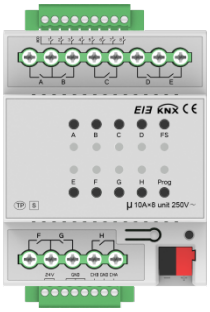
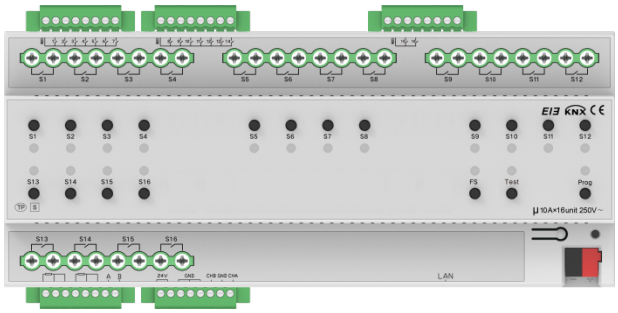
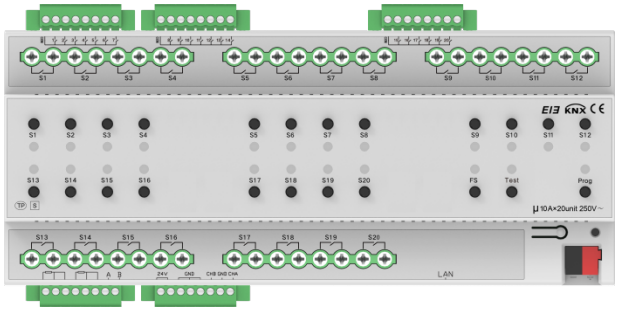
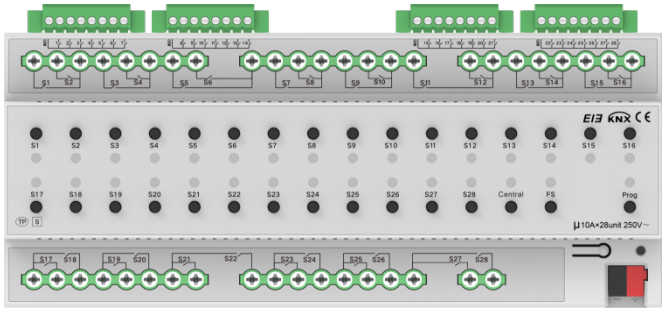
# Multi-function actuator

## 4/8/16/20/28-Fold









## KNX/EIB Intelligent Control Systems for Homes and Buildings

# Contents

# 1. Functional overview

The multi-function actuator is a module with multiple inputs and multiple outputs. The multiple inputs are dry contact scanning inputs and the input signals can be converted into a variety of output signals. The multiple outputs integrate various output functions, such as switch outputs, curtain DC/AC outputs, fan outputs and valve outputs. The functions of this module can be configured arbitrarily according to requirements, e.g. part of the outputs are used to control switches, part of the outputs are used to control curtains, part of the outputs are used to control fans and so on.

This series of products are divided into 4, 8, 16, 20 and 28 inputs and outputs, different output channels of the product with different load size, specific reference to the technical chapter. One relay in the device means one way output, some functions may need to use more than one output, for example, one curtain AC output needs to take up two relay outputs, one relay is used to control forward rotation and the other one is used to control reverse rotation, while the ordinary switch output needs to take up one relay output. Therefore, in the process of engineering applications, according to the actual needs of the product selection. Moreover, there is a manual operation button on the top of the product, which is more convenient to deal with the project debugging.

The multi-function actuators are modular mounting devices, designed for easy installation into distribution boxes according to EN 60715 and can be mounted on 35 mm DIN rails. The devices are electrically connected using screw terminals, the bus connection is directly connected via the EIB terminal blocks, and the system power supply does not require any additional supply voltage other than the bus.

This manual provides the user with detailed technical information about the multi-function actuator, including installation and programming details, and explains how to use it in relation to practical examples.

**The functions of the multi-function actuator are summarised below:**

**Dry contact input scanning** for connecting normal switch panels or sensors with dry contact output types, supporting up to 28 accesses, converting input signals into intelligent control signals, with the functions outlined below:

- Switching function

- Dimming function
- Value sending function
- Scene Functions
- Blinds Function WW
- Shift Register Function

**Switching outputs** to connect a number of electrical loads such as lighting, sockets and heating controls. The switching outputs are available up to 28 channels, with one output occupying a relay control and each output with an electronic switch control, the functions of which are summarised below:

- Ordinary switch
- Time function: delayed on/off function
- Time function: flashing switch function for easy ageing of lamps and lanterns
- Time function: staircase lighting function, turn on the staircase lighting, a period of time automatically switch off the lighting, with the sensor to use the effect is better
- Provides 8 scene controls, called and stored by 1byte objects
- Logic operations: and, or, different or, gate functions, up to three logic inputs
- Status value query response, which makes it easy to know the current contact status of the switch from the visualisation device
- Forced operation function, two data types available: 1bit/2bit, forcing on or off action, with highest priority
- Output time calculation function for recording the length of time a relay has been open
- Electrothermal valve driver control function
- Selection of relay contact positions after supply power is restored
- Selection of relay contact position after power supply dropout
- Manual switch output, single or centralised control

**Curtain AC/DC output** to connect some blinds, awnings, roller blinds, curtains, vertical blinds etc. with motors, up to 14 channels AC control mode (AC motor type and dry contact control motor type) or

7 channels DC control mode (DC motor control type). The output contacts are direction up and direction down, and the pause time when changing direction can be set by parameter. Curtain AC and DC are wired differently, curtain AC occupies two relays per channel and curtain DC occupies four relays per channel, please refer to the connection diagrams in section 3 for specific wiring instructions, but their functions are similar and are summarised below:

- Move up/down
- Stop/adjust louvres
- Move to position 0.....100%
- Louvres adjusted to position 0.....100% (only for "Venetian Blind" operating mode)
- Provides 8 scene controls, called by 1byte objects
- Automatic solar protection
- Safety and security features
- Current Position Status Reply
- Two modes of operation ("Venetian Blind" and "Shutter/Awning").
- Weather warning protection function
- Forced operation function
- Manual operation function
- Centralised Operating Functions

**The fan control** can be connected to a single-phase fan and supports up to 3 levels of fan speed adjustment. The output contacts are identical to the switch outputs. The functions are summarised below:

- Supports fans with Class 1, 2, and 3 wind speeds
- The fans are available in two operating modes: step switch and steering switch.
- Forced operation: enables the wind speed to be operated only within the permitted wind speed range and has the highest priority

- Automatic operation: automatic operation of the air speed according to the control value, which is obtained by a sensing device on the bus, with the possibility of setting the minimum operating time of the air speed
- General operation: manual control of fan operation, e.g. via operating panels, etc.
- Fans with multi-stage air speeds with programmable start-up characteristics
- On/off delay or minimum run time can be set for fans with single-stage air velocity
- Status feedback, e.g. automatic operation status, fan on/off status, wind speed, etc.
- Operational control of bus power-up or power-down behaviour
- Manual operation function, single or centralised control

**Valve control for** connection to 2- or 4-control coil systems, with separate relay outputs for cooling and heating valves, available in three control types: continuous (3point, open and close), PWM switching (continuous, PWM) and 2-point switching (2 state-ON/OFF).

Continuous type is to control the opening of the valve according to the control value of the valve, which can open or close the valve completely or stop the valve at an intermediate position, and this control type is suitable for driving three-wire valves.

PWM switching type can only make the valve fully open or fully closed two states, the valve according to the control value (1byte) and the PWM cycle cycle for cyclic switching operation, the valve switching distinction between normally open or normally closed type, this control type is suitable for driving two-wire valve.

The 2-point switching type is similar to the PWM switching type in that it can only be fully opened or fully closed, but the difference is that it is directly opened or closed according to the control value (1bit) on the bus, which is usually applicable to the occasions where valves are switched on or off according to the difference in temperature, and is suitable for driving two-wire valves.

The functions are summarised below:

- Supports three valve control types
- Monitoring of control values on the bus, possibility of sending fault statuses
- Valve characteristic curve correction (continuous type valves only)

- Automatic valve adjustment function (only for continuous type valves)
- Disable/enable heating or cooling valve
- Valve position status feedback or query
- Manual or automatic cleaning of the valve, sending the cleaning status
- Manual operation function, single or centralised control

The assignment of the physical address and the setting of the parameters can be done using the engineering tool software ETS with knxprod files (version ETS4 and higher).

In order to ensure that all the functions of this product are used correctly, it is necessary to check whether there are any problems with the wiring before use, and also to pay attention to the technical characteristics of the load equipment when setting the parameters, especially for curtain drives, fans and valves, which involve more technical characteristics, and some of which are inherent to the equipment, and which, if improperly set, are likely to result in the damage of the load equipment, or incorrect operation.

# 2. Technical parameters

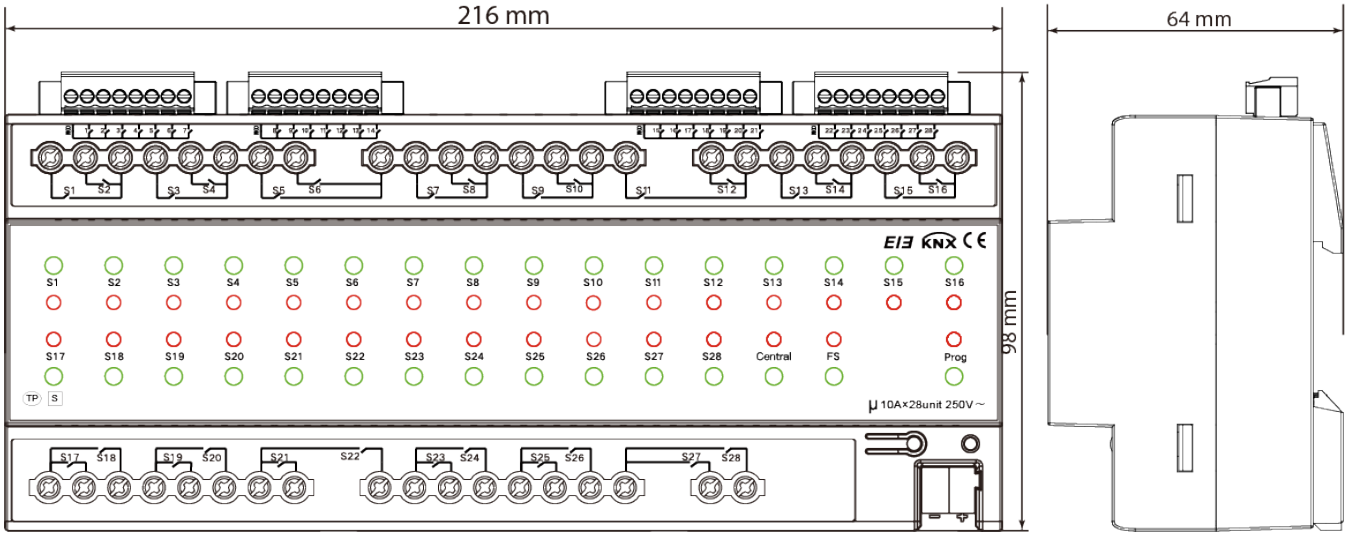
| | | |
|---|---|---|
| **Power supply** | Operating voltage, KNX | 24~30V DC via KNX bus |
| | Maximum current | ≤20 mA (30V DC) |
| | quiescent current | ≤6 mA |
| **Output** | Un rated voltage | 230V AC(50~60Hz) |
| | Switching current | 10A/230V (resistive load) |
| | | 150W/230V (capacitive load) |
| | channel number | 28 |
| **Dry contact input** | Scanning Voltage | 3.3V |
| | Cable length | <300 m (0.4 mm Ø) |
| | channel number | 28 |
| **Connection** | KNX | Bus connection terminal connection (red/black, 0.8 mm Ø) |
| | Load Output | Connection terminals are connected using screwed posts. |
| | | Single-core cable with wire diameter 0.2-2.5mm2, torque 0.4N-m |
| | | Multi-core cables with wire diameter 0.2-4mm2, torque 0.8N-m |
| **Operation and Indicator** | Programming keys and programming LEDs | Used to assign physical addresses |
| | Manual operation buttons and output LEDs | Switching outputs and indicating output status |
| | Manual/automatic switching buttons and LEDs | Manual/automatic operation mode switching and indication of mode status |
| | Manual centralised control buttons and LEDs | Centralised switching of outputs and indication of output status for all channels |
| **Temperature range** | be in motion | -5°C... +45°C |
| | stockpile | -25°C... +55°C |
| | haulage | -25°C... +70°C |
| **Environmental conditions** | Maximum air humidity | <93 per cent, except for condensation |
| **Design** | Modular installation | Standard 35mm DIN rail mounting |
| **CE Standard** | | EMC and low voltage compliant, EN50 090-2-2 |
| **Certificate** | | EIB/KNX certification |

**Apps:**

| application | Maximum number of communication objects | Maximum number of group addresses | Maximum number of joint tables |
|---|---|---|---|
| Multi-function Actuator, 4/8/16/20/28-Fold | 455 | 910 | 910 |

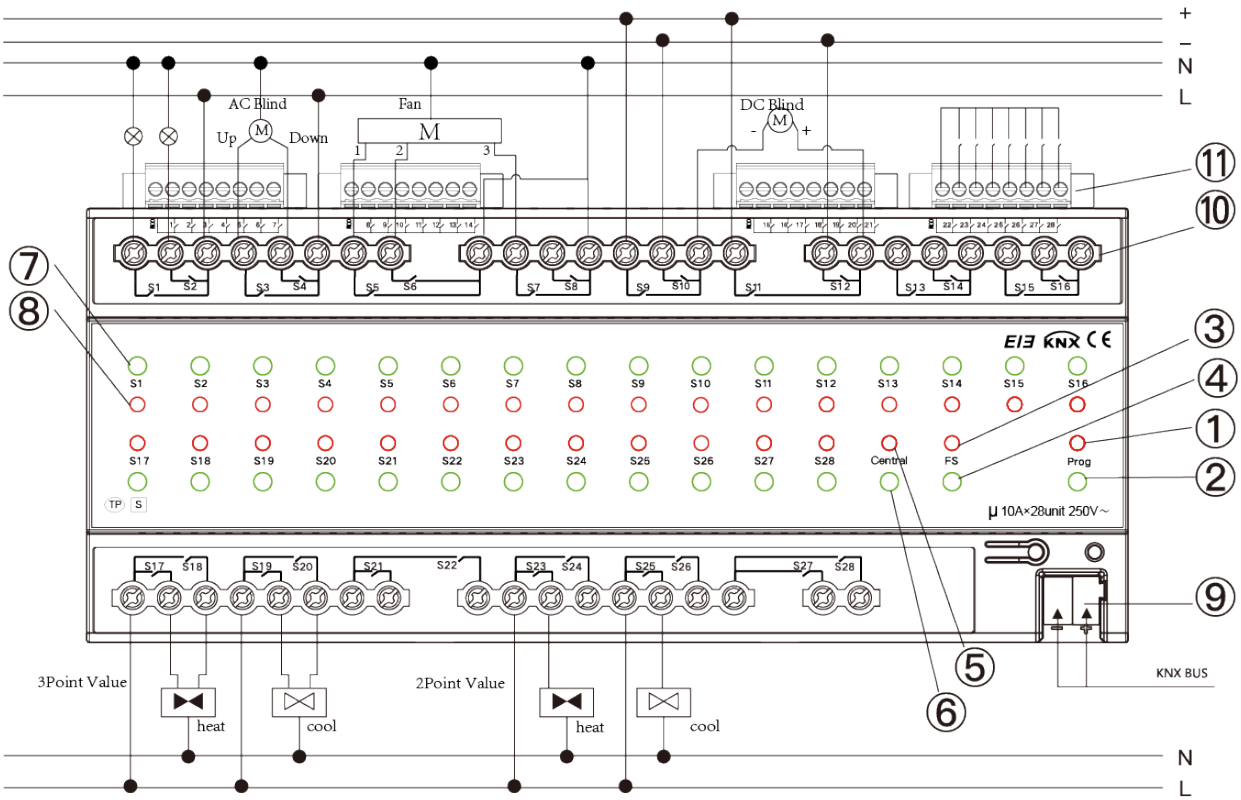
# 3. Dimensional and connecting diagrams

## 3.1. Dimensional drawings




**Multi-function actuator 28-fold**

## 3.2. Wiring diagram




**Multi-function actuator 28-fold**

① ② **Programming Indicator LED and Programming Button:** Press the programming button, the programming indicator lights up and the device enters the programming mode.

③④**Manual mode and automatic mode switching indication LED and key:** Long press this key to switch manual/automatic operation, the indicator light is on for manual operation mode and off for automatic operation mode.

⑤⑥ **Manual centralised control indication LEDs and keys:** For centralised control of all output channels of different functions, enter the manual operation mode first and then press the centralised control key for a long time, the centralised control indication LEDs will light up, i.e. entering the centralised control mode, and the centralised control mode can be exited by exiting the manual operation mode (when there is no database application, the default engineering debugging centralised control mode is used).

**Switch output control:** short press the key to achieve all output channels fully open/closed, corresponding indicator light on/off.

**Curtains/blinds (AC/DC) control:** short press button to move up or down, long press to stop moving/adjusting the blinds, during the operation of curtains/blinds, the corresponding indicator light flashes, and when it reaches the limit position, the indicator light turns to be always on. (When DC output, S3 and S4 indicator lights are not used, other channel operation and phenomenon by analogy)

**Fan control:** short press button can turn on 1, 2, 3 wind speed, long press button will turn off the wind speed, the corresponding indicator light indicates the wind speed level.

**Valve control:** 2 control, short press button to realise open/close valve, long press button to pause valve adjustment.4 control, pause state, long press button to switch heating/cooling mode; running state, long press button to pause valve adjustment. Short press the key to realise open/close valve in current mode.

⑦ ⑧ **manual control output indication LEDs and keys:** perform separate control outputs for different output functions (default engineering debugging centralised control mode when no database application).

**Switching output control:** each channel corresponds to 1 key and indicator light, there is output when the light is on and no output when it is off.

**Curtains/blinds (AC/DC) control:** short press (1) to move up and (2) to move down, long press to stop moving/adjusting the blinds, during the operation of the curtains/blinds, the corresponding indicator lamps flash, and when reaching the limit position, the indicator lamps become normally lit. (Indicator lamps and pushbuttons (3) and (4) are not in use for DC output, other channel operations and phenomena by analogy)

**Fan control:** key (1) to open the 1st gear wind speed, (2) to open the 2nd gear wind speed, (3) to open the 3rd gear wind speed, (4) not in use, long press any key will turn off. The corresponding indicator light of the key indicates the air speed level.

**Valve control:** Under 2 control, key (1) and indicator S1 are used to open/close the valve and to indicate the valve opening/closing status (valve fully open/closed), respectively, and key (2) is not in use. 4 control, key (1) and indicator S1 are used for the opening/closing and status indication of the heating valve, and key (3) and indicator S3 are used for the opening/closing and status indication of the refrigeration valve, and keys (2) and (4) are not in use (the rest of the channel operations and phenomena follow). channel operations and phenomena are analogous). For 3 Point valves, outputs 1 and 3 are open and outputs 2 and 4 are closed.

**KNX terminal: KNX power supply and KNX communication.**

**⑩ Output/Load Terminal: Access to different loads, wiring as shown in the wiring diagram.**

**⑪Dry contact input terminal: Access the dry contact keypad or touch keypad.**

Attention:

1. In manual operation mode, when no database application is running, it enters engineering debugging by default. That is to say, it defaults to the normal relay switching function, and at the same time, it does the interlock operation, that is to say, the relays of the neighbouring channels cannot be closed at the same time.

2. Upon entering the manual operation state, the bus control telegram is ignored (not executed). When exiting the manual operation state, the current operation state is maintained until a bus control command is received. (For details of the special handling of manual operation, refer to the description in the section at the end of each function block.)

3. In the product database configuration, every four relay outputs for a group of control outputs, so in the actual engineering applications, the load wiring must be considered in conjunction with the functional configuration of the database.

4. When controlling the channel output continuously, the stored energy of the device will be consumed rapidly, when the stored energy drops to the low limit, all the output channel indicators flash, that is, it enters into the charging state, all the operations are ignored in this state, the charging is completed and can be operated, the indicators flash stops, and the output state returns to the previous state.

# 4.ETS system parameter setting instructions

**Description of the parameter settings in the ETS system, described below in function blocks**

# 4.1. Parameter window "General".

## 4.1.1. Parameter window "General Setting".

"General Setting" This interface is used to set some general parameters, which are used in each function block, and the parameter setting interface is shown in Figure 4.1.1.

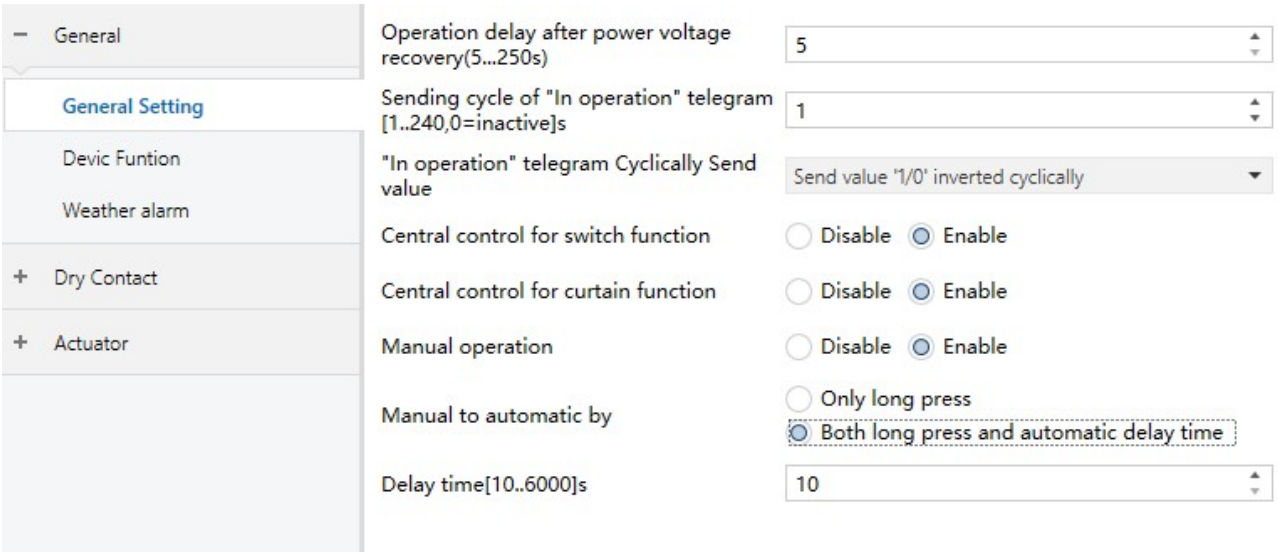



Figure 4.1.1 Parameter window "General Setting".

**Parameter "Operation delay after power voltage recovery [5...250s]"**

This parameter defines how long the operation is delayed after the bus power-down reset and programming reset. Only when the delay is completed, the operation is executed and the device can send a message to the bus.

This delay time does not include the initialisation time of the device. After the bus voltage is restored, the initialisation time for device start-up is approximately 3 s. This operation delay starts only after the device initialisation time.

**Note: During the delay period, i.e., when the output is not operable, the indicators of all output channels of the device blink, and after it is operable, the indicator blinking stops and the output state returns to the previous state.**

**Parameter "Sending cycle of "In operation" telegram [1...240,0 = inactive]s". .240,0 = inactive]s".**

This parameter sets the bus cycle message sending interval. If "0" is set, the object "In operation" does not send messages. If the setting is not "0", the object "In operation" sends a message with a logical

value (the reported logical value is selected according to the following parameter) to the bus at the set time period.

Optional: 0...240s , 0 = cyclic sending disabled

In order to minimise the bus load, the maximum time interval should be selected according to actual needs.

**Note: The time interval is timed from the time power is restored to the bus, independent of the bus power-up delay operation.**

**Parameter ""In operation" telegram Cyclically Send value"**

This parameter sets the value of the Bus Cycle Send message. Options.

**Disable**
**Send value '0' cyclically**
**Send value '1' cyclically**
**Send value '1/0' inverted cyclically**

**Parameter "Central control for switch function".**

This parameter sets the central control of the switching function. Options.

**Disable**
**Enable**

When enabled, the object "Central control for all of switch" is visible, so that all channels for which central control is enabled can be controlled by this object and can be switched together.

**Parameter "Central control for curtain function".**

This parameter sets the central control of the curtain function. Options.

**Disable**
**Enable**

When enabled, the objects "Central control for Up/Down" and "Central control for Slat/Stop" are visible and all channels with central control enabled can be controlled by these two objects. All channels with central control enabled can be controlled by these two objects and can be used together for adjusting the position of the curtains, the angle of the blinds or for stopping operations.

**Parameter "Manual operation**

This parameter is used to set whether to enable manual operation. Optional:

**Disable**

**Enable**

When enabled, the following parameters are visible.

**--Parameter "Manual to automatic by"**

This parameter is used to set the way to restore from manual operation to automatic operation. Optional:

**Only long press**

**Both long press and automatic delay time**

Only long press: Switch to manual operation or back to automatic operation by long pressing the manual/automatic switching button.

Both long press and automatic delay time: Switch to manual operation or back to automatic operation by long pressing the manual/automatic switching button, or automatically return to automatic operation from manual operation by delay time, i.e., if no manual operation is executed within a period of time in the manual operation state, then automatically return to the automatic operation state. When this option is selected, the following parameters are visible.

**--Parameter "Delay time [10....6000]s". .6000]s"**

This parameter is used to set the delay time for automatic return from manual operation to automatic operation. Options: 10...6000

## 4.1.2. Parameterisation window "Devic Function".

"Devic Function" This interface is used to set the enable/disable function block, the parameter setting interface is shown in Figure 4.1.2.


Figure 4.1.2 Parameter window "Devic Function".

**Parameter "Weather alarm function.**

This parameter is used to set whether or not to enable the weather warning function, which is mainly applied to the curtain control of the actuator module. Optional:

**Disable**

**Enable**

When enabled, the parameter setting interface "Weather alarm" is visible, as shown in Figure 4.1.2.1.

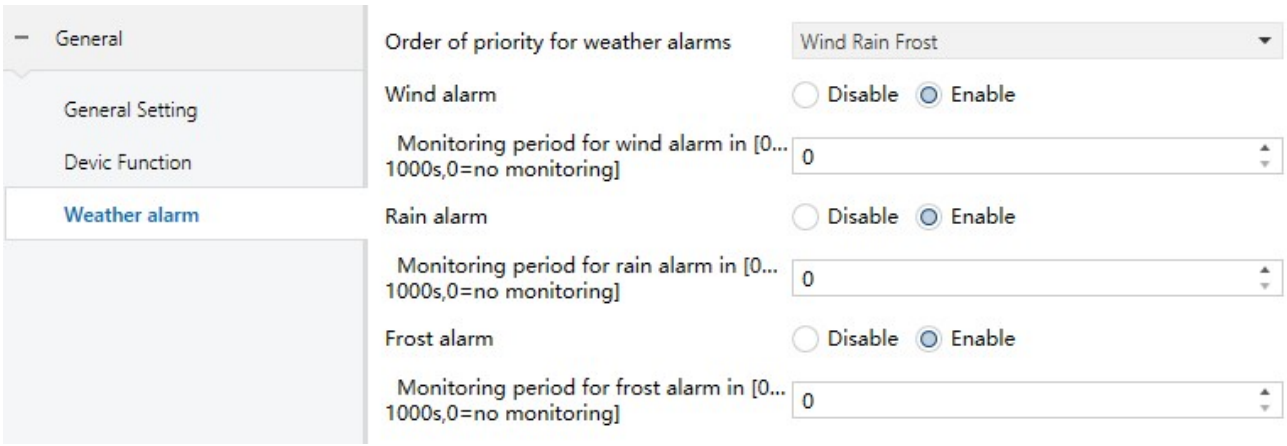



Figure 4.1.2.1 Parameter setting screen "Weather alarm".

**Parameter "Order of priority for weather alarms"**

This parameter sets the priority of different weather triggers for the weather warning function, the priority is from high to low i.e. from left to right, optional:

**Wind Rain Frost**

**Wind Frost Rain**

**Rain Wind Frost**

**Rain Frost Wind**

**Frost Wind Rain**

**Frost Rain Wind**

**Note: If more than one weather alarm occurs at the same time, only the highest priority alarm is activated. The other lower priority returns to the previous lower priority after the highest priority alarm has completed and returned to normal.**

**--Parameter "Wind alarm"**

**--Parameter "Rain alarm"**

**--Parameter "Frost alarm"**

These three parameters set whether or not to enable the high wind warning, heavy rain warning and frost warning, respectively, and are optional:

**Disable**

**Enable**

When enabled, the following parameters are visible and the corresponding operations can be activated for use.

**--Parameter "Monitoring period for wind alarm in [0.... .1000s,0=no monitoring]"**

**--Parameter "Monitoring period for rain alarm in [0.... .1000s,0=no monitoring]"**

**--Parameter "Monitoring period for frost alarm in [0.... .1000s,0=no monitoring]"**

This parameter sets the weather warning monitoring period, if the corresponding weather warning control object has not received the control telegram within this time, the device will consider that the external controller has made an error, and the device will enter the weather warning operation mode to execute the operation according to the priority setting principle. This mode ends when the device receives the control message again. The monitoring time is retimed for each control message received. Options: 0.... .1000s, 0=detection disabled

**Note: If this function is activated, the external controller must periodically send out control telegrams. The monitoring period should be greater than the time between control telegrams sent by the controller.**

**Parameter "Dry contact Function"**

This parameter is used to set whether to enable the dry contact scanning input function. Optional:

**Disable**

**Enable**

When enabled, the parameter setting interface "**Dry contact**" can be seen, and the function is described in section 4.2.

**Parameter "Actuator Function".**

This parameter is used to set whether to enable the actuator output function. Optional:

**Disable**

**Enable**

When enabled, the parameter setting screen "**Actuator**" is visible, see section 4.3 for function description.

## 4.2. Parameter screen "Dry Contact"

### 4.2.1. Parameter setting screen "Inputs"

The "Inputs" parameter setting interface is shown in Fig. 4.2.1-1, which is used to set the function of dry contact input channel.

There are 4-channel inputs, 8-channel inputs, 16-channel inputs, 20-channel inputs, and 28-channel inputs, all of which have the same function, so the following is an example of a 4-channel product to illustrate the parameters and objects.

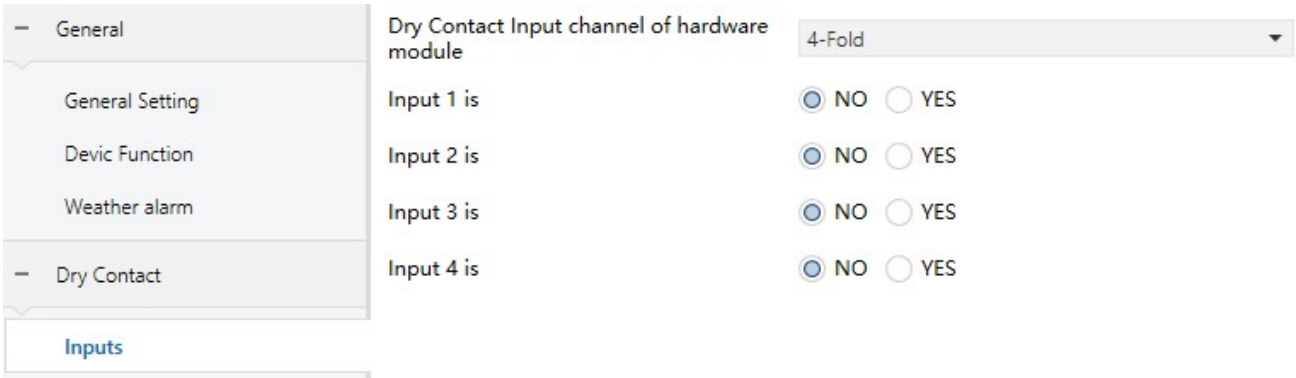



Figure 4.2.1-1 Parameter setting screen "Inputs".

**Parameter "Dry Contact Input channel of hardware module".**

**This parameter is used to select the product type, optional type:**

**4-Fold Quad Inputs**

**8-Fold Eight Inputs**

**16-Fold Hexadecimal Inputs**

**20-Fold Twenty inputs**

**28-Fold Twenty-Eight Input**

**Parameter "Input x is"**

This parameter is used to set the input channel function. Optional:

**Disable**

**Enable**

When enabled, the parameter setting screen "Input x" is visible as shown in Fig. 4.2.1.2. The functions of the input channels are the same, so we will take Input 1 as an example.

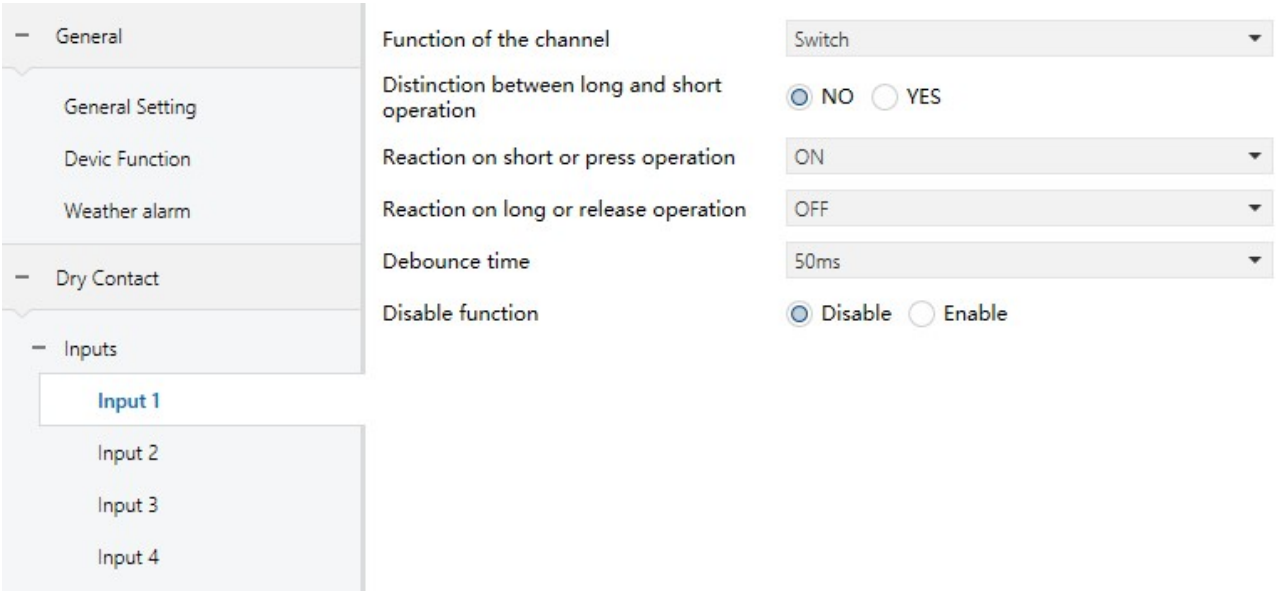



Figure 4.2.1.2 Parameter setting screen "Input 1".

**Parameter "Function of the channel".**

This parameter sets the input function and is optional:

| | |
|---|---|
| **No Function** | **No Function** |
| **Switch** | **Switch** |
| **Switch/Dimming** | **Switch/Dimming** |

| | |
|---|---|
| **Value/Forced output** | **Data type conversion** |
| **Scene control** | **Scene control** |
| **Shutter Control** | **Curtain Control** |
| **Shift register** | **Shift register** |

Each function is described in detail below.

### 4.2.1.1 Parameter setting screen "Switch"

The "Switch" parameter setting interface is shown in Figure 4.2.1.1-1. By configuring this application, a switch message is sent to the input signal processing judgement.

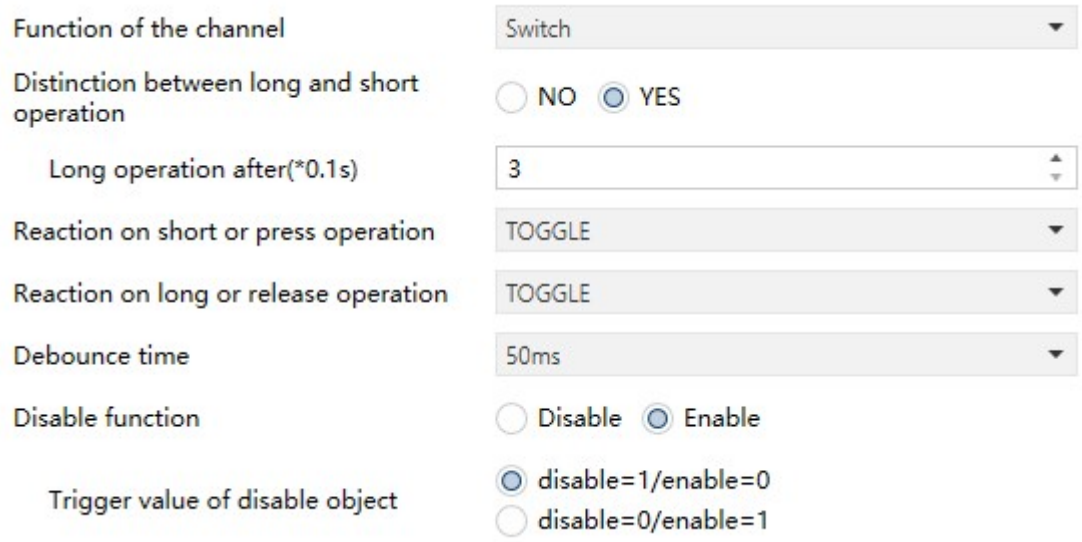



Figure 4.2.1.1-1 Parameter setting screen "Switch".

**Parameter "Distinction between long and short operation"**

This parameter sets whether the key control distinguishes between long/short operation. Options.

**No**

**Yes**

If you select the "Yes" option, the following parameters are visible.

**--Parameter "Long operation after (*0.1s)"**

This parameter sets a certain time for pressing the key to determine whether the operation is a long or short operation before the device performs the corresponding set action. Options: 3.... .25

**Parameter "Reaction on short or press operation".**

**Parameter "Reaction on long or release operation"**

Sets the operation to be performed when the contact is closed/disconnected or during long/short operation. The object value is updated immediately when the input is determined. Optional:

**No action**

**ON**

**OFF**

**TOGGLE**

"No action", no message sent.

"ON" to send an open message.

"OFF" to send the off message.

"TOGGLE", each time an operation sends a message it will switch between on and off, for example, if the last time a switch on message was sent (or received) then this operation will trigger a switch off message to be sent, when the switch operates again a switch on message will be sent, the switch always remembers its last state that will be converted to another value when operated.

**Parameter "Debounce time"**

This parameter sets the de-jitter time to prevent unnecessary multiple operations caused when the contact is triggered several times during the jitter time, i.e. the minimum effective time of the contact input. Options: 10ms/20ms/...../150ms

This parameter is not described below and is used similarly.

**Parameter "Disable function"**

This parameter sets whether or not to enable the disabled function of the input. Optional:

**Disable**

**Enable**

If "Enable", the input can be disabled or used by the object.

This parameter is not described below and is used similarly.

## 4.2.1.2 Parameterisation screen "Switch/Dimming"

The "Switch/Dimming" parameter setting interface is shown in Figure 4.2.1.1-2. By configuring this application, the control message of switching or dimming will be sent by processing and judging the input signal.

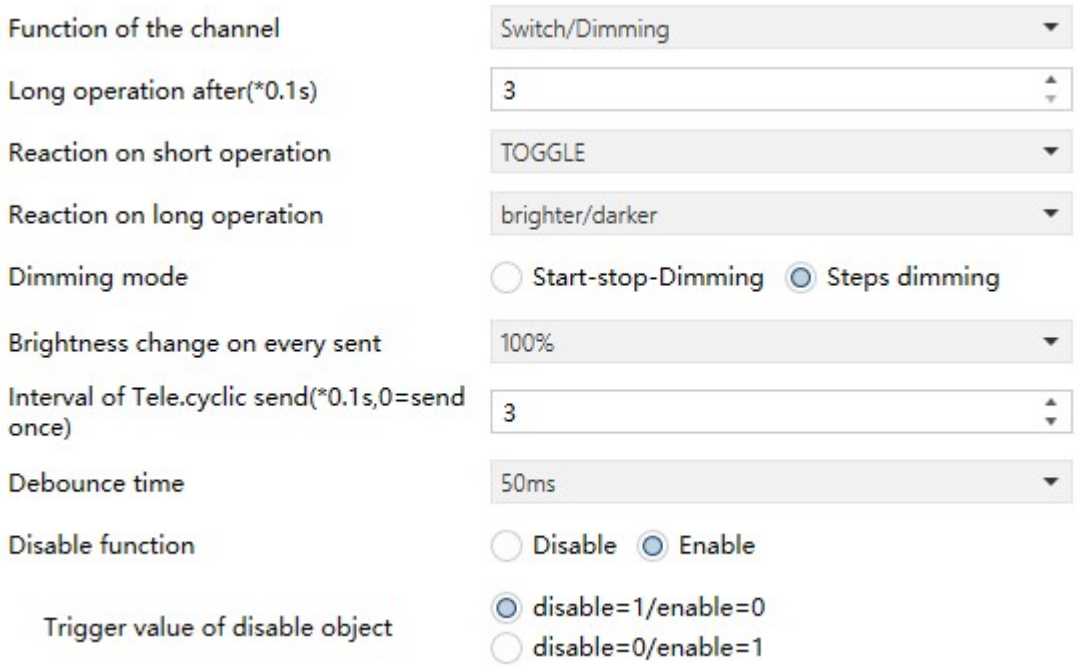



Figure 4.2.1.1-2 Parameter setting screen "Switch/Dimming".

**Parameter "Long operation after (*0.1s)"**

This parameter is only visible when distinguishing between long/short operations, where the valid time for a long operation is set. If the operation time exceeds the time set here, the operation is identified as a long operation, otherwise it is a short operation. Options: 3.... .25

**Parameter "Reaction on short operation"**

This parameter sets the operation that is performed when the key is short operated. When the input is determined, the object value is updated immediately. Options.

**No action**

**ON**

**OFF**

**TOGGLE**

"No action", no message sent.

"ON" to send an open message;

"OFF" to send the off message;

"TOGGLE", the message sent under each operation will switch between on and off.

**Parameter "Reaction on long operation"**

This parameter sets the value of the relative dimming that is sent when the key is operated for a long time, dimming or brightening, and stopping the dimming when the key is released, optional.

**No action**
**brighter**
**darker**
**brighter/darker**

"No action", no message sent.

"brighter", sends a brightening message when the key is operated long.

"darker" to send a dimmed message;

"brighter/darker", each key operation will switch between brightening and darkening.

**Parameter "Dimming mode"**

This parameter sets the relative dimming method, whether it is a start-stop dimming method or a step-by-step dimming method. Options

**Start-stop dimming**
**Steps dimming**

The "Start-stop dimming" option, relative to the dimming method, sends a dimming or brightening message when dimming, and a stop message when ending the dimming. In the start-stop dimming mode, the dimming telegram does not need to be sent cyclically.

With the "Steps dimming" option, the relative dimming method is a step-by-step dimming method, and the dimming message is sent cyclically, and the stop dimming message is sent immediately when the dimming is finished, and the following parameters can be seen.

**--Parameter "Brightness change on every sent"**

This parameter sets the brightness (in percentage) that can be changed when cycling through a dimmer telegram. Options.

**100%**

**50%**

**.....**

**1.56 per cent**

**--Parameter "Interval of Tele.Cyclic send (*0.1s, 0=send once)"**

This parameter sets the time interval for cyclic sending of dimmer telegrams. Options: 0..25 , 0=send only once

## 4.2.1.3 Parameter setting screen "Value/Forced output"

The "Value/Forced output" parameter setting interface is shown in Fig. 4.2.1.1-3. By configuring this application, the control message with a customised data type value is sent to the input signal processing judgement.

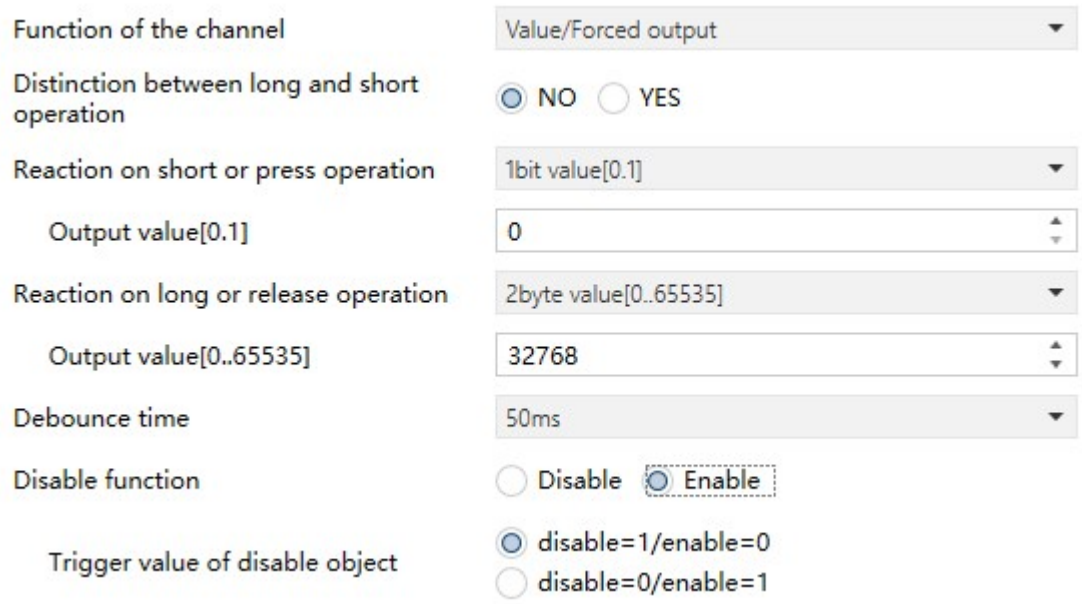



Figure 4.2.1.1-3 Parameter setting screen "Value/Forced output".

**Parameter "Distinction between long and short operation"**

This parameter sets whether the key control distinguishes between long/short operation. Options.

**No**

**Yes**

If you select the "Yes" option, the following parameters are visible.

**--Parameter "Long operation after (*0.1s)"**

This parameter sets a certain time for pressing the key to determine whether the operation is a long or short operation before the device performs the corresponding set action. Options: 3.... .25

**Parameter "Reaction on short or press operation".**

**Parameter "Reaction on long or release operation"**

This parameter sets the type of data that is sent when a key is pressed/released or during long/short operation. Optional:

**No reaction**

**1 bit value[0.1]**

**4bit value[0..15]**

**1byte value[0..255]**

**2byte value[0..65535]**

**Parameter "Output value[...]"**

This parameter sets the value of the data to be sent when the operation is performed. The range of values depends on the data type selected in the previous parameter.

## 4.2.1.4 Parameter window "Scene control"

The "Scene control" parameter setting interface is shown in Fig. 4.2.1.1-4. By configuring this application, it can process the input signals and judge whether to send a control message to recall or store a certain scene.

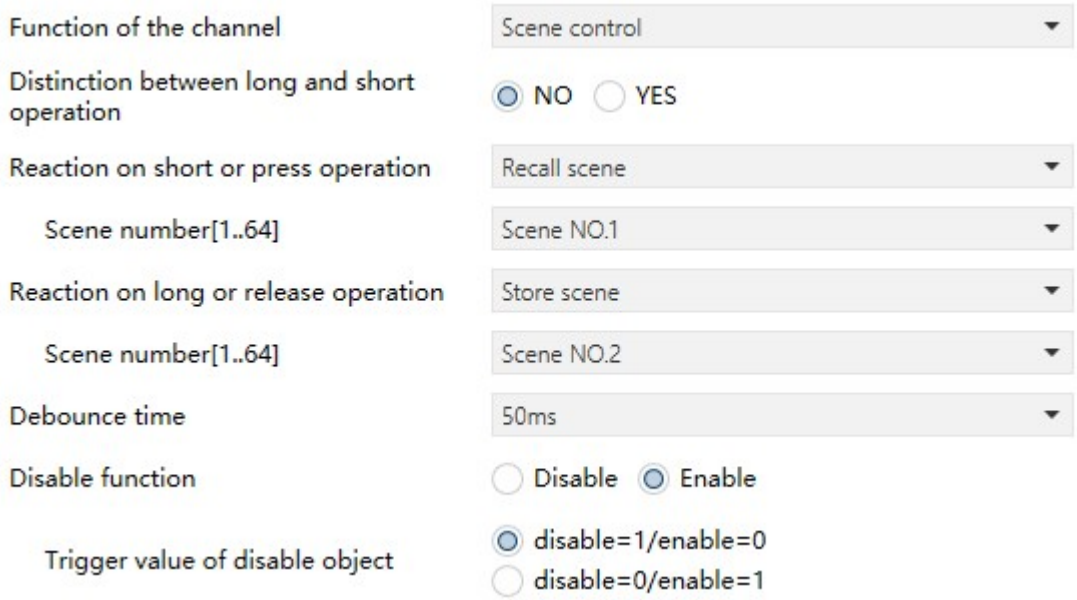



Figure 4.2.1.1-4 Parameter window "Scene control".

**Parameter "Distinction between long and short operation"**

This parameter sets whether the key control distinguishes between long/short operation. Options.

**No**

**Yes**

If you select the "Yes" option, the following parameters are visible.

**--Parameter "Long operation after (*0.1s)"**

This parameter sets a certain time for pressing the key to determine whether the operation is a long or short operation before the device performs the corresponding set action. Options: 3.... .25

**Parameter "Reaction on short or press operation".**

**Parameter "Reaction on long or release operation"**

This parameter sets the type of scene operation to be performed when a key is pressed/released or during long/short operation. Optional:

**No reaction**

**Recall scene**

**Store scene**

"No action", no message sent.

"Recall scene", performs activation of the scene when a key is operated.

"Store scene", save scene is executed when key operation is performed.

**Parameter "Scene number(1..64)"**

This parameter sets the scene number to be called or stored, the scene number range:Scene NO.1~64, the corresponding message is 0~63.

## 4.2.1.5 Parameter window "Shutter Control".

The "Shutter Control" parameter setting interface is shown in Fig. 4.2.1.1-5. By configuring this application, it can process and judge the input signals to send upward, downward and stop control messages.

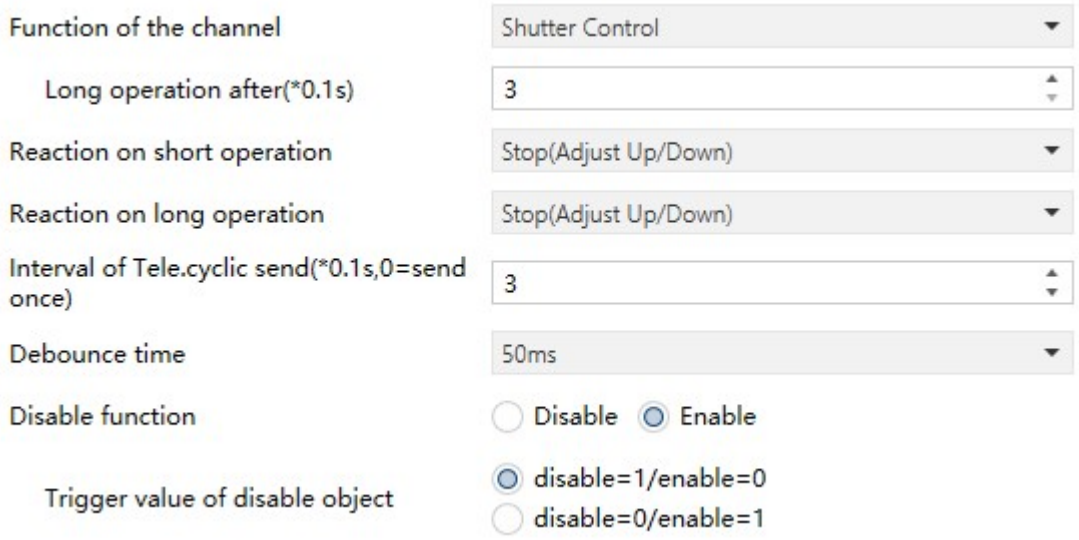



Figure 4.2.1.1-5 Parameter window "Shutter Control".

**Parameter "Long operation after (*0.1s)"**

This parameter is only visible when distinguishing between long/short operations, where the valid time for a long operation is set. If the operation time exceeds the time set here, the operation is identified as a long operation, otherwise it is a short operation. Options: 3.... .25

**Parameter "Reaction on short operation"**

**Parameter "Reaction on long operation"**

This parameter sets the operation to be performed when the key is operated short and long. Options.

**No action**

**Up**

**Down**

**Up/Down**

**Stop (Adjust Up)**

**Stop (Adjust Down)**

**Stop (Adjust Up/Down)**

"No action", no action is performed.

"Up" to move the curtains up or open them;

"Down" to move the curtains down or close them;

"Up/Down", which alternately performs the action of opening and closing (moving up/down) the curtains.

"Stop (Adjust Up)" to stop curtain operation or to adjust the louvre angle upwards;

"Stop (Adjust Down)" to stop the curtain operation or to adjust the angle of the blinds downwards;

"Stop (Adjust Up/Down)", stops the curtain operation or alternatively performs an upward/downward adjustment of the louvre angle;

**Parameter "Interval of Tele. Cyclic send (*0.1s, 0 = send once)"**

This parameter is visible and active when the previous parameter option is "Stop...". This parameter is visible and active when the previous parameter option is "Stop...", here you set the time interval for the cyclic sending of the louvre angle adjustment messages. Options: 0...25 , 0 = send only once

## 4.2.1.6 Parameter window "Shift register"

The "Shift register" parameter setting interface is shown in Fig. 4.2.1.1-6. By configuring this application, the input signal processing judgement sends the control message of the set value in the form of a shift register.

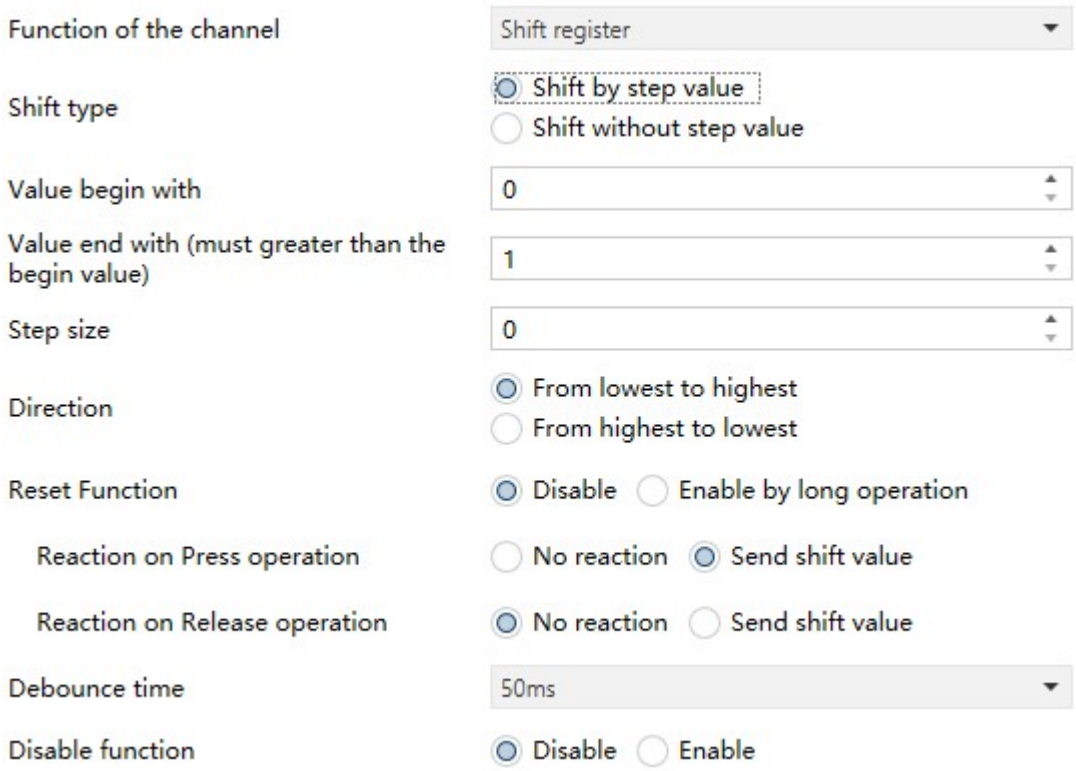



Figure 4.2.1.1-6 Parameter window "Shift register".

**Parameter "Shift type"**

This parameter sets the type of shift, whether it is with or without a step value. Options.

**Shift by step value**

**Shift without step value**

"Shift by step value", with step value, you can set the start and end value of the shift, and the value that will be increased (from low to high direction) or decreased (from high to low direction) for each shift.

"Shift without step value", when there is no step value, you can set the specific value to be sent for each shift, up to 10 numbers, one number is sent for each operation.

**Parameter "Value begin with"**

This parameter is visible when "Shift by step value" is selected for the shift type and sets the start value of the shift. Options: 0...240

**Parameter "Value end with (must greater than the begin value)"**

This parameter is visible when "Shift by step value" is selected for the shift type and sets the end value of the shift. Options: 1.... .250

**Note: The end value must be greater than the start value.**

**Parameter "Step size"**

This parameter is visible when "Shift by step value" is selected for the Shift type and sets the value that will be increased (from low to high direction) or decreased (from high to low direction) for each shift. Options: 0.... .240

**Parameter "Shift number"**

This parameter is visible when "Shift without step value" is selected for the Shift type and sets the number of shift setting values, up to 10 values. Options: 1/2/... /10

Set the specific value to be sent for each shift operation in the following parameters.

**Parameter "Value 1.... .10"**

This parameter sets the value sent for each shift operation. Options: 0...255

**Parameter "Direction"**

This parameter sets the direction of the shift. Options.

**From lowest to highest**

**From highest to lowest**

"From lowest to highest", shift from lowest to highest, e.g. from start value to end value, or from value 1 to value 10, after reaching the end value or value 10, it will be reshifted from the start value or value 1.

"From highest to lowest", shift from high to low, e.g. from end value to start value, or from value 10 to value 1, after reaching start value or value 1, it will be reshifted from end value or value 10.

**Parameter "Reset function"**

This parameter sets whether or not to enable the long press operation shift reset function. Options.

**Disable**

**Enable by long operation**

"Disable", not enabled;

"Enable by long operation" to reset the shift by long operation, after reset, the shift will restart and send the start flag.

**Parameter "Reaction on press/release the button"**

This parameter is visible when the Shift Reset function is not enabled, and sets whether or not the key will be shifted when it is pressed or released. Options.

**No reaction**

**Send shift value**

**Parameter "Long operation after (*0.1s)"**

This parameter is only visible when distinguishing between long/short operations, where the valid time for a long operation is set. If the operation time exceeds the time set here, the operation is identified as a long operation, otherwise it is a short operation. Options: 3.... .25

## 4.3. Parameter window "Actuator"

### 4.3.1. Parameter window "Channel function".

The "Channel function" parameter setting interface is shown in Fig. 4.3.1-1, which is used to set the channel output function.

There are 4-channel outputs, 8-channel outputs, 16-channel outputs, 20-channel outputs, and 28-channel outputs, all of which have the same function, so the 4-channel outputs are used as an example for the parameter and object descriptions below.

Channel functions: switch output, curtain output (distinguishing between AC and DC motors), fan output or valve output. Different functions occupy different output channels.

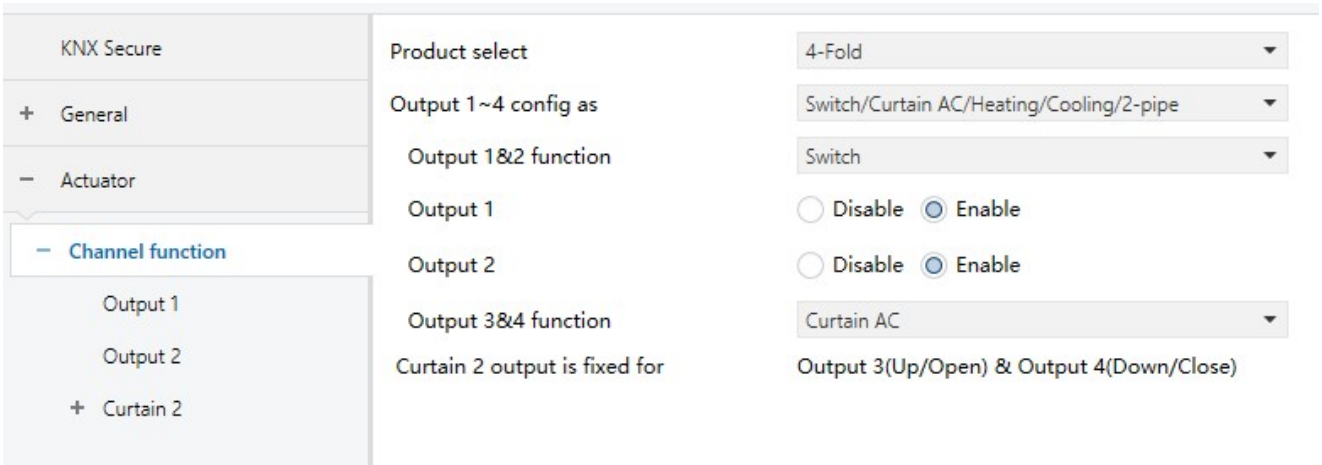


Figure 4.3.1-1 Parameter window "Channel function".

**Parameter "Product select"**

This parameter is used to select the product type, optional type:

**4-Fold Quad Output**

**8-Fold Eight Outputs**

**16-Fold Hexadecimal Output**

**20-Fold Twenty Outputs**

**28-Fold Twenty-eight output**

**Parameter "Output x~y (1~4/5~8/9~12/13~16/17~20/21~24/25~28) config as"**

This parameter is used to set the channel function. Optional

**Disable** **Disable**

**Switch/Curtain AC/Heating/Cooling/2-pipe Switch/Curtain (AC) Output/Heating/Cooling/2-pipe Valve System Output**

**Curtain DC** **Curtain (DC) Output**

**Fan control** **Fan output**

**Valve control (4-pipe)** **4-pipe valve system output**

The following table gives a simple output description of each function output with an example (1~4).

| Output 1~4 | Switch/Curtain AC/Heating/Cooling/2-pipe | | | Curtain DC | Fan control | Valve control (4pipes) |
|---|---|---|---|---|---|---|
| | Switch | Curtain AC | Heating/Cooling/2-pipe | | | |
| Output 1 | Output 1 | Curtain 1 | Valve 1 (Output1&2, if 3point,open and close) | Curtain DC 1 | Fan 1: fan speed 1 | Valve 1: Heat (Output1&2, if 3point,open and close) |
| Output 2 | Output 2 | | | | Fan 2: fan speed 2 | |
| Output 3 | Output 3 | Curtain 2 | Valve 2 (Output3&4, if 3point,open and close) | | Fan 3: fan speed 3 | Valve 1: Cool (Output1&2, if 3point,open and close) |
| Output 4 | Output 4 | | | | | |

From the above table, we can see that one switch output occupies one output channel, one curtain output (AC) occupies two output channels, one curtain output (DC) occupies four output channels, the fan output determines the number of output channels occupied according to the wind speed level, and the valve output determines the number of switch output channels occupied according to the HVAC control mode and valve type. For example, single heating or cooling and 2-pipe valve system occupy one or two switch output channels, while 4-pipe valve system occupies two or four switch output channels.

**In the Fan control function, if some outputs are not used, they can be used as switching outputs, which is determined by the parameter setting.**

**Annotation parameter description (similar functions, take one of them as an example):**

**Parameter "Curtain 1 output is fixed for": Output 1(Up/Open)&Output 2(Down/Close)**

This parameter indicates that the output channels of curtain 1 with AC motor are fixed to Output 1 and Output 2 (output 1 and 2). Output 1 controls the curtain to move up or open, and output 2 controls the curtain to move down or close.

**Parameter "External DC+ input": Output 1&Output 3**

**Parameter "External DC- input": Output 2&Output 4**

**Parameter "Output Driver": Un**

These three parameters indicate the wiring method of the output of curtain with DC motor. The positive input of the motor is connected to Output 1 and Output 3 (output 1 and 3), the negative input of the motor is connected to Output 2 and Output 4 (output 2 and 4), and the output driver is connected to Un.

**Parameter "Fan 1 output is fixed for": 1level:1; 2level:1&2; 3level:1&2&3**

This parameter states that for fans with class 1 air speed, the output channel is Output 1;

Fans with 2 speed levels, output channels Output 1 and Output 2;

Fans with 3 wind speed stages, output channels Output 1, Output 2 and Output 3.

**Parameter "If Fan 1 set to 1 or 2 level, output 3&4 as switch output":**

**Note: Outputs 3 and 4 can be used as switching outputs if the fan type is class 1 or class 2.**

The following two parameters are visible when selecting a 4-pipe valve system and are used to annotate the output channels of a 4-pipe valve system:

**--Parameter "Heat output for 4-pipe valve 1 is Output 1": Output 1&2, if 3 point, open and close**

This parameter states that the heating output channel for valve 1 is Output 1;

That is, for two-wire valves, one end of the valve is connected to Output 1 and the other end is connected to Un, which supplies power to the valve.

For 3-wire valve types, the output channels are Output 1 and Output 2;

That is, for 3-wire valves, two ends of the valve are connected to Output 1 and Output 2, and the other end is connected to Un, which supplies power to the valve.

**--Parameter "Cool output for 4-pipe valve 1 is Output 3": Output 3&4, if 3 points, open and close**

This parameter states that the cooling output channel of valve 1 is Output 3;

That is, for two-wire valves, one end of the valve is connected to Output 3 and the other end is connected to Un, which supplies power to the valve.

For 3-wire valve types, the output channels are Output 3 and Output 4;

That is, a 3-wire valve with two ends of the valve connected to Output 3 and Output 4, and the other end connected to Un, which supplies power to the valve.

**Parameter "Valve 1 output is fixed for Output 1": Output 1&2, if 3 point, open and close**

This comment parameter is visible when the HVAC control is for individual heating or cooling, or a two-pipe valve system, and is used to indicate the output channel to which the valve corresponds.

In the case of a two-wire valve type, the output channel is Output 1, i.e. one end of the valve is connected to Output 1 and the other end is connected to Un, which supplies power to the valve.

In the case of 3-wire valve types, the output channels are Output 1 and Output 2, i.e. both ends of the valve are connected to Output 1 and Output 2, and the other end is connected to the Un. that supplies power to the valve.

## 4.3.2. Switching output "Switch actuator"

The switching outputs have up to 28 output channels. Since the parameters and communication objects assigned to each output are the same, one output is used as an example.

### 4.3.2.1 Parameter window "Switch actuator: Output X"

The "Switch actuator: Output X" parameter setting interface is shown Figure 4.3.2.1-1. The settings on this screen apply to the entire channel of the relay, and in addition to setting the common switching functions, it also allows you to set up the system power-up and switching status reports, etc.

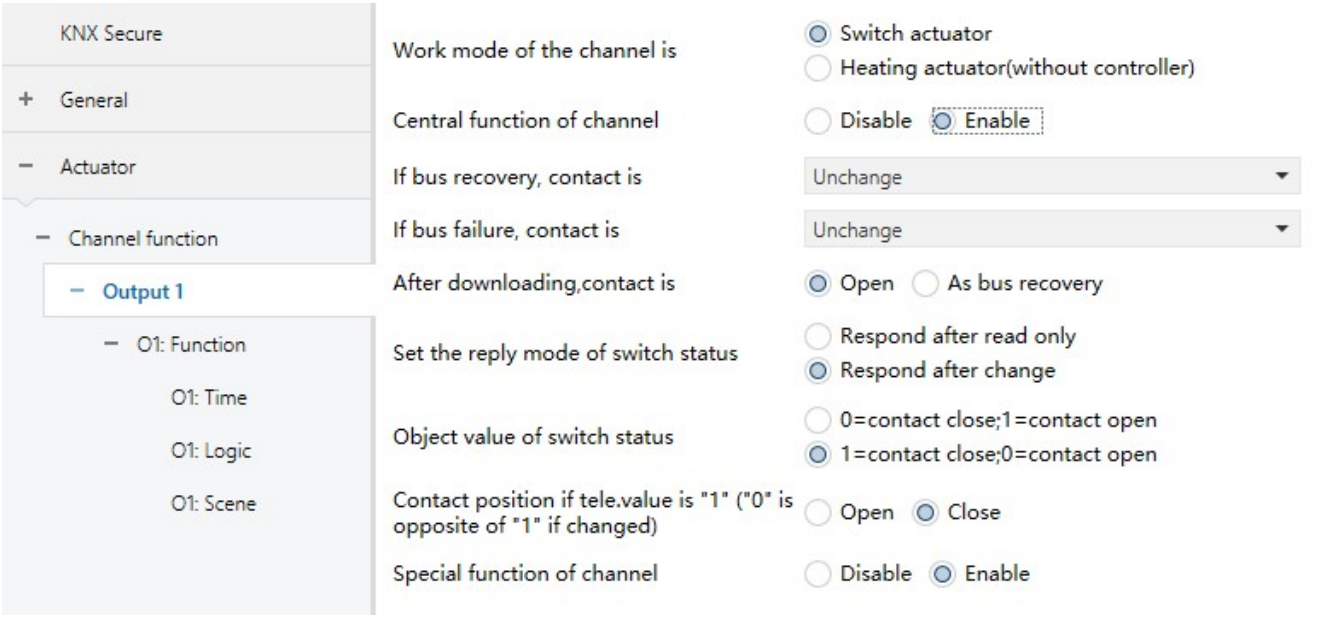



Figure 4.3.2.1-1 Parameter window "Switch actuator: Output X".

**Parameter "Work mode of the channel is"**

This parameter sets the operating mode of the channel. Optional:

**Switch actuator**

**Heating actuator (without controller)**

The "Switch actuator" mode is used for general switching control, e.g. for lighting. This section describes in detail the functions and applications of the parameters in the "Switch actuator" mode.

The "Heating actuator (without controller)" mode is mainly used for the control of heating valves. The function and application of the parameters are described in section 4.3.3.

**Parameter "Central function of channel".**

This parameter sets whether centralised control is enabled for this channel. Optional:

**Disable**

**Enable**

When enabled, the channel will be controlled by the central control object "Central control for all switch".

**Parameter "If bus recovery, contact is"**

This parameter sets the position of the relay contacts when the device bus is powered up. Optional:

**Unchange**

**Open**

**Close**

**As before as bus fail**

When "Unchange" is selected, the relay contacts for this channel do not change when the bus is powered up;

When "Open" is selected, the relay contact of the channel is open when the bus is powered up;

When "Close" is selected, the relay contact of the channel closes when the bus is powered up;

When "As before as bus fail" is selected, the relay contacts of this channel are in the contact position before the bus is powered up.

**Parameter "If bus failure, contact is"**

This parameter sets the position of the relay contacts when the device bus is powered down. Optional:

**Unchange**

**Open**

**Close**

When "Unchange" is selected, the relay contacts of this channel do not change when the bus is powered down;

When "Open" is selected, the relay contact of this channel is open when the bus is powered down;

When "Close" is selected, the relay contact of the channel closes when the bus is powered down.

**Parameter "After downloading, contact is"**

This parameter sets the position of the relay contacts after the application programming is complete. Optional:

**Open**

**As bus recovery**

By selecting "Open", the application performs the action of disconnecting the output after programming.

By selecting "As bus recovery", the contacts will act according to the parameter "If bus recovery, contact is" after the application has been programmed.

**Parameter "Set the reply mode of switch status"**

This parameter sets the conditions under which the device sends a message to report the current switching state of the relay, with two options to choose from. Optional:

**Respond after read only**

**Respond after change**

By selecting "Respond after read only", the object "switch status" sends the current switching status to the bus only when the device receives a request to read the switching status of the channel from another bus device or from the bus. The object "switch status" sends the current switching status to the bus only if the device receives a request to read the switching status of the channel from another bus device or the bus;

By selecting "Respond after change", the object "switch status" immediately sends a message to the bus to report the current status when the switching status of the channel is changed.

**Parameter "Object value of switch status :"**

Optional:

**0=contact close; 1=contact open**

**1=contact close; 0=contact open**

When "0=contact close ; 1=contact open" is set, the value of the communication object "switch status" is "0". When the value of "switch status" of the communication object is "0", it means that the relay contact is closed, and when the value is "1", it means that the relay contact is open;

Setting "1=contact close; 0=contact open" has the opposite meaning.

**Note: If the switch status is determined after programming or system reset, the object "switch status" sends a status message to the bus; if it is not determined, no status message is sent.**

**Parameter "Contact position if tele. value is '1' ('0' is opposite of '1 value is '1' ('0' is opposite of '1' if changed)"**

This parameter defines the position of the channel contact when the switch is switched on. The switching operation is triggered by the communication object "switch". When "input 0" is enabled in the

logic function, the communication object "switch" is not used to trigger the switching operation, but to modify the logical value of "input 0". The setting of this parameter is meaningless. The setting of this parameter is meaningless:

**Open**

**Close**

When "Open" is selected, the channel contact position is open, and the contact is closed when the message "1" is received, and closed when the message "0" is received;

When "Close" is selected, the channel contact position is closed, and the contact is closed when the message "1" is received, and the contact is closed when the message "0" is received.

**Note: When the logic function input 0 is enabled, the object "switch" is used as the input to input 0, and normal switching operations become invalid.**

**Parameter "Special function of channel "**

This parameter is the master switch to enable the special function of the channel. When "Enable" is selected, the parameter setting interface "Ox:Function" will appear, in which all the special functions of the channel can be individually enabled or not, as shown in Fig. 4.3.2.1-2. 4.3.2.1-2. Options:

**Disable**

**Enable**

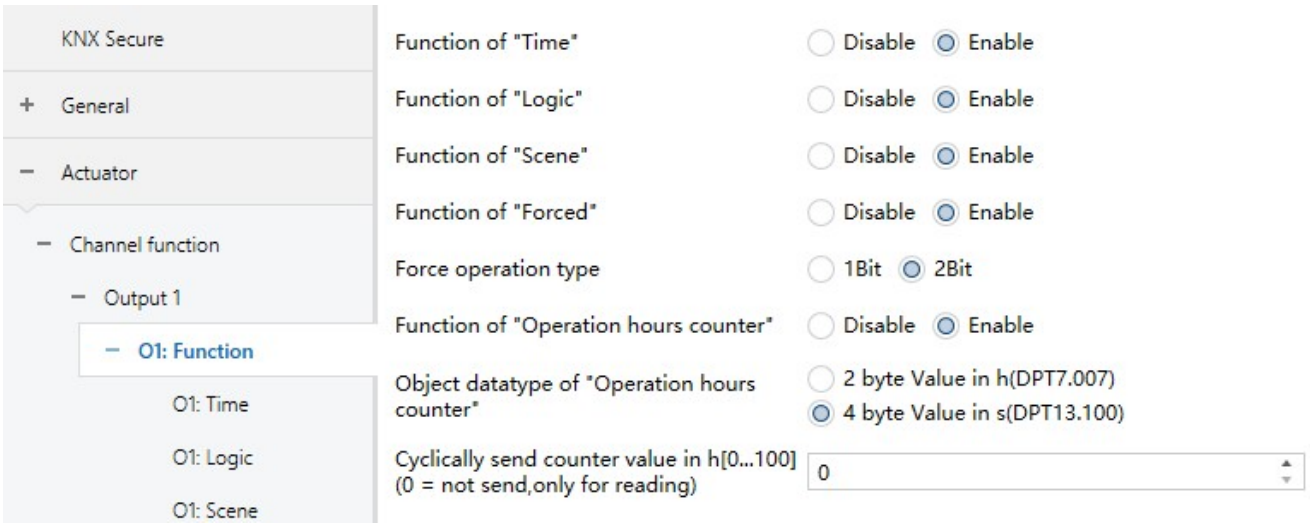



Figure 4.3.2.1-2 Special Function Enable Screen "Ox:Function"

### 4.3.2.2 Parameterisation window "Ox: Time"

This interface is visible when the parameter "Function of "time"" is selected as "Enable" in Figure 4.3.2.1-2, "Ox: Function", and the object "Enable time function" is visible. This interface is visible when the parameter "Function of "time"" in "Ox: Function" in Fig. 4.3.2.2-1 is selected as "Enable" as shown in Fig. 4.3.2.2-1, and at the same time the object "Enable time function" is visible, which is used to disable the time function, and after disabling the time function, the operation before disabling it will continue to execute. After disabling the time function, the operation before disabling will still continue to be executed. For example, if you disable the time function during the time delay, then the operation will still be executed when the time delay expires.

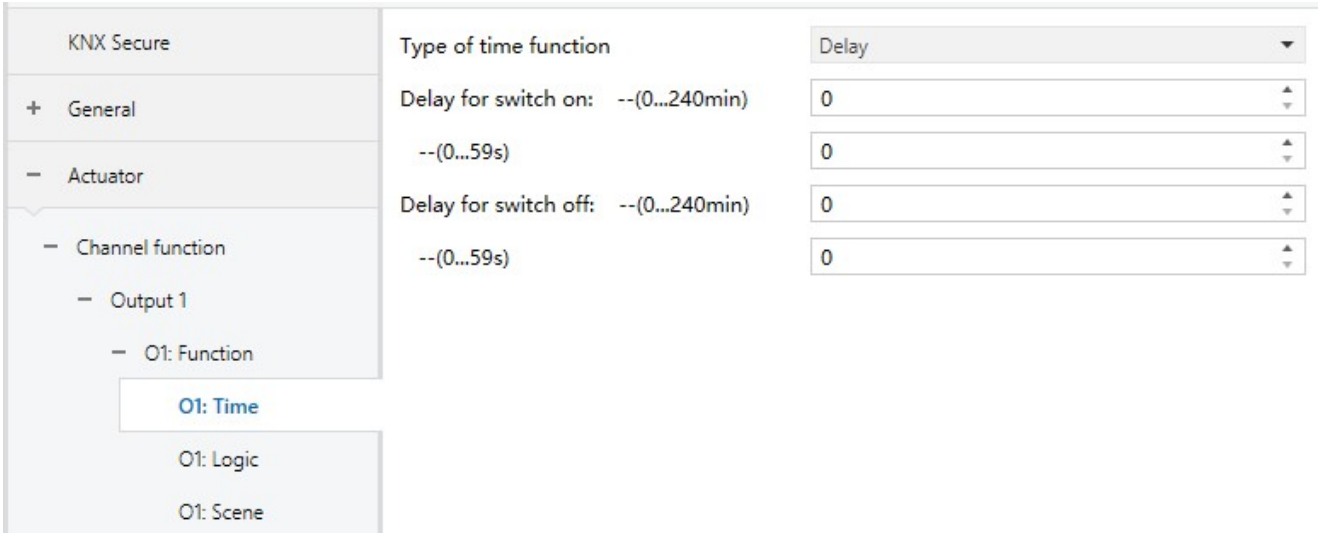



Fig. 4.3.2.2-1 Parameter window "Ox:Time-Delay".

**Parameter "Type of time function"**

This parameter sets the mode of the time function and there are three operating modes to choose from. Optional:

**Delay Delay switch**

**Flashing Flashing switch**

**Staircase Staircase Light**

**Parameter "Ox:Time-Delay"**

When "Delay" is selected, the delay switch setting screen shown in Fig. 4.3.2.2-1 appears. The delay switch function is enabled by the communication object "Delay function".

**Parameter "Delay for switch on: (0....240 min)/ (0.... .240 min)/ (0... .59 s)"**

Sets the delay time for opening the switch. Optional:

**0...240 minutes**

**0...59 seconds**

When the object receives a control command, how long is the delay before the switch is turned on.

**Parameter "Delay for switch off: (0...240 min / (0...240 min)". .240 min) / (0... .59 s)"**

Sets the delay time for switching off. Optional:

**0...240 minutes**

**0...59 seconds**

How long the object delays turning the switch off when it receives a control command.

During the delay period, if a retrigger command is received, the time is retimed.

**Parameter "Ox:Time-Flashing"**

When "Flashing" is selected for "Type of time function", the parameter setting screen of the blinker switch will appear as shown Fig. 4.3.2.2-2. This function facilitates the aging test of the luminaire.

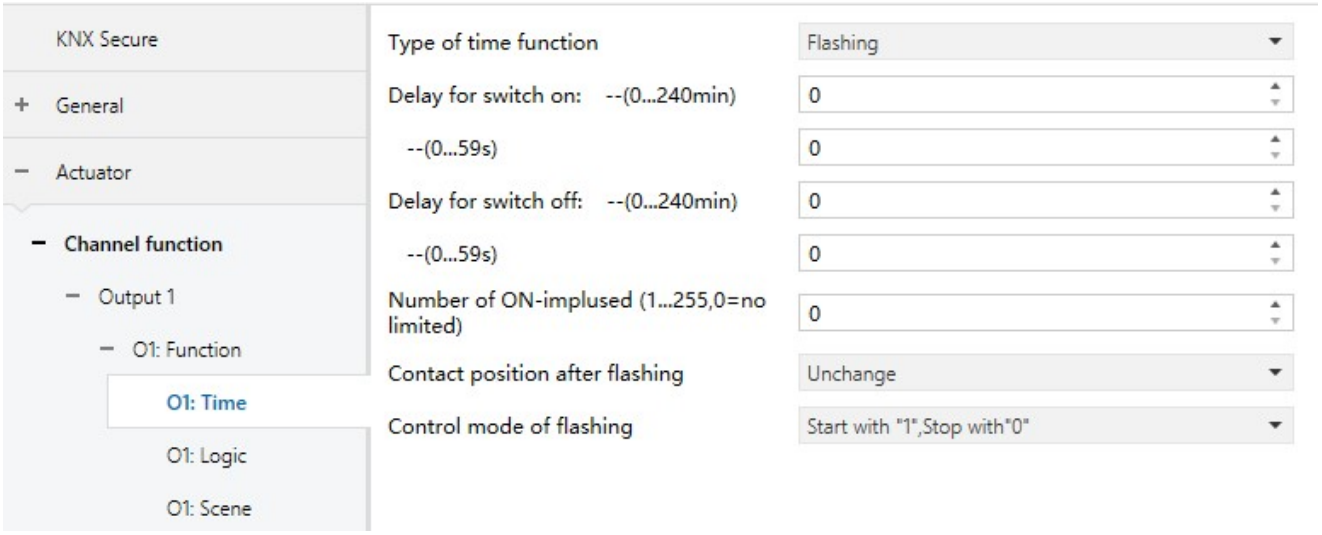



Figure 4.3.2.2-2 Parameter window "Ox:Time-Flashing".

The flashing function is activated by the communication object "Flashing function". The flashing interval can be set in the parameters "Delay for switch on" and "Delay for switch off". The flashing interval can be set in the parameters "Delay for switch on" and "Delay for switch off". If the communication object receives a message to switch on the flashing output again during the flashing switching process, the flashing output is restarted and the contact position after the channel has finished flashing can be set via the parameter.

**Parameter "Delay for switch on: (0...240 min) , (0...240 min) , (0...240 min) .240 min) , (0... .59s)"**

This parameter defines the duration for which the switch is open when flashing the output. Optional:

**0.... .240 minutes**

**0.... .59 seconds**

**It is important to note that only switching frequencies below the relay's limit will be actuated. This is because frequent switching may leave the relay without sufficient energy to execute the action, and this may occur as a delay in executing the action. This can likewise occur after power is restored to the bus.**

**Parameter "Delay for switch off: (0...240Min) , (0...240Min) , (0...240Min) .240Min) , (0....59s)". .59s)"**

This parameter defines the duration for which the switch is switched off when flashing the output. Optional:

**0.... .240 minutes**

**0.... .59 seconds**

**It is important to note that only switching frequencies below the relay's limit will be actuated. This is because frequent switching may leave the relay without sufficient energy to execute the action, and this may occur as a delay in executing the action. This can likewise occur after power is restored to the bus**.

**Parameter "Number of ON-impulsed (1.... .255, 0=no limited)"**

The number of flashing switches is set in this parameter to 1...255, 0 being an unlimited number. One ON/OFF counts as one flashing output. Options: 0....255 .255

**Parameter "Contact position after flashing"**

This parameter sets the position of the relay contacts after the blinking output is complete. Optional:

**Unchange**

**Open**

**Close**

**Parameter "Control mode of flashing".**

This parameter sets how the blink output is switched on. Optional:

**Start with "1", Stop with "0"**

**Start with "0", Stop with "1"**

**Start with "0/1", can not be stopped**

When selecting "Start with '1', Stop with '0'", the value "1 " starts the blinking output and "0" stops the blinking, the stop position is determined by the previous parameter.

When selecting "Start with '0', Stop with '1'", the value "0 " starts the blinking output and "1" stops the blinking, the stop position is determined by the previous parameter.

When "Start with '0/1', can not be stop" is selected, the value "0" or "1" can be used to switch on the blinking output. ", the blinking output can be switched on using either the value "0" or "1". In this case, the blinking output cannot be terminated by a telegram value unless it is interrupted by another operation or until its execution is completed.

**Parameter "Ox:Time-Staircase"**

When "Staircase" is selected for "Type of time function", the staircase function parameter setting interface will appear as shown in Fig. 4.3.2.2-3.

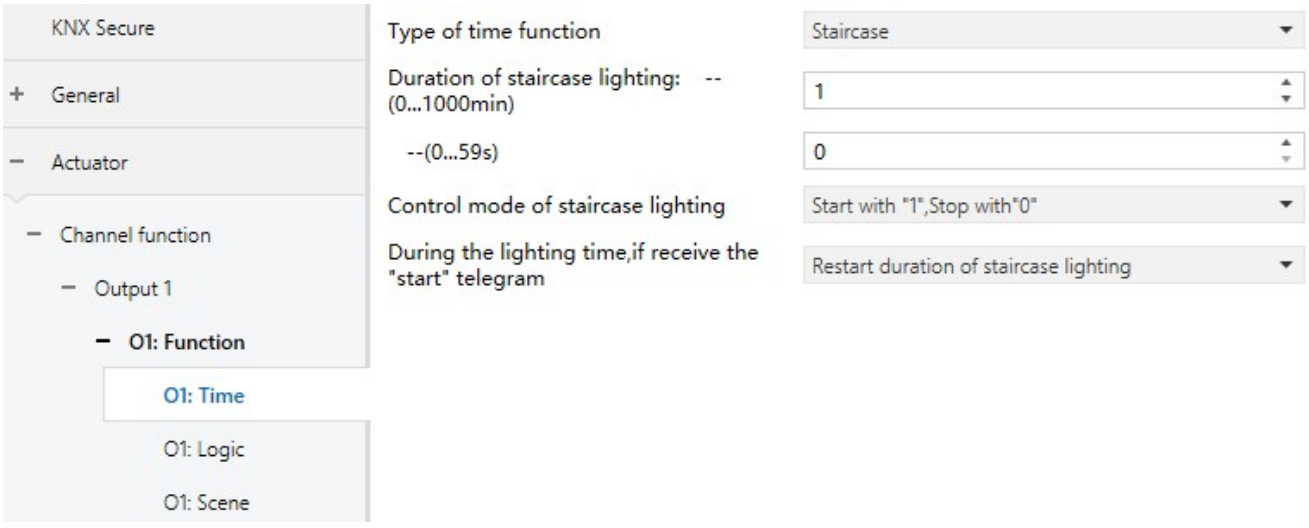



Figure 4.3.2.2-3 Parameter window "Ox:Time-Staircase".

The staircase light function is switched on by the communication object "Staircase function", the value for switching on the staircase light is set by a parameter, and the duration of switching on the staircase light is also set by a parameter.

**Parameter "Duration of staircase lighting --(0...1000 min) --(0...1000 min) .1000 min) --(0... .59 s)"**

This parameter sets the duration of the staircase lighting when the staircase light is switched on. Optional:

**0...1000 minutes**

**0...59 seconds**

**Parameter "Control mode of staircase lighting "**

This parameter sets the way to control the staircase light to switch on and stop, choose the appropriate control method according to the need. Optional:

**Start with "1", Stop with "0"**

**Start with "1", no reaction with "0"**

**Start with "0/1", can not be stopped**

**Start with "1", OFF with "0"**

When "Start with '1' , Stop with '0'" is selected, the value "1 " turns on the staircase lighting and "0" stops the timing of the duration of the staircase lighting, while the contact position remains in its current state until changed by another operation;

When "Start with '1', no reaction with '0'" is selected, the staircase lighting is switched on using the value "1", and there is no response with "0". " is used to switch on the staircase lighting, and "0" gives no response;

If "Start with '0/1', can not be stop" is selected, the staircase lighting can be switched on regardless of the value "0" or "1", but cannot be stopped with the value of the communication object unless the duration of the staircase lighting has expired or has been interrupted by another operation. The staircase lighting can be switched on regardless of the value "0" or "1", but it cannot be stopped with the value of the communication object unless the duration of the staircase lighting has expired or has been interrupted by another operation;

Select "Start with '1', OFF with '0'", use the value "1" to switch on the staircase lighting, and the value "0" to switch off the lighting. to switch on the staircase lighting and "0" to switch it off.

**Parameter "During the lighting time ,if receive the 'start' telegram"**

Optional:

**Restart duration of staircase lighting**

**Extend duration time**

**Ignore the "start" telegram**

If you select "Restart duration of staircase lighting", if the object "Staircase function" receives a message value to switch on the staircase lighting again within the duration of the staircase lighting, the staircase lighting is switched on again and the duration starts counting again. If "Restart duration of staircase lighting" is selected, if the object "Staircase function" receives a message to switch on staircase lighting again during the duration of staircase lighting, the staircase lighting will be switched on again and the duration will start again.

If you select "Extend duration time", if the object "Staircase function" receives a message to switch on the staircase lighting again within the duration of the staircase lighting, the duration set for the staircase lighting is extended cumulatively on top of the current time. If the object "Staircase function" receives another message to turn on the staircase lighting during the duration of the staircase lighting, it will extend the duration of the staircase lighting by adding the current time. For example, if the duration of the staircase light is set to 60 seconds and the current timer reaches 20 seconds, then the duration of the staircase light will be 40+60=100 seconds after receiving an activation message, and the staircase light will be switched off automatically after the 100 seconds have elapsed. If more than one start message is received in succession, the time will be added until the maximum time limit is reached.

If you select "Ignore the 'start' telegram", the value of the telegram received by the object "Staircase function" is ignored for the duration of the staircase lighting. The value of the telegram received by the object "Staircase function" is ignored for the duration of the staircase lighting.

### 4.3.2.3 Parameter window "Ox: Logic"

The logic function parameter setting screen is visible in Figure 4.3.2.1-2 "Ox: Function" when "Enable" is selected for the parameter "Function of "logic" ". can be seen when "Enable" is selected, as shown in Figure 4.3.2.3-1.

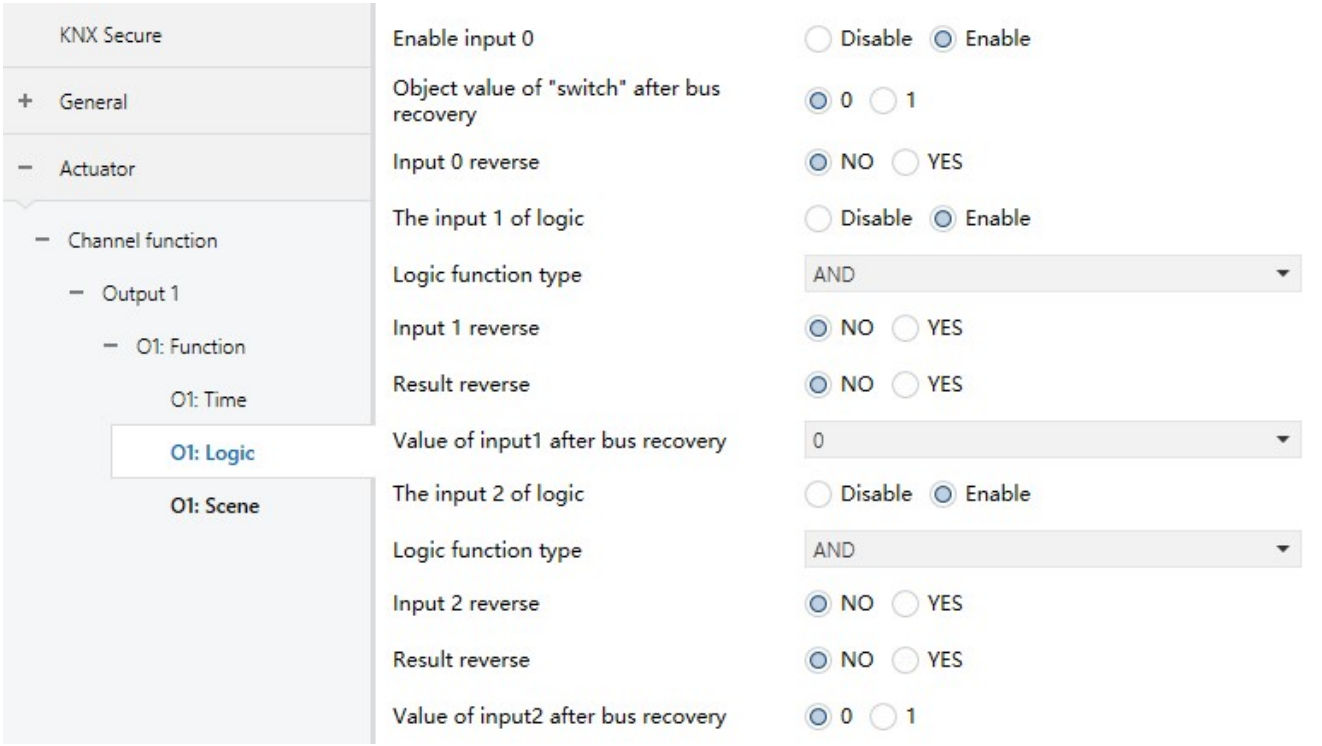



Figure 4.3.2.3-1 Parameter window "Ox: Logic".

The logical operation function provides two logical operation communication objects to determine the output of each channel, and these two logical operation communication objects are associated with the communication object "Switch".

After receiving the value of a logical communication object, the logical operation function performs a new logical operation and outputs the result of the logical operation as the switching state (the channel contact is closed when the result of the logical operation is "1", and the channel contact is opened when the result is "0"). (If the result of the logic operation is "1", the channel contact is closed.) The value of the communication object "Logic 1" is first combined with the value of the communication object "Switch" in a logical operation, and the result is then combined with the value of the communication object "Logic 2" in a logical operation. The result is then used for the logical operation with the value of the communication object "Logic 2". If a logical operation object is not enabled, the logical operation object and the corresponding logical operation are ignored, and the enabled part is taken directly to the next operation.

**Parameter "Enable input 0".**

This parameter enables or disables the participation of "input 0" in logic operations. The logic value of "input 0" is entered via the communication object "Switch". This parameter is optional:

**Disable**

**Enable**

There is a slight difference between the parameters of "Input 0" in the case of enabling and disabling, all parameters of the logic function are described below, in the case of disabling, there are fewer parameters that can be set, and if it doesn't have certain parameters, then the function of these parameters is not available to it.

**Parameter "Object Value of "switch" after bus recovery"**

This parameter is used when the logic function "input 0" is enabled to set the initial value of the communication object "Switch" for this channel when the power supply is restored to the bus. The value can be written as "0" or "1". Option: "0" or "1" can be written.

**0**

**1**

**Parameter "Input 0/1/2 reverse"**

This parameter sets whether or not to invert the values of Input 0/1/2. Selecting "yes" inverts them and then performs the logic operation after the inversion, while "no" does not invert them. Optional:

**No**

**Yes**

**Parameter "The input x of Logic" (x = 1, 2)"**

This parameter enables logic input 1 or 2, whose communication object "Logic 1" or "Logic 2" will also be visible. Optional:

**Disable**

**Enable**

**Parameter "Logic function type".**

This parameter sets the logical relationship of logical operations. Three standard logical operations (AND, OR, XOR) and a "GATE" function are provided. The "GATE" function is applied in such a way that the latter logic condition is equivalent to the enable flag of the former logic condition, and if the enable flag of the latter logic is "1", the former logic condition can be used as the result of the operation.

If the value of Input 1 is 1, the value of Input 0 can be used as the result of the operation. If the value of Input 2 is 1, the value of Input 1 or the result of Input0/Input1 can also be used as the result of the operation. Optional:

**AND**

**OR**

**XOR**

**GATE**

The following arithmetic results are possible:

| logical function | object value | | | | | descriptions |
|---|---|---|---|---|---|---|
| | Input 0 (Switch) | Input 1 | Result of Input 0/ 1 | Input2 | Output | |
| AND | 0 | 0 | 0 | 0 | 0 | The result is 1 only if both input values are 1. |
| | 0 | 1 | 0 | 1 | 0 | |
| | 1 | 0 | 0 | 0 | 0 | |
| | 1 | 1 | 1 | 1 | 1 | |
| OR | 0 | 0 | 0 | 0 | 0 | As long as either of the two input values is 1, the result is 1. |
| | 0 | 1 | 1 | 1 | 1 | |
| | 1 | 0 | 1 | 0 | 1 | |
| | 1 | 1 | 1 | 1 | 1 | |
| XOR | 0 | 0 | 0 | 0 | 0 | When the two input values are different, the result is 1. |
| | 0 | 1 | 1 | 1 | 0 | |
| | 1 | 0 | 1 | 0 | 1 | |
| | 1 | 1 | 0 | 1 | 1 | |
| GATE | 0 | Closed | | Closed | | When the door is open (open "1"), the logical or arithmetic value is allowed to pass, otherwise it is ignored and not saved. |
| | 0 | Open | 0 | Open | 0 | |
| | 1 | Closed | | Closed | | |
| | 1 | Open | 1 | Open | 1 | |

Notes:
1. The value of the communication object "Input 1" is first logically operated with the value of the communication object "Switch", and the operation result is then logically operated with the value of the communication object "Input 2". The result of this operation is used as the final output.
2. Ignore an input if it is not enabled.
3. If the logical result of the inverse, the first inverse, and then the next operation.
4. Gate function, when the gate is open, the signal can pass, otherwise it is ignored. For example, when the gate of Input 1 is closed, the logic value of Input0 is ignored, and the output is directly determined by Input2.

**Parameter "Result reverse"**

This parameter sets whether or not to invert the result of the logic operation, selecting "yes" will invert the result of the logic operation and "no" will not invert it. This parameter is optional:

**No**

**Yes**

**Parameter "Value of input 1 after bus recovery"**

This parameter defines the default logical value of the communication object "Logic 1" after the power supply to the bus is restored, optionally "1", "0" or the value before the power failure. Optional:

**0**

**1**

**Value before power off**

**Parameter "Value of input 2 after bus recovery"**

This parameter defines the default logical value of the communication object "Logic 2" after the power supply to the bus is restored, optionally "1" or "0". Optional:

**0**

**1**

### 4.3.2.4 Parameterisation window "Ox: Scene"

Scene function parameter setting interface is shown in Fig. 4.3.2.1-2 "Ox: Function", when "Enable" is selected for parameter "Function of "Scene"", a total of 8 scenes can be set as shown in Fig. 4.3.2.4-1. When "Enable" is selected, as shown in Fig. 4.3.2.4-1, a total of 8 scenes can be set.

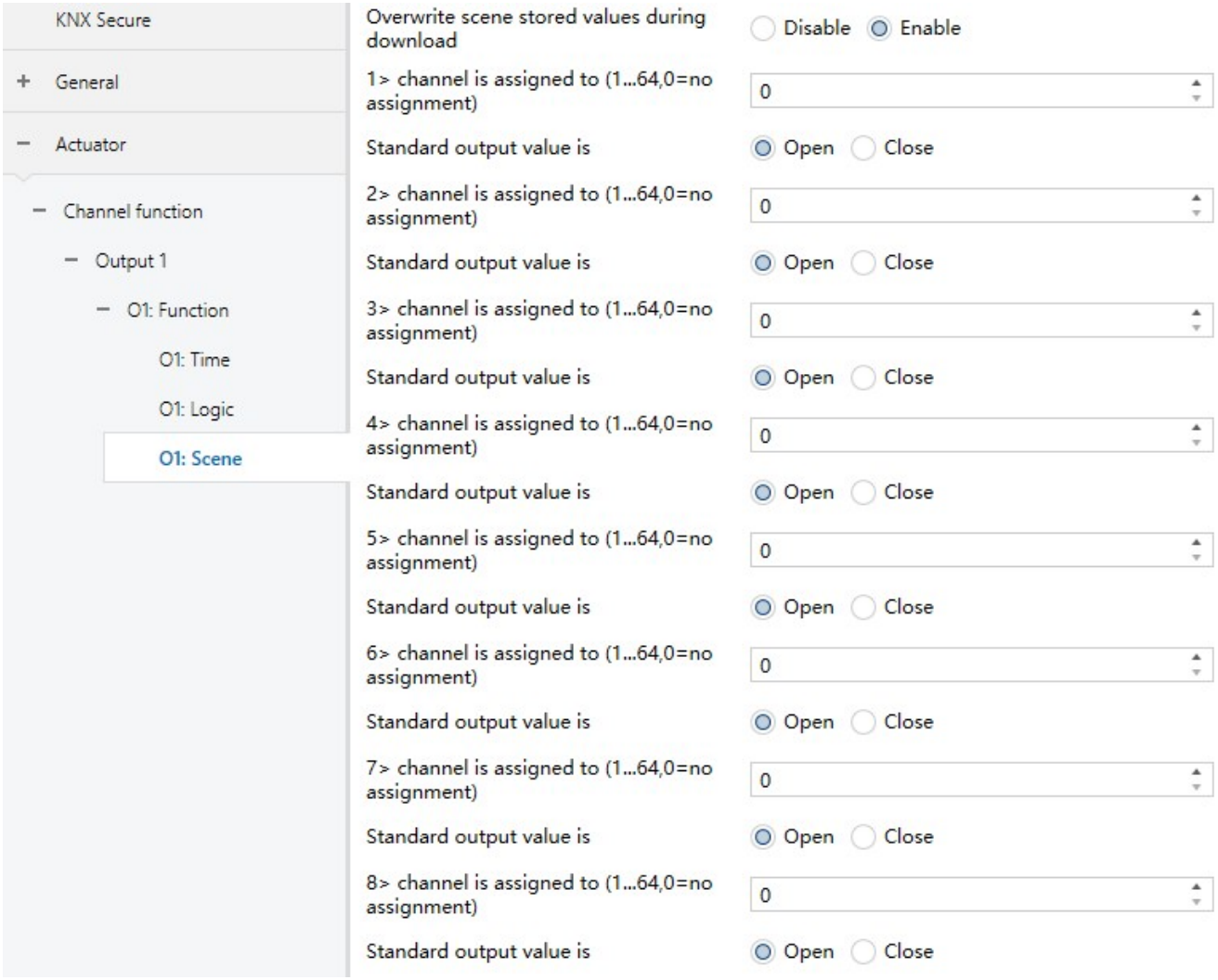



Fig. 4.3.2.4-1 Parameter window "Ox: Scene".

**Parameter "Overwrite scene stored values during download"**

This parameter sets whether to enable override of scene save values during application download. Optional:

**Disable**

**Enable**

Disable: not enabled. During the application download, the saved scene values will not be overwritten by the parameter set scene, and the scene call will still enable the scene saved before the download until it is replaced by the new stored scene.

Enable. During the application download, the saved scene values will be overwritten by the parameter setup scene, and the scene call will follow the parameter setup scene until it is replaced by the new stored scene.

**Parameter "channel is assigned to (1.... .64 ,0= no assignment)"**

Each output can be assigned 64 different scene numbers. Each output can be set to 8 different Scenes at the same time.

Options: **Scene 1... Scene 64, 0=no assignment**

**Note: The valid scene numbers in the parameter setting options are 1 to 64, and the corresponding message values are 0 to 63. bus power down and power back on again will not reset the saved new scene values.**

**Parameter "Standard output value is"**

This parameter sets the output state of the channel when the scene is called. Optional:

**Open**

**Close**

## 4.3.2.5 Parameter window "Ox: Forced"

The parameter "Function of "Forced"" in Fig. 4.3.2.1-2 "Ox: Function" is visible when "Enable" is selected, as shown in Fig. 4.3.2.5-1. The parameter "Function of "Forced" " in Fig. 4.3.2.1-2 "Ox: Function" is visible when "Enable" is selected, as shown in Fig. 4.3.2.5-1.

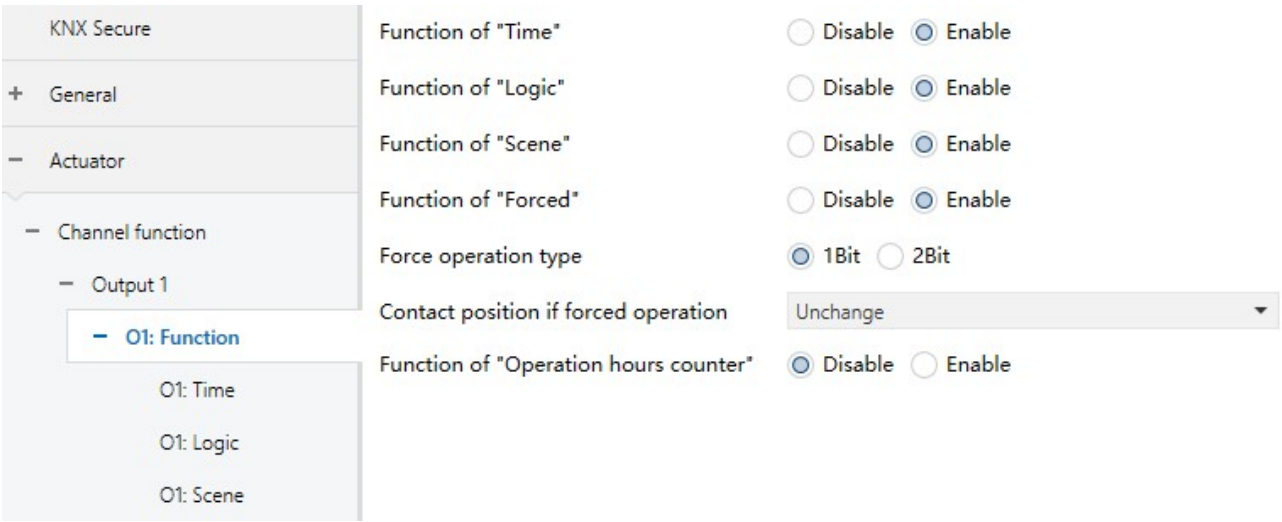


Figure 4.3.2.5-1 Parameter window "Ox: Forced".

Forced operations are activated by the communication object "Forced output" and are used in special cases, e.g. in the event of an emergency. Forced operations have the highest priority in the system, i.e. when a forced operation is activated, other operations are ignored.

**Parameter "Force operation type"**

This parameter sets the data type of the object on which the forced operation is turned on. Optional:

**1bit**

**2bit**

If "1bit" is selected, the object "Forced output" will enable forced operation if a message is received "1", and will cancel forced operation if a message is received "0". If "1bit" is selected, forcing is enabled when the object "Forced output" receives a message "1" and cancelled when it receives a message "0".

If "2bit" is selected, the following table shows the actions to be performed when the message value is received by the object "Forced output":

| The value of the object "Forced output , X". | Actions performed |
|---|---|
| 00b (0), 01b (1) | Force operation cancelled, other operations available |
| 10b (2) | Forced Off (OFF) |
| 11b (3) | Force On (ON) |

When force is cancelled, the contact position of the relay does not change. However, if the time function (Delay/Flashing/Staircase) is running before the force operation, the operation sequence will be timed even during the force period, and if the operation sequence of the time function is not completed after the force is cancelled, the operation of the time function will be continued.

**Parameter "Contact position if forced operation"**

This parameter is visible when "1bit" is selected for the data type of the object and sets the contact position of the channel output when the force operation is activated. Optional:

**Unchange**

**Open**

**Close**

Unchange: The contact position of the relay does not change;

Open: The contact position of the relay is open;

Close: The contact position of the relay is normally open.

Forced operations have the highest priority and all other operations are ignored during a forced operation. Control messages received during a forced operation are ignored.

## 4.3.2.6 Parameter window "Ox: Operation hours counter"

The parameter setting for the loop output time calculation function is visible when "Enable" is selected for the parameter "Function of "Operation hours counter "" in 4.3.2.1-2 "Ox: Function" as shown in Fig. 4.3.2.6-1. " in 4.3.2.1-2 "Ox: Function" is visible when "Enable" is selected, as shown Fig. 4.3.2.6-1. This function is used to record the length of time the relay has been open.

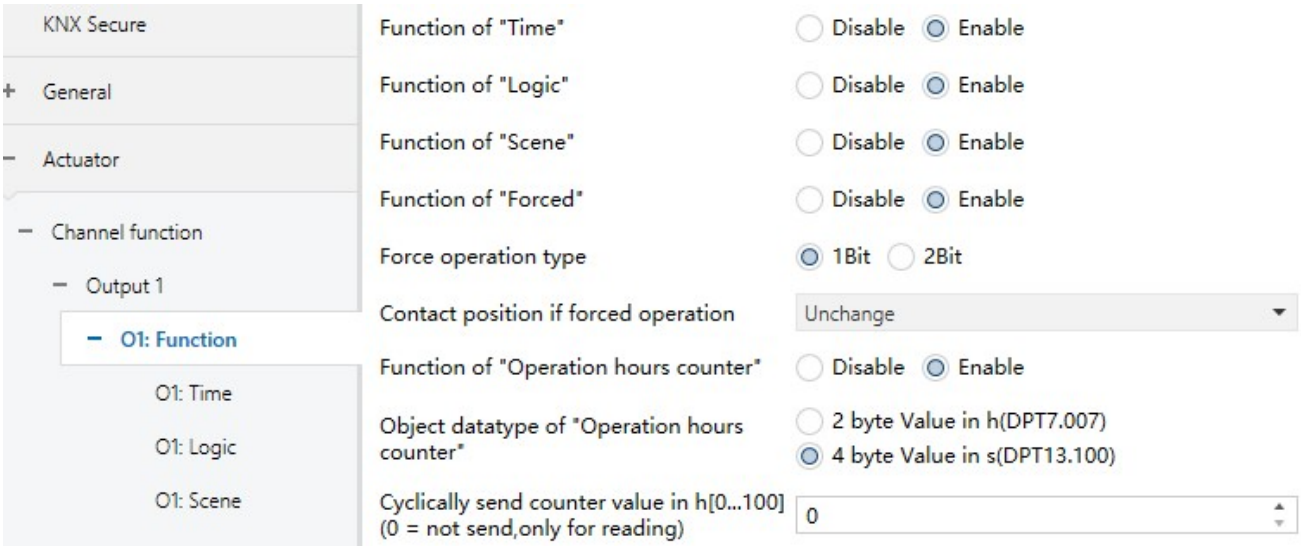



Figure 4.3.2.3-1 Parameter window "Ox: Operation hours counter".

**Parameter "Object datatype of " Operation hours counter"**

This parameter sets the data type for recording the loop output time. Optional:

**2 byte Value in h(DPT 7.007)**

**4 byte Value in s(DPT 13.100)**

The "2 byte Value in h (DPT 7.007)" option indicates a count value of 2 byte;

The "4 byte Value in s (DPT 13.100)" option indicates a count value of 4 byte.

**Parameter "Cyclically send counter value in h[0..100] (0=not send, only for reading)"**

This parameter sets the time interval for the cycle to send the power-up timing time. Options: 0-100

"0" means no period to send power-on time, "1-100" means 1 hour to 100 hours to send power-on time once respectively. When the parameter "Object of switch and operation hours counter" is set to 2byte, the operation time is measured in hours; when it is set to 4byte, the operation time is measured in s. The parameter "Object of switch and operation hours counter" is set to 2byte, the operation time is measured in hours.

**Switch actuator controls the priority of various operations in the section:**

**Initialisation (after completion of parameter download) → manual operation (switch to manual operation by long-pressing the manual button and the button for that channel is operated) → forced operation → normal operation**

**The following points apply:**

**1, the manual operation switch has the highest priority, higher than the forced operation (force operation), if the force has activated, when exiting the manual operation, the status returns to the forced operation;**

**2. Assuming that the time function is currently running, if there is a manual operation in the channel, the unfinished time function will be interrupted and will not continue;**

**3. Under manual operation, any message received is invalid and will not be recorded.**

## 4.3.3 Switch output "Heating actuator (without controller)"

When "Heating actuator (without controller)" is selected for "Work mode of the channel is", the parameter setting screen as shown in Fig. 4.3.3-1 will appear. The parameter setting interface will appear as shown in Figure 4.3.3-1. In this mode of operation, the device is normally used to control an electric heating valve. The device is controlled by a thermostat or a temperature sensor so that the temperature of the room is constant.

Two different types of control commands are available for each output - 1bit control and 1byte control. In the case of 1bit, the control is carried out by means of the control telegram received by the communication object "On-off control value" and in the case of 1byte, the control is carried out by means of the control telegram received by the communication object "Control value (Continuous)". In the case of 1byte, control is carried out with the control message received by the communication object "Control value (Continuous)".

In the control commands, "0%/OFF" means the valve is closed, and "100%/ON" means the valve is open. the intermediate value from 0 to 100% means that the valve is open x% of the time during a cycle, and is closed the rest of the time.

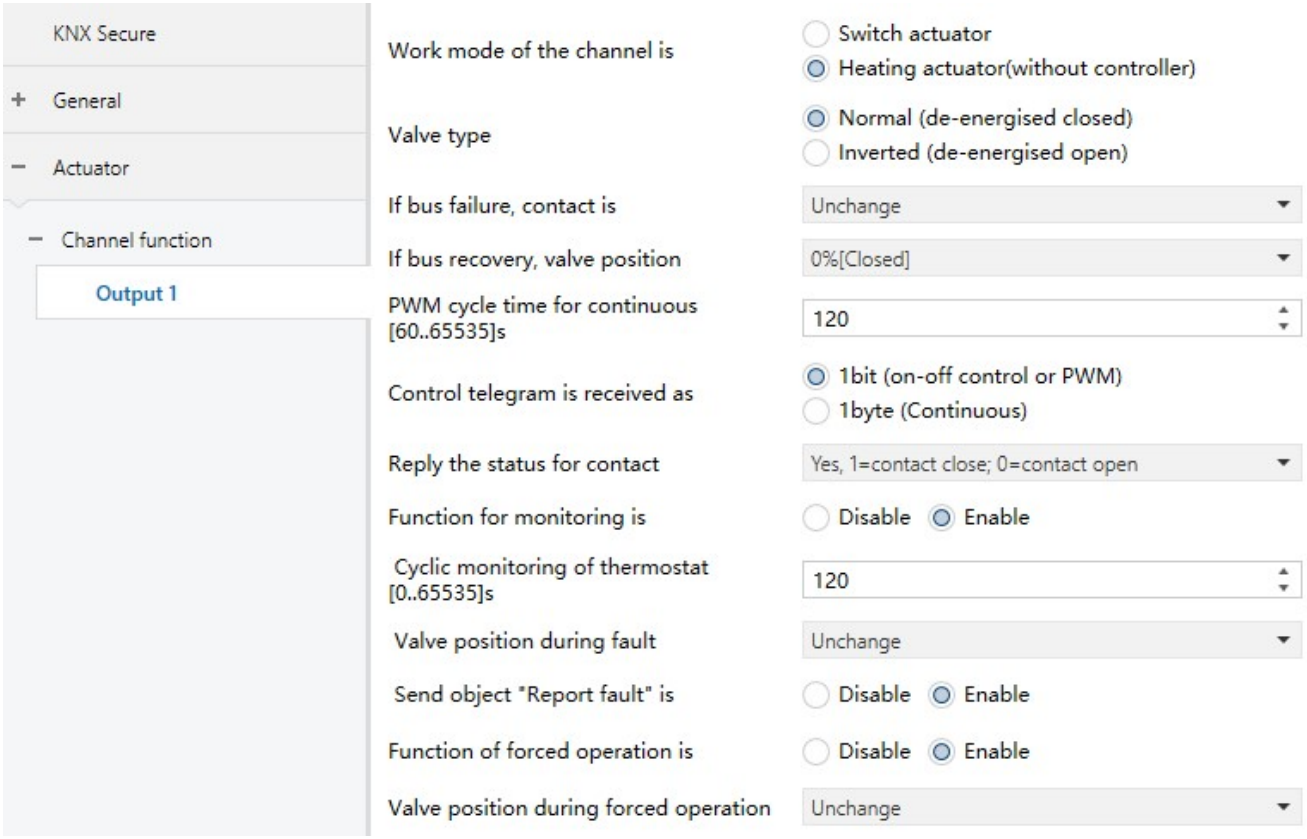



Fig. 4.3.3-1 Parameter setting screen "Heating actuator (without controller)".

**Parameter "Valve type"**

This parameter sets the type of valve switching. Optional:

**Normal (de-energised closed)**

**Inverted (de-energised open)**

For on-off valves, "Normal (de-energised closed)" applies to normally closed on-off valves and "Inverted (de-energised open)" applies to normally open on-off valves.

**Parameter "If bus failure, contact is"**

This parameter sets the position of the relay contacts when the device bus is powered down. Optional:

**Unchange**

**Open**

**Close**

When "Unchange" is selected, the relay contacts of this channel do not change when the bus is powered down;

When "Open" is selected, the relay contact of this channel is open when the bus is powered down;

When "Close" is selected, the relay contact of the channel closes when the bus is powered down.

When the bus is powered down, the above settings can only be executed when the relay has enough energy.

**Parameter "If bus recovery, valve position".**

This parameter sets the valve switch action when power is restored to the bus, which continues until a control command is received or until it enters fault mode. Optional:

**0 per cent [Closed]**

**10 per cent [26]**

**20 per cent [51]**

**...**

**90 per cent [203]**

**100% [Open]**

Example 20%, PWM period is 100s (1 minute 40s), then the period of the valve switching action will be 20s on, 80s off.

**Parameter "PWM cycle time for continuous [60..65535]s"**

This parameter sets the period of pulse width control (PWM). Options: **60...65535**

**Note: To extend the life of the relay and the controlled equipment, this pulse period is set as long as possible.**

**With the 1bit control type, Pulse Width Control (PWM) is only used to control the drive when it is under fault, in forced operation mode, and after bus voltage is restored.**

**Parameter "Control telegram is received as"**

This parameter sets the type of control telegram used to drive the valve control. Optional:

**1bit(on-off control or PWM)**

**1byte (Continuous)**

With "1bit" control, the valve control is similar to normal on/off control: the room thermostat controls the valve outputs with on/off commands. In the event of a thermostat fault where the output does not receive a control signal, the valve will automatically PWM according to the valve position set under the fault. The PWM cycle time set by the channel is not used for this purpose.

With "1byte" control, the room thermostat sends a control value between 0 and 255 (corresponding to 0% ... 100%). 100%). This process is also called "Continuous-action control". At 0% the valve is closed, at 100% it is fully open, and at intermediate values of 0%....100% it is fully open. . 100%, the channel controls the output by adjusting the pulse duty cycle.

**Note: Under the dynamic regulation function, each time a continuous regulation telegram is received, the channel will recalculate the duty cycle of the pulse according to the new control value, the time is up and action is taken.**

**--Parameter "Reply the status for continuous control"**

This parameter is visible when "1byte (Continuous)" is selected in the previous parameter and is used to set whether the status of the controlled valve is reported. There are two types available, 1bit and 1Byte, which can be selected according to the type of controlled device. Optional:

**No reply**

**Yes,0%=0, otherwise "1" (1 bit)**

**Yes,0%=1, otherwise "0" (1 bit)**

**Yes, continuous control value (1 byte)**

**Parameter "Reply the status for contact"**

This parameter sets whether the device reverts to the switching state of the contacts. Optional:

**No reply**

**Yes,0=contact close; 1=contact open**

**Yes,1=contact close; 0=contact open**

When "No reply" is set, the communication object does not reply to the contact state;

When "0=contact close ; 1=contact open" is set, the value of the communication object "status of contact" is "0". When "0=contact close ; 1=contact open" is set, the value of "status of contact" in the

communication object is "0", which means that the relay contact is closed, and the value is "1", which means that the relay contact is open;

Setting "1=contact close; 0=contact open" has the opposite meaning.

**Note: If the status of the switch is determined after programming or system reset, the object "status of contact" sends a status message to the bus; if it is not determined, no status message is sent.**

**Parameter "Function for monitoring is"**

This parameter sets whether to enable the function of monitoring control values. Optional:

**Disable**

**Enable**

The following three parameters are visible when "Enable" is selected for "Function for monitoring is".

**--Parameter "Cyclic monitoring of thermostat [0..65535]s"**

This parameter sets the time for the device to monitor control telegrams from the thermostat. Usually control telegrams from the room thermostat are sent to the device at regular intervals, and if one or more neighbouring control telegrams are not received, this feature of the device can indicate a communication or a thermostat fault in the room. If no control telegrams are received from the thermostat within the time set in this parameter, the device automatically starts the fault mode. The fault mode ends when the device receives the control telegram again. The monitoring time will be retimed for each control telegram received. Options: **0...65535**

**Note: If this feature is activated, the room thermostat must periodically send out control telegrams. The monitoring period should be greater than the time between control telegrams sent by the controller.**

**--Parameter "Valve position during fault"**

This parameter sets the position of the valve in fault mode and the valve will switch action according to the PWM cycle. Optional:

**0 per cent [Closed]**

**10 per cent [26]**

**...**

**100% [Open]**

**Unchange**

Example 20%, PWM period is 100s (1 minute 40s), then the period of the valve switching action will be 20s on, 80s off;

If option "Unchange" is selected, the valve position does not change.

**--Parameter "Send object" Report fault "is"**

This parameter sets whether or not to send a telegram to report the fault mode during the fault mode. If enabled, when the device does not receive a control value within the monitoring time, an error report is sent and this output channel performs the dynamic action in the fault mode until it is interrupted by another operation. When the control value is received again, the monitoring time starts counting again. Optional:

**Disable**

**Enable**

When "Enable" is selected, the communication object "Report fault" is activated and when the value of the communication object "Report fault" is "1", this output channel is in fault mode. When the value of the communication object "Report fault" is "1", it means that the output channel is in fault mode, while a value of "0" means that the output channel is not in fault mode.

**Parameter "Function of forced operation is"**

This parameter sets whether to enable the forced operation function. It is optional:

**Disable**

**Enable**

**--Parameter "Valve position during forced operation"**

This parameter sets the position of the valve under forced operation, and the valve will switch action according to the PWM cycle. Optional:

**0 per cent [Closed]**

**10 per cent [26]**

**...**

**100% [Open]**

**Unchange**

If option "Unchange" is selected, the valve position does not change.

At the end of the forcing mode, the valve output state will return to the previous operation. For example, if the valve position is 40% under forcing operation and the previous operation was 60%, the valve output status will return to the 60% valve position after exiting forcing.

During the forced operation, the monitoring time of monitor still continues, and it will send an error report when the monitoring time is up, but the action under the fault can not be executed, and it can only be executed after exiting the forced operation. However, the action can not be executed under the fault, and it can be executed only after exiting the forced operation. and during the forced operation, the control message received from the common operation will be recorded.

**The Heating actuator controls the priority of the various operations in the section:**

**Initialisation (after completion of parameter download) → manual operation (switch to manual operation by long-pressing the manual button and the button for that channel is operated) → forced operation → normal or fault operation**

**The following points apply:**

**1. During manual operation, the received control values and commands to force operation are invalid, but fault monitoring is continued and the control values can also reset the fault monitoring cycle. After exiting manual operation, the action will be based on the current fault status, if there is no fault, until a new control command is received. If a forced operation was previously in progress, it returns to the forced operation state. Exiting Forced acts according to the current control value or fault status;**

**2. At the end of the forced operation mode, the valve output state will return to the current control value or fault state. Control telegrams received for normal operation are recorded during forced operation.**

## 4.3.4 Curtain (AC) outputs

The curtain (AC) output has up to 14 output channels. Since each output is assigned the same parameters and communication objects, one of the outputs is used as an example for illustration.

### 4.3.4.1 Parameterisation window "Curtain X: Venetian Blind"

The "Curtain X" parameter setting interface is shown in Fig. 4.3.4.1-1. Here, the general parameters of curtain output are set.

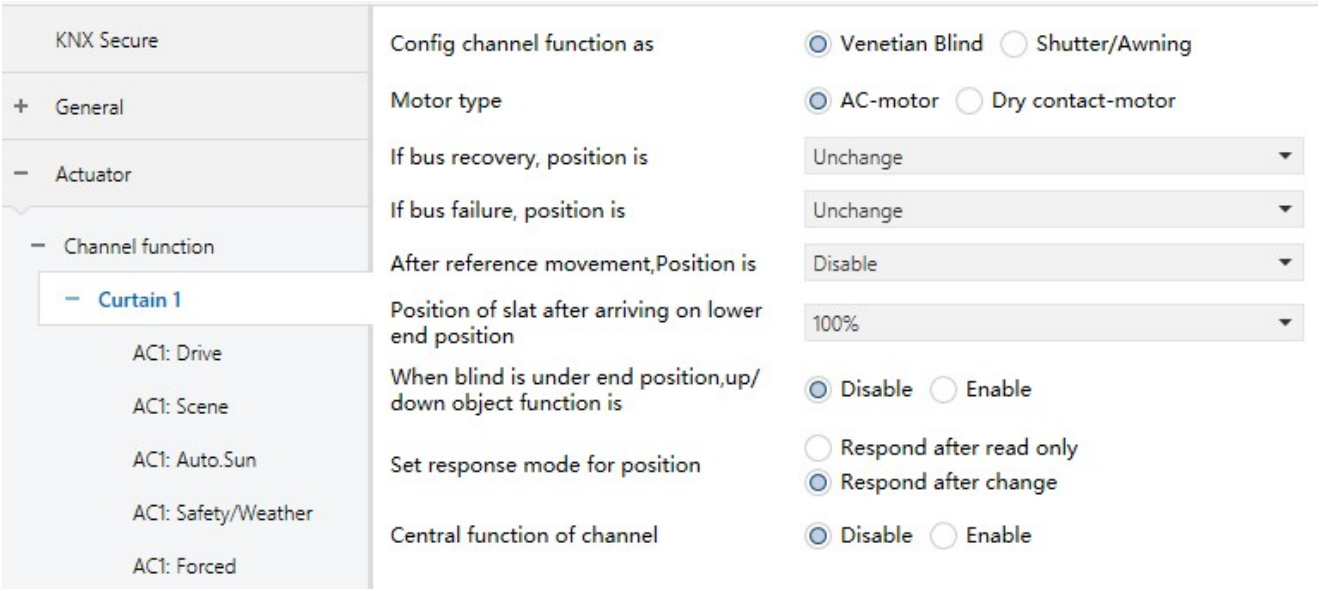



Figure 4.3.4.1-1 Parameter window "Curtain X: Venetian Blind".

**Parameter "Config channel function as:"**

This parameter is used to set the operation mode of the channel, there are two operation modes available, different operation modes correspond to different parameters and communication objects. Optional:

**Venetian Blind**

**Shutter**

With the option "Venetian Blind", the operating mode is the blinds operating mode, i.e. it is possible to operate curtains with blinds.

The "Shutter" option works like the "Venetian Blind" mode, except that it does not adjust the louvres.

This section describes in detail the parameters and communication objects of the "Venetian Blind" operating mode.

**Parameter "Motor type"**

This parameter sets the type of blinds drive. Optional:

**AC-motor**
**Dry contact-motor**

Option "AC-motor" for drives of strong electrical type.

Option "Dry contact-motor" for drives with dry contact control.

**--Parameter "Drive pulse time[1..50]*100ms"**

This parameter is only visible if the "Dry contact-motor" type was selected in the previous parameter and defines the duration of the drive pulses of the dry contact motor. Options: **1...50**

The setting of this parameter should be considered in relation to the technical characteristics of the curtain.

**Parameter "If bus recovery, position is"**

This parameter sets the action performed by the device after a bus reset for this channel shutter. Optional:

**Unchange**
**Up**
**Down**
**Stop**

When "Unchange" is selected, the shutters of the channel remain in the current state when the bus is powered up;

When "Up" is selected, the shutter for that channel operates in the highest position when the bus is powered up;

When "Down" is selected, the shutter for that channel operates in the lowest position when the bus is powered up;

When "Stop" is selected, the blinds for that channel will be stopped if it is running when the bus is powered up.

After programming, all contacts of the output are disconnected.

**Note: After programming or resetting, if the shutter actuator is unable to determine the position status of the current outputs, the communication object "Position status" takes the value of 50% and will not be sent to the bus, but only after the position has been determined will a status message be sent to the bus.**

If the shutter is programmed to give a clear position in the first place, the shutter is first run to the top or bottom (moving closer to the target position to the limit) to perform a full run to determine the current position and then move to the target position. In other words, only when the shutter has completed a full run can it be given a clear position.

**Parameter "If bus failure, position is"**

This parameter sets the action performed by this channel shutter when the device is powered down at the bus. Optional:

**Unchange**

**Up**

**Down**

**Stop**

When "Unchange" is selected, the shutter of the channel remains in the current state when the bus is powered down;

When "Up" is selected, the shutter for that channel operates to the highest position when the bus is powered down;

When "Down" is selected, the shutter of the channel operates to the lowest position when the bus is powered down;

When "Stop" is selected, the blinds for that channel will be stopped if it is running when the bus is powered down.

**Note: Before power down, the curtain is running, if you need to execute an opposite action after power down, then this action will not be executed, but maintain the running state before power down. Because it involves steering action, before steering, it must be stopped first, then run, after power down, there is no time to execute this series of process, so maintain the original action, if it is stop action after power down, then it will execute stop.**

**Parameter "After reference movement, Position is"**

This parameter is used to specify how the shutter actuator operates when the reference move is performed. Optional:

**Disable**

**No reaction**

**Move to saved position**

When the option is "Disable", the reference move is not activated.

With the option "No reaction", the object "reference movement" receives message '0', the shutter runs to the top; If the object receives a message '1', the shutters run to the bottom.

The option is "Move to saved position", when the object receives the message "1", the shutter will run to the lowest position, and then return to the original position; when the object receives the message '0 When the object receives the message '1', the shutter runs to the top and then returns to the original position.

The actuator constantly detects the current position of the shutter, as well as the angular position of the louvres, as the shutter moves. When the shutter is used for a long time, the detected position may be a bit inaccurate due to temperature changes and aging. Therefore, the shutter actuator should clearly define the current position of the shutter when using the upper and lower limit positions. The upper or lower limit position of the shutter is updated each time inside the shutter actuator.

If the limit position is not reached under normal operation, a reference move may be triggered via a bus message, prompting the shutter to move to the top or bottom. Depending on the parameter settings, the shutter may stay in the reference position after the move, or it may move to the original position.

**Parameter "position of slat after arriving on lower end position"**

The angle of the louvre can be defined by this parameter after the louvre has been moved to the lowermost position. Optional:

**0 per cent/10 per cent/.../90 per cent/100 per cent**

For example, if the option is "40%", then when the object "Move UP/DOWN" receives the message "1", the blinds will be moved downwards, and when they have reached the lowest point, the position of the blinds will then be adjusted to 40%. The position of the louvres is then adjusted to 40%.

**Note: At present, this parameter only affects the down action (there is a function parameter to set down), the safe operation is not affected, and the percentage control method is not affected.**

**Parameter "When blind is under end position, up/down object function is"**

This parameter defines whether the curtain can still be moved via the object "Move UP/DOWN" when the curtain reaches the uppermost/lower end. Optional:

**Disable**

**Enable**

If the option is "Disable", it cannot be moved.

The option "Enable" allows you to move, and the travelling time is the full travelling time.

**Parameter "Set response mode for position"**

This parameter defines how the position status is fed back. Optional:

**Respond after read only**

**Respond after change**

Select "Respond after read only" to send the current position of the blinds to the bus only when the device receives the current position of the blinds from another bus device or reads it on the bus with the object "Position status 0...100%/Slat status 0 .100%" sends the current position of the blinds to the bus only if the device receives the current position of the blinds from another bus device or if the bus reads the current position of the blinds;

Selecting "Respond after change", the object "Position status 0...100%/Slat status 0...100%" sends a telegram to the bus to report the current position status of the blinds as soon as the position of the blinds has changed. The object "Position status 0..100%/Slat status 0..100%" immediately sends a message to the bus to report the current position status of the blinds.

**Parameter "Central function of channel".**

This parameter sets whether centralised control is enabled for this channel. Optional:

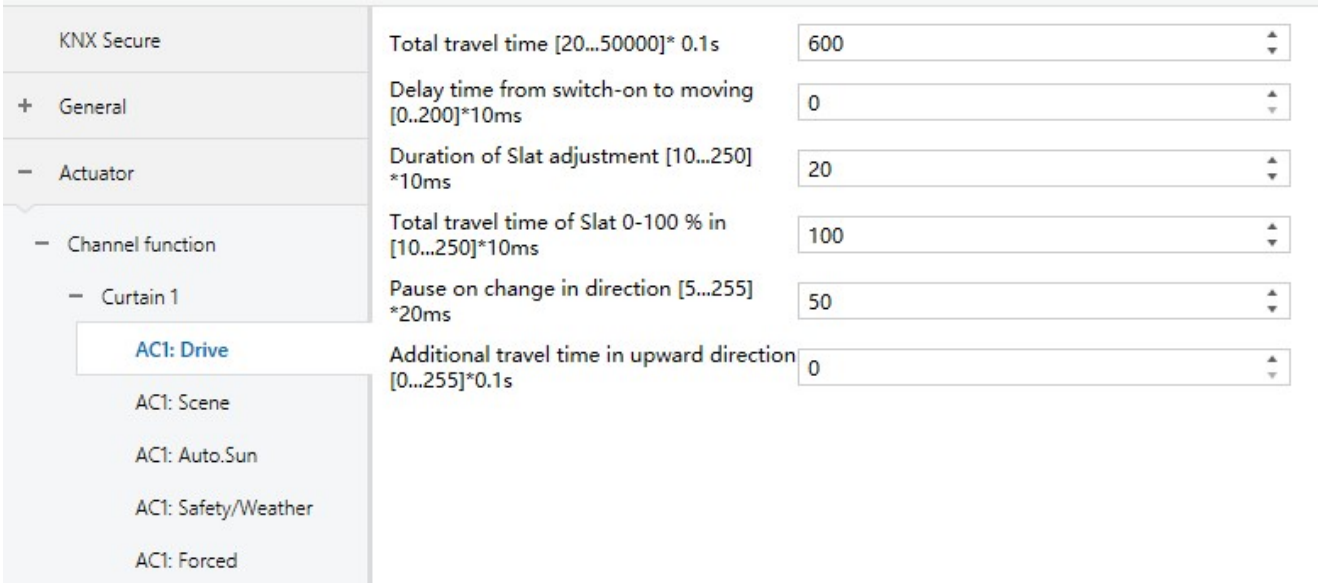
**Disable**

**Enable**

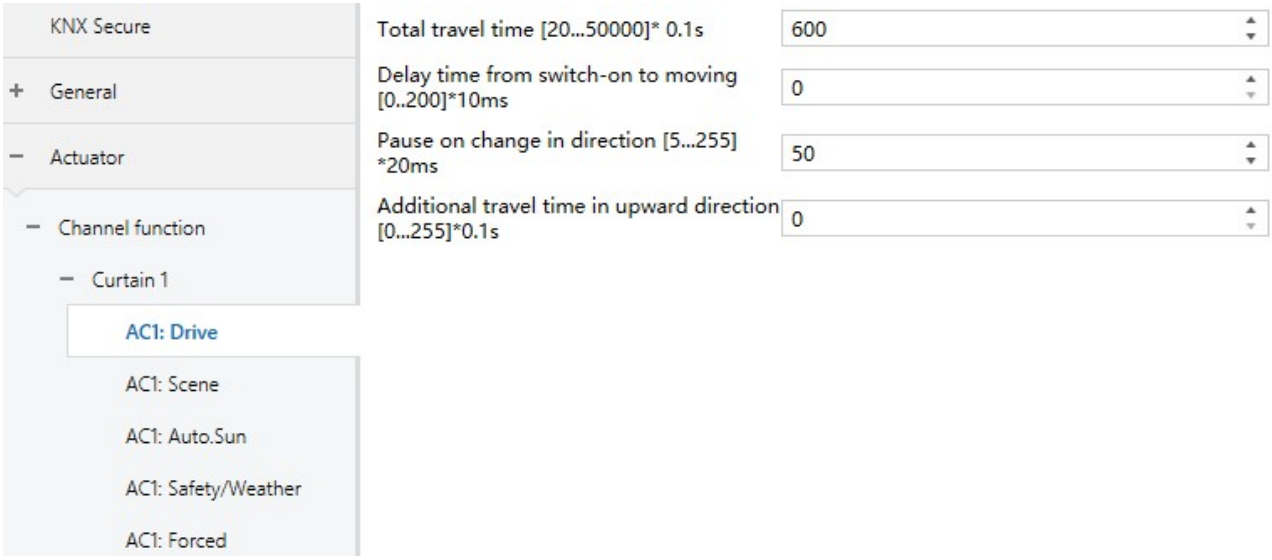
When enabled, the channel is controlled by the central control objects "Central control for Up/Down" and "Central control for Slat/Stop".

### 4.3.4.2 Parameter window "ACx: Drive"

The "ACx: Drive" parameter setting interface is shown in Fig. 4.3.4.2-1, where the parameters associated with the shutter drive are mainly set. The current position of the shutter is usually estimated according to the running time, for example, the total travelling time of the shutter movement can be used to estimate the position of the movement, and the whole time of the shutter angle adjustment and the time of each adjustment can be used to estimate the position of the shutter angle. The total travelling time of the shutter movement can estimate the moving position, the whole time of the shutter angle adjustment and the time of each adjustment can estimate the angle position of the shutter, the motor also has the starting time or stopping time and so on. Different blinds drive, their technical parameters and running time is not the same, therefore, in the use of blinds before the use of blinds, must have a certain understanding of the technical parameters and running time of the blinds drive, only then can the blinds actuator in the relevant parameters for accurate settings.




Venetian Blind type (with louvres)



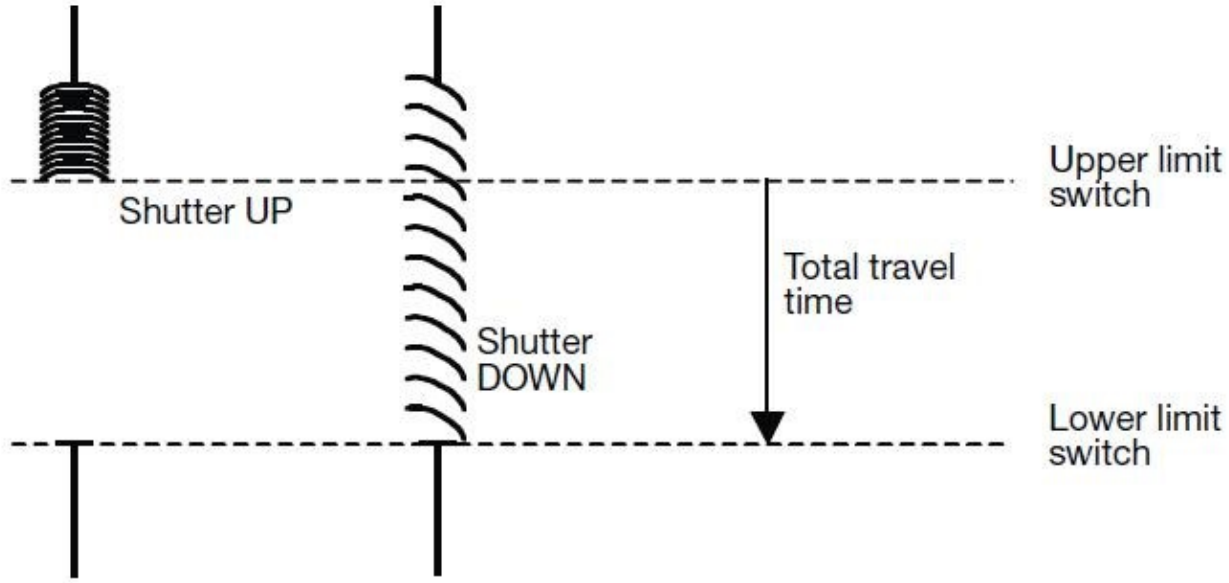

Shutter/Awning type (without louvres)

Figure 4.3.4.2-1 Parameter setting screen "ACx: Drive".

**Parameter "Total travel time [20...50000]*0.1s"**

This parameter sets the time required for the total travelling of the blinds. Options: **20... .**

The total travel time is the time it takes for the shutter to move from the highest to the lowest position (figure below). When the shutter actuator receives a command to move up or down, the shutter moves in the required direction until the shutter receives a command to stop moving, or until it has moved to the highest or lowest position, at which point the shutter closes the motor via its own limit switch. If the shutter is closed by means of the motor, the corresponding outputs connected to the actuator remain closed, and the output connection is only broken if the set total travel time of the movement has elapsed.




**Note: The current position of the shutter during operation is estimated from the total travelling time of the movement, therefore it is important to measure and set the total travelling time as accurately as possible, especially if "movement positioning", "status return" are used. Only in this way can the current position of the shutter be calculated accurately.**

**Parameter "Delay time from switch-on to moving [0..200]*10ms"**

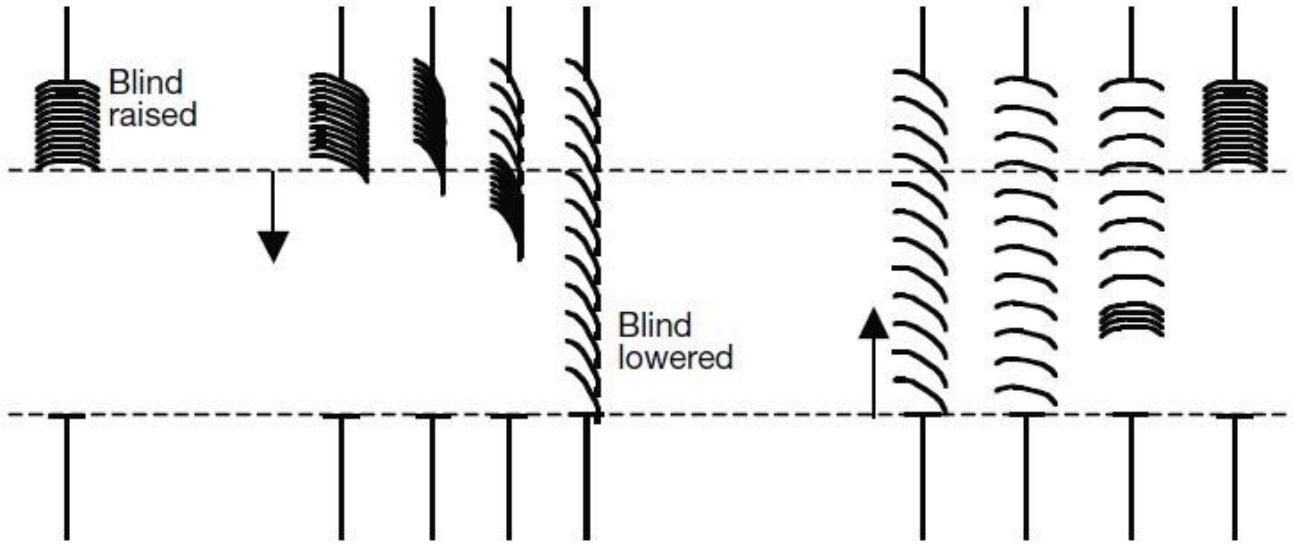
This parameter sets the delay time for the curtains/blinds to start running, i.e. how much time is needed to delay the curtains from starting to slide after the control command is received and the relay contacts are closed, i.e. the start-up buffer time of the motor. Options: **0...**

The setting of this parameter is to be considered in conjunction with the technical characteristics of the curtain activation.

**Parameter "Duration of slat adjustments [10...250]*10ms"**

This parameter sets the louvre angle adjustment time, i.e. the time for louvre angle adjustment when receiving a command to adjust the angle upward or downward; the shorter the time, the more accurate the adjusted angle.

After the blinds have moved upwards, the angle of the louvres is usually open. If the blinds are now lowered, the angle of the louvres is first closed and then the blinds move downwards. If the blinds are now once again rising, the louvre angle is first opened and then rises. (Figure below)




**Parameter "Total travel time of Slat 0...100% in [10...250]*10ms"**

Here the total travelling time required to adjust the louvre angle from fully closed to fully open is set, and the current position of the louvre during the adjustment is determined by this parameter. It is therefore important to measure and set the total travelling time for louvre adjustment as accurately as possible, especially in the case of "louvre angle positioning" and "status return", so that the current position of the louvres can be calculated accurately.

When the louvre angle is adjusted by the object "Slat adj./Stop", the maximum number of times the louvre angle needs to be adjusted from the fully closed state to the fully open state = total travelling time of the louvre angle adjustment / one adjustment time. The adjustment time is set by the previous parameter. The shorter the setting time, the more adjustments will be made and the more accurate the angle will be.

**Parameter "Pause on change in direction [5...255]*20ms"**

This parameter is used to set the pause time when the direction of movement or angle adjustment is changed. The pause time for direction change needs to be considered in conjunction with the technical information provided by the drive manufacturer to arrive at an appropriate value. The steering pause prevents the blinds drive from being damaged during a sudden change of direction and extends the life of the drive.

**Parameter "Additional travel time in upward direction [0..255]*0.1s"**

This parameter is used to set the additional travelling time of movement that is added when the sash runs upwards to the limit position. If the position has not reached the uppermost limit, then the travelling time is not increased. In the other case, the travelling time is also increased if, after reaching the limit position 0%, a turn is made to move to the target position (e.g. reference shift).

**Note: The limit position here is the sash position at 0%, as soon as it reaches this position, the travelling travel time for the upward run is increased.**

## 4.3.4.3 Parameter window "ACx: Scene"

The "ACx: Scene" parameter setting interface is shown in Fig. 4.3.4.3-1. Here, you can mainly set up scenes. Each output can set up 8 scenes at the same time, and different scenes can define different louvre positions and louvre angles.

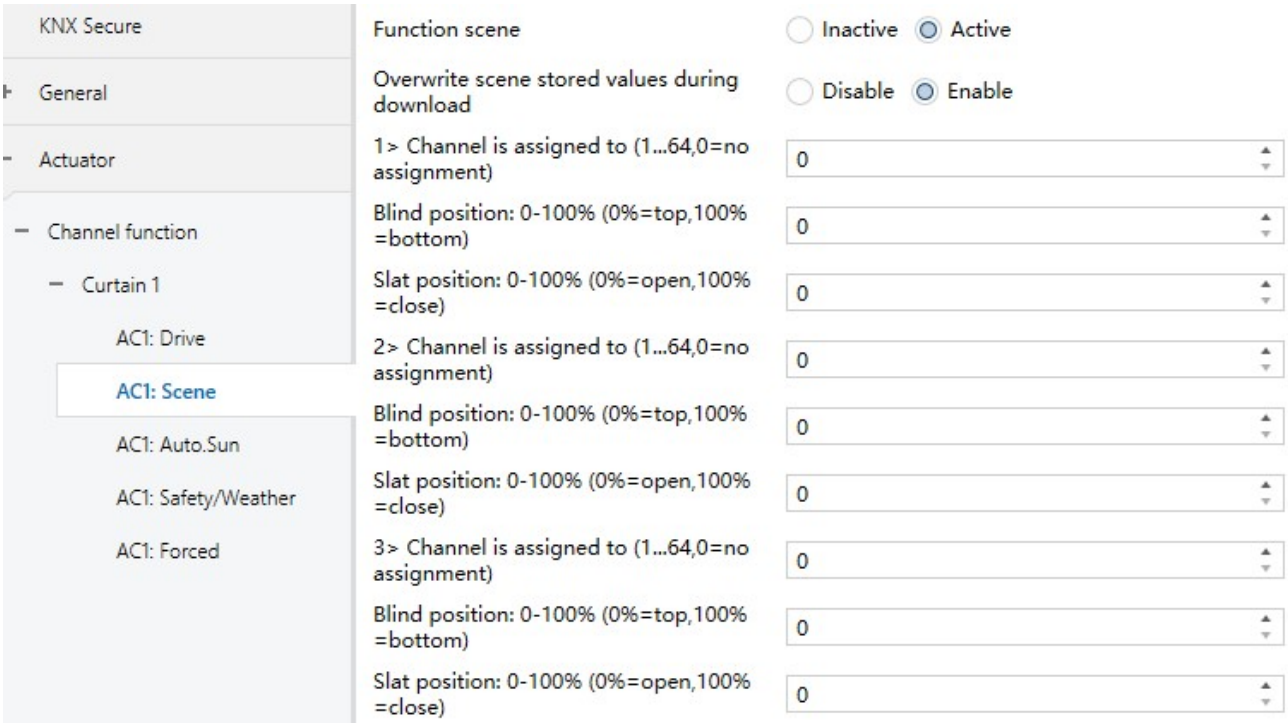



Figure 4.3.4.3-1 Parameter setting screen "ACx: Scene".

**Parameter "Overwrite scene stored values during download"**

This parameter sets whether to enable override of scene save values during application download. Optional:

**Disable**

**Enable**

Disable: not enabled. During the application download, the saved scene values will not be overwritten by the parameter set scene, and the scene call will still enable the scene saved before the download until it is replaced by the new stored scene.

Enable. During the application download, the saved scene values will be overwritten by the parameter setup scene, and the scene call will follow the parameter setup scene until it is replaced by the new stored scene.

**Parameter "Channel is assigned to (1.... .64 ,0= no assignment)"**

The shutter actuator can be assigned 64 different scene numbers per output. 8 different scenes can be set simultaneously per output. Optional:

**Scene 1... Scene 64, 0=no assignment**

**Note: The valid scene numbers in the parameter setting options are 1~64, and the corresponding telegrams are 0~63. When the bus is powered off, the new scene will be saved, and the new scene will be called when it is powered on again.**

**Parameter "Blind position: 0-100%(0%=top,100%=bottom)"**

This parameter sets the position of the blinds when the scene is called: 0...100%, 0%＝ top, 100%=bottom

**Parameter "Slat position: 0-100%(0%=opened,100%=closed)"**

This parameter sets the angular position of the louvres when the scene is called: 0...100%, 0%＝ opened, 100%=closed

## 4.3.4.4 Parameter window "ACx: Auto.Sun"

The "ACx: Auto.Sun" parameter setting interface is shown Fig. 4.3.4.4-1, where the automatic function and sun protection operation are mainly set. The blinds actuator positions the blinds according to the light intensity sensed by the illuminance sensor. For example, when the sun is very weak or no light penetrates the window, the blinds/curtains can be raised so that as much light as possible enters the room. If there is strong sunlight outside the window, the blinds/curtains can be lowered and the angle of the louvres can be adjusted so that no direct light can penetrate into the room, while the blinds are partially open to allow some diffused light into the room.

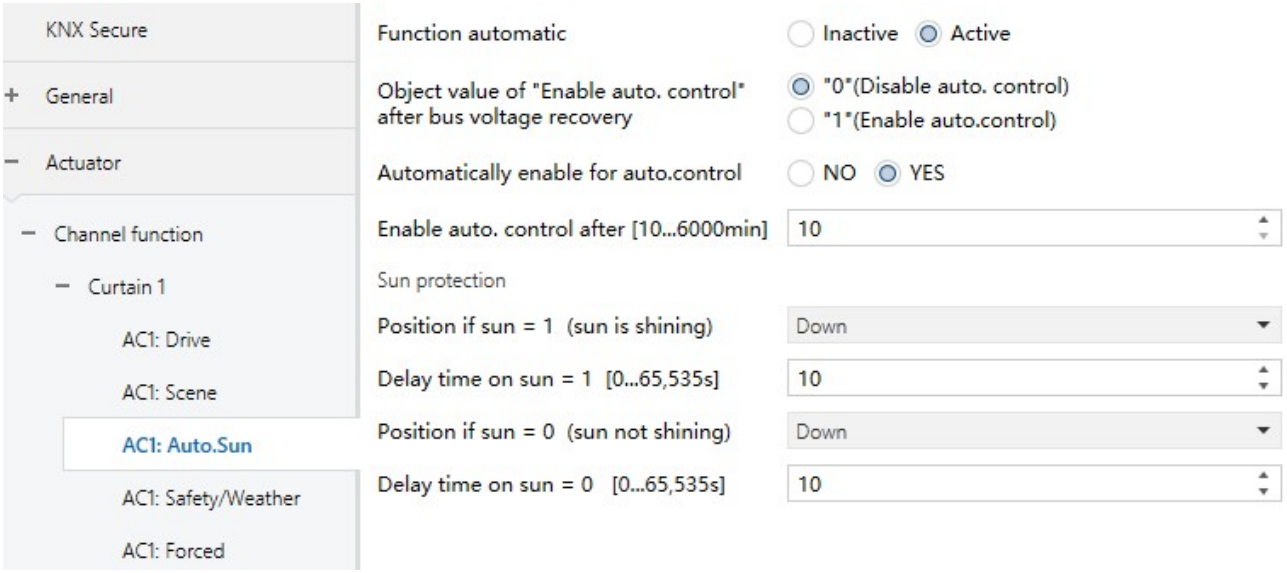



Figure 4.3.4.4-1 Parameter Setting Screen "ACx: Auto.Sun"

**Parameter "Function automatic"**

Here you set whether or not to activate the automatic control operation, i.e. the automatic sun protection function. Optional:

**Inactive**

**Active**

When the option is "Active", the following parameters are visible, the objects "Enable auto. control", "Sun operation The objects "Enable auto. control", "Sun operation", "Sun: blind/shutter position 0..100%" and "Sun: slat adj. 0..100%" are visible.

When the object "Enable auto.control" receives the message "1", the operation of the blinds is switched to automatic operation; when the object "Enable auto.control control" receives a message "0" or the user sends a direct movement command (e.g. move up/down, move to a certain position, etc. these commands make the shutter move; if the scene is saved, these commands which are not direct movements will not make the operation state exit from automatic operation), the operation state exits from automatic operation and switches to normal operation. state exits the automatic operation and switches to the normal operation. Normal operations and automatic operations have the same priority, but they can't happen at the same time.

**Note: After exiting the automatic operation, the message "1" must be received again via the object "Enable auto. control" or the duration of the automatic activation has elapsed (see description of the parameter "Enable auto. control after [10...6000min]" below) in order to enter**

**the automatic operation again. Enable auto. control after [10...6000min]" below), you can only enter automatic operation again.**

**Parameter "Object value of 'Enable auto. control' after bus voltage recovery".**

This parameter defines the initial value of the object "Enable auto. control" after bus reset. Optional:

**"0" (Disable auto. control)**

**"1" (Enable auto. control)**

When the option is "0", the initial value of the object "Enable auto. control" is 0, which means that auto operation is not enabled after bus reset;

When the option is "1", the initial value of the object "Enable auto. control" is 1, which means that auto operation is enabled after bus reset.

**Parameter "Automatically enable for auto. control"**

This parameter defines whether the automatic operation can be reactivated automatically after it has been exited by a normal operation or by the object "Enable auto. control".

**No**

**Yes**

Select "yes" to make the following parameters visible.

**-- Parameter "Enable auto. control after [10...6000min]"**

This parameter defines the duration of the automatic activation of the automatic operation, i.e. when the automatic operation is activated again after the time preset by this parameter has elapsed since the automatic operation was exited by an ordinary operation or object.

If the automatic operation is interrupted within this time by the object "Enable auto. control" or by a normal operation, the duration of the automatic activation is retimed.

**Note: Manual operations have the highest priority and safety operations have the second highest priority. If manual or safety operations are active, automatic operations cannot be activated automatically, but the duration of the automatic activation will not start until the manual or safety operations are cancelled.** **Parameter "Sun protection:"**

**Parameter "Position if sun= 1 (sun is shining) "**

Here you set the position of the blinds in case of sun, i.e. the position to which the blinds are moved when the object "Sun operation" receives the message "1" and activates the sun protection. Optional:

**No reaction**

**Up**

**Down**

**Stop**

**Receive 1 byte value**

If the option is "No reaction", when the object "Sun operation" receives the message "1", it will maintain the current operation state, and if it is not running, it will not run. If there is no current operation, it will not run, but if there is current operation, it will continue to run and finish.

If the option "Receive 1 byte value" is selected, the position of the shutter is determined by the value received by the object "Sun operation" with message "1". The position of the blinds is determined by the values received for the objects "Sun:blind/shutter position 0..100%" and "Sun: slat adj. 0..100%", which have a default value in the event of a bus reset or after programming. In case of uncertainty, the default value is "130" (50%), the position can only be determined when they receive a value, and the value they receive is saved in any operation state, including in the higher-priority protected operation state.

**Parameter "Delay time on sun= 1 [0.... .65535s]"**

This parameter is used to set the delay time, that is, when the object "Sun operation" receives the message "1", the shutter actuator delays the execution of the action time, mainly to prevent the fluctuations in light caused by the shutter actuator frequent action, which makes the device easily damaged and affects the service life of the shutter motor. The main purpose is to prevent the frequent operation of the shutter actuator due to light fluctuation, which may easily damage the device and affect the service life of the shutter motor. Options: 0...65535 s

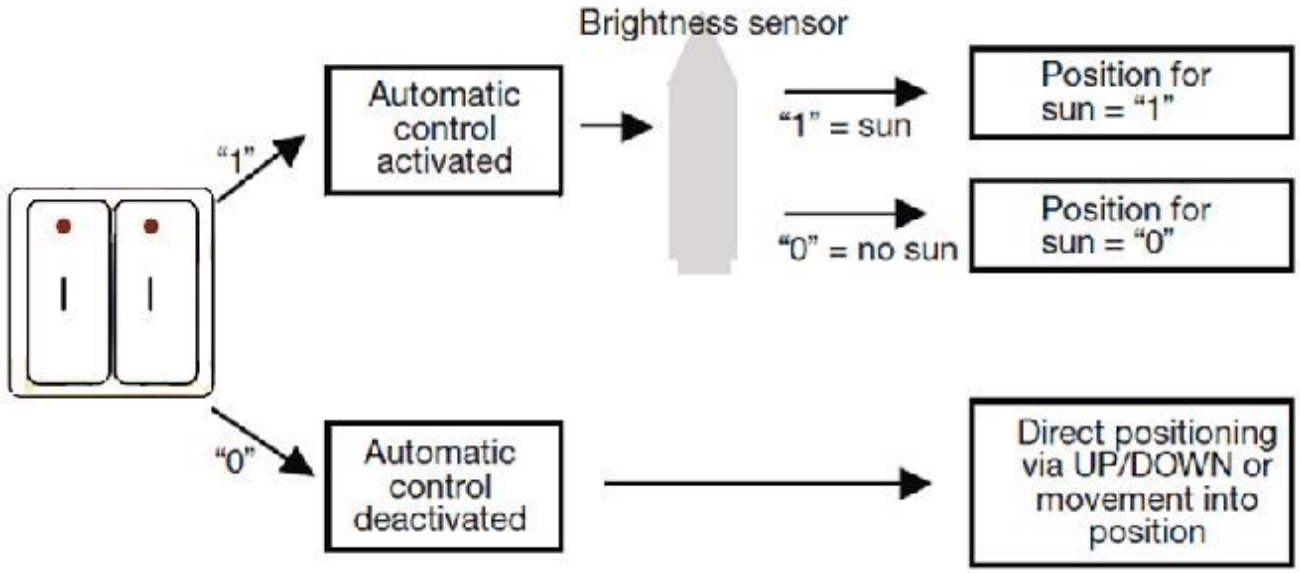
**Parameter "Position if sun= 0 (sun not shining) "**

This parameter is similar to the previous one, except that it defines the position of the blinds when the object "Sun operation" receives the message "0" and cancels the sun protection.

**Parameter "Delay time on sun= 0 [0.... .65535s]"**

This parameter is used to set the delay time, that is, when the object "Sun operation" receives the message "0", the shutter actuator delays the execution of the action time, mainly to prevent the fluctuations in light caused by the shutter actuator frequent action, which makes the device easily damaged and affects the service life of the shutter motor. The main purpose is to prevent the frequent operation of the shutter actuator due to light fluctuation, which may easily damage the device and affect the service life of the shutter motor. Options: 0...65535 s

Here is a simple automatic sunscreen system:




The illuminance sensor senses the intensity of light from outside, and the buttons can be connected to a universal interface or use other control switches on the bus.

The second switch on the button allows the user to specify whether the automatic sun protection is enabled or not, or to control the blinds manually. If the automatic sun protection is activated by a switch, the blinds will move automatically until the automatic sun protection is disabled by the same switch, or if the user sends a direct movement command (up/down, or move to a certain position), and the automatic function is therefore also disabled.

The blinds actuator receives information from the illuminance sensor about the presence of direct light outside the window. Once the adjustable delay has elapsed, the actuator will adjust the blinds according to the set position.

## 4.3.4.5 Parameterisation window "ACx: Safety/Weather"

The "ACx: Safety/Weather" parameter setting interface is shown Fig. 4.3.4.5-1. Here, the main settings are the safety operation function and weather warning function of the blinds.

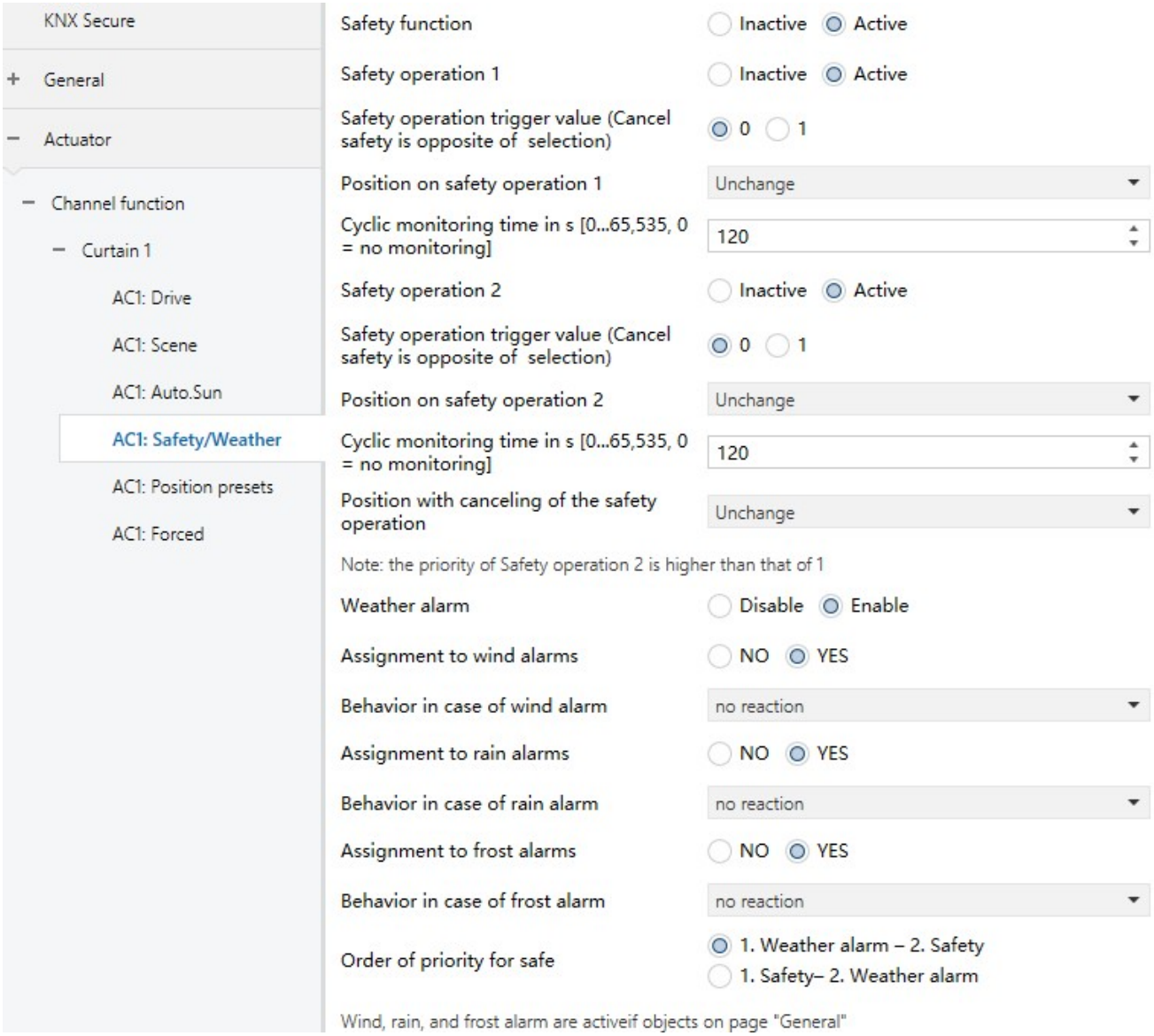



Figure 4.3.4.5-1 Parameter window "ACx: Safety/Weather".

In this interface, set the actions that should be performed by the shutter when the safety operation function or weather warning function of each output is triggered. The settings of each channel are relatively independent and do not affect each other.

**Safe Operation Functions**

**Parameter "Safety operation 1/2 "**

This parameter is used to set whether or not to activate the safety operating function of the blinds. Optional:

**Inactive**

**Active**

When "Inactive" is selected, the safe operation function is not activated;

If you select "Active", the safety operation function is activated, the following parameters are visible, you can set the conditions for triggering the safety operation function and the corresponding communication object "Safety operation 1/2" is enabled. The following parameters are visible.

**Parameter "Safety operation trigger value (Cancel safety is opposite of selection)"**

This parameter is used to set the trigger value for the safety operating function of the blinds. Optional:

**0**

**1**

If "0" is set, the safety operation is triggered if the communication object "Safety operation 1/2" receives a message with a logical value of "0". If a "1" is received, the safety operation is cancelled and the monitoring cycle of the safety operation function is reset;

If "1" is set, the safety operation is triggered if the communication object "Safety operation 1/2" receives a message with a logical value of "1". If a "0" message is received, the safety operation is cancelled and the monitoring cycle of the safety operation function is reset.

**Parameter "Position on safety operation 1/2 "**

This parameter sets the action performed by the shutter when the safety operation is triggered. Optional:

**Unchange**

**Up**

**Down**

**Stop**

**Parameter "Cyclic monitoring time in s[0..65535, 0=no monitoring] "**

This parameter sets the monitoring period of the safety function, which should be at least twice as long as the cycle time of the sensors, in order to prevent the blinds/curtains from moving to the safe position if the bus is busy and the sensing signal is missed. If the value of this parameter is set to "0", it means that the monitoring of the safe operation is not activated and can be controlled directly by the safe operation object.

If the object "Safety operation1/2" does not receive a message to cancel the safety operation within the set monitoring time, the safety operation function of the blinds/curtains will be triggered and the blinds/curtains will carry out the action that was triggered by the safety operation.

**Parameter "Position with cancelling of the safety operation"**

This parameter sets the action performed by the shutter after the safety operation is cancelled. Optional:

**Unchange**
**Up**
**Down**
**Stop**

This action is executed only if a safety operation is entered, a cancellation command is executed, and all safety operations for this channel are cancelled, otherwise it is not executed.

The safety operating function for blinds/curtains has a higher priority than the other functions, if the safety operating function is activated on one output, the other operations on this output are prohibited and safety 2 has a higher priority than safety 1.

**Weather warning function**

**Parameter "Weather alarm"**

This parameter is used to set whether or not to activate the weather warning operation function of the blinds. Optional:

**Disable**
**Enable**

When "Disable" is selected, the weather warning operation function is not activated;

If "Enable" is selected, the weather warning operation is activated and the following parameters will be visible.

**Parameter "Assignment to wind alarms"**

**Parameter "Assignment to rain alarms"**

**Parameter "Assignment to frost alarms"**

This parameter is used to set whether or not to activate the weather warning operation function for high wind, high rain and high frost for the blinds. Optional:

**No**

**Yes**

Select "yes" for the following parameters to take effect.

**Parameter "Behaviour in case of wind alarm"**

**Parameter "Behaviour in case of rain alarm"**

**Parameter "Behaviour in case of frost alarm"**

This parameter is used to set the position of the shutters and louvres to be actuated after triggering a weather warning for high winds, heavy rain or heavy frost. Optional:

**no reaction**

**Up**

**Down**

**Stop**

**position 1**

**position 2**

**position 3**

**position 4**

When "no reaction" is selected, the curtains will not be operated after the weather warning is triggered;

When "Up" is selected, the curtains perform an upward movement when a weather warning is triggered;

When "Down" is selected, the curtains perform a downward movement after the weather warning is triggered;

When "Stop" is selected, the curtains will be paused when the weather warning is triggered;

When "position 1/2/3/4" is selected, the parameter setting interface 4.3.4.6-1 shows that the curtain is executed to the preset position after the weather warning is triggered;

## 4.3.4.6 Parameter window "ACx: Position presets"

The "ACx: Safety/Weather" parameter setting interface is shown Fig. 4.3.4.6-1, where the preset positions of curtains and blinds are set.


Figure 4.3.6-1 Parameter window "ACx: Safety/Weather".

**Parameter "Order of priority for safe"**

This parameter is used to set the execution priority when weather warning operations and safety operations are triggered. Optional:

1. **Weather alarm- 2.**
1. **Safety- 2. weather alarm**

When selecting "1. Weather alarm - 2. Safety", the weather alarm operation has a higher priority than the safety operation.

When "1. Safety - 2. Weather alarm" is selected, the safety operation has a higher priority than the weather alarm operation.

**Note: When two operations are triggered at the same time, the high priority is executed first, and the low priority is executed after the high priority exits.**

## 4.3.4.7 Parameter window "ACx: Forced"

The "ACx: Forced" parameter setting interface is shown in Fig. 4.3.4.7-1. Here, the main function is to set the forced operation of blinds.

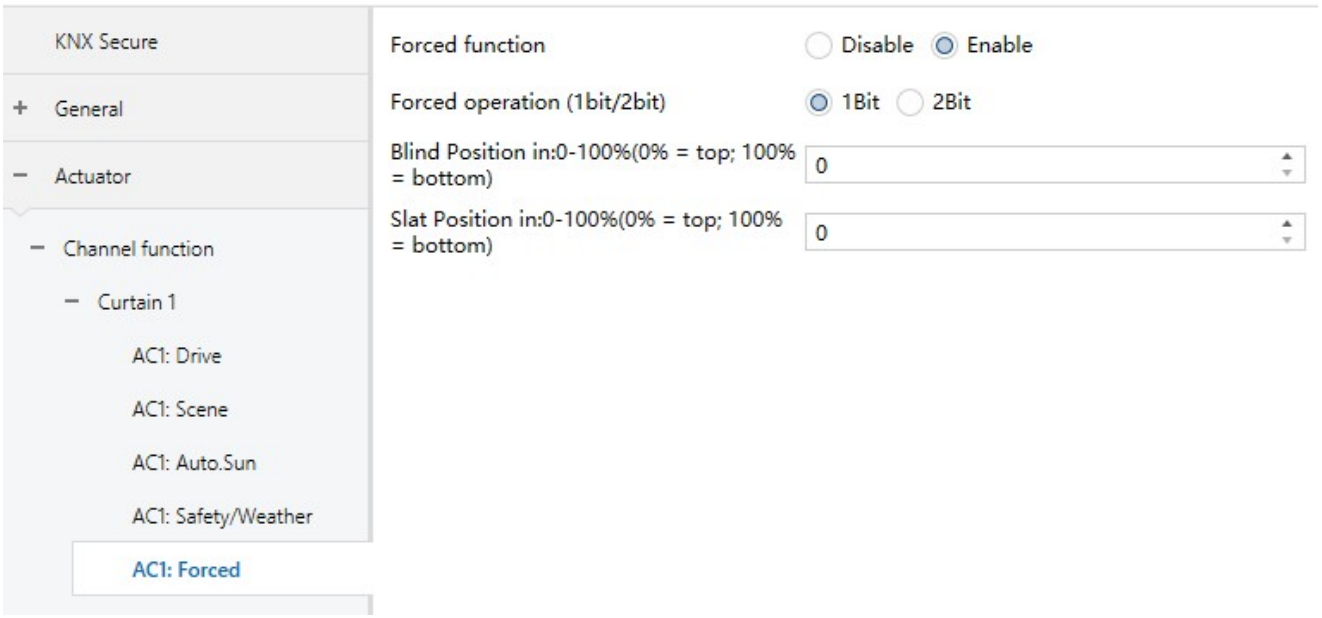



Figure 4.3.7-1 Parameter window "ACx: Forced".

**Parameter "Force operation type (1 Bit/2 Bit)".**

This parameter sets the data type of the object on which the forced operation is turned on. Optional:

**1 Bit**

**2 Bit**

If "1 Bit" is selected, the object "Forced operation 1/2 bit" enables the forced operation when a message is received "1", and cancels it when a message is received "0". If "1 Bit" is selected, the forced operation is enabled when a message is received "1" and cancelled when a message is received "0".

If "2 Bit" is selected, the table below shows the actions to be performed when the message value is received by the object "Forced operation 1/2 bit":

| Value of object "Forced operation 1/2 bit". | Actions performed |
|---|---|
| 00b (0), 01b (1) | Force operation cancelled, other operations available |
| 10b (2) | Forced Off (OFF) |
| 11b (3) | Force On (ON) |

**Parameter "Blind Position in:0-100%(0% =top; 10096= bottom)"**

This parameter is visible when "1bit" is selected for the object's data type and sets the position of the shutter when the force operation is activated. Options: 0.... .100

**Parameter "Slat Position in:0-100%(0%=top; 100%= bottom)"**

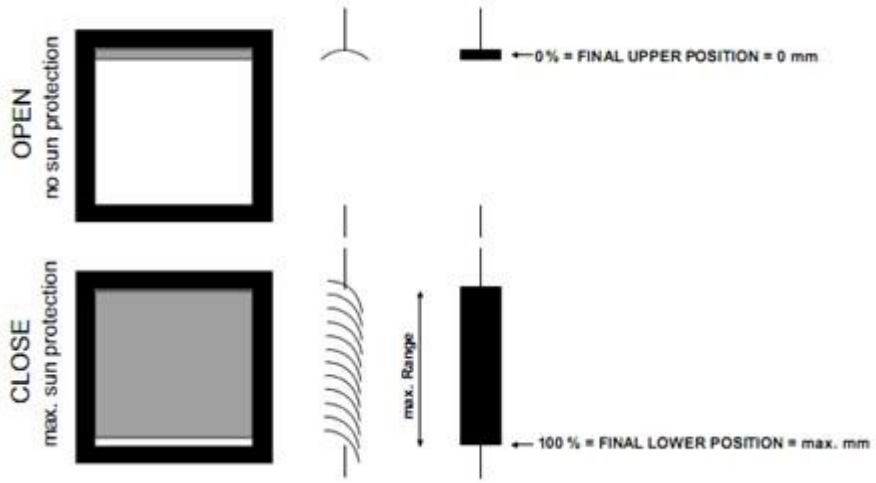
This parameter is visible when "1bit" is selected for the data type of the object and sets the position of the louvres when the force operation is activated. Options: 0.... .100

**Note: Forced operations have the second highest priority, and all other operations are ignored during forced operations (excluding manual operations). During a forced operation, received control messages are ignored.**

## 4.3.4.8 Parameter window "Curtain X: Shutter"

The "Shutter" mode of the blinds actuator is similar to the "Venetian Blind" mode in terms of parameters and communication objects, and also in terms of functionality. The difference is that there is no adjustment of the louvre angle in the "Shutter" mode. The "Shutter" mode involves only the movement of the curtains, not the blinds.

The difference between "Shutter" and "Venetian Blind" is shown below:



Venetian Blind Shutter

The "Shutter" working mode will not be introduced here, and the functions can be referred to the "Venetian Blind" working mode (except for the louvre adjustment function).

### 4.3.5 Curtain (DC) outputs

There are up to 7 output channels for the curtain (DC) outputs. Since the parameters and communication objects assigned to each output are the same as those for the curtain (AC) outputs, except that there is no "Motor type" to select for the parameters, the parameters interface is shown in Fig. 4.3.5-1. The parameter interface is shown Fig. 4.3.5-1.

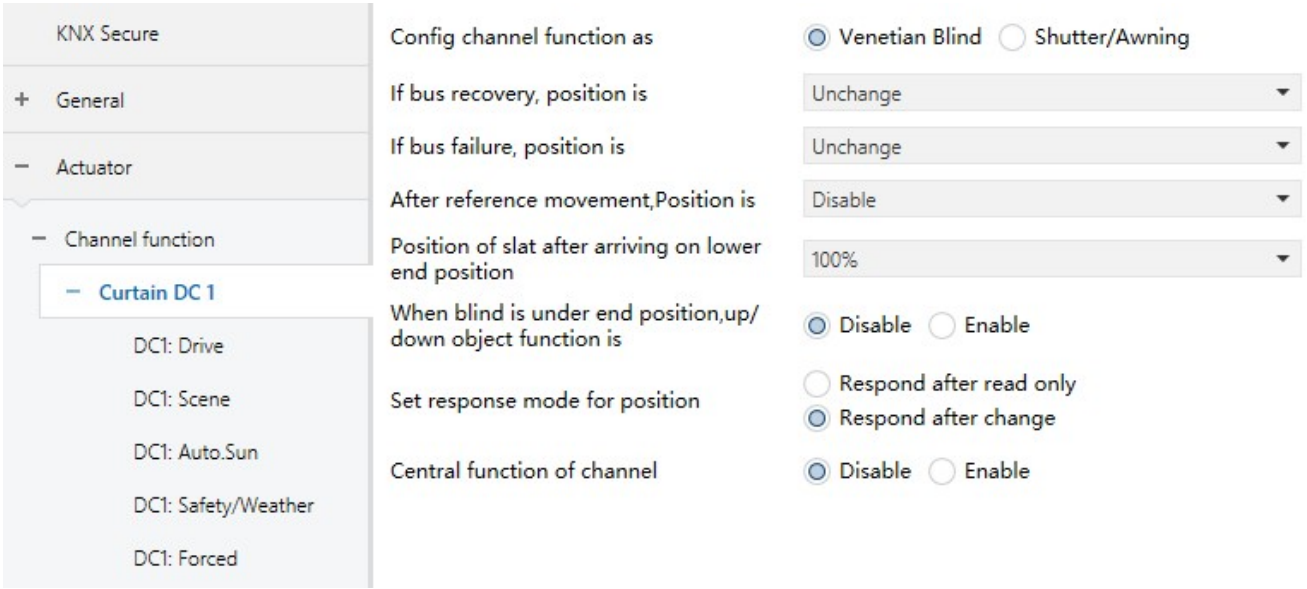



Fig. 4.3.5-1 Parameter window "Contain DC X".

The parameter function of the curtain (DC) output will not be described here, the parameter function can be referred to the curtain (AC) output.

**Priority of various operations in the curtain control section:**

**Initialisation (after completion of parameter download) → Manual operation (switch to manual operation by long-pressing the manual button and the button for that channel is operated) → Forced operation→ [Weather warning operation→ (safety 2→safety 1) (or→ weather warning operation)] → Normal or automatic operation**

**The following points apply:**

**1. Any ordinary operation command with a move can exit the automatic operation;**

**2. During manual operation, the trigger value or reset value of the received automatic operation and safety operation will be recorded. When exiting the manual operation, the action will be executed according to the priority, and after all the priorities are exited, it will return to the normal operation or automatic operation;**

**3. When manual operation is exited, if there is no priority operation, the output status remains unchanged when returning to normal or automatic operation until a control command is received;**

**4, in the case of manual or safety operation activation, automatic operation can not be automatically activated, must wait until the manual or safety operation is withdrawn, the duration of automatic operation automatic activation will be timed. (In the manual or safety operation, the time timing will be interrupted, and after quitting the manual or safety, the previous time timing will be continued.)**

**5. Weather warning operation and safety operation priority can be customised.**

## 4.3.6 Fan control

There are up to 7 output channels for the fan outputs. Since the parameters and communication objects assigned to each output are the same, one output will be used as an example.

### 4.3.6.1 Parameter window "Fan type -- one-level"

The "Fan type -- One-level" parameter setting screen is shown in Fig. 4.3.6.1-1, where the parameters for the one-level fan are set. The parameters are set as shown below:

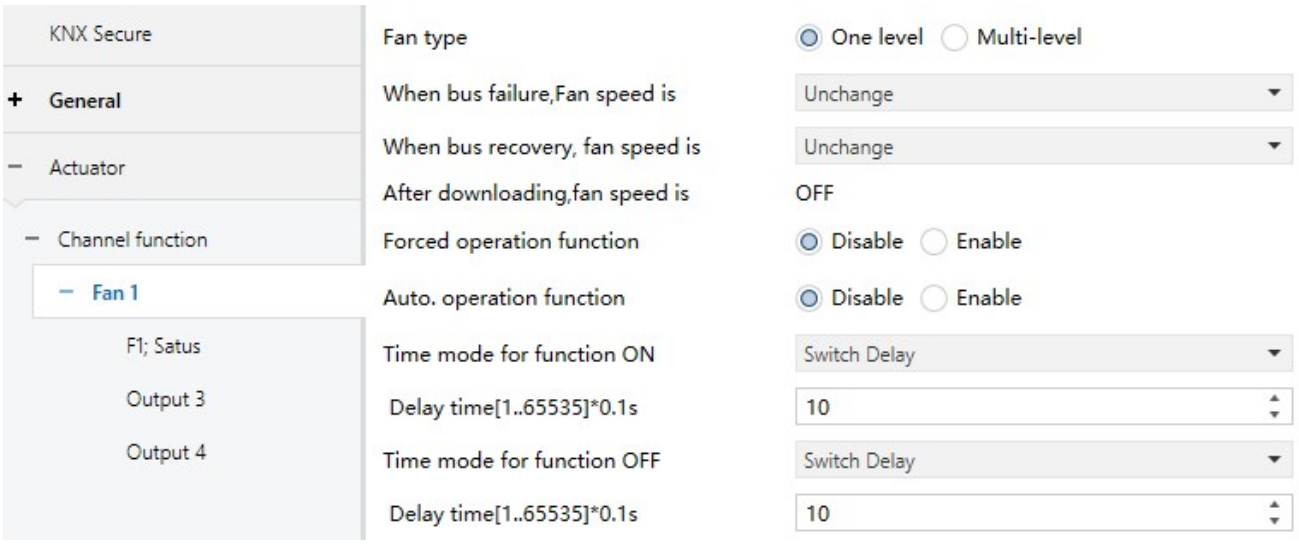



Figure 4.3.6.1-1 Parameter window "Fan type -- One-level".

**Parameter "Fan type"**

This parameter defines the type of fan to be controlled. Optional:

**One level**

**Multi-level**

One level: Controls fans with one level of air speed;

Multi-level: Controls fans with up to 3 levels of air speed, either 2 or 3.

**Parameter "When bus failure, Fan speed is"**

This parameter sets the execution action of the fan when the bus is powered down. Optional:

**Unchange**

**OFF**

**ON**

**Parameter "When bus recovery, Fan speed is".**

This parameter defines the execution action of the fan after the bus voltage is restored. Optional:

**Unchange**

**OFF**

**ON**

**As before as bus fail**

Unchange: The state does not change;

OFF: The fan is switched off;

ON: The fan is switched on;

As before as bus fail: the state of the bus before it is powered down.

**Note: Before connecting the fan, in order to obtain a defined fan on/off state, it is recommended to connect the bus voltage first, which can avoid the possibility of damage to the fan due to incorrect connections.**

**Parameter "After downloading, fan speed is"**

This parameter notes that the fan will be switched off after the application has been programmed.

**Parameter "Forced operation function"**

This parameter is used to enable forced operation. Optional:

**Disable**

**Enable**

If you select "Enable", the 1bit communication object "Forced operation" is visible, as well as the following two parameters, which are used to set the activation value of the forced operation and the action of the forced operation.

**--Parameter "Forced operation on object value "**

This parameter sets the value of the message used to activate the force operation. Optional:

**0=Force/1=Cancel**

**1=Force/0=Cancel**

0=Force/1=Cancel: the forced operation is activated when the object "Forced operation" receives the message value "0", and cancelled when it receives the message value "1". When "1" is received, the forced operation is cancelled;

1=Force/0=Cancel: The forced operation is activated when the object "Forced operation" receives a message with the value "1" and cancelled when it receives "0". When a "0" is received, the forced operation is cancelled.

**--Parameter "Behaviour on Forced operation "**

This parameter defines how the fan acts when a forced operation is performed. Optional:

**Unchange**

**OFF**

**ON**

Unchange: The wind speed of the fan remains constant;

OFF: Fans turned off;

ON: The fan is switched on.

Forced operation has the next highest priority, but is also affected by the minimum run time and delay switch set in the parameters below.

**Parameter "Auto. operation function "**

This parameter is used to enable automatic operation of the fan. Optional:

**Disable**

**Enable**

Enable: Parameter setting screen "Fx;Auto" 4.3.6.2 is visible. Also, the following parameters affect the action of the automatic operation, such as the delay switch and the minimum running time.

**Parameter "Time mode for function ON".**

This parameter defines the running time of the fan. Optional:

**None**

**Switch delay**

**Minimum time**

None: Immediately after receiving the control command to switch on the fan;

Switch delay: Delay time for switching on the fan, the ON action after reset is also delayed until switching on, the delay time is set by the following parameter "Delay time[1...65535]*0.1s". If the fan object "Fan speed" receives the message "1" several times in a row, then the delay time is timed according to the actual situation, not from the time of the last received message;

**Note: The ON action after reset, also need to consider this delay time, wait for the delay time to complete, and then turn on the fan.**

Minimum time: Minimum running time after which the fan can only be switched off, set with the parameter "Minimum time [1...65535]s". If during the minimum time a message is received to switch off the fan, it is necessary to wait until this period has elapsed before switching off the fan.

**--Parameter "Delay time [1..65535]*0.1s"**

This parameter defines the time to delay switching on the fan. Options: **1...65535**

**--Parameter "Minimum time [1..65535]s"**

This parameter defines the minimum running time after the fan has been switched on. Options: **1...65535**

**Parameter "Time mode for function OFF".**

This parameter defines the off time of the fan. Optional:

**None**

**Switch delay**

**Minimum time**

None: Immediately after receiving the control command to switch off the fan;

Switch delay: delay off fan, reset OFF action, will also delay before switching off, the delay time through the following parameter "Delay time[1...65535]*0.1s" set;

Minimum time: The minimum time after which the fan can be switched off before it can be switched on again. The minimum time is set with the parameter "Minimum time[1...65535]s". If a fan-on message is received during the minimum time, the fan will not be switched on until this period has elapsed. Note that the OFF action after reset is also required to take this minimum time into account.

**--Parameter "Delay time [1..65535]*0.1s"**

This parameter defines the time to delay switching off the fan. Options: **1...65535**

**--Parameter "Minimum time [1..65535]s"**

This parameter defines the minimum time for which the fan is switched off. Options: **1...65535**

## 4.3.6.2 Parameter window "Fx;Auto"

When "Enable" is selected for the parameter "Auto. operation function", the screen of the "Fx;Auto" automatic operation is visible. The screen in Fig. 4.21 is used to set up the automatic operation of the 1-step wind speed, with the possibility of defining a threshold value. In the case of Auto, the control value for the air speed is taken from the bus, and one or two control values can be set in the function parameter. For example, in a fan coil control system where there is only heating or cooling, the fan control will only need to be set to one control value, but if there is both heating and cooling in the system, then it would be more appropriate to set two control values for the fan control.

Normal operations and automatic operations cannot occur at the same time, i.e. after activation of an automatic operation by means of the object "Automatic function", if there are other operations (e.g. normal operations, forced operations, manual operations), the automatic operation exits on its own, and needs to be activated again by means of the object "Automatic function", and the object "Status Automatic" reports whether the automatic operation is active or not. The object "Automatic function" reports whether the status of the automatic operation is active or not.

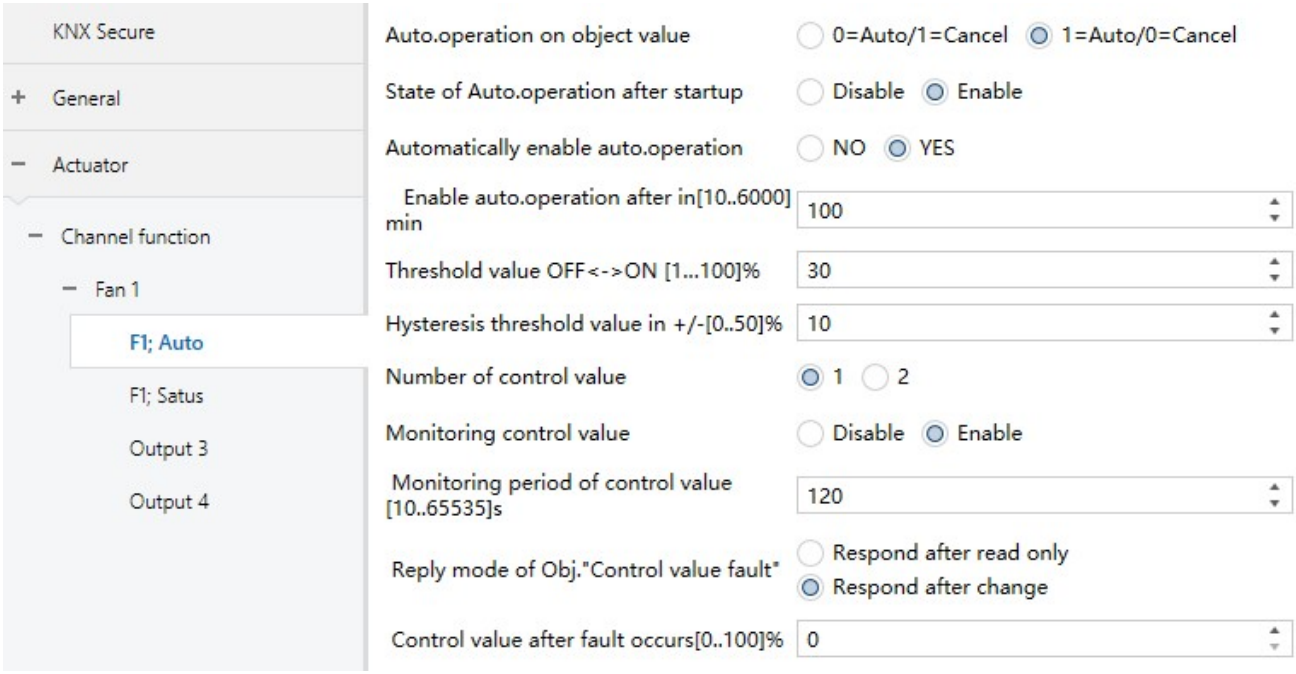



Fig. 4.3.6.2-1 Parameter setting screen "Fx;Auto".

**Parameter "Auto. operation on object value"**

This parameter sets the value of the message used to activate automatic operation. Optional:

**0=Auto/1=Cancel**

**1=Auto/0=Cancel**

0=Auto/1=Cancel: the automatic function is activated when the object "Automatic function" receives the message value "0", and is deactivated when it receives the value "1"; the automatic function is deactivated when it receives the value "1". When the object "Automatic function" receives a message with the value "0", the automatic operation is activated;

1=Auto/0=Cancel: The automatic function is activated when the object "Automatic function" receives the value "1", and is deactivated when it receives the value "0". When the object "Automatic function" receives a message with the value "1", the automatic operation is activated.

**Parameter "State of Auto. operation after startup".**

This parameter sets whether automatic operation is enabled or not when the device starts up. Optional:

**Disable**

**Enable**

Disable: after the device is booted, auto operation is not enabled by default;

Enable: auto operation is enabled by default after the device starts up.

**Parameter "Automatically enable auto. operation"**

This parameter sets whether or not to enable the auto-enable function for automatic operation. Optional:

**No**

**Yes**

Yes: When enabled, the next parameter is visible.

When the normal operation exits the automatic operation, it automatically returns to the automatic operation when the time set for the next parameter arrives without any operation.

**--Parameter "Enable auto.operation after in[10..6000]min"**

This parameter sets the time for automatic return from normal operation to automatic operation. Options: **10...6000**

**Parameter "Threshold value OFF<->ON [1...100]%"**

This parameter defines the threshold value at which the fan can automatically change its operating state according to the threshold range of the control value, which is determined by the object "Control value". Options: **1...100**

If the control value is greater than or equal to the threshold set by the parameter, the fan is switched on;

If the control value is less than this threshold, the fan is switched off.

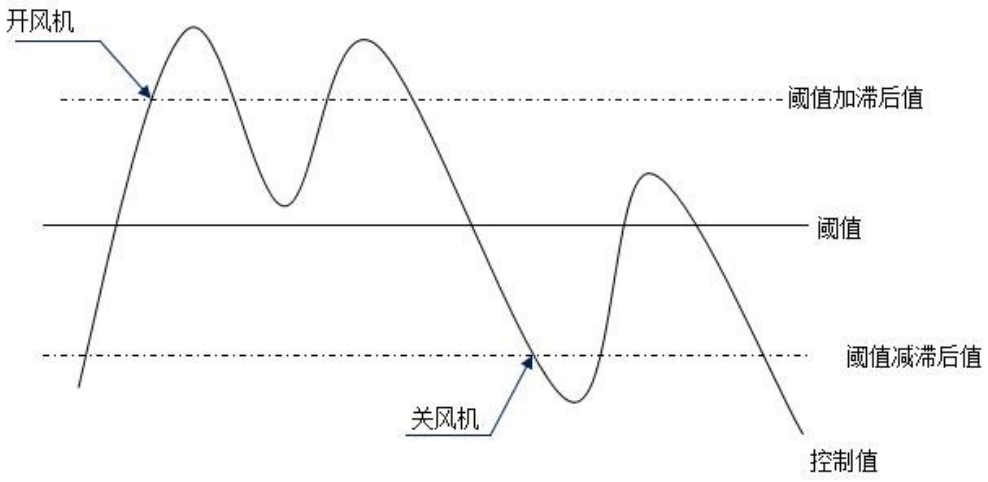
**Parameter "Hysteresis threshold value in +/- [0...50]%"**

This parameter sets the hysteresis value of the threshold. The hysteresis avoids unnecessary movement of the fan caused by fluctuations of the control value near the threshold. Options: **0...50**

If 0, there is no hysteresis and the fan will switch on and off as soon as the control value crosses the threshold;

Assuming a hysteresis value of 10 and a threshold value of 50, there will be an upper threshold value of 60 (threshold+ hysteresis value) and a lower threshold value of 40 (threshold - hysteresis value), so that when the control value is between 40 and 60, it will not cause the fan to act, and still maintain the previous state.

The fan will only be turned off if it is less than 40 and on if it is greater than or equal to 60. This is shown in the figure below:




The following parameters in this subsection are descriptions of the wind speed control values:

**Parameter "Number of control value".**

This parameter is used to set the number of wind speed control values under Auto. Optional:

**1 1 control value**

**2 2 control values**

1 control value: Only one control value is available to control the air speed. Typically used in heating-only or cooling-only, or 2-control fan coil control systems;

2 control values: Two control values are available to control the air speed. Typically used in fan coil control systems that support both heating and cooling.

**--Parameter "Select by"**

This parameter is visible when 2 control values are selected in the previous parameter and is used to set how the control values are switched. Optional:

**Latest value**

**Control value with switching object**

Latest value: The fan will control the air speed according to the latest control value received from the bus;

Control value with switching object: If this option is selected, the object "Switching control value1/2" will be visible and will be used for switching the control value of the wind speed, message 0 corresponds to control value 1 and message 1 corresponds to control value 2. Note: If this option is selected, the control value received is valid only if the enabled control value is 1 or 2 after the automatic operation has been activated. Until this is specified, no response is made to the received control value. The value received by the object "Switching control value 1/2" is also recorded when the automatic operation is not activated.

After the automatic operation has been exited, when the (valid) control value is received from the bus it is recorded, and when the automatic operation is activated again, the air speed is run according to the latest control value or faulty control value. The valid control value is the currently used control value, if it is control value 1, then control value 2 is invalid.

**Parameter "Monitoring control value".**

This parameter sets whether to enable monitoring of external control values. Optional:

**No**

**Yes**

When "yes" is selected, the following parameters are visible.

**--Parameter "Monitoring period of control value [10..65535]s**

This parameter sets the time period for monitoring the external control value. If the control value has not been received within this time, the unit will consider that the external controller has made an error and the fan will output the control value according to the next next parameter setting. Optional: **10...65535s**

**--Parameter "Reply mode of Obj. "Control value fault""**

This parameter defines the way of feedback in case of an error in the external control value. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Control value fault" sends the current status to the bus only if the device receives the status from another bus device or if the status is read on the bus;

Respond after change: When the fault state changes or the device receives a request to read the state, the object "Control value fault" immediately sends a message to the bus to report the current state.

**--Parameter "Control value after fault occurs [0..100]%"**

In the event of an error in the external controller, the fan will output the air speed at the control value set in this parameter. Options: **0...100 %**

## 4.3.6.3 Parameter window "Fx;Status"

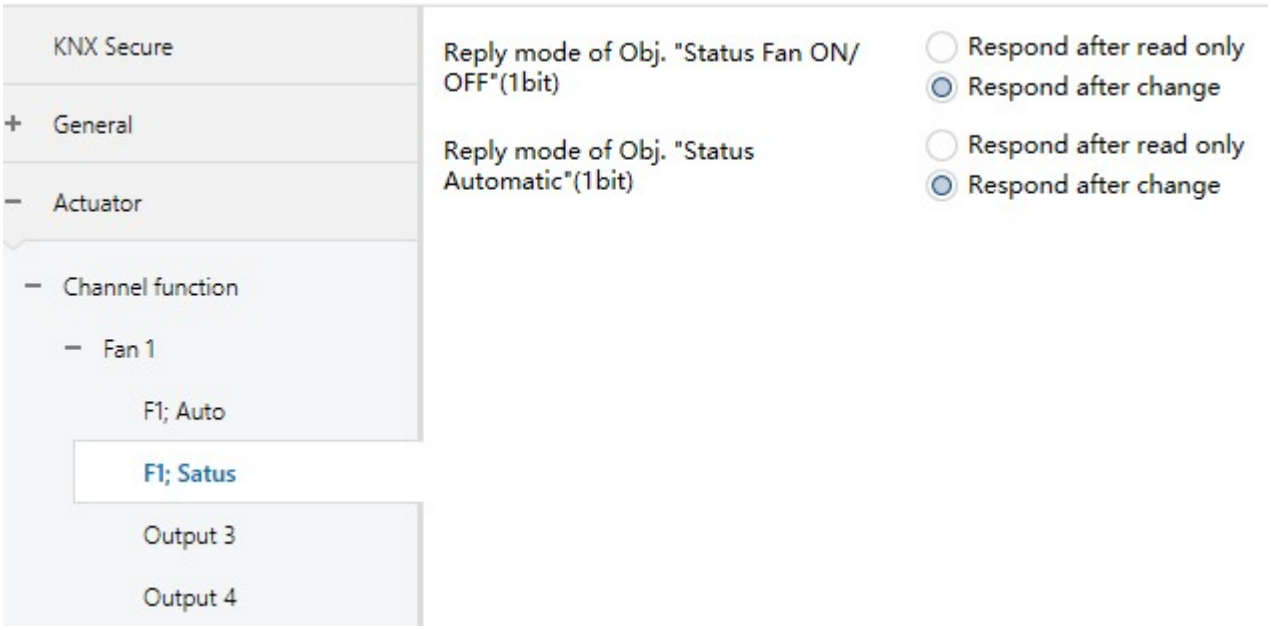



Figure 4.3.6.3-1 Parameter setting screen "Fx;Status".

**Parameter "Reply mode of Obj. "Status Fan ON/OFF" (1bit)"**

This parameter defines how the feedback of the operating status of the fan is given. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Status Fan ON/OFF" sends the current status of the fan to the bus only if the device receives a read from another bus device or from the bus;

Respond after change: When the operating status of the fan changes or the device receives a request to read the status, the object "Status Fan ON/OFF" immediately sends a message to the bus to report the current status.

**Parameter "Reply mode of Obj. "status Automatic" (1bit)"**

This parameter is visible when auto operation is enabled and defines how the auto operation status is fed back.

The object "Status Automatic" sends the message "1" to activate the automatic operation and "0" to deactivate it. Optionally:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Status Automatic" sends the current status of the automatic operation to the bus only if the device receives a request to read this status from another bus device or from the bus;

Respond after change: When the status of an automatic operation changes or the device receives a request to read the status, the object "Status Automatic" immediately sends a message to the bus reporting the current status.

## 4.3.6.4 Parameter window "Fan type - Multi-level"

The parameter setting interface of Multi-stage wind speed is shown Fig. 4.3.6.4-1. The parameter settings are shown below:

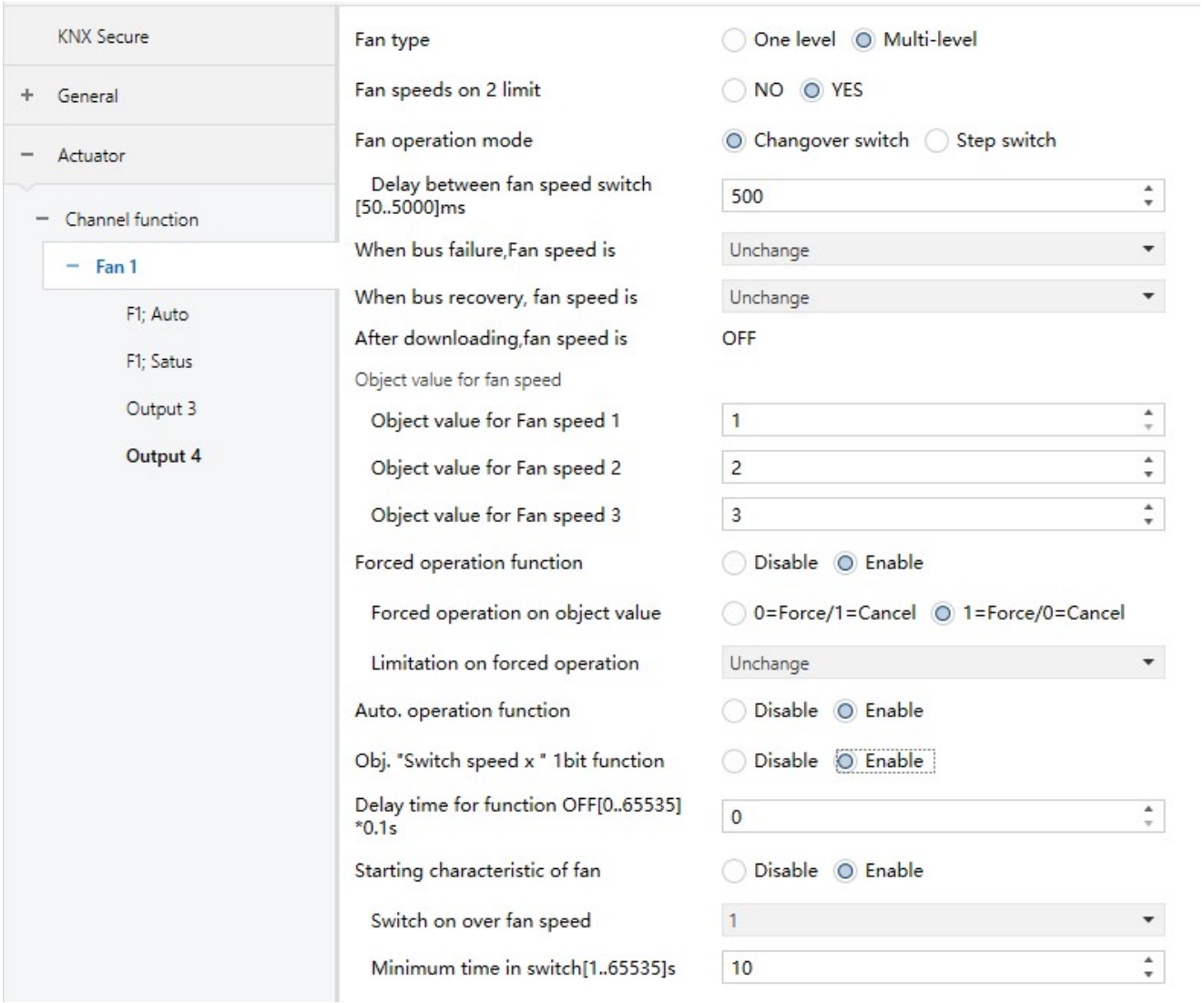


Figure 4.3.6.4-1 Parameter setting screen "Fan type -- Multi-level".

The parameter settings are the same for fans with class 2 and class 3 wind speeds. When the wind speed is limited to class 2, the output wind speed is the same as class 2 if the parameter option is set to wind speed 3.

As it is not like the fan with only 1 level of wind speed described in the previous section, there is no need to consider too many technical parameters. In the case of wind speeds with more than one level, it is necessary to consider not only the start-up characteristics of the fan, but also the mode of operation of the fan, whether it is a changeover switch, or a step switch, etc. It is only by understanding the technical characteristics of the fan that the parameters of the fan can be set up reasonably.

**Parameter "Fan speeds on 2 limit"**

This parameter is visible when "Multi-level" is selected for the type of fan, and determines whether the fan is enabled for 2 or 3 levels of wind speed. Optional:

**No**

**Yes**

No: A fan that can control three levels of air speed;

Yes: Fans with a secondary air speed can be controlled up to a maximum air speed of 2 only, even if the parameter is set to a speed of 3. Communication objects with wind speed 3 are ignored.

**Note: When the wind speed is limited to level 2, it will not execute, i.e. it will remain in the current state, if the wind speed is set to level 3 after power down or reset.**

**Parameter "Fan operation mode"**

This parameter defines the operating mode of the turbine and needs to be considered in relation to the technical characteristics of the turbine. Optional:

**Changeover switch**

**Step switch**

Changeover switch: changeover switch to set the delay time for wind speed changeover, see next parameter. This type of control can switch the wind speed to any level, for example, from the first level to the third level directly, but in any case, only one of the three outputs has an output.

Step switch: Step switch. In this type, 3-step wind speed is equivalent to three single-step wind speeds superimposed, e.g. for 3-step wind speed, all three outputs are output at the same time (e.g. Output 1&2&3), and for 2-step wind speed, 2 outputs are output at the same time (e.g. Output 1&2).

**Note: This parameter must be considered in conjunction with the technical parameters of the fan.**

**--Parameter "Delay between fan speed switch [50...5000]ms"**

This parameter is visible when "changeover switch" is selected for the operating mode and is used to define the changeover delay time, which is a specific element of the turbine and has to be taken into account in all cases. Options: **50...5000**

When a wind speed conversion message is received, wait for this delay to pass before executing the target wind speed.

If the device receives a new wind speed during the switching delay, the delay will not be retimed, but the last wind speed received will be executed.

**Parameter "When bus failure, Fan speed is"**

This parameter remarks the action of the fan in case of bus power down. Optional:

**Unchange**
**OFF**
**1**
**2**
**3**

OFF: Switch off the fan;

1, 2 or 3: The fan is switched on to air speed 1, 2 or 3.

**Note: If 3 is selected for this parameter in the case of Limit 2 wind speed, the wind speed running after power down will remain the same as the wind speed before power down.**

**Parameter "When bus recovery, fan speed is".**

This parameter defines the action of the fan after the bus voltage is restored. Optional:

**Unchange**
**OFF**

**1**

**2**

**3**

**As before as bus fail**

OFF: Switch off the fan;

1, 2 or 3: The fan is switched on to air speed 1, 2 or 3;

As before as bus fail: the wind speed is the wind speed before the bus is powered down.

**Note: Before connecting the fan, in order to obtain a defined fan on/off state, it is recommended to connect the bus voltage first, which avoids the possibility of damaging the fan due to incorrect connections. If 3 is selected for this parameter in the case of limiting the wind speed to 2 levels, the wind speed operated after the reset does not change.**

**Parameter "After downloading, fan speed is"**

This parameter comment switches off the fan when the application programming is complete.

**Object value for fan speed**

**--Parameter "Object value for Fan speed 1/2/3"**

Defines the object value for switching to the respective wind speed, i.e. the value of the communication object "Fan speed - 1byte". Options: 1...255

Object value "0" defaults to wind speed off.

**Parameter " Forced operation function"**

This parameter is used to enable forced operation. Optional:

**Disable**

**Enable**

If you select "Enable", the 1bit communication object "Forced Operation" is visible, as well as the following two parameters, which are used to set the activation value of the forced operation and the actions that can be performed under the forced operation.

**--Parameter "Forced operation on object value "**

This parameter sets the value of the message used to activate the force operation. Optional:

**0=Force/1=Cancel**

**1=Force/0=Cancel**

0=Force/1=Cancel: The forced operation is activated when the object "Forced Operation" receives the message value "0", and cancelled when it receives the message value "1". When "1" is received, the forced operation is cancelled.

1=Force/0=Cancel: The forced operation is activated when the object "Forced Operation" receives a message with the value "1" and cancelled when it receives "0". The forced operation is activated when the object "Forced Operation" receives a message with the value "1" and cancelled when it receives "0".

**Notes:**

**During forced operation, the minimum operating time of the air speed under automatic operation still has to be taken into account, except for the start-up air speed, which has its own minimum operating time.**

**Forced operation is not active by default after a bus reset or after programming**.

**--Parameter "Limitation on forced operation "**

This parameter defines the speed at which the fan can operate under forced operation. Optional:

**Unchange**

**1**

**1, off**

**2**

**2, 1**

**2, 1, off**

**3**

**3, 2**

**3, 2, 1**

**Off**

Unchange: The wind speed of the fan remains unchanged, maintaining the current operating status;

1: Only run wind speed 1;

1, off: Only air speed 1 and off fan can be operated;

2: Can only run wind speed 2;

2, 1: Only wind speeds 1 and 2 can be operated;

2, 1, off: Only fan speeds 1, 2 and off can be operated;

3: Can only run wind speed 3;

3, 2: Only wind speeds 3 and 2 can be operated;

3, 2, 1: Only wind speeds 1, 2 and 3 can be operated;

OFF: Only the fan can be switched off.

**Notes:**

**If the current wind speed is not within the permissible range when forcing is activated, the wind speed will be switched to a wind speed close to the current wind speed to keep it within the permissible range, e.g., if the current wind speed is 1 and the permissible wind speed is 2 or 3, the wind speed will be switched to 2 when forcing is activated, or if it is manually switched to 1, the operating wind speed will be 2.**

**In another case, if the current wind speed is 0, the allowed wind speed is 1, 2, 3, and the activated wind speed is 3, when the forced operation is activated, the wind turbine starts with wind speed 3, and then automatically switches to wind speed 1; if the current wind speed is 2, the allowed wind speed is 1, 2, and when the forced operation is activated, a wind speed 0 telegram is received, then the wind speed will be switched to 1. In this case, the wind speed is switching to the wind speed close to the target wind speed. Switching.**

**Parameter "Auto. operation function"**

This parameter is used to enable automatic operation of the fan. Optional:

**Disable**

**Enable**

Enable: parameter screen 4.24 will be visible.

**Parameter "Obj.'Switch speed x'1bit function"**

Optional:

**Disable**

**Enable**

Enable: Three 1bit objects "Fan speed 1", "Fan speed 2" and "Fan speed 3" are visible.

When the object receives the message "1", turn on the wind speed, any of the three objects receive the message "0" wind off.

If three objects receive several ON/OFF telegrams in succession within a short period of time, the value of the telegram received by the last object will be used to control the fan speed.

**Note: In the normal operation mode, the minimum dwell time set by the parameter in the automatic mode is ignored. Therefore, the response of direct operation can be detected in time.**

**In order to protect the fan, the delay time for switching the air speed is still valid. At the same time the air speed that can be operated under forcing has to be taken into account when forcing is activated.**

**Parameter "Delay time for function OFF[0...65535]*0.1s". .65535]*0.1s".**

This parameter defines the delayed switch-off time of the fan. For example, if the current fan speed is speed1 and a fan OFF control message is received, the fan will maintain the current fan speed and start the delay counting, and then perform the shutdown action after the period of time defined in this parameter.

Note: This parameter is only evaluated if the parameter "Minimum time in fan speed [0...65535]s" is 0 when the fan is running in automatic mode.

**Parameter "Starting characteristic of fan"**

This parameter defines the starting characteristics of the fan, which is also a technical characteristic of the fan. It is often better to switch on the fan motor at a higher wind speed when the fan is switched on in order to ensure a safe start-up of the fan motor, thus allowing the fan motor to obtain a higher torque during the start-up phase.

Such as fans and floor fans used in our life, when the fan is switched on, it is usually started from the second level of air speed and then switched to the minimum air speed, and there are fans started similar to this situation. Optional:

**Disable**

**Enable**

Enable: the following two parameters are visible.

**Notes:**

**Since the start-up characteristic is a technical feature of the turbine, the start-up behaviour has a higher priority than forced operation.**

**If the fan itself does not have a starting characteristic, the parameters related to this characteristic can be disregarded by selecting "No".**

**For example, if the start-up air speed is 3 and the air speed allowed to run by the forced operation is 2 and is currently OFF, when a control message is received with an air speed of 1, the turbine will start at air speed 3 and then go to air speed 2. The actual required air speed of 1 will not be run due to the forced operation limitation.**

**For step-switch type fans, the starting characteristics are different; step-switch type fans usually switch on the wind speed continuously, while steering-switch type fans switch on the wind speed directly. Therefore, when defining the parameters for the starting characteristics, the switching type of the fan also needs to be taken into account.**

**The minimum dwell time for wind speed switching in automatic mode is only considered after the start-up phase, during which it is inactive. The minimum dwell time for wind speed switching on during the start-up phase can be set additionally, see the following parameters.**

**--Parameter "Switch on over fan speed"**

This parameter sets the air speed used to start the fan from the OFF state. Options: **1/2/3**

When controlling a fan with a 2-stage air speed, if the start air speed is set to 3, it will automatically start with air speed 2 at start-up.

However, in order to ensure the normal operation of the fan, set these parameters related to the characteristics of the fan, it is best to first understand the characteristics of the fan, according to the characteristics of the fan and then reasonably set these parameters to avoid damage to the fan.

**--Parameter "Minimum time in switch[1..65535]s"**

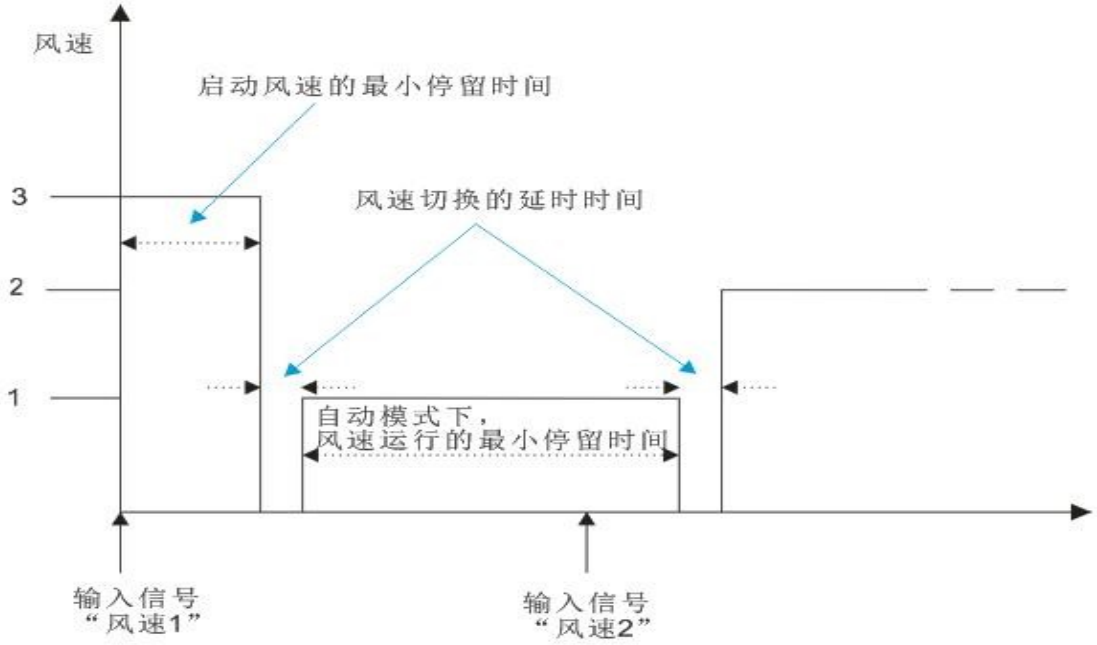
This parameter defines the minimum dwell time for switching on a certain wind speed during the start-up phase. Options: **1...65535**

When the fan is switched on, it is started at the starting air speed and then switched to the target air speed after this minimum dwell time, which can be the air speed of the fan after the reset or the air speed triggered by another operation.

The delay time for switching between the two air speeds during the start-up phase also needs to be taken into account.

Example: Starting characteristics of a fan with 3 wind speed stages

Assuming that the turbine is currently off, the startup wind speed is level 3, the target wind speed is level 1, and the final wind speed is level 2, as shown in the following figure:




The above figure shows that if the fan is currently in the off state, when it receives a "wind speed 1" message, it will start the "wind speed 3", and then switch the wind speed after the minimum residence time of the starting wind speed has elapsed, the switching of the wind speed needs to have a delay (which is a technical parameter for the protection of the fan), after the delay has elapsed, and then switch to the target wind speed "wind speed 1". The switching of wind speed needs a delay time (this is a technical parameter of the fan, which is good for the protection of the fan), and after the delay time has passed, it switches to the target wind speed "wind speed 1", and in the process of the operation of "wind speed 1", if the fan receives a "wind speed 2" message, then it will start "wind speed 3". During the operation of "wind speed 1", if the fan receives a "wind speed 2" message, then it is necessary to consider whether the automatic mode is activated or not. If the automatic mode is activated, then it is necessary to take into account the minimum residence time for the wind speed operation, but if it is

operated directly, then it is not necessary to take into account the minimum residence time for the wind speed operation, and then after the switching delay has elapsed, it operates at "wind speed 2".

### 4.3.6.5 Parameter window "Fx;Auto"

When "Enable" is selected for the parameter "Auto. operation function", the parameter screen as shown Fig. 4.3.6.5-1 is visible. This screen is used to set up the automatic operation of the multi-stage wind speed and to define the threshold values. In automatic operation, the control value of the wind speed comes from the bus and the wind speed is determined according to the threshold range where the control value is located.

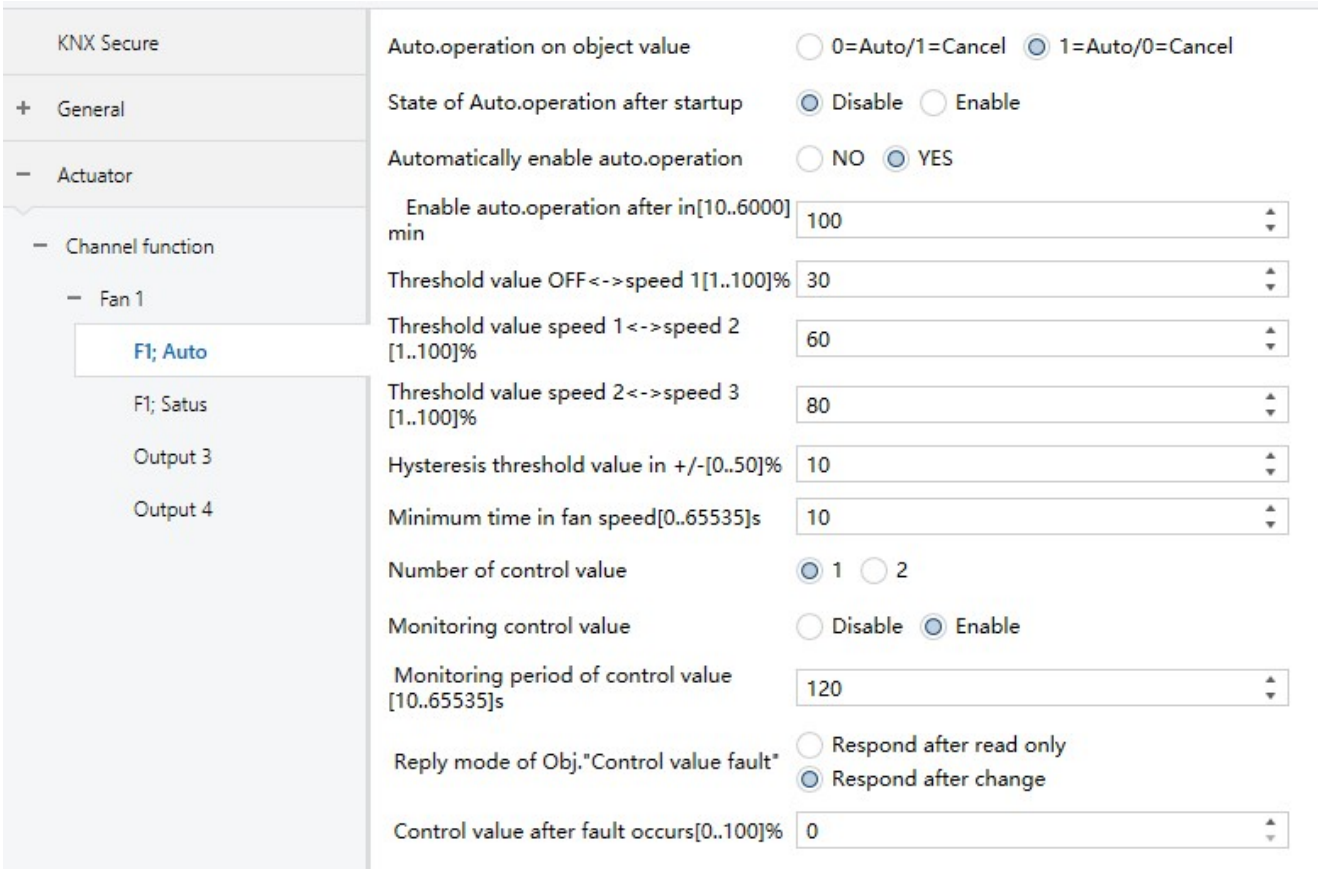



Fig. 4.3.6.5-1 Parameter setting screen "Fx;Auto".

**Parameter "Auto. operation on object value "**

This parameter sets the value of the message used to activate automatic operation. Optional:

**0=Auto/1=Cancel**

**1=Auto/0=Cancel**

0=Auto/1=Cancel: When the object "Fan Automatic ON/OFF" receives a message with the value "0", the automatic operation is activated, and when it receives "1", the automatic operation is deactivated. When "1" is received, the automatic operation is cancelled;

1=Auto/0=Cancel: When the object "Fan Automatic ON/OFF" receives a message with the value "1", automatic operation is activated, and when it receives "0", automatic operation is deactivated. When a "0" is received, the automatic operation is cancelled.

**Parameter "State of Auto. operation after startup".**

This parameter sets whether automatic operation is enabled or not when the device starts up. Optional:

**Disable**

**Enable**

Disable: after the device is booted, auto operation is not enabled by default;

Enable: auto operation is enabled by default after the device starts up.

**Parameter "Automatically enable auto. operation"**

This parameter sets whether or not to enable the auto-enable function for automatic operation. Optional:

No

Yes

Yes: When enabled, the next parameter is visible.

When the normal operation exits the automatic operation, it automatically returns to the automatic operation when the time set for the next parameter arrives without any operation.

**Parameter "Enable auto. operation after [10...6000]min"**

This parameter sets the time for automatic return from normal operation to automatic operation. Options: **10...6000**

**Parameter "Threshold value OFF<-->speed 1 [1...100]%"**

This parameter defines the thresholds for switching off the fan and speed 1, options: **1...100%**.

If the control value is greater than or equal to the threshold set for this parameter, run RPM 1;

If the control value is less than this threshold, the fan is switched off.

**Note: The fan determines the fan on/off or air speed based on a judgement based on the threshold range where the control value is located. The following two parameters are used similarly.**

**Parameter "Threshold value speed 1<-->speed 2 [1...100]%"**

This parameter defines the threshold for switching the air speed to RPM 2, if the control value is greater than or equal to the threshold set in this parameter, then RPM 2 is operated. options: **1...255**

**Parameter "Threshold value speed 2<-->speed 3 [1...100]%"**

This parameter defines the threshold for switching the wind speed to RPM 3. If the control value is greater than or equal to the threshold set in this parameter, RPM 3 is operated. options: **1...255**

**Note: The controller evaluates these thresholds in ascending order, i.e. the thresholds for OFF <-> wind speed 1 are checked first, then those for wind speed 1 <-> wind speed 2, then those for wind speed 2 <-> wind speed 3. The correctness of the function execution is guaranteed only in this case: the thresholds for OFF <-> wind speed 1 are smaller than the thresholds for wind speed 1 <-> wind speed 2, and the thresholds for wind speed 1 <-> wind speed 2 are smaller than the thresholds for wind speed 2 <-> wind speed 3.**

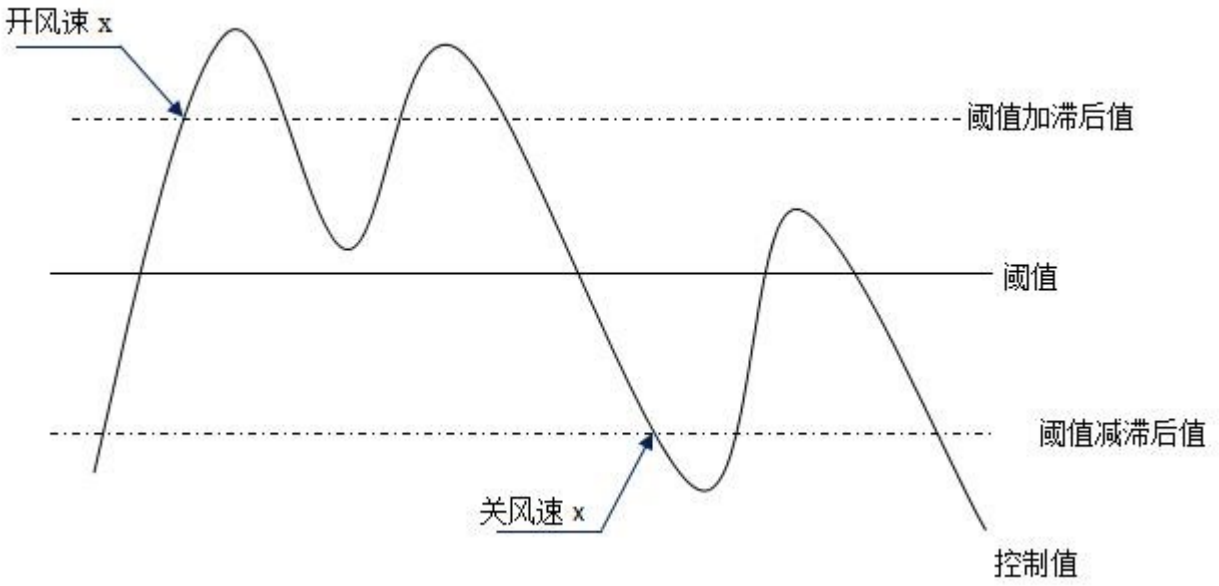
**--Parameter "Hysteresis threshold value in +/- [0...50]%"**

This parameter sets the hysteresis value of the threshold. The hysteresis avoids unnecessary movement of the fan if the control value fluctuates near the threshold. Options: **0...50**

If 0, there is no hysteresis and the fan will switch the air speed as soon as the control value is greater than the threshold;

Assuming a hysteresis value of 10 and a threshold value of 50, there will be an upper threshold value of 60 (threshold+ hysteresis value) and a lower threshold value of 40 (threshold - hysteresis value), so that when the control value is between 40 and 60, it will not cause the fan to act, and still maintain the previous state.

Only a value less than 40 or greater than (or equal to) 60 will cause the fan's operating status to change. This is shown in the diagram below:




**Notes:**

**With hysteresis enabled, if there is an overlap of thresholds, the turbine action is specified as follows:**

**1) The hysteresis determines the control point at which the wind speed transition occurs;**

**2) If a wind speed transition occurs, this new wind speed is determined by the control and valve values without regard to hysteresis;**

**For example (1):**

**OFF <--> Threshold of 10% for wind speed 1**

**Threshold of 20% for wind speed 1 <-> wind speed 2**

**Threshold of 30% for wind speed 2 <-> wind speed 3**

**The lag is 15 per cent**

**Behaviour of the fan when the air speed increases from OFF:**

**The OFF state of the fan will transition at a control value of 25% (≥10% + 15%) and the new wind speed will be 2 (since 25% is between 20% and 30%, no hysteresis needs to be taken into account), so wind speed 1 is ignored;**

**Behaviour of the turbine when the wind speed decreases from 3:**

**The wind speed 3 of the fan will shift at a control value of 14% (<30%-15%) and the new wind speed will be 1 (since 14% is between 10% and 20%, there is no need to consider the hysteresis), so wind speed 2 is ignored.**

**For example (2):**

**OFF <--> Threshold of 10% for wind speed 1**

**Threshold of 40% for wind speed 1 <-> wind speed 2**

**Threshold of 70% for wind speed 2 <-> wind speed 3**

**The lag is 5 per cent.**

**Behaviour of the fan when the air speed increases from OFF:**

**The OFF state of the fan will change at a control value of 15% (≥10%+5%).**

**If the control value received is 41%, the new wind speed will be 2 (since 41% is between 40% and 70%, there is no need to account for hysteresis), so wind speed 1 is ignored;**

**If a control value of 39% is received, the new wind speed will be 1 (since 39% is between 10% and 40%, there is no need to consider lag).**

**Behaviour of the turbine when the wind speed decreases from 3:**

**The air velocity 3 of the fan will shift at a control value of 64 per cent (<70 per cent - 5 per cent).**

**If a control value of 39% is received, the new wind speed will be 1 (since 39% is between 10% and 40%, there is no need to take into account the hysteresis), so wind speed 2 is ignored.**

**3) Whatever the case, a control value of 0 will switch the fan off.**

**--Parameter "Minimum time in fan speed [0...65535]s"**

This parameter defines the dwell time of the turbine before switching from the current wind speed to a higher or lower wind speed, i.e. the minimum time for one wind speed operation.

If you want to switch to another wind speed, you need to wait for this time to pass before switching, if the current wind speed has been running for a long enough period of time, then you can switch quickly when the wind speed changes. Options: 0...65535 , 0: means no delayed switching.

**Notes:**

**The dwell time set by this parameter is only enabled in automatic mode.**

**Each wind speed in automatic mode (including OFF) is subject to a minimum run time and the wind speed in automatic operation is varied step by step.**

**For example, if the current wind speed is 1 and the target wind speed is 3, then the wind speed will be transformed from 1 to 2 and then to 3, and each wind speed will be transformed after the minimum run time.**

**There is no need to consider the minimum running time for the start-up air speed, as the start-up air speed has its own minimum running time.**

**If the minimum time is set to 0, it switches directly to the target wind speed, which no longer changes step by step.**

### 4.3.6.6 Parameter setting screen "Fx;Status"

The "Fx: Status" parameter setting screen is shown in Fig. 4.3.6.6-1. This screen is used to set the operating status information of the turbine for multistage wind speed.

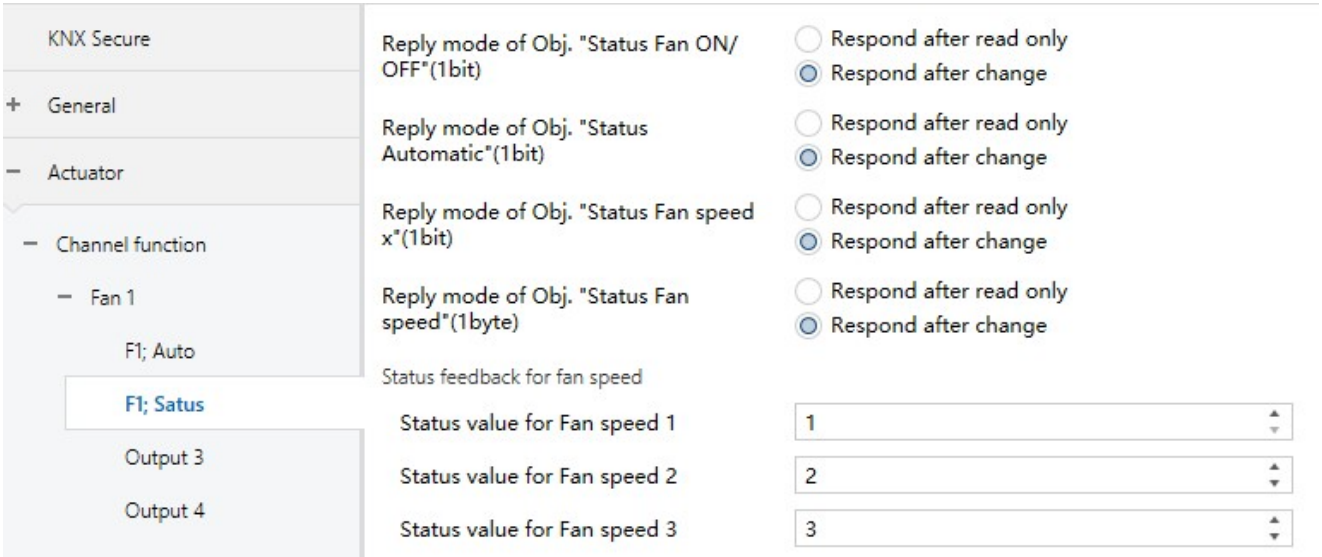



Fig. 4.3.6.6-1 Parameter window "Fx;Status".

**Parameter "Reply mode of Obj. "Status Fan ON/OFF" (1bit)"**

This parameter defines how the fan switching status is fed back. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Status Fan ON/OFF" sends the current switching status of the fan to the bus only if the device receives a read from another bus device or from the bus;

Respond after change: When the switching status of the fan changes or the device receives a request to read the status, the object "Status Fan ON/OFF" immediately sends a message to the bus to report the current status.

**Parameter "Reply mode of Obj. "Status Automatic"(1bit)"**

This parameter is visible when auto operation is enabled and defines how the auto operation status is fed back.

The object "Status Automatic" sends the message "1" to activate the automatic operation and "0" to deactivate it. Optionally:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Status Automatic" sends the current status of the automatic operation to the bus only if the device receives a request to read this status from another bus device or from the bus;

Respond after change: When the status of an automatic operation changes or the device receives a request to read the status, the object "Status Automatic" immediately sends a message to the bus reporting the current status.

**Parameter "Reply mode of Obj." status fan speed x"(1bit)"**

This parameter defines how the status of the fan speed is fed back. Three 1bit objects "Status Fan speed 1", "Status Fan speed 2" and "Status Fan speed 3" are used for the feedback of the status of each wind speed level. "are used for the feedback of the status of each wind speed level. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object sends this status to the bus only if the device receives a request to read it from another bus device or on the bus;

Respond after change: When the state changes or the device receives a request to read the state, the object immediately sends a message to the bus to report the state.

**Parameter "Reply mode of Obj." Status fan speed "(1byte)"**

This parameter sets the feedback method for the current operating wind speed status, the object is "Status Fan speed" and is of 1byte type, the status value for each level of wind speed output is defined by the next parameter. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object sends this status to the bus only if the device receives a request to read it from another bus device or on the bus;

Respond after change: When the state changes or the device receives a request to read the state, the object immediately sends a message to the bus to report the state.

**Status feedback for fan speed**

**--Parameter "Status value for Fan speed 1/2/3 [1..255]"**

This parameter sets the status feedback value for each wind speed. Options: **1..255**, the status value of the wind organ is specified as 0.

**Priority of various operations in the fan control section:**

**Initialisation (after completion of parameter download) → Manual operation (switch to manual operation by long-pressing the manual button and the button for that channel is operated) → Normal or automatic operation**

**The following points apply:**

**1. Manual operation is mainly used for on-site emergency or debugging use, so the fan does not take into account the start-up wind speed, delay/minimum operating time, changeover time and so on these technical characteristics, but the direct output response;**

**2. Manual operation exits the automatic operation, and the automatic operation can only be activated again by the object of the automatic operation after the manual operation has been exited. In the case of a single-stage fan, the forced operation also exits the automatic operation, and in the case of a multi-stage fan, the wind speed is only limited to the permissible range.**

**3. During manual operation, the received mandatory commands are recorded, as are the control values for automatic operation.**

## 4.3.7 Valve control

The valve controls are divided into heating, cooling, 2-valve systems and 4-valve systems, which are basically similar in terms of parameters, except that they occupy different switching output channels, with a maximum of two switching output channels for individual heating, individual cooling or 2-valve systems and a maximum of four switching output channels for 4-valve systems. Therefore, a maximum of 14 output channels can be set for a heating, cooling or 2-valve system and a maximum of 7 output channels for a 4-valve system.

The valve type is set in the parameter interface "Channel function", as shown in Fig. 4.3.7-1; the parameter interface of heating, cooling and 2-pipe valve system is shown Fig. 4.3.7-2; the parameter interface of 4-pipe valve system is shown Fig. 4.3.7-3. The parameters of the different valve types are basically similar, and their parameter functions are described in the following.

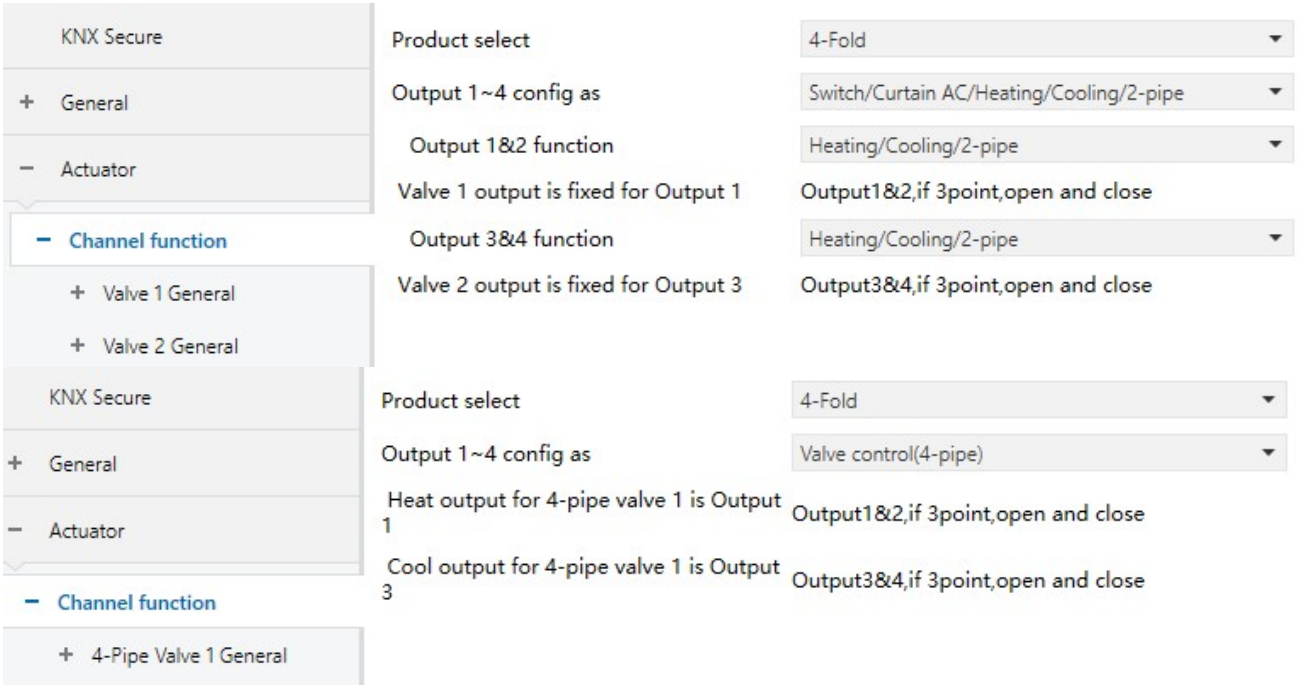



Figure 4.3.7-1 Parameter window "Channel function--valve type".

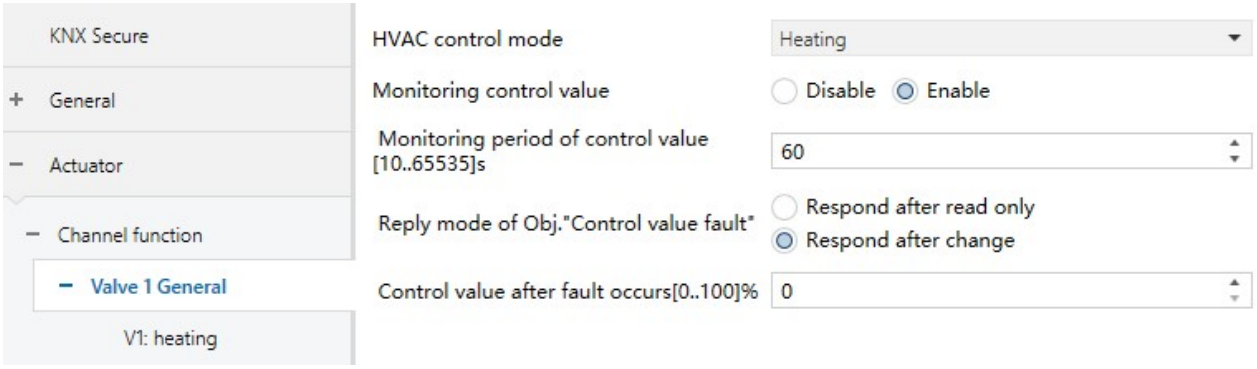



Fig. 4.3.7-2 (1) Parameter window "Valve X General--Heating".

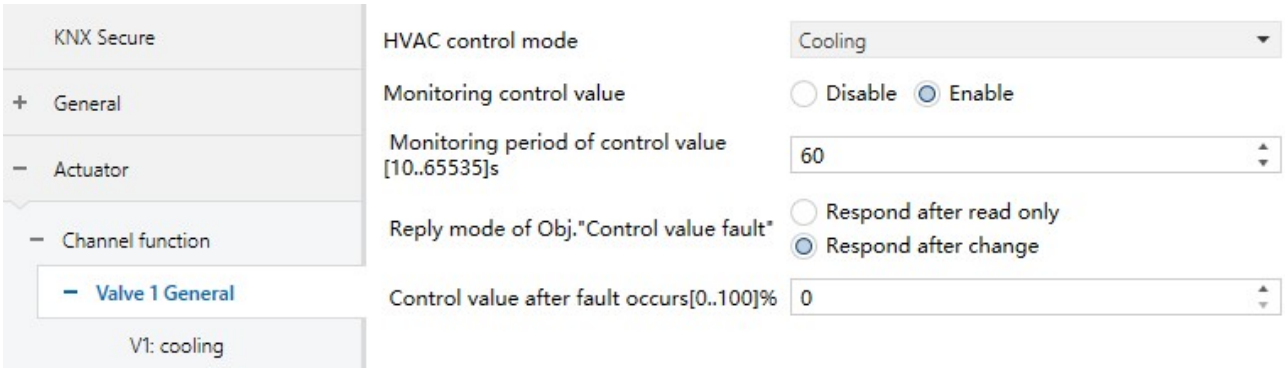



Figure 4.3.7-2 (2) Parameter window "Valve X General--Cooling".

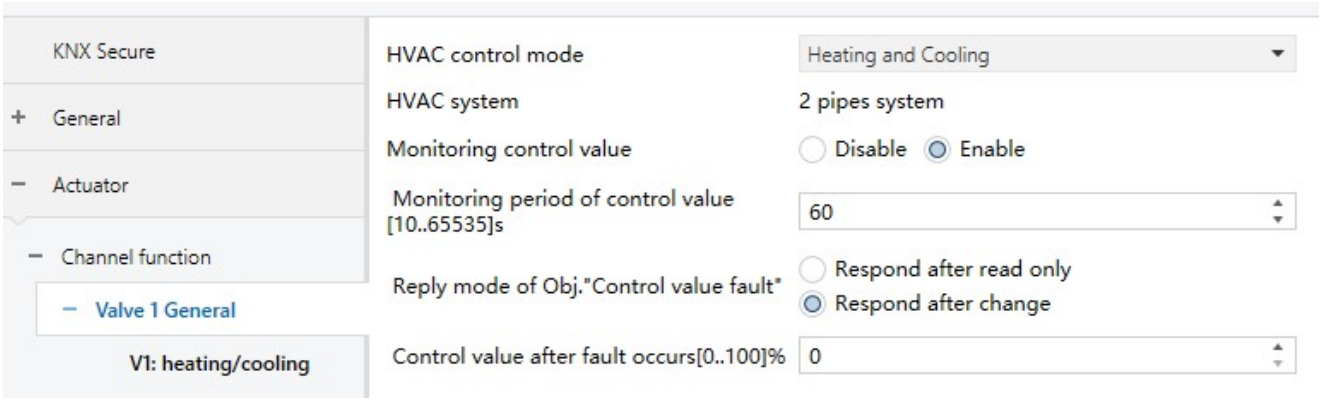



Figure 4.3.7-2(3) Parameter window "Valve X General - Heating and Cooling (2 pipes)"

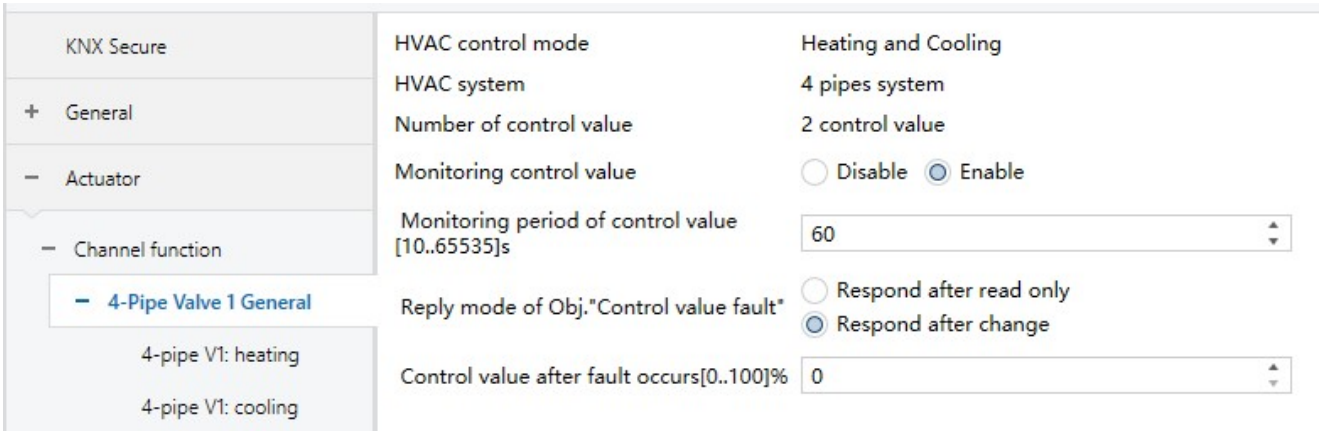



Figure 4.3.7-3 Parameter window "Valve X General - Heating and Cooling (4 pipes)".

**Parameter "HVAC Control mode"**

This parameter sets the HVAC control mode and is optional:

**Heating**

**Cooling**

**Heating and Cooling**

Heating: Fan coils can only fulfil the heating function;

Cooling: Fan coils can only perform cooling functions;

Heating and cooling: Fan coils can be used for both heating and cooling.

**Parameter "HVAC System"**

This parameter is visible when selecting a 2-pipe valved system or a 4-pipe valved system and is used to indicate the HVAC system, i.e. the type of piping for the water in and out of the fan coil.

2 pipes system: two-pipe system, for heating and cooling a common inlet and outlet pipe, that is to say, hot water and cold water are shared by a valve control;

4 pipes system: four-pipe system, for heating and cooling have their own inlet and outlet pipes, need two valves to control the hot water and cold water in and out respectively.

**Parameter "Number of control value".**

This parameter is visible when selecting a 4-pipe valve system and is used to indicate that there are two control values under 4 control, one for the heating valve and one for the cooling valve.

**Parameter "Monitoring control value".**

This parameter sets whether to enable monitoring of control values. Optional:

**Disable**

**Enable**

Enable:The following parameters are visible.

**--Parameter "Monitoring period of control value [10..65535]s**

This parameter sets the time period for monitoring the control value. If the control value has not been received within this time, the unit will consider that the external controller has made an error and the valve will output the control value according to the control value set in the next next parameter. Optional: 10...65535s

**--Parameter "Reply mode of Obj. "Control value fault""**

This parameter defines the way of feedback in case of an error in the external control value. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Control value fault" sends the current status to the bus only if the device receives the status from another bus device or if the status is read on the bus;

Respond after change: When the fault state changes or the device receives a request to read the state, the object "Control value fault" immediately sends a message to the bus to report the current state.

**--Parameter "Control value after fault occurs [0..100]%"**

In the event of an error in the external controller, the unit will output the valve at the control value set in this parameter. Options available: 0...100 %

If the valve is of the on/off type, then the valve is open when the control value set for this parameter is >0% and closed when the control value is set to 0%.

**An additional description of the pipework is given below (this product is available for 2 and 4 pipe systems):**

In daily life, fan coil systems can be differentiated into 2-pipe, 3-pipe and 4-pipe systems according to the hot and cold water inlet and outlet pipes.

A two-pipe system is one inlet/outlet system for cold/hot water, with cooling taking place when cold water is flowing through the pipes and heating taking place when hot water is flowing through the pipes. Therefore, cooling and heating cannot be performed at the same time.

Two-pipe system wiring: only need to connect a valve for controlling the flow of hot or cold water into the way can be.

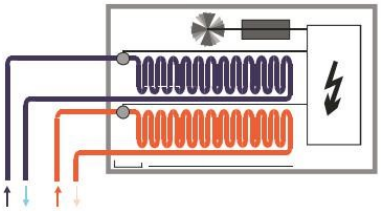
In many applications, two-tube systems are mostly used for cooling, while heating needs to be achieved by other commonly used heaters.

A four-pipe system is somewhat similar to a three-pipe system in that the cold/hot water each has a pipe into the system but shares a common pipe out, so heating and cooling cannot be done at the same time either.

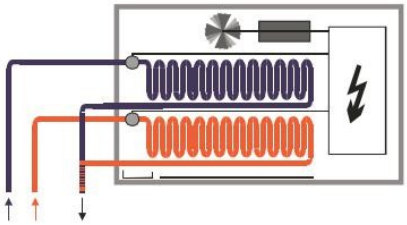
The four-pipe system has two inlet and outlet systems that provide both cold and hot water.

However, there is a single-pole, single-setting switch inside the fan, and only one can be applied at the same time for heating and cooling.

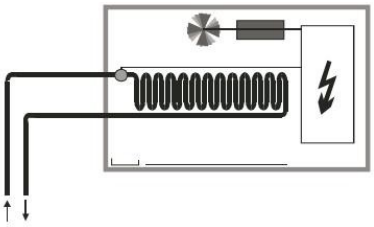
Four-pipe system wiring: are connected to the valve to the equipment's cooling/heating valve connection output to the flow of hot and cold water to control the output.



Four-control fan coiler



Three-control fan coiler



Two control fan coiler

#### 4.3.7.1 Parameter "Vx: Heating/Cooling"

The parameter setting interfaces of "Vx:Heating" and "Vx:Cooling" are shown in Figures 4.3.7.1-1 and 4.3.7.1-2. These two interfaces are mainly used to set the control modes and related parameters of heating and cooling valves. These two interfaces are mainly used to set the control modes and related parameters of heating and cooling valves, and different control modes are applicable to different valve types. (The control modes and related parameters for valves in 2-pipe and 4-pipe systems are similar, so we will not give examples here.)

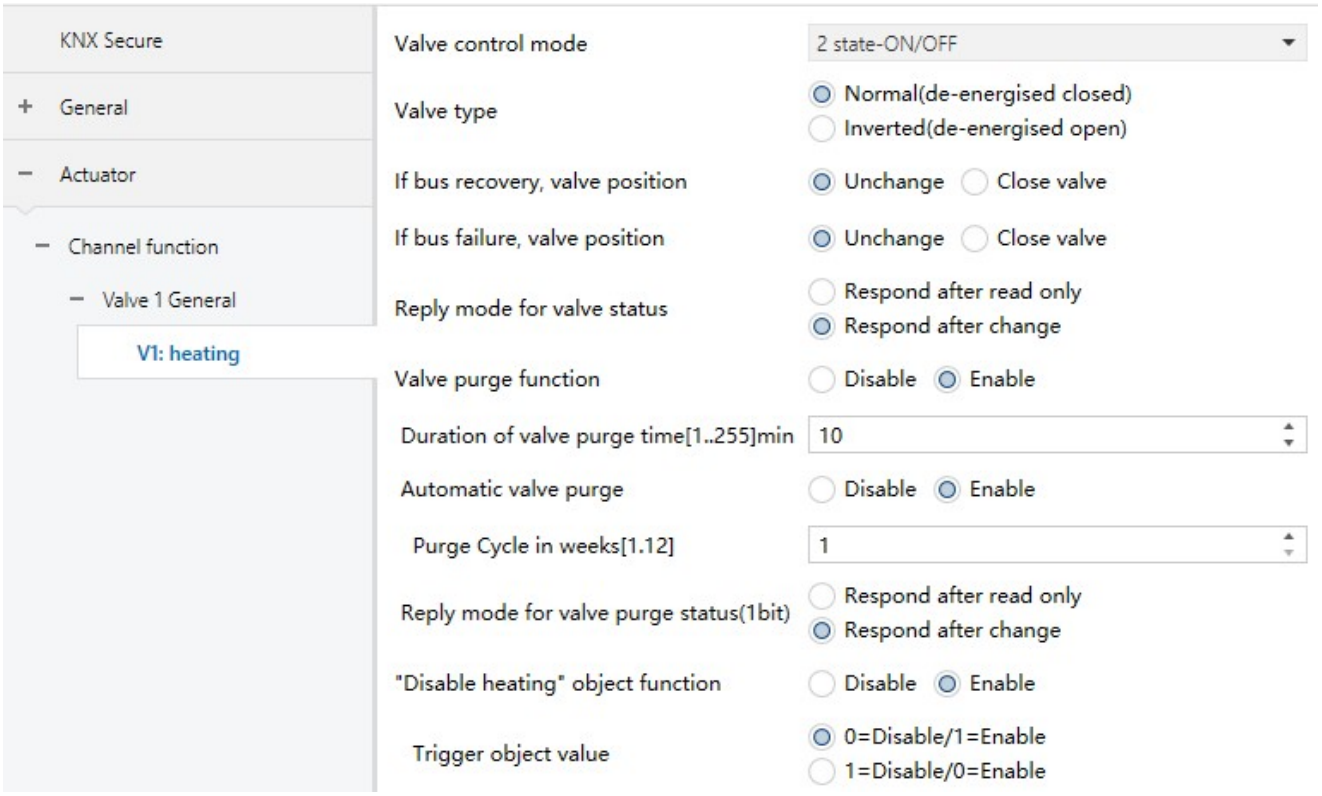



Fig. 4.3.7.1-1 Parameter window "Vx:Heating".

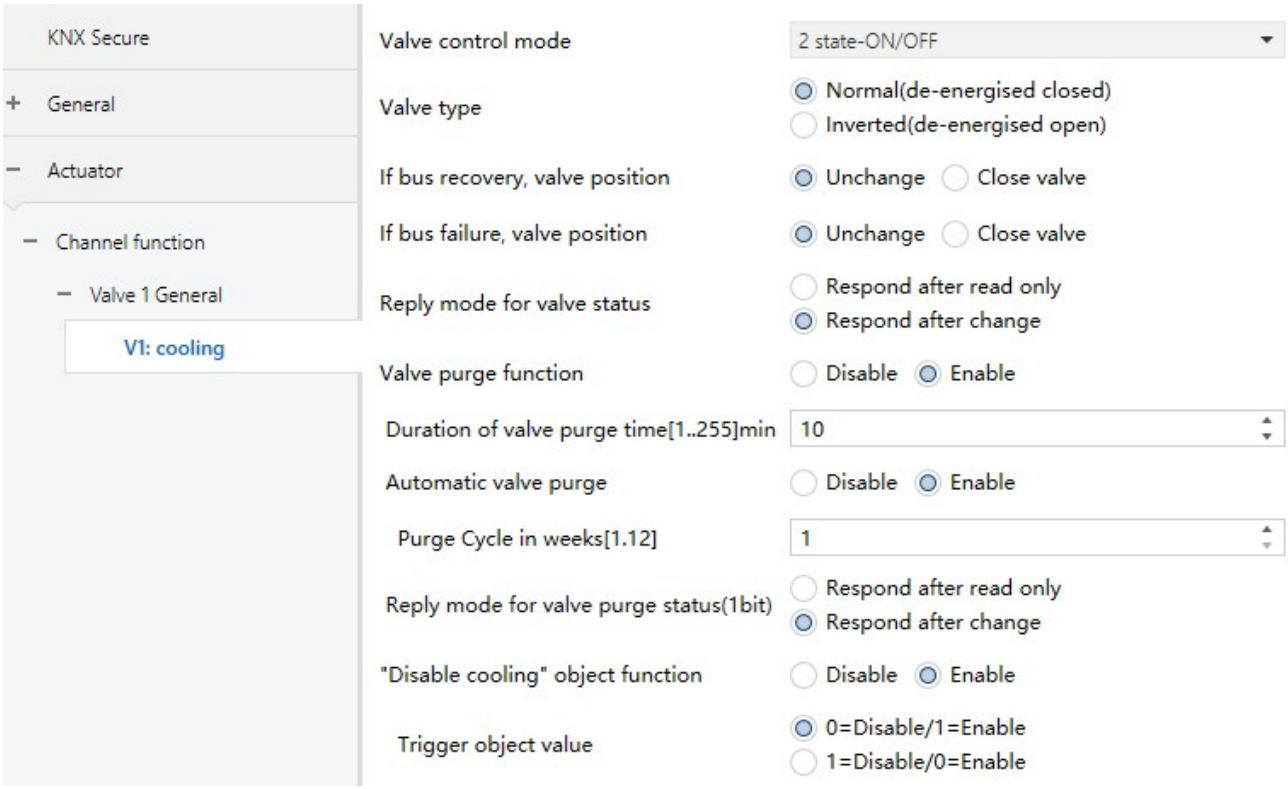



Fig. 4.3.7.1-2 Parameter window "Vx:Cooling".

**Parameter "Valve control mode".**

This parameter is used to set the type of valve to be controlled. Optional:

**2 state-ON/OFF**

**Continuous, PWM**

**3 point, open and close**

2 state-ON/OFF: Two-point switching control mode for normal switching valves where the valve switches the output on and off according to the received switching control value;

Continuous, PWM: PWM Continuous control mode, the valve switches the output cyclically according to the control value received from the object;

3 point, open and close: The control type is suitable for driving 3-wire valves, which control the opening of the valve according to the control value of the valve.

**The following is an example of the parameter interface of the heating valve to illustrate the parameter settings of the three different modes, and the refrigeration valve is similar.**

## 4.3.7.2 Parameter window "state-ON/OFF"

The "state-ON/OFF" parameter setting interface is shown Figure 4.3.7.2-1 below.

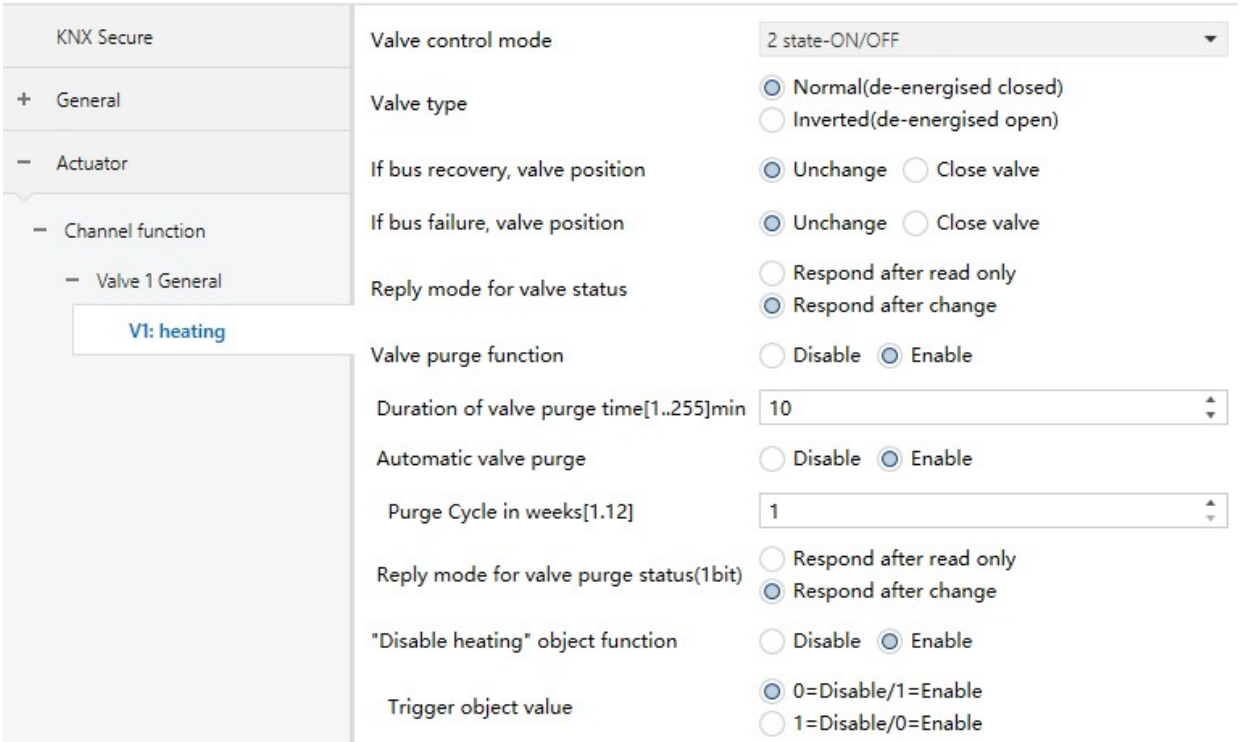


Fig. 4.3.7.2-1 Parameter window "state-ON/OFF".

**Parameter "Valve type"**

This parameter sets the direction of valve switching. Optional:

**Normal (de-energised closed)**

**Inverted (de-energised open)**

For on-off valves, "Normal (de-energised closed)" applies to normally closed on-off valves and "Inverted (de-energised open)" applies to normally open on-off valves.

**Parameter "If bus recovery, valve position".**

This parameter sets the position of the valve after the bus voltage is reset. Optional:

**Unchange**

**Close valve**

Unchange: The valve status remains unchanged after the bus voltage is dropped;

Close valve: The valve is closed.

**Parameter "If bus failure, valve position".**

This parameter sets the position of the valve after a bus voltage drop. Optional:

**Unchange**

**Close valve**

Unchange: The valve status remains unchanged after the bus voltage is dropped;

Close valve: The valve is closed.

Note: After programming the application, the valve status will close by default.

**Parameter "Reply mode for valve status (1bit)".**

This parameter defines the way in which the valve status responds. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Valve status,Heat/Cool" sends the current status to the bus only if the device receives the status from another bus device or if the status is read on the bus.

Respond after change: When the status changes or the device receives a request to read the status, the object "Valve status, Heat/Cool" immediately sends a message to the bus to report the current status.

**Parameter "Valve purge function"**

Optional:

**Disable**

**Enable**

Enable: A 1bit communication object "Trigger valve purge, Heat/Cool" is visible for triggering the valve purge operation and the following parameters are visible.

**--Parameter "Duration of valve purge time[1...255]min". .255]min"**

This parameter sets the duration of the valve cleaning, during which the valve is fully open and when this time elapses, the state before cleaning is re-established. Options: **1...255min**

If the heating/cooling operation is prohibited during the cleaning period, the cleaning will still continue. That is, during the cleaning period, both the prohibited operation telegram and the valve control telegram are recorded and updated for execution after the cleaning is completed.

**--Parameter "Automatic valve purge"**

Visible when the valve cleaning function is enabled. Optional:

**Disable**

**Enable**

Enable: Enables the automatic valve cleaning function, visible in the following parameters.

**--Parameter "Purge Cycle in weeks[1....12]". .12]"**

This parameter defines the cycle of automatic cleaning of the valve in weeks, the time starts from the power-up of the device, and the cleaning operation is triggered when the time is up.

Once the cleaning is completed, the time is reset, whether the cleaning was done by automatic means or by object triggered means.

Options: **1...12**

Note: Manual operation has the highest priority and cleaning has the next highest priority. If the cleaning process is interrupted manually before the cleaning time is up, this cleaning is finished and manual exit will not continue the last cleaning.

**--Parameter "Reply mode for valve purge status (1bit)"**

This parameter is visible when the valve cleaning function is enabled and defines how the valve cleaning status is fed back. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Valve purge status, Heat/Cool" sends the current status to the bus only if the device receives the status from another bus device or if the status is read on the bus;

Respond after change: When the status changes or the device receives a request to read the status, the object "Valve purge status, Heat/Cool" immediately sends a message to the bus to report the current status.

**Parameter ""Disable heating/cooling" object function"**

Optional:

**Disable**

**Enable**

Enable: A 1bit communication object "Disable, Heat/Cool" is visible, which can be used to disable heating/cooling operations, while the following parameters are visible.

**--Parameter "Trigger object value"**

This parameter sets the telegram value used to disable heating/cooling operation. Optional:

**0=Disable/1=Enable**

**1=Disable/0=Enable**

0=Disable/1=Enable: When the object "Disable, Heat/Cool" receives a message with the value "0", the heating/cooling operation is disabled and reactivated upon receipt of "1". When "1" is received, the heating/cooling operation is reactivated;

1=Disable/0=Enable: When the object "Disable, Heat/Cool" receives a message with the value "1", the heating/cooling operation is disabled and reactivated upon receipt of "0". When "0" is received, the heating/cooling operation is reactivated.

**Note: When the operation is disabled, the valve position is immediately switched back to OFF and when enabled again, the valve status is updated according to the current control value. During the prohibition period, the received control telegrams are logged and error monitoring continues. The purge function and the function to disable valve control are similar in each control mode, and their description will not be repeated for the following two control modes.**

### 4.3.7.3 Parameter window "Continuous, PWM "

The "Continuous, PWM" parameter setting interface is shown in Figure 4.3.7.3-1 below.

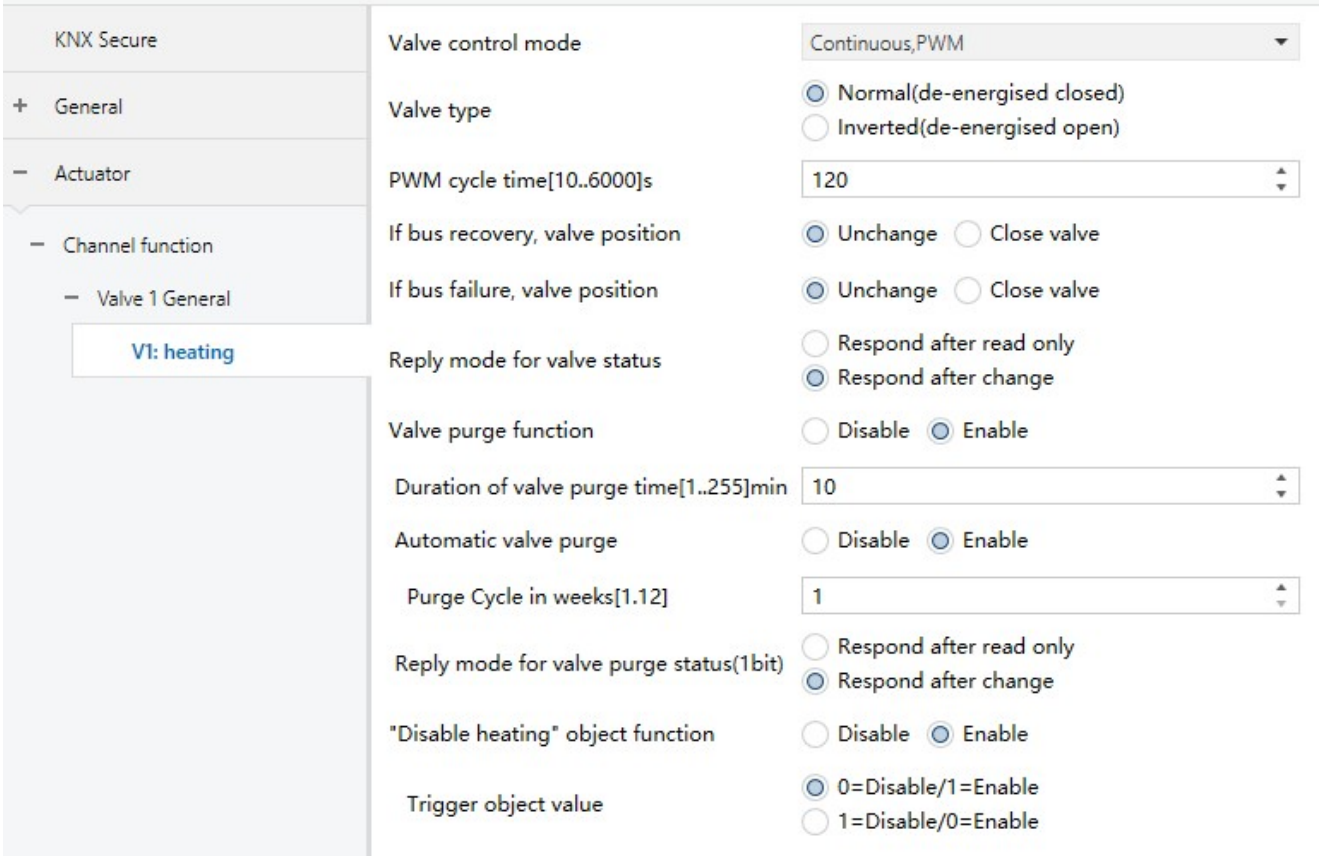


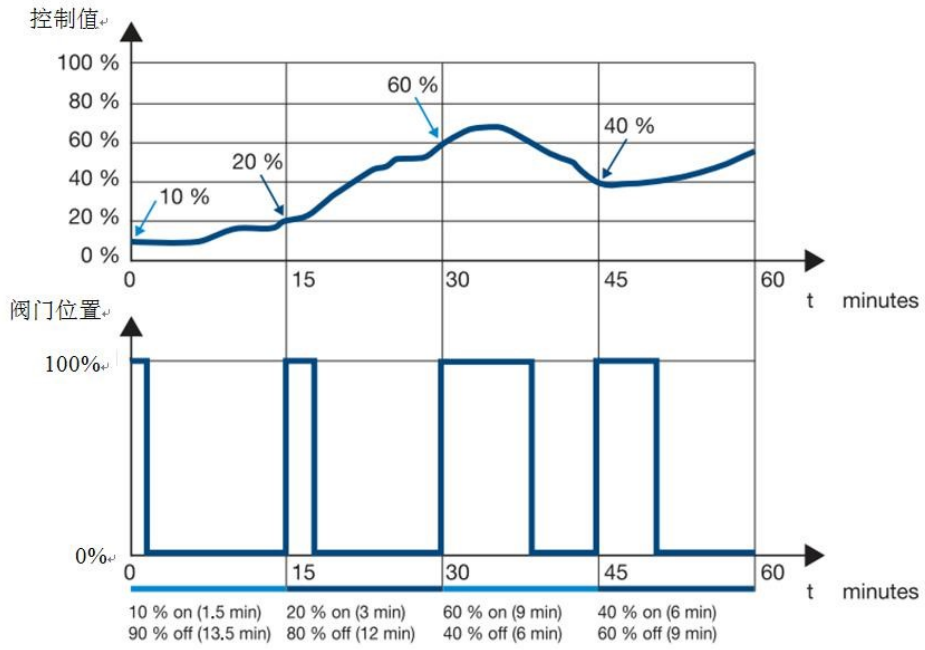

Fig. 4.3.7.3-1 Parameter window "Continuous, PWM".

This control mode is suitable for driving two-wire valves.

There are only two states in this control mode, "fully open" and "fully closed", the valve operates cyclically according to the control value and PWM cycle, for example, if the control value is 20% and

the PWM cycle is 15min, then the valve will be open for 3min and close for 12min, if the control value is 60%, then the valve will be open for 9min and close for 6min. For example, if the control value is 20% and the PWM cycle is 15min, then the valve will be open for 3min and close for 12min, and if the control value is 60%, then the valve will be open for 9min and close for 6min. The control value is evaluated by the thermostat or sensor-type device on the current temperature and the set temperature, and then it is sent to this device.

The valve adjustment schematic is shown below:




This control mode enables relatively accurate temperature control without temperature overshoot and allows the use of simple, low-cost control valves, e.g. in combination with an electrically heated valve driver, with a relatively high switching frequency of the control valve.

The parameter interface of this control mode is similar to that of "2state-ON/OFF", so we will not repeat the description of the same parameters here. The difference is that the PWM switching period can be set as follows:

**Parameter "PWM cycle time [10...6000]s".**

This parameter is used to set the time period for PWM control. The larger the value, the smaller the valve switching frequency, and conversely, the smaller the value, the more frequent the valve switching. Options: **10...6000s**

**NOTE: For Continuous, PWM valves, the status feedback information is as follows for different switches:**

| Valve switch type | descriptions |
|---|---|
| Normal (de-energised closed) | The valve sends telegram "0" for the object "Valve status, Heat/Cool" when there is no current (relay opened) and "1" when there is current (relay closed). "1" when there is current (relay closed). |
| Inverted (de-energised open) | The valve sends telegram "0" for the object "Valve status, Heat/Cool" when there is current (relay closed) and "1" when there is no current (relay opened). "1" when there is no current (relay opened). |

## 4.3.7.4 Parameter window "3 point, open and close"

The "3 point, open and close" parameter setting screen is shown Figure 4.3.7.4-1 below.

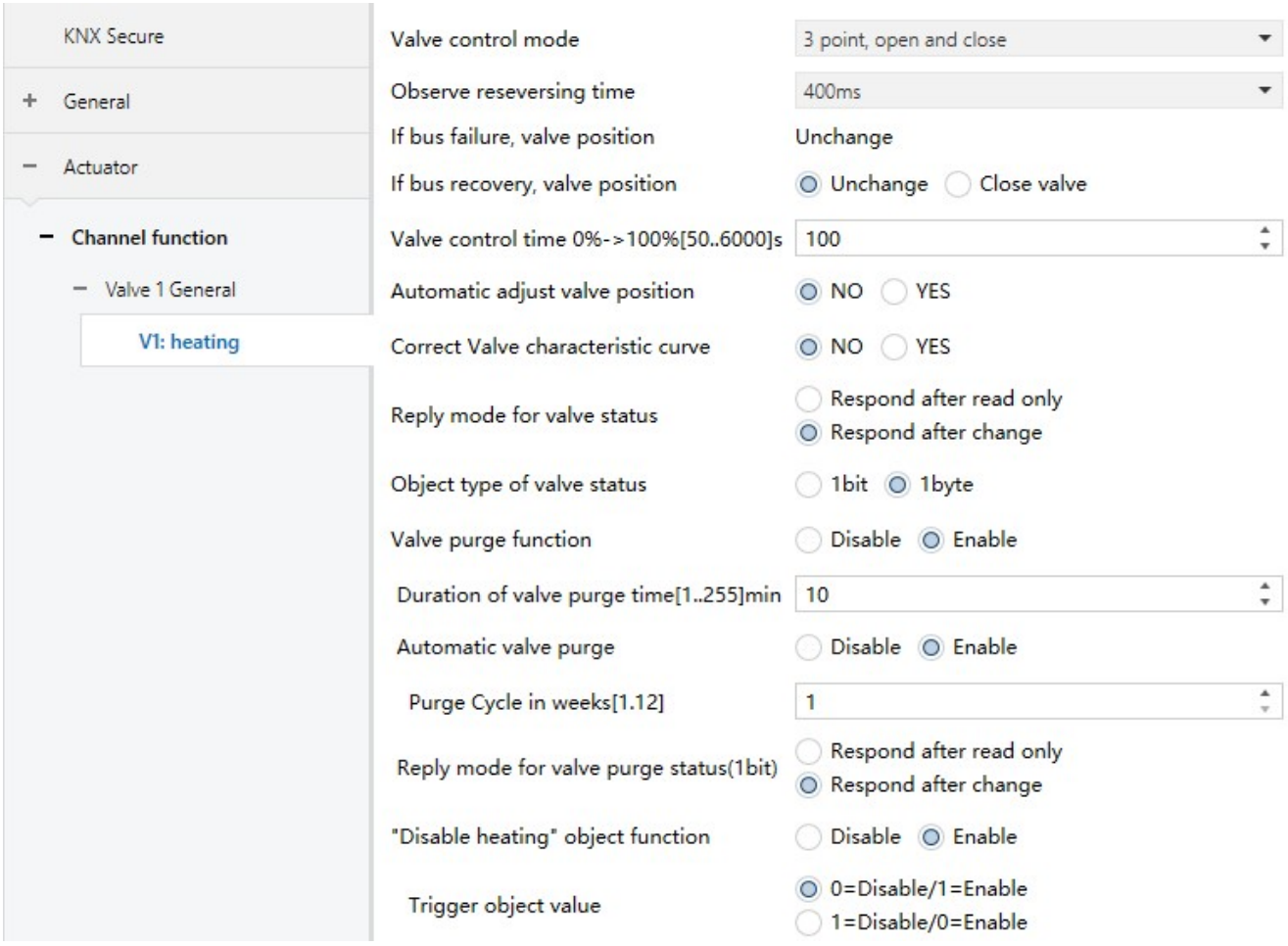
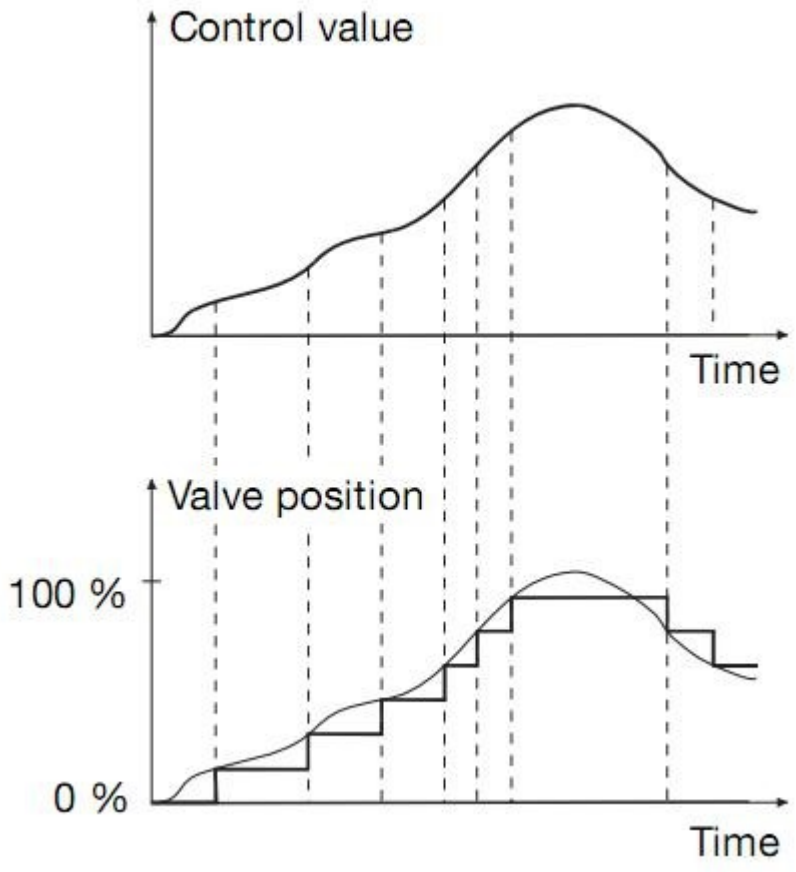



Fig. 4.3.7.4-1 Parameter window "3 point, open and close".

This control mode is suitable for driving a three-wire valve, according to the control value received by the object to control the valve opening, can achieve "completely open", "completely closed" or make

the valve open to a certain position, this control mode is the most accurate control method, at the same time, the valve switching frequency is also very low. This control mode is the most accurate control method, and at the same time, the switching frequency of the valve is also very low. For example, if the control value is 20%, then the valve will stop output at 20%. The valve adjustment schematic is shown below:




The parameter functions of this control mode are described below:

**Parameter "Observe reseversing time"**

This parameter sets the time for the valve to pause when running steering, which is beneficial for protecting the valve. Optional:

**100ms/200ms/.../1s/1.2s/1.5s**

The steering pause time is a technical characteristic of the valve that should be taken into account for any operation and is set with reference to the technical characteristics of the valve.

**Parameter "If bus failure, valve position".**

This parameter annotates that the position of the valve remains as it was before when the system voltage was switched off.

**Parameter "If bus recovery, valve position".**

This parameter sets the position of the valve after the system voltage is reset. Optional:

**Unchange**

**Close valve**

Unchange: maintains the power-up default state after system voltage is restored.

Close valve: The valve is closed.

**Note: The completion of the parameter download is not processed as a system reset, and the valve position are adjusted to 0%, only adjusted to 0% to determine its valve position for the next operation.**

**Timing for the auto purge function in this control mode starts when the valve position is determined.**

**Parameter "Valve control time 0%→100% [50...6000]s"**

This parameter sets the time required for the valve to move from the fully closed state to the fully open state, i.e. the total travelling time. Options: **50...6000s**

Assuming that the travel time set for this parameter is 180s, and that the current valve position is at 20% and the target position is at 60%, then the travel time for the valve to travel from 20%→ 60% takes 72s.

The setting of this parameter requires reference to the technical characteristics of the valve.

**Parameter "Automatic adjust valve position".**

This parameter sets whether or not to enable the automatic adjustment function of the valve. Optional:

**Yes**

**No**

Yes: The following parameters are visible.

Valve automatic adjustment function mainly plays a role in correcting the valve position, because the valve after many adjustments, due to various reasons, such as temperature, device aging, etc., the valve can not be completely closed or completely open the phenomenon, and therefore need to be repositioned by this function.

**--Parameter "Number of valve control up to adjust [1...65535]"**

This parameter sets how many times the valve has been adjusted to perform an automatic adjustment, i.e. the valve position is adjusted to 0% and repositioned, only a longer travelling time is required. Options: **1...65535**

Assuming that the setting is 100 times, when the valve has been adjusted for 100 times, that is, at the 101st adjustment, if the valve is adjusted in the open direction, then no auto tuning will be performed; if the valve is adjusted in the close direction, then one auto tuning will be performed to adjust the valve to 0% position and then to the target position. For example, if the valve position is 50% for the 100th time and 60% for the 101st time, no valve auto-tuning will be performed at this time until a command to adjust in the reverse direction is received; if the 101st time is 40% then the valve performs an auto-tuning run to 0% and then to the target position of 40%. The auto-tuning time is extended by 5% of the total travel time, i.e. the travel time+ total travel time x 5%, total travel time x 5% must be less than or equal to 1min, and when it is greater than 1min, it is taken as 1min.

When the automatic adjustment is executed, the count is recounted. The count is incremented once when valve adjustment stops (positioning adjustment when parameter download is complete is not counted in the count). If a control value is received during the execution of auto tuning, it is also waited until the auto tuning is finished, or if there is a higher priority operation, it is waited until the higher priority operation is finished.

**The setting of this parameter requires reference to the technical characteristics of the valve.**

**Parameter "Correct Valve characteristic curve"**

This parameter sets whether or not the characteristic curve adjustment of the valve is enabled. Optional:

**Yes**

**No**

Yes: The following parameters are visible.

**--Parameter "Min. controller value for closed valve [0..100]%"**

**--Parameter "Max. controller value for fully opened valve [0...100]%". .100]%"**

**--Parameter "Lower valve position for opening [0...100]%". .100]%"**

**--Parameter "Upper valve position for opening [0...100]%". .100]%**

Used to set the characteristic curve of the valve output.

Options: **0.... .100 [%]**

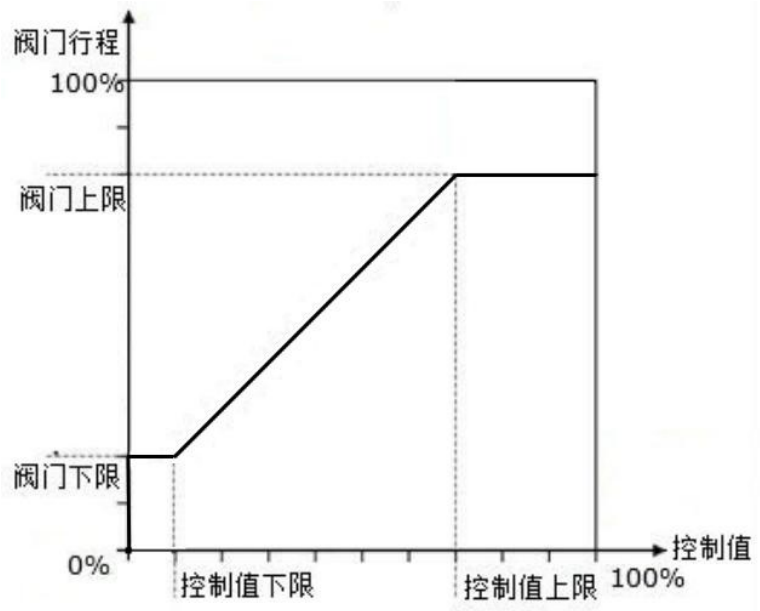
Min. controller value for closed valve: The lower control value of the characteristic curve of the valve;

Max. controller value for fully opened valve: Upper control value for the characteristic curve of the valve;

Lower valve position for opening: The lower limit of the valve position;

Upper valve position for opening: The upper limit of the valve position.

Taking a valve with a valve interface of relay as an example, assuming that the lower limit of the control value is set to 10%, the lower limit of the valve is set to 20%, the upper limit of the control value is set to 70%, and the upper limit of the valve is set to 80%, there is an output characteristic graph as shown in the figure below:




**Parameter "Reply mode for valve status (1bit)".**

This parameter defines the way in which the valve status responds. Optional:

**Respond after read only**

**Respond after change**

Respond after read only: The object "Valve status,Heat/Cool" sends the current status to the bus only if the device receives the status from another bus device or if the status is read on the bus.

Respond after change: When the status changes or the device receives a request to read the status, the object "Valve status,Heat/Cool" immediately sends a message to the bus to report the current status.

**Parameter "Object type of valve status "**

Sets the object type for valve position status feedback. Optional:

**1bit**

**1byte**

1bit: the next parameter is visible and a 1bit object "Valve status, Heat/Cool" is visible to give feedback on the valve status.

1byte: A 1byte object "Valve status, Heat/Cool" is visible for feedback of the valve position status.

**--Parameter "Object value with valve position >0"**

Optional:

**0**

**1**

With option "1", the object "Valve status, Heat/Cool" sends telegram "1" when the valve position is greater than 0; when the valve position is 0, it sends telegram "0"; and vice versa. When the valve position is 0, the object "Valve status, Heat/Cool" sends the message "0"; vice versa.

**Priority of various operations in the valve control section:**

**Initialisation (after completion of parameter download) → manual operation → cleaning function → automatic valve adjustment (only 3point, open and close) → valve operation inhibition → fault monitoring or normal operation (normal operation is triggered by the object Control value, Cool/Heat)**

**The following points apply:**

**1. In fault mode, if the valve is disabled, fault monitoring continues and faults are reported, but no fault action can be performed until there is no higher priority action. The fault status is not reset until the control value is received and the monitoring cycle starts again.**

**2. When in the cleaning process, if there is a higher priority operation (such as manual operation) will be interrupted, the end of this cleaning, manual exit will not continue the last cleaning.**

**3. The curve correction adjustment of the valve corrects the control value and valve position for both fault monitoring and normal operation (3point, open and close only).**

**4. When entering manual operation, if there is no operation button, the action will not be executed, and still continue the original action behaviour. If the current valve is closed, the operation button performs the action of valve open (limited by the maximum valve position) and if the current valve is open, the operation button performs the action of valve close (0%). During manual operation, the commands Control Value, Valve Purge and Valve Prohibit are invalidated, but fault monitoring is continued and Control Value can also reset the fault monitoring cycle. After exiting manual operation, the action will be based on the current fault status, or if there is no fault, until a new control command is received.**

**5. The heating/cooling mode can only be switched by control values or manual operation. Since the cleaning function has a higher priority, it is not limited by the control mode, for example, the cleaning of heating mode can be triggered in cooling mode, and vice versa. If the cleaning of cooling is currently being executed, it will wait until the cleaning of cooling is completed, and then the cleaning of heating will be executed, but the control mode will not be changed, and it will still be the cooling mode. If the control value of another mode is received during cleaning, the state of the control mode will be switched immediately, but it is necessary to wait until the cleaning is completed before executing the action according to the current control value.**

**6. The same control mode, if a period of time occurs a variety of operations, it will be processed according to the priority order, and wait for the cancellation of high-priority operations before dealing with low-priority operations. Assuming that there are cleaning, valve prohibited and general operation, if the cleaning operation is cancelled at this time, then the valve will be returned to the state of valve prohibited according to the priority order, that is, shut down the valve, if the valve is enabled again, then the valve will be acted according to the current control value or fault state.**

**The following points apply to the automatic adjustment of the valve (if enabled):**

**1. If the automatic adjustment operation of the valve is interrupted by the manual operation and the cleaning function, it is performed again after the manual operation and the cleaning function have been completed.**

**2. The valve automatic adjustment of the valve prohibit operation, fault action and control value action has an impact, when the number of valve adjustments to meet the number of automatic adjustment, the travel time of their action will increase, because the valve has to be repositioned before running to the target position.**

**3. Valve Adjustment No matter what control commands (such as manual operation, cleaning, prohibit valve control, etc.) are adjusted to it, the number of adjustments will be increased once when the adjustment is stopped, and the number of adjustments will be reset to 1 after the execution of automatic adjustment.**

**4. If a new control value is received during the valve's operation of auto-tuning, it will wait until the auto-tuning execution (positioning) is completed before running to the new target position.**

# 5. Description of communication recipients

The communication object is the medium through which the device communicates with other devices on the bus, i.e. only the communication object can communicate on the bus.

**The roles of each communication object in each function block are described in detail below.**

**Note: "C" in the attribute column of the table below represents the communication function enable of the communication object;**

**"W" means that the value of the communication object can be rewritten via the bus;**

**"R" means that the value of the communication object can be read over the bus;**

**"T" stands for the communication object with a transmission function;**

**"U" means that the value of the communication object can be updated.**

# 5.1 Description of the addressees of the "General" communication

| Number | Name | Object Function | Description | Group Address | Length | C | R | W | T | U | Data Type | Priority |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | General | In operation | | | 1 bit | C | - | - | T | - | switch | Low |
| 2 | General | Central control for all switch | | | 1 bit | C | - | W | - | - | switch | Low |
| 3 | General | Central control for Up/Down | | | 1 bit | C | - | W | - | - | up/down | Low |
| 4 | General | Central control for Slat/Stop | | | 1 bit | C | - | W | - | - | step | Low |
| 5 | Weather | Wind alarm | | | 1 bit | C | - | W | T | U | alarm | Low |
| 6 | Weather | Rain alarm | | | 1 bit | C | - | W | T | U | alarm | Low |
| 7 | Weather | Frost alarm | | | 1 bit | C | - | W | T | U | alarm | Low |

Figure 5.1-1 "General" communication objects

| Serial number | Function | Communication Object | Type | Attribute | DPT |
|---|---|---|---|---|---|
| **1** | **General** | **In operation** | **1bit** | **C,T** | **1.001 DPT_Switch** |
| This communication object is used to periodically send telegram values of telegram heartbeat packets to the bus to indicate that the device is functioning properly. | | | | | |
| **2** | **General** | **Central control for all switches** | **1bit** | **C,W** | **1.001 DPT_Switch** |
| This communication object is used for centralised control of switching outputs. Only switching output channels enabled for centralised control can be centrally controlled via this object.<br>0 -- off<br>1 -- on | | | | | |
| **3** | **General** | **Central control for Up/Down** | **1bit** | **C,W** | **1.008 DPT_UpDown** |
| This communication object is used for centralised control of the curtain position and can only be used for centralised control via this object if the curtain output channel for centralised control is enabled.<br>Message '0' - shutters move up / curtains open<br>Message '1' - shutters move down / curtains close | | | | | |
| **4** | **General** | **Central control for Slat/Stop** | **1bit** | **C,W** | **1.007 DPT_Step** |
| This communication object is used for centralised control to stop the movement of curtains or to adjust the angle of blinds, and can only be used for centralised control if the output channel of the curtains is enabled.<br>The centralised control can only be carried out via this object if the output channel of the curtains is enabled for centralised control.<br>Message '0' - stop/adjust blinds upwards<br>Message '1' - stop/adjust blinds downwards | | | | | |
| **5** | **Weather** | **Wind alarm** | **1 bit** | **CWTU** | **1.005 DPT_Alarm** |
| **6** | **Weather** | **Rain alarm** | **1 bit** | **CWTU** | **1.005 DPT_Alarm** |
| **7** | **Weather** | **Frost alarm** | **1 bit** | **CWTU** | **1.005 DPT_Alarm** |
| The communication objects numbered 5, 6 and 7 activate or deactivate the weather warning operation and reset the detection time when they receive the message "1" or "0", as described in the parameter section. | | | | | |

Table 5.1-1 Description of "General" communication targets

# 5.2 Description of the object of communication "Dry Contact"

"Switch" switching function

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Switch 1 | Switch | 1 bit | C | - | W | T | - | switch | Low |
| 10 | Input channel 1 | Disable, 1 | 1 bit | C | - | W | - | - | enable | Low |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Switch 1 | Switch | 1 bit | C | - | W | T | - | switch | Low |
| 9 | Switch 1 | Switch-long | 1 bit | C | - | W | T | - | switch | Low |
| 10 | Input channel 1 | Disable, 1 | 1 bit | C | - | W | - | - | enable | Low |

Figure 5.2-1 Communication objects of the "Switch".

"Switch/Dimming" switching/dimming function

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Sw/Dim 1 | Dimming-short | 1 bit | C | - | W | T | - | switch | Low |
| 9 | Sw/Dim 1 | Dimming-long | 4 bit | C | - | - | T | - | dimming c... | Low |
| 10 | Input channel 1 | Disable, 1 | 1 bit | C | - | W | - | - | enable | Low |

Figure 5.2-2 Communication objects of "Switch/Dimming".

"Value/Forced output" data type conversion function

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Val/For Output 1 | Short/Close,1bit value | 1 bit | C | - | - | T | - | switch | Low |
| 9 | Val/For Output 1 | Long/Open,4bit value | 4 bit | C | - | - | T | - | dimming c... | Low |
| 10 | Input channel 1 | Disable, 1 | 1 bit | C | - | W | - | - | enable | Low |

Figure 5.2-3 Communication object of "Value/Forced output".

"Scene control" function

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Scene 1 | Short/Close,scene | 1 byte | C | - | - | T | - | scene cont... | Low |
| 9 | Scene 1 | Long/Open,scene | 1 byte | C | - | - | T | - | scene cont... | Low |
| 10 | Input channel 1 | Disable, 1 | 1 bit | C | - | W | - | - | enable | Low |

Figure 5.2-4 Communication objects of "Scene control".

"Shutter Control" curtain control function

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Shutter 1 | Up/Down,Blind | 1 bit | C | - | - | T | - | up/down | Low |
| 9 | Shutter 1 | Stop/Adjust,Blind | 1 bit | C | - | - | T | - | step | Low |
| 10 | Input channel 1 | Disable, 1 | 1 bit | C | - | W | - | - | enable | Low |

Figure 5.2-5 Communication objects of "Shutter Control".

"Shift register" shift register function

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Shift register 1 | Register value | 1 byte | C | - | - | T | - | counter pu... | Low |
| 10 | Input channel 1 | Disable, 1 | 1 bit | C | - | W | - | - | enable | Low |

Fig. 5.2-6 Description of "Shift register" communication object

| Serial numbe | Function | Communication Object | Type | Attribute | DPT |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **r** | | | | | |
| **8** | **Switch 1** | **Switch** | **1 Bit** | **CWT** | **1.001 DPT_Switch** |
| | This communication object is used to trigger switching operations. | | | | |
| | **Sw/Dim 1** | **Dimming-short** | **1 Bit** | **CWT** | **1.001 DPT_Switch** |
| | This communication object is used to trigger switching operations. Message: 0 - off, 1 - on | | | | |
| | **Val/For Output 1** | **Short/Close,1bit value<br>Short/Close,4bit value<br>Short/Close,1byte value<br>Short/Close,2byte value** | **1 Bit<br>4 Bit<br>1 Byte<br>2 Bytes** | **CT** | **1.001 DPT_Switch<br>3.007 DPT_Dimming control<br>5.010 DPT_counter pulses<br>7.001 DPT_pulses** |
| | This communication object is used to send fixed values, the range of values that can be sent is determined by the data type, which is selected by the corresponding key operation type parameter. | | | | |
| | **Scene 1** | **Short/Close, scene** | **1 Byte** | **CT** | **18.001 DPT_Scene Control** |
| | This communication object sends an 8bit message to call or store a scene. The meaning of the 8bit data is explained in detail below.<br><br>Let an 8bit data be (binary code): FXNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN<br>F: '0' for call scenario; '1' for store scenario<br>X: 0<br>NNNNNNN: scene number (0...63).<br><br>The parameter setting options are 1...64, in fact, the communication object "Scene" receives scene messages corresponding to 0...63. If the parameter is set to scene 1, the communication object "Scene" receives scene messages corresponding to 0...63. If scene 1 is set in the parameter, the communication object "Scene" receives a scene message with a value of 0, as follows:<br>Message value of the object Description<br>0 Call scene 1<br>1 Call Scene 2<br>... ...<br>63 Recall Scenario 64<br><br>128 Storage Scene 1<br>129 Storage Scenario 2<br>... ...<br>191 Storage scenarios 64 | | | | |
| | **Shutter 1** | **Up/Down,Blind** | **1 Bit** | **CT** | **1.008 DPT_up/down** |
| | This communication object is used to send down messages for moving up/down curtains, messages: 0 -- moving up curtains/blinds 1 -- moving down curtains/blinds | | | | |
| | **Shift register 1** | **Register value** | **1 Byte** | **CT** | **5.010 DPT_counter pulses** |
| | This communication object is used to send the value of the key function shift register, which is set by the corresponding function page parameter. | | | | |
| **9** | **Switch 1** | **Switch-long** | **1 Bit** | **CWT** | **1.001 DPT_Switch** |
| | This communication object is used to trigger the long press operation of a switch. | | | | |
| | **Sw/Dim 1** | **Dimming-long** | **4 Bit** | **CT** | **3.007 DPT_Dimming control** |
| | This communication object is used to trigger a relative dimming operation.<br>When the telegram value is 1...7 it is dimming down, the larger the value in this range, the smaller the dimming down, when it is 1 the dimming down is the largest, when it is 7 it is the smallest, and when it is 0 it is stopping the dimming.<br>When the input value is 9...15, it is dimming upward, the larger the value in this range, the smaller the dimming upward, the largest dimming upward when it is 9, the smallest dimming upward when it is 15, and 8 is stopping the dimming. | | | | |
| | **Val/For Output 1** | **Long/Open,1bit value<br>Long/Open,4bit value<br>Long/Open,1byte value<br>Long/Open,2byte value** | **1 Bit<br>4 Bit<br>1 Byte<br>2 Bytes** | **CT** | **1.001 DPT_Switch<br>3.007 DPT_Dimming control<br>5.010 DPT_counter pulses<br>7.001 DPT_pulses** |
| | Consistent with the functional description of the short-press operation communication object | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | **Scene 1** | **Long/Open,scene** | **1 Byte** | **CT** | **18.001 DPT_Scene Control** |
| | Consistent with the functional description of the short-press operation communication object | | | | |
| | **Shutter 1** | **Stop/Adjust,Blind** | **1 Bit** | **CT** | **1.007 DPT_step** |
| | This communication object is used to stop the operation of the curtains or to stop the adjustment of the angle of the blinds. | | | | |
| **10** | **Input channel 1** | **Disable,1** | **1 Bit** | **CW** | **1.003 DPT_Enable** |
| This communication object is used to enable and disable the use of input function operations. | | | | | |

Table 5.2-1 Description of "General" communication targets

# 5.3 Description of the communication object "Actuator".

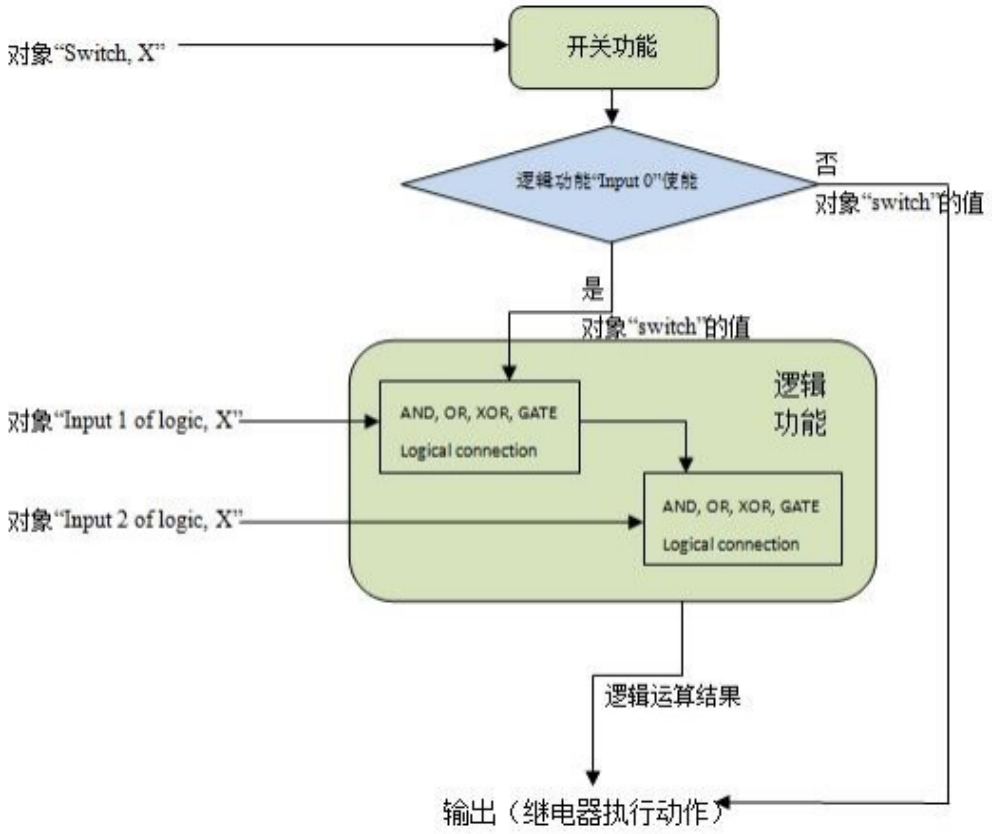
## 5.3.1 Switching outputs

### 5.3.1.1 Switch output - Switch actuator

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 120 | Output 1 | Switch | 1 bit | C | - | W | - | - | switch | Low |
| 121 | Output 1 | Switch status | 1 bit | C | R | - | T | - | switch | Low |
| 123 | Output 1 | Delay function | 1 bit | C | - | W | - | - | switch | Low |
| 124 | Output 1 | Operation hours counter | 4 bytes | C | R | W | T | U | time lag (s) | Low |
| 125 | Output 1 | Scene | 1 byte | C | - | W | - | - | scene control | Low |
| 126 | Output 1 | Forced output | 1 bit | C | - | W | - | - | enable | Low |
| 127 | Output 1 | Logic 1 | 1 bit | C | - | W | - | - | boolean | Low |
| 128 | Output 1 | Logic 2 | 1 bit | C | - | W | - | - | boolean | Low |
| 129 | Output 1 | Enable time function | 1 bit | C | - | W | - | - | enable | Low |
| 123 | Output 1 | Flashing function | 1 bit | C | - | W | - | - | switch | Low |
| 123 | Output 1 | Staircase function | 1 bit | C | - | W | - | - | switch | Low |

Figure 5.3.1.1-1 Communication objects of the "Switch actuator".

| Serial number | Function | Communication Object | Type | Attribute | DPT |
|---|---|---|---|---|---|
| **120** | **Output X** | **Switch** | **1bit** | **CW** | **1.001 DPT_Switch** |
| This communication object is used to trigger a switching operation.<br>When "Input 0" in the logic function is enabled, the communication object "Switch ,X" is not used to trigger the switching operation directly, and the switching action will be affected by the logic function. For details, refer to the following flowchart: | | | | | |




| | | | | | |
|---|---|---|---|---|---|
| **121** | **Output X** | **Switch status** | **1bit** | **CRT** | **1.001 DPT_Switch** |

The value of this communication object (set in "Output X" by the parameter "Object value of switch status:") directly indicates the status of the relay contacts.
If you select "Respond after read only", the object sends the current switching status to the bus only if the device receives a request to read the switching status of the channel on the bus;
If "Respond after change" is selected, this object sends the current switching status to the bus as soon as the switching status of the channel has changed.

| | | | | | |
|---|---|---|---|---|---|
| **123** | **Output X** | **Delay function** | **1bit** | **CW** | **1.001 DPT_Switch** |
| | This communication object is enabled when "Delay" is selected for the "Type of time function" parameter and the delay switch is activated via this communication object. | | | | |
| | **Output X** | **Flashing function** | **1bit** | **CW** | **1.001 DPT_Switch** |
| | This communication object is activated when "Flashing" is selected for the "Type of time function" parameter and the blinking switch is activated via this communication object. | | | | |
| | **Output X** | **Staircase function** | **1bit** | **CW** | **1.001 DPT_Switch** |
| | This communication object is activated when "Staircase" is selected for the "Type of time function" parameter, and the staircase light function is switched on via this communication object. | | | | |
| **124** | **Output X** | **Operation hours counter** | **2byte<br>4byte** | **CRWTU** | **7.007 DPT_TimePeriodHrs<br>13.100<br>DPT_LongDeltaTimeSec** |

This communication object is used to report the time at which the loads of this circuit are switched on, and is displayed when "Enable" is selected for the parameter "Function of " Operation hours counter". It is displayed when "Enable" is selected for the "Function of " Operation hours counter" parameter.
The data type can be selected with the "Object datatype of "Operation hours counter"". 2byte type is in hours and 4byte is in seconds.

| | | | | | |
|---|---|---|---|---|---|
| **125** | **Output X** | **Scene** | **1byte** | **CW** | **18.001 DPT_SceneControl** |

Scenes can be called up or stored by sending an 8bit command via this communication object. The communication object is only enabled if the scene function is enabled. The following describes the meaning of the 8bit command in detail.
The following describes the meaning of the 8bit command in detail.
An 8bit instruction is (binary code): FXNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
F: "0" calls the scene; "1" stores the scene;
X: 0;
NNNNNNN: Scene number (0...63).

The parameter setting options are 1...64, in fact, the communication object "Scene" receives scene messages corresponding to 0...63. If the parameter setting is scene 1, the communication object "Scene" receives scene messages corresponding to 0...63. If scene 1 is set in the parameter, the communication object "Scene" receives a scene message with a value of 0, as follows:
Message value of the object Description
0 Call scene 1
1 Call Scene 2
... ...
63 Recall Scenario 64

128 Storage Scene 1
129 Storage Scenario 2
... ...
191 Storage scenarios 64

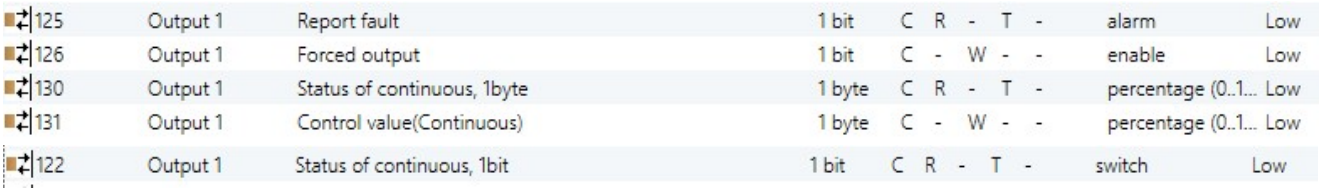
| | | | | | |
|---|---|---|---|---|---|
| **126** | **Output X** | **Forced output** | **1bit<br>2bit** | **CW** | **1.003 DPT_Enable<br>2.001 DPT_Switch control** |
| This communication object is enabled when the enforcement function is enabled.<br>At 1 bit, the device starts the enforcement mode when a message is received with value "1", in which case the device ignores all other actions except enforcement; the enforcement mode ends when a message is received with value "0", the position of the contact during enforcement is set by the parameter.<br>The contact position during forced operation is set by the parameter. 2bit, when receiving telegram value "3", the contact is forced to close; when receiving telegram value "2", the contact is forced to open; when receiving telegram value "1" or "0", the contact is forced to open; when receiving telegram value "1" or "0", the contact is forced to open; when receiving telegram value "1" or "0", the contact is forced to open. When a message value of "1" or "0" is received, the enforced mode is cancelled. | | | | | |
| **127** | **Output X** | **Logic 1** | **1bit** | **CW** | **1.002 DPT_Bool** |
| This communication object is enabled when "Enable" is selected for the parameter "The input 1 of logic" and is used for the logic input of input1. | | | | | |
| **128** | **Output X** | **Logic 2** | **1bit** | **CW** | **1.002 DPT_Bool** |
| This communication object is enabled when "Enable" is selected for the parameter "The input 2 of logic" and is used for the logic input of input2. | | | | | |
| **129** | **Output X** | **Enable time function** | **1bit** | **CW** | **1.003 DPT_Enable** |
| This communication object is enabled when the time function is enabled, and the time function can be disabled by this communication object. The time function is enabled when the communication object receives a message with a logical value of "1" and disabled when it receives a message with a value of "0".<br>When the communication object receives a message with a logical value of "1", the time function is enabled; when the communication object receives a message with a value of "0", the time function is disabled, but the operation before disabling continues to be executed to completion, and time control commands received during the disabling period are ignored.<br>If the time function is enabled, the time function is enabled by default when the bus power is restored. | | | | | |

Table 5.3.1.1-1 Communication object description for "Switch actuator".

## 5.3.1.2 Switching output - Heating actuator (without controller)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120 | Output 1 | On-off control value | 1 bit | C | - | W | - | - | switch | Low |
| 121 | Output 1 | Status of contact | 1 bit | C | R | - | T | - | switch | Low |
| 125 | Output 1 | Report fault | 1 bit | C | R | - | T | - | alarm | Low |
| 126 | Output 1 | Forced output | 1 bit | C | - | W | - | - | enable | Low |

1bit(on-off control or PWM)



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 125 | Output 1 | Report fault | 1 bit | C | R | - | T | - | alarm | Low |
| 126 | Output 1 | Forced output | 1 bit | C | - | W | - | - | enable | Low |
| 130 | Output 1 | Status of continuous, 1byte | 1 byte | C | R | - | T | - | percentage (0..1... | Low |
| 131 | Output 1 | Control value(Continuous) | 1 byte | C | - | W | - | - | percentage (0..1... | Low |
| 122 | Output 1 | Status of continuous, 1bit | 1 bit | C | R | - | T | - | switch | Low |

1byte (Continuous)

Fig. 5.3.1.2-1 Communication object for "Heating actuator (without controller)".

| Serial number | Function | Communication Object | Type | Attribute | DPT |
|---|---|---|---|---|---|
| **120** | **Output X** | **On-off control value** | **1bit** | **CW** | **1.001 DPT_Switch** |
| This communication object is activated when "1bit (on-off control or PWM)" is selected for the parameter "Control telegram is received as". This communication object is used to receive 1bit control commands, "0" closes the valve, "1" opens the valve. | | | | | |
| **121** | **Output X** | **Status of contact** | **1bit** | **CRT** | **1.001 DPT_Switch** |
| This communication object is used if the parameter "Reply the status for contact" is selected as "Yes, 1=contact close ; 0=contact open" or "Yes, 0=contact close ; 1=contact open". This communication object directly indicates the current position of the relay contacts. | | | | | |
| **122** | **Output X** | **Status of continuous,1 bit** | **1bit** | **CRT** | **1.001 DPT_Switch** |
| The communication object is enabled if "Yes, 0%=0, otherwise "1" ( 1bit)" or "Yes, 0%=1, otherwise "0" ( 1bit)" is selected for the parameter "Report the status for continuous control". The communication object is activated when "Yes, 0%=0, otherwise "1" (1bit)" or "Yes, 0%=1, otherwise "0" (1bit)" is selected for the parameter "Report the status for continuous control". The communication object indicates the current operating status of the valve.<br>When "Yes, 0% =0, otherwise "1"( 1 bit)" is selected, a message of "0" indicates that the valve is closed, otherwise "1". "1" in all other cases;<br>When selecting "Yes, 0% =1, otherwise "0" ( 1 bit)", a message of "1" means that the valve is closed, and "0" in all other cases. "0" in all other cases. | | | | | |
| **125** | **Output X** | **Report fault** | | **CRT** | **1.005 DPT_Alarm** |
| This communication object is enabled if the monitoring function is enabled and the parameter "Send object "Report fault" is" is selected as "Enable". This communication object is used to indicate whether the room thermostat is faulty or not. A value of "1" indicates that the room thermostat enters the fault mode and a value of "0" exits the fault mode. | | | | | |
| **126** | **Output X** | **Forced output** | | **CW** | **1.003 DPT_Enable** |
| The communication object is enabled when the enforcement function is enabled. When the logic value "1" is received, the enforcement mode is activated and the device ignores all other actions except enforcement;<br>A logic value of "0" is received to end the forcing mode. The position of the valve during the forcing operation is defined by the parameter. After exiting the forced operation, the device returns to the previous control state. | | | | | |
| **130** | **Output X** | **Status of continuous,1 byte** | **1byte** | **CRT** | **5.001 DPT_Scaling** |
| This communication object is enabled when "Yes, continues control value (1byte )" is selected for the parameter "Report the status for continuous control". The communication object indicates the current operating status of the valve. The communication object the current operating status of the valve and provides information on the duty cycle setting of the pulse width control (PWM). | | | | | |
| **131** | **Output X** | **Control value (continuous)** | **1byte** | **CW** | **5.001 DPT_Scaling** |
| This communication object is enabled when "1byte (Continuous)" is selected for the parameter "Control telegram is received as" and receives control commands of 1 byte via this communication object. The communication object is enabled when "1byte (Continuous)" is selected for "1byte". The value range of the communication object is 0 ... 100%, if "0%" is received, the valve is closed, if "100%" is received, the valve is fully open. | | | | | |

Table 5.3.1.2-1 Communication object description for "Heating actuator (without controller)".

### 5.3.2 Curtain (AC/DC) Outputs

The communication objects for curtain AC and curtain DC outputs are basically similar, so the objects for curtain AC outputs are explained here as an example.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 120 | Curtain AC 1 | Move UP/DOWN | 1 bit | C | - | W | - | - | up/down | Low |
| 121 | Curtain AC 1 | Slat adj/stop | 1 bit | C | - | W | - | - | step | Low |
| 122 | Curtain AC 1 | Reference movement | 1 bit | C | - | W | - | - | up/down | Low |
| 123 | Curtain AC 1 | Move to position 0..100% | 1 byte | C | - | W | - | - | percentage (0..1... | Low |
| 124 | Curtain AC 1 | Slat position 0..100% | 1 byte | C | - | W | - | - | percentage (0..1... | Low |
| 125 | Curtain AC 1 | Scene | 1 byte | C | - | W | - | - | scene control | Low |
| 126 | Curtain AC 1 | Status Position 0..100% | 1 byte | C | R | - | T | - | percentage (0..1... | Low |
| 127 | Curtain AC 1 | Slat status 0..100% | 1 byte | C | R | - | T | - | percentage (0..1... | Low |
| 128 | Curtain AC 1 | Sun operation | 1 bit | C | - | W | - | - | switch | Low |
| 129 | Curtain AC 1 | Enable auto.control | 1 bit | C | - | W | - | - | enable | Low |
| 130 | Curtain AC 1 | Sun:blind position 0..100% | 1 byte | C | - | W | - | - | percentage (0..1... | Low |
| 131 | Curtain AC 1 | Sun:slat adj. 0...100% | 1 byte | C | - | W | - | - | percentage (0..1... | Low |
| 132 | Curtain AC 1 | Safety operation 1 | 1 bit | C | - | W | - | - | alarm | Low |
| 133 | Curtain AC 1 | Safety operation 2 | 1 bit | C | - | W | - | - | alarm | Low |
| 134 | Curtain AC 1 | Status of operation | 1 byte | C | R | - | T | - | percentage (0..1... | Low |
| 141 | Curtain AC 1 | Block | 1 bit | C | - | W | - | - | enable | Low |
| 142 | Curtain AC 1 | Forced operation 1 bit | 1 bit | C | R | W | T | U | enable | Low |

Fig. 5.3.2-1 Communication object for curtain (AC) outputs

| Serial number | Function | Communication Object | Type | Attribute | DPT |
|---|---|---|---|---|---|
| **120** | **Output X** | **Move UP/DOWN** | **1bit** | **CW** | **1.008 DPT_UpDown** |
| If the communication object receives the message "0", the blinds/curtains move up; if the object receives the message "1", the blinds/curtains move down.<br>Message '0' - blinds move up / curtains open<br>Message '1' - shutters move down / curtains close | | | | | |
| **121** | **Curtain X** | **Slat adj. / Stop** | **1bit** | **CW** | **1.007 DPT_Step** |
| | **Curtain X** | **Stop** | **1bit** | **CW** | **1.007 DPT_Step** |
| If the shutters are in mobile operation, operation stops when the communication object receives a "0" or "1" message Venetian Blind operation mode: If the shutters are not in operation and the communication object receives a "0" message, the shutters are adjusted upwards, if it receives a "1" message, they are adjusted downwards. If the message "0" is received, the blinds are adjusted upwards, and if the message "1" is received, the blinds are adjusted downwards.<br>Shutter operation mode: If the blinds are not in operation, the communication object will not perform any action if it receives any message.<br>Message '0' - stop/adjust blinds upwards.<br>Message '1' - stop/adjust louvres downwards.<br>When the louvres are adjusted to the limit position and then continue to be adjusted, the adjustment telegrams will be ignored. | | | | | |
| **122** | **Curtain X** | **Reference movement** | **1bit** | **CW** | **1.008 DPT_UpDown** |
| This object is enabled when the option "After reference movement, Position is" is not "disable". The object is used to make the blinds/curtains perform a reference movement to ensure that the blinds/curtains are positioned accurately. The object is used to make the blinds/curtains perform a reference movement to ensure that the blinds/curtains are positioned accurately. This is described in detail in the Parameters section.<br>Message '0' - the blinds/curtains are run to the top and then to the target position<br>Message '1' - the blinds/curtains are run to the bottom and then to the target position | | | | | |
| **123** | **Curtain X** | **Move to position 0 ... 100%** | **1byte** | **CW** | **5.001 DPT_Scaling** |

If the communication object receives a message value, the blinds/curtains are moved to the position corresponding to this value. In the "Venetian Blind" mode of operation, the position of the blinds does not change, i.e. after moving to the target position, the position of the blinds is adjusted to the previous position unless the communication object "Slat position 0 ... 100%" receives a telegram value according to which the position of the blinds is positioned accordingly. The position of the shutter is positioned accordingly, unless the communication object "Slat position 0 ... 100%" receives a message value.
Message '0% ' -- move to topmost position
... - middle position
telegram '100% ' -- move to the bottom

| 124 | Curtain X | Slat position 0 ... 100% | 1byte | CW | 5.001 DPT_Scaling |
|---|---|---|---|---|---|

The communication object is only visible in the "Venetian Blind" operating mode. If the communication object receives a message value, the shutter is positioned accordingly.
Message '0% ' - the shutter is fully open
... - intermediate position
Message '100%' - the shutter is completely closed

| 125 | Curtain X | Scene | 1byte | CW | 18.001 DPT_SceneControl |
|---|---|---|---|---|---|

Scenes can be called up or stored by sending an 8bit command via this communication object. The communication object is only enabled if the scene function is enabled. The following describes the meaning of the 8bit command in detail.
The following describes the meaning of the 8bit command in detail.
An 8bit instruction is (binary code): FXNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
F: "0" calls the scene; "1" stores the scene;
X: 0;
NNNNNNN: Scene number (0...63).

The parameter setting options are 1...64, in fact, the communication object "Scene" receives scene messages corresponding to 0...63. If the parameter setting is scene 1, the communication object "Scene" receives scene messages corresponding to 0...63. If scene 1 is set in the parameter, the communication object "Scene" receives a scene message with a value of 0, as follows:
Message value of the object Description
0 Call scene 1
1 Call Scene 2
... ...
63 Recall Scenario 64

128 Storage Scene 1
129 Storage Scenario 2
... ...
191 Storage scenarios 64

| 126 | Curtain X | Status Position 0..100% | 1byte | CRT | 5.001 DPT_Scaling |
|---|---|---|---|---|---|

This communication object is used to send the position of the blinds/curtains to the bus as soon as the blinds/curtains run to the target position.
Message '0%' -- topmost position
..... -- middle position
Message '100%' - bottom position

| 127 | Curtain X | Slat status 0..100% | 1byte | CRT | 5.001 DPT_Scaling |
|---|---|---|---|---|---|

This communication object is only visible in the "Venetian Blind" operating mode and is used to send the position of the louvres to the bus as soon as the louvres have reached the target position.
The position of the louvres is sent to the bus as soon as the shutter reaches the target position.
Message '0%' -- shutters fully open
..... -- intermediate position
telegram '100%' - shutters completely closed

| 128 | Curtain X | Sun operation | 1bit | CW | 1.001 DPT_Switch |
|---|---|---|---|---|---|

When this communication object receives a message "0" or "1", the shutter moves to the predefined position, see the description in the parameter chapter.

| 129 | Curtain X | Enable auto. control | 1bit | CW | 1.003 DPT_Enable |
|---|---|---|---|---|---|

This communication object is used to disable and enable automatic operation. "0" messages are received to disable automatic operation; "1" messages are received to enable automatic operation.
Message "0" - exits automatic operation.
Message "1" - enables automatic operation.

| | | | | | |
|---|---|---|---|---|---|
| **130** | **Curtain X** | **Sun:blind/shutter position 0 ... 100%** | **1byte** | **CW** | **5.001 DPT_Scaling** |

In automatic operation, the blinds/curtains are moved to the position corresponding to a telegram value received by the communication object. In the "Venetian Blind" mode of operation, the position of the blinds does not change unless the communication object "Sun:slat adj. 0 ... 100%" receives a telegram value according to which the position of the blinds is positioned accordingly. The position of the louvres is positioned accordingly.
Message "0%" - moved to the top
... - middle position
Message "100 per cent" - moves to the lowest position

| | | | | | |
|---|---|---|---|---|---|
| **131** | **Curtain X** | **Sun: slat adj. 0 ... 100%** | **1byte** | **CW** | **5.001 DPT_Scaling** |

In automatic operation, this communication object is only visible in the "Venetian Blind" operating mode. If the communication object receives a telegram value, the shutter is positioned accordingly.
Message "0%" - the shutter is fully open
... - intermediate position
Message "100 %" - the shutter is completely closed

| | | | | | |
|---|---|---|---|---|---|
| **132/133** | **Curtain X** | **Safety operation1/2** | **1bit** | **CW** | **1.005 DPT_Alarm** |

This communication object is used to receive messages from the sensor cycle (0 or 1, depending on the parameter setting).
If the value of the cancellation safety operation is "1", the monitoring cycle is reset when the object receives a message "1" from the sensor within the monitoring cycle, which means that no abnormality has occurred and the monitoring continues.
If the object does not receive this message during the monitoring cycle, the actuator assumes that the sensor is faulty, the monitoring cycle expires and a safe operation is performed immediately to move the shutter to a safe position.
Safety operation 2 has higher priority than safety operation 1.

| | | | | | |
|---|---|---|---|---|---|
| **134** | **Curtain X** | **Status of operation** | **1byte** | **CRT** | **No DPT** |

This object is used to send the current operation status of the blinds/curtains output, where only one operation can be activated at the same moment. This object sends a telegram when the operation is changed. The definition of the 8bit instruction is described in detail below:
Message "0" - normal operation
Message "1" - manual operation (pushbutton operation)
Message "2" - automatic operation (sun protection)
Message "3" - wind warning operation
Message "4" - rain warning operation
Message "5" - Frost warning operation
Message "6" - Safety operation 1
Message "7" - Safety operation 2
Message "8" - mandatory operation
Other values not used

| | | | | | |
|---|---|---|---|---|---|
| **141** | **Curtain X** | **Block** | **1bit** | **CW** | **1.003 DPT_Enable** |

This communication object is enabled after enabling the weather warning function of the curtain output, and is used to disable and enable the weather warning operation. Receiving message '0' enables the weather warning operation; receiving message '1' disables the weather warning operation.
Message '0' - Weather warning operation is available.
Message '1' - Weather Warning operation is disabled.

| | | | | | |
|---|---|---|---|---|---|
| **142** | **Curtain X** | **Forced operation 1/2 bit** | **1bit<br>2bit** | **CRWTU** | **1.003 DPT_Enable<br>2.002 DPT_BooleanControl** |

This communication object is enabled when the enforcement function is enabled.
At 1bit, when the value "1" is received, the enforcement mode is activated and the device ignores all other actions except enforcement; when the value "0" is received, the enforcement mode is terminated and the position of the curtains and blinds during the enforcement operation is set by the parameter.
In 2bit mode, the curtains and blinds are forced to open when the message value "3" is received; the curtains and blinds are forced to close when the message value "2" is received; the curtains and blinds are forced to close when the message value "1" or "0" is received; the curtains and blinds are forced to close when the message value "1" or "0" is received. When a message value of "1" or "0" is received, the enforcement mode is cancelled.

Table 5.3.2-1 Communication object description for curtain (AC) outputs

## 5.3.3 Fan control

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 120 | Fan 1 | Fan speed | 1 bit | C - W - - | switch | Low |
| 124 | Fan 1 | Status Fan ON/OFF | 1 bit | C R - T - | switch | Low |
| 129 | Fan 1 | Automatic function | 1 bit | C - W - - | enable | Low |
| 130 | Fan 1 | Status Automatic | 1 bit | C R - T - | enable | Low |
| 131 | Fan 1 | Forced operation | 1 bit | C - W - - | enable | Low |
| 132 | Fan 1 | Control value 1 | 1 byte | C - W - - | percentage (0..100%) | Low |
| 134 | Fan 1 | Switching control value 1/2 | 1 bit | C - W - - | switch | Low |
| 135 | Fan 1 | Control value fault | 1 bit | C R - T - | alarm | Low |
| 136 | Fan 1 | Control value 2 | 1 byte | C - W - - | percentage (0..100%) | Low |

Fig. 5.3.3-1 Fan Control_One level Communication Objects

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 120 | Fan 1 | Fan speed | 1 byte | C - W - - | fan stage (0..255) | Low |
| 121 | Fan 1 | Fan speed 1 | 1 bit | C - W - - | switch | Low |
| 122 | Fan 1 | Fan speed 2 | 1 bit | C - W - - | switch | Low |
| 123 | Fan 1 | Fan speed 3 | 1 bit | C - W - - | switch | Low |
| 124 | Fan 1 | Status Fan ON/OFF | 1 bit | C R - T - | switch | Low |
| 125 | Fan 1 | Status Fan speed | 1 byte | C R - T - | fan stage (0..255) | Low |
| 126 | Fan 1 | Status Fan speed 1 | 1 bit | C R - T - | switch | Low |
| 127 | Fan 1 | Status Fan speed 2 | 1 bit | C R - T - | switch | Low |
| 128 | Fan 1 | Status Fan speed 3 | 1 bit | C R - T - | switch | Low |
| 129 | Fan 1 | Automatic function | 1 bit | C - W - - | enable | Low |
| 130 | Fan 1 | Status Automatic | 1 bit | C R - T - | enable | Low |
| 131 | Fan 1 | Forced operation | 1 bit | C - W - - | enable | Low |
| 132 | Fan 1 | Control value 1 | 1 byte | C - W - - | percentage (0..100%) | Low |
| 134 | Fan 1 | Switching control value 1/2 | 1 bit | C - W - - | switch | Low |
| 135 | Fan 1 | Control value fault | 1 bit | C R - T - | alarm | Low |
| 136 | Fan 1 | Control value 2 | 1 byte | C - W - - | percentage (0..100%) | Low |

Fig. 5.3.3-2 Communication objects of Fan Control_Multi level

| Serial number | Function | Communication Object | Type | Attribute | DPT |
|---|---|---|---|---|---|
| **120** | **Fan X** | **Fan speed** | **1bit<br>1byte** | **C,W** | **1.001 DPT_Switch<br>5.001 DPT_Scaling** |
| For single-stage wind turbines, the object is of 1bit type and is used for switching the turbine on and off.<br>Message "0" - fan off<br>telegram "1" - fan on<br>For multi-stage fans, the object is of 1byte type and is used for switching on and off the fan's air speeds. Only one air speed is on at a time, and the start-up characteristics of the air speed need to be taken into account when switching on a new air speed. The value of the object corresponding to each air speed is defined by the parameter, the value of the telegram 1...255, 0 being the air volume. | | | | | |
| **121** | **Fan X** | **Fan speed 1** | **1bit** | **C,W** | **1.001 DPT_Switch** |
| This object is available for multistage wind turbines.<br>It is used to switch on the fan speed 1. If several ON messages are received by the communication objects for fan speeds 1 to 3 within a short period of time, the fan speed is switched on according to the last received message.<br>If one of the communication objects for fan speed 1 to 3 receives an OFF message, the fan is switched off.<br>Telegram "0" - the fan is switched off.<br>Message "1" - fan speed is switched on 1 | | | | | |

| 122 | Fan X | Fan speed 2 | 1Bit | C,W | 1.001 DPT_Switch |
|---|---|---|---|---|---|
| See Objects 121 | | | | | |
| 123 | Fan X | Fan speed 3 | 1Bit | C,W | 1.001 DPT_Switch |
| See Objects 121 | | | | | |
| 124 | Fan X | Status Fan ON/OFF | 1bit | C,R,T | 1.001 DPT_Switch |
| This object is used to send the on/off status of the fan to the bus. The fan is on as long as there is a wind speed.<br>Message "0" - the fan is not switched off<br>Message "1" - the fan is switched on | | | | | |
| 125 | Fan X | Status Fan speed | 1byte | C,R,T | 5.010 DPT_Counter pulses |
| This object is available with multistage wind turbines.<br>It is used to send the currently running fan speed to the bus. The value of the message for each wind speed level is specified in the parameter "Status value for Fan speed 1/2/3 [ 1...255]", message "0": wind organ. | | | | | |
| 126 | Fan X | Status Fan speed 1 | 1bit | C,R,T | 1.001 DPT_Switch |
| This object is available for multistage wind turbines.<br>It is used to send the operational status of wind speed 1 to the bus.<br>Message "0" - wind speed 1 is switched off<br>Message "1" - wind speed 1 is switched on. | | | | | |
| 127 | Fan X | Status Fan speed 2 | 1bit | C,R,T | 1.001 DPT_Switch |
| See Object 126 | | | | | |
| 128 | Fan X | Status Fan speed 3 | 1bit | C,R,T | 1.001 DPT_Switch |
| See Object 126 | | | | | |
| 129 | Fan X | Automatic function | 1bit | C,W | 1.003 DPT_Enable |
| This object is used to activate automatic operation.<br>Whether the automatic operation is activated after bus reset or programming is determined by a parameter. The automatic operation can be deactivated by a normal operation.<br>In automatic operation, for multistage wind speeds, if forced operation is activated, the automatic operation is still active, but the state of the turbine allowed to run is determined by the forced operation, following the wind speeds allowed to run under forced operation. For single stage wind speeds, activation of the forcing operation excludes the automatic operation.<br>Parameter option "0=Auto/ 1=Cancel":<br>Message "0" - activation of automatic operation.<br>Message "1" - to switch off automatic operation.<br>Parameter option "1=Auto/0=Cancel":<br>Message "0" - withdrawal from automatic operation.<br>Message "1" - activates the automatic operation.<br>Normal operations are those triggered by the following objects<br>Object 120: Fan X - Fan speed<br>Objects 121-123: Fan X - Fan speed x (x= 1,2,3,) | | | | | |
| 130 | Fan X | Status Automatic | 1bit | C,R,T | 1.003 DPT_Enable |
| This object is used to send the status of the automatic operation to the bus.<br>Message "0" - automation is not active<br>Message "1" - automation activated | | | | | |
| 131 | Fan X | Forced Operation | 1bit | C,W | 1.003 DPT_Enable |
| This object is used to activate forced operation. When forced operation is activated, the wind speed at which the fan can run is set by the parameter "Limitation on forced operation". Parameter option "0=Force/ 1=Cancel":<br>Message "0" - activation of forced operation.<br>Message "1" - cancellation of the forced operation.<br>Parameter option "1=Force/0=Cancel":<br>Message "1" - activates the forced operation.<br>Message "0" - force is cancelled. | | | | | |

| 132/ 136 | Fan X | Control value 1/ Control value 2 | 1byte | C,W | 5.001 DPT_Scaling |
|---|---|---|---|---|---|
| In automatic operation, the Control value is visible when the control value for wind speed is set to 1, and Control value1/2 is visible when the control value is set to 2.<br>These three objects are used to receive the control value from the bus and the fan output will output the air speed according to the threshold range where the control value is located. | | | | | |
| 134 | Fan X | Switching control value 1/2 | 1bit | C,W | 1.001 DPT_Switch |
| This object is visible when 2 control values are set for the wind speed and is used to select the control value.<br>Message "0" - Control value 1 (control value 1)<br>Message "1" - Control value 2 (Control value 2) | | | | | |
| 135 | Fan X | Control value fault | 1bit | C,R,T | 1.005 DPT_Alarm |
| This object reports a control value error when the device does not receive a control value from the external controller during the monitoring time. As soon as the control value is received, the error status is cancelled.<br>Message "0" - no error<br>Message "1" - an error has occurred | | | | | |

Table 5.3.3-1 Description of fan control communication objects

## 5.3.4 Valve control

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 120 | 4-pipe Valve 1 | Heat/Cool mode status | 1 bit | C | R - T - | cooling/heating | Low |
| 121 | 4-pipe Valve 1 | Control value fault | 1 bit | C | R - T - | alarm | Low |
| 122 | 4-pipe Valve 1 | Disable, Heat | 1 bit | C | - W - - | enable | Low |
| 123 | 4-pipe Valve 1 | Control value, Heat | 1 bit | C | - W - - | switch | Low |
| 124 | 4-pipe Valve 1 | Valve status, Heat | 1 bit | C | R - T - | switch | Low |
| 125 | 4-pipe Valve 1 | Trigger valve purge, Heat | 1 bit | C | - W - - | enable | Low |
| 126 | 4-pipe Valve 1 | Valve purge status, Heat | 1 bit | C | R - T - | enable | Low |
| 127 | 4-pipe Valve 1 | Disable, Cool | 1 bit | C | - W - - | enable | Low |
| 128 | 4-pipe Valve 1 | Control value, Cool | 1 bit | C | - W - - | switch | Low |
| 129 | 4-pipe Valve 1 | Valve status, Cool | 1 bit | C | R - T - | switch | Low |
| 130 | 4-pipe Valve 1 | Trigger valve purge, Cool | 1 bit | C | - W - - | enable | Low |
| 131 | 4-pipe Valve 1 | Valve purge status, Cool | 1 bit | C | R - T - | enable | Low |

Fig. 5.3.4-1 Communication objects for valve control

| Serial number | Function | Communication Object | Type | Attribute | DPT |
|---|---|---|---|---|---|
| 120 | 4-pipe Valve X | Heat/Cool mode status | 1bit | CRT | 1.100 DPT_Heat/Cool |
| This object is used to give feedback on the current heating/cooling status of the valve output, which is sent to the bus when changed.<br>Message "0" - cooling<br>Message "1" - heating | | | | | |
| 121 | 4-pipe Valve X | Control value fault | 1bit | CRT | 1.005 DPT_Alarm |
| This object reports a control value error when the device cannot receive a control value from the external controller within the monitoring time. Once the control value has been received, the error status is lifted.<br>Message "0" - no error<br>Message "1" - an error has occurred | | | | | |
| 122/ 127 | 4-pipe Valve X | Disable, Heat/Cool | 1bit | CW | 1.003 DPT_Enable |
| With this communication object, the heating/cooling valve can be disabled or enabled. When disabled, the valve position is immediately set back to 0% (closed) and when enabled again, the valve action is controlled according to the current control value. | | | | | |
| 123/ 128 | 4-pipe Valve X | Control value, Heat/Cool | 1byte<br>1bit | CW | 5.001 DPT_Scaling<br>1.001 DPT_Switch |

| | | | | | |
|---|---|---|---|---|---|
| This communication object is used to receive valve control values from other controllers.<br>With 2-pipe systems, the heating and cooling valves share one object (318) to receive the valve control value.<br>This control value can be 1bit or 1byte depending on the valve control mode type. | | | | | |
| **124/<br>129** | **4-pipe Valve X** | **Valve status, Heat/Cool** | **1byte<br>1bit** | **CRT** | **5.001 DPT_Scaling<br>1.001 DPT_Switch** |
| This object is used to indicate the switching or positional status of the valve. The object type is determined by the parameter setting. | | | | | |
| **125/<br>130** | **4-pipe Valve X** | **Trigger valve purge, Heat/Cool** | **1bit** | **CW** | **1.003 DPT_Enable** |
| This communication object is used to trigger the cleaning function of the valve, which is fully opened during cleaning.<br>Telegram "0" - end of cleaning<br>Message "1" - triggers the cleaning. | | | | | |
| **126/<br>131** | **4-pipe Valve X** | **Valve purge status, Heat/Cool** | **1bit** | **CRT** | **1.003 DPT_Enable** |
| This communication object is used to indicate the cleaning status of the valve. As soon as the cleaning function is activated, its status is indicated.<br>Message "0" - Purging function not activated<br>Message "1" - Purging function active | | | | | |

Table 5.3.4-1 Description of valve control communication object