PEAR Automation GmbH

Product handbook

Switching actuator
PA-xxS-230-16-1RM

V 0

Index

1 Common information

1.1 Common product information

PEAR Automation PA-xxS-230-16-1RM switching actuators are KNX-certified DIN-rail mountable devices with 8 or 21 identical potential free relay contacts and 4 channel-independent logic channels which can be controlled separately with KNX messages.

The devices impress by their optimal use of recourses in hard- and software and a full functionality. There is only a space requirement of the PA-21S-230-16-1RM of 12 horizontal pitches without any waiver on performance in terms of wiring comfort or quality. With the use of the 4 additional channel-independent logic channels there is the possibility to use digital links, analogue value comparison, time delays, message filters, generating of forced guidance messages, etc.

Part of the functionality of the output channels is:

- adjustable behaviour at power breakdown/return
- 2 free linkable central functions
- an active status object
- disable function and forced guidance
- staircase timer function and ON-/OFF delay
- 5 storable 8-bit scenes per channel
- channel-based logic functions

All base functions are configurable with a variety of further configuration possibilities to get the best for the respective application. The product database can be downloaded at www.pear-automation.at.

The installation takes place on 35mm DIN rails in power distributions.

1.2 Safety instructions

1.2.1 Illustration

Within this handbook you can find advices and warnings to possible dangers on different positions. The used symbols have the following meanings:

DANGER!

means that death or serious injury will happen if the relevant precaution are not carried out

WARNING!

means that death or serious injury may happen if the relevant precaution are not carried out

ATTENTION!

means that property damage or minor injury may happen if the relevant precaution are not carried out

1.2.2 Common safety instructions

The switching actuators were developed, produced, tested and documented with respect to the respective safety standards. If the instructions for normal use and the safety instructions receive attention (see chapter 1.3 *Regular use*) the product does not create any dangers in terms of property damage or health of persons as a rule.

The instructions within this handbook have to be followed precisely otherwise safety hazards may be opened.

The planning and installation by a qualified electrician is a requirement for the safe and smooth operation within the actual and relevant country-specific regulations.

WARNING!

During maintenance the following safety instructions have to be followed:

- **isolate the installation from all possible sources of electrical power**
- **prevent from being switched back**
- **assure that there is no power on all connections**
- **earthing and shorting**
- **cover devices under power nearby**

WARNING!

All line conductors which are connected to the PA-xxS-230-16-1RM switching actuators have to be fused with maximal 16A, characteristic C.

WARNING!

The use of the devices PA-xxS-230-16-1RM is only allowed for power-networks with an earthed neutral (e.g. TN, TT). The use in IT-Networks is not permitted.

WARNING!

Never open the device! Danger of an electric shock!

WARNING!

The devices are not authorized for the use in installations for personal safety or medical applications!

ATTENTION!

The switch of loads between 2 line conductors (400VAC) is not permitted.

ATTENTION!

The joint operation with non-certified KNX devices on the same line is not permitted.

1.3 Regular use

PA-xxS-230-16-1RM devices are designated to control electrical loads in buildings like:

- Lighting
- Heating/Cooling
- Signal indication
- Control of motors, pumps etc.

Within this function the devices are designated to be mounted on stationary installations in appropriate power distributions on 35mm DIN rails.

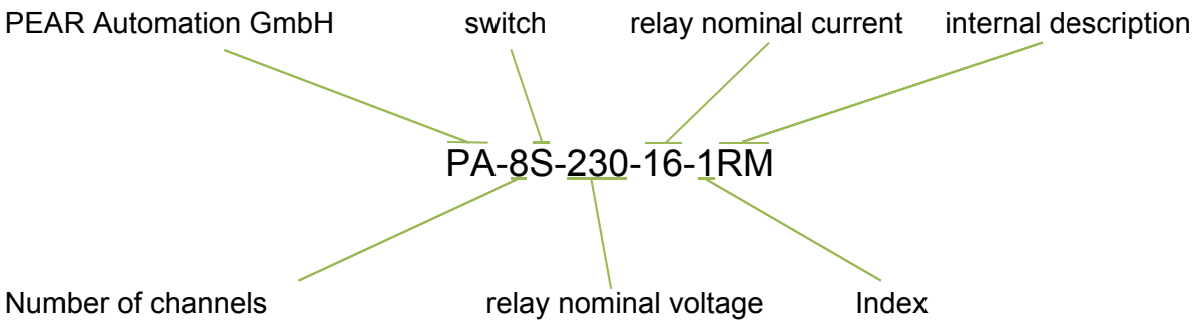
PA-xxS-230-16-1RM devices are KNX-certified and can operate on KNX-BUS TP1 together with up to 256 devices. The combination of KNX-certified devices with those of other suppliers is possible of course.

For configuration of the devices there are product data bases with a wide range of functions available for ETS3f and ETS4.

1.4 Variants and description

Within this document treated product variants:

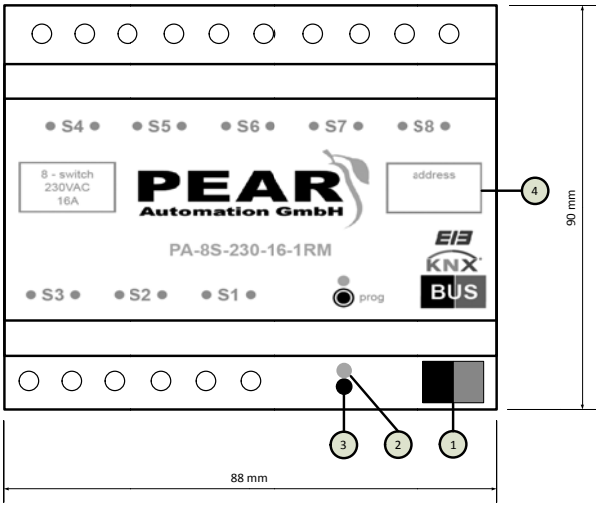
- PA-8S-230-16-1RM: 8 potential free relay contacts
  4 channel-independent logic channels
- PA-21S-230-16-1RM: 21 potential free relay contacts
  4 channel-independent logic channels



2 Hardware description

2.1 Mechanical layout and dimensions

2.1.1 PA-8S-230-16-1RM



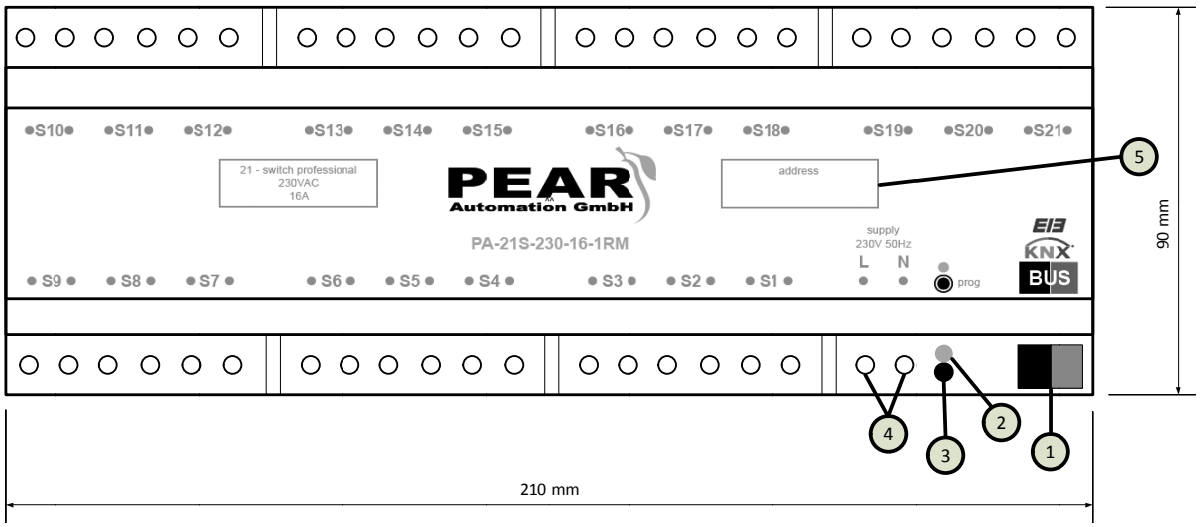
1 … KNX bus terminal
2 … Programming-LED green
3 … Programming switch
4 … Labelling area for physical address

For labelling of the physical address use a water-resistant pen at best.

Use of the programming switch:
The programming switch is positioned on the here referenced area approximately 2mm inside of the enclosure to prevent from an unintentional use. You can push the programming switch with a small safety screwdriver. Never use excessive force! Pay attention that you never push the screwdriver deeper than 5mm inside the enclosure!

WARNUNG!
Always use safety screwdrivers to push the programming switch.

2.1.2 PA-21S-230-16-1RM



1 … KNX bus terminal
2 … Programming-LED green
3 … Programming switch
4 … Application power supply
5 … Labelling area for physical address

For labelling of the physical address use a water-resistant pen at best.

Use of the programming switch:
The programming switch is positioned on the here referenced area approximately 2mm inside of the enclosure is to prevent from an unintentional use. You can push the programming switch with a small safety screwdriver. Never use excessive force! Pay attention that you never push the screwdriver deeper than 5mm inside the enclosure!

WARNING!
Always use safety screwdrivers to push the programming switch.

2.2 Technical data

2.2.1 Device

		PA-8S-230-16-1RM	PA-21S-230-16-1RM
Outputs	Number of potential free channels Nominal voltage Nominal current per channel Power dissipation load side max.	8 230V AC / 50Hz 16A <6,5W	21 230V AC / 50Hz 16A <16,5W
Application power supply	Voltage range Active power consumption	None None	230V ±10% / 50Hz ±10% <500mW
KNX	Physics Number of devices on 1 line Bus voltage Current consumption	TP1 max. 256 21…30V DC <12mA	TP1 max. 256 21…30V DC <12mA
Switching frequency	Max. number of switches among the whole device per minute with homogeneously distribution after device start-up time [1)]	170	500
Reaction time		approx. 25ms	approx. 25ms
Electrical connection	KNX	KNX bus terminal WAGO 243-211 (included in delivery)	KNX bus terminal WAGO 243-211 (included in delivery)
Electrical connection	Switching channels Application power supply 1 x solid core 2 x solid core Stranded core with wire-end sleeve TWIN wire-end sleeve Strip length min. tightening torque	Screw terminal 0,33…4mm² 0,33…2,5mm² 0,25…4mm² 0,25…2,5mm² 8mm 0,5 Nm max.	Screw terminal Screw terminal 0,33…4mm² 0,33…2,5mm² 0,25…4mm² 0,25…2,5mm² 8mm 0,5 Nm max.
Degree of protection	According to EN 60529	IP20	IP20
Protection class	According to EN 61140	II	II
Overvoltage category	According to EN 60664-1	III	III
Pollution degree	According to EN 60664-1	2	2
Acceptable mains supply systems		TN, TT[2)]	TN, TT[2)]
Weight	Without packaging	258g	622g
Dimensions	Width x depth x height	88 x 58 x 90mm	210 x 58 x 90mm
	Width in HP (à 18mm)	5	12
Housing colour		Grey	Grey

1) If the value is exceeded, switching operation will be done after a delay.
2) IT-Networks are not permitted!

2.2.2 Relay contacts

		PA-8S-230-16-1RM	PA-21S-230-16-1RM
Continuous current	Per channel	max. 16A	max. 16A
Max. switching voltage		277V AC	277V AC
Operating principle		Potential free	Potential free
Relay principle		Latching	Latching
Principle of shutoff	At contact opening	Micro shutoff	Micro shutoff
Inrush current peaks	10µs 10ms	500A 170A	500A 170A
Electrical fuse	Characteristics, ampere	max. C16	max. C16
Switching of sockets		Acceptable	Acceptable
Switchable loads	Purely resistive AC1[1)], cosφ=0,8 AC3[1)], cosφ=0,45 Conventional light bulbs, HV-halogen Fluorescent lamp load uncompensated Fluorescent lamp load parallel compensated EB	3680W 3680W 1800W 2500W 2500W 2500W, 200µF To be calculated[2)]	3680W 3680W 1800W 2500W 2500W 2500W, 200µF To be calculated[2)]
Life expectancy	Mechanic 3680W purely resistive 3680W AC1 1800W AC3	>3 x 10^6 operations >1 x 10^5 operations >1,5 x 10^4 operations >1 x 10^5 operations	>3 x 10^6 operations >1 x 10^5 operations >1,5 x 10^4 operations >1 x 10^5 operations
Minimum switching load	24 VDC	100mA	100mA
Forward restistance[3)]	Of relays at closed state, from terminal to terminal	< 55mΩ	< 55mΩ

ATTENTION!

If the here stated values are not taken into consideration the relay contacts may damage.

1) According to EN 60947-4-1

2) The maximum number of EBs depends on inrush peak current of the connected EBs. The combined inrush peak currents of all parallel installed EBs should not exceed the maximum inrush peak current of the relay contacts after taking pulse duration into account. The values of the actuator are stated in the table of this chapter – the values from the EBs to be connected will be stated in their data sheets. In common this number of EBs are no problem:
   - 18W: 20 pieces
   - 24W: 20 pieces
   - 36W: 12 pieces
   - 58W: 10 pieces

3) The value can be taken for the calculation of the loop impedance of a circuit. The stated value correlates to the worst-case, calculated by the worst-cases of each relevant component. The typical value is much lower at approx. 2,5…3mΩ.

2.2.3 Environment conditions

		PA-8S-230-16-1RM	PA-21S-230-16-1RM
Temperature range	Operation	0…45°C	0…45°C
	Storage	-25…55°C	-25…55°C
	Transport	-25…75°C	-25…75°C
Maximal operation height		2000m NN	2000m NN
Air humidity		<85% non-condensing	<85% non-condensing

Prevent from direct sunlight!

ATTENTION!

If the device is intended to be turned on immediately after transport, ensure that the device is not colder than the surrounding air because of the risk of condensation.

2.3 Mounting instruction

The device is designed to be mounted in power distributors and has to be used in dry rooms only. If the device will be used in areas with temporarily spray water a power distributor with a designated IP-class has to be used.

The device should be mounted on 35mm DIN rails corresponding EN 60715.

The connection of the loads and the application power supply will be done via screw terminals. The bus connection will be done via the KNX bus terminal included in delivery. For connection please use the relevant wiring diagram. The number of each channel is printed on the enclosure.

A smooth operation can only be provided if

- In the KNX installation only KNX-certified devices are used and
- the KNX installation is designed according to the KNX specification

Regarding mounting instructions the local regulations have to be taken under consideration!

Pay attention that the device is authorised for operation in the respective country. You can find the list in chapter 4.2 *legal instructions*.

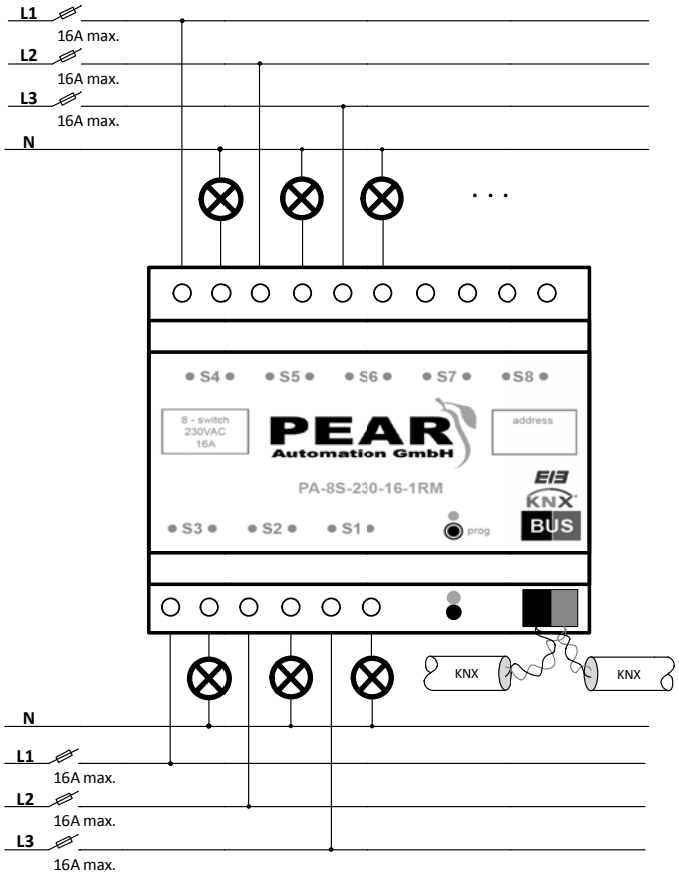
The mounting can be done in each direction.

WARNING!

The operation in rooms with periodical humidity, bath rooms, inflammable or explosive rooms (garage, etc.) and in protected areas (swimming baths, etc.) is not permitted.

2.4 Wiring diagram

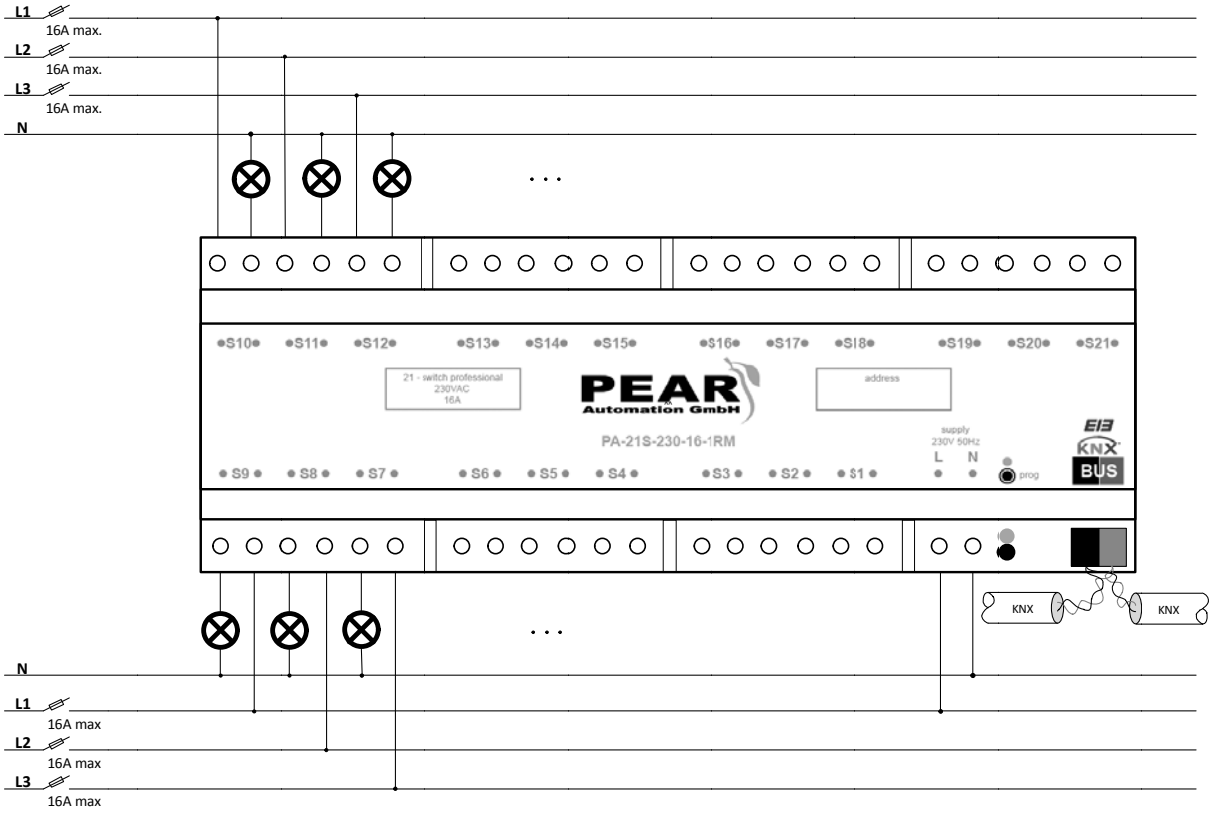
2.4.1 PA-8S-230-16-1RM



WARNING!

It is not allowed to install SELV voltage on output channels.

2.4.2 PA-21S-230-16-1RM



WARNING!

It is not allowed to install SELV voltage on output channels.

2.5 First operation

The relays are delivered with OPEN contacts by factory default. Because of mechanical influences at the transport the real position of the contacts of the (latching) relays can't be guaranteed.

The device will be delivered with the physical address 15.15.255.

Please pay attention before first operations that the device

- will be operating within its specification
- was mounted according to the national specific standards, rules, regulations and terms
- has not damages on the enclosure
- is not dirty

WARNING!

Before first operation make sure that the wiring was realized correctly and that there is no danger from the installation itself or from connected devices.

Requirements:

- PC with ETS3f or ETS4
- KNX bus interface (IP, USB, RS232, …)

Approach once at the beginning of first operation:

1) Connect the bus interface to the bus if necessary
2) Switch on bus power and (only PA-21S-230-16-1RM) application power supply
3) Test communication between ETS and bus

Approach for each actuator:

1) Push the programming switch of the relevant device (the green LED will light)
2) Program the physical address via ETS (the greed LED will disappear)
3) Download the application via ETS
4) Test the application for correct function

Cleaning:
For cleaning use only dry or only smoothly moisturised cleaning wipes without any solvents or other additives.

Maintenance:
The device is maintenance-free.
Opening the case voids the warranty.

3 Functional description

3.1 Common functional description

PEAR Automation PA-xxS-230-16-1RM actuators can be programmed in S-Mode per ETS3f or ETS4[1)]. Each channel respectively each channel-independent logic function has identical configuration possibilities.

The parameters can be grouped in 3 functional groups:

- *Common options*
- Parameter options for each of the 8 respectively 21 cannels
- Parameter options for each of the 4 channel-independent logic functions

Configuration possibilities *Common options*:

- Device start-up time
- Functionality of the central functions
- Behaviour on power breakdown/return[2)] (for all channels together or for each channel separately)

Configuration possibilities for each of the 8/21 switch channels:

- Relay mode: closing contact / opening contact
- Status object: not inverted / inverted
- Assignment to central function
- Disable function / forced guidance
    - Disable function
        - Polarity
        - Behaviour at the beginning of locking
        - Behaviour after end of locking
        - Disable function on power return[2)]
    - Forced guidance
        - Forced guidance on power return[2)]
        - Behaviour at the end of forced guidance
- Time functions
    - Staircase lighting function
        - Switch-on time
        - Adjustable activation possibilities
        - Adjustable Extendibility
        - Extendable via object *Start time function*/*Separate object*
        - Adjustable pre warning time
    - ON- / OFF delay
        - adjustable switch-on and switch-off delay
- Scenes
    - At scene call: Start of time function / switch directly, adjustable on each channel
    - Scenes storable: yes/no, adjustable on each channel
    - 5 storable 8 bit scenes
- Channel-oriented logic functions
    - Apply time function on logic functions: yes/no, adjustable on each channel
    - 2 logic gates, linking with the object *ON / OFF*, functions: AND, OR, EXOR, TOR
    - Adjustable status of the logic inputs after power return[2)]

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1) E-Mode is not available

2) Bus / application power breakdown / return are handled the same way.

Configuration possibilities for each of the 4 channel-independent logic functions

- Configurable output cell
  - Output object 1 Bit
    - Send output value delayed
    - Send output value on each update or only when changed
    - Output invertable
    - Status-dependent message filter: send only designated status
  - Output object 2 Bit, forced guidance
    - Send output value delayed
    - Send output value on each update or only when changed
    - Linking of the 2 bit status
- Digital logic or analog threshold switch
  - Analog threshold switch
    - Input objects 8 or 16 bit always adjustable without sign or signed
    - Comparison of 2 analog values possible (2 objects)
    - Values on power return[1)] adjustable
    - Adjustable hysteresis
  - Digital logic
    - Linking of 2 input objects via: AND, OR, EXOR, TOR
    - Inputs invertable
    - Values on power return[1)] adjustable

	PA-8S-230-16-1RM	PA-21S-230-16-1RM
Maximum number of communication objects	114	244
Maximum number of group addresses	241	241
Maximum number of associations	243	243

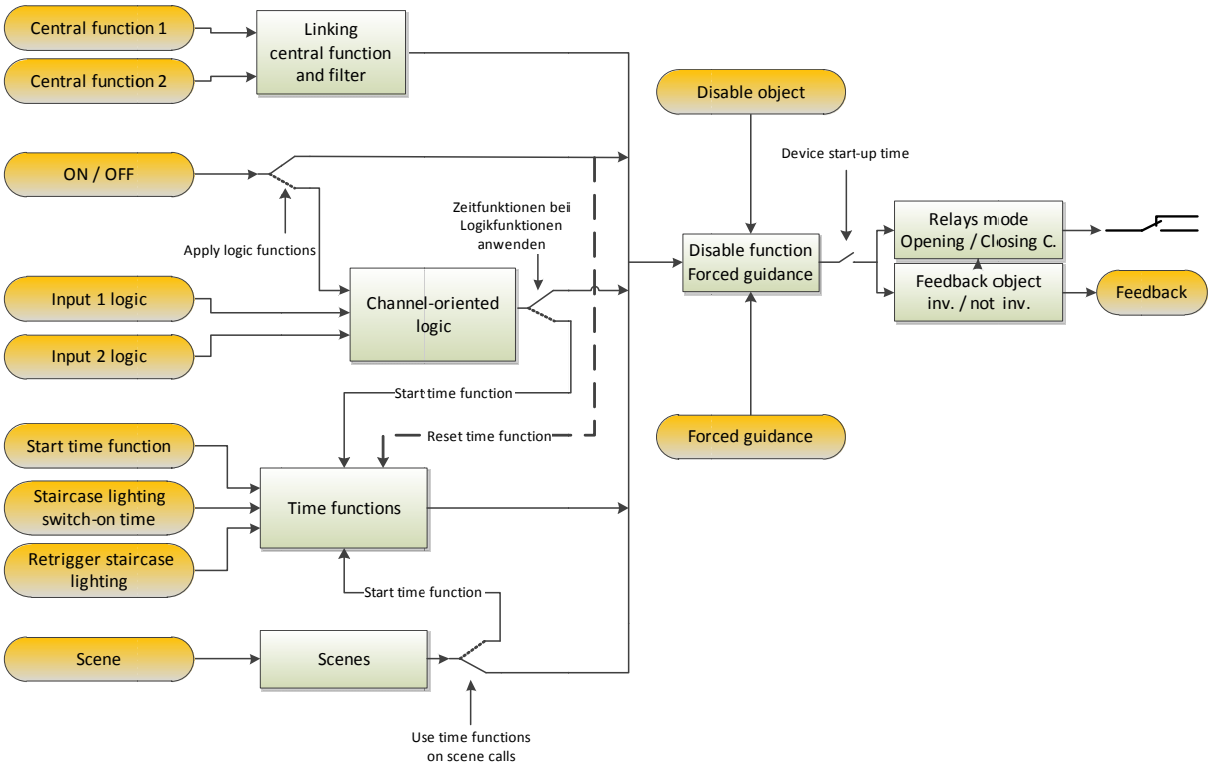
Digital status of 1-bit data types are called *ON* respectively *OFF* in ETS.

Many relevant objects and variables are adjustable in terms of the status on power return[1)].

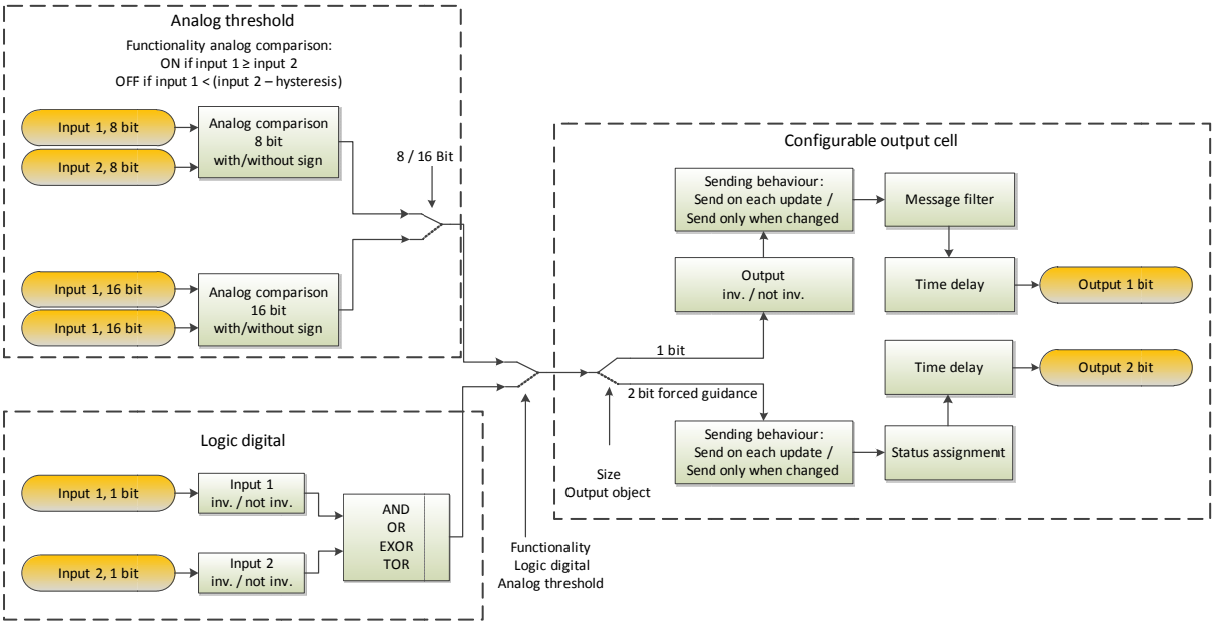
Within this documentation quotations from product database are shown *cursive & underlined*.

[1)] Bus / application power return are handled the same way.

3.2 Overview functionality switch channels



3.3 Overview functionality channel-independent logic functions



3.4 Communication objects

3.4.1 Central functions

The following communication objects are available (once per actuator):

Number	Function	Data type	Flags	Priority
0	Central function 1	DPT 1.001, 1 Bit	K, S	Low
1	Central function 2	DPT 1.001, 1 Bit	K, S	Low

The communication objects of the central functions are always visible. By use of their parameter it is possible to link the central functions to the output channels. The output channels will react according to the adjustments of the call.

3.4.2 Output channels

There are 8 respectively 21 output channels per device available.

Each output channel has the following communication objects:

Number	Function	Data type	Flags	Priority
2	ON / OFF	DPT 1.001, 1 Bit	K, S	Low
3	Feedback	DPT 1.001, 1 Bit	K, L, Ü	Low
4	Disable object	DPT 1.003, 1 Bit	K, S	Low
5	Forced guidance	DPT 2.001, 2 Bit	K, S	Low
6	Scene	DPT 18.001, 1 Byte	K, S	Low
7	Start time function	DPT 1.010, 1 Bit	K, S	Low
8	Retrigger staircase lighting	DPT 1.017, 1 Bit	K, S	Low
9	Staircase light switch-on time	DPT 7.005, 2 BYTE	K, S	Low
10	Input 1 logic	DPT 1.001, 1 Bit	K, S	Low
11	Input 2 logic	DPT 1.001, 1 Bit	K, S	Low

RED written data types are not supported in ETS3.

The communication objects do repeat with the number of outputs.

3.4.2.1 Communication object *ON / OFF*

The communication object *ON / OFF* is always visible.

All outputs can be switched with the *ON / OFF* objects. The writing at object *ON / OFF* appears directly on the output, if it is not the case that

- the output is locked via Disable function / Forced guidance or
- logic functions are in use – then the object *ON / OFF* is linked with the object *Input 1 logic* or the result of the logic from *Input 1 logic* and *Input 2 logic* or
- the *device start-up time in seconds* has not been reached

Changes on the object *ON / OFF* interrupt and deactivate running time functions. In connection with time functions the object *ON / OFF* has the interpretation ”continuously switching“. New started time functions are running as specified as long as they are not interrupted via changes on the object *ON / OFF*.

If more switching operations per time than specified should be done it is possible that the device is switching delayed. If the device starts again to switch after such a break the last received object status will be used. Switching operations between beginning and ending of a break will be discarded (this relates also to other switching operations from other functions of the actuator).

The Feedback of the object *ON / OFF* can be different from the real condition of the contacts. The real output status can be influenced by logic, time, disable functions. The object *ON / OFF* will not be written with the actual status on each change of the output status contrary to object *Feedback*.

3.4.2.2 Communication object *Feedback*

The communication object *Feedback* is always visible.

The object *Feedback* correlates always to the real condition of the relay contact and will be actualized on each change of the contact and pro-actively sent. Except from power return[1)] before the first switching operation of the contact, here the object *Feedback* will be initialized with *OFF*.

If there are different channels switching at the same time there is no rule behind the chronology of the feedback messages.

3.4.2.3 Communication object *Disable object*

The communication object *Disable object* is not visible if disable functions are not in use. Alternatively to the communication object *Disable object* the object *Forced guidance* will be offered but only one of this both objects is visible at the same time.

With the object the corresponding output can be locked for other functions and be defined in its preferred position.

Interpreted Status (via parameter invertable):
0 … released
1 … locked

On power return[1)] the object will be loaded with the status of the parameter adjustment *Disable function on power return*[1)].

3.4.2.4 Communication object *Forced guidance*

The communication object *Forced guidance* is not visible if disable functions are not in use. Alternatively to the communication object *Forced guidance* the object *Disable object* will be offered but only one of this both objects is visible at the same time.

[1)] Bus / application power return are handled the same way.

By using this object the output can be locked for other functions. Via the bus the status of the output during the locking will be defined.

Interpreted values (via parameter invertable):
- 0 (binary: 00) … released
- 1 (binary: 01) … released
- 2 (binary: 10) … locked, status OFF
- 3 (binary: 11) … locked, status ON

There is no difference between 0 and 1.

On power return[1)] the object will be loaded with the status of the parameter adjustment Forced guidance on power return[1)].

3.4.2.5 Communication object *Scene*

The communication object *Scene* is not visible if scene functions are not in use.

With this object it is possible to call or store pre-defined 8 bit scenes. For storing of a scene it is not the status of the communication object *ON / OFF* what is used, but the real condition of the output at the point of time of the call to store is used. The object *ON / OFF* does not have to correspond to the real condition of an output. The output may have a different status because of other functions (e.g. time functions). It is an estimation that the user wants to store the real status of an output at the time of storing.

1-byte values on bus are interpreted as:

0 … 63:	Call scene (scene number = received value +1)
128 … 191:	Store scene (scene number = received value -127)

The values 64 … 127 und 192 … 255 will be ignored.

3.4.2.6 Communication object *Start time function*

The communication object *Start time function* is not visible if time functions are not in use.

With this object it is possible to start and stop the defined time function. The precise functionality can be adjusted by the use of its parameters. For detailed information see parameter description.

3.4.2.7 Communication object *Retrigger staircase lighting*

The communication object *Retrigger staircase lighting* is not visible if time functions are not in use.

With this object the switch-on time of the staircase lighting can be restarted or extended. The precise functionality can be adjusted by the use of its parameters. For detailed information see parameter description.

3.4.2.8 Communication object *Staircase light switch-on time*

The communication object *Staircase light switch-on time* is not visible if time functions are not in use.

With this object the switch-on time in seconds of the staircase light function can be readout or defined. The object will be pre-defined with the value in the parameter switch-on time in seconds during power return.

The staircase lighting function can be deactivated if a 0 will be written in the object.

3.4.2.9 Communication object *Input 1 logic*

The communication object *Input 1 logic* is not visible if logic functions are not in use.

The object *Input 1 logic* will be linked with the object *Input 2 logic* or with the object *ON / OFF*, depending if the second logic gate is activated or not. The way of linking can be adjusted with its parameter.

On power return[1)] the object will be loaded with the value in the parameter *Input 1 logic: Value on power return*.

3.4.2.10 Communication object *Input 2 logic*

The communication object *Input 2 logic* is not visible if logic functions are not in use.

The object *Input 2 logic* will be linked with the object *Input 1 logic* or with the object *ON / OFF*, depending if the second logic gate is activated or not. The way of linking can be adjusted with its parameter.

On power return the object will be loaded with the value in the parameter *Input 2 logic: Value on power return*.

1) Bus / application power return are handled the same way.

3.4.3 Channel-independent logic functions

There are 4 channel-independent logic functions per device available.

Each channel-independent logic function has the following communication objects:

Number	Function	Data type	Flags	Priority
213	Input 1, 1 bit	DPT 1.001, 1 bit	K, S	Low
214	Input 1, bit	5.001, 5.003, 5.004, 5.005, 5.010, 6.001, 6.010, 1 byte[1)]	K, S	Low
215	Input 1, 16 bit	7.001, 7.002, 7.003, 7.004, 7.005, 7.006, 7.007, 7.011, 7.012, 7.013, 8.001, 8.002, 8.003, 8.004, 8.005, 8.006, 8.007, 8.010, 8.011, 9.001, 9.002, 9.003, 9.004, 9.005, 9.006, 9.007, 9.008, 9.010, 9.020, 9.021, 9.022, 9.023, 9.024, 9.025, 2 byte[1)]	K, S	Low
216	Input 2, 1 bit	DPT 1.001, 1 bit	K, S	Low
217	Input 2, 8 bit	5.001, 5.003, 5.004, 5.005, 5.010, 6.001, 6.010, 1 byte[1)]	K, S	Low
218	Input 2, 16 bit	7.001, 7.002, 7.003, 7.004, 7.005, 7.006, 7.007, 7.011, 7.012, 7.013, 8.001, 8.002, 8.003, 8.004, 8.005, 8.006, 8.007, 8.010, 8.011, 9.001, 9.002, 9.003, 9.004, 9.005, 9.006, 9.007, 9.008, 9.010, 9.020, 9.021, 9.022, 9.023, 9.024, 9.025, 2 Byte[1)]	K, S	Low
219	Input, 1 bit	DPT 1.001, 1 bit	K, L, Ü	Low
220	Input, 2 bit	DPT 2.001, 2 bit	K, L, Ü	Low

RED written data types are not supported in ETS3.

The communication objects do repeat with the number of channel-independent logic functions.

3.4.3.1 Communication object ***Input 1, 1 bit***

The communication object *Input 1, 1 bit* is available, if the respective channel-independent logic function is in use and *Digital logic* as an *Operating mode* is chosen.

For further processing the object can be inverted with *Object "Input 1, 1 bit" inverted*.

The object *Input 1, 1 bit* will be linked with the object *Input 2, 1 bit*. The way of linking can be adjusted with the parameter *Linking mode*.

On power return[1)] the object will be loaded with the value in the parameter *Object "Input 1, 1 bit", status on power return*.

3.4.3.2 Communication object ***Input 1, 8 Bit***

The communication object *Input 1, 8 bit* is available, if the respective channel-independent logic function is in use and *Analog threshold* as an *Operating mode* is chosen and *8 bit* is chosen for the parameter *Size of input objects*.

The following data types are possible:

5.001, 5.003, 5.004, 5.005, 5.010, 6.001, 6.010

[1)] Bus / application power return are handled the same way.

It is only possible to compare 2 same data types. It is possible to compare data types with and without sign. For this the parameter *Input objects with/without sign* needs to be adjusted. If this adjustment is configured wrong the comparison will not work if one value is negative.

The Object *input 1, 8 bit* will be compared with *Input 2, 8 bit*, whereby the following arithmetic will be used:
Condition fulfilled, if: *Input 1, 8 bit* ≥ *Input 2, 8 bit*
Condition not fulfilled, if: *Input 1, 8 bit* < (*Input 2, 8 bit* – *hysteresis*)

On power return[1)] the object will be loaded with the value in the parameter *Value "Input 1, 8bit", after power return – analog input*.

3.4.3.3 Communication object *Input 1, 16 bit*

The communication object *Input 1, 16 bit* is available, if the respective channel-independent logic function is in use and *Analog threshold* as an *Operating mode* is chosen and *16 bit* is chosen for the parameter *Size of input objects*.

The following data types are possible:

7.001, 7.002, 7.003, 7.004, 7.005, 7.006, 7.007, 7.011, 7.012, 7.013, 8.001, 8.002, 8.003, 8.004, 8.005, 8.006, 8.007, 8.010, 8.011, 9.001, 9.002, 9.003, 9.004, 9.005, 9.006, 9.007, 9.008, 9.010, 9.020, 9.021, 9.022, 9.023, 9.024, 9.025

It is only possible to compare 2 same data types. It is possible to compare data types with and without sign. For this the parameter *Input objects with/without sign* needs to be adjusted. If this adjustment is configured wrong the comparison will not work if one value is negative. It is possible to compare whole numbers and floating-point numbers.

The object *Input 1, 16 bit* will be compared with *Input 2, 16 bit*, whereby the following arithmetic will be used:
Condition fulfilled, if: *Input 1, 16 bit* ≥ *Input 2, 16 bit*
Condition not fulfilled, if: *Input 1, 16 bit* < (*Input 2, 16 bit* – *hysteresis*)

On power return[1)] the object will be loaded with the value in the parameter *Value "Input 1, 16bit", after power return – analog input*.

3.4.3.4 Communication object *Input 2, 1 Bit*

Look at communication object *Input 1, 1 bit*.

3.4.3.5 Communication object *Input 2, 8 Bit*

Look at communication object *Input 1, 8 bit*.

3.4.3.6 Communication object *Input 2, 16 Bit*

Look at communication object *Input 1, 16 bit*.

[1)] Bus / application power return are handled the same way.

3.4.3.7 Communication object *Output, 1 bit*

The communication object *Output, 1 bit* is available, if the respective channel-independent logic function is in use and *1 bit* is chosen as an *Output object*. The status of the object *Output, 1 bit* corresponds to the used *Operating mode*. By the use of its parameter the object can be inverted, delayed or the sending behaviour in common changed. Look at parameter options.

3.4.3.8 Communication object *Output, 2 bit*

The communication object *Output, 2 bit* is available, if the respective channel-independent logic function is in use and *2 bit - forced guidance* is chosen as an *Output object.*

The object can get the following values:

0 (binary 00) … unlocked
2 (binary 10) … locked, status OFF
3 (binary 11) … locked, status ON

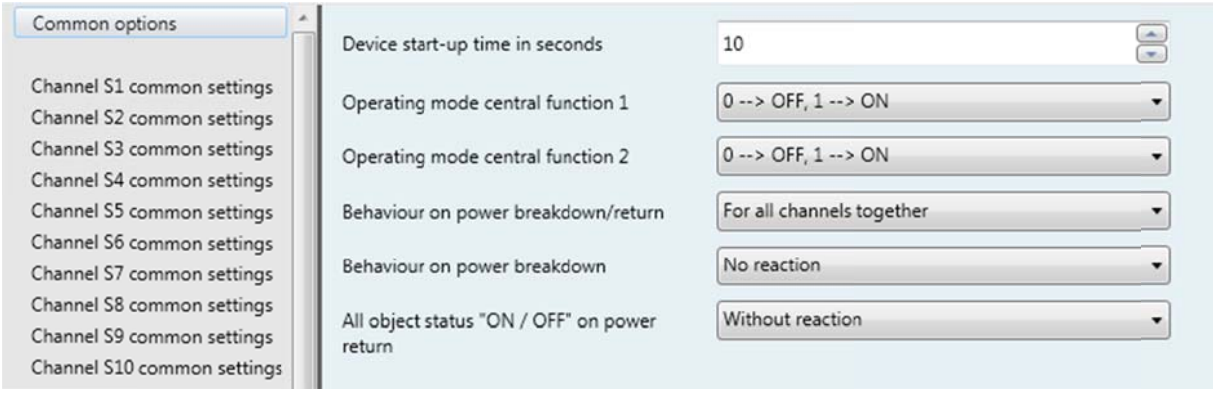
The assignment of the values to the result of the chosen functionality will be made with the parameter *Output status in case of the function is true* and *Output status in case of the function is not true*.

By the use of its parameters the object can be sent delayed or the sending behaviour in common can be changed. See parameter options.

3.5 Parameter and functionality description

In the chapter parameter and functionality description default values are underlined.

3.5.1 Common device adjustments



Device start-up time

Parameter: *Device start-up time in seconds* [10 … 255]

The *Device start-up time in seconds* is required to load internal capacitors. During this time the outputs can't be switched. If messages are received during this period, the status in the actuator will be updated. The function modules of the actuator will be loaded after the device start-up time.

Central functions

Parameter: *Operating mode central function 1*

- 0 --> OFF, 1 --> ON
- 0 --> ON, 1 --> OFF
- 0 --> OFF, 1 --> ignore
- 0 --> ignore, 1 --> ON

Operating mode central function 1
Like central function 1

The functionality of both functions can be adjusted on the page *Common options*. It is possible to choose regular or inverted operation and alternatively 2 filter options. By the use of the filter functions it is possible to realize ALL OFF or PANIC functionalities clearly.

If and which central function is linked to an output can be adjusted for each output on the respective page *Channel Sxx common settings*.

Central functions operate directly on the output. A start of time functions via central functions is not possible. By calling a central function running time functions will be cancelled and set back (but not if a call is *ignored*).

Behaviour on power breakdown/return

As a power breakdown/return the bus power breakdown/return and application power breakdown/return is valid. For operation of the actuator PA-21S-230-16-1RM both powers are necessary. The behaviour on power breakdown/return and the behaviour on application power breakdown/return are handled the same way.

The function *Behaviour on power breakdown* will be performed on KNX bus power breakdown and on application power breakdown but **NOT at ETS programming**.
The function *Behaviour on power return* will be performed on KNX bus power breakdown and on application power breakdown **AND at ETS programming**.

Parameter: *Behaviour on power breakdown/return*
- For all channels together
- For each channel separately

The behaviour on power breakdown/return can be adjusted for all channels together or for each channel separately.

The actuators PA-xxS-230-16-1RM are using latching switching elements therefore it is possible to get closed contacts also on power breakdown. If *no reaction* is chosen on the parameter *Behaviour on power breakdown* the relays will remain stable also without power supply in the position before power breakdown.

Parameter: *Behaviour on power breakdown*
- No reaction
- Switch-on
- Switch-off

The parameter is only available, if *For all channels together* is chosen on the parameter *Behaviour on power breakdown/return*.

The behaviour on power breakdown will be initiated by a under-voltage detection. Between application power breakdown and the initiation some seconds can pass by.

By switching off the outputs via the function *Behaviour on power breakdown* the Feedback objects will not be sent and updated.

Parameter: *All object status "ON / OFF" power return*
- Without reaction
- Set to OFF
- Set to ON
- Set to status before power breakdown

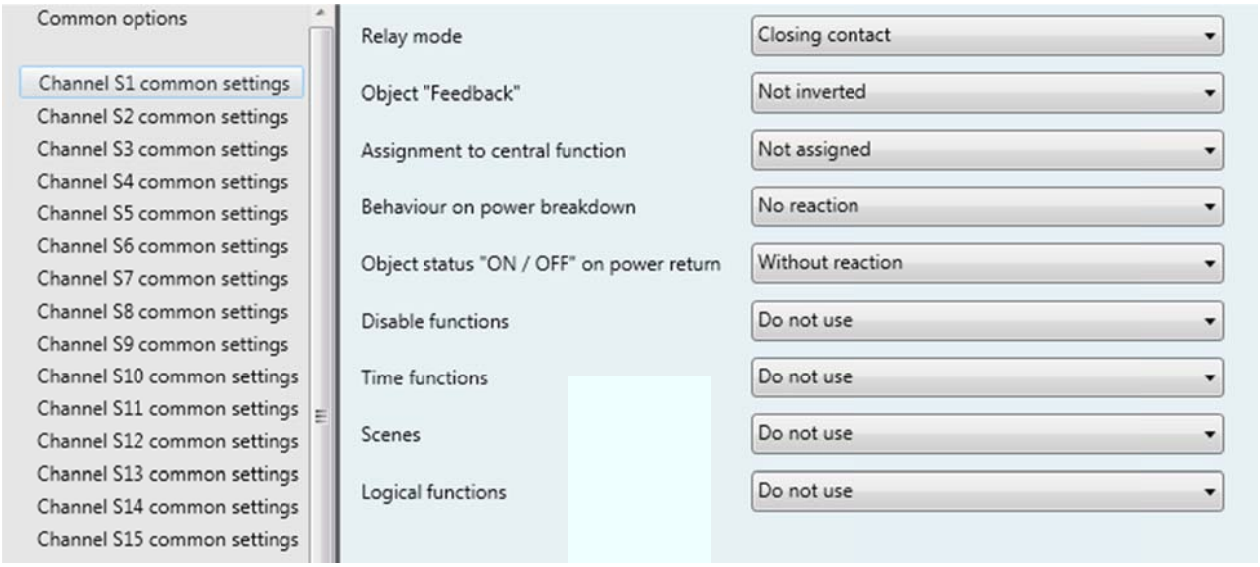
The parameter is only available, if *For all channels together* is chosen on the parameter *Behaviour on power breakdown/return*.

The function *Object status „EIN / AUS“ on power return* operates directly on the object *ON / OFF* of the respective output. This behaviour has impacts on some configurations of the channel-dependent logic functions. For the adjustments *Set to the status before power breakdown* the real status of the output is used before power breakdown. Pay attention on the adjustments *Set to the status before power breakdown*, that an ETS programming is not considered as an power breakdown and after an ETS programming the last real status before power breakdown is used!

Behaviour on power return will be operated after *Device stat-up time in seconds*.

3.5.2 Output channels

3.5.2.1 Common settings



Parameter: *Relay mode*
- Closing contact
- Opening contact

If the output is configured as closing contact, the output is open if OFF and closed if ON.

If the output is configured as an opening contact, the output is open if ON and closed if OFF.

Parameter: *Object “Feedback“*
- Not inverted
- Inverted

The feedback object will be updated and sent inverted or not inverted with the real status on each change of the output.

Parameter: *Assignment to central function*
- Not assigned
- Central function 1
- Central function 2
- Central function 1 and central function 2

It is possible to adjust that the output reacts on messages from both central functions.

Behaviour on power breakdown/return[1)]

The behaviour on power breakdown/return and also be adjusted for each channel separately. In that case the following parameters are available:

Parameter: *Behaviour on power breakdown*
- Without reaction
- Switch-on
- Switch-off

The parameter is only available, if *For all channels together* is chosen on the parameter *Behaviour on power breakdown/return*.

For functionality please look at common settings.

Parameter: *Object status "ON / OFF" on power return*
- Without Reaction
- Set to OFF
- Set to ON
- Set to the status before power breakdown

The parameter is only available, if *For all channels together* is chosen on the parameter *Behaviour on power breakdown/return*.

For functionality please look at common settings.

3.5.2.2 Disable function, forced guidance

By the use of disable functions it is possible to influence an output immediately and with priority. If a locking will be activated the output will be stable until the end of locking and can't be changed by the use of other functions.

1) Bus / application power return are handled the same way.

The actuators PA-xxS-230-16-1RM provide 2 different ways of locking:

- Disable function
- Forced guidance

Disable function will be controlled by a 1-bit object. The status during locking can be adjusted with the parameter *Behaviour at the beginning of locking*. A pre-selection of the status during locking via bus is not possible. If the status will be changed by the parameter *Behaviour at the beginning of locking* or *Behaviour after end of locking*, running time functions will be cancelled and set back.

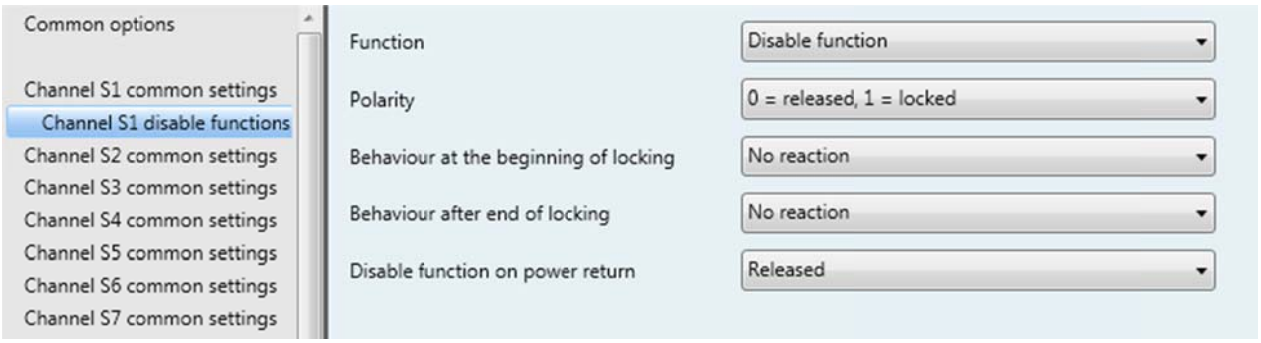
Forced guidance will be controlled by a 2-bit forced-guidance-object. The status during locking can be adjusted with parameter via the bus. Because of that the *Behaviour at the beginning of locking* is not possible to adjust. The following options are available:

- *No priority:* Channel is not locked and operates as per configuration.
- *Priority OFF*: Channel is locked and will be switched OFF on locking.
- *Priority ON*: Channel is locked and will be switched ON on locking.

The direct toggle switch from *Priority OFF* and *Priority ON* is possible. As soon as forced guidance is activated running time functions will be cancelled and set back.

Switching on power breakdown[1)] will not be processed if the output is locked.

Disable functions



The following parameters are only available, if disable functions are activated and *Disable function* are chosen on parameter *Function*.

Parameter: *Polarity*

- 0 = released, 1 = locked
- 0= locked, 1 = released

By using this parameter the polarity of the disable function can be changed.

1) Bus / application power return are handled the same way.

Parameter: *Behaviour at the beginning of locking*

- No reaction
- Switch-on
- Switch-off

By using this parameter the status during locking can be adjusted. As soon as the locking is activated, the channel will switch according to configuration. If the parameters *Switch-on* or *Switch-off* are chosen running time functions will be cancelled and set back at begin of locking.

Parameter: *Behaviour after end of locking*

- No reaction
- Switch-on
- Switch-off
- Status before locking

By using this parameter the status after end of locking can be adjusted. As soon as the locking is activated, the channel will switch according to configuration. The status before locking is he real output status and not the status of the object *ON / OFF*. The object *ON / OFF* does not have to correlate with the real status of the output. The output can be influenced by other functions (e.g. time functions) to another status. If *Switch-on*, *Switch-off* or *Status before locking* is chosen running time functions will be cancelled and set back after end of locking.

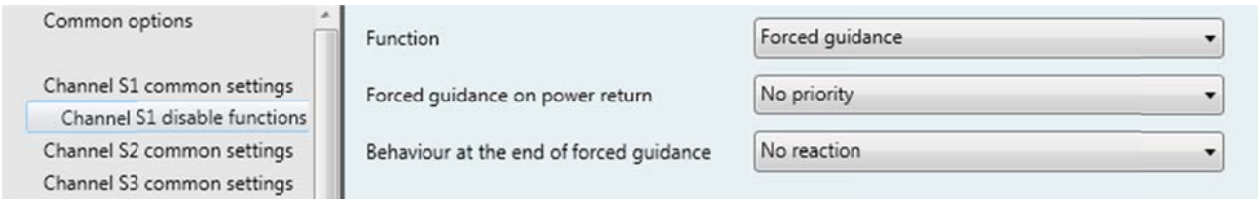
Parameter: *Disable function on power return*

- released
- Locked, proceed with behaviour on pwr.-ret.

On power return[1)] adjusted stitching operations by *Object status ON / OFF on power return* will not proceed if a locking is configured on parameter *Locking on power return*. If the parameter *Locked, proceed with behaviour on pwr.-ret.* is chosen the configured switching operation will proceed after device start-up time.

[1)] Bus / application power return are handled the same way.

Forced guidance



Parameter: *Forced guidance on power return*

- No priority
- Priority OFF
- Priority ON

On power return[1)] the output will be switched accordingly. By parameter *Object status ON / OFF on power return* adjusted switching operations will not be processed, if in parameter *Forced guidance on power return* a forced guidance is configured. If on power return[1)] a forced guidance is active the configured switching operation will proceed after device start-up time.

Parameter: *Behaviour after end of locking*

- No reaction
- Switch-on
- Switch-off
- Status before locking

By using this parameter the status after end of forced guidance can be adjusted. As soon as the forced guidance is deactivated the channel will switch accordingly. The real value of the output will be used as a value before forced guidance and not the status of the object *ON / OFF*.

3.5.2.3 Time functions

There are the following time functions available:

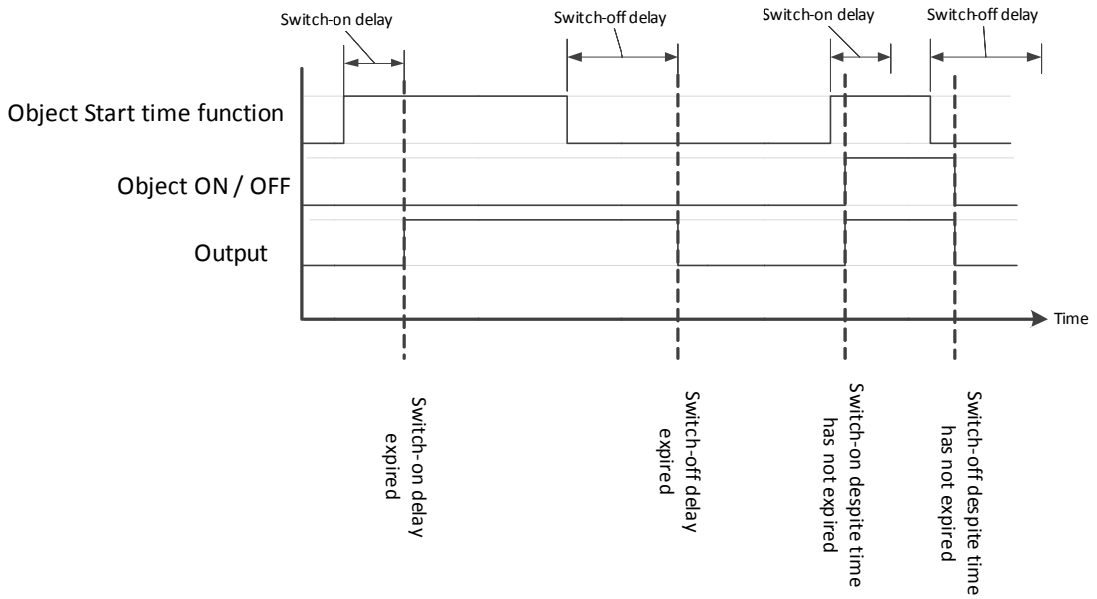
- Staircase lighting function
- ON- / OFF delay

Time functions will be started via object *Start time function* and not by the object *ON / OFF*. The object *ON / OFF* and all other functions operate directly and without delay on the output (apart from scenes of logic functions, if time functions are called by this). Running time functions will be cancelled and set back.

If times are configured with 0 the functions are deactivated (ON- / OFF delay or Staircase lighting function. An external adjustment for time = 0 via object *Staircase light switch-on time* is always possible. The configuration of the object *Staircase light switch-on time* will take effect at the next start of a time function and will not be taken under consideration for the running time function.

[1)] Bus / application power return are handled the same way.

ON- / OFF delay



Messages for the object *ON / OFF* and changes on status via other functions have priority over ON- /OFF delay. If during a running ON – delay an OFF message will be received the delay will be stopped and the output stays OFF. If during a running OFF – delay an ON message will be received the delay will be stopped and the output stays ON.

Times are for ON- / OFF delays not retriggerable because it can be the case that ON respectively OFF messages will be sent by different sources.

The following both parameter are available if time functions of a channel are in use and as an *Operating mode* the option *ON- / OFF delay* is chosen.

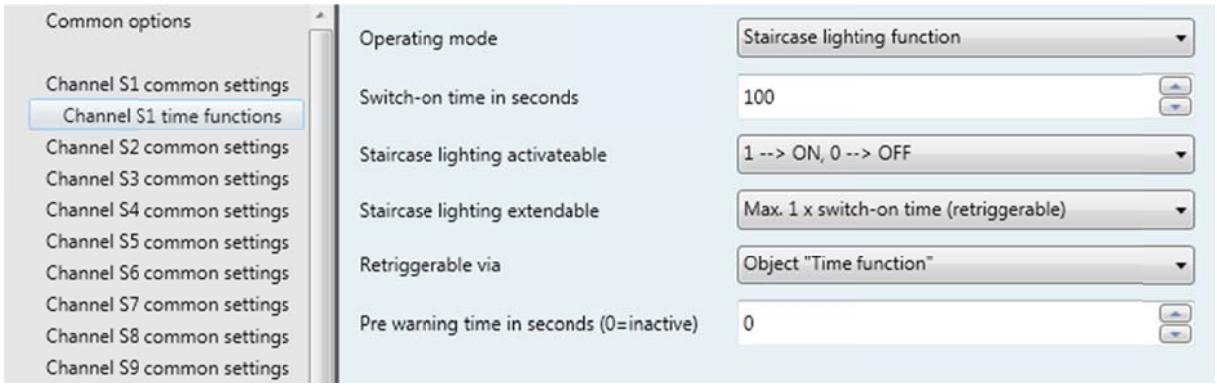
Parameter: *Switch-on delay in seconds* [0 … 65535]

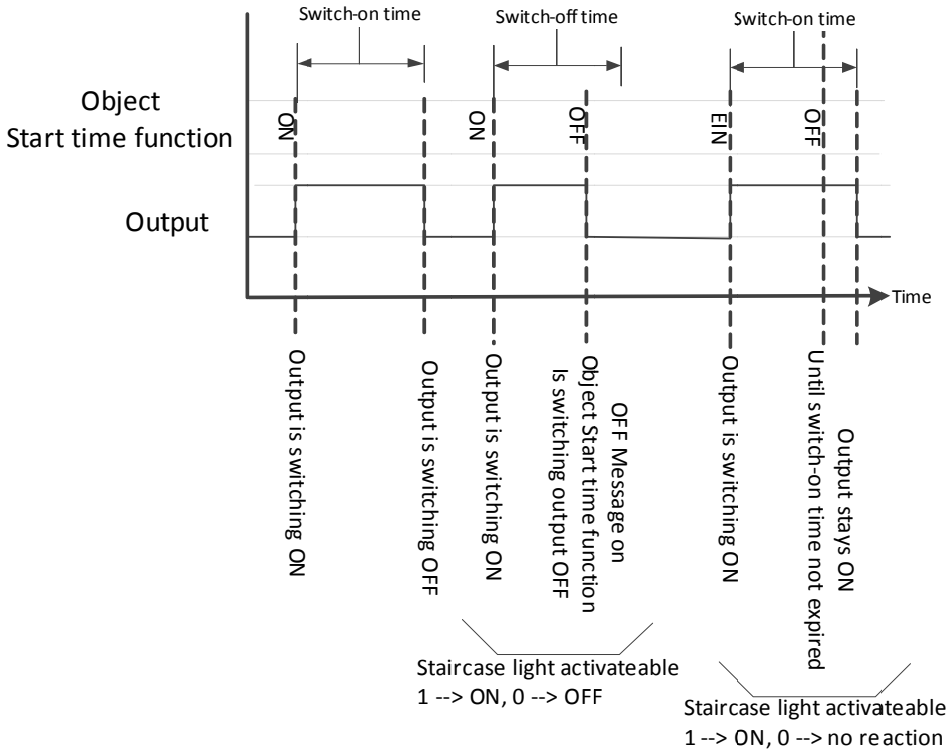
The parameter delays the switch-on operation of a channel after receiving an ON message on the communication object *Start time function* by the adjusted time in seconds (maximum a little more than 18 hours).

Parameter: *Switch-off delay in seconds* [0 … 65535]

The parameter delays the switch-off operation of a channel after receiving an OFF message on the communication object *Start time function* by the adjusted time in seconds (maximum a little more than 18 hours).

Staircase lighting function





It is possible to retrigger the switch-on time by the factor *Staircase lighting extendable* during a running operation. On each message the switch-on time will be extended by the time defined in parameter *Switch-on time in seconds* (limited by parameter *Staircase lighting extendable* prevent from unintentionally too long extensions). The extension time is valid from the point of time of the last received message for extension. Running staircase lighting functions can (if activated) always be extended. The extension can be called via the object *Start time function* or via an own object *Retrigger staircase lighting*. The adjustment will be done via the parameter *Retriggerable via*. The extension is only possible via the chosen object. Starting the staircase lighting function is only possible via the object *Start time function*.

Pay attention on eventually used feedback messages on the adjustments *Max. 2 x switch-on time* and *Max. 3 x switch-off time* on the parameter *Staircase lighting extendable*! If the *Feedback* object is in the same group address as the object *Start time function* respectively *Retrigger staircase lighting* then the sending of the feedback object extends the time by factor 2.

Function example:

A light in a room should be controlled by an actuator but should be switched-off after a specific time with the help of a motion detector (without presence function) if no one is left in the room.

Solution with PA-xxS-230-16-1RM:

By pushing the switch the object Start time function the light will be switched on. The motion detectors will retrigger the time function permanently via the object Retrigger staircase lighting. The light can be always switched-off with an OFF message on the object Start time function. In that case the Output will not be switched-on again by receiving further retrigger messages. If the output will not be switched-off and there are no retrigger messages, the output will be switched-off after switch-on time.

Changes on the object *ON / OFF* and status changes via other functions interrupt and deactivate running time functions. In connection with time functions the object *ON / OFF* has the interpretation ”continuously switching“. New started time functions are running as specified as long as they are not interrupted via changes on the object *ON / OFF*.

Function example:
A staircase lighting function was started. During switch-on time the object EIN / AUS receives an ON message -> The time of the staircase lighting function will be stopped and the Output stays continuously ON.

Function example:
An output was switched-on by a ON message on the object ON / OFF.
After that the staircase lighting function was started -> The Output stays ON because of the start from the staircase lighting function until the Switch-on time is expired and is then switching-off.

The following five parameters are only available if time functions of the respective channel are in use and the option *Staircase lighting function* is chosen on *Operating mode*.

Parameter: *Switch-on time in seconds* [0 … 100 … 65535]

If the time function will be started by the object *Start time function* and therefore the output immediately switched-on the *Switch-on time* is now the time that have to pass by until the actuator will switch-off the output.

The value of the object *Staircase light switch-on time* will be loaded with the configured value *Switch-on time in seconds* on power return (device reset or ETS programming).

Parameter: *Staircase lighting activateable*

- 1 --> ON, 0 --> OFF
- 1 --> ON, 0 --> no reaction
- 1 --> ON, 0 --> ON

By using this parameter it is possible to adjust how the reaction on received messages on the object *Start time function* is whereby *ON* a switching-on and starting, and *OFF* a switching-off and stopping of the time brings.

Parameter: *Staircase lighting extendable*

- Max. 1 x switch-on time (retriggerable)
- Max. 2 x switch-on time
- Max. 3 x switch-on time
- Not extendable

By using this parameter it is possible to adjust how to react on a new start of an currently running staircase lighting function. Each received start message extends the running time by *Switch-on time in seconds* until the maximum is reached. The maximum of extension is adjusted by this parameter.

Parameter: *Retriggerable via*

- Object “Time function“
- Own object

An extension of a running staircase lighting function can be done via object *Start time function* or via object *Retrigger staircase lighting*. The adjustment with what object the time can be retriggered is done via this parameter. The first start of the staircase lighting function can only be done via *Start time function*.

Parameter: *Pre warning time in seconds* [0 … 255]

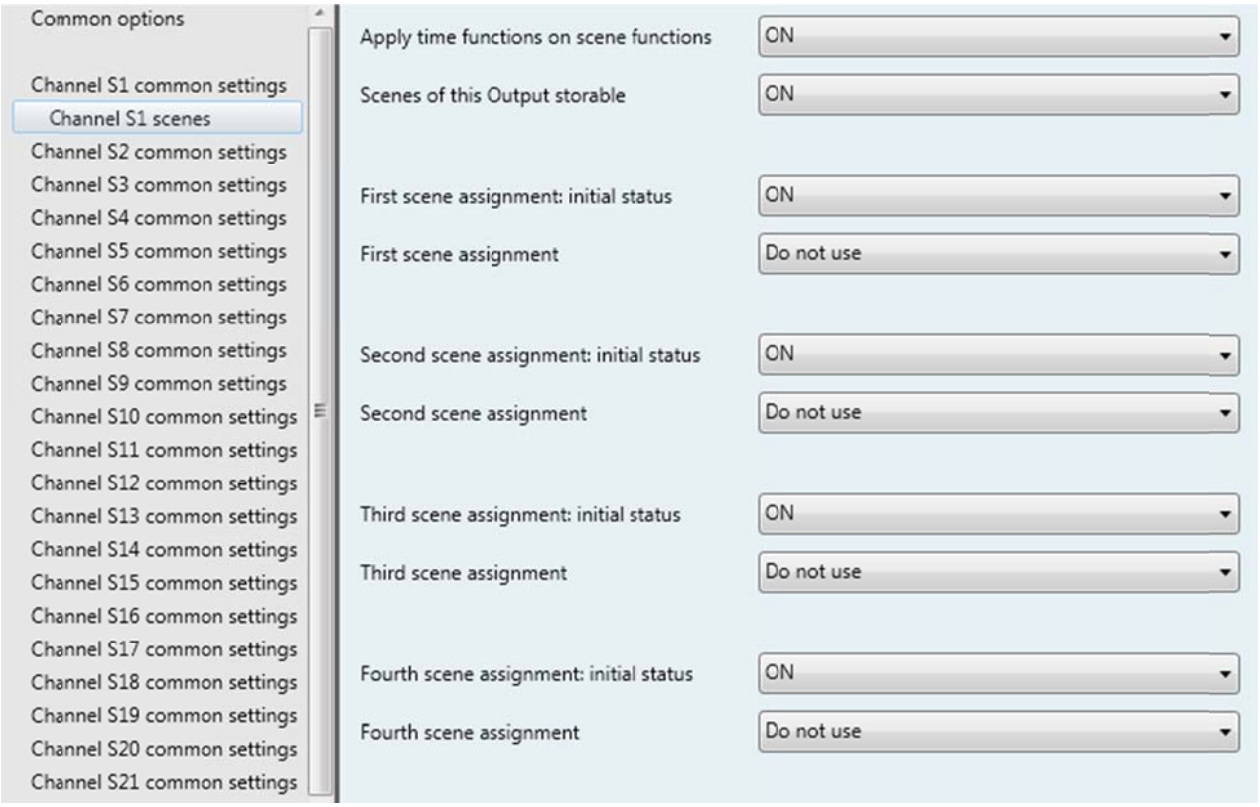
By approaching the pre warning time the output will be switched-off for 1 second. The pre warning time has to be less than the switch-on time – 3 seconds. If not the pre warning time will be ignored.

Pay attention that by using the *Feedback* object the time function can be influenced if the object *Feedback* is in the same group address like the object *Start time function*.

For example:
Object Feedback and object Start time function are in the same group address. A staircase lighting function with pre warning time is in use. The parameter staircase lighting activateable is configured with 1--> ON, 0 --> OFF.

If the pre warning time is achieved the output will be switched-off and an OFF message as feedback sent. In this configuration the feedback message stops he time function. The output will not be switched-on after having achieved the pre-warning time!
If this behaviour is undesired you have to use different group addresses for Start time function and Feedback.

3.5.2.4 Scenes



There are 5 configurable 8-bit scenes available with each one scene object per output. For each output it is adjustable if the scenes can be saved via bus or not. The called status will be defined by the parameter *Initial status*. Via a possible saving the parameter *Initial status* will be overwritten.

The parameters in section *Channel xx scenes* are only available, if scene functions are in use.

Parameter: *Apply time functions on scene functions*
- ON
- OFF

By using the parameter *Apply time functions on scene functions* the adjusted time function can be started instead of direct switching by a scene call. If there is no time function configured the output will switch immediately.
It *OFF* is chosen on this parameter running time functions of the channel will be cancelled and set back on scene call.

Parameter: *Scenes of this output storable*
- ON
- OFF

By using this parameter it is possible to adjust if the configured initial status can be overwritten by save-calls. Saved values will remain saved on power breakdown[1)].

Parameter: *First scene assignment: initial status*
- ON
- OFF

This parameter specifies the status of the output on call of a scene. The description is valid also for the following 4 scene assignments.

Parameter: *First scene assignment*
- Do not use
- 1 … 64

If a scene number will be called the output will be switched into the in parameter *Initial status* adjusted position. The description is valid also for the following 4 scene assignments.

If there will be more of the 5 possible scene assignments used with the same scene number but with different initial status then the initial status with the highest scene number (5) will be used.

3.5.2.5 Channel-oriented logic functions

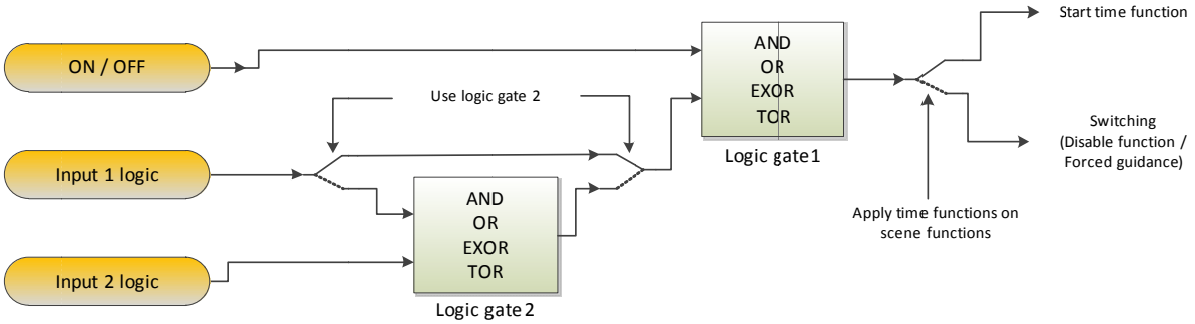
This section is only available if logic functions are in use. There are 2 logic gates available per channel whereby the object *ON / OFF* as one of both inputs of the logic gate 1 is used. All inputs of the logic functions have equal rights. The output of the logic function is always the respective relay of the output channel. The output of the logic function is not available as a KNX object. If this is a requirement the *Channel-independent logic functions* have to be used.

1) Bus / application power return are handled the same way.

The following logic linking types are available:

- AND
- OR
- EXOR
- TOR

Functionality of the logic functions:



State transition diagram for AND, OR and EXOR linking's:

AND

Input 1	Input 2	Output
OFF	OFF	OFF
OFF	ON	OFF
ON	OFF	OFF
ON	ON	ON

OR

Input 1	Input 2	Output
OFF	OFF	OFF
OFF	ON	ON
ON	OFF	ON
ON	ON	ON

EXOR

Input 1	Input 2	Output
OFF	OFF	OFF
OFF	ON	ON
ON	OFF	ON
ON	ON	OFF

At the logic functions AND, OR and EXOR the result will be sent on each update of an input object.

Functionality of the TOR function:

By using the TOR function it is possible to suppress messages. The TOR function delivers the status of the first input only to the output if the second input is ON. If the second input is OFF the output of the logic function will not be written.

TOR		
Input 1	Input 2	Output
OFF	OFF	No reaction
OFF	ON	OFF
ON	OFF	No reaction
ON	ON	ON

In terms of PA-xxS-230-16-1RM actuators this does mean:

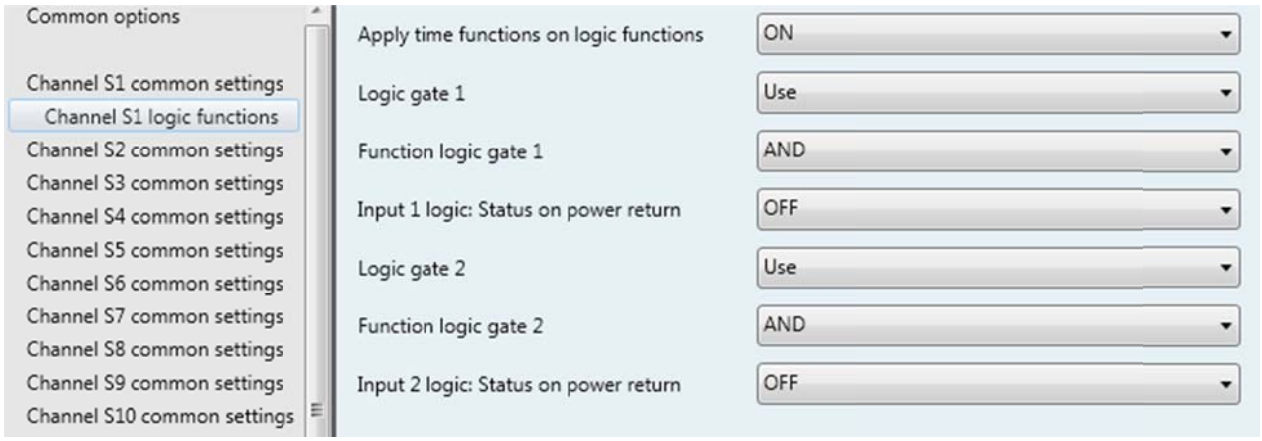
Only logic gate 1 in use:

The output will switch according the object status of the object *ON / OFF* if the status of the object *Input 1 logic* is ON. For further details please look at parameter description.

Both logic gates in use:

The status of the object *Input 1 logic* will only operate with the logic linking with the object *ON / OFF* if the value of the object *Input 1 logic* in ON. For further details please look at parameter description.

Parameter description:



Parameter: *Apply time functions on logic functions*

- ON
- OFF

The parameter is available as soon as logic functions are in use. If the *ON* is chosen on parameter *Apply time functions on logic functions* the output will not be switched directly on changes from the result but the time function started. If *OFF* is chosen on this parameter the output will be switched immediately and running time functions of the channel will be cancelled and set back.

Parameter: *Logic gate 1*

- Use
- Do not use

At least one gate has to be activated to be able to use logic functions.

Parameter: *Function logic gate 1*

- AND
- OR
- EXOR
- TOR

This parameter defines the linking type of the first logic gate. For further descriptions please look at the transition diagrams for AND, OR and EXOR linking and the functionality of the TOR function.

Parameter: *Input 1 Logic: Status on power return*

- OFF
- ON

For a device reset via ETS programming, bus power return or application power return the initial status for the logic inputs are configurable. The initial status for object *ON / OFF* is also configurable. To process the logic function immediately, the object hast to be written with *ON / OFF* with a status (adjustment: *Object status ON / Off on power return* or a message to a group address with an object of the logic function or the object *ON / OFF*).

Parameter: *Logic gate 2*

- Use
- Do not use

Look at parameter *Logic gate 1*

Parameter: *Function logic gate 2*

- AND
- OR
- EXOR
- TOR

Look at parameter *Function logic gate 1*

Parameter: *Input 2 logic: Status on power return*

- OFF
- ON

Look at parameter *Input 1 logic: Status on power return*

3.5.3 Channel-independent logic functions

3.5.3.1 Common

The channel-independent logic functions are designed to work with the functions of the own device and to increase the range of functions. But the logic functions can also work for other KNX devices. There are 4 channel-independent logic functions available per device.

There are 2 modes to choose:

- Analog threshold
- Digital logic

In both modes the result of the logic function will be sent to a configurable output cell by which a lot of functions are possible.

Most of these functions have the possibility to define values on power return[1)]. On power return the output status will be calculated and the object of the function will be updated but not send pro-actively.

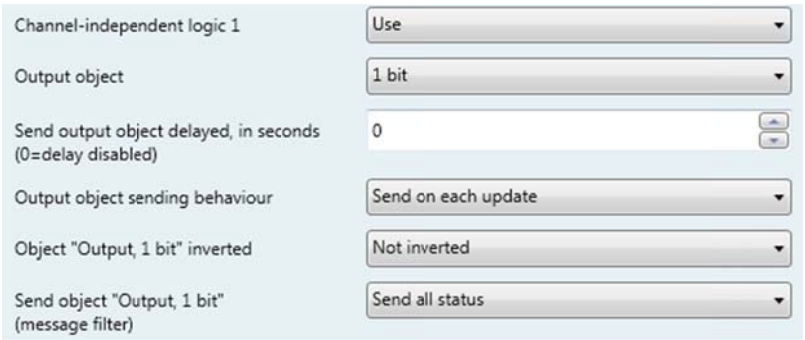
3.5.3.2 Configurable output cell

By using the configurable output cell it is possible to send the result of the adjusted logic function as a 1 bit switch-message or as a 2 bit forced guidance-message. Therefore it is possible to generate a forced guidance telegram out of an analog value for example. By the help of the message filter it is possible to filter undesired messages on 1 bit output objects. It is possible to filter on the content of the message.

At 2 bit output objects it is possible to define the respective status of the 2 bit forced guidance output by the parameter *Output object in case the function is true* und *Output object in case the function is not true*.

It is possible to set a delay for an output if the output status should be sent delayed.

Parameter description:



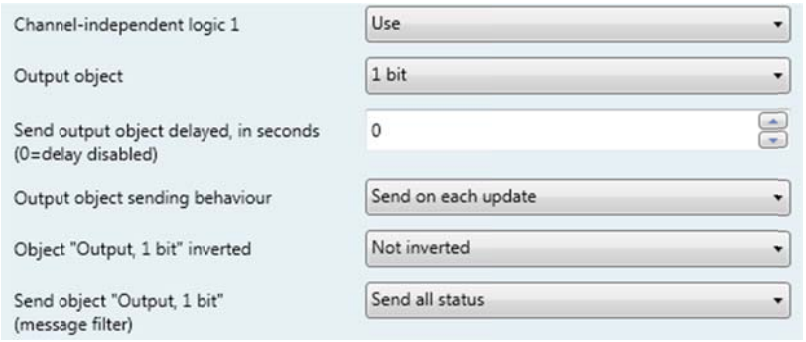
[1)] Bus / application power return are handled the same way.

Parameter: *Output object*

- 1 Bit
- 2 Bit forced guidance

This parameter is only available if *Channel-independent logic x* is in use. With this parameter the object size of the output can be adjusted. The data type of the 1 bit objects can be chosen freely. The data type of the 2 bit objects corresponds to forced guidance.

Chosen output object: 1 Bit



The following parameters are only available if *1 bit* is chosen on parameter *Output object*.

Parameter: *Send output object delayed, in seconds (0=delay disabled)*
[0 … 65535]

By using this parameter it is possible to delay output messages by the adjusted time.

Function example: Delayed sending of an output object.

ATTENTION: If a delay is set and the in the meantime changed output status was not sent already the delay time will be started by each change on new output status again. The status before actualization will be discarded even if this was not sent. Non relevant off- and on-switching will be avoided.

Parameter: *Output object sending behaviour*

- Send on each update
- Send only when changed

It is possible to adjust by when a message by object *Output,1 bit* should be sent. On the adjustment *Send on each update* the (delayed) sending of the output will be processed on each update of an input. On the adjustment *Send only when changed* the output will only be sent on changes of the objects *Output, 1 bit*.

Parameter: *Object "Output, 1 bit" inverted*

- Not inverted
- inverted

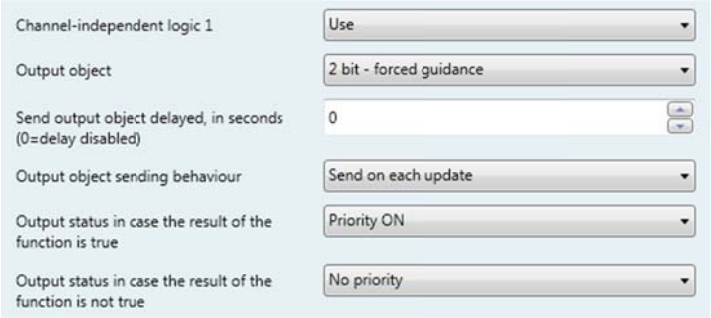
By using this parameter it is possible to invert the object *Output, 1 bit*.

Parameter: Send object *"Output, 1 bit" (message filter)*

- Send all status
- ON: send, AUS: do not send
- EIN: do not send, AUS: send

By using this parameter it is possible to avoid sending from unwanted status via the object *Output, 1 bit*. It is possible to create small message filters. The output object will only be loaded by the settings in the parameter *Object „Output, 1 bit" (message filter)* even if the result of the logic function delivers a different status. This can be important if it is needed to read from the output object. If an message filter is configured and additionally *Send only when changed* is chosen on parameter *Output object sending behaviour* the output object will be sent as soon as the result of the logic linking is also changed (also if the output object has always the same status).

Chosen output object: 2 bit forced guidance



The following parameters are only available if *1 bit forced guidance* is chosen on parameter *Output object*.

Parameter: *Send output object delayed, in seconds (0=delay disabled)*
[0 … 65535]

Look at *Send output object delayed, in seconds (0=delay disabled) of the 1* bit Output.

Parameter: *Output object sending behaviour*

- Send on each update
- Send only when changed

Look at *Output object sending behaviour* of the 1 bit Output.

Parameter: *Output status in case the function is true*
- Priority ON
- No priority
- Priority OFF

By using this parameter the status of the object *Output, 2 bit* will be assigned in dependence on the result of the configured function. Result of the configured function means for example that das it is true that via an analog threshold function Input 1 ≥ Input 2 is or that via a digital logic function 1 AND Input 2 TRUE delivers.

Parameter: *Output status in case the function is true*
- No priority
- Priority ON
- Priority OFF

Look at *Output status in case the function is true*.

3.5.3.3 Analog threshold

Functionality:
There will be an ON delivered to the configurable output cell if:
Input 1 ≥ *input 2*
There will be an OFF delivered to the configurable output cell if:
Input 1< (*input 2 – hysteresis*)

It does only make sense to compare 2 objects with same object sizes and same units e.g. 2 times temperature in °C or 2 times wind speed in m/s, …

According to the used data type pay attention to the correct adjustments to the use of object values with sign. Otherwise calculations with negative signs will not work!

For comparisons of values in the format F16 (exponential format) the hysteresis can't be used. The setting for the hysteresis has to be 0.

The value of both inputs on power return[1)] can be configured independent if whole numbers or floating-point numbers will be used. The product database delivers only the possibility to define whole numbers as values on power return (e.g. unit: counting impulses). If other data types are used the requested values have to be converted into the requested format.

To enter a value for *Hysteresis* > *Input 2* does not make sense. A wrong entry respectively a change during operation is possible and will be ignored by the application.

2) Bus / application power return are handled the same way.

3.5.3.4 Digital logic

The following logic linking types are available:

- AND
- OR
- EXOR
- TOR

Inputs can be inverted individually. The status of the input objects on power return[1)] can be configured.

State transition diagram for AND, OR and EXOR linking's:

AND

Input 1	Input 2	Output
OFF	OFF	OFF
OFF	ON	OFF
ON	OFF	OFF
ON	ON	ON

OR

Input 1	Input 2	Output
OFF	OFF	OFF
OFF	ON	ON
ON	OFF	ON
ON	ON	ON

EXOR

Input 1	Input 2	Output
OFF	OFF	OFF
OFF	ON	ON
ON	OFF	ON
ON	ON	OFF

TOR-Function

The begin status of the logic function what will be sent to the configurable output cell is the status of the object *Input 1, 1 bit*. Changes on this object will only be sent to the configurable output cell if the status of the object *Input 2, 1 bit* is 1 (respectively 0 if the object *Input 2, 1 bit* is inverted).

TOR

Input 1	Input 2	Output
OFF	OFF	No reaction
OFF	ON	OFF
ON	OFF	No reaction
ON	ON	ON

1) Bus / application power return are handled the same way.

4 Appendix

4.1 Delivery contents

PA-xxS-230-16-1RM devices will be delivered with the following components:

- Device PA-xxS-230-16-1RM
- Installation and operating instruction
- KNX bus terminal

Please check the delivery contents of the device on delivery.

4.2 Statutory regulations

PA-xxS-230-16-1RM devices are CE-compliant. Relevant documents are available at PEAR Automation GmbH.

PA-xxS-230-16-1RM devices are permitted to be operated in the following countries:
Germany, Austria, Swiss, Belgium, Bulgaria, Denmark, Estonia, Finland, France, Greece, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Rumania, Sweden, Slovakia, Slovenia, Spain, Czech Republic, Hungary, United Kingdom, Cyprus.

If you want to operate PA-xxS-230-16-1RM devices in other countries please consult PEAR Automation GmbH before the installation.

4.3 Advice on disposal

PA-xxS-230-16-1RM devices content electronic components. Never dispose electronic waste into domestic waste.

4.4 References

KNX is a brand of the KNX Association.

Change log

Version	Date	Description	Author
0	28.12.2011	Translation from German	Christoph Krump

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