The output of the Switch Actuator goes into a safety state and does not process any telegrams. Only after communication object *Safety Priority 1* receives a 1 or 0 again (depending on the parameterization) will incoming telegrams be processed again and the contact position changed. The monitoring period can be adjusted in the parameter *Monitoring time* in seconds. Safety Priority 1 is also triggered if a telegram with the parameterizable trigger value is received.				
2	**Safety Priority 2**	**General**	**1 bit DPT 1.005**	**C, W, U**
See communication object 1				
3	**Safety Priority 3**	**General**	**1 bit DPT 1.005**	**C, W, U**
See communication object 1				
4... 9				
Not assigned.				

2.2 Communication objects, *Output A*

Parameter options for outputs A…X are described in **Parameter window *A: General.***

Number	Object Function	Name	Length	C	R	W	T	U	D
10	Control value (PWM)	Output A	1 Byte	C	-	W	-	-	
11	Trigger valve purge	Output A	1 bit	C	-	W	-	-	
12	Status valve purge	Output A	1 bit	C	-	-	T	-	
13	RTR fault	Output A	1 bit	C	-	-	T	-	
14	Forced operation	Output A	1 bit	C	-	W	-	-	
15	Status heating	Output A	1 bit	C	-	-	T	-	
29	Status Switch	Output A	1 bit	C	R	-	T	-	

No.	Function	Object name	Data type	Flags
10	**Switch**	**Output A**	**1 Bit** **DPT 1.001**	**C, W**

This communication object is visible if control of the heating actuator is implemented via a 1 bit communication object. The heating valve is controlled directly using it.
The device receives a switch telegram via the Switch object.

N/O:
Telegram value: 1 = valve open
0 = valve closed

N/C:
Telegram value: 1 = valve closed
0 = valve open

No.	Function	Object name	Data type	Flags
10	**Control value (PWM)**	**Output A**	**1 byte** **DPT 5.010**	**C, W**

This communication object is visible if the control of the heating actuator is implemented via a 1 byte communication object, e.g. within a continuous control. The communication object value [0…255] is determined by the variable mark-to-space ratio of the valve.

Telegram value: 1 = valve closed
0 = valve open

No.	Function	Object name	Data type	Flags
11	**Trigger valve purge**	**Output A**	**1 bit** **DPT 1.001**	**C, W**

This communication object is enabled if the *yes* option is selected for parameter *Enable function "valve purge"* in the *A: Function* parameter window.

The valve purge is triggered using this communication object.

Telegram value 0 = end valve purge, valve will be closed
1 = start valve purge, valve will be opened

No.	Function	Object name	Data type	Flags
12	**Status valve purge**	**Output A**	**1 bit** **DPT 1.002**	**C, T**

This communication object is enabled if the *yes* option is selected for parameter *Enable function "valve purge"* in the *A: Function* parameter window.

The status of the valve purge is visible via this communication object.

Telegram value: 0 = valve purge not active
1 = valve purge active

Please note
The status is displayed as soon as a purge has been activated. The status remains active even when the purge has been interrupted, e.g. by a priority.

ETS parameters and communication objects

No.	Function	Object name	Data type	Flags
13	**RTR fault**	**Output A**	**1 bit DPT 1.005**	**C, T**
This communication object is enabled if the *yes* option is selected for parameter *Enable monitoring of the controller* in the *A: Function* parameter window. Using this communication object, communication objects *Switch* and *Control value (PWM)* can be cyclically monitored. If the room thermostat (RTR) values are missing, the device assumes that the thermostat is malfunctioning and signals a fault. Telegram value: 1 = fault 0 = no fault				
14	**Forced operation**	**Output A**	**1 bit DPT 1.003**	**C, W**
This communication object is enabled if the yes option is selected for parameter *Enable function "forced operation"* in the *A: Function* parameter window. If the communication object receives the value 1, the valve is forcibly moved to the parameterized position set in parameter window A: *Forced Operation*. The forced positioning of the valve continues until forced operation is ended, which happens when a telegram with value 0 is received via communication object *Forced operation*. Please note that the *Forced operation* function and a bus voltage failure have a higher priority on the contact position.				
15	**Status heating**	**Output A**	**1 byte DPT 5.010**	**C, W**
This communication object is visible if control of the heating actuator is implemented via a 1 bit communication object, e.g. within a continuous control, and feedback of the control value is parameterized with a 1 byte value. The current 1 byte control value of the output is sent via this communication object.				
15	**Status heating**	**Output A**	**1 bit DPT 1.001**	**C, T**
This communication object is visible if control of the heating actuator is implemented via a 1 bit communication object, e.g. within a continuous control, and feedback of the control value is also parameterized with a 1 bit value. The current 1 bit control value of the output is sent via this communication object when there is a change. With selection of the option 0% = *"0" otherwise "1"*, the following applies: Telegram value: 1 = control value is not equal to 0 % 0 = control value is equal to 0 % Telegram value: 1 = control value is equal to 0 % 0 = control value is not equal to 0 %				
16... 28				
Not assigned.				
29	**Status Switch**	**Output A**	**1 bit DPT 1.001**	**C, R, T**
This communication object is enabled if the options *only after changing or always* are selected for parameter *Status response of switching state Object "Status Switch"* in parameter window A: *General*. The communication object value directly indicates the current contact position of the switching relay. The status value can be inverted. Telegram value: 1 = Relay ON or OFF depending on the parameterization 0 = Relay OFF or ON depending on the parameterization				

3. Parameters

The Switch Actuator is parameterized using Engineering Tool Software (ETS), version ETS2 V1.3 or higher.

In ETS2/ETS3 the application program can be found under ABB/Output/Binary output/Switch xf.

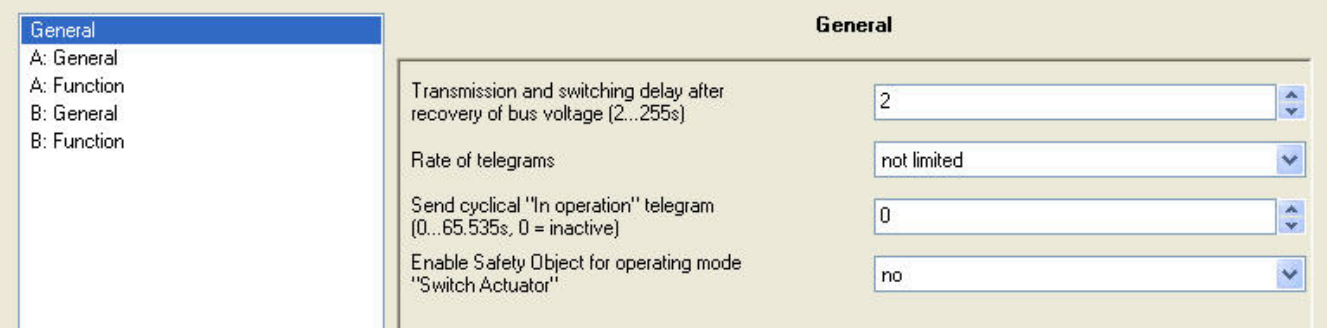
The following sections describe the parameters of the Switch Actuators by their parameter windows. Parameter windows are structured dynamically so that further parameters may be enabled depending on the settings and the function.

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

Options: yes
no

3.1 Parameter window *General*

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



Transmission and switching delay time after recovery of bus voltage [2…255s]

Options: 2…255

During the transmission and switching delay, telegrams are received only. The telegrams are not processed, however, and the outputs remain unchanged. No telegrams are sent via the bus.

After the transmission and switching delay, telegrams are sent and the state of the outputs is set to correspond with the parameterization or the communication object values.

If communication objects are read during the sending and switching delay, e.g. by a visualization system, these read requests are stored, and a response is sent, after the sending and switching delay has been completed.

An initialization time of about two seconds is included in the delay time. The initialization time is the time that the processor requires to be ready to function.

How does the device react on bus voltage recovery?
After bus voltage recovery, the device always waits for the transmission delay time to elapse before sending telegrams via the bus.

Rate of telegrams

Options: not limited
1 Telegram / Second
2 Telegram / Second
3 Telegram / Second
5 Telegram / Second
10 Telegram / Second
20 Telegram / Second

The load on the bus generated by the device can be limited by the telegram rate. This limit relates to all telegrams sent by the device.

• *x* Telegrams / Second*: within a second, x telegrams are sent as quickly as possible via the bus.

Please note
The device counts the number of telegrams sent within a second. As soon as the maximum number of sent telegrams is reached, no further telegrams are sent via KNX until the end of the second. The telegram counter is reset to zero, and sending is allowed again after the second has timed-out. The current communication object value is always sent at the time of transmission.

Example
Maximum number of sent telegrams = 5, 20 telegrams are ready to send. The device immediately sends 5 telegrams. The next 5 telegrams are sent after a maximum of 1 second. From this point, a further 5 telegrams are sent via KNX every second.

x = 1,2,3,5,10 or 20

Send cyclical "In operation" telegram (0...65,535s, 0 = inactive)

Options: 0…65,535

The communication object *In Operation* indicates that the device on the bus is working properly. This cyclic telegram can be monitored by an external device.

Please note
After bus voltage recovery, the communication object sends its value after the set sending and switching delay. To keep the bus load to a minimum, the longest possible transmission time interval should be selected, based on the application.

Enable Safety Object for operating mode "Switch Actuator"

Options: no
yes

- *yes*: Three further parameters appear:

Function Safety Priority 1
Function Safety Priority 2
Function Safety Priority 3

Options: inactive
enabled by object value “0”
enabled by object value “1”

Please note
The functions and setting options for parameters *Function Safety Priority 2* and *Function Safety Priority 3* are the same as those for parameter *Function Safety Priority 1*.

In *Switch Actuator* operating mode there are three *Function Safety Priority x** parameters available. For each priority, you can define your own trigger condition (enabling condition) here. With safety activation, the relevant *Safety Priority x** communication object becomes visible. These communication objects relate to the entire device. However, every output can react differently to the receipt of a telegram. The reaction of the output is parameterized in parameter window *X: Safety* of the respective output.

*x = 1, 2 or 3

- *inactive*: The Safety Priority x function is not used.
- *enabled by object value "0"*: Safety activation is triggered if communication object *Safety Priority x** receives a telegram with the value 0. The following parameter appears.
- *enabled by object value "1"*: Safety activation is triggered if communication object *Safety Priority x* receives a telegram with the value 1 . The following parameter appears:

Control period in seconds (0...65,535s, 0 = inactive)

Options: 0…65,535

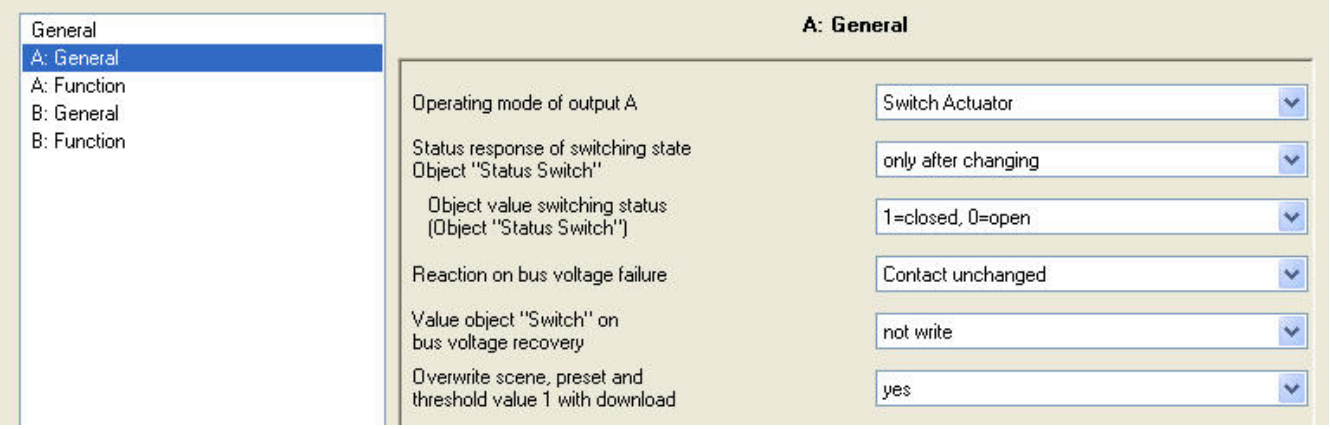
This parameter defines the monitoring period of the *Safety Priority x* function. If during this time communication object *Safety Priority x** receives a telegram with the triggering condition defined in parameter *Function Safety Priority x*, it will be triggered. Should the communication object *Safety Priority x** receive a telegram that does not fulfill the trigger conditions, the control period is reset and restarted.

- *0*: No monitoring is taking place. However, the *Safety Priority x* is triggered if communication object *Safety Priority x* receives a telegram with the triggering condition as defined in parameter *Function Safety Priority x.*

*x = 1, 2 or 3

Please note
The monitoring period in the Switch Actuator should be at least twice as long as the cyclical transmission time of the sensor, so that the absence of an individual signal, e.g. due to a high bus load, does not immediately trigger an alarm.

3.2 Parameter window *A: General*



Operating mode of output A

Options: Switch Actuator
Heating Actuator

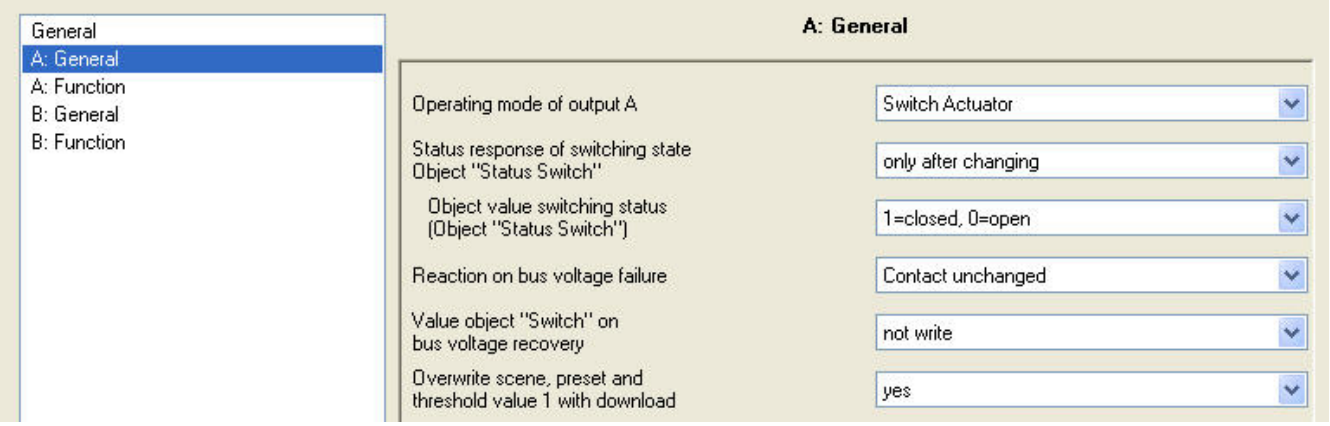
This parameter defines the operating mode of the output. As the parameters and possible functions as well as other parameter windows are different for each operating mode, we will describe them separately here for each mode:

- Operating mode *Switch Actuator*
- Operating mode *Heating Actuator*

3.3 Operating mode Switch Actuator

The *Switch Actuator* operating mode is used for normal switching, e.g. of lighting. The output is controlled via various logic, time and safety functions. The input signal for the function is received via communication object *Switch*. The Switch Actuator carries out the function independently and controls the corresponding relay.

The comprehensive range of additional functions available are described in this section.



Status response of switching state Object "Status Switch"

Options: no
only after changing
always

This parameter can enable the communication object *Status Switch*. This contains the current switch state i.e. contact position.

- *no*: The contact position is updated but the status is not actively sent via the bus.
- *only after changing*: if the contact position changes the status is actively sent via the bus by communication object *Status Switch*.
- *always:* The status of the contact position is always actively sent via the bus via communication object *Status Switch*, even when a change in status has not occurred. Transmission is triggered as soon as the communication objects *Switch, Threshold input* or *Permanent ON* receive a telegram. Even a scene or a preset recall triggers transmission of the switch state. The status is also sent if logic objects *Logical connection 1* or *Logical connection 2* receive a telegram. However, status is not repeated or resent due to a safety change (forced operation, priority) and this applies to all types. This can have a major effect on the bus load on a Switch Actuator with multiple outputs.

Please note
After parameterization changes or subsequently switching off the status object, the existing assignment of group addresses to the *Switch* communication object is lost and needs to be re-allocated.

The status value to be sent is defined using the parameter *Object value switching status (Object "Status Switch").*

Please note
The contact position is determined by a sequence of priorities and logical connections. The contact position can only be correctly evaluated if the switching actions occur via KNX. The 01521 cannot differentiate between manual switching and a cable break or device fault.

Object value switching status
(Object "Status Switch")

Options: 1=closed, 0=open
0=closed, 1=open

- *1=closed, 0=open*: In communication object *Status Switch*, the value 1 is written for a closed contact, and the value 0 for an open contact.
- *0=closed, 1=open*: In communication object *Status Switch* the value 0 is written for a closed contact, and the value 1 for an open contact.

Reaction on bus voltage failure

Options: Contact open
Contact closed
Contact unchanged

The output can adopt a defined state on bus voltage failure with this parameter.

Value object "Switch" on
bus voltage recovery

Options: not write
to write with 0
to write with 1

With this parameter, the output can be influenced after bus voltage recovery. As standard the communication object *Switch* receives the value 0.

- *not write*: After bus voltage recovery, communication object *Switch* retains the value 0. The contact position is not re-determined.

Please note
Before the very first download (device fresh from the factory), the value before bus voltage failure is not defined. For this reason, the communication object *Switch* is written with 0 and the contact is open. If opening of the contact at bus voltage recovery before the first download (installation phase) is not desired, this can be prevented by temporarily removing the KNX voltage.

- *to write with 0*: The communication object *Switch* is written with a 0 on bus voltage recovery. The contact position is redefined and set based on the set device parameterization.
- *to write with 1*: The communication object *Switch* is written with a 1 on bus voltage recovery. The contact position is redefined and set based on the set device parameterization.

Please note
Provided that no manual switching action has occurred, the communication object *Status Switch* indicates the correct status of the contact position independently of the value of communication object *Switch*. The Switch Actuator draws the energy for switching the contact from the bus. Depending on the type of Switch Actuator, about 10 to 30 seconds is required after bus voltage is applied before sufficient energy is available to switch all contacts simultaneously. Depending on the set delay time in the parameter *Transmission and switching delay after recovery of bus voltage* in the *General* parameter window, the individual outputs assume the desired contact position only after this delay has elapsed. If a shorter delay time is set, the Switch Actuator will only switch the first contact when sufficient energy is stored in the Switch Actuator to immediately bring all outputs safely to the required position should another bus voltage failure occur.

Overwrite scene, preset and
threshold value 1 with download

Options: no
yes

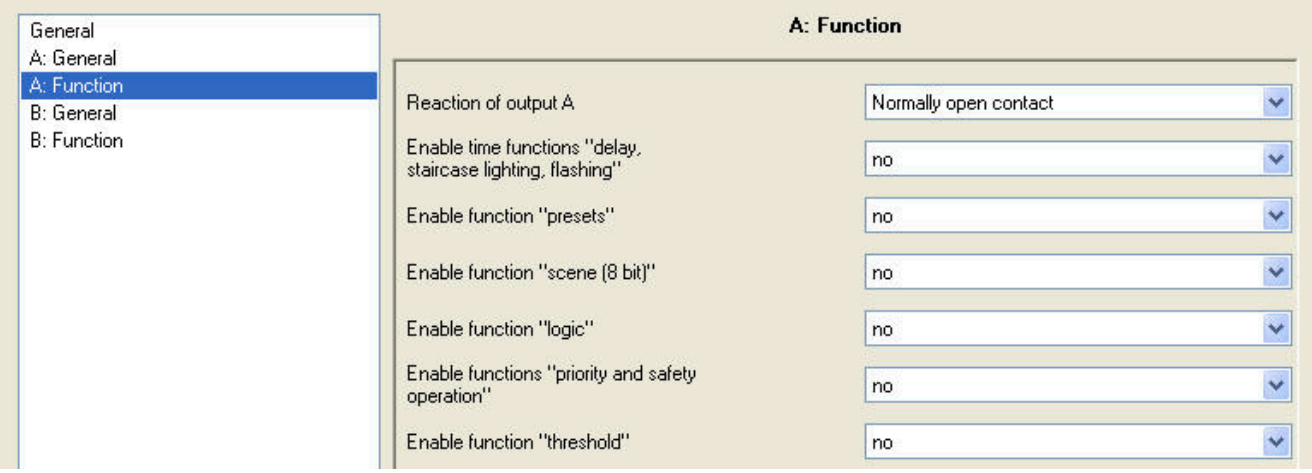
This parameter determines whether the preset and scene values and threshold value 1 of the output modified via the bus are overwritten in the Switch Actuator by the values set in parameter windows *A: Scene, A: Preset* or *A: Threshold*.

- *yes*: The values set in Parameter windows *A: Scene, A: Preset* or *A: Threshold* are transferred to the Switch Actuator when a download occurs, overwriting the existing values. Reprogramming of these values via the bus is still possible at any time.
- *no*: The values set in Parameter windows *A: Scene, A: Preset* or *A: Threshold* value are not transferred to the Switch Actuator when a download occurs. The values can only be changed and set via the bus.

For further information see: **Parameter window A: Scene, Parameter window A: Preset and Parameter window A: Threshold.**

3.3.1 Parameter window *A: Function*

In this parameter window you determine the response (reaction) of the output and can enable different functions, which makes further parameter windows available.



Reaction of output A

Options: Normally closed contact
Normally open contact

This parameter determines the reaction of the output as a normally open or normally closed contact.

- *Normally closed contact*: An ON telegram (1) opens the contact and an OFF telegram (0) closes it.
- *Normally open contact*: An ON telegram (1) closes the contact and an OFF telegram (0) opens it.

Enable time functions "delay, staircase lighting, flashing"

Options: no
yes

- *no*: Parameter window *A: Time* is not enabled for output A.
- *yes*: Parameter window *A: Time* for output A, and communication object *Disable time function*, are enabled.

Using this communication object, the Time function can be enabled (telegram with value 0) or disabled (telegram with value 1) via the bus.

As long as the Time function is disabled, the output can be switched on and off only without delay via the communication object *Switch*.

Please note
The Time function is only disabled when the ongoing Time function has ended. While the output is disabled, the higher switching priorities, e.g. Safety functions, are undertaken. Enabling the Time function enables the communication object *Permanent ON*. The output is switched on via this communication object. It remains switched on until communication object *Permanent ON* receives a telegram with the value 0. Functions continue to operate in the background during the Permanent ON phase. The contact position at the end of the Permanent ON phase results from the functions operating in the background.

With the selection *yes* a new parameter appears:

Value object "Disable time function" after bus voltage recovery

Options: "1", disable time functions
"0", enable time functions

- *"1", disable time functions*: The Time function is disabled by a telegram with the value 1.

Please note
They can only be re-enabled via the communication object *Disable time function*.

- *0, enable time functions*: The Time function is enabled by a telegram with the value 0.

Please note
Should the staircase light on the 01521 be disabled while the Time function is running, the time sequence stops and the light remains ON until switched off by an OFF telegram.

How does the staircase lighting react on bus voltage failure?

Reaction in the event of bus voltage failure is specified by the parameter *Reaction on bus voltage failure* in parameter window *A: General*.

How does the staircase lighting react on bus voltage recovery?

Reaction on bus voltage recovery is defined by two conditions:

A By the communication object *Disable time function*. If staircase lighting is disabled after bus voltage recovery, it can only be switched on or off via the communication object *Switch*.

B By parameterization of the communication object *Switch*. Whether the light is switched on or off on bus voltage recovery depends on the settings of *Switch*.

Enable function "presets"

Options: no
yes

- *no*: Parameter window *A: Preset* is not enabled for output A.
- *yes*: Parameter window *A: Preset* is enabled for output A.

Enable function "scene (8 bit)"

Options: no
yes

- *no*: Parameter window *A: Scene* is not enabled for output A.
- *yes*: Parameter window *A: Scene* is enabled for output A.

Enable function "logic"

Options: no
yes

- *no*: Parameter window *A: Logic* is not enabled for output A.
- *yes*: Parameter window *A: Logic* is enabled for output A.

Enable functions "priority and safety operation"

Options: no
yes

- *no*: Parameter window *A: Safety* is not enabled for output A.
- *yes*: Parameter window *A: Safety* is enabled for output A. This parameter window is used for parameterizing Safety Priorities 1, 2, 3 and Forced operation.

Enable function "threshold"

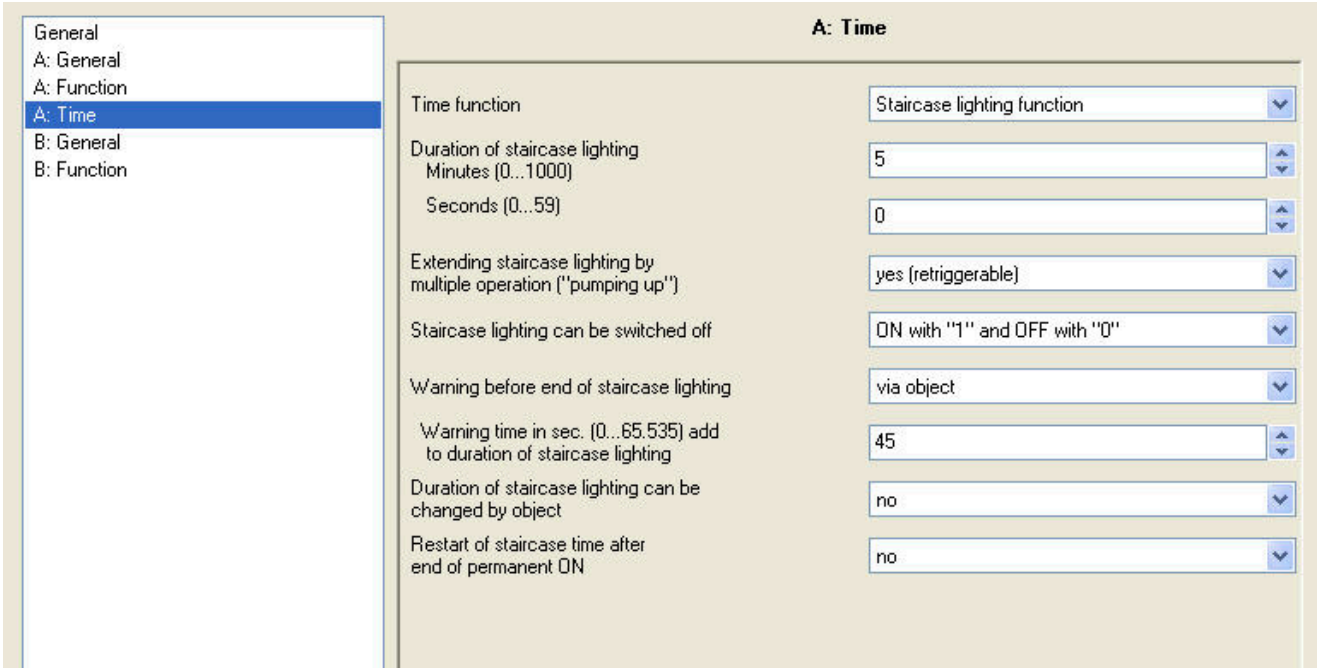
Options: no
yes

- *no*: Parameter window *A: Threshold* is not enabled for output A.
- *yes*: Parameter window *A: Threshold* is enabled for output A.

3.3.2 Parameter window *A: Time*

All settings for the *Time* function are undertaken in this parameter window: *ON/OFF delay, Staircase lighting function* and *Flashing*.

This parameter window is visible if the *Enable time function* parameter has been enabled in **Parameter window *A: Function***.



Time function

Options: Staircase lighting function
ON/OFF delay
Flashing

This parameter defines the type of *Time* function for each output.

- *Staircase lighting function*: The value that switches the staircase lighting on and off can be parameterized. The staircase lighting time starts when the function is switched on. It is switched off immediately after the staircase lighting time ends.

Please note
Switch on means the closing of a normally open contact or opening of a normally closed contact. The staircase lighting function can also be recalled via communication object *Switch, Logical Connection x* (x = 1, 2) or via a light scene recall. The staircase lighting function can be disabled by a telegram to the communication object *Disable time function*. Parameterization is undertaken in parameter window **Parameter window *A: Function***, with the parameter *Value object "Disable time function" on bus voltage recovery*.

- *ON/OFF delay*: The output can be switched on or off with a delay via this function.
- *Flashing*: The output starts to flash as soon as communication object *Switch* receives the parameterized value. The flashing period can be adjusted via the duration set for ON or OFF. At the start of the flashing period, the output is switched on with a normally open contact and off with a normally closed contact. When communication object *Switch* receives a new value, the flashing period will restart. Relay state is parameterizable after flashing. Flashing can be inverted when the output is used as a normally closed contact. The communication object *Status Switch* indicates the current relay state during flashing.

Please note
The Flashing function can be disabled by a telegram to communication object *Disable time function*. Parameterization is undertaken in parameter window **Parameter window *A: Function***, with the parameter Value object "*Disable time function" on bus voltage recovery.*

The following parameters appear when Staircase lighting is selected:

Duration of staircase lighting Minutes

Options: 0…5…1,000

Seconds

Options: 0…59

The staircase lighting time defines how long the staircase lighting is switched on after an ON telegram. The input is made in minutes and seconds. The staircase lighting time may extend depending on the value set in the parameter *Warning before end of staircase lighting.*

Extending staircase lighting by multiple operation ("pumping up")

Options: no (not retriggerable)
yes (retriggerable)
up to max. 2 x staircase lighting time
up to max. 3 x staircase lighting time
up to max. 4 x staircase lighting time
up to max. 5 x staircase lighting time

If a further ON telegram is received during the staircase lighting time sequence, the remaining staircase lighting time can be extended by a further period. This is possible by repeated operation of the button ("pumping up") until the maximum parameterized number of retriggering operations is reached. The maximum time can be set to 1, 2, 3, 4 or 5 times the staircase lighting time.

Let's say the staircase lighting time has been extended by "pumping up" to the maximum time. If some of the time has already timed out, the staircase lighting time can be re-extended to the maximum time by "pumping up".

However the parameterized maximum time may not be exceeded.

- *no (not retriggerable)*: The receipt of an ON telegram is ignored. The staircase lighting time continues without modification to completion.
- *yes (retriggerable):* New ON telegrams reset the staircase lighting time and starts to count again. This process can be repeated as often as desired using this selection.
- *up to max. 2/3/4/5 x staircase lighting time*: New ON telegrams extend the staircase lighting time by 2/3/4/5 times the staircase lighting time.

Staircase lighting can be switched off

Options: ON with "1" and OFF with "0"
ON with "1" no action with "0"
ON with "0" or "1", switch OFF not possible

This parameter defines the telegram value used for switching the staircase lighting on and off prematurely.

- *ON with "0" or "1" switch OFF not possible*: The staircase lighting function is switched on independently of the value of the incoming telegram. Premature switch off is not possible.

Please note
After enabling the Time function via communication object ***Disable time function***, the contact position of the enabled output remains unchanged. The Time function is only triggered after the next switching telegram. However this means that if set to the option ***ON with "1" no action with "0"***, the output is simultaneously switched on when enabled. Switch off via the bus is thus not possible. Only after e.g. the staircase lighting function is started does the output switch off, after the staircase lighting time has elapsed.

Warning before end of staircase lighting

Options: no
via object
via quick switching OFF/ON
via object and switching OFF/ON

Before the staircase lighting time elapse, the user can be informed of the imminent lighting switch of by a warning. If the warning time is not 0, the staircase lighting time is extended by the warning time. The warning time is not modified by "pumping up".

- *no*: No warning is given, the staircase lighting switches off immediately after the staircase lighting time elapses. If the staircase lighting is ended prematurely, e.g. by a switching telegram, no warning is given.

There are two types of warning:

1. The communication object ***warning stair lighting*** is set to the value 1 when the warning time starts, and remains until it has elapsed. The communication object can be used, for example, to switch a warning light.
2. Switching the output (briefly OFF and ON again).

Both options can be used together or separately. The time duration between the OFF and ON process is about 1 second. If the warning time is not 0, the staircase lighting time is extended by the warning time.

Please note
When dealing with the warning time it is important to remember that the 01521 draws its switching energy exclusively from the KNX. Furthermore, the 01521 collects enough energy before the first switch to ensure that all outputs can safely go to the required position should the bus voltage fail. Under these conditions, only a certain number of switching actions are possible per minute.

Warning time in sec. [0...65,535] add to duration of staircase lighting

Options: 0…45…65,535

This parameter is visible if you have set a warning before the staircase lighting time ends. The warning time must be entered in seconds. The staircase lighting time is extended by the warning time. The warning is triggered at the start of the warning time.

The warning time is not modified by "pumping up".

Duration of staircase lighting can be changed by object "Staircase lighting time"

Options: no
yes

- *yes*: A 2 byte *Duration of stair lighting* communication object is enabled. This can be used to change the staircase lighting time via the bus. The value defines the staircase lighting time in seconds. The staircase lighting function that has already started is completed first. A change is applied to the staircase lighting time next time it is recalled.
- *no*: The staircase lighting time cannot be changed via the bus.

Please note
On bus voltage failure, the staircase lighting time changed via the bus is lost and must be reset. Until a new value is set, the staircase lighting time set via ETS applies.

How does the staircase lighting react on bus voltage failure?

Reaction in the event of bus voltage failure is specified by the parameter *Reaction on bus voltage failure* in parameter window *A: General*.

How does the staircase lighting react on bus voltage recovery?

Reaction on bus voltage recovery is defined by two conditions.

A By the communication object *Disable time function*. If staircase lighting is disabled after bus voltage recovery, it can only be switched on or off via the communication object *Switch*.

B By the parameterization of the communication object *Switch*. Whether the light is switched on or off on bus voltage recovery depends on the settings of *Switch*.

Restart of staircase time after end of permanent ON

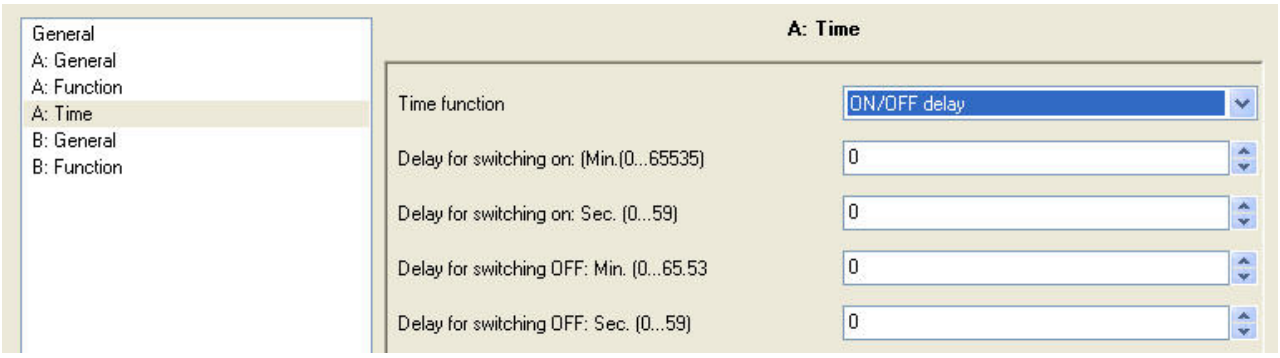
Options: no
yes

- *no*: The lighting switches off if *Permanent ON* is ended.
- *yes*: The lighting remains on and the staircase lighting time restarts.

The function of Permanent ON is controlled via the communication object value *Permanent ON*. If the communication object receives a telegram with the value 1, the output is switched on regardless of the value of the communication object *Switch* and remains switched on until the communication object *Permanent ON* has the value 0.

Please note
Permanent ON only switches ON and "masks" the other functions. This means that the other functions, e.g. Staircase lighting time or "Pumping up", continue to run in the background but do not initiate any action. After *Permanent ON* ends, the contact position which would result without the *Permanent ON* function becomes active.

The following parameters appear with *ON/OFF delay*:



The output can be switched on or off with a delay via this function.

Delay for switching on: Min. [0…65,535]
Delay for switching on: Sec. [0…59]

Options: 0…65,535
0…59

Here you set the time by which an ON telegram is delayed after switch on.

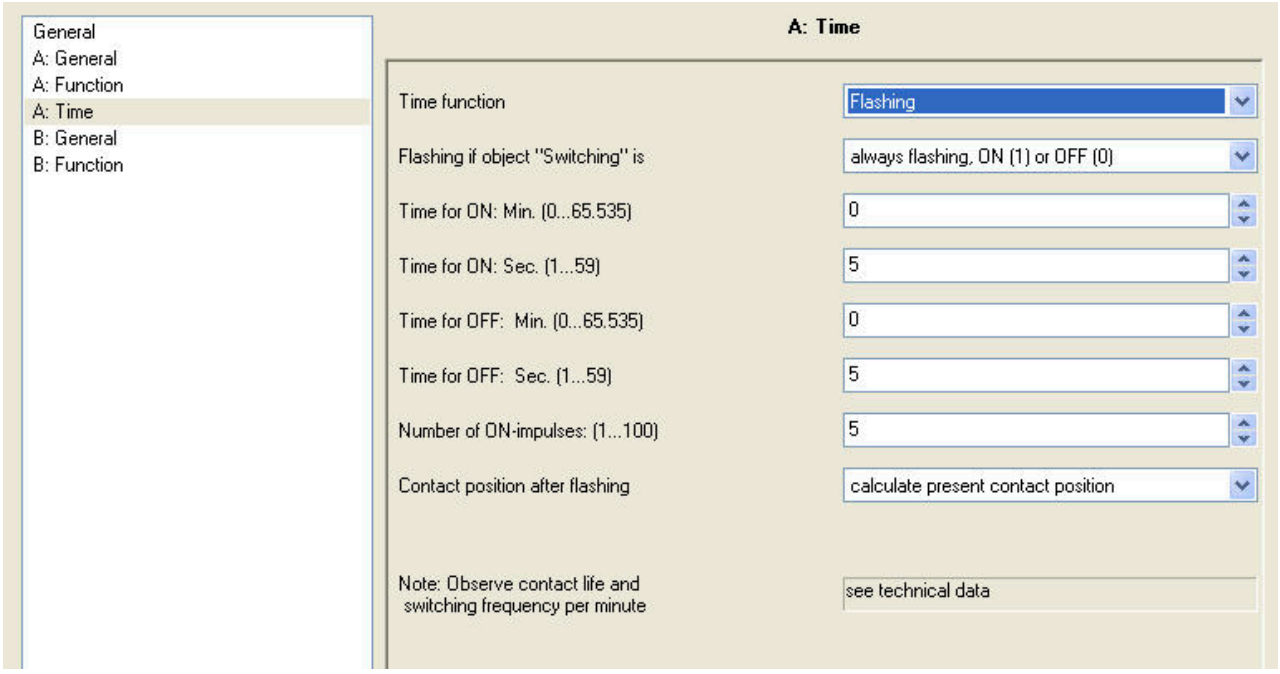
Delay for switching OFF: Min. [0…65,535]
Delay for switching OFF: Sec.. [0…59]

Options: 0…65,535
0…59

Here, you set the amount of time by which switch OFF is delayed after a switch OFF telegram.

ETS parameters and communication objects

The following parameters appear when *Flashing* is selected:



The output starts to flash as soon as communication object *Switch* receives the parameterized value. The flashing period can be adjusted via the parameterized time duration for ON or OFF. At the start of the flashing period, the output is switched on with a normally open contact and off with a normally closed contact. When communication object *Switch* receives a new value, the flashing period will restart. The relay state after flashing can be parameterized. Flashing can be inverted when the output is used as a normally closed contact.

The communication object *Status Switch* indicates the current relay state during flashing.

Please note
Only a certain number of switching actions are possible per minute and Switch Actuator. This means that frequent switching may cause a switching delay. The same applies directly after bus voltage recovery. When the flashing function is selected, the service life of the switching contacts must be considered The Flashing function can be disabled by a telegram to the communication object Disable time function. The parameterization is undertaken in parameter window **Parameter window *A: Function***, with the parameter *Value object "Disable time function" on bus voltage recovery.*

Flashing if object "Switching" is

Options: ON (1)
OFF (0)
always flashing, ON (1) or OFF (0)

Here you set the value of the communication object *Switch* at which the output flashes. Flashing is not retriggerable.

- *ON (1)*: Flashing starts when communication object *Switch* receives a telegram with the value 1. A telegram with the value 0 ends flashing.
- *OFF (0)*: Flashing starts when communication object *Switch* receives a telegram with the value 0. A telegram with the value 1 ends flashing.
- *always flashing, ON (1) or OFF (0)*: A telegram with the value 1 or 0 triggers flashing. Suspension of flashing is not possible in this case.

Time for ON: Min. [0…65,535]
Time for ON: Sec. [0…59]

Options: 0…65,535
1…5…59

Time for ON defines how long the output is switched on during a flashing period. The smallest value is 1 second.

Please note
Only a certain number of switching actions are possible per minute and Switch Actuator. This means that frequent switching may cause a switching delay. The same applies directly after bus voltage recovery.

Time for OFF: Min. [0…65,535]
Time for OFF: Sec. [0…59]

Options: 0…65,535
1…5…59

The time for OFF defines how long the output is switched off during a flashing period. The smallest value is 1 second.

Please note
Only a certain number of switching actions are possible per minute and Switch Actuator. This means that frequent switching may cause a switching delay. The same applies directly after bus voltage recovery.

Number of ON impulses: [1...100]

Options: 1…5…100

This parameter defines the maximum number of pulses. This is useful to prevent flashing causing unnecessary wear of the contacts.

Contact position after flashing

This parameter defines the state that the parameter should assume after flashing.

- *ON*: The output is switched on after flashing.
- *OFF*: The output is switched off after flashing.
- *calculate present contact position*: The output assumes the contact position which it had before flashing commenced.

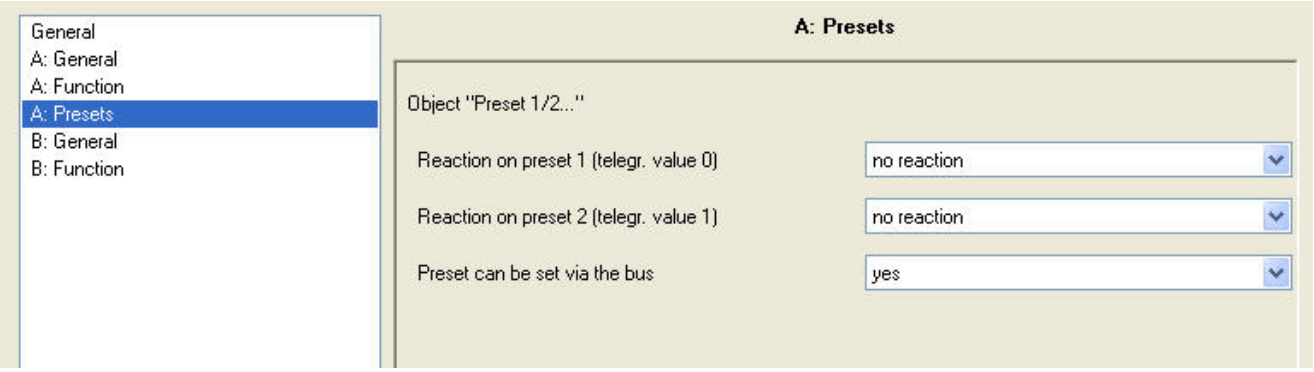
Please note
Observe the contact life span and switching cycles per minute.

Please note
Only a certain number of switching actions are possible per minute and Switch Actuator. This means that frequent switching may cause a switching delay. The same applies directly after bus voltage recovery.

3.3.3 Parameter window *A: Preset*

Preset settings can be made in this parameter window.

This parameter window is visible if *Enable function "presets" has* been enabled in **Parameter window *A: Function*.**



What is a preset?

Presets are used to recall a parameterized switch value, e.g. in order to implement light scenes. In addition, the output value that is currently set can be saved as a new preset value.

The preset values can be set (stored) via the bus. In parameter window *A: General* you define whether the values set in ETS are transferred to the Switch Actuator with a download. This is how the values saved in the actuator are overwritten.

Two presets are available per output. Preset 1 is recalled by a telegram with the value 1, Preset 2 is recalled by a telegram with the value 0. Separate communication objects are available for recalling and for saving/setting a preset.

Preset telegrams continue to be executed when the Staircase lighting function is set. The Staircase lighting function is triggered by a preset recall (ON telegram).

Reaction on preset 1 (telegr. value 0)

Options: no reaction
ON
OFF
Restore old value before preset 2
Restore parameterized value of preset 2

This parameter determines the contact position that the output assumes when preset 1 is recalled, i.e., communication object *Call Preset 1/2* receives a telegram with the value 0.

The following functions can be selected as further selection options:

- *no reaction*: No switching action is undertaken with a preset recall. The preset is ignored. The preset is also ignored on storage via the bus, i.e., no value is saved, the preset remains inactive.
- *restore old value before preset 2*: The current relay contact position is stored when preset 2 is first recalled. This stored value (switch state) is retained until it is set again by the recall of preset 1. The current contact position is stored again next time preset 2 is recalled.

Example
With preset 2, the lighting in a conference room is recalled for a presentation. When the presentation is finished, the lighting is restored via preset 1 to the state it was in previously.

• *restore parameterized value of preset 2*: resets preset 2 to the parameterized value. This can be advisable if preset 2 can be stored via the bus, see below.

Please note
With options restore *old value before preset 2 or restore parameterized value of preset 2*, saving the preset concerned has no effect. The saved value is not recalled, but rather the parameterized function is undertaken.

Reaction on preset 2 (telegr. value 1)

Options: no reaction
ON
OFF

This parameter determines the contact position that the output assumes when preset 2 is recalled, i.e., communication object *Recall Preset 1/2* receives a telegram with the value 1.

At the same time, on the first call up of preset 2, the state of the output is saved so that the value before preset 2 can be restored if the setting is changed accordingly.

Preset can be set via the bus

Options: no
yes

This parameter enables the communication object *Set preset 1/2*. It is thus possible to store the current contact position as the new preset value.

Telegram value 0 saves preset 1, whereas telegram value 1 saves preset 2.

If the option *no reaction, restore old value before preset 2 or restore parameterized value of preset 2* has been selected in parameter *Reaction on preset 1 (telegr. value 0)*, no new communication object value is saved.

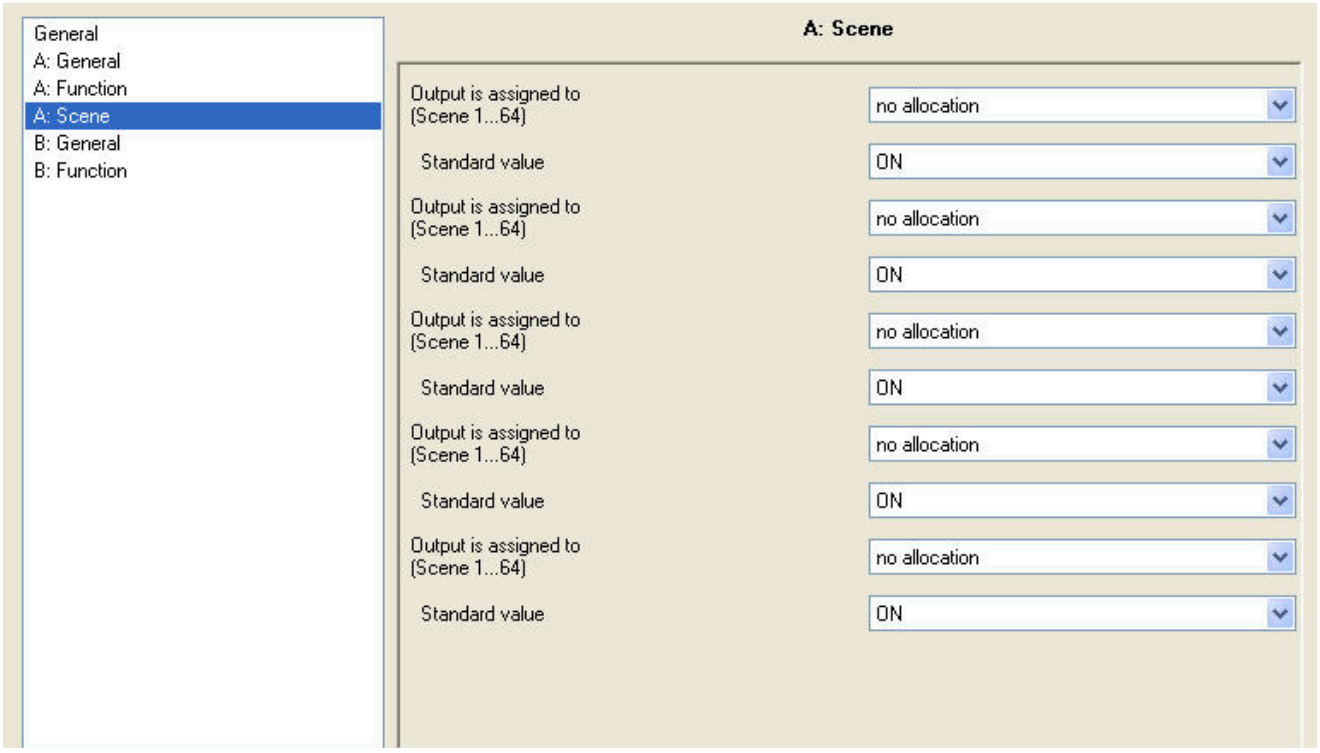
Using the parameter *Overwrite scene, preset and threshold value 1 with download* in parameter window *A: General*, it is possible not to overwrite the scene values set via the bus during a download and thus to protect them.

If a mains voltage failure occurs the stored preset values are lost. They are overwritten by the parameterized default values.

3.3.4 Parameter window *A: Scene*

All settings for the *Scene* function are undertaken in this parameter window.

This parameter window is visible if the parameter *Enable function* "*scene*" has been enabled in **Parameter window *A: Function***.



Using the parameter *Overwrite scene, preset and threshold value 1 with download* in parameter window *A: General,* it is possible not to overwrite the scene values set via the bus during a download and thus to protect them.

Output is assigned to [Scene 1…64]

Options: no allocation
Scene 1
…
Scene 64

The Scene function manages up to 64 scenes using one single group address. With this group address, all slaves integrated into a scene are linked via a 1 byte communication object. The following information is contained in a telegram:

• Scene number (1…64) and

• Telegram: *Recall scene or store scene.*

The output can be integrated in up to five scenes. So for example, the output can be switched on by a scene in the morning and switched off in the evening, or it can be integrated into light scenes.

Standard value

Options: ON
OFF

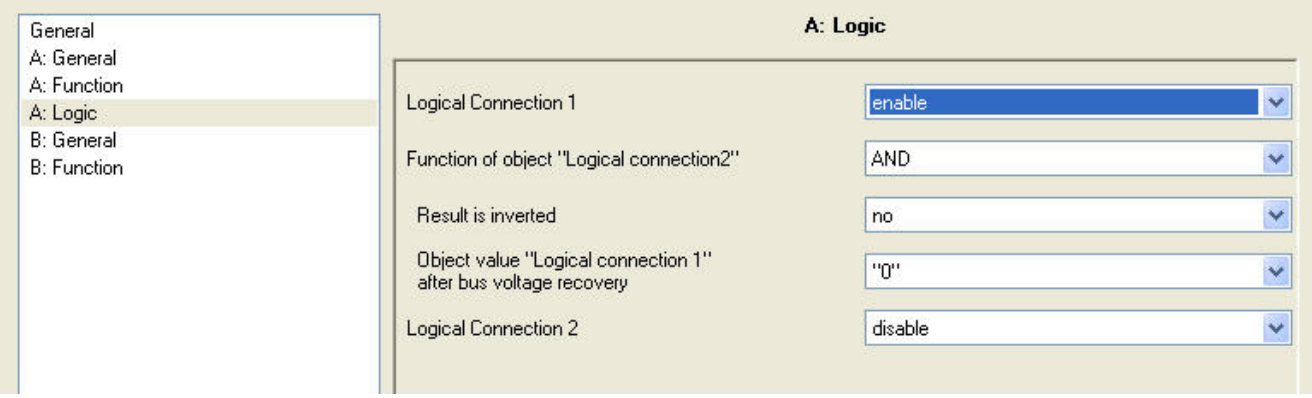
By storing a scene, the user has the opportunity to change the parameterized value stored in ETS. After a bus voltage failure, the value saved via KNX is retained.

Please note
When a scene is recalled: - the *Time* function is restarted. - the *logical connections* are re-evaluated.

3.3.5 Parameter window *A: Logic*

All settings for the *Logic* function are undertaken in this parameter window.

This parameter window is visible if *Enable function* "*logic*" has been enabled in **Parameter window *A: Function*.**



The *Logic* function provides up to two logic objects for each output, which can be logically connected via the communication object *Switch*.

The logic is always re-calculated when an object value is received. First, the communication object *Logical connection 1* is evaluated with communication object *Switch*. The result is then logically linked with communication object *Logical connection 2*.

Logical Connection 1

Options: disable
enable

These parameters enable the communication object *Logical connection 1.*

• *enable*: The following parameters appear:

Function of object "Logical Connection 1"

Options: AND
OR
XOR
GATE

The logical function of the communication object *Logical Connection 1* is determined with the switch telegram.

All three standard operations (AND, OR, XOR) are possible. In addition, the GATE operation can be used to inhibit switch commands.

Result is inverted

Options: no
yes

- *yes*: The result of the logical connection can be inverted.
- *no*: There is no inversion.

Object value "Logical connection 1" after bus voltage recovery

Options: 1
0

This parameter defines the value allocated to the communication object *Logical connection 1* on bus voltage recovery.

Please note
The values of communication objects *Logical connection 1/2* are stored on bus voltage failure. The values are set again on bus voltage recovery On reset via the bus, the values of communication objects *Logical Connection 1/2* remain unchanged.

If GATE is selected with the parameter *Function of logical connection*, a further parameter appears:

Gate disabled, if Object value "Logical Connection 1" is

Options: 1
0

This parameter defines the value at which communication object *Logical Connection 1* disables the GATE.

While it is disabled, telegrams received on communication object *Switch* are ignored. As long as GATE is active, the last value sent to the GATE input remains on the output's logic gate. When disabled, the value that was on the output beforehand remains.

After the GATE is enabled, this value will be retained until a new value is received.

The GATE is deactivated on bus voltage failure and remains so on bus voltage recovery.

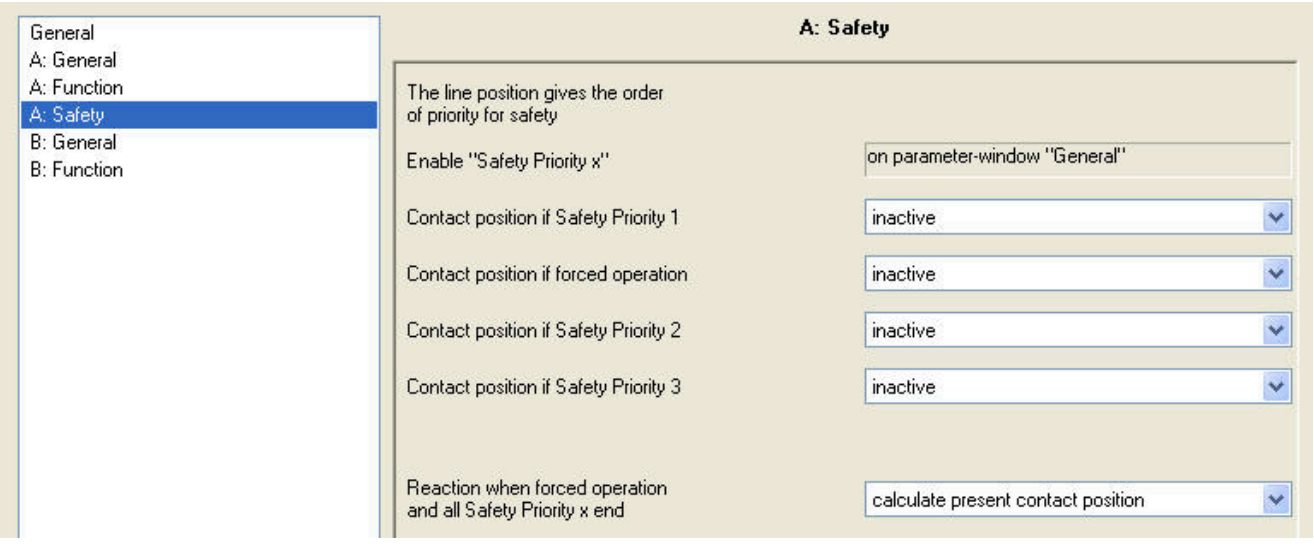
Logical Connection 2

The same programming options exist as those for parameter *Logical Connection 1*.

3.3.6 Parameter window *A: Safety*

All settings for the *Safety* function are undertaken in this parameter window.

This parameter window is visible if the parameter *Enable functions "priority and safety operation"* has been enabled in **Parameter window *A: Function*.**



The forced operation (a 1 or 2 bit communication object per output) or safety priority (three independent 1 bit communication objects per Switch Actuator) sets the output in a defined state which can no longer be changed as long as forced operation or safety priority is active. The parameterized reaction on bus voltage failure and recovery has a higher priority.

Enabling of the three communication objects *Safety Priority x* (x = 1, 2, 3) is undertaken in the *General* parameter window. Monitoring time and the telegram value to be monitored are set in this window. If a telegram is not received within this monitoring time, the output will assume the safety position. This is determined in parameter window *A: Safety*, described below.

In contrast to the three safety priorities, each output has a communication object *Forced operation*.

Forced operation can be activated or deactivated via a 1 or 2 bit communication object. Using the 2 bit communication object, the output state is defined directly via the value.

The contact position after the safety function ends can be set using the parameter *Reaction when forced operation and all Safety Priority x end*.

ETS parameters and communication objects

If multiple demands occur, the priority is defined as follows in accordance with the sequence in parameter window *A: Safety*:

- Safety Priority 1 (highest priority)
- Forced operation
- Safety Priority 2
- Safety Priority 3 (lowest priority)

With the option *inactive*, Safety Priority x or Forced operation and the associated communication object are not considered and are omitted from the priority sequence.

Contact position if Safety Priority 1

Options: unchanged
inactive
ON
OFF

This parameter determines the contact position of the output if the safety condition *Safety Priority 1* (setting undertaken in parameter window **Parameter window *General***) has been met.

The 1 bit communication object *Safety Priority 1* is used as a master for the safety position. The contact positions ON, OFF and unchanged are available.

- *inactive*: The state of communication object *Safety Priority 1* has no effect on the output.

Contact position if forced operation

Options: inactive
unchanged via 1 bit object
on, via 1 bit object
off, via 1 bit object
switch position via 2 bit object

Forced operation relates to the 1 or 2 bit *Forced operation* communication object available on every output.

- *inactive*: The state of the communication object *Forced operation* has no effect on the output.
- *unchanged (via 1 bit object), on (via 1 bit object) and off (via 1 bit object)*: The 1 bit communication object *Forced operation* determines the contact position of the output during forced operation.
- *Switch position via 2 bit object*: The 2 bit *Forced operation* communication object is enabled. The value of the telegram sent via the 2 bit object determines the contact position, see the following table:

Value	Bit 1	Bit 0	State	Description
0	0	0	Enabled	If the communication object *Forced operation* receives a telegram with the value 0 (binary 00) or 1 (binary 01), the output is enabled and can be actuated via different communication objects.
1	0	1	Enabled	
2	1	0	Forced OFF	If the communication object *Forced operation* receives a telegram with the value 2 (binary 10), the output of the Switch Actuator is switched off and remains disabled until forced operation is switched off again. Actuation via another communication object is not possible as long as forced operation is activated. The state of the output at the end of forced operation can be parameterized.
3	1	1	Forced ON	If the communication object *Forced operation* receives a telegram with the value 3 (binary 11), the output of the Switch Actuator is switched on and remains disabled until forced operation is switched off again. Actuation via another communication object is not possible as long as forced operation is activated. The state of the output at the end of forced operation can be parameterized.

**Object value "Forced positioning"
on bus voltage recovery**

This parameter is only visible if forced operation is activated.

Depending on whether the forced operation object is a 1 bit or 2 bit communication object, there are two different parameterization possibilities available:

1 bit communication object:

Options: inactive
active

- *inactive:* Forced operation is switched off, and the output behaves in the same way as with parameter *Reaction when forced operation and all safety Priority x end.*
- *active*: Forced operation is active again after bus voltage recovery. The contact position of the output is determined by the parameterization of *Contact position if forced operation.*

2 bit communication object:

Options: "0" inactive
"2" OFF
"3" ON

- "*0*" *inactive*: Forced operation is switched off and the output behaves in the same way as with parameter *Reaction when forced operation and all safety Priority x end*.
- "*2*" *OFF*: The communication object *Forced operation* is written with the value 2 and the output is switched off.
- "*3*" *ON*: The communication object *Forced operation* is written with the value 3 and the output is switched on.

Contact position if Safety Priority 2
Contact position if Safety Priority 3

The same setting options exist as those for parameter *Contact position if Safety Priority 1*.

Reaction when forced operation and all Safety Priority x end

Options: calculate present contact position
ON
OFF
unchanged

This parameter is only visible if forced operation or a Safety Priority x (x = 1, 2 or 3) function is activated.

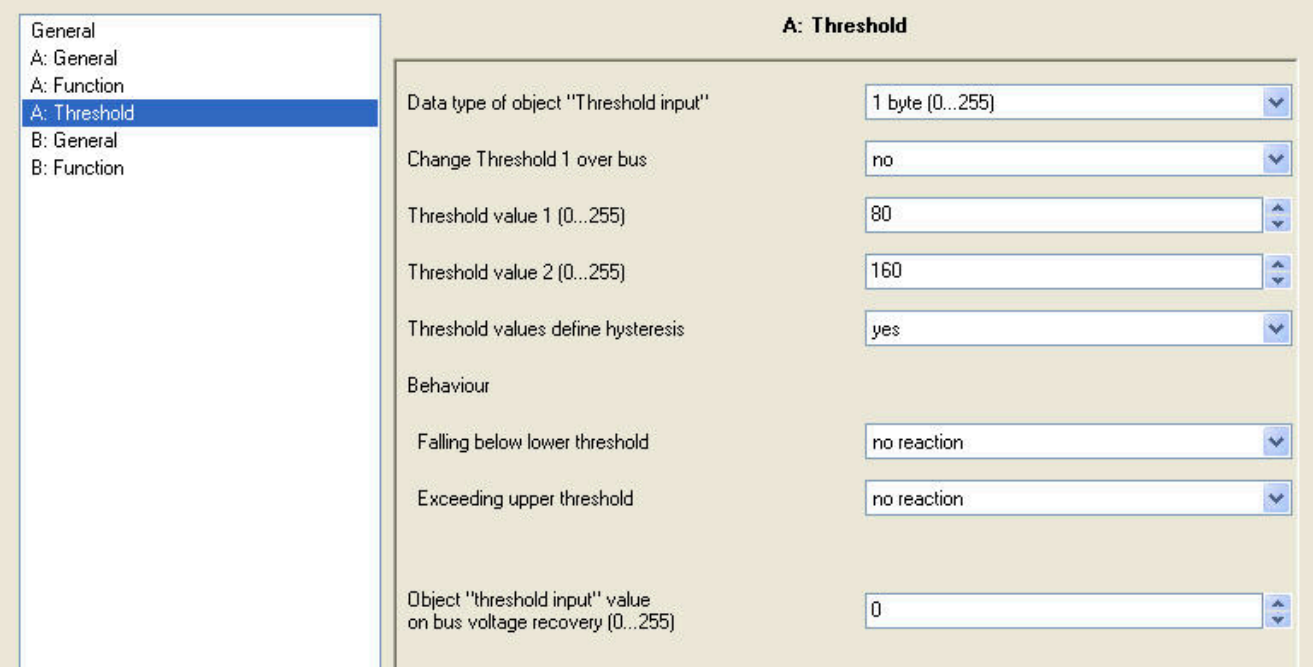
The contact position of the relay at the end of forced operation and safety priorities is defined here.

- *calculate present contact position*: After forced operation has ended, the switch value is recalculated and immediately initiated, i.e., the output continues to operate normally in the background during forced operation, the output is not changed and is only set after safety priorities end.
- *unchanged*: The contact position is retained during forced operation or safety priority. The contact position only changes when a new calculated switch value is received.

3.3.7 Parameter window *A: Threshold*

All settings for the *Threshold* function are undertaken in this parameter window.

This parameter window is visible if the *Enable function threshold* parameter has been enabled in **Parameter window *A: Function*.**



The threshold function facilitates the evaluation of a 1 or 2 byte communication object, *Threshold input*. A switching action can be triggered as soon as the value of the communication object undershoots or overshoots a threshold value. Two independent threshold values are available. Threshold 1 can be modified via the bus.

When the threshold function is active, the Switch Actuator continues to receive switching telegrams. In this way, the contact position determined by the threshold function can be changed. The threshold function generates a switching telegram as soon as a new threshold telegram is received and a new switching condition exists simultaneously due to undershoot or overshoot of the switching criterion.

Data type of object "Threshold input"

Options: 1 byte [0…255]
2 byte [0…65,635]

The data type for the threshold input received via the communication object *Threshold input* can be determined here.

You can choose between a 1 byte integer value or a 2 byte counter value.

Change Threshold 1 over bus

Options: no
yes

This parameter defines whether threshold value 1 can or cannot be changed via the bus.

- *yes*: Communication object *Threshold value 1* can be changed via the bus. This can be a 1 or 2 byte communication object depending on the parameterization of the threshold value input.
- *no*: The communication object *Threshold value 1* cannot be changed via the bus.

With the parameter *Overwrite scene, preset and threshold value 1 with download* in parameter window *A: General*, it is possible during a download to not overwrite the threshold values set via the bus and thus to protect them.

Threshold value 1 [0...255]

The value range is dependent on the selection made in the parameter *Data type of object* "*Threshold input*".

1 byte [0…255]:

Options: 0…80…255

2 byte [0…65.535]:

Options: 0…20,000…65,535

Threshold value 2 [0...255]

The value range is dependent on the selection made in the parameter Data type of object "*Threshold input*".

1 byte [0…255]:

Options: 0…160…255

2 byte [0…65.535]:

Options: 0…40,000…65,535

Threshold values define hysteresis

Options: no
yes

This parameter defines whether Threshold values 1 and 2 should be interpreted as hysteresis limits.

The hysteresis can reduce continuous threshold value messages if the input value fluctuates around one of the threshold values.

With option yes, the following parameters appear:

Behaviour
Falling below lower threshold
Exceeding upper threshold

Options: no reaction
ON
OFF

This parameter determines the contact position of the output based on the value of communication object *Threshold input* if this value exceeds or falls below the upper or lower threshold respectively.

A reaction only occurs if the communication object value was previously smaller or larger than Threshold 1 or Threshold 2.

With option *no*, the following parameters appear:

Object value < lower threshold
Lower thrsh. <= object <= upper thrsh.
Object value > lower threshold

Options: unchanged
ON
OFF

This parameter determines the contact position of the output (ON, OFF, unchanged) based on the threshold (communication object) value.

Object "threshold input" value
on bus voltage recovery [0...255]

Object "threshold input" value
on bus voltage recovery [0...65,535]

The value range is dependent on the selection made in the parameter *Data type of object* "*Threshold input*".

1 byte [0…255]:

Options: 0…255

2 byte [0…65,535]:

Options: 0…65,535

This parameter determines the value of communication object *Threshold input* after bus voltage recovery.

Threshold value evaluation is carried out after bus voltage recovery using the threshold parameterized here, whereby the last *Status Threshold* value detected in operation is used for comparison. Should no *Status Threshold value* exist before bus voltage failure, the factory-set status (hysteresis limit undershoot) is assumed.

ETS parameters and communication objects

3.4. Operating mode Heating Actuator

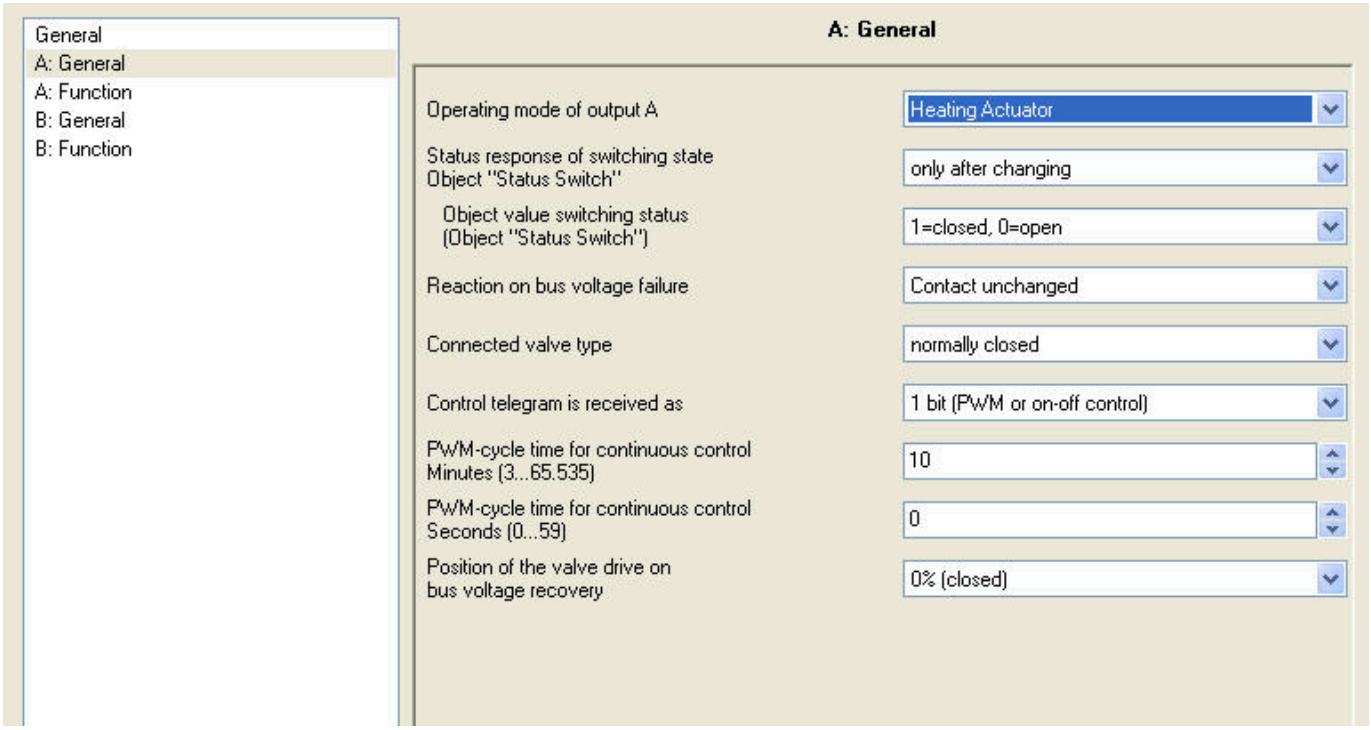
In *Heating Actuator* operating mode the Switch Actuators are generally used as setting elements for electro-thermal valve drives. Room temperature can be controlled in conjunction with a room thermostat or room thermometer which controls the Switch Actuator.

Various types of control are possible, e.g. PWM, 2-point control (1 bit) or continuous control (1 byte).

Every individual output of a Switch Actuator can be controlled via a 1 bit control value. For this purpose, the *Switch* communication objects for the outputs have to be connected with the *Control value* communication objects of the room thermostats/temperature controllers.

Please note
The parameters of the room thermostat must be set to *continuous 2-point control or switching 2-point control*.

With so-called continuous control, a 1 byte value [0...255] is used as an input signal. This input signal is used in the Switch Actuator in accordance with the parameterizable cycle time in the ON and OFF command of the switch relay. At 0 %, the valve is closed, and at 100 % it is fully open. Intermediate values are calculated via pulse width modulation (PWM).



Status response of switching state

Object "Status Switch"

Options: no
only after changing
always

This parameter enables the communication object *Status Switch*. This contains the current switch state i.e. contact position.

- *no:* The contact position is updated but the status is not actively sent via the bus.
- *only after changing*: When the contact position changes, communication object *Status Switch* actively sends the status via the bus. This can have a major effect on the bus load on a Switch Actuator with multiple outputs.
- *always*: The status of the contact position is always actively sent via the bus via communication object *Status Switch*, even when no status change has occurred. Transmission is triggered as soon as communication objects *Control value (PWM)* or Valve purge receive a telegram.

Please note
After parameterization changes or subsequently switching off the status object, the existing assignment of group addresses to the *Switch* communication object is lost and needs to be re-allocated.

The status value to be sent is defined using the parameter *Object value switching status (Object "Status Switch")*.

ETS parameters and communication objects

Please note
The contact position is determined by a sequence of priorities and logical connections. The contact position can only be correctly evaluated if the switching actions occur via KNX. The 01521 cannot differentiate between manual switching and a cable break or device fault.

Object value switching status

(Object "Status Switch")

Options: 1=closed, 0=open
0=closed, 1=open

- *1=closed, 0=open*: The value 1 is written to communication object *Status Switch* for a closed contact, 0 for an open contact.
- *0=closed, 1=open*: The value 0 is written to communication object *Status Switch* for a closed contact, 1 for an open contact.

The reaction of the heating valve is dependent on the position of the Switch Actuator relay and the valve type (normally open or normally closed).

Reaction on bus voltage failure

Options: Contact open
Contact closed
Contact unchanged

This parameter defines how the contacts and accordingly the valve drives are controlled on bus voltage failure.

Only enough energy for a switching action is available when the bus voltage fails.

If a normally closed valve is used, a closed contact means an open valve (100 %) or a closed valve (0 %) if the contact is open.

If a normally open valve is used, a closed contact means a closed valve (100 %) or an open valve (0 %) if the contact is open.

A middle position cannot be set for the valve on bus voltage failure. It moves either to its closed (0%) or open (100%) end position.

Connected valve type

Options: normally closed
normally open

This parameter sets the valve type for the connected valve.

How does a de-energized closed (normally closed) valve react?

If no current is flowing in the control circuit, the valve closes.
The valve opens as soon as current is flowing in the control circuit.

How does a de-energized opened (normally open) valve react?

If no current is flowing in the control circuit, the valve opens.
The valve closes as soon as current is flowing in the control circuit.

Control telegram is received as

The heating actuator can either be controlled via the 1 bit communication object *Switch* or the 1 byte communication object *Control value (PWM)*.

Options: 1 bit (PWM or on-off control)
1 byte (continuous)

- *1 bit (PWM or on-off control)*: The room thermostat controls the heating actuator via standard switching telegrams. This enables on-off control of the control value. The 1 bit value can also originate from pulse width modulation (PWM) calculated by a room thermostat. During a malfunction when the control signal is not received by the room thermostat, the Switch Actuator will undertake an autonomous PWM calculation. The 01521 uses the parameterizable PWM cycle time for this.
- *1 byte (continuous)*: A value of 0…255 (corresponds to 0 %…100 %) is preset by the room thermostat. This process is also known as “continuous-action control”. At 0 % the valve is closed and at 100 %, fully open. The heating actuator controls intermediate values via pulse width modulation.

With 1 byte (continuous) selected, an additional parameter appears:

Transmit status response

Object "Status heating"

Options: no
yes, 0% = "0" otherwise "1" (1 bit)
yes, 0% = "1" otherwise "0" (1 bit)
yes, continuous control value (1 byte)

This parameter is only visible with continuous control with a 1 byte value.

For 2-step control the current control value is synonymous with communication object *Status Switch*.

- *no*: A control value is not reported back.
- *yes, 0% = "0" otherwise "1" (1 bit) and 0% = "1" otherwise "0" (1 bit):* enables communication object *Status heating (1 bit).* The current control value is sent.
- *yes, continuous control value (1 byte):* enables communication object *Status heating (1 byte).* The current control value is sent.

PWM-cycle time for continuous control Minutes [3...65,535]

Options: 3...10...65,535

PWM-cycle time for continuous control Seconds [0...59]

Options: 0...59

With 1 bit control this time setting is only used during control of the actuator in fault mode, with the Forced operation function and directly after bus voltage recovery.

With 1 byte control (continuous control), this setting determines the duration of the control signals. This corresponds with the cycle time t_{CYC}.

The time has been limited to three minutes to suit the endurance of the switch relay, as the number of relay switching operations is limited.

Position of the valve drive on bus voltage recovery

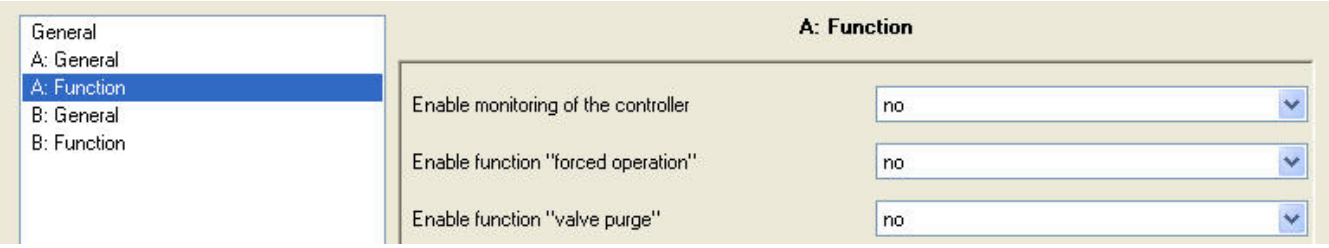
Options: 0% (closed)
10% (26)
...
90% (230)
100% (open)

This parameter sets how the valve drive is set after bus voltage recovery until the first switching or positioning telegram is received from the room thermostat. The Switch Actuator uses PWM control with the parameterized PWM cycle time until the room thermostat sends a signal.

The value in brackets corresponds to the 1 byte value.

3.4.1 Parameter window *A: Function*

In this parameter window you determine the response (reaction) of the output and can enable different functions, which makes further parameter windows available.



Enable monitoring of the controller

Options: no
yes

- *no*: Parameter window A: *Monitoring* is not enabled for output A.
- *yes*: Parameter window A: *Monitoring* is enabled for output A. There the communication object *RTR fault* can be enabled for monitoring. Thus a failure of the room thermostat can be detected, the output changed to fault mode and a parameterized valve position can be set.

Enable function "forced operation"

Options: no
yes

With forced operation, the output can assume a determined position, e.g. for inspection purposes.

- *no*: Parameter window A: *Forced Operation* is not enabled for output A.
- *yes*: Parameter window A: *Forced Operation* and communication object *Forced Operation* are enabled for output A.

Enable function "valve purge"

Options: no
yes

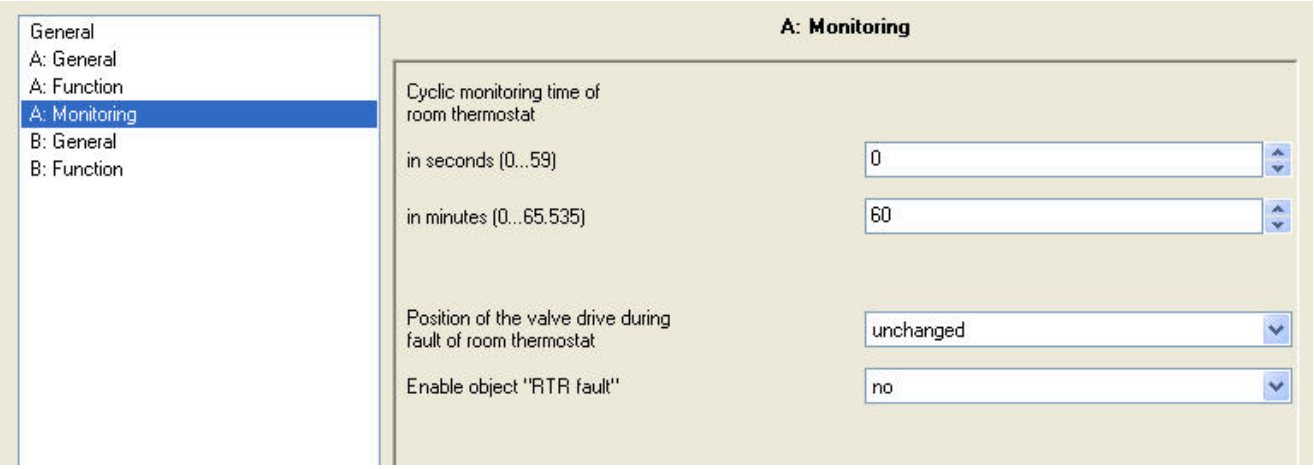
Cyclic valve purge prevents deposits from forming in the valves.

- *no*: Parameter window A: *Valve Purge* is not enabled for output A.
- *yes*: Parameter window A: *Valve Purge* and communication objects *Trigger valve purge* and *Status valve purge* are enabled for output A.

3.4.2 Parameter window *A: Monitoring*

All settings for the *Monitoring* function are undertaken in this parameter window.

This parameter is visible if parameter *Enable monitoring of the controller* has been enabled in **Parameter window *A: Function*.**



Cyclic monitoring time of room thermostat in seconds [0...59]

Options: 0...59

in minutes [0...65,535]

0...60...65,535

Telegrams from the room thermostat are transferred to the Switch Actuator at specific intervals. If one or more of the consecutive telegrams is omitted, this may indicate a communications fault or a room thermostat malfunction.

If communication objects *Switch* or *Control value (PWM)* receive no telegrams during the period defined in this parameter, the output switches to fault mode and triggers a safety position. Fault mode ends as soon as a telegram is received as a control value.

Please note
If this parameter window is visible, the room thermostat must send the control value cyclically, otherwise no monitoring function is possible. The monitoring time should be twice as long as the sending cycle time, to ensure that a one-time absent signal does not immediately trigger an error.

Position of the valve drive during fault of room thermostat

Options: unchanged
0% (closed)
10% (26)
...
90% (230)
100% (open)

This parameter determines the safety position that the 01521 controls in error mode. The value in brackets corresponds to the 1 byte value.

The switch cycle time t_{CYC} used for control should be set via the parameter *PWM-cycle time for continuous control* in parameter window A: *General*.

Enable object "RTR fault"

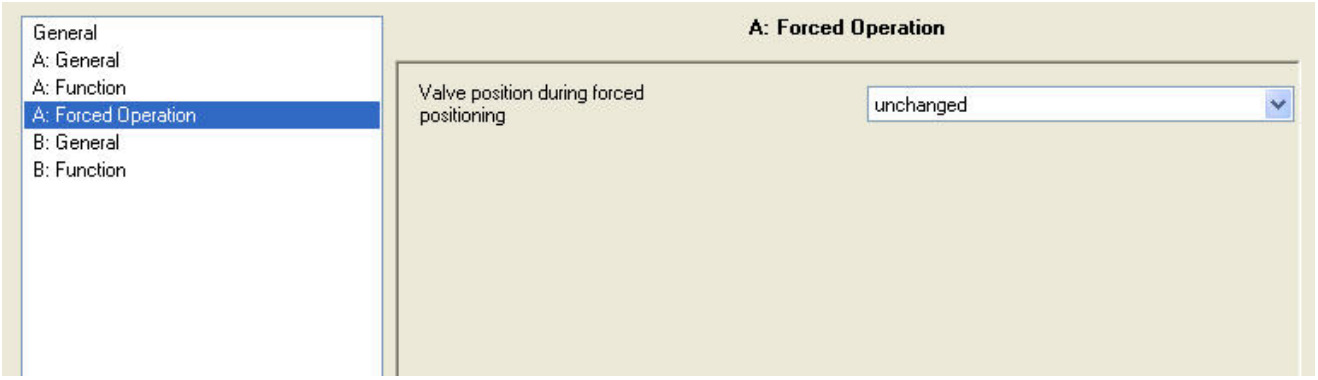
Options: no
yes

This parameter enables communication object *RTR fault*. In fault mode the communication object has the value 1, if there is no fault the value is 0.

2.1.2 Parameter window *A: Forced Operation*

All settings for the function are undertaken in this parameter window.

This parameter window is visible if the *Enable function* "*forced operation*" parameter has been enabled in **Parameter window *A: Function***.



During a forced operation, the Switch Actuator triggers a freely adjustable forced position. This has the highest priority, i.e. it is not modified by a valve purge or safety position.

Forced operation can be activated via communication object

Forced operation = "*1*" and deactivated via
Forced operation = "*0*".

Valve position during forced positioning

Options: unchanged
0% (closed)
10% (26)
...
90% (230)
100% (open)

The valve position triggered by the actuator during the forced operation is determined by this parameter. The value in brackets corresponds to the 1 byte value.

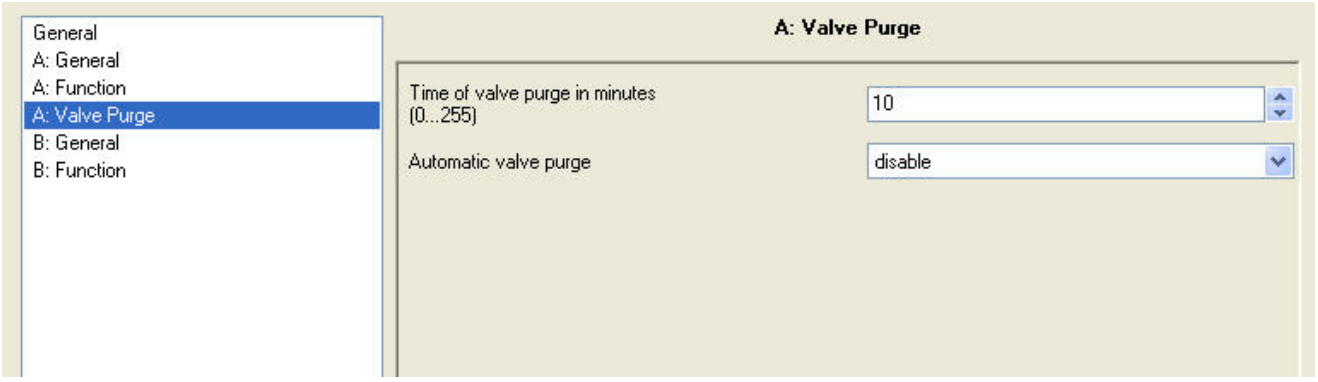
The switch cycle time t_{CYC} used for control should be set in the parameter *cycle time* for continuous control in parameter window *A: General.*

When forced operation ends the Switch Actuator returns to its normal method of operation and calculates its next contact position value from the incoming values on communication objects *Switch* or *Control value (PWM)*.

2.1.3 Parameter window *A: Valve Purge*

All settings for the *Valve Purge* function are undertaken in this parameter window.

This parameter window is visible if the *Enable function* "*valve purge*" parameter has been enabled in **Parameter window *A: Function***.



Regular purging of a heating valve can prevent deposits from forming in the valve area and restricting the valve function. This is particularly important at times when the valve position does not change very much. The valve is opened to the maximum during a valve purge. It can be triggered via the communication object *Trigger valve purge* and/or automatically at adjustable intervals.

Time of valve purge in minutes

[0...255]

Options: 1…10…255

This parameter sets the duration of the valve purge.

During this time, the valve is fully opened. When the time has elapsed, the state before the purge is re-established.

Please note
The opening time of the valve must be considered when entering the purge time.

Automatic valve purge

Options: disable
one times per day
one times per week
one times per month

The counter for automatic purging starts to run when the parameter is downloaded. The time is reset each time it is downloaded.

The time is reset as soon as purging is completed. This can occur either through automatic purging or via communication object *Trigger valve purge*.

Please note
Purging can also be triggered via the bus, with the communication object *Trigger valve purge*. After bus voltage recovery and download the purge cycle continues, the bus failure time – the time for which the bus actually failed – is not considered. An intermediate switching operation of the Switch Actuator relay does not affect the time, as there is no assurance that the valve stroke required for purging has been carried out.

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