optimus solutions

Product Manual

Room Controller

OPT-RCxxyy-111

OPT-RC44-111 (4 Input + 4 Output)

OPT-RC88-111 (8 Input + 8 Output)

OPT-RC1212-111 (12 Input + 12 Output)

OPT-RC1416-111 (14 Input + 16 Output)

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About This Document

This document provides detailed technical information on the function, installation, and programming of the OPT-RCxxyy-111 device.

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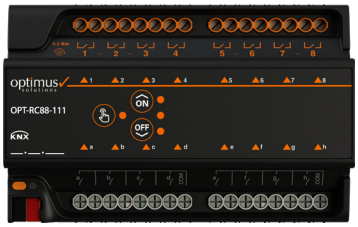
1 Product Description

OPT-RCxxyy-111 is an intelligent KNX room control device that combines multiple input and output channels in a compact housing designed for DIN-rail mounting. Its relay outputs use latching-contact technology to ensure high operational reliability, while its dry-contact inputs allow signal acquisition from wall switches and sensors. Integrated LED indicators and manual control buttons facilitate fast commissioning and maintenance.

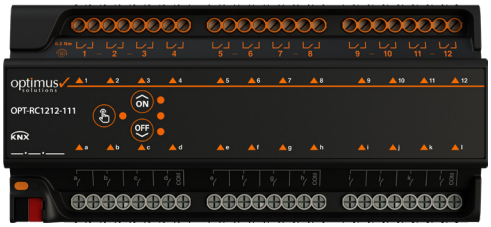
The device is optimized for controlling lighting, shutters/blinds, HVAC systems, and various auxiliary electrical loads. It can be fully configured via ETS with complete KNX compatibility, and—thanks to its ability to internally link inputs and outputs—it can also continue operating without KNX bus voltage when powered by an external 24…30 V DC supply. It offers a flexible, reliable, and multifunctional control solution ideal for meeting rooms, hotel rooms, and compact living spaces.

1.1 Product Models

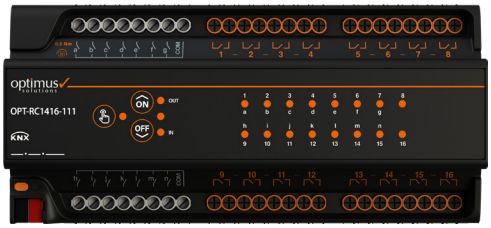
OPT-RC44-111
4 Input
4 Output



OPT-RC88-111
8 Input
8 Output



OPT-RC1212-111
12 Input
12 Output



OPT-RC1416-111
14 Input
16 Output

1.2 Mounting and Installation

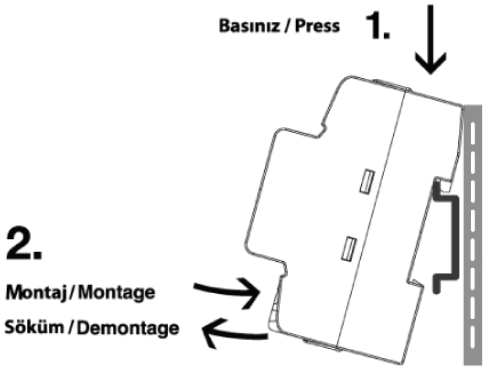
The device must be installed only in an electrical panel, and only by personnel qualified in electrical installations and KNX automation systems.

Notes for authorized personnel: The device is installed inside an electrical panel. Phase connections must be made according to the markings indicated on the device. All electrical safety precautions must be followed during wiring. Considering the product's IP protection class, it must not be used in humid or dusty environments.

Mounting on a 35 mm DIN rail is performed as follows:

After hooking the upper part of the device onto the rail, press the lower part toward the rail; once you hear a click, the device is seated correctly.

To remove the device from the rail, first push the lower part downward and pull it toward you to release it. Once the lower section is detached, lift the device upward to remove it from the hook.



Before starting any electrical or data line connections, ensure that the mains supply is switched off and all necessary safety precautions have been taken. Comply with the electrical installation standards and regulations of the country in which the device is being installed. After performing a short-circuit check for both the mains voltage and the KNX line, make the connections as shown in the diagram.

Once power is applied, check the status indicators. When powered from the KNX line, the device completes its startup sequence and becomes ready for operation. Connection methods may vary by device model.

1.3 Technical Specifications

Supply Voltage	KNX 30 VDC	
KNX Current Consumption	Max 10mA	
KNX mode	S-Mode	
Connection	KNX Connection Terminal	
Protection Class	IP20	
Mounting	DIN Rail	
Input Type	Dry Contact, Grey Terminals	
Output Type	Bistable (Latching) Relay, Orange Terminals	
Temperature Range	Operating -5...+45°C / Storage -25...+55°C	
Output Load Characteristics	16 A @ 250 VAC, Inrush: max. 165 A / 20 ms, LED / Electronic Ballast: max. 492 A / 1.5 ms, cos⌀ = 0.6, Capacitive: max. 140 µF @ 250 VAC	
Dimensions and Weight RC44 RC88 RC1212 RC1416	(WxHxD) 90 x 92 x 64 mm (5MW) 144 x 92 x 64 mm (8MW) 198 x 92 x 64 mm (11MW) 144 x 92 x 64 mm (11MW)	Net – Gross 230g -261g 382g – 424g 531g – 581g 531g – 581g
Housing	ABS V0	
Terminals	Screw, max. 0.6 Nm, 4 mm^2 / 6 mm^2	
Certificate	CE	

2 Manual Operation

Manual symbol and status indicator.
Long press: Enter manual mode/exit manual mode
Short press: Switch the selected channel while in manual mode

When not in manual mode, long press: Switch to output operation
When in manual mode: On, Up, or Increase command

When not in manual mode, long press: Switch to input operation
When in manual mode: Off, Down, or Decrease command

Channel Selection Indicators
If the LED is flashing, it indicates the channel(s) selected in manual mode.

Channel Status Indicators:

Upper LED: Indicates that the channel is ON, Open, or operating at the third fan speed.
Middle LED: Indicates that the channel is operating at the second fan speed.
Middle LED (flashing): Indicates that the corresponding channel is inactive.
Lower LED: Indicates that the channel is OFF, Closed, or operating at the first fan speed.
If all LEDs are off: The Fan Coil is in the OFF state.

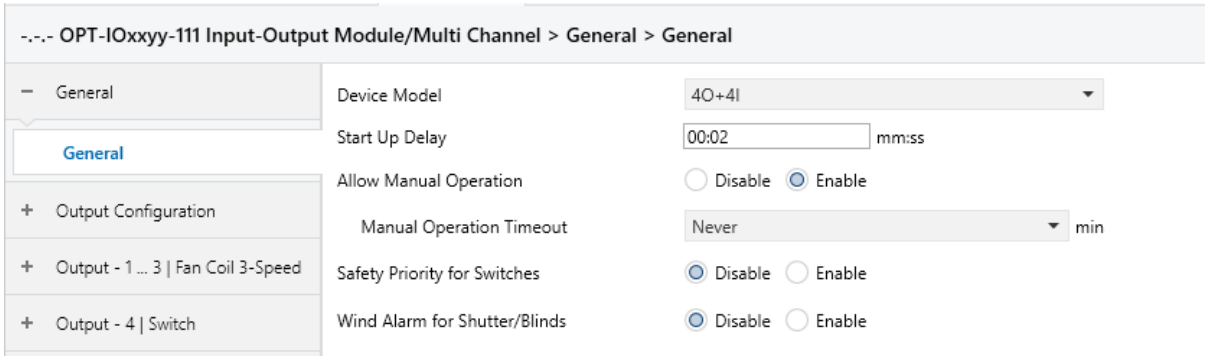
OPT-RC1416-111 Membrane Details: The membrane layout and indicator structure of the OPT-RC1416-111 model differ from those of the other models. The membrane arrangement and functions specific to this model are explained separately below.

In this module, the LED indicators correspond to the outputs by default. To switch to the input indicators, the "OFF" button must be pressed and held for 1 second. To switch the indicators back to the outputs, the "ON" button must be pressed and held for 1 second. When the device is switched to manual mode, the functions belonging to the currently selected indicator group can be controlled manually.

The indicators show the output states when the OUT LED is active, and the input states when the IN LED is active.

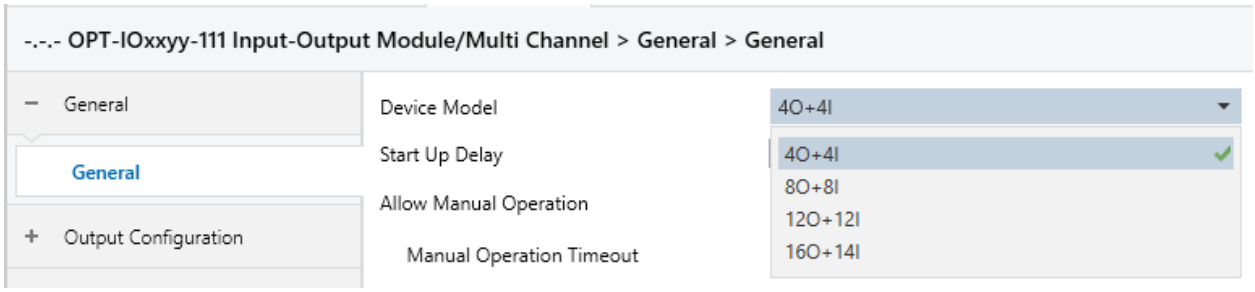
3 Device Parameters

3.1 General Parameters



Before commissioning, the correct number of channels must be selected based on the device model being configured. Selecting a different model during commissioning may lead to configuration errors and operational issues.

3.1.1 Device Model



After the device model has been correctly selected, configuration of the remaining parameters can proceed.

3.1.2 Start Up Delay

This parameter sets the delay before the device begins startup procedures after power is applied.
It is used to distribute simultaneous startup requests across devices in the system. The adjustable range is between 2 seconds and 4 minutes 15 seconds.

3.1.3 Allow Manual Operation

This parameter enables or disables the manual operation feature described in Section 3. The available options are “Active” or “Inactive.” The default value is “Active.”

3.1.3.1 Manual Operation Timeout

This list defines the duration for which manual operation is permitted. The available options are: Never, 5 minutes, 60 minutes, and 240 minutes. When a duration is selected, the device automatically exits manual mode once the defined timeout expires.

3.1.4 Safety Priority Object for Switches

This object is used to determine the state of the output contacts based on information received from a safety communication object. The Safety Priority Communication Object (Object No. 4) can be shown or hidden. Additionally, the visibility of the "Safety Priority" setting within the Switch function depends on whether this option is enabled.

3.1.5 Wind Alarm for Shutter/Blinds

This object determines the positions of the shutter/blinds outputs based on information received from the Wind Alarm object. The Wind Alarm Communication Object (Object No. 5) can be made visible or hidden. The visibility of the "Wind Alarm Status" option within the Shutter/Blinds function settings depends on whether this parameter is enabled.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
1	General	Manual Operation Status	Output	1 bit	1.011 state	C	R	-	T
2	General	Stop Manual Operation	Input	1 bit	1.001 switch	C	-	W	-
3	General	Request Status Values	Input	1 bit	1.001 switch	C	-	W	-
4	General	Safety Priority	Input	1 bit	1.005 alarm	C	-	W	-
5	General	Wind Alarm	Input	1 bit	1.005 alarm	C	-	W	-

Table 1: General Communication Object

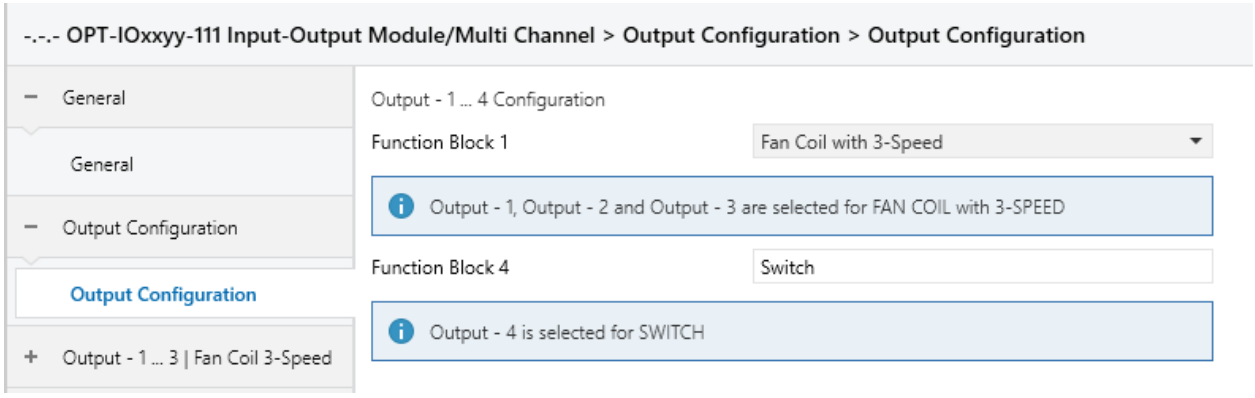
- **Manual Operation Status:** A 1-bit information object that indicates whether the device has entered or exited manual mode.
- **Stop Manual Operation:** When the value "1" is sent to this object, the device exits manual mode. Any other command(s) are ignored.
- **Request Status Values:** When triggered by a 1-bit request from a central control or visualization system, the device transmits all current status information through the corresponding status objects.
- **Safety Priority for Switches:** Explained in the relevant section above.
- **Wind Alarm for Shutter/Blinds:** Explained in the relevant section above.

3.2 Channel Configuration

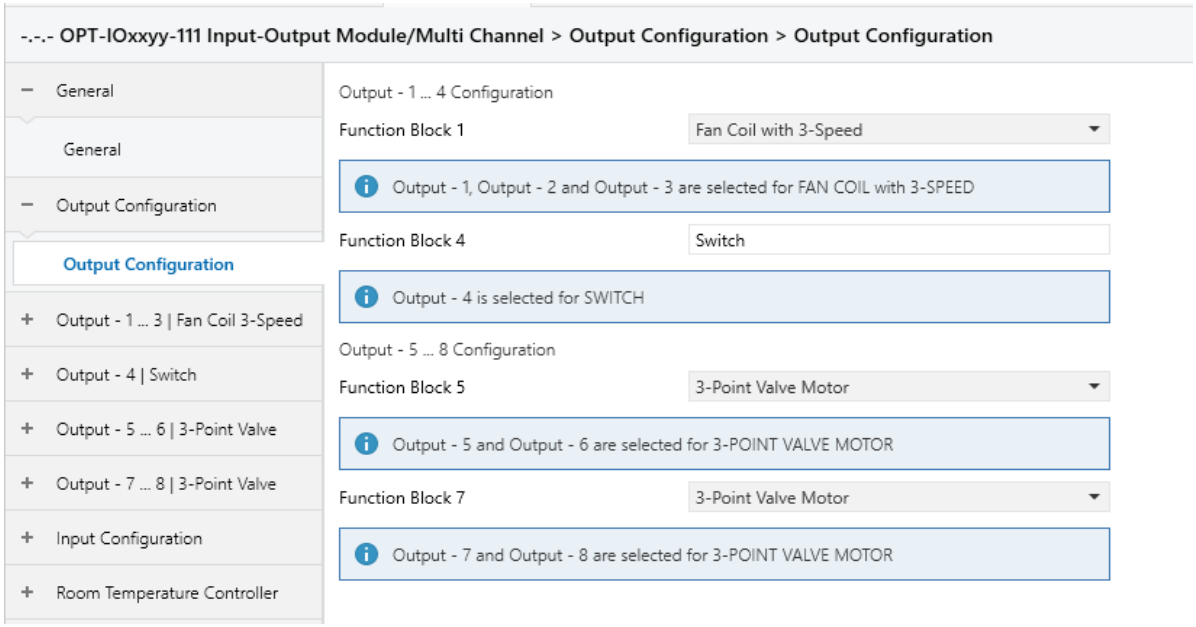
The second and final section of the General Settings tab is Channel Configuration.

In this section, the function type to be used for each channel is selected, and if necessary, individual assignments can be made separately for every group of four channels.

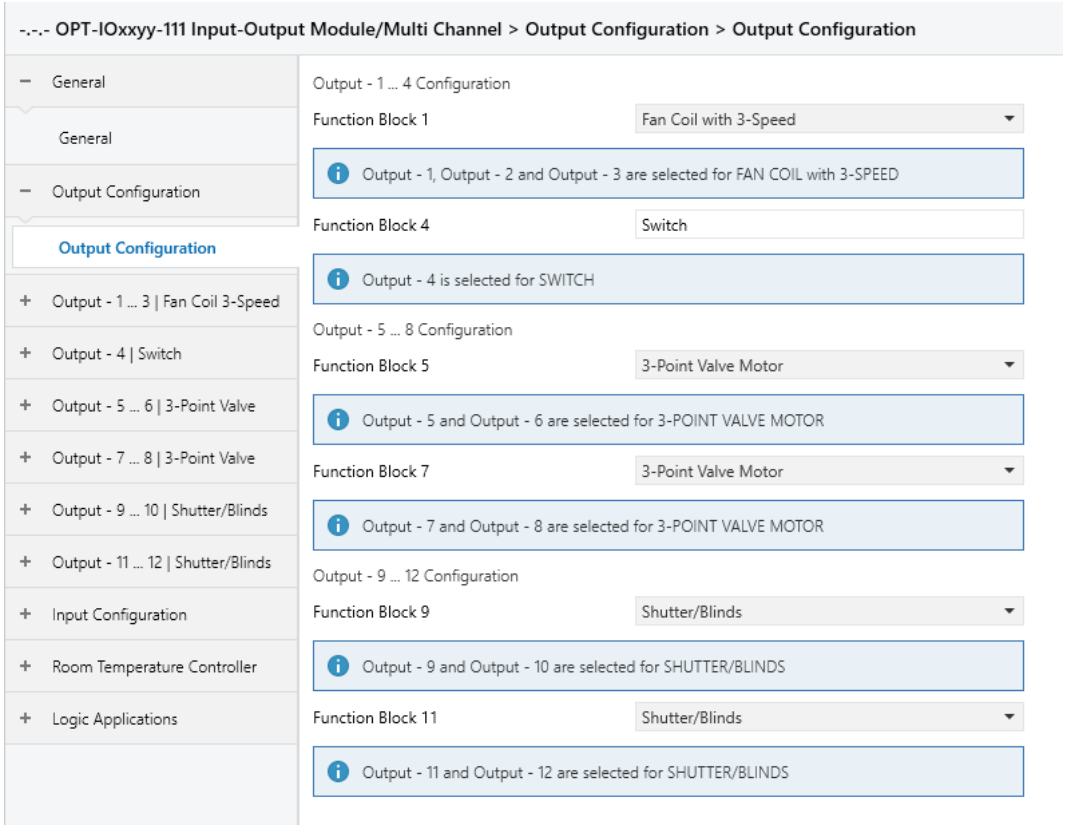
Configuration area for the 4I+4O model:



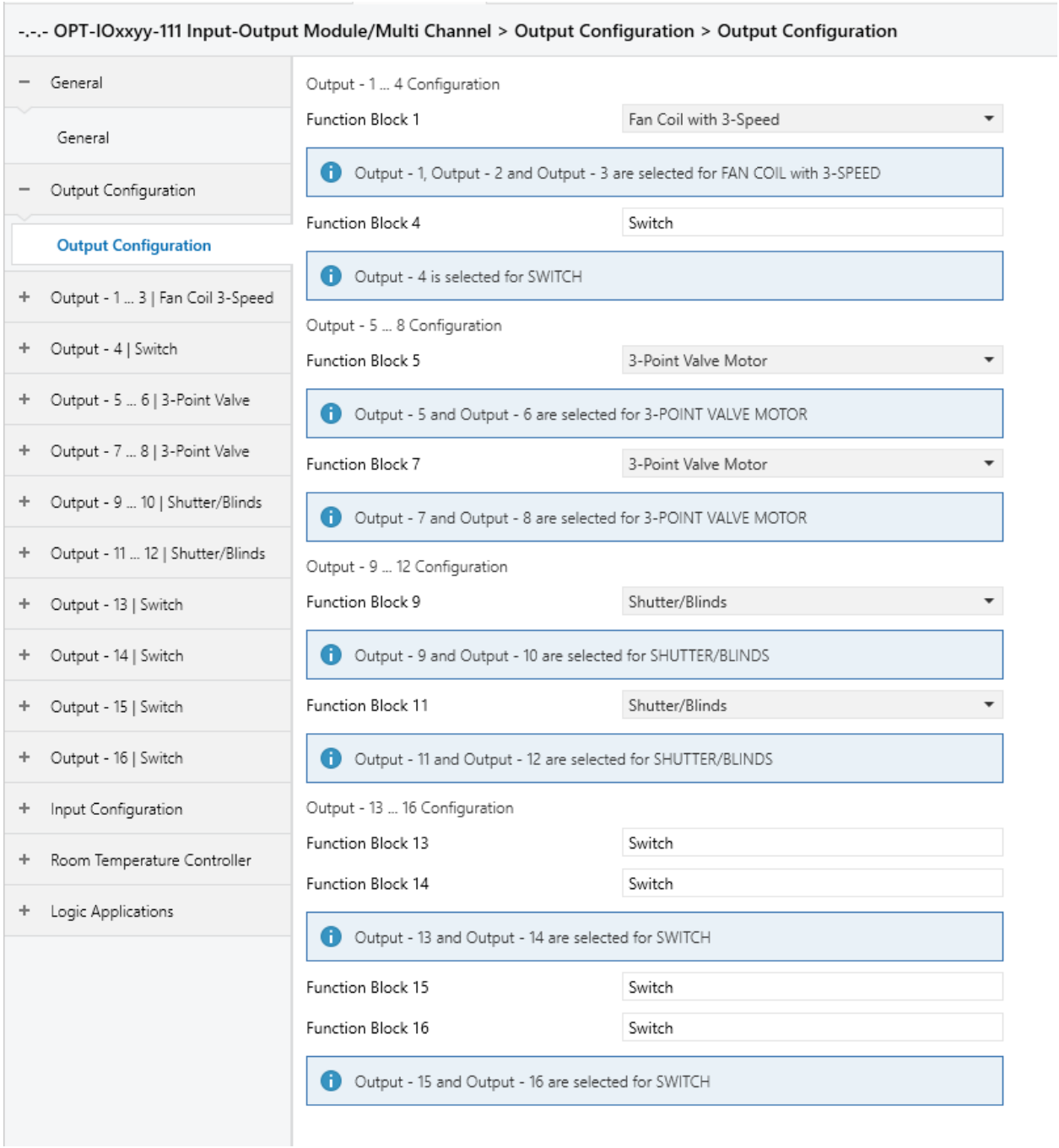
Configuration area for the 8I+8O model:



Configuration area for the 12I+12O model:



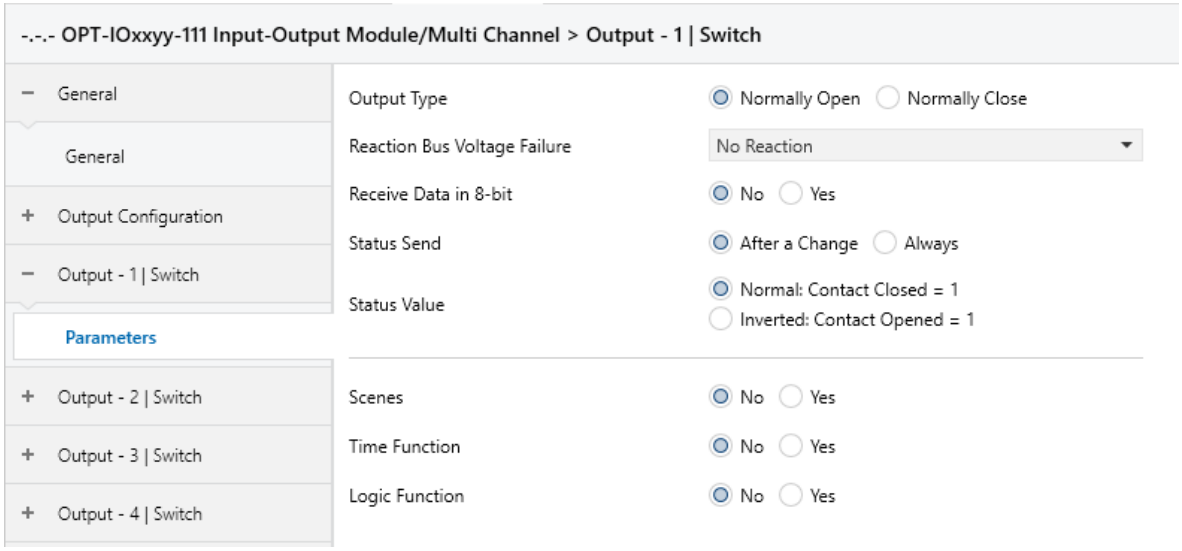
Configuration area for the 14I+16O model:



4 Device Function

4.1 Switch Parameters

This function controls the output by switching it between an open-circuit and a short-circuit state based on the received command. The parameters are explained below:



4.1.1 Output Type

This field defines the basic operating characteristic of the output contact. The default value is Normally Open. In this mode, when an ON command is received, the contact closes (short circuit); when an OFF command is received, it opens (open circuit). In the Normally Closed option, this behavior is reversed.

The status information is fixed: the contact outputs value 1 when short-circuited and value 0 when open. The device's status indicator also reflects the actual contact state (1 for short, 0 for open).

4.1.2 Reaction Bus Voltage Failure

The device can change the output state if the KNX bus voltage is lost. This parameter defines the position after such a failure. Options: Current Position, Open Contact, and Closed Contact. The default value is Current Position. For installations where long-term power loss may occur, the Open Contact option may be preferred.

4.1.3 Reaction at Safety Priority

This setting defines how the device responds to commands received via communication object number 6. Available options: **Current Position, Open Contact,** and **Closed Contact**. The default value is **Current Position**. When another option is selected, the "Reaction End of Safety Priority" parameter becomes visible and must be configured to match the option chosen.

4.1.4 Reaction End of Safety Priority

This section defines how the channel should behave when the device receives a value of 0 from communication object number 6 after the end of a safety alarm. Options: Current Position, Open Contact, Closed Contact, and Return to Previous Position.

4.1.5 Receive Data in 8-Bit

This setting is used when the contact must be controlled not only by 1-bit values but also by 1-byte values. It is typically preferred in heating/cooling valve control applications that use thermostats to send 1-byte values. When enabled by selecting "Yes," a threshold value can be defined in the field that appears. If the value from the threshold input is equal to or greater than the defined threshold, the output becomes active; otherwise, it becomes inactive. Thermal or solenoid valves used in fan coil applications are also controlled using this method.

4.1.6 Threshold (Included)

When the information received from the threshold input is equal to or greater than the defined value, the output becomes active for normally open contacts. For normally closed contacts, the output becomes inactive. If the received value is below the threshold, the output becomes inactive for normally closed contacts and active for normally open contacts. This structure is typical for connecting thermal or solenoid valves in fan coil applications.

4.1.7 Status Send

The device can transmit its current state through the Contact Status communication object. This parameter defines whether the status should be sent only when the contact state changes or every time a command is received.

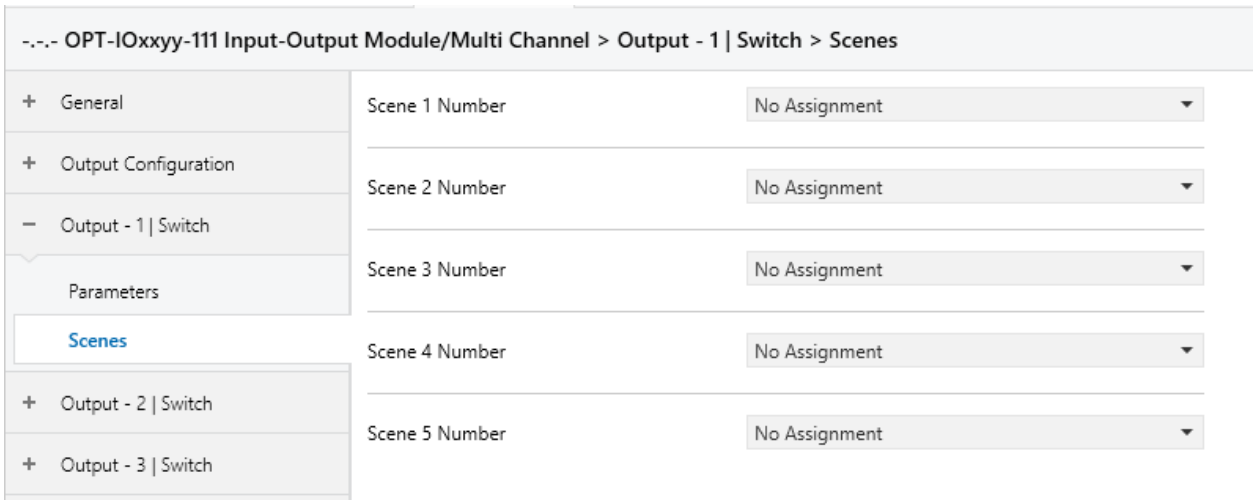
4.1.8 Status Value

This parameter is used to invert the output status information.

When "Normal" is selected, the device outputs 1 when the contact is closed and 0 when it is open. When "Inverted" is selected, the device outputs 1 when the contact is open and 0 when it is closed.

4.1.9 Scenes

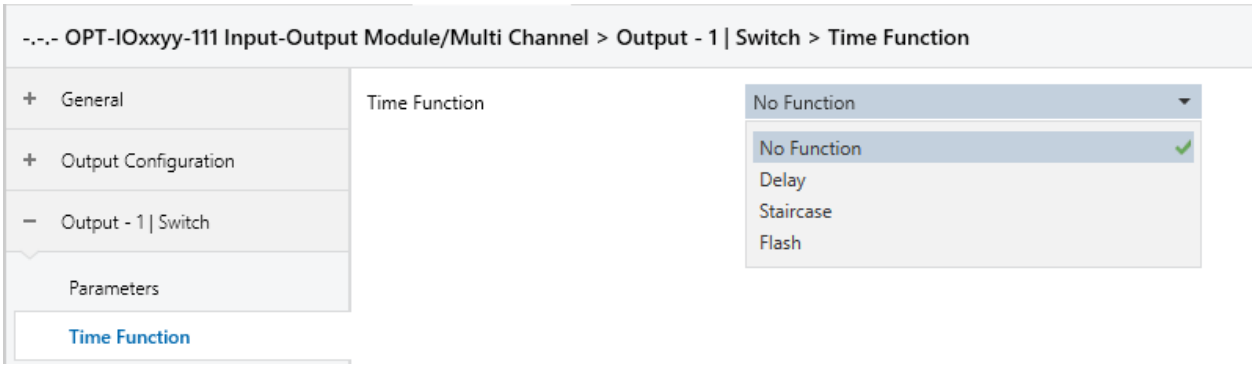
This setting is used to define the contact position according to 1-byte scene commands. When enabled by selecting "Yes," a new tab called "Scenes" appears under Contact Parameters in the middle section. The following screen is displayed:



Up to 5 scene entries can be defined for each contact. In the "Scene Number" field, the value expected from the Contact Scene communication object is selected; in the "Scene Position" field, the position the contact should take for that scene is defined.

4.1.10 Time Function

This setting is used when the contact must perform time-based operations. If the feature is to be used, "Yes" must be selected. When enabled, a tab named "Time Function" appears under Contact Parameters in the middle section. The following screen is displayed:



The default value is "No Function." The other options are explained below.

To disable the time functions and manually activate the contact, a 1-bit ON command can be sent to the "Permanent" communication object. When an OFF command is sent from this object, the time functions resume operation with the next command.

4.1.10.1 Delay

This parameter is used when the device must wait before processing an On or Off command. A value can be set for ON Command Delay or OFF Command Delay within the range of 0 to 1 hour 48 minutes 20 seconds. If a command in the opposite direction is received before the delay expires, the delay timer for the newly received command begins.

4.1.10.2 Staircase

When enabled, the contact automatically switches to OFF after a defined period following an ON command. This duration, called "Lighting Time," can be set between 1 second and 1 hour 48 minutes 20 seconds.

4.1.10.3 Flash

This function allows the contact output to remain active (ON) for a defined period and inactive (OFF) for another period, repeating this cycle continuously. It is typically used in warning lights or audible alert applications.

4.1.10.3.1 Total Flashing Time

This parameter defines the total operating time of the flash function. During the defined period, the output flashes according to the configured flash cycle, and at the end of the period, the output is switched to OFF. The selectable range is between 2 seconds and 1 hour 48 minutes 20 seconds

4.1.11 Logic Function

This parameter allows the contact input to perform logic-based operations. If this feature is to be used, "Yes" must be selected. When enabled, a tab named "Logic Function" appears under Contact Parameters in the middle section.

When this tab is opened, the following screen is displayed:

The default value is "No Logic." The other options are described below.

Depending on the selected logic type (AND, OR, Toggle), the device automatically creates the corresponding 1-bit group object. Logic operations are performed using this group object.

4.1.11.1 Logic (AND)

The AND gate determines the output value by taking the logical multiplication of the inputs. The initial value of "Logic Input" is always 0 and is not stored after a power cycle.

Switch Object	Logic Object	Output
1	1	1
1	0	0
0	1	0
0	0	0

With every new input value, the output is recalculated, and the relay position is updated accordingly.

4.1.11.2 Logic (OR)

The OR gate determines the output value according to the logical sum of the inputs.The initial value of "Logic Input" is always 0 and is not retained after a power interruption.

Switch Object	Logic Object	Output
1	1	1
1	0	1
0	1	1
0	0	0

Each incoming input value triggers a recalculation of the output value.

4.1.11.3 Logic (TOGGLE)

A 1-bit value of 1 or 0 received by the Toggle object inverts the current state of the output.

Switch Object	Logic Object	Output
not considered	1	0->1
not considered	0	0->1
not considered	1	1->0
not considered	0	1->0

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
10-160	Output-x|Switch	Switch	Input	1 bit	1.001 switch	C	-	W	-
11-161	Output-x|Switch	Status	output	1 bit	1.001 switch	C	R	-	T
12-162	Output-x|Switch	Threshold Input	Input	1 byte	5.001 percentage	C	-	W	-
13-163	Output-x|Switch	Delay Lighting Permanent ON	Input	1 bit	1.001 switch	C	-	W	-
14-164	Output-x|Switch	AND Input	Input	1 bit	1.001 switch	C	-	W	-
15-165	Output-x|Switch	Scene	Input	1 byte	17.001 scene number	C	-	W	-

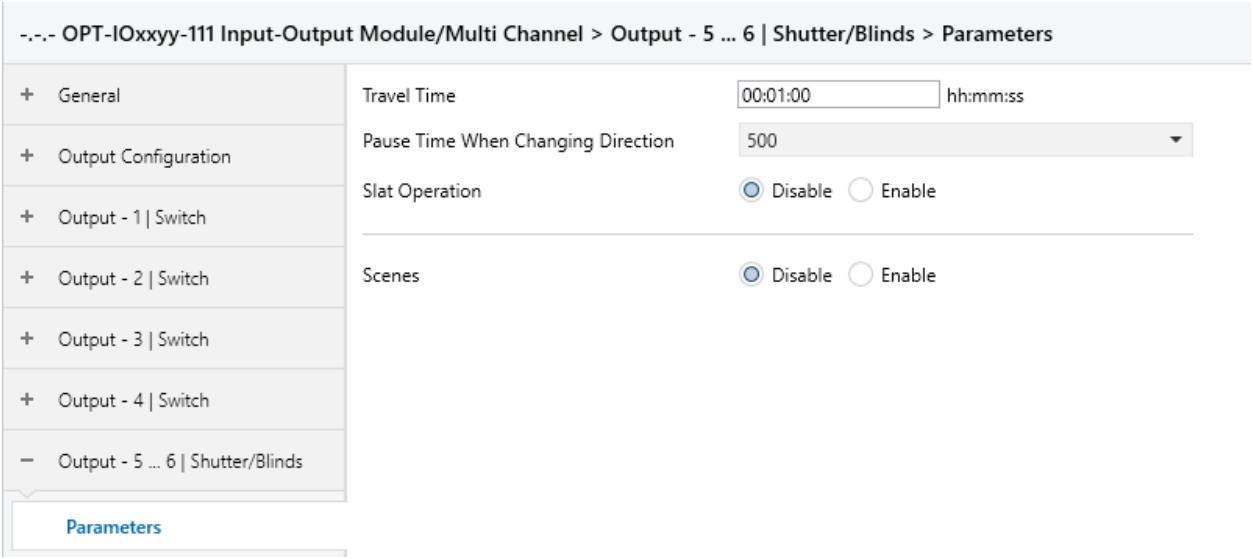
Table 2: Switch Communication Objects

- **Switch:** Sending a 1-bit value to this object switches the output contact to open-circuit or short-circuit position.
- **Switch Status:** This object reports the current position of the contact as a 1-bit value.
- **Threshold Input:** Sending a 1-byte value to this object determines whether the contact becomes open-circuit or short-circuit.
- **Permanent On:** This object is used on channels where the time function is active. When "1" is sent to the object on normally open contacts, or "0" on normally closed contacts, the output remains short-circuited independently of the time function. When other values are sent, the channel returns to its normal behavior.
- **Logic AND Input; Logic OR Input; Logic Toggle Input:** These objects are used together with the Contact object to change the output logically based on received 1-bit values.
- **Scene:** When a 1-byte scene number is sent to this object, the channel switches to the scene position defined in its corresponding scene parameters.

4.2 Shutter/Blinds

Shutters or blinds are controlled using two contacts. It is important to ensure that only one output is allowed to be active at any given time. The device guarantees this safety through software. Because shutters use two contacts, the odd-numbered contacts on the upper row must be connected for the opening direction. In contrast, the even-numbered contacts on the lower row must be connected for the closing direction.

The Shutter/Blind parameters are as follows:



4.2.1 Travel Time

This field defines the time, in seconds, required for the shutter or blind to move from fully closed to open fully. It can be set between 1 second and 1 hour 48 minutes 20 seconds. The default value is 60 seconds. This information is used for two purposes:

1. For requesting and tracking the shutter position as a percentage (%0: fully open, 100%: fully closed),

2. To deactivate the output contacts at the end of the defined movement time (+10% additional duration), ensuring energy saving and protecting the relay contacts.

4.2.2 Pause Time When Changing Direction

This parameter prevents both outputs from becoming active simultaneously during a direction change. It defines a safe waiting time between Up and Down commands. This prevents possible short circuits and mechanical stress on the motor during direction reversal. The waiting time can be adjusted between 250 ms and 5500 ms.

4.2.3 Slat Operation

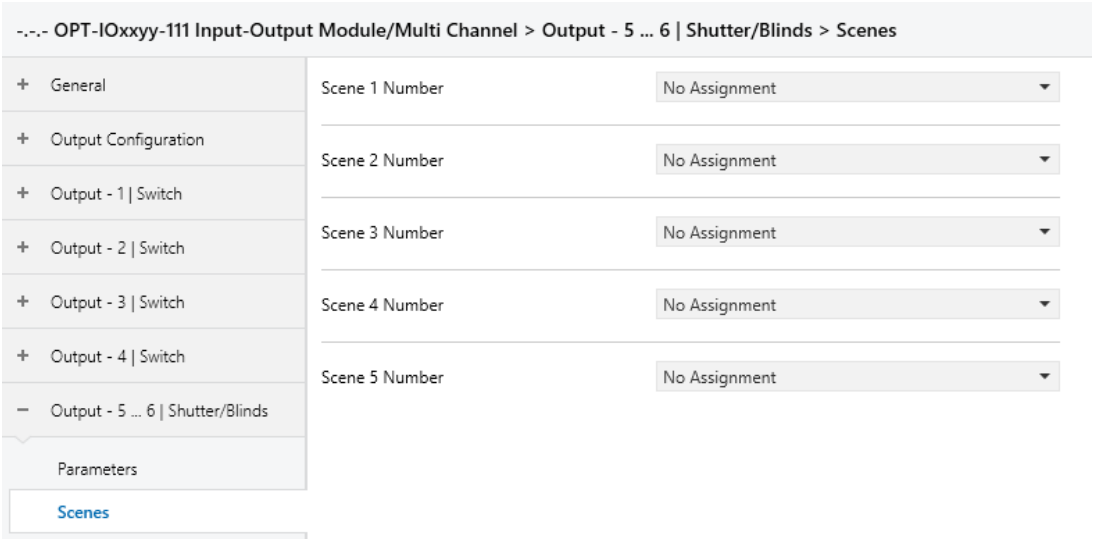
This parameter applies to blinds with adjustable slats. Such devices allow not only height adjustment but also slat-angle adjustment. When the Slat Operation is set to "Active," the additional parameter "Slat Step Time" becomes visible. From this list, the step time used for adjusting the slats is selected. The device remains active for this duration according to the command received from the Stop/Step object, allowing the slat angle to be adjusted.

4.2.3.1 Slat Step Time

This parameter defines the slat adjustment step duration, selected from the list. Based on the command received by the Stop/Step object, the device remains active for the defined time, enabling adjustment of the slat angle.

4.2.4 Scenes

This parameter is used to define the position that the shutter/blind will take according to 1-byte Scene commands. When the "Scenes" option is set to "Yes," a tab named "Scenes" appears under the Shutter/Blind Parameters in the middle section. When this tab is opened, the corresponding screen is displayed.



Up to 5 scenes can be defined for each shutter module. In the "Scene Number" field, the scene number expected from the "Shutter Scene" communication object is selected. In the "Scene State" field, the position that the shutter should take in that scene is defined.

For example, if the shutter is required to move down in Scene 2, the settings should be:

Scene Number x: Scene 2

Scene State x: Move Down (Close)

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
50-110	Output-x..x|Shutter	Move	Input	1 bit	1.001 switch	C	-	W	-
51-111	Output-x..x|Shutter	Stop/Step	Input	1 bit	1.001 switch	C	-	W	-
52-112	Output-x..x|Shutter	Scene	Input	1 byte	17.001 scene number	C	-	W	-
53-113	Output-x..x|Shutter	Move to Position	Input	1 byte	5.001 percentage	C	-	W	-
54-114	Output-x..x|Shutter	Position Status	Output	1 byte	5.001 percentage	C	R	-	T

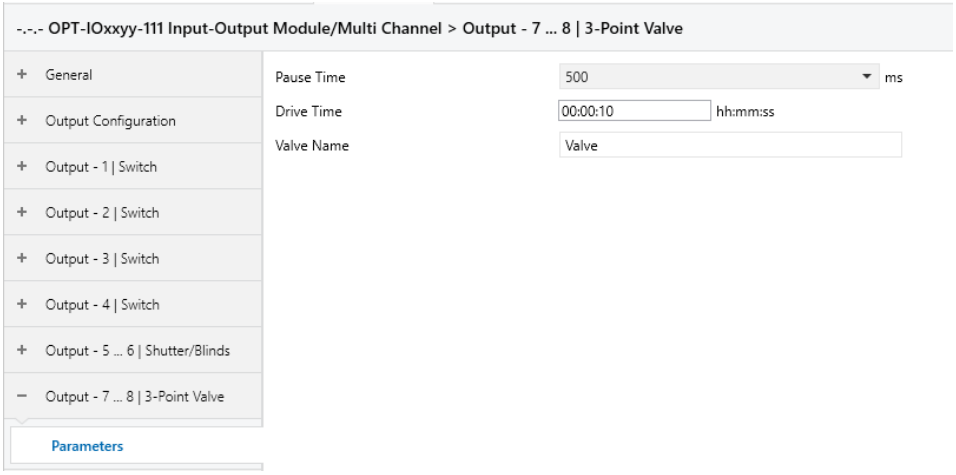
Table 3: Shutter Communication Objects

- **Move:** A 1-bit movement object. An ON command sends a move command in the closing direction, while an OFF command sends a move command in the opening direction.
- **Stop/Step:** A 1-bit command sent to this object stops the shutter motor while it is moving. It is also used for slat adjustment in blinds with adjustable slats. An ON command adjusts the slats toward the darkening direction, while an OFF command adjusts them toward the brightening direction.
- **Scene:** This object receives the 1-byte Scene value. Scene-related movements are explained in the parameter section.
- **Move to Position:** By sending a connected 1-byte command, the shutter is moved to the desired position. A value of 100% represents the fully closed position.
- **Position Status:** A communication object that reports the calculated current position of the shutter. The position value is updated and transmitted when the shutter movement stops.

4.3 3-Point Valve

These valve actuators are controlled via two contacts. Odd-numbered contacts drive the valve in the opening direction, while even-numbered contacts drive the valve in the closing direction. Upon power-up or reset, a referencing (homing) procedure is applied with the first position command to eliminate any position uncertainty. For example, if the target position is 60%, the actuator is first driven to the end position by energizing the relevant relay for 100% of the Drive Time, bringing the valve to the 100% position. Then, since the difference between 100% and 60% is 40%, the actuator is driven in the opposite direction for 40% of the Drive Time to reach the target position. This method is applied symmetrically in both directions and ensures accurate and repeatable valve positioning from the first command onward.

The parameters for 3-Point Valve Control are as follows:



4.3.1 Pause Time

This parameter defines the waiting time between opening and closing commands of the valve actuator. A value between **250 ms** and **1000 ms** can be selected from the list. This delay is implemented to ensure that the valve actuator fully completes movement in one direction before switching to the opposite direction.

4.3.2 Drive Time

This field is used to enter the time required for the valve to move from the fully closed position to the fully open position. A value between 1 second and 1 hour 48 minutes 20 seconds can be defined. The valve calculates all percentage-based position changes by referencing this duration.

4.3.3 Valve Name

This parameter is used to customize the **"Valve"** part of the name of the **Valve Control Value** group object. A name with a maximum length of **32 characters** can be entered. The entered name is automatically displayed in the name of the corresponding group object. Special characters can also be used if required.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
50, 70	Output-x..x|3-P Valve	Control Value	Input	1 byte	5.001 percentage	C	-	W	-
51, 71	Output-x..x|3-P Valve	Status Value	Output	1 byte	5.001 percentage	C	R	-	T

Table 4: 3-Point Valve Communication Objects

Valve Control Value: The 1-byte value sent to this object defines the target position of the valve.

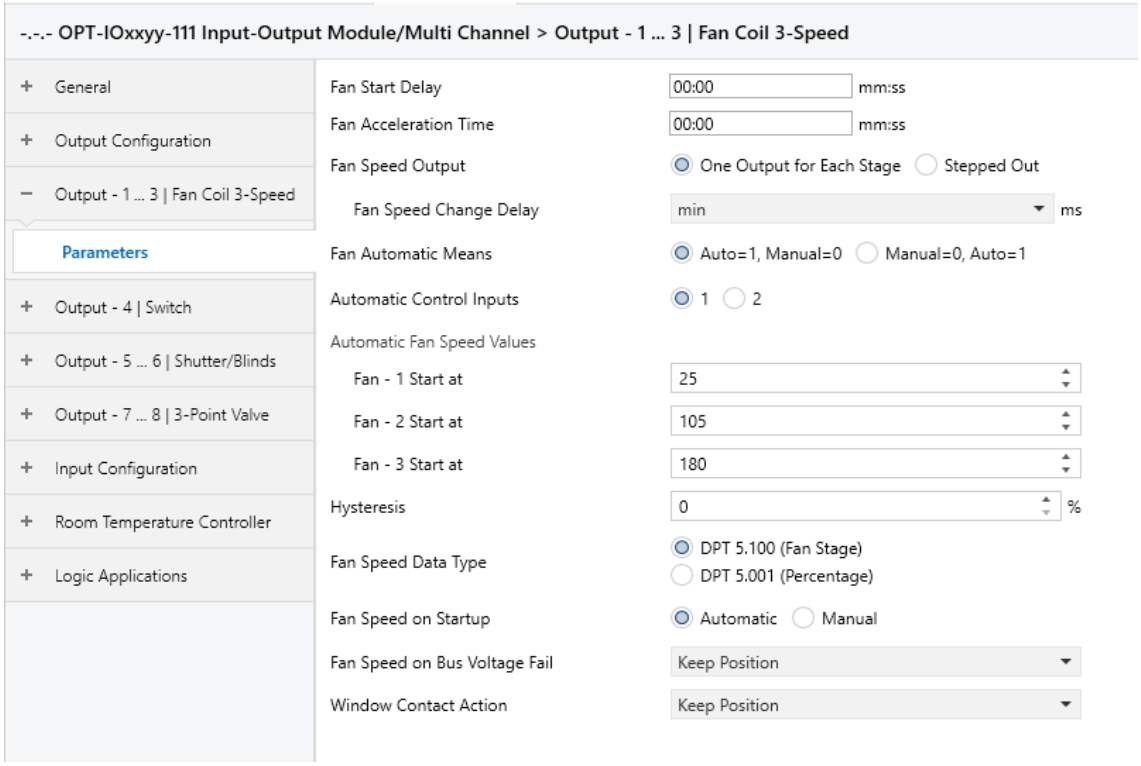
Valve Status Value: From this object, the current position of the valve can be read.

4.4 Fan Coil with 3-Speed

Fan coil units are mechanical devices used in heating and cooling systems to condition indoor spaces using temperature-controlled fluid circulating through them. Inside the unit, a fan motor provides air circulation and typically operates at multiple speed levels, most commonly three (though this can vary between two and five). This device directly supports 3-speed fan coil unit control.

Fan coil units are classified as 2-pipe or 4-pipe systems, depending on the number of hot and cold water circuits. The valves in these circuits must also be controlled. Thermal, solenoid, or 3-point controlled valve actuators operating at 230 V can be connected to any suitable output channel of the device.

The startup parameters of the Fan Coil page are as follows:



4.4.1 Fan Start Delay

This parameter defines the delay applied before the fan coil starts operating. Typically, the valve that allows hot/cold water flow and the fan are activated at the same time; however, it takes some time for the water to circulate and transfer heat through the heat exchanger. If the fan operates during this period, unconditioned air may be blown into the space. To prevent this, a delay time between 0 and 4 minutes and 15 seconds can be defined.

4.4.2 Fan Acceleration Time

Fan motors include electronic circuits that control the rotation speed. This allows the fan to operate at lower speeds, especially at lower speed stages. At low speeds, it may take time for the motor to reach the target speed. This parameter defines the minimum time the motor must remain at any speed stage. This duration is referred to as the "Acceleration Time."

4.4.3 Fan Speed Output

There are two types of progressive operation. Two fan speed output modes are available: in which one single output is activated for each stage, while the others are made open switches. So for low fan speed, the first speed output is On, the others are Off; for medium fan speed, the second speed output is On, the others are Off, and for high fan speed, the third fan speed is On, and the others are Off. Another working operation is the progressive output operation. In this operation, for low fan speed, the first speed output is On, the others are Off; for medium fan speed, the first, second, and the outputs are On, the other is Off, and for high fan speed, all three outputs are On. Pay attention to the electrical requirements of the fan coil device in this model. If they are fed through the same phase, make sure that the contacts feed through the same phase. The default value is "One Output for Each Stage". When the cascaded output model is selected, attention must be paid to the electrical requirements of the fan coil unit. If the supply is provided from the same phase, it must be ensured that the contacts are also supplied from the same phase.

The default value is "Single Output per Stage."

4.4.3.1 Fan Speed Change Delay

This parameter defines the waiting time inserted between fan speed stages to prevent possible electrical issues during speed transitions. A value between 0 ms (minimum) and 5000 ms can be selected. During this time, all contacts remain in the open-circuit state, after which the required outputs for the new speed are activated.

4.4.4 Fan Automatic Means

To allow the fan speed to be adjusted automatically according to the received heating/cooling control value, a 1-bit Automatic/Manual information object is required. This parameter defines the meaning of the received 1-bit value. If the information value "1" corresponds to automatic operation, the option Automatic = 1, Manual = 0 is selected; otherwise, the opposite option is used.

4.4.5 Automatic Control Inputs

This parameter defines the number of control value inputs used for automatic fan control in fan coil applications and, in dual-input configurations, determines which control value is processed.

• **When Automatic Control Inputs** = 1 is selected, the fan speed is controlled directly based on the value received in the 0–255 range via the Heating / Cooling Control Value communication object. This configuration is intended for systems where heating and cooling are managed through a single control value, and the device simply drives the fan speed according to the received value.

• **When Automatic Control Inputs** = 2 is selected, the Heating Control Value and Cooling Control Value inputs are used separately, and the Select Control Input parameter becomes active.

• **When Last Effective Value** is selected, the device monitors both control inputs independently and determines the fan speed based on the most recently received valid control value that is greater than or equal to the Fan-1 Start threshold; newly received values below this threshold are ignored, and the current fan speed is maintained.

• **When HeatCool Selection Object** is selected, the operating mode is defined via an additional Heating/Cooling Selection communication object; in this case, 1 = Heating causes the fan to be controlled by the Heating Control Value, and 0 = Cooling causes the fan to be controlled by the Cooling Control Value.

4.4.6 Automatic Fan Speed Values

To convert the control value into automatic fan speed stages, threshold values must be defined. The received control value is translated into the appropriate fan speed according to the thresholds defined in this parameter. The normally expected relationship is:

0 < Fan 1 < Fan 2 < Fan 3 < 256

If the threshold values are not defined in this order, the software automatically sorts them; however, the correct approach is to enter the thresholds in ascending order from the beginning.

4.4.7 Hysteresis

This technique is used to prevent unnecessary and frequent fan speed changes during transitions between fan speed stages. By adding hysteresis ranges to the previously defined Automatic Fan Speed Values, stable zones are created betwee fan speeds.

4.4.8 Fan Speed Data Type

Fan speeds are transmitted using a 1-byte data type and can be used in two different formats:

- **DPT 5.100:** Fan speeds are expressed as stepped values such as 0, 1, 2, 3 (0 = off, 1–3 = speed stages).
- **DPT 5.001:** A continuous value in the range 0–255 (or 0–100%) is used.

According to standard KNX functions for three-speed fan control, based on the 1-byte value received from the fan speed communication object:

- (1–33)% / $(1–85)_{10}$ / $(1–55)_{16}$: 1st speed,
- (34–66)% / $(86–170)_{10}$ / $(56–AA)_{16}$: 2nd speed,
- (67–100)% / $(171–255)_{10}$ / $(AB–FF)_{16}$: 3rd speed.

As status information, one of the values 0, 85, 170, or 255_{10} is transmitted, depending on the active speed.

4.4.9 Fan Speed On Startup

This parameter defines the startup behavior of the fan speed when the device is powered on.

- If **Automatic** is selected, the device switches to automatic mode based on the received heating/cooling control values.
- If **Manual** is selected, an additional selection row appears to define the fan speed.

The appropriate startup value is selected from the list. If "Keep Position" is selected, the device continues operating at the fan speed used before the power interruption; otherwise, the fan speed is set according to the selected value.

4.4.10 Fan Speed On Bus Voltage Fail

This parameter defines the fan speed position to be maintained when the KNX bus voltage fails and until power is restored. The available options are the same as those listed under the Fan Speed on Startup parameter.

4.4.11 Window Contact Action

A 1-bit ON command sent from the KNX bus to the "Fan Coil Window Open" communication object informs the device that a window or door has been opened. Upon receiving this information, the device can adjust the fan speed according to the window-open scenario or maintain the current speed without change. When a 1-bit OFF command is sent to the same object, the fan speed returns to the previous position used when the window was closed.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
10	Output-1..3|Fan Coil	Automatic/Manual Mode On/Off	Input	1 bit	1.002 boolean	C	-	W	-
11	Output-1..3|Fan Coil	Heating/Cooling Control Value / Heating Control Value	Input	1 byte	5.001 percentage	C	-	W	-
12	Output-1..3|Fan Coil	Cooling Control Value	Input	1 byte	5.001 percentage	C	-	W	-
13	Output-1..3|Fan Coil	Heating/Cooling Mode Selection	Input	1 bit	1.100 cooling/heating	C	-	W	-
14	Output-1..3|Fan Coil	Window Contact	Input	1 bit	1.001 switch	C	-	W	-
15	Output-1..3|Fan Coil	Automatic/Manual Mode Status	Output	1 bit	1.002 boolean	C	R	-	T
16	Output-1..3|Fan Coil	On/Off Status	Output	1 bit	1.002 boolean	C	R	-	T
17	Output-1..3|Fan Coil	Heating/Cooling Mode Status	Output	1 bit	1.100 cooling/heating	C	R	-	T
18	Output-1..3|Fan Coil	Speed Set	Input	1 byte	5.100 fan stage	C	-	W	-
19	Output-1..3|Fan Coil	Speed Status	Output	1 byte	5.100 fan stage	C	R	-	T

Table 5: Fan Coil Communication Objects

• **Fan Coil Automatic Mode On/Off; Fan Coil Manual Mode On/Off:** These objects are used to switch the device between automatic and manual modes using a 1-bit command.

• **Fan Coil Heating/Cooling Control Value; Fan Coil Heating Control Value; Fan Coil Cooling Control Value:** The 1-byte values received by these objects determine the fan speed stage at which the device operates.

• **Fan Coil Heating/Cooling Mode Selection:** This object determines which of the xx1 and xx2 control objects is taken into account, allowing selection of whether the device operates in Heating or Cooling mode.

• **Fan Coil Window Contact:** This object is used to trigger the window-open condition for the device.

• **Fan Coil Automatic Mode Status; Fan Coil Manual Mode Status:** These objects indicate which control mode (automatic or manual) the device is currently operating in.

• **Fan Coil On/Off Status:** This object provides information on whether the device is operating or not.

• **Fan Coil Heating/Cooling Mode Status:** This object indicates whether the device is operating in heating or cooling mode.

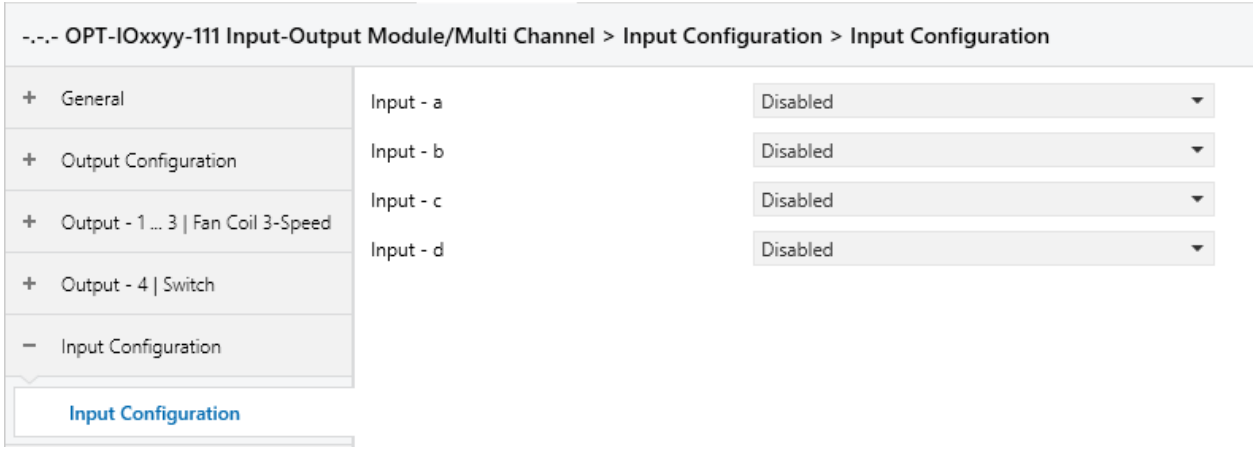
• **Fan Coil Speed Set:** This object switches the device to manual mode and allows the fan speed to be stepped manually.1-byte speed values are used.

• **Fan Coil Speed Status:** This is the feedback object that indicates which fan speed stage the device is currently operating at.

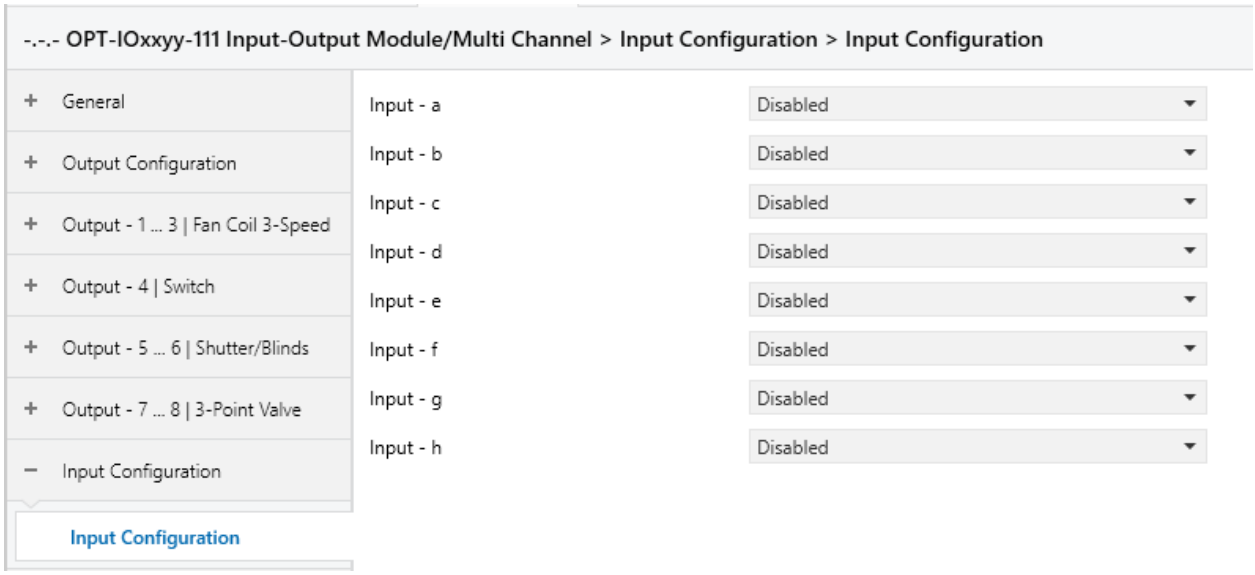
5 Input Configuration

In this section, the functions to be assigned to the channels are configured.

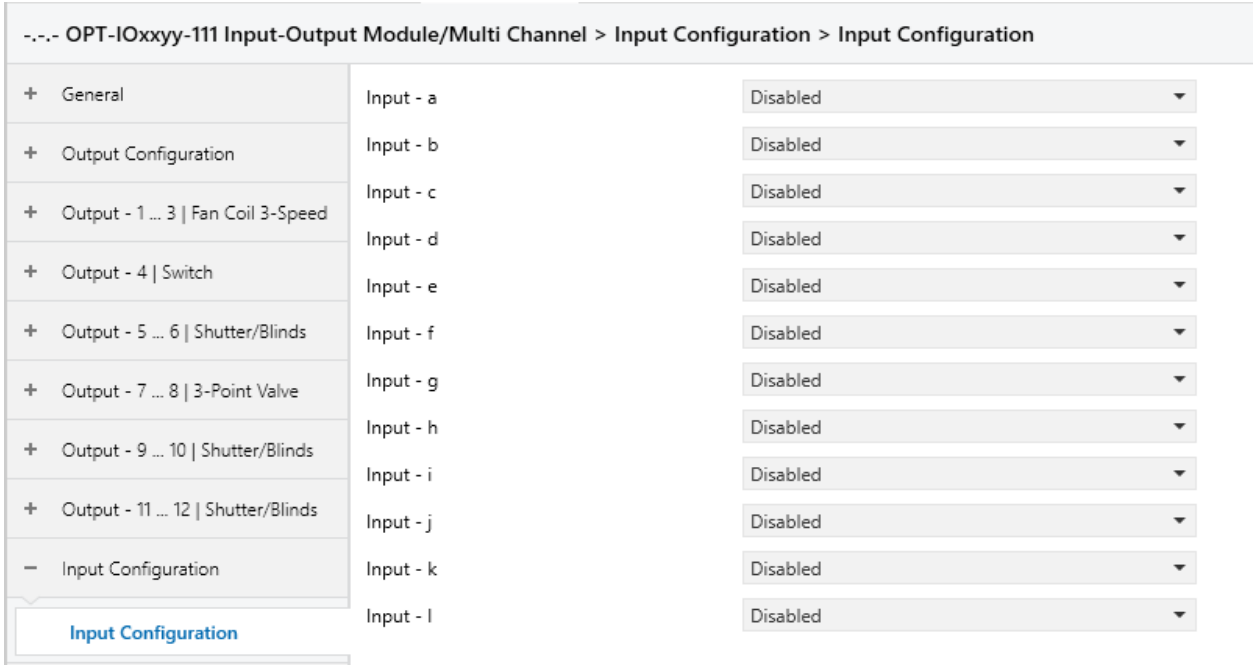
Input configuration for the 4I+4O model:



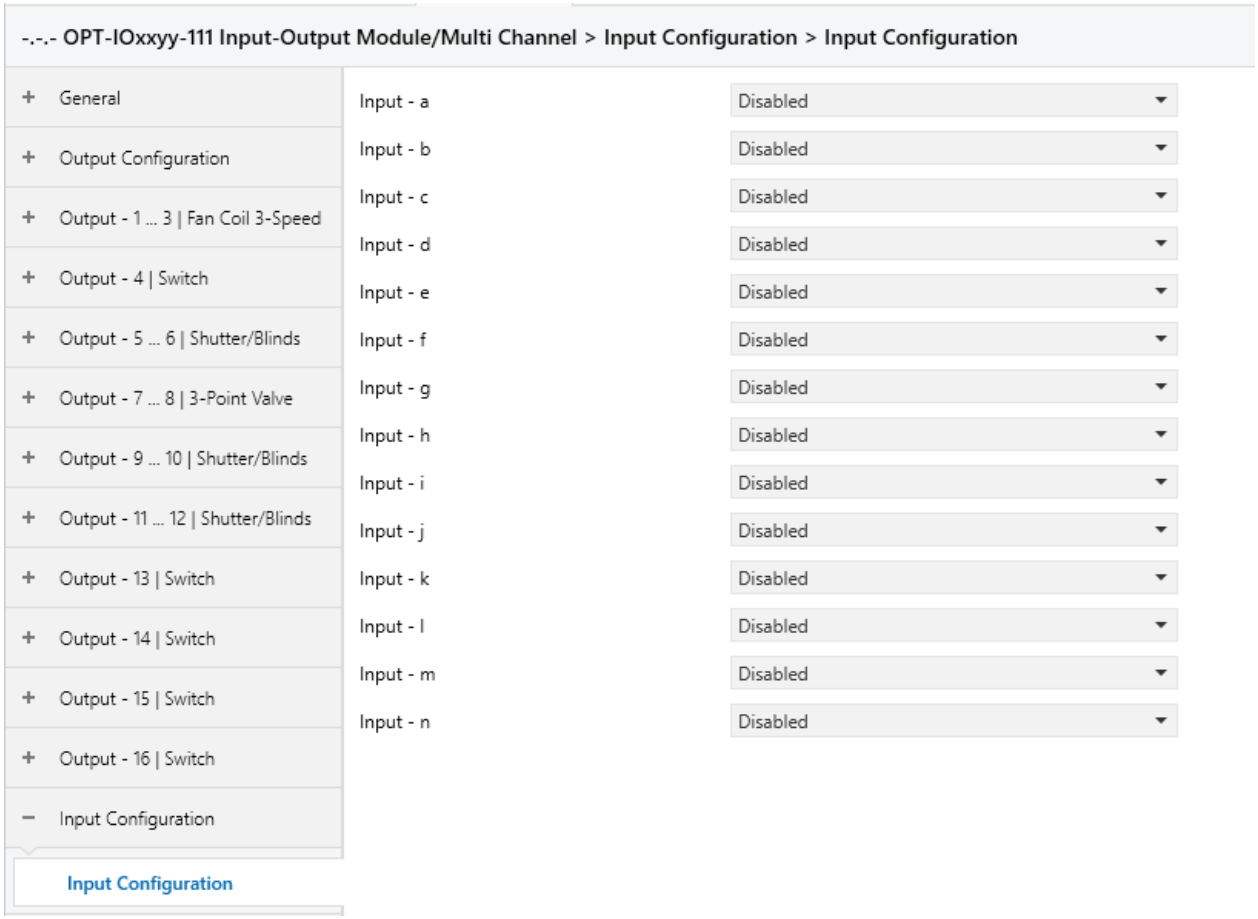
Input configuration for the 8I+8O model:



Input configuration for the 12I+12O model:

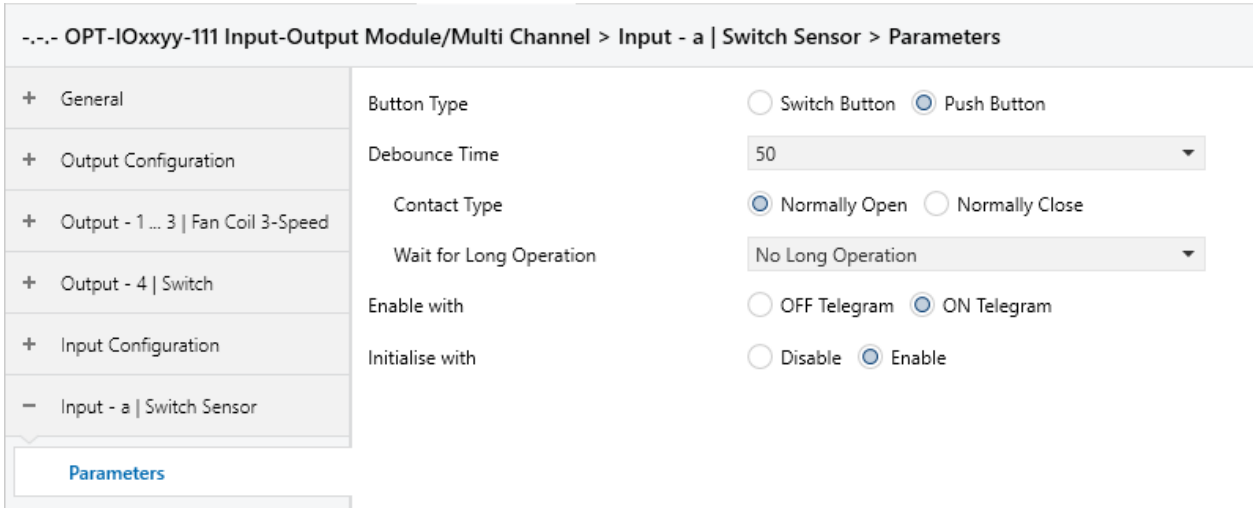


Input configuration for the 14I+16O model:



5.1 Input -x | Switch Sensor

5.1.1 Parameters



5.1.1.1 Button Type

Depending on the type of the connected switch, “Switch Button” is selected for switches that remain in the pressed position, while “Push Button” is selected for push buttons that return to their initial position after being pressed.

5.1.1.2 Debounce Time

This parameter is used to select the minimum contact duration that the device will consider for contact detection. The available options are 20 ms, 30 ms, 50 ms, and 150 ms. The default value is 50 ms. Contacts shorter than this duration are treated as noise and are not processed.

5.1.1.3 Contact Type

This parameter is used to define the contact structure of the connected switch when it is not pressed. The appropriate option is selected from “Normally Open” or “Normally Closed.” The default option is “Normally Open.”

5.1.1.4 Wait for Long Operation

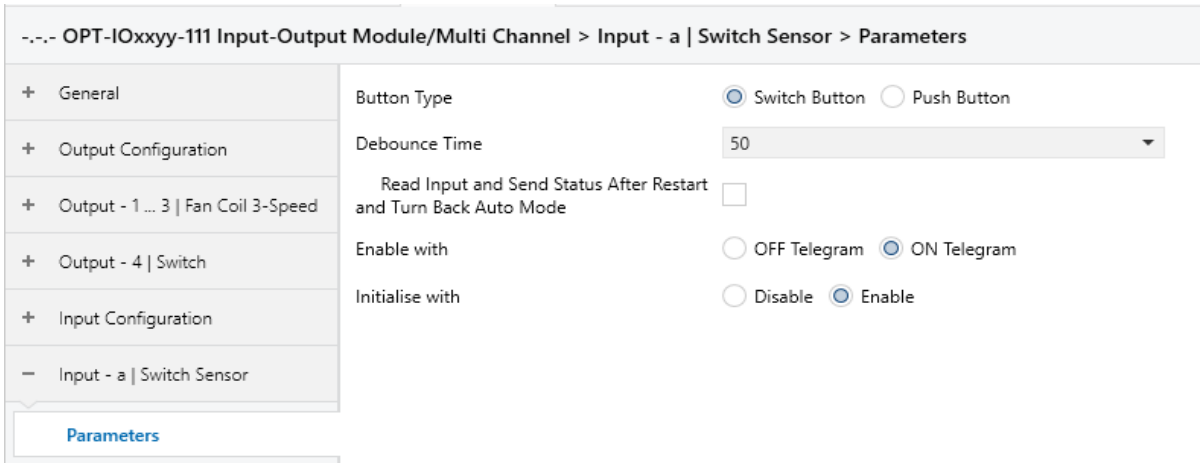
This option allows the device to generate an additional function (for example, for shutter or dimmer control) when the contact remains pressed longer than a defined threshold time. The feature can be disabled by selecting “No Long Operation,” or a value between 0.25 s and 60 s can be selected from the list. The default value is “No Long Operation.”

5.1.1.5 Enable with

An enable object for the corresponding channel is added by default. This parameter defines how this object is used. If “OFF Telegram” is selected, the channel becomes active when a value of “0” is sent to the Enable object. If “ON Telegram” is selected, the channel becomes active when a value of “1” is sent to the same object. The default value is ON Telegram.

5.1.1.6 Initialise with

This parameter defines whether the channel is initialized as enabled or disabled when the device starts operating. The default selection is “Enable.”

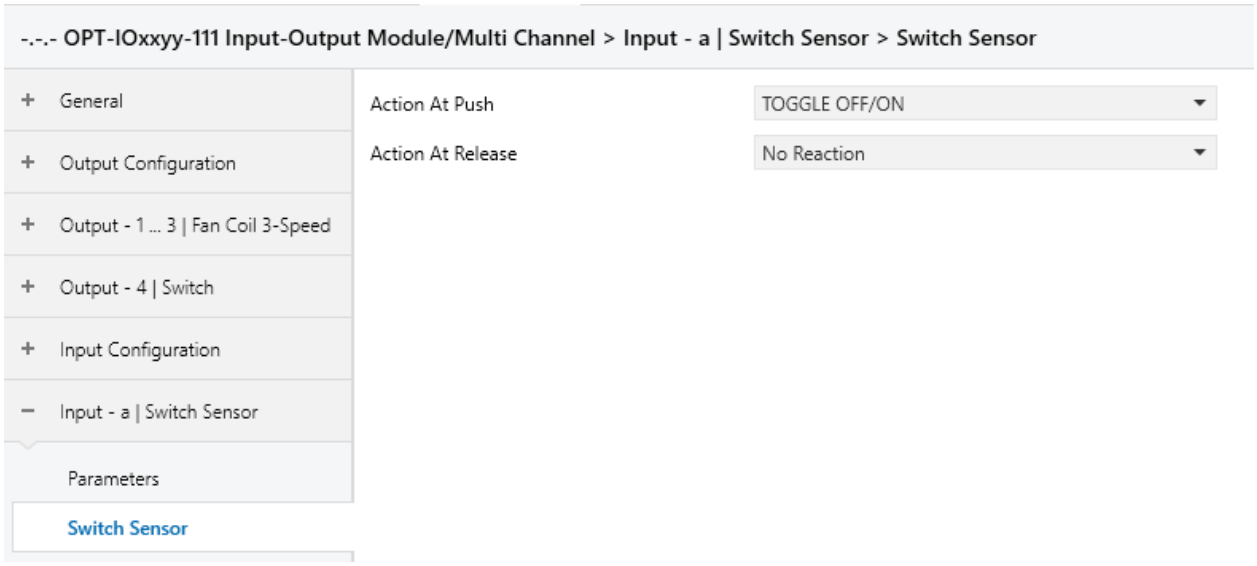


5.1.1.7 Read Input and Send Status After Restart and Turn Back Auto Mode

This option is used for “Switch Button” type switches to send the current position of the switch to the bus when the device is powered up. For push buttons, this option is hidden.

5.1.2 Switch Sensor

5.1.2.1 Push Button



5.1.2.1.1 Action at Push

This parameter defines the action to be performed when the position of a push button changes from the defined contact position (Normally Open or Normally Closed) to the other state. The default value is “TOGGLE OFF/ON.”

5.1.2.1.2 Action at Release

This parameter defines the action to be performed when a push button returns to the defined contact position (Normally Open or Normally Closed). The default value is "No Reaction."

The "Push" and "Release" functions of the channels are separated into two different communication objects to provide programming flexibility. If desired, the same group address can be assigned to both objects to perform standard commissioning.

5.1.2.1.3 Action at Short Operation

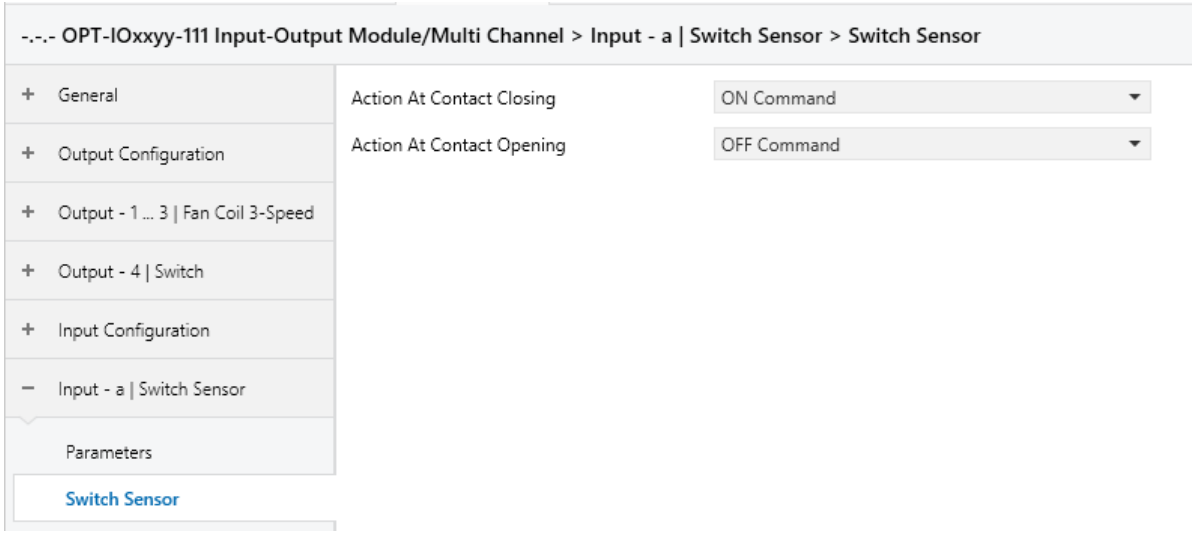
This parameter becomes visible when the "Wait for Long Operation" parameter in the Parameters section is set to a value other than "No Long Operation." It defines the action to be performed when the position of a push button changes from the defined contact position (Normally Open or Normally Closed) to the other state before the "Wait for Long Operation" time expires. The default value is "No Reaction."

The "Short Operation" and "Long Operation" functions of the channels are separated into two different communication objects to provide programming flexibility. If desired, the same group address can be assigned to both objects to perform standard commissioning.

5.1.2.1.4 Action at Long Operation

This parameter becomes visible when the "Wait for Long Operation" parameter in the Parameters section is set to a value other than "No Long Operation." It defines the action to be performed when the position of a push button changes from the defined contact position (Normally Open or Normally Closed) to the other state after the "Wait for Long Operation" time has elapsed. The default value is "No Reaction."

5.1.2.2 Switch Button



5.1.2.2.1 Action at Contact Closing

This parameter defines the action to be performed for switch-type buttons when the switch position changes from the defined contact position (Normally Open or Normally Closed) to the other state. The default value is "ON Command."

5.1.2.2.2 Action at Contact Opening

This parameter defines the action to be performed for switch-type buttons when the switch returns to the defined contact position (Normally Open or Normally Closed). The default value is "OFF Command."

The "Closing" and "Opening" functions of the channels are separated into two different communication objects to provide programming flexibility. If desired, the same group address can be assigned to both objects to perform standard commissioning.

	Common Object: Channel Number	Object Function	Length / Data Type	C	R	W	T
Switch Sensor	210: Input – a 220: Input – b 230: Input – c 240: Input – d 250: Input – e 260: Input – f 270: Input – g 280: Input – h 290: Input – i 300: Input – j 310: Input – k 320: Input – l 330: Input – m 340: Input – n	Enable	1 bit / Boolean	C	-	W	-
	211: Input – a 221: Input – b 231: Input – c 241: Input – d 251: Input – e 261: Input – f 271: Input – g 281: Input – h 291: Input – i 301: Input – j 311: Input – k 321: Input – l 331: Input – m 341: Input – n	Push Output (for a push button) / Output (push button with long press) / Output (Closing) (for switch button)	1 bit / Switch	C	-	W	T
	212: Input – a 222: Input – b 232: Input – c 242: Input – d 252: Input – e 262: Input – f 272: Input – g 282: Input – h 292: Input – i 302: Input – j 312: Input – k 322: Input – l 332: Input – m 342: Input – n	Release Output (for a push button) / Output (push button with long press) / Output (Opening) (for switch button)	1 bit / Switch	C	-	W	T

Table 6: Switch Sensor Communication Objects

5.2 Input -x | Shutter/Blind Sensor

5.2.1 Parameters

This function is used for controlling bidirectional shutter/blind motors. It can be configured according to the switch type and button model. Movement commands (Up or Down) are sent via the "Move" object, while "Stop/Step" commands are sent via the "Stop/Step" object.

5.2.1.1 Debounce Time

This parameter is used to select the minimum contact duration that the device will consider for contact detection. The available options are 20 ms, 30 ms, 50 ms, and 150 ms. The default value is 50 ms. Contacts shorter than this duration are treated as noise and are not processed.

5.2.1.2 Contact Type

This parameter defines the contact structure of the connected switch when it is not pressed. The appropriate option is selected from "Normally Open" or "Normally Closed." The default option is "Normally Open.

5.2.1.3 Wait for Long Operation

This option allows the device to generate an additional function when the contact remains pressed for a defined threshold time. The feature can be disabled by selecting "No Long Operation," or a value between 0.25 s and 60 s can be selected from the list. The default value is "No Long Operation."

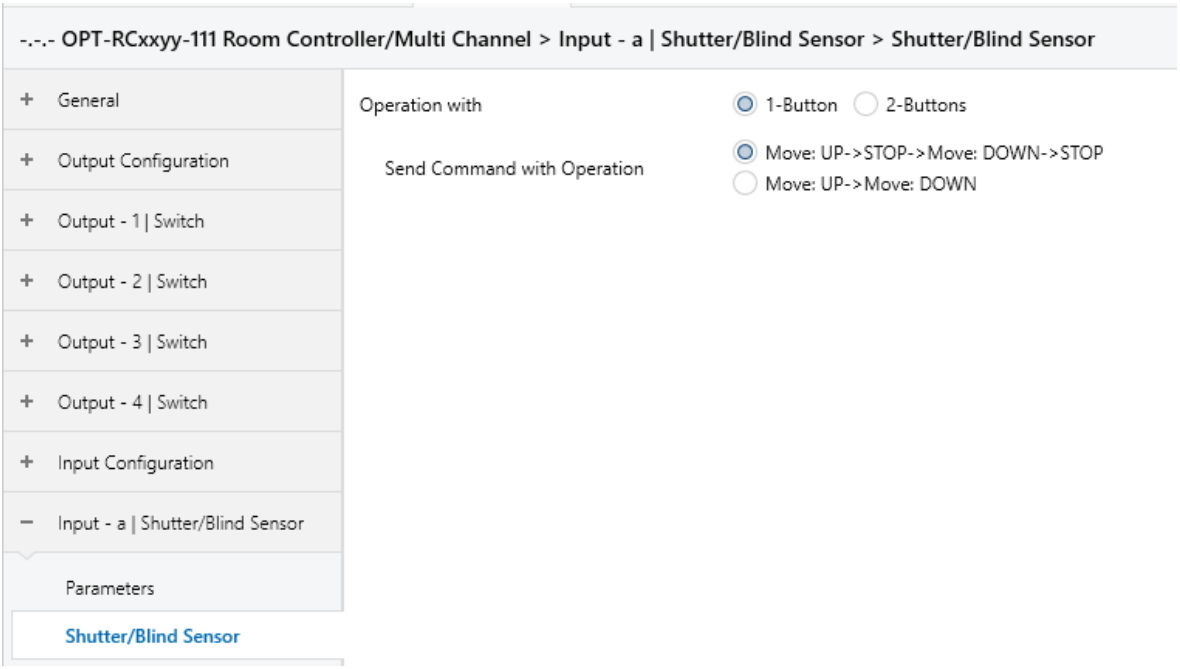
5.2.1.4 Enable with

An enable object for the corresponding channel is added by default. This parameter defines how this object is used. If "OFF Telegram" is selected, the channel becomes active when a value of "0" is sent to the Enable object. If "ON Telegram" is selected, the channel becomes active when a value of "1" is sent to the same object. The default value is ON Telegram.

5.2.1.5 Initialise with

This parameter defines whether the channel is initialized as enabled or disabled when the device starts operating. The default selection is "Enable."

5.2.2 Shutter/Blind Sensor



5.2.2.1 1-Button

Up/Stop/Down/Stop: Each time the push button is pressed, the next command in the sequence is sent via the corresponding objects. No long-press operation is used.

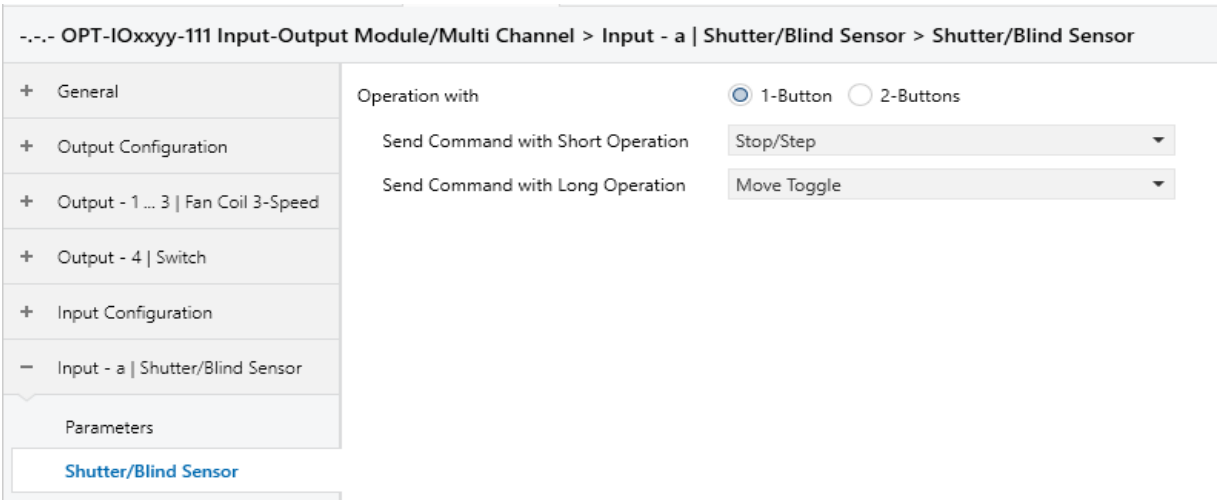
Up/Down: Each time the push button is pressed, the next command in the sequence is sent via the corresponding objects. No long-press operation is used.

5.2.2.2 2-Button

Move Up: When this button is pressed, a "1-bit up" command is sent via the "Move" object.

Move Down: When this button is pressed, a "1-bit down" command is sent via the "Move" object.

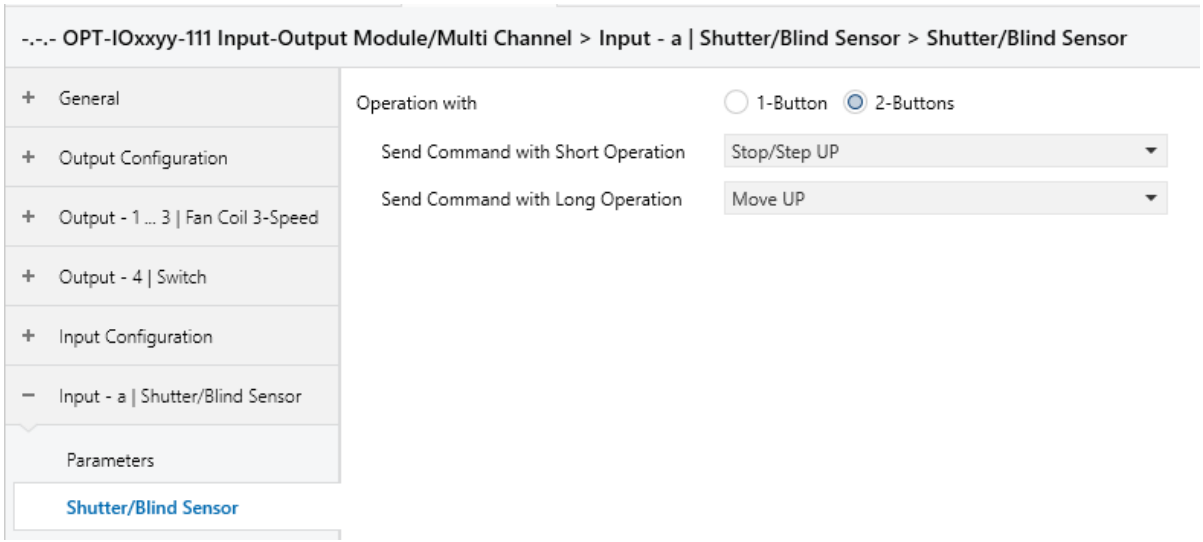
5.2.3 With Long Operation



5.2.3.1 1-Button

Send Command with Short Operation: This parameter becomes active for push buttons when a duration is assigned to the "Wait for Long Operation" parameter. When the button is pressed and released before the long-press time expires, the command selected here is sent. The default value is "Stop/Step."

Send Command with Long Operation: This parameter is also used for push buttons when the "Wait for Long Operation" parameter is enabled. After the button is pressed and the defined long-press duration has elapsed, the command selected here is sent. The default value is "Move Toggle."



5.2.3.2 2-Button

Send Command with Short Operation: This parameter becomes active for push buttons when a duration is assigned to the "Wait for Long Operation" parameter. When the button is pressed and released before the long-press time expires, the command selected here is sent. The default value is "Stop/Step UP."

Send Command with Long Operation: This parameter is also used for push buttons when the "Wait for Long Operation" parameter is enabled. After the button is pressed and the defined long-press duration has elapsed, the command selected here is sent. The default value is "Move UP."

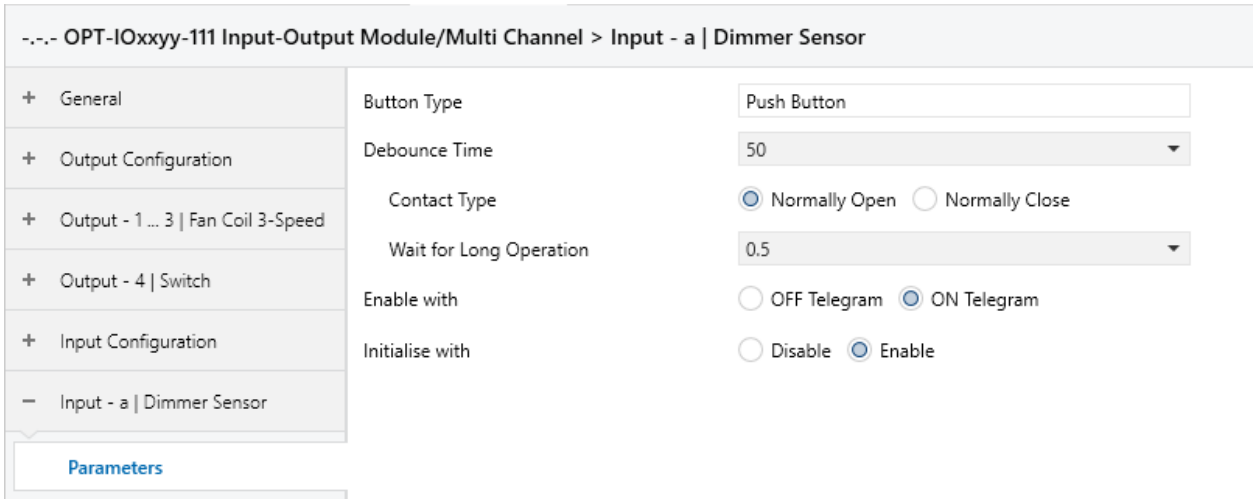
	Common Object: Channel Number	Object Function	Length / Data Type	C	R	W	T
Shutter Sensor	210: Input – a 220: Input – b 230: Input – c 240: Input – d 250: Input – e 260: Input – f 270: Input – g 280: Input – h 290: Input – i 300: Input – j 310: Input – k 320: Input – l 330: Input – m 340: Input – n	Enable	1 bit / Boolean	C	-	W	-
	211: Input – a 221: Input – b 231: Input – c 241: Input – d 251: Input – e 261: Input – f 271: Input – g 281: Input – h 291: Input – i 301: Input – j 311: Input – k 321: Input – l 331: Input – m 341: Input – n	Move	1 bit / Up/Down	C	-	-	T
	212: Input – a 222: Input – b 232: Input – c 242: Input – d 252: Input – e 262: Input – f 272: Input – g 282: Input – h 292: Input – i 302: Input – j 312: Input – k 322: Input – l 332: Input – m 342: Input – n	Stop/Step	1 bit / step	C	-	-	T

Table 7: Shutter Sensor Communication Objects

5.3 Input -x | Dimmer Sensor

This function is used to perform dimming operations (decrease, increase, switch on/off) by sending different types of data depending on the press duration of one or more push buttons. It is most commonly used for controlling dimmable lighting systems.

5.3.1 Parameters



5.3.1.1 Debounce Time

This parameter is used to select the minimum contact duration that the device will consider for contact detection. The available options are 20 ms, 30 ms, 50 ms, and 150 ms. The default value is 50 ms. Contacts shorter than this duration are treated as noise and are not processed.

5.3.1.2 Contact Type

This parameter defines the contact structure of the connected switch when it is not pressed. The appropriate option is selected from "Normally Open" or "Normally Closed." The default option is "Normally Open."

5.3.1.3 Wait for Long Operation

This option allows the device to generate an additional function when the contact remains pressed for a defined threshold time. A value between 0.25 s and 60 s can be selected from the list. The default value is set to "0.5 seconds."

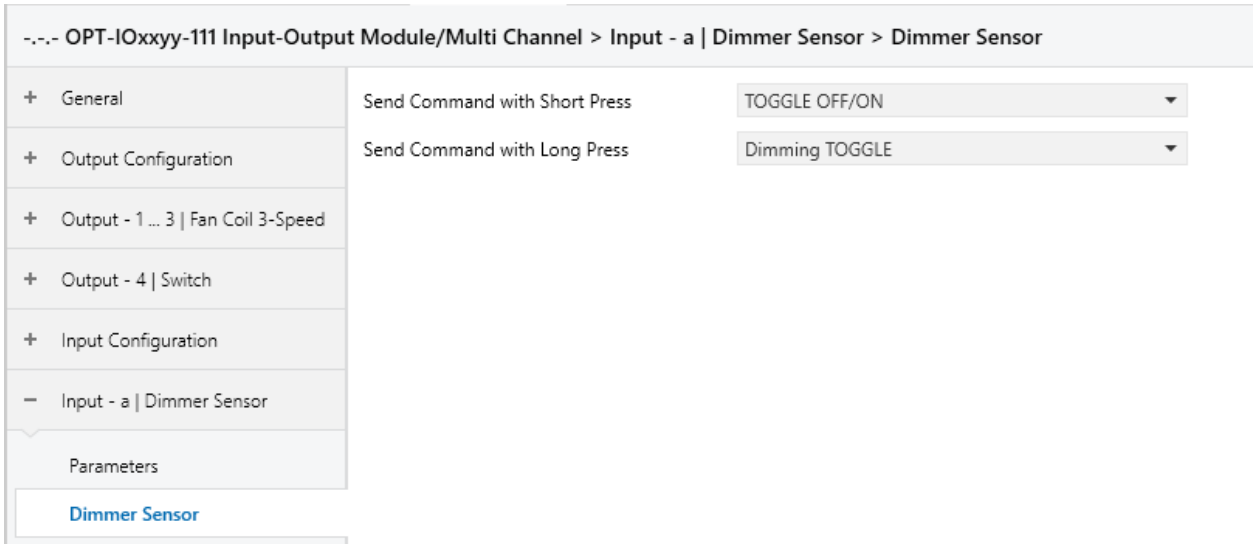
5.3.1.4 Enable with

An enable object for the corresponding channel is added by default. This parameter defines how this object is used. If "OFF Telegram" is selected, the channel becomes active when a value of "0" is sent to the Enable object. If "ON Telegram" is selected, the channel becomes active when a value of "1" is sent to the same object. The default value is ON Telegram.

5.3.1.5 Initialise with

This parameter defines whether the channel is initialized as enabled or disabled when the device starts operating. The default selection is "Enable."

5.3.2 Dimmer Sensor



5.3.2.1 Send Command with Short Press

This defines the action to be performed when the button is released before the short-press duration is completed. Short press: This is the short trigger behavior that occurs when the button is pressed and released before the defined "Wait for Long Operation" time expires. The available options are:

No Command: No command is sent when the button is pressed briefly.

ON Command: When the button is pressed briefly, a 1-bit "ON" command is sent via the "Input – x | Dimmer Sensor Switching" object.

OFF Command: When the button is pressed briefly, a 1-bit "OFF" command is sent via the "Input – x | Dimmer Sensor Switching" object.

Toggle OFF/ON: With each short press, the next ON or OFF command is sent in sequence.

Note: This object can also be linked to the dimmer device's status object to keep it updated and ensure correct toggle operation.

5.3.2.2 Send Command with Long Press

The action performed when the button is pressed for a long duration is dimming (brightening or darkening).Long press: This is the long trigger behavior that occurs when the button is pressed and held until the long-press duration defined by the "Wait for Long Operation" parameter expires. The available options are:

Brighter: When the button is pressed for a long time, an increase (brighten) command is sent via the "Input – x | Dimmer Sensor Dimming" object.

Darker: When the button is pressed for a long time, a decrease (dim) command is sent via the "Input – x | Dimmer Sensor Dimming" object.

Dimming Toggle: With each long press, the next operation in the sequence (**Brighter** or **Darker**) is executed.

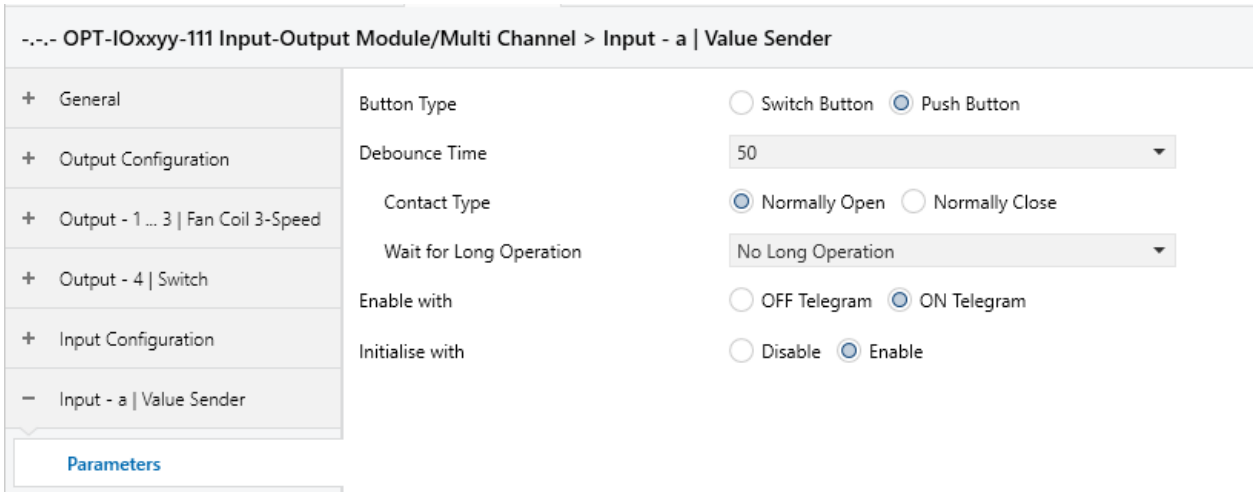
	Common Object: Channel Number ı	Object Function	Length / Data Type	C	R	W	T
Dimmer Sensor	210: Input – a 220: Input – b 230: Input – c 240: Input – d 250: Input – e 260: Input – f 270: Input – g 280: Input – h 290: Input – i 300: Input – j 310: Input – k 320: Input – l 330: Input – m 340: Input – n	Enable	1 bit / Boolean	C	-	W	-
	211: Input – a 221: Input – b 231: Input – c 241: Input – d 251: Input – e 261: Input – f 271: Input – g 281: Input – h 291: Input – i 301: Input – j 311: Input – k 321: Input – l 331: Input – m 341: Input – n	Switching	1 bit / Boolean	C	-	-/W	T
	212: Input – a 222: Input – b 232: Input – c 242: Input – d 252: Input – e 262: Input – f 272: Input – g 282: Input – h 292: Input – i 302: Input – j 312: Input – k 322: Input – l 332: Input – m 342: Input – n	Dimming	4 bit / Dimming Control	C	-	-	T

Table 8: Dimmer Communication Objects

5.4 Input -x | Value Sender

The Value Sender is an auxiliary function that allows the value read from an input channel to be processed in a specific format and transmitted onto the KNX bus. Each Value Sender channel operates independently and has its own transmission objects. The value obtained from the input channel is processed according to the selected transmission type and sent to the KNX system via the associated group objects.

5.4.1 Parameters



5.4.1.1 Debounce Time

This parameter is used to select the minimum contact duration that the device will consider for contact detection. The available options are 20 ms, 30 ms, 50 ms, and 150 ms. The default value is 50 ms. Contacts shorter than this duration are treated as noise and are not processed.

5.4.1.2 Contact Type

This parameter defines the contact structure of the connected switch when it is not pressed. The appropriate option is selected from "Normally Open" or "Normally Closed." The default option is "Normally Open."

5.4.1.3 Wait for Long Operation

This option allows the device to generate an additional function when the contact remains pressed for a defined threshold time. The feature can be disabled by selecting "No Long Operation," or a value between 0.25 s and 60 s can be selected from the list. The default value is "No Long Operation."

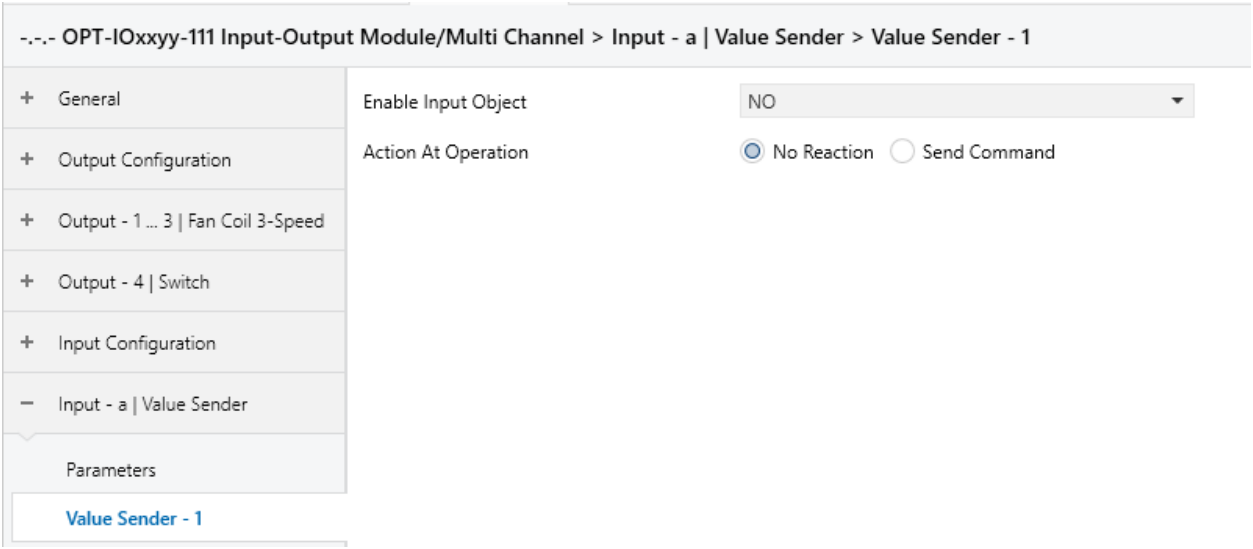
5.4.1.4 Enable with

An enable object for the corresponding channel is added by default. This parameter defines how this object is used. If "OFF Telegram" is selected, the channel becomes active when a value of "0" is sent to the Enable object. If "ON Telegram" is selected, the channel becomes active when a value of "1" is sent to the same object. The default value is ON Telegram.

5.4.1.5 Initialise with

This parameter defines whether the channel is initialized as enabled or disabled when the device starts operating. The default selection is "Enable."

5.4.2 Value Sender - x



5.4.2.1 Enable Input Object

Each Value Sender channel has its own Enable object, allowing the channels to be enabled or disabled individually. An enable object for the corresponding channel is added by default. This parameter is used to define how this object is utilized. If "NO" is selected, the "Enable Function" group object of the corresponding channel is disabled. If "OFF Telegram" is selected, the channel becomes active when a value of "0" is sent to the Enable object. If "ON Telegram" is selected, the channel becomes active when a value of "1" is sent to the same object. The default value is set to "NO."

5.4.2.2 Action at Operation

This parameter defines the action to be performed when the contact position changes from the defined contact state (Normally Open or Normally Closed) to the other state. The default selection is "No Reaction." When set to "Send Command," the settings become configurable. First, the data type of the command to be sent is selected, followed by the value to be transmitted. By default, the data type is 1-bit, and the value is "ON Telegram." Depending on the selected data type, the value to be sent is either entered manually or selected from the list in the "Send Value" field.

5.4.2.3 Action at Short Operation

This parameter becomes active when a duration is assigned to the "Wait for Long Operation" parameter. When the button is pressed and released before the long-press duration expires, the command selected here is sent. The default selection is "No Reaction." When set to "Send Command," the settings become configurable. First, the data type of the command to be sent is selected, followed by the value to be transmitted. By default, the data type is 1-bit, and the value is "ON Telegram." Depending on the selected data type, the value to be sent is either entered manually or selected from the list in the "Send Value" field.

5.4.2.4 Action at Long Operation

This parameter becomes active when a duration is assigned to the "Wait for Long Operation" parameter. After the button is pressed and the defined long-press duration has elapsed, the command selected here is sent. The default selection is "No Reaction."

When set to "Send Command," the settings become configurable. First, the data type of the command to be sent is selected, followed by the value to be transmitted. By default, the data type is 1-bit and the value is "OFF Telegram." Depending on the selected data type, the value to be sent is either entered manually or selected from the list in the "Send Value" field.

	Common Object: Channel Number	Object Function	Length/ Data Type	C	R	W	T
Value Sender	210: Input – a 220: Input – b 230: Input – c 240: Input – d 250: Input – e 260: Input – f 270: Input – g 280: Input – h 290: Input – i 300: Input – j 310: Input – k 320: Input – l 330: Input – m 340: Input – n	Enable	1 bit / Boolean	C	-	W	-
	211: Input – a 221: Input – b 231: Input – c 241: Input – d 251: Input – e 261: Input – f 271: Input – g 281: Input – h 291: Input – i 301: Input – j 311: Input – k 321: Input – l 331: Input – m 341: Input – n	Value	1 bit / Switch 1 byte unsigned / Counter Pulse(0,...255) 1 byte signed / Counter Pulse(-128,...127) 1 byte / Scene Number 1 byte / HVAC Mode 2 byte unsigned / Pulses 2 byte signed / Pulses Difference 2 byte float / Temperature °C	C	-	-/W	T
	212: Input – a 222: Input – b 232: Input – c 242: Input – d 252: Input – e 262: Input – f 272: Input – g 282: Input – h 292: Input – i 302: Input – j 312: Input – k 322: Input – l 332: Input – m 342: Input – n	Value (Long)	1 bit / Switch 1 byte unsigned / Counter Pulse(0,...255) 1 byte signed / Counter Pulse(-128,...127) 1 byte / Scene Number 1 byte / HVAC Mode 2 byte unsigned / Pulses 2 byte signed / Pulses Difference 2 byte float / Temperature °C	C	-	-/W	T

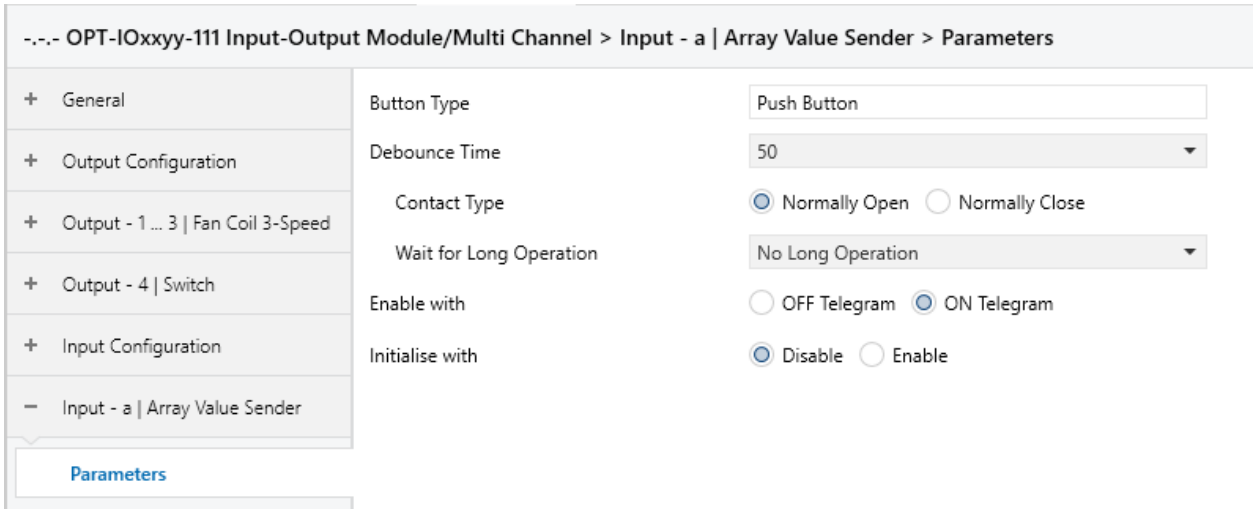
	213: Input – a 216: Input – a 219: Input – a 223: Input – b 226: Input – b 229: Input – b 233: Input – c 236: Input – c 239: Input – c 243: Input – d 246: Input – d 249: Input – d 253: Input – e 256: Input – e 259: Input – e 263: Input – f 266: Input – f 269: Input – f 273: Input – g 276: Input – g 279: Input – g 283: Input – h 286: Input – h 289: Input – h 293: Input – i 296: Input – i 299: Input – i 303: Input – j 306: Input – j 309: Input – j 313: Input – k 316: Input – k 319: Input – k 323: Input – l 326: Input – l 329: Input – l 333: Input – m 336: Input – m 339: Input – m 343: Input – n 346: Input – n 349: Input – n			C	-	W	-

Table 9: Value Sender Communication Objects

5.5 Input -x | Array Value Sender

The Array Value Sender is a special transmission mechanism that allows predefined values within an array to be sent sequentially each time an input channel is triggered. With this structure, a single button, sensor, or internal connection can transmit a different value on each trigger. The array size, the values to be transmitted, and the operating behavior of the array are defined by the user via parameters.

5.5.1 Parameters



5.5.1.1 Debounce Time

This parameter is used to select the minimum contact duration that the device will consider for contact detection. The available options are 20 ms, 30 ms, 50 ms, and 150 ms. The default value is 50 ms. Contacts shorter than this duration are treated as noise and are not processed.

5.5.1.2 Contact Type

This parameter defines the contact structure of the connected switch when it is not pressed. The appropriate option is selected from "Normally Open" or "Normally Closed." The default option is "Normally Open."

5.5.1.3 Wait for Long Operation

This option allows the device to generate an additional function when the contact remains pressed for a defined threshold time. The feature can be disabled by selecting "No Long Operation," or a value between 0.25 s and 60 s can be selected from the list. The default value is "No Long Operation."

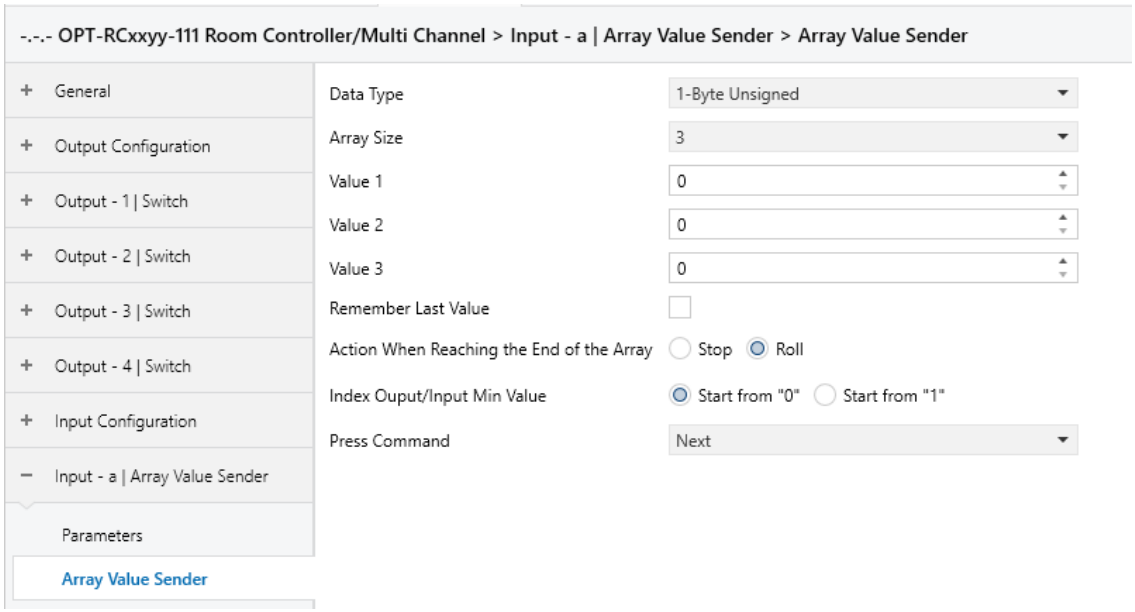
5.5.1.4 Enable with

An enable object for the corresponding channel is added by default. This parameter defines how this object is used. If "OFF Telegram" is selected, the channel becomes active when a value of "0" is sent to the Enable object. If "ON Telegram" is selected, the channel becomes active when a value of "1" is sent to the same object. The default value is ON Telegram.

5.5.1.5 Initialise with

This parameter defines whether the channel is initialized as enabled or disabled when the device starts operating. The default selection is "Enable."

5.5.2 Array Value Sender



5.5.2.1 Data Type

This parameter defines the data type of each element in the array. The data type determines the size and format of each data packet.

5.5.2.2 Array Size

This parameter defines how many elements the array will contain. The user sets the number of values to be transmitted using this parameter.

5.5.2.3 Value x

This parameter defines the specific value of each element in the array. These values are configured according to the array size and the selected data type. The value fields become visible depending on the array size. For example, if the Array Size is set to 4, Value 4 becomes visible.

5.5.2.4 Remember Last Value

This parameter defines whether the last transmitted value should be remembered. This allows the device to retain the last sent value after a restart or under other conditions.

5.5.1.5 Action When Reaching The End Of Array

This parameter defines what happens when the function reaches the last value in the array. If “Stop” is selected, the sequence stops at the last value. If “Roll” is selected, the sequence restarts from Value 1. The default value is “Roll.”

5.5.2.6 Start Index Value

This parameter defines the starting value from which the Index Output group object begins counting while the array values are being advanced. When "Start from '0'" is selected, the index starts from 0 when the first value is sent; when "Start from '1'" is selected, it starts from 1. The default setting is "Start from '0'."

5.5.2.7 Press Command

This parameter defines the action to be performed during a short press.

First: Sends the first value.

Previous: Sends the previous value.

Next: Sends the next value.

Last: Sends the last value.

The default value is "Next."

5.5.2.8 Long Press Action

This parameter becomes active when a duration is entered for the "Wait for Long Operation" parameter. It defines the action to be performed when the button is pressed for the defined duration.

No Action: No change occurs.

First: Sends the first value.

Previous: Sends the previous value.

Next: Sends the next value.

Last: Sends the last value.

The default value is "First."

5.5.2.9 Repeat Command Every

When this parameter is enabled, the "Long Press Action" is repeated periodically during a long press as long as the button remains pressed. The default value is "No Repeat."

	Common Object: Channel Number	Object Function	Length / Data Type	C	R	W	T
Array Value Sender	210: Input – a 220: Input – b 230: Input – c 240: Input – d 250: Input – e 260: Input – f 270: Input – g 280: Input – h 290: Input – i 300: Input – j 310: Input – k 320: Input – l 330: Input – m 340: Input – n	Enable	1 bit / Boolean	C	-	W	-
	211: Input – a 221: Input – b 231: Input – c 241: Input – d 251: Input – e 261: Input – f 271: Input – g 281: Input – h 291: Input – i 301: Input – j 311: Input – k 321: Input – l 331: Input – m 341: Input – n	Value	1 byte / counter pulses 2 byte / pulses 2 byte / temperature°C	C	-	-	T
	212: Input – a 222: Input – b 232: Input – c 242: Input – d 252: Input – e 262: Input – f 272: Input – g 282: Input – h 292: Input – i 302: Input – j 312: Input – k 322: Input – l 332: Input – m 342: Input – n	Index Output	1 byte / counter pulses	C	R	W	T

Table 10: Array Value Sender Communication Objects

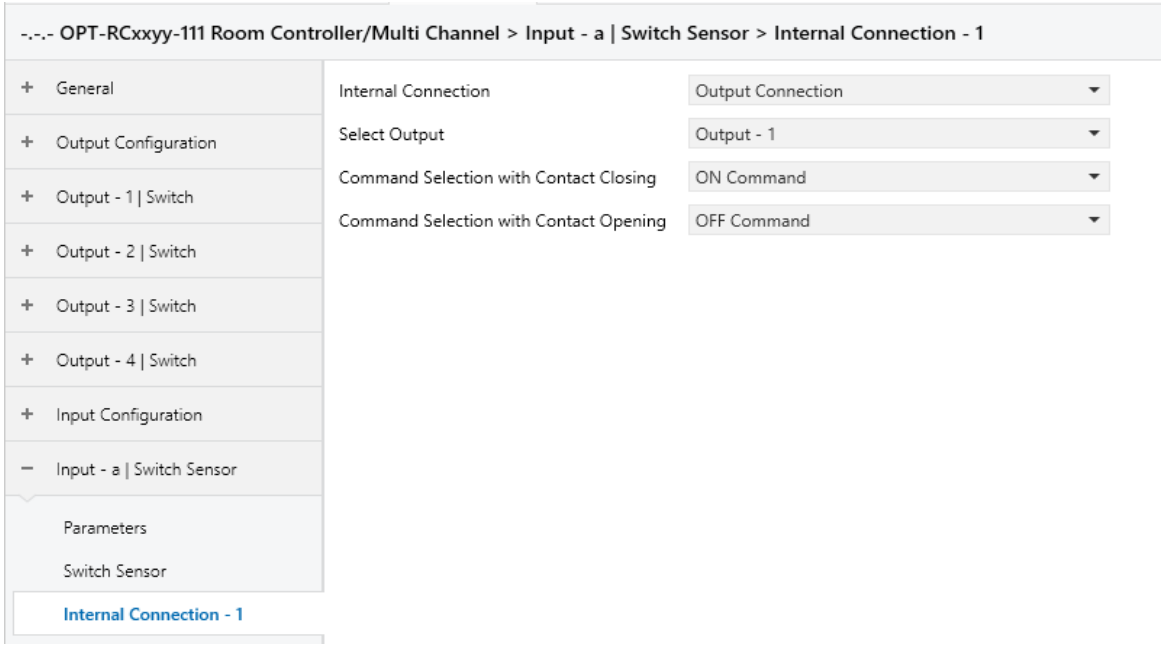
5.6 Internal Connection - x

Internal Connection allows an internal link to be established between the device's input and output channels without the need to bind group objects. In this way, information received from an input can directly control the corresponding output channel via parameters. When Internal Connection is enabled, the device can send a value directly, trigger the scene parameters of an output channel, or perform other operations appropriate to the selected output function. Since this operation takes place only within the internal structure of the device, the corresponding input or output group objects can still continue to be used externally by being linked to other group addresses. Internal Connection provides a fast and independent control mechanism within the device for applications requiring internal automation.

Note: After the parameters have been loaded into the device, the device can continue to operate even if the KNX bus voltage is not present. In this case, it is sufficient to power the device via an external 24…30 V DC supply. Thus, the input-output relationships defined within Internal Connection and the internal device functions continue to operate. However, KNX bus communication cannot be performed without KNX line power.

5.6.1 Output Connection

Output Connection allows the corresponding input channel to internally control the outputs within the device. This feature can only be used with output channels configured with the Switch function.

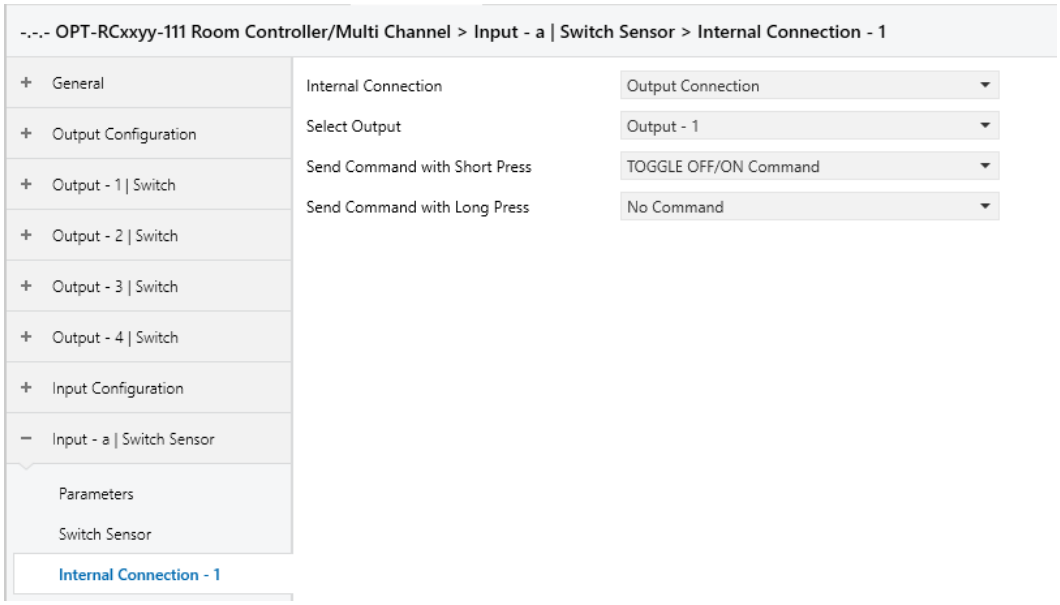


5.6.1.1 Select Output

This parameter is used to define which output channel will be controlled by the input channel. The output channels configured with the Switch function are listed, and the desired output is selected from this list.

5.6.1.2 Send Command with Press

This is the basic transmission method used when the “Wait for Long Operation” parameter is disabled. When the corresponding input is triggered, the selected command is transmitted to the defined output channel. Available commands are: No Command, ON Command, OFF Command, TOGGLE Command. The default value is “No Command.”



Note: If a duration is assigned to the "Wait for Long Operation" parameter for the input channel, two separate command options appear instead of a single command:

5.6.1.3 Send Command with Short Press

This parameter defines the command to be sent during a short press (when the button is released before the long-press duration expires). Available commands are: No Command, ON Command, OFF Command, TOGGLE Command. The default value is "TOGGLE Command."

5.6.1.4 Send Command with Long Press

This parameter defines the command to be sent when the long-press duration has elapsed.

Available commands are: No Command, ON Command, OFF Command, TOGGLE Command.

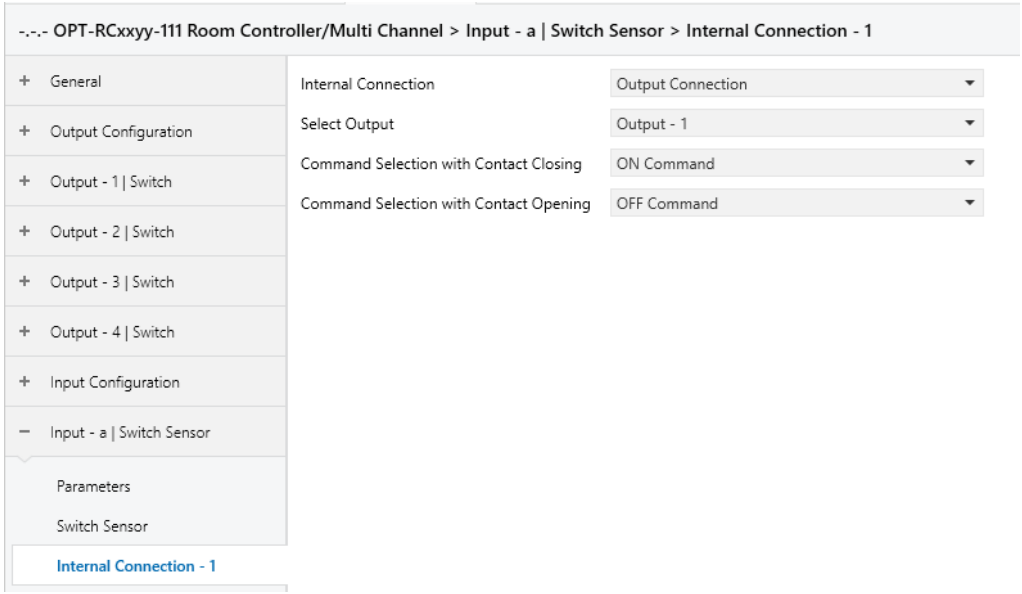
The default value is "No Command."

• **ON Command:** A value "1" is sent to the output.

• **OFF Command:** A value "0" is sent to the output.

• **TOGGLE Command:** The current state of the output is inverted.

• **NO Command:** No command is sent (*Default*).



Note: If the Button Type of the corresponding channel is set to Switch Button, two additional parameters become visible:

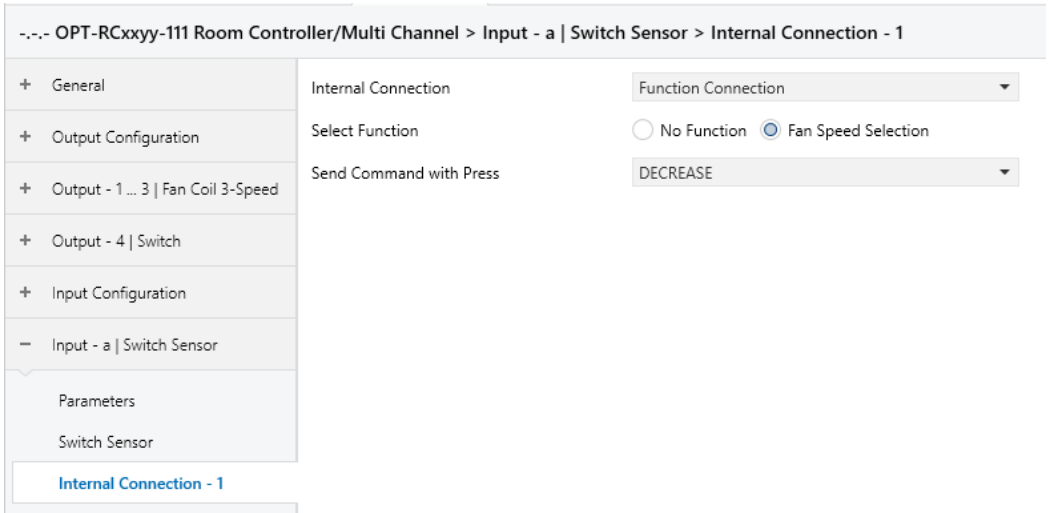
5.6.1.5 Command Selection with Contact Closing

This parameter defines the command to be sent to the output channel when the switch contact changes from the defined contact position to the other state (e.g., Normally Open → Closed). The available commands are the same as those in the Output Connection section (No Command, ON Command, OFF Command, TOGGLE Command). The default value is "ON."

5.6.1.6 Command Selection with Contact Opening

This parameter defines the command to be sent to the output channel when the switch contact changes in the opposite direction (e.g., Closed → Open). The command list again consists of the same options (No Command, ON Command, OFF Command, TOGGLE Command). The default value is "OFF."

5.6.2 Function Connection



Function Connection allows an input channel to directly control a specific function within the device.

5.6.2.1 Select Function

This parameter is used to define which function will be controlled within the corresponding Internal Connection configuration. The available options include Fan Speed Selection or Shutter (X…X) functions linked to specific output pairs.

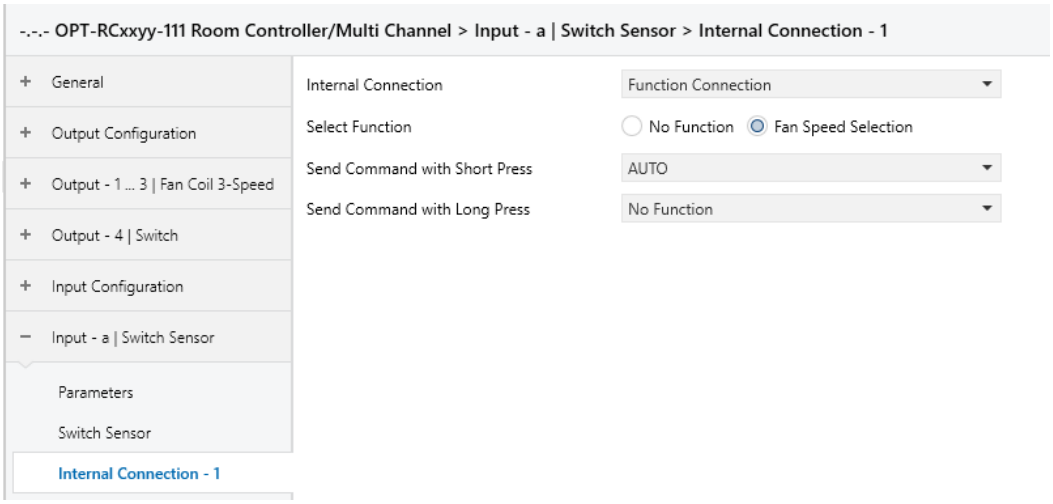
Note: If the button type of the corresponding input channel is set to Switch Button, the Window Contact for FCU parameter option becomes available.

5.6.2.2 Fan Speed Selection

In this mode, the input channel controls the fan speed of the corresponding Fan Coil output using defined commands. When the "Wait for Long Operation" parameter is disabled, only the Send Command with Press parameter is displayed.

5.6.2.2.1 Send Command with Press

This parameter defines the command to be sent to the Fan Coil function when the input is triggered. The default value is Decrease. The available commands are listed below:



5.6.2.2.2 Send Command with Short Press

This parameter defines the fan speed command to be sent during a short press. Default value: AUTO

5.6.2.2.3 Send Command with Long Press

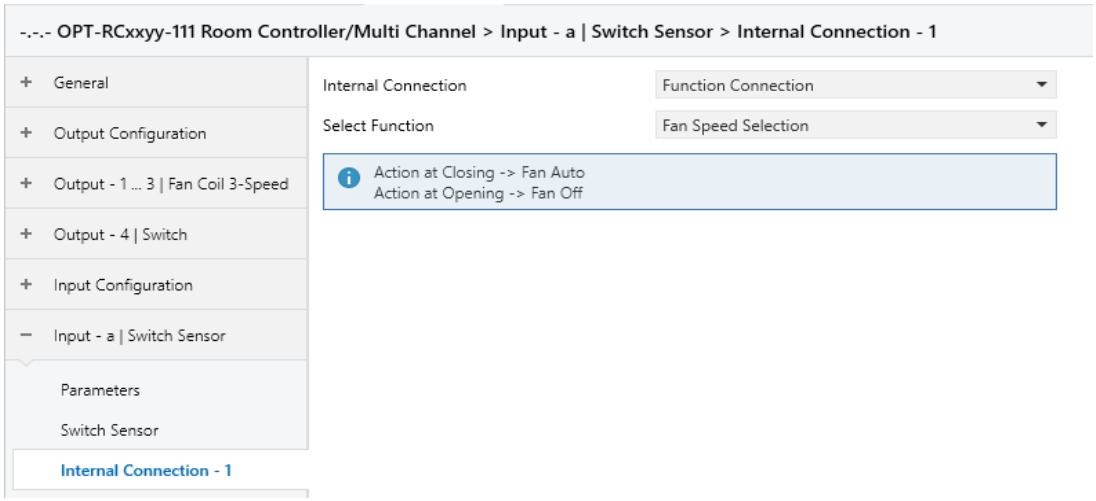
This parameter defines the command to be sent when the long-press duration has elapsed.

- **DEFAULT VALUE:** No Command
- **OFF:** Sets the fan to Stage 0. If Fan Coil Automatic Mode is active, automatic mode is disabled.
- **LOW:** Sets the fan to Stage 1. If Automatic Mode is active, automatic mode is disabled.
- **MID:** Sets the fan to Stage 2. If Automatic Mode is active, automatic mode is disabled.
- **HIGH:** Sets the fan to Stage 3. If Automatic Mode is active, automatic mode is disabled.

• **DECREASE:** Decreases the fan speed by one stage. If Automatic Mode is active, automatic mode is disabled.

• **INCREASE:** Increases the fan speed by one stage. If Automatic Mode is active, automatic mode is disabled.

• **AUTO:** Forces the Fan Coil unit to switch to Automatic Mode. In this mode, the fan speed is automatically determined by the system's control algorithm.



Note: When the Switch Button is selected, the fan mode of the Fan Coil unit is controlled based on the contact closing and opening states of the input. In this case, two parameters automatically become visible:

5.6.2.3 Fan Speed Selection (Switch Button)

When the Switch Button is selected, the fan mode of the Fan Coil unit is controlled according to the contact closing and opening states of the input. In this case, two parameters automatically become visible:

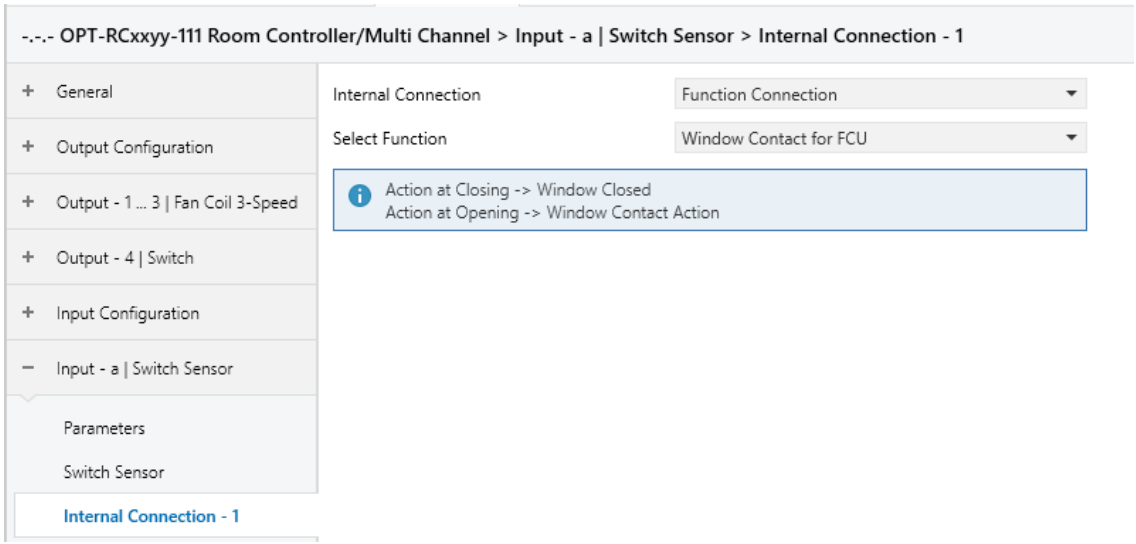
5.6.2.3.1 Action at Closing

When the contact closes, the Fan Coil unit is switched to Automatic Mode. (The fan speed of the FCU is automatically determined according to the control algorithm.)

5.6.2.3.2 Action at Opening

When the contact opens, the fan is set to the OFF position.

5.6.2.4 Window Contact for FCU (Switch Button)



Note: When the Switch Button is selected, the fan mode of the Fan Coil unit is controlled according to the contact **closing** and **opening** states of the input. In this case, two parameters automatically become visible:

5.6.2.4.1 Action At Closing

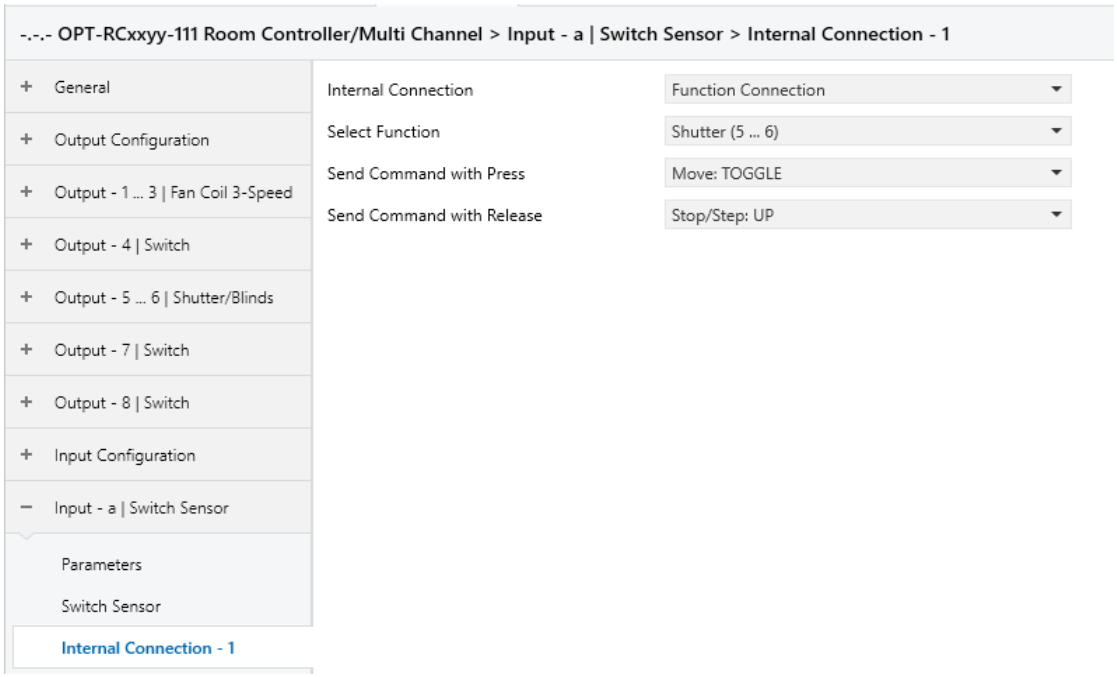
When the input contact *closes*, a Down command (window assumed closed) is applied to the corresponding output. This allows the FCU to detect the window as closed and continue normal operation.

5.6.2.4.2 Action At Opening

When the input contact *opens*, an Up command (window assumed open) is applied to the corresponding output. In this case, the FCU may stop or limit the fan and valve outputs by assuming that the window is open (according to the behavior defined in the Window Contact Action parameter of the output channel).

5.6.2.5 Shutter (x … x)

The Shutter function allows the input channel to directly control shutter/blind outputs. Depending on the selected button type, the commands to be sent are configured through different parameters.



5.6.2.5.1 Send Command with Press

This parameter defines the command to be sent when the button is pressed. Available options: UP, DOWN, STOP/STEP DOWN, STOP/STEP UP, TOGGLE. The default value is "TOGGLE."

5.6.2.5.2 Send Command with Release

This parameter defines the command to be sent when the button is released. Available options: No Function, UP, DOWN, STOP/STEP UP, STOP/STEP DOWN. The default value is "STOP/STEP UP."

• **UP**: Moves the shutter upward.

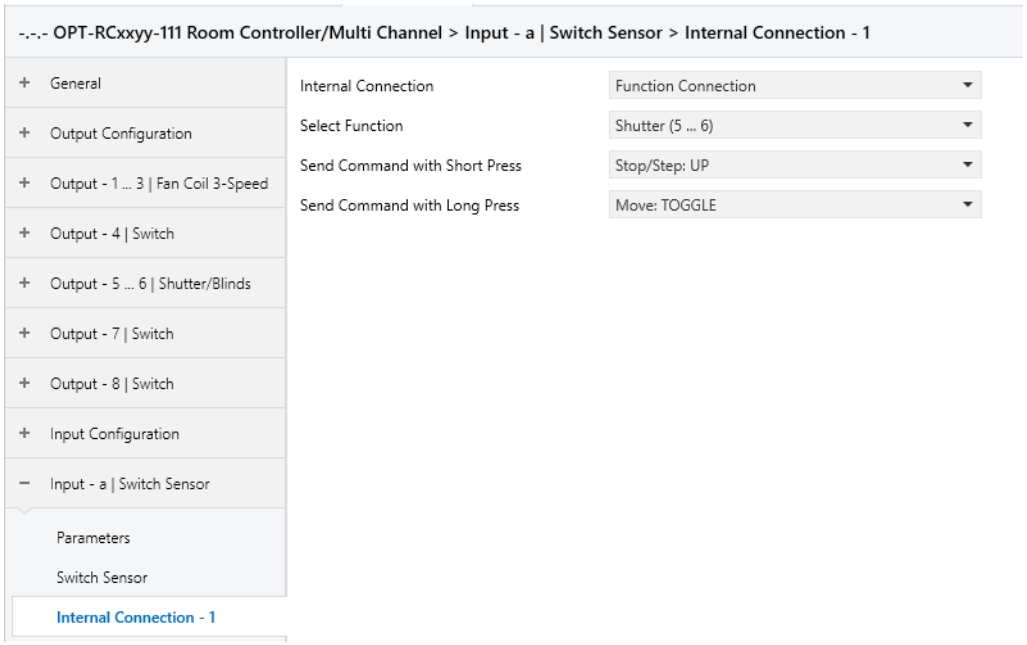
• **DOWN**: Moves the shutter downward

• **STOP/STEP DOWN**: Stops movement or sends a short step-down command.

• **STOP/STEP UP**: Stops movement or sends a short step-up command.

• **TOGGLE**:Toggles between UP and DOWN depending on the current state.

• **NO FUNCTION:** No command is sent.



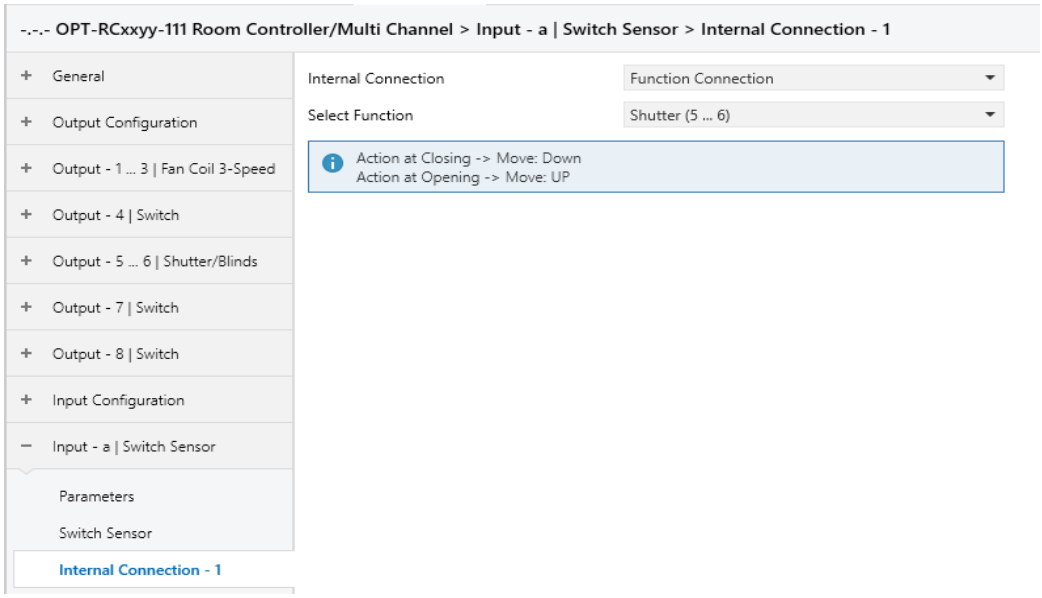
Note: When a duration is entered for the "Wait for Long Operation" parameter, the Push Button behavior is divided into two actions:

5.6.2.5.3 Send Command with Short Press

This parameter defines the command to be sent when the button is released before the "Wait for Long Operation" time expires. Available options: UP, DOWN, STOP/STEP DOWN, STOP/STEP UP, TOGGLE. The default value is "TOGGLE."

5.6.2.5.4 Send Command with Long Press

This parameter defines the command to be sent when the button is held longer than the defined duration. Available options: UP, DOWN, STOP/STEP DOWN, STOP/STEP UP, TOGGLE. The default value is "STOP/STEP UP."



Note: When the Switch Button is selected, contact closing and opening states are evaluated instead of press/release actions. In this case, the following two parameters automatically become visible:

5.6.2.5.5 Action At Closing

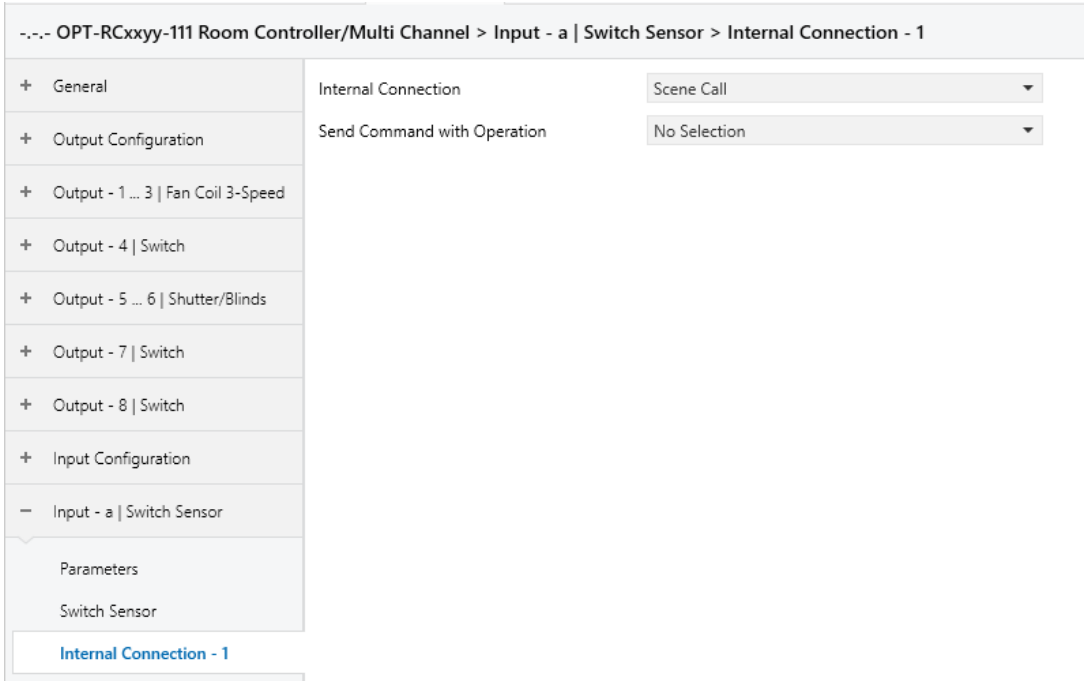
When the contact closes, a DOWN command is sent.

5.6.2.5.6 Action At Opening

When the contact opens, an UP command is sent.

5.6.3 Scene Call

The Scene Call function allows scenes with the same scene number (Scene 1…64) on the corresponding output channels to be triggered according to the command sent from the input channel. The behavior of each scene is preconfigured in the "Scene" section of the respective output channel. Therefore, the scene number selected at the input causes the execution of the scene with the same number on the outputs.

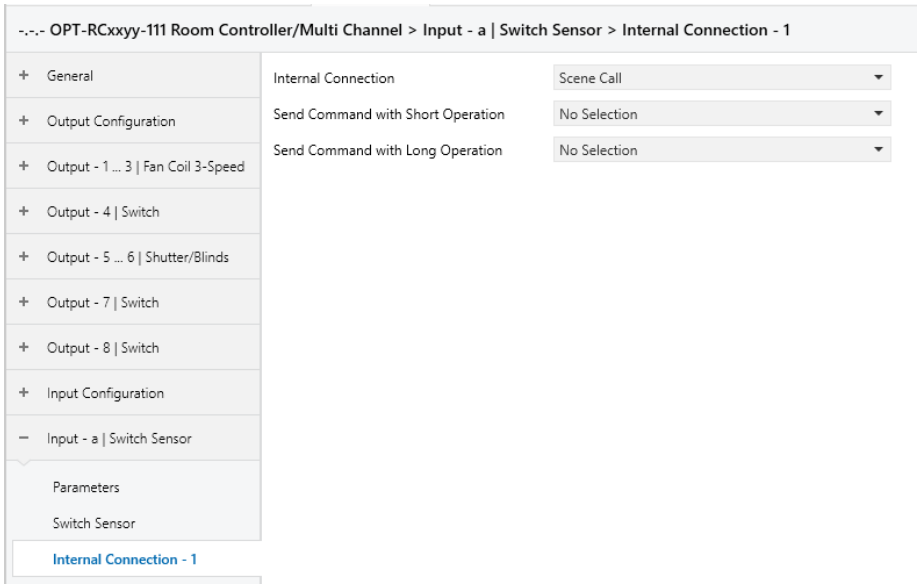


5.6.3.1 Send Command with Operation

This parameter is used to select the scene that will be triggered when the button is pressed. Available options: No Selection, Scene 1…64. The default value is "No Selection".

• **Scene 1 … Scene 64 :** The selected scene is triggered on the outputs.

• **No Selection :**No command is sent. (Default)



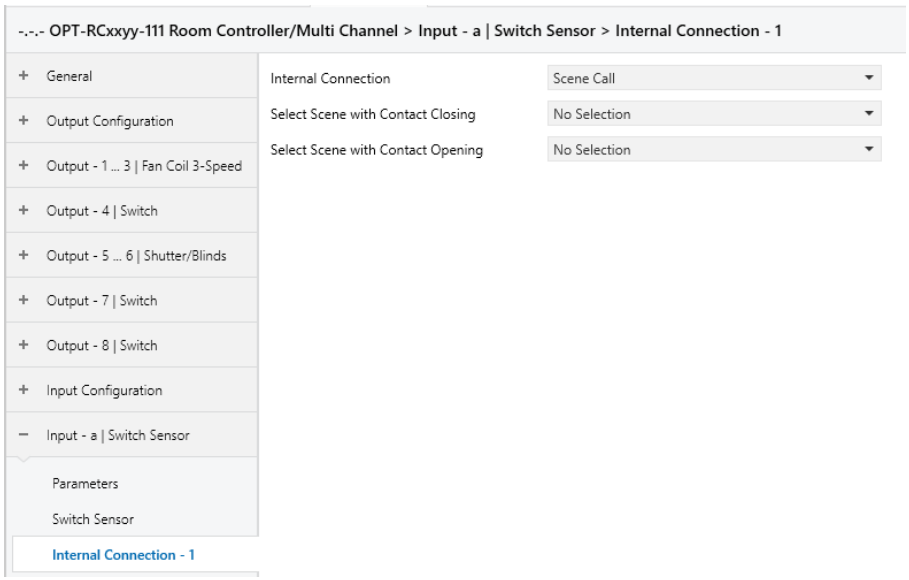
Note: When a duration is entered for the "Wait for Long Operation" parameter, two separate behaviors become available:

5.6.3.2 Send Command with Short Operation

This parameter defines the scene to be triggered when the button is released before the long-press duration expires. Available options: No Selection, Scene 1…64. The default value is "No Selection."

5.6.3.3 Send Command with Long Operation

This parameter defines the scene to be triggered when the button is held and the long-press duration is exceeded. Available options: No Selection, Scene 1…64. The default value is "No Selection.



Note: When Switch Button is selected, the input triggers scenes based on contact closing/opening states instead of press actions, and if the "Read Input and Send Status After Restart and Turn Back Auto Mode" parameter is enabled, the initially selected scene is recalled at startup.

5.6.3.4 Select Scene with Contact Closing

This parameter selects the scene to be triggered when the contact closes. Available options: No Selection, Scene 1…64. The default value is "No Selection."

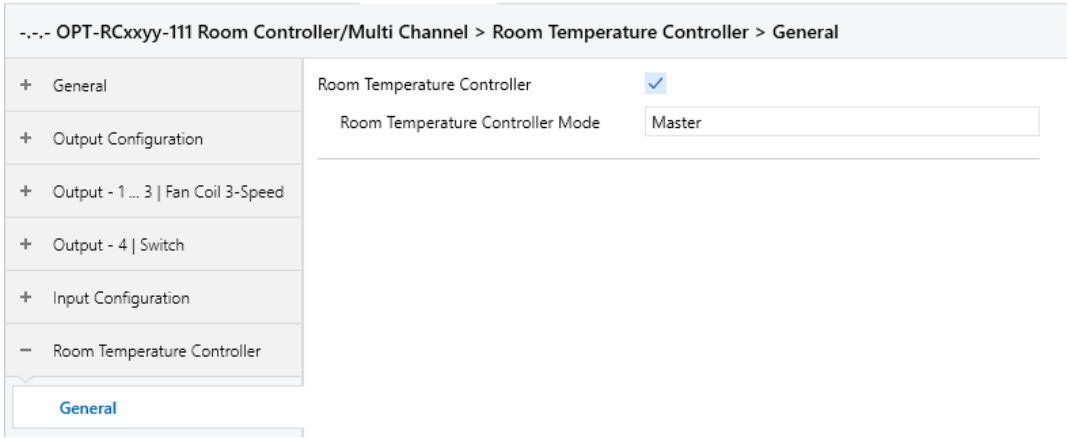
5.6.3.5 Select Scene with Contact Opening

This parameter selects the scene to be triggered when the contact opens. Available options: No Selection, Scene 1…64. The default value is "No Selection."

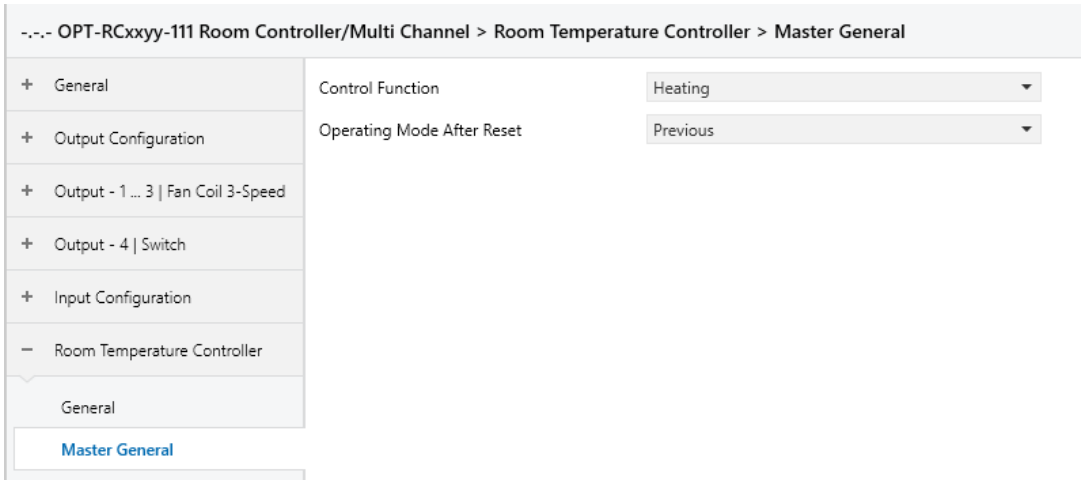
6. Room Temperature Control (RTC)

6.1 General

The Room Temperature Control (RTC) general function comes with the OPT-RCxxyy-111 product. The use of the function depends on the status of the parameter; if the control checkbox is not activated, the relevant communication objects will not be displayed. RTC operates as a master device.



6.2 Master General



No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
102	RTC-Master	Fan Speed Request	Input	1-byte	5.010 counter pulses	C	-	W	-
103	RTC-Master	Confirmed Fan Speed Status	Output	1-byte	5.010 counter pulses	C	R	-	T
106	RTC-Master	Request Fan Auto	Input	1-bit	1.001 switch	C	-	W	-
107	RTC-Master	Confirm Fan Auto	Output	1-bit	1.001 switch	C	R	-	T

Table 12: RTC-2 Communication Objects

It is activated by selecting it from the parameters. The master mode is used if the RTC is to operate alone or with at least one slave-programmed RTC device. In this mode, the device that decides on the control is selected as the master, while the information affecting the control decision is provided by the slave-programmed RTC device, and feedback is sent from the master device to the slave device.

6.2.1 Control Function

This is the section where the regions in which the RTC function can operate are selected. Here, the RTC can be selected as a heating controller, cooling controller, or both heating and cooling controller. This selection is made considering the heating and cooling elements used in the system. Then, value selection parameters are chosen to properly manage these elements.

6.2.1.1 Heating

It is selected for systems with only heating elements. It processes according to the calculations between the calculated ambient temperature and the set value, and sends the necessary information to the output. By selecting an additional heating zone, multiple heating elements can be controlled.

6.2.1.2 Cooling

It is selected for systems with only cooling elements. It processes according to the calculations between the calculated ambient temperature and the set value, and sends the necessary information to the output. By selecting an additional cooling zone, multiple cooling elements can be controlled.

6.2.1.3 Heating and Cooling

It is selected for systems with both heating and cooling elements. It processes according to the calculations between the calculated ambient temperature and the set degree, and sends the information to the output based on the RTC's heating or cooling zone.

Note: Automatic mode is the mode where the RTC function decides which zone it should be in based on the environmental conditions. (See 6.4Setpoint Changes)

6.2.2 HVAC Operating Modes

• **Comfort Mode:** This mode operates according to the comfort set temperature of the controlled area.

• **Standby ve Eco/Night Mode:** These modes provide energy savings by shifting the comfort set temperature up or down (depending on the heating or cooling mode). The shift value can be selected from the parameters (See 6.4Setpoint Changes), and for the Economy/Night mode, this value is larger, thus ensuring economic usage.

• **Protection Mode:** This mode means the RTC is off. The outputs remain off until the ambient temperature reaches a critical state for the controlled zone. The RTC operating mode can be changed via the bus line.

Note: The priority table is consulted to determine the operating mode, with the priority order being from left to right.

Forced mode	Window Contact	Presence Input	Local/Bus	HVAC Status
Auto	No Alarm	Absence	Comfort	Comfort
Auto	No Alarm	Absence	Standby	Standby
Auto	No Alarm	Absence	Eco/Night	Eco/Night
Auto	No Alarm	Absence	Protection	Protection
Auto	No Alarm	Presence	-	Comfort
Auto	Alarm	-	-	Protection
Comfort	-	-	-	Comfort
Standby	-	-	-	Standby
Eco/Night	-	-	-	Eco/Night
Protection	-	-	-	Protection

Table 13: RTC-3 Communication Objects

Auto:0, Comfort:1, Standby:2, Eco/Night:3, Protection:4

• **Forced Mode:** The forced mode is the highest priority object in determining the operation mode. If the mode set through this mode is not an automatic mode, it cannot be changed from anywhere else (e.g., another communication object).

• **Window Contact:** This object is the second priority in the priority table. As long as the window contact value is 0 (closed), the next object in the priority table is considered, and in this case, the window contact does not determine the operation mode. When the window contact value is 1 (open), it switches to protection mode.

• **Local/Bus:** This is the lowest priority in the priority table. Modes are selected via values received from the communication object.

Note: When the forced mode is set to auto, data is requested from the window contact and presence input objects.

6.2.2.1 Operating Mode After Reset

When the RTC starts operating, it begins in the operation mode selected in the parameters. If "Previous" is selected, the RTC remembers its last state and starts in that mode.

6.2.3 RHCC Feedback

The communication object, according to the RHCC (Room Heating Cooling Control) device status specification, provides the heating/cooling operating mode, active/passive operation, and real temperature measurement error.

The RHCC status is transmitted as a 2-byte data object. In this device implementation, the heating/cooling operating mode is encoded in the least significant bit (Bit 0) of the data field. The remaining bits are reserved and shall be ignored.

Bit Definition – RHCC Status (2 Bytes)

Byte	Bit	Value	Description
Byte 0	Bit 0 (LSB)	0	Cooling mode
Byte 0	Bit 0 (LSB)	1	Heating mode
Byte 0	Bit 1–7	–	Reserved
Byte 1	Bit 8–15	–	Reserved

Note: This object is used for status indication only. Reserved bits are set to 0 and may be used in future extensions.

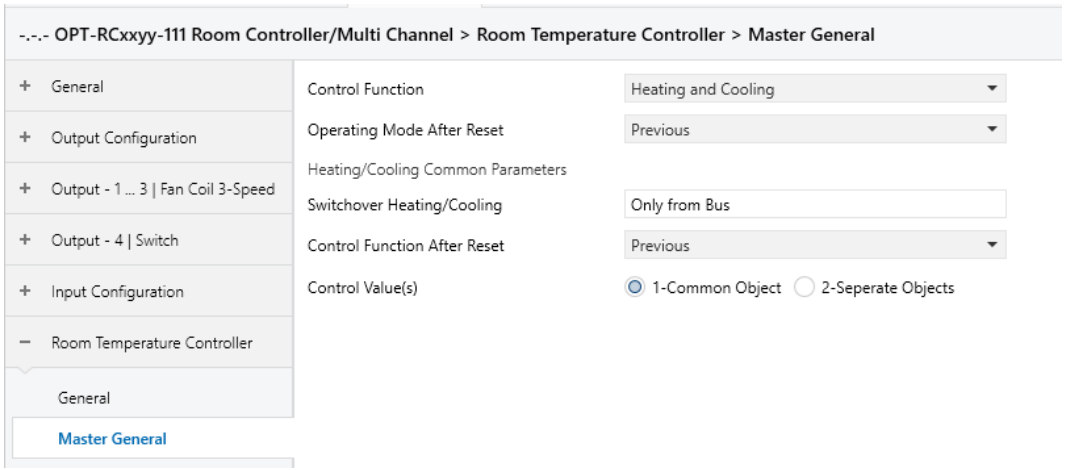
6.2.3.1 HVAC Controller Status

The RTC operation mode (comfort, standby, eco/night), operating zone (heating, cooling), and RTC active/passive status are the communication objects it sends.

Bit No	Function	Value
B0	Comfort	0 = false 1 = true
B1	Standby	0 = false 1 = true
B2	Night	0 = false 1 = true
B3	Frost/Heat Protection	0 = false 1 = true
B4		
B5	Heat/Cool	0 = cooling 1 =heating
B6	Controller Status	0 = inactive 1 = active
B7		

Auto:0, Comfort:1, Standby:2, Eco/Night:3, Protection:4

6.2.4 Heating/Cooling Common Parameters



No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
128	RTC- Heating/ Cooling	HVAC Control Mode Input	Input	1-byte	20.105 HVAC Control Mode	C	-	W	-
129	RTC- Heating/ Cooling	HVAC Control Mode Status	Output	1-byte	20.105 HVAC Control Mode	C	R	-	T
130	RTC- Heating/ Cooling	HVAC Changeover Mode Input	Input	1-byte	20.107 Changeover Mode	C	-	W	-
131	RTC- Heating/ Cooling	HVAC Changeover Mode Status	Output	1-byte	20.107 Changeover Mode	C	R	-	T
132	RTC- Heating/ Cooling	Heating Cooling Select	Input	1-bit	1.100 heating/ cooling	C	-	W	-
138	RTC- Heating/ Cooling	Heating Cooling Select Status	Output	1-bit	1.100 Heating / Cooling	C	R	-	T

Table 14: RTC-4 Communication Objects

6.2.4.1 Control Function After Reset

• **Previous:** The RTC remembers the control function it was in before the restart and starts in that mode.

• **Heating:** The RTC disregards the control function it was in before the restart and starts in heating mode.

• **Cooling:** The RTC disregards the control function it was in before the restart and starts in cooling mode.

• **Automatic:** The RTC disregards the control function it was in before the restart and starts in automatic mode, comparing the ambient and set temperatures to decide the appropriate mode.

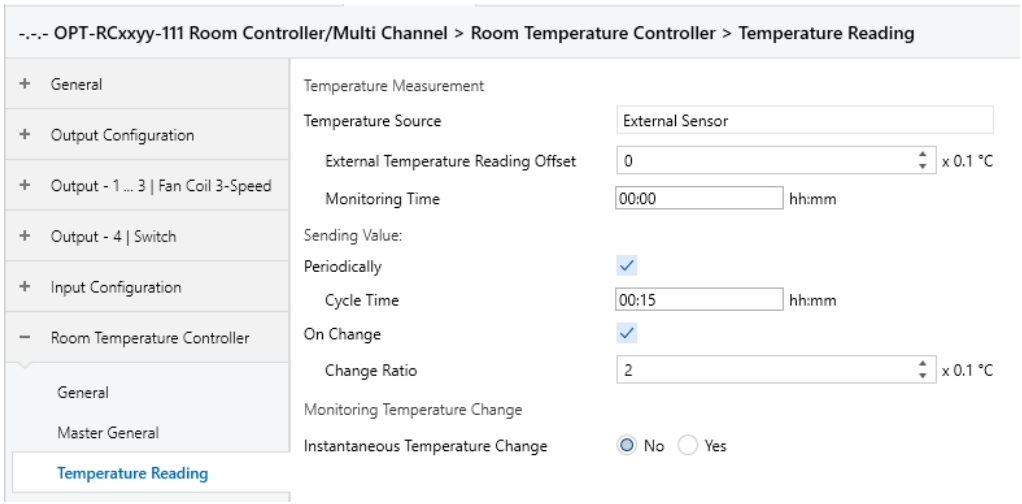
6.2.4.2 Control Value(S)

Common Object: If this option is selected, the control value is sent via a common object. The RTC sends the calculated value for heating or cooling mode through the same object. This option is suitable for systems that do not have both heating and cooling modes simultaneously, such as two-pipe heating-cooling systems. In this parameter, the control value cannot be separated for heating and cooling zones; the control type selected for the heating zone applies to the cooling zone as well. Additional zones are not valid; different control types can be used for heating and cooling additional zones.

Separate Object: If this option is selected, the control value is sent via two different objects. The RTC selects the object to send based on the heating or cooling mode, and the other object always receives a closed or 0% value. This option is suitable for systems that can perform both

heating and cooling simultaneously, such as four-pipe heating-cooling systems. In this parameter, the control value can be selected differently for heating and cooling zones.

6.3 Temperature Reading



No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
122	RTC- Temperature Reading	Internal Temperature	Output	2-bytes	9.001 Temperature (°C)	C	R	-	T
123	RTC- Temperature Reading	Actual Temperature Error (inactive)	Output	1-bit	1.005 Alarm	C	-	-	T
124	RTC- Temperature Reading	External Temperature	Input	2-bytes	9.001 Temperature (°C)	C	-	W	-
125	RTC- Temperature Reading	Temperature Output	Output	2bytes	9.001 Temperature (°C)	C	R	-	T
126	RTC- Temperature Reading	Fault Temperature Reading	Output	1-bit	1.005 alarm	C	R	-	T
127	RTC- Temperature Reading	Instantaneous Temperature Change	Output	1-bit	1.005 alarm	C	R	-	T

Table 15: RTC-5 Communication Objects

6.3.1 Temperature Measurement

6.3.1.1 Temperature Source

The RTC function can use the temperature sensor located in the OPT-RCxxyy-111, data from the bus line, or a combination of both sources to obtain the ambient temperature. The source is selected from the parameters.

6.3.1.1.1 External Sensor

The temperature information received from the bus line is selected as the source, and output calculations are performed using the obtained value. This value can be conditioned via parameters (offset).

6.3.1.1.1.1 External Temperature Reading Offset

This adjusts the ambient temperature value received from the bus line by adding or subtracting a value. The entered value is multiplied by '0.1' and added to the measured ambient temperature.

6.3.1.1.1.2 Monitoring Time

The RTC waits for ambient temperature data at specified intervals. This interval is selected from the parameters. If the temperature data is not received within the time period specified in the parameter, the RTC assumes there is an error in the ambient temperature reading, publishes an alarm object, and RTC function will stop.

Note: Selecting a duration of 00:00 indicates that monitoring is not performed. The RTC does not expect periodic data flow.

6.3.2 Sending Value

6.3.2.1 Periodically

Determines the frequency at which the ambient temperature data obtained from the selected source is sent to the bus line.

6.3.2.1.1 Cycle Time

The calculated ambient temperature data is sent to the bus line at the specified time intervals.

Note: If the ambient temperature cannot be obtained due to an error, the data is not sent to the bus line periodically.

6.3.2.2 On Change

Sends data to the bus line when the value obtained from the selected source changes by the specified amount.

6.3.2.2.1 Change Ratio

The value specified in the parameter is multiplied by '0.1' to obtain the change ratio. The calculated ambient temperature is compared with the previous value. If the difference is equal to or greater than the value calculated in the parameter, the calculated ambient temperature is sent to the bus line.

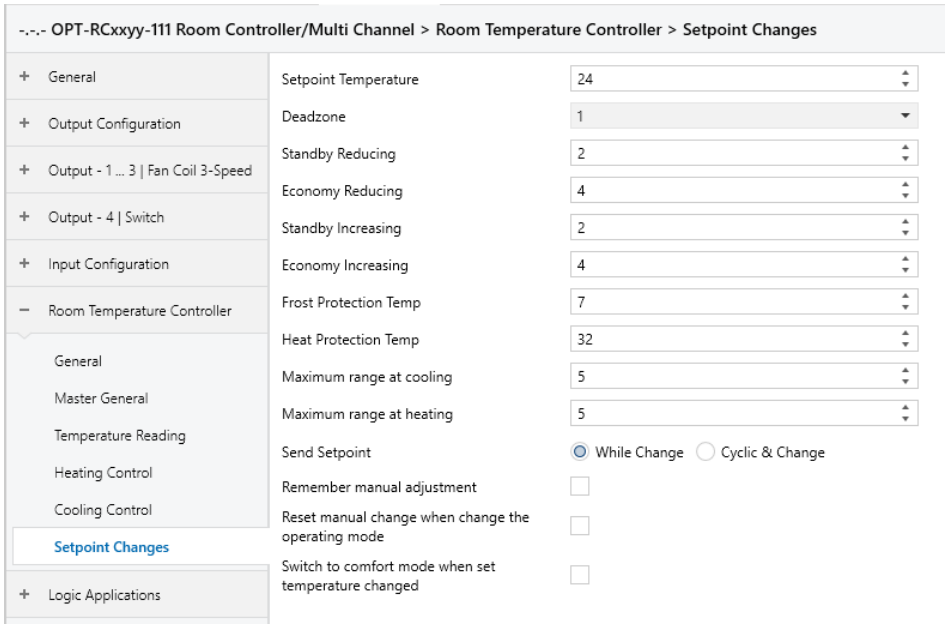
6.3.3 Monitoring Temperature Change

6.3.3.1 Instantaneous Temperature Change

• **No:** Instantaneous temperature change is not monitored.

• **Yes:** Instantaneous temperature change is monitored. If a specified or greater temperature change occurs within the defined time, an alarm value is sent to the bus line from the relevant communication object.

6.4 Setpoint Changes



No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
120	RTC- Setpoint	Set Temperature Output	Output	2-bytes	9.001 temperature(°C)	C	R	-	T
121	RTC- Setpoint	Set Temperature Request	Output	2-bytes	9.001 temperature(°C)	C	-	W	T

Table 16: RTC-6 Communication Objects

This section is where the setpoint temperature settings for the RTC are configured. Parameters are used to select the desired dead zone for heating and cooling transitions (if automatic mode is available), define the degrees for increasing and decreasing economy and standby modes, and set the critical setpoint temperatures for freezing and heating protection modes.

6.4.1 Setpoint Temperature

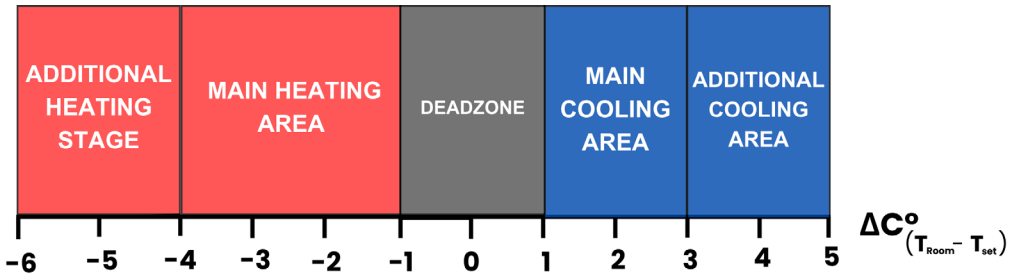
The value to which the OPT-RCxxyy-111 is initially set is determined via parameters. If the“Remember manual adjustment” parameter is not selected, the device starts with the parameter value. If selected, the last setpoint adjustment will be applied.

6.4.2 Deadzone

Used when the heating-cooling transition is in automatic mode. It is the required temperature difference between the setpoint and ambient temperature for mode changes. At the start of the RTC function, if within the dead zone, it does not consider this area and determines the operating range based on the difference between the ambient and set temperatures. The dead zone is considered in temperature difference changes between ambient and set temperatures.

Note: This parameter is only applicable for the heating-cooling selected control function. It does not become Enable if only heating or only cooling is selected.

Example of heating-cooling zone transition with a 1°C dead zone.



6.4.3 Standby Reducing

When the RTC is operating in the heating zone, this specifies the reduction value of the set temperature when the standby mode is activated. If the 'switch to comfort mode when set temperature changed' parameter is not selected, the set value can be changed while in standby mode. In standby mode, the heating-cooling zone may change (if in automatic mode). If this parameter is selected, set changes are not allowed in standby mode, and the RTC switches to comfort mode when the set value is changed.

6.4.4 Economy Reducing

When the RTC is operating in the heating zone, this specifies the reduction value of the set temperature when the economy mode is activated. If the 'switch to comfort mode when set temperature changed' parameter is not selected, the set value can be changed while in economy mode. In economy mode, the heating-cooling zone may change (if in automatic mode). If this parameter is selected, set changes are not allowed in economy mode, and the RTC switches to comfort mode when the set value is changed. (The set value reduction in economy mode is generally larger than in standby mode.)

6.4.5 Standby Increasing

When the RTC is operating in the cooling zone, this specifies the increase value of the set temperature when the standby mode is activated. If the 'switch to comfort mode when set temperature changed' parameter is not selected, the set value can be changed while in standby mode. In standby mode, the heating-cooling zone may change (if in automatic mode). If this parameter is selected, set changes are not allowed in standby mode, and the RTC switches to comfort mode when the set value is changed.

6.4.6 Economy Increasing

When the RTC is operating in the cooling zone, this specifies the increase value of the set temperature when the economy mode is activated. If the 'switch to comfort mode when set temperature changed' parameter is not selected, the set value can be changed while in economy mode. In economy mode, the heating-cooling zone may change (if in automatic mode). If this parameter is selected, set changes are not allowed in economy mode, and the RTC switches to comfort mode when the set value is changed.

6.4.7 Frost Protection Temp

A critical threshold is set for frost protection. When the RTC is in the heating zone, it does not activate the outputs until the calculated ambient temperature reaches the set threshold. This mode means the RTC is off, but a critical threshold must be set to prevent damage to the controlled area (e.g., damage to belongings, freezing of water in pipes, etc.). When the measured ambient temperature reaches the critical threshold, the RTC heats the environment until it rises above the threshold.

6.4.8 Heat Protection Temp

A critical threshold is set for heat protection. When the RTC is in the cooling zone, it does not activate the outputs until the calculated ambient temperature reaches the set threshold. This mode means the RTC is off, but a critical threshold is set to prevent damage to the controlled area. When the measured ambient temperature reaches the critical threshold, the RTC cools the environment until it falls below the threshold.

6.4.9 Maximum Range at Cooling

Defines the range of setpoint temperatures in the cooling zone. It is the number of steps in both positive and negative directions from the starting setpoint temperature.

Example :Maximum range at cooling: 5°C Setpoint Temperature: 24 Range at cooling: 19°...24°...29°

6.4.10 Maximum Range at Heating

Defines the range of setpoint temperatures in the heating zone. It is the number of steps in both positive and negative directions from the starting setpoint temperature.

6.4.11 Send Setpoint

The setpoint temperature can be sent to the bus line if required. There are two methods for this:

• **While Change:** Sends the data to the bus line with every change in the setpoint temperature. (The setpoint can be read from the bus line whenever needed.)

• **Cyclic and Change:** Sends the setpoint to the bus line periodically based on the entered window time, regardless of changes. Additionally, if there is a change in the setpoint, it is sent to the bus line immediately, regardless of the time.

6.4.12 Remember Manual Adjustment

When the device is restarted, it remembers the last manually adjusted setpoint temperature and starts with this value. If not selected, it starts with the initial setpoint temperature defined in the parameters.

6.4.13 Reset Manual Change When Change The Operating Mode

When the operating mode is changed, the setpoint to be referenced is selected. If the parameter is selected, the setpoint will be increased or decreased (depending on the heating-cooling zone) from the initial setpoint when the operating mode is changed. If the parameter is not selected, the setpoint of the new operating mode will be calculated based on the current value.

Example : Initial setpoint value: 24°C, Current setpoint value: 26°C, Zone: Heating, Standby reducing 2°C.)

If parameter is selected : Standby Set: 22°C – If parameter is not selected: Standby Set: 24°C

- Parameter selected: Standby Set: 22°C
- Parameter not selected: Standby Set: 24°C

6.4.14 Switch To Comfort Mode When Set Temperature Changed

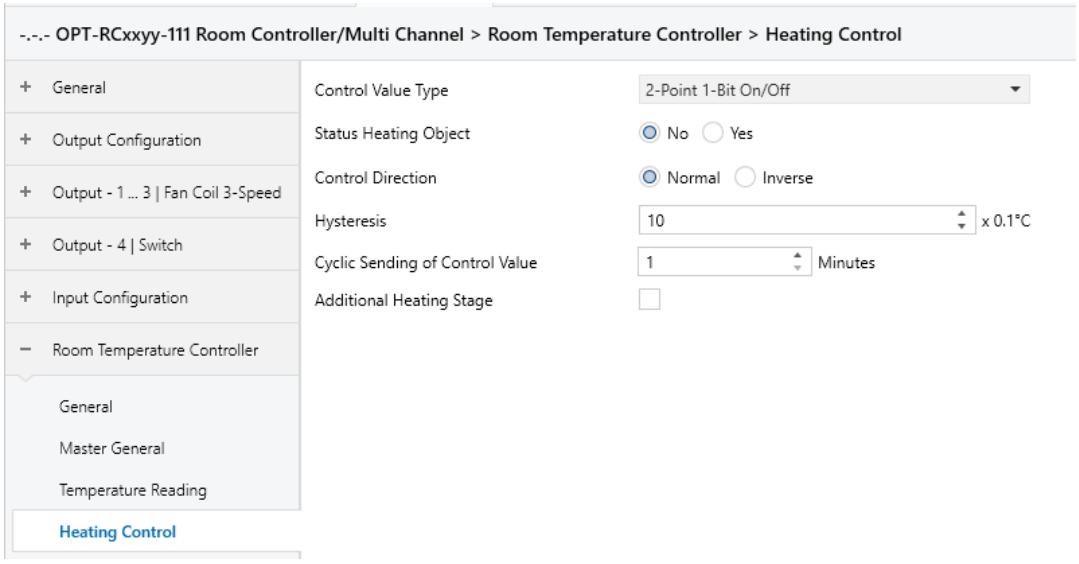
If selected, when the setpoint temperature changes (bus line), the operating mode will switch to comfort mode if it was in standby or economy mode. It can be switched back to standby or economy mode if desired. In protection mode, the setpoint cannot be changed, so the mode will not switch to comfort. If not selected, changing the setpoint temperature does not change the Enable mode; the setpoint temperature changes for standby or economy mode.

6.5 Control Value Type

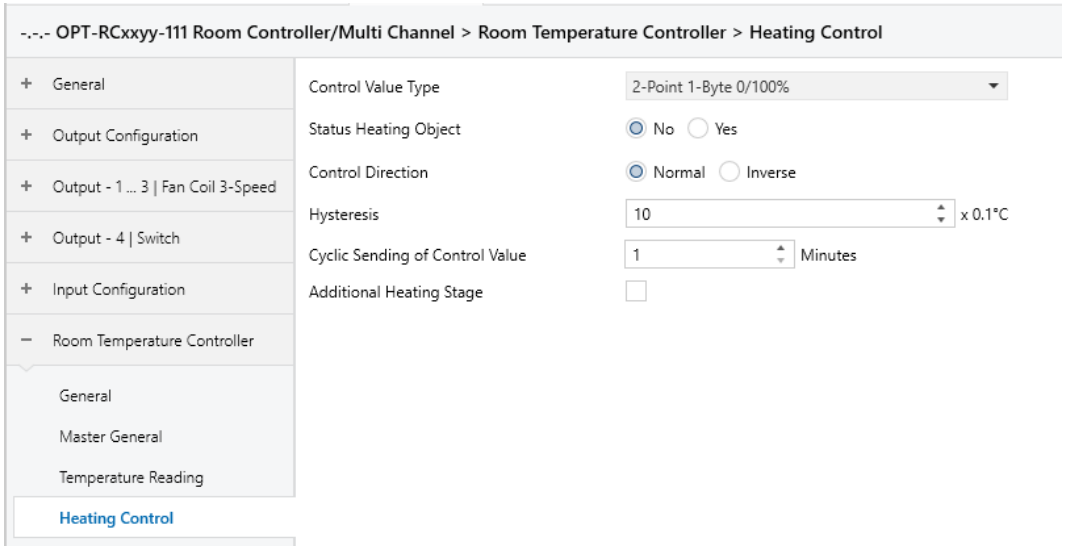
No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
133	RTC- Heating/ Cooling	Heating Cooling Control Value	Output	1bit/1byte	1.001 switch /5.001 percentage	C	-	-	T
134	RTC- Heating	Heating Control Value	Output	1bit/1byte	1.001 switch /5.001 percentage	C	-	-	T
135	RTC- Heating	Additional Heating Stage	Output	1bit/1byte	1.001 switch /5.001 percentage	C	-	-	T
136	RTC- Cooling	Cooling Control Value	Output	1bit/1byte	1.001 switch /5.001 percentage	C	-	-	T
137	RTC- Cooling	Additional Cooling Stage	Output	1bit/1byte	1.001 switch /5.001 percentage	C	-	-	T
139	RTC- Heating	Heating Status	Output	1-bit	1.001 switch	C	-	-	T
140	RTC- Cooling	Cooling Status	Output	1-bit	1.001 switch	C	-	-	T

Table 17: RTC-7 Communication Objects

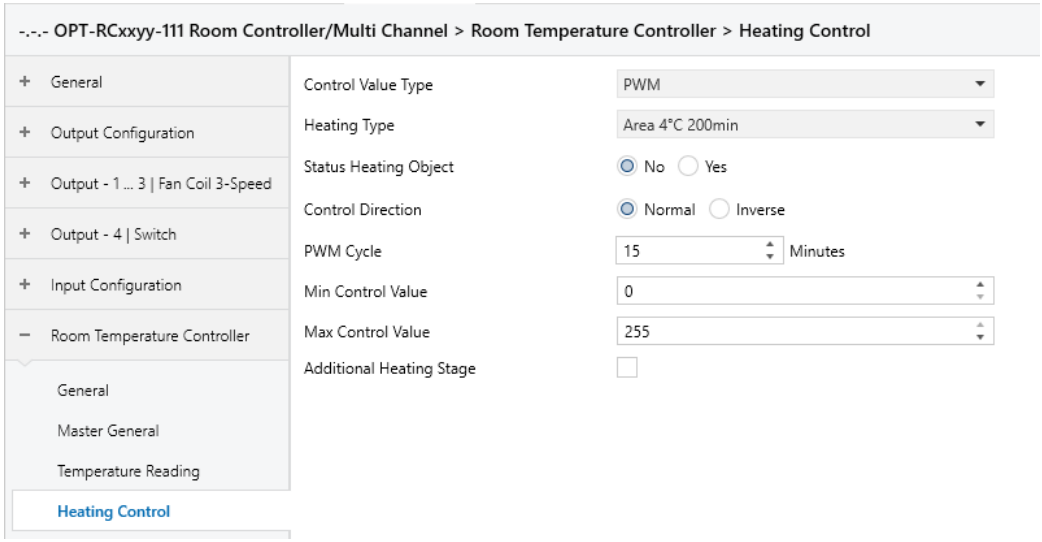
• **2 Point 1 Bit On/Off:** This is the simplest control type. The thermostat turns on when the room temperature drops below a certain level (setpoint temperature minus hysteresis) and turns off when the temperature exceeds a certain level (setpoint temperature plus hysteresis). On and off telegrams are transmitted as 1-bit telegrams.



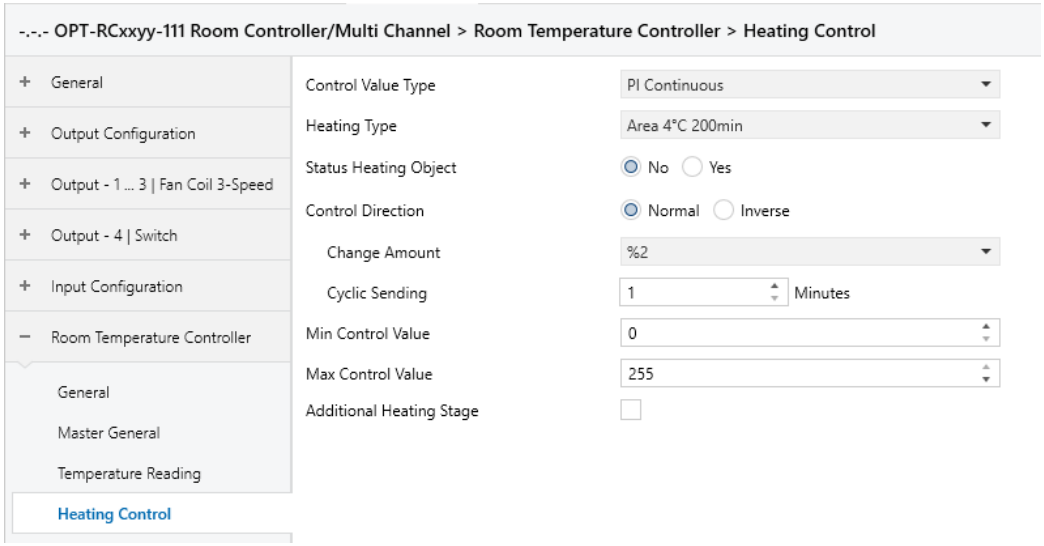
• **2 Point 1 Byte 0/100%:** This is similar to the 2-point control described above. However, in this case, the on and off telegrams are transmitted as 1-byte values (0% / 100%).



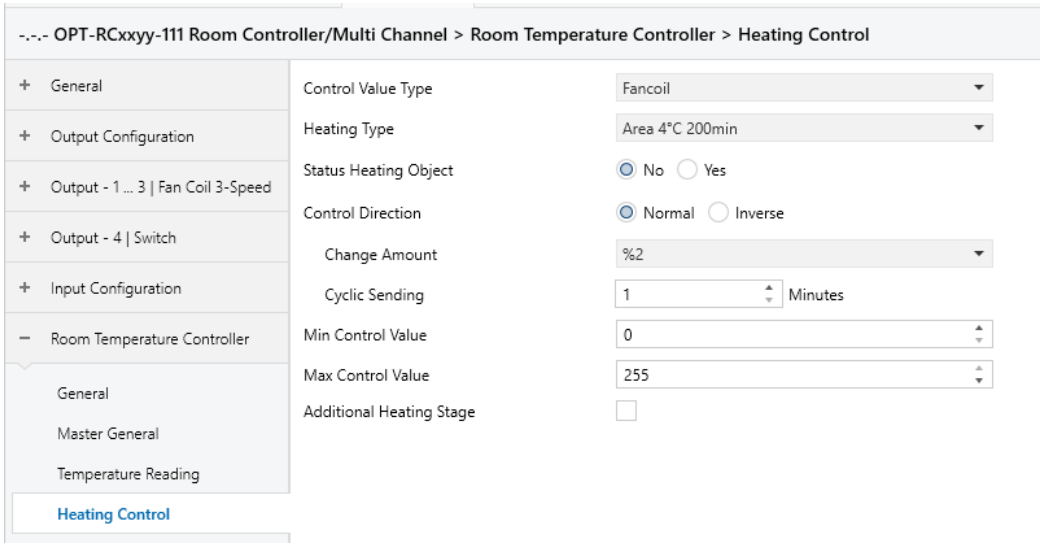
• **PI PWM On/Off:** This is a PI (Proportional-Integral) controller. Here, the output is a 1-bit telegram. The calculated control value is converted into a pulse width modulation (PWM) signal.



• **PI Continuous 0-100%:** A PI controller adjusts the output value between 0% and 100% to match the difference between the actual value and the setpoint value, ensuring precise regulation of room temperature. The control value is transmitted to the bus line as a 1-byte value (0% - 100%). To reduce bus line congestion, the control value is only transmitted when there is a certain percentage change from the previously sent value. The control value can also be transmitted cyclically.



• **Fan Coil**: The fan coil controller operates similarly to the PI continuous controller. Additionally, it allows separate activation of the fan in the fan coil unit (e.g., fan speed levels 1-5).



6.5.1 2 Point 1 Bit On/Off - 1 Byte 0-255

The 2 Point 1 Bit On/Off – 0-255 control type provides a simple and effective control for the RTC (Room Thermostat Controller) based on specific parameters when heating or cooling. This control type sends an output signal by considering the room temperature, hysteresis value, and the setpoint temperature. The system generates and sends an output value when the temperature moves outside the defined temperature range (hysteresis).

1 Bit On/Off Parameter: If the 1-bit on/off parameter is selected, the output is sent as an on or off value through a 1-bit communication object.

1 Byte 0-255 Parameter: If the 1-byte 0-255 parameter is selected, the output is sent as a 0 or 255 value through a 1-byte communication object.

The output value (1 bit or 1 byte) is transmitted to the bus line when the temperature deviates from the setpoint by the hysteresis range defined in the parameters.

6.5.1.1 Status Heating Object

When the RTC is in heating mode, it operates in sync with the control value. If the control value is positive, it sends a value of 1 (ON) through the corresponding communication object to the bus line. If the control value indicates an inEnable state (e.g., when the setpoint temperature is reached), it sends a value of 0 (OFF) to the bus line.

6.5.1.2 Status Cooling Object

Similarly, when the RTC is in cooling mode, it operates in sync with the control value. If the control value is positive, it sends a value of 1 (ON) through the corresponding communication object to the bus line. If the control value in- dicates an inEnable state (e.g., when the setpoint temperature is reached), it sends a value of 0 (OFF) to the bus line.

6.5.1.3 Control Direction

The control direction can be adjusted parametrically. By default, when the control value is Enable, it sends:

• **1 Bit Object:** 1 (ON)

• **1 Byte Object:** 255

This default behavior can be reversed using the parameter settings. In this case:

• **1 Bit Object:** 0 (OFF)

• **1 Byte Object:** 0

• **1 Bit Object:** 1 (ON)

• **1 Byte Object:** 255

6.5.1.4 Hysteresis

6.5.1.4.1 Heating Control Hysteresis

For Heating Mode:

• **Activation Condition:** The heating output activates when the calculated room temperature is lower than or equal the desired set Temperature.

• **Deactivation Condition:** The output remains Enable until the room temperature reaches the set temperature. Once the set temperature is achieved, the heating output deactivates.

• **Reactivation:** After deactivation, the system will wait until the room temperature drops below the hysteresis threshold to reactivate the heating output.

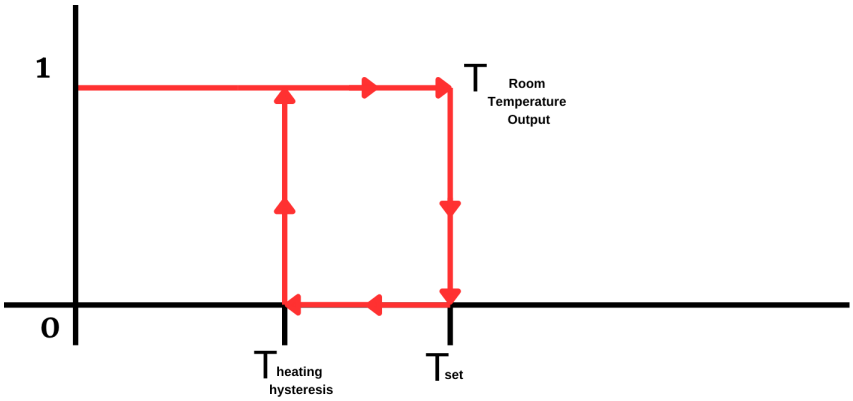
Example:

• **Set Temperature (Theating):** 22°C

• **Hysteresis:** 2°C

• **Heating Output Deactivation:** Room temperature ≥ 22°C

• **Reactivation Threshold:** Room temperature < 20°C (22°C - 2°C)



6.5.1.4.2 Cooling Control Hysteresis

For Cooling Mode:

• **Activation Condition:** The cooling output activates when the calculated room temperature is higher than or equal the desired set Temperature.

• **Deactivation Condition:** The output remains Enable until the room temperature reaches the set temperature. Once the set temperature is achieved, the cooling output deactivates.

• **Reactivation:** After deactivation, the system will wait until the room temperature exceeds the hysteresis threshold to reactivate the cooling output.

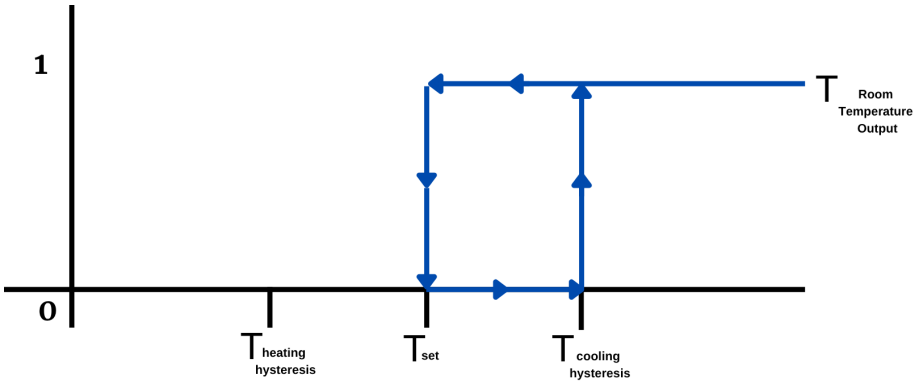
Example:

• Set Temperature (Tcooling): 22°C

• Hysteresis: 2°C

• Cooling Output Deactivation: Room temperature ≤ 22°C

• Reactivation Threshold: Room temperature > 24°C (22°C + 2°C)



6.5.1.5 Cyclic Sending Control Value

The calculated control value can be sent to the bus line periodically. The interval for sending the control value to the bus line is selected in this area, and the value is sent through a communication object at the specified time interval.

Note: Changes in the control value are sent to the bus line regardless of the parameter settings. If there is a change in the heating/cooling zone, the control value is reset.

6.5.2 Common Parameters For PI Controlled Value Types

• **Proportinal Component:** Considers the instantaneous difference between the room temperature and the set temperature. The larger the difference (error), the faster the response rate of the control value. As the difference (error) decreases, the response rate of the control value decreases proportionally.

• **Integral Component:** Considers the accumulated error amount over time. The amount of error is tracked proportionally; if the value produced by the PI controller does not reduce the error at the expected rates, the PI control value increases to bring the set point closer.

6.5.2.1 Heating / Cooling Type

The magnitude and speed of the PI control response are parametric, affecting the performance of the heating and cooling elements in the system, user comfort, and energy savings. Pre-set values for the PI controller can be found in the parameters (e.g., Area, Convector, Fan Coil). Alternatively, the PI controller parameters can be freely configured if desired.

• **Area (4°C 200 min):** The PI controller generates a control value to achieve a temperature change of 4°C within 200 minutes. During this period, the PI controller uses both proportional and integral components to adjust the system's response rate and control value to bring the temperature closer to the target. This allows the system to respond more quickly and accurately.

• **Convector (1,5°C 100 min):** The PI controller generates a control value to achieve a temperature change of 1.5°C within 100 minutes.

• **Free Configuration:** Free configuration allows the user to manually set the P and I values. This provides more flexibility and can be adjusted according to the specific requirements of a system or application.

Proportional Gain generates the control signal by multiplying the temperature error (difference) by a specific factor. The error is multiplied by 0.1 to obtain the proportional gain.

P=Kp×e(t)

where KpK_pKp is a constant coefficient. For example, if the temperature error is 2°C and Kp=0.1K_p = 0.1Kp=0.1, the proportional control coefficient would be 0.2.

Integral Gain considers the accumulated error over time. It is determined in minutes, and the control signal is created by multiplying the integral of the error by a specific coefficient.

I=Ki×∫0t e(τ) dτ

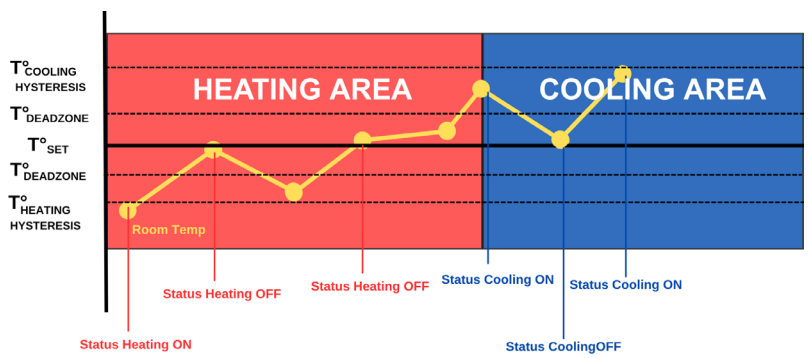
where Ki is a constant coefficient determined in minutes. This coefficient controls the rate at which the error accumulates over time.

6.5.2.2 Status Heating Object / Status Cooling Object

This parameter indicates whether the system is Enablely heating or cooling (based on the current heating or cooling zone).

• **Yes:** If selected, the control value is taken into account. If the control value is positive, the RTC sends a 1-bit (ON) value from the relevant communication object to the bus line. When the control value reaches the setpoint, or when the RTC changes zones or is turned off, the value becomes '0', and a 0 (OFF) is sent to the bus line.

• **No:** If selected, no feedback is sent based on the control value.



6.5.2.3 Control Direction

PWM control value produces 1-bit 1 – 0 data and controls the system's on and off times with this data. This data can be inverted parametrically.

• **Normal:** If selected, the system remains on by sending a 1-bit 1 (ON) value and completes the PWM cycle by sending a 0 (OFF) value to turn off.

• **Inverse:** If selected, the data is inverted; the on time is triggered by a 0 (OFF) value, and the off time is triggered by a 1 (ON) value.

6.5.2.4 Min/Max Control Value

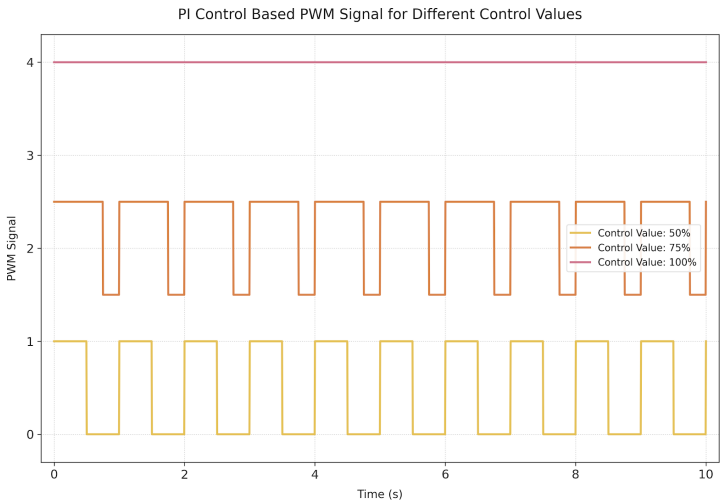
The limits of the PI control value are parameterized. Due to user preferences,

performance of heating and cooling elements, and energy saving considerations, the control value can be operated within the desired range. The PI controller scales the value it produces (between 0 and 255) to fit within these limits and manages PWM control accordingly.

• **Minimum Control Value:** This represents the smallest value that the control value can take. If the PI controller aims to set the control value to 0, the minimum value specified in the parameter will be sent to the bus line.

Note: If a value greater than 0 is entered for this parameter, the control value will always be Enable.

• **Maximum Control Value:** Indicates the highest value that the control value can assume. If the PI controller intends to set the control value to 100, the maximum value entered in the parameter will be sent to the bus line.



6.5.2.5 PWM

The PI (Proportional-Integral) PWM (Pulse Width Modulation) control type is used to precisely regulate the room temperature to the setpoint value. This control type converts the control value calculated by the PI controller into a 1-bit (on/off) telegram using the pulse width modulation (PWM) method.

6.5.2.6 PWM Cycle

The control value percentage determines the ON and OFF phases within a defined PWM (Pulse Width Modulation) cycle when the value is converted into a PWM signal. For example, a 40% control value in a 15-minute PWM cycle represents an ON phase of six minutes and an OFF phase of nine minutes.

PWM (Pulse Width Modulation): PWM enables the device to operate at the desired power level by switching the control signal ON and OFF at defined time intervals. The control value calculated by the PI controller is converted into a pulse width over a specific time period. For example, if the calculated value is 30%, the signal remains ON for 30% of the time and OFF for the remaining 70%.

6.5.3 PI Continuous / Fancoil

The PI controller adjusts the output value between 0% and 100% to match the difference between the calculated temperature and the setpoint value, ensuring precise regulation of the room temperature to the desired setpoint. The control value is sent to the bus line as a 1-byte value (0% - 100%).

6.5.3.1 Change Amount

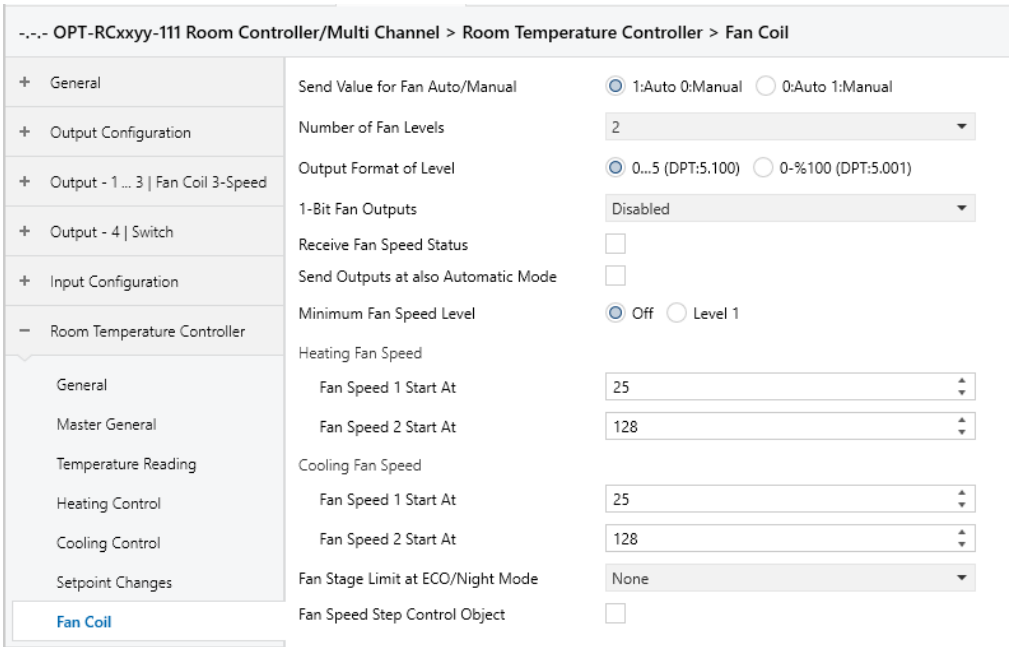
The control value is sent to the bus line based on a specific percentage change from the previously sent value to reduce bus line load, and it is also sent cyclically.

• **%2-%5-%10:** The control value is compared with the previously sent value each time it is calculated. If the amount of change is greater than the percentage specified in the parameter of the maximum control value, this new value is sent to the bus line. If the change is smaller, the value is not sent to the bus line.

• **Only Cyclic:** The control value is sent to the bus line only at the intervals specified in the parameter, regardless of the amount of change.

Note: When there is a change in the heating or cooling zone of the RTC, if the control value is sent from a single object, the value is sent as 0 to this object. If it is sent from two objects, the value 0 is sent to the communication object of the old mode.

6.5.4 Fancoil (Heating / Cooling)



No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
170	RTC- Fan Coil	Fan Speed Auto Control	Bidirectional	1-bit	1.001 switch	C	-	W	T
172	RTC- Fan Coil	Fan Speed Auto Control Status	Output	1-bit	1.001 switch	C	R	-	T
173	RTC- Fan Coil	Fan Speed Set	Output	1-byte	5.100 fan stage (0..255) 5.001 percentage	C	-	-	T
174	RTC- Fan Coil	Fan Speed 1	Output	1-bit	1.001 switch	C	-	-	T
175	RTC- Fan Coil	Fan Speed 2	Output	1-bit	1.001 switch	C	-	-	T
176	RTC- Fan Coil	Fan Speed 3	Output	1-bit	1.001 switch	C	-	-	T
177	RTC- Fan Coil	Fan Speed 4	Output	1-bit	1.001 switch	C	-	-	T
178	RTC- Fan Coil	Fan Speed 5	Output	1-bit	1.001 switch	C	-	-	T
179	RTC- Fan Coil	Fan Speed Step Control	Input	1-bit	1.001 switch	C	-	W	-
180	RTC- Fan Coil	Fan Speed Status	Input	1-byte	5.100 fan stage (0..255) 5.001 percentage	C	-	W	-

Table 18: RTC-8 Communication Objects

Fan coil units are devices used for heating or cooling a space and typically include a fan and a heat exchanger (coil). In a KNX system, the control of fan coil units can be achieved using a PI (Proportional-Integral) control algorithm to provide more precise and efficient temperature regulation

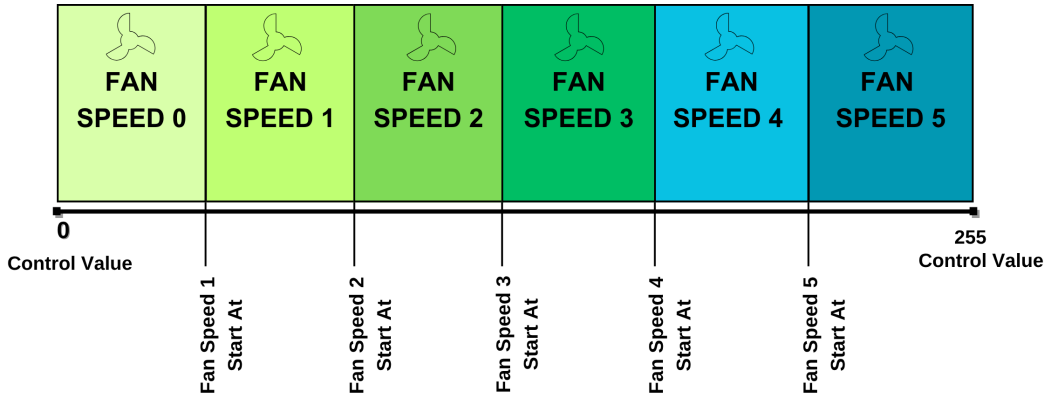
6.5.4.1 Send Value for Fan Auto/Manual

The fan coil fan stage can be set as automatic or manual. The automatically determined fan stage adheres to the fan stage thresholds specified in the parameter for the PI control value. In manual mode, the fan stage is determined by the data received on the bus line. In this case, the PI value is ignored, and the fan continues to operate at the specified stage until it is switched back to automatic mode. The fan auto/manual mode selection is done via 1-bit data with On or Off values, and this selection is parametric.

• **1: Auto 0: Manual:** If selected, the RTC fan stage switches to automatic mode with a 1 (ON) value and to manual mode with a 0 (OFF) value.

• **0: Auto 1: Manual:** If selected, the RTC fan stage switches to automatic mode with a 0 (OFF) value and to manual mode with a 1 (ON) value.

6.5.4.2 Number of Fan Level



This parameter specifies the number of fan levels in the fan coil unit used in the system. You can choose from 2, 3, or 5 levels. Threshold values are set for the selected levels. The fan level that corresponds to the range of the control value produced by the PI controller is sent to the bus line (if the fan is in automatic mode).

Note: If the minimum fan speed level 1 is selected, the fan stage cannot be 0

6.5.4.3 Output Format of Level

The transmission of the calculated or manually set fan speed value onto the bus line is configurable. The transmitted data may vary depending on the selected data type. The data type of the fan speed is selected using this parameter.

• **0..5 (DPT:5.100):** If selected, the fan level is sent to the bus line in 1 byte DPT5.100 (fan stage) data type

Fan Stage	DPT 5.100 Value
Fan Speed 0	0
Fan Speed 1	1
Fan Speed 2	2

Fan Stage	DPT 5.100 Value
Fan Speed 0	0
Fan Speed 1	1
Fan Speed 2	2
Fan Speed 3	3

Fan Stage	DPT 5.100 Value
Fan Speed 0	0
Fan Speed 1	1
Fan Speed 2	2
Fan Speed 3	3
Fan Speed 4	4
Fan Speed 5	5

• **0..100% (DPT 5.010):** Seçilirse fan kademesi bus hattına 1 byte DPT5.010 (percentage) veri tipinde knx standart değerlerine göre gönderilir.

Fan Stage	DPT 5.010 Value
Fan Speed 0	0
Fan Speed 1	128
Fan Speed 2	255

Fan Stage	DPT 5.010 Value
Fan Speed 0	0
Fan Speed 1	85
Fan Speed 2	170
Fan Speed 3	255

Fan Stage	DPT 5.010 Value
Fan Speed 0	0
Fan Speed 1	51
Fan Speed 2	102
Fan Speed 3	153
Fan Speed 4	204
Fan Speed 5	255

6.5.4.4 1 Bit Fan Outputs

The fan level is sent separately to the bus line as 1-bit data communication objects, depending on the parameter setting. If selected, the RTC sends the fan level information as 1 (ON) for Enable and 0 (OFF) for inEnable via the 1-bit communication object. There are two methods for sending this data, depending on the choice for the fan coil unit:

• **Disabled:** The fan level is not sent via 1-bit communication objects.

• **1 of Stages:** If selected, only the Enable fan stage sends the ON information, while inEnable stages send OFF information.

Example: In a 3-stage fan coil system, if stage 2 is Enable, stages 1 and 3 will send OFF values, while stage 2 will send ON (if there is a change).

• **All of stages:** If selected, the Enable stage and all lower stages send ON information, while higher stages send OFF values to the bus line (if there is a change).

Example: In a 5-stage fan coil unit, if stage 3 is Enable, stages 1, 2, and 3 will send ON information, while stages 4 and 5 will send OFF information.

6.5.4.5 Receive Fan Speed Status

If this parameter is selected, the fan speed feedback communication object will be used. In manual mode, the fan speed sent is dependent on the feedback value received and this value is considered correct. If a value different from what was sent by the RTC is received from the feedback object, the RTC will display the fan speed based on the received value.

If this parameter is not selected, the relevant communication object will not be visible, and the fan speed will operate without feedback. The RTC will not receive information about the operation of the fan speed it has sent, and will only be responsible for sending the value.

Note: This parameter can be used in cases where the fan speed is not sent to the bus line in automatic mode; therefore, if this parameter is selected, the 'send output at also Automatic Mode' parameter will be disabled.

6.5.4.6 Send Output at Also Automatic Mode

The RTC can send the fan speed to the bus line while in automatic mode or only report that it is in automatic mode. This option is parametric.

• **Selected:** The fan speed within the range of the PI controller will be sent to the bus line in the data type chosen in the parameter.

• **Not Selected:** The RTC will not send fan speed data to the bus line while in automatic mode, only informing that it is in automatic mode.

6.5.4.7 Minimum Fan Speed Level

The minimum fan speed level can be selected as either 1 or 0. If the minimum fan speed level is set to 1, the 0-speed fan option will not be available in the manual mode fan menu. In automatic mode, and if a value is being sent to the bus line, the fan speed is defined as 1 until the 'fan speed start at 2' threshold is reached.

6.5.4.8 Fan Stage Limit at ECO/Night Mode

When the RTC is set to ECO operation mode, it can limit the fan stages to provide energy savings and comfort. This option is parametric, and the fan stages can be limited according to the fan coil unit's allowed stages.

- **None:** Fan stages are not limited.
- **0-1-2-3-4:** The fan stages can be limited according to the number of stages in the fan coil unit. (For a 5-stage fan coil unit, the stages can be limited to 0-1-2-3-4; for a 3-stage unit, to 0-1-2; for a 2-stage unit, to 0-1). If the fan stage in ECO/Night mode is limited and the PI controller calculates a value above this limit, the highest allowed fan stage will be sent to the bus line. If a lower stage is calculated, this value will be sent to the bus line. In manual mode, the fan stage menu can be selected up to a limited value.

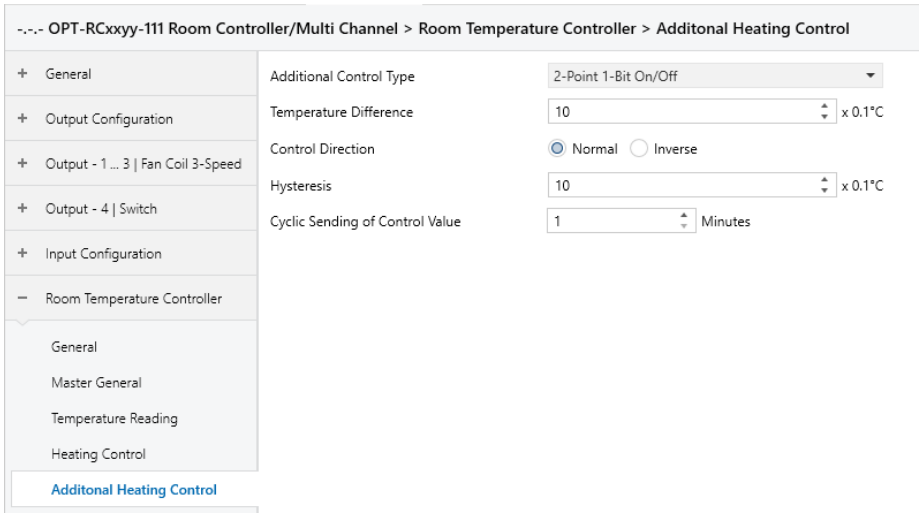
Note: If the Minimum Fan Speed Level parameter is set to "1," the limit cannot be 0.

6.5.4.9 Fan Speed Step Control Object

Change of fan stage could be done via a single communication object that has 1 bit data length. If parameter is selected related communication object becomes visible. Fan stage will be increased by an 'On value' through the communication object. Fan stage decreases by the Off value. (In a 3-stage system, if the 2nd stage is Enable, it switches to the 3rd stage with an ON signal and to the 1st stage with an OFF signal.)

Note: When the fan stage is at the maximum value, it does not change stages with an ON signal, and similarly, when it is at the minimum value, it does not change stages with an OFF signal.

6.6 Additional Heating/Cooling Stages



RTC can manage additional heating or cooling stages in environments where a primary heating or cooling element is either inadequate or requires rapid response. These additional stages are configured through the parameters of the extra zone.

6.6.1 Additional Control Types

All control types that RTC can manage are selected based on the type of secondary heating or cooling element. The control value is derived from the temperature difference from the setpoint.

• **2 Point 1 Bit, On/Off:** The simplest control type. The thermostat turns on when the room temperature falls below a set point minus hysteresis and turns off when it rises above the set point plus hysteresis. Telegrams are transmitted as 1-bit values.

• **2 Point 1 Byte, 0/100%:** Similar to the 2-Point On/Off control but uses 1-byte values (0% / 100%) for telegrams.

• **PI Continuous, 0-100%:** The PI controller adjusts the output between 0% and 100% to match the difference between the actual value and the setpoint, finely regulating the room temperature. The control value is sent as a 1-byte value (0% - 100%). For efficiency, the control value is only sent if there is a certain percentage change from the last sent value and can be sent cyclically.

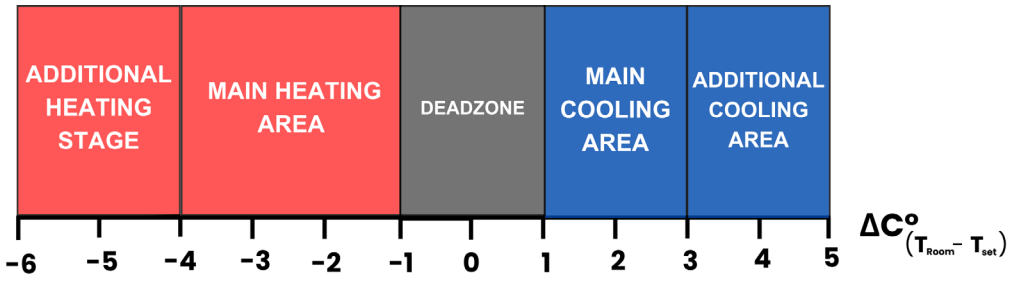
• **PI PWM, On/Off:** A PI controller where the output is a 1-bit telegram. The calculated control value is converted into a pulse width modulation (PWM) signal.

• **Fan Coil:** Works like a PI continuous controller but additionally allows separate control of the fan within the fan coil unit (e.g., fan speed levels from 1 to 5).

6.6.2 Temperature Difference

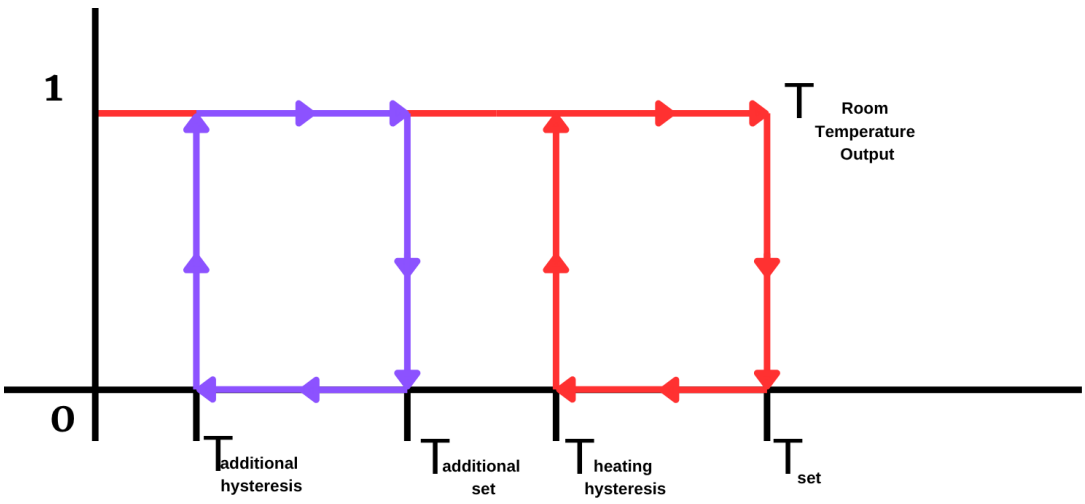
The activation of the additional zone is determined by the difference between the setpoint of the main zone and the additional zone, and this is parameterizable.

If the additional zone setpoint temperature difference is set to 0, the main zone and the additional zone will activate together.

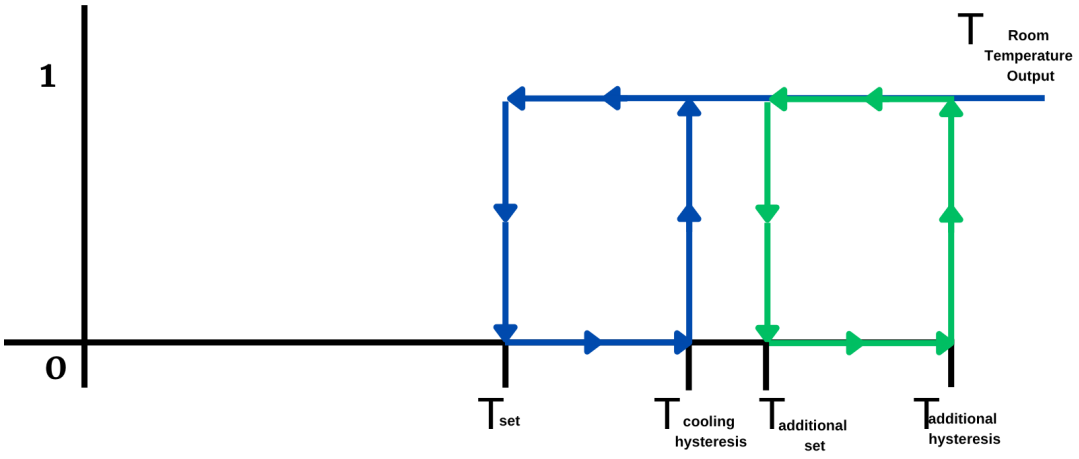


6.6.3 Additional Stage Hysteresis

When the required temperature difference for activating the additional zone is met, the RTC will activate the additional zone. The additional zone will be controlled until the temperature difference specified in the parameters is resolved and then deactivated. Afterward, it remains in the standby position for the hysteresis value, and the additional zone will reactivate after an increase or decrease (depending on the heating or cooling zone) equal to the hysteresis value.



Hysteresis Operation for Additional Heating Zone

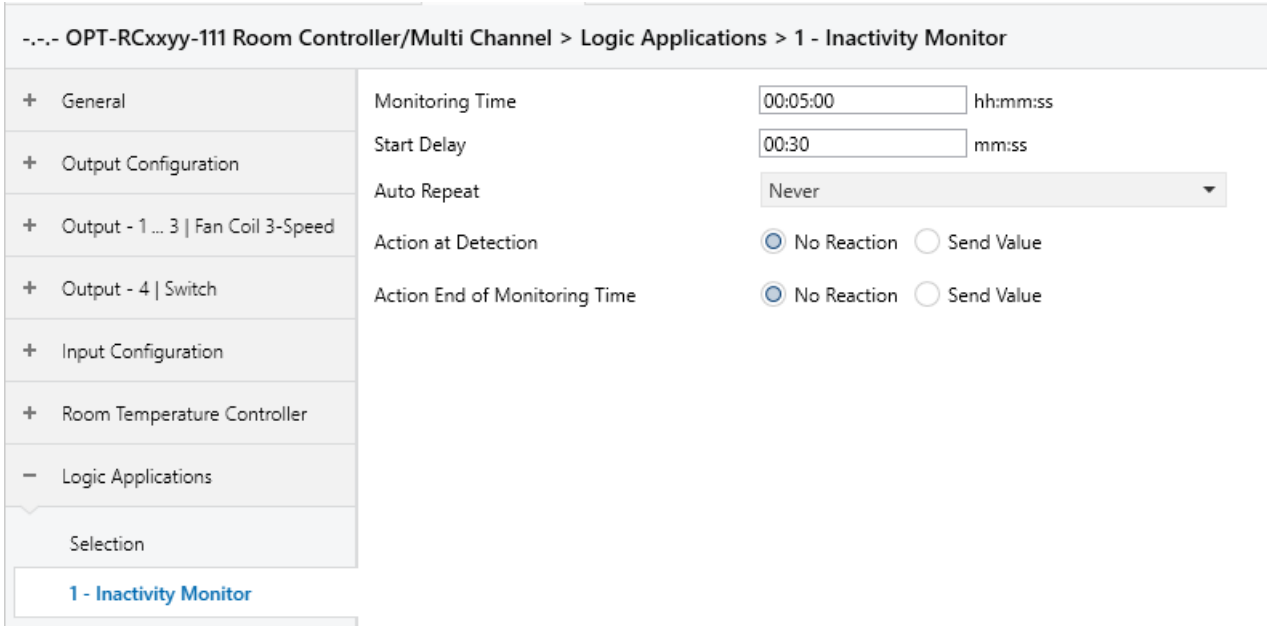


Hysteresis Operation for Addittional Cooling Zone

7 Logic Applications

7.1 Inactivity Monitor

This application is used to monitor the activity level of a space over a specified period. If no movement is detected during this time, it sends an inactivity signal. It can be used for monitoring hotel rooms or for security purposes to track activity in a specific area.



7.1.1 Monitoring Time

Defines the duration for monitoring movement. If no movement information is received from the movement information object during this period, the system will consider it as inactivity. The observation duration can be set through the "Observation Function Start" object. It can be set between 10 and 65536 seconds, with a default value of 300 seconds.

7.1.2 Start Delay

Used to set an initial delay before the device begins detection. It can be set between 0 and 255 seconds, with a default value of 5 seconds

7.1.3 Auto Continue

The observation function typically works as a single observation. After the delay, if no movement is detected during the observation period, the system will stop the function and send a "Stop" telegram from the Start/Stop object. If the list is selected twice, the system will automatically resend the "Start" telegram from the Start/Stop object if no movement is detected during the first observation and will activate the second observation period without delay. It will produce an output based on the condition during the second observation period and send a "Stop" telegram from the Start/Stop object.

7.1.4 Action at Detection

Determines whether any action will be taken upon movement detection. "Send Telegram" means no telegram will be sent. "Send Value" will send the value defined below.

7.1.4.1 Output Data Type

Determines the type of data that will be produced as a result of the observation. Options include "1-bit,""1-byte Counter Pulses,""1-Byte Percentage,""Scenario,""HVAC," or "2-Byte Temperature."

7.1.5 Action End of Monitoring Time

Determines what action will be taken if no movement is detected at the end of the monitoring period. If no action is to be taken, select "Send Telegram." If a value is to be sent, select "Send Value."

7.1.5.1 Output Data Type

Determines the type of data that will be produced as a result of the observation. Options include "1-bit,""1-byte Counter Pulses,""1-Byte Percentage,""Scenario,""HVAC," or "2-Byte Temperature."

7.1.6 Send Value

Defines the value to be sent when "Send Value" is selected. The value must be entered according to the selected "Output Type."

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA- x I Inactivity Monitor	Start/Stop Monitoring	Input	1-bit	1.010 Start/Stop	C	R	W	T
x	LA- x I Inactivity Monitor	Movement Input	Input	1-bit	1.001 Switch	C	R	-	T
x	LA- x I Inactivity Monitor	Action at Detection	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 UCount	C	-	-	T
				1-byte	5.001 Percentage	C	-	-	T
				1-byte	17.001 Scene Nr	C	-	-	T
				2-bytes	20.102 HVAC Mode	C	-	-	T
				2-bytes	9.001 Temperature	C	-	-	T
x	LA- x I Inactivity Monitor	Action End of Monitoring Time	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 UCount	C	-	-	T
				1-byte	5.001 Percentage	C	-	-	T
				1-byte	17.001 Scene Nr	C	-	-	T
				2-bytes	20.102 HVAC Mode	C	-	-	T
				2-bytes					

Table 19: Logic Applications - Inactivity Monitor Communication Objects

7.2 Scene Controller

A scene controller is an application that sends predefined values to n outputs, which can be of different data types. There can be one or more scenes for the same output group. Users may be granted the ability to save new values to the scenes if desired.

7.2.1 General Parameters

7.2.1.1 Scene Name

This field allows you to specify the name of the scene, making it easier to identify and distinguish between different scenes. For example, you might name a scene "Meeting Mode" or "Evening Lighting."

7.2.1.2 Scene Count

This parameter allows you to choose a value between 1 and 8, determining how many different scenes can be defined on the module.

7.2.1.3 Actuator Number

You can select a value between 1 and 8. This specifies how many actuators (devices controlled by the scene, such as lights or blinds) will be used in each scene.

7.2.1.4 Duration Between Send Telegram

Values such as 0.1 s, 0.2 s, up to 10.0 s can be entered. This sets the delay time between sending telegrams to each actuator when a scene is triggered. For instance, setting a delay of 0.5 seconds means telegrams will be sent to each actuator every half second.

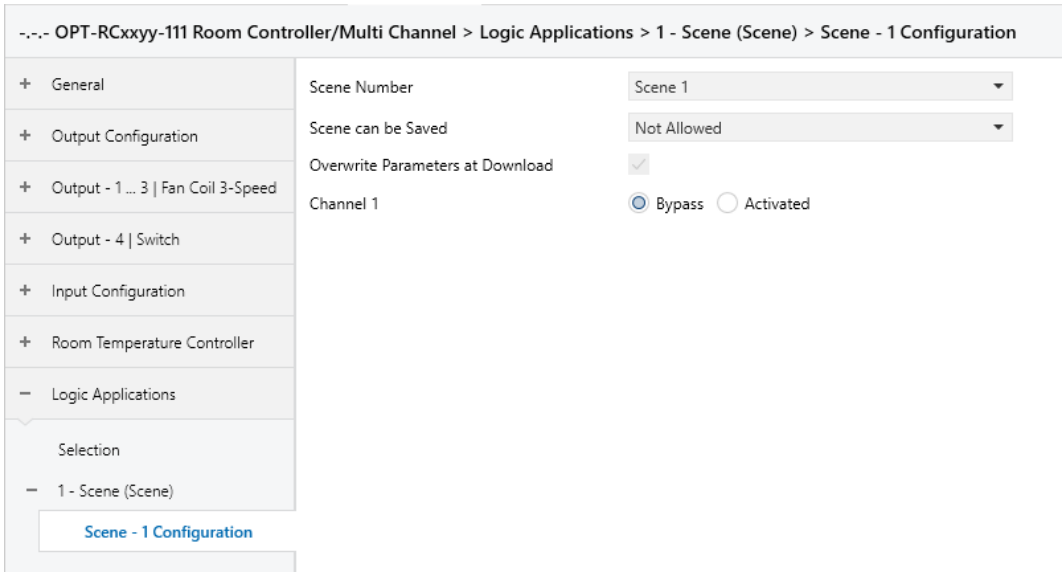
7.2.1.5 Data Type Actuators

The data type for each channel is selected based on the type of device or function. For example:

• **1-bit Switch:** Used for on/off functions, such as turning lights on or off.

• **1-byte Percentage:** Used for dimmers to set the brightness level as a percentage.

7.2.2 Scene X Configuration



7.2.2.1 Scene Number

Select a value between 1 and 64 to identify and organize scenes. This number helps in managing the order and selection of scenes.

7.2.2.2 Scene Can Be Saved

Choose from "Save," "Save Last Values," or "Send Read Telegrams."

• **Save:** The scene can only be recalled.

• **Save Last Values:** Stores the last values received from the related status objects after a Learn command. Values are recorded sequentially per channel and require approximately 750 ms per channel before activation.

• **Send Read Telegrams:** Responses to Read telegrams sent at 500ms intervals are recorded as current values.

7.2.2.3 Overwrite Parameters at Download

When this option is selected, existing parameters will be overwritten while loading new scene settings. This is useful when updating scene configurations. If not selected, the actuator values stored on the device will not revert to their default values.

7.2.2.4 Channel 1..x

Each channel has two options:

7.2.2.4.1 Activated

When checked, this option makes the channel active when the scene is triggered.

• **Send Value:** Specifies the value to be sent for each channel. This value is determined based on the actuator's data type and is sent when the scene is activated. For example, it could adjust the brightness of a light or set the position of a blind.

7.2.2.4.2 Bypass

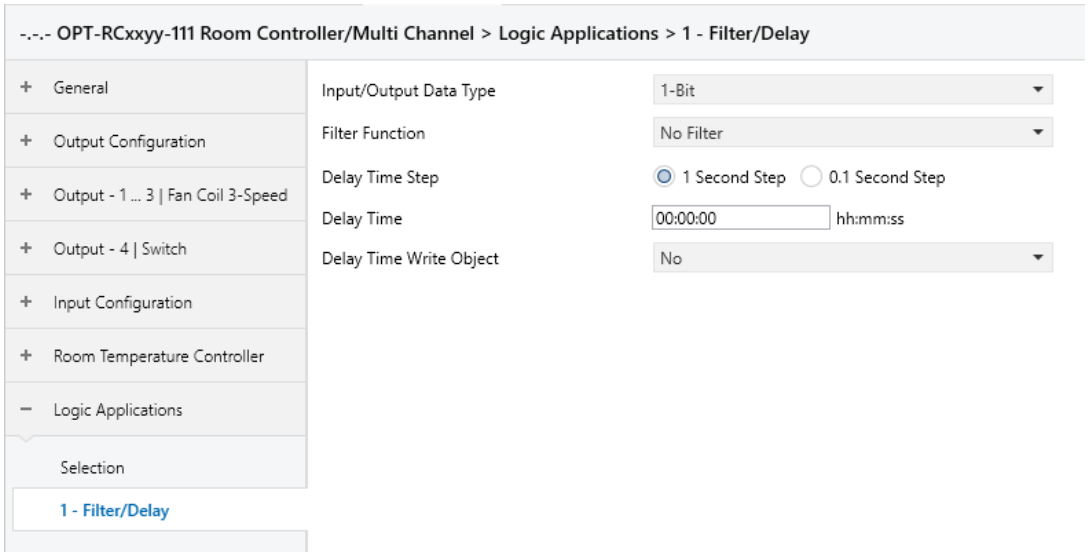
When checked, this option skips the channel when the scene is triggered, meaning it will not participate in the scene's actions.

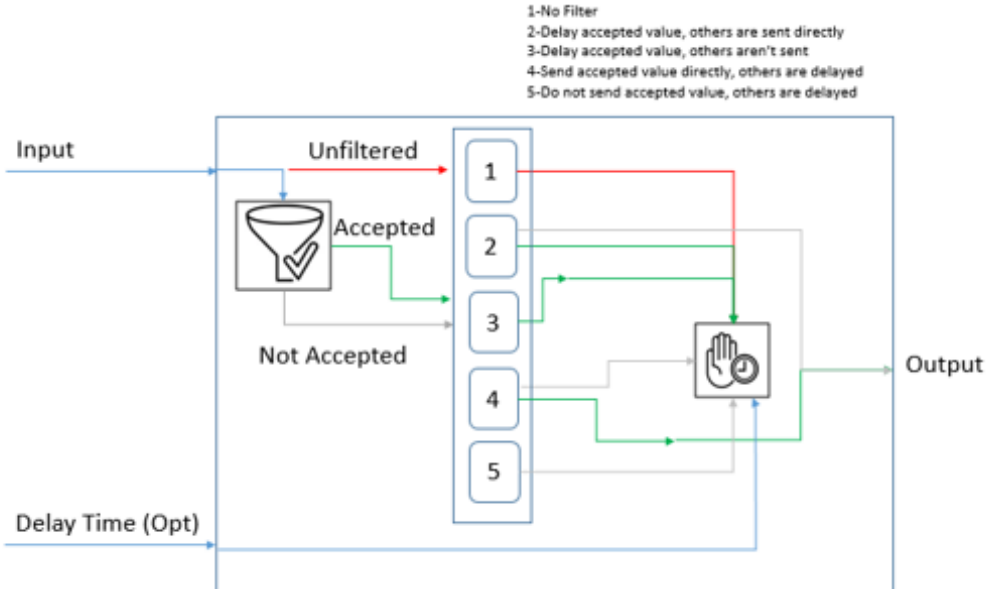
No	Name	Object Function	Direction	Length	Data Type	C	R	W	T	U
x	LA- x I Scene	Light Scene Number	Input	1-bit	18.001 Scene C.	C	-	W	-	-
x	LA- x I Scene	Channel -x Output	Output	1-bit	1.001 Switch	C	-	-	T	-
				1-bit	1.008 Up/Down	C	-	-	T	-
				1-byte	5.010 UCount	C	-	-	T	-
				1-byte	5.001 Percentage	C	-	-	T	-
				2-bytes	9.001 Temperature	C	-	-	T	-
x	LA- x I Scene	Channel -x Output	Output	1-bit	1.001 Switch	C	-	W	-	U
				1-bit	1.008 Up/Down	C	-	W	-	U
				1-byte	5.010 UCount	C	-	W	-	U
				1-byte	5.001 Percentage	C	-	W	-	U
				2-bytes	9.001 Temperature	C	-	W	-	U

Table 20: Logic Applications - Scene Communication Section Objects

7.3 Filter/Delay

This logic consists of one input and one output communication object. It forwards the information received from the input to the output after a specified delay, provided that a condition is defined and met (either parametrically or via the bus). Filtering and delay functions can be used independently.





The incoming data is evaluated based on the selected criterion, or no criterion is applied (option 1). Depending on the selected option (1 to 5), a corresponding delay is applied before the data is forwarded to the output. The delay duration can also be set to zero.

7.3.1 Input/Output Data Type

This parameter determines the type of data for both input and output. Different data types ensure compatibility with various applications and devices.

7.3.2 Filter Function

Chooses the filter function:

• **No Filter:** No filter is applied; all data is sent directly.

• **Delay accepted value, others are sent directly:** Values that meet the specified criteria are delayed, while other data is sent immediately.

• **Delay accepted value, others aren't sent:** Values that meet the specified criteria are delayed, while other data is not sent.

• **Send accepted value directly, others are delayed:** Values that meet the specified criteria are sent immediately, while other data is delayed.

• **Do not send accepted value, others are delayed:** Values that meet the specified criteria are not sent, while other data is delayed.

7.3.2.1 Filter Criteria

Defines the filtering criteria:

• **Equal:** Checks if the value is equal to the specified criteria.

• **Greater Than:** Checks if the value is greater than the specified criteria.

• **Less Than:** Checks if the value is less than the specified criteria.

• **Greater or Equal:** Checks if the value is greater than or equal to the specified criteria.

• **Less or Equal:** Checks if the value is less than or equal to the specified criteria.

7.3.2.2 Criteria Value

You can manually enter the criteria value. This value is determined according to the selected data type. For example, for a 1-bit Switch, it could be 0 or 1; for 1-byte, it could be a value in the range of 0-255.

7.3.3 Delay Time Step

The delay time can be set in increments of 1 second or 0.1 seconds..

7.3.4 Delay Time

You can manually enter the delay time. A value between 1 and 6000 seconds can be specified. This time determines how long the device will wait to respond after a triggering event.

7.3.5 Delay Time Write Object

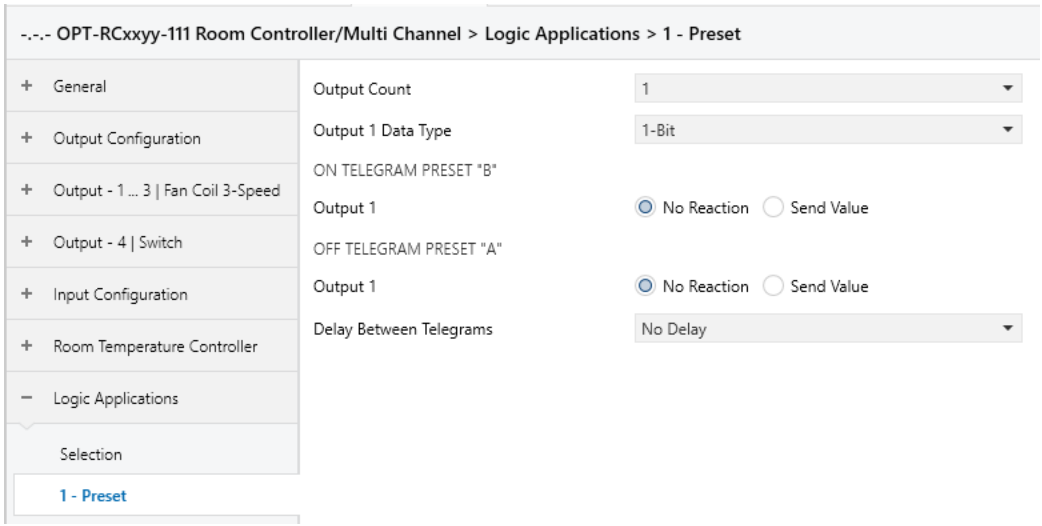
This parameter activates the delay time object and specifies the data type. The Filter/Delay function has two communication objects: one input and one output, both of the same data type.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x I Filter/ Delay	Input	Input	1-bit	1.001 Switch	C	-	W	-
				1-byte	5.010 Counter P.	C	-	W	-
				1-byte	5.001 Percentage	C	-	W	-
				1-byte	6.010 Counter P.	C	-	W	-
				1-byte	7.001 Pulses	C	-	W	-
				2-bytes	8.001 Pulses	C	-	W	-
				2-bytes	9.001 Temperature	C	-	W	-
				4-bytes	12.001 Pulses	C	-	W	-
				4-bytes	13.001 Counter P.	C	-	W	-
				4-bytes	4-byte Float Value	C	-	W	-
				2-bytes	9.001 Temperature	C	-	-	T
x	LA – x I Filter/ Delay	Output	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 Counter P.	C	-	-	T
				1-byte	5.001 Percentage	C	-	-	T
				1-byte	6.010 Counter P.	C	-	-	T
				1-byte	7.001 Pulses	C	-	-	T
				2-bytes	8.001 Pulses	C	-	-	T
				2-bytes	9.001 Temperature	C	-	-	T
				4-bytes	12.001 Pulses	C	-	-	T
				4-bytes	13.001 Counter P.	C	-	-	T
				4-bytes	4-byte Float Value	C	-	-	T
				2-bytes	9.001 Temperature	C	-	-	T
x	LA – x I Filter/ Delay	Delay Time	Input/ output	2-bytes	7.005 Time s	C	R	W	T

Table 21: Logic Applications - Filter Delay Communication Section Objects

7.4 Preset

A function that allows a device to operate with a set of predefined settings or configurations. These settings define how the device should behave under certain conditions. Presets enable the device to automatically apply these predefined settings when a specific state or trigger event occurs.



7.4.1 Output Count

The number of outputs can be selected between 1 and 4.

7.4.2 Output x Data Type

Specifies the value to be sent for output "x." Options include 1-bit, 1-byte, 2-byte Unsigned, 2-byte Signed, 2-byte Float.

ON TELEGRAM PRESET "B"

Determines what the outputs will do when an "On" telegram is received from the input group object.

7.4.3 Output x

If the corresponding output is to be triggered by this preset, select "Send Value"; if not, select "No Reaction".

7.4.3.1 Send Value

Defines the value to be sent for output "x".

OFF TELEGRAM PRESET "A"

Determines what the outputs will do when an "Off" telegram is received from the input group object.

7.4.4 Output x

If the corresponding output is to be triggered by this preset, select "Send Value"; if not, select "No Reaction".

7.4.4.1 Send Value

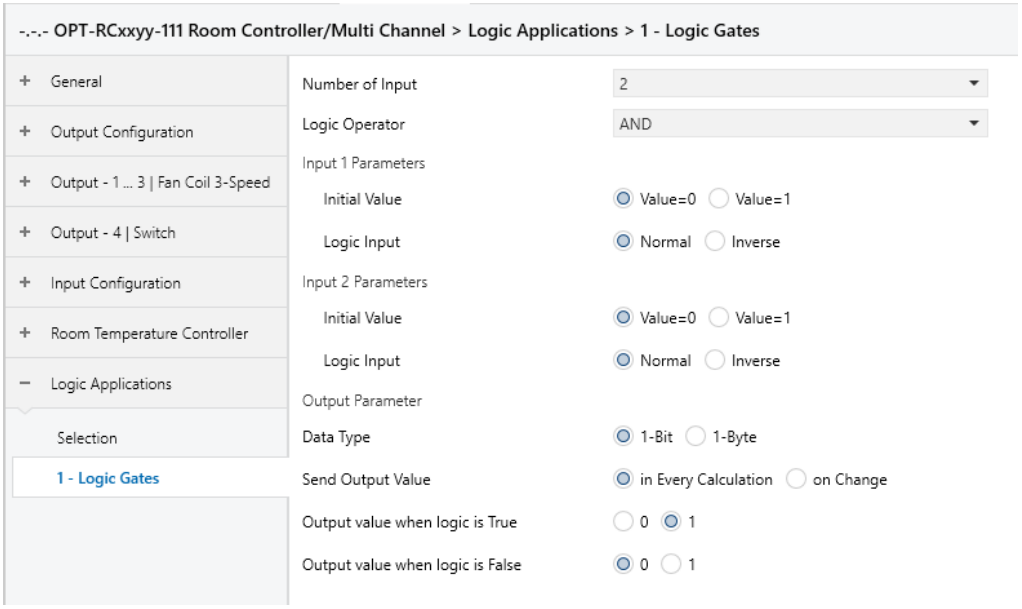
Defines the value to be sent for output "x".

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA- x I Preset	Call Preset	Input	1-bit	1.022 Scene	C	-	W	-
x	LA- x I Preset	Output - x	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 UCount	C	-	-	T
				2-bytes	7.001 Pulses	C	-	-	T
				2-bytes	8.001 Pulses	C	-	-	T
				2-bytes	9.001 Temperature	C	-	-	T

Table 22: Logic Applications - Preset Communication Section Objects

7.5 Logic Gate

An application that produces results based on standard logical functions of one or more inputs.



In 1	**In 2**	**In *n***	**AND**	**OR**	**XOR**	**XNOR**	**NAND**	**NOR**
0	0	0	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
0	0	1	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE
0	1	0	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE
0	1	1	FALSE	TRUE	FALSE	TRUE	TRUE	FALSE
1	0	0	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE
1	0	1	FALSE	TRUE	FALSE	TRUE	TRUE	FALSE
1	1	0	FALSE	TRUE	FALSE	TRUE	TRUE	FALSE
1	1	1	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE

AND: Output is True only if all inputs are 1; otherwise, the output is False.

OR: Output is True if at least one input is 1; if all inputs are 0, the output is False.

NAND: The inverse of the AND function (NOT AND). If all inputs are 1, the output is False; otherwise, the output is True.

NOR: The inverse of the OR function (NOT OR). If all inputs are 0, the output is True; if at least one input is 1, the output is False.

XOR: Evaluation is performed progressively: the first two inputs are compared, then the result is compared with the next input, and so on. If the number of inputs with value 1 is odd, the output is True; if even, the output is False.

XNOR: Evaluated similarly to XOR. If the number of inputs with value 1 is even, the output is True; if odd, the output is False.

7.5.1 Number of Inputs

Determines the number of input signals connected to the logic gate. The type of logic gate used is determined based on the number of inputs (e.g., NOT Gate for 1 input, AND, OR, etc., for 2 or more inputs).

7.5.2 Logic Operator

Defines the operation of the logic gate. For example, the AND operator results in true if all inputs are true, while the OR operator results in true if any input is true. When multiple inputs are selected, for instance, in a 3-input logic gate, the result of the logic operation on input 1 and input 2 is processed through another gate with input 3, and this result defines the "Output" value.

7.5.3 Input x Parameters

7.5.3.1 Data Type

Determines the data type of the input signal. The 1-bit data type is used for simple on/off signals, while the 1-byte data type is used for broader value ranges.

7.5.3.2 Logic Input

Specifies whether the input signal should be processed normally (directly) or inverted (inverse). In normal mode, the signal is processed as is; in inverted mode, the signal is processed in its inverted form.

7.5.3.3 Initial Value

Defines the initial value of the input signal. This is the value the input will take when the device is first powered on or reset.

7.5.4 Output Parameters 7.5.4.1 Data Type

Specifies the data type of the output signal. The 1-bit data type is used for simple on/off signals, while the 1-byte data type is used for broader value ranges.

7.5.4.2 Send Output Value

Determines when the output value will be sent. In the "After Change" option, the output value is sent only when it changes. In the "Each Calculation" option, the output value is sent after each calculation.

7.5.4.3 Output Value

When Logic is true: Specifies the value of the output when the logic condition is true. For the 1-bit data type, values of 1 (On) or 0 (Off) are chosen. For the 1-byte data type, a value between 0-255 can be entered.

7.5.4.4 Output Value

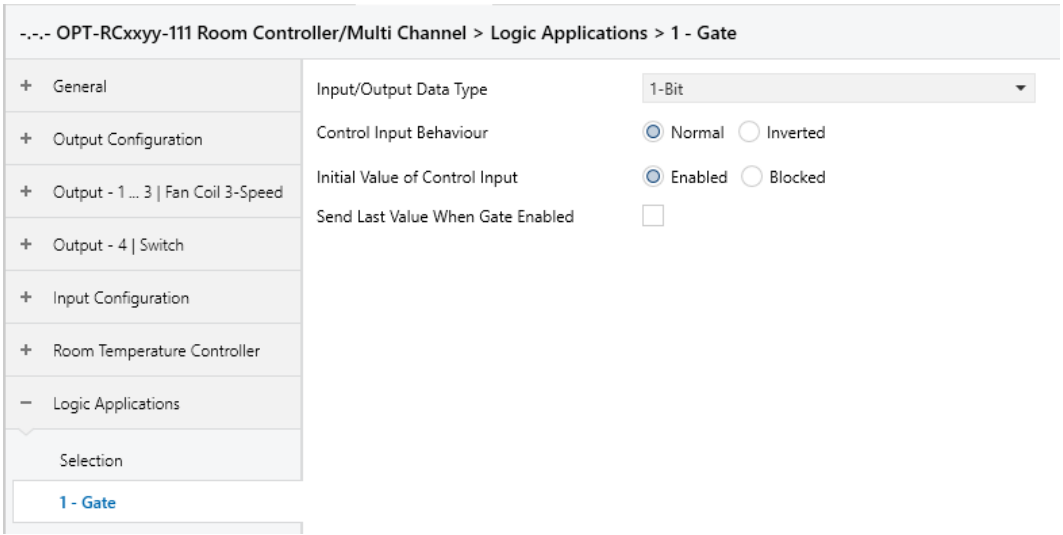
When Logic is false: Specifies the value of the output when the logic condition is false. For the 1-bit data type, values of 1 (On) or 0 (Off) are chosen. For the 1-byte data type, a value between 0-255 can be entered.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA- x I Logic Gate	Input - x	Giriş	1-bit	1.001 Switch	C	-	W	-
x	LA- x I Logic Gate	Output	Çıkış	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 UCount	C	-	-	T

Table 23: Logic Applications - Logic Gate Communication Section Objects

7.6 Gate

The GATE logic function evaluates input signals according to specific rules to generate the output signal. This function is used for logical operations and signal management. GATE functions provide flexible control by working with different data types.



7.6.1 Input/Output Data Type

Selects the data type to be used in the GATE logic function. This data type determines how the input and output signals are processed.

7.6.2 Enable Object Value

Sets the value of the object used to enable or disable the GATE function.

- **Normal:** The GATE function operates under normal conditions.
- **Inverted:** The GATE function operates under inverted (reverse) conditions.

7.6.3 Initial Value Of Enable Object

Determines whether the GATE function is active or passive initially.

7.6.3.1 Enabled

The GATE function is active initially.

7.6.3.2 Blocked

The GATE function is inactive (passive) initially.

7.6.4 Send Last Value When Gate Enabled

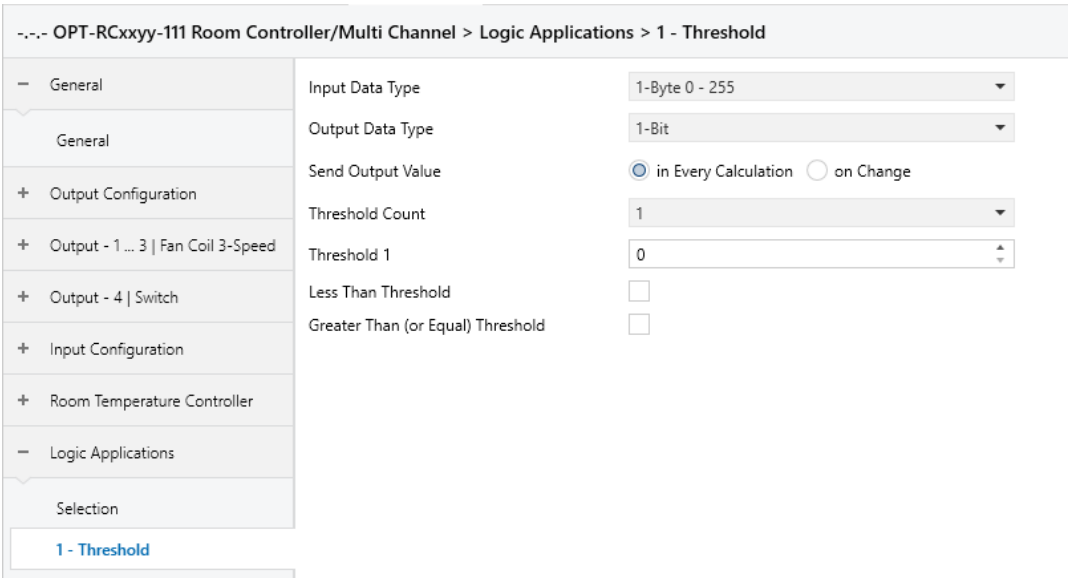
When the GATE function is activated, this option helps in sending the last value of the related input.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x I Gate	Input	Input	1-bit	1.001 Switch	C	-	W	-
				3-bit	3-bit Controlled	C	-	W	-
				1-byte	5.010 Counter P.	C	-	W	-
				1-byte	5.001 Percentage	C	-	W	-
				1-byte	6.010 Counter P.	C	-	W	-
				2-bytes	8.001 Pulses	C	-	W	-
				2-bytes	9.001 Temperature	C	-	W	-
x	LA – x I Gate	Output	Output	1-bit	1.001 Switch	C	-	-	T
				3-bit	3-bit Controlled	C	-	-	T
				1-byte	5.010 Counter P.	C	-	-	T
				1-byte	5.001 Percentage	C	-	-	T
				1-byte	6.010 Counter P.	C	-	-	T
				2-bytes	8.001 Pulses	C	-	-	T
				2-bytes	9.001 Temperature	C	-	-	T
x	LA – x I Gate	Control Input	Input	1-bit	1.003 Enable	C	-	W	-

Table 24: Logic Applications Gate Communication Section Objects

7.7 Threshold

It is a logic function used to create decision mechanisms by comparing the input information against defined threshold value(s). It can be used in applications such as thermostatic control, fan stage control, and alarm generation.



7.7.1 Input Data Type

The Threshold Control feature evaluates input data against specified threshold values and sends the output data based on certain rules. This feature can be configured flexibly with different data types and numbers of thresholds.

7.7.2 Output Data Type

Determines the type of output data.

7.7.3 Send Output Value

Determines when the output data will be sent.

7.7.3.1 On Changed

Sends data only when there is a change

7.7.3.2 Every Calculation

Sends data after each calculation

7.7.4 Threshold Count

Determines the number of thresholds to be used.

7.7.5 If Threshold Number is 1

7.7.5.1 Threshold 1

Enter a threshold value based on the input data type.

7.7.5.2 Less Than Threshold

If this box is checked, a specific action is taken when the input value is below the threshold value.

7.7.5.2.1 Send Value

Enter a value based on the output data type.

7.7.5.3 Greater Than (or Equal) Threshold

If this box is checked, a specific action is taken when the input value is above the threshold value.

7.7.5.3.1 Send Value

Enter a value based on the output data type.

7.7.6 If Threshold Number is 2

7.7.6.1 Threshold 1

Enter a threshold value based on the input data type.

7.7.6.2 Less Than Threshold 1

If this box is checked, a specific action is taken when the input value is below Threshold 1.

7.7.6.2.1 Send Value

Enter a value based on the output data type.

7.7.6.3 Threshold 2

Enter a threshold value based on the input data type.

7.7.6.4 Greater Than (or Equal) Threshold 1 and Less Than Threshold 2

If this box is checked, a specific action is taken when the input value is between Threshold 1 and Threshold 2.

7.7.6.4.1 Send Value

Enter a value based on the output data type.

7.7.6.5 Greater Than (or Equal) Threshold 1 and Less Than Threshold 2

If this box is checked, a specific action is taken when the input value is above Threshold 2.

7.7.6.5.1 Send Value

Enter a value based on the output data type.

7.7.7 If Number of Thresholds is 3

7.7.7.1 Threshold 1

Enter a threshold value based on the input data type.

7.7.7.2 Less Than Threshold 1

If this box is checked, a specific action is taken when the input value is below Threshold 1.

7.7.7.2.1 Send Value

Enter a value based on the output data type.

7.7.7.3 Threshold 2

Enter a threshold value based on the input data type.

7.7.7.4 Greater Than (or Equal) Threshold 1 and Less Than Threshold 2

If this box is checked, a specific action is taken when the input value is between Threshold 1 and Threshold 2.

7.7.7.4.1 Send Value

Enter a value based on the output data type.

7.7.7.5 Threshold 3

Enter a threshold value based on the input data type.

7.7.7.6 Greater Than (or Equal) Threshold 2 and Less Than Threshold 3

If this box is checked, a specific action is taken when the input value is between Threshold 2 and Threshold 3.

7.7.7.6.1 Send Value

Enter a value based on the output data type.

7.7.7.7 Greater Than (or Equal) Threshold 3

If this box is checked, a specific action is taken when the input value is above Threshold 3.

7.7.7.7.1 Send Value

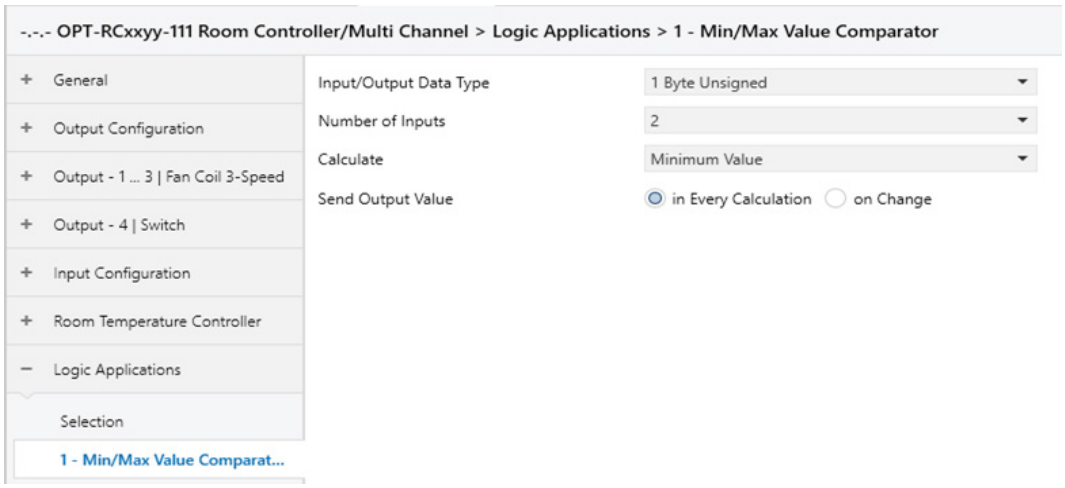
Enter a value based on the output data type.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x I Threshold	Input	Input	1-byte	5.010 Counter P.	C	-	W	-
				1-byte	5.001 Percentage	C	-	W	-
				1-byte	6.010 Counter P.	C	-	W	-
				2-byte	7.001 Pulses	C	-	W	-
				2-byte	8.001 Pulses	C	-	W	-
				2-byte	9.001 Temperature	C	-	W	-
				4-byte	12.001 Pulses	C	-	W	-
				4-byte	13.001 Counter P.	C	-	W	-
				4-byte	4-byte Float Value	C	-	W	-
x	LA – x I Threshold	Output	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 Counter P.	C	-	-	T
				1-byte	5.001 Percentage	C	-	-	T
				1-byte	6.010 Counter P.	C	-	-	T

Table 25: Logic Applications - Threshold Communication Section Objects.

7.8 Min /Max/Avg Value Calculator

This function calculates and outputs the minimum, maximum, or average of up to 8 input values.



Input/Output Data Type: Defines the data type of both input and output communication objects.

Number of Inputs: Defines the number of inputs to be included in the calculation. Between 2 and 8 inputs can be used. The calculation is performed using data from all assigned inputs, excluding unassigned ones. This parameter sets how many inputs will be used for data acquisition.

Calculate: Selects the calculation method to be used. One of the following options can be chosen:

- **Minimum Value:** Selects the smallest value among the inputs and sends it to the output.
- **Maximum Value:** Selects the largest value among the inputs and sends it to the output.
- **Average Value:** Calculates the average of the inputs and sends it to the output.

Send Output Value: Defines when the output value is sent to the KNX bus:

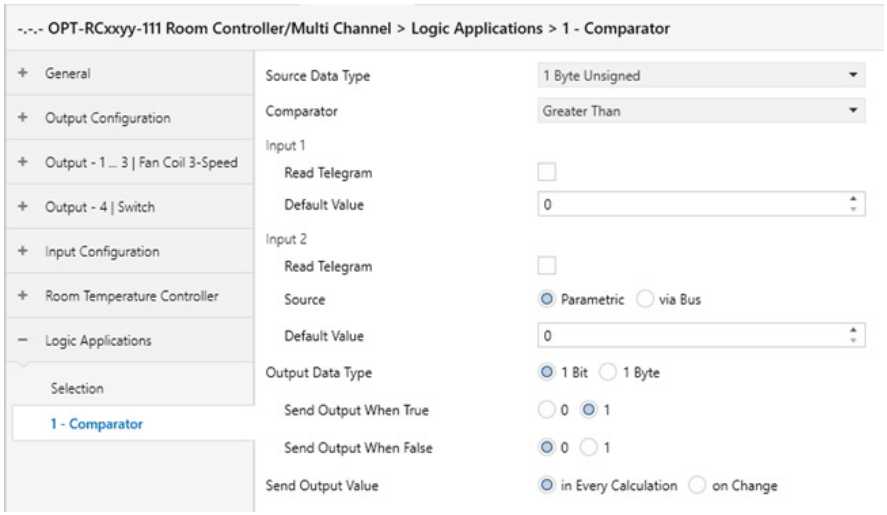
- **Every Calculation:** After each calculation, the calculated value is automatically sent to the bus.
- **On Changed:** The output value is sent to the bus only when there is a change in the inputs.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x Min/Max/Avg Comparator	Input x	Input	1-byte	5.010 Counter P.	C	-	W	-
				1-byte	5.001 Percentage	C	-	W	-
				1-byte	6.010 Counter P.	C	-	W	-
				2-bytes	7.001 Pulses	C	-	W	-
				2-bytes	8.001 Pulses	C	-	W	-
				2-bytes	9.001 Temperature	C	-	W	-
				4-bytes	12.001 Pulses	C	-	W	-
				4-bytes	13.001 Counter P.	C	-	W	-
				4-bytes	4-byte Float Value	C	-	W	-
x	LA – x Min/Max/Avg Comparator	Output	Output	1-byte	5.010 Counter P.	C	-	-	T
				1-byte	5.001 Percentage	C	-	-	T
				1-byte	6.010 Counter P.	C	-	-	T
				2-bytes	7.001 Pulses	C	-	-	T
				2-bytes	8.001 Pulses	C	-	-	T
				2-bytes	9.001 Temperature	C	-	-	T
				4-bytes	12.001 Pulses	C	-	-	T
				4-bytes	13.001 Counter P.	C	-	-	T
				4-bytes	4-byte Float Value	C	-	-	T

Table 26: Logic Applications – Min/Max/Avg Value Comparator Communication Section Objects

7.9 Comparator

This function compares two input values and transmits the result to the output in the defined data type. The comparison parameters are as follows:



Source Data Type: Defines the data type of the input values.

Comparator: Defines the comparison method to be applied between the two input values. The available options are:

- **Greater Than**
- **Less Than**
- **Equal To**
- **Not Equal To**
- **Greater Than or Equal**
- **Less Than or Equal**
- **Read Telegram:** Activates the read operation for input x from the KNX bus.
- **Default Value:** Assigns an initial value for input x. A user-defined default value can be used.
- **Source:** Defines the source of Input 2. Two options are available:
- **Parametric:** Refers to a fixed value manually entered by the user.
- **Via Bus:** The input data is received from the KNX bus
- **Output Data Type:** Specifies the data type in which the comparison result will be sent to the output.
- **Send Output When True:** Defines the output value when the comparison result is true. The output value for the "true" condition is assigned by the user (e.g., 1 or 0)
- **Send Output When False:** Defines the output value when the comparison result is false. The output value for the "false" condition is assigned by the user (e.g., 1 or 0).
- **Send Output Value:** Determines when the output value is sent to the KNX bus:

• **Every Calculation:** The output value is sent after each calculation.

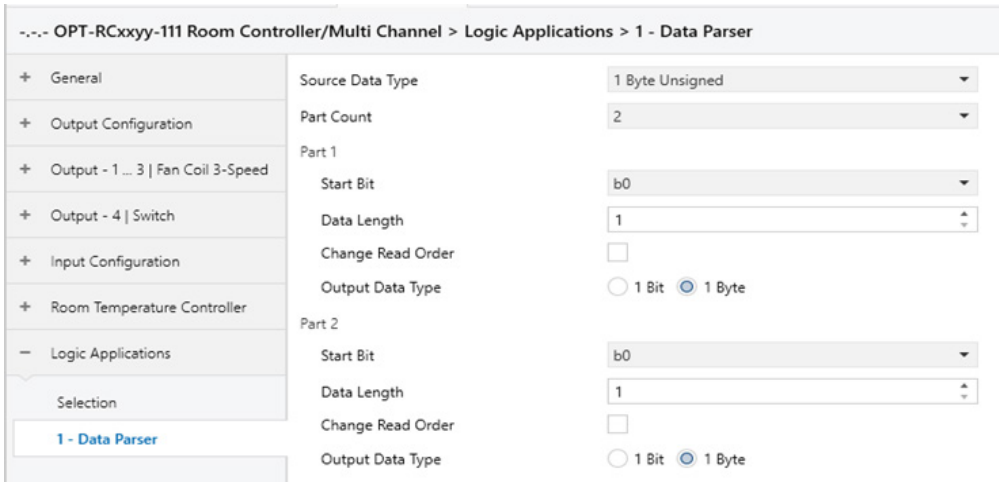
• **On Changed:** The output value is sent only when there is a change in the inputs.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x Comparator	Input x	Input	1-byte	5.010 Counter P.	C	-	W	-
				1-byte	5.001 Percentage	C	-	W	-
				1-byte	6.010 Counter P.	C	-	W	-
				2-bytes	7.001 Pulses	C	-	W	-
				2-bytes	8.001 Pulses	C	-	W	-
				2-bytes	9.001 Temperature	C	-	W	-
				4-bytes	12.001 Pulses	C	-	W	-
				4-bytes	13.001 Counter P.	C	-	W	-
				4-bytes	4-byte Float Value	C	-	W	-
x	LA – x Comparator	Output	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 Counter P.	C	-	-	T

Table 27: Logic Applications – Comparator Communication Section Objects

7.10 Data Parser

In KNX systems, certain data can be combined and transmitted through a single communication object. This function allows the combined data to be split into separate parts. Using the splitter function, unsigned 1-byte, 2-byte, or 4-byte data can be divided into specified segments. The splitting process supports up to a maximum of 8 segments in total.



Source Data Type: Defines the type of the source data.

Part Count: Specifies how many parts the source data will be divided into. The selected number of parts also determines the number of output communication objects. In the illustration, 2 parts are selected, meaning the data will be split into two segments.

Part X

Start Bit: Defines the starting bit of each part within the source data. Selecting bit 0 (b0) means the operation begins from the least significant bit of the data.

Data Length: Defines how many bits each part consists of. The maximum data length can be 16 bits. Here, the length for both parts is set to 1 bit each.

Change Read Order: When selected, reverses the bit reading order. This parameter is used to specify whether the bit order should be changed. In the illustration, this option is not selected.

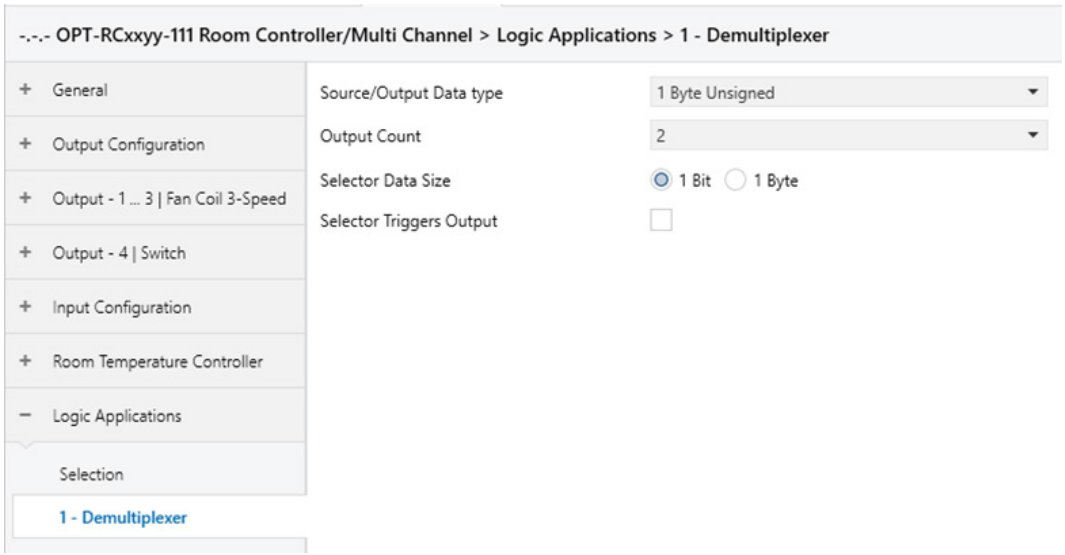
Output Data Type: The output data type of the part can be set as either 1-bit or 1-byte. When the data length is 1, the output data type can be set to 1-bit. Here, both parts are selected as 1 Byte.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x Data Parser	Source Data	Input	1-byte	5.010 Counter P.	C	-	W	-
				2-bytes	7.001 Pulses	C	-	W	-
				4-bytes	12.001 Pulses	C	-	W	-
x	LA – x Data Parser	Output x	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 Counter P.	C	-	-	T

Table 28: Logic Applications – Data Parser Communication Section Objects

7.11 Multiplexer

This application routes the selected source data to the output. Both sources and output support data types ranging from 1-byte to 2-byte.



7.11.1 Input/Output Data Type

The size of the data to be selected and forwarded to the output is determined here. Available options include 1-byte unsigned, 1-byte signed, 2-byte unsigned, 2-byte signed, and 2-byte float. Sources and output are defined according to this data type.

7.11.2 Input Count

The number of selectable sources can be set between 2 and 8. This selection determines the number of source communication objects.

7.11.3 Control Input Data Size

• If the number of sources is 2, the selector can be set to 1-bit. In this case, when the selector is in the "Off" position, the first source is selected; when "On," the second source is selected. Since the data defaults to 0, the first source's data is directly routed to the output when the device starts.

• If the number of sources is 2, the 1-byte selector option is optional. For other source counts, the selector size is set to 1 byte. The selector value ranges from 1 to 8, indicating the source number. Since the selector defaults to 0, the device does not transmit any value to the output at startup. The same occurs if the selector is assigned a value exceeding the number of sources.

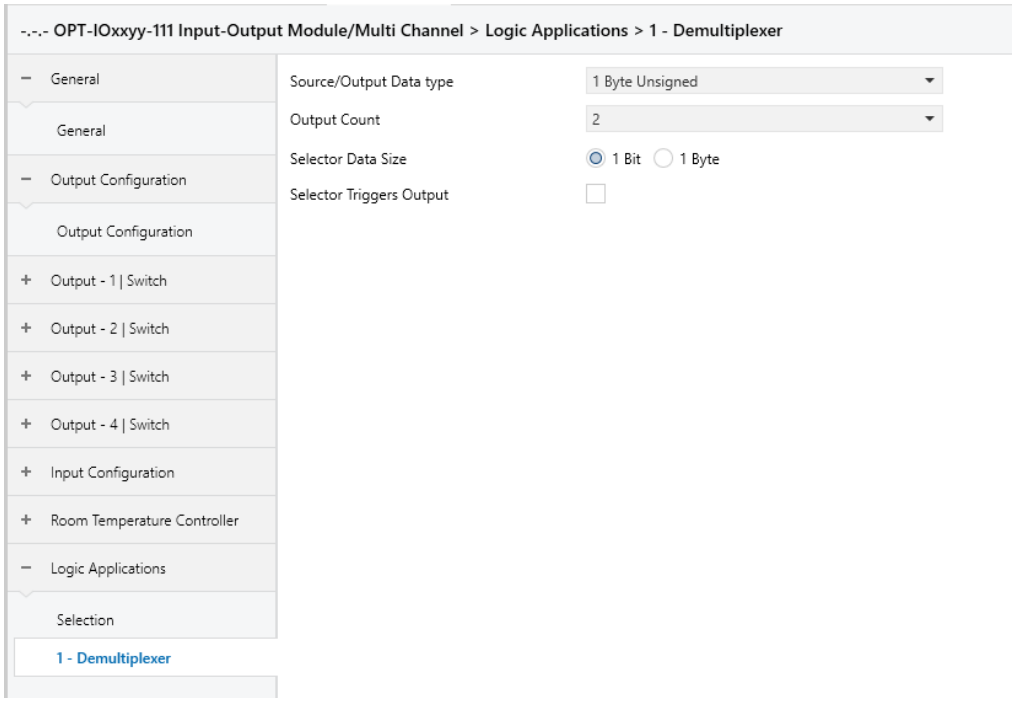
7.11.4 Selector Triggers Input X

When this box is checked, data coming to Source X is stored in memory. When the selector is set to value X, the last data from that source is sent to the output. If unchecked, data must be received from Source X to be forwarded to the output.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x Multiplexer	Source	Input	1-byte	5.010 Counter P.	C	-	W	-
				1-byte	6.010 Counter P.	C	-	W	-
				2-bytes	7.001 Pulses	C	-	W	-
				2-bytes	8.001 Pulses D.	C	-	W	-
				2-bytes	2-byte Float Value	C	-	W	-
x	LA – x Multiplexer	Source	Input	1-bit	1.001 Switch	C	-	W	-
				1-byte	5.010 Counter P.	C	-	W	-
x	LA – x Multiplexer	Output x	Output	1-byte	5.010 Counter P.	C	R	-	T
				1-byte	6.010 Counter P.	C	R	-	T
				2-bytes	7.001 Pulses	C	R	-	T
				2-bytes	8.001 Pulses D.	C	R	-	T
				2-bytes	2-byte Float Value	C	R	-	T

Table 29: Logic Applications – Multiplexer Communication Section Objects

7.12 Demultiplexer



This application determines to which output the source is routed via a selector.

7.12.1 Source/Output Data Type

This section defines the size of the data to be selected and forwarded to the output. Options include 1-byte unsigned, 1-byte signed, 2-byte unsigned, 2-byte signed, and 2-byte float. Sources and outputs are defined according to this data type.

7.12.2 Output Count

The number of selectable outputs can be set between 2 and 8. This selection determines the number of output communication objects.

7.12.3 Selector Data Size

• If the number of outputs is 2, the selector can be set to 1-bit. In this case, when the selector is in the "Off" position, the first output is selected; when "On," the second output is selected. Since the data defaults to 0, the source data is routed directly to the first output at device startup.

• If the number of outputs is 2, the 1-byte selector option is optional. For other output counts, the selector size is fixed at 1 byte. The selector value ranges from 1 to 8, indicating the output number. Since the selector defaults to 0, no value is transmitted to the outputs at startup. The same occurs if the selector is assigned a value exceeding the number of outputs.

7.12.4 Selector Triggers Output X

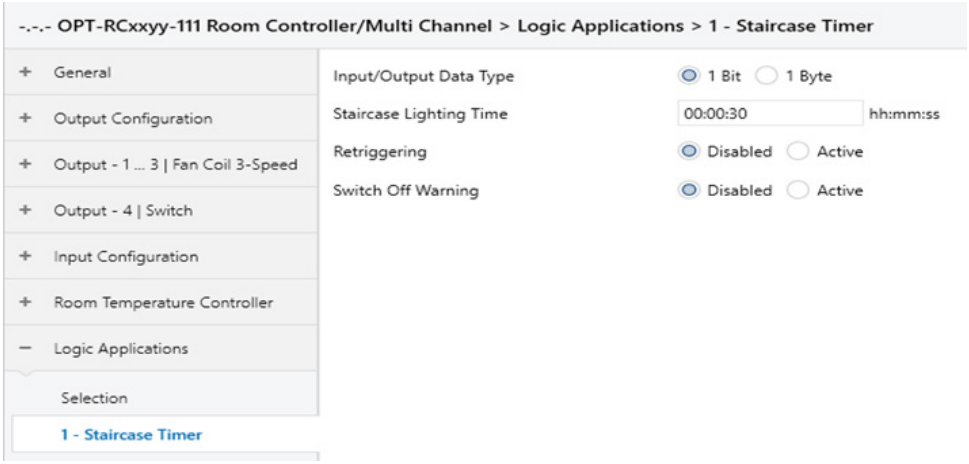
When this box is checked, data coming to Source X is stored in memory. When the selector is set to value X, the last data from that source is sent to the output. If unchecked, data must be received from Source X to be forwarded to the output.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – xDemultiplexer	Source	Input	1-byte	5.010 Counter P.	C	-	W	-
				1-byte	6.010 Counter P.	C	-	W	-
				2-bytes	7.001 Pulses	C	-	W	-
				2-bytes	8.001 Pulses D.	C	-	W	-
				2-bytes	2-byte Float Value	C	-	W	-
x	LA – x Demultiplexer	Selector	Input	1-bit	1.001 Switch	C	-	W	-
				1-byte	5.010 Counter P.	C	-	ffi	-
x	LA – x Demultiplexer	Output x	Output	1-byte	5.010 Counter P.	C	R	-	T
				1-byte	6.010 Counter P.	C	R	-	T
				2-bytes	7.001 Pulses	C	R	-	T
				2-bytes	8.001 Pulses D.	C	R	-	T
				2-bytes	2-byte Float Value	C	R	-	T

Table 30: Logic Applications – Demultiplexer Communication Section Objects

7.13 Staircase

The staircase automation is an application that, after triggering a certain state, automatically terminates this state after a preset time. This function is commonly used in both lighting and other automation processes.



7.13.1 Input/Output Data Type

The application can operate with input and output communication objects of either 1-bit or 1-byte data types. When the data that starts the staircase automation is 1-bit, it operates with an "ON" telegram. If the data is 1-byte, any value greater than 0 can trigger the automatic start. This input data is forwarded to the output in the same way, and the staircase timer is started. If an "OFF" telegram or a 1-byte value of 0 is received from the input, this data is immediately sent to the output and the timer is stopped

7.13.2 Staircase Lighting Time

This is the duration for which the staircase automation output remains active. The time can be set between a minimum of 10 seconds and a maximum of 1 hour. This timing controls the automatic switch-off duration.

7.13.3 Retriggering

While the staircase automation is running, if a new positive value is received from the input object (1-bit "ON" or 1-byte value greater than zero), the timer is reset and restarted. If the retriggering function is inactive, only the first positive value is considered, and when the timer ends, a "0" is sent to the output.

7.13.4 Switch Off Warning

Towards the end of the staircase automation time, it is possible to give a warning to the user. For 1-bit inputs, this warning is done by blinking the output every second. For 1-byte data types, a user-defined warning value can be assigned.

The staircase automation includes one input and one output communication object of the same data type (1-bit or 1-byte) and one timer object whose duration can be read or modified.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA – x Staircase Timer	Input	Input	1-bit	1.001 Switch	C	-	W	-
				1-byte	5.010 Counter P.	C	-	W	-
x	LA – x Staircase Timer	Staircase Timer	Input/ Output	2-byte	7.005 time	C	R	W	T
x	LA – x Staircase Timer	Output x	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 Counter P.	C	-	-	T

Table 31: Logic Applications – Staircase Communication Section Objects

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OPTIMUS SOLUTIONS TEKNOLOJİ
ÜRETİM SANAYİ TİCARET A.Ş.
Emek Mh. Ordu Cd. 4
34785 Sancaktepe
İstanbul / Türkiye
Phone.: +90 216 487 33 46
Fax: +90 216 487 33 48
Email: info@optimusst.com