EAE ORIA THERMOSTAT

Product Manual Oria Thermostat

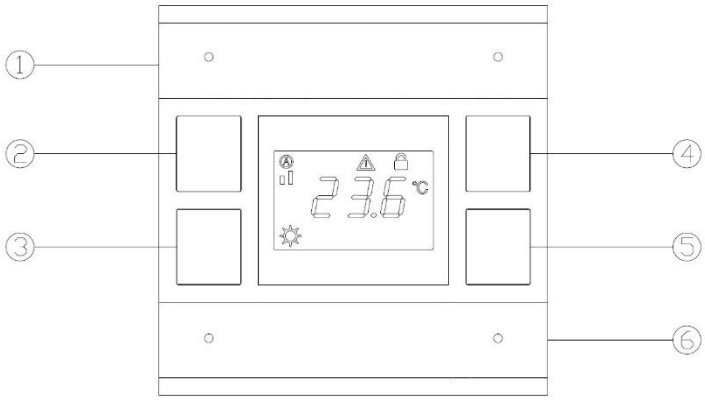
Content

1. General

Extendable up to 4 folds, Oria thermostats offer a wide range of functional flexibility with integrated programmable switches.
Buttons on Oria thermostats can be programmed to control lighting, shutter/blind drivers, speakers, make scene calls and mimic panic buttons. Each button can be programmed independently for a different function.

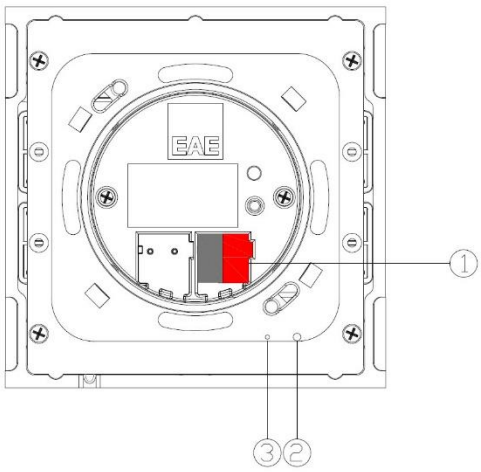
2. Device Technology

2.1 Button Definitions



1. Programmable Button Group 1
2. Fan Speed (1, 2, 3, A)
3. Operation Mode (Comfort, Night, Away, OFF)
4. Setpoint Temperature UP
5. Setpoint Temperature DOWN
6. Programmable Button Group 2

2.2 Connection Diagram



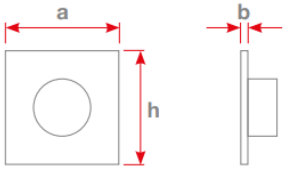
1. KNX Port Terminal
2. Programming Button
3. Programming LED

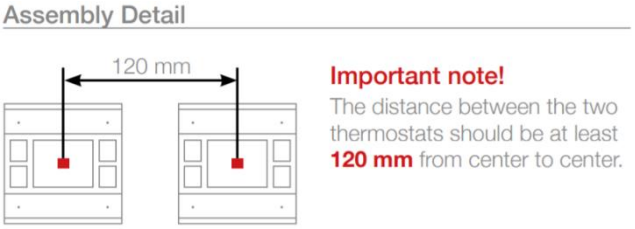
2.3 Technical Data

Protection Type	IP20	EN 60529
Safety Class	II	EN 61140
Supply	Voltage Range Supply Voltage Power Consumption	21-30V DC, Supply from EIB/KNX line 20 mA 20 mA x 30V
Operation LEDs	Programming LED for each fold	1 to 5 RGB LEDs for physical address identification
Button Operation Life	100.000	
Temperature	Operating Storage Transport	-5° C + 45° C -25° C + 55° C -25° C + 70° C
CE	In accordance with EMC guideline and low voltage regulation	

2.4 Dimensions

Dimensions (mm)	a	b	h
2 Fold Thermostat	90	9	90
3 Fold Thermostat	90	9	111,5
4 Fold Thermostat	90	9	133





3. Communication Object Table

No.	Object Name	Function	Number of Bits	Flags
0	General, operation	Active	1	CT
1	Rocker 1, switch	On/Off	1	CWT
	Rocker 1, shutter	Up/Down	1	CWT
	Rocker 1, value[0,1]	Send	1	CWT
	Rocker 1, value[0…255]	Send	8	CWT
	Rocker 1, value[0…65535]	Send	16	CWT
	Rocker 1, value[-32768…32768]	Send	32	CWT
	Rocker 1, value[0…4294967295]	Send	64	CWT
	Rocker 1, value.temperature	Send	64	CWT
	Button 1, switch	On/Off	1	CWT
	Button 1, shutter	Up/Down	1	CWT
	Button 1, value[0,1]	On/Off	1	CWT
	Button 1, value[0...255]	Send	8	CWT
	Button 1, value[0..65535]	Send	16	CWT
	Button 1, value[-32768…32768]	Send	32	CWT
	Button 1, value[0…4294967295]	Send	64	CWT
	Button 1, value.temperature	Send	64	CWT
2	Rocker 1, dimming	Send	4	CWT
	Rocker 1, shutter	Stop/Lamella Adj	1	CWT
	Button 1, dimming	Send	4	CWT
	Button 1, shutter	Stop/Lamella Adj	1	CWT
	Button 1, value[0,1]	On/Off	1	CWT
	Button 1, value[0…255]	Send	8	CWT
	Button 1, value[0…65535]	Send	16	CWT
	Button 1, value[-32768…32768]	Send	32	CWT
	Button 1, value[0…4294967295]	Send	64	CWT
	Button 1, value.temperature	Send	64	CWT
3	Rocker 1, shutter	Top Position	1	CWT
	Rocker 1, status	Top Position	1	CWT
	Button 1, shutter	Top Position	1	CWT
	Button 1, status	Top Position	1	CWT
4	Rocker 1, shutter	Bottom Position	1	CWT
	Button 1, shutter	Bottom Position	1	CWT

49	Window Status	Open/Close	1	CW
50	Regulation	On/Off	1	CWT

51	Split Heat	On/Off	1	CT
52	Split Cool	On/Off	1	CT
53	Split Heat Error	True/False	1	CT
54	Split Coo Error	True/False	1	CT
55	Current Temperature	Temperature	16	CRT
56	Current Setpoint	Temperature	16	CRT
57	Operating Mode	Send	8	CW
	Comfort Mode	Enable	1	CW
58	Night Mode	Enable	1	CW
59	Away Mode	Enable	1	CW
60	Protect Mode	Enable	1	CW
61	Heat Control Value	On/Off	1	CT
	Heat Control Value	Send	8	CT
62	Cool Control Value	On/Off	1	CT
	Cool Control Value	Send	8	CT
63	Switchover	Control Mode	1	CRWT
	Switchover	Control Mode Status	1	CRT
	Switchover	Control Mode	8	CRWT
	Switchover	Control Mode Status	8	CRT
64	Status Heat	On/Off	1	CRT
65	Status Cool	On/Off	1	CRT
66	Automatic Fan Speed	On/Off	1	CWT
67	Fan Speed	Send	8	CWT
	Fan Speed 1	Enable	1	CWT
68	Fan Speed 2	Enable	1	CWT
69	Fan Speed 3	Enable	1	CWT
70	Setpoint Comfort (°C)	Temperature	16	CW
	Setpoint Comfort (°F)	Temperature	16	CW
71	Setpoint Night (°C)	Temperature	16	CW
	Setpoint Night (°F)	Temperature	16	CW
72	Setpoint Away (°C)	Temperature	16	CW
	Setpoint Away (°F)	Temperature	16	CW
73	Reset OnSite	0/1	1	CW
74	Status Operating Mode	Send	8	CRT
	Status Comfort	True/False	1	CRT
75	Status Night	True/False	1	CRT

76	Status Away	True/False	1	CRT
77	Status Protect	True/False	1	CRT

4. Parameters and Communication Objects

4.1 General

General parameters include configuration of “in operation bit”, total rocker count, telegram limitations, window status, LED and LCD controls.

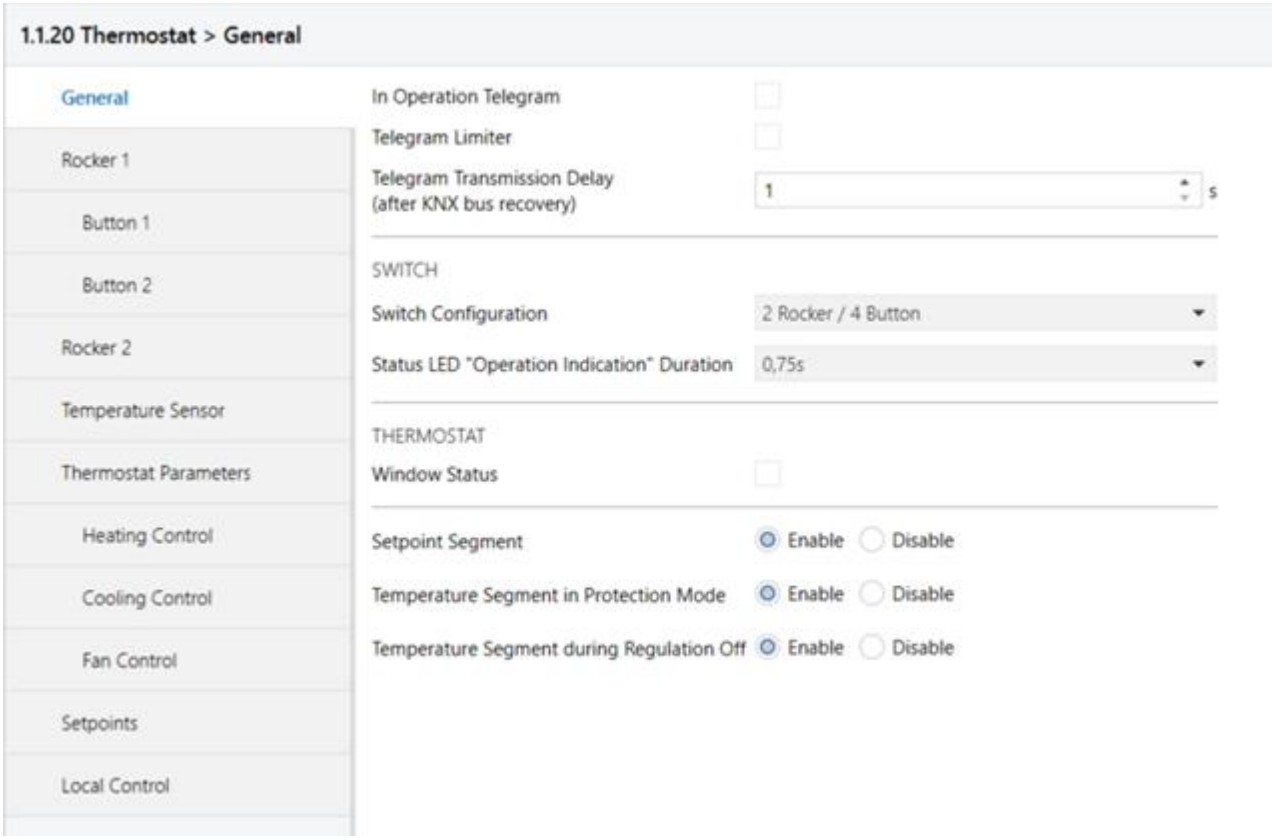


Figure 1

4.1.1 Parameters

Parameter	Settings	Description
Enable In Operation	Enable/**Disable**	In operation can be used to ensure that device is alive and connected to KNX line.
In Operation Bit	Off/**On**	Visible when "Enable In Operation" enabled. Bit value to send as device alive operation
In Operation Send Interval[sec]	0…**300**…65535	Visible when "Enable In Operation" enabled. Cyclic time period for sending in operation bit
Enable Telegram Limit	**Enable**/Disable	Limits the number of telegrams to send in certain time period
Telegram Limit Period Duration	**50ms**, 100ms, …, 30sn, 1min	Visible when "Enable Telegram Limit" enabled. Time period to check telegram numbers
Maximum Telegram Count in Period	1..**100**…255	Visible when "Enable Telegram Limit" enabled. Maximum number of telegrams to send in telegram limit period duration
Light Duration of LED	**0,75s**, 2.25s, 3.25s	LEDs on duration when status LEDs used as status indication with rocker or push buttons.
Rocker Count	**2**, 3 ,4	Number of rockers should be selected compatible with device to be able to use rockers and push buttons correctly.
Window Status	Enable/**Disable**	Enables communication object which will be used to detect window status. When window detected as open thermostat automatically enters "Protect Mode" with error and detected as close will return to the previous mode.
LCD Setpoint Segment	**Enable**/Disable	When disabled current setpoint value will replace temperature segment on LCD and blink for a few seconds, otherwise additional setpoint segment will be used.
Temperature Segment in Protection Mode	**Enable**/Disable	When enabled current temperature value will be shown on LCD while device in Protection Mode.
Temperature Segment during Regulation Off	**Enable**/Disable	When enabled current temperature value will be shown during regulation Off.

Table 2

4.1.2 Communication Objects

No	Object Name	Function	Data Type	Flags
0	General – In operation	Active	1 Bit DPT 1.002	CT
In operation value (0,1) selected through "In operation bit" parameter will be send via the group address which is linked to this communication object				
49	Window Status	Open/Close	1 bit DPT 1.009	CWT
If window status enabled, this communication object will be used to detect window status. If window detected as open thermostat will enter protect mode and will not response mode change commands (over communication object or operating mode button) until window detected as closed through this communication object.				

Table 3

4.2 Rockers and PushButtons

Total number of rockers can be selected through "Rocker Count" parameter in "General" tab. Buttons on the thermostat can be used as rockers or push buttons. Select the desired operation from the "Rocker N" (N: Rocker number) tab (Figure 2). If configured as push buttons, 2 push button tabs will be visible under "Rocker N" tab (Figure 3). Both rockers and push button have 5 functions, no function, switch, switch and dim, shutter and value operation.

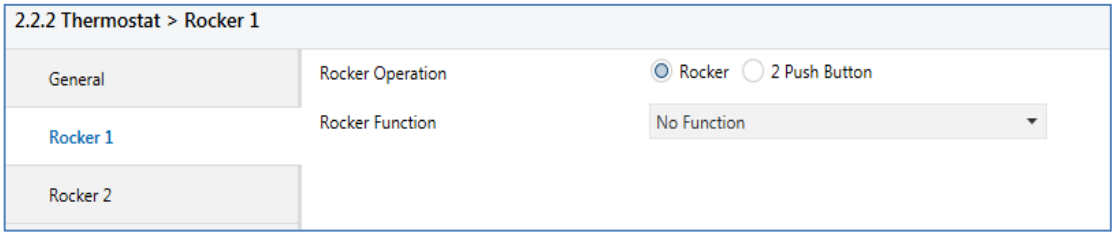


Figure 2

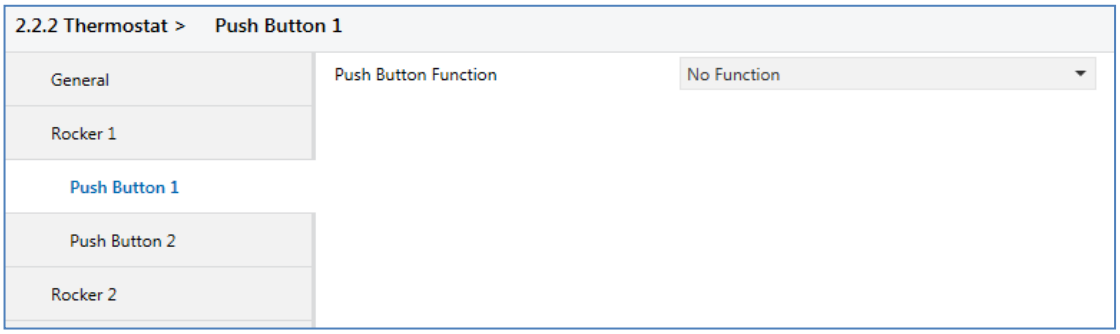


Figure 3

4.2.1 Rockers

Number of rockers should be selected in "General" tabs in parameters and should be chosen as compatible with the device that will be configured. Rockers are numbered from top to bottom, topmost rocker as Rocker 1, below it Rocker 2, and so on. Rockers can be configured as 4 different operations and 1 function to disable rocker (No Function). Operation selection can be configured with "Rocker Function" parameter. Every function enables different parameters and communication objects that will be explained in the following chapters.

Parameter	Setting	Description

Rocker Operation	**Rocker**/2 Push Button	Selects the function of rocker
Rocker Function	**No Function**	Disables the rocker
	Switch	Rocker can be used to send on/off telegrams. (For more information Chapter 4.2.1.1)
	Switch and Dim	Rocker can send on/off and dimming telegrams. (For more information Chapter 4.2.1.2)
	Shutter	Rocker can control shutter, venetian blind, blind, roller and awning. (For more information Chapter 4.2.1.3)
	Value Operation	Rocker buttons can send predefined values from different data types. (For more information Chapter 4.2.1.4)

Table 4

Rockers also have status LEDs which can be configured to indicate state of the operation that is configure.

4.2.1.1.1 Switch

Selecting "Switch" as "Rocker Function" enables to send 1 bit On(1)/Off(0) telegrams to the group address that is linked to respective communication object. Status LEDs can be configured to notify the current status of operation directly with buttons or using communication objects for confirmation to show current status.

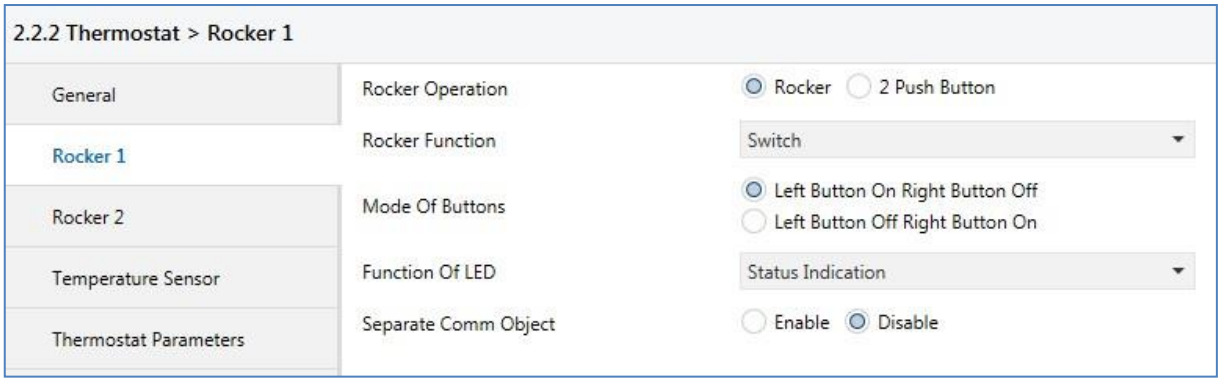


Figure 4

4.2.1.1.1 Parameters

Parameter	Setting	Description
Mode of Buttons	**Left Button On Right Button Off** Left Button Off Right Button On	Select which button is ON button and which button is OFF button
Function of LED	**LED permanently Off**	LED always Off
	LED permanently On	LED always On

	Status Indication	Status LED of last pressed rocker button is on, other rocker button is off. If "Separate Comm Object" parameter selected as "Enable" status LEDs will wait for confirmation from communication object before changing state.
	Inverted Status Indication	Status LED of last pressed rocker button is off, other rocker button is on. If "Separate Comm Object" parameter selected as "Enable" status LEDs will wait for confirmation from communication object before changing state.
	Operation Indication	Status LED of the pressed rocker button will be on for the time period selected at "Light Duration of LED" parameter at "General" tab.
Separate Comm Object	Enable/**Disable**	Only visible when "Function of LED" selected as "Status Indication" or "Inverted Status Indication". This communication objects is the input of confirmation for status LEDs. If selected "Enable" respective communication object should be linked to an appropriate group address

Table 5

4.2.1.1.2 Communication Objects

No	Object Name	Function		Data Type	Flags
1	Rocker1 – Telegr.switch	On/Off		1 bit DPT 1.001	CWT
	On/Off telegrams will be send to group address that is linked to this communication object.				
3	Rocker1 – Status Comm.Obj.	On/Off		1 bit DPT 1.002	CWT
	Confirmation for On/Off switch telegrams will be received from this communication object. If these communications object visible, it must link to an appropriate group address. Otherwise status LEDs will not function correctly. If status confirmation not to be used the communication object should be disabled by "Separate Comm Object" parameter.				

Table 6

4.2.1.2 Switch and Dim

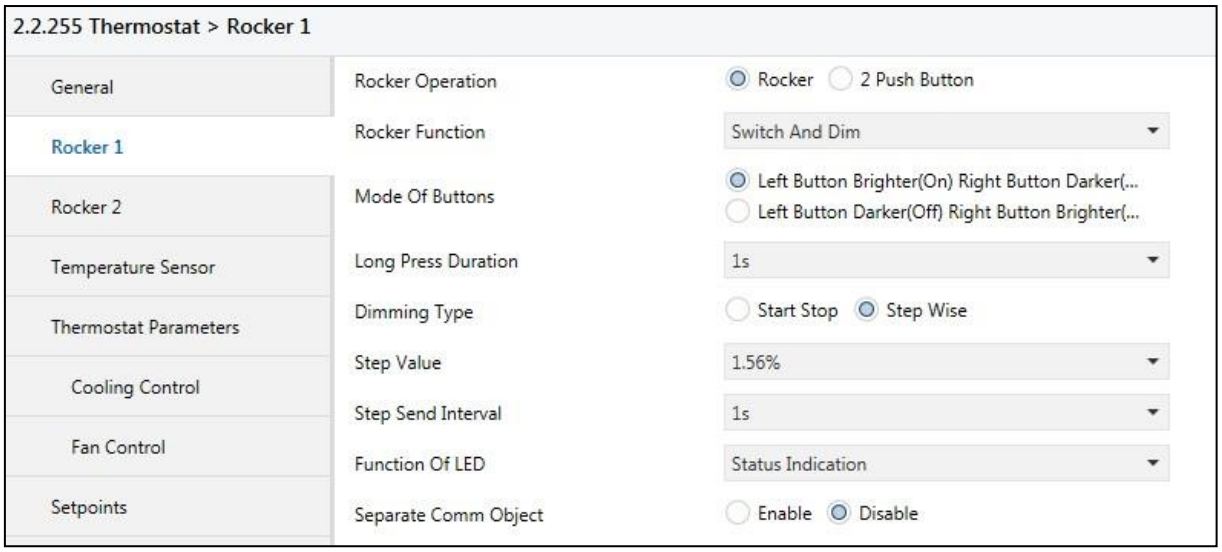


Figure 5

Rockers can be configured with switching and dimming capability. When configured as "Switch and Dim" rocker buttons will have two modes switch mode and dim mode. When rocker button pressed shorter than time period specified in "Long Press Duration" parameter, rocker button will act as a switch. In switch mode rocker buttons will behave as normal switches as explained in Chapter 4.1.1. When rocker buttons pressed longer than "Long Press Duration" rocker will enter "Dim mode". Dimming capability can be used in two different types "Start Stop" and "Step Wise". Which type to use can be configured in "Dimming Type" parameter.

Dimming - Start Stop Type

When rocker button pressed (and not released) and pressed duration exceeds "Long Press Duration" time "Increase, %100"(When on button pressed) or "Decrease,%100"(When off button pressed) dimming level will be send using respective communication object. When button is released "Increase, Break" or "Decrease, Break" value will be sent to stop dimming operation.

Dimming - Step Wise Type

When rocker button pressed (and not released) and pressed duration exceeds "Long Press Duration" time, a step value level configured in "Step Value" parameter will be send using respective communication object.

Until button is released same step value will be send periodically with a time interval defined in "Step Send Interval".

4.2.1.2.1 Parameters

Parameter	Setting	Description
Mode of Buttons	**Left Button Brighter(On) Right Button Darker(Off)** / Left Button Brighter(Off) Right Button Darker(On)	Select which rocker button is on button and which rocker button is off button
Long Press Duration	300ms/ 400ms/ 500ms/ 600ms/ 800ms/ **1s**/ 1.2s/ 1.5s/ 2s/ 3s/ 4s/ 5s/ 6s/ 7s/ 8s/ 9s/ 10s	Time interval to switch from "switch mode" to "dimming mode".
Dimming Type	**Start Stop** / Step Wise	Select dimming type. (Chapter 4.2.1.2)

Step Value	%100/%50/%25/**%12.5**/%6.25/%3.13/ % 1.56	Visible when dimming type is Step Wise. Selects the dimming resolution that will be sending at every "Step Send Interval".
Step Send Interval	300ms/400ms/500ms/600ms/800ms/**1s**/ 1.2s/1.5s/2s/3s/4s/5s/6s/7s/8s/9s/ 10s	Visible when dimming type is Step Wise. Selects the time interval to send dimming increase/decrease values
Function of LED	**LED Permanently Off**	LED always off
	LED Permanently On	LED always on
	Status Indication	Status LED of last pressed rocker button is on, other rocker button is off. If "Separate Comm Object" parameter selected as "Enable" status LEDs will wait for confirmation from communication object before changing state.
	Inverted Status Indication	Status LED of last pressed rocker button is off, other rocker button is on. If "Separate Comm Object" parameter selected as "Enable" status LEDs will wait for confirmation from communication object before changing state.
	Operation Indication	Status LED of the pressed rocker button will be on for the time period selected at "Light Duration of LED" parameter at "General" tab.
Separate Comm Object	Enable / **Disable**	Only visible when "Function of LED" selected as "Status Indication" or "Inverted Status Indication". This communication objects is the input of confirmation for status LEDs. If selected as "Enable" respective communication object should be linked to an appropriate group address

Table 7

4.2.1.2.2 Communication Objects

No	Object Name	Function	Data type	Flags
1	Rocker1 – switch	On/Off	1 bit DPT 1.001	CWT
On/Off telegrams will be send to group address that is linked to this communication object.				
2	Rocker1 – dimming	Dim	4 bit DPT 3.007	CWT
Dimming values will be send to group address that is linked to this communication object.				
3	Rocker1-Status Comm.Obj.	On/Off	1 bit DPT 1.002	CWT
Confirmation for On/Off switch telegrams will be received from this communication object. If these communication object visible, it must link to an appropriate group address. Otherwise status LEDs will not function correctly. If status confirmation not to be used the communication object should be disabled by "Separate Comm Object" parameter.				

Table 8

4.2.1.3 Shutter

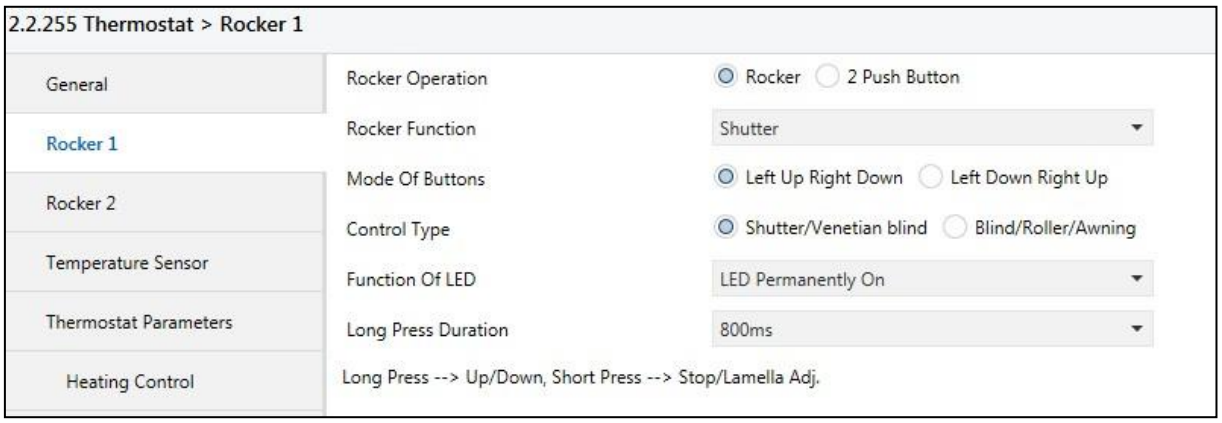


Figure 6

Selecting "Shutter" for "Rocker Operation" enables shutter operation for rocker buttons. Shutter functions can be configured to control two different shutter operations "Shutter/Venetian Blind" function or "Blind/Roller/Awning" function.

Shutter/Venetian Blind Function

Firstly, select which rocker button is used for "up" operation, which rocker button is used for "down" operation by "Mode of Buttons" parameter. Both buttons have two functions as "short press" function and "long press" function, "Long Press Duration" parameter configures the limit time period for "long press" operation. "Long Press" will be used to move the blind upwards or downwards. "Short press" has two different functions whether blind is moving or not. When blind is moving "short press" acts as a stop button that stops the blinds movement, when blind is not moving "short press" function is used to adjust lamella position.

	Short Press	Long press
Up Button – Blind Moving	Stop	Up
Down Button – Blind Moving	Stop	Down
Up Button – Blind Stopped	Lamella Down	Up
Down Button – Blind Stopped	Lamella Up	Down

Table 9

When "Up Button" long pressed "Up" telegram will be transmitted using "Rocker1 – Shutter UP/DOWN" communication object and shutter will start moving upwards until it reaches "Top Position" or "STOP" telegram transmitted using "Rocker1 – STOP/Lamella Adj." communication object by short pressing "Up Button" or "Down Button".

When "Down Button" long pressed "Down" telegram will be transmitted using "Rocker1 – Shutter UP/DOWN" communication object and shutter will start moving downwards until it reaches "Bottom Position" or "STOP" telegram transmitted using "Rocker1 – STOP/Lamella Adj." communication object by short pressing "Up Button" or "Down Button".

When blind is not moving "Up Button" and "Down Button" operate as lamella adjustment and respective

telegram will be send using "Rocker1-STOP/Lamella Adj." communication object.

Blind/Roller/Awning Function

Selecting "Control Type" parameter as "Blind/Roller/Awning" disables lamella adjustment functions of rocker buttons. In this control type, when "Up Button" pressed "Up" telegram will be send using "Rocker1 – shutter. UP/DOWN" communication object and pressed again while blind is moving "STOP" telegram will be send using "Rocker1 – STOP/Lamella adj." communication object. When "Down Button" pressed "DOWN" telegram will be sending using "Rocker1 – shutter. UP/DOWN" communication object and pressed again while blind is moving "STOP" telegram will be send using "Rocker1 – STOP/Lamella adj." communication object.

4.2.1.3.1 Parameters

Parameter	Setting	Description
Mode of Buttons	**Left Up Right Down** Left Down Right Up	Select which rocker button is "Up Button" and which rocker button is "Down Button".
Control Type	**Shutter/Venetian Blind** Blind/Roller/Awning	Selects control type of blinds. Shutter/Venetian Blind function includes "Lamella Control" and Blind/Roller/Awning function does not include "Lamella Control".
Function of LED	**LED Permanently Off**	LED always off
	LED Permanently On	LED always on
	Status Indication	Visualize blind's state using status LEDs of up and down buttons. ***[5]**
	Operation Indication	Status LED of the pressed rocker button will be on for the time period selected at "Light Duration of LED" parameter at "General" tab.
Long Press Duration	300ms/ 400ms/ 500ms/ 600ms/ **800ms** / 1s / 1.2s / 1.5s/ 2s / 3s / 4s / 5s / 6s / 7s / 8s / 9s / 10s	Time interval to switch from short press to long press

Table 10

***[5]** LED Function – Status Indication

Status indication operates the same way for "Shutter/Venetian Blind" and "Blind/Roller/Awning". LEDs status respective to blind's state is given below

	Up Button - Status LED	Down Button - Status LED
Moving upward	Blink	Off
Moving downward	Off	Blink
At top position	On	Off
At bottom position	Off	On
Stop between top - bottom	Off	Off

Table 11

When "Function of Led" selected as "Status Indication", "Top Position" and "Bottom Position" communication objects given below must be linked to the appropriate group addresses for the status LEDs to function

correctly.

4.2.1.3.2 Communication Objects

No	Object Name	Function	Data Type	Flags
1	Rocker1-shutter UP/DOWN	Up/Down	1 bit DPT 1.008	CWT
This communication object will be used to start blind movement.				
2	Rocker1 – STOP/Lamella adj.	Stop/Lamella adj.	1 bit DPT 1.002	CWT
When “Control Type” parameter is “Shutter/Venetian Blind” this communication object is used to stop movement of blind and adjust lamella position, otherwise when “Control Type” parameter is “Blind/Roller/Awning” only used for stopping blind movement.				
3	Rocker1-Top Position	True/False	1 bit DPT 1.002	CWT
This communication object should be linked to an appropriate group address that will be used to detect whether blind is at “Top Position” (True) or not (False).				
4	Rocker1-Bottom Position	True/False	1 bit DPT 1.002	CWT
This communication object should be linked to an appropriate group address that will be used to detect whether blind is at “Bottom Position” (True) or not (False).				

Table 12

4.2.1.4 Value Operation

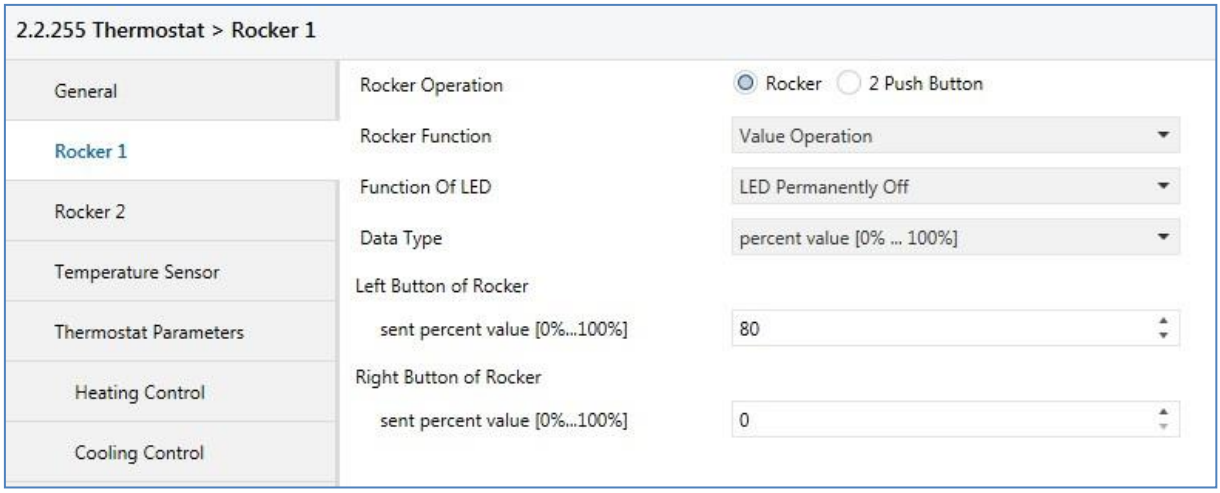


Figure 7

Rocker buttons can be configured to send predefined values from different data types. Values selected for both rocker buttons will be transmitted over the same communication object.4.2.1.4.1 Parameters

Parameter	Setting	Description
Function of Led	**LED Permanently Off**	LED always off
	LED Permanently On	LED always on
	Operation Indication	Status LED of the pressed rocker button will be on for the time period selected at “Light Duration of LED” parameter at “General” tab.

Data Type	**No Reaction** 1 bit value 1byte value [0…255] Percent value [%0…%100] 2 byte value [-32768…32767] 2 byte value [0…65535] 4 byte value [floating point] 4 byte value [0…4294967295]	Select data type.
Left Button of Rocker		
Sent value	**0**/1	Visible when "Data Type" selected as "1 bit value".
Transmitted value [0…255]	**0**…255	Visible when "Data Type" selected as "1 byte value".
Send percent value [%0…%100]	0…**80**…100	Visible when "Data Type" selected as "percent value".
Transmitted value [-32768…32767]	-32768…**0**…32767	Visible when "Data Type" selected as "2 byte value [-32768…32767]".
Transmitted value [0…65535]	**0**…65535	Visible when "Data Type" selected as "2 byte value [0…65535]".
Float decimal	-128…**0**…127	Visible when "Data Type" selected as "4 byte value [floating point]".
Float rational	**0**…99	Visible when "Data Type" selected as "4 byte value [floating point]".
Transmitted value [0…4294967295]	**0**…4294967295	Visible when "Data Type" selected as "4 byte value [0…4294967295]".
Right Button of Rocker – Operate the same way as Left Button of Rocker		

Table 13

4.2.1.4.2 Communication Objects

No	Object Name	Function	Data type	Flags
1	PushButton1 – value[0,1]	True/False	1 bit DPT 1.002	CWT
	Enabled when "Data Type" selected as "1 bit value"			
	PushButton1– value[0…255]	Send	1 byte DPT 5.010	CWT
	Enabled when "Data Type" selected as "1byte value [0…255]"			
	PushButton1– value[0…255]	Send	1 byte DPT 5.001	CWT
	Enabled when "Data Type" selected as "Percent value [%0…%100]			
	PushButton1- value[-32768…32767]	Send	2 byte DPT 8.001	CWT
	Enabled when "Data Type" selected as "2 byte value [-32768…32767]"			
	PushButton1- value[0…65535]	Send	2 byte DPT 7.001	CWT
	Enabled when "Data Type" selected as "2 byte value [0…65535]"			
	PushButton1- value[temperature]	Send	4 byte DPT 14.068	CWT
	Enabled when "Data Type" selected as "4 byte value [floating point]			
	PushButton1-value[0…4294967295]	Send	4 byte DPT 12.001	CWT
	Enabled when "Data Type" selected as "4 byte value [0…4294967295]"			

2	PushButton1-long – value[0,1]	True/False	1 bit DPT 1.002	CWT
	Enabled when “Long Press Data Type” selected as “1 bit value”			
	PushButton1-long – value[0…255]	Send	1 byte DPT 5.010	CWT
	Enabled when “Long Press Data Type” selected as “1byte value [0…255]”			
	PushButton1– value[0…255]	Send	1 byte DPT 5.001	CWT
	Enabled when “Long Press Data Type” selected as “Percent value [%0…%100]			
	PushButton1 - long- value[-32768…32767]	Send	2 byte DPT 8.001	CWT
	Enabled when “Long Press Data Type” selected as “2 byte value [-32768…32767]”			
	PushButton1- long - value[0…65535]	Send	2 byte DPT 7.001	CWT
	Enabled when “Long Press Data Type” selected as “2 byte value [0…65535]”			
	PushButton1-long - value[temperature]	Send	4 byte DPT 14.068	CWT
	Enabled when “Long Press Data Type” selected as “4 byte value [floating point]			
	PushButton1- long - value[0…4294967295]	Send	4 byte DPT 12.001	CWT
	Enabled when “Long Press Data Type” selected as “4 byte value [0…4294967295]”			

Table 14

4.2.2 Push Buttons

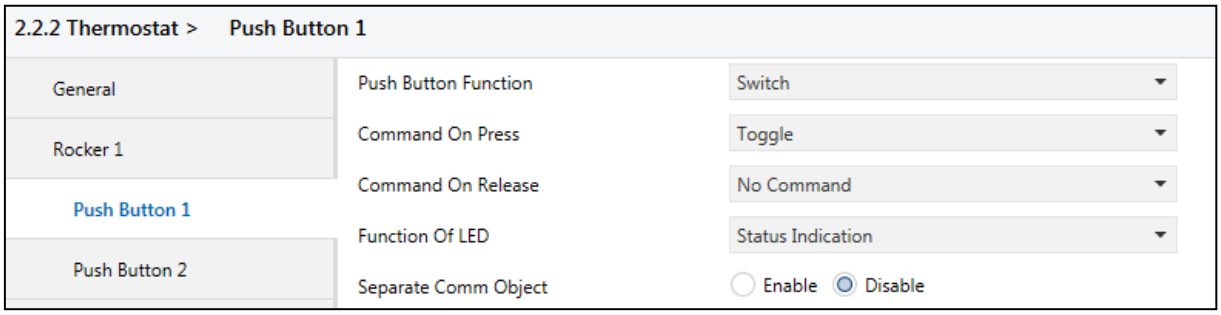
Number of rockers should be selected in “General” tabs in parameters and should be chosen as compatible with the device that will be configured. Push buttons are numbered from top to bottom – right to left, topmost right push button as push button 1, near it push button 2, and so on. Push buttons can be configured as 4 different operations and 1 function to disable push button (No Function). Operation selection can be configured from “Push Button N” (N: Push button number) tab, visible when “Rocker Operation” selected as “2 Push Buttons”. Every function enables different parameters and communication objects that will be explained in the following chapters.

Parameter	Setting	Description
Push Button Function	**No Function**	Disables the push button
	Switch	Push buttons can be used to send on/off telegrams. (For more information Chapter 4.2.2.1)
	Switch and Dim	Push buttons can send on/off and dimming telegrams. (For more information Chapter 4.2.2.2)
	Shutter	Push button can control shutter, venetian blind, blind, roller and awning. (For more information Chapter 4.2.2.3)
	Value Operation	Push button can send predefined values from different data types. (Refer Section 4.2.2.4)

Table 15

Push buttons also have status LEDs which can be configured to indicate state of the operation that is configured.

4.2.2.1 Switch



Selecting "Switch" as "Push Button Function" enables to send 1 bit On(1)/Off(0) telegrams to the group address that is linked to respective communication object. Pressing and releasing buttons can be assigned to different commands (On, Off, Toggle and No Command). Status LEDs can be configured to notify the current status of operation directly with buttons or using communication objects for confirmation to show current status.

4.2.2.1.1 Parameters

Parameter	Setting	Description
Command on Press	On / Off / Toggle / **No command**	Selects button function when button pressed.
Command on Release	On / Off / Toggle / **No command**	Selects button function when button released.
Function of LED	**LED permanently Off**	LED always Off
	LED permanently On	LED always On
	Status Indication	Last transmitted command "on" -> LED on Last transmitted command "off" -> LED off If "Separate Comm Object" enabled, status LEDs will wait for confirmation before changing status.
	Inverted Status Indication	Last transmitted command "on" -> LED off Last transmitted command "off" -> LED on If "Separate Comm Object" enabled, status LEDs will wait for confirmation before changing status.
	Operation Indication	Status LED of the pressed push button will be on for the time period selected at "Light Duration of LED" parameter at "General" tab. Last transmitted command value has no effect to the status led operation.
Separate Comm Object	Enable/**Disable**	Only visible when "Function of LED" selected as "Status Indication" or "Inverted Status Indication". This communication objects is the input of confirmation for status LEDs. If selected "Enable" respective communication object should be linked to an appropriate group address.

Table 16

4.2.2.1.2 Communication Objects

No	Object Name	Function	Data Type	Flags

1	PushButton1	switch	1 bit DPT 1.001	CWT
On/Off telegrams will be send to group address that is linked to this communication object.				
3	PushButton1	Status Comm.Obj.	1 bit DPT 1.002	CWT
Confirmation for On/Off switch telegrams will be received from this communication object. If these communications object visible, it must link to an appropriate group address. Otherwise status LEDs will not function correctly. If status confirmation not to be used the communication object should be disabled by "Separate Comm Object" parameter.				

Table 17

4.2.2.2 Switch and Dim

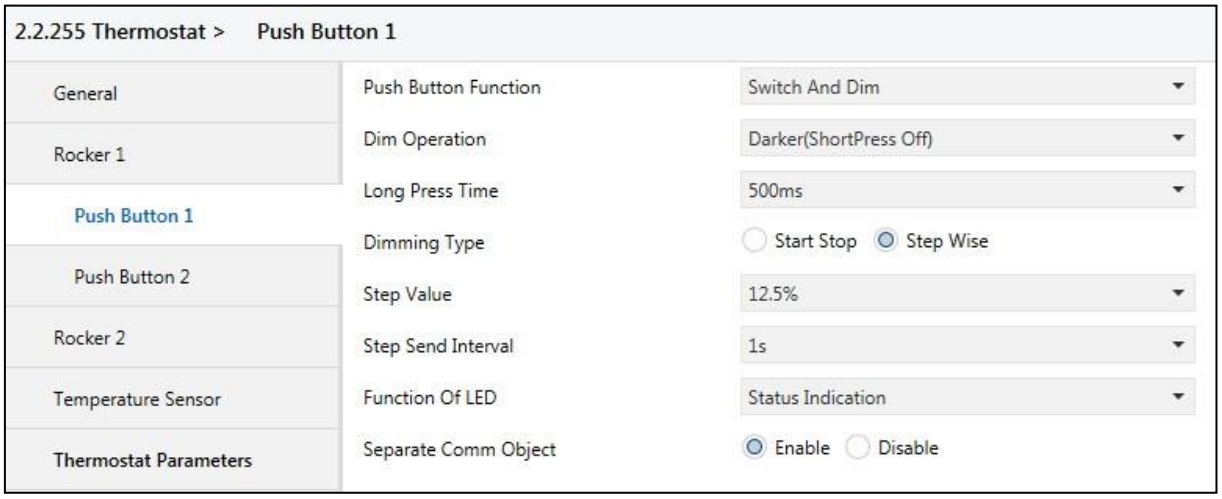


Figure 9

When push button function selected as "Switch and Dim" push button can be configured in three different ways to control brightness value.

	Short Press	Long press
Darker(Short Press Off)	Off (%0)	Decrease, (%XX)
Brighter(Short Press On)	On(%100)	Increase,(%XX)
Darker/Brighter(Short Press Toggle)	Toggle between Darker/Brighter	Decrease,(%XX)/Increase,(%XX)

Table 18

%XX values can have different values relative to the "Dimming Type" parameter. "Dimming Type" parameter allows two different types of dimming functionality "Start Stop" and "Step Wise".

Dimming - Start Stop Type

When push button pressed (and not released) and pressed duration exceeds "Long Press Duration" time "Increase, %100" (When button in Brighter mode) or "Decrease, %100" (When button in Darker mode) dimming level will be send using respective communication object. When button released "Increase, Break" or "Decrease, Break" value will be send.

Dimming - Step Wise Type

When push button pressed (and not released) and pressed duration exceeds "Long Press Duration" time, a step

value level configured in “Step Value” parameter will be send using respective communication object. If button mode is “Darker”, “Decrease, % [Step Value]”, else button mode is “Brighter”, “Increase, % [Step Value]” values will be send. Until button is released same step value will be send periodically with a time interval defined in “Step Send Interval”.

4.2.2.2.1 Parameters

Parameter	Setting	Description
Dim Operation	**Darker(Short Press Off)** Brighter(Short Press On) Darker/Brighter (Short Press Toggle)	Select push button dim operation. (For more information Chapter 4.2.2.2)
Long Press Time	300ms/ 400ms/ 500ms/ 600ms/ 800ms/ **1s** / 1.2s / 1.5s/ 2s / 3s / 4s / 5s / 6s / 7s / 8s / 9s / 10s	Time interval to switch from “switch/toggle mode” to “dimming mode”.
Dimming Type	**Start Stop** / Step Wise	Select dimming type. (For more information Chapter 4.2.2.2)
Step Value	%100 / %50 / %25 / **%12.5** / %6.25 / %3.13 / % 1.56	Visible when dimming type is Step Wise. Selects the dimming resolution that will be sending at every “Step Send Interval”.
Step Send Interval	300ms/ 400ms/ 500ms/ 600ms/ 800ms/ **1s** / 1.2s / 1.5s/ 2s / 3s / 4s / 5s / 6s / 7s / 8s / 9s / 10s	Visible when dimming type is Step Wise. Selects the time interval to send dimming increase/decrease values
Function of LED	**LED Permanently Off**	LED always off
	LED Permanently On	LED always on
	Status Indication	Last transmitted command “on” -> LED on Last transmitted command “off” -> LED off If “Separate Comm Object” enabled, status LEDs will wait for confirmation before changing status.
	Inverted Status Indication	Last transmitted command “on” -> LED off Last transmitted command “off” -> LED on If “Separate Comm Object” enabled, status LEDs will wait for confirmation before changing status.
	Operation Indication	Status LED of the pressed push button will be on for the time period selected at “Light Duration of LED” parameter at “General” tab.
Separate Comm Object	Enable / **Disable**	Only visible when “Function of LED” selected as “Status Indication” or “Inverted Status Indication”. This communication objects is the input of confirmation for status LEDs. If selected “Enable” respective communication object should be linked to an appropriate group address.

Table 19

4.2.2.2.2 Communication Objects

No	Object Name	Function	Data type	Flags
1	PushButton1 – switch	On/Off	1 bit DPT 1.001	CWT
On/Off telegrams will be send to group address that is linked to this communication object.				
2	PushButton1 – dimming	Dim	4 bit DPT 3.007	CWT
Dimming values will be send to group address that is linked to this communication object.				
3	PushButton1-Status Comm.Obj.	On/Off	1 bit DPT 1.002	CWT
Confirmation for On/Off switch telegrams will be received from this communication object. If these communications object visible, it must link to an appropriate group address. Otherwise status LEDs will not function correctly. If status confirmation not to be used the communication object should be disabled by "Separate Comm Object" parameter.				

Table 20

4.2.2.3 Shutter

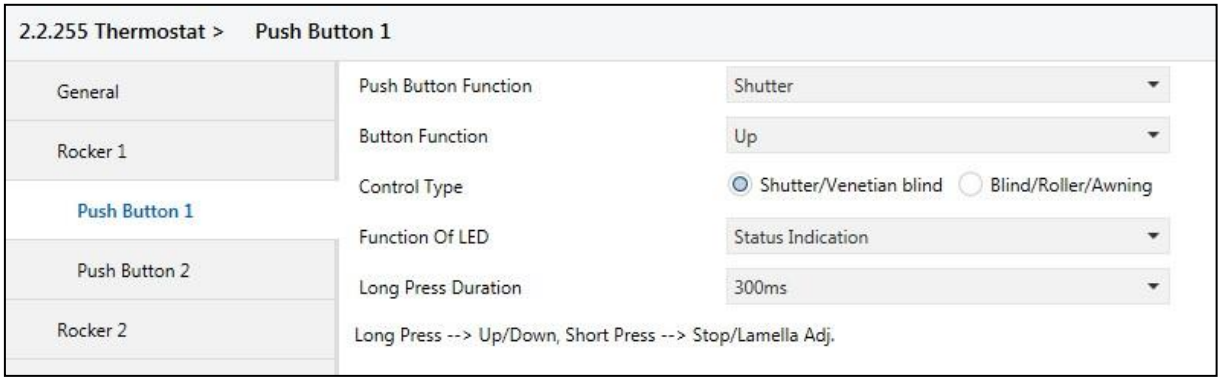


Figure 10

Selecting "Shutter" for "Push Button Function" enables shutter operation for push buttons. Shutter functions can be configured to control two different shutter operations "Shutter/Venetian Blind" function or "Blind/Roller/Awning" function. In both functions push button can be configured as 3 different button function; Up, Down and Toggle. When push button selected as up or down, that button can only move the blind and lamella to the configured direction. For example, if configured as up button, push button can be used to move the blind up and adjust the lamella down. If push button configured as toggle button, single button can be used to move the blind up – down and adjust lamella up – down.

Shutter/Venetian Blind Function

When "Controller Type" configured as "Shutter/Venetian Blind", lamella operations of blind control will be enabled as "short press" function of the push button. Also, "Button Function" parameter enables the use of push button 3 different ways;

Up: "Long Press" moves the blind upwards; "Short Press" operates two different ways, short pressed while the blind is moving, stops the blind, short pressed while the blind is not moving adjust the lamella position down.

Down: "Long Press" moves the blind downwards; "Short Press" operates two different ways, short

pressed while the blind is moving, stops the blind, short pressed while the blind is not moving adjust the lamella position up.

Toggle: "Long Press" moves the blind upwards or downwards toggling the last "Long Press" action. For example, if last state was up, when push button long pressed, it will send "Down" telegram. Every time push button long pressed it will toggle its last state. If push button short pressed while the blind is moving upward or downward "Short Press" will stop the blind, if the blind is not moving "Short Press" will adjust the lamella. Lamella adjustment will operate respective to the last state, for example if the last "Long Press" action was up, then lamella will be adjusted down when push button short pressed and if the last "Long Press" action was down, then lamella will be adjusted up when push button short pressed.

Blind/Roller/Awning Function

When "Controller Type" configured as "Blind/Roller/Awning Function" lamella operations of blind control will be disabled and "short press" will only stop the movement of the blind. "Button Function" parameter enables the use of push button 3 different ways;

Up: "Long Press" moves the blind upwards; "Short Press" stops the blind.

Down: "Long Press" moves the blind downwards; "Short Press" stops the blind.

Toggle: "Long Press" action moves the blind upwards or downwards toggling the last "Long Press" action. For example, if last state was up, when push button long pressed it will send "Down" telegram. Every time push button long pressed it will toggle its last state. "Short Press" stops the blind whether it's moving upwards or downwards

4.2.2.3.1 Parameters

Parameter	Setting	Description
Push Button Function	**Up** / Down / Toggle	Chapter 4.2.2.3
Control Type	**Shutter/Venetian Blind** Blind/Roller/Awning	Selects control type of blinds. Shutter/Venetian Blind function includes "Lamella Control" and Blind/Roller/Awning function does not include "Lamella Control".
Function of LED	**LED Permanently Off**	LED always off
	LED Permanently On	LED always on
	Status Indication	Visualize blind's state using status LEDs of up and down buttons. *[6]
	Operation Indication	Status LED of the pressed rocker button will be on for the time period selected at "Light Duration of LED" parameter at "General" tab.
Long Press Duration	**300ms**/ 400ms/ 500ms/ 600ms/ 800ms / 1s / 1.2s / 1.5s/ 2s / 3s / 4s / 5s / 6s / 7s / 8s / 9s / 10s	Time interval to switch from short press to long press

Table 21

4.2.2.3.2 Communication Objects

***[6]** LED Function – Status Indication

Status indication operates the same way for "Shutter/Venetian Blind" and "Blind/Roller/Awning". LEDs status respective to blind's state and "Button Function" configuration given below;

	Up Mode	Down Mode	Toggle Mode
Moving upward	Blink	Off	Blink
Moving downward	Off	Blink	Blink
At top position	Off	Off	Off
At bottom position	Off	Off	Off
Stop between top - bottom	Off	Off	Off

Table 22

When "Function of Led" selected as "Status Indication", "Top Position" and "Bottom Position" communication objects given below must be linked to the appropriate group addresses for the LEDs to function correctly.

4.2.2.4 Value Operation

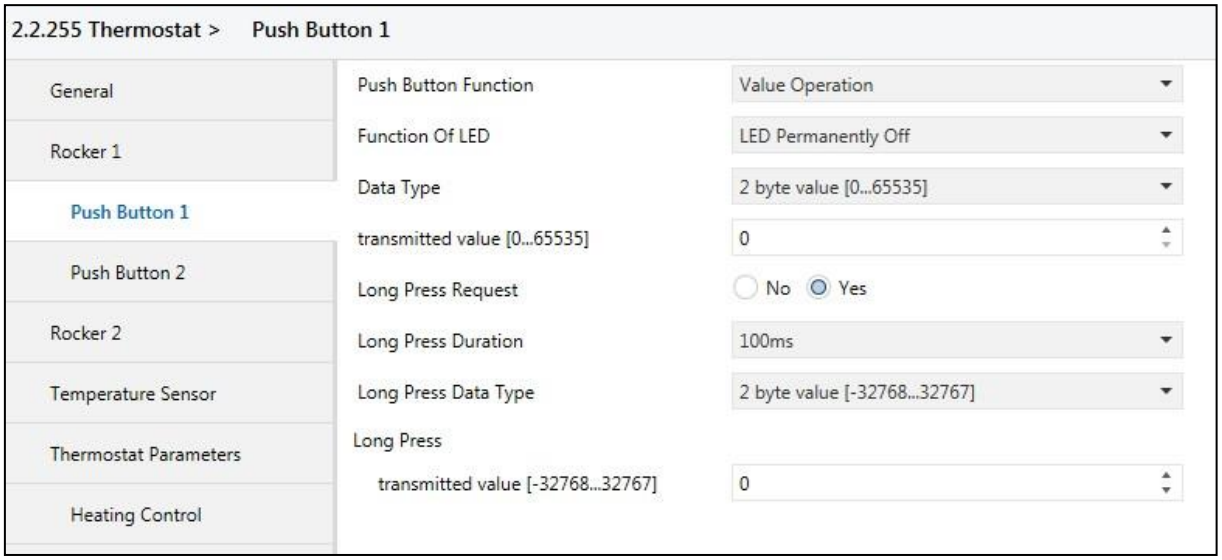


Figure 11

Push button can be configured to send predefined values from different data types. Additionally, a long press request can be enabled to be used as a secondary value operation.

4.2.2.4.1 Parameters

Parameter	Setting	Description
Function of Led	**LED Permanently Off**	LED always off
	LED Permanently On	LED always on
	Operation Indication	Status LED of the pressed rocker button will be on for the time period selected at "Light Duration of LED" parameter at "General" tab.

Data Type	**No Reaction** 1 bit value 1byte value [0…255] Percent value [%0…%100]	Select data type.
	2 byte value [-32768…32767] 2 byte value [0…65535] 4 byte value [floating point] 4 byte value [0…4294967295]	
Sent value	**0**/1	Visible when "Data Type" selected as "1 bit value".
Transmitted value [0…255]	**0**…255	Visible when "Data Type" selected as "1 byte value".
Send percent value [%0…%100]	0…**80**…100	Visible when "Data Type" selected as "percent value".
Transmitted value [-32768…32767]	-32768…**0**…32767	Visible when "Data Type" selected as "2 byte value [-32768…32767]".
Transmitted value [0…65535]	**0**…65535	Visible when "Data Type" selected as "2 byte value [0…65535]".
Float decimal	-128…**0**…127	Visible when "Data Type" selected as "4 byte value [floating point]".
Float rational	**0**…99	Visible when "Data Type" selected as "4 byte value [floating point]".
Transmitted value [0…4294967295]	**0**…4294967295	Visible when "Data Type" selected as "4 byte value [0…4294967295]".
Long Press Request	**No** / Yes	Enable/Disable long press duration
Long Press Duration	**100ms** / 1s / 10s / 1min / 10min	Select time period for long press operation
Long Press Data Type	**No Reaction** 1 bit value 1byte value [0…255] Percent value [%0…%100] 2 byte value [-32768…32767] 2 byte value [0…65535] 4 byte value [floating point] 4 byte value [0…4294967295]	Select data type.
Sent value	**0**/1	Visible when "Long Press Data Type" selected as "1 bit value".
Transmitted value [0…255]	**0**…255	Visible when "Long Press Data Type" selected as "1 byte value".
Send percent value [%0…%100]	0…**80**…100	Visible when "Long Press Data Type" selected as "percent value".
Transmitted value [-32768…32767]	-32768…**0**…32767	Visible when "Long Press Data Type" selected as "2 byte value [-32768…32767]".
Transmitted value [0…65535]	**0**…65535	Visible when "Long Press Data Type" selected as "2 byte value [0…65535]".
Float decimal	-128…**0**…127	Visible when "Long Press Data Type" selected as "4 byte value [floating point]".
Float rational	**0**…99	Visible when "Long Press Data Type" selected as "4 byte value [floating point]".

Transmitted value [0…4294967295]	**0**…4294967295	Visible when "Long Press Data Type" selected as "4 byte value [0…4294967295]".

Table 23

4.3 Temperature Sensor

Temperature sensor and temperature status parameters should be configured from "Temperature Sensor" tab.

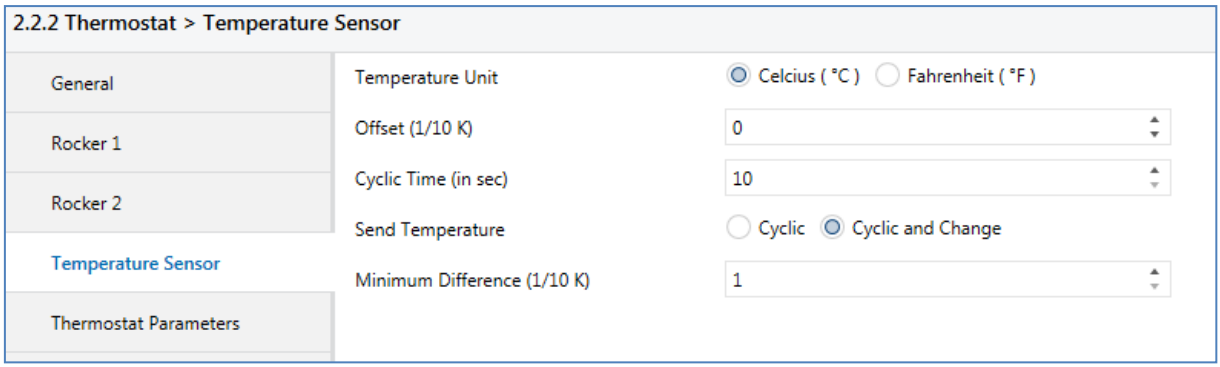


Figure 12

4.3.1 Parameters

Parameter	Function	Description
Temperature Unit	**Celsius(°C)** / Fahrenheit(°F)	Select temperature unit. After selection all temperature related parameters and communication objects should be enter as selected unit.
Offset (1/10 K)	-128…**0**…127	Offset value entered here will be added to measured temperature. It can be used to compensate for temperature difference caused by thermostat placement. Entered value will be divided by 10.
Cyclic Time (in sec)	10…**30**…65535	Cyclic time period to send temperature from "Current Temperature" communication object.
Send Temperature	**Cyclic** / Cyclic and Change	Selects whether temperature will be send periodically or periodically and in case of a change in temperature. Minimum change value defined in "Minimum Difference" parameter.

Minimum Difference (1/10 K)	1…255	Only visible if “Send Temperature” selected as “Cyclic and Change”. Selects minimum change in temperature that will trigger transmission of temperature.

Table 24

4.3.2 Communication Objects

No	Object name	Function	Data Type	Flags
55	Current Temperature (°C)	Temperature	2 byte DPT 9.001	CRT
	Current Temperature (°F)	Temperature	2 byte DPT 9.027	CRT
Communication objects DPT should be decided according to the selected temperature unit. Temperature telegrams will be send when a temperature change defined at “Minimum Difference” parameter occurs or cyclic time period overflows.				

Table 25

4.4 Thermostat

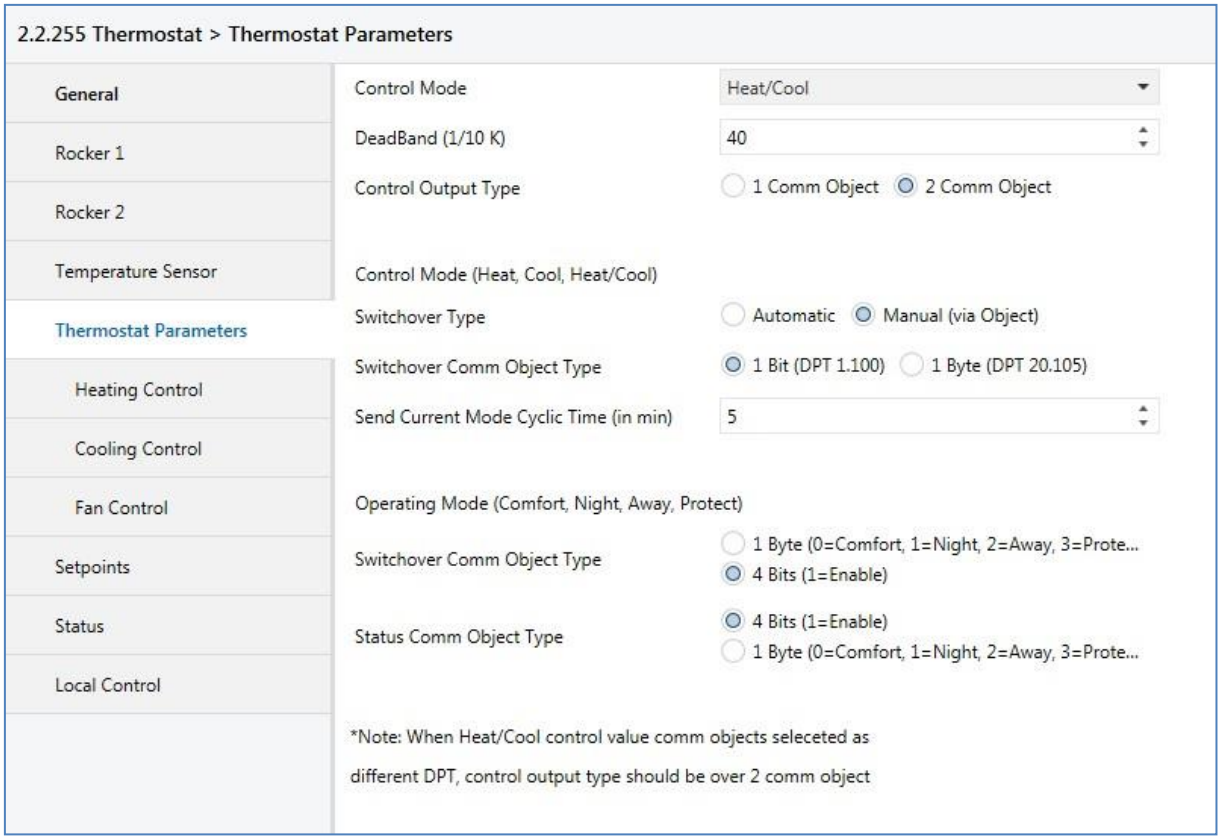


Figure 13

Parameters related to thermostat control should be configured in this tab. Whether thermostat will be used for heating, cooling or both should be selected here. When heat/cool control activated a new tab will be open

under "Thermostat Parameters" tab. Controller operation should be configured in respective tabs for heating, cooling and if enabled fan control. When control mode selected as "Heat/Cool", configuration parameters for switchover (transition from heating to cooling or vise versa) conditions should be entered here.

4.4.1 Parameters

Parameter	Setting	Description
Control Mode	**Heat** Cool Heat/Cool	Select whether thermostat will be used for heating, cooling or both
Deadband (1/10K)	5…**40**…255	Only visible when "Control Mode" is
		"Heat/Cool". Entered value will be divided by 10. Temperature difference between ambient temperature and setpoint temperature exceeds half of this value a control mode switchover will be triggered if control mode switchover is automatic***[2]**.
Control Output Type	1 Comm Object / **2 Comm Object**	Only visible when "Control Mode" is "Heat/Cool". Selects whether heat control value and cool control value will be send over separate communication objects or single communication object.***[3]**
Control Mode (Heat, Cool, Heat/Cool)		
Switchover Type	**Automatic** / Manual (via Object)	Selects whether control mode switchover will be controlled by thermostat or controlled manually using this communication object.
Switchover Comm Object Type	**1 Bit (DPT 1.100)** / 1 byte (DPT 20.105)	Selects the control mode switchover communication object type.
Send Current Mode Cyclic Time (in min)	1…**5**…255	Selects cyclic time period (in minutes) to transmit control mode switchover object.
Operating Mode (Comfort, Night, Away, Protect)		
Switchover Comm Object Type	**1 byte** / 4 bits	Selects the data type for operating mode switchover communication object type.
Status Comm Object Type	**4 bits** / 1 byte	Selects the data type for operating mode status communication object type.

Table 26

***[3]** For example, control mode: heating, control mode switchover: automatic, setpoint: 25 °C, deadband: 40, control mode will switch to cooling if ambient temperature drops below 25 – (40/10)/2 = 23 °C. When in cooling mode control mode will switch to heating if ambient temperature increase over 25 + (40/10)/2 = 27 °C.

***[4]** "Control Output Type" parameter should only be used as "1 Comm Object" when heat and cool control values have same data types (1 bit - 1 bit, 1-byte – 1 byte).

4.4.2 Communication Objects

No	Object Name	Function	Data Type	Flags
57	Operating Mode	Select Operating Mode	1 byte DPT 5.011	CW
	Comfort mode	Enable	1 bit DPT 1.003	CW
58	Night Mode	Enable	1 bit DPT 1.003	CW
59	Away Mode	Enable	1 bit DPT 1.003	CW
60	Protect Mode	Enable	1 bit DPT 1.003	CW
"Operating Mode" is visible when "Switchover Comm Object Type" is "1 byte". Values for enabling different operating modes; 0: Comfort Mode, 1: Night Mode, 2: Away Mode, 3: Protect Mode.				
"Comfort Mode", "Night Mode", "Away Mode" and "Protect Mode" are visible when "Switchover Comm Object Type" is "4 bits". Sending "True (1)" to this communication objects enables respective operating mode.				
63	Switchover	Control Mode Status	1 bit DPT 1.100	CRT
	Switchover	Control Mode	1 bit DPT 1.100	CRWT
	Switchover	Control Mode Status	1 byte DPT 20.105	CRT
	Switchover	Control Mode	1 byte DPT 20.105	CWRT
When "Switchover Type" is "Automatic" acts as a status communication object and sends current control mode telegram from this communication object. When "Switchover Type" is "Manual (via Object)" acts as a control communication object and current control mode can be changed using this communication object.				
74	Status Operating Mode	Operating Mode Status	1 byte DPT 5.010	CRT
	Status Comfort	Enabled	1 bit DPT 1.002	CRT
75	Status Night	Enabled	1 bit DPT 1.002	CRT
76	Status Away	Enabled	1 bit DPT 1.002	CRT
77	Status Protect	Enabled	1 bit DPT 1.002	CRT

"Status Operating Mode" is visible when "Status Comm Object Type" is "1 byte". Values for different operating modes; 0: Comfort Mode, 1: Night Mode, 2: Away Mode, 3: Protect Mode. "Status Comfort", "Status Night", "Status Away" and "Status Protect" are visible when "Status Comm Object Type" is "4 bits". When "Status Comm Object Type" is "4 bits" and an operating mode switchover occurs a "False (0)" telegram will be send from previous operating modes communication object. For example; while in Night mode and "Enable Away Mode" telegram received, Status Night -> False Status Away -> True

Table27

4.4.3 Control Types

Thermostat uses 5 different control types; these are PI Continuous, PI PWM, On/Off, Fan Coil and Split. Operation of every control type explained in the following chapters.

	Control Type	Output Type	Fan
PI Continuous	PI	1 byte (%0…%100)	Disabled
PI PWM	PI	1 bit (On - Off)	Disabled
On/Off	On/Off	1 bit(On - Off)	Disabled
Fan Coil	PI	1 byte (%0…%100)	Enabled
Split	None	None	Enabled

Table 28

4.4.3.1 PI Continuous

Uses PI algorithm to calculate control signal and 1 byte (%0…%100) floating values as output, PI values should be selected compatible with the room that wants to be controlled. Default values are given for an average room and for different rooms PI values must be readjusted for better performance. As a general rule;

KP value: Changes the speed of the control and decreasing KP value increase the control speed. If given too low might cause overshoot, and given too large cause control to operate too slow.

KI value: More inactive the system smaller KI value should be.

Note finding optimum values for a specific room might require some trial and error. Using default values as a reference point and increase and decreasing these values according to the directions given above might increase controller performance.

4.4.3.2 PI PWM

Uses PI algorithm as controller to calculate control signal and 1 bit value as output, since PI algorithm outputs 1 byte floating value PWM method used to realize this output as 1 bit. PWM (Pulse with Modulation) requires a PWM cycle as period and uses control output to calculate duty cycle. For example, PWM cycle: 10 min, PI output: %20, Then an "on" telegram will be send at the beginning of 10 min cycle and "off" telegram at 10*20/100 = 2 min. Note that PI values and PWM cycle should be selected appropriate to room. As a general rule more inactive the system larger the PWM cycle should be.

4.4.3.3 On/Off

On/Off controller operate as a simple switch around the given setpoint using hysteresis values. Hysteresis values prevent the thermostat from oscillation and give larger margin to turning heat or cool on or off. When system is more active hysteresis values should be given larger and more inactive values can be given smaller.

4.4.3.4 Fan coil

Fan coil uses the same control type and same output type as "PI Continuous", only difference fan coil enables "Fan Control" parameters and communication objects.

4.4.3.5 Split

Split controller does not directly control the split AC, So ambient temperature must be controller by split AC's controller. Therefore, "Ambient Temperature" and "Setpoint Temperature" of split ACs communication objects should be linked to "Current Temperature" and "Current Setpoint" communication objects. Otherwise, split unit will be unaware of setpoint and ambient temperature and temperature control will not function correctly. "Split Heat" and "Split Cool" communication objects are given to only to notify the split AC when there is a control mode change (heat - cool). Also, when both heating controller and cooling controller configured as "Split Unit" only one "Split Heat/Cool" communication object will be revealed regardless of "Control Output Type" parameter in "Thermostat Parameters" tab.

4.4.4 Heating Control

Selection of the heating control type, parameters of the selected control type should be configured here.

4.4.4.1 PI Continuous

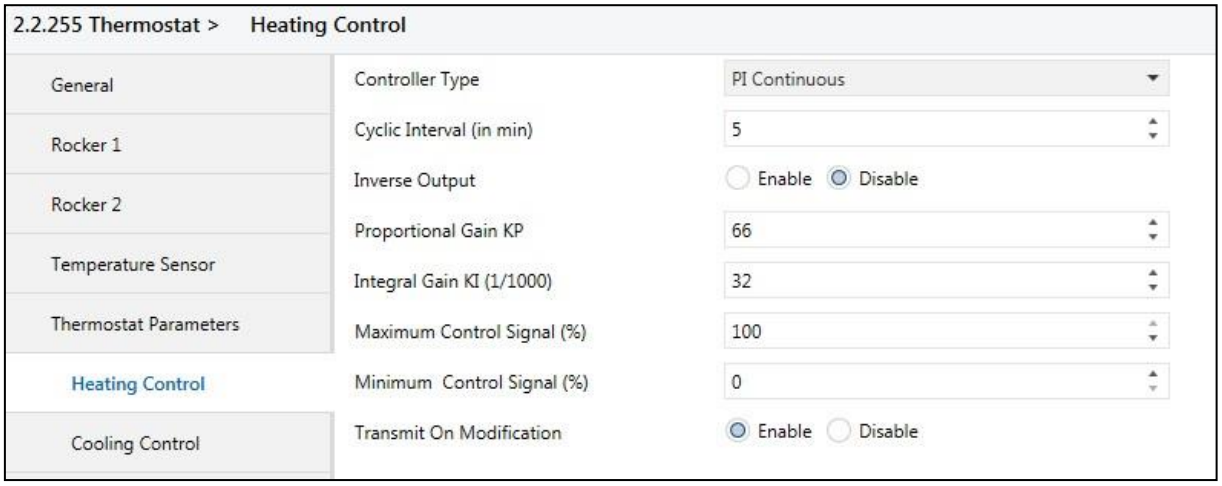


Figure 14

For more information how the PI parameters should be selected Chapter 4.4.3.1

4.4.4.1.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send heating control value over "Heating Control Value" communication object.
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is %80, then inverted output is %20.
Proportional Gain KP	1…**66**…255	Proportional gain of PI algorithm
Integral Gain KI (1/1000)	1…**32**…255	Integral gain of PI algorithm, given value divided by 1000.
Maximum Control Signal (%)	0…**100**	Maximum control signal value.
Minimum Control Signal (%)	**0**…100	Minimum control signal value
Transmit on Modification	**Enable** / Disable	When control signal change more than (%4), heating control value will be transmitted over "Heating Control Value" communication object.

Table 29

4.4.4.1.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Heat Control Value	Send	1 byte DPT 5.001	CT
Heating actuator will be controlled through this communication object.				

Table 30

4.4.4.2 PI PWM

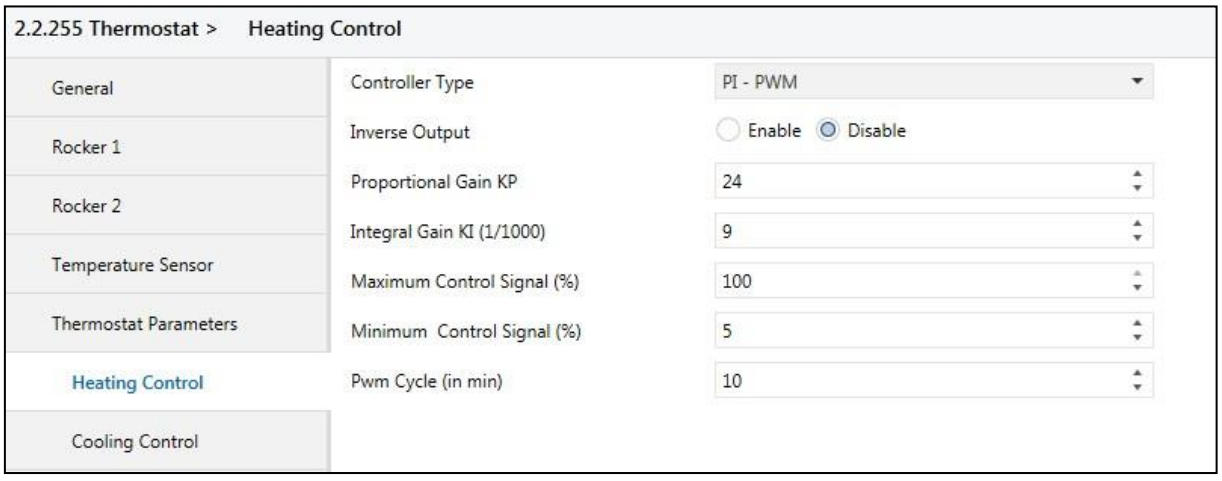


Figure 15

For more information how the PI parameters and PWM cycle should be selected Chapter 4.4.3.2

4.4.4.2.1 Parameters

Parameter	Setting	Description
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is "On", then inverted output is "Off".
Proportional Gain KP	1…**24**…255	Proportional gain of PI algorithm
Integral Gain KI (1/1000)	1…**9**…255	Integral gain of PI algorithm, given value divided by 1000.
Maximum Control Signal (%)	0…**100**	Maximum control signal value.
Minimum Control Signal (%)	0…**5**…100	Minimum control signal value. This value must be given compatible with PWM cycle. ***[4]**
PWM Cycle (in min)	1…**10**…255	PWM cycle.

Table 31

*[4] "PWM Cycle" and "Minimum Control Signal" parameters should be configured considering the limitations of the actuator. For example; when actuator is Solenoid valve with a response time of 120 seconds,

- PWM cycle configured as 10 minutes (Chapter 4.4.3.2)

- "Minimum Control Signal" should be bigger than 120*100/ (10*60) = %20

- PWM cycle configured as 20 minutes

- "Minimum Control Signal" should be bigger than 120*100/ (20*60) = %10

4.4.4.2.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Heat Control Value	Send	1 bit DPT 1.002	CT
Heating actuator will be controlled through this communication object.				

Table 32

4.4.4.3 On/Off

Figure 16

Heating control parameters for on/off controller type should be configured here. For more information about on/off controller read Chapter 4.4.3.3.

4.4.4.3.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send heating control value over "Heating Control Value" communication object.
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is "On", then inverted output is "Off".
Hysteresis (1/10 K)	1…**30**…255	Hysteresis value (Chapter 4.4.3.3)

Table 33

4.4.4.3.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Heat Control Value	Send	1 bit DPT 1.002	CT
Heating actuator will be controlled through this communication object.				

Table 34

4.4.4.4 Fan Coil

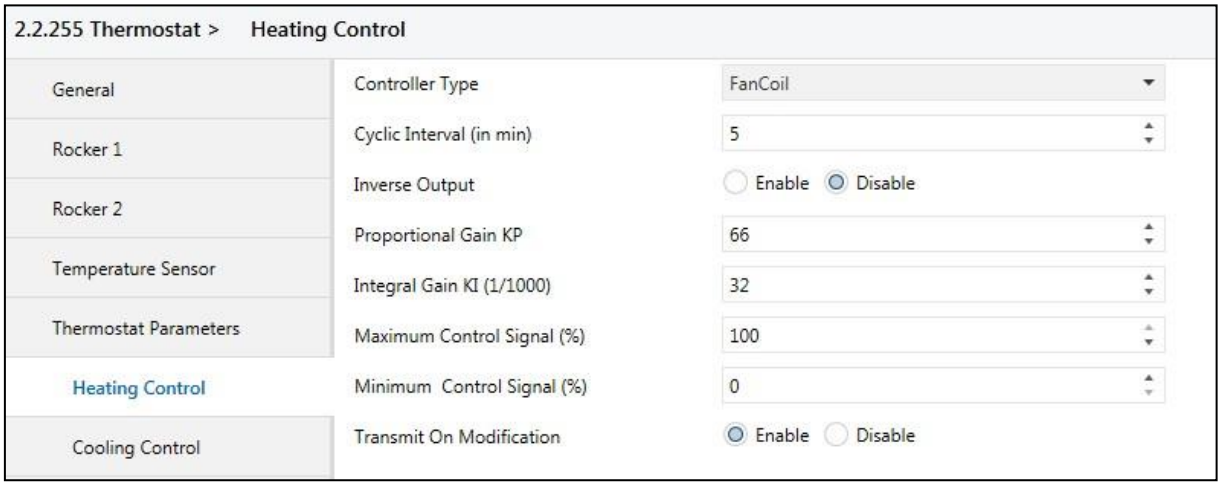


Figure 17

Heating control parameters for fan coil controller type should be configured here. For more information about on/off controller read Chapter 4.4.3.4.

4.4.4.4.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send heating control value over "Heating Control Value" communication object.
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is %80, then inverted output is %20.
Proportional Gain KP	1…**66**…255	Proportional gain of PI algorithm
Integral Gain KI (1/1000)	1…**32**…255	Integral gain of PI algorithm, given value divided by 1000.
Maximum Control Signal (%)	0…**100**	Maximum control signal value.
Minimum Control Signal (%)	**0**…100	Minimum control signal value
Transmit on Modification	**Enable** / Disable	When control signal change more than (%4), heating control value will be over "Heating Control Value" communication object.

Table 35

4.4.4.4.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Heat Control Value	Send	1 bit DPT 1.002	CT
Heating actuator will be controlled through this communication object.				

Table 36

4.4.4.5 Split Unit

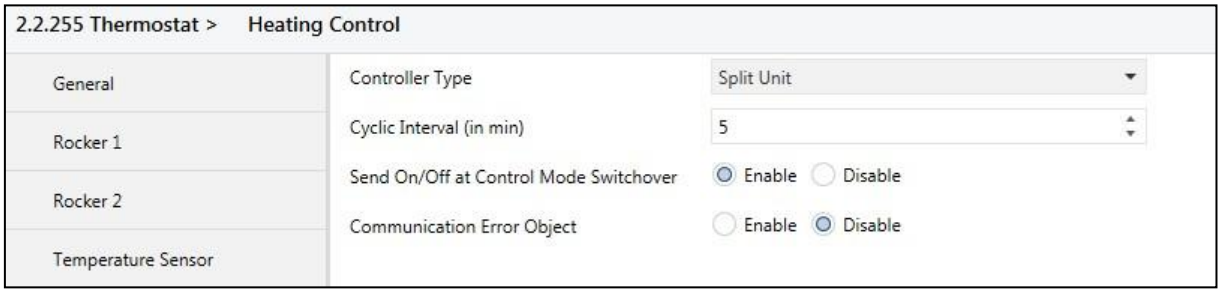


Figure 18

Split unit controller does not directly control temperature, since temperature control is split unit's responsibility "Current Temperature" and "Current Setpoint" communication objects should be linked to split units "Ambient Temperature" and "Setpoint Temperature" communication objects.

4.4.4.5.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send heating control value over "Heating Control Value" communication object.
Send On/Off at Control Mode Switchover	**Enable** / Disable	Enables "Split Heat" communication object, can be used to open/close the split unit when a control mode change occurs.
Communication Error Object	Enable / **Disable**	Enables "Split Heat Error" communication object. "True" telegram from this communication objects cause thermostat to enter "Protection Mode" with error. (For more information Chapter 4.5.2)

Table 37

4.4.4.5.2 Communication Objects

No	Object Name	Function	Data Type	Flags
51	Split Heat	On/Off	1 bit DPT 1.001	CT
Visible if "Send On/Off at Control Mode Switchover" parameter enabled. This communication object is not a control object, it will send "True" when control mode is "Heat" and "False" when control mode is "Cool" and can be used to enable the split unit.				
53	Split Heat Error	True/False	1 bit DPT 1.002	CW
Visible if "Communication Error Object" parameter enabled. "True" telegram causes the thermostat to enter "Protect Mode wit Error" and thermostat stay in this state until "False" telegram received (For more information Chapter 4.5.2).				

Table 38

4.4.5 Cooling Control

Selection of the cooling control type, parameters of the selected control type should be configured here.

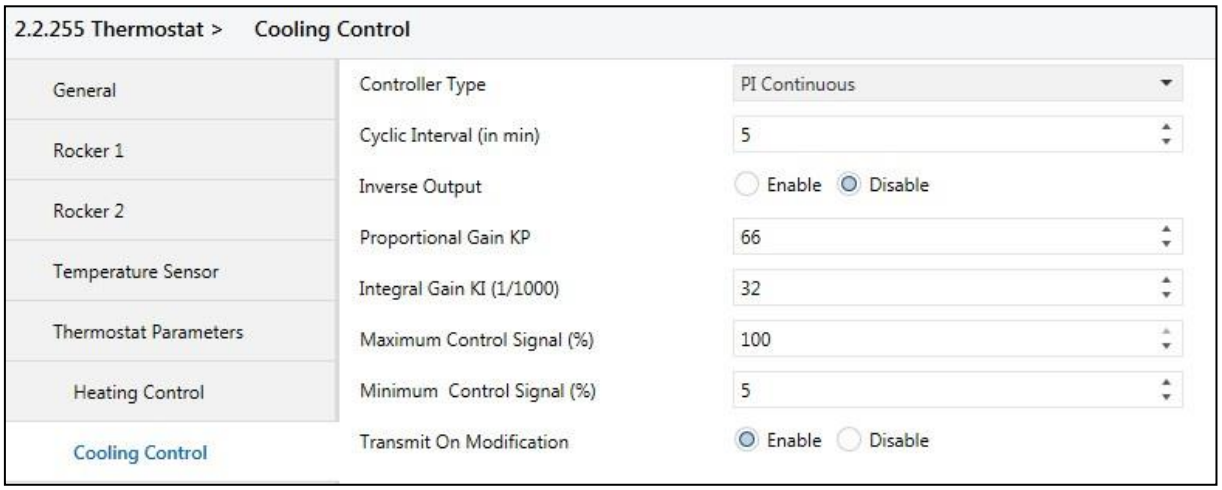


Figure 19

For more information how the PI parameters should be selected Chapter 4.4.3.1

4.4.5.1.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send heating control value over "Cooling Control Value" communication object.
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is %80, then inverted output is %20.
Proportional Gain KP	1…**66**…255	Proportional gain of PI algorithm
Integral Gain KI (1/1000)	1…**32**…255	Integral gain of PI algorithm, given value divided by 1000.
Maximum Control Signal (%)	0…**100**	Maximum control signal value.
Minimum Control Signal (%)	**0**…100	Minimum control signal value
Transmit on Modification	**Enable** / Disable	When control signal change more than (%4), cooling control value will be transmitted over "Cooling Control Value" communication object.

Table 39

4.4.5.1.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Cool Control Value	Send	1 byte DPT 5.001	CT
Cooling actuator will be controlled through this communication object.				

Table 40

4.4.5.2 PI PWM

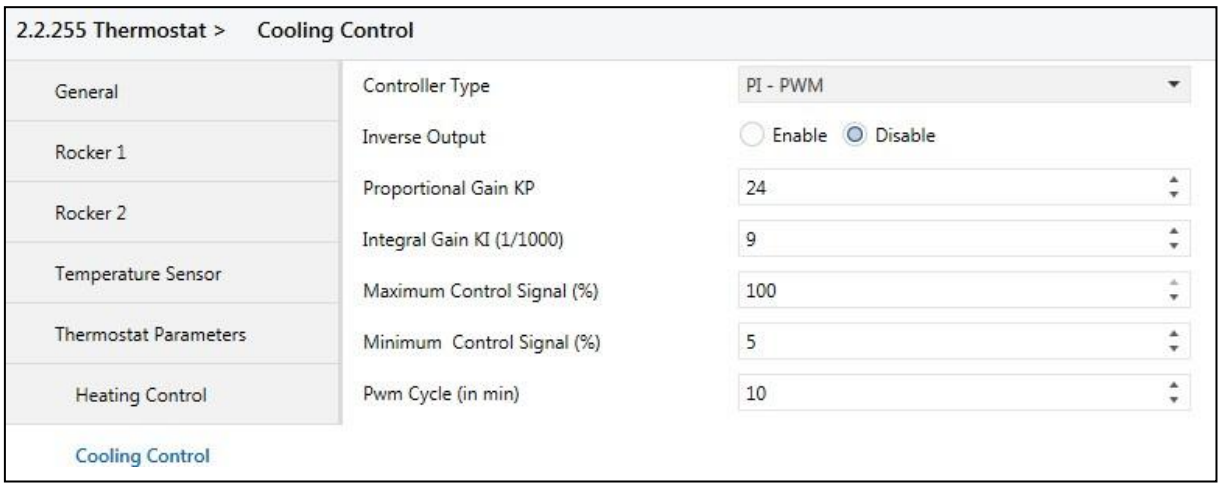


Figure 20

For more information how the PI parameters should be selected Chapter 4.4.3.2

4.4.5.2.1 Parameters

Parameter	Setting	Description
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is "On", then inverted output is "Off".
Proportional Gain KP	1…**24**…255	Proportional gain of PI algorithm
Integral Gain KI (1/1000)	1…**9**…255	Integral gain of PI algorithm, given value divided by 1000.
Maximum Control Signal (%)	0…**100**	Maximum control signal value.
Minimum Control Signal (%)	0…**5**…100	Minimum control signal value. This value must be given compatible with PWM cycle. ***[5]**
PWM Cycle (in min)	1…**10**…255	PWM cycle.

Table 41

*[5] "PWM Cycle" and "Minimum Control Signal" parameters should be configured considering the limitations of the actuator. For example; when actuator is Solenoid valve with a response time of 120 seconds,

- PWM cycle configured as 10 minutes (Chapter 4.4.3.2)

- "Minimum Control Signal" should be bigger than 120*100/(10*60) = %20

- PWM cycle configured as 20 minutes

- "Minimum Control Signal" should be bigger than 120*100/(20*60) = %10

4.4.5.2.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Cool Control Value	Send	1 bit DPT 1.002	CT
Cooling actuator will be controlled through this communication object.				

Table 42

4.4.5.3 On/Off

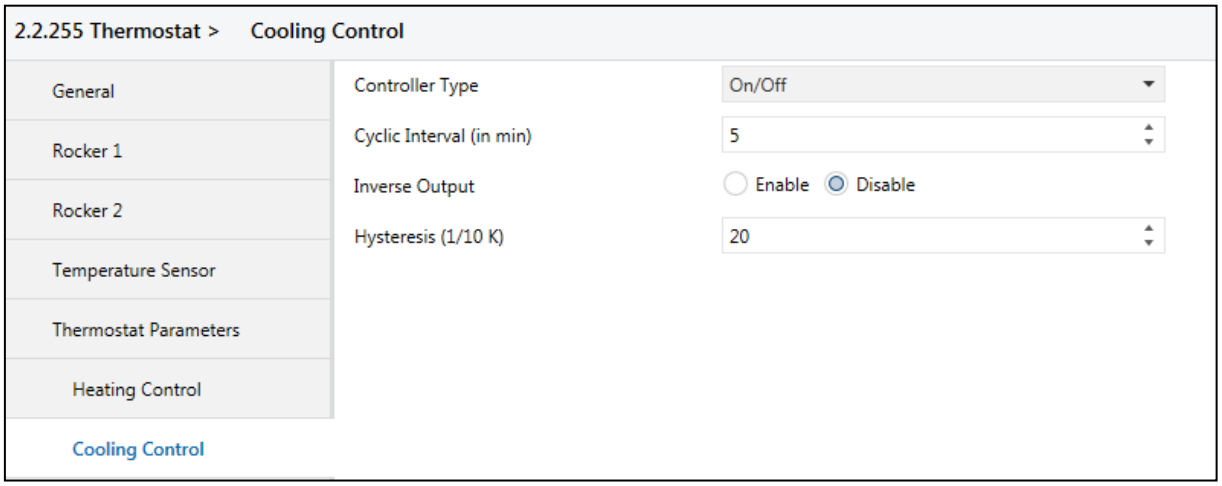


Figure 21

Cooling control parameters for on/off controller type should be configured here.

4.4.5.3.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send cooling control value over “Cool Control Value” communication object.
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is “On”, then inverted output is “Off”.
Hysteresis (1/10 K)	1…**30**…255	Hysteresis value (Chapter 4.4.3.3)

Table 43

4.4.5.3.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Cool Control Value	Send	1 bit DPT 1.002	CT
Cooling actuator will be controlled through this communication object.				

Table 44

4.4.5.4 Fan Coil

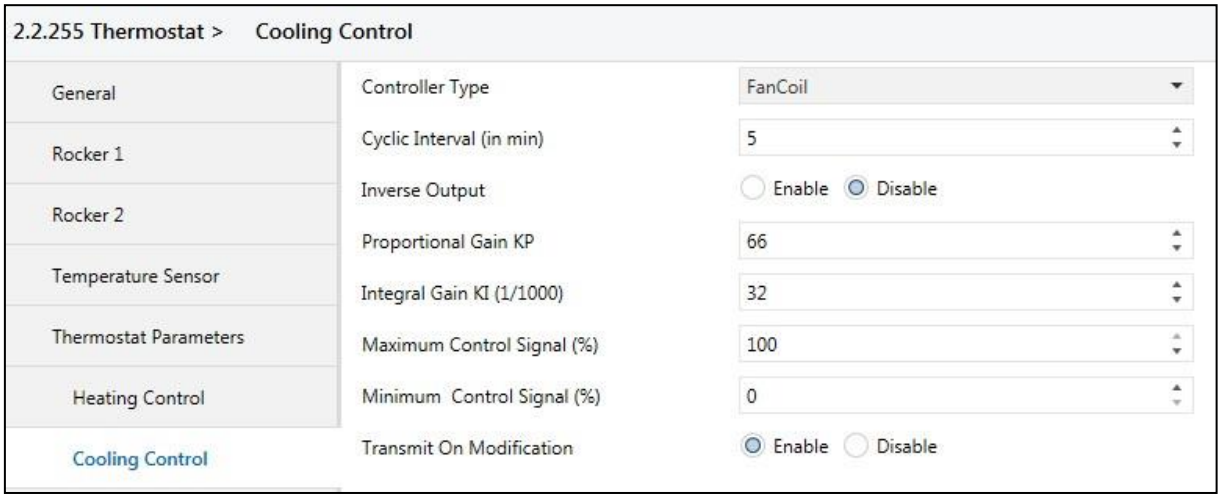


Figure 22

Cooling control parameters for fan coil controller type should be configured here.

4.4.5.4.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send cooling control value over "Cool Control Value" communication object.
Inverse Output	Enable / **Disable**	Invert the output of the controller. For example if normal output is %80, then inverted output is %20.
Proportional Gain KP	1…**66**…255	Proportional gain of PI algorithm
Integral Gain KI (1/1000)	1…**32**…255	Integral gain of PI algorithm, given value divided by 1000.
Maximum Control Signal (%)	0…**100**	Maximum control signal value.
Minimum Control Signal (%)	**0**…100	Minimum control signal value
Transmit on Modification	**Enable** / Disable	When control signal change more than (%4), cooling control value will be transmitted over "Cooling Control Value" communication object.

Table 45

4.4.5.4.2 Communication Objects

No	Object Name	Function	Data Type	Flags
61	Cool Control Value	Send	1 bit DPT 1.002	CT
Cooling actuator will be controlled through this communication object.				

Table 46

4.4.5.5 Split Unit

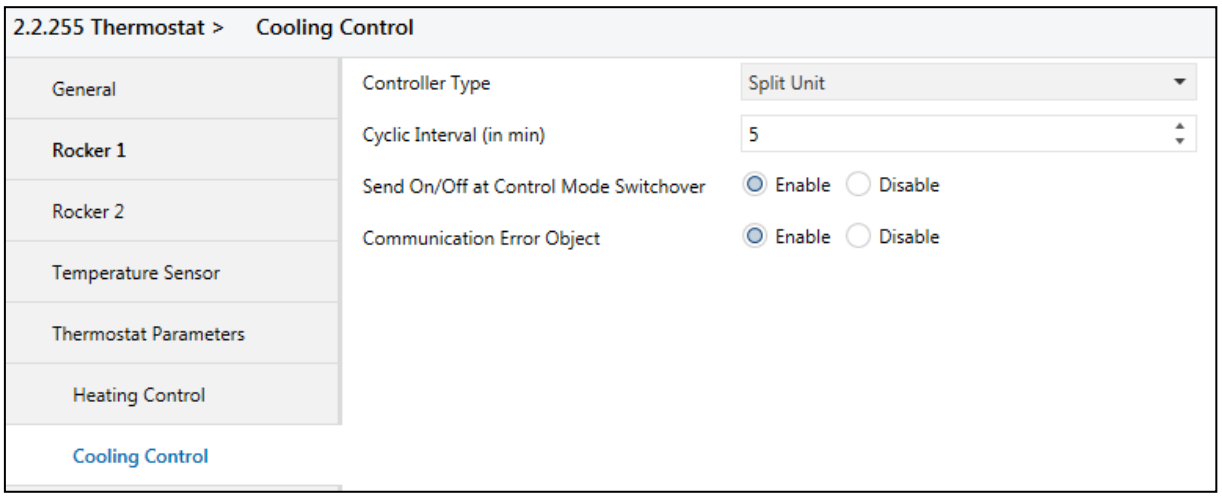


Figure 23

Split unit controller does not directly control temperature, since temperature control is split unit's responsibility "Current Temperature" and "Current Setpoint" communication objects should be linked to split units "Ambient Temperature" and "Setpoint Temperature" communication objects.

4.4.5.5.1 Parameters

Parameter	Setting	Description
Cyclic Interval	1…**5**…255	Time period to send cooling control value over "Cool Control Value" communication object.
Send On/Off at Control Mode Switchover	**Enable** / Disable	Enables "Split Cool" communication object, can be used to open/close the split unit when a control mode change occurs.
Communication Error Object	Enable / **Disable**	Enables "Split Cool Error" communication object. "True" telegram from this communication objects cause thermostat to enter "Protection Mode" with error. (For more information Chapter 4.5.2)

Table 47

4.4.5.5.2 Communication Objects

No	Object Name	Function	Data Type	Flags
52	Split Cool	On/Off	1 bit DPT 1.001	CT
Visible if "Send On/Off at Control Mode Switchover" parameter enabled. This communication object is not a control object, it will send "True" when control mode is "Cool" and "False" when control mode is "Heat" and can be used to enable split unit.				
54	Split Cool Error	True/False	1 bit DPT 1.002	CW
Visible if "Communication Error Object" parameter enabled. "True" telegram causes the thermostat to enter "Protect Mode" with error and thermostat stay in this state until "False" telegram received.				

4.4.6 Fan Control

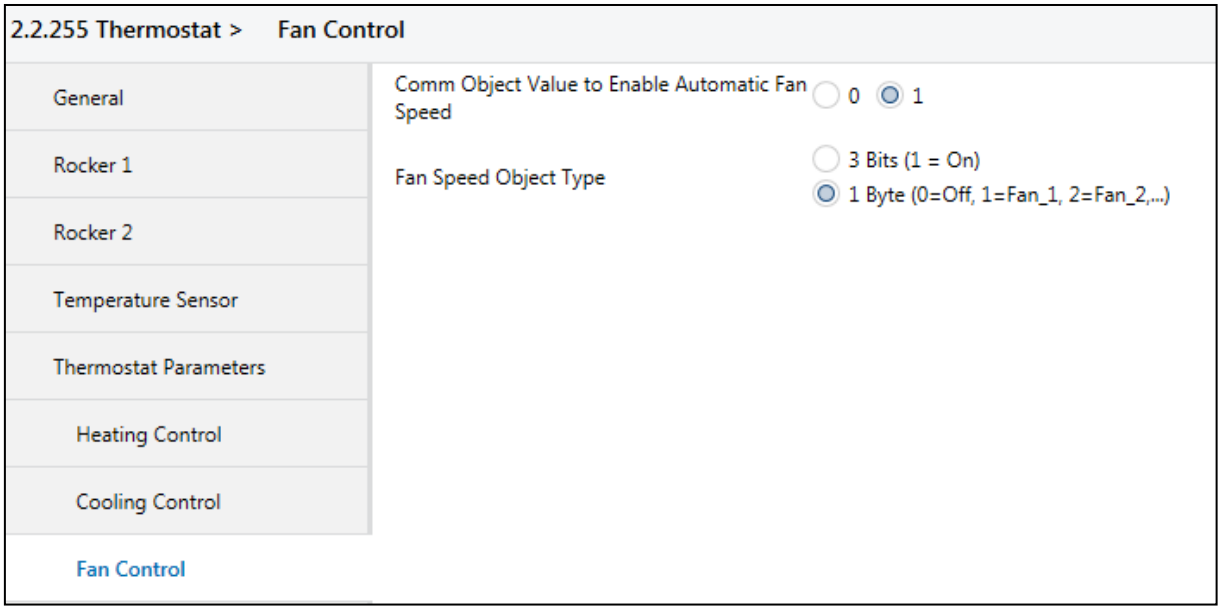


Figure 24

When heating control or cooling control selected as "Fan Coil" or "Split Unit", "Fan Control" tab will be visible. Note that, if both heat and cool controllers configured as "Fan Coil" or "Split Unit", only one set of communication objects and parameters for fan control will be enabled.

When fan control enabled, "Fan Speed" parameters of different operating modes in "Setpoints" tab will also be visible and "LCD Fan Speed" icons will be activated. Since fan speed communication objects are used as control objects and status objects, change in fan speed will be visible from LCD Fan Speed icons.

4.4.6.1 Parameter

Parameter	Setting	Description
Comm Object Value to Enable Automatic Fan Speed	0 / **1**	Telegram value to enable automatic fan speed might differ between different actuators; use this parameter to change the telegram value for enabling automatic fan speed.
Fan Speed Object Type	**3 Bits** / 1 byte	Selects the data type to control fan speed.

4.4.6.2 Communication Objects

No	Object Name	Function	Data Type	Flags
66	Automatic Fan Speed	Send	1 bit DPT 1.002	CWT
Automatic fan speed will be enabled/disabled through this communication object. Telegram value to enable automatic fan speed should be selected in "Comm Object Value to Enable Automatic Fan Speed" parameter.				
67	Fan Speed	Send	1 byte DPT 5.010	CWT
	Fan Speed 1	Enable	1 bit DPT 1.002	CWT
"Fan Speed" communication object visible when "Fan Speed Object Type" is "1 byte" and fan speed controlled and status received with given values; 0 = Fan Speed 0, 1 = Fan Speed 1, 2 = Fan Speed 2, 3 = Fan Speed 3 "Fan Speed 1" communication object visible when "Fan Speed Object Type" is "3 bits" and sending "True" telegram to this communication objects sets fan speed to fan speed 1.				
68	Fan Speed 2	Enable	1 bit SPT 1.002	CWT
"Fan Speed 2" communication object visible when "Fan Speed Object Type" is "3 bits" and sending "True" telegram to this communication objects sets fan speed to fan speed 2.				
	Fan Speed 3	Enable	1 bit DPT 1.002	CWT
"Fan Speed 3" communication object visible when "Fan Speed Object Type" is "3 bits" and sending "True" telegram to this communication objects sets fan speed to fan speed 3.				

4.5 Setpoints

Setpoints, setpoint limitations, fan speeds and reset on site operations controlled through this parameter tab.

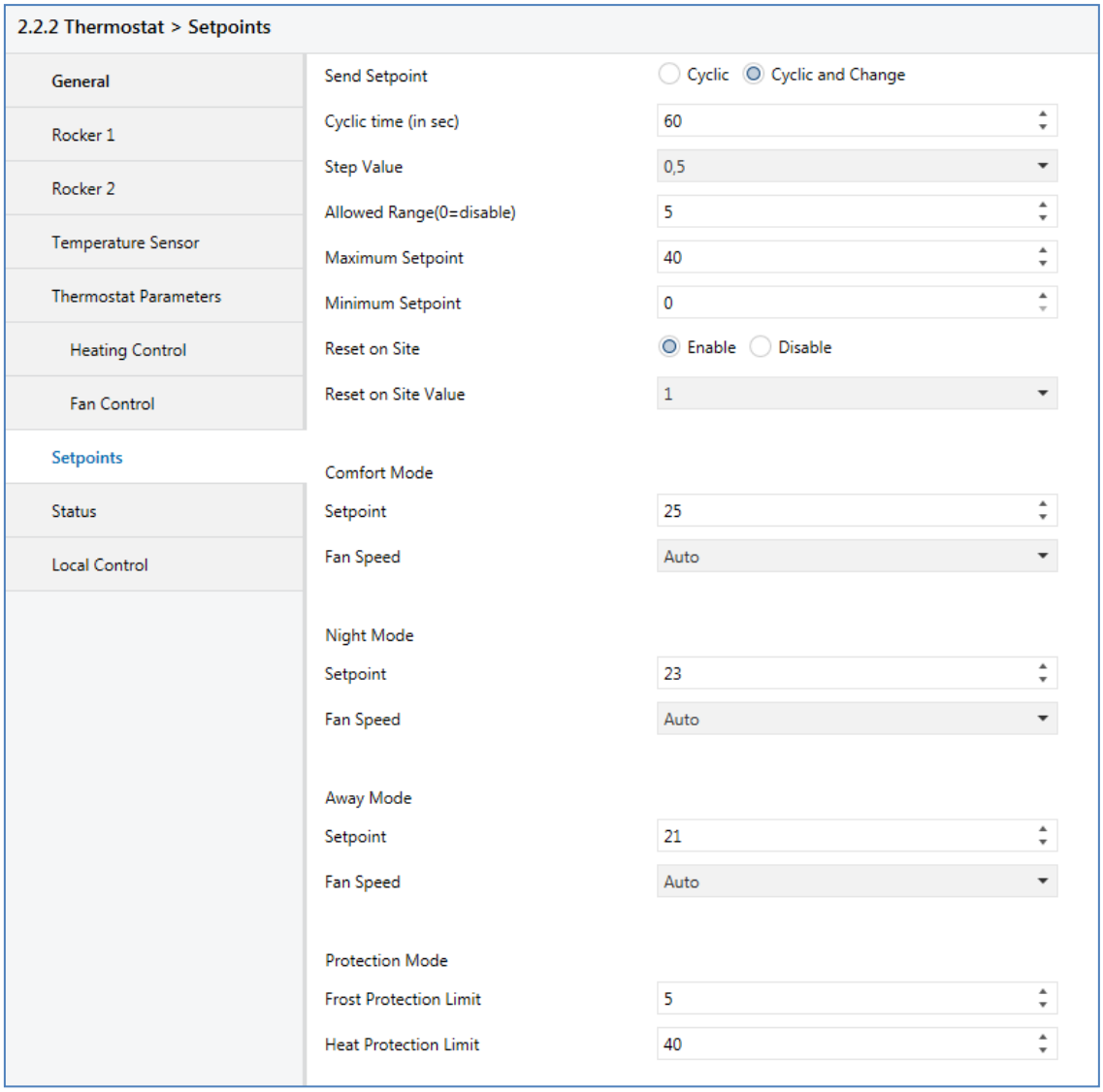


Figure 25

Current setpoint value can be transmitted over “Current Setpoint” communication object periodically or periodically and when a change occurs. When selected as “Cyclic and Change” minimum difference is defined in “Minimum Difference” parameter at “Temperature Sensor” tab.

4.5.1 Setpoint Limitations

Setpoint limitations can be controlled through “Allowed Range”, “Minimum Setpoint” and “Maximum Setpoint” parameters. “Allowed Range” parameter limits setpoint values relative to the default setpoint values of the operating modes downloaded with ETS when commissioned. “Maximum Setpoint” and “Minimum Setpoint” values are absolute values limit all operating modes setpoints. If relative setpoint limitation conflict with absolute limitation, absolute value overwrites the relative value.

“Maximum Setpoint” must be configured as bigger than “Minimum Setpoint” otherwise these parameter below will be set as minimum and maximum setpoint.

For temperature unit as Celsius (°C): Minimum Setpoint = 0 °C, Maximum Setpoint = 40 °C

For temperature unit as Fahrenheit (°F): Minimum Setpoint = 32 °F, Maximum Setpoint = 95 °F

4.5.2 Operating Modes

Thermostat has 4 operating modes; these are “Comfort Mode”, “Night Mode”, “Away Mode” and “Protect Mode”. Transition from one operating mode to another can be achieved through “Operating Mode Button” on the thermostat or “Operating Mode” communication objects that explained in Thermostat chapter. Additionally, thermostat regulation can be turned off by pressing the “Operating Mode Button” for longer than 7 seconds or sending off (0) to the “Regulation” communication object. While regulation is off, thermostat will only send temperature values over “Current Temperature” communication object. Regulation can be restarted by pressing “Operating Mode Button” or sending on (1) to the “Regulation” communication object.

Comfort, Night, Away Modes

These 3 operating modes have their own predefined setpoint temperatures and, if fan control is used, fan speeds. When thermostat enters an operating mode, current setpoint temperature will be set as that operating modes setpoint temperature and if fan control exists, then fan speed will also be set. When setpoint temperatures or fan speeds for operating modes modified using “Setpoint Buttons”, “Fan Speed Button” or over respective communication objects, new values overwrites the old values and become the new default values for the operating mode.

If Comfort, Night and Away modes setpoint temperatures are not compatible to “Minimum Setpoint” and “Maximum Setpoint” limitations; Comfort, Night and Away mode setpoints sets as closest acceptable values.

Protect Mode

“Protect Mode” differs from other modes by having two setpoint, “Heat Protection Limit” and “Frost Protection Limit”, when thermostats control mode is heat, setpoint will be set as “Frost Protection Limit” and when control mode is cool, setpoint will be set as “Heat Protection Limit”.

“Protect Mode” is also the error mode, when error sources (Window Status, Split Heat Error, Split Cool Error) indicates an error, thermostat will enter “Protect Mode” and will not change its operating mode until error is fixed. Error state will be shown on the LCD by activating “Warning Icon”.

Error	Enter Error Mode Condition	Leave Error Mode Condition
Window Status	Open	Close
Split Heat Error	True	False
Split Cool Error	True	False

Table 48

When in error mode if another error condition occurs, thermostat will stay in error mode until both errors are fixed.

4.5.3 Reset on Site

Reset on site operation resets the default setpoint temperatures and fan speeds for Comfort, Night and Away modes to their original value which downloaded when commissioned using ETS.

4.5.4 Parameters

Parameter	Setting	Description
Send Setpoint	**Cyclic** / Cyclic and Change	Selects whether setpoint will be send periodically or periodically and change. If selected as change, minimum difference that will trigger a transmission is defined in "Minimum Difference" parameter in "Temperature Sensor" tab.
Cyclic Time (in sec)	10…**30**…65535	Cyclic time period to send setpoint from "Current Setpoint" communication object.
Step Value	0,1 / **0,5** / 1	Increase/Decrease value of current setpoint when "Setpoint Buttons" on thermostat is pressed.
Allowed Range	0…**5**…30	Setpoint limitations relative to the operating modes setpoint. (For more information - Chapter 4.5.1)
Maximum Setpoint	0…**40**…99	Maximum absolute setpoint limitation (For more information - Chapter 4.5.1).
Minimum Setpoint	**0**…99	Minimum absolute setpoint limitation (For more information - Chapter 4.5.1).
Reset on Site	**Enable** / Disable	Enables reset on site operation which resets the default setpoint temperatures and fan speeds to their original value which downloaded when commissioned using ETS.
Reset on Site Value	**0** / 1 / Any Value	Select the "Reset on Site" communication object value that will trigger reset on site operation
Comfort Mode		
Setpoint	0…**25**…99	Comfort mode setpoint value
Fan Speed	Fan Speed 1 / Fan Speed 2 / Fan Speed 3 / **Auto**	Comfort mode fan speed value
Night Mode		

Setpoint	0…**23**…99	Night mode setpoint value
Fan Speed	Fan Speed 1 / Fan Speed 2 / Fan Speed 3 / **Auto**	Night mode fan speed value
Away Mode		
Setpoint	0…**21**…99	Away mode setpoint value
Fan Speed	Fan Speed 1 / Fan Speed 2 /	Away mode fan speed value
	Fan Speed 3 / **Auto**	
Protect mode		
Frost Protection Limit	0…**5**…99	Protect mode control mode heat setpoint
Heat Protection Limit	0…**40**…99	Protect mode control mode cool setpoint

Table 49

4.5.5 Communication Objects

No	Object Name	Function	Data Types	Flags
50	Regulation	On/Off	1 bit DPT 1.002	CWT
Thermostat regulation can be turned on/off using this communication object. Also, when regulation controlled through "Operating Mode Button" (Chapter 4.5.2) regulation status will be send using this communication object.				
56	Current Setpoint (°C)	Temperature	2 byte DPT 9.001	CRT
	Current Setpoint (°F)	Temperature	2 byte DPT 9.027	CRT
Setpoint value will be send as Celsius or Fahrenheit(configured "Temperature Sensor" tab) using this communication object, when the setpoint will be send explained in Chapter 4.5				
70	Setpoint Comfort (°C)	Temperature	2 byte DPT 9.001	CW
	Setpoint Comfort (°F)	Temperature	2 byte DPT 9.027	CW
Setpoint temperature for Comfort mode should be set using this communication object. Temperature value should be compatible with selected "Temperature Unit" and setpoint limitations(Chapter 4.5.1)				
71	Setpoint Night (°C)	Temperature	2 byte DPT 9.001	CW
	Setpoint Night (°F)	Temperature	2 byte DPT 9.027	CW
Setpoint temperature for Night mode should be set using this communication object. Temperature value should be compatible with selected "Temperature Unit" and setpoint limitations(Chapter 4.5.1)				
72	Setpoint Away (°C)	Temperature	2 byte DPT 9.001	CW
	Setpoint Away (°F)	Temperature	2 byte DPT 9.027	CW
Setpoint temperature for Away mode should be set using this communication object. Temperature value should be compatible with selected "Temperature Unit" and setpoint limitations(Chapter 4.5.1)				
73	Reset on Site	Enable	1 bit DPT 1.003	CW
Reset on site operation should be triggered through this communication object, value to initiate operation should be selected in "Reset on Site Value" parameter in "Setpoints" tab.				

Table 50

4.6 Status

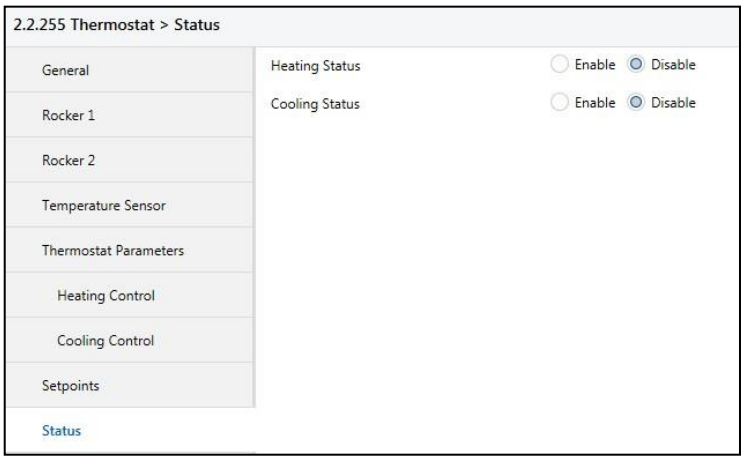


Figure 26

4.6.1 Parameters

Status parameter can be used to enable/disable additional control mode status telegrams. Status telegrams operate the same way as switchover telegrams. But instead of sending switchover telegrams as DPT 1.100 or DPT 20.105, sends 1 bit On/Off (DPT 1.002) telegrams.

Parameter	Setting	Description
Heating Status	Enable / **Disable**	Enable additional heating status communication object.
Cooling Status	Enable / **Disable**	Enable additional cooling status communication object.

Table 51

4.6.2 Communication Objects

No	Object Name	Function	Data Types	Flags
64	Status Heat	On/Off	1 bit DPT 1.002	CRT
Heating status will be send through this communication object. (0 : Heating Off, 1 : Heating On)				
65	Status Cool	On/Off	1 bit DPT 1.002	CRT
Cooling status will be send through this communication object. (0 : Cooling Off, 1 : Cooling On)				

Table 52

4.7 Local Control

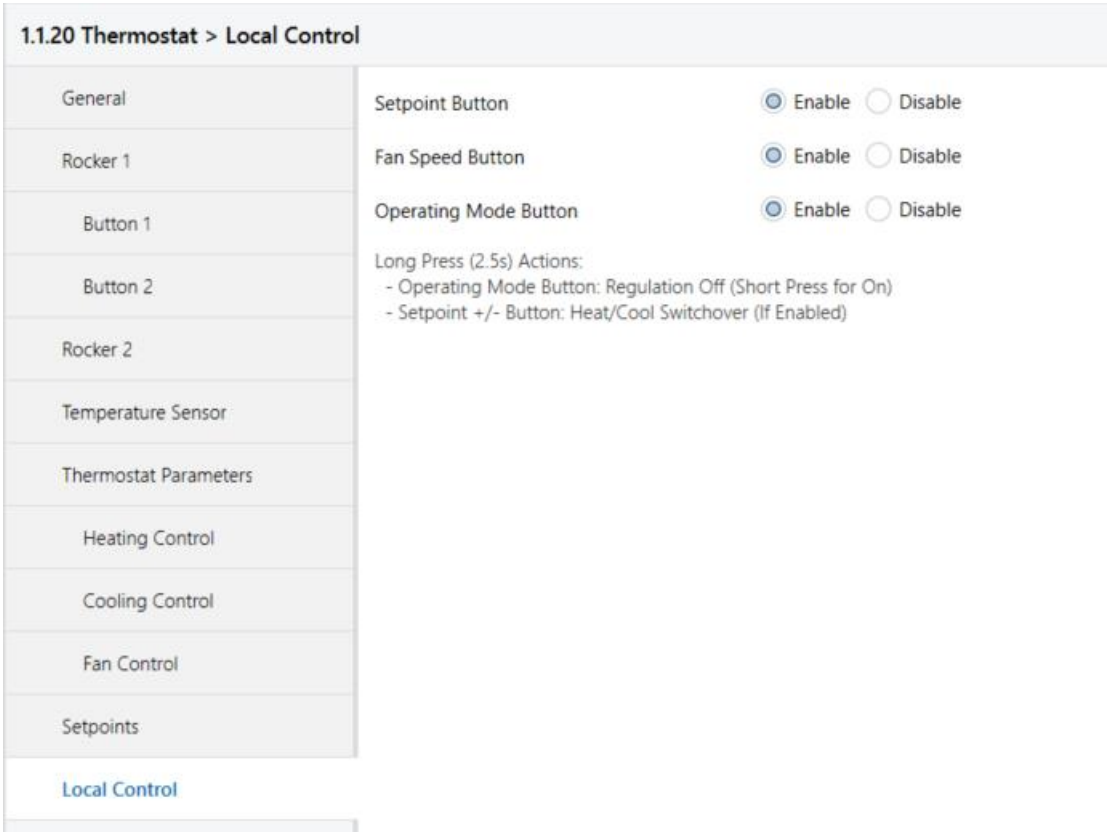


Figure 27

4.7.1 Parameters

Parameter	Setting	Description
Setpoint Button	**Enable** / Disable	Enable/Disable setpoint buttons on thermostat.
Operating Mode Button	**Enable** / Disable	Enable/Disable operating mode button on thermostat

Table 53

When any of the thermostat buttons disabled “Lock Icon” on the thermostat will be activated.

Disabling buttons will not affect secondary functions of those buttons. For example, even setpoint buttons are disabled, long press of setpoint buttons will still operate as backlight dim as explained in Chapter 4.1.1.