Room thermostat with display
VARIA 824, VARIA 826

VARIA 824	824 9 200
VARIA 826	826 9 200

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1 Functional characteristics

1.1 Integrated functions

- Room thermostat for heating and cooling operation with additional heating stage.
- 8 channel time switch: 1 channel for controlling HVAC operating mode of room thermostat and 7 free channels.
- User-friendly switching on of lights via hotkey function
- Up to 5 freely configurable screens
- Each screen can display a heading and up to 8 lines of text or functions,
  → equivalent to 40 channels.
- User-specific function with free choice of text for each line for sending or displaying received values or status telegrams
- Multilingual user interface

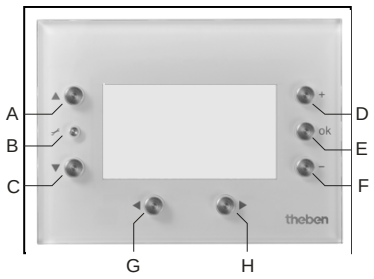
1.2 Special features

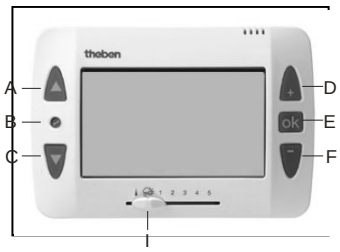
- Integrated time switch with the option of sending 3 rather than just 2 different statuses.
- Receipt and display of 14 byte text strings via the bus
- 1 display page for weather data
- Own physical address can be displayed

1.3 New from device version SW: 061 (menu settings/system)

- Can also be operated without mains supply
- Free choice of +/- button function with switching function
- Display of 4 Byte floating-point telegrams (DPT 14.xxx / EIS 9)
- RTR page can be permanently blanked out (via a parameter)
- Optional display of operating advice for the end user
- Display/sending of 1 or 2 Byte now also measured in negative numerical range (format DPT 6.001 and DPT 8.001)

1.4 Operation





Key		
A	▼	UP cursor
B		Settings menu
C	▲	DOWN cursor
D	+	Increase value / reverse status
E	OK	Confirm entry
F	-	Reduce value / reverse status
G	◄	Previous page
H	►	Next page
I		Select page

1.5 Differences between VARIA 824 and VARIA 826

Both devices have the same range of functions
The only difference is how to operate the display pages.

- VARIA 826: The desired page is selected via two arrow buttons and one favourite page can be selected per object.
- VARIA 824: The desired page is selected using a slide switch

2 Technical data

2.1 Technical data

Power supply:	Bus voltage / 230 V AC 50 Hz (if available)
Permitted operation temperature:	- 5 C°.. +45 C°
Power draw from the mains, if available:	1.5 W
Power draw from bus voltage:	with mains supply: Approx. 10 mA without mains supply: max. 25 mA
Protection class:	III
Protection rating:	EN 60529: IP 21
Dimensions of device:	VARIA 824: 120 x 80 x 20 mm (L x W x H) VARIA 826: 128 x 94 x 22 mm (L x W x H)

3 Varia 824 / 826 EIB V1.1 application program

3.1 Selection in the product database

Manufacturer	THEBEN AG
Product family	Heating, ventilation, air conditioning
Product type	Controller with display and operating function
Program name	Varia 82x: RTR with display and operating function V1.1

This application program was produced for **ETS from version 3.0e**.
The ETS database can be found on our downloads page: www.theben.de

Table 1

Number of communication objects:	129
Number of group addresses:	154
Number of associations:	154

3.2 Communication objects

Table 2: Overview

No.	Object name	Function	Type & DPT	Flags				
				C	R	S	T	A
0	*Base set point value*	*Defining the set point temperature*	2 byte 9.001	✓	✓	✓		
1	*Manual set point offset*	*Send/receive manual offset*	2 byte 9,002	✓	✓	✓	✓	
2	*Outdoor temperature compensation*	*Adjust set point value*	2 byte 9,002	✓	✓	✓		
		Adjust set point value		✓	✓	✓	✓	
3	*Current set point value*	*Report current set point value*	2 byte 9.001	✓	✓		✓	
4	*Actual value*	*Send actual value*	2 byte 9.001	✓	✓		✓	
5	*External actual value*	*Receive external actual value*	2 byte 9.001	✓	✓	✓		
6	*Sensor failure*	*Report sensor failure*	1 bit 1.001	✓	✓		✓	
7	*Operating mode preset*	*Operating mode preset*	1 byte 5.010	✓	✓	✓		
	Night <-> standby	*1 = night, 0 = standby*	1 bit 1.001					
8	*Presence*	*Input for presence signal*	1 bit 1.001	✓	✓	✓		
	Comfort	*1 = Comfort*						
9	*Window position*	*Input for window contact*	1 bit 1.001	✓	✓	✓		
	Frost protection	*1 = Frost protection*						
10	*Operating mode of time program*	*Report internal operating mode*	1 byte 5.010	✓	✓		✓	
11	*Lock time program*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
12	*Current operating mode*	*Report current operating mode*	1 byte 5.010	✓	✓		✓	
13	*Heating actuating value (%)*	*Send actuating value*	1 byte 5.001	✓	✓		✓	
	ON/OFF actuating value heating	*Send actuating value*	1 bit 1.001					
14	*Heating PWM actuating value*	*Send actuating value*	1 bit 1.001	✓	✓		✓	
15	*Additional heating stage actuating value (%)*	*Send actuating value*	1 byte 5.001	✓	✓		✓	
	ON/OFF actuating value additional heating stage	*Send actuating value*	1 bit 1.001					
				C	R	S	T	A

Continuation:

No.	Object name	Function	Type & DPT	Flags				
				C	R	S	T	A
16	*Cooling actuating value (%)*	*Send actuating value*	1 byte 5.001	✓	✓		✓	
	ON/OFF actuating value cooling	*Send actuating value*	1 bit 1.001	✓	✓		✓	
17	*Cooling PWM actuating value*	*Send cooling actuating value*	1 bit 1.001	✓	✓		✓	
18	*Report heating mode/cooling mode*	*Heating = 0, Cooling = 1*	1 bit 1.001	✓	✓	✓	✓	
	Switchover between heating and cooling	*Heating = 0, Cooling = 1*						
19	*No energy medium*	*1 = No energy medium*	1 bit 1.001	✓	✓		✓	
20	*Operating mode scene*	*Scenes 1-16 = 0 ..15*	1 byte 18.001	✓	✓	✓		
21	*Hotkey function*	*Switch*	1 bit 1.001	✓	✓	✓	✓	
22	*Forced fan stage*	*Send/receive*	1 byte 5.001	✓	✓	✓	✓	
23	*Fan forced/auto mode*	*1 = Forced/ 0 = Auto*	1 bit 1.001	✓	✓	✓	✓	
	Fan auto/forced mode	*1 = Auto / 0 = Forced*						
24	*Time*	*Receive time*	1 byte 10.001	✓	✓	✓		
		Send / receive time		✓	✓	✓	✓	
25	*Date*	*Receive date*	1 byte 11.001	✓	✓	✓		
		Send / receive date		✓	✓	✓	✓	
26	*Time query*	*Send time and date*	1 bit 1.001	✓		✓		
27	*Outdoor temperature*	*Receive outdoor temperature*	2 byte 9.001	✓	✓	✓		
28	*Wind speed*	*Receive wind speed*	2 byte 9.005	✓	✓	✓		
29	*Brightness*	*Receive brightness value*	2 byte 9.004	✓	✓	✓		
30	*Rain*	*Receive rain status*	1 bit 1.001	✓	✓	✓		
31	*Recording weather data*	*Restart recording*	1 bit 1.001	✓	✓	✓	✓	
				C	R	S	T	A

Continuation:

No.	Object name	Function	Type & DPT	Flags				
				C	R	S	T	A
32	*Switching program channel 2*	*Send temperature in K*	2 byte 9.002	✓	✓		✓	
		Send temperature in °C	2 byte 9.001	✓	✓		✓	
		Send percentage value	1 byte 5.001	✓	✓		✓	
		Send On/Off	1 bit 1.001	✓	✓		✓	
		Send value 0..255	1 byte 20.102	✓	✓		✓	
		Send HVAC operating mode		✓	✓		✓	
33	*Switching program channel 3*	*See object 32*	-	✓	✓		✓	
34	*Switching program channel 4*	*See object 32*	-	✓	✓		✓	
35	*Switching program channel 5*	*See object 32*	-	✓	✓		✓	
36	*Switching program channel 6*	*See object 32*	-	✓	✓		✓	
37	*Switching program channel 7*	*See object 32*	-	✓	✓		✓	
38	*Switching program channel 8*	*See object 32*	-	✓	✓		✓	
39	*Display page 1, line 1*	*Text string*	14 byte 16.001	✓	✓	✓		
	Display page 1, line 1	*Switching ON/OFF*	1 bit 1.001	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Percentage value*	1 byte 5.001	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*HVAC operating mode*	1 byte 20.102	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Value 0..255*	1 byte 5.010	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Dim brighter / darker*	4 bit 3.007	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Temperature*	2 byte 9.001	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*EIS 5 value*	2 byte 9.*	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Counter value 0 ..65535*	2 byte 7.001	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Scene*	1 byte 18.001	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Blinds up/down*	1 bit 1.008	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*Valuator*	1 byte 5.010	✓	✓	✓		✓
	Operation page 1, line 1			✓	✓	✓	✓	
	Display page 1, line 1	*DPT 14.xxx (floating-point number)*	4 byte 14.xxx	✓	✓		✓	✓
				C	R	S	T	A

Continuation:

No.	Object name	Function	Type & DPT	Flags				
				C	R	S	T	A
40	*Operation page 1, line 1*	*Dimming On/Off*	1 bit 1.001	✓	✓	✓	✓	
		Blinds Step/Stop	1 bit 1.001	✓	✓	✓	✓	
41	*Display page 1, line 2*	*See object 39*	-	✓	✓	✓		✓
	Operation page 1, line 2		-	✓	✓	✓	✓	
42	*Operation page 1, line 2*	*See object 40*	-	✓	✓	✓	✓	
43	*Display page 1, line 3*	*See object 39*	-	✓	✓	✓		✓
	Operation page 1, line 3		-	✓	✓	✓	✓	
44	*Operation page 1, line 3*	*See object 40*	-	✓	✓	✓	✓	
45	*Display page 1, line 4*	*See object 39*	-	✓	✓	✓		✓
	Operation page 1, line 4		-	✓	✓	✓	✓	
46	*Operation page 1, line 4*	*See object 40*	-	✓	✓	✓	✓	
47	*Display page 1, line 5*	*See object 39*	-	✓	✓	✓		✓
	Operation page 1, line 5		-	✓	✓	✓	✓	
48	*Operation page 1, line 5*	*See object 40*	-	✓	✓	✓	✓	
49	*Display page 1, line 6*	*See object 39*	-	✓	✓	✓		✓
	Operation page 1, line 6		-	✓	✓	✓	✓	
50	*Operation page 1, line 6*	*See object 40*	-	✓	✓	✓	✓	
51	*Display page 1, line 7*	*See object 39*	-	✓	✓	✓		✓
	Operation page 1, line 7		-	✓	✓	✓	✓	
52	*Operation page 1, line 7*	*See object 40*	-	✓	✓	✓	✓	
53	*Display page 1, line 8*	*See object 39*	-	✓	✓	✓		✓
	Operation page 1, line 8		-	✓	✓	✓	✓	
54	*Operation page 1, line 8*	*See object 40*	-	✓	✓	✓	✓	
55	*Page 2 line 1*	*See object 39*	-	✓	✓	✓	✓	✓
56		*See object 40*	-	✓	✓	✓	✓	
57	*Page 2 line 2*	*See object 39*	-	✓	✓	✓	✓	✓
58		*See object 40*	-	✓	✓	✓	✓	
59	*Page 2 line 3*	*See object 39*	-	✓	✓	✓	✓	✓
60		*See object 40*	-	✓	✓	✓	✓	
61	*Page 2 line 4*	*See object 39*	-	✓	✓	✓	✓	✓
62		*See object 40*	-	✓	✓	✓	✓	
63	*Page 2 line 5*	*See object 39*	-	✓	✓	✓	✓	✓
64		*See object 40*	-	✓	✓	✓	✓	
65	*Page 2 line 6*	*See object 39*	-	✓	✓	✓	✓	✓
66		*See object 40*	-	✓	✓	✓	✓	
67	*Page 2 line 7*	*See object 39*	-	✓	✓	✓	✓	✓
68		*See object 40*	-	✓	✓	✓	✓	
69	*Page 2 line 8*	*See object 39*	-	✓	✓	✓	✓	✓
70		*See object 40*	-	✓	✓	✓	✓	
71	*Page 3 line 1*	*See object 39*	-	✓	✓	✓	✓	✓
72		*See object 40*	-	✓	✓	✓	✓	
				C	R	S	T	A

Continuation:

No.	Object name	Function	Type & DPT	Flags				
				C	R	S	T	A
73	*Page 3 line 2*	*See object 39*	-	✓	✓	✓	✓	✓
74		*See object 40*	-	✓	✓	✓	✓	
75	*Page 3 line 3*	*See object 39*	-	✓	✓	✓	✓	✓
76		*See object 40*	-	✓	✓	✓	✓	
77	*Page 3 line 4*	*See object 39*	-	✓	✓	✓	✓	✓
78		*See object 40*	-	✓	✓	✓	✓	
79	*Page 3 line 5*	*See object 39*	-	✓	✓	✓	✓	✓
80		*See object 40*	-	✓	✓	✓	✓	
81	*Page 3 line 6*	*See object 39*	-	✓	✓	✓	✓	✓
82		*See object 40*	-	✓	✓	✓	✓	
83	*Page 3 line 7*	*See object 39*	-	✓	✓	✓	✓	✓
84		*See object 40*	-	✓	✓	✓	✓	
85	*Page 3 line 8*	*See object 39*	-	✓	✓	✓	✓	✓
86		*See object 40*	-	✓	✓	✓	✓	
87	*Page 4 line 1*	*See object 39*	-	✓	✓	✓	✓	✓
88		*See object 40*	-	✓	✓	✓	✓	
89	*Page 4 line 2*	*See object 39*	-	✓	✓	✓	✓	✓
90		*See object 40*	-	✓	✓	✓	✓	
91	*Page 4 line 3*	*See object 39*	-	✓	✓	✓	✓	✓
92		*See object 40*	-	✓	✓	✓	✓	
93	*Page 4 line 4*	*See object 39*	-	✓	✓	✓	✓	✓
94		*See object 40*	-	✓	✓	✓	✓	
95	*Page 4 line 5*	*See object 39*	-	✓	✓	✓	✓	✓
96		*See object 40*	-	✓	✓	✓	✓	
97	*Page 4 line 6*	*See object 39*	-	✓	✓	✓	✓	✓
98		*See object 40*	-	✓	✓	✓	✓	
99	*Page 4 line 7*	*See object 39*	-	✓	✓	✓	✓	✓
100		*See object 40*	-	✓	✓	✓	✓	
101	*Page 4 line 8*	*See object 39*	-	✓	✓	✓	✓	✓
102		*See object 40*	-	✓	✓	✓	✓	
103	*Page 5 line 1*	*See object 39*	-	✓	✓	✓	✓	✓
104		*See object 40*	-	✓	✓	✓	✓	
105	*Page 5 line 2*	*See object 39*	-	✓	✓	✓	✓	✓
106		*See object 40*	-	✓	✓	✓	✓	
107	*Page 5 line 3*	*See object 39*	-	✓	✓	✓	✓	✓
108		*See object 40*	-	✓	✓	✓	✓	
109	*Page 5 line 4*	*See object 39*	-	✓	✓	✓	✓	✓
110		*See object 40*	-	✓	✓	✓	✓	
111	*Page 5 line 5*	*See object 39*	-	✓	✓	✓	✓	✓
112		*See object 40*	-	✓	✓	✓	✓	
113	*Page 5 line 6*	*See object 39*	-	✓	✓	✓	✓	✓
114		*See object 40*	-	✓	✓	✓	✓	
				C	R	S	T	A

Continuation:

No.	Object name	Function	Type & DPT	Flags				
				C	R	S	T	
115	*Page 5 line 7*	*See object 39*	-	✓	✓	✓	✓	✓
116		*See object 40*	-	✓	✓	✓	✓	
117	*Page 5 line 8*	*See object 39*	-	✓	✓	✓	✓	✓
118		*See object 40*	-	✓	✓	✓	✓	
119	*LCD backlight*	*Switching On/Off*	1 bit 1.001	✓	✓	✓		
120	*Acoustic signal*	*On/Off*	1 bit 1.001	✓	✓	✓		
121	*Select favourites page*	*Only with Varia 826*	1 bit 1.001	✓	✓	✓		
122	*Lock switching program channel 2*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
123	*Lock switching program channel 3*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
124	*Lock switching program channel 4*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
125	*Lock switching program channel 5*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
126	*Lock switching program channel 6*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
127	*Lock switching program channel 7*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
128	*Lock switching program channel 8*	*Lock switching program = 1*	1 bit 1.001	✓	✓	✓		
				C	R	S	T	A

Table 3: Communication flags

Flag	Name	Application
C	Communication	Object can communicate
R	Read	Object status can be viewed (ETS / display etc.)
W	Write	Object can receive
T	Transmit	Object can send
U	Update	Object can accept answer to own read requests

3.2.1 Description of objects

- **Object 0 "*Base set point value*"**

The base set point value is first specified via the application at start-up and stored in the "Base set point value" object.
It can be reset at any time using object 0 (limited by minimum or maximum valid set point value).
If the bus supply fails, this object is backed up and the last value is restored when the bus supply returns. The object can be described as required.

- **Object 1 "*Manual set point value adjustment*"**

The object receives a temperature differential in EIS 5 format. The desired room temperature (current set point value) can be adjusted from the base set point value by this differential.
The following applies in comfort mode (heating):

Current set point value (object 3) = Base set point value (Obj. 0) + manual set point value offset (Obj. 1)

Values outside the configured range are limited to the highest or lowest value.

Note:
The offset always refers to the set base set point value and not to the current set point value.

If a 0 is received, a previously entered set point value offset is reset to
0 K.

- **Object 2 *"Outdoor temperature compensation"***

The function of the object is determined by the *Set point adjustment with high outside temperatures* parameter on the *RTR setting* parameter page.

Receive only:
Receives the correction value for set point adjustment.

Calculate internally and send:
Reports the current set point adjustment as an amount or as a differential.
The *format of the correction value* is set on the *set point adjustment* parameter page.

Table 4

Format of adjustment value	Object function	Example
Absolute	Transmits the amount: *Unadjusted base set point value + set point correction* as set point value for additional temperature controls.	*Base set point without adjustment* = 20°C. *Set point adjustment* = +2 K The object transmits : 22 °C
Relative	Calculated set point adjustment (in Kelvin) based on outside temperature.	*Base set point without adjustment* = 20°C. *Set point adjustment* = +2 K The object transmits : 2 K *

- **Object 3** ***"Current set point value"***

This object sends the current set point temperature as a EIS 5 telegram (2 bytes) to the bus.
The send response can be set on the *setpoint values* parameter page.

- **Object 4** ***"Actual value"***

This object sends the temperature currently being measured by the sensor (if sending via configuration is permitted).

- **Object 5** ***"External actual value"***

Receives the room temperature from another measurement point via the bus.
This object can be activated on the actual value parameter page.

- **Object 6** ***"Sensor failure"***

Reports error if the internal or external temperature sensors malfunction.
Error = 1

- **Object 7** ***"Operating mode preset", "Night <-> standby"***

The function of this object depends on the *objects for setting operating mode* parameter on the *RTR setting* parameter page.

Table 5

Objects for determining the operating mode	Object function
New: Operating mode, presence,window status	Here is a 1-byte object. One of 4 operating modes can be directly activated. 0 = Auto i.e. the operating mode depends on the time program (channel 1) 1 = Comfort 2 = Standby 3 = Night, 4 = Frost protection (heat protection) Values over 4 are ignored. If the time program is locked or not used, the configured *operating mode after reset* is accepted unit until a new and valid operating mode is received or the operating mode on the device is changed by the user.
Old: Comfort, night, frost	With this setting, the object is a 1 bit object. Night or standby operating mode can be activated. 0=Standby 1=Night

- **Object 8** ***"Presence" / "comfort"***

The function of this object depends on the *objects for setting operating mode* parameter on the *RTR setting* parameter page.

Table 6

Objects for determining the operating mode	Object function
New: Operating mode, presence, window status	**Presence:** The status of a presence detector (e.g. push button, motion detector) can be received via this object. 1 on this object activates the comfort operating mode.
Old: Comfort, Night, Frost	**Comfort:** 1 on this object activates the comfort operating mode. This operating mode takes priority over night and standby modes. Comfort mode is deactivated by sending a 0 to the object. **Important:** This object should not be sent events cyclically as a comfort extension is deleted (via the push button from the device) if a 0 is received.

- **Object 9** ***"Window position" / "frost/heat protection"***

The function of this object depends on the *objects for setting operating mode* parameter on the *RTR setting* parameter page.

Table 7

Objects for determining the operating mode	Object function
New: Operating mode, presence, window status	**Window position:** The status of a window contact can be received via this object. 1 on this object activates the frost / heat protection operating mode.
Old: Comfort, night, frost	**Frost/heat protection:** 1 on this object activates the frost protection operating mode. The heat protection operating mode is activated during cooling. The frost/heat protection operating mode takes top priority. The frost/heat protection mode remains until it is cleared again by entering 0.

- **Object 10** ***"Time program operating mode"***

Always sends the operating mode defined by the time program on channel 1.
This also applies if the room thermostat has been changed to another operating mode by a presence sensor, push of a button etc.

- **Object 11** ***"Time program lock"***

Receive object: Lock = 1.
Makes the time program on channel 1 inoperative.
Example:
Manually set RTR to frost and lock time program before holiday period.
The frost protection operating mode remains on until the lock is lifted after the holiday period or when frost protection is ended manually.

- **Object 12 "Current operating mode"**

Transmits the current operating mode as a 1 byte value (see below: Coding of operating modes).
The send response can be set on the *RTR setting* parameter page.

Table 8: Coding of HVAC operating modes:

Value	Operating mode
1	Comfort
2	Standby
3	Night
4	Frost protection/heat protection

- **Object 13 "Heating actuating value %", "Heating and cooling actuating value %", "2-point heating actuating value", "2-point cooling actuating value"**

Sends the current heating actuating value (0...100%) or heating or cooling if the *output of cooling actuating value* parameter has been set to *together with heating actuating value (objects 13 & 14)* (parameter page *Cooling Control*).

- **Object 14 "Heating and cooling PWM actuating value"**

The actuating value is emitted as a PWM signal (ON/OFF).
See appendix: PWM cycle

- **Object 15 "Additional heating stage actuating value (%)", "2-point additional stage actuating value"**

This object is only available if the additional heating stage is used.
The *number of heating stages* parameter must also be set to *main stage and additional stage*.
See heating control parameter page.

The send format, EIS6 or EIS1, depends on the selected *type of control* on the *heating control* parameter page.

- **Object 16 "Cooling actuating value (%)", "2-point cooling actuating value"**

Sends the current actuating value or cooling switching command depending on the *type of control* selected on the *cooling control* parameter page.
The object is only available if the cooling function has been selected on the *general* parameter page (*control= heating and cooling*).

- **Object 17 "PWM cooling actuating value"**

Sends a PWM signal (ON/OFF) that corresponds to the current actuating value.
See appendix: PWM cycle.

- **Object 18 "Report heating/cooling operation", "switch between heating and cooling"**

The object is available if the cooling function has been selected on the General parameter page (control= heating and cooling).
The function of the object depends on the *switching between heating and cooling* parameter on the *cooling control* parameter page.

Table 9

Switchover between heating and cooling	Function
Automatic	Reports whether the room thermostat is currently operating in heating or cooling mode. Heating = 0, Cooling = 1
Via object	Receives the switching command for switching between heating and cooling mode. Heating = 0, Cooling = 1

- **Object 19 "No energy medium"**

Error reporting object:
An error is reported in the following cases (object status = 1):

Case 1: Heating mode was forced *switching between heating and cooling* object, however the room temperature is so far above the set point temperature that cooling would be required.

Case 2: Cooling mode was forced via the *switching between heating and cooling* object, however the room temperature is so far below the set point temperature that heating would be required.

- **Object 20 "Operating mode scene"**

Scenes can be saved or retrieved via this object.
The current operating mode is allocated to the selected scene number when saving.
Up to 16 different scenes are supported.
See appendix: The scenes.

- **Object 21 "Hotkey function"**

The hotkey function is available on the RTR and on the weather page.
Pressing one of the buttons on the right (+, OK or -) triggers the sending of a switching telegram.
Pushing the button again reverses the switching status.

This function makes it possible to switch room lighting on/off quickly when entering a room without having to first select a specific page.

Note:
The hotkey function must be activated in the ETS on the *RTR* parameter page

While a set point value or operating mode can be set, i.e. by pressing one of the cursor buttons on the left, only the buttons on the right fulfil the setting task.

The hotkey function only becomes available again if the set point value and operating mode are no longer blacked out.

- **Object 22 "Fan stage in forced mode"**

The object is available if the *fan stage control* parameter has been set to *yes* (*RTR setting* parameter page).

If a manual fan stage is selected on the device, this object sends a percentage value that corresponds to the configured threshold value.
See appendix: Fan forced operation

The forced fan step has no effect on the actuating value.

- **Object 23 "Fan forced/ auto ", "fan auto/forced"**

The object is available if the *fan stage control* parameter has been set to *yes* (*RTR setting* parameter page).

Sends a forced command to the fan coil actuator or to fan control if a fan stage on the device is set manually on the RTR display page.

The desired fan step for forced operation is sent by object 22 .
See appendix: Fan forced operation.

- **Object 24 "Send time", "receive time"**

The function of the object depends on the *objects time and date function* parameter on the *general* parameter page.

Table 10

Function of time and date objects	Function
Receive time and date	Receives time from bus for setting the internal real time clock.
Send and receive time and date	Can both receive the time as well as send it to the bus. See object 26.

Format: KNX DPT 10.001 / EIS 3

It is recommended to set the KNX time transmitter so that it transmits time/date telegrams at 0:02 every day.

- **Object 25 "Send date", "receive date"**

The function of the object depends on the *objects time and date function* parameter on the *general* parameter page.

Table 11

Function of time and date objects	Function
Receive time and date	Receives date from bus for setting the internal real time clock.
Send and receive time and date	Can both receive the date as well as send it to the bus. See object 26.

Format: KNX DPT 11.001 / EIS 4

It is recommended to set the KNX time transmitter so that it transmits time/date telegrams at 0:02 every day.

Note: If neither date nor time,
(e.g. after reset without battery), the date display will be Mon 00.00.00 and the time display 00:00.
The date only sets itself to 1.1.2008 when the time has been received
until a valid date telegram is received.

- **Object 26 "Time query"**

If this object is described with a 1 or a 0, VARIA immediately sends a time and date telegram. This object only appears if the *send and receive time and date* function has been selected.

- **Object 27 "Outside temperature"**

Receives the current outside temperature, e.g. from a weather station (order no. 132 9 201). The received value can appear on the *weather* display page and is needed as a reference for calculation of the set point value adjustment at high outside temperatures.

- **Object 28 "Wind speed"**

Receives the current wind speed, e.g. from a weather station (order no. 132 9 201) for display on the *weather* page.

- **Object 29 "Brightness"**

Receives the current brightness value, e.g. from a weather station (order no. 132 9 201) for display on the *weather* page.

- **Object 30 "Rain"**

Receives the current rain status, e.g. from a weather station (order no. 132 9 201) for display on the *weather* page.

- **Object 31 "Reset recording weather data"**

When the object receives a 1, the stored min./max. values of objects 27..30 on the weather page are deleted and a new recording is started.

- **Objects 32..38 "Time program channel 2..8"**

Sends the status of the individual time program from channel 2..channel 8.
The telegram format is set on the relevant *time program channel 2..8* parameter page via the *type of time program*.

- **Objects 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117 "Display page 1.. 5, line 1.. 8," "Operate page 1.. 5, line 1.. 8“**

These objects are for controlling text lines 1 to 8 on the customer specific display pages Page 1 to 5.
Data orientation depends on the *allow change to object value?* parameter (see table 12)
Exception: 4 Byte floating-point numbers (DPT 14.xxx) and text strings are only received.

The type of data is set via the *line format* parameter on the relevant display page (e.g. *page 1, line 1*).

Table 12: Data orientation

Authorise amendment of object value?	Function
Yes	*Operation page 1..5, line 1..8* The value/status on the display line can be changed by the user on the device. The changed value is sent to the bus and can be overwritten with received values.
No	*Display page 1..5, line 1..8* Values are received from the bus and only displayed in the display line.

- **Objects 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118 "to operate page 1.. 5, line 1.. 8“**

This object is only available if, in *formatting of lines*, the object types *dimming* or *blinds/shutters* are set.

Table 13

Line format	Function
Dimming	Sends On/Off telegram to the dimmer
Blinds/shutters	Sends the Step/Stop telegrams to the blinds actuator

- **Object 119 "LCD backlighting"**

Enables switching on and off of LCD backlighting via the bus.
This means, for example, that all displays can be turned off simultaneously.

- **Object 120 "Acoustic signal"**

Controls the installed buzzer.
1 = On every 2 secs for 100 millisecs.
0 = Off

- **Object 121 "Select favourite pages"**

If a 1 is received, the display changes from VARIA 826 to the set favourite page.
The favourite page is set on the *select display pages* parameter page.

Important: This function is only available with the VARIA 826.

- **Objects 122..128 "Lock time program channel 2..8"**

Locks the relevant channel.
1 = Locked, i.e. object does not send.

0 = Enable.

3.3 Parameters

3.3.1 Parameter pages

Table 14

Name	Description
General	Heating/cooling, language, releases, summer time rule etc.
RTC setting	Operating modes, presence detector, fan control etc.
Heating set point values	Base set point value, reductions, offset.
Cooling set point values	Dead zone, increases, heating protection.
Heating control	Type of control, heating stages, control parameters, PWM time.
Cooling control	Type of control, control parameters, PWM time.
Additional stage heating	Type of control, control parameters, send response.
Actual value	Source for actual value measurement, actual value monitoring.
Fan stages	Number, threshold values, compulsory control.
Set point shift	Setting maximum adjustment.
Switching program Channel 1	Settings for the internal HVAC time program.
Switching program Channel 2.0.8	Settings for the freely selectable programs.
Select screens	Activation of weather page and freely programmable display pages
Weather data	Display outside measurements: Temperature, wind, rain and min./max. values.
Display objects page 1..5	Heading and favourite line
Page 1, line 1 to page 5, line 8	Unrestricted text entry and choice of function for each text line of display pages 1..5.
Text list	Customer-specific designation for scene numbers and valuator stages.

3.3.2 Parameter description

3.3.2.1 The General parameter page

Table 15

Designation	Values	Description
Settings menu on device		Selection of settings menu on device:
	Disabled	Operation not possible.
	Enabled	Possible at any time
	Released via PIN	Only possible if correct PIN has been entered
Selection of temperature menu	***Adjustable on device***	Determines whether the set point values on the device can be set in temperature → settings temperature settings menu.
	Not possible on device	
Set point value settings on device	*Unchanged after download*	The set point values set on the device are stored after download if, for example, only customer-specific texts or control-independent parameters. Important: However, ETS has to overwrite the set point values if the following basic controller parameters are changed: - Type of control (continuous/2-point) both during heating and cooling operation - Hysteresis of 2-point control - Control (only heating control / heating and cooling)
	Overwrite via download	When downloading all the set point values entered on the device are replaced by the ETS values

Continuation:

Designation	Values	Description
Language after download	*Unchanged* ***German*** *English* *French* *Italian* *Spanish* *Dutch* *Swedish* *Reserved for additional language 2* … *Reserved for additional language 9*	The language set by the user remains unchanged after download. Desired menu language after download Reserved for future upgrades: Do not select.
Function of time and date objects	***Receive time and date*** *Send and receive time and date*	Varia can be set via the bus. Varia can both be set via the bus and time can be sent precisely to the bus. To achieve the highest accuracy, we recommend sending the time with a ZS 600 DCF time signal transmitter and only use VARIA as time-transmitter (*receive time and date*).
Send time and date	*Only on request* *every minute* *Every hour* *Every day at 00:00:00 midnight and at summer/winter changeover* *Every day at 00:02:00 midnight and at summer/winter changeover*	Only when the *send time and date* parameter is set to *send and receive time and date*. Setting, when for example how often time and date should be sent. Note: Via the *time query* object (Object 26) sending can be initiated at anytime.

Continuation:

Designation	Values	Description
Summer time rules	*Adjustable on device*	The desired summer time rule can be set directly on the device. (Settings menu 🔧 → Date and time).
	none	No summer time changeover required.
	EU *GB/IRL/P* *USA* *FIN/GR/TR*	Adjustment to location.
Activate hotkey function? *(Buttons +/- OK page RTR and weather)*	***Yes***	Pressing one of the buttons on the right (+, OK or -) on the RTR r weather display page triggers the sending of a switching telegram (obj. 21). Pushing the button again reverses the switching status. This function makes it possible to switch room lighting on/off quickly when entering a room without having to quit the RTR or weather page. Change set point value/operating mode: If one of the left cursor buttons is pressed first to change the set point value or operating mode then the buttons on the right are used for adjustments. The hotkey function only becomes available again if the set point value and operating mode are no longer blacked out.
	No	No hotkey function. Pressing the + or – button changes Varia in the input mode for manual set point value adjustment or change of operating mode. Selection using the left cursor buttons ▼▲ is not required.

Continuation:

Designation	Values	Description
Is mains supply connected?	*No, only bus supply*	The device is not powered by the mains supply: - The display lighting is somewhat weaker than with mains operation - The current consumption is higher on the bus (max. 25 mA, as 2 bus users).
	Yes	The device is powered by the mains: - No restriction on display lighting - No increase in bus power draw.

3.3.2.2 The RTR setting parameter page

Table 16

Designation	Values	Application
Control	***Heating control only***	Heating operation only
	Heating and cooling	An additional cooling system can be controlled **Important:** If this parameter is changed, then all the set point values entered on the device will be deleted during download and overwritten with the current ETS values.
Objects for determining the operating mode	***New: Operating mode, presence, window status***	Varia can switch the operating mode depending on the window and presence contacts.
	Old: Comfort, night, frost (not recommended)	Traditional setting without window and presence status. **Important:** As long as frost protection object = 1 (obj. 9) then no other operating mode can be selected.
Operating mode after reset (if no time program is active)	*Frost protection* *Night-time temperature reduction* ***Standby*** *Comfort*	Operating mode after start-up or reprogramming. **Important:** Time programs have priority
Cyclical transmission of current operating mode	***Not cyclical, only in the event of change*** *Every 2 min.* *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* *Every 30 min.* *Every 45 min.* *Every 60 min.*	How often should the current operating mode be sent?

Continuation:

Designation	Values	Description
Type of presence sensor (to object 8)		The presence sensor activates comfort operating mode.
	Presence detector	Comfort operating mode as long as the presence object is set*.
	Presence buttons	1. If a new operating mode is received on object 7 with the presence object set (*operating mode preset)*, then it is accepted and the presence object is reset. 2. Reception of the same operating mode prior to the presence status (e.g. via cyclical sending) is ignored. 3. If the presence object is set during night / frost operation, it is reset after the configured comfort extension finishes* 4. If the presence object is set during standby mode, the comfort operating mode is accepted without time restriction.

***Exception:** If a window is opened (window object = 1), the room thermostat changes to frost protection mode.

Continuation:

Designation	Values	Description
Time for comfort extension	*30 min.* *1 hour* *1.5 hours* *2 hours* *2.5 hours* *3 hours* *3.5 hours*	This determines how long VARIA should remain in comfort mode after the presence button is pressed.
Operating mode selection on device	*Disabled* ***Launch all operating modes***	Release of operating mode selection via the user.
Maximum valid set point value offset	*+/- 1 K* ***+/- 2 K*** *+/- 3 K* *+/- 4 K* *+/- 5 K*	Limits the available setting range for set point values on the RTR page and the values received via object 1 (*manual set point adjustment*).
Activate fan stage control	*Yes* ***No***	Brings up *fan stages* parameter page and objects 22, 23. No fan control.
Setpoint value adjustment at high outside temperature	***none*** *Receive only* *Calculate internally and send*	Function is deactivated The adjustment value is received by the bus and own set point value is adjusted to increase in outside temperature. Varia calculates the adjustment value, sends it to other controllers (obj. 2) and adjusts own set point value to increase in outside temperature.
Display switching program on RTC page	***Yes*** *No*	Is time program 1 (operating modes for the current day) to be shown on the room thermostat display page? If *no program* is selected for channel 1 (either on device or via parameter) then no program bar will appear.

Continuation:

Designation	Values	Application
Temperature display on RTR page	***Actual value, set point value only when operated***	The current room temperature is displayed on the RTR page. The set point value is revealed by pressing a button.
	Always set point value	Only displays the set point value on the RTR page.

3.3.2.3 Heating set point values parameter page

Table 17

Designation	Values	Application
Base set point value after loading the application	*16 °C, 17 °C, 18 °C, 19 °C* *20 °C,* ***21 °C****, 22 °C, 23 °C* *24 °C, 25 °C, 26 °C, 27 °C* *28 °C*	Output set point value for temperature control.
Minimum valid base set point value	***10 °C****, 11 °C, 12 °C, 13 °C* *14 °C, 15 °C, 16 °C, 17 °C* *18 °C, 19 °C, 20 °C*	Minimum set point value (heating). If a base set point value received by object 0 is lower than the set value, it will be limited to this value.
Maximum valid base set point value	*20 °C, 21 °C, 22 °C, 23 °C* *24 °C, 25 °C, 27 °C, 30 °C* ***32 °C***	Maximum set point value (heating). If a base set point value received by object 0 is higher than the set value, it will be limited to this value.
Reduction in standby mode (during heating)	*0.5 K, 1 K, 1.5 K,* ***2 K*** *2.5 K, 3 K, 3.5 K, 4 K*	Example: With a base set point value of 21°C in heating operation and a 2K reduction, VARIA controls at a set point value of 21 – 2 = 19°C
Reduction at night operation mode (during heating)	*3 K, 4 K,* ***5 K*** *6 K, 7 K, 8 K*	By what value should the temperature be reduced in night mode?
Set point value for frost protection mode (during heating)	*3 °C, 4 °C, 5 °C* ***6 °C****, 7 °C, 8 °C* *9 °C, 10 °C*	Preset temperature for frost protection operation in heating mode (Heat protection operation applies in cooling mode).

Continuation:

Designation	Values	Application
Manual offset works	*Only in comfort mode*	In which operating modes can the set point value be changed through set point value adjustment via object or adjustment on the device (RTR page)? **Important:** The operating mode-dependent set point values in the device remain unchanged (settings menu via 🔧 button + settings)
	With comfort and standby mode	
	at comfort, standby and night mode	
Send current set point value in cycles		How often should the currently valid set point value be sent?
	Not cyclical, only in the event of change	Only send in the event of a change.
	Every 2 min. *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* *Every 30 min.* *Every 45 min.* *Every 60 min.*	Send cyclically

3.3.2.4 Cooling set point values parameter page:

Table 18

Designation	Values	Application
Dead zone between heating and cooling	*1 K, **2 K**, 3 K* *4 K, 5 K, 6 K*	Specifies the buffer zone between set point values in heating and cooling modes. The dead zone is expanded through hysteresis in switching (2 point) control. See glossary: Dead zone
Increasing in standby mode (during cooling)	*0.5 K, 1 K, 1.5 K* ***2 K**, 2.5 K, 3 K* *3.5 K, 4 K*	The temperature is increased in standby mode during cooling operation
Increase during night operation (during cooling)	*3 K, 4 K, **5 K*** *6 K, 7 K, 8 K*	see above.
Set point value for heat protection mode (during cooling)	***42 °C i.e. no real heat protection)*** *29 °C, 30 °C, 31 °C, 32 °C, 33 °C, 34 °C, 35 °C*	Heat protection represents the maximum permitted temperature for the controlled room. It performs the same function during cooling as the frost protection mode during heating, e.g. saves energy while avoiding non-permitted temperatures

3.3.2.5 Heating control parameter page

Table 19

Designation	Values	Application
Number of heating stages	***Only one heating stage*** *Main stage and additional stage*	Choice of 1- or 2-stage heating
Type of control	***Continuous control*** *2-point control*	**Important:** If this parameter is changed, then all the set point values entered on the device will be deleted during download and overwritten with the current ETS values.
Sets the control parameters	***Via system type*** *User-defined*	Standard application Professional application: P/PI controller set up
System type	***Radiator heating*** *Underfloor heating*	PI control with: Integrated time = 90 minutes Bandwidth = 2.5 k Integrated time = 180 minutes Bandwidth = 4 k
Send heating actuating value in cycles	*With change of 1 %* *With change of 2 %* *With change of 3 %* ***With change of 5 %*** *With change of 7 %* *With change of 10 %* *With change of 15 %*	After how much % change* in the control variable is the new value to be sent. Small values increase control accuracy but also the bus load.
Send heating actuating value in cycles	*Not cyclical, only in the event of change* *Every 2 min.* *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* *Every 30 min.* *Every 45 min.* ***Every 60 min***.	How often is the current heating actuating value to be sent (regardless of changes)?

*Change since last transmission
Continuation:

Designation	Values	Application
PWM time for cooling ON/OFF actuating value	*2 min.* *3 min.* ***5 min.*** *10 min.* *15 min.* *20 min.* *30 min.*	An actuation cycle consists of a switch-on and a switch-off process and forms a PWM period. Example: Actuating value= 20%, PWM time = 10 min: In an actuating cycle of 10 min, 2 min switched on and 8 min switched off (i.e. 20% on/ 80% off).
2-point control		
Hysteresis of 2 point control	*0.3 K* *0.5 K* *0.7 K* ***1 K*** *1.5 K*	Interval between the switch-off point (set point value) and the turn back on point (set point value – hysteresis). The hysteresis prevents constant switching on/off. **Important:**If this parameter is changed, then all the set point values entered on the device will be deleted during download and overwritten with the current ETS values.
Recirculation of hysteresis after switching point	***none*** *0.1 K/min* *0.2 K/min* *0.3 K/min*	The recirculation causes a gradual decrease in hysteresis over time, and the control accuracy is increased. The hysteresis is equivalent to the programmed value for each switch-off and is gradually reduced by the recirculation process. The hysteresis can reduce to 0 K over prolonged periods of switch-off. At the next switch-on, it is reset to the configured value.

Continuation:

User-defined parameters		
Integrated time of heating control	*Pure P control* *15 min., 30 min., 45 min.* *60 min., 75 min., 90 min.* *105 min., 120 min., 135 min.* ***150 min.**, 165 min., 180 min.* *195 min., 210 min., 225 min.*	Professional setting: See appendix: Response of the PI controller This time can be adapted to suit particular circumstances. If the heating system is over-dimensioned and therefore too fast, shorter values should be used. Conversely, under-dimensioned heating (slow) benefits from longer integrated times.
Proportional band of heating control	*1 K, 1.5 K, **2 K**, 2.5 K* *3 K, 3.5 K, 4 K, 4.5 K* *5 K, 5.5 K, 6 K, 6.5 K* *7 K, 7.5 K, 8 K, 8.5 K*	Professional setting for adapting control response to the room. Small values cause large changes in control variables, larger values cause finer control variable adjustment. See appendix: Temperature control

3.3.2.6 Cooling control parameter page

Table 20

Designation	Values	Application
Type of control	***Continuous control***	Infinite control (0 .. 100%).
	2-point control	Switching control (On/Off). See appendix: Continuous and switching control **Important:** If this parameter is changed, then all the set point values entered on the device will be deleted during download and overwritten with the current ETS values.
Sets the control parameters	*Via system type*	Standard application
	User-defined	Professional application: P/PI controller set up
System type	*Cooling surface*	PI control with: Integrated time = 90 minutes Bandwidth = 2 k
	Fan coil unit	Integrated time = 180 minutes Bandwidth = 4 k
PWM time for cooling ON/OFF actuating value	*2 min.* *3 min.* ***5 min.*** *10 min.* *15 min.* *20 min.* *30 min.*	An actuation cycle consists of a switch-on and a switch-off process and forms a PWM period. Example: Actuating value= 20%, PWM time = 10 min: In an actuating cycle of 10 min, 2 min switched on and 8 min switched off (i.e. 20% on/ 80% off).

Continuation:

Designation	Values	Application
cooling actuating value cyclically	*With change of 1 %* *With change of 2 %* *With change of 3 %* ***With change of 5 %*** *With change of 7 %* *With change of 10 %* *With change of 15 %*	After how much % change* in the control variable is the new value to be sent. Small values increase control accuracy but also the bus load.
Sends the cooling control variable in cycles	*Not cyclical, only in the event of change* *Every 2 min.* *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* *Every 30 min.* *Every 45 min.* ***Every 60 min.***	How often is the current cooling control variable to be sent (regardless of changes)?
Switching between heating and cooling	***Automatic*** *Via object*	VARIA automatically switches to cooling mode when the actual temperature is above the set point value. The cooling mode can only be activated on the bus via object 18 (1= cool). Cooling mode remains off for as long as this object is not set (=0).
Output of the cooling actuating value	*on separate object (for 4-pipe systems)* *In common with heating Heating (2-pipe system)*	Cooling actuating value is output via object 16 and heating actuating value via object 13. For systems with separate heating and cooling circuits. Both actuating values are sent via object 13. For 2-pipe systems with a valve and seasonal change of medium.

*Change since last transmission

Continuation:

Designation	Values	Application
2-point control		
Hysteresis of 2 wire control for cooling	*0.3 K* *0.5 K* *0.7 K* ***1 K*** *1.5 K*	Interval between the switch-off point (set point value) and the turn back on point (set point value – hysteresis). The hysteresis prevents constant switching on/off. **Important:**If this parameter is changed, then all the set point values entered on the device will be deleted during download and overwritten with the current ETS values.
Recirculation of hysteresis after switching point	***none*** *0.1 K/min* *0.2 K/min* *0.3 K/min*	The recirculation causes a gradual decrease in the hysteresis over time, and the control accuracy is increased. The hysteresis is equivalent to the programmed value for each switch-off and is gradually reduced by the recirculation process. The hysteresis can reduce to 0 K over prolonged periods of switch-off. At the next switch-on, it is reset to the configured value.

Continuation:

Designation	Values	Application
User-defined parameters		
Proportional band of the cooling control	*1 K, 1.5 K, 2 K, 2.5 K* *3 K, 3.5 K,* ***4 K****, 4.5 K* *5 K, 5.5 K, 6 K, 6.5 K* *7 K, 7.5 K, 8 K, 8.5 K*	Professional setting for adapting control response to the room. Small values cause large changes in control variables, larger values cause finer control variable adjustment. See appendix: Temperature control
Integrated time of the cooling control	*Pure P control* *15 min., 30 min., 45 min.* *60 min., 75 min.,* ***90 min.*** *105 min., 120 min., 135 min.* *150 min., 165 min., 180 min.* *195 min., 210 min., 225 min.*	Professional setting: See appendix: Response of the PI controller This time can be adapted to suit particular circumstances. If the cooling system is over-dimensioned and therefore too fast, shorter values should be used. Conversely, under-dimensioned cooling (slow) benefits from longer integrated times.

3.3.2.7 Additional heating stage parameter page

Table 21

Designation	Values	Application
Type of control	***Continuous control***	Infinite control (0 .. 100%).
	2-point control	Switching control (On/Off). See appendix: Continuous and switching control
Differential between main stage and additional stage	*1 K, 1.5 K,* ***2 K*** *2.5 K, 3 K, 3.5 K 4 K*	Specifies the negative interval between the current set point value and the set point value of the additional stage. Example with base set point value of 21°C and difference of 1K: The main stage controls with the base set point value and the addition stage controls with Base set point value – 1K = 20°C
Proportional band of additional stage	*1 K, 1.5 K, 2 K, 2.5 K 3 K, 3.5 K,* ***4 K****, 4.5 K 5 K, 5.5 K, 6 K, 6.5 K 7 K, 7.5 K, 8 K, 8.5 K*	With a continuous additional stage, Professional setting for adapting control response to the room. Large values cause finer changes to the control variables with the same control deviation and more precise control than smaller values.
Transmission of actuating value 2. Heating stage	*With change of 1 % With change of 2 % With change of 3 %* ***With change of 5 %*** *With change of 7 % With change of 10 % With change of 15 %*	After how much % change* in the control variable is the new value to be sent. Small values increase control accuracy but also the bus load.

Continuation:

Designation	Values	Application
2-point control		
Hysteresis of 2 point control	*0.3 K* *0.5 K* *0.7 K* ***1 K*** *1.5 K*	Interval between the switch-off point (set point value) and the turn back on point (set point value – hysteresis). The hysteresis prevents constant switching on/off. **Important:**If this parameter is changed, then all the set point values entered on the device will be deleted during download and overwritten with the current ETS values.
Recirculation of hysteresis after switching point	***none*** *0.1 K/min* *0.2 K/min* *0.3 K/min*	The recirculation causes a gradual decrease in the hysteresis over time, and the control accuracy is increased. The hysteresis is equivalent to the programmed value for each switch-off and is gradually reduced by the recirculation process. The hysteresis can reduce to 0 K over prolonged periods of switch-off. At the next switch-on, it is reset to the configured value.
Sends the additional heating stage in cycles	***Not cyclical, only in the event of change*** ***every 2 min., every 3 min., every 5 min., every 10 min., every 15 min.*** ***every 20 min., every 30 min., every 45 min., every 60 min.***	How often is the current heating actuating value of the additional heating stage to be sent (regardless of changes)?

3.3.2.8 Actual value parameter page

Table 22

Designation	Values	Application
Function of external actual value	***Not used***	VARIA measured and controls room temperature via the internal sensor.
	Take average with internal actual value	VARIA takes an average of the room temperature received from the bus and its own measurements.
	Control actual value	VARIA solely acquires room temperature via the bus.
Calibration value for internal sensor in 1/10 K (-64..63)	*manual input -64 ... 63* *Default value = **0***	Positive or negative adjustment of measured temperature in 1/10 K increments. Examples: a) VARIA sends 20.3°C. A room temperature of 21.0°C is measured using a calibrated thermometer. In order to increase the temperature of VARIA to 21 °C, “7” (i.e. 7 x 0.1K) must be entered. b) VARIA sends 21.3°C. 20.5°C is measured. In order to reduce the temperature of VARIA to 20.5 °C, “8” (i.e. -8 x 0.1K) must be entered.
transmission of actual value	*Not in the event of change* *With change of 0.2 K* *With change of 0.3 K* ***With change of 0.5 K*** *With change of 0.7 K* *With change of 1 K* *With change of 1.5 K* *With change of 2 K*	Is the current room temperature to be transmitted? If yes, from which minimum change should this be resent? This setting keeps the bus load as low as possible.

Continuation:

Designation	Values	Application
"Actual value malfunction" telegram	*Always cyclically*	Error status is always sent: 1 = Actual value error 0 = No error
	Only report cyclically in the event of malfunction	Error status is only sent if no actual value has been received during the monitoring period.
Send "actual value error"	*Every 2 min.* *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* ***Every 30 min.*** *Every 45 min.* *Every 60 min.*	How often should the error status be sent?
Parameter for *external actual value*		
Monitoring time for external actual value	*Do not monitor* *5 min.* ***10 min.*** *15 min.* *20 min.* *30 min.* *45 min.* *60 min.*	If no actual value is received within the configured period, the *response to loss of external actual value* See below.
Reaction to failure of external actual value or *response prior to reception of first actual value* (if monitoring is deactivated)	***Control with internal sensor*** With PI controller: 0% with 2-point controller: Off with PI controller: 10 % with 2-point controller: On with PI controller: 20 % with 2-point controller: On with PI controller: 30 % with 2-point controller: On with PI controller: 50 % with 2-point controller: On	If the external actual value is no longer available or no valid value has been received: Use the internally measured room temperature for control (recommended). Control heating with set actuating value without taking room temperature into account.

3.3.2.9 Fan stages parameter page

This parameter page is only available if the fan stage control has been activated on the *RTR setting* parameter page.

Table 23

Designation	Values	Application
Number of fan stages	*1 fan stage* *2 fan stages* ***3 fan stages***	How many stages does the fan control have?
Value for fan stage 1	*0 %* *0.4%, equivalent to value 1* *0.8%, equivalent to value 2* *1.2%, equivalent to value 3* *1.6%, equivalent to value 4* *2 %, equivalent to value 5* *10 %,* ***20 %****, 30 %* *40 %, 50 %, 60 %* *70 %, 80 %, 90 %* *100 %*	At what control variable should the first fan stage switch on? The percentage values are used with fan coil actuator FCA 1 a with the majority of fan actuators. The provision in values of 1..5 are particularly suitable for fan actuators controlled via EIS 14 telegrams.
Value for fan stage 2	*see above.* *Default value =* ***50%***	See above.
Value for fan stage 3	*see above.* *Default value =* ***80%***	See above.
Switch fan between auto and forced	***via forced/auto object, Force = 1*** *via auto/forced object, Force = 0*	Effect of forced object to adapt to the used fan coil actuator. See appendix: Fans, forced operation Setting for the Theben Fan Coil Actuator FCA 1 (Order no. 492 0 200) Forced mode is triggered by 1. Forced mode is triggered by 0.

3.3.2.10 Set point value adjustment parameter page

The parameters on this page depend on the setting of the *set point value adjustment with high outside temperatures* parameter on the *RTR setting* page.
See appendix: Set point value adjustment

This page is only available if a set point value adjustment has been selected on the RTR setting parameter page.

Table 24: Calculate set point value internally and send

Designation	Values	Application
Set point adjustment from	*25 °C, 26 °C, 27 °C* *28 °C, 29 °C, 30 °C* *31 °C, 32 °C, 33 °C* ***34 °C**, 35 °C, 36 °C* *37 °C , 38 °C, 39 °C* *40 °C*	Activation threshold for set point adjustment. See object 2 and object 27
Adjustment	*1 K per 1 K outdoor temperature* *1 K per 2 K outdoor temperature* ***1 K per 3 K outdoor temperature*** *1 K per 4 K outdoor temperature* *1 K per 5 K outdoor temperature* *1 K per 6 K outdoor temperature* *1 K per 7 K outdoor temperature*	Strength of set point adjustment: At what change of outdoor temperature should the set point value be adjusted by 1 K?
Set point adjustment format	**relative** absolute	of object 2 transmits a temperature differential in K, in relation to the outdoor temperature. This value can be used as a set point adjustment for additional room thermostats. of object 2 transmits a set point value in °C (*base unadjusted set point*). This is increased in relation to the outdoor temperature and serves as set point value for additional temperature controls.

Continuation:

Designation	Values	Application
Unadjusted base set point value	*15 °C, 16 °C, 17 °C* *18 °C, 19 °C, 20 °C* *21 °C, 22 °C, 23 °C* *24 °C, 25 °C, 26 °C,* *27 °C, 28 °C, 29 °C,* *30 °C*	(Only with format = *absolute*). This is the base set point value for the remote controller. If correction is required, then it is added to this and the result is sent as a newer, adjusted set point value (see obj. 2).
Maximum adjustment	Unlimited +3 K **+5 K** +7 K	The set point value continues to increase in step with the outside temperature. The set point value increase ends as soon as the adjustment has achieved the set value.
Send all set point adjustment	*Not cyclical, only in the event of change* *Every 2 min.* *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* ***Every 30 min.*** *Every 45 min.* *Every 60 min.*	When should the set point value adjustment be sent?

Table 25: Only receive set point value adjustment

Designation	Values	Application
Maximum adjustment	***until heating temperature is achieved*** *+3 K* *+5 K* *+7 K*	The set point value must not exceed the heat protection temperature despite adjustment. The set point value adjustment must not exceed the set value.

3.3.2.11 Select display pages parameter page

Table 26

Designation	Values	Application
Show [weather data] page?	*Yes* ***No***	Should the display page for weather data be used on the device?
Show page 1 for display objects	*Yes* ***No***	Should the individual display page 1 be displayed? Each individual display page consists of 8 freely programmable lines to show and/or change data.
Show page 2 for display objects	*Yes* ***No***	See above.
Show page 3 for display objects	*Yes* ***No***	See above.
Show page 4 for display objects	*Yes* ***No***	See above.
Show page 5 for display objects	*Yes* ***No***	See above. Up to a maximum of 5 such pages may be used.
Favourite page *(Only VARIA 826)*	*RTC page* *Weather data, if page is available* ***Screen 1 if page available*** *Screen 2 if page available* … *Screen 5 if page available*	Here, the user can select the page that he/she most prefers to display. (see below).

Continuation

Designation	Values	Application
Select favourites page (Only VARIA 826)	*Via object only*	The favourite page can be selected via object 121. It can, for example, be used as an "alarm page" and selected as required.
	Via object and after 3 minutes without use	The favourite page can be selected via object 121 and is also automatically displayed if the device is not used for more than three minutes.
Blank out RTC page		This parameter is **not** available if the RTR page has been selected as a favourite.
	Yes	Choose this setting if the RTR page is no longer designed to be called up (e.g. for hotel rooms etc.)
	No	Standard setting The RTR page is always available

3.3.2.12 Weather data parameter page

Designation	Values	Application
Temperature unit	**°C**	The temperature is displayed in °C.
Min/max temperature recording	***Yes*** *No*	Should the maximum and minimum temperature values be stored in the device?
Wind unit	***Km/h*** *m/s* *Mph, calculated from m/s* *Km/h, calculated from m/s*	Units for wind speed
Min/max wind recording	*Yes* ***No***	Should the maximum and minimum wind speed values be stored in the device?
Record rain	*Yes* ***No***	Should rainfall during the measuring period be recorded?
Resetting min/max values	*on device* *Via object* ***On device and via object*** *On device, via object and daily at 08:00* *On device, via object and daily at 12:00:00* *On device, via object and daily at 18:00:00* *On device, via object and daily at 22:00:00* *On device, via object and daily at 00:00:00*	How are the stored measurements deleted? By the user on the weather page. By telegram on object 31 See above. If the memory is not deleted by telegram or on the device, it is automatically deleted at the set time.

Continuation:

Designation	Values	Application
Display before receipt of value		What is displayed if no telegrams have been received and the object, therefore, does not have a defined status?
	Space	The display remains empty.
	---	Display 3 dashes.
	according to object value after Reset	Displays the value last allocated 0 value. Examples: 0 m/s 0.0 °C No rain
	Read from object via bus	Varia sends a read command to the allocated object as soon as the line is selected. The display remains empty if no answer is received.

3.3.2.13 Display objects parameter pages 1..5

Table 27

Designation	Values	Application
Fade in operating advice on page 1 (Varia 826 only)	*Yes*	Help text for the user: A short description of the button functions is provided on display page 1. Page selection: < > Line selection: ∧ ∨ Change selection: + - Confirm selection: ok Blinds: up= + / down= -
	No	Do not display help text: Page 1 has the same function as the display pages 2 - 5
Operating advice language	*German* *English* *French*	The operating advice (if selected) is available in three languages.
Page heading (22)	Manual input	Customer-specific heading for the relevant page. Maximum text length: 22 characters
Favourite line on page	*No favourite* *Line 1* *Line 2* *Line 3* *Line 4* *Line 5* *Line 6* *Line 7* *Line 8*	Determines which line automatically appears as soon as the page is displayed. If another line is selected, the favourite line can immediately be accessed by pressing the + or OK buttons.

3.3.2.14 Page 1, line 1 to page 5, line 8 parameter pages

VARIA has 5 display pages for individual applications. See appendix:
Freely programmable display pages.

3.3.2.14.1 Common parameters

Table 28

Designation	Values	Application
Line format	***Entered text***	The line should only display one text. (max. 22 characters) and has no other function. **Hint:** **This option can be used as required to supplement the text in an adjacent line or to represent an empty line.**
	Object type: Switching	No switching command can be received or sent.
	Object type: Percentage value	A percentage value can be received or sent.
	Object type: HVAC operating mode	An HVAC operating mode can be received or sent. Value: 1 = Comfort; 2 = Standby; 3 = Night; 4 = Frost protection/heat protection
	Object type: Counted measurement 8-Bit	A 1 byte number (e.g. counter reading) can be received or sent. Value range: 0..255 or -128.. 127

Continuation:

<table>
<tr><th>Designation</th><th>Values</th><th>Application</th></tr>
<tr><td>Line format</td><td>Object type: Dimming</td><td>Dimmer control with 2 objects:
Brighter/darker (4 bit)
and On/Off</td></tr>
<tr><td></td><td>Object type: Temperature</td><td>A temperature value can, for example, be sent as a set point value for another temperature controller or just the temperature received or displayed via the bus.</td></tr>
<tr><td></td><td>Object type: EIS 5</td><td>A value with commas can be sent or received.
Unit used
(e.g. °C or m/s etc.) can be selected as required.</td></tr>
<tr><td></td><td>Object type: Counted measurement 16 Bit</td><td>A 2 byte number
(e.g. counter reading) can be received or sent.
Value range:
-32768.. 32767 or 0..65535</td></tr>
<tr><td></td><td>Object type: Scene</td><td>Up to 64 scenes can both be displayed and learned</td></tr>
<tr><td></td><td>Object type: Blinds/shutters</td><td>Blinds control with 2
1-bit objects:
Up/down and step/stop</td></tr>
<tr><td></td><td>Object type: Priority</td><td>3 priority statuses can be received or sent.
<table>
<tr><th>Function</th><th>Value</th></tr>
<tr><td>Priority inactive
(no control)</td><td>0
(00_{bin})</td></tr>
<tr><td>Priority ON
(control: enable, on)</td><td>3
(11_{bin})</td></tr>
<tr><td>Priority OFF
(control: disable, off)</td><td>2
(10_{bin})</td></tr>
</table>
Each status can be individually renamed.</td></tr>
</table>

Continuation:

Designation	Values	Application
Line format	*Object type: Display text string*	A freely chosen 14-character text (14 byte) can be received and displayed from the bus.
	Object type: Valuator	here, the user can choose from 8 separate predefined values (0..255). Application: E.g. volume control.
	Object type: Floating-point number (DPT 14.xxx)	A 4-Byte floating-point number from the bus can be received and displayed here. Value range: $-3{,}4.10^{38}$ … $3{,}4.10^{38}$
Text for line 1..8	Manual input	Enter line description.
Authorise amendment of object value?		This parameter determines the **data orientation** for the object allocated to the individual line (see objects 39, 41…).
	Yes	The value/status on the display line can be changed by the user on the device. The changed value is sent to the bus and can be overwritten with received values.
	No	The line only displays the received values.
Display before receipt of value		What is displayed if no telegrams have been received and the object, therefore, does not have a defined status?
	Space	The display remains empty
	---	Display 3 dashes

Continuation:

Designation	Values	Application
Display before receipt of value	*Corresponding object value after reset*	Displays the value which is allocated the 0 value depending on object type. Examples: 0 0.00 of 0% 0.0 °C etc.
	Read from object via bus	Varia sends a read command to the allocated object. The display remains empty if no answer is received. **Important:** Each time a page or line with objects with undefined status is selected these objects are requested by VARIA via a read telegram.

3.3.2.14.2 Specific parameters according to object type

Important: Certain parameters only become visible when the *allow changes to object value?* parameter is set to *yes*.
Certain parameters can be faded out or renamed depending on the setting.
Important:
Text for line is displayed flush left
Unit is always displayed from the 20th position

Table 29

Designation	Values	Application
Switch on object type		
Text at object value = 0 (7)	Text entry: Maximum 7 characters	Text to be displayed at *Off* switching status
Text at object value = 1 (7)	Text entry: Maximum 7 characters	Text to be displayed at *On* switching status
Function of +/- buttons	*Switch*	every time the + or – buttons are pressed, the channel sends a telegram with the opposite switching status (ON/ OFF/ ON…)
	+ = ON/ - = OFF	Only switch-on telegrams are sent with the + button. Only switch-off telegrams are sent with the - button.
	+/- = ON	Only switch-on telegrams are sent using both buttons.
	+/- = OFF	Only switch-off telegrams are sent using both buttons.

Continuation:

Designation	Values	Application
Percentage value object type		
Text at object value = 0 (7)	Text entry: Maximum 7 characters	Text to be displayed at 0% value
Increment	*1 %, 2 %, , 5 %,* ***10 %*** *20 %, 25 %, 33 %* *50 %*	by what % should the value change at each push of the button (+/-) ?
Lower adjustable threshold value	***0 %****..100 %*	Determines the lowest percentage value that can be set
Upper adjustable threshold value	*0 %..****100 %***	Determines the highest percentage value that can be set
HVAC operating mode object type		
Adjustable operating modes	*All operating modes* ***All operating modes except auto*** *Night, standby and comfort* *Comfort and night only* *Comfort and standby only*	Which operating modes should be available?
Counter value 0..255 object type		
Unit	Text entry: Maximum 3 characters	Abbreviation for the unit that goes with the value, e.g. pcs
Value range	*positive numbers only* *negative and positive numbers*	0..255 -128..127
Increment	***1****..255*	how much should the value change at each push of the button (+/-) ?
Lower adjustable threshold value	***0****..255 or -128..127**	Determines the lowest value that can be set
Upper adjustable threshold value	*0..****255*** *or -128..127**	Determines the highest value that can be set
Dimming object type		
Text at object value = 0 (7)	Text entry: Maximum 7 characters	Text to be displayed when the light is switched off
Text at object value = 1 (7)	Text entry: Maximum 7 characters	Text to be displayed when the light is switched on

*Depending on selected value range.

Continuation:

Designation	Values	Application
Dimming process is stopped by	*Releasing the button* *OK button*	The dimming value changes as long as the + or – button is pressed or a final value is reached (0% or 100 %). The value reached is retained when the button is released. When the (+/-) button is pressed the dimming value changes as long as the OK button is depressed or a final value is reached (0% or 100 %).
Temperature object type		
Unit for display object (3)	Text entry: Maximum 3 characters	Abbreviation for the unit that goes with the value, e.g. °C
Increment	*0.1 °C* *0.2 °C* *0. 5 °C* *1 °C* *2 °C* *5 °C* *10 °C*	by how many °C should the value change at each push of the button (+/-) ?
Lower adjustable threshold value (-20..50 °C)	*-20 °C..50 °C*	Determines the lowest value that can be set
Upper adjustable threshold value (0..50 °C)	*0 °C..50 °C*	Determines the highest value that can be set

Continuation:

Designation	Values	Application
EIS 5 object type		
Unit for display object (3)	Text entry: Maximum 3 characters	Abbreviation for the unit that goes with the value, e.g.
Increment	*0.1* *0.2* *0.5* *1* *2* *5* *10* *20* *50* *100* *200* *500* *1000*	how much should the value change at each push of the button (+/-) ?
Lower adjustable threshold value	*-99 999…**0**...99 999*	Determines the lowest value that can be set
Upper adjustable threshold value	*-99 999..99 999* Default value = ***1000***	Determines the highest value that can be set
Object type: Counter value 0.. 65535		
Unit for display object (3)	Text entry: Maximum 3 characters	Abbreviation for the unit that goes with the value, e.g. pcs
Value range	*positive numbers only* *negative and positive numbers*	0..65535 -32768..32767
Increment	***1**..65535*	how much should the value change at each push of the button (+/-) ?
Lower adjustable threshold value	***0**.0.65535 or -32768.0.32767**	Determines the lowest value that can be set
Upper adjustable threshold value	***0**.0.65535 or -32768.0.32767**	Determines the highest value that can be set
Object type: Scene		
Send [save scene] command	***Yes, by pressing "OK" for more than 3 seconds*** *No*	When the OK button is pressed Varia sends a scene access telegram. If the OK button is pressed for longer than 3 seconds, Varia sends a scene learning telegram. Varia only sends scene access telegrams.

*Depending on selected value range.

Continuation:

Designation	Values	Application
Lower adjustable scene number	***1**..64*	Determines the number range of the scenes used. Only visible if *Allow change of object value ? parameter = yes*
Upper adjustable scene number	*1..**64***	
Allocate text to scene number	***No, only display number*** *Yes, display text instead of number*	Varia only displays the scene numbers The scene numbers are replaced by individual scene names such as e.g. holiday, evening etc… The required scene numbers are entered on the *text list* parameter page. See appendix: Allocate text to scene numbers
Name of lower adjustable scene	***See text list: Text 1*** *...* *See text list: Text 40*	Only if *Allow change of object value ? = yes.* Which text should be allocated to the lower scene numbers ?
Lowest scene number with text	***1**..64*	Only if *Allow change of object value ? = no* From which scene number should the scene number be replaced by text? *Text list* parameter page See appendix: Allot scene numbers text
Text for this scene number	***See text list: Text 1*** *...* *See text list: Text 40*	Text for the *lowest scene number with text*entered above

Continuation:

Designation	Values	Application
	Object type: Blinds/shutters	
Movement is stopped by	***Releasing the button*** *short use or via OK button*	The drive operates for as long as the button is pressed or the end position is reached. The drive starts with a long push of the button and can be stopped by briefly pressing the button or by confirming with OK button.
	Object type: Priority	
Text at "no priority " (6)	Text entry: Maximum 6 characters	Text to be displayed at *no priority* status
Text at "priority Off " (6)	Text entry: Maximum 6 characters	Text to be displayed at *priority Off* status
Text at "priority On" (6)	Text entry: Maximum 6 characters	Text to be displayed at *priority On* status
	Object type: Display text string	
Text adjustment	***Flush left*** *1 characters entered flush left* *2 characters entered flush left* *3 characters entered flush left* *4 characters entered flush left* *5 characters entered flush left* *6 characters entered flush left* *7 characters entered flush left* *8 characters entered flush left* *Flush right* *1 characters entered flush right* *2 characters entered flush right* … *7 characters entered flush right* *8 characters entered flush right*	Positioning of the text lines received from the bus on the display.

Continuation:

Designation	Values	Application
	Object type: Valuator	
Use which of the following values?	*Value 1 only* ***Values 1 and 2*** *Values 1-3* *Values 1-4* *Values 1-5* *Values 1-6* *Values 1-7* *Values 1-8*	This type of valuator allows individually predefined values to be directly selected and sent at the push of a button (+/-). The number of values to be made available is set here. The enables quick and easy setting as this just leaves the necessary values to choose from.
Value 1 *Value 2* … *Value 7* *Value 8*	Manual input 0 ... 255	Input of required values
Allocate text to values?	*No, only display number* *Yes, display text instead of number*	Varia only displays the configured values. Varia sends the configured values and displays the text allocated to each value The required scene numbers are entered on the *text list* parameter page. See appendix: Allocate text to scene numbers
Text for value 1	*See text list: Text 1* … *See text list: Text 40*	Reference to the text that is to be displayed for the predefined value 1
=> NOTE: Following scenes	*have the subsequent texts*	Example: If text 11 is selected for value 1 then value 2 is allocated the following text, i.e. text 12 etc.

3.3.2.15 Text list parameter page

Table 30

Designation	Values	Application
Text 1 (10) … Text 40 (10)	Text entry: Maximum 10 characters	The entered texts can replace values or scene numbers from the page 1..5, lines 1..8 parameter page.

3.3.2.16 Time program channel 1 (for RTR) parameter page

Table 31

Designation	Values	Application
Name of channel	manual input (max. 8 characters)	Input of description for channel 1 (e.g. heating)
Type of switching program	*HVAC operating mode*	Channel 1 is exclusively designed for controlling HVAC operating modes and is internally linked to the room thermostat.
Switching program after download	*Unchanged*	Which program is to be active after downloading in VARIA? The program that was active before the download should continue.
	Program 1 (at home during the day)	Mon-Fri: 6:00 – 22:00 Comfort Mon-Fri: 22:00 – 6:00 Night Sat, Sun: 8:00 – 23:00 Comfort Sat, Sun: 23:00 – 08:00 Night
	Program 2 *(out during the day)*	Mon-Fri: 6:00 – 8:00 Comfort Mon-Fri: 08:00:00 – 17:00 Night Mon-Fri: 17:00:00 – 22:00 Comfort Mon-Fri: 22:00 – 6:00 Night Sat, Sun: 8:00 – 23:00 Comfort Sat, Sun: 23:00:00 – 08:00 Night
	Program 3 *(out during the morning)*	Mon-Fri: 6:00 – 8:00 Comfort Mon-Fri: 8:00 – 12:00 Standby Mon-Fri: 12:00:00 – 22:00 Comfort Mon-Fri: 22:00 – 6:00 Night Sat, Sun: 8:00 – 23:00 Comfort Sat, Sun: 23:00:00 – 08:00 Night

Continuation:

Designation	Values	Application
Switching program after download	*Own program* *No program*	The programs entered on the device by the user are valid.* Channel 1 is completely deactivated.
Change switching program via user	*Disabled* ***Enabled***	Can the user switch the time program to channel 1?
Reaction after unlocking	*Operating mode of switching program starts immediately* *Operating mode functions after next time program change*	As soon as the channel is unlocked the RTR takes up the prescribed operating mode from the time program. No reaction when cancelling the lock. These are only taken up by the RTR if the channel switches to another operating mode based on a switching program.
Send time program cyclically *(if used)*	***Not cyclical, only in the event of change*** *Every 2 min.* *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* *Every 30 min.* *Every 45 min.* *Every 60 min.*	When is the status of the switching program sent from channel 1?

* If the own program is selected via the *time program after download* it is not lost but instead can be reactivated at any time.

3.3.2.17 Time program channel 2..8 parameter pages

Table 32

Designation	Values	Application
Name of channel	manual input (max. 8 characters)	Input of description for channel (e.g. "light 1")
Type of switching program		Type of telegrams to be sent.
	HVAC operating mode	The channel can send up to 3 different statuses: Comfort, standby and night operation , i.e. stage 1, 2 and 3 (input on device).
	On/Off	The channel can only send two statuses; On and Off
	Valuator	The channel can send up to 3 different 1-byte values (0..255).
	Percentage value	The channel can send up to 3 different percentage values (0..100%).
	Temperature in °C	The channel can send up to 3 different temperature values. Example: Set point values for a thermostat.
	Temperature in K	The channel can send up to 3 different temperature differential values. Example: Temperature decrease or increase for a thermostat.

Continuation:

Designation	Values	Application
Switching program after download		Which program is to be active after downloading?
	Unchanged	The program that was active before the download should continue.
	Program 1 (at home during the day)	Mon-Fri: 6:00 – 22:00 On or stage 3 Mon-Fri: 22:00 – 6:00 Off or stage 1 Sat, Sun: 08:00:00 – 23:00 On or stage 3 Sat, Sun: 23:00 – 8:00 Off
	Program 2 *(out during the day)*	Mon-Fri: 6:00 – 8:00 On or stage 3 Mon-Fri: 08:00:00 – 17:00 Off or stage 1 Mon-Fri: 17:00:00 – 22:00 On or stage 3 Mon-Fri: 22:00 – 6:00 Off or stage 1 Sat, Sun: 08:00:00 – 23:00 On or stage 3 Sat, Sun: 23:00 – 8:00 Off or stage 1
	Program 3 *(out during the morning)*	Mon-Fri: 06:00 – 08:00 On or stage 3 Mon-Fri: 08:00:00 – 12:00 On or stage 2 Mon-Fri: 12:00:00 – 22:00 On or stage 3 Mon-Fri: 22:00:00 – 06:00 Off or stage 1 Sat, Sun: 08:00:00 – 23:00 On or stage 3 Sat, Sun: 23:00:00 – 08:00 Off or stage 1
	Own program	The programs entered on the device by the user are valid.*
	No program	Channel is completely deactivated.

* If the own program is selected via the *time program after download* it is not lost but instead can be reactivated at any time.

Continuation:

Designation	Values	Application
Change switching program via user	*Disabled* ***Enabled***	Can the user change the time program?
Reaction after unlocking	*Only send status after next change* ***Immediately send current status***	Only send when the channel status changes. **Important**: If *send cyclically* is selected, cyclic sending is only active after next change. The channel status is sent immediately as soon as the lock is cancelled.
Send time program cyclically (if used)	***Not cyclical, only in the event of change*** *Every 2 min.* *Every 3 min.* *Every 5 min.* *Every 10 min.* *Every 15 min.* *Every 20 min.* *Every 30 min.* *Every 45 min.* *Every 60 min.*	When should the status of the channel be sent?

4 Start-up

4.1 Activate program mode

The program mode can be motivated in 2 different ways.

→ Move a magnet along the right upper side of the device
→ In the settings menu 🔧, in the "system" line → select "Prog Mode" and set to *active* using the + button.

The LED on the right upper side of the device lights up and the device can be programmed

After the device has been programmed for the first time, the settings menu can be selected without entering the PIN.

4.2 Settings menu

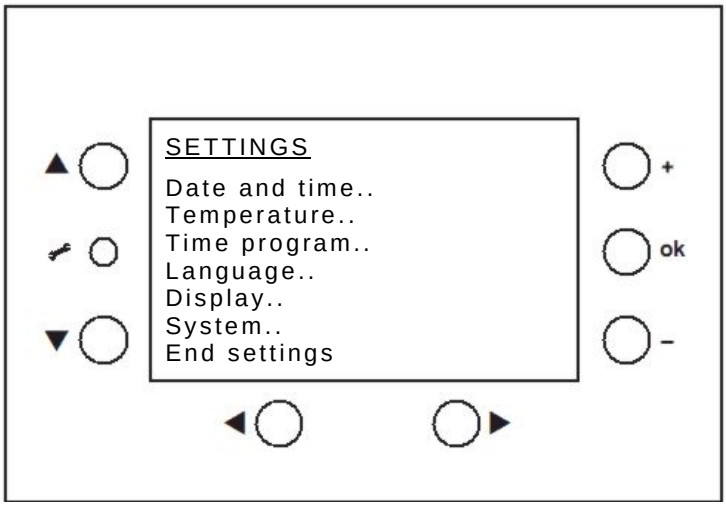
The *SETTINGS* menu is opened using the button.
A PIN code may be required depending on configuration.

4.2.1 PIN code

If PIN code protection is configured (*General, settings menu on device = released by PIN*) pressing
the -button reveals the PIN entry **PIN 5555** in the display and the first space is blacked out.

Select the right number using the +/- buttons and confirm with OK.
Every time the button is pressed the next entry space is automatically selected.

The settings menu appears after the last position has been completed and confirmed.



4.2.2 Date and time

Select the line to be changed with the ▼▲buttons.
Press OK: The value to be changed is blacked out.
Use +/- to change the value and move to the next value by pressing OK.

4.2.3 Temperature

Individual set point values for the different operating modes can be entered here.

Room temperature If the installation location is unsuitable for measuring room temperature this can be corrected here.

 Set point value in comfort mode (16 °C to 28 °C)

 Set point value in standby mode (maximum of 5 K lower than in comfort mode)

 Set point value in night operation mode (maximum of 8 K lower than in comfort mode)

Advice on entering set point values:

The night operation set point value must be lower than the set point value for comfort mode.

Table 33: Setting ranges

Operating mode	Setting range
Standby	Comfort heating – 0..5 K
Night	Comfort heating – 3.0.8 K
Comfort in cooling mode	Comfort heating + dead zone*

* Dead zone = 1..6 K

Non-permitted values are automatically corrected if required. Here, the ETS threshold parameter is taken into consideration, i.e. both *minimum* and *maximum valid set point value* as well as the *set point value for frost protection mode*.

Example:
Heating set point value = 20 °C, night 14 °C

If the heating set point value is increased to 24 °C , then the set point value in night mode changes automatically to 16 °C, as a maximum reduction of 8 K is permissible in night operation mode (24 °C – 8 K = 16 °C).
See table above: Setting ranges.

4.2.4 Switching program

There are 8 channels (time programs) available.
Both customer-specific and preset switching programs can be selected.
The programs are weekly programs with a minimum time interval of 15 minutes.

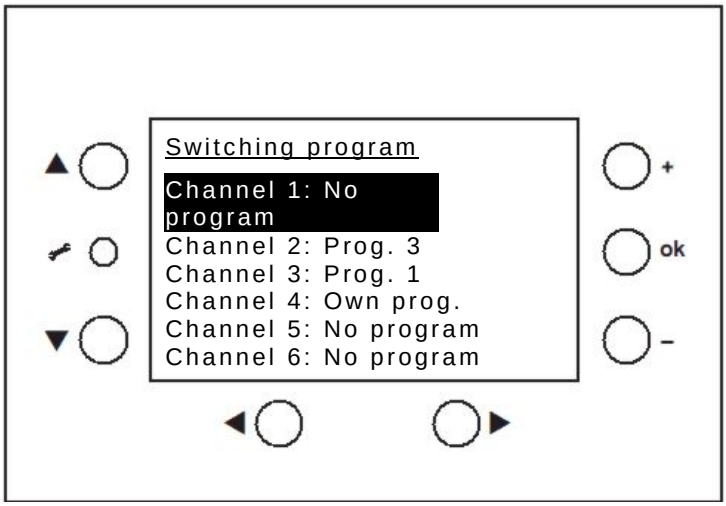
Programming is completed on the device. ETS is only used to determine whether and which programs are active.

Channel 1 is internally linked to the temperature controller and controls the operating modes.
The current channel status is reported back to object 10.
See time program channel 1 (for RTR) parameter page.

Channels 2 to 8 can send all types of telegrams to the bus.
2 or 3 operating modes/values can be sent depending on the configuration.
See The time program channel 2..8.

4.2.4.1 Time program overview page

Set cursor using the ▼▲buttons to **time program** and confirm by pressing OK
This page is used to display time programs for each channel.



Programs 1-3 are fixed preset programs for heating applications.
Fixed means they cannot be easily changed.
It is, however, possible to copy them on channels with an own program and use as a template.

The +/- buttons can be used in each channel to select from 5 program options:

- Program 1
- Program 2
- Program 3
- Own program
- No program

Depending on the ETS setting (*type of time program)* these programs function as

- 3 stage,
- 2 stage or
- HVAC programs.

For channel 1 the *type of time program = HVAC operating mode* is unchangeable

3-stage programs are possible with: percentage value, valuator, temperature in °C and temperature differential in K.
3 different values can be sent during the course of a day.

Table 34: Program options depending on selected *type of time program* (ETS).

	switching times	*Type of switching program*		
		HVAC	On/Off	3 steps
Program 1	Mon-Fri: 6:00 – 22:00	Comfort	On	Stage 3
	Mon-Fri: 22:00 – 6:00	Night	Off	Stage 1
	Sat, Sun: 8:00 – 23:00	Comfort	On	Stage 3
	Sat, Sun: 23:00 – 8:00	Night	Off	Stage 1
Program 2	Mon-Fri: 6:00 – 8:00	Comfort	On	Stage 3
	Mon-Fri: 8:00 – 17:00	Night	Off	Stage 1
	Mon-Fri: 17:00– 22:00	Comfort	On	Stage 3
	Mon-Fri: 22:00 – 6:00	Night	Off	Stage 1
	Sat, Sun: 8:00 – 23:00	Comfort	On	Stage 3
	Sat, Sun: 23:00 – 8:00	Night	Off	Stage 1
Program 3	Mon-Fri: 6:00 – 8:00	Comfort	On	Stage 3
	Mon-Fri: 8:00 – 12:00	Standby	Off	Stage 2
	Mon-Fri: 12:00– 22:00	Comfort	On	Stage 3
	Mon-Fri: 22:00 – 6:00	Night	Off	Stage 1
	Sat, Sun: 8:00 – 23:00	Comfort	On	Stage 3
	Sat, Sun: 23:00 – 8:00	Night	Off	Stage 1
Own program	The programs entered on the device by the user are valid.*			
No program	Channel 1 is completely deactivated.			

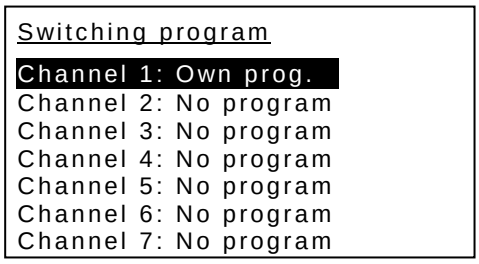
* If the own program is selected via the *time program after download* it is not lost but instead can be reactivated at any time.

Special case:
Switch existing 3 stage *time program* with the ETS to On/Off program .
The device has a time program with 3 stages and type of program is reconfigured to a 2 stage program.
Stages 1 and 2 are combined.

Table 35: Conversion from 3 to 2 stages

Previously: 3 stage program	After: On/Off program
Stage 1	Off
Stage 2	
Stage 3	On

4.2.4.2 Display, enter or change programs



Use the ▼▲ buttons on the overview page to select channel and press OK
An overview page appears for the selected channel (except for "no program").

Set the day of the week with the +/- buttons.
The associated program is displayed on the screen.
By leafing through with +/- to the weekday you can get a quick overview of the whole week.

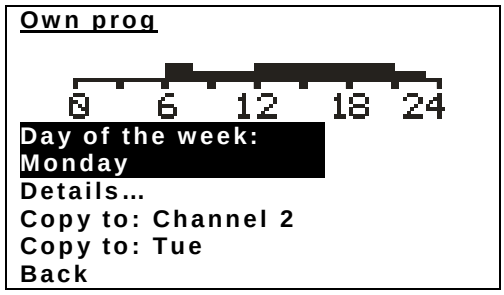
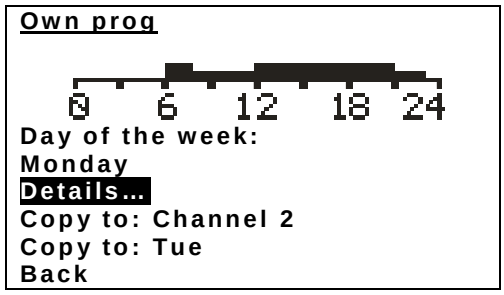


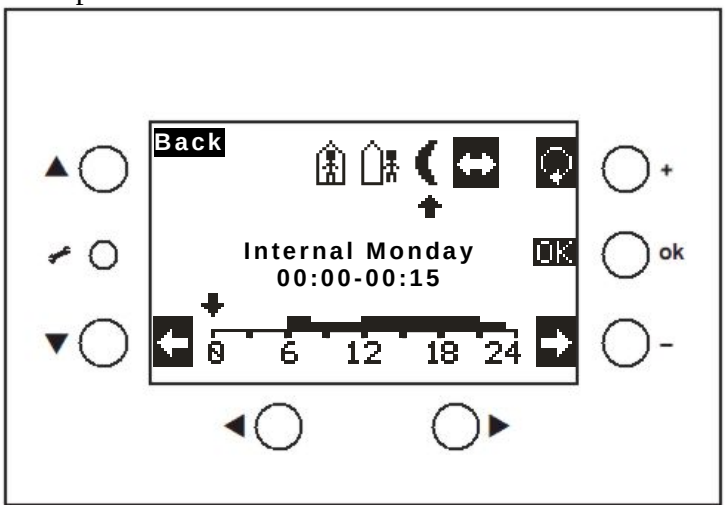
Table 36: Representation of switching statuses on the time bar

Time bar	*Type of switching program*			
	HVAC		On/Off	3 steps
		Night	Off	1
		Standby		2
		Comfort	On	3

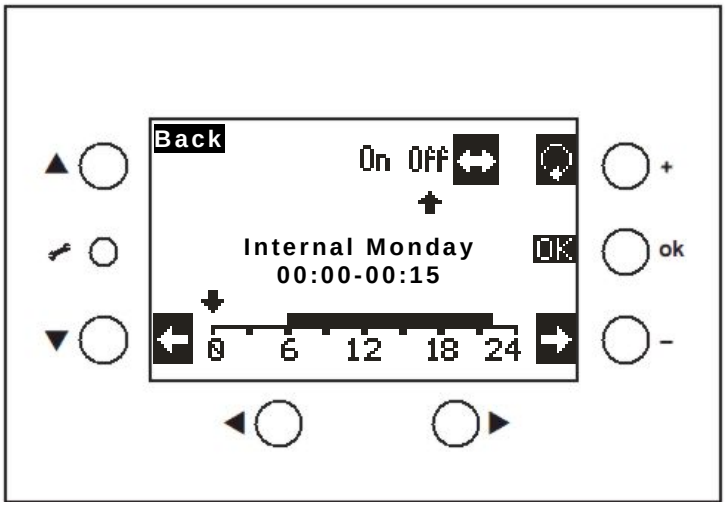
For a more detailed view of the program or to change own program, select details and confirm with OK.



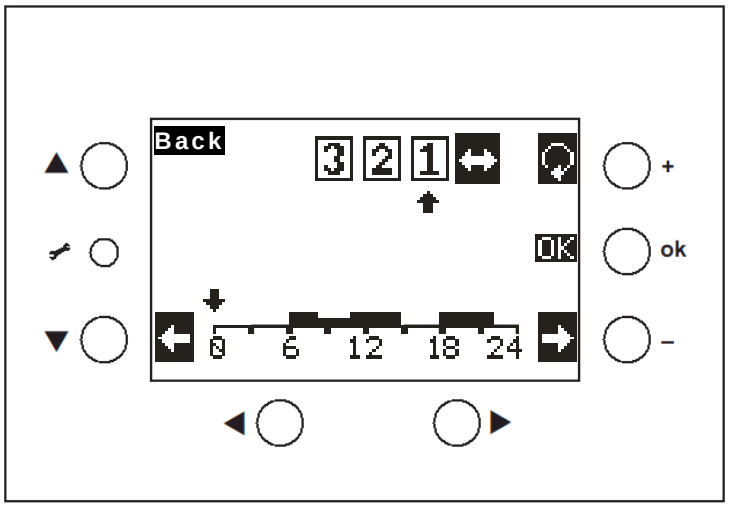
The buttons have new functions in the detailed view.
These are shown as symbols on the display next to the relevant buttons.
The cursor ▼ above the time bar points to the selected 15 minute segment.
The up arrow ▲ shows the associated status.



Type of time program: HVAC



Type of time program: On/Off



Type of time program: 3 steps

Table 37: Button symbols

Button	Symbol	Button function
+		Select operating mode: Current cursor function is displayed by the arrow ▲ : See next table.
▼		Move the program cursor left and program the desired status with the button
-		Move the program cursor right and program the desired status with the button
▲	Back	Leave detailed view

Table 38: Select the cursor functions via the button.

Button	Function	
	The cursor can be moved over the time bar without changing the program and the current status is shown by an arrow ▲ on the top right. The corresponding time span is blended in above the time bar (e.g. 06:00 - 06:15).	
	The cursor ▼ programs the "night" operating mode.	
	The cursor ▼ programs the "standby" operating mode.	
	The cursor ▼ programs the "comfort" operating mode.	
On	The cursor ▼ programs the switch-on time	On/Off
OFF	The cursor ▼ programs the switch-off time	
1	The cursor ▼ programs stage 1	Percentage value Valuator Temperature in °C Temperature difference in K See Time program channel 2..8 parameter pages.
2	The cursor ▼ programs stage 2	
3	The cursor ▼ programs stage 3	

Program entry:

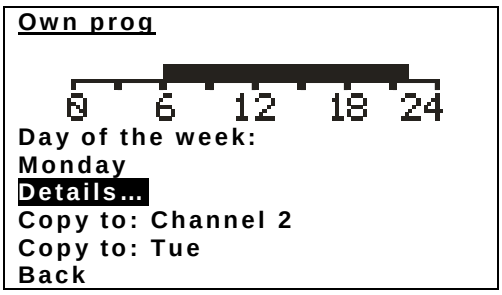
The symbol ↔ is blacked out : With the help of the arrows the cursor can can be moved to the desired position (time) for programming.

Select the desired status (or stage) via the button and this has a black background.

Use the button to move the cursor, the status is accepted.

The button can be used at anytime to select another status or the symbol used to deactivate the selection.

After programming is completed, press OK.



The"copy to weekday" function

Use +/- to select weekday and confirm with OK.
The daily program displayed in the graphics is copied to the selected weekday of the same channel

The "copy to channel n"

Use +/- to select desired channel and confirm with OK.
All weekdays are copied to the selected channel.

4.2.5 Language

Use ▼▲buttons to select desired language for VARIA and confirm with OK.
Use back and OK to leave menu.

4.2.6 Display

Table 39

Menu item	Description
Button sound	What does a beep signify on pressing the buttons?
Button light	If the display backlighting should come on for 30 seconds when the buttons are pressed?
Max. brightness	Controls brightness if display lighting with push of a button. (0-100%)

4.2.7 System

Menu item	Description
Prog. mode	With this function, the programming LED can be switched on with the +/- buttons and the device programmed with the ETS.
Phys. address	The current physical address of the device is displayed
SW:	Data for diagnostic purposes
S/N:	
FD:	

4.3 Freely programmable display pages

VARIA has 5 freely programmable display pages with 8 independent, freely programmable lines that can be activated on the *select display pages* parameter pages (parameter *fade in page x for display objects*).

Each line is divided up into 1 to 3 sections:

- A descriptive text (e.g. kitchen temperature)
- of a value or status display (= object value or status)
- if necessary, a unit display (e.g. °C)

Each line is allocated an object (see object 39), with the dimmer or blinds control function there are two (see object 40).

2 functions can be used according to the *line format* :

- Display value or status
- Display value or status and change using + and - buttons.

This is defined by the *permit change of object value?* parameter.

Table 40: Overview of line formats

Line format	Parameters	Length	Object type
Entered text	Line texts	22	-
Switch on object type	Line texts	14	1 bit KNX 1.001
	Text at object value = 0 / 1	7	
Percentage value object type	Line texts	14	1 byte KNX 5.001
	Text at object value 0	7	
HVAC operating mode object type	Line texts	14	1 byte KNX 6.010
Counter value 0..255 object type	Line texts	14	1 byte KNX 6.010
	Unit for display object	3	
Dimming object type	Line texts	14	4 bit KNX 3.007
	Text at object value = 0 / 1	7	
Temperature object type	Line texts	12	2 byte KNX 9.001
	Unit for display object	3	
EIS 5 object type	Line texts	11	2 byte KNX 9.*
	Unit for display object	3	
Counter value 0.0.65535 object type	Line texts	14	2 byte KNX 8.*
	Unit for display object	3	
Scene object type	Line texts	11	1 byte KNX 6.010
Blinds/shutters object type	Line texts	22	1 bit KNX 1.009 / 1.010

Continuation:

Line format	Parameters	Length	Object type
Priority object type	Line texts	12	2 bit KNX 2.001
	Text at "no priority "	7	
	Text at "priority Off "	7	
	Text at "priority On "	7	
Display text string object type	Bus telegrams	14	14 byte KNX 16.000

➔ **See example "Maximum text length for the display pages depending on line format" and template at the end of the manual.**

4.3.1 Operation

The value or status can only be changed if the *changing the object value* parameter is set to *yes*.
Otherwise, values and statuses can only be displayed.
Only the amendable lines can be selected using the den ▼▲ buttons; the others are missed out.

Line format	Permit *changing object value* parameter	
	Yes	No
Entered text	Does not require operation as only text is displayed.	
Object type: Switching	The switching status is selected using the + / - buttons	Received switching status is displayed
Object type: Percentage value	The percentage value is set using the + / - buttons and confirmed with OK	Received percentage value is displayed
Object type: HVAC operating mode	The desired operating mode is set using the + / - buttons and confirmed with OK	Received operating mode is displayed
Object type: Counter value 0..255	The desired value is set using the + / - buttons and confirmed with OK	Received value is displayed
Object type: Dimming	Briefly press button: + button = switch on - button = switch on The reaction if the button is pressed longer depends on setting of the stopping the dimmer process .	
Object type: Temperature	The desired temperature (e.g. set point value for a thermostat) mode is set using the + / - buttons and confirmed with OK	Received temperature is displayed
Object type: EIS 5	The desired value is set using the + / - buttons and confirmed with OK	Received value is displayed
Object type: Counter value 0.. 65535	The desired value is set using the + / - buttons and confirmed with OK	Received value is displayed
Object type: Scene	The desired scene is set using the + / - buttons and confirmed with OK	Received scene number or associated text is displayed

Continuation:

Line format	Permit *changing object value* parameter	
	Yes	No
Object type: Blinds/shutters	Briefly press button: + button = step up or stop + button = step down or stop The reaction if the button is pressed longer depends on setting of the stopping movement.	
Object type: Priority	The desired priority is set using the + / - buttons and confirmed with OK	Received priority mode is displayed
Object type: Display text string	No operation required. A 14 character text is received and displayed from each line object.	
Object type: Valuator	The +/- buttons can be used to select up to 8 predefined values or associated texts	Display value or associated text

4.3.2 Hints on setting up pages

The *line format = entered text*, i.e. pure text line, can prove helpful in different cases, e.g. as an empty line, as a supplementary line or provide assistance to the user:

Case 1: A maximum of 4 lines are required per page:

A clear and easy to read view can be achieved if functions are only configured for every second line and the remaining ones are configured as empty lines.

Example:

Line 1: *Line format = entered text* with empty text field.
Line 2: *Line format = switching*
Line 3: *Line format = entered text* with empty text field
Line 4: *Line format = switching*
etc.

CONFERENCE ROOM 5	
Ceiling light	OFF
Right hand light	
Left hand light	
Path lighting	OFF

Case 2: The required text is longer than the space available per line

In this case, an adjacent line (the previous or next) as a pure text line can form a heading for the next or a supplement to the preceding line.

Example:

CONSERVATORY	
Skylight	
- south	open
- west	Closed
- east	Closed
Sun protection	
- south	40%
- west	100%
- east	open

Case 3: Display advice for user:

A whole page can be used to provide brief operating advice

Example:

```
INSTRUCTIONS
Page selection:
with <> arrow buttons

Line selection:
with ^v arrow buttons

Set values:
with the + - ok buttons
```

➔ **For easy and clear text entry, see template at the end of the manual.**

4.3.3 Favourite page

The favourite page is set on the select display pages parameter page.
It can be selected in 2 different ways:
Automatically or via object 121.

4.3.3.1 Favourite page as standard display page

The *select favourite page* parameter on the *display page range* parameter page is set to: *via object and not operated for 3 minutes*.
This page is then always displayed again 3 minutes after the last use of the device at the latest.

4.3.3.2 Favourite page as alarm page

The *select favourite page* parameter on the *display page range* parameter page is set to: *Via object only*.

The occurrence of the monitored event is reported to object 121 by a telegram and VARIA displays the favourite page.
This page contains the reports or values set by the user.

This option is used in the example of Heating control with 6 heating circuits and window monitoring for caretakers.

A brief signal sounds every 2 seconds in the event of an alarm if the alarm telegram is linked to objects 120 and 121.

4.4 Troubleshooting

Response	Potential causes	Remedy
Display backlighting flashes*, LCD display is empty.	Download was interrupted or not completed	1. Bus voltage interrupted 2. press down and hold and OK button simultaneously 3. Reconnect bus voltage 4. Release buttons 5. Download ETS application program again.

*only flashes if mains supply available.

5 Typical applications:

These examples of use are designed to aid planning and are not to be considered as an exhaustive list.
It can be extended and updated as required.

5.1 Display weather data and air quality

5.1.1 Devices:

- VARIA 824 / 826 (824 9 200 / 826 9 200)
- Amun 716 (716 9 200)
- Weather station (132 9 201

5.1.2 Overview

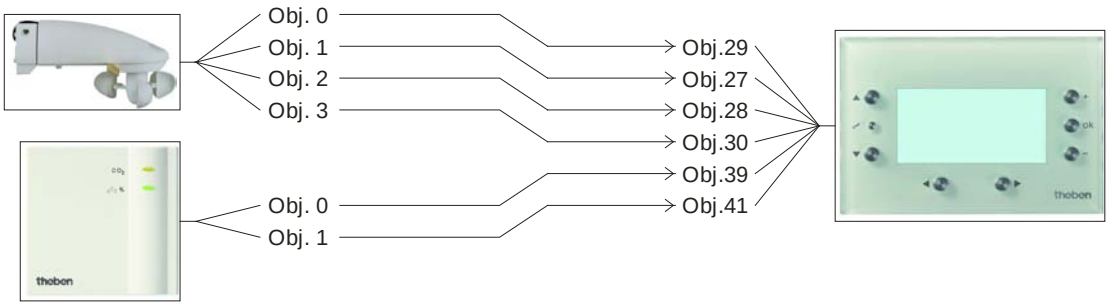


Figure 1

5.1.3 Objects and links

Table 41

No.	Weather station Object name	No.	VARIA Object name	Comments
0	*Brightness value*	29	*Brightness*	Display on the weather page
1	*Temperature value*	27	*Outdoor temperature*	Display on the weather page
2	*Wind speed*	28	*Wind speed*	Display on the weather page
3	*Rain sensor*	30	*Rain*	Display on the weather page

Table 42

No.	Amun 716 Object name	No.	VARIA Object name	Comments
0	*CO2 value*	39	*Display page 1, line 1 - EIS 5 value*	Display on freely programmable pages
1	*relative humidity*	41	*Display page 1, line 2 - percentage value*	Display on freely programmable pages

5.1.4 Important parameter settings

The standard parameter settings apply for unlisted parameters.

Table 43: VARIA

Parameter page	Parameters	Setting
Select screens	*Show [weather data] page?*	*Yes*
	Show page 1 for display objects	*Yes*
Weather data	*Wind unit*	*Km/h*
Page 1 line 1	*Line format*	*Object type: EIS 5*
	Text for line 1 (11)	*CO2 value*
	Unit for display object (3)	*ppm*
	Authorise amendment of object value?	*No*
Page 1 line 2	*Line format*	*Object type: Percentage value*
	Text for line 3 (14)	*Relative humidity*
	Authorise amendment of object value?	*No*

Table 44: Weather station

Parameter page	Parameters	Setting
Measured values	*Send wind speed in the event of a change of …*	*20 %, but at least 1 m/s*
	Send wind speed in	*Km/h*
	Send wind speed cyclically	*every 10 minutes*
	Send brightness value in the event of a change in …	*30 %, but at least 1 lx*
	Send brightness value cyclically	*every 10 minutes*
	Transmit temperature in the event of change of	*1 °C*
	Send temperature cyclically	*every 10 minutes*
	Send rain in the event of change and	*every 10 minutes*
	Off-delay	*none*

Table 45: Amun 716

Parameter page	Parameters	Setting
Measured values	*Send CO2 content on change of*	*200 ppm*
	Send CO2 content cyclically	*every 10 minutes*
	Send humidity value in the event of a change in …	*2 %*
	Send humidity value cyclically	*every 10 minutes*

5.2 Blinds or shutter / awning control

Blinds, shutters or awnings are controlled via line 1
on display page 1 by pressing the +/- buttons.
The difference between blinds and shutter control is determined by the configuration of the blinds actuator.

5.2.1 Devices:

- VARIA 824 / 826 (Order nos. 824 9 200 / 826 9 200)
- JMG 4S (Order no. 491 0 250)

5.2.2 Overview

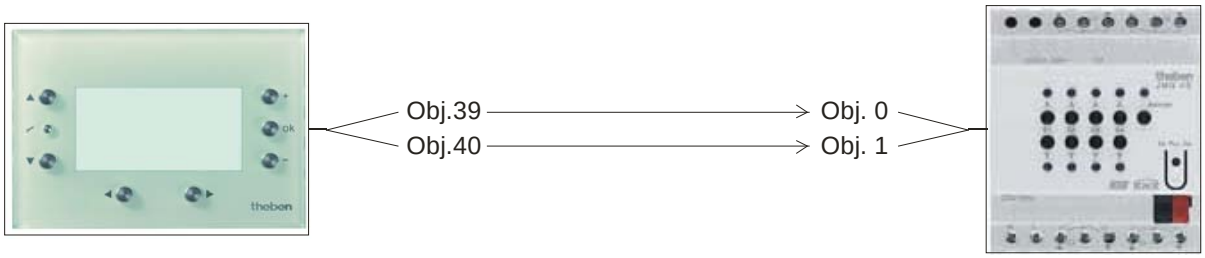


Figure 2

5.2.3 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

5.2.3.1 Varia

Table 46

Parameter page	Parameters	Setting
Select screens	*Show page 1 for display objects*	*Yes*
Page 1, line 1	*Line format*	*Blinds/shutter object type (DPT 1 .008..)*

5.2.3.2 JMG 4S

Parameter page	Parameters	Setting
GM JMG 4S	*Type of curtain*	*Blinds* or *Shutter / awning / general drive*

5.2.4 Objects and links

Table 47: VARIA

No.	VARIA Object function	No.	JMG 4S Object function	Comments
39	*Blinds up/down*	0	*Up / Down*	Length of pressing the + button = Up Length of pressing the - button = Down
40	*Blinds Step/Stop*	1	*Step / stop*	Briefly pressing the + / - button = Step Up/ Step Down or Stop

5.3 Winter garden control

5.3.1 Devices:

- VARIA 824 / 826 (824 9 200 / 826 9 200)
- Amun 716 (716 9 200)
- Weather station (132 9 201

5.3.2 Overview

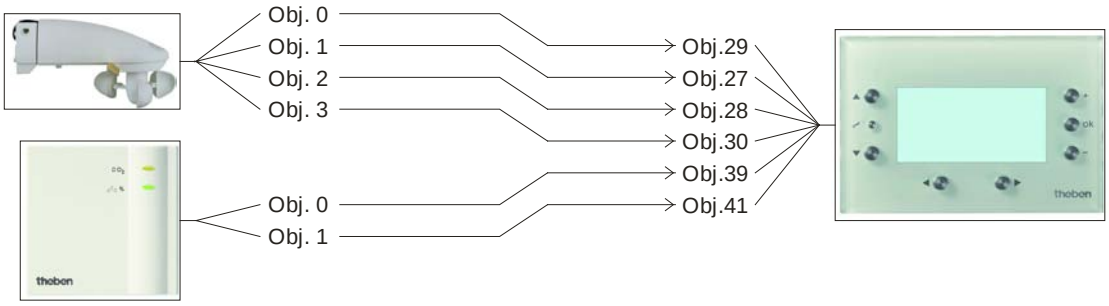


Figure 3

5.3.3 Objects and links

Table 48

No.	Weather station Object name	No.	VARIA Object name	Comments
0	*Brightness value*	29	*Brightness*	Display on the weather page
1	*Temperature value*	27	*Outdoor temperature*	Display on the weather page
2	*Wind speed*	28	*Wind speed*	Display on the weather page
3	*Rain sensor*	30	*Rain*	Display on the weather page

Table 49

No.	Amun 716 Object name	No.	VARIA Object name	Comments
0	*CO2 value*	39	*Display page 1, line 1 - EIS 5 value*	Display on freely programmable pages
1	*relative humidity*	41	*Display page 1, line 2 - percentage value*	Display on freely programmable pages

5.3.4 Important parameter settings

The standard parameter settings apply for unlisted parameters.

Table 50: VARIA

Parameter page	Parameters	Setting
Select screens	*Show [weather data] page?*	*Yes*
	Show page 1 for display objects	*Yes*
Weather data	*Wind unit*	*Km/h*
Page 1 line 1	*Line format*	*Object type: EIS 5*
	Text for line 1 (11)	*CO2 value*
	Unit for display object (3)	*ppm*
	Authorise amendment of object value?	*No*
Page 1 line 2	*Line format*	*Object type: Percentage value*
	Text for line 3 (14)	*Relative humidity*
	Authorise amendment of object value?	*No*

Table 51: Weather station

Parameter page	Parameters	Setting
Measurements	*Send wind speed in the event of a change of …*	*20 %, but at least 1 m/s*
	Send wind speed in	*Km/h*
	Send wind speed cyclically	*every 10 minutes*
	Send brightness value in the event of a change in …	*30 %, but at least 1 lx*
	Send brightness value cyclically	*every 10 minutes*
	Transmit temperature in the event of change of	*1 °C*
	Send temperature cyclically	*every 10 minutes*
	Send rain in the event of change and	*every 10 minutes*
	Off-delay	*none*

Table 52: Amun 716

Parameter page	Parameters	Setting
Measured values	*Send CO2 content on change of*	*200 ppm*
	Send CO2 content cyclically	*every 10 minutes*
	Send humidity value in the event of a change in …	*2 %*
	Send humidity value cyclically	*every 10 minutes*

5.4 Heating control, basic configuration

Varia controls a Cheops actuator.
A window contact, on a TA 2 binary input sends the window status.

5.4.1 Devices:

- VARIA 824 / 826 (824 9 200 / 826 9 200)
- Cheops drive (order no. 731 9 200)
- TA 2 (order no. 496 9 202)

5.4.2 Overview

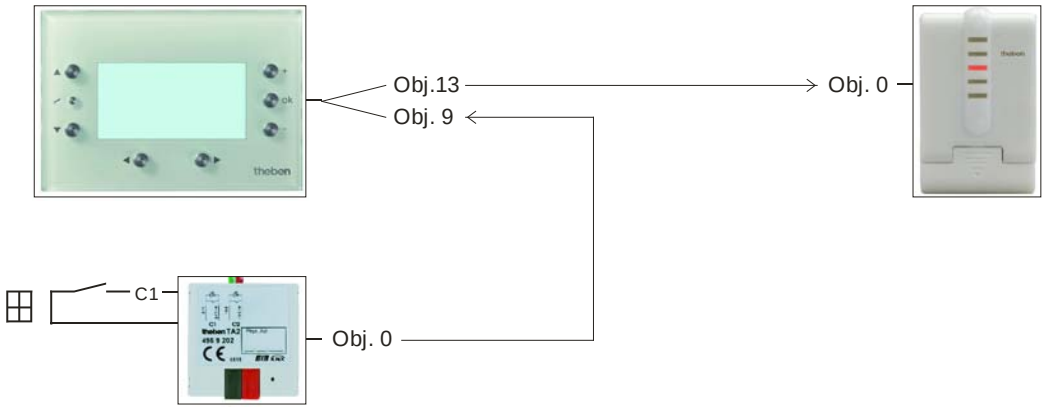


Figure 4

5.4.3 Objects and links

Table 53

No.	VARIA Object name	No.	Cheops drive Object name	Comments
13	*Heating actuating value %*	0	*Control variable*	RTR output actuator

Table 54

No.	TA 2 Object name	No.	VARIA Object name	Comments
0	*Channel 1 switching*	9	*Window position*	Input for window contact

5.4.4 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

5.4.4.1 Varia

Table 55

Parameter page	Parameters	Setting
RTC setting	*Control*	*Heating control only*
	Objects for determining the operating mode	*New: Operating mode, presence, window status*

5.4.4.2 TA 2

Table 56

Parameter page	Parameters	Setting
Channel 2	*Channel function*	*Switch/push button*
	Debounce time	*100 ms*
	Object type	*Switching (1-bit)*
	Response to rising edge	*ON (OFF*)*
	Response to falling edge	*OFF(ON*)*
	Response after restoration of the bus supply	*update*

* Depending on type of window contact. The details in brackets refer to the following: Window closed → Contact closed

5.4.4.3 Cheops drive

The standard parameter settings can be used here.

5.5 Fan coil actuator control

5.5.1 Devices:

- VARIA 824 / 826 (Order nos. 824 9 200 / 826 9 200)
- FCA 1 (Order no. 492 0 200)
- Presence detector (e.g. Theben HTS Eco-IR 180, 360 or Compact Office*)

5.5.2 Overview

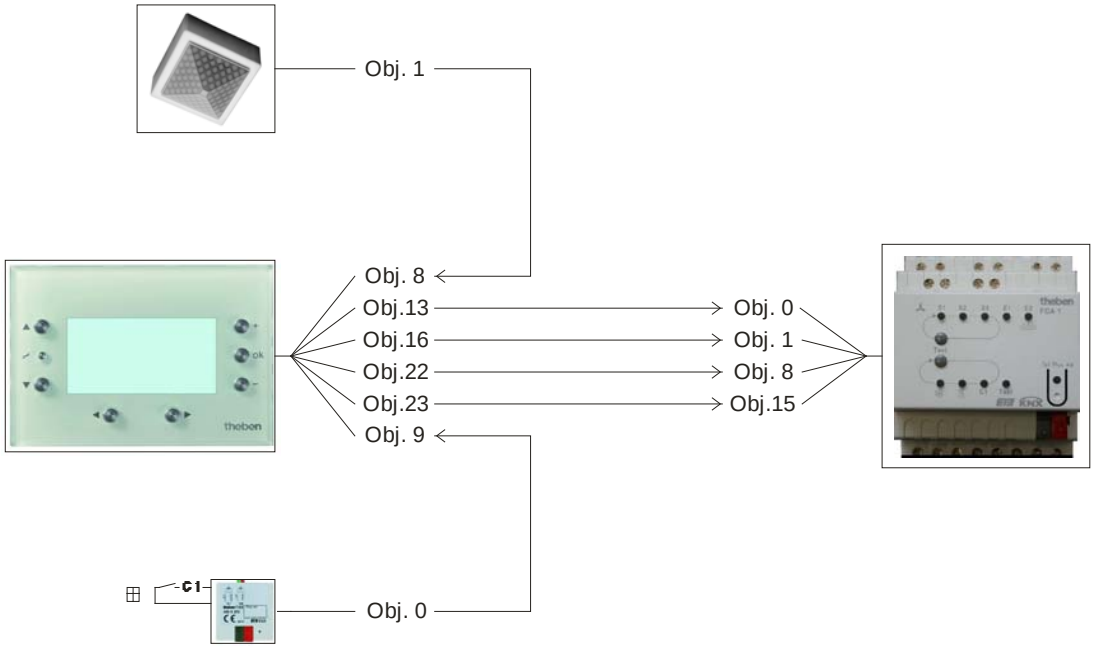


Figure 5

5.5.3 Important parameter settings

The standard parameter settings apply for unlisted parameters.

5.5.3.1 Varia

Table 57

Parameter page	Parameters	Setting
RTC setting	*Control*	*Heating and cooling*
	Objects for determining the operating mode	*New: Operating mode, presence, window status*
	Presence sensor type (to obj. 8)	*Presence detector*
	Activate fan stage control	*Yes*
Heating control	*Number of heating stages*	*Only one heating stage*
	Type of control	*Continuous control*
Cooling control	*Type of control*	*Continuous control*
	Sets the control parameters	*Via system type*
	System type	*Fan coil unit*
	Switching between heating and cooling	*Automatic*
Fan stages	*Number of fan stages*	*3 fan stages*
	Value for fan stage 1	*20 %*
	Value for fan stage 2	*50 %*
	Value for fan stage 3	*80 %*
	Switch fan between auto and forced	*via object forced/auto, forced = 1*

5.5.3.2 FCA 1

Parameter page	Parameters	Setting
General	*Supported function*	*Heating and cooling*
	Heating system	*Fan coil*
	Cooling system	*Fan coil*
	System type	*4-pipe system*
	Type of controller used	*Remote controller*
Fan	*Switched threshold for fan step 1*	*10 %*
	Switched threshold for fan step 2	*40 %*
	Switched threshold for fan step 3	*70 %*
Heating valve	*Type of valve*	*2-point*
Cooling valve	*Type of valve*	*2-point*

5.5.3.3 Presence detector

Table 58: Presence detector (e.g. Eco-IR 180, 360 or Compact Office*)

Parameter page	Parameters	Setting
General data	*Normal or test operation mode*	*Normal operation*
	*HVAC switch output**	*Active*
HVAC switch output	*Response at start/end of HVAC requirement*	*Transmit On and Off telegram*

* Presence output

5.5.3.4 TA 2

Table 59

Parameter page	Parameters	Setting
Channel 1	*Channel function*	*Switch/push button*
	Debounce time	*100 ms*
	Object type	*Switching (1-bit)*
	Response to rising edge	*ON (OFF*)*
	Response to falling edge	*OFF(ON*)*
	Response after restoration of the bus supply	*update*

* Depending on type of window contact.
The details in brackets refer to the following:
Window closed → Contact closed

5.5.4 Objects and links

Table 60: VARIA

No.	VARIA Object name	No.	FCA 1 Object name	Comments
13	*Heating actuating value (%)*	0	*Heating control variable*	FCA receives the actuating value heating from VARIA
14	*Cooling actuating value (%)*	1	*Cooling control variable*	FCA receives the actuating value cooling from VARIA
22	*Forced fan stage*	8	*Forced fan stage*	% value for forced mode
23	*Fan forced/auto mode*	15	*Fan forced/auto mode*	enables the manual selection of fan stage on VARIA

Table 61: Presence detector

No.	ECO-IR Object name	No.	VARIA Object name	Comments
1	*HVAC switch output*	8	*Presence*	Presence signal for switch to comfort mode

Table 62: TA 2 for window status

No.	TA 2 Object name	No.	VARIA Object name	Comments
0	*Channel 1 switching*	9	*Window position*	Window status for den RTR (frost protection) 1 = window open

5.6 Heating control with 6 heating circuits and window monitoring for caretakers.

Combined with 5 RAM 712 Varia controls 6 rooms (rooms 1-6), with window contacts and presence detectors, via a HMT 6 with thermal actuators.

In room 1 (monitoring room) the window contacts and the presence sensors are connected to a TA 2.
Here, VARIA controls the room temperature and monitors the window status in all rooms.

In each of the rooms 2 to 6, room temperature is controlled by a RAM 712.
The window contacts and presence sensors are connected to the binary inputs on the RAM 712.

All window objects send their status to a line on display page 1
which can be configured as a favourite page.
All window objects are also centrally linked to the Varia *favourite page* object.

If a window is opened in a room, the favourite page containing the window display status is displayed (only VARIA 826).

Alternatively, a signal can be activated as soon as a window is opened.
The only other requirement is to connect object 120 with same group addresses as object 121.

5.6.1 Devices:

- VARIA 824 / 826 (824 9 200 / 826 9 200)
- TA 2 (order no. 496 9 202)
- 5x RAM 712 (order no. 712 9 200)

5.6.2 Overview

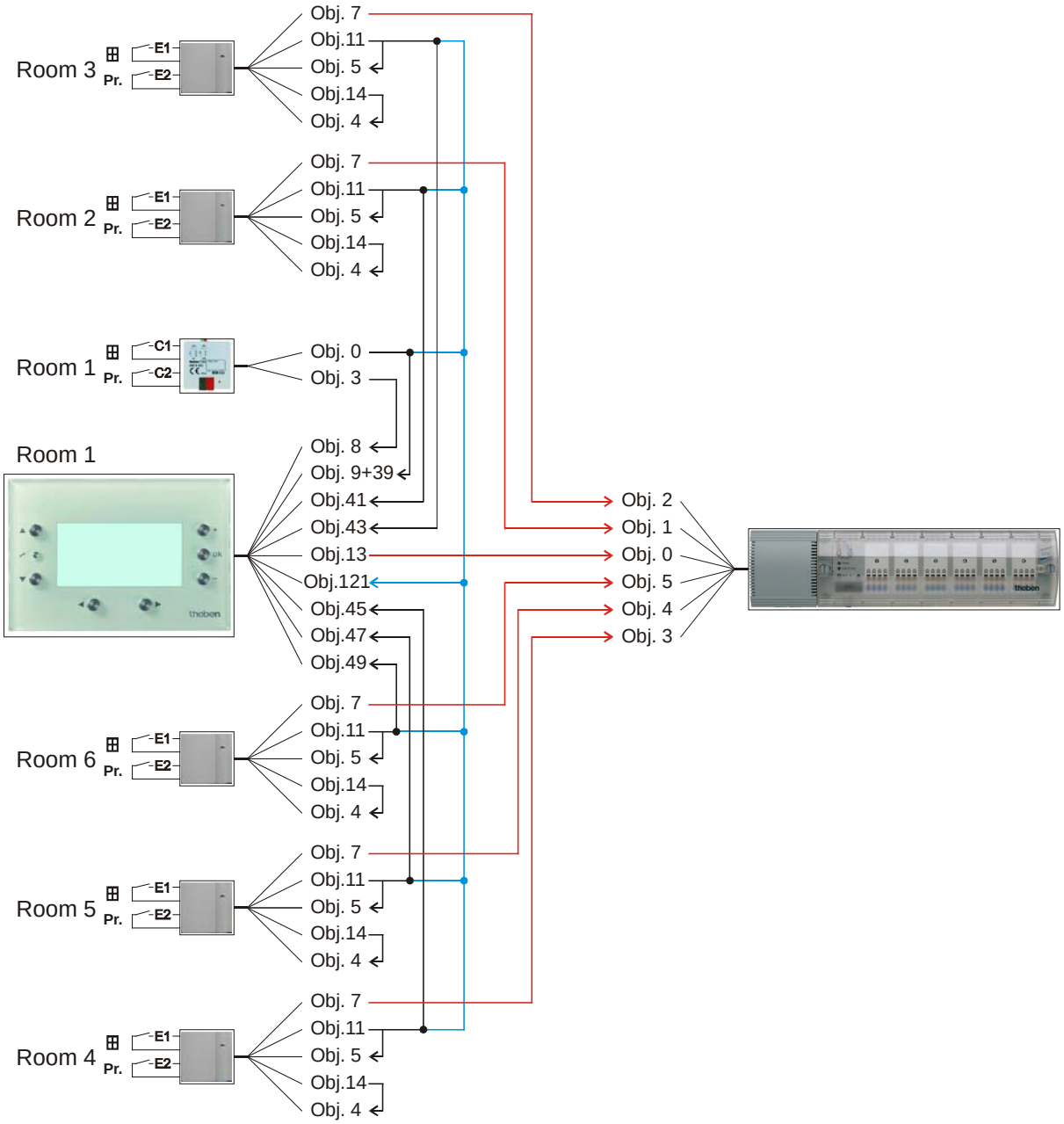


Figure 6

5.6.3 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

5.6.3.1 Varia

Table 63

Parameter page	Parameters	Setting
RTC setting	*Control*	*Heating control only*
	Objects for determining the operating mode	*New: Operating mode, presence, window status*
Heating control	*Number of heating stages*	*Only one heating stage*
	Type of control	*Continuous control*
Select screens	*Show page 1 for display objects*	*Yes*
	Favourite page (Only VARIA 826)	*Screen 1 if page available*
	Select favourites page (Only VARIA 826)	*Via object only*
Display objects page 1	*Page heading*	**Window status**
Joint parameters for page 1		
Page 1, lines 1-6	*Line format*	*Object type: Switching*
	Text at object value = 0	**Closed**
	Text at object value = 1	**open**
	Authorise amendment of object value?	*No*
Own parameters for line descriptions		
Page 1, line 1	*Text for line 1*	**Window room 1**
Page 1, line 2	*Text for line 2*	**Window room 2**
Page 1, line 3	*Text for line 3*	**Window room 3**
Page 1, line 4	*Text for line 4*	**Window room 4**
Page 1, line 5	*Text for line 5*	**Window room 5**
Page 1, line 6	*Text for line 6*	**Window room 6**

5.6.3.2 TA 2

Table 64

Parameter page	Parameters	Setting
Channel 1	*Channel function*	*Switch/push button*
	Debounce time	*100 ms*
	Object type	*Switching (1-bit)*
	Response to rising edge	*ON (OFF*)*
	Response to falling edge	*OFF(ON*)*
	Response after restoration of the bus supply	*update*
Channel 2	*Channel function*	*Switch/push button*
	Debounce time	*100 ms*
	Object type	*Switching (1-bit)*
	Response to rising edge	*ON*
	Response to falling edge	*none*
	Response after restoration of the bus supply	*none*

* Depending on type of window contact. The details in brackets refer to the following:
Window closed → Contact closed

5.6.3.3 RAM 712

Parameter page	Parameters	Setting
Settings	*Control*	*Standard*
	Function of the external interface	*Active*
Operating mode	*Objects for determining the operating mode*	*Operating mode, presence, window status*
	Presence sensor type (to obj. 4)	*Presence buttons*
Input 1	*Input function*	*Switch/push button*
	Debounce time	*100 ms*
	Object type	*Switching (1-bit)*
	Response to rising edge	*ON (OFF*)*
	Response to falling edge	*OFF(ON*)*
	Response after restoration of the bus supply	*update*
Input 2	*Input function*	*Switch/push button*
	Debounce time	*100 ms*
	Object type	*Switching (1-bit)*
	Response to rising edge	*ON*
	Response to falling edge	*none*
	Response after restoration of the bus supply	*none*

* Depending on type of window contact. The details in brackets refer to the following:
Window closed → Contact closed

5.6.3.4 HMT 6

Parameter page	Parameters	Setting
General	*Which device is used*	*HMT 6*
Channel 1.. 6	*Type of control variable*	*Continuous*
	Monitoring the actuating value of the room thermostat	*without monitoring*

5.6.4 Objects and links

Table 65: Varia window status and presence sensor feedback

	No.	Object name	VARIA		Comments
			No.	Object name	
TA2 room 1	0	*Channel 1 switching*	9	*Window position*	Window status for den RTR (frost protection) 1 = window open
			39	*Display page 1, line 1*	Window status for display (1 = window open)
			121	*Launch favourites page**	Central address for all window contacts. 1 = window open = call up display page 1
	3	*Channel 2 switching*	8	*Presence*	Presence sensor for the RTR (comfort)
RAM 712 Room 2	11	*Input 1 switching*	41	*Display page 1, line 2*	Window status for display (1 = window open)
			121	*Launch favourites page**	Central address for all window contacts. 1 = window open = call up display page 1
RAM 712 Room 3	11	*Input 1 switching*	43	*Display page 1, line 3*	Window status for display (1 = window open)
			121	*Launch favourites page**	Central address for all window contacts. 1 = window open = call up display page 1
RAM 712 Room 4	11	*Input 1 switching*	45	*Display page 1, line 4*	Window status for display (1 = window open)
			121	*Launch favourites page**	Central address for all window contacts. 1 = window open = call up display page 1

Continuation:

	No.	Object name	VARIA		Comments
			No.	Object name	
RAM 712 Room 5	11	*Input 1 switching*	47	*Display page 1, line 5*	Window status for display (1 = window open)
			121	*Launch favourites page**	Central address for all window contacts. 1 = window open = call up display page 1
RAM 712 Room 6	11	*Input 1 switching*	49	*Display page 1, line 6*	Window status for display (1 = window open)
			121	*Launch favourites page**	Central address for all window contacts. 1 = window open = call up display page 1

*ONLY Varia 826

Table 66: Actuating value for the heating actuator

	No.	Object name	HMT 6		Comments
			No.	Object name	
VARIA	13	*Heating actuating value (%)*	0	*Actuating value channel 1*	Control of actuator room 1
RAM 712 Room 2	7	*Heating control variable*	1	*Actuating value channel 2*	Control of actuator room 2
RAM 712 Room 3	7	*Heating control variable*	2	*Actuating value channel 3*	Control of actuator room 3
RAM 712 Room 4	7	*Heating control variable*	3	*Actuating value channel 4*	Control of actuator room 4
RAM 712 Room 5	7	*Heating control variable*	4	*Actuating value channel 5*	Control of actuator room 5
RAM 712 Room 6	7	*Heating control variable*	5	*Actuating value channel 6*	Control of actuator room 6

Table 67: Own links for window and presence object with each RAM 712 (see Overview illustration)

No.	RAM 712	No.	RAM 712	Comments
	Object name		Object name	
11	*Input 1 switching*	5	*Window position*	Link window status to own window object.
14	*Input 2 switching*	4	*Presence*	Link input for presence sensor with own presence object.

6 Appendix

6.1 Fan forced mode

This function enables the manual selection of fan stage on the RTR display page of device.
The fan coil actuator or the fan control is moved into forced mode.
Select fan symbol using the arrow buttons ▲/▼ and use the +/- buttons to set desired fan stage.

Table 68: Button operation (+/-)

Button push	Function	Display
1	Fan off	**OFF**
2	Fan stage 1	**1**
3	Fan stage 2	**2**
4	Fan stage 3	**3**
5	Auto	**Auto**

Important: Depending on the actuator used, either 1 or 0 is needed to trigger forced operation.
This response is adjustable, see *switch fan between auto and forced* parameter on the *fan stages* parameter page.

Send response in forced mode with fan coil actuator FCA 1 (forced = 1):
Object 23 sends 1 to the fan coil actuator thereby triggering forced mode.
Object 22 sends the control variable for the selected fan stage in accordance with the set threshold value.
This control variable (in accordance with the set threshold value) is transferred to the fan coil actuator as a fan stage between 0 and 3.

Important: the sent forced control variable should always be higher than the threshold setting of the fan coil actuator.

Example:

Threshold value for Fan stage	Set values for VARIA	Recommended values for FCA 1
1	20 %	10 %
2	50 %	40 %
3	80 %	70 %

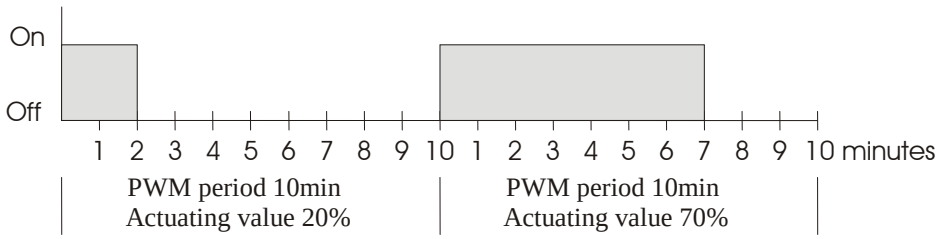
If fan stage 2 is selected using the button, object 22 sends control variable 50 %.
As the threshold value for stage 2 in the fan coil actuator is set at 40 % , the received control variable of 50 % is clearly allocated to fan stage 2 and accepted by the fan.

6.2 PWM cycle

6.2.1 Basic principle

The 50% control variable is converted into switch-on/switch-off cycles in order to achieve a heating output of 50%.
The actuator is switched on for 50% of the time and switched off for 50% of the time over a fixed period (10 minutes in our example).

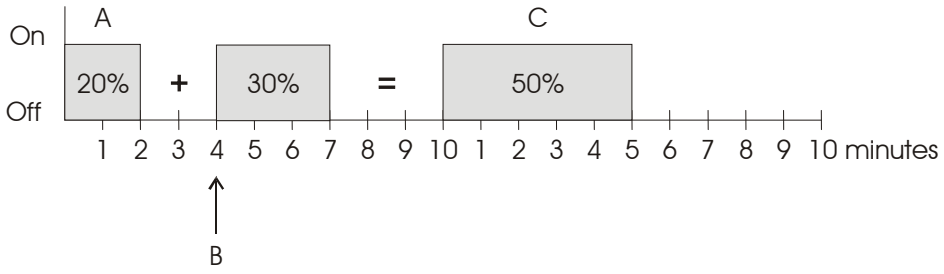
Example:
Two different switch-on times of 2 and 7 minutes indicate conversion of 2 different control variables, namely 20% and 70%, into a PWM period of 10 minutes.



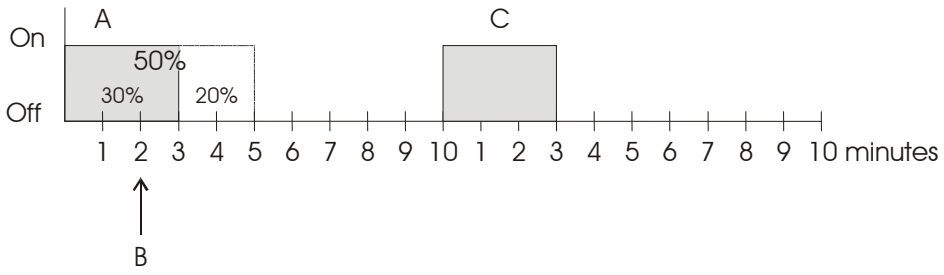
6.2.2 Response to changes in the control variable

Every change in the control variable is immediately transferred to the PWM cycle in order to respond to changes in the quickest possible time.

Example 1:
The last control variable was 20% (A).
A new control variable of 50% is received during the cycle (B).
The output is immediately switched on and the missing 30% switch-on time is added
The next cycle is executed with 50% (C).



Example 2:
The last control variable was 50% (A)
A new control variable of 30% is received during the cycle (B).
The output is switched off after completing 30% of the PWM and thus the new control variable is executed.



Note:
If the rated switch-on time for the current cycle has already exceeded while receiving the new control variable, the output is immediately switched off and the new control variable is executed during the next cycle.

6.3 Operating mode scene

6.3.1 Principle

The current operating mode can be saved with the scene functions and restored later at any time.
The current operating mode is allocated to the appropriate scene number when a scene is saved.
The previously saved operating mode is reactivated when a scene number is called.

This allows VARIA to be easily associated to each chosen user scene.

VARIA can participate in up to 16 scenes.

The scenes are permanently stored and remain intact even after the application has been downloaded again.

6.3.2 Saving scenes:

The appropriate storage code is sent to object 20 to save a scene.

Table 69

Scene no.	Storage code	
	Hex	Dec
1	$80	128
2	$81	129
3	$82	130
4	$83	131
5	$84	132
6	$85	133
7	$86	134
8	$87	135
9	$88	136
10	$89	137
11	$8A	138
12	$8B	139
13	$8C	140
14	$8D	141
15	$8E	142
16	$8F	143

Example:
Save current operating mode with scene 5:
→ $84 send to obj. 20.

6.3.3 Calling scenes:

The appropriate retrieval code is sent to object 20 to call a scene.

Table 70

Scene no.	Retrieval code	
	Hex	Dec
1	$00	0
2	$01	1
3	$02	2
4	$03	3
5	$04	4
6	$05	5
7	$06	6
8	$07	7
9	$08	8
10	$09	9
11	$0A	10
12	$0B	11
13	$0C	12
14	$0D	13
15	$0E	14
16	$0F	15

Example:
Call operating mode with scene 5:
→ $04 send to obj. 20.

6.4 Create and display scene telegrams

Varia can send and display 1..5 scene telegrams on the user-specific display pages.
These can also be sent, if necessary, by a common group address to object 20 to control the operating mode with scenes (scenes 1-16)
See scenes for operating mode and priorities in selecting operating mode.

Both access and learning telegram can be sent.
All scene numbers from 1 to 64 are possible.
The following parameters must be set here.

Table 71: Parameters for scene telegrams

Parameter page	Parameter name	Value
Send and display scene access telegrams		
Page x, line y	*Line format*	*Object type: Scene*
	Authorise amendment of object value?	*Yes*
Send and display learning telegrams		
Page x, line y	*Send [save scene] command*	*Yes, by pressing OK for more than 3 seconds*

6.4.1 Allocate text to scene numbers

An up to 10 character long text can be displayed in place of a scene number.
Configuration is completed on the page of the relevant line (e.g. *page 2, line 1*).
The texts are entered on the *text list* parameter page
Only the *name of the lowest scene* needs to be entered for the allocation of text numbers. The following scene numbers are automatically allocated for the subsequent text numbers.

6.4.1.1 Examples:

Only scene numbers 1 to 10 are permitted in this example.
Scene no. 1 is allocated text 1, scene no. 2 text 2 etc.
If a scene number is sent or received, e.g. 10,
VARIA displays the entered name: Party.

Table 72: Scenes 1..10 with texts 1..10

Parameter page	Parameter name	Value
Page 2, line 1	*Line format*	*Object type: Scene*
	Allocate text to scene number	*Yes, display text instead of number*
	Lower adjustable scene number	*1*
	Upper adjustable scene number	*10*
	Name of lower adjustable scene	*See text list: Text 1*
Text list	*Text 1 (10)*	*Party*
	Text 2 (10)	*TV*
	…	…
	Text 9 (10)	*Evening*
	Text 10 (10)	*Holiday*

Table 73: Text allocation

Scene		Text list	
1	———	Text 1	Party
2	———	Text 2	TV
…	———	…	…
9	———	Text 9	Evening
10	———	Text 10	Holiday

Only scene numbers 20 to 29 are permitted in the following example.
That means the lower scene number = 20.
Texts 5..14 are allocated.

Table 74: Scenes 20.0.29 with texts 5.0.14

Parameter page	Parameter name	Value
Page 2, line 1	*Line format*	*Object type: Scene*
	Allocate text to scene number	*Yes, display text instead of number*
	Lower adjustable scene number	*20*
	Upper adjustable scene number	*29*
	Name of lower adjustable scene	*See text list: Text 5*
Text list	*Text 5 (10)*	Work
	Text 6 (10)	Conference
	…	…
	Text 13 (10)	Presentation
	Text 14 (10)	Break

Table 75: Text allocation

Scene		Text list	
20	_____	Text 5	Work
21	_____	Text 6	Conference
22	_____	Text 7	…
23	_____	Text 8	…
24	_____	Text 9	…
25	_____	Text 10	…
26	_____	Text 11	…
27	_____	Text 12	…
28	_____	Text 13	Presentation
29	_____	Text 14	Break

6.5 Set point shift

The set point adjustment enables a dynamic adjustment of the set point to the outdoor temperature when cooling.

This function prevents too great a temperature deviation between the outside area and the cooled interior with high outside temperatures.

If the outdoor temperature exceeds a set threshold, adjustment is activated and a relevant increase of the set point is calculated.

The current outside external temperature for calculating the adjustment is made via object 27.

The set point adjustment is activated on the *RTR setting* parameter page via the *use set point value adjustment with high temperatures* and set on the *set point adjustment* parameter page.

The set point value adjustment is internally linked to the RTR so no bus connection is required.

The standard DIN1946 part 2 (Jan 94) recommends increasing the set point value proportionally from a certain outside temperature.
Recommendation:
1 K per 3 K outdoor temperature

6.5.1 Format of set point adjustment: Relative

Set point adjustment is sent from object 2 as a temperature differential.
Under the set point adjustment threshold (*set point adjustment from*) the value 0 is sent.

If the set point value threshold is exceeded, the set point value is increased each time by 1 K if the outdoor temperature has risen above the configured value (*adjustment*).

Example: Calculated adjustment value
Set point adjustment from: 25 °C

Figure 7: Set point adjustment dependent on outdoor temperature

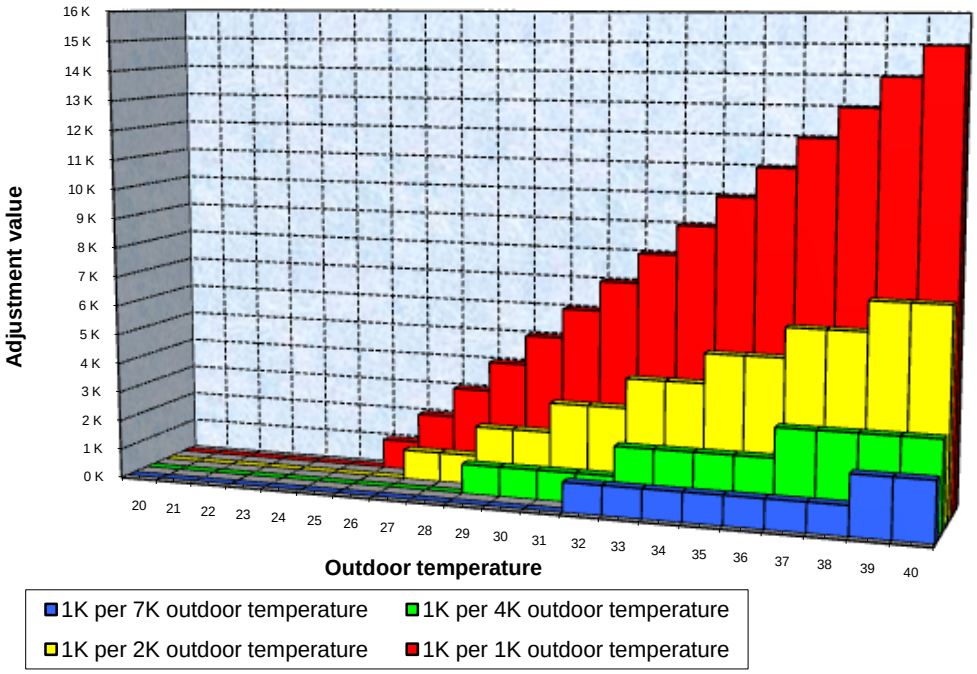


Table 76: Adjustment values

Outdoor temperature	1K/1K	1K/2K	1K/3K	1K/4K	1K/5K	1K/6K	1K/7K
20	0 K	0 K	0 K	0 K	0 K	0 K	0 K
21	0 K	0 K	0 K	0 K	0 K	0 K	0 K
22	0 K	0 K	0 K	0 K	0 K	0 K	0 K
23	0 K	0 K	0 K	0 K	0 K	0 K	0 K
24	0 K	0 K	0 K	0 K	0 K	0 K	0 K
25	0 K	0 K	0 K	0 K	0 K	0 K	0 K
26	1 K	0 K	0 K	0 K	0 K	0 K	0 K
27	2 K	1 K	0 K	0 K	0 K	0 K	0 K
28	3 K	1 K	1 K	0 K	0 K	0 K	0 K
29	4 K	2 K	1 K	1 K	0 K	0 K	0 K
30	5 K	2 K	1 K	1 K	1 K	0 K	0 K
31	6 K	3 K	2 K	1 K	1 K	1 K	0 K
32	7 K	3 K	2 K	1 K	1 K	1 K	1 K
33	8 K	4 K	2 K	2 K	1 K	1 K	1 K
34	9 K	4 K	3 K	2 K	1 K	1 K	1 K
35	10 K	5 K	3 K	2 K	2 K	1 K	1 K
36	11 K	5 K	3 K	2 K	2 K	1 K	1 K
37	12 K	6 K	4 K	3 K	2 K	2 K	1 K
38	13 K	6 K	4 K	3 K	2 K	2 K	1 K
39	14 K	7 K	4 K	3 K	2 K	2 K	2 K
40	15 K	7 K	5 K	3 K	3 K	2 K	2 K

6.5.2 Format of set point adjustment: Absolute

Object 2 sends the adjusted set point value to the bus for additional room thermostat.

This set point value consists of:
Unadjusted base set point + dead zone + adjustment.

Example:
Set point adjustment from: 25 °C, *unadjusted base set point* : 21 °C, *dead zone* = 2 K

Figure 8: Set point adjustment dependent on outdoor temperature

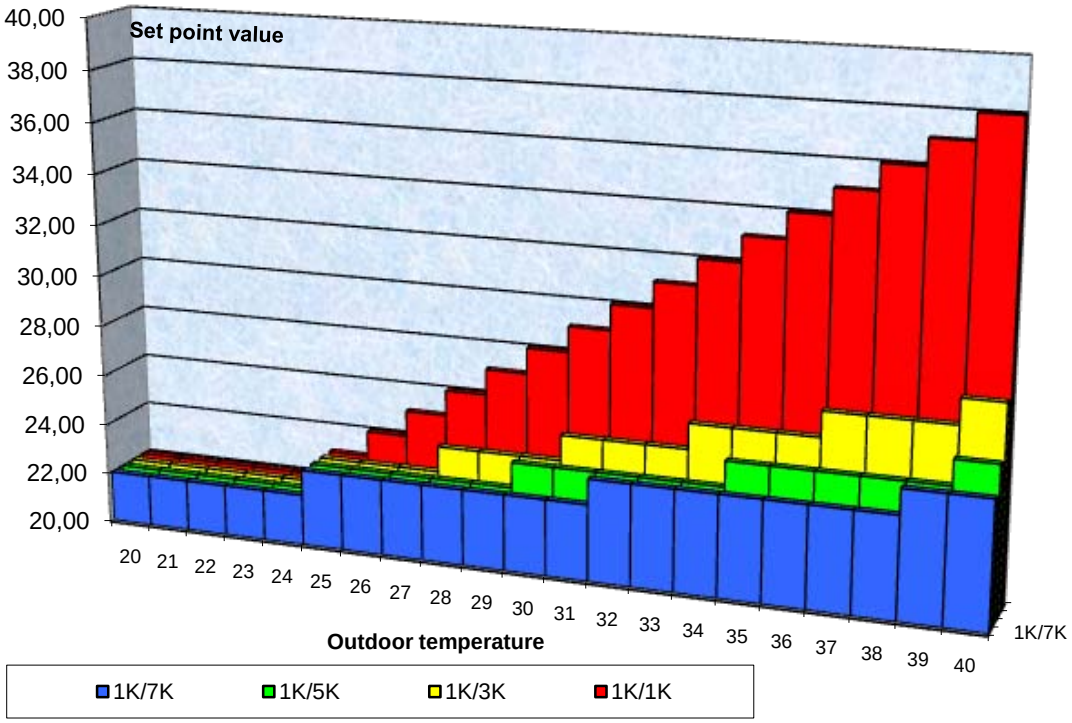


Table 77: Set point values

Outdoor temperature	1K/1K	1K/2K	1K/3K	1K/4K	1K/5K	1K/6K	1K/7K
20	22.00	22.00	22.00	22.00	22.00	22.00	22.00
21	22.00	22.00	22.00	22.00	22.00	22.00	22.00
22	22.00	22.00	22.00	22.00	22.00	22.00	22.00
23	22.00	22.00	22.00	22.00	22.00	22.00	22.00
24	22.00	22.00	22.00	22.00	22.00	22.00	22.00
25	23.00	23.00	23.00	23.00	23.00	23.00	23.00
26	24.00	23.00	23.00	23.00	23.00	23.00	23.00
27	25.00	24.00	23.00	23.00	23.00	23.00	23.00
28	26.00	24.00	24.00	23.00	23.00	23.00	23.00
29	27.00	25.00	24.00	24.00	23.00	23.00	23.00
30	28.00	25.00	24.00	24.00	24.00	23.00	23.00
31	29.00	26.00	25.00	24.00	24.00	24.00	23.00
32	30.00	26.00	25.00	24.00	30.00	24.00	24.00
33	31.00	27.00	25.00	25.00	24.00	24.00	24.00
34	32.00	27.00	26.00	25.00	24.00	24.00	24.00
35	33.00	28.00	26.00	25.00	25.00	24.00	24.00
36	34.00	28.00	26.00	25.00	25.00	24.00	24.00
37	35,00	29.00	27.00	26.00	25.00	25.00	24.00
38	36,00	29.00	27.00	26.00	25.00	25.00	24.00
39	37,00	30.00	27.00	26.00	25.00	25.00	25.00
40	38.00	30.00	28.00	26.00	26.00	25.00	25.00

6.6 Temperature control

6.6.1 Introduction

If the VARIA is not configured as a switching controller, it can alternatively be configured as a P or as a PI controller, whereby PI control is preferable.

With the proportional control (P control), the control variable is statically adjusted to the control deviation.
The proportional integral control (PI controller) is far more flexible, i.e. controls more quickly and more accurately.

To explain the function of both temperature controls, the following example compares the room to be heated with a vessel.

The filling level of the vessel denotes the room temperature.
The water supply denotes the radiator output.
The heat loss from the room is illustrated by a curve.

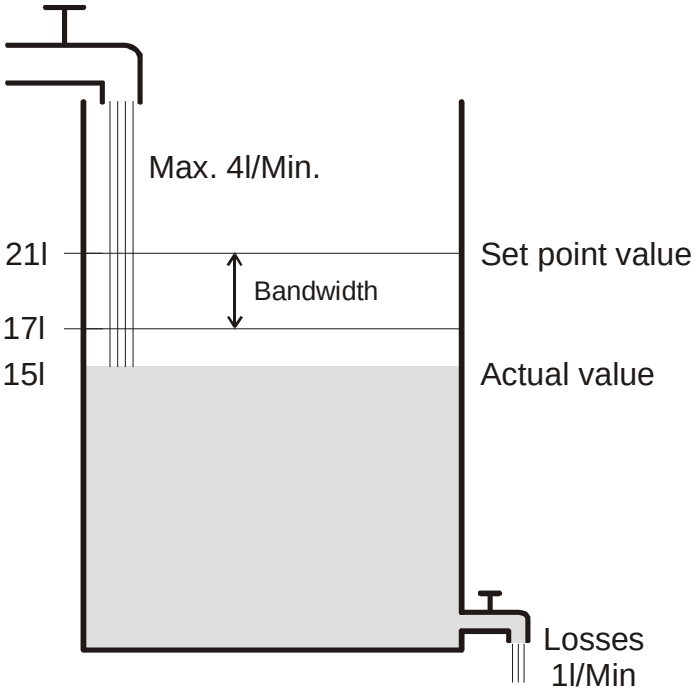
In our example, the maximum supply volume is 4 litres per minute and also denotes the maximum radiator output.
This maximum output is achieved with an actuating value of 100%.
Accordingly, with an actuating value of 50%, only half the water volume, i.e. 2 litres per minute, would flow into our vessel.

The bandwidth is 4l.
This means that the controller operates at 100% provided the actual value is smaller than, or equal, to (211 – 41) = 171.

Function:

- Desired filling volume:
  21 litres (= set point value)
- From what point should the supply flow gradually be reduced to avoid an overflow? :
  4l below the desired filling volume, i.e. at 21l – 41 = 171 (=bandwidth)
- Original filling volume
  15l (=actual value)
- The loss amounts to 1l/minute

6.6.2 Response of the P-control



A filling volume of 15l gives rise to a control deviation of 211 – 151 = 61
As our actual value lies outside the bandwidth, the control will operate the flow rate at 100% i.e. at 4l / minute

The supply quantity (control variable) is calculated from the control deviation (set point value – actual value) and the bandwidth.
Control variable = (control deviation / bandwidth) x 100

The table below shows the response and therefore also the limits of the P-control

Table 78

Filling level	Control variable	Supply	Loss	Increase in filling level
15l	100%	4 l/min	1 l/min	3 l/min
19l	50%	2 l/min		1 l/min
20l	25%	1 l/min		0 l/min

The last line indicates that the filling level cannot increase any further, because the inflow only allows the same amount of water to flow in as flows out through loss.
The result is a permanent control deviation of 11 and the set point value can never be reached.
If the loss was 1l higher, the permanent control deviation would increase by the same amount and the filling level would never exceed the 19l mark.
In a room this would mean that the control deviation increases with a decreasing outside temperature.

P-control as temperature control

The P-control response during heating control is as shown in the previous example.
The set point temperature (21°C) can never quite be reached.

The permanent control deviation increases as the heat loss increases and decreases as the ambient temperature decreases.

6.6.3 Response of the PI controller

Unlike the pure P-control, the PI controller works dynamically.
With this type of controller, the actuating value remains unchanged, even at a constant deviation.

In the first instant, the PI controller sends the same actuating value as the P-control, although the longer the set point value is not reached, the more this value increases.
This increase is time-controlled over the so-called integrated time.
With this calculation method, the actuating value does not change if the set point value and the actual value are the same.
Our example, therefore, shows equivalent in and outflow.

Notes on temperature control:

Effective control depends on agreement of bandwidth and integrated time with the room to be heated.
The bandwidth influences the increment of the actuating value change:
Large bandwidth = finer increment on control variable change.
The integrated time influences the response time to temperature changes:
Long integrated time = slow response.
Poor agreement can result in either the set point value being exceeded (overshoot) or the control taking too long to reach the set point value.

Usually, the best results are achieved with the standard settings or the settings via system type.

6.7 Continuous and switching control

A switching (2 point) control recognises only 2 statuses, On or Off.
A continuous control works with a control variable between 0% and 100% and can thus exactly measure out the energy input. This achieves a pleasant and precise degree of control.

Table 79: Summary of control function

Operating mode / stage	Type of control	Hysteresis
actuating value	2-point / PI controller	positive
actuating value	2-point / PI controller	negative
Additional stage	2-point / P control	negative

6.8 Hysteresis

Hysteresis determines the difference between a controller's switching on and off temperature. It can be both positive and negative.
A combination of heating and cooling control influences the amount of the deadd zone.

Without hysteresis, the control would activate and deactivate continuously provided the temperature is within the set point value range.

6.8.1 Negative hysteresis:

Heating: Heating is provided until the set point value has been reached.
Afterwards, the heating is only switched on again when the temperature falls below the "Hysteresis set point value" threshold.
Cooling: Cooling lasts until the "Hysteresis set point value" threshold has been achieved.
Afterwards, it is only switched on again when the temperature rises above the set point value.

Example of additional heating stage
Additional stage with a set point value of 20 °C, hysteresis 0.5 K and starting temperature 19 °C.
The additional stage is switched on and does not switch off again until the set point value (20o) is reached.
The temperature falls and the additional stage does not switch on again until 20 °C-0.5K= 19.5 °C.

Cooling example:
Cooling with set point value 25 °C, hysteresis = 1°C and ambient temperature 27 °C.
The cooling is switched and only switched off again when a temperature
of 24C (25 °C – 1 °C) is achieved.
It switches on again when the temperature rises above 25 °C.

6.8.2 Positive hysteresis

Heating lasts until the temperature reaches "set point value + hysteresis " threshold has been achieved.
The heating is only switched on again when the temperature falls below the set point value.

Heating example:
Heating with set point value 20°C, hysteresis = 1°C and ambient temperature 19 °C.
The heating is switched on and only switches off again when a temperature of 21 °C (20 °C + 1 °C) is achieved.
It switches on again when the temperature falls below 20 °C.

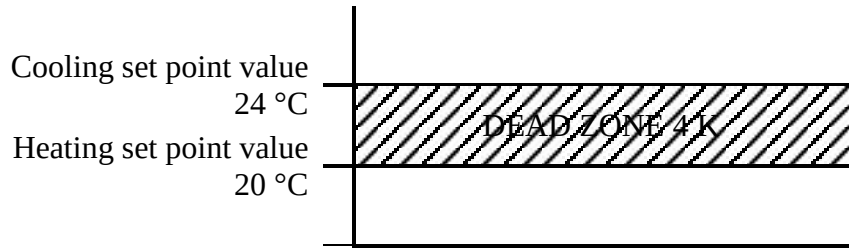
6.9 Dead zone

The dead zone is a buffer area between heating and cooling operation.
Neither heating nor cooling takes place within this dead zone.

Without this buffer zone, the system would switch continuously between heating and cooling. As soon as the set point value has been under-run, the heating is activated and the set point value would not be achieved. If cooling were then to be started immediately, the temperature would fall below the set point value and switch on the heating again..

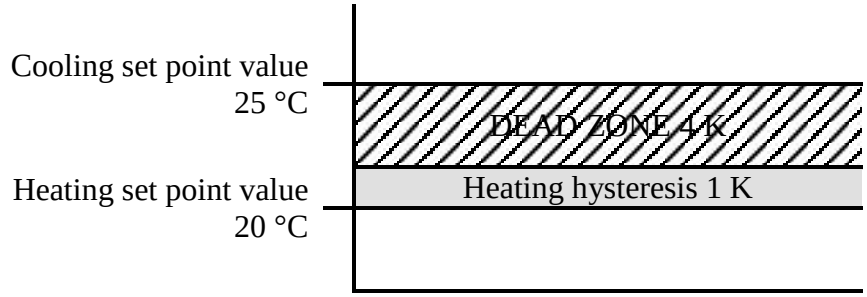
Depending on the type of control, the dead zone can be extended by the value of the hysteresis.

6.9.1 Case 1: Heating and cooling with continuous control



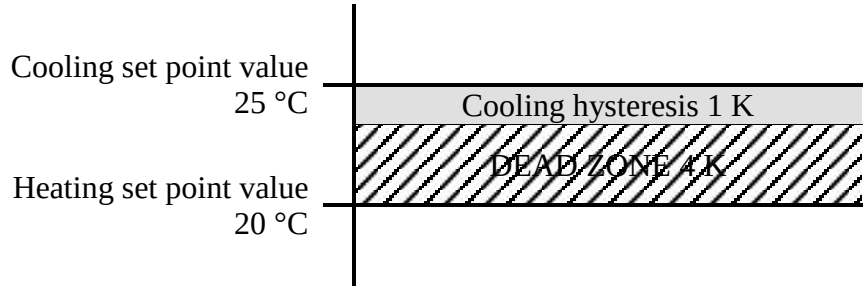
The dead zone (4 K) is not affected

6.9.2 Case 2: Heating with 2-point control and cooling with continuous control



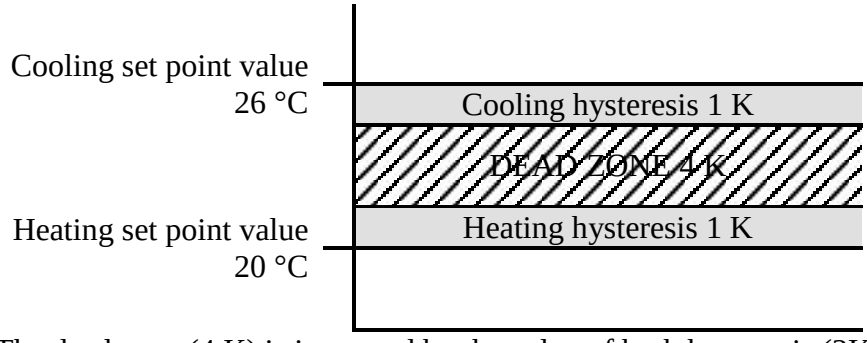
The dead zone (4 K) is increased by the value of the hysteresis (1K) and offsets the cooling set point value to 25 °C.

6.9.3 Case 3: Heating with continuous control and cooling with 2-point control



The dead zone (4 K) is increased by the value of the hysteresis (1K) and offsets the cooling set point value to 25 °C.

6.9.4 Case 4: Heating and cooling with 2-point control



The dead zone (4 K) is increased by the value of both hysteresis (2K) and offsets the cooling set point value to 26 °C.

6.10 Operating mode selection

6.10.1 Priorities for operating mode selection

The operating mode selection between comfort, standby, night operation and frost protection can happen in
4 different ways:

- Via object 7 *operating mode selection*
- Manually on device on RTR page
- Via the time program
- Via scene control

All 4 possibilities are all on the same priority level.
The following applies: The last instruction overwrites the previous one.

Exception: Frost mode via window contact (object 9) has priority on all other operating modes.

Selection of *presence sensor* parameter also involves:

1. If a new operating mode is received on object 7 with the presence object set (*operating mode preset)*, then it is accepted and the presence object is reset (only with presence sensor).

2. Reception of the same operating mode prior to the presence status (e.g. via cyclical sending) is ignored.

3. If the presence object is set during night / frost operation, it is reset after the configured comfort extension finishes (see below).

4. If the presence object is set during standby mode, the comfort operating mode is accepted without time restriction.

6.10.2 Determining the current operating mode

The current setpoint value can be adjusted to the relevant requirements via the choice of operating mode.
The operating mode can be specified by objects 7.0.9.
There are two methods available:

6.10.2.1 New operating modes

If "*objects for determining the operating mode*" = *new:...* selected on the RTR setting parameter page then the current operating mode is set out as follows:

Table 80

Operating mode preset Object 7	Presence Object 8	Window position Object 9	Current operating mode (object 12)
Any	Any	1	Frost / heat protection
Any	1	0	Comfort
Comfort	0	0	Comfort
Standby	0	0	Standby
Night	0	0	Night
Frost / heat protection	0	0	Frost / heat protection

Typical application:

In the mornings, object 7 activates “standby” or “comfort” operating mode and in the evenings “night” operating mode via a time switch(e.g. TR 648).
During holiday periods, object 7 also selects frost / heat protection via another channel on the timer.

Object 8 is connected to a presence detector. If a presence is detected
VARIA switches to comfort operating mode (see table).

Object 9 is connected to a window contact via the bus (binary inputs).
As soon as a window is opened, VARIA switches to frost protection operating mode.

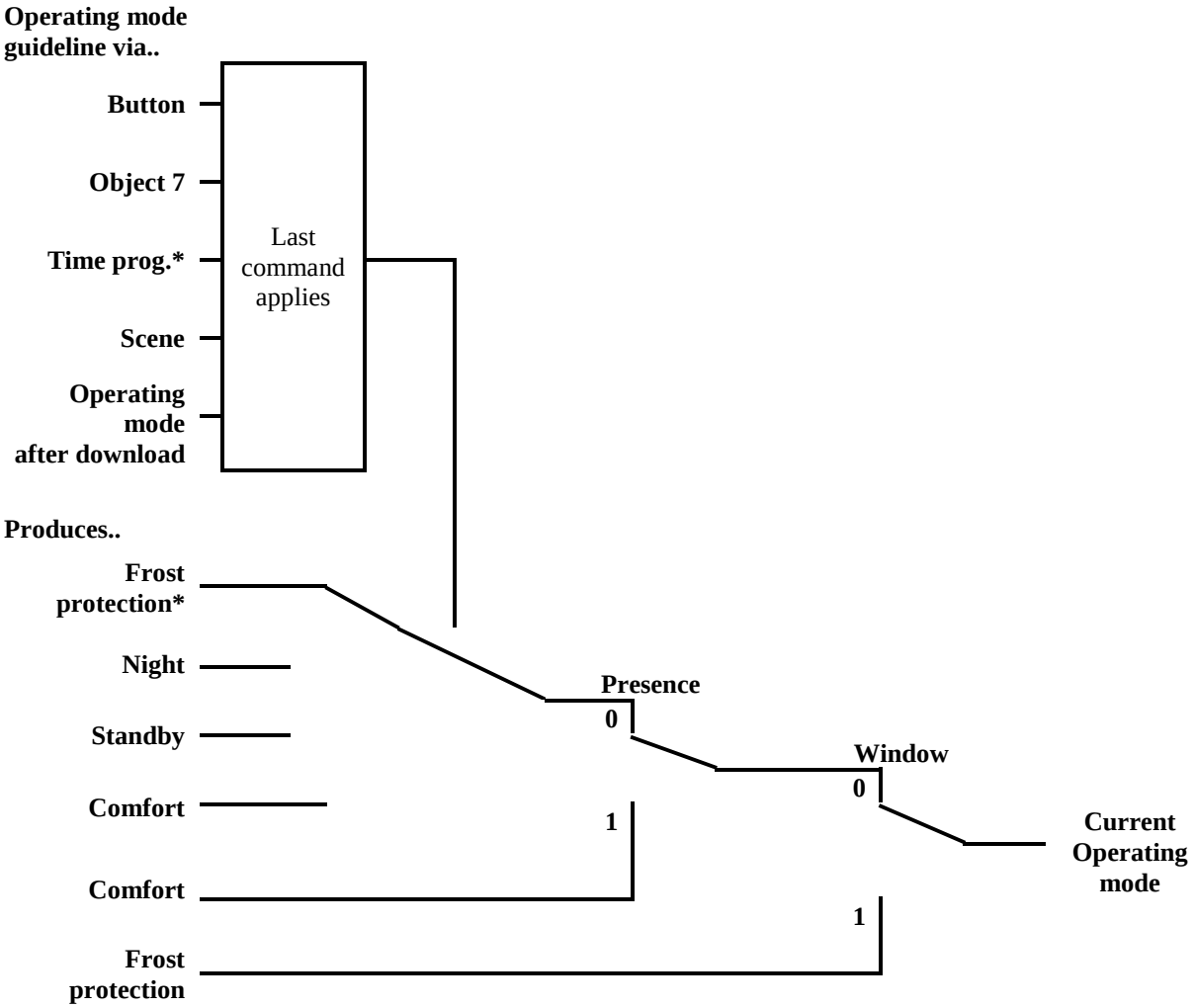


Figure 9

*** Frost protection switching protection possible**

6.10.2.2 Old operating modes

If *objects for determining the operating mode = old:...* selected on the RTR setting parameter page then the current operating mode is set out as follows:

Table 81

Night Object 7	Comfort Object 8	Object 9 frost/heat protection	Current operating mode Object 12
Any	Any	1	Frost / heat protection
Any	1	0	Comfort
Standby	0	0	Standby
Night	0	0	Night

Typical application:

In the mornings, "standby" operating mode, and in the evenings "night" operating mode are activated via a time switch via object 7.
In holiday periods, frost/heat protection is selected on another channel via object 9.

Object 8 (comfort) is connected to a presence detector. If a presence is detected, VARIA switches to comfort operating mode (see table).

Object 9 is connected to a window contact. As soon as a window is opened, VARIA switches to frost protection operating mode.

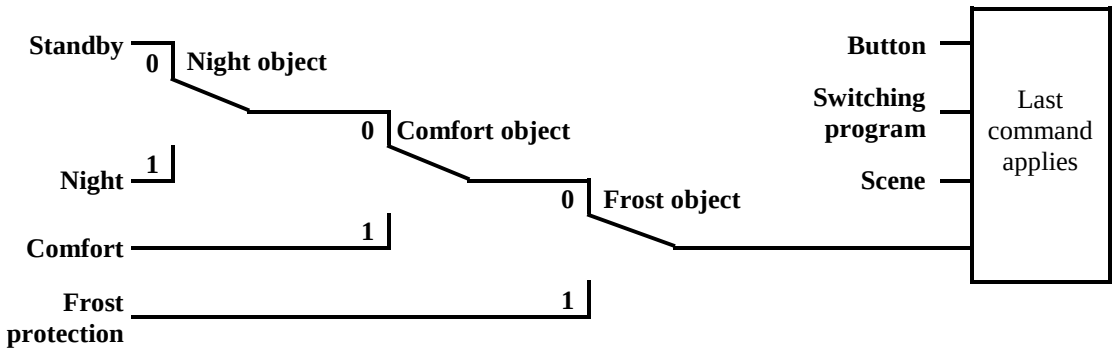


Figure 10

The old method has two disadvantages over the new method:

1. To switch from comfort to night operating mode, 2 telegrams (2 time switch channels if necessary) are required.
   Object 8 must be set to “0” and object 7 to “1”.

2. If during periods when “frost / heat protection” is selected via the timer, the window is opened and then closed again, the “frost / heat protection” operating mode is cleared.

6.10.2.3 Determining the set point value

6.10.2.3.1 Calculating the set point value in heating operation

See : Base set point value and current set point value

Table 82: Current set point value during heating

Operating mode	Current set point value
Comfort	Base setpoint value +/- set point value offset
Standby	*Base set point value* +/- set point adjustment – *reduction in standby mode*
Night	*Base set point value* +/- set point adjustment – *reduction in standby mode*
Frost / heat protection	configured *set point value for frost protection mode*

Example:
Heating in comfort operating mode.

Parameter page	Parameters	Setting
Set point values	*Base set point after reset*	*21 °C*
	Reduction in standby mode (during heating)	*2 K*
Operation	*Maximum valid set point value offset*	*+/- 2 K*

The set point value was previously increased by 1 K using the + button.

Calculation:

Current set point value = base set point + set point offset
= 21°C + 1K
= 22°C

If operation is switched to standby mode, the current setpoint value is calculated as follows:

Current set point = base set point + set point value offset – reduction in standby mode
= 21°C + 1K – 2K
= 20°C

6.10.2.3.2 Calculating the set point value in cooling operation

Table 83: Current set point value during cooling

Operating mode	Current set point value
Comfort	Basic set point value + *set point adjustment + dead zone*
Standby	Base set point value + *set point value offset + dead zone + increase in standby mode*
Night	*Base set point value + set point offset + dead zone + increase in night mode*
Frost / heat protection	configured *set point value for heat protection mode*

Example: Cooling in comfort operating mode.

The room temperature is too high and VARIA has switched to cooling operation

Table 84

Parameter page	Parameters	Setting
RTC setting	*Maximum valid set point value offset*	*+/- 2 K*
Heating set point values	*Base set point value after loading the application*	*21 °C*
Cooling set point values	*Dead zone between heating and cooling*	*2 K*
	Increasing in standby mode (during cooling)	*2 K*

The set point value was previously lowered by 1 K on the device.

Calculation:

Current set point value = *Base set point value + set point offset + dead zone*
= 21°C -1K +2K
= 22°C

Changing to standby mode causes a further increase in the set point value (energy saving) and gives rise to the following set point value.
Set point value
= base set point value + set point value offset + dead zone + increase in standby mode
= 21°C - 1K + 2K + 2K
= 24°C

6.11 Set point offset

The current setpoint value can be adjusted in 2 ways with VARIA.

- step by step with the + and – buttons on the RTR page
- via Object 1 “Manual set point value offset”

The differential between the set point value offset and the base set pointvalue is sent by object 1 at each change (e.g. -1.00) using the +/- buttons .

The offset limits are specified on the *RTR setting* parameter page by the *maximum set point value offset on the rotary control* parameter and apply to both types of set point value offset.

Table 85: Example of temperature offset with base set point value = 20 °C

Maximum valid set point value offset	Setting range	
	From	1 through
+/- 1 K	19 °C	21 °C
+/- 2 K	18 °C	22 °C
+/- 5 K	15 °C	25 °C

6.11.1 Set point temperature offset via the + and - buttons

- Select temperature display using ▲▼ buttons.
- Use + or – to set desired set point value.
- Confirm with OK.

If the hotkey function is deactivated selection with the ▲▼ button can be omitted:

Every set point value offset via the +/- buttons (confirmed with OK) is sent to object 1.

If a 0 is received by object 1, a previously entered set point value offset is reset to 0 K.

6.11.2 Set point temperature offset via object 1

In this case, the set point value is changed by sending the desired offset to object 1.
This involves the differential to the base set point value (may be preceded by a minus sign) being sent to object 1 in EIS5 format.

Example Base set point value of 21°C:

If object 1 receives a value of 2.00, the new set point value is calculated as follows:
21°C + 2.00K = 23.00°C.
In order to bring the set point value to 22°C, the differential to the programmed base set point value (here 21°C) is sent to object 1, in this case, 1.00K (21°C + 1.00K = 22°C)

The offset always relates to the basic set point value (as configured) and not to the current set point value.

6.12 Base set point value and current set point value

The **base setpoint value** is the standard temperature for the comfort operating mode and the reference temperature for reduction in standby and night modes.
The configured base set point value (see "base set point value after loading application") is stored in object 0 and can be changed as required via the bus, by sending a new value to object 0.
After reset (bus returned), the last used base set point value is restored.

The **current set point value** is the value that actually determines the control. It is the result of all the operating mode reductions or increases depending on the control function.

Example:
At a base set point value of 22°C and a reduction in night mode of 4K, the current set point value (in night mode) is: 22°C – 4K = 18°C. During the day (in comfort mode) the current set point value is 22°C (in heating mode).

The formation of the current set point value relating to the base set point value can be observed in the block diagram on the next page:
The base set point value on the left is specified via object 0 or set on the device.
The current set point value is on the right, i.e. the value upon which the room temperature is effectively controlled.

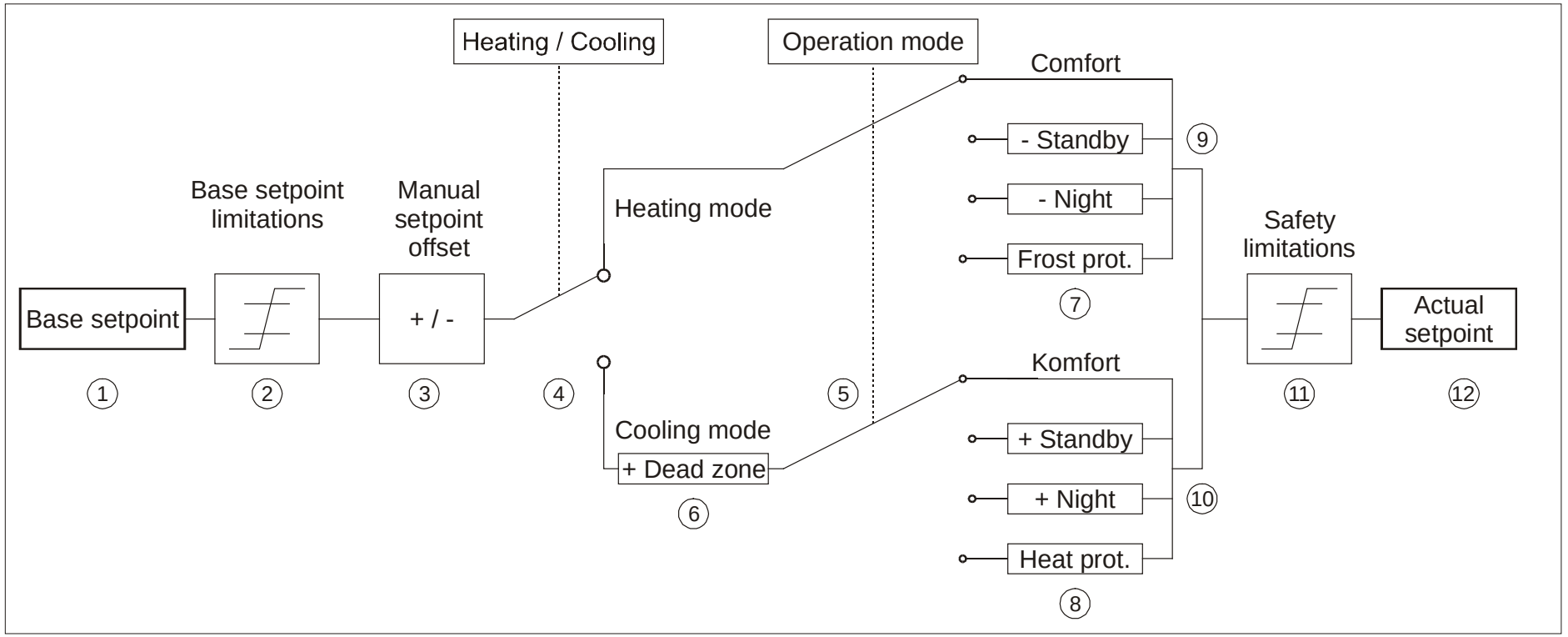
As you can see in the block diagram, the current set point value depends on the operating mode (5) and the control function (4) selected.

The base set point value limits (2) prevent an incorrect base set point value from being specified to
object 0. These are the following parameters:

- *Minimum valid base set point value*
- *Maximum valid base set point value*

The base set point value limits (11) prevent an incorrect base set point value from being specified to

6.12.1 Set point value calculation



1 Specified base set point value from object 0 or user input
2 Max. and min. valid base set point values
3 Manual set point offset
4 Switches between heating and cooling: Automatically or via object 6
5 Selection of operating mode, by operator, object, switching program or scene.
6 The set point value is increased in cooling mode by the amount of the dead zone
7 The set point value is replaced by the set point value for frost protection mode
8 The set point value is replaced by the set point value for heat protection mode
9 Set point value after reductions conditional to the operating mode
10 Set point value after increases conditional to the operating mode
11 The limits for frost and heat protection must be adhered to.
12 Current set point value according to increases, reductions and limits conditional to the operation.

6.13 Maximum text length according to line format

Text elements \ Max. length		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Object type
Page heading		L	I	V	I	N	G		R	O	O	M												
Object type	Parameters																							
Entered text	Line texts	C	O	N	T	R	O	L		W	I	N	T	E	R		G	A	R	D	E	N		
Switching	Line texts	C	E	I	L	I	N	G		L	I	G	H	T										1 bit DPT 1.001
	Text with Object value = 0																					O	N	
	Text with Object value = 1																				O	F	F	
Percentage value	Line texts	S	K	Y	L	I	G	H	T															1 byte DPT 5.001
	Text at object value = 0																							
	Text with Value = 1																							
HVAC	Line texts	H	E	A	T	I	N	G																1 byte DPT 6.010
Counter value 0..255	Line texts	C	O	U	N	T	E	R																1 byte DPT 6.010
	Unit for number of object																							
Dimming	Line texts	L	I	G	H	T																		4 bit DPT 3.007
	Text at object value = 0																					O	N	
	Text at object value = 1																				O	F	F	
Temperature	Line texts	T	E	M	P	E	R	A	T	U	R	E												2 byte DPT 9.001
	Unit for number of object																				°	C		
EIS 5	Line texts	B	R	I	G	H	T	N	E	S	S													2 byte DPT 9.*
	Unit for number of object																				L	U	X	
Counter value 0 ..65535	Line texts	V	I	S	I	T	O	R	S															2 byte DPT 8.*
	Unit for number of object																							
Scene	Line texts	S	C	E	N	E																		1 byte DPT 6.010
	Scene text															H	O	L	I	D	A	Y	S	
Blinds/ Shutter	Line texts	B	L	I	N	D	S		L	I	V	I	N	G		R	O	O	M					1 bit KNX 1.009 / 1.010
Priority	Line texts	P	I	O	R	I	T	Y																2 bit DPT 2.001
	Text at "priority Off, On, none"																							
Valuator	Line texts	V	O	L	U	M	E																	1 byte DPT 5.001
Floating-point number	Line texts	P	O	W	E	R																		4 Byte DPT 14.xxx

6.14 Template for documentation of use of freely programmable pages.

Display page	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐																		**Object type and text length**																	**Object no. for page**				
Heading																							**Own text**	**Switching**	**Percent**	**HVAC**	**0..255**	**Dimming**	**Temperature**	**EIS 5**	**0..65535**	**Scene**	**Blinds / shutters**	**Priority**	**Text string**	**Value**	**Floating-point**					
Length	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	22	14	14	14	14	12	11	12	11	11	20	12	-	11	10	**1**	**2**	**3**	**4**	**5**
Line	**User texts**																																											
1																																						39	55	71	87	103
2																																						41	57	73	89	105
3																																						43	59	75	91	107
4																																						45	61	77	93	109
5																																						47	63	79	95	111
6																																						49	65	81	97	113
7																																						51	67	83	99	115
8																																						53	69	85	101	117
Length	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**																						

1. Print or copy template for each display page required.
2. Enter desired text flush left taking into account the maximum text length.
3. Mark the correct object type with a cross for each line in the right-hand section of the table → Facilitates ETS configuration.
4. For numerical values enter the relevant unit flush right as required (e.g. °C)

- The maximum text length for a line can be found in the right-hand section of the table under object type.
- Use any empty lines to create clearer structure (*line format = entered text*).
- Use additional lines if maximum text length is not sufficient.

<u>Before</u> entering text in ETS, ensure that the *line format* parameter is set correctly.
The relevant line text is deleted when object type is amended in the ETS.
Text for lines is displayed flush left, unit is always displayed from place 20