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Product Manual

Multi Sensor

OPT-MSx-21x

About this document

This document provides detailed technical information on the function, installation and programming of the OPT-MSx-212 device.

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1 Product Description

The OPT-MSx-21x series is a multifunctional ceiling-mounted sensor designed to support motion detection, constant light control, HVAC integration, and various sensing functions. The series is available in two variants to meet different application requirements:
• **OPT-MSx-211** – Standard Version
• **OPT-MSx-212** – Advanced Version

OPT-MSx-211 – Standard Version
The OPT-MSx-211 model provides essential sensing capabilities for efficient integration in lighting and climate control systems. Key supported applications include:

• **Motion Detection:** Detects presence or movement within the monitored area to trigger lighting or other automation systems.
• **Constant Light Control:** Measures ambient light levels and automatically adjusts artificial lighting to maintain a target brightness level.
• **HVAC Control:** Enables integration with heating, ventilation, and air conditioning systems to support energy-efficient climate management.
• **Brightness Detection:** Measures ambient illuminance for scene control or to support logic-based automation.
• **Logic Functions:** Allows the creation of advanced automation scenarios using user-defined logic operations.
• **3-Input Binary Interface:** Supports integration with external switches, sensors, or push buttons via three binary inputs.
• **3-Input and 2-Input Box Function:** Provides switching capabilities for applications such as lighting, shading (curtain/blind), and valve control.

OPT-MSx-212 – Advanced Version
In addition to the features offered by the standard version, the OPT-MSx-212 model includes extended functionalities for enhanced environmental monitoring and control:
• **Thermostat Function:** Measures room temperature and directly controls heating and cooling systems based on setpoints.
• **Temperature Sensing:** Continuously monitors ambient temperature for climate control and monitoring applications.
• **Humidity Sensing:** Measures relative humidity levels to trigger ventilation or dehumidification scenarios.
• **Air Quality Monitoring (VOC Sensor):** Detects Volatile Organic Compounds (VOCs) to assess indoor air quality and enable interaction with ventilation systems.

Both models operate via the **KNX bus**, which also supplies their power. Commissioning and parameter configuration of the OPT-MSx-21x series devices must be carried out using **ETS5 or higher.**

1.1 Product Models

OPT-MSS-212- Premium Standard Multi Sensor
OPT-MSW-212- Premium Wide Range Multi Sensor
OPT-MSH-212- Premium High-Bay Multi Sensor
OPT-MSC-212- Premium Corridor Multi Sensor

OPT-MSS-211 - Standard Multi Sensor
OPT-MSW-211 - Wide Range Multi Sensor
OPT-MSH-211 - High-Bay Multi Sensor
OPT-MSC-211 - Corridor Multi Sensor

1.2 Product Accessory

OPT-MB2-WH: Surface mount box, white
OPT-MB2-BL: Surface mount box, black
OPT-MXXXX: Buat Connection Adaptor

Product accessories are ordered separately.

1.3 Places of Use and Functions

OPT-MSS-21x Standard Multi Sensor
This sensor is ideal for standard indoor spaces such as offices, residences and small commercial spaces. It saves energy and increases user comfort with its brightness, temperature, humidity and movement detection features. It works in integration with constant brightness control and HVAC applications, so that the light and temperature levels of the environment are automatically regulated.

OPT-MSW-21x Wide Range Multi Sensor
It is designed for large areas, open offices, large commercial areas and meeting rooms. Thanks to its wide detection capacity, it works effectively in larger areas. It optimizes energy management and ensures user comfort with its brightness, temperature, humidity and movement detection features.

OPT-MSH-21x High-Bay Multi Sensor
It is suitable for warehouses, industrial facilities and high-ceilinged buildings. Thanks to its high detection capacity, it effectively monitors movement and environmental conditions in large and high-ceilinged areas. It provides energy saving and environmental control with its brightness, temperature, humidity and movement detection features.

OPT-MSC-21x Corridor Multi Sensor
Ideal for corridors, transition areas and narrow and long spaces. Provides movement detection and lighting control in narrow and long spaces. Uses movement detection and constant brightness control features to save energy in corridors. Also optimizes ambient conditions with temperature and humidity monitoring.

1.4 Product Images

OPT-MSS-21x
Standard Multi Sensor

OPT-MSW-21x
Wide Range Multi Sensor

OPT-MSH-21x
High-Bay Multi Sensor

OPT-MSC-21x
Corridor Multi Sensor

1.5 Operation Mode

It must be powered only by KNX line. That is, there should be no need for any other supply voltage. It will communicate with ETS 5 and other KNX products with the KNX line.

When the device KNX is first started or restarted (power cycled), it runs the applications that were activated after the delay specified as “Startup Delay”. Startup Delay is 10 seconds.

1.6 Technical Specifications

Supply voltage	KNX 30 VDC		
KNX current consumption	10 mA		
KNX mode	S-Mode		
Connection	KNX connection terminal		
Protection class	IP 20		
Sensor type	PIR, brightness, temperature, humidity		
Mounting	Surface or flush mounting		
Mounting height	2,5-4 m (Standard, wide range type, corridor) 9-12 m (High-bay)		
Brightness measurement	10...1000 lux		
Temperature range	Operation -5...+45°C Storage -25...+55°C		
Dimensions Standard Wide Range High-Bay Corridor Surface mount box	a 29 mm 29 mm 37 mm 29 mm	b 45 mm 45 mm 52 mm 45 mm 80 mm	c 78 mm 78 mm 78 mm 78 mm 45 mm
Weight Standard Wide Range High-Bay Corridor Surface mount box	Net Gross 53g 91 g 53 g 91 g 56 g 94 g 53 g 91 g 46 g 46 g		
Relative humidity measurement	< 80 %		
Certificate	CE		

2 Movement

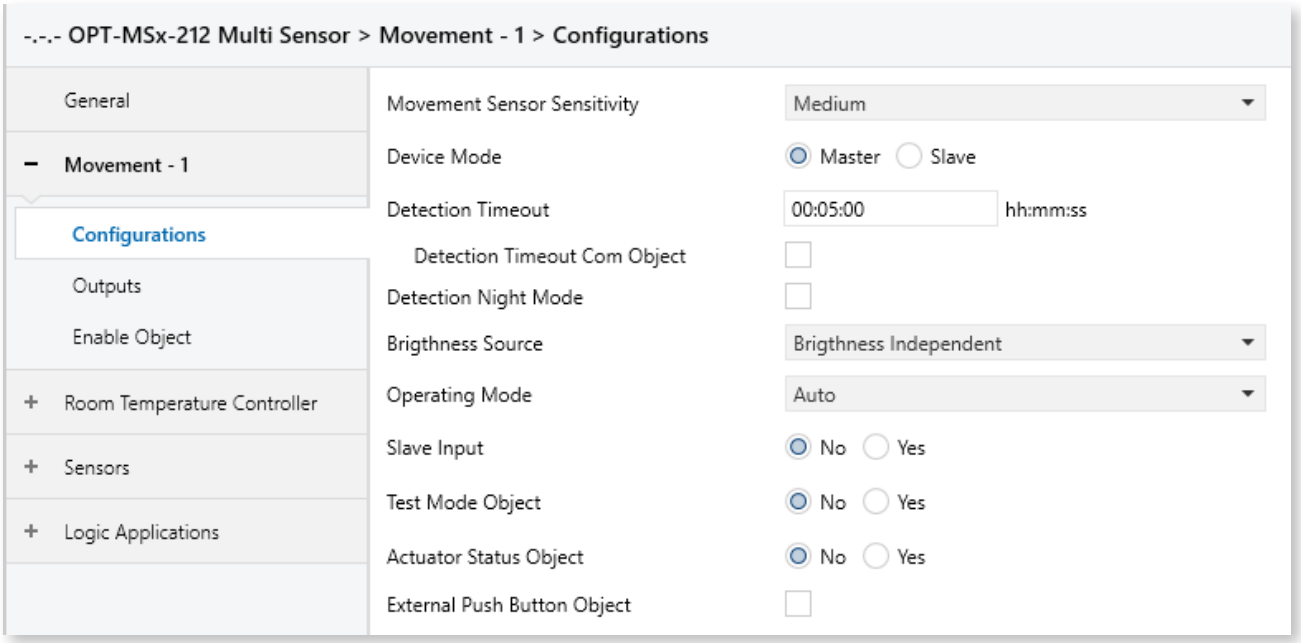
Movement information will be received periodically with the sensor on the hardware. Movement detection algorithm will be performed by separating movement information from 28-bit sensor data. The temperature information received from the sensor will be examined to see if it has any relationship with movement.

Calibration Process
In applications with a motion sensor, the PIR sensor requires approximately 1 minute of calibration after each programming or powering up to function correctly. During this initial 1-minute period, the sensor remains passive and does not detect any movement. After 1 minute, the calibration is completed, and the sensor is ready to detect motion and send relevant information to the system.

2.1 Sensor Selection (Only Corridor type Sensor)

When the corridor type sensor is selected, this parameter allows the sensors on the hardware to be separated and adjusted. Depending on the desired area, a single sensor or both sensors can be used together. In this way, a flexible structure is offered according to the movement detection requirements in different areas.

2.2 Movement Sensor Sensitivity



The sensitivity of the movement sensor, which forms the basis of the device, can be changed in 3 stages: Low, Medium and High. By decreasing the sensitivity, unwanted movements can be eliminated or by increasing it, more sensitive detections can be made.

2.3 Device Mode

The operating principle of the device can be selected as “Master” or “Slave”. In cases where a single sensor does not complete the coverage area, the movement features of more than one sensor may need to work as a group. In this case, one of the sensors becomes the Master and the others are selected as Slaves. The Slave sensors send a trigger to the Master sensor, indicating that the movement has started. The Master sensor also performs its operation according to other parameters.

2.4 Detection Timeout

It is the time period that determines the time from when the sensor detects movement to when it will stop operating. It can be specified between 10 seconds and 65535 seconds (18 hours 12 minutes 15 seconds). The default value is 300 seconds.

2.4.1 Detection Timeout Com Object

This is the option that allows the detection period to be changed externally. When "Enable" is selected, the "Movement Detection Period" object opens. The movement detection period can be changed via this object.

2.5 Detection Night Mode

If the Movement Detection time is not desired to be tied to a single mode, this parameter is activated. When activated, if the On telegram comes from outside to the com object of this parameter, the 2.4 Detection time becomes Disable and the detection time is assigned as long as the time under this parameter. The purpose of this is to create a solution in places where the same detection time is not desired in the morning and evening.

2.6 Brightness Source

This is the option that allows the Night Mode Detection time to be changed externally. When "Enable" is selected, the "Night Mode Movement Detection Time" object opens. The movement detection time can be changed via this object.

2.6.1 Cyclic Send Period (Slave Mode)

As soon as the slave device sees the first movement, it sends the movement detected information to the master. For the sending repeat, the user enters a value between 10-65535 seconds for this parameter and waits for the entered time.

The default value is 300 seconds. It ignores the movements it detects during the first ¾ of this period. If movement is detected during the remaining ¼ of the period, the sensor broadcasts the movement detected information to the master again from the KNX line when the sending repeat period is over. If the slave device sees the first movement and sends the movement information to the master device and does not see any movement during the last ¼ of the sending repeat period, it does not send any data via KNX.

2.6.2 Detection Night Timeout

If the "Open telegram" is received by the night mode communication object, this parameter is the time period that determines the time from when the sensor detects movement and when it will stop operating. It can be specified between 10 seconds and 65535 seconds (18 hours 12 minutes 15 seconds). The default value is 300 seconds. If the "Open telegram" is received by the night mode communication object, it waits for inactivity for the time entered in this parameter.

2.6.3 Internal Sensor

When the internal source is selected, the sensor receives the brightness information via the photodiode on its own. With this information, it needs to work on the movement detection algorithm according to the brightness level of the environment. For this, it needs to read analog data via the photodiode at certain periods.

2.6.4 External Sensor

The sensor needs to work the movement detection algorithm according to the ambient brightness level. For this, it needs to read the Lux value from the "External Brightness Com Object" at certain periods.

2.6.5 Internal or External Sensor

The detector is activated only when the internally measured brightness falls below the internal brightness value threshold or when the externally measured brightness falls below the external brightness value threshold.

2.7 Light Level Threshold

Light information allows the threshold value to be determined when the "Internal Sensor" is selected. If the light level at the time the movement starts is below this value, the action is taken, if it is above, it is not taken. A value between "10-1000 Lux" can be entered. The default value is 400.

2.8 Light Level Threshold Com Object

If this parameter is activated when the light information "Internal Sensor" is selected, the "Internal Light Level Threshold" object of the threshold value is opened. The brightness level threshold can be changed via this object. If the light level at the time the movement starts is below this value, the action is taken, if it is above it, it is not taken. Values between "10-1000 Lux" can be entered. The default value is 400.

2.9 Operation Mode

The application operates based on the selected mode from this parameter. There are 3 modes, which are;

2.9.1 Auto

This is the standard operating mode of the sensor. When it detects movement, it performs the 'Action at the start of detection.' If it detects inactivity for the duration of the detection time, it performs the 'Action at the end of detection.

2.9.2 Auto ON

This is the standard operating mode of the sensor. When it detects movement, it performs the 'Action at the start of detection.' If an external off telegram is received, it performs the 'Action at the end of detection.' If an external on telegram is received, it also performs the 'Action at the start of detection.

2.9.3 Auto OFF

When the device receives an external on telegram, it performs the 'Action at the start of detection.' At the end of the timeout, it performs the 'Action at the end of detection.' If it receives an external off telegram, it also performs the 'Action at the end of detection.

2.10 Slave Input

When this parameter is activated, if the "Open telegram" comes from the communication object, it indicates to the sensor that movement is detected. The master sensor performs its operation according to the other parameters.

2.11 Slave Input Depends on Brightness

It determines the relationship between the movement telegrams from the slave input and the light threshold value set on the master device. If 'Yes' is selected, the input information from the slave will depend on the status of the brightness information.

2.12 Test Mode Object

When the parameter is activated and a 1 is received from the 1-bit test mode object, the addressing LED is used as a movement indicator. When a 0 is received from the object or after 10 minutes, the test mode is deactivated.

2.13 Actuator Status Object

When a telegram is sent to the actuator linked to the sensor via this parameter's communication object, and if the telegram does not come from the sensor, the sensor is notified and becomes ready to activate again after a timeout (10 seconds). The sensor is activated if it receives a telegram opposite to its current output state. If it receives the same telegram as its current output state, no action is taken. The purpose of this is that if the light turned on by the sensor is turned off externally, the sensor will resume movement detection 10 seconds after the opposite state without waiting for the timeout.

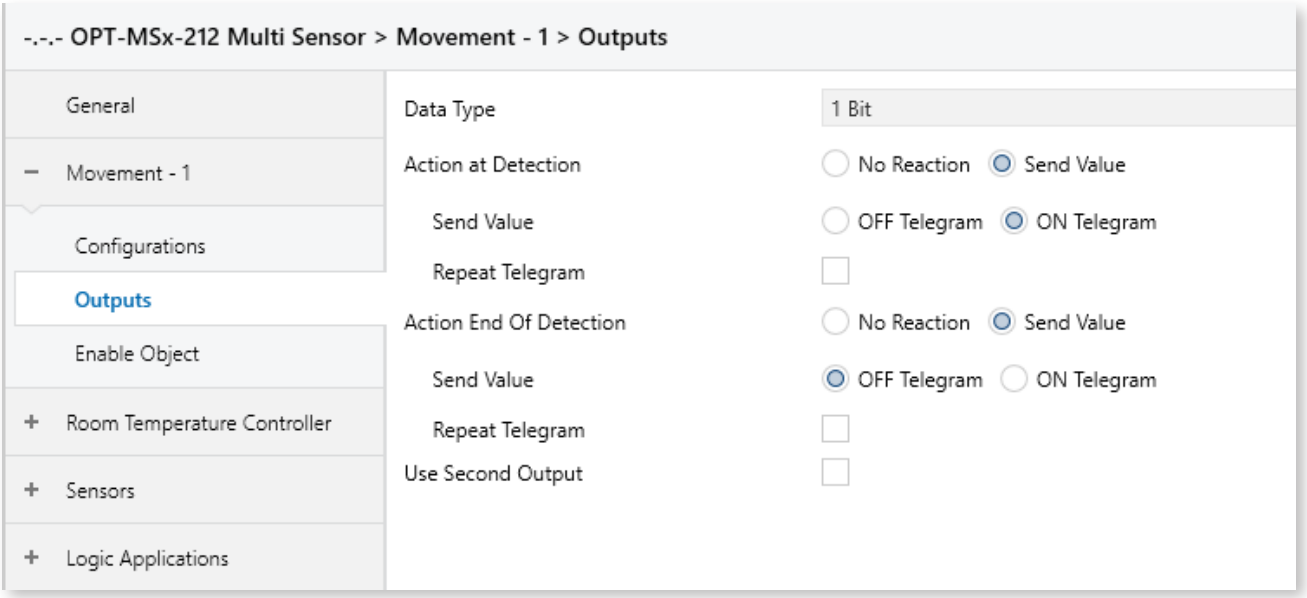
2.14 External Push Button Object

It allows external button intervention to the output. The output can be either on or off depending on the switch. When 'On' is sent, the sensor activates the output; it will turn off the output after a timeout or when 'Off' is received from the switch. This is mandatory in the Automatic On and Automatic Off modes described in section 6.17.1 and 6.17.2

2.15 Pause Time

The duration set in the parameter is triggered when a 'Action at the End of Detection' telegram, an External Switch Object, or an Actuator Status Object receives a shutdown telegram. During this period, the sensor's presence detection is inEnable. The purpose of this parameter is to prevent the sensor from quickly resuming detection after receiving an external telegram to turn off the output.

2.16 Outputs



When 'Master Sensor' is selected, it is Enable. It provides movement information through this output based on the parameters above. The parameters for this output are listed below.

2.16.1 Data Type

Used to specify the data type of the information produced by the device's movement detection function. The options are '1-bit', '1-byte', '1-byte Percentage', 'Scenario', or 'HVAC Mode'.

2.16.2 Action at Detection

Select the appropriate option between 'Do Not Send Value' or 'Send Value.' If 'Send Value' is selected, additional options will become available.

2.16.2.1 Send Value

Depending on the Output Data Type, the value will either be selected from a dropdown menu or entered manually.

2.16.2.2 Repeat Telegram

If activated, it will send the information at the start of detection, and periodically during the following repetition interval.

2.16.3 Action End of Detection

Select the appropriate option between 'Do Not Send Value' or 'Send Value.' If 'Send Value' is selected, additional options will become available.

2.16.3.1 Send Value

Depending on the Output Data Type, the value will be selected from a dropdown menu or entered manually.

2.16.4 Repeat Telegram

If activated, it will send the end-of-detection information, and even periodically, during the following repetition interval.

2.16.5 Common Repeat Cyclic

Defines the frequency of sending movement information. It can be set between 10 and 65535 seconds. The default value is 10 seconds.

2.16.6 Two Stage Off

If not activated, the detector has a shutdown delay and sends the value set under the 'Action at the End of Detection' parameter after this delay. If 'Yes' is selected, after the shutdown delay, the detector first transitions to the set reduced brightness level, and only after the brightness has been reduced according to the shutdown delay, it sends the value set under the 'Action at the End of Detection' parameter. This parameter is Enable for 1-byte operations. Values between 0-255 for 1-byte or between 0-100% for 1-byte percentage can be entered.

2.16.6.1 Brightness Independent

The sensor works according to the ambient brightness level and whether there is movement or not. In this case, there is no need to read any value from the photodiode sensor on it.

2.16.6.2 Two Stage Off Brightness Value

This parameter is used to enter the value for the second stage of a two-stage shutdown. It is Enable for 1-byte operations. Values between 0-255 for 1-byte or between 0-100% for 1-byte percentage can be entered.

2.16.6.3 Two Stage Off Brightness Delay Time

This parameter defines the processing time for the two-stage shutdown. If the sensor does not detect movement at the end of the detection period, it sends the two-stage shutdown value and does not perform any actions for the duration set in this parameter. After this duration, it sends the value assigned to the 'Action at the End of Detection' parameter.

2.16.4 Use Second Output

When the 'Use Output 2' parameter is activated, Output 2 objects become Enable. The outputs of this Com object are configured according to the parameters below.

2.16.5 Data Type

Used to specify the data type of the information produced by the device's movement detection function. Options include '1-bit', '1-byte', '1-byte Percentage', 'Scenario', or 'HVAC Mode'.

2.16.6 Action at Detection

Select the appropriate option between 'Send Telegram' or 'Send Value.' If 'Send Value' is selected, additional options will become available.

2.16.6.1 Send Value

Depending on the Output Data Type, the value will be selected from a dropdown menu or entered manually.

2.16.6.2 Repeat Telegram

If activated, it will send the information at the start of detection, and even periodically, according to the repetition interval specified below.

2.16.7 Action End of Detection

Select the appropriate option between 'Send Telegram' or 'Send Value.' If 'Send Value' is selected, additional options will become available below.

2.16.7.1 Send Value

Depending on the Output Data Type, the value will be selected from a dropdown menu or entered manually.

2.16.7.2 Repeat Telegram

If activated, it will send the end-of-detection information and even periodically during the repetition interval specified below.

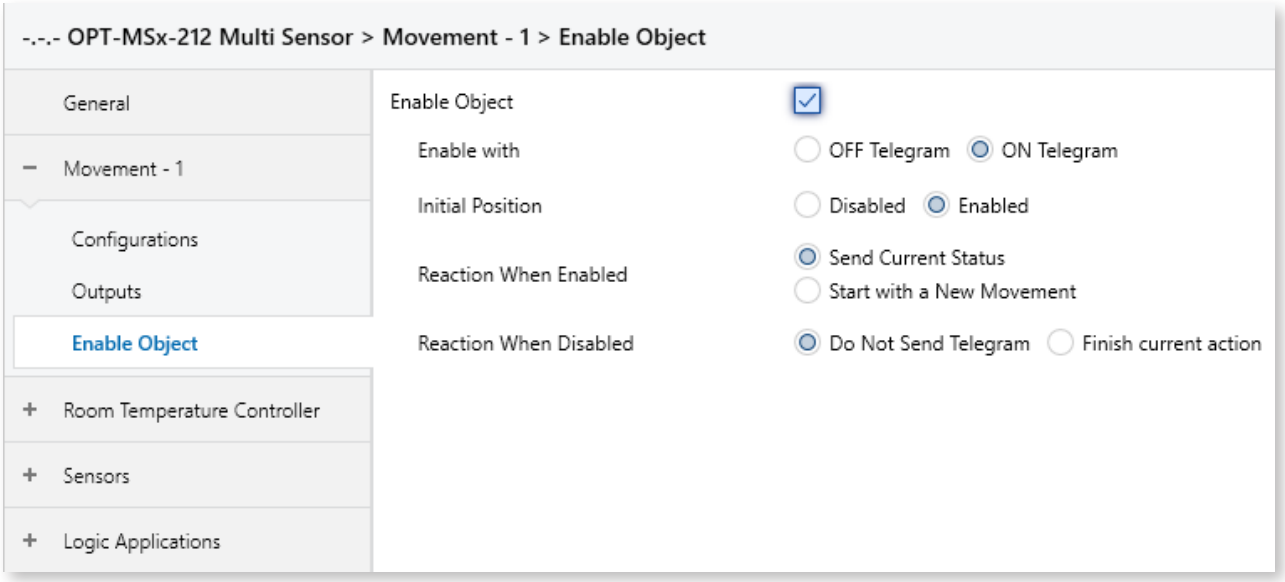
2.16.8 External Light Level Threshold

When "External Sensor" is selected, the light information allows the threshold value to be determined. If the light level at the time the movement starts is below this value, the action is taken, if it is above it, it is not done. Values between "10-1000Lux" can be entered. The default value is 400.

2.16.9 External Light Level Threshold Com Object

If this parameter is activated when the light information "External Sensor" is selected, the "External Brightness Level Threshold" object of the threshold value is opened. The brightness level threshold can be changed via this object. If the light level at the time the movement starts is below this value, the action is taken, if it is above, it is not taken. Values between "10-1000Lux" can be entered. The default value is 400.

2.17 Enable Object



This is the section where the sensor's movement application can be set to 'Enable' or 'Disable.' The default option is 'No.' When set to 'Yes,' the following parameters become available:

2.17.1 Enable With

This specifies which data will activate the sensor's movement function. The options are 'OFF Telegram' or 'ON Telegram.' Depending on which telegram is selected, the movement application will start working when that telegram is received from the Activation Object.

2.17.2 Initial Position

This setting determines the activation state of the device upon startup. If 'Disabled' is selected, the movement function will not operate when the device is started and will wait for the appropriate value to come from the relevant object. If 'Enable' is selected, the device's movement function will start operating immediately.

2.17.3 Reaction when Enabled

The device's movement function operates in the background regardless of its activity status. When the movement function is activated, if it is desired for the device to report its current state (such as processing an existing movement immediately), select 'Send Current State.' If it is desired for the sensor to start processing with new movement, select 'Start with New Movement.

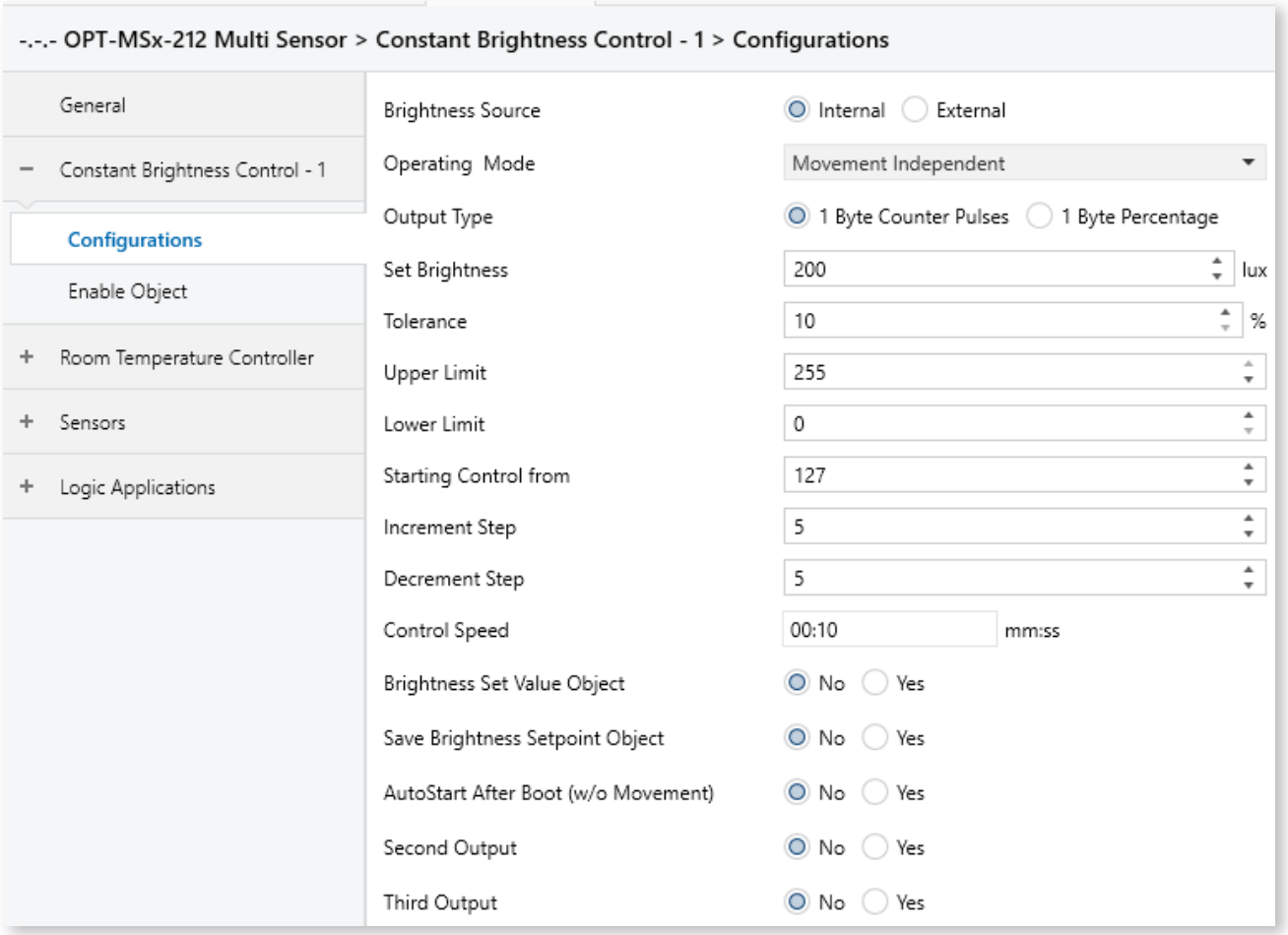
2.17.4 Reaction When Disabled

This section defines the behavior of the device when its movement detection is deactivated while the movement function remains Enable. If you want the device to stop sending telegrams immediately, select 'Stop Sending Telegrams.' If you prefer the device to complete its current task (e.g., send the end-of-activity telegram) and then switch to Disable mode, select 'Finish Current Task.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	Movement 1/2	Enable Input	Input	1 bit	1.003 Enable	C	-	W	-
x		Slave Output	Output	1 bit	1.001 DPT Switch	C	-	-	T
x		Slave Input	Input	1 bit	1.001 DPT Switch	C	-	W	-
x		Detection Timeout	Input/Output	2-byte	7.005 Time	C	R	W	-
x		Detection Night Input	Input	1 bit	1.001 DPT Switch	C	-	W	-
x		Detection Night Timeout	Input/Output	2-byte	7.005 Time	C	R	W	-
x		Internal Brightness Threshold	Input	2-byte	9.004 lux	C	-	W	-
x		External Brightness	Input	2-byte	9.004 lux	C	-	W	-
x		External Brightness Threshold	Input	2-byte	9.004 lux	C	-	W	-
x		Test Mode Object	Input	1 bit	1.001 DPT Switch	C	-	W	-
x		Actuator Status	Input	1 bit	1.001 DPT Switch	C	-	W	-
x		External Push Button	Input	1 bit	1.001 DPT Switch	C	-	W	-
x		Output 1	Output	1 bit	1.001 DPT Switch	C	-	-	T
x				1byte	5.010 Counter Pulses	C	-	-	T
x				1byte	5.001 Percentage	C	-	-	T
x				1 byte	17.001 Scene Number	C	-	-	T
x				1 Byte	20.102 HVAC Mode	C	-	-	T
x				2 Byte	9.001 Temperature	C	-	-	T
x		Output 2	Output	1 bit	1.001 DPT Switch	C	-	-	T
x				1byte	5.010 Counter Pulses	C	-	-	T
x				1byte	5.001 Percentage	C	-	-	T
x				1 byte	17.001 Scene Number	C	-	-	T
x				1 byte	20.102 HVAC Mode	C	-	-	T
x				2 Byte	9.001 Temperature	C	-	-	T

Table 2:Movement Application 1/2 Communication Section Objects

3 Constant Brightness Control



The sensor can be programmed to adjust the lighting requirements of a space exposed to daylight. The primary goal of Fixed Light Level Control is to maintain the brightness of the environment at the desired level. If the measured brightness is above or below the desired light level, the sensor will begin to increase or decrease the artificial light level until the measured brightness reaches the desired value. The desired light level can be configured via a parameter or adjusted through a communication object.

Calibration Process
In applications with a motion sensor, the PIR sensor requires approximately 1 minute of calibration after each programming or powering up to function correctly. During this initial 1-minute period, the sensor remains passive and does not detect any movement. After 1 minute, the calibration is completed, and the sensor is ready to detect motion and send relevant information to the system.

3.1 Brightness Source

3.1.1 Internal

The sensor uses its measured brightness and threshold brightness value to decide whether to enable or disable CBC (Constant Brightness Control).

3.1.2. External

A 2-byte 'External Brightness' (input) communication object is activated. The sensor uses this external measured brightness and the 'Brightness Value Threshold' (lux) parameter to determine whether to enable or disable the presence detector.

3.2. Operation Mode

Automatic Mode, Automatic Switch Off, Independent of Movement.

3.2.1 Automatic

In 'Automatic' mode, the sensor automatically turns on when it detects movement in the environment. The shutdown occurs after the configured movement timeout period following the last detection.

3.2.2 Automatic Switch OFF

In 'Automatic Switch Off' mode, the sensor must be manually turned on using the 'automatic/manual' object. The shutdown is automatically performed considering the shutdown delay.

3.2.3 Movement Independent

In 'Independent of Movement' mode, the sensor operates solely based on brightness ± tolerance for turning on and off.

3.3 Output Type

This parameter defines the data type of the Output Com object when adjusting the desired light level. Two options are available: 1-byte (0-255) or 1-byte Percentage (0-100%).

3.4 Set Brightness

This parameter sets the desired light intensity in the environment. Values can be entered between 10 and 1000 lux, with a default value of 400 lux. Since the device is a ceiling-mounted type and measures the light intensity reflected off the ceiling, you need to compare the desired light intensity with the light level at the location of the sensor.

3.5 Tolerance

This parameter defines the ± tolerance range for constant brightness. It can be set between 10% and 100%, with a default value of 10%. For example, if the set value is 400 and the tolerance is 10%, the control will not occur between 380 and 420.

3.6 Upper Limit

This parameter defines the maximum value to be sent to the lighting device. The default value is 255 (100%).

3.7 Lower Limit

This parameter defines the minimum value to be sent to the lighting device. The default value is 0 (0%).

3.8 Starting Control Value

This parameter defines the starting value for constant brightness control. It can be set between 0 and 255. The default value is 128 (50%). The device starts from the value defined here to check whether the lighting is sufficient and to control the light level.

3.9 Increment Step

This parameter defines the value by which the device will increase the starting value or the last value sent to control. A value between 1 and 15 can be specified. The default value is 5.

3.10 Decrement Step

This parameter defines the value by which the device will decrease the starting value or the last value sent to control. A value between 1 and 15 can be specified. The default value is 5.

3.11 Control Speed

This parameter is the delay time before the device sends a new value, allowing the environment to reach the new light level. It can be set between 2 and 255 seconds. The default value is 10 seconds. Please note that setting a shorter duration may cause more interference in the light level.

3.12 Brightness Set Value Object

A 2-byte 'Brightness Set Value Object' (input) communication object is enabled. This object allows the externally set brightness level to be changed.

3.13 Save Brightness Setpoint Object

This parameter is used to save the current measured brightness as a new control threshold using an On/Off telegram received by this communication object.

3.14 Autostart After Boot (w/o Movement)

This parameter allows the device to operate on initial startup without receiving an external activation telegram, if it is not dependent on movement.

3.15 Second Output

If an additional output is to be used that behaves in parallel with the main output but changes its value by a certain percentage, select 'Yes'. The default value is 'No'. When Enable, the second output can be adjusted between 10% and 255% of the main output. The default value is 100%. It can be used to provide more uniform lighting in brighter (e.g. near windows) or darker areas of the room where the sensor is located.

3.15.1 Gain

This parameter specifies the proportional value of the second output compared to the main output (Output 1) when the second output is activated. It can be set between 10% and 255%. The default value is 100%. For example, if set to 50%, Output 2 will always be 50% less than Output 1. When Output 1 reaches its maximum value and if additional brightness is needed in the environment, Output 2 will start to reach its own maximum value.

3.15.2 Upper Limit

This parameter defines the maximum value to be sent to the device connected to the second output when it is activated. The default value is 255 (100%).

3.15.3 Bottom Limit

This parameter defines the minimum value to be sent to the device connected to the second output when it is activated. The default value is 0 (0%).

3.16 Third Output

If an additional third output is to be used that behaves in parallel with the main output but changes its value by a certain percentage, select 'Yes'. The default value is 'No'. When Enable, the third output can be adjusted between 10% and 255% of the main output. The default value is 100%. It can be used to provide more uniform lighting in brighter (e.g., near windows) or darker areas of the room where the sensor is located.

3.16.1 Gain

This parameter specifies the proportional value of the third output compared to the main output (Output 1) when the third output is activated. It can be set between 10% and 255%. The default value is 100%. For example, if set to 50%, Output 3 will always be 50% less than Output 1. When Output 1 reaches its maximum value and if additional brightness is needed in the environment, Outputs 2 and 3 will start to reach their own maximum values.

3.16.2 Upper Limit

This parameter defines the maximum value to be sent to the device connected to the third output when it is activated. The default value is 255 (100%).

3.16.3 Bottom Limit

This parameter defines the maximum value to be sent to the device connected to the third output when it is activated. The default value is 0 (0%).

3.17 Movement Source

If the CBC application is set to be movement-dependent, it receives the required movement detection for the operation of the connected CBC in 3 different ways. These are:

3.17.1 Internal

The CBC application responds only to movement detected by its own movement sensor.

3.17.2 External

The CBC application performs CBC activation only through the telegram received via the 'External Movement Input' object.

3.17.3 Internal or External

The CBC application responds to telegrams from both its own movement sensor and the 'External Movement Input' object.

3.18 Internal Movement Source

When movement dependency is enabled, the sensitivity of the device's primary movement sensor can be adjusted in 3 levels: Low, Medium, and High. Sensitivity can be decreased to reduce unwanted movement or increased for more precise detection.

3.19 Movement Timeout

The movement detection duration can be set between 10 and 65535 seconds. The default value is 300 seconds (5 minutes).

3.20 Movement Timeout Object

Allows external specification of the movement duration. When 'Enable' is selected, the '24 - Detection Timeout' object becomes visible. The default value is 'Disable'.

3.21 End Of Movement Output Value

The value that the lighting will take when the movement duration is completed is specified here. It can be set between 0 and 255, with the default value being 0.

3.22 Two Stage OFF

When this parameter is activated, the sensor will send the two-stage closing value set in this parameter when 'Action at End of Detection' occurs. If no presence is detected during the two-stage closing period, the value assigned to the 'Output Value to be Sent at End of Movement' parameter will be sent.

3.22.1 Two Stage Off Brightness Value

This parameter specifies the value for the second stage of the two-stage closing. A value can be entered between 1-byte 0-255 and 1-byte 0-%100.

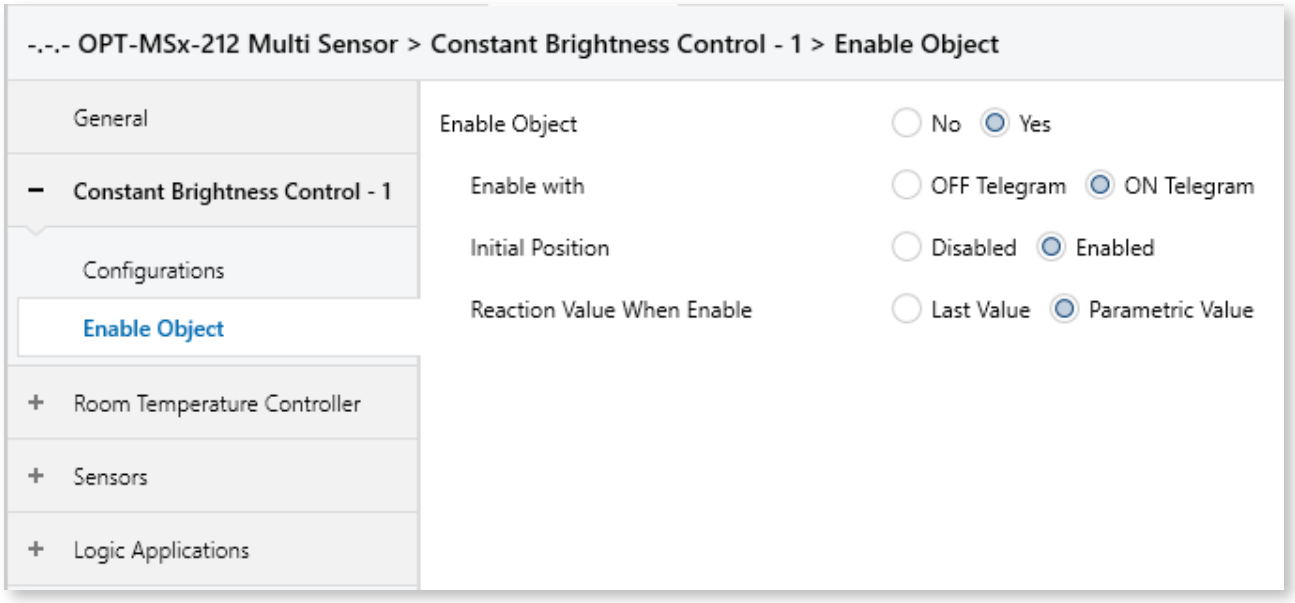
3.22.2 Two Stage Off Brightness Delay Time

This parameter specifies the processing time for the two-stage closing. If no movement is detected after the detection time, the sensor sends the two-stage closing value and does not perform any action for the duration set in this parameter. After the time expires, it sends the value assigned to the 'Output Value to be Sent at End of Movement' parameter.

3.23 Manual Control Time

When the sensor receives any value from 'Stop' 1-bit, 4-bit, or 1-byte objects, it will no longer operate automatically. The sensor will return to automatic mode only after the duration set in this parameter has elapsed.

3.24 Enable Object



This parameter is used to completely enable or disable the Constant Brightness Control. Options include 'Disable' or 'Enable'. The default value is 'Disable'. When 'Enable' is selected, additional options will be revealed.

3.24.1 Enable With

The 'OFF Telegram' indicates that activation occurs with a 1-bit 0 (zero) telegram, while the 'ON Telegram' indicates activation with a 1-bit 1 (one) telegram. The default value is set to 'ON Telegram'.

3.24.2 Initial Position

Indicates the initial state of the device. If 'Enable' is selected, the device will start operating immediately upon initialization. If not selected, 'Constant Light Control' will not operate immediately after the device starts.

3.24.3 Reaction Value When Enable

When the Constant Brightness Control (CBC) function is enabled, if you want the device to start from the previous value before becoming Disable, select 'Last Value'. If you want the sensor to start operation with the value set by the parameter, select 'Parametric Value'

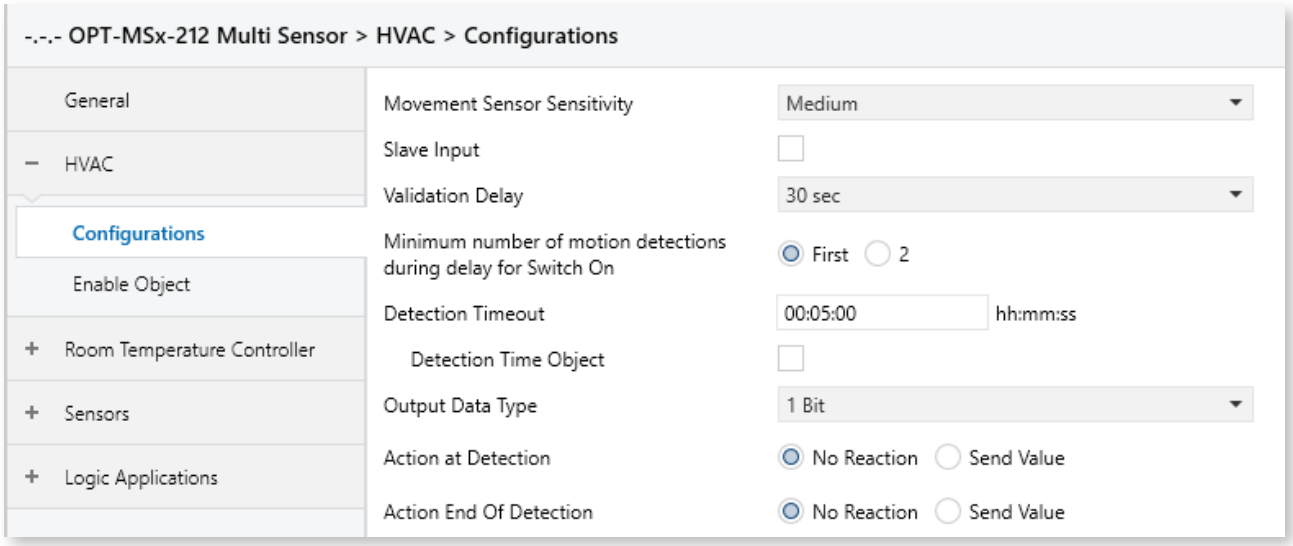
3.24.4 Reaction Value When Disabled

When the Constant Brightness Control (CBC) function is Enable, this parameter determines how the device behaves when CBC is deactivated. If you want the device to stop sending telegrams immediately, select 'Switch OFF'. If you want the device to complete its current task (send the end of activity telegram) before becoming Disable, select 'Switch OFF After timeout'.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	CBC 1/2	Enable Input	Input	1 Bit	1.003 Enable	C	R	W	T
x		Start Stop	Input	1 Bit	1.001 Switch	C	R	W	T
x		External Movement Input	Input	1 Bit	1.001 Switch	C	-	W	-
x		Detection Timeout	Input	2 byte unsigned	7.005 time	C	R	W	T
x		Brightness Setpoint	Input	1 Bit	1.001 Switch	C	-	W	-
x		Brightness Set Value	Input	2 byte unsigned	9.004 Lux	C	R	W	T
x		External Brightness Value	Input	2 byte unsigned	9.004 Lux	C	-	W	-
x		Stop 1 Bit	Input	1 Bit	5.010 Counter Pulses	C	-	W	-
x		Stop 4 Bit	Input	4 Bit	3.007 Dimming C.	C	-	W	-
x		Stop 1 Byte	Input	1 Byte	5.010 Counter Pulses	C	-	W	-
x		Stop 1 Byte	Input	1 Byte	5.001 Percentage	C	-	W	-
x		Stop 1 Byte	Output	1 Byte	5.010 Counter Pulses	C	-	-	T
x		Output 1	Output	1 Byte	5.001 Percentage	C	-	-	T
x			Output	1 Byte	5.010 Counter Pulses	C	-	-	T
x		Output 2	Output	1 Byte	5.001 Percentage	C	-	-	T
x			Output	1 Byte	5.010 Counter Pulses	C	-	-	T
x		Output 3	Output	1 Byte	5.001 Percentage	C	-	-	T
x			Output	1 Byte	5.001 Percentage	C	-	-	T

Table 3: Constant Brightness Application 1/2 Communication Section Objects

4 HVAC



In HVAC systems, a sensor is used to enhance energy efficiency and comfort by detecting movement. The sensor counts the number of movements detected within a specified period and sends signals to the HVAC system based on this information. For example, the HVAC system can be set to a low power mode when the room is empty, and switch back to normal operation when movement is detected, thereby ensuring energy savings and maintaining comfort.

Calibration Process
In applications with a motion sensor, the PIR sensor requires approximately 1 minute of calibration after each programming or powering up to function correctly. During this initial 1-minute period, the sensor remains passive and does not detect any movement. After 1 minute, the calibration is completed, and the sensor is ready to detect motion and send relevant information to the system.

4.1 Movement Sensor Sensitivity

The sensitivity of the movement sensor, which forms the basis of the device, can be independently adjusted in three levels: Low, Medium, and High. Lowering the sensitivity can reduce the detection of unwanted movements, while increasing it allows for more precise movement detection.

4.2 Slave Input

When this parameter is activated, receiving an 'On' telegram from communication object 137 (Slave Input) indicates movement detection. This parameter is equivalent to the movement detection information of the internal sensor.

4.3 Validation Delay

This parameter defines the duration during which the sensor must detect a minimum number of movements. If the sensor does not detect the specified number of movements within this period, the movement is not considered valid. The sensor continuously detects movement during the Validation Delay period and considers the movement valid once the minimum number of detections is reached. For example, if Validation Delay is set to 30 seconds and Minimum Number of Movement Detections during Validation Delay is set to 2, the sensor must detect at least one more movement after the initial detection. If no additional movement is detected within 30 seconds, the movement is deemed invalid, and the system will not respond.

4.4 Minimum number of movement detections during delay for Switch On

This parameter specifies the minimum number of movements required for movement to be considered valid during the Validation Delay period. Once the sensor detects the specified number of movements within this time frame, it accepts the movement as valid and sends this information to the 'Action at Detection' object.

4.5 Detection Timeout

The Validation Delay is the time period that starts when the sensor detects movement and ends when it ceases its activity. It can be set between 10 seconds and 65535 seconds (18 hours, 12 minutes, and 15 seconds). The default value is 300 seconds. The sensor resets this duration with each movement detection within this period.

4.6 Detection Time Object

This option allows external modification of the detection time. When 'Enable' is selected, the 'Movement Detection Time' object is enabled. The movement detection time can be adjusted through this object.

4.7 Output Data Type

This parameter specifies the data type for the information output by the movement detection function. It can be set to '1-bit', '1-byte', '1-byte Percentage', 'Scenario', '2-Byte Temperature' or 'HVAC Mode'

4.8 Action at Detection

This parameter defines the action or operation triggered by the sensor when movement is detected. Choose between 'Send Telegram' or 'Send Value'. If 'Send Value' is selected, additional options will be available.

4.8.1 Send Value

Depending on the Output Data Type, the value can be selected from a drop-down menu or entered manually.

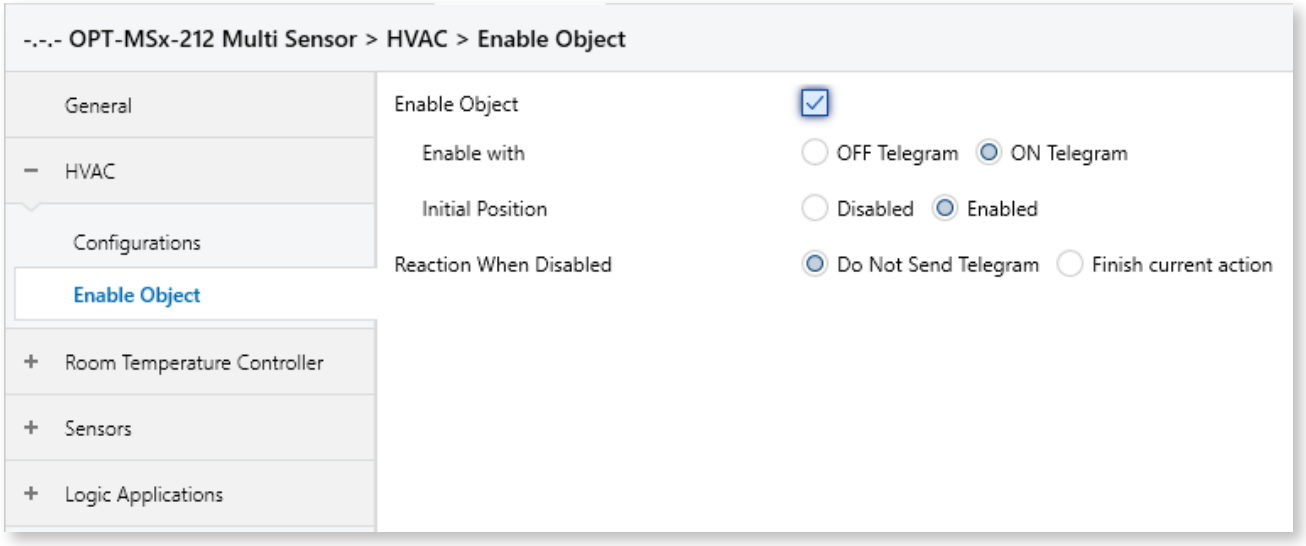
4.9 Action End Of Detection

Defines the action or process triggered by the sensor when movement detection ends. Select either 'Send Telegram' or 'Send Value'. If 'Send Value' is selected, additional options will be revealed.

4.9.1 Send Value

The value will be selected from a drop-down menu or entered manually, depending on the Output Data Type.

4.10 Enable Object



Used to completely enable or disable HVAC Control. Options include 'Disable' or 'Enable.' The default value is 'Disable.' When 'Enable' is selected, additional options become available.

4.10.1 Enable With

The 'OFF Telegram' is activated by a 1-bit 0 (zero) telegram, while the 'ON Telegram' is activated by a 1-bit 1 (one) telegram. The default value is 'ON Telegram'.

4.10.2 Initial Position

This parameter indicates the initial state of the device. If 'Enable' is selected, the device will start operating immediately. Otherwise, if 'HVAC' is selected, the device will not operate immediately after start-up.

4.11 Reaction When Disabled

This section defines the behavior of the device when its movement detection is deactivated while the movement function remains Enable. If you want the device to stop sending telegrams immediately, select 'Stop Sending Telegrams.' If you prefer the device to complete its current task (e.g., send the end-of-activity telegram) and then switch to Disable mode, select 'Finish Current Task.

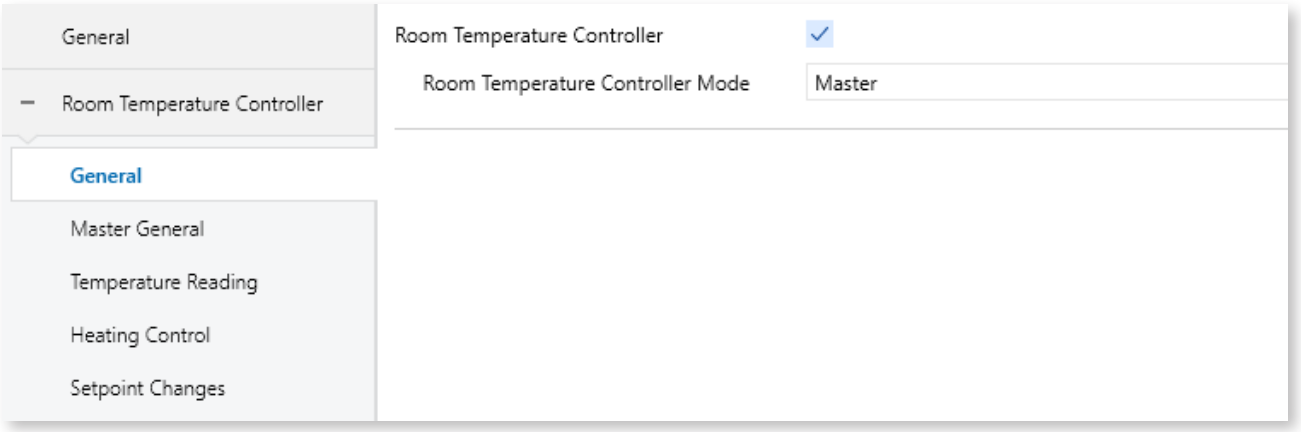
No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
90	HVAC	Enable Input	Input	1 bit	1.003 Enable	C	-	W	-
91		Slave Input	Input	1 bit	1.001 DPT Switch	C	-	W	-
92		Detection Timeout	Input/ Output	2-byte	7.005 DPT_ TimePeriodSec	C	R	W	-
93		HVAC Output	Output	1 bit	1.001 DPT Switch	C	-	-	T
				1byte	5.010 Counter Pulses	C	-	-	T
				1byte	5.001 Percentage	C	-	-	T
				1 byte	17.001 Scene Number	C	-	-	T
				1 Byte	20.102 HVAC Mode	C	-	-	T
				2 Byte	9.001 Temperature	C	-	-	T

Table 4: HVAC Communication Section Objects

5 Room Temperature Control (RTC)

5.1 General

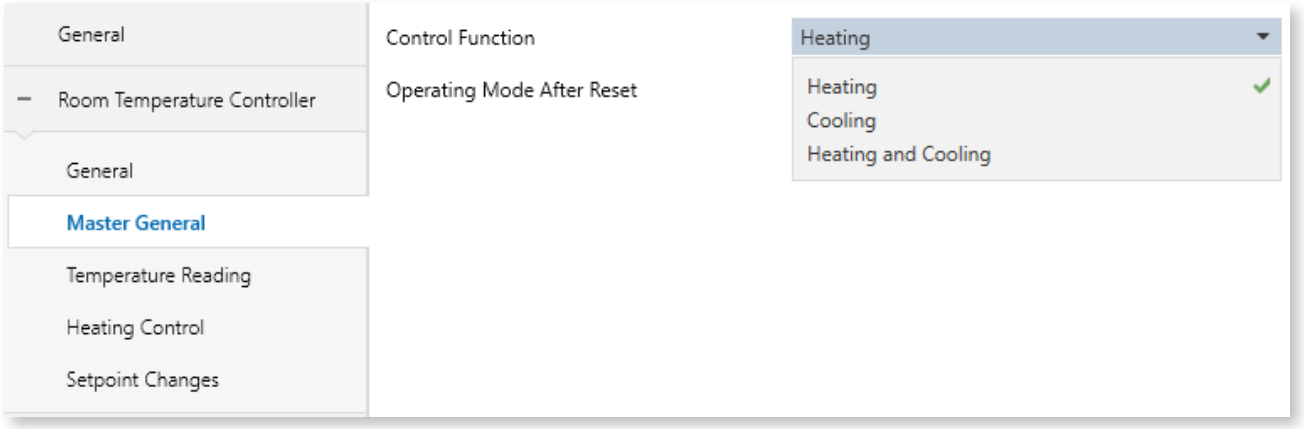
The Room Temperature Control (RTC) general function comes with the OPT-MSx-212 product. The use of the function depends on the status of the parameter; if the control checkbox is not activated, the relevant communication objects will not be displayed. RTC operates as a master device.



No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
110	RTC-General	HVAC Operating Mode	Bidirectional	1byte	20.102 HVAC Mode	C	R	W	T
111	RTC-General	Comfort Operating Mode Select	Bidirectional	1bit	1.001 switch	C	R	W	T
112	RTC-General	Standby Operating Mode Select	Bidirectional	1bit	1.001 switch	C	R	W	T
113	RTC-General	ECO Operating Mode Select	Bidirectional	1bit	1.001 switch	C	R	W	T
114	RTC-General	Protection Operating Mode Select	Bidirectional	1bit	1.001 switch	C	R	W	T
115	RTC-General	Forced Operating Mode	Input	1byte	20.102 HVAC Mode	C	-	W	-
116	RTC-General	Presence Detector Input	Input	1bit	1.001 switch	C	-	W	-
117	RTC-General	Window Contact Input	Input	1bit	1.001 switch	C	-	W	-
118	RTC-General	RTC Controller RHCC Status	Output	2bytes	22.101RHCC Status	C	R	-	T
119	RTC-General	Controller HVAC Status	Output	1byte	20.102 HVAC Mode	C	R	-	T

Table 5: RTC-1 Communication Objects

5.2. Master General



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

Table 6: 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

5.2.1 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.

5.2.1.1 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.

5.2.1.2 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

5.2.1.3 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 5.4 Setpoint Changes)

5.2.2 HVAC Operating Modes

- **Comfort Mod:** This mode operates according to the comfort set temperature of the controlled area.
- **Standby ve Eco/Night Mod:** 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 Setpoint changes), and for the Economy/Night mode, this value is larger, thus ensuring economic usage.
- **Protection Mod:** 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 7: 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.

- **Presence Input:** This mode is the third priority in the priority table. It becomes Enable with a value of 1 (open) received by this communication object, switching the system to RTC comfort mode. A value of 0 (closed) is undefined; in this case, the next object in the priority table is considered. .

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

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

5.2.2.1 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.

5.2.3 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.

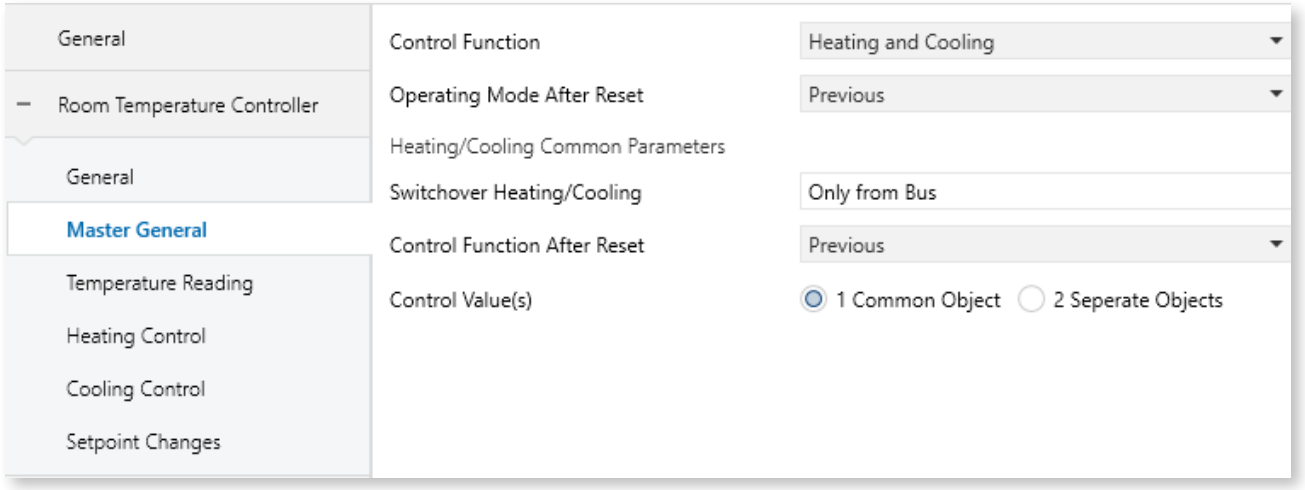
5.2.3.1 HVAC Controller Status

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 Prtoection	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

5.2.4 Heating/Cooling Common Parameters



Nr	Name	Object Function	Direction	Length	Data Type	C	R	W	T
128	RTC- Heating/Cooling	HVAC Control Mode Input	Input	1byte	20.105 HVAC Control Mode	C	-	W	-
129	RTC- Heating/Cooling	HVAC Control Mode Status	Output	1byte	20.105 HVAC Control Mode	C	R	-	T
130	RTC- Heating/Cooling	HVAC Changeover Mode Input	Input	1byte	20.107 Changeover Mode	C	-	W	-
131	RTC- Heating/Cooling	HVAC Changeover Mode Status	Output	1byte	20.107 Changeover Mode	C	R	-	T
132	RTC- Heating/Cooling	Heating Cooling Select	Input	1bit	1.100 heating/cooling	C	-	W	-
138	RTC- Heating/Cooling	Heating Cooling Select Status	Output	1bit	1.100 Heating / Cooling	C	R	-	T

Table 8: RTC-4 Communication Objects

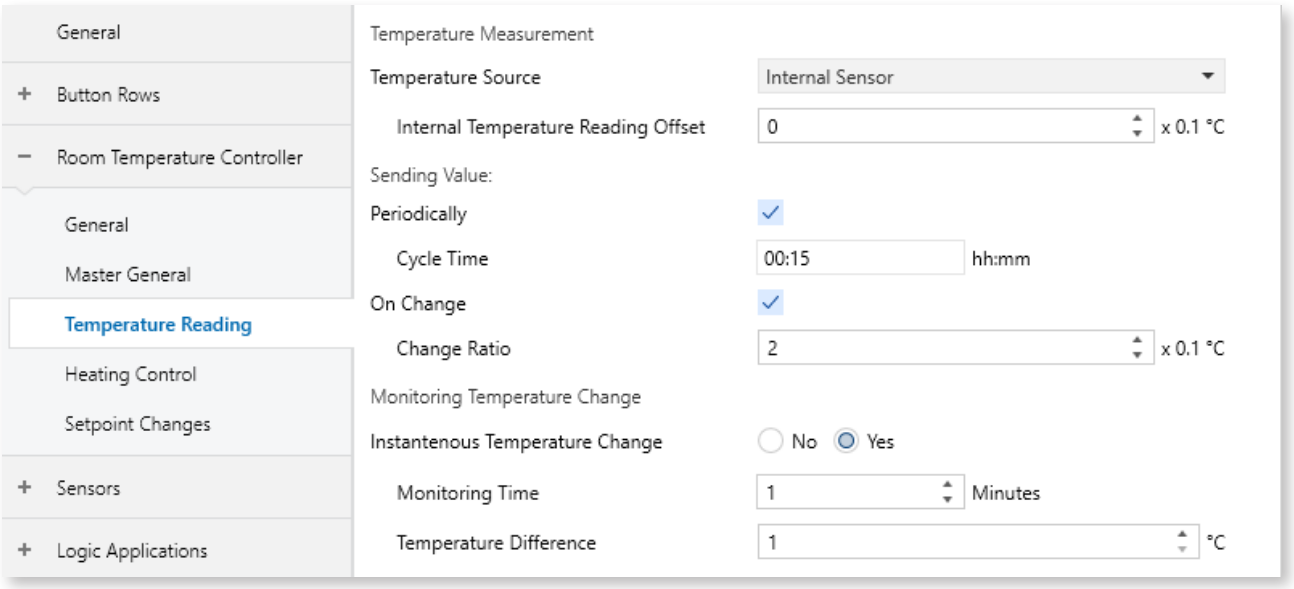
5.2.4.1 Control Function After Reset

- **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.

5.2.4.2 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.
- **Seperate 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.

5.3 Temperature Reading



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

Table 9: RTC-5 Communication Objects

5.3.1 Temperature Measurement

5.3.1.1 Temperature Source

The RTC function can use the temperature sensor located in the OPT-MSx-212, data from the bus line, or a combination of both sources to obtain the ambient temperature. The source is selected from the parameters.

5.3.1.1.1 Internal Sensor

It designates the sensor inside the OPT-MSx-212 as the source. The ambient temperature is taken from the sensor and used in output calculations. It can be conditioned from the parameters (offset).

5.3.1.1.1.1 Internal Temperature Reading Offset

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

5.3.1.1.1.2 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).

5.3.1.1.1.2.1 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.

5.3.1.1.1.2.2 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.

5.3.1.1.1.3 Both of Them

The RTC uses a combination of the OPT-SSxxxx and bus line data as the ambient temperature source. Both sources can be conditioned in the parameters. Data from the bus line can also be requested periodically; if data is not received from the bus line within the specified time the RTC function will stop.

5.3.1.1.1.3.1 Weight

This determines the ratio of the combined sensor and bus line data. The proportion of data from the sensor is specified as a percentage, and the remaining portion is calculated from the data received from the bus line to obtain the combined ambient temperature data.

For example
Weight %80 - Internal (20°C) - External (25°C) = Weight Temperature = 20 * 0.8 + 25 * 0.2 = 21°

5.3.2 Sending Value

5.3.2.1 Periodically

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

5.3.2.1.1 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.

5.3.2.2 On Change

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

5.3.2.2.1 Change Ratio

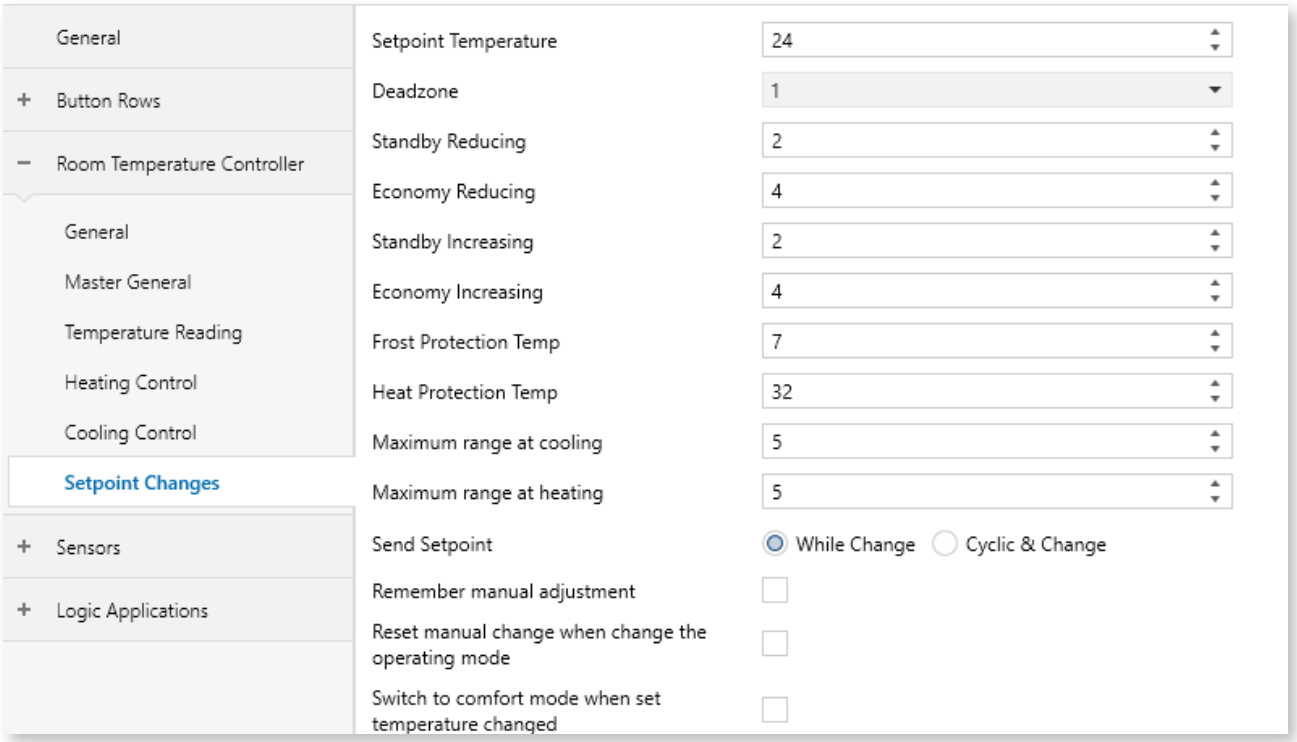
The value specified in the parameter is multiplied by '0.1' to obtain the change ratio. The calculated ambient temperature is compared with the previous value. If the difference is equal to or greater than the value calculated in the parameter, the calculated ambient temperature is sent to the bus line.

5.3.3 Monitoring Temperature Change

5.3.3.1 Instantenous 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.

5.4 Setpoint Changes



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

Table 10: 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.

5.4.1 Setpoint Temperature

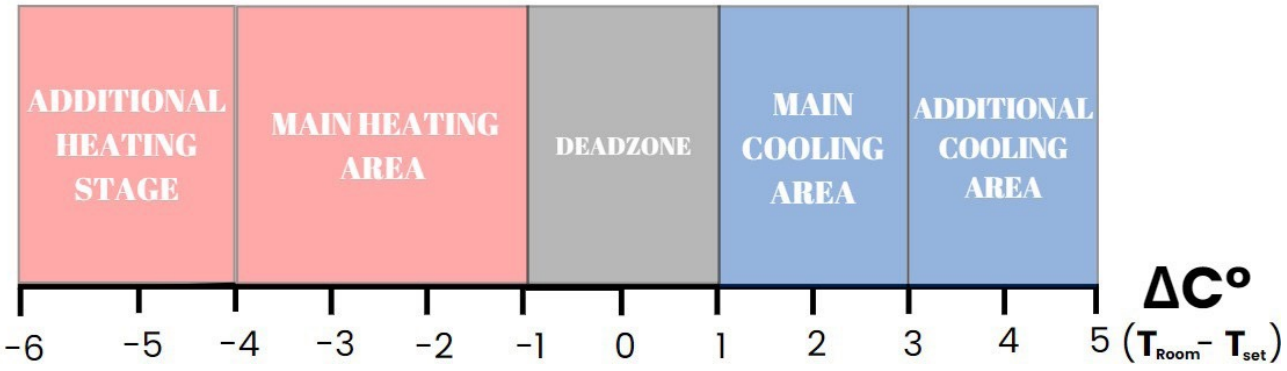
The value to which the OPT-SSxxxx is initially set is determined via parameters. If the "Remember manual adjustment" parameter is not selected, the device starts with the parameter value. If selected, the last setpoint adjustment will be applied.

5.4.2 Deadzone

Used when 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.



5.4.3 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.

5.4.4 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.)

5.4.5 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.

5.4.6 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.

5.4.7. 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.

5.4.8 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.

5.4.9 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°C Range at cooling: 19°C...24°C...29°C

5.4.10 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.

5.4.11 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.

5.4.12 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.

5.4.13 Reset Manuel 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.)

- Parametre seçili: Standby Set: 22°C
- Parametre seçili değil: Standby Set: 24°C

5.4.14 Switch to Comfort Mode when Set Temperature Changed

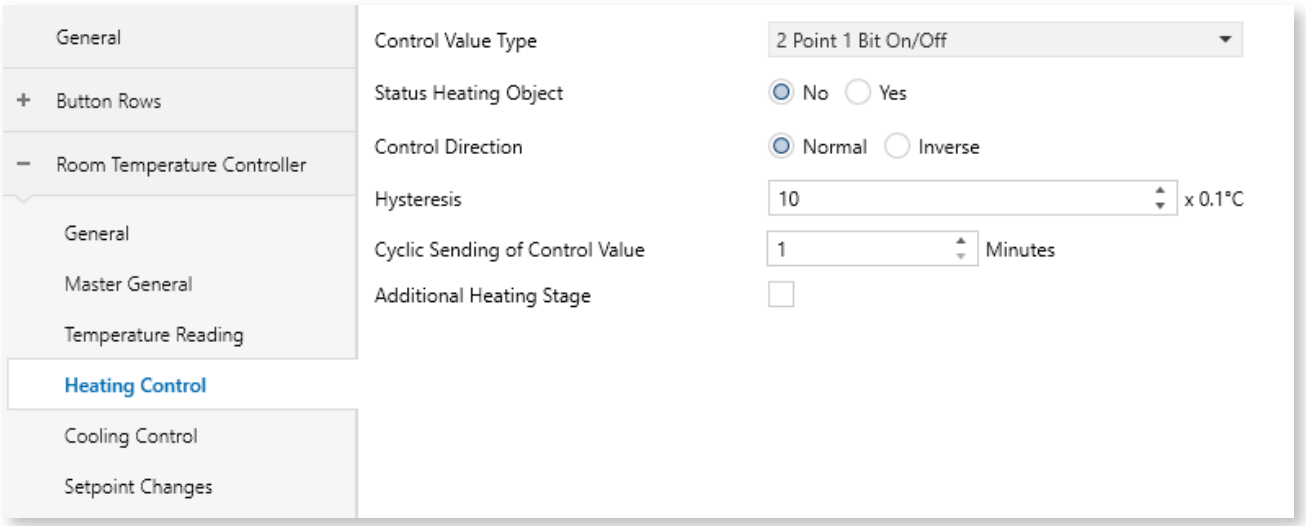
If selected, when the setpoint temperature changes (bus line), the operating mode will switch to comfort mode if it was in standby or economy mode. It can be switched back to standby or economy mode if desired. In protection mode, the setpoint cannot be changed, so the mode will not switch to comfort.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

5.5 Control Values

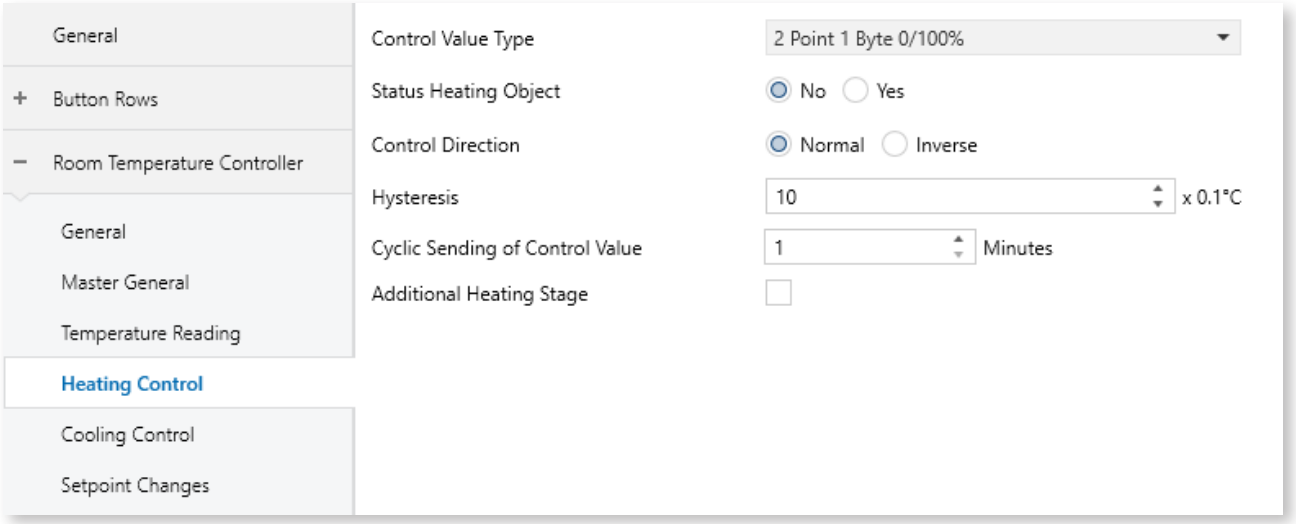
No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
133	RTC- Heating/Cooling	Heating Cooling Control Value	Output	1bit/1byte	1.001 switch /5.001 percentage	C	-	-	T
134	RTC- Heating	Heating Control Value	Output	1bit/1byte	1.001 switch /5.001 percentage	C	-	-	T
135	RTC- Heating	Addittional Heating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

Table 11: RTC-7 Communication Objects

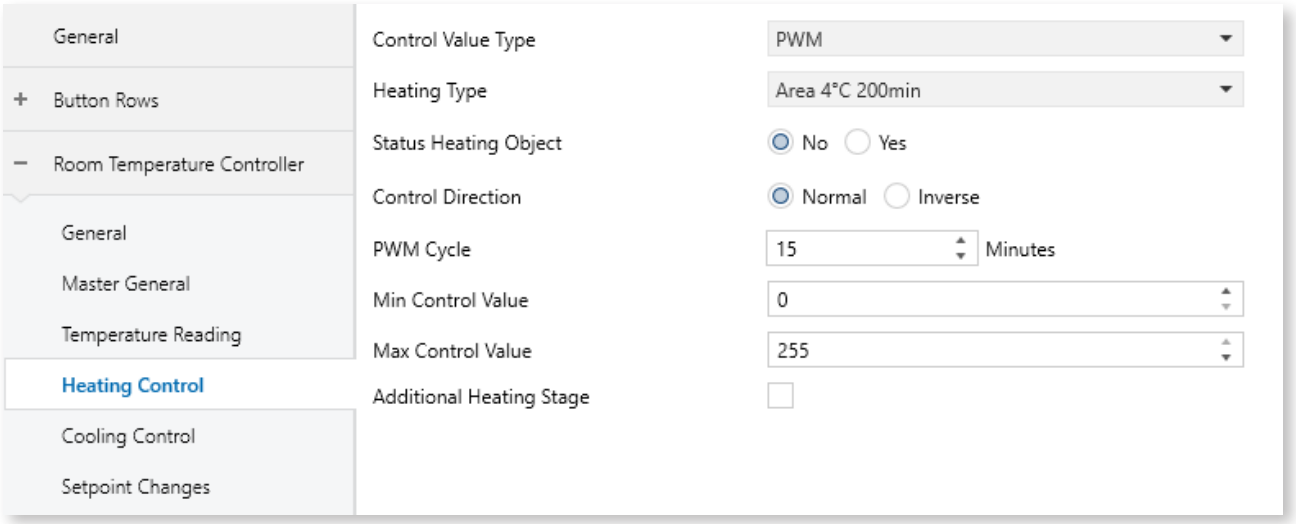
- **2 Point 1 Bit On/Off:** This is the simplest control type. The thermostat turns on when the room temperature drops below a certain level (setpoint temperature minus hysteresis) and turns off when the temperature exceeds a certain level (setpoint temperature plus hysteresis). On and off telegrams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



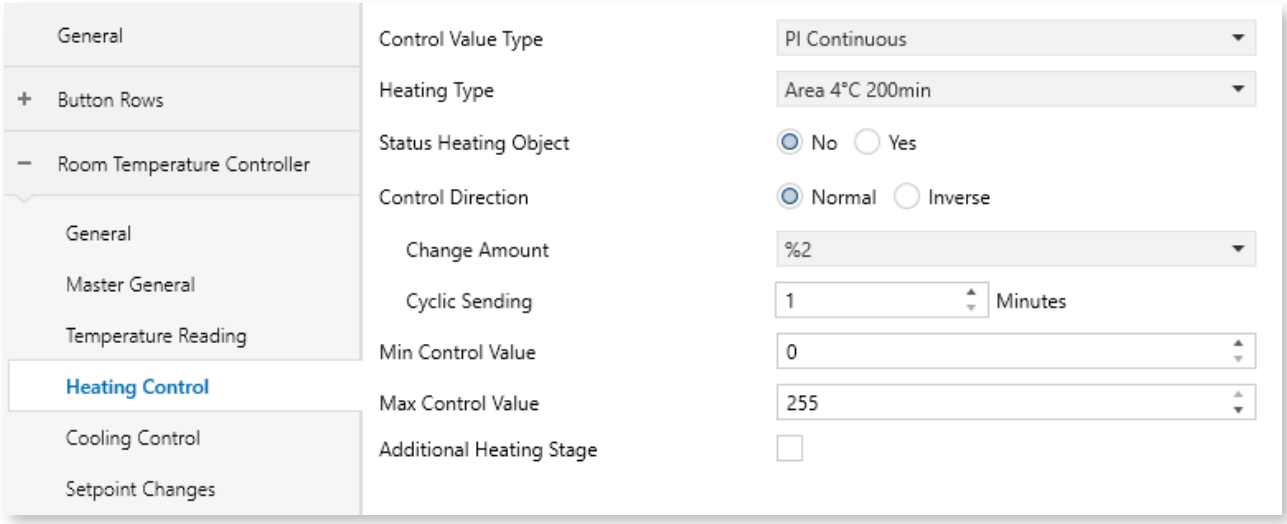
- **2 Point 1 Byte 0/100%:** This is similar to the 2-point control described above. However, in this case, the on and off telegrams are transmitted as 1-byte values (0% / 100%).



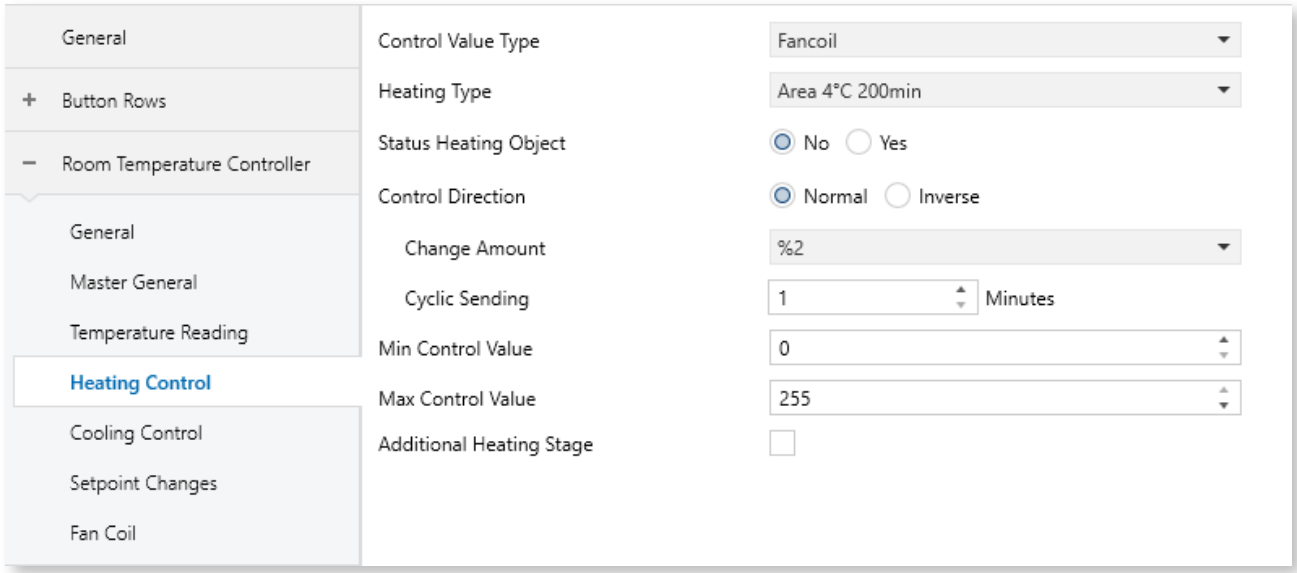
- **PI PWM On/Off:** This is a PI (Proportional-Integral) controller. Here, the output is a 1-bit telegram. The calculated control value is converted into a pulse width modulation (PWM) signal.



- **PI Continiuous 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).



5.5.1 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.

5.5.1.1 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.

5.5.1.2 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 indicates an inEnable state (e.g., when the setpoint temperature is reached), it sends a value of 0 (OFF) to the bus line.

5.5.1.3 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:

- If the control value is Enable:

1. **1 Bit Object:** 0 (OFF)
2. **1 Byte Object:** 0

- If the control value is inEnable:

1. **1 Bit Object:** 1 (ON)
2. **1 Byte Object:** 255

This allows for flexibility in how the system communicates the control status based on the Enable or inEnable state.

5.5.1.4 Hysteresis

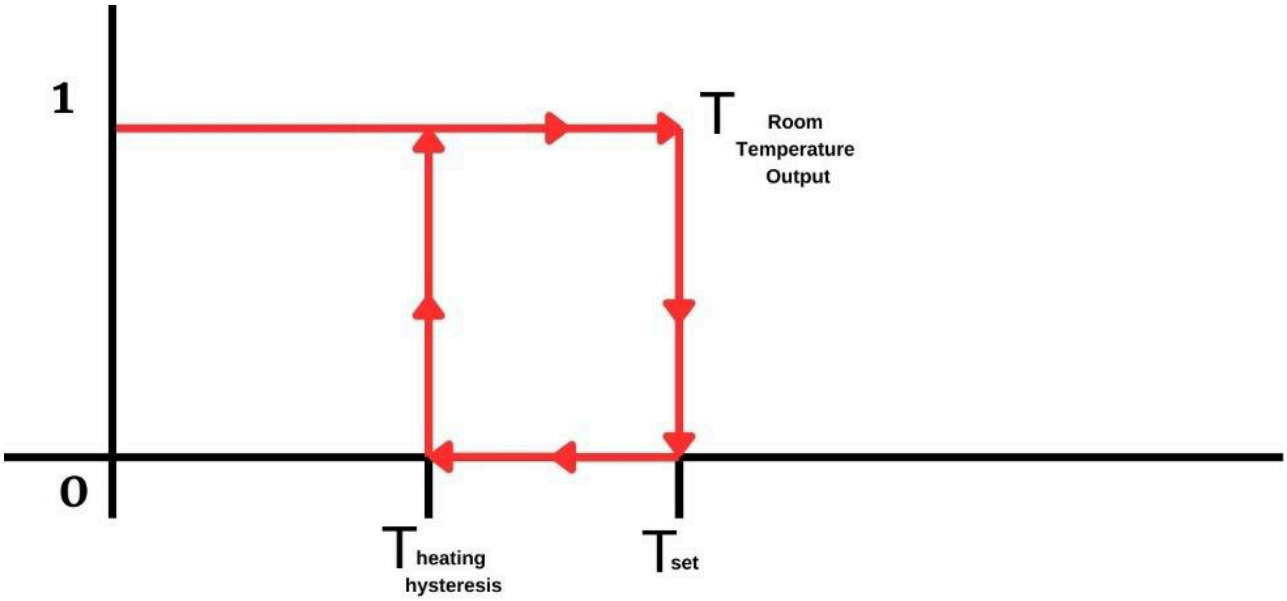
5.5.1.4.1 Heating Control Hysteresis

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)



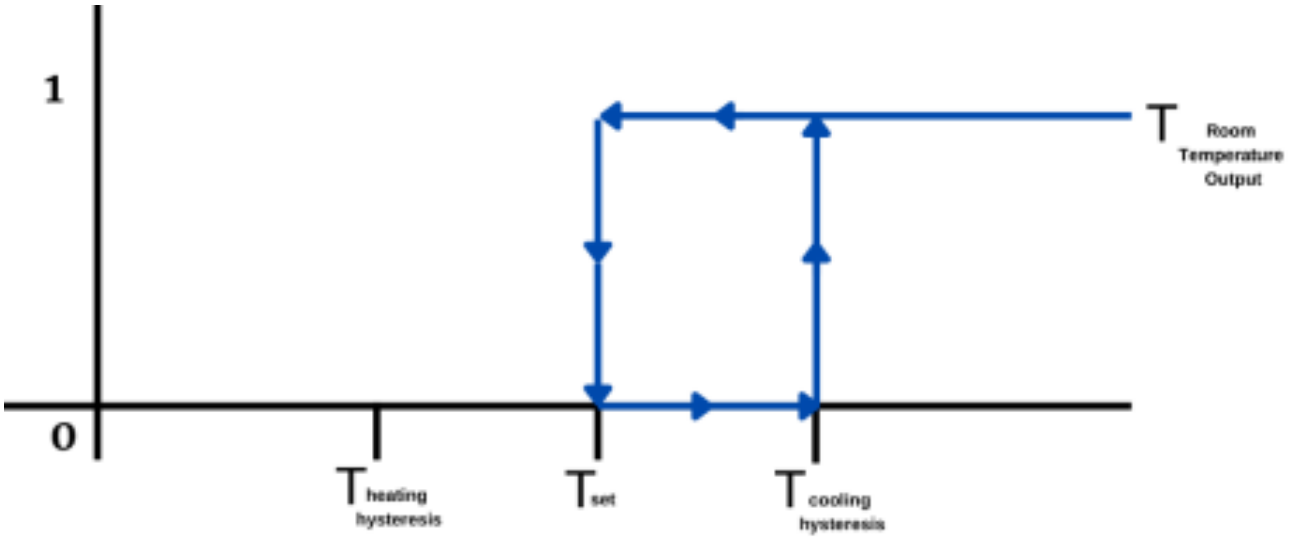
5.5.1.4.2 Cooling Control Hysteresis

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)



5.5.1.5 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.

5.5.2 Common Parameters For PI Controlled Value Types

- **Proportional 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.

5.5.2.1 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.

$P=Kp \times e(t)$

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.

$I=Ki \times \int_0^t e(\tau)\, d\tau$

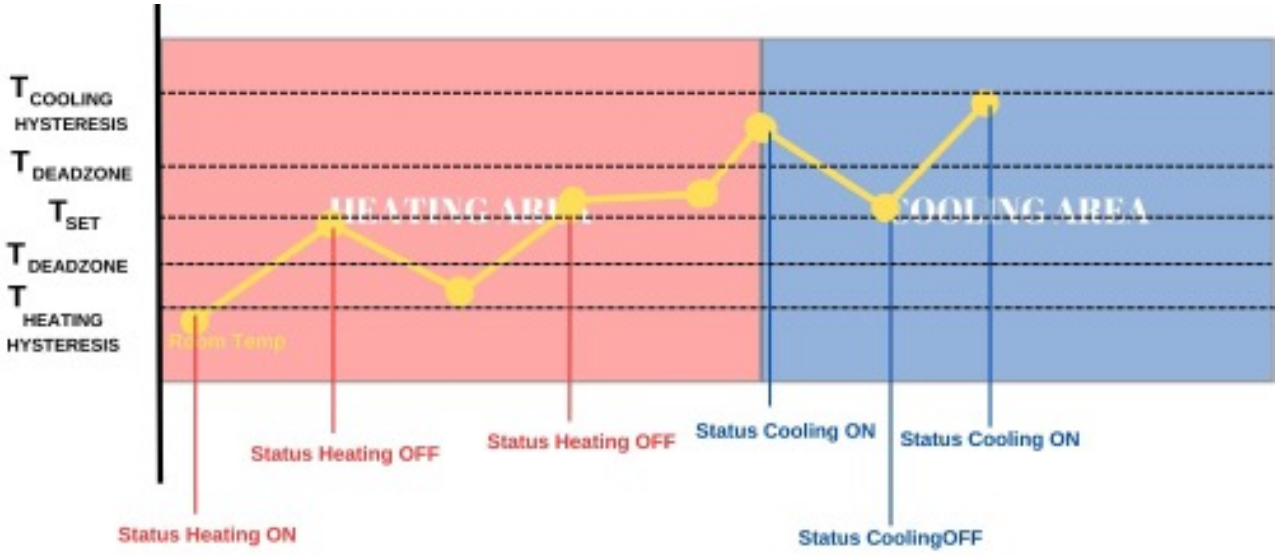
where Ki is a constant coefficient determined in minutes. This coefficient controls the rate at which the error accumulates over time.

5.5.2.2 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.



5.5.2.3 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.

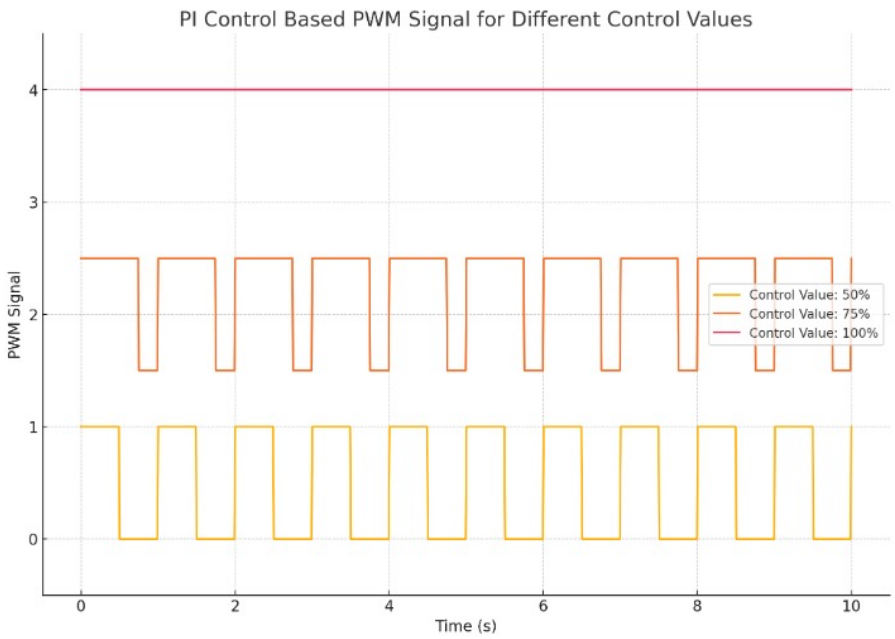
5.5.2.4 Min/Max Control Value

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.



5.5.2.5 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.

5.5.2.6 PWM Cycle

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) command using the pulse width modulation (PWM) method.

- **PWM (Pulse Width Modulation):** This method allows the device to operate at the desired power level by turning the control signal on and off at specific time intervals. The control value calculated by the PI controller is converted into a pulse width over a defined period. For example, if the calculated value is 30%, the signal will be on for 30% of the time and off for 70% of the time.

5.5.3 PI Continouous / 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%).

5.5.3.1 Change Amount

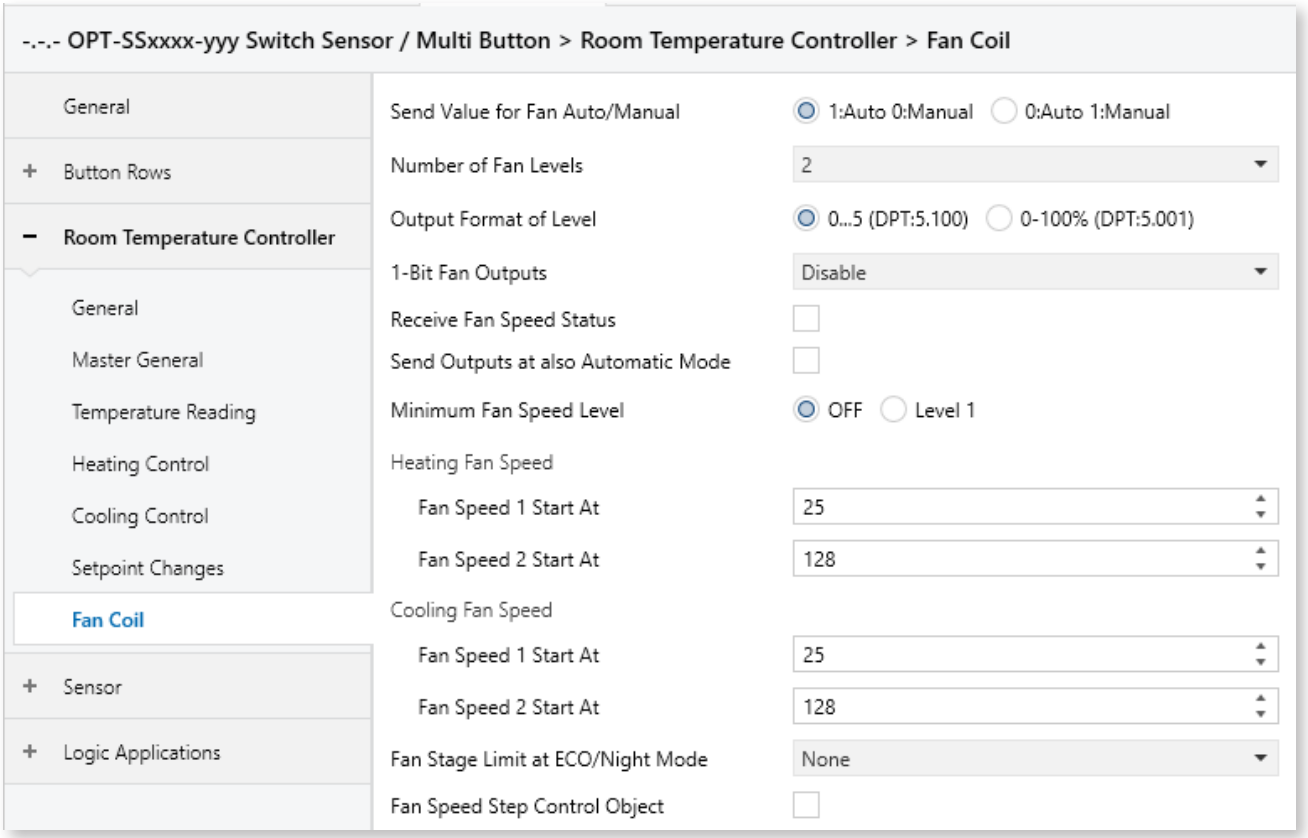
The control value is sent to the bus line based on a specific percentage change from the previously sent value to reduce bus line load, and it is also sent cyclically..

- **%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.

5.5.4 Fancoil (Heating / Cooling)



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

Table 12: RTC-8 Communication Objects

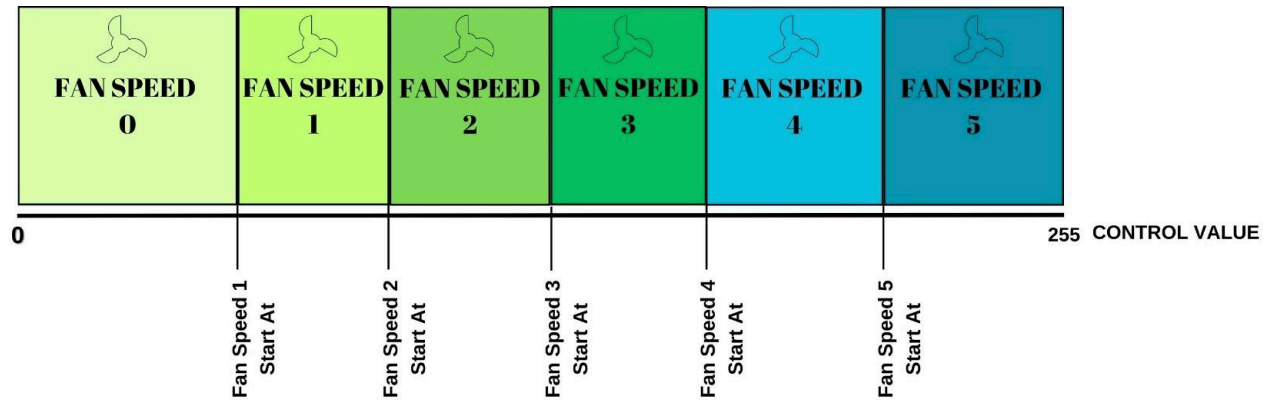
Fan coil units are devices used for heating or cooling a space and typically include a fan and a heat exchanger (coil). In a KNX system, the control of fan coil units can be achieved using a PI (Proportional-Integral) control algorithm to provide more precise and efficient temperature regulation.

5.5.4.1 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.

5.5.4.2 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.

5.5.4.3 Output Format of Level

The output format of the fan level, whether calculated or manually sent, is parameterized and can vary depending on the data type. The data type for the fan level is selected from 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):** If selected, the fan level is sent to the bus line in 1 byte DPT5.010 (percentage) data type according to KNX standard values.

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

5.5.4.4 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.

5.5.4.5 Recieve 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.

5.5.4.6 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.

5.5.4.7 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.

5.5.4.8 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 alculated, this value will be sent to the bus line. In manual mode, the fan stage menu can be selected up to the limited value.

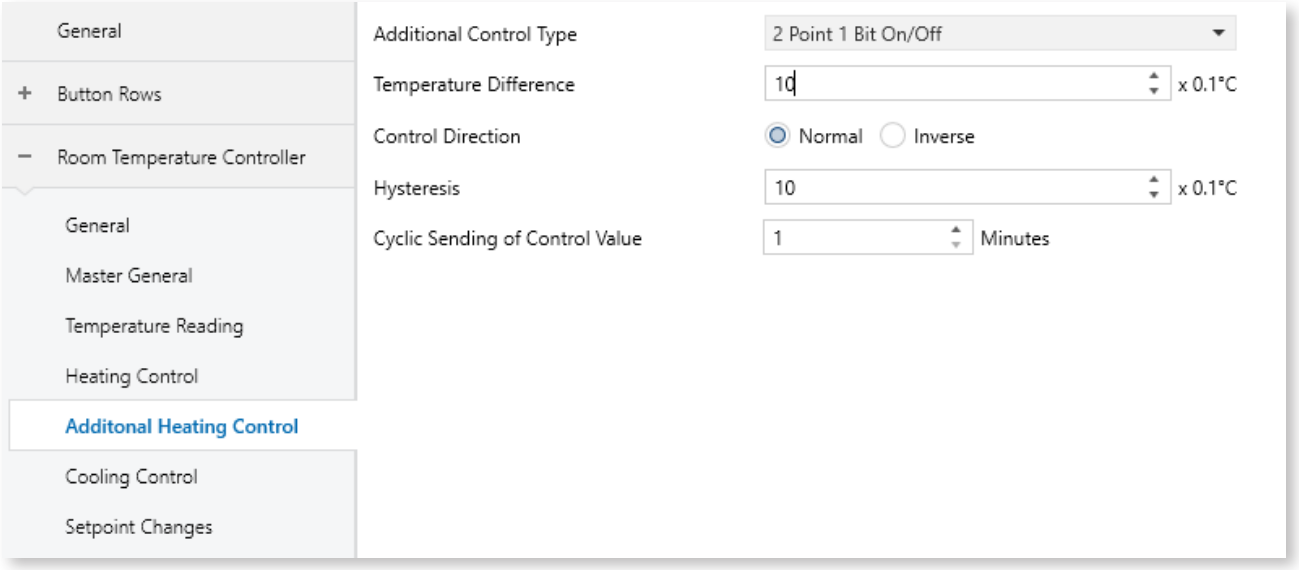
Note
If the Minimum Fan Speed Level parameter is set to "1," the limit cannot be 0.

5.5.4.9 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 decreses 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.

5.6 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.

5.6.1 Additional Control Types

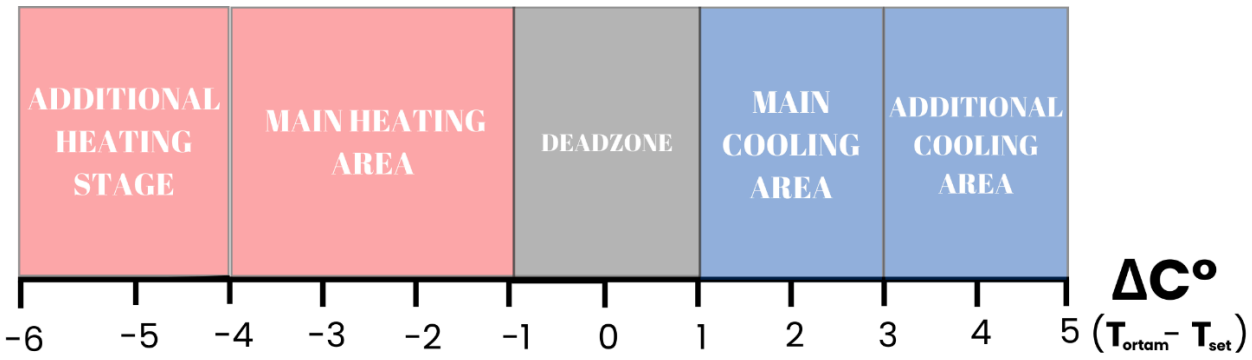
All control types that RTC can manage are selected based on the type of secondary heating or cooling element. The control value is derived from the temperature difference from the setpoint.

- **2 Noktalı 1 Bit, Kapalı/Açık:** 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 Noktalı 1 Byte, 0/100%:** Similar to the 2-Point On/Off control but uses 1-byte values (0% / 100%) for telegrams.
- **PI Sürekli, 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, Kapalı/Açık:** 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).

5.6.2. Temperature Differance

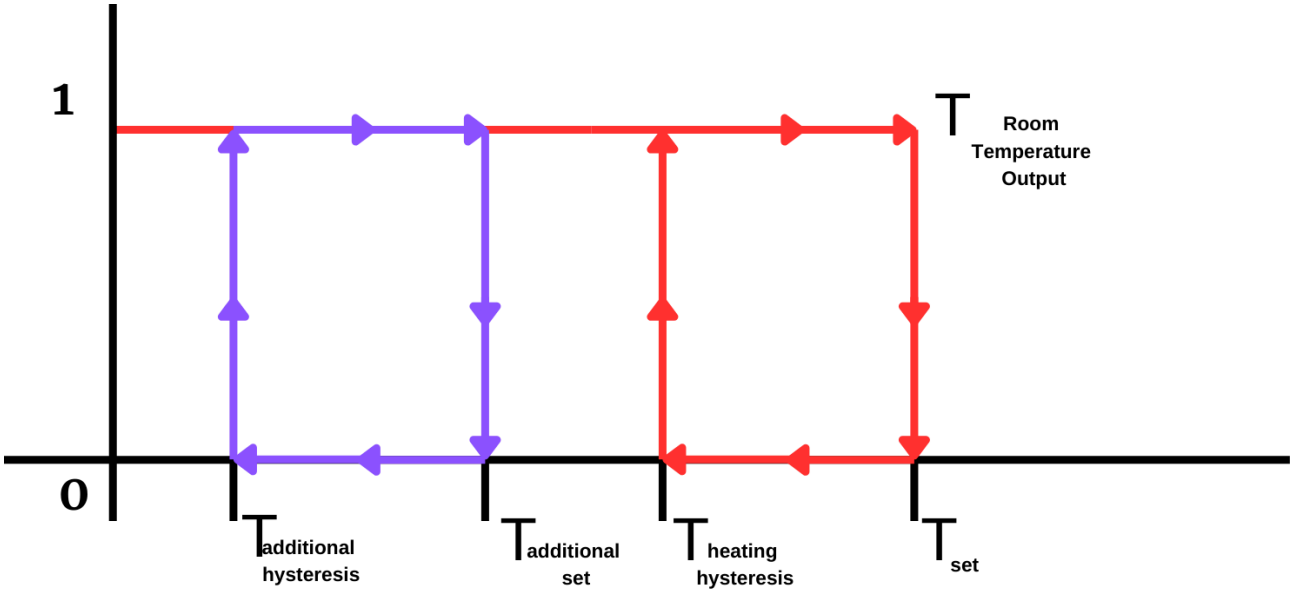
The activation of the additional zone is determined by the difference between the setpoint of the main zone and the additional zone, and this is parameterizable.

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

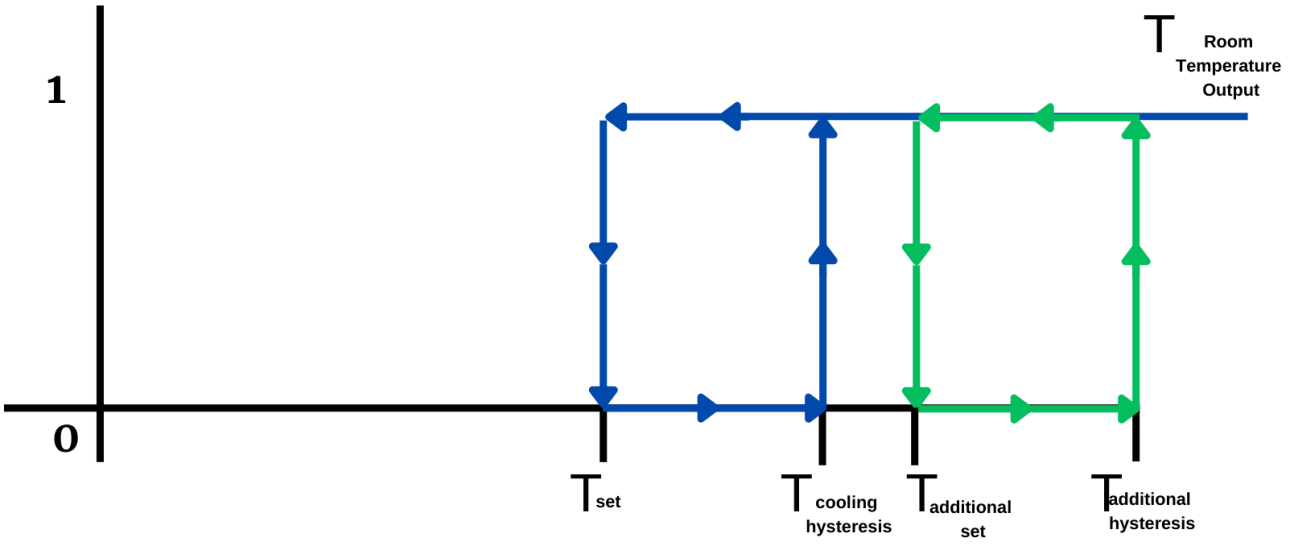


5.6.3 Additional Stage Hysteresis

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.

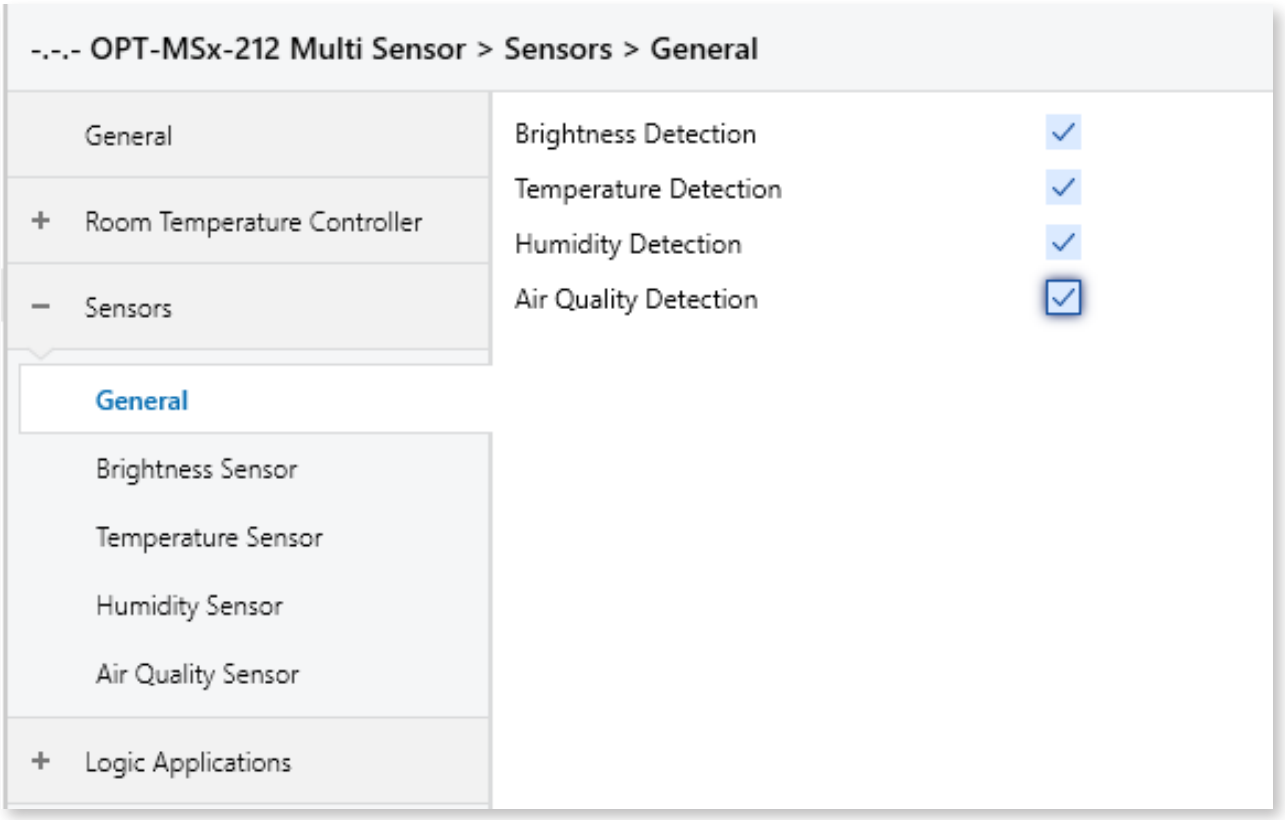


Hysteresis Operation for Addittional Heating Zone

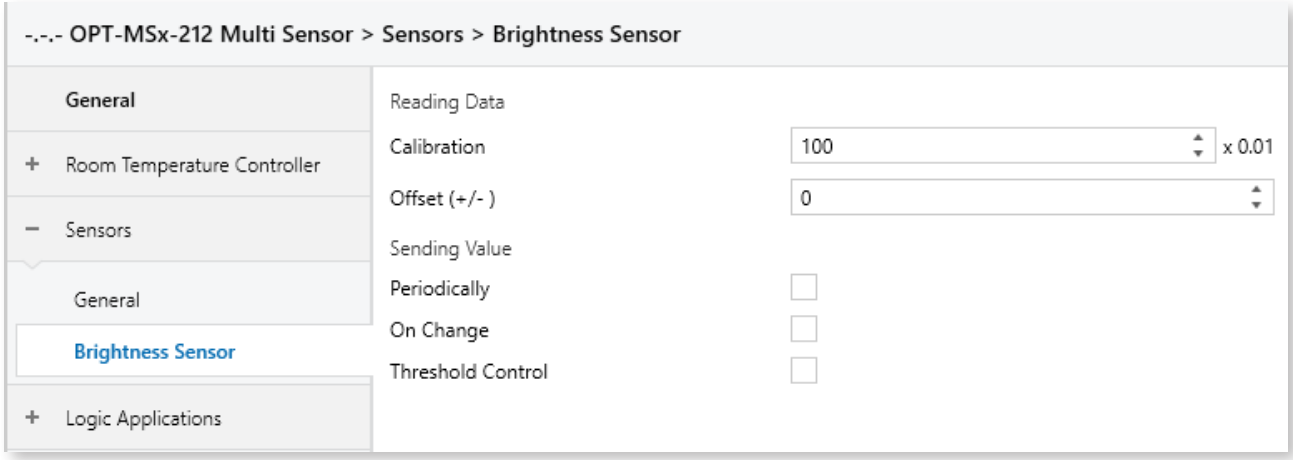


Hysteresis Operation for Addittional Heating Zone

6 Sensors



6.1 Brightness Sensor



The sensor measures the brightness level of the environment with the help of an integrated Photodiode. This measurement is used both in the movement detection process and in constant brightness control. The purpose of the brightness detection application is to transmit the lux value of the environment to the KNX line with the specified parameters when desired. If necessary, the threshold value control is activated and the relevant telegrams are transmitted to the KNX BUS line in cases below or above the specified threshold value.

6.1.1 Calibration

6.1.1.1 Calibration

It ensures that the value read by the sensor is equal to the actual ambient brightness level. For example, if the value read is 120 and the ambient brightness level is 200 lux, the value 166 written in this field will equalize the value 120 read to 200. (120 x 166) / 100 = 199.2 = ~200. The default multiplier is 100%.

6.1.1.2 Usage Of Offset Value

After the calibration value, if necessary, it shifts the lux value by the entered value between -128 and +127. Thus, the lux value detected by the sensor approaches the lux value in the environment. The default value is 0.

6.1.2 Sending Value

There are two methods that can be used to send the brightness level to the KNX line. These are "Periodic" and "Change Amount". In cases where neither method is activated, the current brightness level is answered (Response) from the same communication object based on the "Read" requests coming to the communication object.

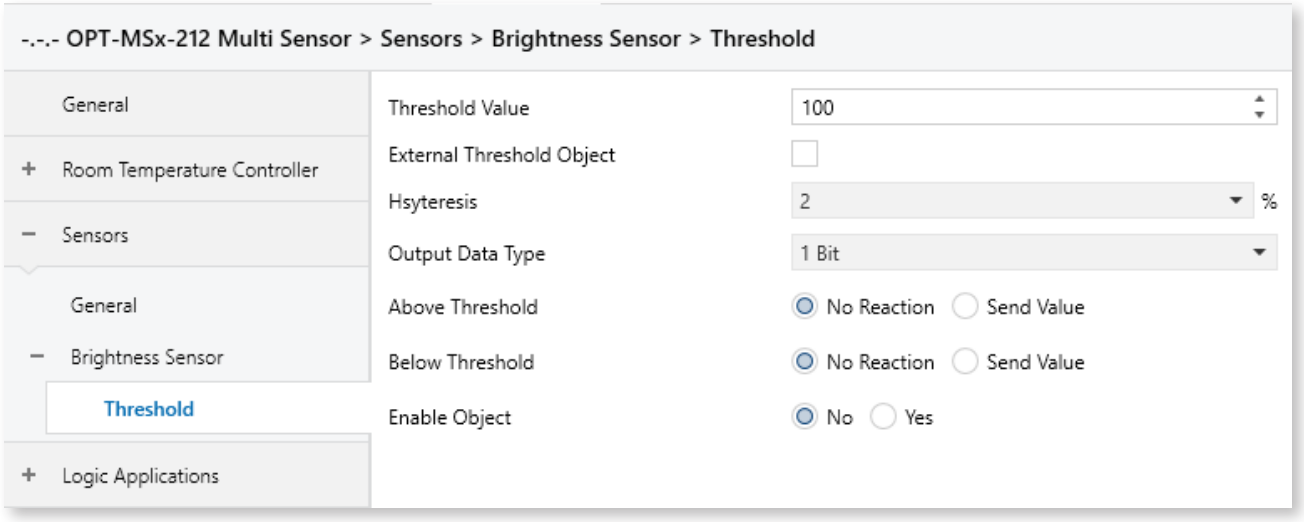
6.1.2.1 Periodically

The measured brightness level is transmitted to the data bus by repeating it for a period of time parametrically determined by the user (between 2 and 255 seconds). The default value is 60 seconds.

6.1.2.2 Change Amount

When the light level changes by more than the amount parametrically determined by the user (between 10-1000lux), the current light level is transmitted to the data bus. The default value is 100 Lux.

6.1.3 Threshold



6.1.3.1 Threshold Value

When "Threshold Activation" is activated, the brightness threshold value is controlled. Threshold activation works with the values entered by the user (10…100…1000Lux). The default value is 100 Lux.

6.1.3.2 External Threshold Object

It works with a brightness threshold value that can be updated from the KNX line with the "Brightness Threshold Value". When this parameter is activated, the Brightness Threshold Value object is set to be both input and output, not output. When this parameter is not Enable, the "Brightness Threshold Value" object will only respond to read requests and will ignore write telegrams.

6.1.3.3 Hysteresis

It is the area where the total tolerance around the specified threshold value is determined. One of the values (2,5,10,20,30,50,75,100%) can be selected. In order for the threshold exceeding process to occur, the hysteresis around the threshold value must also be exceeded. For example, if the Threshold is selected as 200 and the hysteresis is selected as 10%, the threshold processes will occur when the measured illuminance falls below 190 Lux or rises above 210 Lux.

6.1.3.4 Output Data Type

The data type that the decision resulting from the threshold process will be sent to the data path is selected. The appropriate one is selected from the "1-bit", "1-byte", "1-byte Percentage" or "Scenario" mode options.

6.1.3.5 Above Threshold

The action to be taken when the room brightness exceeds the tolerant threshold value is selected. When "No Action" is selected, no telegram is sent. When "Send Value" is activated, the "Threshold Status" is transmitted to the data bus.

6.1.3.6 Below Threshold

The action to be taken when the room brightness falls below the tolerant threshold value is selected. When “No Action” is selected, no telegram is sent. When “Send Value” is activated, the “Threshold Status” is transmitted to the data bus.

6.1.3.7 Enable Object

It is used to make the Constant Light Level Control completely Enable or completely inEnable. “Disable” or “Enable” can be selected. The default value is “Disable”. When Enable is selected, the options below it and the object 210 - "Constant Light Activation Object" are opened.

6.1.3.8 Enable with

“OFF Telegram” indicates that it will be activated with a 1-bit 0 (zero) telegram; “ON Telegram” indicates that it will be activated with a 1-bit 1 (one) telegram. The default value is “ON Telegram”.

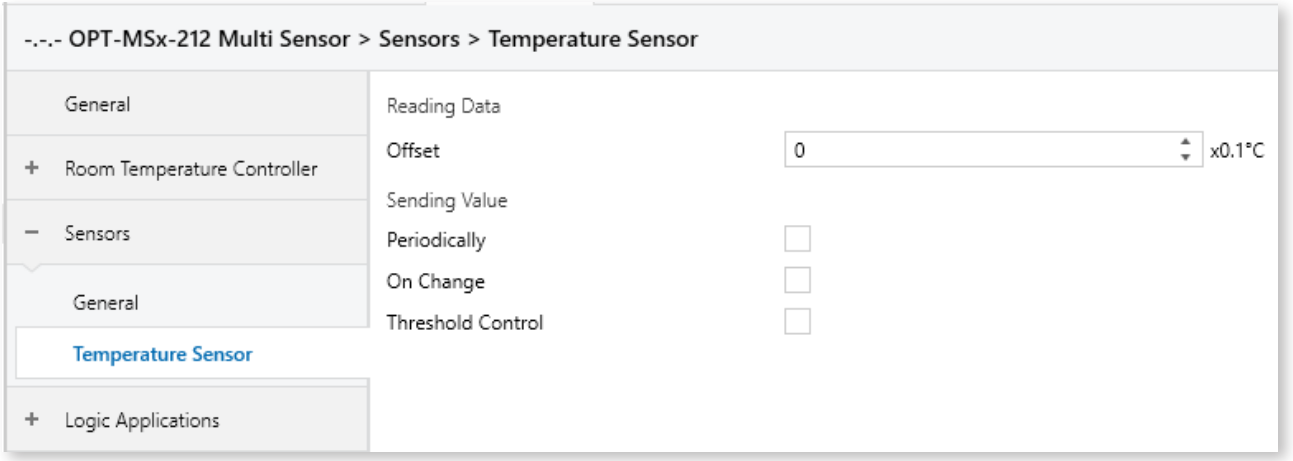
6.1.3.9 Initial Position

It shows the initial status of the device. If “Enable” is selected, the device will work directly at startup, otherwise, “Light Sensing” will not work immediately after the device starts.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
1	Brightness	Enable Input	Input	1-bit	1.003 Enable	C	-	W	-
2	Brightness	Brightness Value Output	Output	2-byte	9.004 lux	C	R	-	T
3	Brightness	Brightness Treshold Value	Output	2 byte float	9.004 lux	C	R	-	T
4			Input/Output	2 byte float	9.004 lux	C	R	W	T
	Brightness	Brightness Treshold Status	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

Table13: Brigtness Communication Section Object

6.2 Temperature Detection



The sensor measures the temperature level of the environment with the help of the integrated temperature sensor. This measurement is used in both the temperature detection process and RTC applications. The purpose of the temperature detection application is to continuously monitor the temperature value of the environment and transmit it to the KNX line with the specified parameters. If desired, the relevant telegrams are transmitted to the KNX BUS line in cases where the temperature is below or above the specified threshold values.

6.2.1 Offset

The value measured by the internal temperature sensor of the device may differ from the actual ambient temperature due to the sensor being located at a higher point. This value can be adjusted by comparing it with portable thermometers. The adjustment range is between -12.8 °C and +12.7 °C, with steps from -128 to +128 (x0.1). The default value is 0 °C.

6.2.2 Sending Value Method

There are two methods that can be used to send the temperature level to the KNX line. In cases where both methods are not specified, the current temperature information is answered from the same communication object based on the "Read" requests received by the communication object.

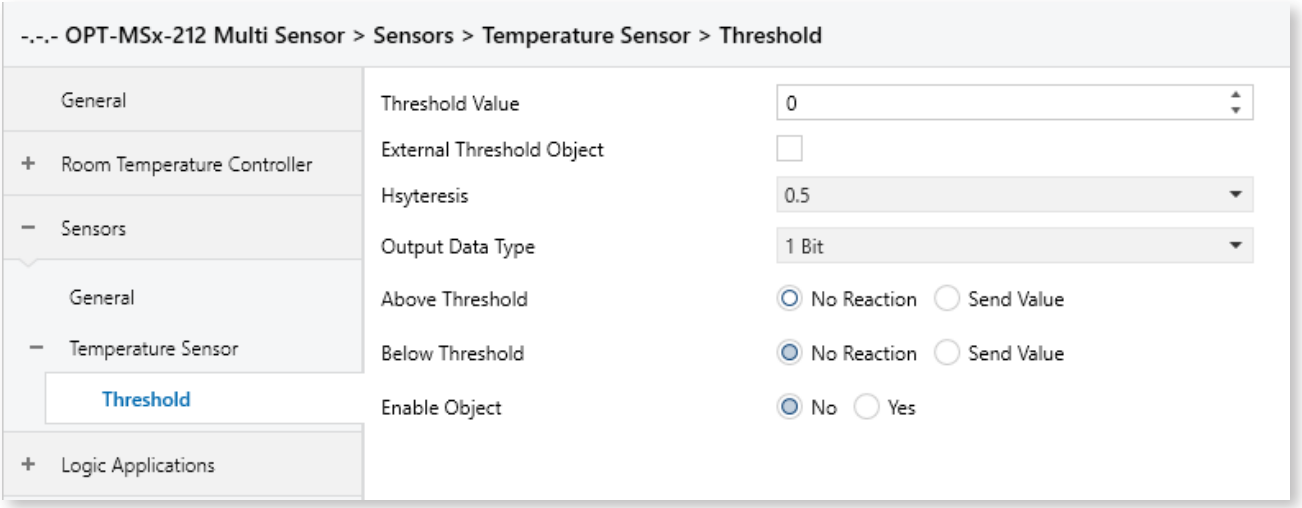
6.2.2.1 Periodically

The measured temperature value is transmitted to the data bus by repeating it for a period of time parametrically determined by the user (between 2-255 minutes). The default value is 2 minutes.

6.2.2.2 Change Ratio

When the temperature value changes by more than the amount parametrically determined by the user (between 1 and 50 degrees), the current temperature value is transmitted to the data bus. The default value is 1°C.

6.2.3 Threshold



It is used to determine a threshold for the measured temperature values and to take action when this threshold is exceeded or dropped below. The appropriate option is selected from the "Disable" or "Enable" options. When activated, the options below it open.

6.2.3.1 Threshold Value

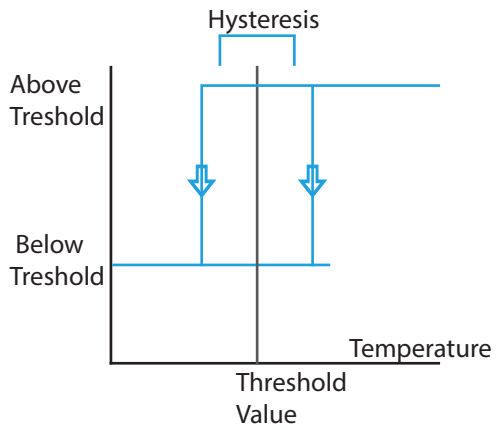
The threshold value we want to measure is determined at this point. The default value is 23 °C.

6.2.3.2 External Threshold Object

When activated, the temperature threshold value should be able to be changed with the “Temperature Threshold Value” object and the relevant com object from the KNX line.

6.2.3.3 Hysteresis

This is the area where the total tolerance around the specified threshold value is determined. A value between 0.5 °C and 10 °C can be selected. In order for the threshold exceeding process to occur, the hysteresis around the threshold value must also be exceeded. For example, if the threshold is selected as 23 °C and the hysteresis is selected as 1 °C, the threshold processes will occur when the measured temperature falls below 22 °C or rises above 24 °C.



6.2.3.4 Output Data Type

The data type that the decision resulting from the threshold process will be sent to the data path is selected. The appropriate one is selected from the "1-bit", "1-byte", "1-bytePercentage", "Hvac" or "Scenario" mode options.

6.2.3.5 Above Threshold

The action to be taken when the room temperature exceeds the tolerable threshold value is selected. When "No Action" is selected, no telegram is sent. When "Send Value" is activated, the "Threshold Status" is transmitted to the data bus.

6.2.3.6 Below Threshold

The action to be taken when the room temperature falls below the tolerable threshold value is selected. When "No Action" is selected, the telegram is not sent. When "Send Value" is activated, the "Threshold Status" is transmitted to the data bus.

6.2.3.7 Enable Object

It is used to make the Constant Light Level Control completely Enable or completely inEnable. "Disable" or "Enable" can be selected. The default value is "Disable". When Enable is selected, the options below it and the "Temperature Control Activity" object open.

6.2.3.8 Enable with

"OFF Telegram" indicates that it will be activated with a 1-bit 0 (zero) telegram; "ON Telegram" indicates that it will be activated with a 1-bit 1 (one) telegram. The default value is "ON Telegram".

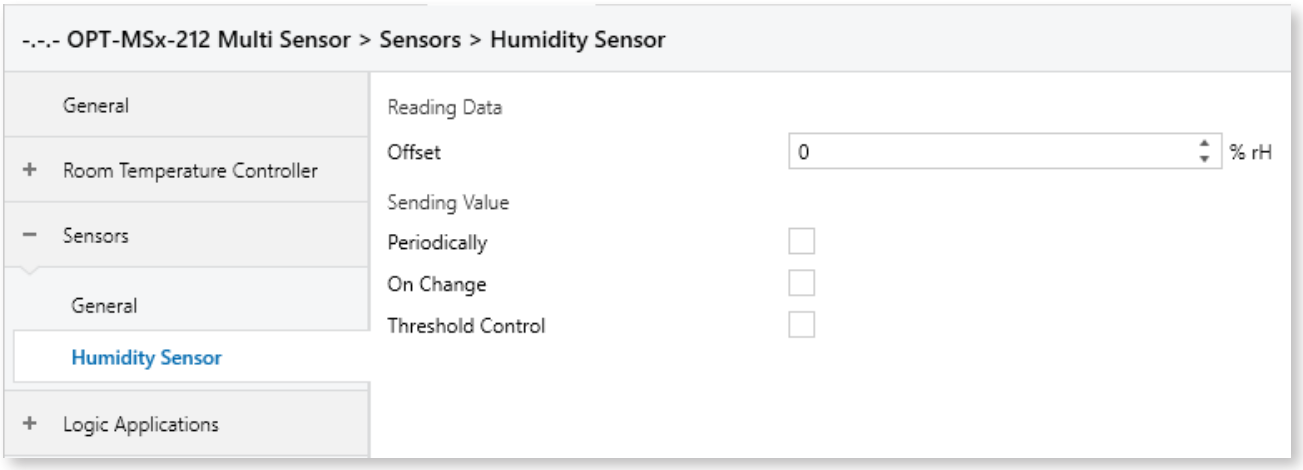
6.2.3.9 Initial Positions

It shows the initial status of the device. If "Enabled" is selected, the device will work directly at startup, otherwise, "Temperature Detection" will not work immediately after the device starts.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
230	Temperature	Enable Input	Input	1-bit	1.003 Enable	C	-	W	-
231	Temperature	Value Output	Output	2 byte	9.001 Temperature	C	R	-	T
232	Temperature	Treshold Value	Output	2 byte	9.001 Temperature	C	R	-	T
			Input/Output	2 byte	9.001 Temperature	C	R	W	T
233	Temperature	Treshold Status	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-byte	20.102 HVAC Mode	C	-	-	T
				2-byte	9.001 Temperature	C	-	-	T

Table 14: Temperature Communication Section Objects

6.3 Humidity Detection



It is used to transfer the data line of the relative humidity measurement made by the internal humidity sensor of the device.

6.3.1 Offset

The value measured by the internal humidity sensor may differ from the perceived humidity due to its location. An external humidity meter can be used to compensate. The conversion can be between -50 and +50. The default value is 0%.

6.3.2 Sending Value

There are two methods that can be used to send humidity information to the KNX line. In cases where neither method is specified, the current humidity information is answered from the same communication object based on the “Read” requests coming to the communication object. (Response).

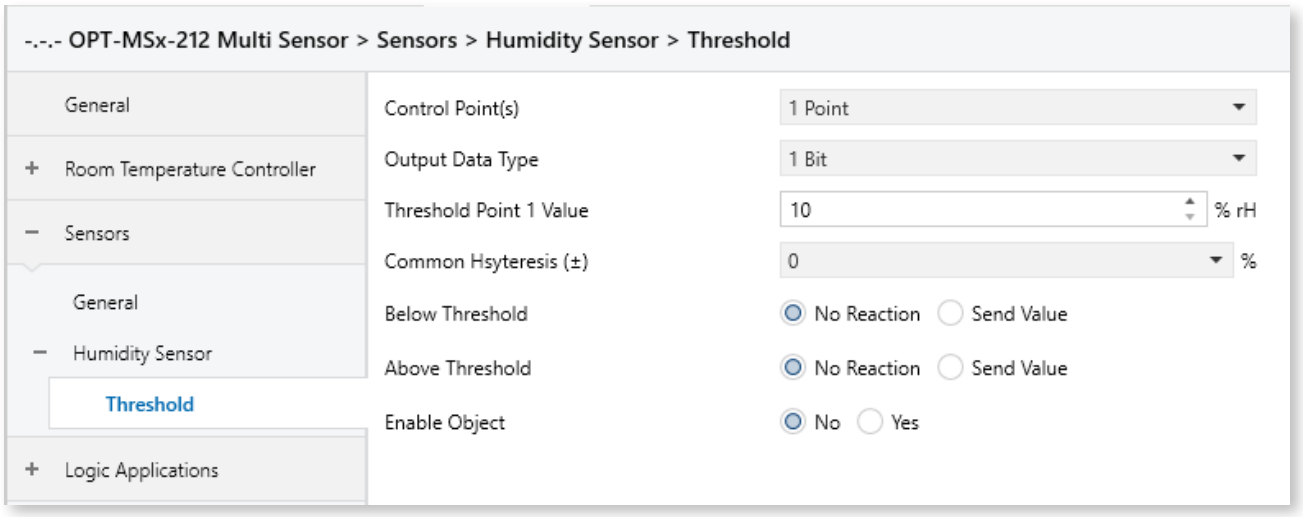
6.3.2.1 Periodically

It determines the sending frequency of the measured humidity value to the data line via the "Humidity Value" object. The sending frequency can be determined between 2 and 255 minutes. The default value is 2 minutes.

6.3.2.2 Change Ratio

When the humidity value changes more than the amount parametrically determined by the user (between 1% and 100%), the current humidity value is transmitted to the data bus. The default value is 1.

6.3.3 Threshold



It is used to determine a threshold for the measured humidity value and to take action when this threshold is exceeded or dropped below. The appropriate option is selected from the "Disable" or "Enable" options. When activated, the options below it open.

6.3.3.1 Hysteresis

It is the area where the total tolerance around the specified threshold value is determined. A value between 0% and 10% can be selected. Threshold activation is one-sided and negative. For example, if we select our threshold value as 50% and hysteresis as 10%, when the humidity value is 50%, the activation will be activated directly above the threshold, and when it drops to 45%, the activation will be activated below the threshold.

6.3.3.2 Output Data Type

The data type that the decision resulting from the threshold process will be sent to the data path is selected. The appropriate one is selected from the "1-bit", "1-byte", "1-byte Percentage", "HVAC" or "Scenario" mode options.

6.3.3.3 Enable Object

It is used to make the threshold control of the Humidity Detection application completely Enable or completely inEnable. "Disable" or "Enable" can be selected. The default value is "Disable". When Enable is selected, the options below it and the "Activation Input" object open.

6.3.3.4 Enable with

"OFF Telegram" indicates that it will be activated with a 1-bit 0 (zero) telegram; "ON Telegram" indicates that it will be activated with a 1-bit 1 (one) telegram. The default value is "ON Telegram".

6.3.3.5 Initial Position

It shows the initial status of the device. If "Enable" is selected, the device will work directly at startup, otherwise, "Moisture Detection" will not work immediately after the device starts.

6.3.3.6 Control Point

It ensures that the humidity information is checked with 1, 2 and 3 different control points and the appropriate data resulting from this control is transmitted to the relevant Com object.

6.3.3.6.1 Control Point 1

6.3.3.6.1.1 Threshold Point 1 Value

When control point 1 is activated, threshold control is performed by entering a value between 10-90 into this parameter.

6.3.3.6.1.2 Input Below Threshold

The action to be taken when the current humidity value falls below the tolerable threshold value is selected. When "No Action" is selected, the telegram is not sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

6.3.3.6.1.3 Input Above Threshold

The action to be taken when the current humidity value exceeds the tolerable threshold value is selected. When "No Action" is selected, no telegram is sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

6.3.3.6.2 Control Point 2

6.3.3.6.2.1 Threshold Point 2 Value

In this parameter, which appears when control point 2 is activated, how much additional value will be written over threshold point 1 as a percentage is entered. Threshold control is performed by entering one of the values of 10%, 20%, 30%, 40%, 50%, or 60%. For example, if the value of threshold point 1 is 40% and the value entered in this parameter is 20%, threshold point 2 is defined as 60%.

6.3.3.6.2.2 Between Point 1 and Point 2

If the current Humidity value is between the tolerant threshold value 1 and the tolerant threshold value 2, the action to be taken is selected. When "No Action" is selected, the telegram is not sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "Hvac", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

6.3.3.6.2.3 Above Threshold 2

The action to be taken when the current humidity value exceeds the tolerant threshold 2 is selected. When "No Action" is selected, no telegram is sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

6.3.3.6.3 Control Point 3

6.3.3.6.3.1 Threshold Point 3

In this parameter, which appears when control point 3 is activated, how much additional value will be written above threshold point 2 as a percentage is entered. Threshold control is performed by entering one of the values of 10%, 20%, 30%, 40%, 50%, or 60%. For example, if the value of threshold point 2 is 60% and the value entered in this parameter is 20%, threshold point 3 is defined as 80%.

6.3.3.6.3.2 Between Point 2 and Point 3

If the current Humidity value is between the tolerant threshold value of 2 and the tolerant threshold value of 3, the action to be taken is selected. When "No Action" is selected, the telegram is not sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

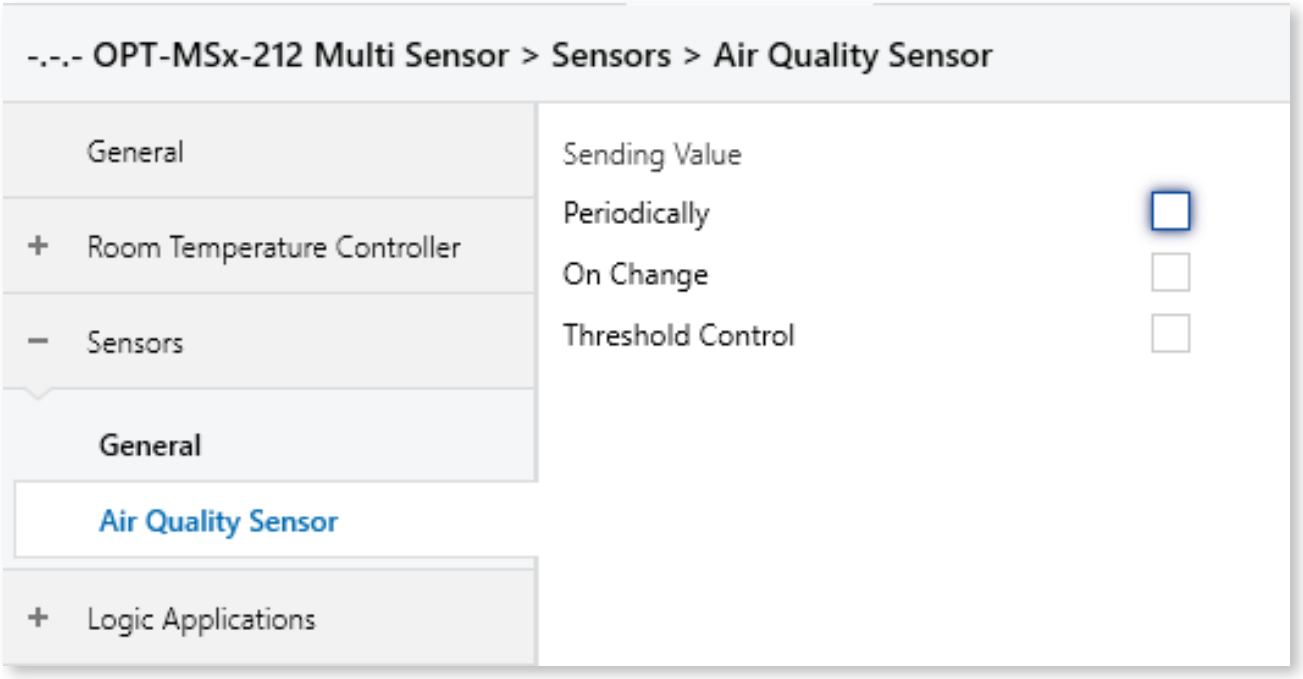
6.3.3.6.3.3 Above Threshold 3

The action to be taken when the current humidity value exceeds the tolerant threshold 3 is selected. When "No Action" is selected, no telegram is sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
250	Humidity	Enable Input	Input	1-bit	1.003 Enable	C	-	W	-
251	Humidity	Sensor Output	Output	2-byte	9.007 Humidity	C	R	-	T
252	Humidity	Treshold Status	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-byte	20.102 HVAC Mode	C	-	-	T
				2-byte	9.001 Temperature	C	-	-	T

Table 15: Humidity Communication Section Objects

6.4 Air Quality Detection



To ensure the data line transfer of the relative air quality measurement made by the device's internal air quality sensor used for the purpose.

6.4.1 Sending Value

There are two methods that can be used to send air quality information to the KNX line. In cases where both methods are not specified, the current Air quality information is responded to from the same communication object based on the "Read" requests received by the communication object.

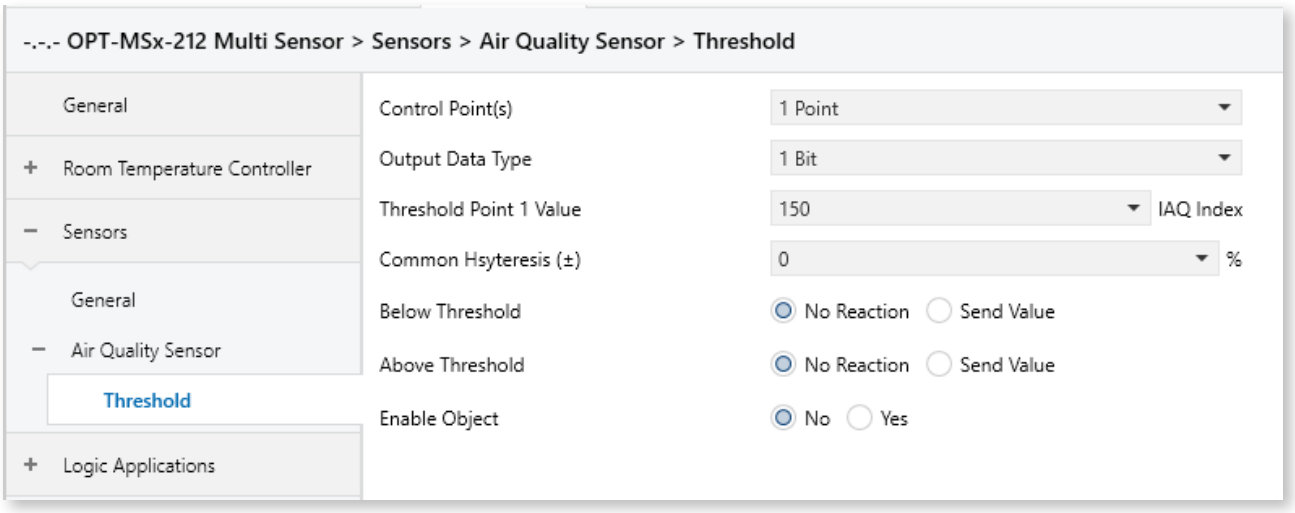
6.4.1.1 Periodically

It determines the sending frequency of the measured air quality value to the data line via the "Air Quality" object. The sending frequency can be specified between 2 and 255 minutes. The default value is 2 minutes.

6.4.1.2 Change Amount

When the air quality value changes more than the amount parametrically determined by the user (between 50ppm and 500ppm), the current air quality value is transmitted to the data bus. The default value is 100.

6.4.2 Threshold



It is used to determine a threshold for the measured Air Quality value and to take action when this threshold is exceeded or dropped below. The appropriate option is selected from the "Disable" or "Enable" options. When it is activated, the options below will open.

6.4.2.1 Hysteresis

This is the area where the total tolerance around the specified threshold value is determined. A value between 0% and 10% can be selected. In order for the threshold exceeding process to occur, the hysteresis around the threshold value must also be exceeded. It will work as one-way negative like the hysteresis of the humidity application.

6.4.2.2 Output Data Type

The data type that the decision resulting from the threshold process will be sent to the data path is selected. The appropriate one is selected from the "1-bit", "1-byte", "1-byte Percentage", "HVAC" or "Scenario" mode options.

6.4.2.3 Enable Object

It is used to make the Constant Light Level Control completely Enable or completely inEnable. "Disable" or "Enable" can be selected. The default value is "Disable". When Enable is selected, the options below it and the Air Quality Control Activity "Enable" or "Disable" object opens.

6.4.2.4 Enable with

"OFF Telegram" indicates that it will be activated with a 1-bit 0 (zero) telegram; "ON Telegram" indicates that it will be activated with a 1-bit 1 (one) telegram. The default value is "ON Telegram".

6.4.2.5 Initial Position

It shows the initial status of the device. If "Enable" is selected, the device will work directly at startup, otherwise, "Air Quality" will not work immediately after the device starts.

6.4.2.6 Control Point

It ensures that air quality information is checked with 1, 2 and 3 different control points and the appropriate data resulting from this control is transmitted to the relevant "Com Object".

6.4.2.6.1 Control Point 1

6.4.2.6.1.1 Threshold Point 1

When control point 1 is activated, threshold control is performed by entering a value between 100-2000 for this parameter.

6.4.2.6.1.2 Input Below Threshold

The action to be taken when the current air quality value falls below the tolerable threshold value is selected. When “No Action” is selected, no telegram is sent. When “Send Value” is activated, the values entered in the “1-bit”, “1-byte”, “1-byte Percentage”, “HVAC”, “Scenario” or “2-Byte Temperature” parameters are transmitted to the “Threshold Status” data path.

6.4.2.6.1.3 Input Above Threshold

The action to be taken when the current air quality value exceeds the tolerable threshold value is selected. When “No Action” is selected, no telegram is sent. When “Send Value” is activated, the values entered in the “1-bit”, “1-byte”, “1-byte Percentage”, “HVAC”, “Scenario” or “2-Byte Temperature” parameters are transmitted to the “Threshold Status” data path.

6.4.2.6.2 Threshold Point 2

In this parameter, which appears when control point 2 is activated, how much additional value will be written over threshold point 1 is entered. Threshold control is made by entering one of the values between 100-2000. For example, if the value of threshold point 1 is 1000ppm and the value entered in this parameter is 500, threshold point 2 is defined as 1500ppm.

6.4.2.6.2.1 Between Point 1 and Point 2

If the current air quality value is between the tolerant threshold value 1 and the tolerant threshold value 2, the action to be taken is selected. When “No Action” is selected, the telegram is not sent. When “Send Value” is activated, the values entered in the “1-bit”, “1-byte”, “1-byte Percentage”, “Hvac”, “Scenario” or “2-Byte Temperature” parameters are transmitted to the “Threshold Status” data path.

6.4.2.6.2.2 Above Threshold 2

The action to be taken when the current air quality value exceeds the tolerant threshold 2 value is selected. When "No Action" is selected, the telegram is not sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

6.4.2.6.3 Control Point 3

6.4.2.6.3.1 Threshold Point 3

When control point 3 is activated, this parameter enters how much additional value will be written on threshold point 2. Threshold control is performed by entering one of the values between 100-2000. For example, if the value of threshold point 2 is 1500ppm and the value entered in this parameter is 300, threshold point 3 is defined as 1800ppm.

6.4.2.6.3.2 Between Point 2 and Point 3

If the current air quality value is between the tolerant threshold value 2 and the tolerant threshold value 3, the action to be taken is selected. When "No Action" is selected, the telegram is not sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

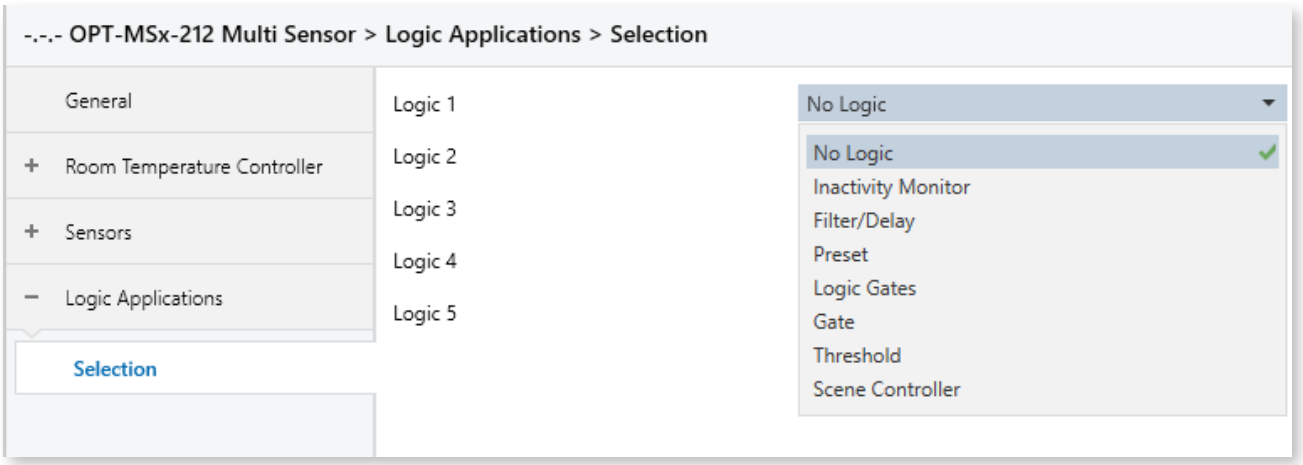
6.4.2.6.3.3 Above Threshold 3

The action to be taken when the current air quality value exceeds the tolerant threshold 3 is selected. When "No Action" is selected, no telegram is sent. When "Send Value" is activated, the values entered in the "1-bit", "1-byte", "1-byte Percentage", "HVAC", "Scenario" or "2-Byte Temperature" parameters are transmitted to the "Threshold Status" data path.

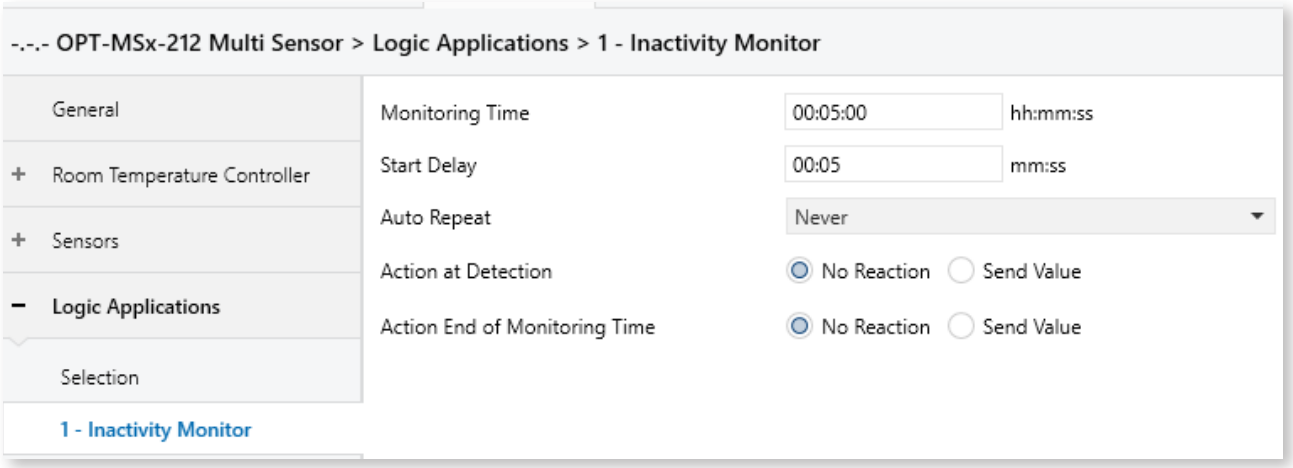
No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
271	Air Quality	Enable Input	Input	1-bit	1.003 Enable	C	-	W	-
272	Air Quality	Sensor Output (VOC Index)	Output	2-byte	7.001 Pulses	C	R	-	T
273	Air Quality	Sensor Output (ppm)	Output	2 byte	9.008 Air Quality	C	R	-	T
273	Air Quality	Threshold Status	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-byte	20.102 HVAC Mode	C	-	-	T
				2-byte	9.001 Temperature	C	-	-	T

Table 16: Air Quality Communication Section Objects

7 Logical 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.

7.1.4 Auto Continue

The observation function operates as a single observation in the normal scenario; it waits for movement information during the delay period and sends a "Stop" telegram at the end of the observation period. If selected twice, it will re-send the "Start" telegram from the Start/Stop object automatically if no movement is detected during the first observation, initiating the second observation period without delay. If selected five times, the process will be repeated five times. If "Until Movement Detected" is selected, the observation function will automatically restart until movement information is received from the Movement Information object.

7.1.5 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 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.

7.1.7 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."

7.1.8 Send Value

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

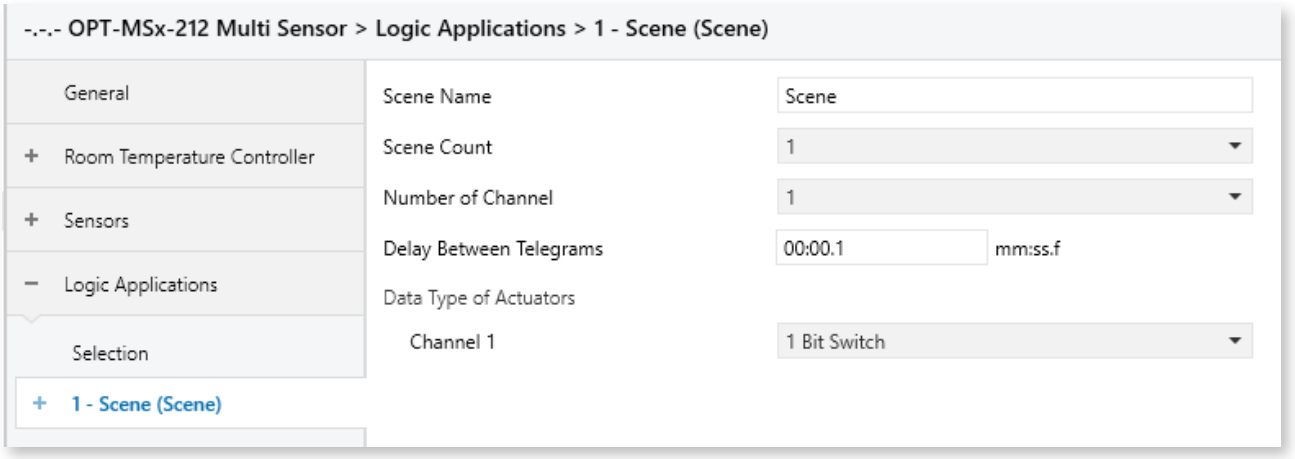
No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	LA- x I Inactivity Monitor	Start/Stop Monitoring	Input	1-bit	1.010 Start/Stop	C	R	W	T
x	LA- x I Inactivity Monitor	Movement Input	Input	1-bit	1.001 Switch	C	R	-	T
x	LA- x I Inactivity Monitor	Action at Detection	Output	1-bit	1.001 Switch	C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

Table 17: Logic Applications - Inactivity Monitor Communication Section 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

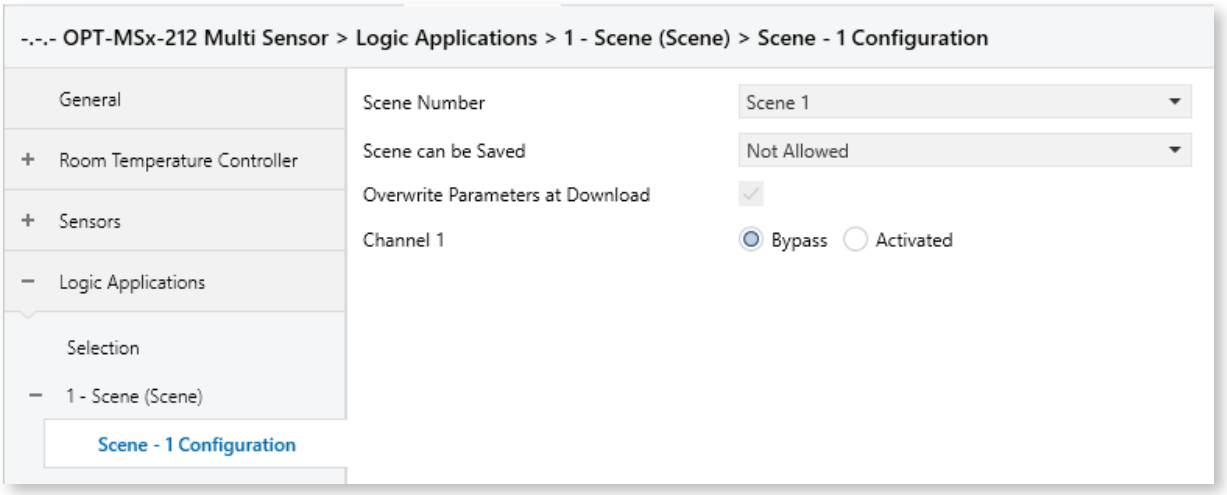
Values such as 0.1 s, 0.2 s, up to 10.0 s can be entered. This sets the delay time between sending telegrams to each actuator when a scene is triggered. For instance, setting a delay of 0.5 seconds means telegrams will be sent to each actuator every half second.

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:** The most recent values received by "Status" communication objects are stored in memory.
- **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 selected, this option ensures that existing parameters are overwritten when new scene settings are uploaded, facilitating updates to scene configurations.

7.2.2.4 Channel 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.

7.2.2.4.1.1 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.

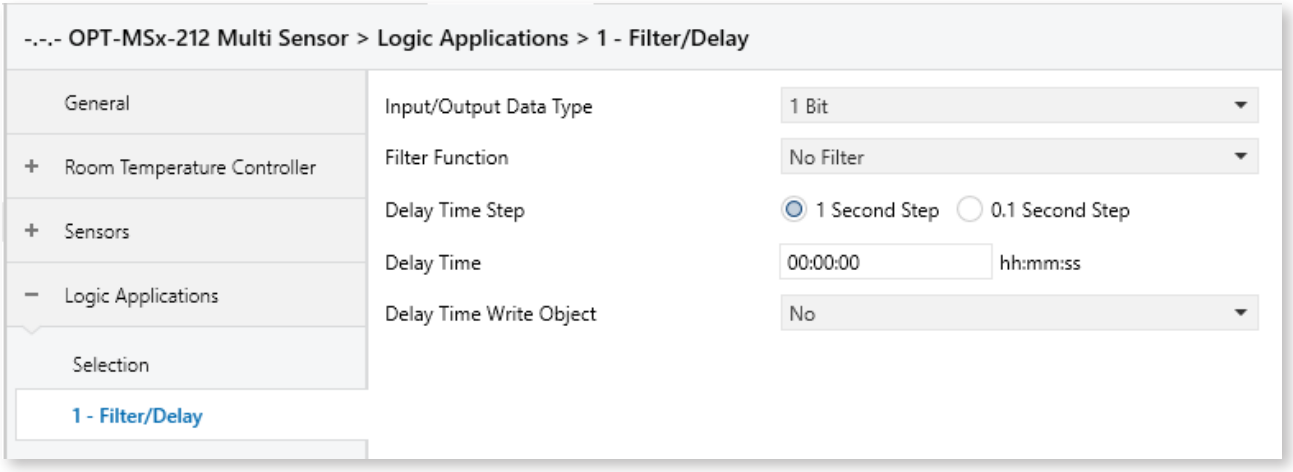
7.2.2.4.2 Bypass

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	-	-
	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-byte	9.001 Temperature	C	-	-	T	-
	LA- x I Scene	Channel -x Status	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-byte	9.001 Temperature	C	-	W	-	U

Table 18: Logic Applications - Scene Communication Section Objects

7.3 Filter/Delay



This function processes the input data based on specified criteria and sends it to the data bus after a defined delay if the criteria are met (either parametrically or through the data bus).

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 Delay Time

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

7.3.3 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.

7.3.4 Delay Time Write Object

This parameter activates the delay time object and specifies the data type.

7.3.5 Filter Function

Selects the filtering function:

7.3.5.1 No Filter

No filter is applied; all data is sent directly.

7.3.5.2 Delay accepted value, others are sent directly

Values that meet the specified criteria are delayed, while other data is sent immediately.

7.3.5.3 Delay accepted value, others aren't sent

Values that meet the specified criteria are delayed, while other data is not sent.

7.3.5.4 Send accepted value directly, others are delayed

Values that meet the specified criteria are sent immediately, while other data is delayed.

7.3.5.5 Do not send accepted value, others are delayed

Values that meet the specified criteria are not sent, while other data is delayed.

7.3.6. Filter Criteria

Defines the filtering criteria:

7.3.6.1. Equal

Checks if the value is equal to the specified criteria.

7.3.6.2. Greater Than

Checks if the value is greater than the specified criteria.

7.3.6.3. Less Than

Checks if the value is less than the specified criteria.

7.3.6.4 Greater or Equal

Checks if the value is greater than or equal to the specified criteria.

7.3.6.5 Less or Equal

Checks if the value is less than or equal to the specified criteria.

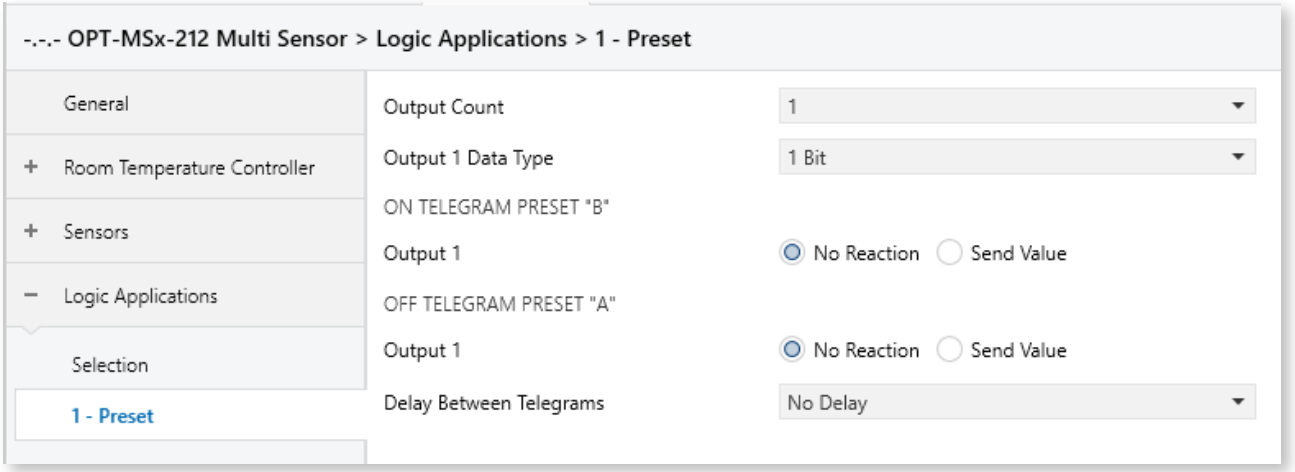
7.3.7. Criteria Value

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.

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-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	-
				2-byte	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-byte	8.001 Pulses	C	-	-	T
				2-byte	9.001 Temperature	C	-	-	T
				4-byte	12.001 Pulses	C	-	-	T
				4-byte	13.001 Counter P.	C	-	-	T
				4-byte	4-byte Float Value	C	-	-	T
				2-byte	9.001 Temperature	C	-	-	T
x	LA – x I Filter/Delay	Delay Time	Input / Output	2-byte	7.004 Time 100ms	C	R	W	T
				2-byte	7.005 Time s	C	R	W	T

Table 19: 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 pre-defined 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 On Telegram Preset

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

7.4.2.1 Output x

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

7.4.3 Off Telegram Preset

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

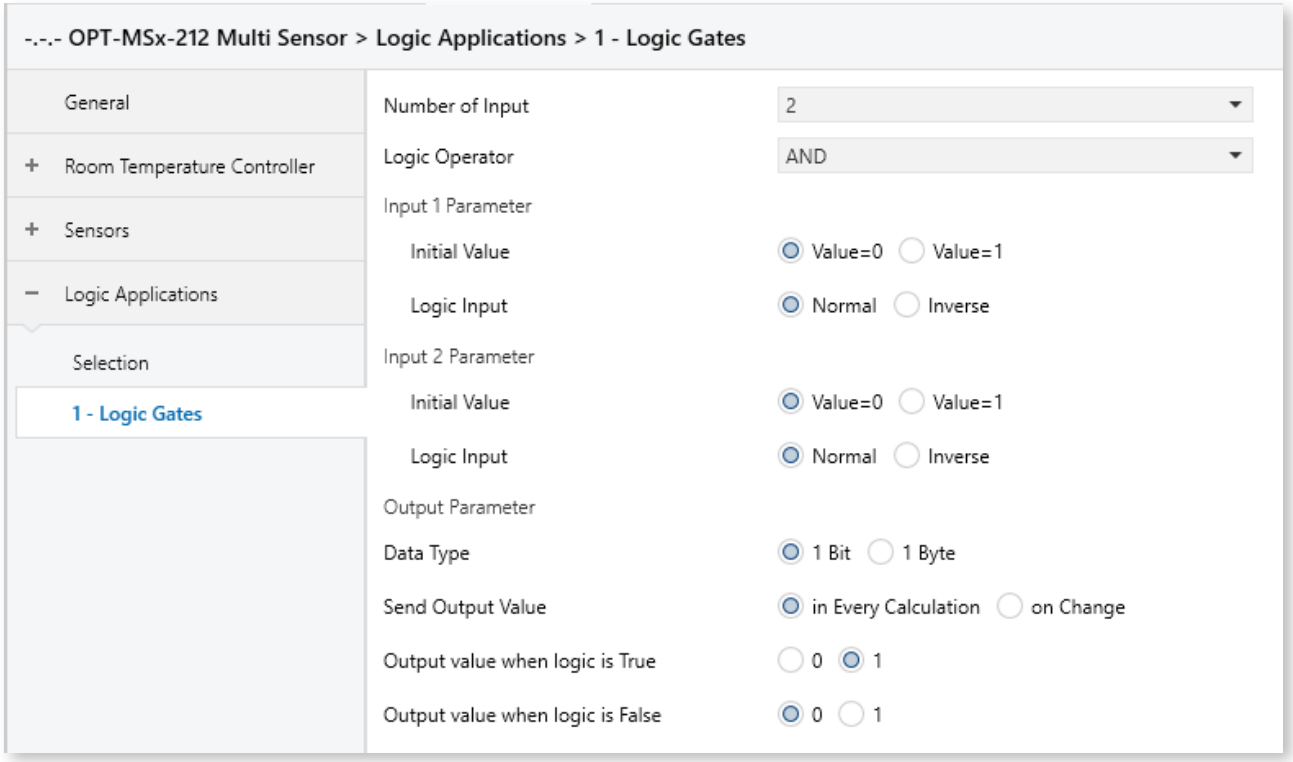
7.4.3.1 Output x

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

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-byte	7.001 Pulses	C	-	-	T
				2-byte	8.001 Pulses	C	-	-	T
				2-byte	9.001 Temperature	C	-	-	T

Table 20: 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.

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.

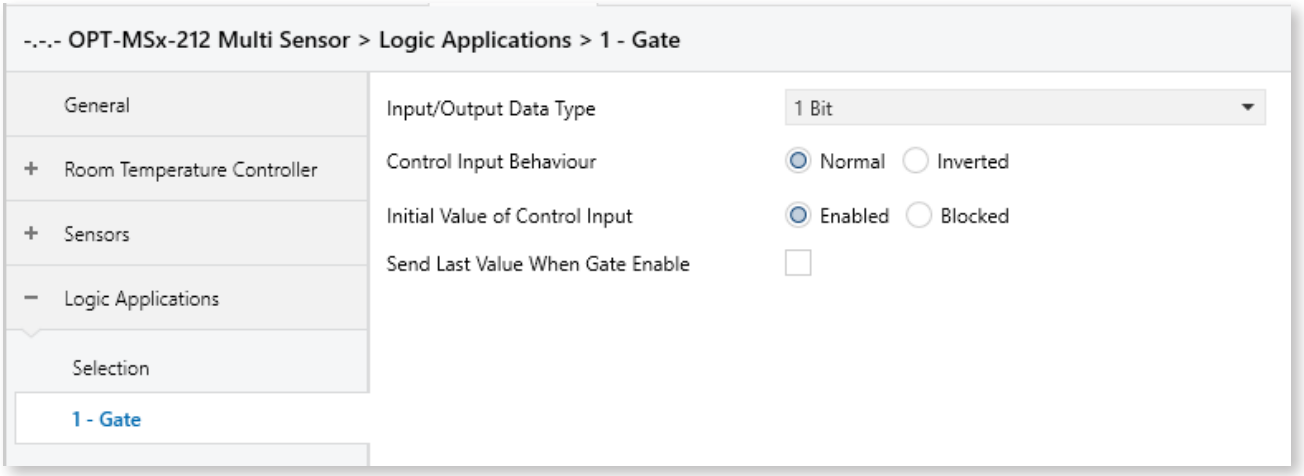
7.5.4.4 Output Value

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	Input	1-bit	1.001 Switch	C	-	W	-
x	LA- x I Logic Gate	Output	Output	1-bit	1.001 Switch	C	-	-	T
				1-byte	5.010 UCount	C	-	-	T

Table 21: 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.

7.6.2.1 Normal

The GATE function operates under normal conditions.

7.6.2.2 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.

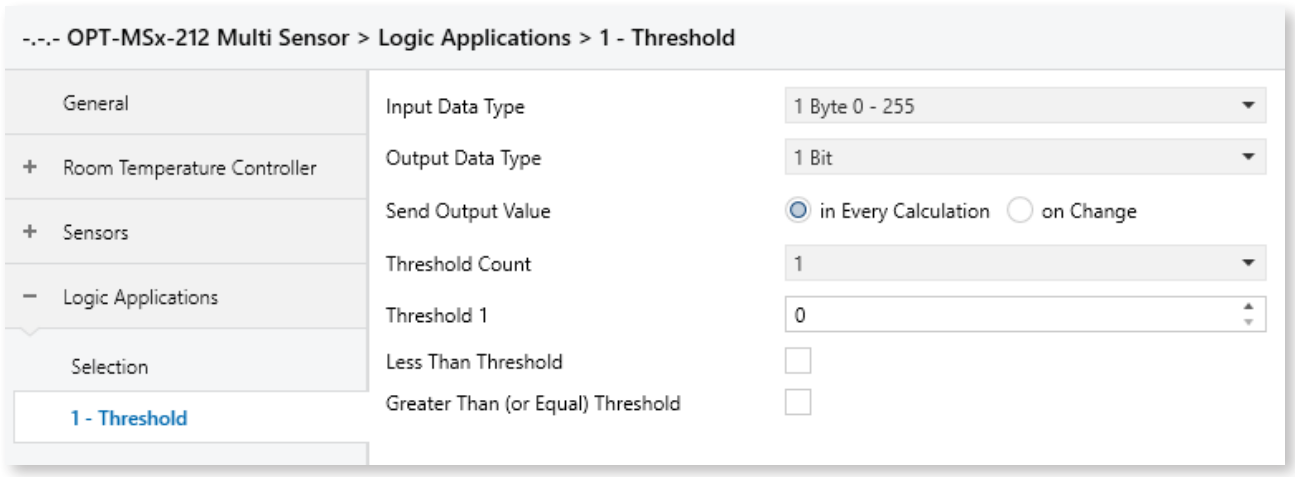
7.6.4 Send Last Value When Gate Enabled

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-byte	8.001 Pulses	C	-	W	-
				2-byte	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-byte	8.001 Pulses	C	-	-	T
				2-byte	9.001 Temperature	C	-	-	T
x	LA – x I Gate	Control Input	Input	1-bit	1.003 Enable	C	-	W	-

Table 22: Logic Applications - Gate Communication Section Objects

7.7 Threshold



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 Number of Thresholds is 1

7.7.5.1 Threshold

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 Number of Thresholds 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 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 23: Logic Applications - Threshold Communication Section Objects

8 Accessory

8.1 Input

Allows the functions of external physical contact devices to be transferred to the KNX bus.

8.1.1 Digital Input Function

Channels are initially passive. At this point, a selection is made based on the intended use of this input. In the Digital Input Function, the appropriate option is selected from the window that opens, such as "Send Value" or "Curtain/ Shutter".

8.1.2 Debounce Time

Used to select the minimum contact time that the device will use as a basis for detecting contact, chosen from a dropdown list. The options are 20ms, 30ms, 50ms, and 150ms. The default value is 50ms. Contacts shorter than this duration are perceived as interference and are not processed.

8.1.3 Enable Object

Used to completely enable or disable the Input Control. "Passive" or "Active" can be selected. The default value is "Passive." When "Active" is selected, the options below it are enabled.

8.1.3.1 Enable With

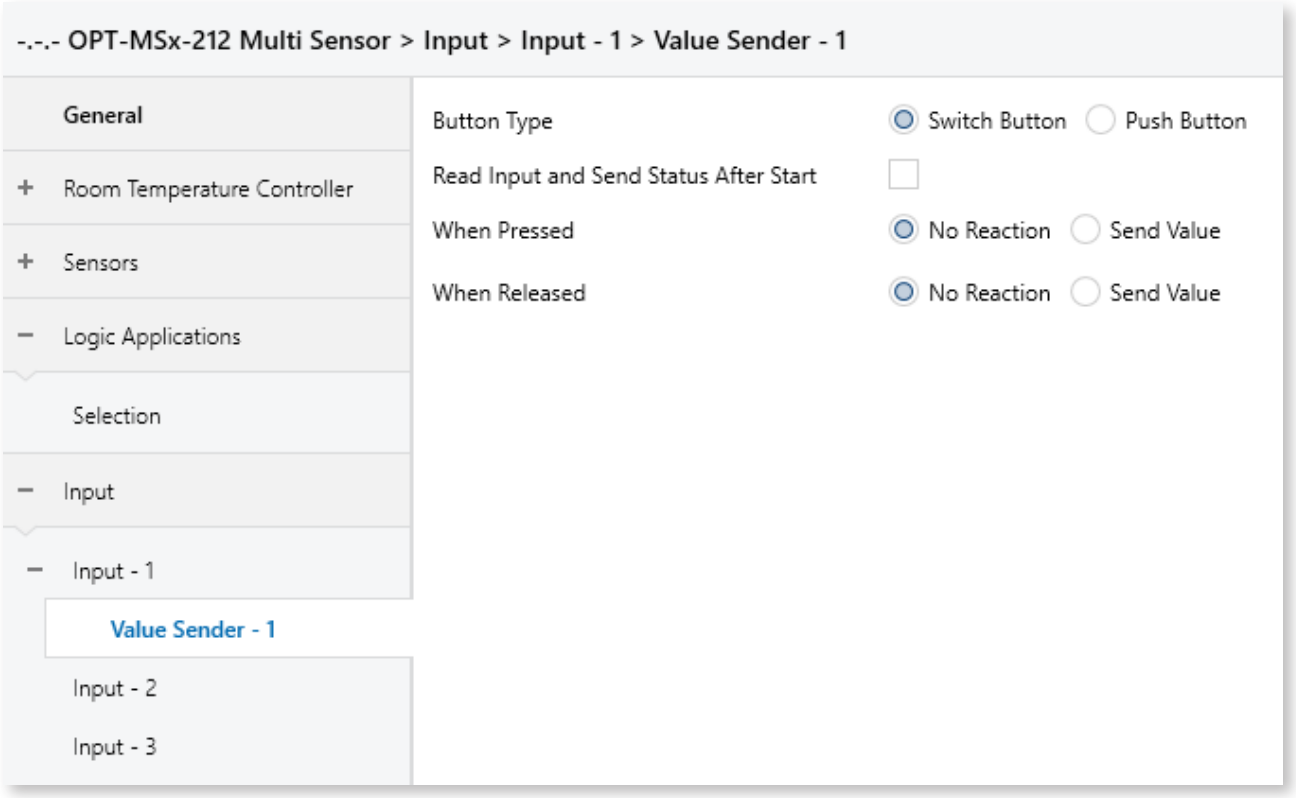
Indicates that it will be activated with the "OFF Telegram" using the 1-bit 0 (zero) telegram, or with the "ON Telegram" using the 1-bit 1 (one) telegram. The default value is "ON Telegram".

8.1.3.2 Initial State

Indicates the initial state of the device. If "Active" is selected, the device will start directly upon initialization; otherwise, "Input" will not function immediately after the device starts.

8.1.4 Value Sender: Value Sending Settings

This section opens in the left panel when "Value Send" is selected as the Digital Input option. The details of the connection made in this section are configured here.



8.1.4.1 Button Type

Based on the type of connected switch, select "Toggle" for switches that stay in the pressed position or "Spring Return" for switches that return to their original position after being pressed..

8.1.4.2 Read Input and Send Status After Start

Used for toggle-type switches to send the current position of the switch to the bus when the device is powered on. This option is hidden for spring return switches.

8.1.4.3 Switch Button

For toggle-type switches, this setting determines the action to be taken when the switch position changes from the contact position specified on the first page (Normally Open or Normally Closed) to the other. It is initially set to "Passive". To configure, set it to "Active". First, select the data type of the telegram to be sent, then select the value to be sent. By default, a 1-bit value is selected. Depending on the selected data type, the value to be sent is either written in the "Send Value" section or selected from a list.

8.1.4.3.1 When Pressed

For toggle-type switches, this setting determines the action to be taken when the switch position changes from the contact position specified on the first page (Normally Open or Normally Closed) to the other. It is initially set to "Passive". To configure, set it to "Active". First, select the data type of the telegram to be sent, then select the value to be sent. By default, a 1-bit value is selected. Depending on the selected data type, the value to be sent is either written in the "Send Value" section or selected from a list.

8.1.4.3.2 When Released

For toggle-type switches, this setting determines the action to be taken when the switch position returns to the contact position specified on the first page. It is initially set to "Passive". To configure, set it to "Active". First, select the data type of the telegram to be sent, then select the value to be sent. By default, a 1-bit value is selected. Depending on the selected data type, the value to be sent is either written in the "Send Value" section or selected from a list. The press and release functions of the channels are divided into two separate communication objects to provide programming flexibility. If desired, the same group address can be assigned to both objects (provided the data types are the same) to perform the usual commissioning.

8.1.4.4 Push Button

For spring-return switches, events occur when the button is pressed and/or when held down for a specific duration. The first option is for when the button is pressed or, if long press detection is enabled, for short presses.

8.1.4.4.1 Contact Type

Select to determine the form of the contact structure when the connected switch is not pressed. Choose from "Normally Open" or "Normally Closed" contact options. The default is "Normally Open".

8.1.4.4.2 When Pushed

For spring-return switches, this setting determines the action to be taken when the switch position changes from the contact position specified on the first page (Normally Open or Normally Closed) to the other. It is initially set to "Passive". To configure, set it to "Active". First, select the data type of the telegram to be sent, then select the value to be sent. By default, a 1-bit value is selected. Depending on the selected data type, the value to be sent is either written in the "Send Value" section or selected from a list.

8.1.4.4.3 Long Press Detection

Used to activate long press detection for spring-return switches. In this case, the device performs its function based on the duration the button is pressed. The long press duration is set in the general parameters of the device. The settings are done in the same way. The data types to be sent are the same for all types of switches. However, for spring-return switches, in addition to the On and Off telegrams for 1-bit, there is also an "Other" telegram. In this option, the opposite of the last sent value or the value updated from the data bus is sent (1 becomes 0, 0 becomes 1)..

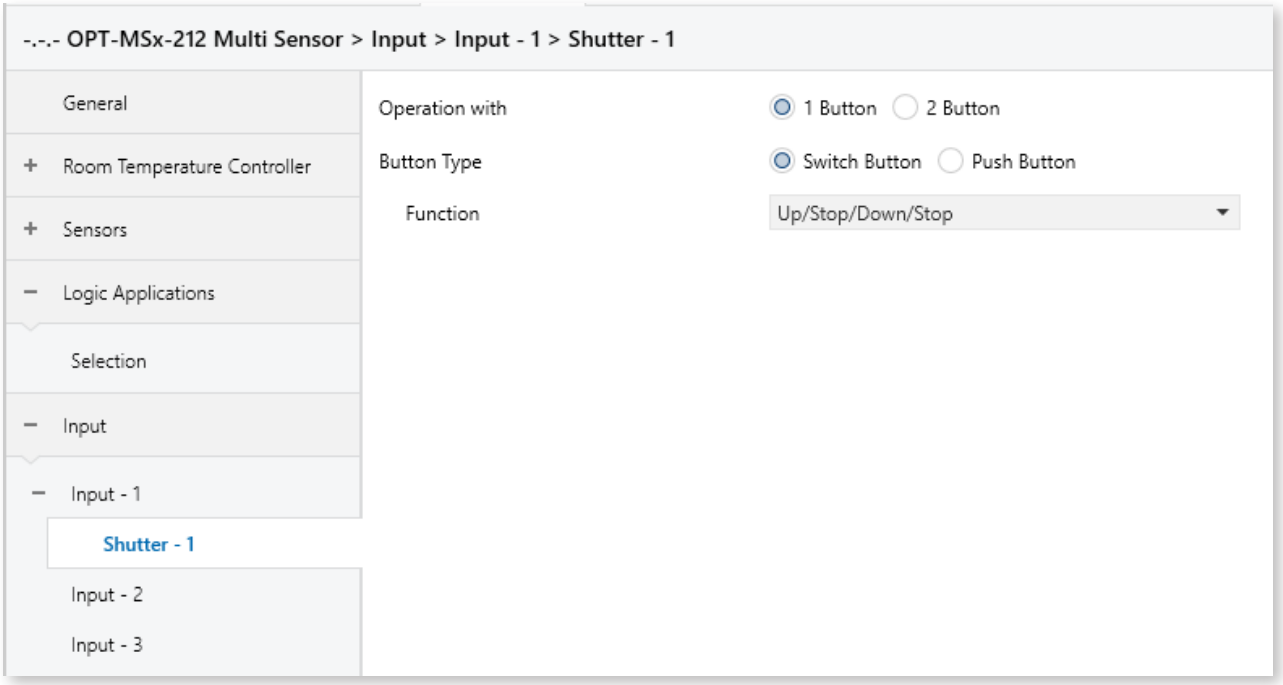
8.1.4.4.3.1 Time for Long Operations

The minimum duration required for long press detection.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
510	Input x	Enable	Input	1-Bit	1.003 Enable	C	-	W	-
x		Press Output / Output (Short Press)	Output	1 bit	1.001 DPT Switch	C	-	-	T
				1byte	5.010 Counter Pulses	C	-	-	T
				1byte	6.010 Counter Pulses	C	-	-	T
				1 byte	17.001 Scene N.	C	-	-	T
				1 Byte	20.102 HVAC Mode	C	-	-	T
				2 Byte	7.001 Pulses	C	-	-	T
				2 Byte	8.001 Pulses	C	-	-	T
				2 Byte	9.001 Temperature	C	-	-	T
x		Release Output / Output (Long Press)	Output	1 bit	1.001 DPT Switch	C	-	-	T
				1byte	5.010 Counter Pulses	C	-	-	T
				1byte	6.010 Counter Pulses	C	-	-	T
				1 byte	17.001 Scene N.	C	-	-	T
				1 Byte	20.102 HVAC Mode	C	-	-	T
				2 Byte	7.001 Pulses	C	-	-	T
				2 Byte	8.001 Pulses	C	-	-	T
				2 Byte	9.001 Temperature	C	-	-	T

Table 24: Accessory - Input Communication Section Objects

8.1.5 Shutter



Used for controlling two-way curtain/blind motors. It can be adjusted according to the type of switch and button model. Movement telegrams (up or down) are sent from the "Input-x Movement" object, and "Stop/Step" telegrams are sent from the "Input-x Stop" object.

8.1.5.1 Operation With

The area where the number of buttons used for control is selected; options include 1-button and 2-button. If 1-button is selected, the operations are sequential or only occur in a specific direction. If 2-button is selected, a more comfortable application is provided.

8.1.5.2 Button Type

Based on the type of connected switch, select "Switch Button" for switches that stay in the pressed position or "SPush Button" for switches that return to their original position after being pressed. The short or long press duration is set in the General Settings and is the same for all buttons.

8.1.5.3 Function

8.1.5.4 1-Button/Switch

8.1.5.4.1 Up/Stop/Down/Stop

A telegram is sent (from the relevant objects) each time the toggle switch changes position.

8.1.5.4.2 Up/Stop

One of the two positions of the toggle switch sends a "Move Up" telegram, while the other position sends a "Stop" telegram from the Stop Object.

8.1.5.4.3 Down/Stop

One of the two positions of the toggle switch sends a "Move Down" telegram, while the other position sends a "Stop" telegram from the Stop Object.

8.1.5.4.4 Up/Down (Without Stop)

Each time the toggle switch changes position, a "Move Up" or "Move Down" telegram is sent via the "Input-x Movement" object.

8.1.5.5 2-Button/Switch

8.1.5.5.1 Move Up

When this button is pressed, a "1-bit up" telegram is sent via the "Input-x Movement" object. When the switch moves to the other position, a "1-bit step/stop" telegram is sent via the "Input-x Stop" object.

8.1.5.5.2 Move Down

When this button is pressed, a "1-bit down" telegram is sent via the "Input-x Movement" object. When the switch moves to the other position, a "1-bit step/stop" telegram is sent via the "Input-x Stop" object.

8.1.5.6 1-Button/Push Button

8.1.5.6.1 Short Press: Stop/Step, Long Press: Move

"1-bit step/stop" telegram is sent via the "Input-x Stop" object for short presses, and a "Move Up" or "Move Down" telegram is sent via the "Input-x Movement" object for long presses.

8.1.5.6.2. Short Press: Move, Long Press: Stop/Step

A "Move Up" or "Move Down" telegram is sent via the "Input-x Movement" object for short presses, and a "1-bit step/stop" telegram is sent via the "Input-x Stop" object for long presses.

8.1.5.6.3 Up/Stop/Down/Stop

Each time the spring return button is pressed, the next telegram is sent (from the relevant objects). Long press detection is not used.

8.1.5.7 2-Button/Push Button

8.1.5.7.1 Standard

Tasks are assigned according to short and long presses.

8.1.5.7.2 Short Press

Select either "Stop/Up Step" or "Stop/Down Step". The information is sent via the "Input-x Stop" object.

8.1.5.7.3 Long Press

Select either "Move Up" or "Move Down". The information is sent via the "Input-x Movement" object.

8.1.5.7.4 Moving

The buttons send only the movement telegram, regardless of the press duration (no telegram is sent from the Input-x Object).

8.1.5.7.5 Stepping

This technique is mainly used for louvered blinds or small motorized devices where precise movement control is needed.

8.1.5.7.6 Press

Select either "Move Up" or "Move Down". The information is sent via the "Input-x Movement" object.

8.1.5.7.7 Repetition Period (0 = No Repeat)

The area where the time interval for repeating the step action when the button is held down is set. The entered value is multiplied by 100ms to be processed.

No	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	Input x	Enable	Input	1-Bit	1.003 Enable	C	-	W	-
x		Move	Output	1-Bit	1.008 Up/Down	C	-	-	T
x		Stop	Output	1-Bit	1.007 Step	C	-	-	T

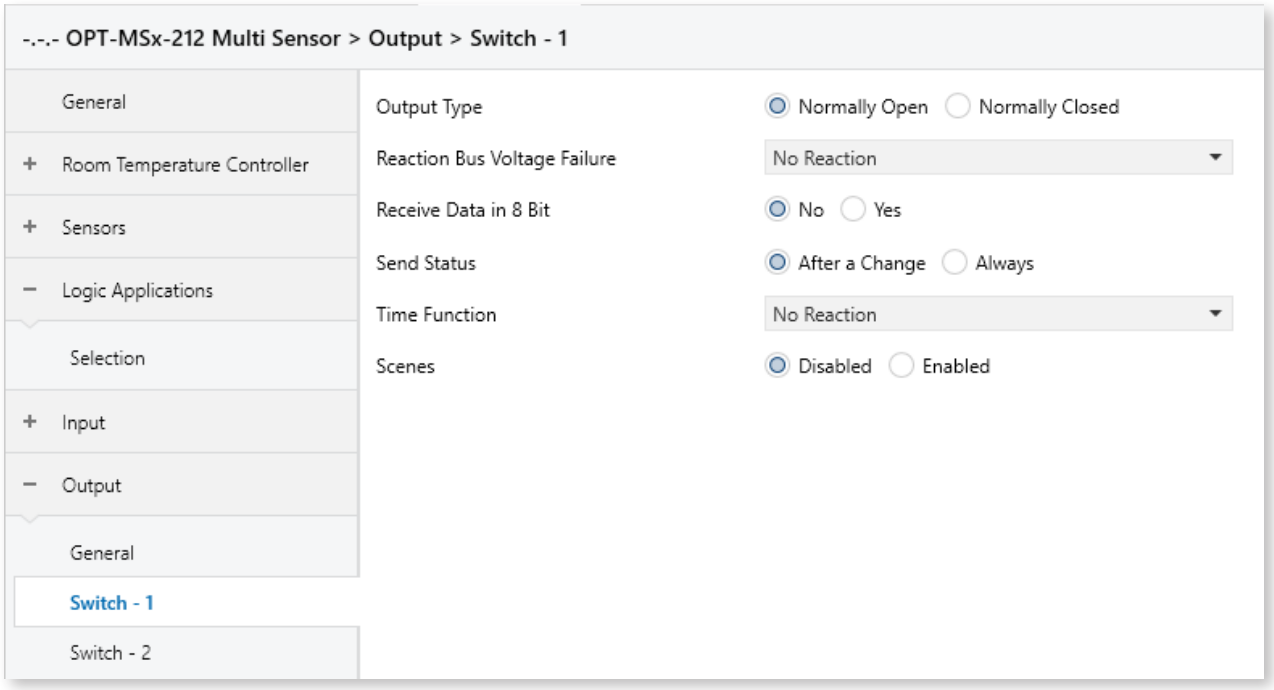
Table 25: Shutter Communication Section Objects

8.2 Output

8.2.1 Output Configuration

This is where you select what the output channels will do. Since there are two outputs, if the Contact type is selected, the other output will also be a Contact. When Shutter or 3-point Valve is selected, each application uses one output for either the open or close telegram.

8.2.1.1 Switch



Uses 1 output. If Output 1 is selected as Contact, Output 2 is also set as Contact.

8.2.1.1.1 Output Type

This is where the natural operating principle of the output contact is defined. The default value is Normally Open. When an ON telegram is received, the contact becomes short-circuited; when an OFF telegram is received, the contact becomes open-circuited. In the Normally Closed contact, the telegrams work in reverse. The status information is fixed: if the contact is short-circuited, a value of 1 is generated; if it is open-circuited, a value of 0 is generated. The status information on the device also shows the actual status of the contact (1 for short-circuit, 0 for open circuit).

8.2.1.1.2 Reaction at Bus Voltage Fail

The device can change its position in the event of a power failure (KNX bus power). The preferred setting for this is made here. The options are Current Position, Open Contact, and Closed Contact. The default value is Current Position. It is recommended to set it to Open Contact in applications where long-term power failures are expected.

8.2.1.1.3 Receive Data in 8-bit

This setting allows the contact to change position using 1-byte as well as 1-bit data. It is generally used for controlling heating/cooling valves that work with thermostats sending 1-byte values. When selected as "Yes," an additional row opens to set the Threshold value. If the information received at the threshold input is equal to or greater than this value, the output becomes active for normally open channels; if the information is less than the threshold value, the output becomes inactive. This method is also used for thermal or solenoid valve connections in fan coil applications.

8.2.1.1.3.1 Treshold (Included)

If the information received at the threshold input is equal to or greater than this value, the output becomes active for normally open channels. In normally closed channels, the output becomes inactive. If the received information is less than the threshold value, the output remains inactive for normally closed channels and active for normally open channels. This method is also used for thermal or solenoid valve connections in fan coil applications.

8.2.1.1.4 Send Status

The device can send its current position via the Contact Status communication object during operation. The status information can be sent either when the contact output changes position or whenever a telegram is received, even if the contact does not change. This preference is made here.

8.2.1.1.5 Time Function

This is the section where the contact's time-based operations are set. If operations related to this are to be performed, "Yes" is selected. In this case, a tab called "Time Function" will appear under the Contact Parameters in the middle section.
The default value is "No Function." The other options are explained below. To deactivate the time functions and make the contact output active, a 1-bit ON telegram can be sent from the "Permanent On" communication object. When an OFF telegram is sent from this object, the time functions will resume with the next telegram.

8.2.1.1.5.1 Delay

This parameter is selected if a delay is required when the device receives an Open or Close telegram. A value between 0-6500 seconds can be entered as the ON Telegram Delay or OFF Telegram Delay. If a telegram in the opposite direction is received before the delay period ends, the delay in that direction will start to process.

8.2.1.1.5.2 Staircase

The switch is used to automatically switch to the OFF statement at the end of the time to be entered in this section from the ON telegram it receives. Lighting Time can be determined between 1-6500 sec.

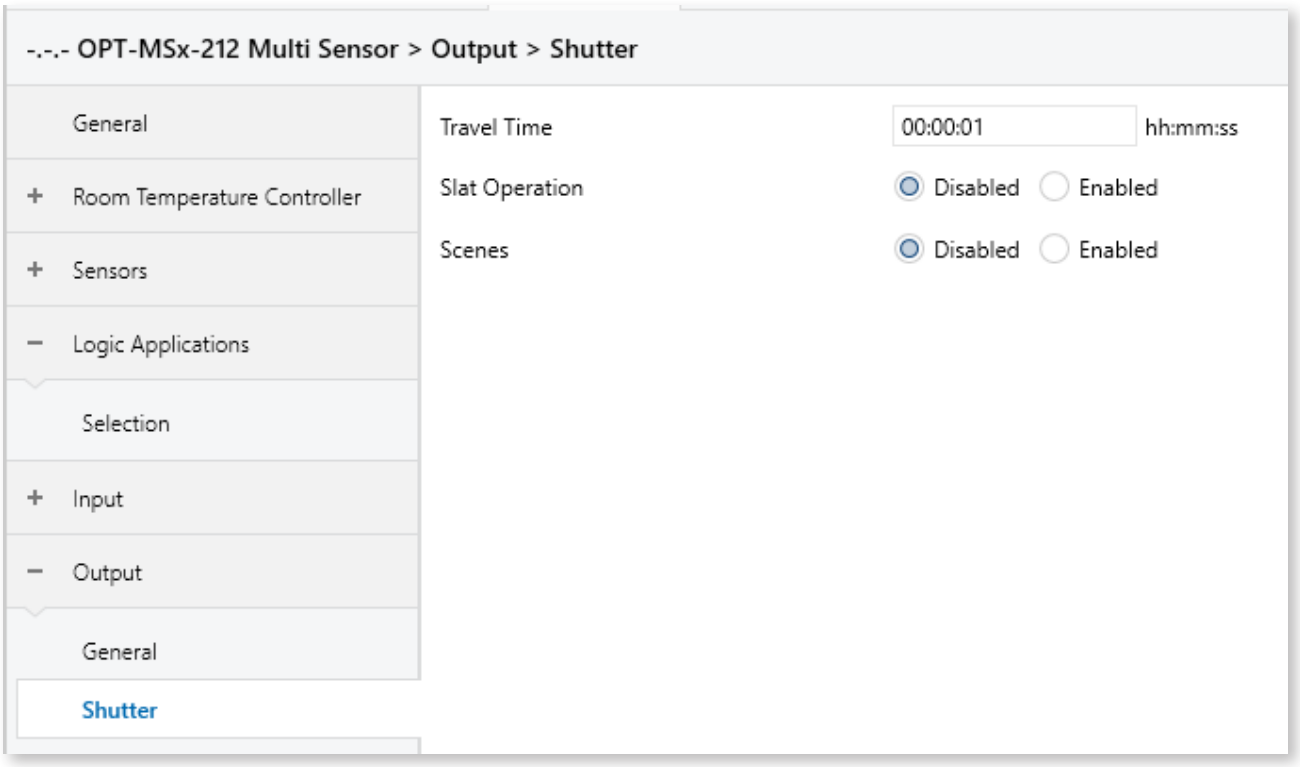
8.2.1.1.6 Scenes

Used to define the positions that the contact will take according to 1-byte Scene telegrams. When the Scenes option is selected as "Yes," a tab called "Scenes" will appear under the Contact Parameters in the middle section. When you enter this tab, the following screen will appear:

Nr	Name	Object Function	Direction	Length	Data Type	C	R	W	T
x	Output x	Switch	Input	1bit	1.001 Switch	C	-	W	-
x		Switch Status	Output	1bit	1.001 Switch	C	R	-	T
x		Switch Threshold Input	Input	1byte	5.001 Percentage	C	-	W	-
x		Switch Permanent On	Input	1bit	1.001 Switch	C	-	W	-
x		Switch Scene	Input	1byte	17.001 Scene N.	C	-	W	-

Table 26: Accessory - Scenes Communication Section Objects

8.2.1.2 Shutter / Blinds



Curtains or blinds are controlled through 2 contacts. It is important to ensure that only one output is active at any given position. The device performs this function programmatically. Since curtains consume two contacts, the odd-numbered contacts on the upper row should be connected to the opening direction of the curtain, while the even-numbered contacts on the lower row should be connected to the closing direction of the curtain. The Shutter/Blind parameters are as follows:

8.2.1.2.1 Travel Time

This is the area where the time required for the curtain or blind to move from the closed position to the fully open position is entered in seconds. It can be selected between 1-6500 seconds, with the default value set to 60 seconds. This information is used for two purposes: first, to request and track the curtain position as a percentage (%0: fully open, %100: fully closed); and second, to make the output contacts passive after this time (+10% additional time) to ensure energy conservation.

8.2.1.2.2 Slat Operation

Used for blinds with adjustable slats. These devices can not only adjust the length of the curtain but also the slat position. When Slat Adjustment is set to "Active," an additional option called "Slat Step Time" appears. In this option, you can select the time step for slat adjustment from the dropdown list. The device will remain active for the time specified in the Stop/Step object to allow for slat adjustment.

8.2.1.2.2.1 Slat Step Time

In this option, the duration of the slat adjustment step is selected from the dropdown list. The device remains active for the duration specified in the Stop/Step object to allow for slat adjustment.

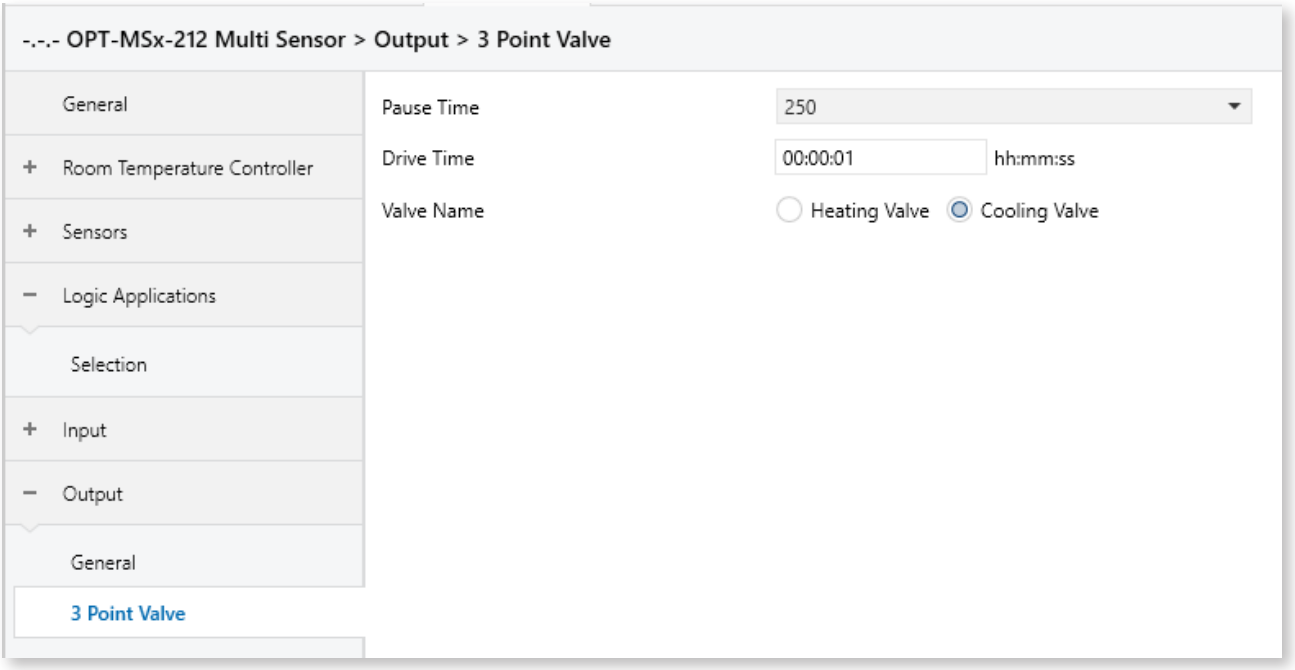
8.2.1.2.3 Scenes

Used to define the positions that the shutter/blinds will take according to 1-byte Scene telegrams. When the Scenes option is selected as "Yes," a tab called "Scenes" appears under the Shutter/Blind Parameters in the middle section. When you enter this tab, the following screen will appear. Up to 5 scenes can be processed for the shutter module. In the Scene Number section, the information to be received from the "Shutter/Blind Scenario" communication object is selected, and in the "Scenario Position" section, the position that the contact will take in this scenario is determined. For example, if the shutter is to be lowered in Scenario 2, Scene Number x: Scenario 2, Scenario Position x: Down is selected.

Nr	Name	Object Function	Direction	Length	Data Type	C	R	W	T
610	Output	Shutter/Blinds Move	Input	1bit	1.008 Up/Down	C	-	W	-
611		Shutter/Blinds Stop/Step	Input	1bit	1.007 Step	C	-	W	-
612		Shutter/Blinds Scene	Input	1byte	17.001 Scene N.	C	-	W	-
613		Shutter/Blinds Move to Position	Input	1byte	5.001 Percentage	C	-	W	-
614		Shutter/Blinds Move to position status	Output	1byte	5.001 Percentage	C	-	-	T

Table 27: Shutter / Blinds Communication Section Objects

8.2.1.3 3-Point Valve Motor



These valve motors receive telegrams from different inputs to either open or close the flow (similar to shutters/blinds). Since these valve motors use two contacts, the odd-numbered contacts on the upper row should be connected to the opening direction of the valve, while the even-numbered contacts on the lower row should be connected to the closing direction of the valve. The 3-Point Valve Control parameters are as follows:

8.2.1.3.1 Pause Time

This is the area where the waiting time between the telegrams the valve motor receives in the opening and closing directions is set. It can be selected from the list between 250 and 1000 ms. This pause is added to ensure that the valve motor completely stops its current movement before starting to move in the opposite direction.

8.2.1.3.2 Drive Time

This is the area where the time it takes for the valve to move from the fully closed position to the fully open position is entered. A value between 1-6500 seconds can be set. The valve calculates all percentage changes based on this time.

8.2.1.3.3 Valve Name

This is the area where it is specified whether the fluid controlled by the valve is used for cooling or heating. It also determines the name of the communication object.

Nr	Name	Object Function	Direction	Length	Data Type	C	R	W	T
610	Output	Valve Heating Control Value	Input	1byte	5.001 Percentage	C	-	W	-
610		Valve Cooling Control Value	Input	1byte	5.001 Percentage	C	-	W	-
611		Valve Status Value	Output	1byte	5.001 Percentage	C	-	-	T

Table 28: Shutter / Blinds Communication Section Objects

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OPTIMUS SOLUTIONS TEKNOLOJİ
ÜRETİM SANAYİ TİCARET A.Ş.
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