Touch Panel 3,5 KNX

VS00ExxKNX

Product Handbook

Product: **Touch Panel 3,5 KNX**
Order Code: **VS00ExxKNX**

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- Any information inside this manual can be changed without advice.
- This handbook can be download freely from the website: www.eelectron.com
- **Exclusion of liability:**
  Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this.
  Any necessary corrections will be incorporated into newer versions of this manual.

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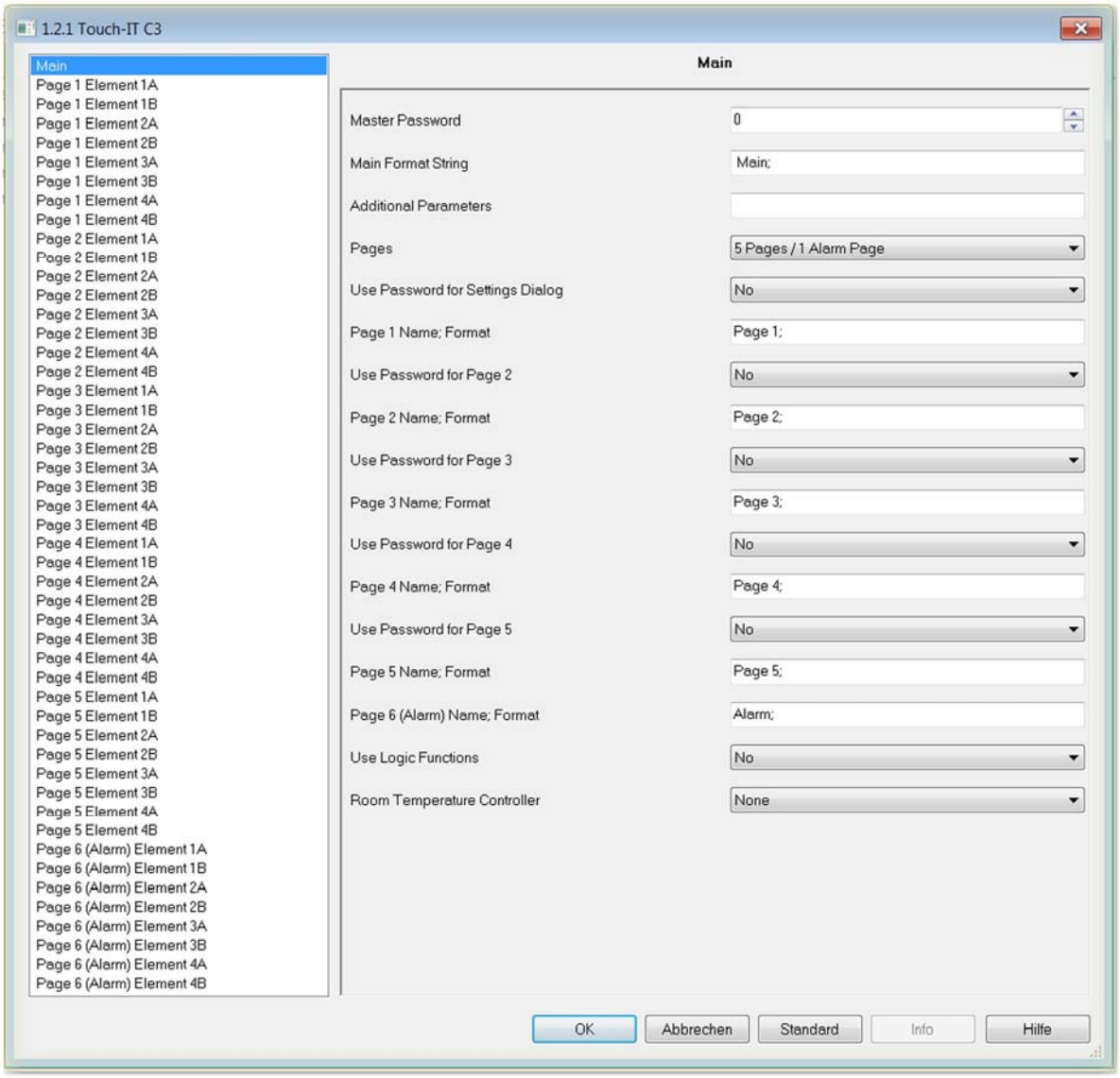
1. Application description

1.1 Main



1.2 Master password

A 4-digit password can be assigned to protect the different pages or object functions. In case that the value is „0“, this function is inactive.
e.g. In case that the password is „1“, „0001“ must be entered on the Eelecta® Touch Panel in order to access the protected page or to execute a function of the protected element.

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1.3 Main Format String and Additional Parameters

These fields are used for global parameter setting. The following parameters can be used:

TDSEND	No default value assigned. Date and time will not be sent.
TDSEND=xx	Time allowance for sending time and date. Specified in solid hours. e.g. TDSEND=17 (Time and date will be sent every day at 5 pm)
STDLONG	Interpretation of a manual input as LONG (Default 500ms)
STDLONG=xx	Determines the time (in ms) from which the manual input will be taken as LONG.
STDREP	Default use of the general repetition rate. (Default 300ms)
STDREP=xx	Sets the repetition rate (in ms)

Two more parameters can be set in order to control standby object 194.

1.4 OBJ194OUT

This parameter determines how the output object reacts when the screen saver mode is changed. Values can be sent when activating and leaving the screen saver. The following scheme demonstrates the settings in dependency on the desired actions. Standby mode will be interpreted as an extended screen saver mode.

	Screensaver inactive			**Demonstration:**
	0	**1**	**x**	Standby object parameters are to be set as follows: „Send a 1 when activating and a 0 when leaving the screen saver mode“. The outcome of this is:
Screen saver (or standby) active				
0	--	SW	Sx	
1	WS	--	xS	OBJ194OUT=WS;
x	Wx	xW	--	

1.5 OBJ194IN

Incoming telegrams on the system standby object can change the current status of the screen saver. The changes can be defined for the values 0/1, as demonstrated in the following scheme.

	Possible settings				**Demonstration:**
	xx	**Ox**	**Sx**	**Wx**	The interpretation of an incoming telegram is to be carried out as follows: Change into standby mode at 0, and into wake-up mode at 1 OBJ194IN=OW;
0	--	Standby	Screensaver	Wake-Up	
1	--	--	--	--	
	xO	**OO**	**SO**	**WO**	
Input					
0	--	Standby	Screensaver	Wake-Up	
1	Standby	Standby	Standby	Standby	
	xS	**OS**	**SS**	**WS**	
0	--	Standby	Standby	Wake-Up	
1	Screensaver	Screensaver	Screensaver	Screensaver	
	xW	**OW**	**SW**	**WW**	
0	--	Standby	Screensaver	Wake-Up	
1	Wake-Up	Wake-Up	Wake-Up	Wake-Up	

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1.6 Pages

There are two possible option:

- 5 control pages + 1 alarm page
- control pages

1.7 Use Password for Settings Dialog:

Protect system page with a 4-digit password.

1.8 Page 1-5 Name; Format:

The names of the control pages that appear in the layout menu can be assigned here.

1.9 Use Password for Pages 2-5

Except for control page 1, all service pages can be protected/locked with a password.
(Exception: When 6 control pages are defined, page 6 cannot be protected with a password.)

1.10 Page 6 (Alarm) Name; Format

The name of the control or alarm page that appears in the layout menu can be assigned here.
In addition, global alarm settings can be set here.

- **RESCAN=** Defines the time (in seconds) when alarm object is rescanned.
- **BEEPOFF=** Number of acoustic alarm signals
- **AUTOHIDE** = Leave alarm page if alarm condition is changed or confirmed in a different point.

1.11 Using Logic Functions:

Further information on the logic functions is given in chapter 20 **Logic**.

1.12 Using Temperature Control:

Further information on the regulation of the room temperature is given in chapter 17 **RTC General Information**.

1.13 ETS Objects

Up to 196 group addressed can be administrated. If no elements are activated yet, only the system objects within topology are displayed.

Number	Name	Object Function	Description	Group Ad...	Length	C	R	W	T	U	Data Type	Priority
195	System LED1	LED			1 bit	C	R	W	-	U	1 bit DPT_Switch	Low
194	System Standby	Standby			1 bit	C	R	W	-	U	1 bit DPT_Switch	Low
193	System Date	Date			3 Byte	C	R	-	T	-	Date DPT_Date	Low
192	System Time	Time			3 Byte	C	R	-	T	-	Time DPT_TimeOfDay	Low

e.g. Element 1A is active on page 1 and defined as a 1-bit object. Topology will change as follows:

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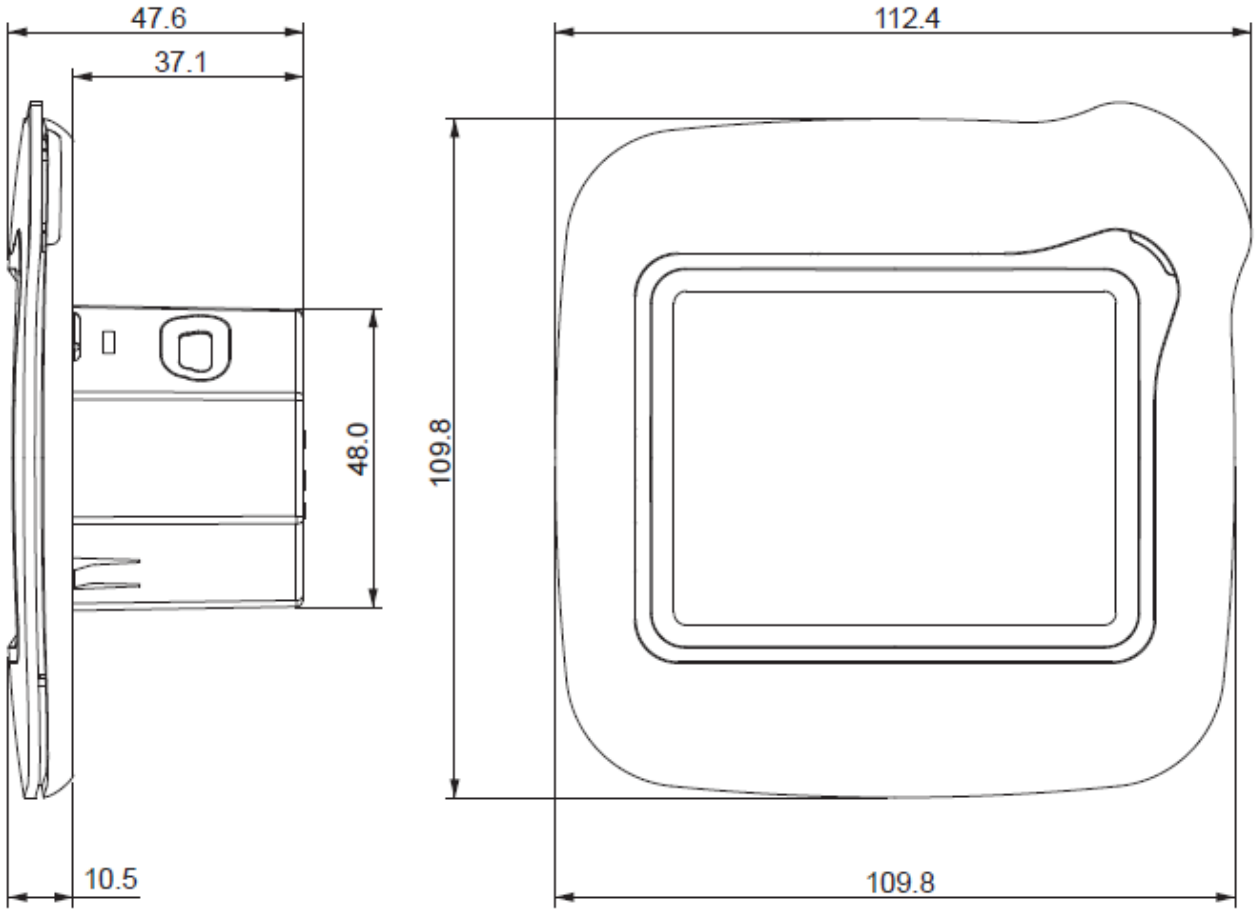
Number	Name	Object Function	Description	Group Ad...	Length	C	R	W	T	U	Data Type	Priority
0	1.1-A Output, Switching	Switch			1 bit	C	R	W	T	U	1 bit DPT_Switch	Low
1	1.1-A Input, Feedback	Switch			1 bit	C	R	W	T	U	1 bit DPT_Switch	Low
192	System Time	Time			3 Byte	C	R	-	T	-	Time DPT_TimeOfDay	Low
193	System Date	Date			3 Byte	C	R	-	T	-	Date DPT_Date	Low
194	System Standby	Standby			1 bit	C	R	W	-	U	1 bit DPT_Switch	Low
195	System LED1	LED			1 bit	C	R	W	-	U	1 bit DPT_Switch	Low

Every element includes function-specific objects that can be linked (Cf. chapter 3 **Description of the control elements**). The exact analogy between parameter view and object view within topology will be displayed as follows:
e.g. Page 3,element 2B equals 3.2-B within topology.

2. Product Page

2.1 Installation

3,5" display for visualization and control in a KNX bus, Installation is carried out using a mounting ring.



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Areas of application:

- Switching and dimming of lights
- Adjustment of color and brightness in RGB lights
- Displaying switching states in a building
- Operating blinds
- Alarm functions, acoustic and optical
- Alarm display of motion sensors with clear text
- Displaying and setting heating adjustments
- Displaying indoor and outdoor temperature
- Weekly time switch

2.2 Technical data

Technical data	Touch_IT C3
Display	3,5" TFT color display (320x240) (256k color) touch screen
Processor	200MHz 32 Bit ARM
Operating system	Linux
Background	Adjustable LED background light
Parameterization	ETS
Max. Number of elements / Max. number of pages	8 / (5 control pages + 1 alarm page or 6 control pages)
Ambient temperature, storage (operation)	-5 … +50°C (+45°C)
Operational voltage	EIB/KNX bus voltage 21-32V DC
Approx. power consumption from KNX bus	< 10 mA (at 24V DC)
Auxiliary voltage	DC 9-32 V, approx. 1.5 VA
Bus coupler	integrated
Connections	EIB-polar term.l (red/black); AUX-polar terminal (yell/white)
Degree of protection	IP20
Installation type	Installation with a metal frame adapter
Casing measurements	110 mm x 110 mm x 10 mm (W x H x D)
Article number:	
VS00E11KNX	3,5" TOUCH PANEL KNX EELECTA - IVORY
VS00E20KNX	3,5" TOUCH PANEL KNX EELECTA - CHROMO
VS00E21KNX	3,5" TOUCH PANEL KNX EELECTA - CHROMO WITH BLACK FRAME
VS00E30KNX	3,5" TOUCH PANEL KNX EELECTA - BLACK MATTE
VS00E31KNX	3,5" TOUCH PANEL KNX EELECTA - BLACK MATTE - FRAME CHROMO
VS00E32KNX	3,5" TOUCH PANEL KNX EELECTA - BLACK WEAVE
VS00E40KNX	3,5" TOUCH PANEL KNX EELECTA - GOLD
VS00E50KNX	3,5" TOUCH PANEL KNX EELECTA - BRONZE

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2.3 Commissioning

Commissioning the Eelecta Touch Panel is carried out using the ETS (EIB Tool Software) and the corresponding application software. At delivery, the device is unprogrammed. All functions must be parameterized and programmed using the ETS.

2.4 Behaviour at bus voltage recovery:

All settings carried out using the ETS will be preserved.

2.5 Discharging program and resetting device:

If the visualization does not react due to a malfunction or incorrect configuration of the programming, the entire project work can be deleted by pressing the programming button. The device will be reset to delivery status. Please hold the programming button while connecting power supply and wait until the application for touch screen calibration appears. Normally, this takes 40-60 seconds. After entering the 5 calibration points, you can download your application once again.

If the reset *ex fabrica* is performed all the default icons must be reload, to perform this operation follow the instruction described in the document downloadable from eelectron website:

http://www.eelectron.com/download/120911042536_VS00E01KNXFI01020004.zip

And use the snapshot dowloadable from :

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

2.6 Arrangement of the control elements

A maximum of 8 elements can be placed on each Eelecta® Touch Panel page.
After uploading the parameters, the pages will be formatted automatically.
If there is a smaller number of elements on a page, they will be maximized to the available surface

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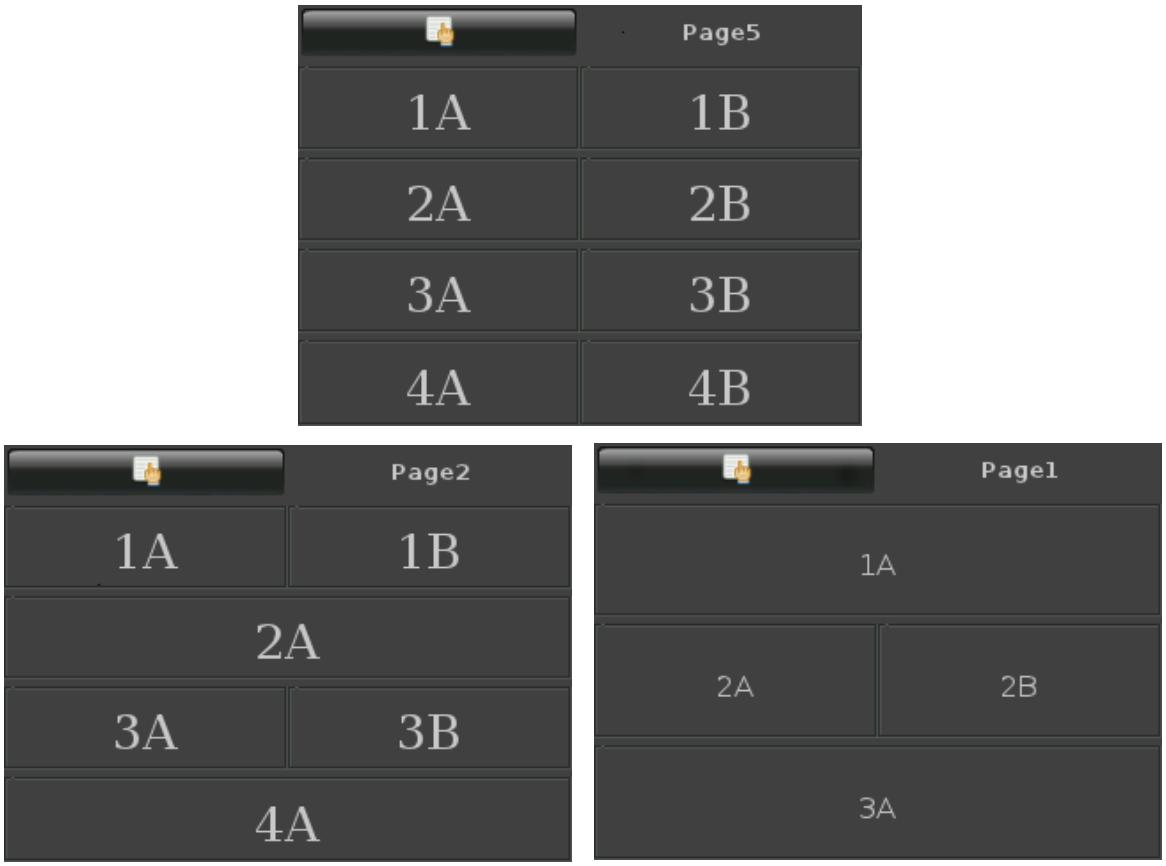

(in case that the expand-settings (vertically and horizontally) are enabled).

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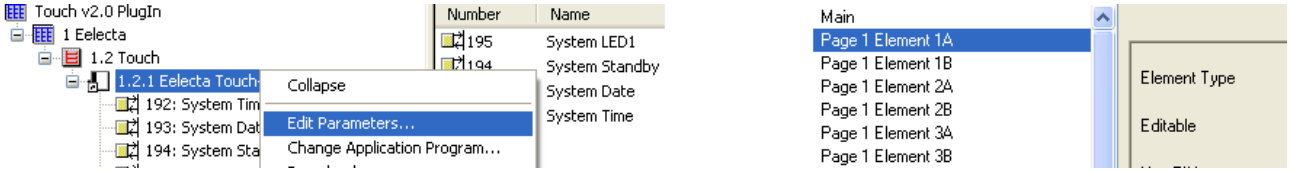
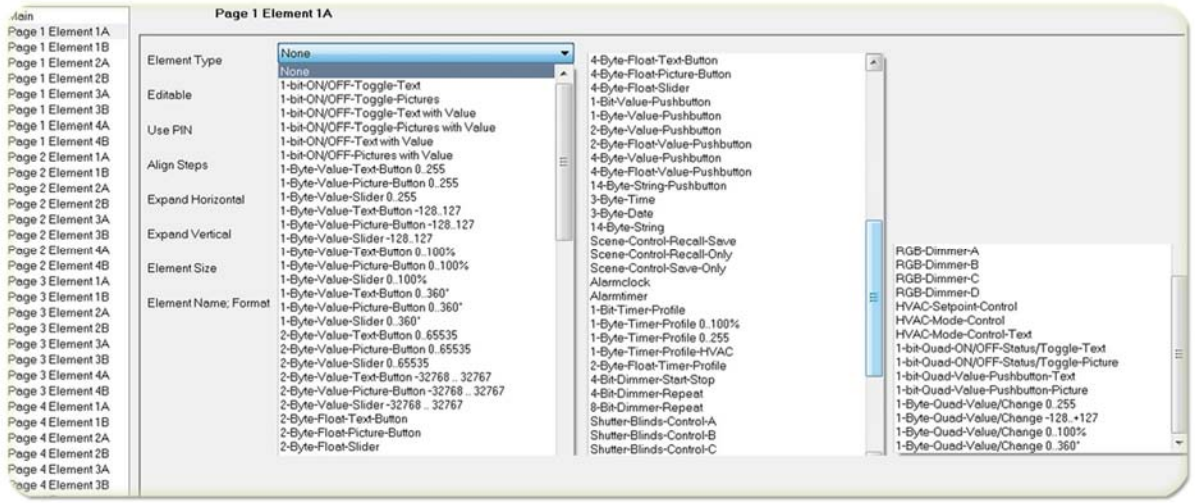
3. Description of the control elements

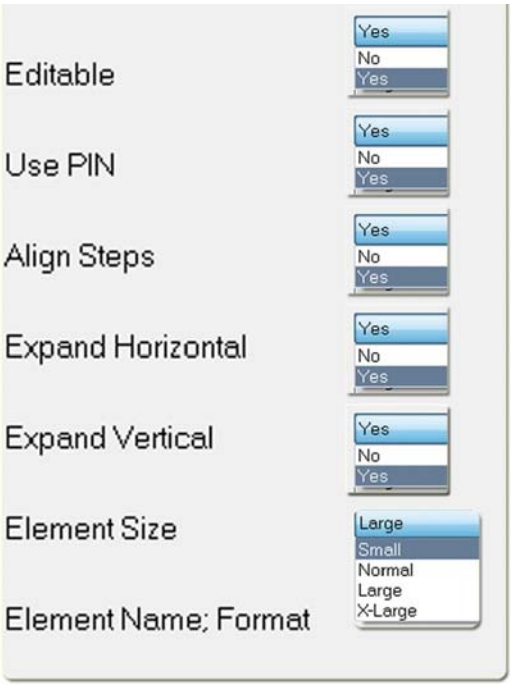
3.1 Selecting and presetting control elements

The selection of control elements is carried out through a parameterization within the ETS.



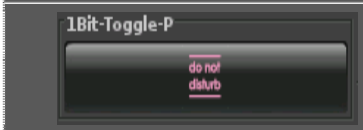
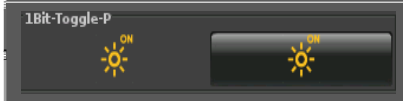
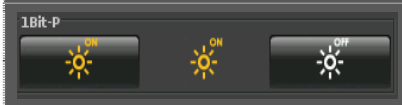
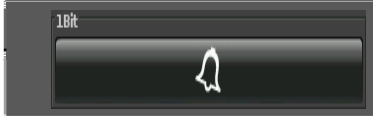
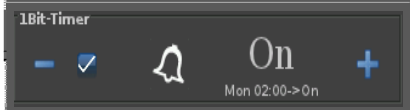


Subsequently, various presets can be adjusted.



Editable
YES: Element is used as a display with a control element.
NO: Control element is solely used as a display.
Use Pin
Protect control element with a password.
Align Steps
Round value up or down to a multiple of the stepwidth.
Expand Horizontal
Maximize control element horizontally.
Expand Vertical
Maximize control element vertically.
Element Size
Determines, which element size is used.
There are 4 sizes available (Small, Normal, Large, X- Large).

4. Overview 1bit Elements

Image	Element number Range of values	Element type Format	Paragraph details
	1	**1-bit-ON/OFF-Toggle-Text**	4.1
	0/1	B0,B1,AL,AH,NOBG,LOGIC,BSWAP,LSWAP,PIN	
	2	**1-bit-ON/OFF-Toggle-Picture**	4.2
	0/1	IMGSET,AL,AH,NOBG,LOGIC,BSWAP,LSWAP,PIN	
	3	**1-bit-ON/OFF-Toggle-Text with Value**	4.3
	0/1	W,L0,L1,B0,B1,AL,AH,NOBG,LOGIC,BSWAP, LSWAP,PIN	
	4	**1-bit-ON/OFF-Toggle-Picture with Value**	4.4
	0/1	W,IMGSET,L0,L1,B0,B1,AL,AH,NOBG,LOGIC,BSWAP,LSWAP,PIN	
	5	**1-bit-ON/OFF-Text with Value**	4.5
	0/1	W,L0,L1,B0,B1,AL,AH,NOBG,LOGIC,BSWAP, LSWAP,PIN	
	6	**1-bit-ON/OFF-Picture with Value**	4.6
	0/1	W,L0,L1,B0,B1,IMGSET,AL,AH,NOBG,LOGIC, BSWAP,LSWAP,PIN	
	40	**1-Bit-Value-Pushbutton**	4.7
	0/1	IMG,PRESS,RELEASE,LABEL,NOBG,JUMP,LOGIC, LOGICR,PIN	
	62	**1-Bit-Timer-Profile**	4.8
	0/1	W,L0,L1,OVRTO,NOBG,IMG,PIN.PPIN	
	85	**1-bit-Quad-ON/OFF-Status/Toggle-Text**	4.10
	4x 0/1	LABELS,N,W,NOBG,SWAP	
	86	**1-bit-Quad-ON/OFF-Status/Toggle-Picture**	4.10
	4x 0/1	IMGSETS,N,W,NOBG,SWAP	
	87	**1-bit-Quad-Value-Pushbutton-Text**	4.11
	4x 0/1	LABELS,N,W,NOBG,SWAP	
	88	**1-bit-Quad-Value-Pushbutton-Picture**	4.12
	4x 0/1	IMGSETS,N,W,NOBG,SWAP	

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4.1 1-bit-ON/OFF-Toggle-Text

ETS objects:		
Range of values	0/1	
Input	Feedback	1 Bit
Output	Switching	1 Bit
Format:		
B0	Text default for button on "0"	
B1	Text default for button on "1“	
NOBG	No button background	
BSWAP	Switch between display of the current state and the subsequent state (button)	
LOGIC	Function call or direct incorporation of a logical function	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 1-bit value 0/1.

Set the displayed texts on the buttons using B0 and B1

NOBG eliminates the button‘s surface and the display is visualized directly on the background.

BSWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function.

If „Use PIN“ is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:

1Bit-Toggle-T; B0=UP; B1=DOWN

1Bit-Toggle-T; B0=OFF; B1=ON

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4.2 1-bit-ON/OFF-Toggle-Picture

ETS objects:		
Range of values	0/1	
Input	Feedback	1Bit
Output	Switching	1Bit
Format:		
IMGSET	Choosing set of images	
NOBG	No button background	
BSWAP	Switch between display of the current state and the subsequent state (button)	
LOGIC	Function call or direct incorporation of a logical function	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 1-bit value 0/1.

Use IMGSET to chose the set of images you want to use.

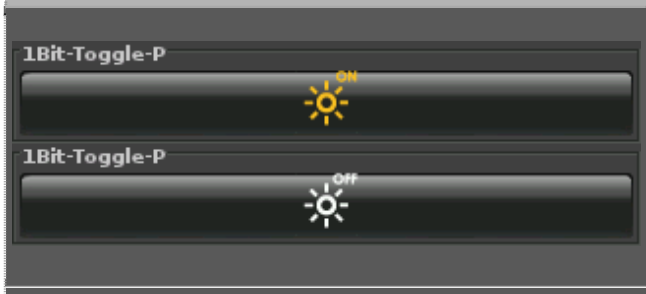
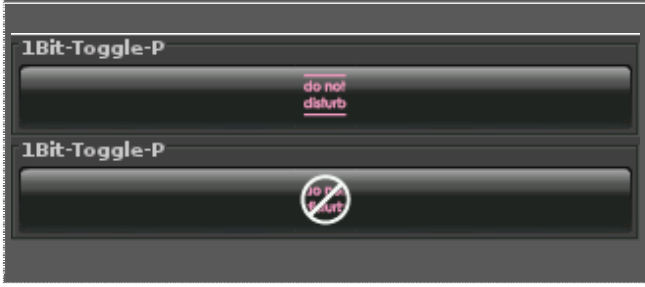
NOBG eliminates the button‘s surface and the display is visualized directly on the background..

BSWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function.

If „Use PIN“ is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Bit-Toggle-P; IMGSET=lightbulb;
	1Bit-Toggle-P; IMGSET=dnd ;

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4.3 1-bit-ON/OFF-Toggle-Text with Value

ETS objects:		
Range of values	0/1	
Input	Feedback	1Bit
Output	Switching	1Bit

Format:	
W	Determines width of button's surface
B0	Text default for button on "0"
B1	Text default for button on "1“
L0	Text default for display on "0“
L1	Text default for display on "1“
NOBG	No button background
BSWAP	Switch between display of the current state and the subsequent state (**button**)
LSWAP	Switch between display of the current state and the subsequent state (**display**)
LOGIC	Function call or direct incorporation of a logical function
PIN	In case "Use PIN" is selected, an individual password can be assigned
AL	Alarm low limit / ONLY ON ALARM SIDE
AH	Alarm up limit / ONLY ON ALARM SIDE

Simple element to send/receive a 1-bit value 0/1.

W (in Pixel) determines the width of the button‘s surface.

Use B0 and B1 to determine the button‘s texts. Use L0 and L1 to determine the texts to be displayed.

NOBG eliminates the button‘s surface and the display is visualized directly on the background..

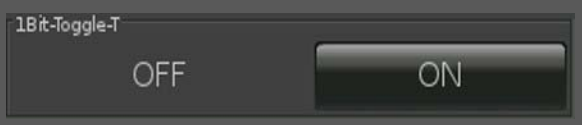
BSWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state.

LSWAP is used to switch between the states of the display: display of subsequent state (standard display) or display of the current state.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function.

If „Use PIN“ is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Bit-Toggle-T; B0=UP; B1=DOWN; L0=UP;L1=DOWN; BSWAP
	1Bit-Toggle-T; B0=DOWN; B1=UP; L0=DOWN;L1=UP
	1Bit-Toggle-T; B0=OFF; B1=ON; L0=OFF;L1=ON; LSWAP
	1Bit-Toggle-T; B0=OFF; B1=ON; L0=OFF;L1=ON; w=80

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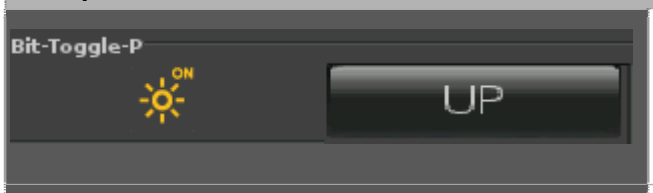
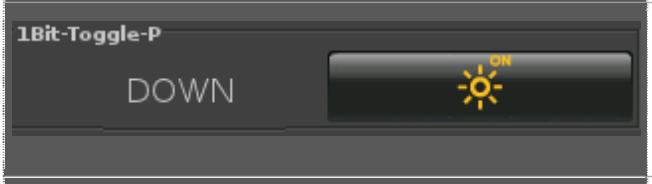
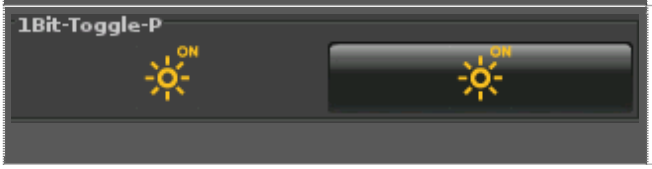
4.4 1-bit-ON/OFF-Toggle-Picture with Value

ETS objects:			Simple element to send/receive a 1-bit value 0/1.
Range of values	0/1		W (in Pixel) determines the width of the button‘s surface. Use IMGSET to chose the set of images you want to use.
Input	Feedback	1Bit	
Output	Switching	1Bit	
Format:			Use B0 and B1 to determine the button‘s texts. Use L0 and L1 to determine the texts to be displayed.
W	Determines width of button's surface		
IMGSET	Choosing set of images		NOBG eliminates the button‘s surface and the display is visualized directly on the background..
B0	Text default for button on "0"		
B1	Text default for button on "1“		BSWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state.
L0	Text default for display on "0“		
L1	Text default for display on "1“		LSWAP is used to switch between the states of the display: display of subsequent state (standard display) or display of the current state.
NOBG	No button background		
BSWAP	Switch between display of the current state and the subsequent state (**button**)		Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function.
LSWAP	Switch between display of the current state and the subsequent state (**display**)		
LOGIC	Function call or direct incorporation of a logical function		If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM SIDE		AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
AH	Alarm upper limit / ONLY ON ALARM SIDE		

examples:	
	1Bit-Toggle-P; B0=UP; B1=DOWN;IMGSET=lightbulb
	1Bit-Toggle-P; L0=UP; L1=DOWN;IMGSET=lightbulb
	1Bit-Toggle-P;IMGSET=lightbulb;BSWAP

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	1Bit-Toggle-P;IMGSET=lightbulb;

4.5 1-bit-ON/OFF-Text with Value

ETS objects:		
Range of values	0/1	
Input	Feedback	1Bit
Output	Switching	1Bit
Format:		
W	Determines width of display‘s surface	
B0	Text default for button on "0"	
B1	Text default for button on "1“	
L0	Text default for display on "0“	
L1	Text default for display on "1“	
NOBG	No button background	
BSWAP	Switch between display of the current state and the subsequent state (button)	
LSWAP	Switch between display of the current state and the subsequent state (display)	
LOGIC	Function call or direct incorporation of a logical function	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm low limit / ONLY ON ALARM SIDE	
AH	Alarm up limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 1-bit value 0/1.

W (in Pixel) determines the width of the display‘s surface.

Use B0 and B1 to determine the button‘s texts.

Use L0 and L1 to determine the texts to be displayed.

NOBG eliminates the button‘s surface and the display is visualized directly on the background..

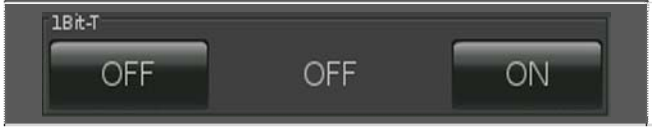
BSWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state.

LSWAP is used to switch between the states of the display: display of subsequent state (standard display) or display of the current state.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Bit-T; B0=DOWN; B1=UP; L0=DOWN;L1=UP; BSWAP
	1Bit-T; B0=DOWN; B1=UP; L0=DOWN;L1=UP;
	1Bit-T; B0=OFF; B1=ON; L0=OFF;L1=ON; w=80

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4.6 1-bit-ON/OFF-Picture with Value

ETS objects:		
Range of values	0/1	
Input	Feedback	1Bit
Output	Switching	1Bit
Format:		
W	Determines width of display's surface	
IMGSET	Choosing set of images	
B0	Text default for button on "0"	
B1	Text default for button on "1“	
L0	Text default for display on "0“	
L1	Text default for display on "1“	
NOBG	No button background	
BSWAP	Switch between display of the current state and the subsequent state (button)	
LSWAP	Switch between display of the current state and the subsequent state (display)	
LOGIC	Function call or direct incorporation of a logical function	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm low limit/ ONLY ON ALARM SIDE	
AH	Alarm up limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 1-bit value 0/1.

W (in Pixel) determines the width of the display surface.

Use IMGSET to chose the set of images you want to use.

Use B0 and B1 to determine the button‘s texts.

Use L0 and L1 to determine the texts to be displayed.

NOBG eliminates the button‘s surface and the display is visualized directly on the background.

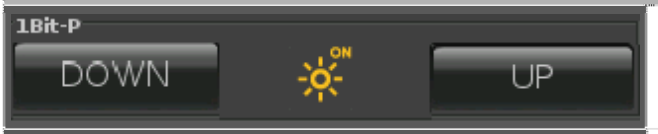
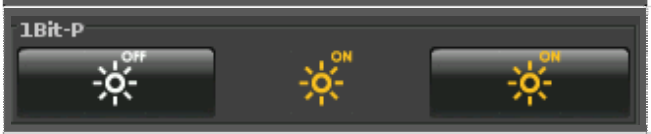
BSWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state.

LSWAP is used to switch between the states of the display: display of subsequent state (standard display) or display of the current state.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Bit-P; B0=DOWN; B1=UP;IMGSET=lightbulb
	1Bit-P;IMGSET=lightbulb;BSWAP
	1Bit-P;IMGSET=lightbulb;
	1Bit-P; L0=UP; L1=DOWN;IMGSET=lightbulb

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4.7 1-Bit-Value-Pushbutton

ETS objects:		
Range of values	0/1	
Input	-	-
Output	Value	1Bit
Input/Output	Value B	1Bit

Format:	
IMG	Choosing an image
PRESS	Value that will be sent when pressing button
RELEASE	Value that will be sent when releasing button
LABEL	Text default for button
NOBG	No button background
JUMP	Command to jump to any side
LOGIC	Function call or direct incorporation of a logical function
LOGICR	Function call or direct incorporation of a logical function
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple button element to send a 1-bit value 0/1.

Using LABEL, you can define the text, or else an image using IMG, on the button.

PRESS determines the value that will be sent when pressing the button.

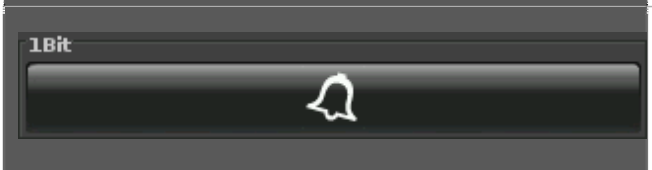
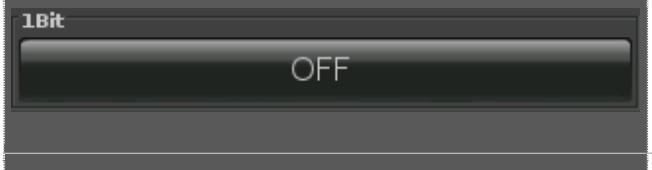
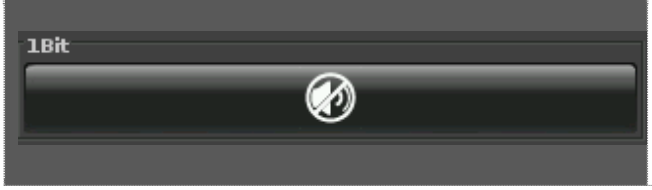
RELEASE determines the value that will be sent when releasing the button.

NOBG eliminates the button‘s surface and the display is visualized directly on the background.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when pressing the button.

Using LOGICR, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when releasing the button.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

examples:	
	1Bit; PRESS=0;LABEL=ON
	1Bit; PRESS=1;IMG=bell
	1Bit; RELEASE=1;LABEL=OFF
	1Bit; RELEASE=0;IMG=sound

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4.8 1-Bit-Timer-Profile

ETS objects:		
Range of values	0/1	
Input	-	-
Output	Profile	1Bit
Input/Output	Profile Enable	1Bit

Format:	
W	Determines width of display's surface
L0	Text default for display on "0“
L1	Text default for display on "1“
IMG	Choosing an image
OVRTO	Determines the time (in minutes) until manual settings are overwritten
NOBG	No button background
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN

Complex element to send a 1-bit value 0/1 in a set time allowance.

W (in Pixel) determines the width of the display‘s surface.

Use L0 and L1 to determine the texts to be displayed.

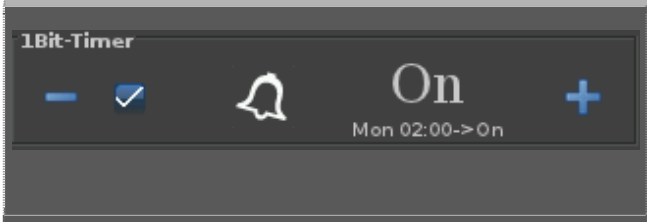
OVRTO determines the span of time, after which the settings made manually by the user are overwritten by the values set in the time table. (in minutes)

NOBG eliminates the button‘s surface and the display is visualized directly on the background.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

In case „Use PIN“ is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.

examples:



1Bit-Timer; IMG=bell.png;NOBG;OVRTO=1

Pressing the options button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled.

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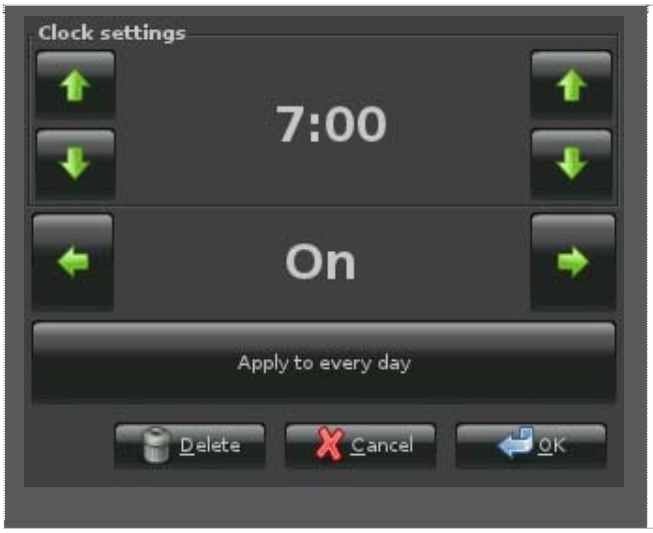

It is possible to determine up to 6 times for each weekday, at which freely selectable values out of the object value range can be sent.

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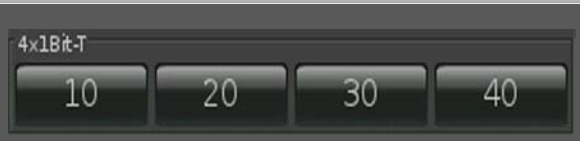
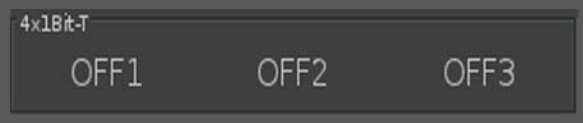
4.9 1-bit-Quad-ON/OFF-Status/Toggle-Text

ETS objects:			Simple element to send/receive 4 x 1-bit values 0/1. W (in Pixel) determines the width of the button‘s surface. LABELS determines the button‘s labels. N determines how many buttons are displayed. (A maximum of 4) NOBG eliminates the button‘s surface and the display is visualized directly on the background. SWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	0/1		
Input/Output	4x IO Switching	4x 1Bit	
Format:			
W	Determines width of display's surface		
LABELS	Labeling of buttons		
N	Number of buttons displayed		
NOBG	No button background		
SWAP	Switch between display of the current state and the subsequent state (button/ display)		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

examples:	
	4x1Bit-T;LABELS=10,11,20,21,30,31,40,41;
	4x1Bit-T; LABELS=OFF1,ON1,OFF2,ON2,OFF3,ON3; N=3;NOBG;
	4x1Bit-T;LABELS=OFF1,ON1,OFF2,ON2;N=2;SWAP;

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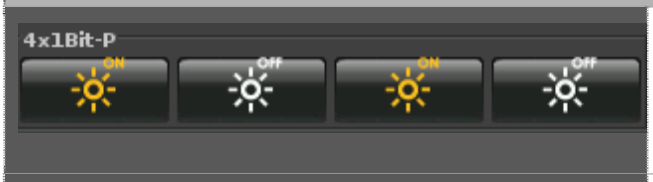
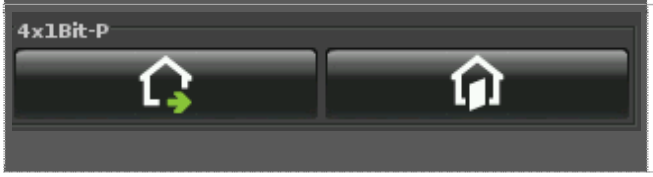
4.10 1-bit-Quad-ON/OFF-Status/Toggle-Picture

ETS objects:			Simple element to send/receive 4x 1-bit values 0/1. W (in Pixel) determines the width of the button‘s surface. Use IMGSETS to choose the set of images you want to use. N determines how many buttons are displayed. (A maximum of 4) NOBG eliminates the button‘s surface and the display is visualized directly on the background. SWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	0/1		
Input/Output	4x IO Switching	4x 1Bit	
Format:			
W	Determines width of display's surface		
IMGSETS	Choosing set of images		
N	Number of buttons displayed		
NOBG	No button background		
SWAP	Switch between display of the current state and the subsequent state (button/ display)		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

examples:	
	4x1Bit-P;IMGSETS=lightbulb
	4x1Bit-P; IMGSETS=lightbulb,sound,dnd; N=3;NOBG;
	4x1Bit-P;IMGSETS=window,door;N=2;SWAP;

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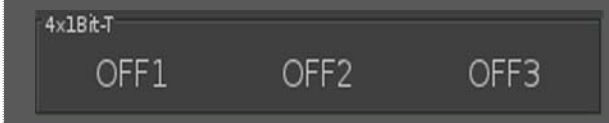
4.11 . 1-bit-Quad-Value-Pushbutton-Text

ETS objects:			Simple element to send 4x 1-bit values "1“. W (in Pixel) determines the width of the button‘s surface. LABELS determines the button‘s labels N determines how many buttons are displayed. (A maximum of 4) NOBG eliminates the button‘s surface and the display is visualized directly on the background. SWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned
Range of values	1		
Output	4x Switching	4x 1Bit	
Format:			
W	Determines width of display's surface		
LABELS	Labeling of buttons		
N	Number of buttons displayed		
NOBG	No button background		
SWAP	Switch between display of the current state and the subsequent state (button/ display)		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

examples:	
	4x1Bit-T;LABELS=10,11,20,21,30,31,40,41;
	4x1Bit-T; LABELS=OFF1,ON1,OFF2,ON2,OFF3,ON3; N=3;NOBG;
	4x1Bit-T;LABELS=OFF1,ON1,OFF2,ON2;N=2;SWAP;

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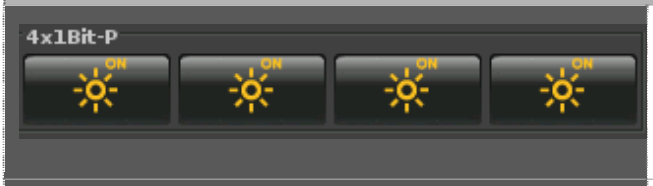
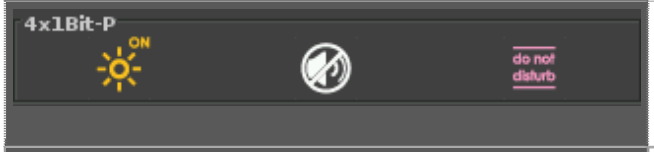
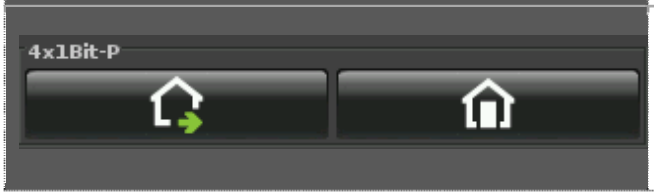
4.12 1-bit-Quad-Value-Pushbutton-Picture

ETS objects:			Simple element to send 4x 1-bit values "1". W (in Pixel) determines the width of the button‘s surface. Use IMGSETS to chose the images you want to use. (In case sets of images are chosen only the ON images will be used) N determines how many buttons are displayed. (A maximum of 4) NOBG eliminates the button‘s surface and the display is visualized directly on the background.. SWAP is used to switch between the states of the buttons: display of subsequent state (standard display) or display of the current state. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	1		
Output	4x Switching	4x 1Bit	
Format:			
W	Determines width of display's surface		
IMGSETS	Choosing set of images		
N	Numberof buttons displayed		
NOBG	No button background		
SWAP	Switch between display of the current state and the subsequent state (button/ display)		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

examples:	
	4x1Bit-P;IMGSETS=lightbulb;
	4x1Bit-P; IMGSETS=lightbulb,sound,dnd; N=3;NOBG;
	4x1Bit-P;IMGSETS=window,door;N=2;SWAP;

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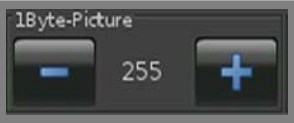
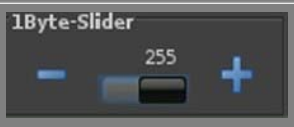
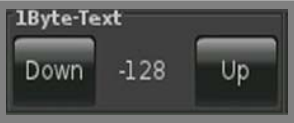
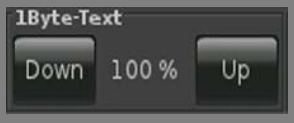
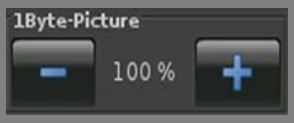
5. Overview 1Byte Elements

Image	Element number Range of values	Element type Format	Details Page
	10	**1-Byte-Value-Text-Button 0..255**	5.1
	0...255	W,B-,B+,PF,STEPS,MIN,MAX,AL,AH,NOBG,REP, PIN	
	11	**1-Byte-Value-Picture-Button 0..255**	5.2
	0...255	W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP,IMGVAL,PIN	
	12	**1-Byte-Value-Slider 0..255**	5.3
	0...255	W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP,PIN	
	13	**1-Byte-Value-Text-Button -128..127**	5.4
	-128..127	W,B-,B+,PF,STEPS,MIN,MAX,AL,AH,NOBG,REP, PIN	
	14	**1-Byte-Value-Picture-Button -128..127**	5.5
	-128..127	W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP,IMGVAL,PIN	
	15	**1-Byte-Value-Slider -128..127**	5.6
	-128..127	W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP,PIN	
	16	**1-Byte-Value-Text-Button 0..100%**	5.7
	0...255	W,B-,B+,PF,STEPS,MIN,MAX,AL,AH,NOBG,REP, PIN	
	17	**1-Byte-Value-Picture-Button 0..100%**	5.8
	0...255	W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP,IMGVAL,PIN	

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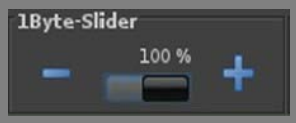	18	**1-Byte-Value-Slider 0..100%**	5.9
	0...255	W,PF,IMGSET,STEPS,MIN, MAX,AL,AH,NOBG,REP, PIN	
	19	**1-Byte-Value-Text-Button 0..360°**	5.10
	0...255	W,B- ,B+,PF,STEPS,MIN,MAX,AL ,AH,NOBG,REP, PIN	
	20	**1-Byte-Value-Picture-Button 0..360°**	5.11
	0...255	W,PF,IMGSET,STEPS,MIN, MAX,AL,AH,NOBG,REP, IMGVAL,PIN	
	21	**1-Byte-Value-Slider 0..360°**	5.12
	0...255	W,PF,IMGSET,STEPS,MIN, MAX,AL,AH,NOBG,REP, PIN	
	22	**1-Byte-Value-PushButton**	5.13
	23	**1-Byte-Timer-Profile 0..100%**	5.14
	24	**1-Byte-Timer-Profile 0..255**	5.15
	25	**1-Byte-Quad-Value/Change 0..255**	5.16
	26	**1-Byte-Quad-Value/Change -128..127**	5.17
	27	**1-Byte-Quad-Value/Change 0..100%**	5.18
	28	**1-Byte-Quad-Value/Change 0..360°**	5.19

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5.1 1-Byte-Value-Text-Button 0..255

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte
Format:		
W	Determines width of button's surface	
B+	Text default for button on incrementing	
B-	Text default for button on decrementing	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 1-byte value 0...255.

Set the displayed texts on the buttons using B- and B+

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

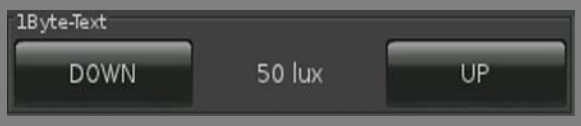
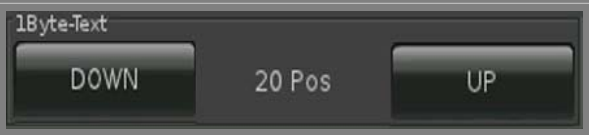
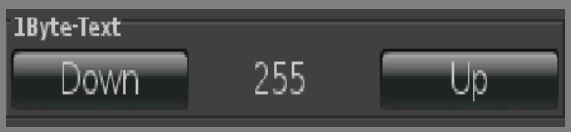
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected..

examples:	
	1Byte-Text;PF=lux;B+=UP;B-=DOWN;MIN=50;MAX=200; STEPS=15;REP=1000;
	1Byte-Text;PF=Pos;B+=DOWN;B-=UP;MIN=20;MAX=100; STEPS=16;REP=500;
	1Byte-Text;

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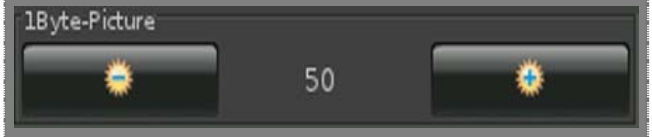
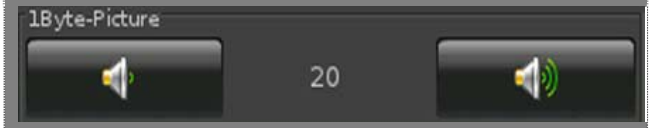
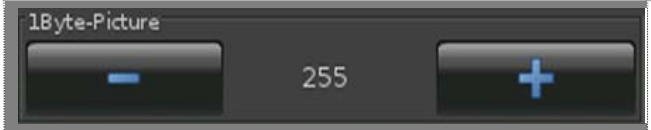
5.2 1-Byte-Value-Picture-Button 0..255

ETS objects:			Simple element to send/receive a 1-byte value 0...255.
Range of values	0...255		Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background.
Input	Feedback	1 Byte	
Output	Switching	1 Byte	
Format:			Using PF, a unit of measurement can be adjusted according to the measured value.
W	Determines width of button's surface		
IMGSET	Choosing set of images		STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)
NOBG	No button background		
PF	Declaration of the unit		MIN determines lower limit. MAX determines upper limit.
STEPS	Setting step width		
MIN	Default setting of lower limit		When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)
MAX	Default setting of upper limit		
REP	Setting repetition rate		Use IMGVAL to visualize the measured value. The labeling of the images limits the choice. (see chapter 8, User-defined features)
IMGVAL	measured value-oriented image incorporation		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
AL	Alarm low limit / ONLY ON ALARM		AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
AH	Alarm up limit / ONLY ON ALARM		

examples:	
	1Byte-Picture;IMGSET=lightbulb;MIN=50;MAX=200; STEPS=15;REP=1000;
	1Byte-Picture;IMGSET=volume;MIN=20;MAX=100; STEPS=16;REP=500;
	1Byte-Picture;

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	Here, the graphics have to be adjusted in advance ;IMGVAL=ampel;

5.3 1-Byte-Value-Slider 0..255

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte

Format:	
W	Determines width of button's surface
IMGSET	Choosing set of images
NOBG	No button background
PF	Declaration of the unit
STEPS	Setting step width
MIN	Default setting of lower limit
MAX	Default setting of upper limit
REP	Setting repetition rate
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN
AL	Alarm lower limit / ONLY ON ALARM
AH	Alarm upper limit / ONLY ON ALARM

Simple element to send/receive a 1-byte value 0...255.

Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

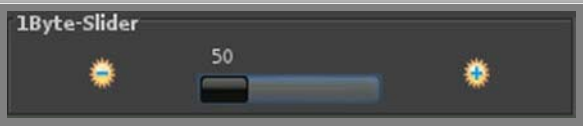
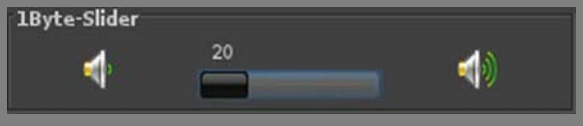
STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

MIN determines lower limit.
MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Byte-Slider;IMGSET=light;MIN=50;MAX=200; STEPS=15;REP=1000;
	1Byte-Slider;IMGSET=volume;MIN=20;MAX=100; STEPS=16;REP=500;

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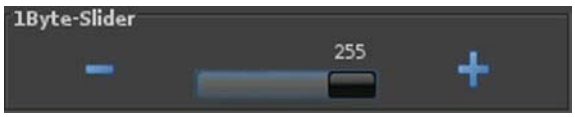
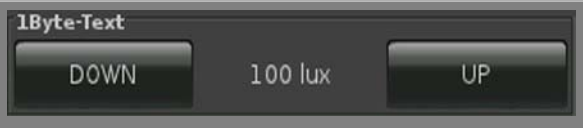
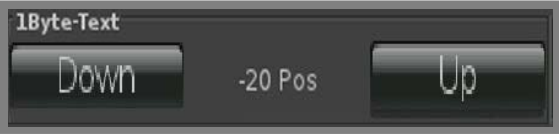
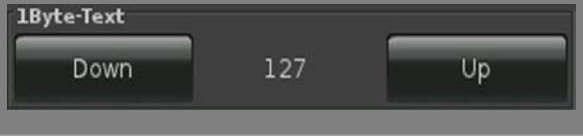
	1Byte-Slider;

5.4 1-Byte-Value-Text-Button -128..127

ETS objects:			Simple element to send/receive a 1-byte value – 128...127. Set the displayed texts on the buttons using B- and B+. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	-128...127		
Input	Feedback	1 Byte	
Output	Switching	1 Byte	
Format:			
W	Determines width of button's surface		
B+	Text default for button on incrementing		
B-	Text default for button on decrementing		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM		
AH	Alarm upper limit / ONLY ON ALARM		

examples:	
	1Byte-Text;PF=lux;B+=UP;B-=DOWN;MIN=-50;MAX=100; STEPS=15;REP=1000;
	1Byte-Text;PF=Pos;B+=DOWN;B-=UP;MIN=-20;MAX=100; STEPS=16;REP=500;
	1Byte-Text;

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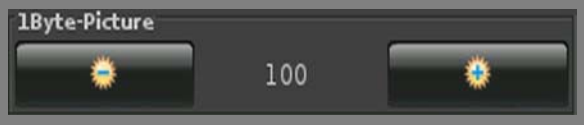
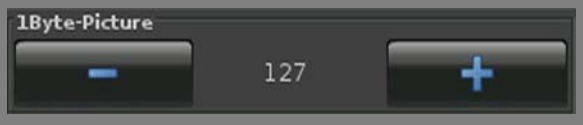
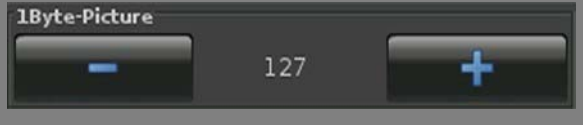
5.5 1-Byte-Value-Picture-Button -128..127

ETS objects:			Simple element to send/receive a 1-byte value – 128...127. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) Use IMGVAL to visualize the measured value. The labeling of the images limits the choice. (see chapter 8, User-defined features) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	-128...127		
Input	Feedback	1 Byte	
Output	Switching	1 Byte	
Format:			
W	Determines width of button's surface		
IMGSET	Choosing set of images		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
IMGVAL	measured value-oriented image incorporation		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM SIDE		
AH	Alarm upper limit / ONLY ON ALARM SIDE		

examples:	
	1Byte-Picture;IMGSET=light;MIN=-50;MAX=100; STEPS=15;REP=1000;
	1Byte-Picture;IMGSET=volume;MIN=-20;MAX=100; STEPS=16;REP=500;
	1Byte-Picture;

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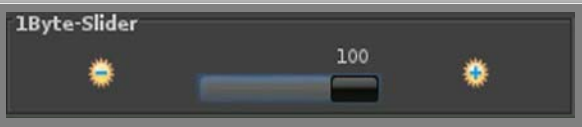
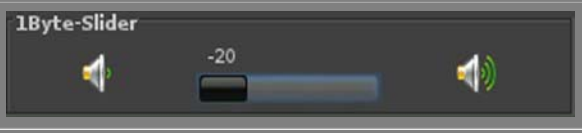
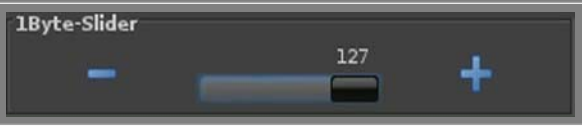
	Here, the graphics have to be adjusted in advance ;IMGVAL=ampel;

5.6 1-Byte-Value-Slider -128..127

ETS objects:			Simple element to send/receive a 1-byte value – 128...127. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	-128...127		
Input	Feedback	1 Byte	
Output	Switching	1 Byte	
Format:			
W	Determines width of button's surface		
IMGSET	Choosing set of images		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM SIDE		
AH	Alarm upper limit / ONLY ON ALARM SIDE		

examples:	
	1Byte-Slider;IMGSET=light;MIN=-50;MAX=100; STEPS=15;REP=1000;
	1Byte-Slider;IMGSET=volume;MIN=-20;MAX=100; STEPS=16;REP=500;
	1Byte-Slider;

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5.7 1-Byte-Value-Text-Button 0..100%

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte
Format:		
W	Determines width of button's surface	
B+	Text default for button on incrementing	
B-	Text default for button on decrementing	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM	
AH	Alarm upper limit / ONLY ON ALARM	

Simple element to send/receive a 1-byte value 0...255.

Set the displayed texts on the buttons using B- and B+.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

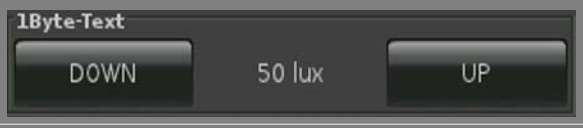
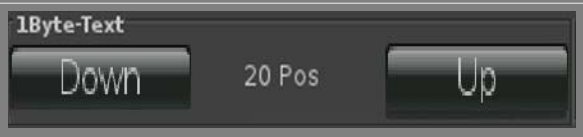
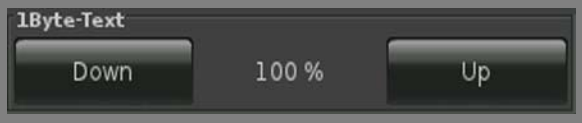
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Byte-Text;PF=lux;B+=UP;B-=DOWN;MIN=50;MAX=80; STEPS=15;REP=1000;
	1Byte-Text;PF=Pos;B+=DOWN;B-=UP;MIN=20;MAX=70; STEPS=16;REP=500;
	1Byte-Text;

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5.8 1-Byte-Value-Picture-Button 0..100%

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte
Format:		
W	Determines width of button's surface	
IMGSET	Choosing set of images	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
IMGVAL	measured value-oriented image incorporation	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple circuit element to send/receive a 1-byte value 0...255.

Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

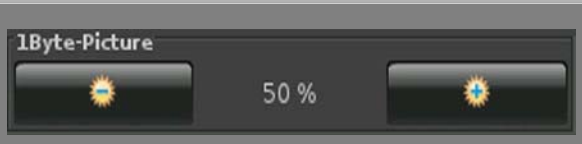
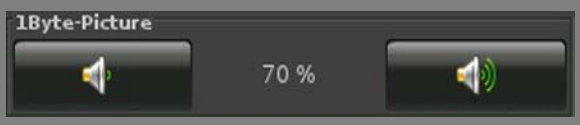
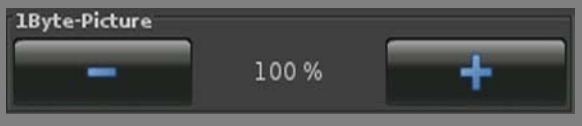
MIN determines lower limit.

MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

Use IMGVAL to visualize the measured value. The labeling of the images limits the choice. (see chapter 8, User-defined features)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Byte-Picture;IMGSET=light;MIN=50;MAX=80; STEPS=15;REP=1000;
	1Byte-Picture;IMGSET=volume;MIN=20;MAX=70; STEPS=16;REP=500;
	1Byte-Picture;

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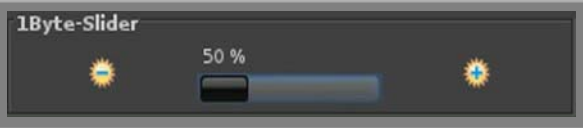
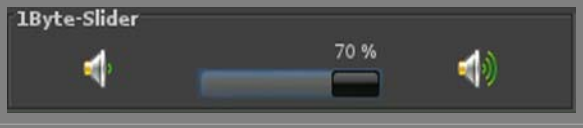
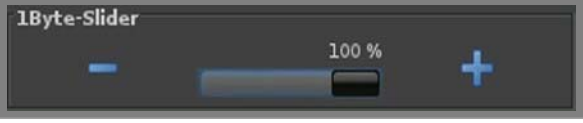
	Here, the graphics have to be adjusted in advance ;IMGVAL=ampel;

5.9 1-Byte-Value-Slider 0..100%

ETS objects:			Simple element to send/receive a 1-byte value 0...255. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	0...255		
Input	Feedback	1 Byte	
Output	Switching	1 Byte	
Format:			
W	Determines width of button's surface		
IMGSET	Choosing set of images		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM		
AH	Alarm upper limit / ONLY ON ALARM		

examples:	
	1Byte-Slider;IMGSET=light;MIN=50;MAX=80; STEPS=15;REP=1000;
	1Byte-Slider;IMGSET=volume;MIN=20;MAX=70; STEPS=16;REP=500;
	1Byte-Slider;

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5.10 1-Byte-Value-Text-Button 0..360°

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte
Format:		
W	Determines width of button's surface	
B+	Text default for button on incrementing	
B-	Text default for button on decrementing	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM	
AH	Alarm upper limit / ONLY ON ALARM	

Simple element to send/receive a 1-byte value 0...255.

Set the displayed texts on the buttons using B- and B+.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

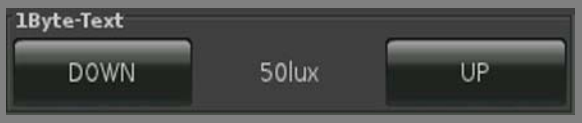
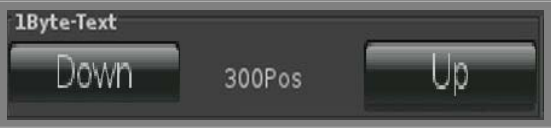
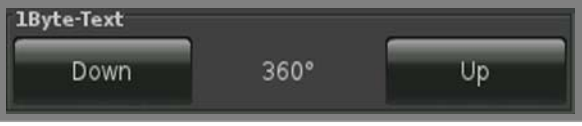
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Byte-Text;PF=lux;B+=UP;B-=DOWN;MIN=50;MAX=280; STEPS=15;REP=1000;
	1Byte-Text;PF=Pos;B+=DOWN;B-=UP;MIN=20;MAX=300; STEPS=16;REP=500;
	1Byte-Text;

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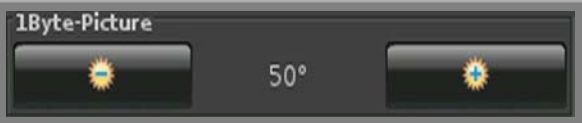
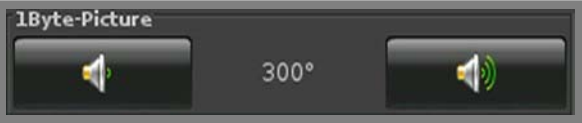
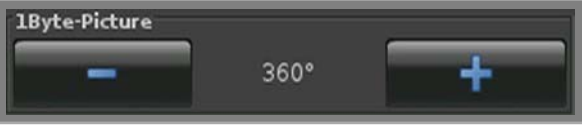
5.11 1-Byte-Value-Picture-Button 0..360°

ETS objects:			Simple element to send/receive a 1-byte value 0...255. Set the displayed texts on the buttons using B- and B+. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) Use IMGVAL to visualize the measured value. The labeling of the images limits the choice. (see chapter 8, User-defined features) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	0...255		
Input	Feedback	1 Byte	
Output	Switching	1 Byte	
Format:			
W	Determines width of button's surface		
B+	Text default for button on incrementing		
B-	Text default for button on decrementing		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
IMGVAL	measured value-oriented image incorporation		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM		
AH	Alarm upper limit / ONLY ON ALARM		

examples:	
	1Byte-Picture;IMGSET=light;MIN=50;MAX=280; STEPS=15;REP=1000;
	1Byte-Picture;IMGSET=volume;MIN=20;MAX=300; STEPS=16;REP=500;
	1Byte-Picture;

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	Here, the graphics have to be adjusted in advance ;IMGVAL=ampel;

5.12 1-Byte-Value-Slider 0..360°

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte
Format:		
W	Determines width of button's surface	
IMGSET	Choosing set of images	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 1-byte value 0...255.

Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

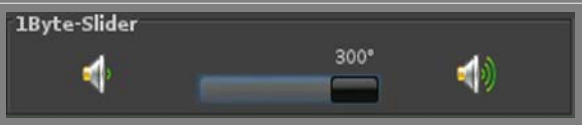
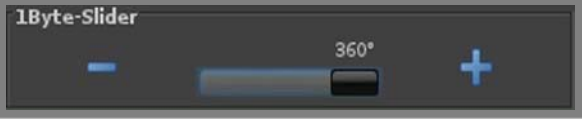
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	1Byte-Slider;IMGSET=light;MIN=50;MAX=280; STEPS=15;REP=1000;
	1Byte-Slider;IMGSET=volume;MIN=20;MAX=300; STEPS=16;REP=500;
	1Byte-Slider;

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5.13 1-Byte-Value-Pushbutton

ETS objects:		
Range of values	0...255	
Input	-	-
Output	Value	1 Byte
	ValueB	1 Byte

Format:	
IMG	Choosing an image
PRESS	Value that will be sent when pressing button
RELEASE	Value that will be sent when releasing button
LABEL	Text default for button
NOBG	No button background
JUMP	Command to jump to any side
LOGIC	Function call or direct incorporation of a logical function
LOGICR	Function call or direct incorporation of a logical function
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple button element to send/receive a 1-byte value 0...255.

Using LABEL, you can define the text, or else an image using IMG, on the button.

PRESS determines the value that will be sent when pressing the button.

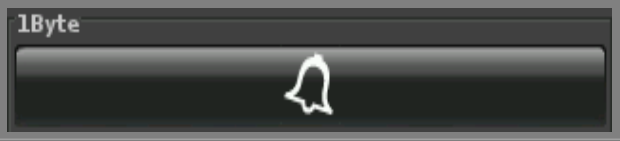
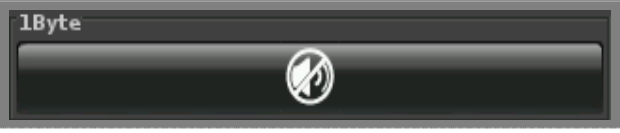
RELEASE determines the value that will be sent when releasing the button.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when pressing the button.

Using LOGICR, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when releasing the button.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

examples:	
	1Byte; PRESS=115;LABEL=DOWN
	1Byte; PRESS=112;IMG=bell_b_on
	1Byte; RELEASE=71;LABEL=UP
	1Byte; RELEASE=0;IMG=sound_b_off

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5.14 1-Byte-Timer-Profile 0..100%

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte
Format:		
W	Determines width of button's surface	
IMG	Choosing set of images	
OVRTO	Determines the time (in minutes) until manual settings are overwritten	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN	

Complex element to send a 1-byte value 0...255 in a set time allowance.

W (in Pixel) determines the width of the display's surface.

OVRTO determines the span of time, after which the settings made manually by the user are overwritten by the values set in the time table. (in minutes)

NOBG eliminates the button's surface and the display is visualized directly on the background.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set).

MIN determines lower limit.

MAX determines upper limit.

If "Use PIN" is selected, the default master password will be used in case PIN is not set.

Using PIN, an individual password can be assigned. In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.

examples:	
	1Byte-Timer; IMG=bell_b_on.png;NOBG;OVRTO=1
	Pressing the options button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled.

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It is possible to determine up to 6 times for each weekday, at which freely selectable values out of the object value range can be sent.

5.15 1-Byte-Timer-Profile 0..255

ETS objects:		
Range of values	0...255	
Input	Feedback	1 Byte
Output	Switching	1 Byte
Format:		
W	Determines width of button's surface	
IMG	Choosing set of images	
OVRTO	Determines the time (in minutes) until manual settings are overwritten	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN	

Complex element to send a 1-byte value 0...255 in a set time allowance.

W (in Pixel) determines the width of the display's surface.

OVRTO determines the span of time, after which the settings made manually by the user are overwritten by the values set in the time table. (in minutes)

NOBG eliminates the button's surface and the display is visualized directly on the background.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set).

MIN determines lower limit.

MAX determines upper limit.

If "Use PIN" is selected, the default master password will be used in case PIN is not set.

Using PIN, an individual password can be assigned. In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.

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examples:	
	1Byte-Timer; IMG=bell_b_on.png;NOBG;OVRTO=1
	Pressing the options button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled.
	It is possible to determine up to 6 times for each weekday, at which freely selectable values out of the object value range can be sent.

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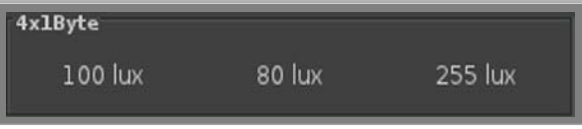
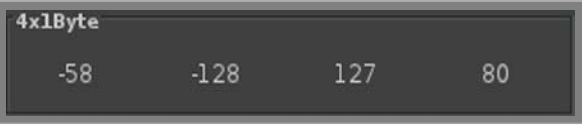
5.16 1-Byte-Quad-Value/Change 0..255

ETS objects:			Simple element to receive 4x 1-byte values 0...255. W (in Pixel) determines the width of the button's surface. N determines how many buttons are displayed. (A maximum of 4) Using PF, a unit of measurement can be adjusted according to the measured value.
Range of values	4x 0...255		
Input	4x Feedback	4x 1Byte	
Format:			
W	Determines width of display's surface		
PF	Declaration of the unit		
N	Number of buttons displayed		

examples:	
	4x1Byte;N=3;PF=lux

5.17 1-Byte-Quad-Value/Change -128..127

ETS objects:			Simple element to receive 4x 1-byte values -128...127 W (in Pixel) determines the width of the button's surface. N determines how many buttons are displayed. (A maximum of 4) Using PF, a unit of measurement can be adjusted according to the measured value.
Range of values	4x -128...127		
Input	4x Feedback	4x 1Byte	
Format:			
W	Determines width of display's surface		
PF	Declaration of the unit		
N	Number of buttons displayed		

examples:	
	4x1Byte;N=4;

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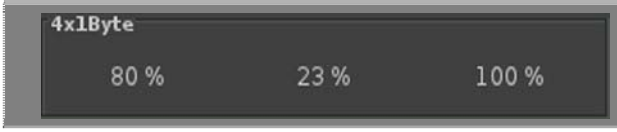
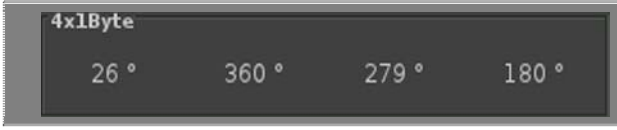
5.18 1-Byte-Quad-Value/Change 0..100%

ETS objects:			Simple element to receive 4x 1-byte values 0...255 W (in Pixel) determines the width of the button's surface. N determines how many buttons are displayed. (A maximum of 4) Using PF, a unit of measurement can be adjusted according to the measured value.
Range of values	4x 0...255		
Input	4x Feedback	4x 1Byte	
Format:			
W	Determines width of display's surface		
PF	Declaration of the unit		
N	Number of buttons displayed		

examples:	
	4x1Byte;N=3;PF=%;

5.19 1-Byte-Quad-Value/Change 0..360°

ETS objects:			Simple element to receive 4x 1-byte values 0...255 W (in Pixel) determines the width of the button's surface. N determines how many buttons are displayed. (A maximum of 4) Using PF, a unit of measurement can be adjusted according to the measured value.
Range of values	4x 0...255		
Input	4x Feedback	4x 1Byte	
Format:			
W	Determines width of display's surface		
PF	Declaration of the unit		
N	Number of buttons displayed		

examples:	
	4x1Byte;N=4;PF=°;

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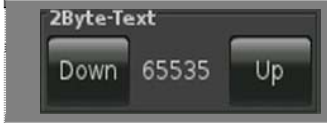
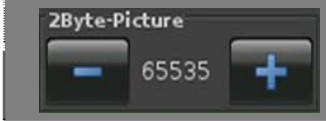
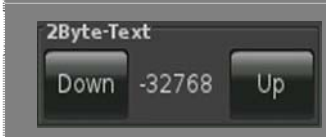
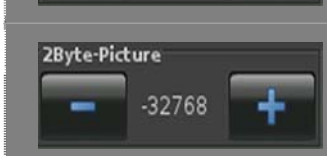
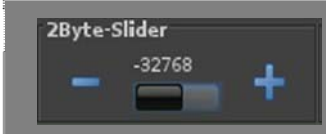
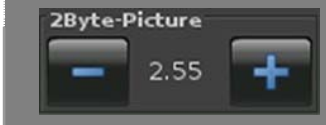
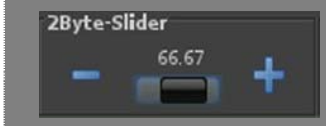
6. Overview 2Byte Elements

Image	Element number Range of values	Element type Format	Details Page
	22 0...65535	**2-Byte-Value-Text-Button 0..65535** W,B-,B+,PF,STEPS,MIN,MAX,AL,AH,NOBG,REP, PIN	6.1
	23 0...65535	**2-Byte-Value-Picture-Button 0..65535** W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP, IMGVAL,PIN	6.2
	24 0...65535	**2-Byte-Value-Slider 0..65535** W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP, PIN	6.3
	25 -32768...32787	**2-Byte-Value-Text-Button -32768..32767** W,B-,B+,PF,STEPS,MIN,MAX,AL,AH,NOBG,REP, PIN	6.4
	26 -32768...32787	**2-Byte-Value-Picture-Button -32768..32767** W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP, IMGVAL,PIN	6.5
	27 -32768...32787	**2-Byte-Value-Slider -32768..32767** W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP, PIN	6.6
	30 -671088.64 ... 670760,96	**2-Byte-Float-Text-Button** W,B-,B+,PF,STEPS,MIN,MAX,AL,AH,NOBG,REP,DC, PIN,*	6.7
	31 -671088.64 ... 670760,96	**2-Byte-Float-Picture-Button** W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP, DC,IMGVAL,PIN,*	6.8
	32 -671088.64 ... 670760,96	**2-Byte-Float-Slider** W,PF,IMGSET,STEPS,MIN,MAX,AL,AH,NOBG,REP, DC,PIN,*	6.9

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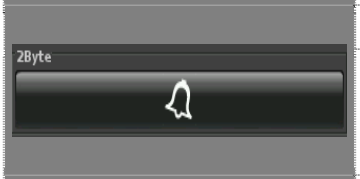
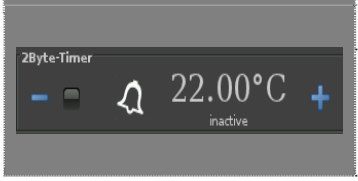
	42	**2-Byte-Value-Pushbutton**	6.10
	0...65535	IMG,PRESS,RELEASE,LABEL,NOBG,JUMP,LOGIC, LOGICR,PIN	
	43	**2-Byte-Float-Value-Pushbutton**	6.11
	-671088.64 ... 670760,96	IMG,PRESS,RELEASE,LABEL,NOBG,JUMP,LOGIC, LOGICR,PIN	
	66	**2-Byte-Float-Timer-Profile**	6.12
	-671088.64 ... 670760,96	W,PF,MIN,MAX,STEP,OVRTO,NOBG,IMG,PIN.PPIN	

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6.1. 2-Byte-Value-Text-Button 0..65535

ETS objects:		
Range of values	0...65535	
Input	Feedback	2 Byte
Output	Switching	2 Byte
Format:		
W	Determines width of button's surface	
B+	Text default for button on incrementing	
B-	Text default for button on decrementing	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 2-byte value 0...65535.

Use B- and B+ to determine the button's texts.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

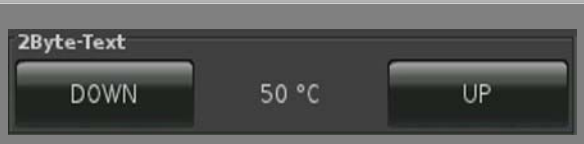
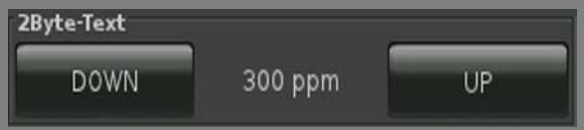
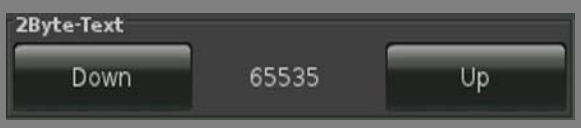
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	2Byte-Text;PF=°C;B+=UP;B-=DOWN;MIN=50;MAX=200; STEPS=75;REP=500;
	2Byte-Text;PF=ppm;B+=DOWN;B-=UP;MIN=300;MAX=1100; STEPS=400;REP=500;
	2Byte-Text;

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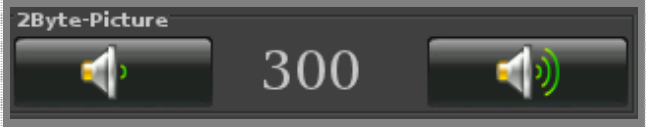
6.2. 2-Byte-Value-Picture-Button 0..65535

ETS objects:			Simple element to send/receive a 2-byte value 0...65535. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	0...65535		
Input	Feedback	2 Byte	
Output	Switching	2 Byte	
Format:			
W	Determines width of button's surface		
IMGSET	Choosing set of images		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM SIDE		
AH	Alarm upper limit / ONLY ON ALARM SIDE		

examples:	
	2Byte-Picture;IMGSET=bass;MIN=50;MAX=200; STEPS=75;REP=500;
	2Byte-Picture;IMGSET=volume;MIN=300;MAX=1100; STEPS=400;REP=500;
	2Byte-Picture;

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6.3. 2-Byte-Value-Slider 0..65535

ETS objects:		
Range of values	0...65535	
Input	Feedback	2 Byte
Output	Switching	2 Byte
Format:		
W	Determines width of button's surface	
IMGSET	Choosing set of images	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 2-byte value 0...65535.

Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

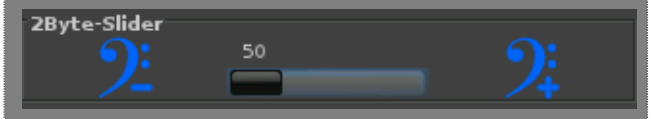
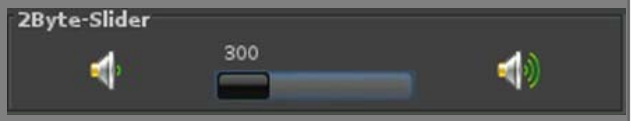
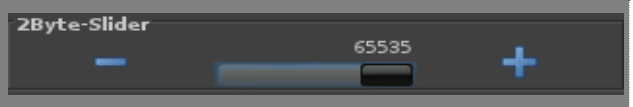
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	2Byte-Slider;IMGSET=bass;MIN=50;MAX=200; STEPS=75;REP=500;
	2Byte-Slider;IMGSET=volume;MIN=300;MAX=1100; STEPS=400;REP=500;
	2Byte-Slider;

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6.4. 2-Byte-Value-Text-Button -32768..32767

ETS objects:		
Range of values	-32768...32767	
Input	Feedback	2 Byte
Output	Switching	2 Byte
Format:		
W	Determines width of button's surface	
B+	Text default for button on incrementing	
B-	Text default for button on decrementing	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 2-byte value -32768...32767.

Use B- and B+ to determine the button's texts.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

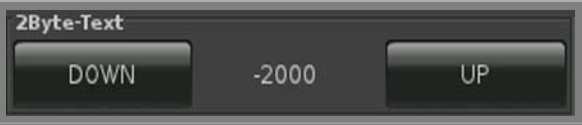
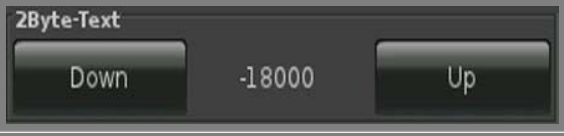
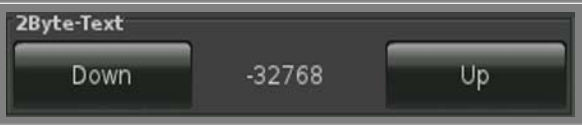
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	2Byte-Text;B+=UP;B-=DOWN;MIN=-2000;MAX=100;
	2Byte-Text;B+=DOWN;B-=UP;MIN=-18000;MAX=2000;
	2Byte-Text;

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6.5. 2-Byte-Value-Picture-Button -32768..32767

ETS objects:		
Range of values	-32768...32767	
Input	Feedback	2 Byte
Output	Switching	2 Byte
Format:		
W	Determines width of button's surface	
IMGSET	Choosing set of images	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple circuit element to send/receive a 2-byte value -32768...32767.

Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

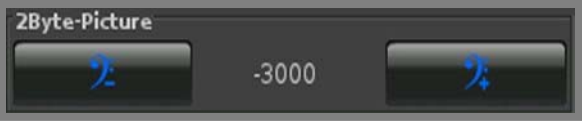
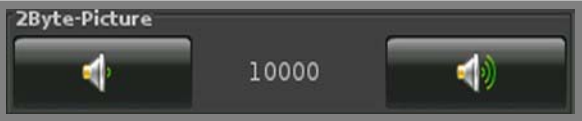
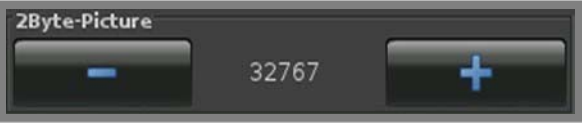
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	2Byte-Picture;IMGSET=bass;MIN=-3000;MAX=-100;
	2Byte-Picture;IMGSET=volume;MIN=-20000;MAX=10000;
	2Byte-Picture;

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6.6. 2-Byte-Value-Slider -32768..32767

ETS objects:		
Range of values	-32768...32767	
Input	Feedback	2 Byte
Output	Switching	2 Byte

Format:	
W	Determines width of button's surface
IMGSET	Choosing set of images
NOBG	No button background
PF	Declaration of the unit
STEPS	Setting step width
MIN	Default setting of lower limit
MAX	Default setting of upper limit
REP	Setting repetition rate
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN
AL	Alarm lower limit / ONLY ON ALARM SIDE
AH	Alarm upper limit / ONLY ON ALARM SIDE

Simple element to send/receive a 2-byte value -32768...32767.

Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

MIN determines lower limit.

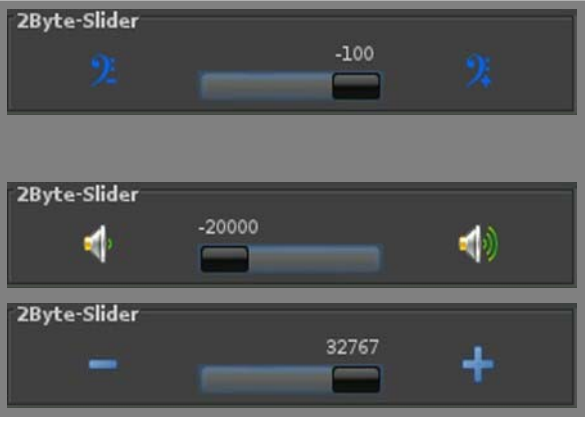
MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:



2Byte-Slider;IMGSET=bass;MIN=-3000;MAX=-100;

2Byte-Slider;IMGSET=volume;MIN=-20000;MAX=10000;

2Byte-Slider;

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6.7. 2-Byte-Float-Text-Button

ETS objects:		
Range of values	0...65535	
Input	Feedback	2 Byte
Output	Switching	2 Byte
Format:		
W	Determines width of button's surface	
B+	Text default for button on incrementing	
B-	Text default for button on decrementing	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
DC	Number of displayed decimal places	
*	Multiplication factor	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 2-byte value 0...65535.

Use B- and B+ to determine the button's texts.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

DC defines the displayed decimal places.

Use * to determine a multiplication factor.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

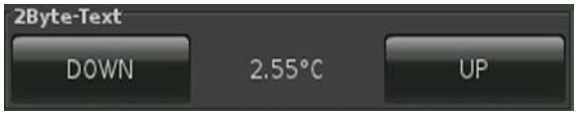
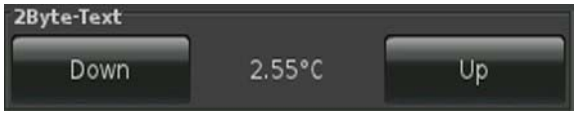
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	2Byte-Text;B+=UP;B-=DOWN;PF=°C;DC=2;
	2Byte-Text;B+=HIGH;B-=LOW;PF=°C;DC=3;*=100;
	2Byte-Text;

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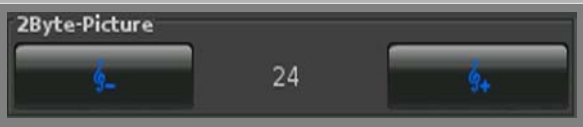
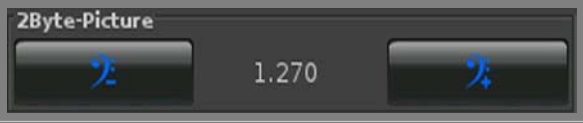
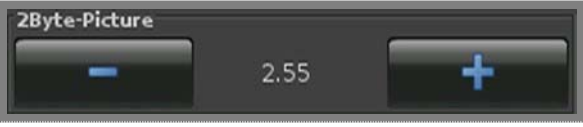
6.8. 2-Byte-Float-Picture-Button

ETS objects:			Simple element to send/receive a 2-byte value 0...65535. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. DC defines the displayed decimal places. Use * to determine a multiplication factor. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	0...65535		
Input	Feedback	2 Byte	
Output	Switching	2 Byte	
Format:			
W	Determines width of button's surface		
IMGSET	Choosing set of images		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
DC	Number of displayed decimal places		
*	Multiplication factor		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM SIDE		
AH	Alarm upper limit / ONLY ON ALARM SIDE		

examples:	
	2Byte-Picture;IMGSET=treble;DC=0;PF= ;
	2Byte-Picture;IMGSET=bass;DC=3;*=0,01;PF= ;
	2Byte-Picture;PF= ;

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6.9. 2-Byte-Float-Slider

ETS objects:		
Range of values	0...65535	
Input	Feedback	2 Byte
Output	Switching	2 Byte
Format:		
W	Determines width of button's surface	
IMGSET	Choosing set of images	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
DC	Number of displayed decimal places	
*	Multiplication factor	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple element to send/receive a 2-byte value 0...65535.

Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

DC defines the displayed decimal places.

Use * to determine a multiplication factor.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

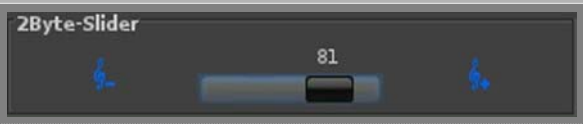
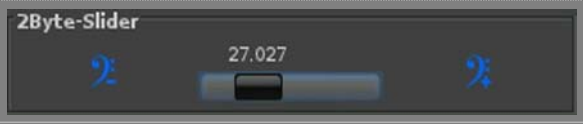
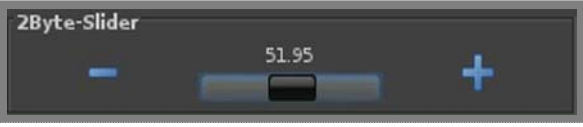
MIN determines lower limit.

MAX determines upper limit.

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

examples:	
	2Byte-Slider;IMGSET=treble;DC=0;PF= ;
	2Byte-Slider;IMGSET=bass;DC=3;*=0,01;PF= ;
	2Byte-Slider;PF= ;

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6.10. 2-Byte-Value-Pushbutton

ETS objects:		
Range of values	0...255	
Input	-	-
Output	Value	2 Byte
	ValueB	2 Byte

Format:	
IMG	Choosing an image
PRESS	Value that will be sent when pressing button
RELEASE	Value that will be sent when releasing button
LABEL	Text default for button
NOBG	No button background
JUMP	Command to jump to any side
LOGIC	Function call or direct incorporation of a logical function
LOGICR	Function call or direct incorporation of a logical function
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple button element to send a 2-byte value 0...65535.

Using LABEL, you can define the text, or else an image using IMG, on the button.

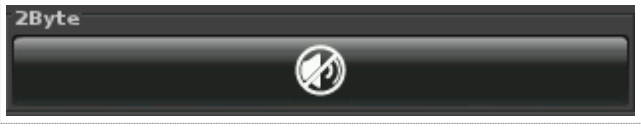
PRESS determines the value that will be sent when pressing the button.

RELEASE determines the value that will be sent when releasing the button.

NOBG eliminates the button's surface and the display is visualized directly on the background. Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when pressing the button.

Using LOGICR, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when releasing the button.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

examples:	
	2Byte; PRESS=6500;LABEL=LOW
	2Byte; PRESS=10050;IMG=bell
	2Byte; RELEASE=1;LABEL=HIGH
	2Byte; RELEASE=0;IMG=sound

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6.11. 2-Byte-Float-Value-Pushbtton

ETS objects:		
Range of values	2 Byte Float	
Input	-	-
Output	Value	2 Byte
	ValueB	2 Byte

Format:	
IMG	Choosing an image
PRESS	Value that will be sent when pressing button
RELEASE	Value that will be sent when releasing button
LABEL	Text default for button
NOBG	No button background
JUMP	Command to jump to any side
LOGIC	Function call or direct incorporation of a logical function
LOGICR	Function call or direct incorporation of a logical function
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple button element to send a 2-byte float value.

Using LABEL, you can define the text, or else an image using IMG, on the button.

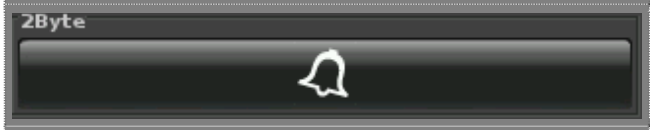
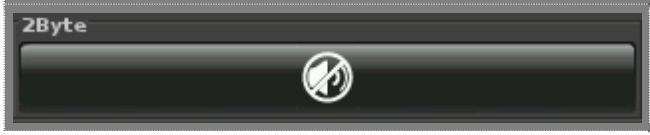
PRESS determines the value that will be sent when pressing the button.

RELEASE determines the value that will be sent when releasing the button.

NOBG eliminates the button's surface and the display is visualized directly on the background. Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when pressing the button.

Using LOGICR, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when releasing the button.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

examples:	
	2Byte; PRESS=32,5;LABEL=LOW
	2Byte; PRESS=-12,25;IMG=bell
	2Byte; RELEASE=0,01;LABEL=HIGH
	2Byte; RELEASE=0;IMG=sound_b_off

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6.12. 2-Byte-Float-Timer-Profile

ETS objects:		
Range of values	2 Byte Float	
Input	-	-
Output	Profile	2 Byte
	Profile Enable	2 Byte

Format:	
W	Determines width of display's surface
IMG	Choosing an image
OVRTO	Determines the time (in minutes) until manual settings are overwritten
NOBG	No button background
STEP	Setting step width
MIN	Default setting of lower limit
MAX	Default setting of upper limit
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN

Complex element to send a 2-byte float value 0...255 in a set time allowance.

W (in Pixel) determines the width of the display's surface.

OVRTO determines the span of time, after which the settings made manually by the user are overwritten by the values set in the time table. (in minutes)

NOBG eliminates the button's surface and the display is visualized directly on the background.

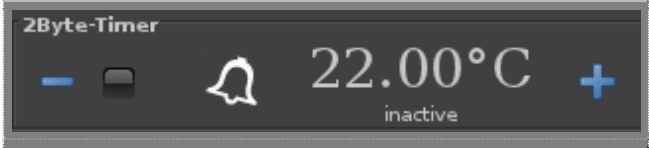
STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set).

MIN determines lower limit.

MAX determines upper limit.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.

examples:	
	2Byte-Timer; IMG=bell_b_on.png;NOBG;OVRTO=1
	Pressing the options button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled.
	It is possible to determine up to 6 times for each weekday, at which freely selectable values out of the object value range can be sent.

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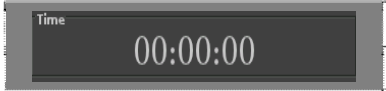
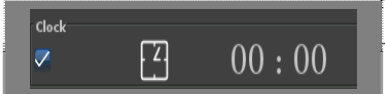
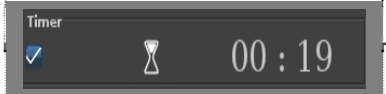
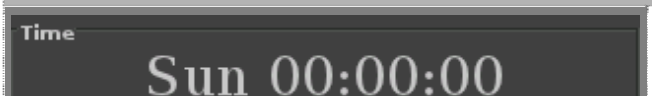
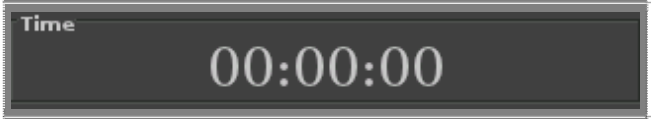
7. Overview Time/Date Elements

Image	Element number Range of values	Element type Format	Page
	50 Time	**3-Byte-Time** LONG,NOBG,ACTUAL,PIN	7.1
	51 Date	**3-Byte-Date** LONG,NOBG,ACTUAL,PIN	7.2
	60 0/1	**Alarmclock** W,MOD,ALTO,PIN,PPIN,NOBG	7.3
	61 0/1	**Alarmtimer** W,MOD,ALTO,PIN,PPIN,NOBG	7.4

7.1. 3-Byte-Time

ETS Objects:			Complex clock element to send/receive a 3-byte value. Use LONG to add weekday to time. Use ACTUAL to visualise internal time. (Without use of communication objects) NOBG eliminates the button's surface and the display is visualized directly on the background. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned .
Range of values	Time		
Input	Feedback	3Byte	
Input/Output	Time	3Byte	
Format:			
LONG	Activating weekday statement		
NOBG	No button background (only possible in special modification)		
ACTUAL	Visualizing internal time		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	Time; LONG
	Time;
	Pressing the time button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled.

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7.2. 3-Byte-Date

ETS Objects:			Complex clock element to send/receive a 3-byte value. Use LONG to add weekday to time. Use ACTUAL to visualize internal time. (Without use of communication objects) NOBG eliminates the button's surface and the display is visualized directly on the background. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned .
Range of values	Date		
Input	Feedback	3Byte	
Input/Output	Date	3Byte	
Format:			
LONG	Activating long year display		
NOBG	No button background (only possible in special modification)		
ACTUAL	Visualizing internal time		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	Date; LONG
	Date;
	Pressing the date button will open a dialog box where date allowances can be set, according to which the ETS object is then controlled.

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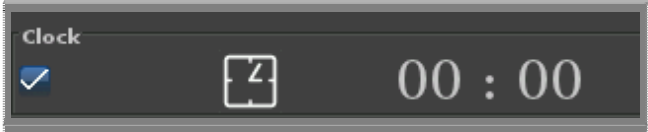
7.3. Alarmclock

ETS Objects:			Timer element to send a 1-bit value. Can additionally be activated from the bus. Use ALTO to determine length of the alarm. (in seconds) Use SILENT to trigger a silent alarm. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.
Range of values			
Input/Output	Alarm clock Enable	1bit	
Output	Alarm clock	1bit	
Format:			
W	Determines width of display's surface		
ALTO	Time allowance for alarm duration		
SILENT	Silent alarm		
NOBG	No button background (only possible in special modification)		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN		

Examples:	
	Clock; ALTO=5
	Clock; SILENT
	Pressing the time button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled. Format (hh:mm)

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7.4. Alarmtimer

ETS Objects:			Timer element to send a 1-bit value. Can additionally be activated from the bus. Use ALTO to determine length of the alarm. (in seconds) Use SILENT to trigger a silent alarm. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.
Range of values			
Input/Output	Alarm timer Enable	1bit	
Output	Alarm timer	1bit	
Format:			
W	Determines width of display's surface		
ALTO	Time allowance for alarm duration		
SILENT	Silent alarm		
NOBG	No button background (only possible in special modification)		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN		

Examples:	
	Timer; ALTO=5
	Timer; SILENT
	Pressing the time button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled. Format (hh:mm)

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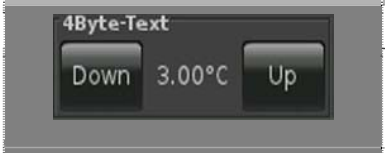
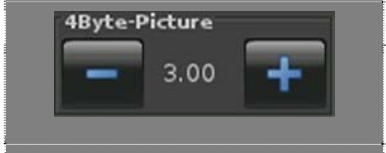
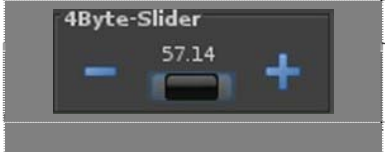
8. Overview 4Byte Elements

Image	Element number	Element type	Page
	Range of values	Format	
	33	**4-Byte-Float-Text-Button**	8.1
	IEEE 754	W,B- ,B+,PF,STEPS,MIN,MAX,AL,AH,NO BG,REP,DC, PIN,*,INT,UNIT	
	34	**4-Byte-Float-Picture-Button**	8.2
	IEEE 754	W,PF,IMGSET,STEPS,MIN,MAX,AL, AH,NOBG,REP, DC,IMGVAL,PIN,*,INT,UNIT	
	35	**4-Byte-Float-Slider**	8.3
	IEEE 754	W,PF,IMGSET,STEPS,MIN,MAX,AL, AH,NOBG,REP, DC,PIN,*,INT,UNIT	
	44	**4-Byte-Value-Pushbutton**	8.4
	IEEE 754	IMG,PRESS,RELEASE,LABEL,NOB G,JUMP,LOGIC, LOGICR,PIN	
	45	**4-Byte-Float-Value-Pushbutton**	8.5
	IEEE 754	IMG,PRESS,RELEASE,LABEL,NOB G,JUMP,LOGIC, LOGICR,PIN	

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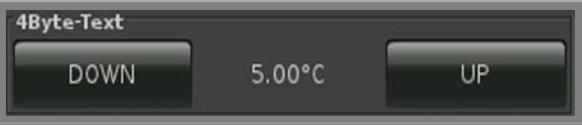
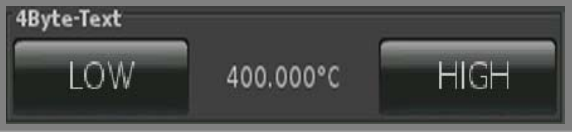
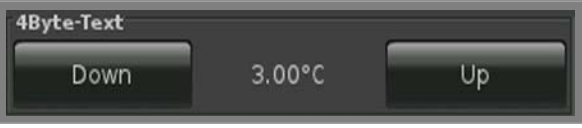
8.1. 4-Byte-Float-Text-Button

ETS objects:			Simple element to send/receive a 4-byte value. Use B- and B+ to determine the button's texts. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. DC defines the displayed decimal places. Use * to determine a multiplication factor. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) Using INT the number range can be changed from floating point (float) to integers (integer). Using UINT the number range can be changed from floating point (float) to unsigned integers (unsigned Integer). If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	4 Byte		
Input	Feedback	4 Byte	
Output	Switching	4 Byte	
Format:			
W	Determines width of button's surface		
B+	Text default for button on incrementing		
B-	Text default for button on decrementing		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
DC	Number of displayed decimal places		
*	Multiplication factor		
INT	Shift of number range to integer		
UINT	Shift of number range to unsigned integer		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM		
AH	Alarm upper limit / ONLY ON ALARM		

Examples:	
	4Byte-Text;B+=UP;B-=DOWN;PF=°C;DC=2;
	4Byte-Text;B+=LOW;B-=HIGH;PF=°C;DC=3;*=100;
	4Byte-Text;

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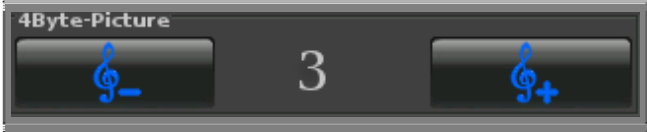
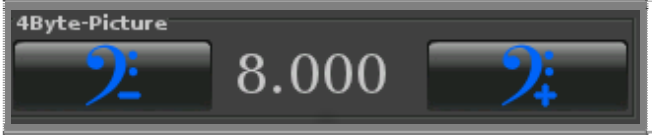
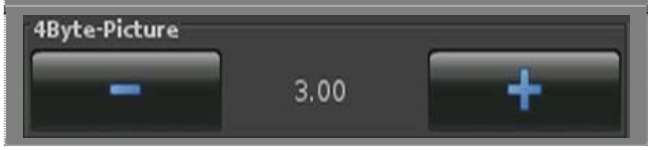
8.2. 4-Byte-Float-Picture-Button

ETS objects:			Simple element to send/receive a 4-byte value. Use IMGSET to chose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. Using PF, a unit of measurement can be adjusted according to the measured value. DC defines the displayed decimal places. Use * to determine a multiplication factor. STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set) MIN determines lower limit. MAX determines upper limit. When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) Using INT the number range can be changed from floating point (float) to integers (integer). Using UINT the number range can be changed from floating point (float) to unsigned integers (unsigned Integer). If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.
Range of values	4 Byte		
Input	Feedback	4 Byte	
Output	Switching	4 Byte	
Format:			
W	Determines width of button's surface		
IMGSET	Choosing set of images		
NOBG	No button background		
PF	Declaration of the unit		
STEPS	Setting step width		
MIN	Default setting of lower limit		
MAX	Default setting of upper limit		
REP	Setting repetition rate		
DC	Number of displayed decimal places		
*	Multiplication factor		
INT	Shift of number range to integer		
UINT	Shift of number range to unsigned integer		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
AL	Alarm lower limit / ONLY ON ALARM SIDE		
AH	Alarm upper limit / ONLY ON ALARM SIDE		

Examples:	
	4Byte-Picture;IMGSET=treble;DC=0;PF= ;
	4Byte-Picture;IMGSET=bass;DC=3;*=0,01;PF= ;
	4Byte-Picture;PF= ;

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8.3. 4-Byte-Float-Slider

ETS objects:		
Range of values	4 Byte	
Input	Feedback	4 Byte
Output	Switching	4 Byte
Format:		
W	Determines width of button's surface	
IMGSET	Choosing set of images	
NOBG	No button background	
PF	Declaration of the unit	
STEPS	Setting step width	
MIN	Default setting of lower limit	
MAX	Default setting of upper limit	
REP	Setting repetition rate	
DC	Number of displayed decimal places	
*	Multiplication factor	
INT	Shift of number range to integer	
UINT	Shift of number range to unsigned integer	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
AL	Alarm lower limit / ONLY ON ALARM SIDE	
AH	Alarm upper limit / ONLY ON ALARM SIDE	

Simple circuit element to send/receive a 4-byte value.

Use IMGSET to chose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using PF, a unit of measurement can be adjusted according to the measured value.

DC defines the displayed decimal places.

Use * to determine a multiplication factor.

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set)

MIN determines lower limit.

MAX determines upper limit.

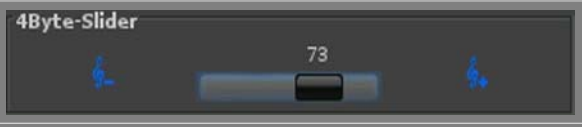
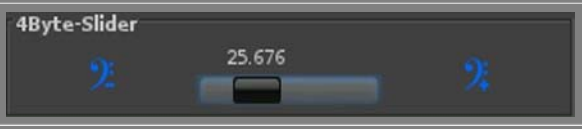
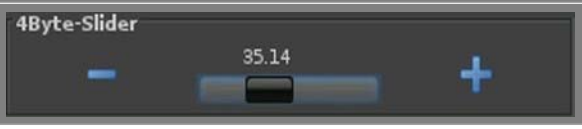
When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

Using INT the number range can be changed from floating point (float) to integers (integer).

Using UINT the number range can be changed from floating point (float) to unsigned integers (unsigned Integer).

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

AL/AH can only be used on alarm side. They serve as a limit setting the temporal point from which an alarm is detected.

Examples:	
	4Byte-Slider;IMGSET=treble;DC=0;PF= ;
	4Byte-Slider;IMGSET=bass;DC=3;*=0,01;PF= ;
	4Byte-Slider;PF= ;

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8.4. 4-Byte-Value-Pushbutton

ETS objects:		
Range of values	4 Byte	
Input	-	-
Output	Value	4 Byte
	Value B	4 Byte

Format:	
IMG	Choosing an image
PRESS	Value that will be sent when pressing button
RELEASE	Value that will be sent when releasing button
LABEL	Text default for button
NOBG	No button background
JUMP	Command to jump to any side
LOGIC	Function call or direct incorporation of a logical function
LOGICR	Function call or direct incorporation of a logical function
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple button element to send a 4-byte value.

Using LABEL, you can define the text, or else an image using IMG, on the button.

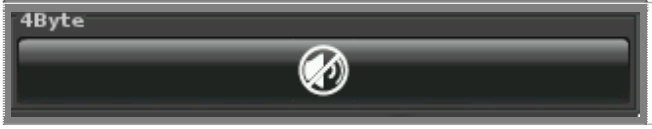
PRESS determines the value that will be sent when pressing the button.

RELEASE determines the value that will be sent when releasing the button.

NOBG eliminates the button's surface and the display is visualized directly on the background. Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when pressing the button.

Using LOGICR, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when releasing the button.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	4Byte; PRESS=6500;LABEL=DOWN
	4Byte; PRESS=10050;IMG=bell
	4Byte; RELEASE=1;LABEL=LOW
	4Byte; RELEASE=0;IMG=sound_b_off

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8.5. 4-Byte-Float-Value-Pushbutton

ETS objects:		
Range of values	4 Byte Float	
Input	-	-
Output	Value	4 Byte
	Value B	4 Byte

Format:	
IMG	Choosing an image
PRESS	Value that will be sent when pressing button
RELEASE	Value that will be sent when releasing button
LABEL	Text default for button
NOBG	No button background
JUMP	Command to jump to any side
LOGIC	Function call or direct incorporation of a logical function
LOGICR	Function call or direct incorporation of a logical function
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple button element to send a 4-byte float value.

Using LABEL, you can define the text, or else an image using IMG, on the button.

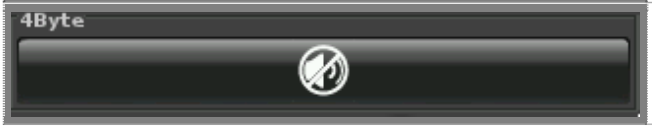
PRESS determines the value that will be sent when pressing the button.

RELEASE determines the value that will be sent when releasing the button.

NOBG eliminates the button's surface and the display is visualized directly on the background. Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when pressing the button.

Using LOGICR, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when releasing the button.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	4Byte; PRESS=32,5;LABEL=DOWN
	4Byte; PRESS=-12,25;IMG=bell_b_on
	4Byte; RELEASE=0,01;LABEL=LOW
	4Byte; RELEASE=0;IMG=sound_b_off

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9. Overview 14Byte Elements

Image	Element number Range of values	Element type Format	Details Page
	46	**14-Byte-String-Pushbutton**	9.1
	14Byte	MG,PRESS,RELEASE,LABEL,NOBG,JUMP,LOGIC, LOGICR,PIN	
	52	**14-Byte-String**	9.2
	14Byte	NOBG,TEXT	

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9.1. 14-Byte-String-Pushbutton

ETS Objects:		
Range of values	-	
Input	-	
Output	Value	14Byte
Format:		
IMG	Choosing an image	
PRESS	Value that will be sent when pressing button	
PRESS	Value that will be sent when releasing button	
LABEL	Text default for button	
NOBG	No button background	
JUMP	Command to jump a user-defined page	
LOGIC	Function call or direct incorporation of a logical function	
LOGICR	Function call or direct incorporation of a logical function	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	

Simple button element to send a 14-byte string.

Using LABEL, you can define the text, or else an image using IMG, on the button.

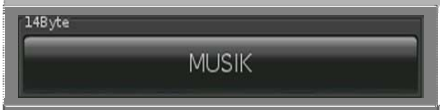
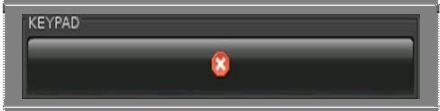
PRESS determines the value that will be sent when pressing the button.

RELEASE determines the value that will be sent when releasing the button.

NOBG eliminates the button's surface and the display is visualized directly on the background.

Using LOGIC, LUA functions can be activated or manually incorporated in a LUA syntax-based logical function which is triggered when pressing the button.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	14Byte; PRESS=PLAY;LABEL=MUSIK
	KEYPAD; PRESS=KEYPAD;IMG=acc_cancel_b_on; KEYPAD; RELEASE=KEYPAD;IMG=acc_cancel_b_on;
	Pressing the button will open a dialog box in which an alpha numeric input will be effected, according to which the ETS object is then controlled.

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9.2. 14-Byte-String

ETS Objects:			Simple text element to receive a 14-byte string. Using TEXT a text default can be effected which will be set upon the display element as a default value after every reset. NOBG eliminates the button's surface and the display is visualized directly on the background.
Range of values			
Input	Value	14Byte	
Output			
Format:			
TEXT	Text default		
NOBG	No button background		

Examples:	
	14Byte; TEXT=Hallo;
	14Byte; TEXT=UG;

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10. Overview Scene Elements

Image	Element number Range of values	Element type Format	Details Page
	55 0...63	**Scene-Control-Recall-Save (until FW v 2.15)** TO,N,MOD,Nx,Sx (x = 1..4),NOBG,PIN,PPIN	10.1
	56 0...63	**Scene-Control-Recall-Only (until FW v 2.15)** N,MOD,Nx,Sx (x = 1..4),NOBG,PIN	10.2
	57 0...63	**Scene-Control-Save-Only (until FW v 2.15)** N,MOD,Nx,Sx (x = 1..4),NOBG,PIN	10.5
	55 0...63	**Scene-Control-Recall-Save (from FW v 2.16)** TO,N,MOD,Nx,SCENES=x (x = 1..64) ,NOBG,PIN,PPIN	
	56 0...63	**Scene-Control-Recall-Only (from FW v 2.16)** N,MOD,Nx, SCENES=x (x = 1..64),NOBG,PIN	5
	57 0...63	**Scene-Control-Save-Only (from FW v 2.16)** N,MOD,Nx, SCENES=x (x = 1..64),NOBG,PIN	

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10.1. Scene-Control-Recall-Save (Until FW version 2.15)

ETS Objects:			Complex element to activate and save up to 4 external scene stores (corresponding with DPT 18.001). Use TO to determine the time (in milliseconds) from which the manual input will be taken as LONG. N determines how many buttons are displayed. Using MOD, the output control can be adjusted. SINGLE: Displayed buttons communicate via Scene Control1 SC2- SC4 have no functions. DIFF: Displayed buttons communicate via the corresponding Scene Control objects. DUAL: Displayed buttons communicate via SC1 and SC2. Use SC1 to retrieve and SC2 to save scenes. SC3-SC4 have no functions. N1..N4 determine the labelling of the buttons. Use S1..S4 to determine the scene store you want to use for the respective button. NOBG eliminates the button's surface and the display is visualized directly on the background. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned. In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.
Range of values			
Input	-	-	
Output	Scene Control 1	1 Byte	
	Scene Control 2	1 Byte	
	Scene Control 3	1 Byte	
	Scene Control 4	1 Byte	
Format:			
TO	Time allowance in ms for input analysis		
N	Number of buttons displayed		
MOD	Setting output parameters SC1..SC4		
	SINGLE	Saving and activation via SC1	
	DUAL	Saving control via SC2 and retrieving control via SC1	
	DIFF	SC1..SC4 are working independently	
Nx(1..4)	Labelling of buttons		
Sx(1..4)	Determination of locations in use		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN		

Examples:	
	Scene-RS; TO=500;N=3;MOD=DUAL;N1=AN;N2=AUS;N3=ROT;S1=1;S2=2;S3=3;
	Scene-RS; TO=1000;N=2;MOD=DIFF;N1=ON;N2=OFF;S1=4;S2=5;

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After TO has elapsed, a memory dialog will open. With the confirmation and depending on the MOD position the ETS objects are set..

10.2. Scene-Control-Recall-Save (From FW version 2.16)

ETS Objects:			Complex element to activate and save up to 4 external scene stores (corresponding with DPT 18.001).
Range of values			
Input	-	-	Use TO to determine the time (in milliseconds) from which the manual input will be taken as LONG.
Output	Scene Control 1	1 Byte	N determines how many buttons are displayed.
	Scene Control 2	1 Byte	
	Scene Control 3	1 Byte	Using MOD, the output control can be adjusted.
	Scene Control 4	1 Byte	SINGLE: Displayed buttons communicate via Scene Control1 SC2- SC4 have no functions.
Format:			
TO	Time allowance in ms for input analysis		DIFF: Displayed buttons communicate via the corresponding Scene Control objects.
N	Number of buttons displayed		
MOD	Setting output parameters SC1..SC4		DUAL: Displayed buttons communicate via SC1 and SC2. Use SC1 to retrieve and SC2 to save scenes. SC3-SC4 have no functions.
	SINGLE	Saving and activation via SC1	
	DUAL	Saving control via SC2 and retrieving control via SC1	LABELS determine the labelling of the buttons.
	DIFF	SC1..SC4 are working independently	IMAGES determine the selected images for the buttons.
LABELS	Labelling of buttons		Use SCENES to determine the scene store you want to use for the respective button.
IMAGES	Selecting of Images for the buttons		
SCENES	Determination of locations in use		NOBG eliminates the button's surface and the display is visualized directly on the background.
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN		In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.

Examples:	
	Scene-RS; TO=500;N=3;MOD=DUAL;LABELS=AN,AUS,ROT;SCENES=1,2,3;

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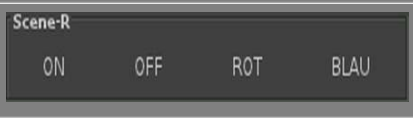
	Scene-RS; TO=1000;N=2;MOD=DIFF;LABELS=ON,OFF;SCENES=4,5;

10.3. Scene-Control-Recall-Only (Until FW version 2.15)

ETS Objects:			Simple element to activate up to 4 external scene stores (corresponding with DPT 18.001). N determines how many buttons are displayed. Using MOD, the output control can be adjusted. SINGLE: Displayed buttons communicate via Scene Control 1. SC2-SC4 have no functions. DIFF: Displayed buttons communicate via the corresponding Scene Control objects. N1..N4 determine the labelling of the buttons. Use S1..S4 to determine the scene store you want to use for the respective button. NOBG eliminates the button's surface and the display is visualized directly on the background. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values			
Input			
Output	Scene Control 1	1 Byte	
	Scene Control 2	1 Byte	
	Scene Control 3	1 Byte	
	Scene Control 4	1 Byte	
Format:			
N	Number of buttons displayed		
MOD	Setting output parameters SC1..SC4		
	SINGLE	Saving and activation via SC1	
	DIFF	SC1..SC4 are working independently	
Nx(1..4)	Labelling of buttons		
Sx(1..4)	Determination of locations in use		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	Scene-R; N=3;MOD=DIFF;N1=AN;N2=AUS;N3=ROT;S1=1;S2=2;S3=3 ;
	Scene-R; N=2;MOD=DIFF;N1=ON;N2=OFF;S1=4;S2=5;
	Scene-R; N=4;MOD=SINGLE;N1=ON;N2=OFF;N3=ROT;N4=BLAU;S1=6;S2=7;S3=8;S4=9;NOBG

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10.4. Scene-Control-Recall-Only (From FW version 2.16)

ETS Objects:			Simple element to activate up to 4 external scene stores (corresponding with DPT 18.001). N determines how many buttons are displayed. Using MOD, the output control can be adjusted. SINGLE: Displayed buttons communicate via Scene Control1 SC2- SC4 have no functions. DIFF: Displayed buttons communicate via the corresponding Scene Control objects. DUAL: Displayed buttons communicate via SC1 and SC2. Use SC1 to retrieve and SC2 to save scenes. SC3-SC4 have no functions. LABELS determine the labelling of the buttons. N1..N4 determine the labelling of the buttons. NOBG eliminates the button's surface and the display is visualized directly on the background. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values			
Input			
Output	Scene Control 1	1 Byte	
	Scene Control 2	1 Byte	
	Scene Control 3	1 Byte	
	Scene Control 4	1 Byte	
Format:			
N	Number of buttons displayed		
MOD	Setting output parameters SC1..SC4		
	SINGLE	Saving and activation via SC1	
	DIFF	SC1..SC4 are working independently	
Nx(1..4)	Labelling of buttons		
SCENES	Determination of locations in use		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN		

Examples:	
	Scene-RS; TO=500;N=3;MOD=DUAL;LABELS=AN,AUS,ROT;SCENES=1,2,3;
	Scene-RS; TO=1000;N=2;MOD=DIFF;LABELS=ON,OFF;SCENES=4,5;

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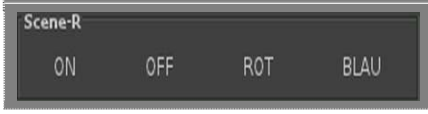
10.5. Scene-Control-Save-Only (Until FW version 2.15)

ETS Objects:			Simple element to save up to 4 external scene stores (corresponding with DPT 18.001). N determines how many buttons are displayed. Using MOD, the output control can be adjusted. SINGLE: Displayed buttons communicate via Scene Control 1. SC2-SC4 have no functions. DIFF: Displayed buttons communicate via the corresponding Scene Control objects. N1..N4 determine the labelling of the buttons. Use S1..S4 to determine the scene store you want to use for the respective button. NOBG eliminates the button's surface and the display is visualized directly on the background. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values			
Input			
Output	Scene Control 1	1 Byte	
	Scene Control 2	1 Byte	
	Scene Control 3	1 Byte	
	Scene Control 4	1 Byte	
Format:			
N	Number of buttons displayed		
MOD	Setting output parameters SC1..SC4		
	SINGLE	Saving and activation via SC1	
	DIFF	SC1..SC4 are working independently	
Nx(1..4)	Labelling of buttons		
Sx(1..4)	Determination of locations in use		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	Scene-S; N=3;MOD=DIFF;N1=AN;N2=AUS;N3=ROT;S1=1;S2=2;S3=3 ;
	Scene-S; N=2;MOD=DIFF;N1=ON;N2=OFF;S1=4;S2=5;
	Scene-S; N=4;MOD=SINGLE;N1=ON;N2=OFF;N3=ROT;N4=BLAU;S1=6;S2=7;S3=8;S4=9;NOBG

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10.6. Scene-Control-Save-Only (From FW version 2.16)

ETS Objects:			Simple element to save up to 4 external scene stores (corresponding with DPT 18.001). N determines how many buttons are displayed. Using MOD, the output control can be adjusted. SINGLE: Displayed buttons communicate via Scene Control1 SC2- SC4 have no functions. DIFF: Displayed buttons communicate via the corresponding Scene Control objects. DUAL: Displayed buttons communicate via SC1 and SC2. Use SC1 to retrieve and SC2 to save scenes. SC3-SC4 have no functions. LABELS determine the labelling of the buttons. IMAGES determine the selected images for the buttons. Use SCENES to determine the scene store you want to use for the respective button. NOBG eliminates the button's surface and the display is visualized directly on the background. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values			
Input			
Output	Scene Control 1	1 Byte	
	Scene Control 2	1 Byte	
	Scene Control 3	1 Byte	
	Scene Control 4	1 Byte	
Format:			
N	Number of buttons displayed		
MOD	Setting output parameters SC1..SC4		
	SINGLE	Saving and activation via SC1	
	DIFF	SC1..SC4 are working independently	
Nx(1..4)	Labelling of buttons		
SCENES	Determination of locations in use		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN		

Examples:	
	Scene-RS; TO=500;N=3;MOD=DUAL;LABELS=AN,AUS,ROT;SCENES=1,2,3;
	Scene-RS; TO=1000;N=2;MOD=DIFF;LABELS=ON,OFF;SCENES=4,5;

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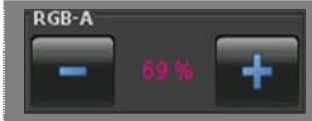
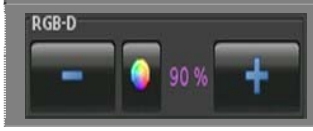
11. Overview RGB Elements

Image	Element number Range of values	Element type Format	Details Page
	76 4x (0...255)	**RGB-Dimmer-A** W,STEPS,IMGSET,B- ,B+,NOBG,RGBH,RGBW,PIN	11.1
	77 4x (0...255)	**RGB-Dimmer-B** W,STEPS,IMGSET,B- ,B+,NOBG,RGBH,RGBW,PIN	11.2
	78 4x (0...255)	**RGB-Dimmer-C** W,STEPS,IMGSET,B- ,B+,NOBG,RGBH,RGBW,PIN	11.3
	79 4x (0...255)	**RGB-Dimmer-D** W,STEPS,IMGSET,B- ,B+,NOBG,RGBH,RGBW,PIN	11.4

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11.1. RGB-Dimmer-A

ETS Objects:		
Range of values	-	
Input	-	-
Input/Output	Red	1 Byte
	Green	1 Byte
	Blue	1 Byte
	White	1 Byte
Format:		
W	Determines width of display's surface	
STEPS	Setting step width	
IMGSET	Choosing set of images	
B-	Text default for button on incrementing	
B+	Text default for button on decrementing	
NOBG	No button background	
RGBH	RGB+brightness	
RGBW	RGB+white	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	

RGB element to send/receive a 3x (or 4x) 1-byte value.

Button feature:
short activation = switching ON/OFF
long activation = Dimming +/-

Set the displayed texts on the buttons using B- and B+.

Use IMGSET to choose the set of images you want to use.

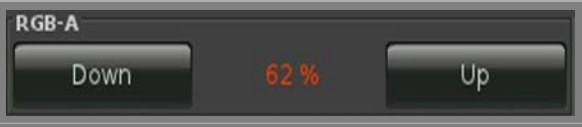
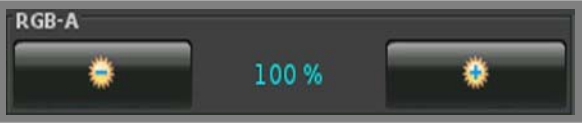
NOBG eliminates the button's surface and the display is visualized directly on the background.

STEPS determines the step width which is required to get from the minimum to the maximum (0...100%).

Using parameter RGBH channel 4 (White) transmits the brightness value and channels 1-3 determine the colour.(only for RGB illuminants that support this feature)

Parameter setting RGBW provides a 4 channel (White). Using this channel an additional white LED can be gated.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	RGB-A;B-=Down;B+=Up;STEPS=10;RGBH;
	RGB-A;IMGSET=light;RGBW;
	Pressing the per cent button will open a dialog box where colour defaults can be set, according to which the ETS objects adjust themselves.

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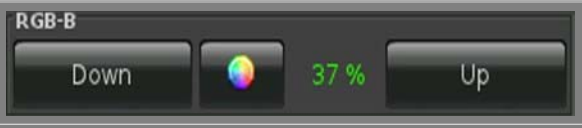
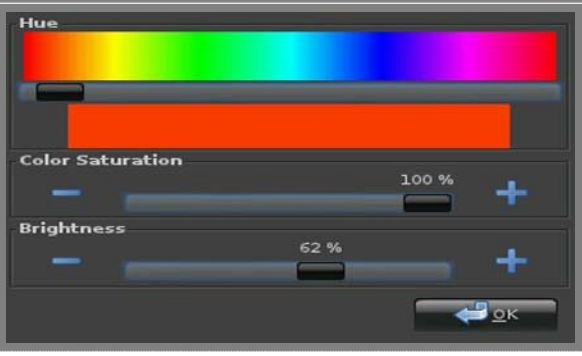
11.2. RGB-Dimmer-B

ETS Objects:			RGB element to send/receive a 3x (or 4x) 1-byte value. Button feature: short activation = switching ON/OFF long activation = Dimming +/- Set the displayed texts on the buttons using B- and B+. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. STEPS determines the step width which is required to get from the minimum to the maximum (0...100%). Using parameter RGBH channel 4 (White) transmits the brightness value and channels 1-3 determine the colour.(only for RGB illuminants that support this feature) Parameter setting RGBW provides a 4 channel (White). Using this channel an additional white LED can be gated. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	-	-	
Input/Output	Red	1 Byte	
	Green	1 Byte	
	Blue	1 Byte	
	White	1 Byte	
Format:			
W	Determines width of display's surface		
STEPS	Setting step width		
IMGSET	Choosing set of images		
B-	Text default for button on incrementing		
B+	Text default for button on decrementing		
NOBG	No button background		
RGBH	RGB+brightness		
RGBW	RGB+white		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	RGB-B;B-=Down;B+=Up;STEPS=10;RGBH;
	RGB-B;IMGSET=light;RGBW;
	Pressing the per cent button will open a dialog box where colour defaults can be set, according to which the ETS objects adjust themselves.

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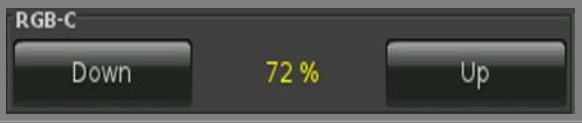
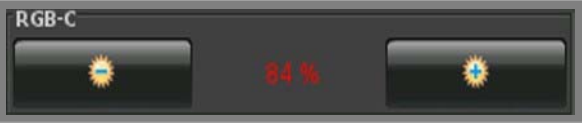
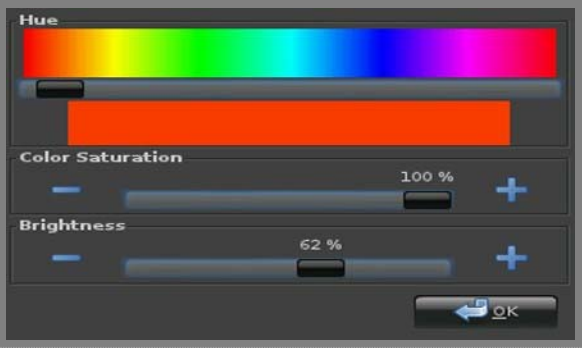
11.3. RGB-Dimmer-C

ETS Objects:			RGB element to send/receive a 3x (or 4x) 1-byte value. Button feature: short activation = switching ON/OFF long activation = Dimming +/- Set the displayed texts on the buttons using B- and B+. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background. STEPS determines the step width which is required to get from the minimum to the maximum (0...100%). Using parameter RGBH channel 4 (White) transmits the brightness value and channels 1-3 determine the colour.(only for RGB illuminants that support this feature) Parameter setting RGBW provides a 4 channel (White). Using this channel an additional white LED can be gated. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	-	-	
Input/Output	Red	1 Byte	
	Green	1 Byte	
	Blue	1 Byte	
	White	1 Byte	
Format:			
W	Determines width of display's surface		
STEPS	Setting step width		
IMGSET	Choosing set of images		
B-	Text default for button on incrementing		
B+	Text default for button on decrementing		
NOBG	No button background		
RGBH	RGB+brightness		
RGBW	RGB+white		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	RGB-C;B-=Down;B+=Up;STEPS=10;RGBH;
	RGB-C;IMGSET=light;RGBW;
	Pressing the per cent button will open a dialog box where colour defaults can be set, according to which the ETS objects adjust themselves.

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11.4. RGB-Dimmer-D

ETS Objects:		
Range of values	-	
Input	-	-
Input/Output	Red	1 Byte
	Green	1 Byte
	Blue	1 Byte
	White	1 Byte
Format:		
W	Determines width of display's surface	
STEPS	Setting step width	
IMGSET	Choosing set of images	
B-	Text default for button on incrementing	
B+	Text default for button on decrementing	
NOBG	No button background	
RGBH	RGB+brightness	
RGBW	RGB+white	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	

RGB element to send/receive a 3x (or 4x) 1-byte value.

Button feature:
short activation = switching ON/OFF
long activation = Dimming +/-

Set the displayed texts on the buttons using B- and B+.

Use IMGSET to choose the set of images you want to use.

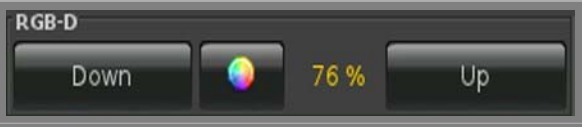
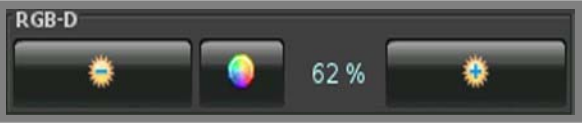
NOBG eliminates the button's surface and the display is visualized directly on the background.

STEPS determines the step width which is required to get from the minimum to the maximum (0...100%).

Using parameter RGBH channel 4 (White) transmits the brightness value and channels 1-3 determine the colour.(only for RGB illuminants that support this feature)

Parameter setting RGBW provides a 4 channel (White). Using this channel an additional white LED can be gated.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	RGB-D;B-=Down;B+=Up;STEPS=10;RGBH;
	RGB-D;IMGSET=light;RGBW;
	Pressing the per cent button will open a dialog box where colour defaults can be set, according to which the ETS objects adjust.

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12. Overview Dimmer Elements

Image	Element number	Element type	Details Page
	Range of values	Format	
	70	**4-Bit-Dimmer-Start-Stop**	12.1
	0...15	W,B-,B+,STEP,REP,TO,IMGSET,PIN,NOBG	
	71	**4-Bit-Dimmer-Repeat**	12.2
	0...15	W,B-,B+,STEP,REP,TO,IMGSET,PIN,NOBG	
	72	**8-Bit-Dimmer-Repeat**	12.3
	0...255	W,B-,B+,STEP,REP,TO,IMGSET,PIN,NOBG	

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12.1. 4-Bit-Dimmer-Start-Stop

ETS Objects:		
Range of values	-	
Input	ON/OFF feedback	1 bit
	Value Feedback	1 Byte
Input/Output	ON/OFF	1 bit
	Dimming	4 bit

Format:	
W	Determines width of display's surface
TO	Time allowance in ms for input analysis
REP	Setting repetition rate
STEPS	Setting step width
IMGSET	Choosing set of images
B-	Text default for button on incrementing
B+	Text default for button on decrementing
NOBG	No button background
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple 4-bit dimmer element to send/receive values.

Button feature:
short activation = switching ON/OFF
long activation = dimming (
After passing of TO time a dimming command will be sent when releasing a stop command.)

Using TO, it is possible to determine from what point onwards (in milliseconds) the manual input is interpreted as holding the button down.

Set the displayed texts on the buttons using B- and B+.

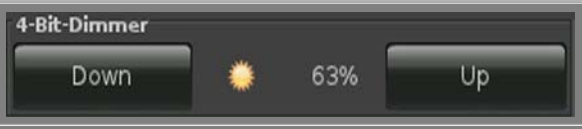
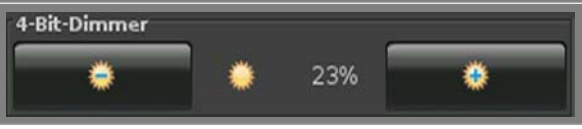
Use IMGSET to choose the set of images you want to use.

NOBG eliminates the button's surface and the display is visualized directly on the background

STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set.)

When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	4-Bit-Dimmer;B-=Down;B+=Up;STEP=10;REP=1000
	4-Bit-Dimmer;

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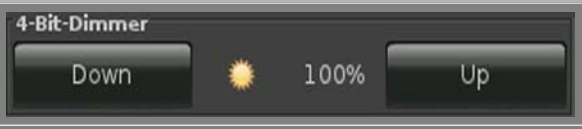
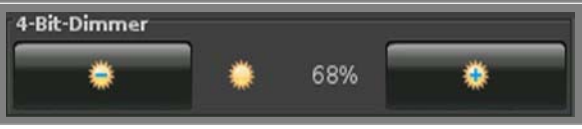
12.2. 4-Bit-Dimmer-Repeat

ETS Objects:			Simple 4-bit dimmer element to send/receive values. Button feature: short activation = switching ON/OFF long activation = dimming (After passing of TO time a dimming command will be sent when releasing a stop command.) Using TO, it is possible to determine from what point onwards (in milliseconds) the manual input is interpreted as holding the button down. Set the displayed texts on the buttons using B- and B+. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set.) When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	ON/OFF feedback	1 bit	
	Value Feedback	1 Byte	
Input/Output	ON/OFF	1 bit	
	Dimming	4 bit	
Format:			
W	Determines width of display's surface		
TO	Time allowance in ms for input analysis		
REP	Setting repetition rate		
STEPS	Setting step width		
IMGSET	Choosing set of images		
B-	Text default for button on incrementing		
B+	Text default for button on decrementing		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	4-Bit-Dimmer;B-=Down;B+=Up;STEP=10;REP=1000
	4-Bit-Dimmer;

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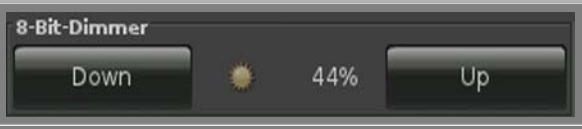
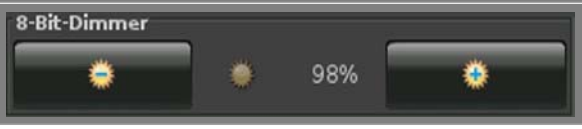
12.3. 8-Bit-Dimmer-Repeat

ETS Objects:			Simple 4-bit dimmer element to send/receive values. Button feature: short activation = switching ON/OFF long activation = dimming (After passing of TO time a dimming command will be sent when releasing a stop command.) Using TO, it is possible to determine from what point onwards (in milliseconds) the manual input is interpreted as holding the button down. Set the displayed texts on the buttons using B- and B+. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set.) When pressing the buttons a little longer, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	ON/OFF feedback	1 bit	
	Value Feedback	1 Byte	
Input/Output	ON/OFF	1 bit	
	Dimming	1 Byte	
Format:			
W	Determines width of display's surface		
TO	Time allowance in ms for input analysis		
REP	Setting repetition rate		
STEPS	Setting step width		
IMGSET	Choosing set of images		
B-	Text default for button on incrementing		
B+	Text default for button on decrementing		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	8-Bit-Dimmer;B-=Down;B+=Up;STEP=10;REP=1000
	8-Bit-Dimmer;

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13. Overview Shutter-Blinds Elements

Image	Element number Range of values	Element type Format	Details Page
	73 0/1	**Shutter-Blinds-Control-A** W,B-,B+,STEP,REP,TO,IMGSET,PIN,NOBG	13.1
	74 0/1	**Shutter-Blinds-Control-B** W,B-,B+,STEP,REP,TO,IMGSET,PIN,NOBG	13.2
	75 0/1	**Shutter-Blinds-Control-C** W,B-,B+,STEP,REP,TO,IMGSET,PIN,NOBG	13.3

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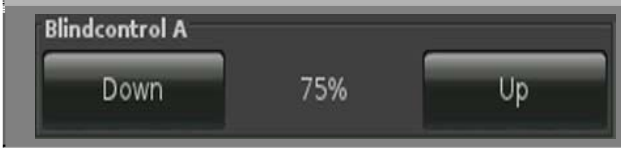
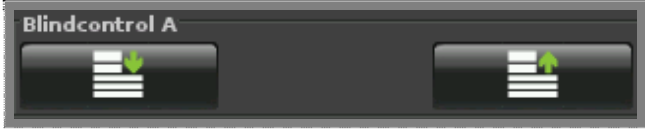
13.1. Shutter-Blinds-Control-A

ETS Objects:			Simple 4-bit dimmer element to send/receive values. Button feature: When pressed for a short time, a SHORT telegram will be sent (slat position/stop). In case TO has passed, a LONG telegram (MOVE) will be sent and the shutter moves towards its end position, as long as the movement is not stopped by a new STOP command. Using TO, it is possible to determine from what point onwards (in milliseconds) the manual input is interpreted as holding the button down. Set the displayed texts on the buttons using B- and B+. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set.) When holding the buttons down, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	Position Feedback	1 Byte	
Input/Output	LONG	1 bit	
	SHORT	1 bit	
Format:			
W	Determines width of display's surface		
TO	Time allowance in ms for input analysis		
STEPS	Setting step width		
IMGSET	Choosing set of images		
B-	Text default for button on incrementing		
B+	Text default for button on decrementing		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	Blindcontrol A;B-=Down;B+=Up;STEP=10;REP=1000
	Blindcontrol A;

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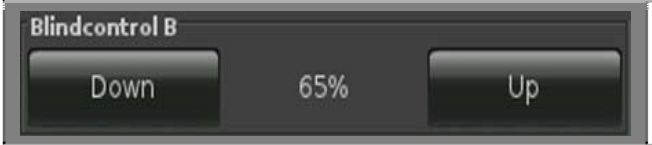
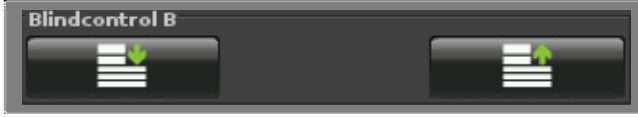
13.2. Shutter-Blinds-Control-B

ETS Objects:			Simple 4-bit dimmer element to send/receive values. Button feature: When pressed for a short time, a SHORT telegram will be sent (slat position/stop). In case TO has passed, a LONG telegram (MOVE) will be sent and the shutter moves towards its end position, as long as the movement is not stopped by a new STOP command. Using TO, it is possible to determine from what point onwards (in milliseconds) the manual input is interpreted as holding the button down. Set the displayed texts on the buttons using B- and B+. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set.) When holding the buttons down, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	Position Feedback	1 Byte	
Input/Output	LONG	1 bit	
	SHORT	1 bit	
Format:			
W	Determines width of display's surface		
TO	Time allowance in ms for input analysis		
STEPS	Setting step width		
IMGSET	Choosing set of images		
B-	Text default for button on incrementing		
B+	Text default for button on decrementing		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	Blindcontrol B;B-=Down;B+=Up;STEP=10;REP=1000
	Blindcontrol B;

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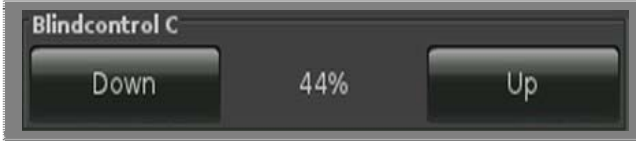
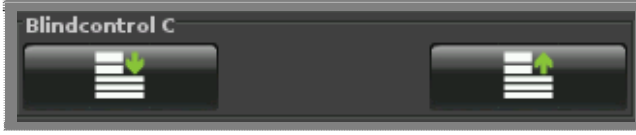
13.3. Shutter-Blinds-Control-C

ETS Objects:			Simple 4-bit dimmer element to send/receive values. Button feature: When pressing the button, a LONG telegram will be sent (MOVE). In case button is released during TO, a SHORT telegram (STOP) will be sent. (For alteration of slat position) in case TO has passed, the shutter moves towards its end position and no SHORT telegram (STOP) will be sent. Using TO, it is possible to determine from what point onwards (in milliseconds) the manual input is interpreted as holding the button down. Set the displayed texts on the buttons using B- and B+. Use IMGSET to choose the set of images you want to use. NOBG eliminates the button's surface and the display is visualized directly on the background STEPS determines the step width which is required to get from the minimum to the maximum (given that MIN and MAX are set.) When holding the buttons down, REP sets the interval by which the values are sent. (in milliseconds) If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	Position Feedback	1 Byte	
Input/Output	LONG	1 bit	
	SHORT	1 bit	
Format:			
W	Determines width of display's surface		
TO	Time allowance in ms for input analysis		
STEPS	Setting step width		
IMGSET	Choosing set of images		
B-	Text default for button on incrementing		
B+	Text default for button on decrementing		
NOBG	No button background		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	Blindcontrol C;B-=Down;B+=Up;STEP=10;REP=1000
	Blindcontrol C

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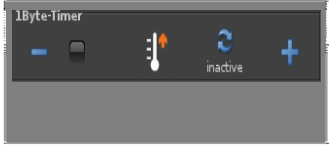
14. Overview HVAC Elements

Image	Element number Range of values	Element type Format	Details Page
	80	**HVAC Setpoint-Control**	14.1
	-671088.64... 670760,96	W,TO,DC,STEP,T,MIN,MAX,NOBG,MASK, INTERN,PIN	
	81	**HVAC Mode-Control**	14.2
	0/1	W,NOBG,MASK,INTERN,FAN,TSET,PIN	
	82	**HVAC Mode-Control-Text**	14.3
	0/1	W,NOBG,MASK,PIN	
	65	**1-Byte-Timer-Profile HVAC**	14.4
	0...255	W,PF,MIN,MAX,STEP,OVRTO,NOBG,IMG,PIN.PPIN	

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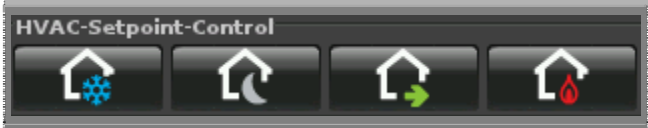
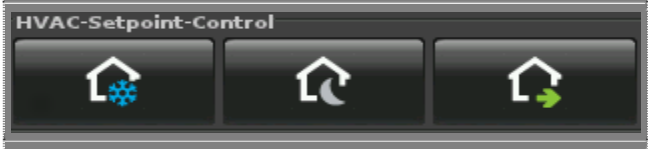
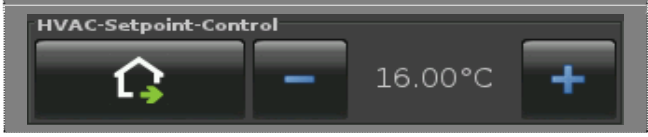
14.1. HVAC Setpoint-Control

ETS Objects:			Complex circuit element to send the set points for the room temperature control. W (in pixels) determines the width of the button's surface. Using TO, you can determine after how much time the display returns to its standard position. DC defines the displayed decimal places. STEPS determines the step width which is required to get from the minimum to the maximum of the respective temperature range (given that MIN and MAX are set) Use T to initialize the temperatures (Syntax: T=T1:T2:T3:T4) MIN determines lower limit of the respective temperatures (Syntax: T=T1:T2:T3:T4) MAX determines upper limit of the respective temperatures (Syntax: T=T1:T2:T3:T4) NOBG eliminates the button's surface and the display is visualized directly on the background. The masking will be conducted as follows: (Syntax:0=showing; 1=masking out) masking sequence: MASK=Comfort:StandBy:Night:Protection (in case INTERN is selected, Protection will be automatically masked out) In case the internal control is used and the set point defaults for the Touch_IT are activated, a communication via GA is unnecessary, as soon as INTERN is set. If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.
Range of values	-		
Input	-	-	
Input/Output	Protection Setpoint	2 Byte	
	Night Setpoint	2 Byte	
	Standby Setpoint	2 Byte	
	Comfort Setpoint	2 Byte	
Format:			
W	Determines width of display's surface		
TO	Time allowance in ms for input analysis		
DC	Number of displayed decimal places		
STEPS	Setting step width		
T	Initialization values for temperatures		
MIN	Default setting of temperature‘s lower limit		
MAX	Default setting of temperature‘s upper limit		
NOBG	No button background		
INTERN	Direct connection with internal RTR		
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN		

Examples:	
	HVAC-Setpoint-Control; TO=5;DC=2;MIN=7:15:18:15; MAX=7:17:20:30; T=7:15:18:22;INTERN
	HVAC-Setpoint-Control; TO=5;DC=2;MASK=0101; MIN=7:15:18:15;MAX=7:17:20:30; T=7:15:18:22;
	HVAC-Setpoint-Control; TO=5;DC=2;MASK=1000; MIN=7:15:18:15;MAX=7:17:20:30; T=7:15:18:22;
	In order to activate temperature defaults select the respective circuit element. The displayed control element changes temporarily. The user can set manual defaults.

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14.2. HVAC Mode-Control

ETS Objects:		
Range of values	-	
Input	Feedback	2 Byte
Input/Output	HVAC-Mode	1 Byte

Format:	
W	Determines width of display's surface
FAN	Controlling ventilation
TSET	Shifting set point
NOBG	No button background
MASK	Masking displayed buttons
INTERN	Direct connection with internal RTR
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple circuit element to send the HVAC modi and to display the room temperature.

W (in pixels) determines the width of the button's surface.

NOBG eliminates the button‘s surface and the display is visualized directly on the background.

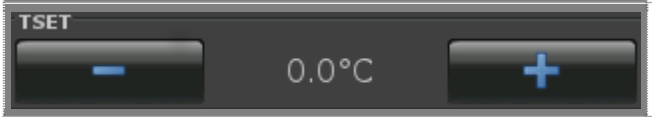
The masking will be conducted as follows: (Syntax:0=showing; 1=masking out) masking sequence: MASK=Protection:Night:StandBy:Comfort:Automatic

In case the internal control is used and the selection for the Touch_IT is activated, a communication via GA is unnecessary, as soon as INTERN is set.

FAN changes the display of the control element. Use it only in combination with INTERN. Use it to control the ventilation.(Depends on the parameter setting of the controller page fan)

TSET changes the display of the control element. Use it only in combination with INTERN. Use it to raise or to lower the comfort temperature. (Depends on the parameter setting of the setpoint adjustment range).

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	HVAC-Mode-Control;INTERN
	TSET;TSET;INTERN
	FAN;FAN;INTERN;

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14.3. HVAC Mode-Control-Text

ETS Objects:		
Range of values	-	
Input	Feedback	2 Byte
Input/Output	HVAC-Mode	1 Byte

Format:	
W	Determines width of display's surface
FAN	Controlling ventilation
TSET	Shifting set point
NOBG	No button background
MASK	Masking displayed buttons
INTERN	Direct connection with internal RTR
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN

Simple circuit element to send the HVAC mode and to display the room temperature.

W (in Pixel) determines the width of the button's surface.

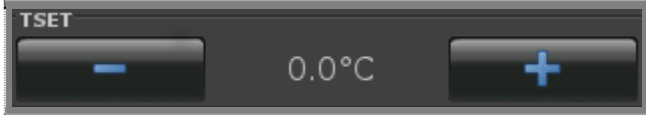
NOBG eliminates the button‘s surface and the display is visualized directly on the background.

The masking will be conducted as follows: (Syntax:0=showing; 1=masking out) masking sequence: MASK=Protection:Night:StandBy:Comfort:Automatic

In case the internal control is used and the selection for the Touch_IT is activated, a communication via GA is unnecessary, as soon as INTERN is set.

TSET changes the display of the control element. Use it only in combination with INTERN. Use it to raise or to lower the comfort temperature. (Depends on the parameter setting of the setpoint adjustment range)

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

Examples:	
	HVAC-Mode-Control;
	TSET;TSET;INTERN

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14.4. 1-Byte-Timer-Profile HVAC

ETS Objects:		
Range of values	0...255	
Input	-	-
Output	Profile	1 Byte
Input/Output	Profile Enable	1Bit
Format:		
W	Determines width of display's surface	
IMG	Choosing an image	
OVRTO	Determines the time (in minutes) until manual settings are overwritten	
NOBG	No button background	
PIN	In case "Use PIN" is selected, an individual password can be assigned using PIN	
PPIN	In case "Use PIN" is selected, an individual password for the secondary function can be assigned using PPIN	

Complex element to send a 1-byte value 0...255 in a set time allowance.

W (in pixels) determines the width of the display's surface.

OVRTO determines the span of time, after which the settings made manually by the user are overwritten by the values set in the time table. (in minutes)

NOBG eliminates the button's surface and the display is visualized directly on the background.

If "Use PIN" is selected, the default master password will be used in case PIN is not set. Using PIN, an individual password can be assigned.

In case "Use PIN" is selected, an individual password can be assigned using PPIN, which protects the secondary functions of this object.

Examples:	
	1Byte-Timer; IMG=thermometer.png;NOBG;OVRTO=1
	Pressing the options button will open a dialog box where time allowances can be set, according to which the ETS object is then controlled.

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It is possible to determine up to 6 times for each weekday, at which freely selectable values out of the object value range can be sent.

15. System settings

15.1. Main

In the main display of the system page, the following settings can be set directly on the Eelecta touch .

- Time and date
- Standby
- Audio signals
- Fonts
- System & SD-card
- Layouts & language

These settings can be changed and adjusted to individual defaults by the user at any time.

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15.2. Time & date

Use the time zone setting for localization. An automatic switch to daylight saving time can be activated. The clock will then shift automatically.

As soon as the communication objects
192 (System Time) and
193 (System Date)
are connected, the Eelecta Touch can either be used as a timer in the bus, or be adjusted by a timer.

15.3. Standby

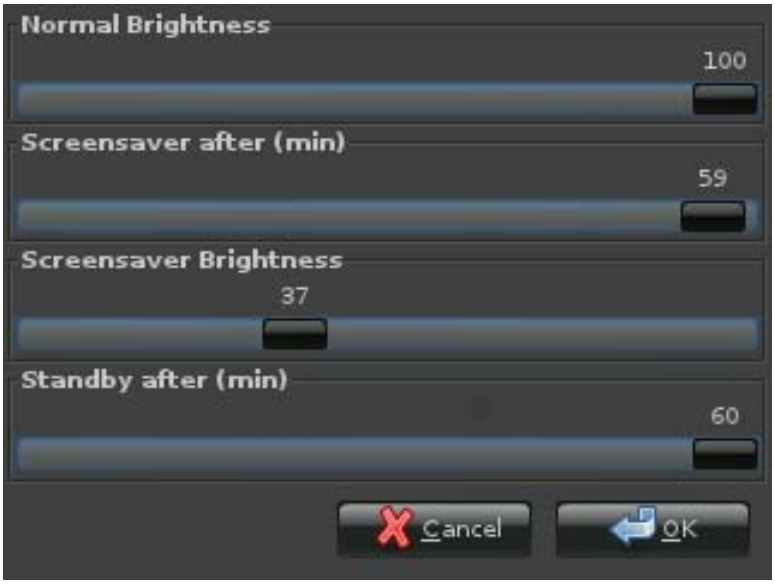
Two brightness settings can be defined.

- •Standard operation
- •Screen saver operation

Additionally, two time allowances can be set.

- •Screen saver operation
- •Standby

If the setting is 0, the respective function will be inactive. As soon as a minute default between 1 and 60 is set, the respective function will be effected after this time has elapsed.



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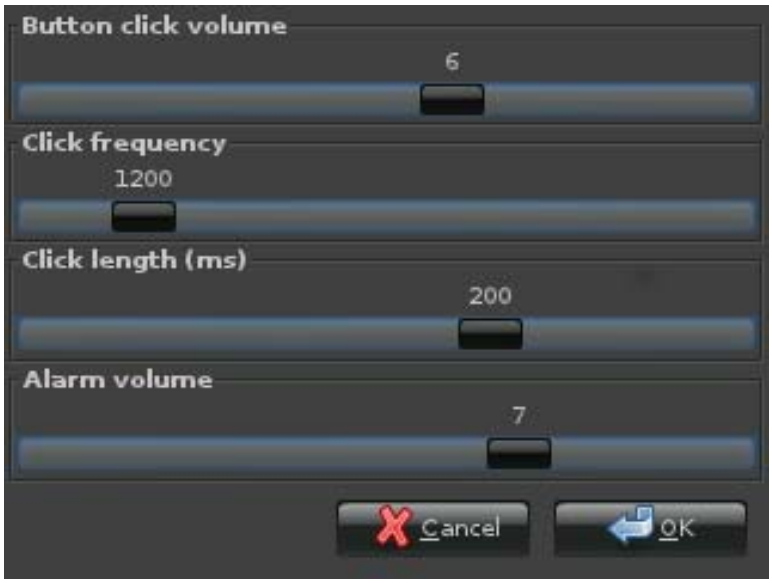
15.4. Audio signals

The operation sound and the volume of the alarm sound can be defined individually.

Volume of click and alarm can vary within the scope of 0 to 10.

The frequency of the operation sound can modulate between 100 and 8000 Hz.

The duration or running time of the operation sound can be adjusted within the scope of 10 to 300 ms



15.5. Fonts

The element sizes that are selectable in the ETS can be freely parameterized.

ETS (Element Size)	↔	**Eelecta Touch**
Small	↔	small
Normal	↔	normal
Large	↔	large
X-Large	↔	extra large

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It is also possible to change

- Frame label
- Page name
- Menu label

The alterable parameters are

- Typeface
- Type form
- Type size

15.6. System & SD card

All these settings can optionally be

- written to the internal memory
- downloaded from the intern memory
- reset to factory setting.

The programming button is additionally materialized in the software. It can be activated on demand, using the „P“ button.

In case data logging is carried out on the Touch an SD card has to be included. After inclusion, the free memory space will be displayed and the logging starts automatically.

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15.7. Layouts & language

In the overview below you can find examples of different themes and navigation options to choose from.

Currently, the following languages are supported.

- German
- English
- Hebrew
- Italian
- Chinese
- Spanish
- Turkish
- French
- Russian

(Please note that your system software as well as ETS must support these languages in order to ensure a proper use.)

If the screen saver operation is activated, there are different screen savers to choose from.

- Analog clock
- Time
- Slideshow
- Static screen

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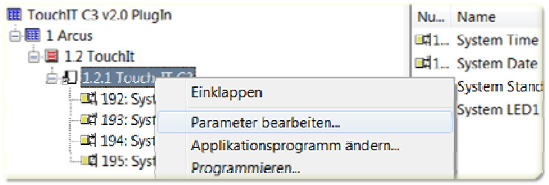
16. Screensaver

There are four different screen saver types available.

- Analog clock (displays analog time and date in front of the image uploaded to the background)
- Time (displays digital time and date on a black background)
- Static screen (displays uploaded image)
- Slideshow (displays uploaded images in an infinite loop)

The screen saver types 1 to 3 are identical except for the fact that they have different predefined default settings. The customer is free to create an individual screen saver. The parameter setting is carried out using ETS and will be described more detailed (see below).



16.1. ETS

16.2. Parameter setting

ETS Objects:		
Range of values	-	
Input/Output	System Time	3 Byte
	System Date	3 Byte
	Input, external Temp.	2 Byte
Additional Parameters:		
SCRBG	Defaults for background	
SCRACLK	Defaults for analog clock	
SCRDCLK	Defaults for digital clock	
SCRDATE	Defaults for date	
SCRTEMP	Defaults for temperature	

If no static image is used, the background color can be defined using SCRBG. The color selection can be entered either in HTML color code or in HEX RGB code. (SCRBG=#445578 or SCRBG=green)

Use SCRACLK to set the parameters of the analog time.
For this purpose, X- / Y- position, as well as the width, need to be set. The analog clock must be considered as a rectangular surface enclosing the circular shape. (SCRACLK=100,50,80)

Use SCRDCLK to set the parameters of the digital time.
Positioning can be carried out as in the case of the analog time. Additionally, the font color can be defined. (SCRDCLK=200,0,80,lightgrey oder SCRDCLK=200,0,80,#4433FA)

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Use SCRDATE to set the date just like in the case of the digital time.
(SCRDATE=200,0,80,lightgrey oder SCRDATE=200,0,80,#4433FA)

Use SCRTEMP to visualize the internally used temperature. The parameter setting of SCRTEMP can be carried out as in the case of the digital time, with an additional adjustment of the decimal places. (SCRTEMP=200,40,80,1,#334489 oder SCRTEMP=200,40,80,1,purple)

Examples:	
	selected screen saver: static image SCRACLK=10,10,100; SCRDCLK=200,120,100,black; SCRDATE=210,160,80,#000000; SCRTEMP=220,200,60,1,white
	selected screen saver: static image SCRBG=#0735fe; SCRDCLK=200,120,100,#000000; SCRDATE=210,160,80,#FFFFFF; SCRTEMP=220,200,60,1,#FDFA00
	factory setting of the analog clock
In case one element is not to be used, it can be deactivated using „=N“.. The overall size of the display is 320x240pixels The origin of all elements (including the entire display itself) is the upper left corner. All elements are positioned in relation to the origin in the upper left corner.	

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17. RTC General Information

17.1. Structure of this section

This document features three major sections. In the second section, all parameters are listed and described. In the third section you find a description of all objects related to the Room Temperature Controller. At the end of this document there is an index where all object and parameter names are listed including name and page number.
The first section contains descriptions of rather general characteristics which are related to multiple objects and parameters. The different subsections of this first section are called “articles“. They appear in the respective parameter and object descriptions and Every parameter and every object includes a functional description

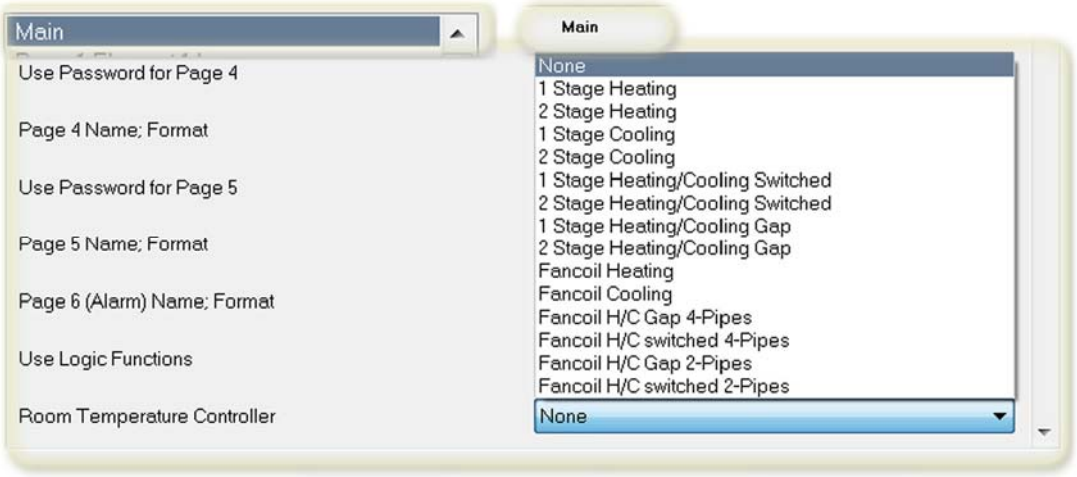
Some of them have examples marked by

use cases are marked by

and important notes marked by

Also, there are links to other sections with further information corresponding to the respective entry.

17.2. How to read this



If there are any ambiguities with a parameter or an object, please look it up in the index at the end and go to the corresponding site with the description. In the section General Information, there is a schematic diagram of the Room Temperature Controller.
If a parameter is referenced in the text, it has the following structure:
Parameter "Controller type (Temp. Controller Heating/Cooling), Page xxx"
The string in the brackets stands for the tab in the ETS parameter of the device.

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The following schematic diagram shows a general overview of the Room Temperature Controller (RTC). It provides an overview, but it doesn't show every detail. For more details, see the list of all parameters and objects including their descriptions. For some special parts, see the following sections.

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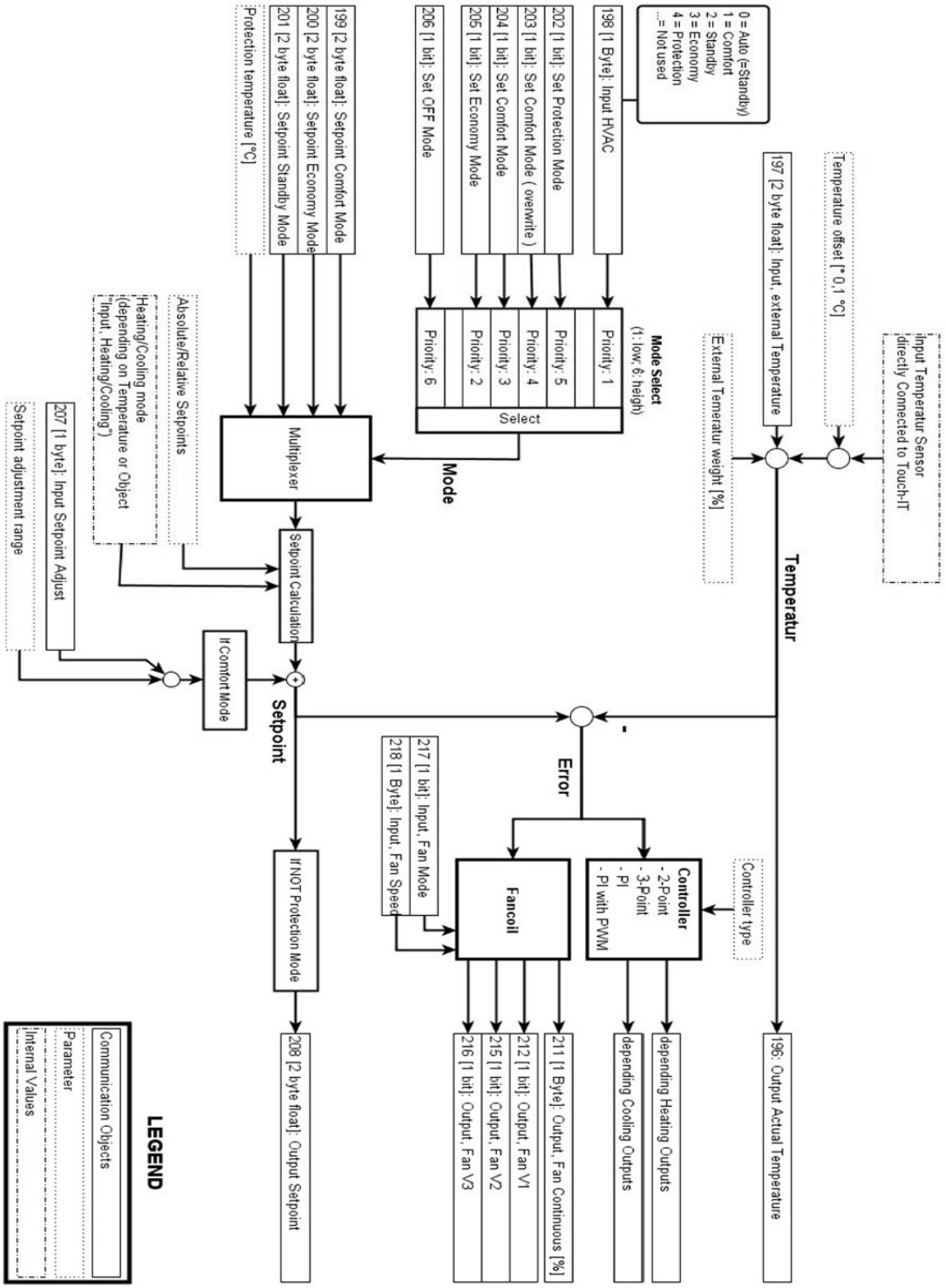
17.3. Overview



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17.4. Important

- **Check the parameter "External Temperature weight [%]" (If no temperature sensor is directly connected to the device, the parameter "External temperature weight [%] (Temp. Controller Settings), Page 128 must be 100!)**
- **Mode selection (comfort, economy, ...) by the different objects is prioritized**
- **If PI-controller is poorly or wrongly parameterized, there is the danger of continual oscillation**
- **The controller does not start if there is no temperature input (If both the internal and the external one are used, both must have readings.)**
- **If the integration time for a PI-Controller is set to 0, it will turn into a simple P-Controller**
- **There is the possibility to directly control the RTC from the HVAC element types without any object or group address. See "Device-internal communication to control the RTC"**

17.5. Device-internal communication to control the RTC

Various HVAC element types have the format string INTERN, which allows to directly control the Room Temperature Controller (RTC) without using the object. Only one of the different element types can have the INTERN format. Otherwise, only one element type will be evaluated. This allows to directly define the different setpoints via the element "HVAC setpoint control" without using any group address or object.
For more information see Chapter 2 Elements.

17.6. PI-Controller set up

17.6.1. Adjusting the PI Controller:

There are different systems for heating and cooling rooms. This is done using water, oil or air in various designs, such as in-floor heating, cooling ceilings, and radiators. The diversity of these combinations and the design of the room, such as the placement of radiators and the types of windows, play an important factor in the correct adjustment of the PI Controller. Therefore, it is not possible to specify a general PI parameter set. This description deals more or less with practical results of properly planned and installed heating units. If a system is improperly installed, it can be either slow, need too long to reach the desired temperature or fluctuate above or below the selected temperature.

Heating Type	**Pre-programmed Value**		**Controlling Type**	**PWM Cycle Type**
	Proportional band	**Integration time**		
Warm Water	5 °C	150 minutes	steady /PWM	
In-Floor Heating	5 °C	240 minutes	PWM	15-20 min
Electric Heating	4 °C	100 minutes	PWM	15-20 min
Heating Ventilation	4 °C	90 minutes	steady	-
Split Unit	4 °C	90 minutes	PWM	15-20 min
Cooling Type				
Cooling Ceiling	5 °C	240 minutes	PWM	15-20 min
Air-Conditioning	4 °C	90 minutes	steady	-
Split unit	4 °C	90 minutes	PWM	15-20 min

- Just a small change in the parameter can result in a noticeable change in the controlling performance.
- The above mentioned values are based on experience and it is suggested to use them in the adjustment of the controlling parameters..

For a more detailed description of the PI controller process, please refer to relevant technical literature. Two other example methods to determine the controller‘s parameter are the Ziegler-Nichols tuning method and the pole

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compensation technique. These are only examples and there are more methods. Which method to use always depends on the use case

17.6.2. General basic rules:

Parameter Specifications	Effect
Lower Proportional Band	Large fluctuation (perhaps continual fluctuation), quick adjustment to set point
Higher Proportional Band	Little or no fluctuation, but slow adjustment
Short Integration Period	Quick adjustment of controlling modulations (dependent on conditions), danger of continual oscillation
Long Integration Period	Slow adjustment of controlling modulations

17.6.3. Setpoint handling

The setpoints are predefined in the parameter settings and are changeable via the corresponding objects. As long as the controller is not in the protection mode, the actual setpoint is sent to the object "Output, Setpoint".

The different setpoints are saved if changed manually or over the corresponding objects and stay saved also if the device is reprogrammed via ETS. To reset the setpoints of the parameter on an already RTC-programmed device, it is necessary to program the device with disabled RTC and then reprogram it with the desired settings. Especially if changing the RTC from absolute to relative mode this reset should be done once.

17.6.4. Setpoint adjustment

If the controller is in comfort mode, it is possible to temporarily adjust the setpoint within the range determined by the parameter "Setpoint adjustment range (Temp. Controller Settings), Page 133 " to the time set in the parameter "Overwrite timeout [minutes] (Temp. Controller Settings), Page 131" by the object "Input, Setpoint Adjust".

17.6.5. Absolute vs. relative setpoint

It is possible to set the calculation of the setpoints relative to the comfort setpoint or absolute in °C. This is selectable using the parameter "Absolute/relative setpoints (Temp. controller Settings), Page 122 " which determines how the values of the parameter and the object-related setpoint are interpreted. The setpoints for the cooling part are calculated internally by mirroring the set values at the comfort setpoint.

Setpoint is absolute and a heating/cooling controller type is installed.
Comfort setpoint is set to 20 °C and the economy setpoint for heating is set to 15 °C. In this case, the setpoint for economy cooling will be calculated to 25 °C (20 °C + (20 °C - 15 °C)).

Setpoint is relative and a heating/cooling controller type is installed. Comfort setpoint is set to 20 °C and the relative economy setpoint for heating is set to 2 °C. In this case, the setpoint for economy cooling is calculated to 22 °C (20 °C + 2 °C) and for heating it is calculated to 18 °C (20 °C - 2 °C)..

17.6.6. Heating/Cooling gap

If controller types with a gap are used, all setpoints are pushed apart relative to the comfort setpoint by the set value at the parameter "Heating/cooling bandgap (Temp. Controller Settings), Page 129 " (the spacing between the comfort setpoints of heating and cooling corresponds to this value), but the output value at the object "Output, Setpoint" is not

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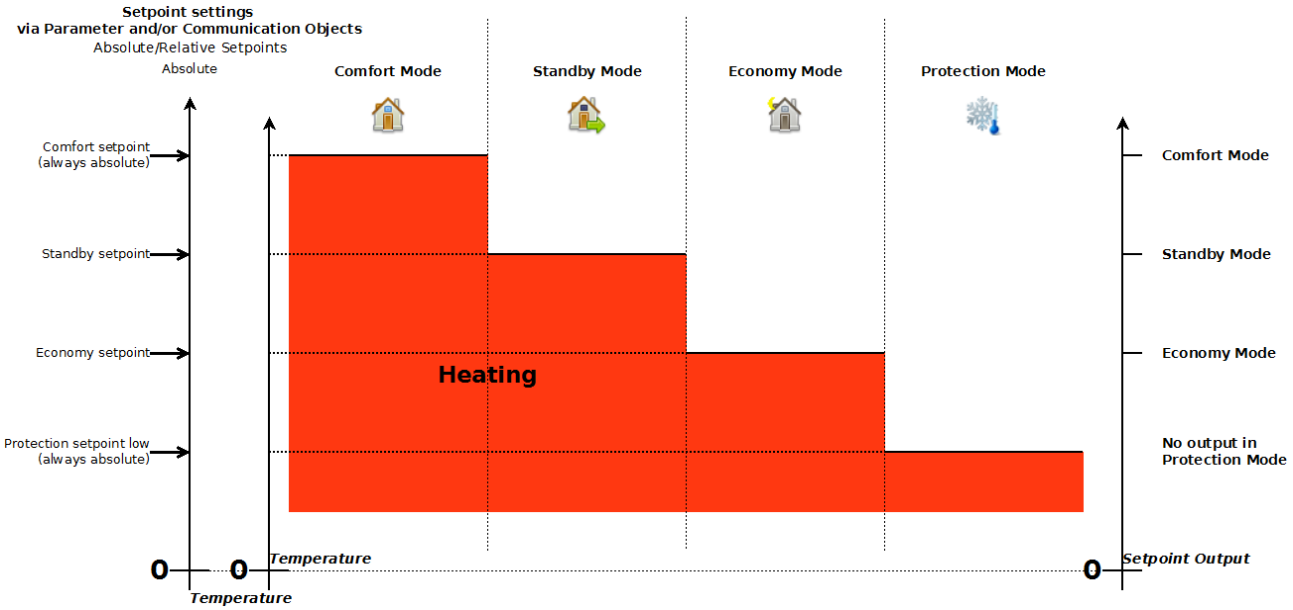
affected by the gap value. This means that the setpoint calculation with the gap is carried out only internally and will not be sent.

e.g. Setpoint is relative and a controller type with a gap is selected. The comfort setpoint is 20 °C, the relative setpoint for Stand-By is 5 °C, and the gap is set to 2 °C (setpoint adjust is not used!). In comfort mode, the output at the object "Output, Setpoint" is always 20 °C, no matter if heating or cooling. In economy mode, the output corresponds with the actual state (heating or cooling), i.e. 15 °C or 25 °C.
Internally, in heating state the controller uses 19 °C as setpoint for comfort mode and 14 °C as setpoint for stand-by mode. In cooling state it uses 21 °C as setpoint for comfort mode and 26 °C for stand-by mode.

17.6.7. Illustrated Examples

In the following, there are some illustrated examples for different setpoints.

Simple heating controller type with absolute setpoints



A simple Heating controller, with absolute setpoints and without setpoint adjust. As one sees the setpoints are used as they are by the controller corresponding to the Mode. The values are also sent without changes to the Object "Output, Setpoint".

Heating/Cooling switched controller type with relative setpoints

A switched heating/cooling controller with relative setpoints and without setpoint adjustment. As is shown, the set setpoints for economy and stand-by mode are relative to the comfort setpoint. The comfort setpoint, as well as both protection setpoints are

If the controller is in protection mode, there is no output of the setpoint on the object "Output, Setpoint"..

Heating/Cooling with gap controller type, with relative and absolute setpoints and setpoint adjustment

This figure shows an overview of a heating/cooling controller type with a heating/cooling gap and setpoint adjustment, as well as the setpoint input interpretation for absolute and relative setpoints and the output of these at the object „Output, Setpoint“.
As is shown, the gap causes all setpoints to be pushed apart relative to the comfort setpoint, but the output is still as if there were no gap. The setpoint adjustment is only available in comfort mode and is being output at the object. All relative and absolute setpoints for economy and stand-by are only set for heating. Subsequently, the setpoints for the cooling part are calculated by mirroring the values at the comfort setpoint.

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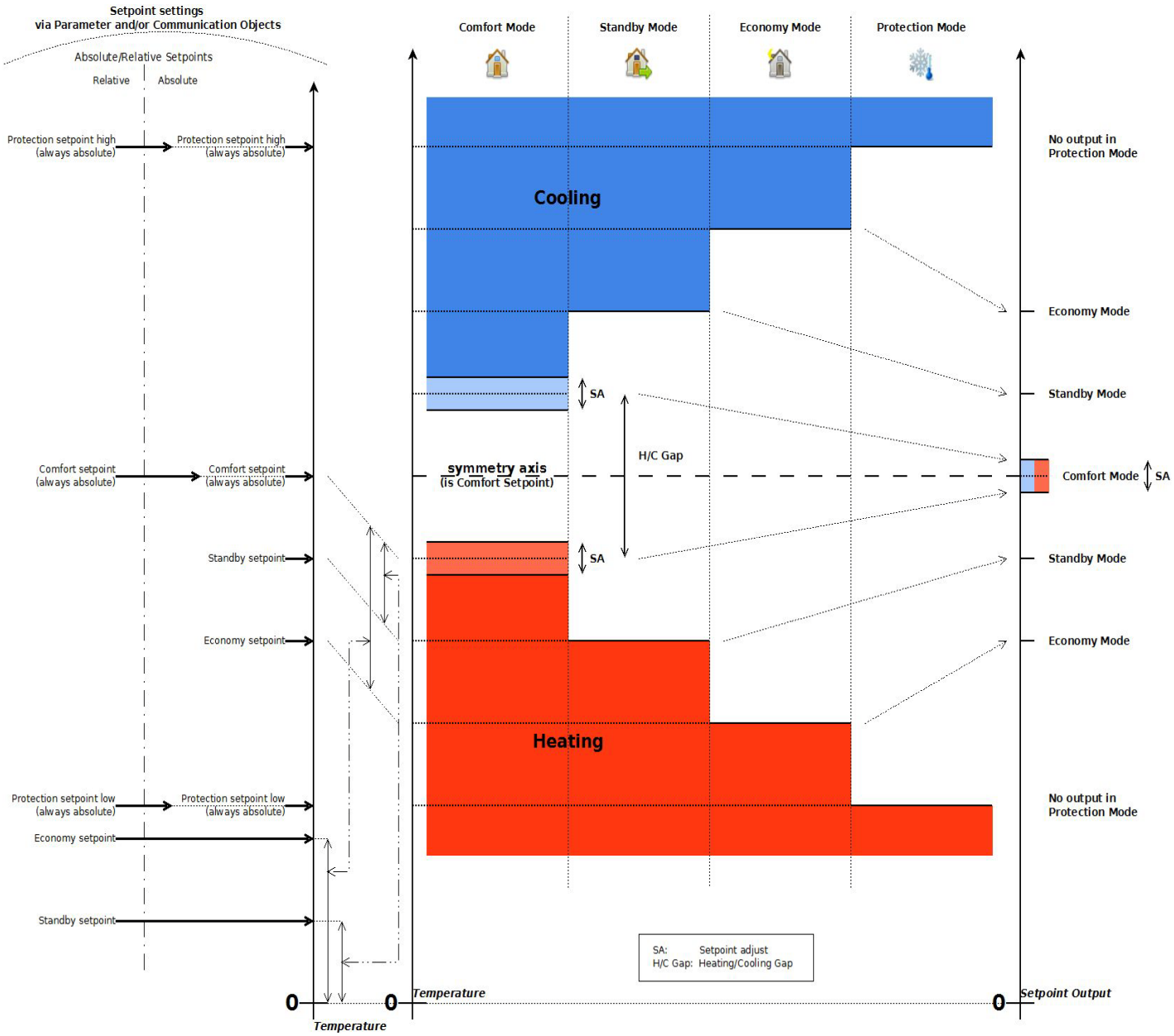

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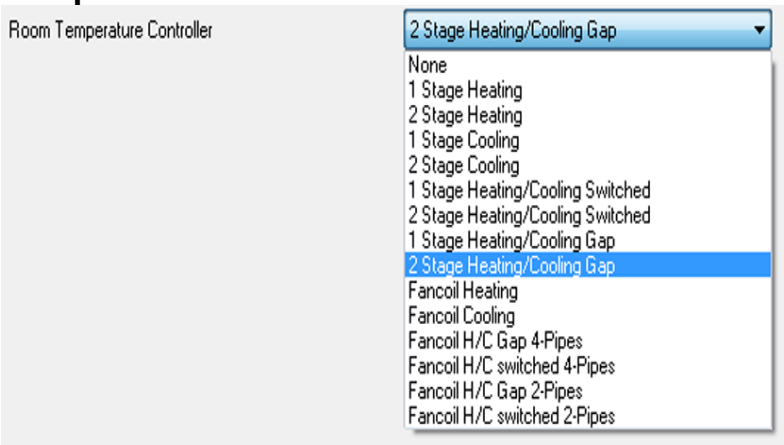
17.7. Room temperature controllers



There are different selectable controller types with different functionalities. In the following, their different properties will be described. In most cases, a simple 1-stage heating should be sufficient.

17.7.1. Heating vs. Cooling controller

Heating
IIf a heating controller is used or the controller is in heating state (heating/cooling controller), and the actual temperature falls below the current setpoint (corresponding to the actual mode, e.g. stand-by), the controller, if enabled, starts heating, according to the used controller type (e.g. PI-Controllers, selectable in the parameters).

Cooling
Cooling mode works vice versa to the heating mode, so if the temperature rises over the current setpoint, the controller starts cooling.

17.7.2. One- vs. Two-stage controllers

One Stage
One-Stage controllers have only one controller that allows to control the current setpoint.

Two-stage
Two-stage controllers have two controllers, each separately configurable. The first stage controller controls on the current setpoint (depending on mode, setpoint adjustment and heating/cooling gap), the second stage controls the actual setpoint plus/minus the parameter "1st/2nd stage bandgap (Temp. Controller Heating/Cooling), Page 121".

e.g. Comparison: see figure. 2-stage cooling controller in comfort mode, with comfort setpoint at 20 °C, no setpoint adjustment, no heating/cooling gap and parameter "1st/2nd Stage Bandgap" is 2 °C. If the temperature exceeds 20 °C, the first stage starts to
work and tries to reduce the temperature to 20 °C. If the temperature still rises and then exceeds 22 °C (20 °C + 2 °C), the second stage starts working and tries to keep the temperature below 22 °C.

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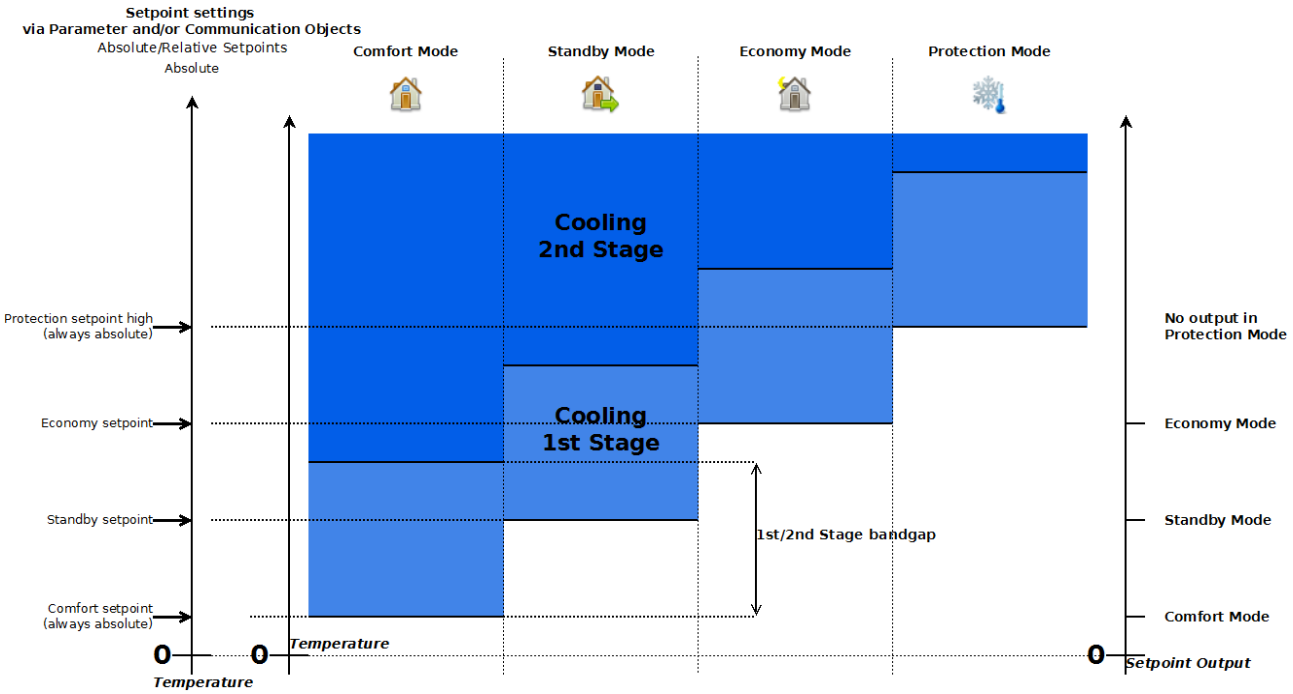

If there are solar panels used for heating and for cold days and there is also an electrical heater, the solar heater can be connected to the 1st Stage and the electrical one to the 2nd Stage.
Now if the solar heater doesn‘t provide sufficient power, the electrical heater will switch on.

17.7.3. Heating/Cooling switched vs. gap controller

Switched
If a switched controller type is selected, the heating or cooling mode needs to be set by the object "Input, Heating/Cooling". So if the controller is in heating mode and the exceeds the comfort setpoint, the controller does not switch automatically into the cooling mode. This must be done by the object.

Normally the switch signal is calculated from the long term mean value of the outdoor temperature.

Gap
The gap controller types have a gap between heating and cooling mode. If the temperature is within this gap, both controllers are inactive.

Heating/cooling controller with gap in comfort mode, with setpoint set to 20 °C and heating/cooling gap set to 4 °C. If the temperature is below 18 °C (20 °C - 4 °C / 2), the controller is heating. If the temperature is higher than 18 °C but below 22 °C, the controller is neither heating nor cooling. If the temperature is above 22 °C, the controller is cooling.

Fancoil
The fancoil controller types allow the control of fan coil units. It is possible to control 2 and 4 pipe units. It allows to control the fan speed via steady output or via three 1-bit objects for three different speeds. The fan can also be controlled by two objects, which allows one to change the fan speed manually for a limited time (Objects "Input, Fan Mode" and "Input, Fan Speed"). Furthermore, there is the possibility to set a Lead and Lag Time (via parameter "Fan Lead-time [sec] (Controller Page Fan), Page 129" and "Fan lag-time [sec] (Controller Page Fan), Page 129") which allows to set a time before the fan starts and how long the fan runs afterwards, even if according to the calculation the fan should already be turned on or off. This makes it possible to e.g. use the remaining heat in the radiator after the controller is shut offf.

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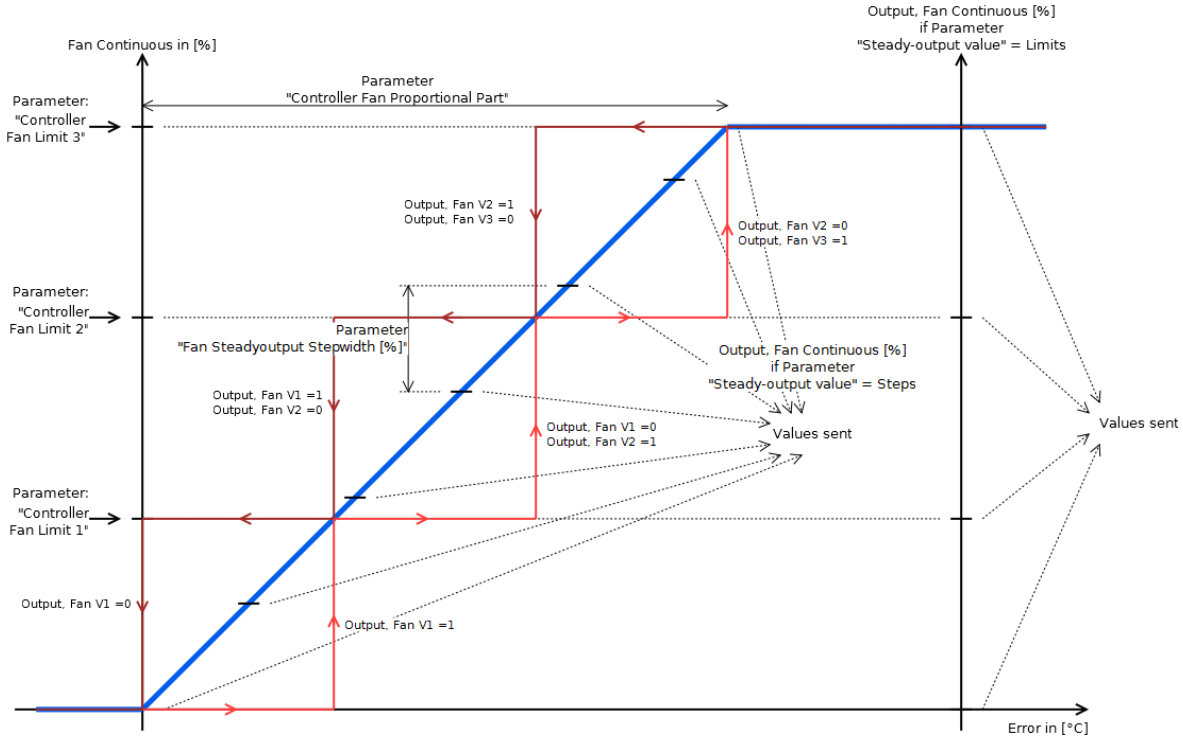
General
The fan coil controller sets the control-value depending on the actual temperature and the Setpoint as follows:[5]:

$$\text{Fan Continuous [\%]} = \frac{\text{(Setpoint – Temperature)}}{\text{Controller Fan Proportional Part}}$$

[For the parameter description see "Controller Fan Proportional Part (Controller Page Fan), Page 123".]

The fan‘s continuous signal will then be output at the object "Output, Fan Continuous [%]" in a discretized form, as set by the parameter "Steady-Output Stepwidth [%]", the "Controller Fan Limit 1 [%] (Controller Page Fan), Page 122" and, if available, "Fan Steadyoutput Stepwidth [%] (Controller Page Fan), Page 129", as shown in the following figure.



Manual Fan control

It is possible to manually control the fan (1-byte Object "Output, Fan Continuous [%]" and the 1-bit Objects "Output, Fan VX").
The objects "Input, Fan Mode" and "Input, Fan Speed" make it possible to set the fan speed for the amount of time set by the parameter "Overwrite timeout [minutes] (Temp. Controller Settings), Page 131 " after which it returns to the actual value given by the controller. That can e.g. be used to switch off the fan manually.

It enables setting the fan speed to zero or one of the three defined limits (parameter "Controller Fan Limit 1 [%] (Controller Page Fan), Page 122]") by setting the object "Input, Fan Speed" to a value between 0 and 3 (see Table).
It is possible to set the fan speed to the actual value selected by the object „Input, Fan Speed“ by setting the Object „Input, Fan Mode“ to 1. If this object is set to 0, the Fan speed returns to the given controller value. When started, the fan runs for the time set in the parameter „Overwrite timeout [minutes] (Temp. Controller Settings), Page 131“ before it returns to the given value from the controller.
If the object value of "Input, Fan Speed" is changed, the fan automatically starts (only if value is changed) for the set amount of time..

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Value „Input, Fan Speed“	Object „Output, Fan Continuous [%]“	Object „Output, Fan ...		
		V1	V2	V3
0	0 %	0	0	0
1	Limit 1	1	0	
2	Limit 2	0	1	0
3	Limit 3	0	0	1

17.7.4. 2 vs. 4-Pipes Fancoil

2 Pipes
2-Pipe Fancoils only have one circuit for both heating and cooling. So there is one valve that controls the flow of the hot/cold media and one that switches between heating and cooling. This controller provides the objects corresponding to the selected type (e.g. PI-Controller) necessary to control a valve for the flow. The object "Output, Heating/Cooling" provides the information whether it is in heating or cooling mode

4 Pipes
4-Pipe Fancoils have 2 circuits, one for the heating and one for the cooling media. So the Provides two seperate controllers for heating and cooling. This controller provides the objects corresponding to the selected types (e.g. PI-Controller) necessary to control 2 valves for the flow, one for heating, one for cooling. The Object "Output, Heating/Cooling" provides the information whether it is in heating or cooling mode.

17.7.5. Switched vs. gap fancoil controller

If a switched room controller type is selected, it is necessary to switch between heating and cooling mode by changing the object "Input, Heating/Cooling". If a gap is selected, a temperature difference needs to be defined (parameter "Heating/cooling bandgap (Temp. Controller Settings), Page 129“), so that in the gap around the comfort setpoint all controllers are inactive.

If a fancoil is used for heating and cooling (especially if a 2-Pipe fancoil is used), and if the parameters are set accordingly, there is the possibility that e.g. the heating valve opens immediately after the cooling valve is closed, so that the hot heating fluid floods the cold system, which may be unwanted. To prevent this, use the parameter „Heating/cooling changeover deadtime (Temp. Controller Settings), Page 130“.

17.7.6. Controller output objects

The prefixes such as:

- -Output, Heating/Cooling,
- -Output, Cooling 1st Stage .
- -Output, Cooling 2nd Stage,
- -Output, Cooling,
- -Output, Heating 1st Stage,
- -Output, Heating 2nd Stage,
- -Output, Heating,

correspond to the available controllers, which depend on the selected room temperature controller (Parameter "RTC Parameter, Page 121“)

1st level switch
This one comes with the 3-point controller and is one of the two 1-bit outputs of this controller. The following figure shows the output values for a simple 3-point heating controller.

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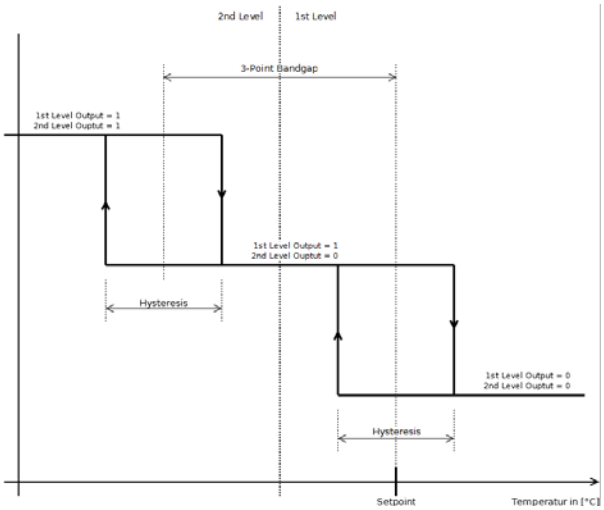


2nd level switch
See 1st level switch

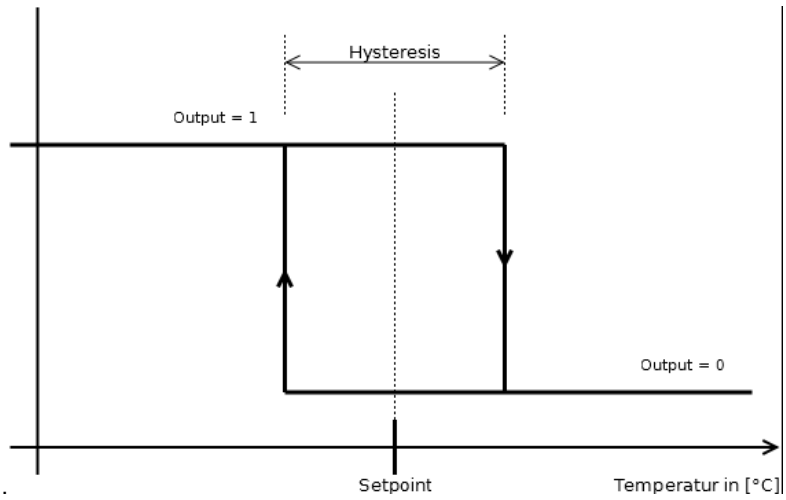
PWM output
This one comes with the PI-Controller with PWM. It is a 1-bit object with an PWM signal, its duty cycle is controlled corresponding to the PI-Controller output.

Steady output
This one comes with the PI-Controller. It is a 1-byte object holding the control variable of the PI-Controller.

Allows to control a steady valve with a PI-Controller.

Steady output non-zero
This one comes with the PI-Controller. It is a 1-bit object which only determines if the steady output is not zero.
!USE Can be used to indicate that the heater/cooler is active.

Switch
This one comes with the 2-point controller. It is a 1-bit value and outputs a simple switching signal, corresponding to the figure that shows the output values for a simple 2-point heating controller



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18. RTC Parameter

18.1. 1st/2nd stage bandgap (Temp. Controller Heating/Cooling)

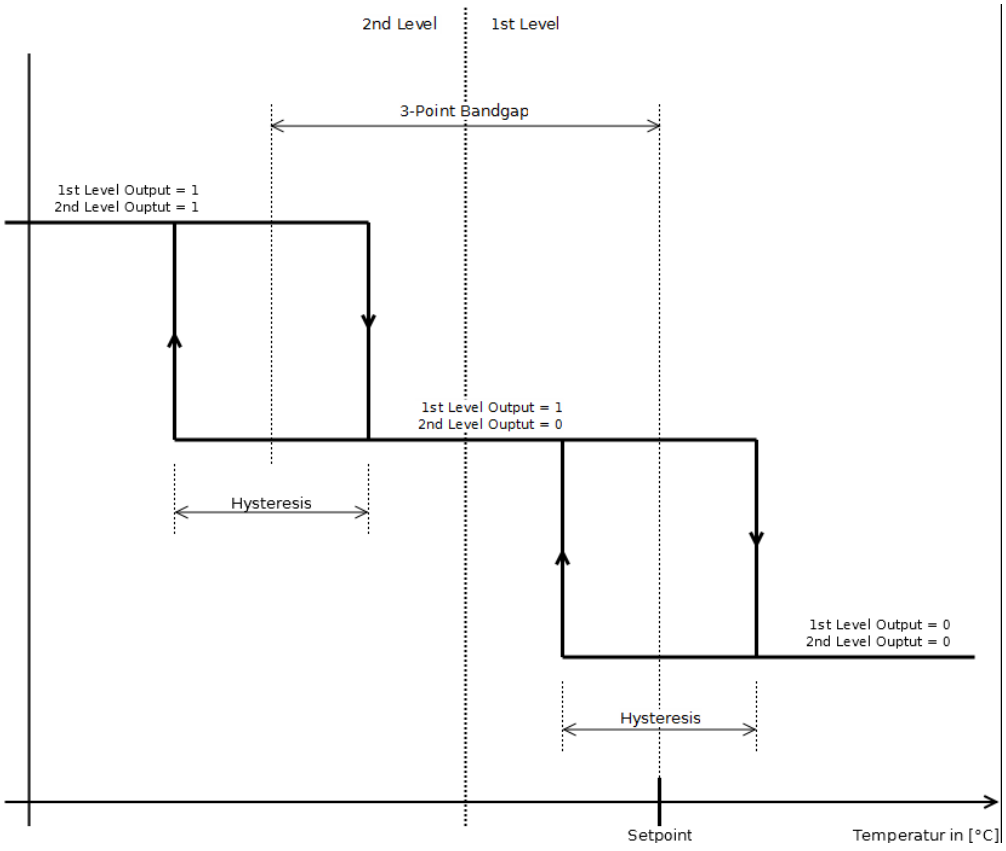
See article "Heating vs. Cooling controller, Page 116".
The gap in °C between the first and the second controller stage.

A two-stage heating controller is selected, the actual setpoint to be regulated is 20 °C and the parameter "1st/2nd Stage Bandgap" is set to 5 °C. The temperature falls below 20 °C. Now the first controller tries to heat. If the temperature should fall below 15 °C, the second controller will also start to heat.

If e.g. there are solar panels installed for heating, this heat source can be connected to the first stage. Only if the temperature keeps on falling, the electrical heater is activated via the second stage

18.2. 3-point bandgap (Temp. Controller Heating/Cooling)

See also section „3-point controller, Page 126“.
This sets the bandgap between the two 2-point controllers of the 3-point controller.
See figure.



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18.3. Absolute/relative setpoints (Temp. controller Settings)

This affects all parameters and objects that have an effect upon the different setpoints (Comfort setpoint is not affected because it is always absolute).
See also article "Setpoint handling, Page 113".

18.4. Relative

The settings for economy and stand-by setpoints are interpreted relative to the comfort setpoint. To get the setpoint in cooling mode, the relative economy and stand-by setpoints are added to the comfort setpoint. Vice versa, in heating mode they are subtracted.

18.5. Absolute

The settings for economy and stand-by setpoints are interpreted as absolute values. If a controller with heating and cooling functionality is selected, the economy and stand-by setpoints are set for the heating part. For the cooling controllers, the setpoints are mirrored at the comfort setpoint.

Controller with heating and cooling and absolute setpoints. Comfort setpoint is 20 °C, economy setpoint is 15 °C, so that in heating mode the economy setpoint is 15 °C and in cooling it is 25 °C (20 °C + (20 °C - 15 °C)).

18.6. Comfort setpoint temperature (absolute) (Temp. Controller Settings)

See also article "Setpoint handling, Page 113".
The comfort setpoint is always set as an absolute temperature. It is used as mirror point for the economy and stand-by setpoints.

18.7. Controller Fan Limit 1 [%] (Controller Page Fan)

See also article "Fancoil, Page 117".

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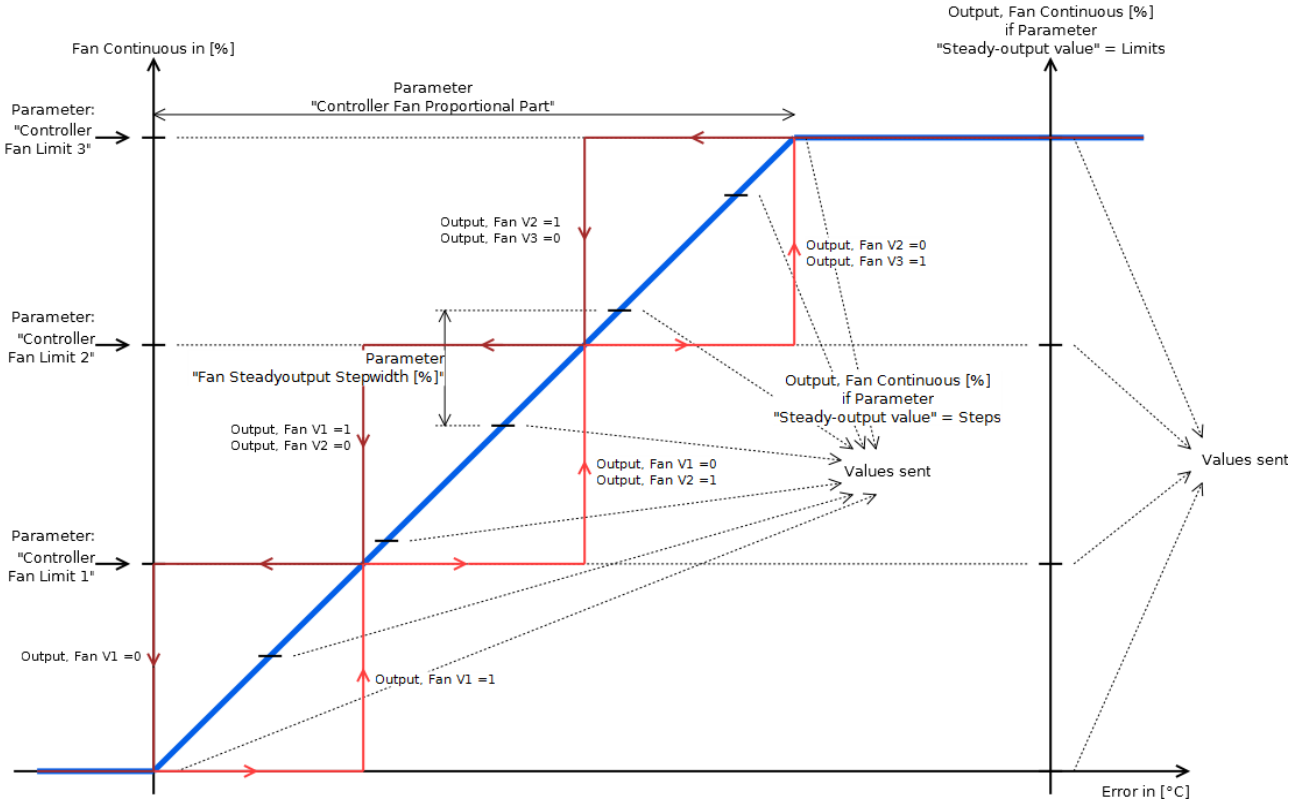

This is used as an input for the calculation of the "Output, Fan VX" 1-bit objects, with the internal steady value of the object "Output, Fan Continuous [%]" as reference value. This is formed according to the error (Setpoint - Temperature) and in dependency of the parameter "Controller Fan Proportional Part (Controller Page Fan), Page 124“. The formula for the steady value is {Error * (100%/ parameter "Controller Fan Proportional Part")}.

At any time, only one object "Output, Fan VX" can be active. It is not possible that two or more are active at the same time.
If the continuous value exceeds[2] a limit, the corresponding object "Output, Fan VX" is set to 1 if the continuous value falls below the limit the output object remains 1 until the continuous value falls below the next smaller limit or 0.

Parameter "Controller Fan Limit 1 [%]" is 30%. The steady value is 0, and so is the object "Output, Fan V1". If the steady value exceeds the 30 % threshold, the object is set to 1. If the steady value then falls below the 30 % threshold, the Fan V1 output remains at 1 until the value falls below 0.

If the parameter "Steady-output value" (Controller Page Fan) is set to limits, the "Controller Fan Limits X [%]" limits are also used as discretization steps for the object "Output, Fan Contiuous [%]". See parameter "Steady-output value (Controller Page Fan), Page 134".
These limits are also used for the objects "Input, Fan Mode [217], Page 144" and "Input, Fan Speed [218], Page 145“.

18.8. Controller Fan Limit 2 [%] (Controller Page Fan)

See Parameter "Controller Fan Limit 1 [%] (Controller Page Fan), Page 122“.

18.9. Controller Fan Limit 3 [%] (Controller Page Fan)

See Parameter "Controller Fan Limit 1 [%] (Controller Page Fan), Page 122“.

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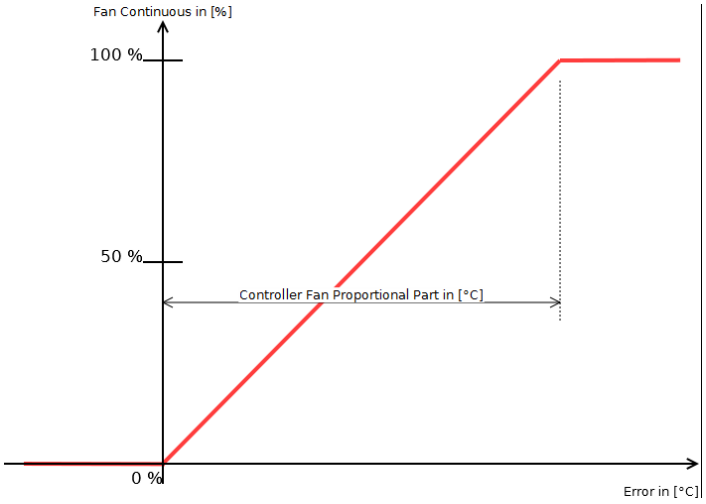
18.10. Controller Fan Proportional Part (Controller Page Fan)

See also article "Fancoil, Page 117".
This sets the proportional part for the calculation of the object "Output, Fan Continuous [%]" (see equation).

Together with the parameters "Controller Fan Limit X [%]", it serves as an input for the calculation for the output values of the objects "Output, Fan VX".

Fan Continuous = Controller Fan Proportional Part * (setpoint – Temperature)



18.11. Controller proportional band style (Temp. Controller Settings)

Affects all PI-controllers and PI-controllers with PWM. This setting describes how the "Proportional Part" of the PI-controller is interpreted .

Fancoil is not affected.

Use this if you only have a P-Controller (I=0)
This controller can be used with advantage in proper designed systems which pre-regulate the inlet temperature. Then this controller has better response times and lead to less distortion when changing the setpoints. It has disadvantages when using heating+cooling designs, because the bands may overlap.)
At an error of 0, the control variable is 50 %, and within the PB, the control variable is linear to the error and else 0 % or 100 %.
Equation for controller variable:

18.12. Symmetric to setpoint

$$\text{Control variable} = K_p \cdot Error(t) + K_i \cdot \int_0^t Error(\tau)d\tau + 50\%$$

(for Kp and Ki see parameter „Controller type (Temp. Controller Heating/Cooling), Page 125“)

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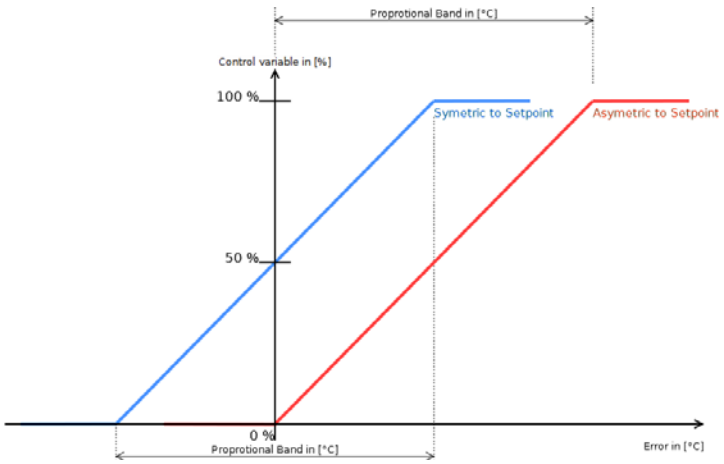
18.13. Asymmetric to setpoint

Use this if in doubt.

If the error is 0, the control variable is also 0%, and if the error equals the parameter "Proportional Band", the control variable is 100%. Between these two points, it increases linearly.

Equation for controller variable:

$$\text{Control variable} = K_p \cdot Error(t) + K_i \cdot \int_0^t Error(\tau)d\tau$$



18.14. Controller type (Temp. Controller Heating/Cooling)

See also article "Controller output objects, Page 119“.

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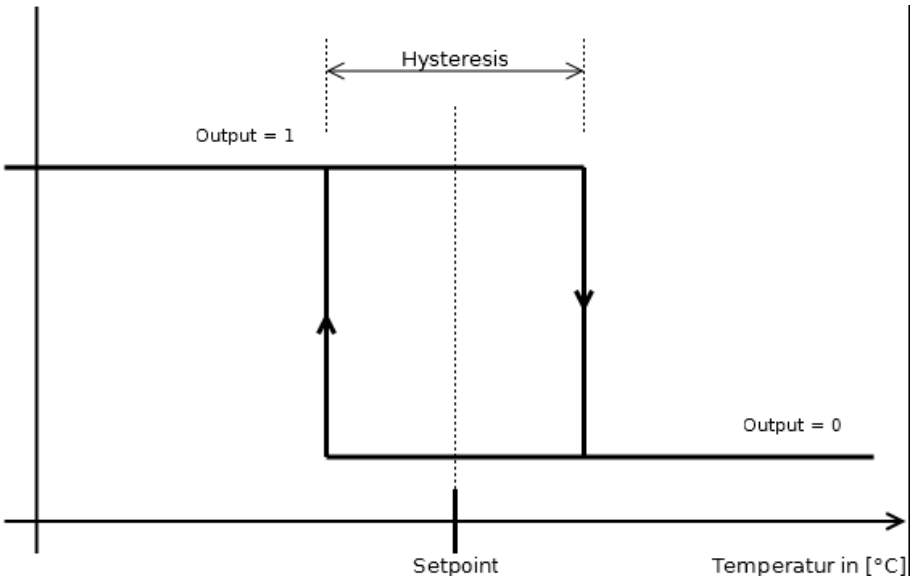
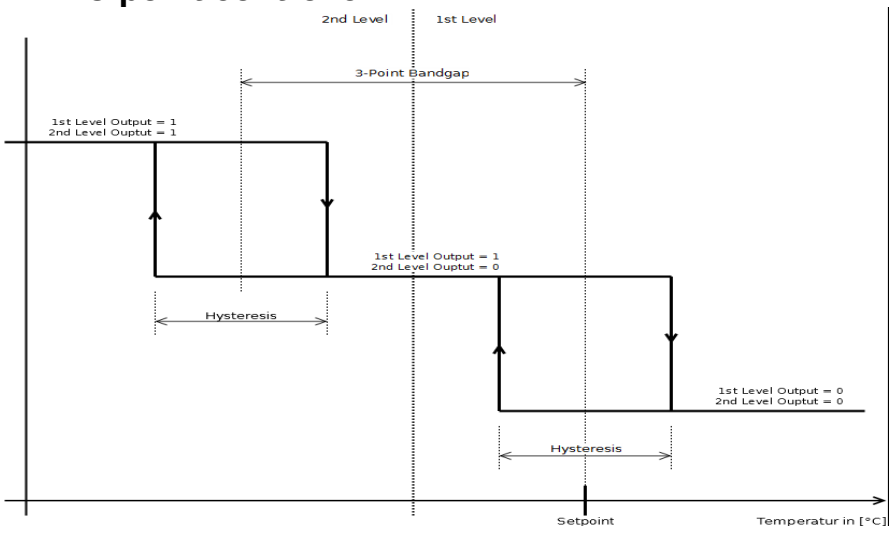
18.14.1. 2-point controller



The figure shows a 2-point-controller heating. The hysteresis is set by the parameter "Hysteresis" (Temp. Controller Heating/Cooling) and the setpoint is at half the hysteresis value. For cooling mode, the figure can be viewed mirror-inverted at the setpoint.

18.14.2. 3-point controller



The figure shows a simple 3-point-controller heating. The setpoint in the 1st level is at half the hysteresis value. The hysteresis for both levels is the same and set by the parameter "Hysteresis" (Temp. Controller Heating/Cooling). The gap between the two levels is set by the 3-point bandgap. For cooling mode, the figure can be viewed mirror-inverted at the

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setpoint.There are two 1-bit objects "... 1st Level Switch" and "... 2nd Level Switch". Both outputs correspond to the two levels in the figure.

18.14.3. PI-controller

Affected by the parameter "Controller proportional band style (Temp. Controller Settings), Page 124“. The following description refers to the setting "Asymmetric to Setpoint".

For a more complete overview of how to set up a PI-controller see the article "PI-Controller set up, Page 112“.

The equation for the control variable, which is a 1-byte object [0..100%], is shown in the box below. For the variable „proportional band“ see parameter "Proportional band (Temp. Controller Heating/Cooling, Page 115“, for the variable „Integration Time“ see parameter "Integration time [minutes] (Temp. Controller Heating/Cooling), Page 130". The error variable is setpoint minus temperature.

$$\text{Control variable} = K_p \cdot Error(t) + K_i \cdot \int_0^t Error(\tau)d\tau$$

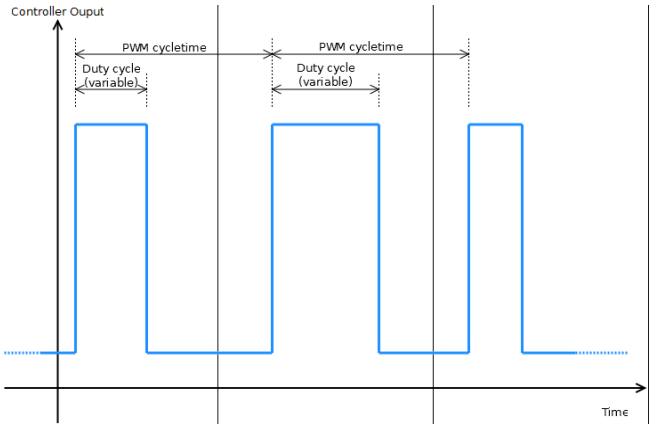
$$K_p = \frac{100}{\text{Proportional band}}$$

$$K_p = \frac{100}{\text{Proportional band} \cdot \text{Integration time} \cdot 60}$$

18.14.4. PI-controller with PWM

Affected by the parameter "Controller proportional band style (Temp. Controller Settings), Page 124 “. The internal function is the same here as in the PI-controller above. The parameter "PWM cycletime [seconds] (*10) (Temp. Controller Heating/Cooling), Page 132“ sets the time for the cycle and for the duty cycle according to the control variable

There is a steady 1-byte and a 1-bit PWM output.



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18.15. Economy setpoint temperature (absolute) (Temp. Contr. Settings)

See also article „Setpoint handling, Page 113“.

The economy setpoint for a heating or cooling controller is set as absolute temperature value.

18.16. Economy setpoint temperature (heating, absolute) (Temp. Contr. Settings)

See also article „Setpoint handling, Page 113“.

The economy setpoint for a combined heating/cooling controller is set as absolute temperature value for the heating controller part. For the economy setpoint of the cooling controller part, the value set here is mirrored at the comfort setpoint.

(calculation: EconomySetpointCooling = ComfortSetpoint + (ComfortSetpoint - EconomySetpoint)).

18.17. Economy setpoint temperature decrease (Temp. Contr. Settings)

See also article „Setpoint handling, Page 113“.

Economy setpoint for an Heating Controller, set as temperature difference to the Comfort Setpoint (Relativ).

18.18. Economy setpoint temperature increase (Temp. Contr. Settings)

See also article „Setpoint handling, Page 113“.

The economy setpoint for a cooling controller is set as temperature difference to the comfort setpoint (relative).

18.19. Economy setpoint temperature de-/increase (Temp. Contr. Settings)

See also article „Setpoint handling, Page 113“.

The economy setpoint for a heating/cooling controller is set as temperature difference to the comfort setpoint (relative).

18.20. External temperature weight [%] (Temp. Controller Settings)

Defines the weight of the external temperature (object "Input, Actual Temperature") in relation to the temperature measured by the sensor that is directly connected to the device.

The temperature. For the calculation see equation:

$$\text{Temperature} = \begin{array}{l}\text{ExternalTemperature [°C]} \cdot \text{ExternalTemperature weight [\%]} \; + \\ \text{InternalTemperature [°C]} \cdot (100\ \% - \text{ExternalTemperature weight [\%]})\end{array}$$

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The calculated temperature is displayed at the object "Output, actual Temperature" and is used as a reference for all operations of all controllers and is the displayed actual temperature if used.

No sensor directly connected to the device, only the temperature from the object "Input, External Temperature" shall be used. Set the parameter "External Temperature weight" to 100. With this setting, the external temperature will be used and the other temperature input will be ignored.

The parameter "External Temperature weight" is set to 50, the external temperature reading is 21 °C and the internal is 22 °C. With this setting, the internal temperature will be calculated to 21.5 °C and also sent to the object "Output, Actual Temperature".

If no sensor is directly connected to the device, the external temperature weight must be 100%.

18.21. Fan lag-time [sec] (Controller Page Fan)

See also article "Fancoil, Page 117".
The timer starts after the internal Continuous Fan Value[3] returns to zero. Until the time set with this parameter is elapsed, the object "Output, Fan V1" remains on 1 and the object "Output, Fan continuous [%]" remains on the value set at parameter "Controller Fan Limit 1 [%]" (Controller Page Fan), although both should already be zero.

If the valve for the heating/cooling fluid is closed, there is still some fluid left in the radiator. With this setting it is possible to use this rest more efficiently.

18.22. Fan Lead-time [sec] (Controller Page Fan)

The timer starts after the Continuous Fan Value[4] becomes other than zero. The objects "Output, Fan VX" and "Output, Fan Continuous [%]" remain on 0 until the time has elapsed, although both should already have values.

When the valve for the heating/cooling fluid is opened, it takes some time until the fluid arrives at the radiator. With this setting it is possible to save the energy for the fan in that time

18.23. Fan Steadyoutput Stepwidth [%] (Controller Page Fan)

Defines how big the change of the object "Output, Fan Continues [%]" has to be before it is sent to the bus.

18.24. Heating/cooling bandgap (Temp. Controller Settings)

More also article „Setpoint handling, Page 113“.; Defines the gap between heating and cooling mode in °C.

If the temperature rises above the comfort setpoint minus heating/cooling gap, half the heating controller will be switched off. If the temperature then rises above the comfort setpoint plus heating/cooling gap, half the cooling controller will be switched on, using comfort setpoint plus heating/cooling gap half as setpoint to regulate upon. In the area between these two points, both controllers are inactive.

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18.25. Heating/cooling changeover deadtime (Temp. Contr. Settings)

Time until the switch between heating and cooling controller occurs.

After the temperature has risen above the comfort setpoint, the heating controller will be switched off, and the timer starts. When the timer has elapsed, the cooling controller starts if the temperature is still above the comfort setpoint.

Can prevent fluctuations of fast switching between heating and cooling mode.

18.26. Hysteresis (Temp. Controller Heating/Cooling)

Defines the hysteresis in °C for the 2-point and the 3-point controller.

18.27. Integration time [minutes] (Temp. Controller Heating/Cooling)

Defines the integration time for the PI and PI-controller with PWM.

If this value is set to 0, the PI-controller becomes an simple P-controller.

There is always the possibility that a PI-controller oscillates if the wrong or poor parameters are used.

In general, a shorter integration time means a quicker adjustment to the setpoint but a higher risk of continual oscillation. Vice versa, a longer integration time means a slower adjustment to the setpoint but an lower risk of continual oscillation.

18.28. Minimum/maximum gap [%] (Temp. Controller Heating/Cooling)

If the control variable rises above (100% - Minimum/maximum gap) or below the minimum/maximum gap, the control variable is directly set to 100% or 0%, see figure.

Some steady valves have problems in there marginal areas. With this, it is possible to "jump" over these areas

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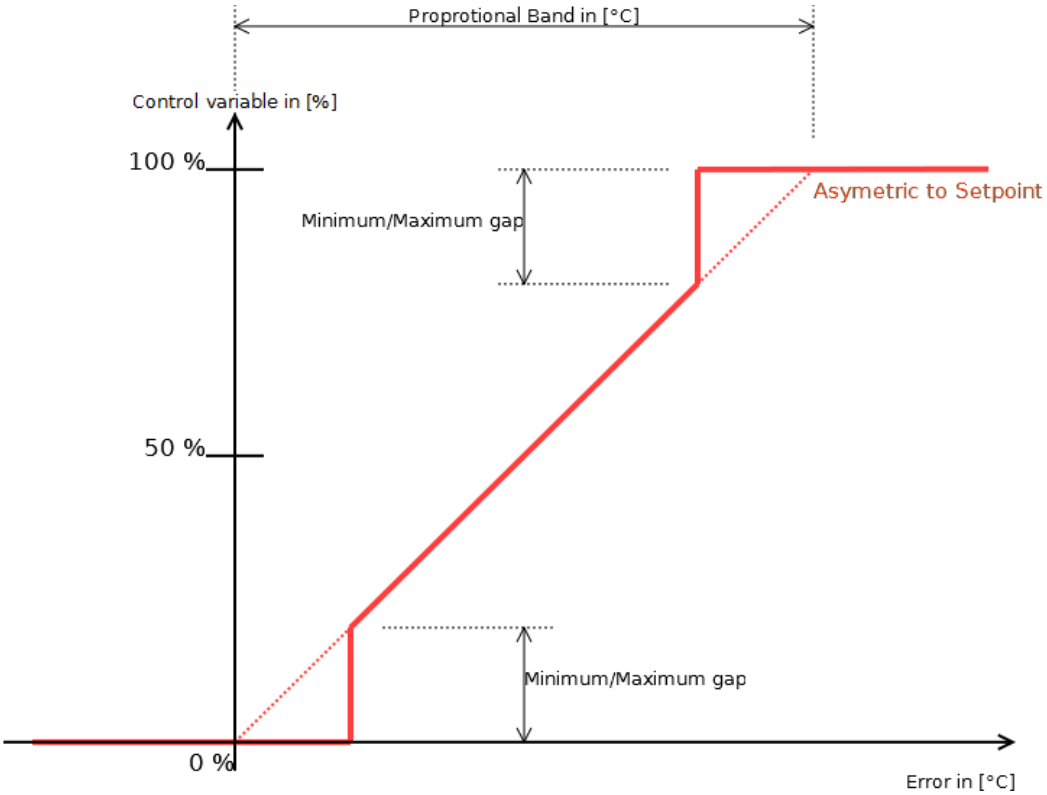

18.29. Output send on change off (Temp. Controller Heating/Cooling)

This affects the corresponding Steady PI-Controller Outputs and determines after which change the value is sent again.

18.30. Outputs sending cycle [minutes] (Temp. Controller Settings)

This affects the output of the object "Output, actual Temperature" and determines, in which time interval the temperature is sent. If 0, the value will not be sent cyclically.

18.31. Overwrite timeout [minutes] (Temp. Controller Settings)

This determines how long it takes to return to the last mode before the object "Input, Set Comfort Mode (overwrite)" was used and how long it takes to return to the default comfort setpoint after a setpoint adjustment via object "Input, Setpoint Adjust" was carried out. This timeout is also used for the fancoil object "Input, Fan Mode" and "Input, Fan Speed". See the object descriptions for further information.

e.g. If the controller is in stand-by mode and the comfort overwrite mode is activated via the object "Input, Set Comfort Mode (overwrite)", the controller changes into comfort mode and starts to regulate the corresponding comfort setpoint. The timer with the set timeout starts. If the mode is not changed otherwise (e.g. by higher prioritized mode selectors like object "Input, Set Protection Mode") and the timer elapses, the controller returns to stand-by mode.

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18.32. Proportional band (Temp. Controller Heating/Cooling]

Defines the proportional band for the PI and PI-controller with PWM.

There is always the possibility that a PI-controller oscillates if the wrong or poor parameters are used.

In general, a smaller proportional band means an quicker adjustment to the setpoint, but more fluctuations. Vice versa, a bigger proportional band means a slower adjustment to the setpoint and smaller or no fluctuations.

18.33. Protection setpoint temperature high (absolute) [°C] (Temp. Controller Settings)

See also article "Setpoint handling, Page 113“.

Protection setpoint for cooling controller. This one is always set absolute in °C. If the controller is in protection mode, there is no setpoint output on the object "Output, Setpoint".

18.34. Protection setpoint temperature low (absolute) [°C] (Temp. Controller Settings)

See also article "Setpoint handling, Page 113“.

Protection setpoint for heating controller. This one is always set absolute in °C. If the controller is in protection mode, there is no setpoint output on the object "Output, Setpoint".

18.35. PWM cycletime [seconds] (*10) (Temp. Contr. Heating/Cooling)

A low PWM cycle time also means more switching cycles for the valves or relays. Not all are designed for that.

Defines how long one PWM cycle takes. See figure.

In general, a shorter cycle time means a faster response and less temperature fluctuation but also more stress for the valve or relay. Vice versa, a longer cycle time means a slower response and more temperature fluctuations, but also less stress for the valve or relay. This strongly depends on the used heating and/or cooling system.

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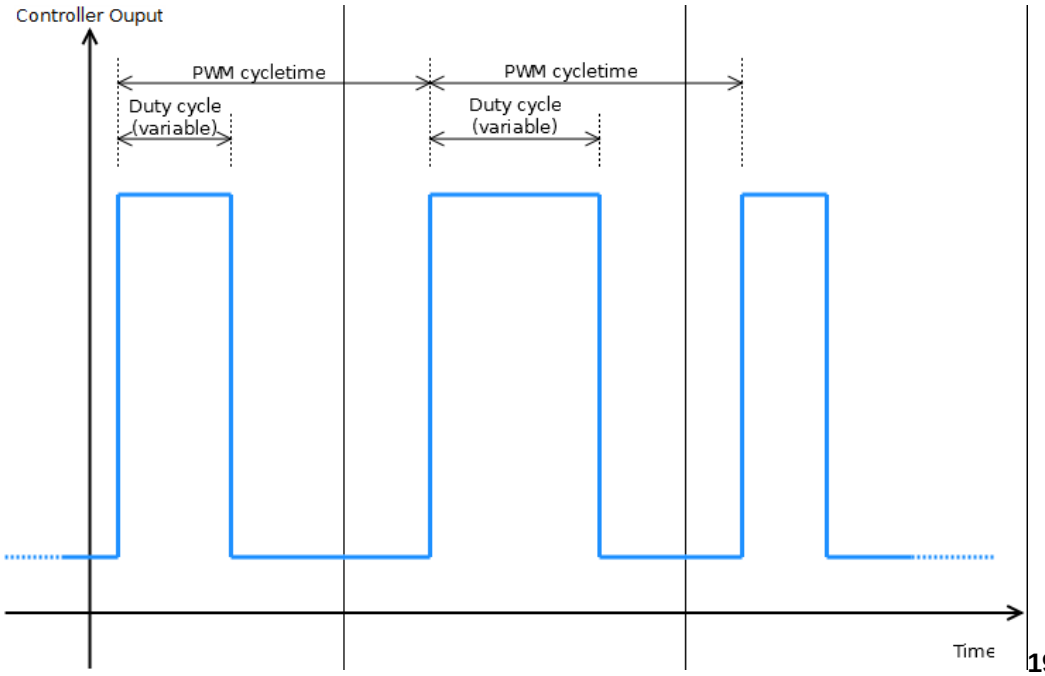

19.32. Room Temperature Controller (Main)

Determines the general used controller structure, e.g. how many unique controllers there are, if fancoil is available, if it is a one- or two-stage controller, heating and/or cooling, etc. The major differences of the available entries are described in the article "Room temperature controllers, Page 116“.

18.36. Setpoint adjustment range (Temp. Controller Settings)

The comfort setpoint can be adjusted temporally in the range set by this parameter. The setpoint changes at least for the time set in parameter "Overwrite timeout [minutes] (Temp. Controller Settings), Page 131“ or until the mode is changed otherwise (e.g. to stand-by).

The object "Input, Setpoint Adjust" is a 1-byte object which is interpreted according to the set range as follows:

Selection "+0 °C .. +3 °C" and "+0 °C .. +5 °C"

as 1 byte unsigned in which 0 corresponds to +0 °C and 255 to +3 °C or +5 °C.

Selection "-3 °C .. +3 °C" and "-5 °C .. +5 °C"

as 1 byte signed in which 0 corresponds to +0 °C, 127 to +3 °C or +5 °C and -128 to -3 °C or -5 °C.

Selection "-3 °C .. +0 °C" and "-5 °C .. +0 °C"

as 1 byte unsigned in which 0 corresponds to +0 °C and 255 to -3 °C or -5 °C.

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18.37. Stand-by setpoint temperature (absolute) (Temp. Contr. Settings)

See also article "Setpoint handling, Page 113“.

Stand-by setpoint for a heating or cooling controller, set as absolute temperature value.

18.38. Stand-By setpoint temperature (heating, absolute) (Temp. Contr. Settings)

See also article "Setpoint handling, Page 113“.

Stand-by setpoint for a combined heating/cooling controller, set as absolute temperature value for the heating controller part. For the stand-by setpoint of the cooling controller part, the value set here is mirrored at the comfort setpoint .

(calculation: Stand-bySetpointCooling = ComfortSetpoint + (ComfortSetpoint - Stand-bySetpoint)).

18.39. Stand-by setpoint temperature de-/increase (Temp .Controller Settings)

See also article "Setpoint handling, Page 113“.

Economy setpoint for a heating/cooling controller, set as temperature difference to the comfort setpoint (relative).

18.40. Stand-By setpoint temperature decrease (Temp. Controller Settings)

See also article "Setpoint handling, Page 113“.

Stand-by setpoint for heating controller, set as temperature difference to the comfort setpoint (relative).

18.41. Standby setpoint temperature increase (Temp. Controller Settings)

See also article "Setpoint handling, Page 113“.

Stand-by setpoint for cooling controller, set as temperature difference to the comfort setpoint (relative).

18.42. Steady-output value (Controller Page Fan)

Determines in which intervals the output on the object "Output, Fan Continuous [%]" is sent. See figure below.

If this is selected, the parameter option "Fan Steadyoutput Stepwidth [%]" (Controller Page Fan) is enabled. Now this new parameter allows to set a stepwidth, which defines how much the object "Output, Fan Continuous [%]" has to change until it is sent again.

The output is only sent if the value passes the corresponding limit of the limits set by the parameters "Controller Fan Limit X [%]" (Controller Page Fan).

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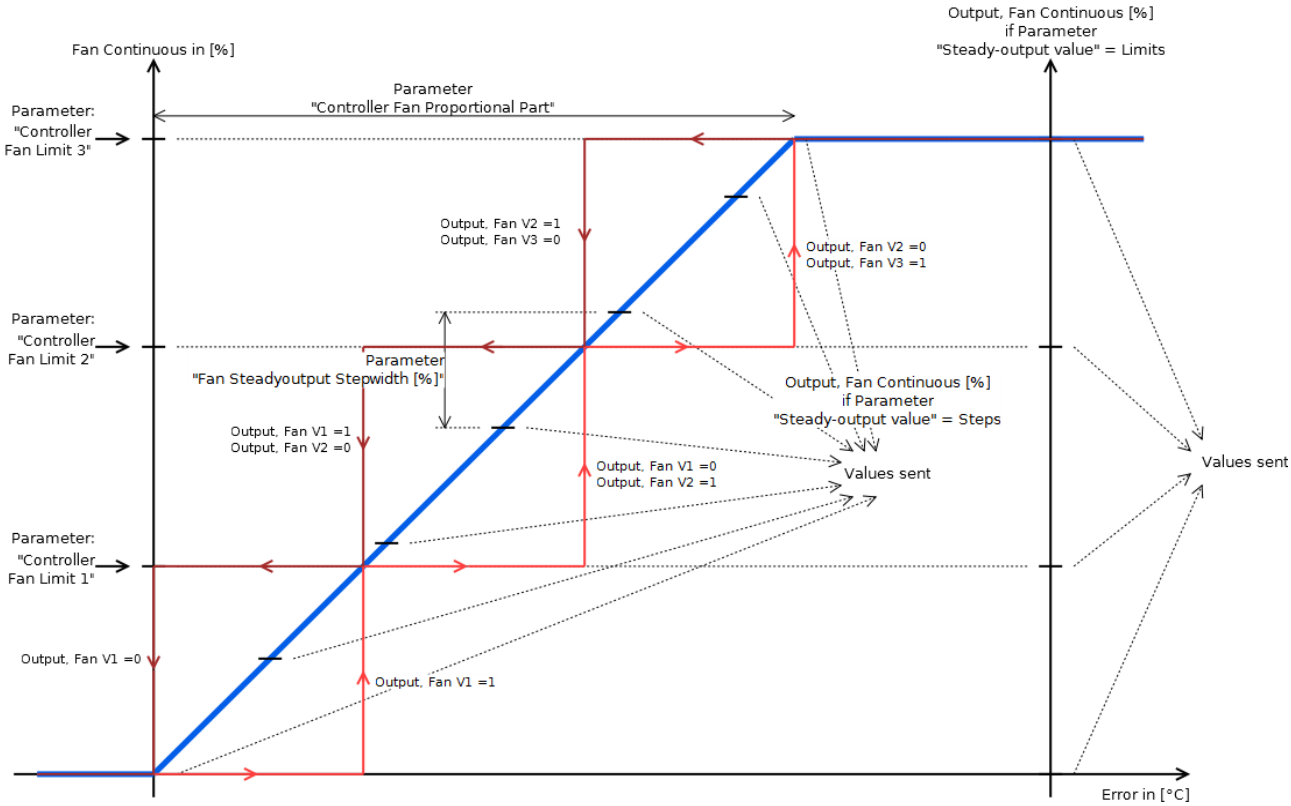
e.g. Fan limit 1 is 25 %. If the value exceeds this limit, the value 25 % is sent to the object "Output, Fan Continuous [%]". If the value falls below this limit, it remains to be 25 %. If the value reaches 0% (in other cases the next lower limit), the object is updated to 0%..



18.43. Temperature offset [* 0,1 °C] (Temp. Controller Settings)

The value set here, multiplied with 0,1 °C, will be added to the temperature measured by the sensor that is directly connected to the Touch-IT (doesn't affect the temperature via object "Input, external Temperature"). The so calculated temperature is then combined with the temperature from the object "Input, external Temperature" (according to the factor set by the parameter "External temperature weight [%] (Temp. Controller Settings), “).

It will then be used for internal controller calculation and also for the output on object "Output, actual Temperature".

18.44. Temperature send cycle [minutes] (Temp. Controller Settings)

This affects the output of the object "Output, actual Temperature". It determines in which interval the value is sent. If it is set to 0, the value will not be sent cyclically.

18.45. Temperature send on change of (Temp. Controller Settings)

This affects the output of the object "Output, actual Temperature" and determines how much the temperature has to change until the temperature is sent again.

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19. RTC Communication Objects

19.1. Output, actual Temperature [196]

The actual temperature is sent to this object. This temperature value is calculated as described in the parameter "External temperature weight [%] (Temp. Controller Settings), ".

It is possible to send this value periodically or, if it has changed by a certain value, parameterized by the parameter "Temperature send on change of (Temp. Controller Settings), Page 135" and "Temperature send cycle [minutes] (Temp. Controller Settings), Page 135]".

19.2. Input, external Temperature [197]

Allows to input an external temperature value from an external sensor that is connected to the bus. The weight against the internal temperature that is measured by the sensor directly attached to the device is set by the parameter "External temperature weight [%] (Temp. Controller Settings)".

19.3. Input, HVAC-Mode [198]

Allows to switch between the different modes, e.g. comfort, stand-by, ... mode in order to activate the different setpoints, see table.

There is also the possibility to set this mode via 1-bit objects, e.g. the object "Input, Set Comfort Mode". These different possibilities are prioritized. The object "Input, HVAC-Mode" has the lowest priority, which means it is overwritten if one of

the 1-bit objects is used (set to 1).

Input, HVAC-Mode Value	
0	Auto Mode (Hands the mode-control over to a HVAC-profile-display-widget, defaults to Standby Mode if no internal profile-widget is defined)
1	Comfort Mode
2	Standby Mode
3	Economy Mode
4	Protection Mode
5...255	Not used

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19.4. Input, Setpoint Comfort Mode (absolute) [199]

Allows to set the Comfort setpoint for an Heating or Cooling Controller set as absolute temperature Value. The Comfort setpoint is always absolute and serves as reference for the other setpoints.

e.g. If comfort setpoint is 20 °C, standby setpoint is 15 °C, an Room Temperature Controller with heating and cooling and also absolute setpints are used. This means that the standby setpoint for cooling is calculated to 25 °C (20°C + (20 °C - 15 °C)).

19.5. Input, Setpoint Economy Mode decrease [200]

Allows to set the economy setpoint for a heating controller, set as temperature difference to the comfort setpoint (relative).

19.6. Input, Setpoint Standby Mode decrease [201]

Allows to set the stand-by setpoint for a heating controller, set as temperature difference to the comfort setpoint (relative).

19.7. Input, Set Protection Mode [202]

Priority: 5 (low value low Priority)

See Object "Input, Set Comfort Mode".

19.8. Input, Set Comfort Mode (overwrite) [203]

Priority: 4 (low value, low priority)

See object "Input, Set Comfort Mode [204], Page 137" exept the setting to comfort-mode is only temporary as defined by parameter „Overwrite timeout [minutes] (Temp. Controller Settings), Page 131“.

19.9. Input, Set Comfort Mode [204]

Priority: 3 (low value, low priority)

If this 1-bit object is set to 1, the corresponding setpoint is activated and remains active until the object is set to 0 or another object like "Input, Set OFF Mode" with a higher priority is set to 1.

19.10. Input, Set Economy Mode [205]

Priority: 2 (low value low Priority)

See Object "Input, Set Comfort Mode [204], Page 137".

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19.11. Input, Set OFF Mode [206]

Priority: 6 (low value, low priority)

See Object "Input, Set Comfort Mode [204], Page 137".

19.12. Input, Setpoint Adjust [207]

See also parameter "Setpoint adjustment range (Temp. Controller Settings), Page 133".

If and only if the controller is in comfort mode, it is possible to adjust the current setpoint within the range set in the parameter "Setpoint adjustment range (Temp. Controller Settings), Page 133". These changes remain active for the time set in the parameter "Overwrite timeout [minutes] (Temp. Controller Settings), Page 131". After that time, the setpoint returns to the value it was set to before the adjustment.

e.g. The comfort setpoint is 20 °C and the room controller is in comfort mode. The parameter "Setpoint adjustment range" is set to "-5 °C .. +5 °C" and the parameter "Overwrite timeout [minutes]" is 30.

If the object "Input, Setpoint Adjust" is set to 64, the used setpoint is 22.5 °C (20 °C + (5°C * 64/127), this setpoint is then valid for 30 minutes .

19.13. Output, Setpoint [208]

The actual setpoint is sent to this object if the controller is not in protection mode.

e.g. Heating/cooling room controller type sends the actual setpoint corresponding to the modes heating/cooling and comfort, stand-by and economy.

e.g. Room controller in comfort mode and setpoint adjustment are used. If the value at the object "Input, Setpoint Adjust" is changed, the value on the object "Output, Setpoint" will be updated.

19.14. Input, Setpoint Economy Mode (absolute) [200]

Allows to set the economy setpoint for a heating or cooling controller, set as absolute temperature value.

19.15. Input, Setpoint Economy Mode (heating, absolute) [200]

Allows to set the economy setpoint for a combined heating/cooling controller, set as absolute temperature value for the heating controller part. For the economy setpoint of the cooling controller part, the value set here is mirrored at the comfort setpoint.

(calculation: EconomySetpointCooling = ComfortSetpoint + (ComfortSetpoint - EconomySetpoint)).

19.16. Input, Setpoint Economy Mode de-/increase [200]

Allows to set the economy setpoint for a heating/cooling controller, set as temperature difference to the comfort setpoint (relative).

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19.17. Input, Setpoint Economy Mode increase [200]

Allows to set the economy setpoint for a cooling controller, set as temperature difference to the comfort setpoint (relative).

19.18. Input, Setpoint Standby Mode (absolute) [201]

Allows to set the stand-by setpoint for a heating or cooling controller, set as absolute temperature value

19.19. Input, Setpoint Standby Mode (heating, absolute) [201]

Allows to set the stand-by setpoint for a combined heating/cooling controller, set as absolute temperature value for the heating controller part. For the stand-by setpoint of the cooling controller part, the value set here is mirrored at the comfort setpoint .

(calculation: StandbySetpointCooling = ComfortSetpoint + (ComfortSetpoint - StandbySetpoint))

19.20. Input, Setpoint Standby Mode de-/increase [201]

Allows to set the economy setpoint for a heating/cooling controller, set as temperature difference to the comfort setpoint (relative)

19.21. Input, Setpoint Standby Mode increase [201]

Allows to set the stand-by setpoint for a cooling controller, set as temperature difference to the comfort setpoint (relative).

19.22. Input, Heating/Cooling [219]

IIf a switched room controller type is selected, it is possible to set the modes heating or cooling via this object (also available if a fancoil room controller type is selected)..

Input, heating/cooling Value	
1	Heating
0	Cooling

19.23. Output, Heating/Cooling [219]

If a room controller type with heating/cooling and a gap is used, this output indicates if the controller is in heating or in cooling mode.)

Input, heating/cooling Value	
1	Heating
0	Cooling

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19.24. Output, Heating/Cooling, 1st Level Switch [210/214]

See also article "Controller output objects, Page 119".

19.25. Output, Heating/Cooling, 2nd Level Switch [212/216]

See also article "Controller output objects, Page 119".

19.26. Output, Heating/Cooling, PWM Output [210/214]

See also article "Controller output objects, Page 119".

19.27. Output, Heating/Cooling, Steady Output [209/213]

See also article "Controller output objects, Page 119".

19.28. Output, Heating/Cooling, Steady Output non-zero [210/214]

See also article "Controller output objects, Page 119".

19.29. Output, Heating/Cooling, Switch [210/214]

See also article "Controller output objects, Page 119".

19.30. Output, Cooling 1st Stage, 1st Level Switch [214]

See also article "Controller output objects, Page 119".

19.31. Output, Cooling 1st Stage, 2nd Level Switch [216]

See also article "Controller output objects, Page 119".

19.32. Output, Cooling 1st Stage, PWM Output [214]

See also article "Controller output objects, Page 119".

19.33. Output, Cooling 1st Stage, Steady Output [213]

See also article "Controller output objects, Page 119".

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19.34. Output, Cooling 1st Stage, Steady Output non-zero [214]

See also article "Controller output objects, Page 119".

19.35. Output, Cooling 1st Stage, Switch [214]

See also article "Controller output objects, Page 119".

19.36. Output, Cooling 2nd Stage, 1st Level Switch [214]

See also article "Controller output objects, Page 119".

19.37. Output, Cooling 2nd Stage, 2nd Level Switch [216]

See also article "Controller output objects, Page 119".

19.38. Output, Cooling 2nd Stage, PWM Output [216]

See also article "Controller output objects, Page 119".

19.39. Output, Cooling 2nd Stage, Steady Output [215]

See also article "Controller output objects, Page 119".

19.40. Output, Cooling 2nd Stage, Steady Output non-zero [216]

See also article "Controller output objects, Page 119".

19.41. Output, Cooling 2nd Stage, Switch [216]

See also article "Controller output objects, Page 119".

19.42. Output, Cooling, 1st Level Switch [213]

19.43. Output, Cooling, 2nd Level Switch [214]

See also article "Controller output objects, Page 119".

19.44. Output, Cooling, PWM Output [214]

See also article "Controller output objects, Page 119".

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19.45. Output, Cooling, Steady Output [216]

See also article "Controller output objects, Page 119“.

19.46. Output, Cooling, Steady Output non-zero [214]

See also article "Controller output objects, Page 119“.

19.47. Output, Cooling, Switch [214]

See also article "Controller output objects, Page 119“.

19.48. Output, Heating 1st Stage, 1st Level Switch [209]

See article “Controller output objects, Page 105“.

19.49. Output, Heating 1st Stage, 2nd Level Switch [210]

See also article "Controller output objects, Page 119“.

19.50. Output, Heating 1st Stage, PWM Output [210]

See also article "Controller output objects, Page 119“.

19.51. Output, Heating 1st Stage, Steady Ouptut non-zero [210]

See also article "Controller output objects, Page 119“.

19.52. Output, Heating 1st Stage, Steady Output [209]

See also article "Controller output objects, Page 119“.

19.53. Output, Heating 1st Stage, Switch [210]

See also article "Controller output objects, Page 119“.

19.54. Output, Heating 2nd Stage, 1st Level Switch [211]

See also article "Controller output objects, Page 119“.

19.55. Output, Heating 2nd Stage, 2nd Level Switch [212]

See also article "Controller output objects, Page 119“.

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19.56. Output, Heating 2nd Stage, PWM Output [212]

See also article "Controller output objects, Page 119".

19.57. Output, Heating 2nd Stage, Steady Output [211]

See also article "Controller output objects, Page 119".

19.58. Output, Heating 2nd Stage, Steady Output non-zero [212]

See also article "Controller output objects, Page 119".

19.59. Output, Heating 2nd Stage, Switch [212]

See also article "Controller output objects, Page 119".

19.60. Output, Heating, 1st Level Switch [209]

See also article "Controller output objects, Page 119".

19.61. Output, Heating, 2nd Level Switch [210]

See also article "Controller output objects, Page 119".

19.62. Output, Heating, PWM Output [210]

See also article "Controller output objects, Page 119".

19.63. Output, Heating, Steady Output [209]

See also article "Controller output objects, Page 119".

19.64. Output, Heating, Steady Output non-zero [210]

See also article "Controller output objects, Page 119".

19.65. Output, Heating, Switch [210]

See also article "Controller output objects, Page 119".

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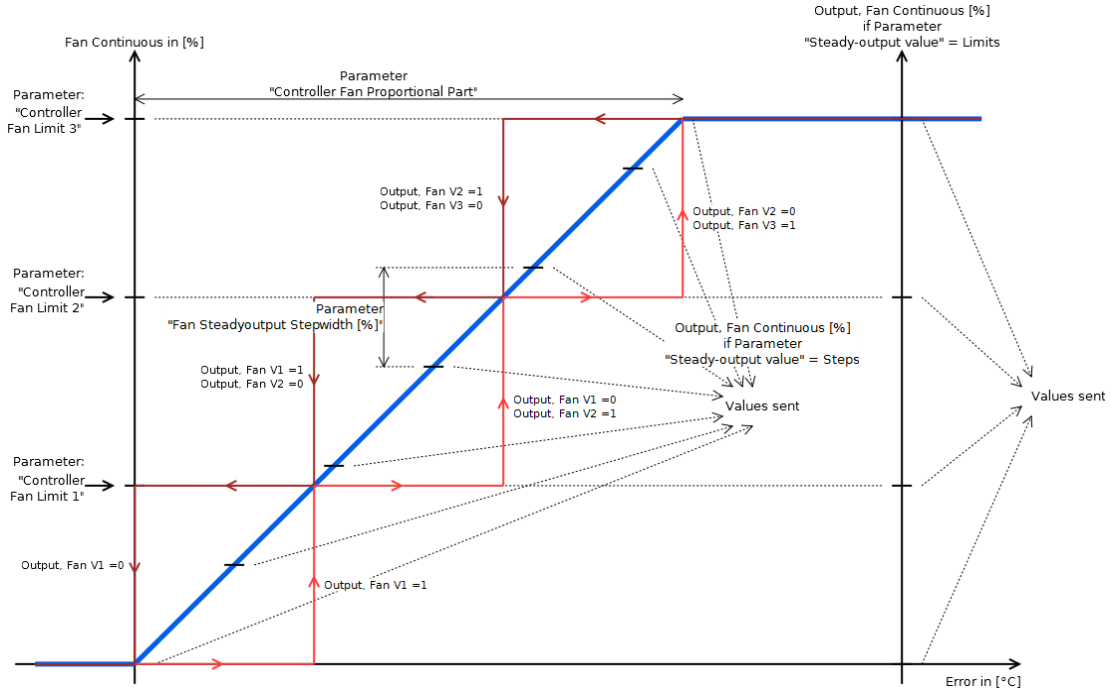
19.66. Output, Fan Continuous [%] [211]

This is a steady 1-byte output for the fan of a fancoil room controller type. The style of the output is set by different parameters such as "Steady-output value (Controller Page Fan), Page 134", "Controller Fan Limit 1 [%] (Controller Page Fan), Page 122" and "Fan Steadyoutput Stepwidth [%] (Controller Page Fan), Page 129".It is also possible to use the three 1-bit objects "Output, Fan VX" to control the fan.

19.67. Output, Fan V1 [212]

See also article “Fancoil, Page 104“. If the corresponding limit, set by the parameter "Controller Fan Limit 1 [%] (Controller Page Fan), Page 122", is exceeded by the fan continuous value, this object is set to 1. It remains to be 1 until the value falls below the next lower limit or becomes 0. See figure.



19.68. Output, Fan V2 [215]

See "Output, Fan V1 [212], Page 144"

19.69. Output, Fan V3 [216]

See "Output, Fan V1 [212], Page 144"

19.70. Input, Fan Mode [217]

If set to 1, the objects "Output, Fan Continuous [%]" and "Output, Fan VX" are set to the values corresponding to the speed set at the object "Input, Fan Speed". This value remains active for the time set in the parameter "Overwrite timeout [minutes] (Temp. Controller Settings), Page 131“. Afterwards, it returns to the given value of the controller.

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If set to 0, the fan outputs are set as given by the controller.

19.71. Input, Fan Speed [218]

Allows to define the value which is then available to set[1] via the object "Input, Fan Mode" as shown in the table. If this value is changed, the corresponding outputs of the objects "Output, Fan VX" and "Output, Fan Continuous [%]" are immediately set to the corresponding value. As usual, these values only remain active for the time set in the parameter "Overwrite timeout [minutes] (Temp. Controller Settings), Page 131 ".

The new values are output immediately when they are changed. This makes it possible to see if the desired setting is OK without having to change the object "Input, Fan Mode" after every change..

Value ,,Input, Fan Speed"	Object ,,Output. Fan Continuos	Object,,Output,Fan V1"	V2"	V3"
0	0%	0	0	0
1	Parameter „Controller Fan Limit 1 [%]“ (Controller Page Fan)	1	0	0
2	Parameter „Controller Fan Limit 1 [%]“ (Controller Page Fan)	0	1	0
3	Parameter „Controller Fan Limit 1 [%]“ (Controller Page Fan)	0	0	1

19.72. Output, Status1 [220]

Provides general room controller status information.

This is inspired by the DPT_HVACStatus, only the fourth bit differs, which is not the dew point, see table.

Bit	Attributes	Description	Encoding
b0	Comfort Mode	Indicates if Comfort Mode is active or not	1=active 0=inactive
b1	Standby Mode	Indicates if Standby Mode is active or not	1=active 0=inactive
b2	Economy Mode	Indicates if Economy Mode is active or not	1=active 0=inactive
b3	Frost/Heat protection Mode	Indicates if Protection Modes is active (only Mode)	1=active 0=inactive
b4	OFF Mode	Indicates if OFF Mode is active or not	1=active 0=inactive
b5	Heating/Cooling	Indicates if controller is heating or cooling	1=active 0=inactive
b6	Controller Status	Indicates if one Heating or Cooling output is not equal 0	1=active 0=inactive
b7	Frost alarm	Indicates if in Protection mode and controller is active (controller output not equal zero)	1=active 0=inactive

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19.73. "Output, Status2" [221]

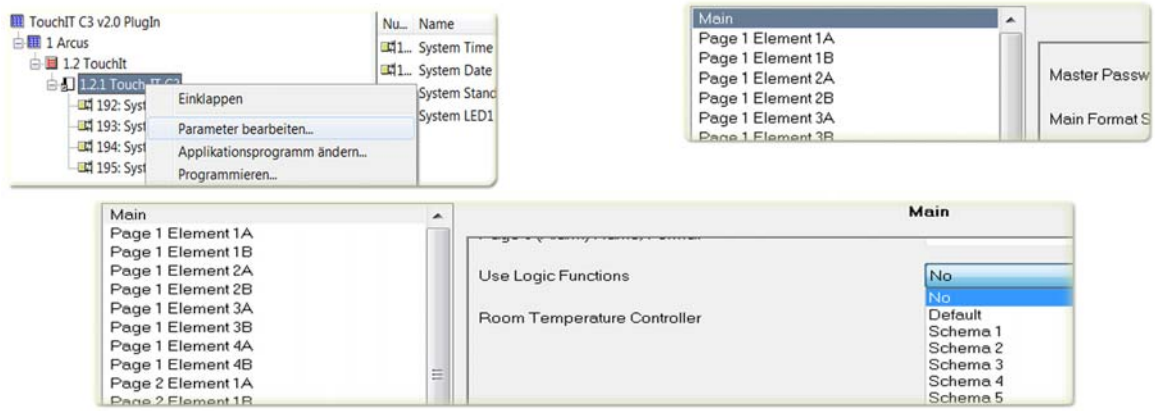
Provides more detailed information of the Room Controller status.

Bit	Attributes	Description	Encoding
b0	Controller Heating 1st Stage	Indicates if this Controller is active ore not	1=active 0=inactive
b1	Controller Heating 2nd Stage	Indicates if this Controller is active ore not	1=active 0=inactive
b2	Controller Cooling 1st Stage	Indicates if this Controller is active ore not	1=active 0=inactive
b3	Controller Cooling 2nd Stage	Indicates if this Controller is active ore not	1=active 0=inactive
b4 b5	Fancoil limits	Shows the actual status of the Fancoil limits	1=active 0=inactive
b6 .. b15	Not used	Not used	always 0

20. Logic

The logical functions are developed in the scripting language LUA. The available implemented functions will be described more in detail in another document. 31 communication objects are reserved for logical functions. As the necessary object types can vary depending on the requirements, there are 6 different object schemas available.

20.1. ETS



Object Schemas	Quantity	Communication Objects
No		No Objects
Default	10 x 8 x 8 x 5 x	1 Bit 1 Byte 2 Bytes 4 Bytes
	23x	1 Bit

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Schema 1	4x 1 Byte 2x 2 Bytes 2x 4 Bytes
Schema 2	5x 1 Bit 22x 1 Byte 2x 2 Bytes 2x 4 Bytes
Schema 3	10x 1 Bit 8x 1 Byte 12x 2 Bytes 1x 4 Bytes
Schema 4	31x 1 Bit
Schema 5	15x 1 Bit 16x 1 Byte

20.2. Functions

20.2.1. KNX functions

Function	Example
knx.get_string(a,b,...)	X,Y,Z=knx.get_string(CO1,CO2,CO3)
Reads one or more 14-Byte strings from the objects a,b,...	
knx.set_string(a,b)	knx.set_string(CO1,“Hello World“.. 3)
Writes the 14-Byte string b (Hello World 3) to a communication object (a)	
knx.get_integer(a,b,...)	X,Y,Z=knx.get_integer(48,52,56)
Reads one or more integer value(s) from the objects a,b,... (1Bit, 1Byte, 2Byte, 4Byte (un-)signed).	
knx.get_float(a,b,...)	X,Y,Z=knx.get_float(20,24)
Reads one or more float value(s) from the objects a,b,... (4Byte float).	
knx.set_integer(a,b,c)	knx.set_integer(4,2,344)
Outputs the integer value c with the length b=1..4 to a communication object a.	
knx.set_float(a,b)	knx.set_float(8,27.8)
Outputs the float value b to the communication object a.	
knx.dpt9_to_int(a)	b=knx.dpt9_to_int(Value);
Converts a 2-Byte float value into an integer value (*100).	
knx.int_to_dpt9(a	b=knx.int_to_dpt9(Value)
Converts an integer value into a 2-Byte float value .	
knx.tx_idle(a)	knx.tx_idle(6)
Tests a communication object whether it has completed the sending process.	

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20.2.2. System functions

Function	Example
sys.timeout(a[,b])	sys.timeout(1000,233)
When a (1000 milliseconds) has elapsed, the function timeout() with the value b (233) will be executed.	
sys.set_page(a)	sys.set_page(0)
Displaying page a, leaving stand-by.	
sys.set_brightness(a)	sys.set_brightness(100)
Setting brightness to a value a (given in %).	
sys.beep(a,{,b[,c]})	sys.beep(100,1500,15)
The internal beeper is activated for a (100) milliseconds, with the frequency b (1500 Hz) and the volume c (100%).	
sys.put_setting(a,b)	sys.put_setting(„test value“,10)
Creates a variable named a (test value) and sets it to the value b (10). Will be saved in the flash memory.	
sys.get_setting(a)	sys.get_setting(„test value“)
Outputs the value of the variable a (test value).	
sys.signal_obj(a)	sys.signal_obj(48)
Outputs a signal to the graphical elements that the value of object a (48) has changed.	
sys.message(a)	sys.message(„Hallo Welt“)
Opens a message dialog with the message a („Hello World“).	
sys.settings_dialog(a)	sys.settings_dialog(„table“)
Opens a dialog in order to change the settings table named a („table“).	
sys.read_settings(a)	sys.read_settings(„table“)
Reads a settings table named a („table“).	
sys.write_settings(a)	sys.write_settings(„table“)
Saves the values of the settings table a („table“) in the flash memory.	
settings={ {name;min;max;val;dc} }	settings={ {name="Limit1 kW";min=0.5;max=6.0;val=1.0;dc=1}; {name="Limit2 kW";min=0.5;max=6.0;val=2.5;dc=1}; }
Defines a settings table. „dc“ ist the number of decimal places displayed in the settings dialog.	

20.2.3. Callback functions

Function	Example
knx_value_changed(x)	
Is carried out when the value of an object changes. X is the object number.	
knx_value_update(x)	
Is carried out when the value of a logical object is updated. X is the object number.	
settings_set(x)	
Is carried out when a settings dialog (x = name of the table) is closed by pressing “OK“.	

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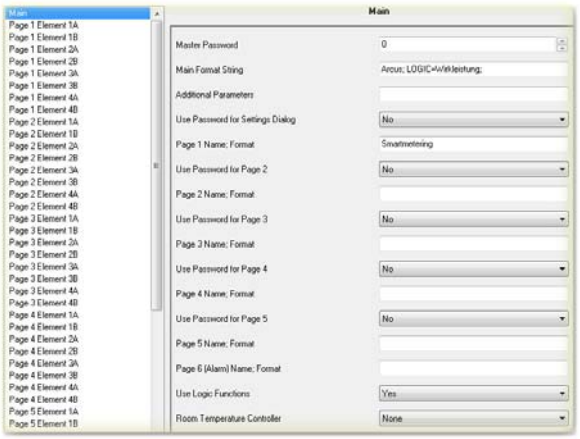
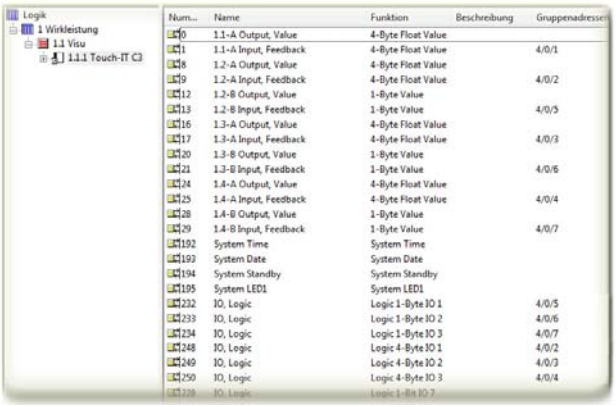
20.2.4. Example applications

In the following example, three 4-Byte float values coming from a KNX three-phase electricity meter are analyzed and then output as graphic depictions of three 1-Byte values (0,1,2). The figure shows a traffic light. Depending on the performance, one of the three colors red, yellow or green will be displayed.

ETS:



Parameter Setting
•Main



Topology

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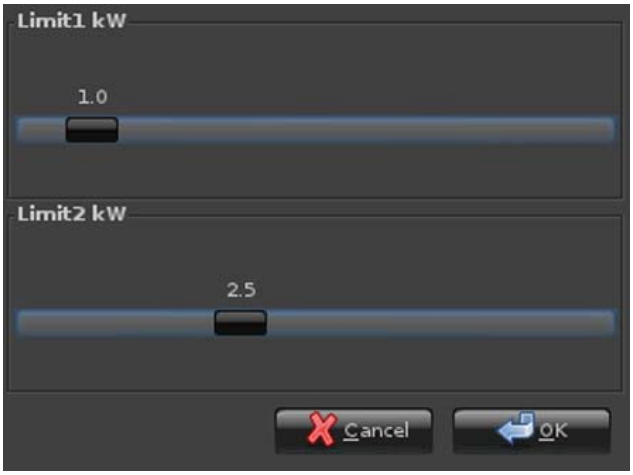
Operating the button “Logic“ will open the limits preset page.



It is possible to predefine 2 different limits.

- Limit 1 (e.g. 1000W)
- Limit 2 (e.g. 2500W)

The operating page displays the current performance values. The graphics depend on the pre-defined limits.

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Source code

```
settings={
{name="Limit1 kW";min=0.5;max=6.0;val=1.0;dc=1.0};
{name="Limit2 kW";min=0.5;max=6.0;val=2.5;dc=1.0};
}
last_states={ -1;-1;-1 }; --last-state
function settings_set(x)
sys.write_settings(x)
knx_value_changed(248) --KO 248
knx_value_changed(249) --KO 249
knx_value_changed(250) --KO 250
end
function knx_value_changed(x)
if ( x == 248 ) then
val=knx.get_float(x);
state=0;
if (val>(settings[2].val*1000)) then
state= 2;
elseif (val >(settings[1].val*1000)) then
state= 1;
end
if (state ~= last_states[1]) then
last_states[1]=state;
knx.set_integer(232,1,state)
end
end
if ( x == 249 ) then
val=knx.get_float(x);
```


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```
state=0;
if (val>(settings[2].val*1000)) then
state= 2;
elseif (val >(settings[1].val*1000)) then
state= 1;
end
if (state ~= last_states[2]) then
last_states[2]=state;
knx.set_integer(233,1,state)
end
end
if ( x == 250 ) then
val=knx.get_float(x);
state=0;
if (val>(settings[2].val*1000)) then
state= 2;
elseif (val >(settings[1].val*1000)) then
state= 1;
end
if (state ~= last_states[3]) then
last_states[3]=state;
knx.set_integer(234,1,state)
end
end
end
function knx_value_update(x)
knx_value_changed(x)
end
sys.read_settings("settings")
```


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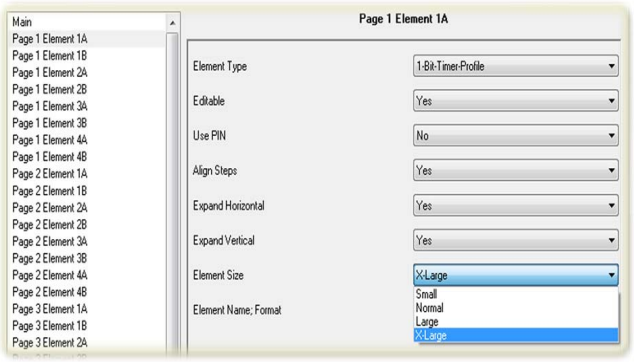
21. Custom Properties

21.1. General



The element size can be defined using the ETS.
There are four sizes available:
•Small
•Normal
•Large
•X-Large
Internally, there are 3 different icon sizes available.
•16x16 Pixel
•32x32 Pixel
•Custom size

Classification:		
ETS Element Size	Button	Label
Small	16x16 Pixel	16x16 Pixel
Normal	16x16 Pixel	32x32 Pixel
Large	32x32 Pixel	32x32 Pixel
X-Large	32x32 Pixel	32x32 Pixel

Remark::
Custom icons are not classified

23.2. 1-Bit ON/OFF Control Widgets

Naming convention:		
Button	xxx_b_on.png	xxx_b_off.png
Label	xxx_l_on.png	xxx_l_off.png

Icons can be named with a freely selectable prefix. The suffix must be chosen according to the naming convention.

Examples:


shutter_b_on.png


shutter_b_off.png


shutter_l_on.png


shutter_l_off.png

Control elements working with this naming convention:
• 1-bit-ON/OFF-Toggle-Picture
• 1-bit-ON/OFF-Toggle-Picture with value
• 1-bit-ON/OFF-Picture with value

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ETS Parameter Element name;format	;IMGSET=shutter;

23.3. Slider/Dimmer/Shutter Widgets

Naming convention:		
Button	xxx_up.png	xxx_down.png
Label	xxx_l_on.png	xxx_l_off.png

Icons can be named with a freely selectable prefix. The suffix must be chosen according to the naming convention.

Examples:


lux.png


lux_off.png

lightbulb_on.png


light_off.png

Control elements working with this naming convention:
- 1-Byte-Value-Picture-Button
- 1-Byte-Value-Slider
- 2-Byte-Value-Picture-Button
- 2-Byte-Value-Slider
- 2-Byte-Float-Picture-Button
- 2-Byte-Float-Slider
- 4-Byte-Float-Picture-Button
- 4-Byte-Float-Slider
- RGB-Dimmer
- 4-Bit-Dimmer
- 8-Bit-Dimmer
- Shutter-Blinds-Control

ETS Parameter Element name;format	;IMGSET=lighbulbt;

23.4. Pushbuttons/Profiles/Control Widgets

Naming convention:	
Button	xxx.png

Names of icons can be freely selected.

Examples:


accept.png


1staid.png

bell.png

Control elements working with this naming convention:
- 1-Bit-Value-Pushbutton
- 1-Bit-Timer-Profile
- 1-Byte-Value-Pushbutton
- 1-Byte-Timer-Profile
- 2-Byte-Value-Pushbutton
- 2-Byte-Float-Value-Pushbutton
- 2-Byte-Float-Timer-Profile
- 4-Byte-Value-Pushbutton
- 4-Byte-Float-Value-Pushbutton
- 14-Byte-String-Pushbutton

ETS Parameter Element name;format	;IMG=bell.png;

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23.5. IMGVAL Widgets

Naming convention:		
label	xxx	Names of icons can be freely selected.

Examples:		
	ampel_0	Control element working with this naming convention: • 1-Byte-Value-Picture-Button **Remark**: The format must be PNG and the ending must be removed.
	ampel_1	
	ampel_2	
ETS Parameter Element name;format	;IMGVAL=ampel;	

23.6. QUAD Widgets

Naming convention:			
label	xxx_l_on.png	xxx_l_off.png	Icons can be named with a freely selectable prefix. The suffix must be chosen according to the naming convention.

Examples:		
	lightbulb_l_on.png	Control elements working with this naming convention: • 1-bit-Quad-ON/OFF-Status/Toggle-Picture • 1-bit-Quad-Value-Pushbutton-Picture
	lightbulb_l_off.png	
ETS Parameter Element name;format	;IMGSET=lightbulb;	

21.2. Default set of icons

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