SIEMENS

12 S1 Temperature Control 210B04

Use of the application program

Product family: Product type: Manufacturer:	Heating, air conditioning, ventilation Thermostat Siemens
Name:	Temperature controller UP 237 DELTA i-system
Order no.:	5WG1 237-2AB_1
Name:	Temperature controller UP 252 DELTA profil
Order no.:	5WG1 252-2AB_3
Name:	Temperature controller UP 254 DELTA style,
Order no.:	5WG1 254-2AB_3
Name:	Temperature controller UP 253 DELTA ambiente
Order no.:	5WG1 253-2AB_3

Contents

1. Functional description

- 1.1. General
- 1.2. Closed loop control
- 1.2.1 Controller status
- 1.2.2 Behaviour on voltage failure / commissioning / fault
- 1.3. Operating modes
- 1.4. Actual value
- 1.5. Setpoints
- 1.6. Control value output

2. Communication objects and parameters

- 2.1. Assigning parameters for heating
- 2.1.1. Heating: Communication objects
- 2.1.2. Heating: Parameters
- 2.1.3. Setpoints: Parameters
- 2.1.4. Mode: Parameters
- 2.1.5. Measurement of actual value: Parameters
- 2.1.6. Control value output: Parameters
- 2.2. Assigning parameters for cooling
- 2.2.1. Cooling: Communication objects
- 2.2.2. Cooling: Parameters
- 2.2.3. Setpoints: Parameters
- 2.2.4. Mode: Parameters
- 2.2.5. Measurement of actual value: Parameters
- 2.2.6. Control value output: Parameters

- 2.3. Assigning parameters for heating and cooling
- 2.3.1. Heating and cooling: Communication objects
- 2.3.2. Heating and cooling: Parameters
- 2.3.3. Setpoints: Parameters
- 2.3.4. Mode: Parameters
- 2.3.5. Measurement of actual value: Parameters
- 2.3.6. Control value output: Parameters
- 2.4. Assigning parameters for 2-level heating
- 2.4.1. 2-level heating: Communication objects
- 2.4.2. 2-level heating: Parameters
- 2.4.3. Setpoints: Parameters
- 2.4.4. Mode: Parameters
- 2.4.5. Measurement of actual value: Parameters
- 2.4.6. Control value output: Parameters
- 2.5. Assigning parameters for 2-level cooling
- 2.5.1. 2-level cooling: Communication objects
- 2.5.2. 2-level cooling: Parameters
- 2.5.3. Setpoints: Parameters
- 2.5.4. Mode: Parameters
- 2.5.5. Measurement of actual value: Parameters
- 2.5.6. Control value output: Parameters

3. Diagrams

- 3.1. PI controller in heating / cooling mode
- 3.2. Control value output
- 3.3. Setpoints of the operating modes

1. Functional description

1.1. General

The temperature controller can be used as a two-level controller or a continuous controller (PI controller) for pure heating or cooling mode, for combined heating and cooling mode as well as two-level heating or cooling.

The application program compares the actual temperature measured by the temperature controller with the required setpoint temperature and calculates the associated control value.

This control value is then either transferred as a switching command (ON/OFF) to actuators (e.g. binary output UP 562) to control the electrothermal valve drives or as a positioning command (0-100%) to control the valve actuators.

The clear and self-explanatory operator interface contains 5 LEDs to display the current operating state, a presence button for toggling between comfort and standby mode as well as a rotary switch for adjusting the base setpoint value.

210B04, 24 pages

May 2011

12 S1 Temperature Control 210B04

The functional description is structured according to the components of a control system:

- Closed loop control (controller)
- Operating modes
- Actual value
- Setpoint
- Control value output

1.2. Closed loop control

The closed loop control of the room temperature is carried out with a digital PI controller whose control function is mathematically reproduced by a PI algorithm i.e. an arithmetic process.

The properties of a PI controller are mainly determined by the proportional coefficient (KP) and the integration time (Tn). These two variables can be entered via the parameter window for closed loop control in a limited framework that is sufficient for the majority of applications. Since however a great deal of experience is required to set a controller, it is possible to set the type of heating or cooling instead of using the control parameters. The correct control parameters are then automatically assigned.

The controller can be used for pure heating mode, pure cooling mode, combined heating and cooling as well as for 2-level heating or cooling (see Diagrams 1 ... 3 in the chapter "Diagrams").

For the function of heating and cooling, the controller is either in the heating or cooling mode. The control value of the inactive mode is switched to 0% (OFF). The toggling between heating and cooling can be carried out manually via the bus (communication object no. 4) or automatically.

When toggling is carried out automatically (adjustable), the parameter "Dead zone between heating and cooling" is taken into consideration.

Note:

The value selected for the dead zone between heating and cooling mode (see "Setpoint") may not be too small as otherwise continuous toggling between heating and cooling could occur.

1.2.1. Controller status

The current controller status is stored in a byte and automatically sent via communication object no. 9 "Status" when the following events occur: when switching on on bus voltage recovery after each change of the operating mode when the status of the frost alarm bit changes

The controller status can also be read out manually.

1.2.2. Behaviour on voltage failure / commissioning / fault

Behaviour on bus voltage failure

On failure of the bus voltage, no actions are carried out by the controller. Continuous EIB valve drives maintain their position. The behaviour of switching valve drives (OPEN/CLOSED) can be set via the switch actuator.

Behaviour on bus voltage recovery

On bus voltage recovery, all the LEDs light up briefly one after the other. The controller then switches to standby mode and requests the current states of the communication objects after approx. 40 seconds. The requested operating mode is set and the current setpoint is determined.

The relevant control value is calculated from the current setpoint and the measured actual temperature and then issued.

Commissioning

The first time the controller is switched on, it behaves in the same way as on bus voltage recovery.

Behaviour in the event of a fault

If a suitable application has not been loaded, the LEDs continue to light up one after the other in intervals of 5 seconds. If the upper three LEDs light up at the same time, data transmission to the bus is disrupted.

1.3. Operating modes

The controller has 5 basic operating modes. A unique "Setpoint" for heating and cooling is assigned to each of these modes. The states are displayed at the device via LEDs.

Comfort mode

In comfort mode, the room temperature is always regulated to the "current setpoint". This is a combination of the "base setpoint" and the "setpoint adjustment" of the setpoint by -5 to +5 Kelvin which can be set via the rotary switch on the front panel of the controller.

Technical manual

The base setpoint is a communication object and can therefore be modified via the EIB during operation e.g. so that the setpoint of the room temperature can be adjusted in the summer depending on the external temperature (summertime compensation). As the base setpoint is stored in the EEPROM, it should only be changed once per day. (The service life of the EEPROM is approx. 10,000 write cycles).

The operating mode "Comfort" is indicated on the front panel of the controller by a green LED under the following pictogram:



If the presence button is pressed in this operating mode, the "Standby" mode is selected.

It is possible to switch at any time via a bus telegram from the "Comfort" mode to "Standby" or "Night/Holiday" mode. This type of bus telegram can be sent by a bus push button for controlling operating modes, a timer or a PC with visualisation software or a time program.

If a presence detector is installed in a room, a telegram for toggling to another operating mode only takes effect if the detector has reported "no presence". If required the telegram is stored temporarily in the controller.

Standby mode

In standby mode, the room temperature is lowered by e.g. 2°C (value can be set) for heating mode compared to the current setpoint for comfort mode or increased by approx. 2°C (value can be set) for cooling mode. On the one hand, energy is saved for short periods (several hours) when the room is not occupied and on the other hand, the reduction or increase by e.g. 2°C can be quickly corrected when the room is occupied again.

The "Standby" mode is indicated on the front panel of the controller by a green LED under the following pictogram:



If the presence button is pressed in this operating mode, the "Comfort" mode is selected.

It is possible to switch at any time via a bus telegram from the "Standby" mode to "Comfort" or "Night/Holiday" mode.

If a presence detector is installed in a room and presence is detected, the controller is switched to "Comfort" mode until presence is no longer detected.

Night mode

In "Night/Holiday" mode, the room temperature is lowered by e.g. 4°C (value can be set) for heating mode compared to the current setpoint for comfort mode or increased by e.g. 4°C (value can be set) for cooling mode. On the one hand, energy is saved for a long period (one night or several days) when the room is not in use and on the other hand, the room does not fall below the dew point threshold in heating mode.

The "Night/Holiday" mode is indicated on the front panel of the controller by a green LED under the following pictogram:



If the presence button is pressed in this operating mode, the controller switches to extended comfort mode for 30 minutes (interval can be set). After 30 minutes, the controller automatically reverts to "Night/Holiday" mode. This enables the central toggling of all controllers to "Night/Holiday" mode but enables people that wish to continue working to continually set the room to the comfort temperature for 30 minutes.

If a presence detector is installed in a room, the "Night/Holiday" mode is only selected if no presence has been detected.

Frost/heat protection

This is used to switch off the heating or cooling when a critical temperature is reached (the room is freezing or excessively hot).

The opening of a window that is monitored by a window contact leads to the controller switching to "Frost protection" while in heating mode or "Heat protection" while in cooling mode. In "Frost protection" mode, the setpoint of the room temperature is lowered to e.g.

+ 7° C while the temperature is raised to e.g. + 35° C in "Heat protection" mode (values can be set). This reduction or increase of the setpoint causes the heating or cooling valve to close immediately. On the one hand, any waste of energy is prevented. On the other hand, it guarantees that the controller remains active and the room cannot become freezing or heat up.

1000 1, 2 1 pages

May 2011

12 S1 Temperature Control 210B04

The "Frost/heat protection" mode is indicated by a red LED on the front panel of the controller next to the following pictogram:



Pressing the presence button in this mode has no effect. Telegrams for toggling between operating modes also have no function. If the window is closed again, the controller automatically reverts to the set mode before the window was opened.

If several window contacts are to effect the same controller, they should either be connected electrically in series or linked logically via a logic module to a common "Frost/heat protection" object.

It is not possible to switch to "Frost/heat protection" either manually or via a time program as the opening and closing of a window could lead to the thermostat switching to another operating mode. If you wish to lower the temperature for a longer period in unoccupied rooms below the normal setpoint for night mode, you can modify the base setpoint for comfort mode accordingly and then switch to night mode.

Dew point mode

If cooling is carried out via a cooling ceiling and the dew point detector that is installed on the cooling ceiling is addressed, the thermostat switches to "Dew point mode" and closes the valve of the cooling ceiling for the duration of the dew point alarm.

The "Dew point mode" is indicated on the front panel of the thermostat by a yellow LED next to the following pictogram:



Pressing the presence button in this mode has no effect. Telegrams for toggling between operating modes also have no function.

Extended comfort mode See "Night/Holiday" mode.

Anti-tamper protection

When activated, it is possible to prevent any interference via the operator interface.

1.4. Actual value

The actual temperature is recorded by the temperature controller via the integrated temperature sensor. The measuring range, resolution and accuracy of the temperature measurement are given in the technical product information.

The actual temperature is automatically sent via communication object no. 6 "Actual temperature value" when the following events occur:

- when switching on
- on bus voltage recovery
- after each change in the actual temperature (e.g. by 0.5 K, value can be set)

The actual temperature can also be read out manually. The actual temperature that is applied to the control algorithm (see "Closed loop control") can be manually adjusted i.e. the measured value can be increased or reduced by a specific value (can be set).

1.5. Setpoints

The current setpoint temperature i.e. the setpoint temperature which is used to regulate the temperature is dependent on the base setpoint, the manual setpoint adjustment at the rotary switch as well as the selected operating mode.

The setpoint temperature is automatically sent via communication object no. 5 "Setpoint" when the following events occur:

- when switching on
- on bus voltage recovery
- each time the operating mode is changed
- when the manual setpoint adjustment is operated (rotary switch)
- The setpoint temperature can also be read out manually.

1.6. Control value output

The control values that are calculated by the control algorithm are issued via the communication objects. It is possible to choose between a continuous output (EIS 6) and a switching output (EIS 1) of the control value using parameters.

Continuous output of the control value

(see Diagram 4 under "Diagrams") The output of the calculated control value is carried out as quasi-analogue with a resolution of 8 bit. Separate upper and lower limits for the control value output can be set for heating and cooling and the value can also be inverted (can be set).

Technical manual

210B04, 24 pages

Note: Inverting the value means that the function of the control value output is reversed.

Switching output of the control value (see Diagram 5 under "Diagrams") The output of the calculated control value is carried out via pulse width modulation, whereby the pulse duty factor between "ON" and "OFF" corresponds to the calculated control value.

The cycle time (period T) of the switching control value can be set.

2. Communication objects and parameters

2.1. Assigning parameters for heating

2.1.1. Heating: Communication objects

<u>no.</u>	Function	Object name	Туре
01.01.002	12 S1 Temperature Co	ontrol 210804	
⊒ ⊷ 0	On / Off	Comfort mode	1 Bit
⊒⊷ 1	On / Off	Night mode	1 Bit
⊒⊷ 2	On / Off	Frost/heat protection	1 Bit
⊒ң з	On / Off	Dew point mode	1 Bit
⊒ ₹ 4	On / Off	Button	1 Bit
⊒ → 5	Actual setpoint	Setpoint	2 Byte
⊒→ 6	Sensor internal	Actual temperature value	2 Byte
□→ 7	continuous	Control value heating	1 Byte
⊒→ 8	1=System heats	Message	1 Bit
⊒→ 9	8-bit Status	Status	1 Byte
⊒ ⊷ 10	Base-setpoint in °C	Base-setpoint	2 Byte

Note:

The view of the objects can be arranged individually i.e. this view can vary.

Obj	Function	Object name	Туре	Flags
0	On / Off	Comfort mode	1 Bit	CWTU
The "Comfort" mode is selected via this object. In heating mode, the setpoint is increased or reduced to a comfortable level. The telegram can be sent e.g. by a presence detector or a timer.				
1	On / Off	Night mode	1 Bit	CWTU

_				
Obj	Function	Object name	Туре	Flags
The "Night" mode is selected via this object. In heating mode,				
the s	elpoint in rooms i	nat are unoccupie	u for long	perious
a set	level. The telegra	m can be sent e.g.	by a time	r.
2	On / Off	Frost/heat protection	1 Bit	CWTU
The " The s	'Frost/heat protect setpoint is reduced	tion" mode is select d or increased until	ted via thi the room	s object. is
prote	ected from excess	ive cooling or overl	neating. T	he toggling
can b is op	pe activated e.g. v ened.	ia a window contae	ct when th	ie window
3	On / Off	Dew point mode	1 Bit	CWTU
The '	'Dew point" mode	is selected via this	object. Th	ne heating
(and	cooling) is switch	ed off uncondition	ally. The t	elegram
can b	pe sent e.g. by a d	ew point sensor in	a cooling	ceiling.
4	On / Off	Button	1 Bit	CRWTU
object. The value can also be modified via the bus. Object value "1": switched to comfort mode with the presence button Object value "0": presence button is reset The object is sent automatically if the button status changes (the presence button is pressed) or when night mode is ctacted or orded				
5	Actual setpoint	Setpoint	2 Byte	CRT
This object contains the current setpoint which is used to regulate the temperature instantaneously. The value is sent with a resolution of 0.08 K. The object is automatically sent if the room temperature changes or after bus voltage recovery.				
6	Sensor internal	Actual temperature value	2 Byte	CRT
This object contains the current actual temperature value that is sent automatically by the controller when there is a change. See also the parameters for measuring the room temperature.				
7	Continuous	Control value heating	1 Byte	CRT
The control value for the heating mode is issued via this object. The object type is defined in the parameter setting "Control value output".				
8	1 = System heats	Message	1 Bit	CRT

May 2011

12 S1 Temperature Control 210B04

Obj	Function	Object name	Туре	Flags
The signal that energy is required for heating is sent via this object. The telegrams are sent automatically. This is carried out cyclically every 2, 10 or 40 minutes depending on the parameter setting "Cycle time for automatic sending" or if the status changes or each time the controller toggles between heating and cooling mode or after a BCU reset (once the bus voltage has been applied or the application has been programmed). Object value "1", if object "Heat" > 0 Object value "0", if object "Heat" = 0 The telegram can be used e.g. for controlling the inlet pump. Note: The object is only accessible if the parameter "Operating				
9	8-bit Status	Status	1 Byte	CRT
This object contains the current controller status which is automatically sent after a change in the status. The individual bits have the following meaning: Bit 0: 1 = Comfort mode On Bit 1: 1 = Standby mode On Bit 2: 1 = Night mode On Bit 3: 1 = Frost/heat protection mode On Bit 4: 1 = Dew point alarm Bit 5: 1 = Heating mode, 0 = Cooling mode Bit 6: 1 = Controller Off, 0 = Controller On Bit 7: 1 = Frost alarm				
10	Base setpoint in °C	Base setpoint	2 Byte	CRTU
This object is used to modify the base setpoint that is preset in the parameter setting via the bus (e.g. dependent on the external temperature or summer/wintertime). The accuracy is 1°C, as in the parameter setting. As the previous value is overwritten in the EEPROM after a change, this value should not be modified more than once a day, in order to avoid errors in the EEPROM.				

2.1.2. Heating: Parameters

Heating-/Cooling Setpoints Mode Me	easurement of actual value Control value output
Operating mode	heating
Dynamic performance for heating	continuous PI regulator
Type of heating system (Prop. band / Integration time)	warm water heating (5 K / 150 min)

Parameters	Settings
Operating mode	heating cooling
	heating and cooling 2-level heating 2-level cooling

Technical manual

Parameters	Settings	
This parameter is used to activate the heating and cooling function. The following settings are possible: "heating": only the heating function is active "cooling": only the cooling function is active "heating and cooling": both the heating and cooling function are active (e.g. air conditioning system) "2-level heating": heating function with basic and additional levels is active "2-level cooling": cooling function with basic and additional levels is active		
Dynamic performance for heating	continuous PI regulator switching PI regulator continuous 2 level regulator switching 2 limits regulator	
This parameter is used to select a control algorithm for the heating system and determines which data format is used to send the control value on the bus.		
Type of heating system (Prop. band / Integration time)		
This parameter is used to adapt the PI algorithm via field values from various heating systems. If the setting "via control parameter" is selected, the control parameters can be set directly.		

2.1.3. Setpoints: Parameters

Heating-/Cooling Setpoints Mode	Measurement of actual value Control value output
Base-setpoint for comfort operation unit 1°C (7-40)	21
Reduced heating in standby mode unit 0.1 K (0-200)	20
Reduced heating during the night unit 0.1 K (0-200)	40
Setpoint for frost protection (heating) unit 1*C (7-40)	7
Range of setpoint adjustment	± 1.5 K

Parameters	Settings
Base setpoint for comfort operation unit 1°C (7-40)	21
This parameter is used to calculate the setpoint values. The setpoints for comfort, standby and night mode are based on this value i.e. all these setpoints can be adjusted via this parameter. This value has the same meaning as the object "Base setpoint" whereby the object has a higher priority (see also the description for object no. 10).	
Reduced heating in stand-by mode unit 0.1 K (0-200)	20

210B04, 24 pages

Parameters	Settings	
The temperature reduction for standby mode in the "heating" setting can be defined via this parameter. Note: The temperature reduction is calculated as follows: Value x 0.1 [Kelvin]:($20 \times 0.1 \text{ K} = 2 \text{ K}$ temperature reduction).		
Reduced heating during the night unit 0.1 K (0-200)	40	
The temperature reduction for night mode in the "heating" setting can be defined via this parameter. Note: The temperature reduction is calculated as follows: Value x 0.1 [Kelvin]:(40 x 0.1 K = 4 K temperature reduction).		
Setpoint for frost protection (heating) unit 1°C (7-40)	7	
The opening of a window that is monitored by a window contact causes the controller to switch to "Frost protection" in heating mode. If "Frost protection" has been detected, the setpoint of the room temperature is lowered to the value that is set here (default is 7°C). On the one hand, it prevents the energy for heating from being wasted and on the other hand, it guarantees that the controller remains active and the room cannot cool down or heat up. The "Frost/heat protection" mode is indicated on the front panel of the controller by a red LED next to a corresponding pictogram.		
Range of setpoint adjustment	0 (passive) ± 0.5 K; ± 1.0 K; ± 1.5 K ± 2.0 K; ± 2.5 K; ± 3.0 K; ± 3.5 K; ± 4.0 K; ± 4.5 K; ± 5.0 K	
The step width of the setpoint adjustment per notch of the rotary switch is set via this parameter. The selected value applies to both an upward (+) or downward (-) adjustment.		

2.1.4. Mode: Parameters

Heating-/Cooling Setpoints Mode	Measurement of actual value Control value output
Function of status object	Controller status (EIS 6)
Function of pash batton	normal
Behaviour of button if Obj. if night mode obj. is 0	Clear button state
Behaviour of button if Obj. if comfort mode obj. is O	Button state not changed
Duration of prolonged comfort mode unit 1 min (0-255) (0:infinite)	30
Closed loop control	active

Parameters	Settings
Function of status object	Controller status (EIS 6) Comfort mode (EIS 1) Standby mode (EIS 1) Night mode (EIS 1) Frost/heat protection (EIS 1) Dew point mode (EIS 1) Heating mode (EIS 1) Controller inactive mode (EIS 1) Frost alarm (EIS 1)
This parameter defines which s "Status" object.	tatus information is sent in the
Function of push button The function of the presence b parameter. In the setting "norm	normal Button disabled button can be disabled via this nal", the controller reacts to a
push button action depending the setting "Button disabled", " button actions.	on the parameter settings. In the controller ignores all push
Behaviour of button if nightClear button statemode obj. is 0Button state restore	
This parameter determines whe state is restored or deleted whe The controller can thus revert to reduction if this mode was prev button action.	ther the previous push button n night mode has ended. o comfort mode after night viously activated via a push
Behaviour of button if comfort mode obj. is 0	Button state not changed Clear button state
This parameter specifies who should be deleted via the o comfort mode has ended. It external presence detector to r the bus and the presence butto	ether the push button state object "Comfort mode" once is therefore possible for an eset any set presence both via n.
Duration of prolonged comfort mode unit 1 min (0-255) (0:infinite)	30
If the presence button is pre presence is reported by a pr temperature is activated for the	ssed while in night mode or esence detector, the comfort e period set in this parameter.
Closed loop control	active inactive
This parameter switches the clo	sed loop control on or off.

2.1.5. Measurement of actual value: Parameters

Deviation for automatic conding	· · · ·
Adjustment of actual value measurement increase measurement value	
Offset for measurement of actual value 0 0 0	

May 2011

12 S1 Temperature Control 210B04

Parameters	Settings	
Deviation for automatic sending unit 0.1 K (0-255) (0:inactive)	1	
The room temperature is sent a the set value.	utomatically if it changes by	
Adjustment of actual value measurement	increase measurement value decrease measurement value	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the room temperature that is measured externally is e.g. lower than the actual temperature in the controller, the setting "decrease measurement value" must be selected.		
Offset for measurement of actual value unit 0.1 K (0-127)	0	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the differential between the external measuring device and the temperature that is measured internally is e.g. 2°C, the value 20 must be entered here.		

2.1.6. Control value output: Parameters

Heating-/Cooling	Setpoints	Mode	Meas	urement of actual value	Control value output	
Heating mode				normal	<u>•</u>]
Deviation for auto unit 1 % (0-100)	omatic sending (O:inactive)]		1		1
Cycle time of swit unit 10 sec (1-25	ching control 5)	value		90]
Cycle time for aut	omatic sendin	g		10 minutes	_]
Control value out	put			at once	•	

Parameters	Settings	
Heating mode	normal inverted	
In the setting "normal", the closed loop control assumes that the valve is open at a control value of 100%. Various types of valves can therefore be adapted.		
Deviation for automatic sending unit 1 % (0-100) (0: inactive)	1	
If the control value changes by the value that is set here, it is sent to the valve drive.		
Cycle time of switching control value unit 10 sec (1-255)	90	
This parameter sets the period i.e. the interval in which a closed loop control is carried out via pulse width modulation (pulse duty factor: ON / OFF time). Note: The cycle time is calculated as follows: Value x 10 sec (90 x 10 sec = 900 sec cycle time).		

Parameters	Settings
Cycle time for automatic sending	inactive 2 minutes 10 minutes 40 minutes
In addition to being sent autom sent after a change according t	atically, the control value is o the time base that is set here.
Control value output	at once limited to 1 telegram per minute
This parameter enables the au value after a change to be minute. It is a good idea proportional ranges are operate	tomatic sending of the control limited to one telegram per to filter telegrams if small ed in larger projects so that the

2.2. Assigning parameters for cooling

2.2.1. Cooling: Communication objects

<u>no.</u>	Function	Object name	Туре
01.01.002	12 S1 Temperature Co	ontrol 210804	
	On / Off	Comfort mode	1 Bit
□ ⊷ 1	On / Off	Night mode	1 Bit
⊒⊷ 2	On / Off	Frost/heat protection	1 Bit
⊒⊷ 3	On / Off	Dew point mode	1 Bit
⊒ ₹ 4	On / Off	Button	1 Bit
⊒ → 5	Actual setpoint	Setpoint	2 Byte
⊡→ 6	Sensor internal	Actual temperature value	2 Byte
□→ 7	1=System cools	Message	1 Bit
⊡ → 8	continuous	Control value cooling	1 Byte
⊒→ 9	8-bit Status	Status	1 Byte
⊒ ⊷ 10	Base-setpoint in °C	Base-setpoint	2 Byte

Note:

The view of the objects can be arranged individually i.e. this view can vary.

Obj	Function	Object name	Туре	Flags
0	On / Off	Comfort mode	1 Bit	CWTU
The "Comfort" mode is selected via this object. In cooling mode, the setpoint is increased or reduced to a comfortable				

mode, the setpoint is increased or reduced to a comfortable level. The telegram can be sent e.g. by a presence detector or a timer.

Technical manual

210B04, 24 pages

Obj	Function	Object name	Туре	Flags
1	On / Off	Night mode	1 Bit	CWTU
The ' the s (e.g. a set	'Night" mode is se etpoint in rooms t over night or at th level. The telegra	lected via this obje that are unoccupie ne weekend) is incr m can be sent e.g.	ct. In coo d for long reased or by a time	lling mode, g periods reduced to er.
2	On / Off	Frost/heat protection	1 Bit	CWTU
The ' The s prote can b is op	'Frost/heat protect setpoint is reduced ected from excessi be activated e.g. v ened.	tion" mode is select d or increased until ive cooling or overl ia a window contac	ted via th the roon neating. It when t	is object. n is The toggling he window
3	On / Off	Dew point mode	1 Bit	CWTU
The ' mod sent	'Dew point" mode e is switched off u e.g. by a dew poir	is selected via this inconditionally. The nt sensor in a coolin	object. T e telegrar ng ceiling	he cooling m can be J.
4	On / Off	Button	1 Bit	CRWTU
The s object Object butto Object The of (the start	The status of the presence button is sent on the bus via this object. The value can also be modified via the bus. Object value "1": switched to comfort mode with the presence button Object value "0": presence button is reset The object is sent automatically if the button status changes (the presence button is pressed) or when night mode is ctated of a condod			
5	Actual setpoint	Setpoint	2 Byte	CRT
This regu with the r	object contains th late the temperatu a resolution of 0.0 oom temperature	e current setpoint ure instantaneously 08 K. The object is changes or after b	which is v . The val automati us voltag	used to ue is sent cally sent if e recovery.
6	Sensor internal	Actual temper- ature value	2 Byte	CRT
This is sei See a	This object contains the current actual temperature value that is sent automatically by the controller when there is a change. See also the parameters for measuring the room temperature.			
7	1 = System cools	Message	1 Bit	CRT
The signal that energy is required for cooling is sent via this object. The telegrams are sent automatically (cyclically) if the status changes or after bus voltage recovery. Object value "1", if object "Cool" > 0 Object value "0", if object "Cool" = 0 The telegram can be used e.g. for controlling the inlet pump. Note: The object is only accessible if the parameter "Operating mode" is set to "heating" or "cooling".				
8	Continuous	Control value cooling	1 Byte	CRT
The object "Con	control value for tl ct. The object type trol value output".	he cooling mode is is defined in the p	issued vi arameter	a this r setting

Obj	Function	Object name	Туре	Flags
9	8-bit Status	Status	1 Byte	CRT
This auto The i Bit 0 Bit 1 Bit 2 Bit 2 Bit 3 Bit 4 Bit 5 Bit 6 Bit 7	object contains th matically sent afte individual bits hav : 1 = Comfort mod : 1 = Standby mod : 1 = Night mode (: 1 = Frost/heat pro- : 1 = Dew point als : 1 = Heating mod : 1 = Controller Of : 1 = Frost alarm	e current controlle er a change in the s e the following me le On le On On otection mode On arm e, 0 = Cooling moo f, 0 = Controller Or	r status w tatus. aning: le	/hich is
10	Base setpoint in °C	Base setpoint	2 Byte	CWTU
This the p exter 1°C, over not b in th	object is used to n parameter setting rnal temperature of as in the parameto written in the EEP pe modified more e EEPROM.	nodify the base set via the bus (e.g. de or summer/winterti er setting. As the p ROM after a chang than once a day, in	point tha pendent me). The revious va e, this val order to	t is preset in on the accuracy is alue is ue should avoid errors

2.2.2. Cooling: Parameters

Heating-/Cooling Setpoints Mode Meas	urement of actual value Control value output
Operating mode	cooling
Dynamic performance for cooling	continuous PI regulator
Type of cooling system (Prop. band / Integration time)	cooling ceiling (5 K / 240 min)

Parameters	Settings	
Operating mode	heating cooling heating and cooling 2-level heating 2-level cooling	
This parameter is used to activate the heating and cooling function. The following settings are possible: "heating": only the heating function is active "cooling": only the cooling function is active "heating and cooling": both the heating and cooling function are active (e.g. air conditioning system) "2-level heating": heating function with basic and additional levels is active "2-level cooling": cooling function with basic and additional		
Dynamic performance for cooling continuous PI regulator switching PI regulator continuous 2 level regulator switching 2 limits regulator		
This parameter is used to select a control algorithm for the cooling system and determines which data format is used to send the control value on the bus.		

May 2011

12 S1 Temperature Control 210B04

Parameters	Settings	
Type of cooling system (Prop. band / Integration time)	air convector (4 K/90 min) Split Unit (4 / 90 min) cooling ceiling (5 K / 240 min) via control parameter	
This parameter is used to adapt the PI algorithm via field values from various cooling systems. If the setting "via control parameter" is selected, the control parameters can be set directly.		

2.2.3. Setpoints: Parameters

Heating-/Cooling Setpoints Mode	Measurement of actual value Control value output
Base-setpoint for comfort operation unit 1*C (7-40)	21
Increase cooling in standby mode unit 0.1 K (0-200)	20
Increase cooling during the night unit 0.1 K (0-200)	40
Setpoint for frost protection (cooling) unit 1*C (7-45)	35
Range of setpoint adjustment	± 1.5 K

Parameters	Settings	
Base setpoint for comfort operation unit 1°C (7-40)	21	
This parameter is used to calculate the setpoint values. The setpoints for comfort, standby and night mode are based on this value i.e. all these setpoints can be adjusted via this parameter. This value has the same meaning as the object "Base setpoint" whereby the object has a higher priority (see also the description for object no. 10).		
Increase cooling in standby mode unit 0.1 K (0-200)	20	
The temperature increase for standby mode in the "cooling" setting can be defined via this parameter. Note: The temperature increase is calculated as follows: Value x 0.1 [Kelvin]:(20 x 0.1 K = 2 K temperature increase).		
Increase cooling during the night unit 0.1 K (0-200)	40	
The temperature increase for night mode in the "cooling" setting can be defined via this parameter. Note: The temperature increase is calculated as follows: Value x 0.1 [Kelvin]:(40 x 0.1 K = 4 K temperature increase).		
Setpoint for heat protection (cooling) unit 1°C (7-45)	35	

Parameters	Settings
The opening of a window that is monitored by a window contact causes the controller to switch to "Heat protection" in cooling mode. If "Heat protection" has been detected, the setpoint of the room temperature is increased to the value that is set here (default is 35° C). On the one hand, it prevents the energy for cooling from being wasted and on the other hand, it guarantees that the controller remains active and the room cannot cool down or heat up. The "Frost/heat protection" mode is indicated on the from panel of the controller by a red LED next to a corresponding pictogram.	
Range of setpoint adjustment	0 (passive) ± 0.5 K; ± 1.0 K; ± 1.5 K ± 2.0 K; ± 2.5 K; ± 3.0 K; ± 3.5 K; ± 4.0 K; ± 4.5 K;

 \pm 5.0 K The step width of the setpoint adjustment per notch of the rotary switch is set via this parameter. The selected value applies to both an upward (+) or downward (-) adjustment.

2.2.4. Mode: Parameters

Heating-/Cooling	Setpoints	Mode	Measurement of actual value	Control value output
Function of status	s object		Controller status (EIS (6) 💌
Function of push	button		normal	_
Behaviour of butt Obj. if night mod	on if e obj. is 0		Clear button state	
Behaviour of butt Obj. if comfort m	on if ode obj. is O		Button state not chang	ged 💌
Duration of prolor unit 1 min (0-255	nged comfort ı i) (O:infinite)	node	30	
Closed loop contr	ol		active	•

Parameters	Settings	
Function of status object	Controller status (EIS 6) Comfort mode (EIS 1) Standby mode (EIS 1) Night mode (EIS 1) Frost/heat protection (EIS 1) Dew point mode (EIS 1) Heating mode (EIS 1) Controller inactive mode (EIS 1) Frost alarm (EIS 1)	
This parameter defines which status information is sent in the "Status" object.		
Function of push button	normal Button disabled	
The function of the presence button can be disabled via this parameter. In the setting "normal", the controller reacts to a push button action depending on the parameter settings. In the setting "Button disabled", the controller ignores all push button actions.		

May 2011

12 S1 Temperature Control 210B04

Parameters	Settings	
Behaviour of button if night mode obj. is 0	Clear button state Button state restore	
This parameter determines whether the previous push button state is restored or deleted when night mode has ended. The controller can thus revert to comfort mode after night reduction if this mode was previously activated via a push button action.		
Behaviour of button if comfort mode obj. is 0	Button state not changed Clear button state	
This parameter specifies whether the push button state should be deleted via the object "Comfort mode" once comfort mode has ended. It is therefore possible for an external presence detector to reset any set presence both via the bus and the presence button.		
Duration of prolonged comfort mode unit 1 min (0-255) (0:infinite)	30	
If the presence button is pressed while in night mode or presence is reported by a presence detector, the comfort temperature is activated for the period set in this parameter.		
Closed loop control	active inactive	
This parameter switches the closed loop control on or off.		

2.2.5. Measurement of actual value: Parameters

Heating-/Cooling	Setpoints	Mode	Measurement of actual value	Control value output	
Deviation for auto unit 0.1K (0-255) Adjustment of act	omatic sending (0:inactive) ual value mea	g asurement	1 increase measurement	value	•
Offset for measure unit 0.1 K (0-127)	ement of actu	al value	0		

Parameters	Settings	
Deviation for automatic sending unit 0.1 K (0-255) (0:inactive)	1	
The room temperature is sent a the set value.	utomatically if it changes by	
Adjustment of actual value measurement	increase measurement value decrease measurement value	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the room temperature that is measured externally is e.g. lower than the actual temperature in the controller, the setting "decrease measurement value" must be selected.		

Parameters	Settings
Offset for measurement of actual value unit 0.1 K (0-127)	0
If the room temperature that is from the actual temperature in can be made here. If the differential between the e the temperature that is measur value 20 must be entered here.	measured externally deviates the controller, an adjustment external measuring device and ed internally is e.g. 2°C, the

2.2.6. Control value output: Parameters

Heating-/Cooling	Setpoints Mode	Measurement of actual value	Control value output
Cooling mode		normal	
Deviation for automa unit 1 % (0-100) (0:	atic sending :inactive)	1	
Cycle time of switch unit 10 sec (1-255)	ing control value	90	
Cycle time for autom	atic sending	10 minutes	_
Control value output	I	at once	<u> </u>

Parameters	Settings	
Cooling mode	normal inverted	
In the setting "normal", the closed loop control assumes that the valve is open at a control value of 100%. Various types of valves can therefore be adapted.		
Deviation for automatic sending unit 1% (0-100) (0: inactive)	1	
If the control value changes by the value that is set here, it is sent to the valve drive.		
Cycle time of switching con-trol value unit 10 sec (1-255)	90	
This parameter sets the period i.e. the interval in which a closed loop control is carried out via pulse width modulation (pulse duty factor: ON / OFF time). Note: The cycle time is calculated as follows: Value x 10 sec (90 x 10 sec = 900 sec cycle time).		
Cycle time for automatic sending	inactive 2 minutes 10 minutes 40 minutes	
In addition to being sent automatically, the control value is sent after a change according to the time base that is set here.		

May 2011

12 S1 Temperature Control 210B04

Parameters	Settings
Control value output	at once limited to 1 telegram per minute
This parameter enables the au value after a change to be minute. It is a good idea proportional ranges are operate amount of telegrams on the bu	tomatic sending of the control limited to one telegram per to filter telegrams if small ed in larger projects so that the s is reduced.

2.3. Assigning parameters for heating and cooling

2.3.1. Heating and cooling: Communication objects

<u>no.</u>	Function	Object name	Туре	
01.01.002	12 S1 Temperature Control 210B04			
⊒⊷∣o	On / Off	Comfort mode	1 Bit	
	On / Off	Night mode	1 Bit	
⊒⊷ 2	On / Off	Frost/heat protection	1 Bit	
⊒⊷ 3	On / Off	Dew point mode	1 Bit	
■ ₹ 4	On / Off	Button	1 Bit	
⊒ → 5	Actual setpoint	Setpoint	2 Byte	
⊡ + 6	Sensor internal	Actual temperature value	2 Byte	
□→ 7	continuous	Control value heating	1 Byte	
⊒ → 8	continuous	Control value cooling	1 Byte	
⊒+ 9	8-bit Status	Status	1 Byte	
⊒⊷ 10	Base-setpoint in *C	Base-setpoint	2 Byte	

Note:

The view of the objects can be arranged individually i.e. this view can vary.

Obj	Function	Object name	Туре	Flags
0	On / Off	Comfort mode	1 Bit	CWTU
The "Comfort" mode is selected via this object. In heating and cooling mode, the setpoint is increased or reduced to a comfortable level. The telegram can be sent e.g. by a presence detector or a timer.				
1	On / Off	Night mode	1 Bit	CWTU
The "Night" mode is selected via this object. In heating and cooling mode, the setpoint in rooms that are unoccupied for long periods (e.g. over night or at the weekend) is increased or reduced to a set level. The telegram can be sent e.g. by a timer.				

Obj Function **Object name** Flags Туре On / Off Frost/heat 1 Bit CWTU 2 protection The "Frost/heat protection" mode is selected via this object. The setpoint is reduced or increased until the room is protected from excessive cooling or overheating. The toggling can be activated e.g. via a window contact when the window is opened. On / Off CWTU Dew point 1 Bit 3 mode The "Dew point" mode is selected via this object. The heating (and cooling) is switched off unconditionally. The telegram can be sent e.g. by a dew point sensor in a cooling ceiling. On / Off Button CRWTU 4 1 Bit The status of the presence button is sent on the bus via this object. The value can also be modified via the bus. Object value "1": switched to comfort mode with the presence button Object value "0": presence button is reset The object is sent automatically if the button status changes (the presence button is pressed) or when night mode is started or ended. Note: This object only appears, when the parameter Switch between heating / cooling is turned on "automatic". CWTU 1 = Heating / Operating mode 1 Bit 0 = CoolingOver this object in the operating mode Heating and Cooling there is a manual swith between Heating and Cooling. Object value "1": Heating Object value "0": Cooling Note: This object only appears, when the parameter Switch between heating / cooling is turned on "with object heating / cooling" or the Control value is expended on the combined object Heating. Actual setpoint 2 Byte CRT 5 Setpoint This object contains the current setpoint which is used to regulate the temperature instantaneously. The value is sent with a resolution of 0.08 K. The object is automatically sent if the room temperature changes or after bus voltage recovery. Actual temper-CRT Sensor internal 2 Byte ature value This object contains the current actual temperature value that is sent automatically by the controller when there is a change. See also the parameters for measuring the room temperature. Continuous Control value 1 Byte CRT heating The control value for the heating mode is issued via this object. The object type is defined in the parameter setting 'Control value output".

Technical manual

210B04, 24 pages

Subject to change without prior notice

Obj	Function	Object name	Туре	Flags		
8	Continuous	Control value cooling	1 Byte	CRT		
The o object "Con	control value for the control value for the control type type trol value output".	he cooling mode is is defined in the p	issued vi arametei	a this r setting		
9	8-bit Status	Status	1 Byte	CRT		
This object contains the current controller status which is automatically sent after a change in the status. The individual bits have the following meaning: Bit 0: 1 = Comfort mode On Bit 1: 1 = Standby mode On Bit 2: 1 = Night mode On Bit 3: 1 = Frost/heat protection mode On Bit 4: 1 = Dew point alarm Bit 5: 1 = Heating mode, 0 = Cooling mode Bit 6: 1 = Controller Off, 0 = Controller On Bit 7: 1 = Frost alarm						
10	0 Base setpoint Base setpoint 2 Byte CWTU in °C					
This object is used to modify the base setpoint that is preset in the parameter setting via the bus (e.g. dependent on the external temperature or summer/wintertime). The accuracy is 1°C, as in the parameter setting. As the previous value is overwritten in the EEPROM after a change, this value should not be modified more than once a day, in order to avoid errors in the EEPROM.						

2.3.2. Heating and cooling: Parameters

Heating-/Cooling Setpoints Mode Mea	surement of actual value Control value output
Operating mode	heating and cooling
Dynamic performance for heating	continuous PI regulator
Type of heating system (Prop. band / Integration time)	warm water heating (5 K / 150 min)
Dynamic performance for cooling	continuous PI regulator
Type of cooling system (Prop. band / Integration time)	cooling ceiling (5 K / 240 min)

Parameters	Settings
Operating mode	heating cooling heating and cooling 2-level heating 2-level cooling

Parameters	Settings		
This parameter is used to activate the heating and cooling function. The following settings are possible: "heating": only the heating function is active "cooling": only the cooling function is active "heating and cooling": both the heating and cooling function are active (e.g. air conditioning system) "2-level heating": heating function with basic and additional levels is active "2-level cooling": cooling function with basic and additional levels is active			
Dynamic performance for heating	continuous PI regulator switching PI regulator continuous 2 level regulator switching 2 limits regulator		
This parameter is used to sele heating system and determine send the control value on the b	ct a control algorithm for the s which data format is used to us.		
Type of heating system (Prop. band / Integration time) This parameter is used to ad values from various heating	warm water heating (5 K / 150 min) floor heating (5 K/240 min) electric heating (4 K/ 100 min) air convector (4 K/90 min) Split Unit (4 / 90 min) via control parameter apt the PI algorithm via field systems. If the setting "via		
control parameter" is selected, set directly.	the control parameters can be		
Dynamic performance for cooling	continuous PI regulator switching PI regulator continuous 2 level regulator switching 2 limits regulator		
This parameter is used to select a control algorithm for the cooling system and determines which data format is used to send the control value on the bus.			
Type of cooling system (Prop. band / Integration time)	air convector (4 K/90 min) Split Unit (4 / 90 min) cooling ceiling (5 K / 240 min) via control parameter		
This parameter is used to adapt the PI algorithm via field values from various cooling systems. If the setting "via control parameter" is selected, the control parameters can be set directly.			

May 2011

12 S1 Temperature Control 210B04

2.3.3. Setpoints: Parameters

Heating-/Cooling	Setpoints	Mode	Measurement of actual value	Control value output
Base-setpoint for a unit 1*C (7-40)	comfort opera	tion	21	
Reduced heating i unit 0.1 K (0-200)	in standby mo	de	20	
Reduced heating (unit 0.1 K (0-200)	during the nig	ht	40	
Setpoint for frost p unit 1*C (7-40)	protection (he	ating)	7	
Increase cooling in unit 0.1 K (0-200)	n standby mo	de	20	
Increase cooling d unit 0.1 K (0-200)	luring the nig	ht	40	
Setpoint for frost p unit 1*C (7-45)	protection (co	oling)	35	
Dead zone betwee unit 0.1 K (0-255)	en heating an	d cooling	20	
Range of setpoint	adjustment		± 1.5 K	_

Parameters	Settings			
Base setpoint for comfort operation unit 1°C (7-40)	21			
This parameter is used to calculate the setpoint values. The setpoints for comfort, standby and night mode are based on this value i.e. all these setpoints can be adjusted via this parameter. This value has the same meaning as the object "Base setpoint" whereby the object has a higher priority (see also the description for object no. 10).				
Reduced heating in stand-by mode unit 0.1 K (0-200)	20			
The temperature reduction for s setting can be defined via this p Note: The temperature reductic Value x 0.1 [Kelvin]:(20 x 0.1 K	standby mode in the "heating" parameter. on is calculated as follows: = 2 K temperature reduction).			
Reduced heating during the night unit 0.1 K (0-200)	40			
The temperature reduction for night mode in the "heating" setting can be defined via this parameter. Note: The temperature reduction is calculated as follows: Value x 0.1 [Kelvin]:(40 x 0.1 K = 4 K temperature reduction).				
Setpoint for frost protection (heating) unit 1°C (7-40)	7			
The opening of a window that is monitored by a window contact causes the controller to switch to "Frost protection" in heating mode. If "Frost protection" has been detected, the setpoint of the room temperature is lowered to the value that is set here (default is 7°C). On the one hand, it prevents the energy for heating from being wasted and on the other hand, it guarantees that the controller remains active and the room cannot cool down or heat up. The "Frost/heat protection" mode is indicated on the front panel of the controller by a red LED next to a corresponding pictogram.				
Increase cooling in standby mode 0,1 K (0-200)	20			
The temperature increase for standby mode in the "cooling" setting can be defined via this parameter. Note: The temperature increase is calculated as follows: Value x 0.1 [Kelvin]:(20 x 0.1 K = 2 K temperature increase).				

Parameters	Settings	
Increase cooling during the night unit 0.1 K (0-200)	40	
The temperature increase for night mode in the "cooling" setting can be defined via this parameter. Note: The temperature increase is calculated as follows: Value x 0.1 [Kelvin]:(40 x 0.1 K = 4 K temperature increase).		
Setpoint for heat protection (cooling) unit 1°C (7-45)	35	
The opening of a window that i contact causes the controller to cooling mode. If "Heat protectic setpoint of the room temperatu that is set here (default is 35°C) the energy for cooling from bei hand, it guarantees that the con room cannot cool down or heat The "Frost/heat protection" me panel of the controller by a ree pictogram.	s monitored by a window switch to "Heat protection" in on" has been detected, the tre is increased to the value . On the one hand, it prevents ng wasted and on the other ntroller remains active and the cup. ode is indicated on the front d LED next to a corresponding	
Dead zone between heating and cooling unit 0.1 K (0-255)	20	
It is necessary to set an insensitive zone in the operating mode "heating and cooling" when the setting "automatic" is selected for the parameter "Switch between heating/cooling". Note: The value selected for the dead zone between heating and cooling mode may not be too small as otherwise con- tinuous toggling between heating and cooling could occur.		
Range of setpoint adjustment	0 (passive) ± 0.5 K; ± 1.0 K; ± 1.5 K ± 2.0 K; ± 2.5 K; ± 3.0 K; ± 3.5 K; ± 4.0 K; ± 4.5 K; ± 5.0 K	
The step width of the setpoint adjustment per notch of the rotary switch is set via this parameter. The selected value applies to both an upward (+) or downward (-) adjustment.		

2.3.4. Mode: Parameters

Heating-/Cooling	Setpoints	Mode	Measu	urement of actual value	Control value output	
Assignment to the heating and cooli	e objects ng			separate		-
Switch between h	neating / cooli	ing		automatic		•
Function of statu:	s object			Controller status (EIS	6)	-
Function of push	button			normal		•
Behaviour of butt Obj. if night mod	onif eobj.is0			Clear button state		•
Behaviour of butt Obj. if comfort m	onif ode obj. is 0			Button state not chang	ged	-
Duration of prolor unit 1 min (0-255	nged comfort ı i) (0:infinite)	node		30		
Closed loop contr	ol			active		-

Technical manual

Update: http://www.siemens.de/gamma

Parameters	Settings			
Assignment of the objects heating and cooling	separate both on object heating (special fct.)			
This parameter determines the output objects that are used for issuing the control values. In the setting "separate", the control value for heating is output via the object "Heating" and the control value for cooling is output via the object "Cooling". If the setting "both on object heating" is selected, both control values are output via the object "Heating". The object "Cooling" is not used in this case. The switch between Heating / Cooling appears in this setting not automatically				
Switch between heating/cooling	automatic with object heating/cooling			
In the operating mode "heating and cooling", toggling takes place either automatically depending on the room temperature or "manually" via the bus (object "Heating/cooling"). Note: This parameter appears only in separate control value				
Function of status object	Controller status (EIS 6) Comfort mode (EIS 1) Standby mode (EIS 1) Night mode (EIS 1) Frost/heat protection (EIS 1) Dew point mode (EIS 1) Heating mode (EIS 1) Controller inactive mode (EIS 1) Frost alarm (EIS 1)			
This parameter defines which s "Status" object.	tatus information is sent in the			
Function of push button	normal Button disabled			
The function of the presence button can be disabled via this parameter. In the setting "normal", the controller reacts to a push button action depending on the parameter settings. In the setting "Button disabled", the controller ignores all push button actions.				
Behaviour of button if night	Clear button state			
This parameter determines whether the previous push button state is restored or deleted when night mode has ended. The controller can thus revert to comfort mode after night reduction if this mode was previously activated via a push button action.				
Behaviour of button if	Button state not changed			
This parameter specifies whether the push button state should be deleted via the object "Comfort mode" once comfort mode has ended. It is therefore possible for an external presence detector to reset any set presence both via the bus and the presence button.				

Parameters Settings		
Duration of prolonged comfort mode unit 1 min (0- 255) (0:infinite)	30	
If the presence button is pressed while in night mode or presence is reported by a presence detector, the comfort temperature is activated for the period set in this parameter.		
Closed loop control active inactive		
This parameter switches the closed loop control on or off.		

2.3.5. Measurement of actual value: Parameters

Heating-/Cooling Setpoints Mode	Measurement of actual value Control value output
Deviation for automatic sending unit 0.1K (0-255) (0:inactive)	1
Adjustment of actual value measurement	increase measurement value
Offset for measurement of actual value unit 0.1 K (0-127)	0

Parameters	Settings	
Deviation for automatic sending unit 0.1 K (0-255) (0:inactive)	1	
The room temperature is sent a the set value.	utomatically if it changes by	
Adjustment of actual value	increase measurement value	
measurement	decrease measurement value	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the room temperature that is measured externally is e.g. lower than the actual temperature in the controller, the setting "decrease measurement value" must be selected.		
Offset for measurement of 0 actual value unit 0.1 K (0-127)		
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the differential between the external measuring device and the temperature that is measured internally is e.g. 2°C, the value 20 must be entered here.		

May 2011

12 S1 Temperature Control 210B04

2.3.6. Control value output: Parameters

Heating-/Cooling	Setpoints	Mode	Mea	surement of actual value	Control value output	
Heating mode				normal		•
Cooling mode				normal		•
Deviation for auto unit 1 % (0-100)	omatic sendin (O:inactive)	g		1		
Cycle time of swit unit 10 sec (1-25	tching control 5)	value		90		
Cycle time for aut	tomatic sendir	ng		10 minutes		•
Control value out	put			at once		•

Parameters Settings			
Heating mode	normal inverted		
In the setting "normal", the clo the valve is open at a control v valves can therefore be adapted	osed loop control assumes that value of 100%. Various types of d.		
Cooling mode	normal inverted		
In the setting "normal", the clo the valve is open at a control v valves can therefore be adapted	sed loop control assumes that alue of 100%. Various types of d.		
Deviation for automatic sending unit 1 % (0-100) (0: inactive)	1		
If the control value changes by sent to the valve drive.	the value that is set here, it is		
Cycle time of switching con- trol value unit 10 sec (1-255)			
This parameter sets the period i.e. the interval in which a closed loop control is carried out via pulse width modulation (pulse duty factor: ON / OFF time). Note: The cycle time is calculated as follows: Value x 10 sec (90 x 10 sec = 900 sec cycle time).			
Cycle time for automatic sending	inactive 2 minutes 10 minutes 40 minutes		
In addition to being sent automatically, the control value is sent after a change according to the time base that is set here.			
Control value output at once limited to 1 telegram per minute			
This parameter enables the automatic sending of the control value after a change to be limited to one telegram per minute. It is a good idea to filter telegrams if small proportional ranges are operated in larger projects so that the amount of telegrams on the bus is reduced.			

2.4. Assigning parameters for 2-level heating

2.4.1. 2-level heating: Communication objects

<u>no.</u>	Function	Object name	Туре
01.01.002	12 S1 Temperature	Control 210B04	
⊡ ⊷ 0	On / Off	Comfort mode	1 Bit
□ ← 1	On / Off	Night mode	1 Bit
⊒⊷ 2	On / Off	Frost/heat protection	1 Bit
⊒ ⊷ 3	On / Off	Dew point mode	1 Bit
⊒ ₹ 4	On / Off	Button	1 Bit
⊑+ s	Actual setpoint	Setpoint	2 Byte
⊡ → 6	Sensor internal	Actual temperature value	2 Byte
⊒→ 7	continuous	Control value basic heating	1 Byte
⊒ → 8	continuous	Control value of additional heating	1 Byte
⊡ ≯ 9	8-bit Status	Status	1 Byte
🔤 н 10	Base-setpoint in °C	Base-setpoint	2 Byte

Note:

The view of the objects can be arranged individually i.e. this view can vary.

Obj	Function	Object name	Туре	Flags		
0	On / Off	Comfort mode	1 Bit	CWTU		
The ' mod level a tim	'Comfort" mode is e, the setpoint is i . The telegram car ner.	selected via this ol ncreased or reduce n be sent e.g. by a	bject. In ł d to a co presence	neating mfortable detector or		
1	On / Off	Night mode	1 Bit	CWTU		
The ' the s (e.g. a set	'Night" mode is se aetpoint in rooms t over night or at th level. The telegra	lected via this obje that are unoccupie ne weekend) is incr m can be sent e.g.	ct. In hea d for long reased or by a time	iting mode, g periods reduced to er.		
2	2 On / Off Frost/heat 1 Bit CWTU protection					
The ' The s prote can b is op	The "Frost/heat protection" mode is selected via this object. The setpoint is reduced or increased until the room is protected from excessive cooling or overheating. The toggling can be activated e.g. via a window contact when the window is opened.					
3	On / Off	Dew point mode	1 Bit	CWTU		
The ' is sw by a	The "Dew point" mode is selected via this object. The heating is switched off unconditionally. The telegram can be sent e.g. by a dew point sensor in a cooling ceiling.					
4	On / Off	Button	1 Bit	CRWTU		

Obj	Function	Object name	Туре	Flags		
The s object Object butto Object The of (the	The status of the presence button is sent on the bus via this object. The value can also be modified via the bus. Object value "1": switched to comfort mode with the presence button Object value "0": presence button is reset The object is sent automatically if the button status changes (the presence button is pressed) or when night mode is					
5	Actual saturaint	Satagint	2 Puto	CPT		
2	Actual setpoint	Selpoint	2 byte	CNI		
This regu with the r	object contains th late the temperati a resolution of 0.0 oom temperature	e current setpoint ure instantaneously 08 K. The object is changes or after b	which is v /. The val automati us voltag	used to ue is sent cally sent if e recovery.		
6	Sensor internal	Actual tempera- ture value	2 Byte	CRT		
This is ser See a	object contains th nt automatically b also the paramete	e current actual ter y the controller wh rs for measuring th	mperatur en there e room te	e value that is a change. emperature.		
7	Continuous	Control value basic heating	1 Byte	CRT		
The o mode para	control value for t e is issued via this meter setting "Cor	he basic level in the object. The object htrol value output".	e 2-level l type is de	heating efined in the		
8	Continuous	Control value of additional heating	1 Byte	CRT		
The control value for the additional level in the 2-level heating mode is issued via this object. The object type is defined in the parameter setting "Control value output".						
9 8-bit Status Status 1 Byte CRT						
This object contains the current controller status which is automatically sent after a change in the status. The individual bits have the following meaning: Bit 0: 1 = Comfort mode On Bit 1: 1 = Standby mode On Bit 2: 1 = Night mode On Bit 3: 1 = Frost/heat protection mode On Bit 4: 1 = Dew point alarm Bit 5: 1 = Heating mode, 0 = Cooling mode Bit 6: 1 = Controller Off, 0 = Controller On Bit 7: 1 = Frost alarm						
10	Base setpoint in °C	Base setpoint	2 Byte	CWTU		
This object is used to modify the base setpoint that is preset in the parameter setting via the bus (e.g. dependent on the external temperature or summer/wintertime). The accuracy is 1°C, as in the parameter setting. As the previous value is overwritten in the EEPROM after a change, this value should not be modified more than once a day, in order to avoid errors in the EEPROM.						

2.4.2. 2-level heating: Parameters

Heating-/Cooling Setpoints Mode	Measurement of actual value Control value output	
Operating mode	2-level heating	•
Dynamic performance of basic stage	continuous PI regulator	•
Type of basic heating system (Prop. band / Integration time)	warm water heating (5 K / 150 min)	•
Dynamic performance of additional stage	continuous P regulator	•
Type of additional heating system (Prop. band / Integration time)	warm water heating (5 K)	-

Parameters	neters Settings		
Operating mode	heating cooling heating and cooling 2-level heating 2-level cooling		
This parameter is used to activate the heating and cooling function. The following settings are possible: "heating": only the heating function is active "cooling": only the cooling function is active "heating and cooling": both the heating and cooling function are active (e.g. air conditioning system) "2-level heating": heating function with basic and additional levels is active "2-level cooling": cooling function with basic and additional levels is active			
Dynamic performance of basic stage	continuous PI regulator switching PI regulator continuous 2 level regulator switching 2 limits regulator		
This parameter is used to select a control algorithm for the heating system and determines which data format is used to send the control value on the bus.			
Type of basic heating system (Prop. band / Integration time)			
This parameter is used to adapt the PI algorithm via field values from various heating systems. If the setting "via control parameter" is selected, the control parameters can be set directly.			
Dynamic performance of additional stage	continuous PI regulator switching PI regulator continuous 2 level regulator switching 2 limits regulator		
This parameter is used to select a control algorithm for the heating system and determines which data format is used to send the control value on the bus.			

May 2011

12 S1 Temperature Control 210B04

Parameters	Settings
Type of additional heating system (Prop. band / Integration time)	warm water heating (5 K / 150 min) floor heating (5 K/240 min) electric heating (4 K/ 100 min) air convector (4 K/90 min)
	Split Unit (4 / 90 min) via control parameter
This parameter is used to ada values from various heating	apt the PI algorithm via field systems. If the setting "via

values from various heating systems. If the setting "via control parameter" is selected, the control parameters can be set directly.

2.4.3. Setpoints: Parameters

Base-setpoint for comfort operation unit 1°C (7-40) 21 Reduced heating in standby mode unit 0.1 K (0-200) 20 Reduced heating during the night unit 0.1 K (0-200) 40 Setpoint for frost protection (heating) unit 1°C (7-40) 7 Distance from basic to additional stage unit 0.1 K (0-255) 20	Heating-/Cooling Setpoints	Mode	Measurement of actual value	Control value output
Reduced heating in standby mode 20 unit 0.1 K (0-200) 40 Reduced heating during the night unit 0.1 K (0-200) 40 Setpoint for frost protection (heating) unit 1°C (7-40) 7 Distance from basic to additional stage unit 0.1 K (0-255) 20 Range of setpoint adjustment 11 E K	Base-setpoint for comfort oper unit 1*C (7-40)	ation	21	
Reduced heating during the night unit 0.1 K (0-200) 40 Setpoint for forst protection (heating) unit 1°C (7-40) 7 Distance from basic to additional stage unit 0.1 K (0-255) 20 Range of setpoint adjustment 1.1 E K	Reduced heating in standby m unit 0.1 K (0-200)	ode	20	
Setpoint for frost protection (heating) Unit 1°C (7-40) Distance from basic to additional stage unit 0.1K (0-255) Z0 Intervent	Reduced heating during the ni unit 0.1 K (0-200)	ght	40	
Distance from basic to additional stage 20 unit 0.1K (0:255) Rance of setpoint adjustment	Setpoint for frost protection (he unit 1*C (7-40)	eating)	7	
Range of setpoint adjustment	Distance from basic to addition unit 0.1K (0-255)	al stage	20	
±1.3K	Range of setpoint adjustment		± 1.5 K	_

Parameters	Settings	
Base setpoint for comfort operation unit 1°C (7-40)	21	
This parameter is used to calculate the setpoint values. The setpoints for comfort, standby and night mode are based on this value i.e. all these setpoints can be adjusted via this parameter. This value has the same meaning as the object "Base setpoint" whereby the object has a higher priority (see also the description for object no. 10).		
Reduced heating in stand-by mode unit 0.1 K (0-200)	20	
The temperature reduction for standby mode in the "heating" setting can be defined via this parameter. Note: The temperature reduction is calculated as follows: Value x 0.1 [Kelvin] \otimes 20 x 0.1 K = 2 K temperature reduction).		
Reduced heating during the night unit 0.1 K (0-200)	40	
The temperature reduction for night mode in the "heating" setting can be defined via this parameter. Note: The temperature reduction is calculated as follows: Value x 0.1 [Kelvin] \otimes 40 x 0.1 K = 4 K temperature reduction).		
Setpoint for frost protection 7 (heating) unit 1°C (7-40)		

Parameters	Settings		
The opening of a window that is monitored by a window contact causes the controller to switch to "Frost protection" in heating mode. If "Frost protection" has been detected, the setpoint of the room temperature is lowered to the value that is set here (default is 7° C). On the one hand, it prevents the energy for heating from being wasted and on the other hand, it guarantees that the controller remains active and the room cannot cool down or heat up. The "Frost/heat protection" mode is indicated on the front panel of the controller by a red LED next to a corresponding pictogram.			
Distance from basic to additional stage unit 0.1 K (0-255)	20		
This parameter determines whether the starting point of the additional level is below or above the setpoint of the basic level for 2-level heating or cooling.			
Range of setpoint	0 (passive)		
adjustment	\pm 0.5 K; \pm 1.0 K; \pm 1.5 K		
	\pm 2.0 K; \pm 2.5 K; \pm 3.0 K;		
	\pm 3.5 K; \pm 4.0 K; \pm 4.5 K;		
	± 5.0 K		
The step width of the setpoint adjustment per notch of the rotary switch is set via this parameter. The selected value applies to both an upward (+) or downward (-) adjustment.			

2.4.4. Mode: Parameters

Heating-/Cooling	Setpoints	Mode	Measurement of actual value	Control value output	
Choice among fur	nctions/object	\$	external button - acce	\$\$	·
Function of status	s object		Controller status (EIS	6)	-
Function of push	button		normal	-	•
Behaviour of butt Obj. if night mode	onif eobj.is0		Clear button state	2	-
Behaviour of butt Obj. if comfort me	on if ode obj. is 0		Button state not chan	ged 💌	•
Duration of prolor unit 1 min (0-255	nged comfort r) (0:infinite)	node	30		
Closed loop contr	ol		active		•

Parameters	Settings
Choice among functions/ objects	external button – access lockable additional stage
Due to space restrictions in the use the object "External button for 2-level operation. Note: The parameter can o operation.	controller, it is only possible to " or "Lockable additional stage" nly be accessed for 2-level

Parameters	Settings			
Function of status object	Controller status (EIS 6) Comfort mode (EIS 1) Standby mode (EIS 1) Night mode (EIS 1) Frost/heat protection (EIS 1) Dew point mode (EIS 1) Heating mode (EIS 1) Controller inactive mode (EIS 1) Frost alarm (EIS 1)			
This parameter determines whi the "Status" object.	ch status information is sent in			
Function of push button The function of the presence b	normal Button disabled outton can be disabled via this			
parameter. In the setting "normal", the controller reacts to a push button action depending on the parameter settings. In the setting "Button disabled", the controller ignores all push button actions.				
Behaviour of button if nightClear button statemode obj. is 0Button state restore				
This parameter determines whether the previous push button state is restored or deleted when night mode has ended. The controller can thus revert to comfort mode after night reduction if this mode was previously activated via a push button action.				
Behaviour of button if comfort mode obj. is 0Button state not changed				
This parameter specifies whether the push button state should be deleted via the object "Comfort mode" once comfort mode has ended. It is therefore possible for an external presence detector to reset any set presence both via the bus and the presence button.				
Duration of prolonged comfort mode unit 1 min (0-255) (0:infinite)	30			
If the presence button is pressed while in night mode or presence is reported by a presence detector, the comfort temperature is activated for the period set in this parameter.				
Closed loop control	active inactive			
This parameter switches the clo	sed loop control on or off.			

2.4.5. Measurement of actual value: Parameters

Heating-/Cooling	Setpoints M	ode Meas	urement of actual value	Control value output	
Deviation for auto unit 0.1K (0-255) Adjustment of act	omatic sending (0:inactive) ual value measure	ement	1 increase measurement	value	-
Offset for measure unit 0.1 K (0-127)	ement of actual v	alue	0		

Parameters	Settings	
Deviation for automatic sending unit 0.1 K (0-255) (0:inactive)	1	
The room temperature is sent a the set value.	utomatically if it changes by	
Adjustment of actual value measurement	increase measurement value decrease measurement value	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the room temperature that is measured externally is e.g. lower than the actual temperature in the controller, the setting "decrease measurement value" must be selected.		
Offset for measurement of actual value unit 0.1 K (0-127)	0	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the differential between the external measuring device and the temperature that is measured internally is e.g. 2°C, the value 20 must be entered here.		

2.4.6. Control value output: Parameters

Heating-/Cooling	Setpoints	Mode	Measurement of actual value	Control value output
Direction of basic	: stage		normal	
Direction of additi	ional stage		normal	
Deviation for auto unit 1 % (0-100)	omatic sending (O:inactive)		1	
Cycle time of swit unit 10 sec (1-255	ching control 5)	value	90	
Cycle time for aut	omatic sendin	g	10 minutes	
Control value out	put		at once	_

Parameters	Settings		
Direction of basic stage	normal inverted		
In the setting "normal", the closed loop control assumes that the valve is open at a control value of 100%. Various types of valves can therefore be adapted.			
Direction of additional stage	normal inverted		
In the setting "normal", the closed loop control assumes that the valve is open at a control value of 100%. Various types of valves can therefore be adapted.			
Deviation for automatic sending in unit 1 % (0-100) (0: inactive)	1		
If the control value changes by the value that is set here, it is sent to the valve drive.			

May 2011

12 S1 Temperature Control 210B04

Parameters	Settings	
Cycle time of switching control value unit 10 sec (1-255)	90	
This parameter sets the period i.e. the interval in which a closed loop control is carried out via pulse width modulation (pulse duty factor: ON / OFF time). Note: The cycle time is calculated as follows: Value x 10 sec (90 x 10 sec = 900 sec cycle time).		
Cycle time for automatic sending	Inactive 2 minutes 10 minutes 40 minutes	
In addition to being sent autom sent after a change according to	atically, the control value is o the time base that is set here.	
Control value output	at once limited to 1 telegram per minute	
This parameter enables the automatic sending of the control value after a change to be limited to one telegram per minute. It is a good idea to filter telegrams if small proportional ranges are operated in larger projects so that the amount of telegrams on the bus is reduced.		

2.5. Assigning parameters for 2-level cooling

2.5.1. 2-level cooling: Communication objects

Note:

The view of the objects can be arranged individually i.e. this view can vary.

Obj	Function	Object name	Туре	Flags		
0	On / Off	Comfort mode	1 Bit	CWTU		
The ' mod level a tim	The "Comfort" mode is selected via this object. In cooling mode, the setpoint is increased or reduced to a comfortable level. The telegram can be sent e.g. by a presence detector or a timer					
1	On / Off	Night mode	1 Bit	CWTU		
The ' the s (e.g. a set	'Night" mode is se tetpoint in rooms t over night or at th level. The telegra	lected via this obje hat are unoccupie ne weekend) is inci m can be sent e.g.	ct. In coo d for long reased or by a time	ling mode, g periods reduced to er.		
2	On / Off	Frost/heat protection	1 Bit	CWTU		
The ' The s prote can b is op	Frost/heat protect setpoint is reduced ected from excessi be activated e.g. vi ened.	ion" mode is select d or increased until ve cooling or overl ia a window contac	ted via th the roon neating. 1 ct when t	is object. n is The toggling he window		
3	On / Off	Dew point mode	1 Bit	CWTU		
The ' swite a dev	'Dew point" mode ched off unconditi w point sensor in a	is selected via this onally. The telegra a cooling ceiling.	object. T m can be	he cooling is sent e.g. by		
4	On / Off	Button	1 Bit	CRWTU		
The s object Object butto Object The of (the start	The status of the presence button is sent on the bus via this object. The value can also be modified via the bus. Object value "1": switched to comfort mode with the presence button Object value "0": presence button is reset The object is sent automatically if the button status changes (the presence button is pressed) or when night mode is stated or ended					
5	Actual setpoint	Setpoint	2 Byte	CRT		
This object contains the current setpoint which is used to regulate the temperature instantaneously. The value is sent with a resolution of 0.08 K. The object is automatically sent if the room temperature changes or after bus voltage recovery.						
6	Sensor internal	Actual value temperature	2 Byte	CRT		
This object contains the current actual temperature value that is sent automatically by the controller when there is a change. See also the parameters for measuring the room temperature.						
7	Continuous	Control value basic cooling	1 Byte	CRT		
The control value for the basic level in the 2-level cooling mode is issued via this object. The object type is defined in the parameter setting "Control value output".						

Obj	Function	Object name	Туре	Flags
8	Continuous	Control value of additional cooling	1 Byte	CRT
The o mod para	control value for t e is issued via this meter setting "Cor	he additional level object. The object ntrol value output".	in the 2-l type is d	evel cooling efined in the
9	8-bit Status	Status	1 Byte	CRT
This object contains the current controller status which is automatically sent after a change in the status. The individual bits have the following meaning: Bit 0: 1 = Comfort mode On Bit 1: 1 = Standby mode On Bit 2: 1 = Night mode On Bit 3: 1 = Frost/heat protection mode On Bit 4: 1 = Dew point alarm Bit 5: 1 = Heating mode, 0 = Cooling mode Bit 6: 1 = Controller Off, 0 = Controller On Bit 7: 1 = Frost alarm				
10	Base setpoint in °C	Base setpoint	2 Byte	CWTU
This object is used to modify the base setpoint that is preset in the parameter setting via the bus (e.g. dependent on the external temperature or summer/wintertime). The accuracy is 1°C, as in the parameter setting. As the previous value is overwritten in the EEPROM after a change, this value should not be modified more than once a day, in order to avoid errors in the EEPROM.				

2.5.2. 2-level cooling: Parameters

Heating-/Cooling Setpoints Mode N	Measurement of actual value Control value output
Operating mode	2-level cooling
Dynamic performance of basic stage	continuous PI regulator
Type of basic cooling system (Prop. band / Integration time)	cooling ceiling (5 K / 240 min)
Dynamic performance of additional stage	continuous P regulator
Type of additional cooling system (Prop. band / Integration time)	cooling ceiling (5 K)

Parameters	Settings
Operating mode	heating cooling heating and cooling 2-level heating 2-level cooling

Deveryetere	Cattings	
rarameters	Setungs	
This parameter is used to activate the heating and cooling function. The following settings are possible: "heating": only the heating function is active "cooling": only the cooling function is active "heating and cooling": both the heating and cooling function are active (e.g. air conditioning system) "2-level heating": heating function with basic and additional levels is active "2-level cooling": cooling function with basic and additional levels is active		
Dynamic performance of basic stage	continuous PI regulator switching PI regulator continuous2 level regulator switching 2 limits regulator	
This parameter is used to select a control algorithm for the cooling system and determines which data format is used to send the control value on the bus.		
Type of basic cooling system (Prop. band / Integration time)	air convector (4 K/90 min) Split Unit (4 / 90 min) cooling ceiling (5 K / 240 min) via control parameter	
This parameter is used to adapt the PI algorithm via field values from various cooling systems. If the setting "via control parameter" is selected, the control parameters can be set directly.		
Dynamic performance of additional stage	continuous PI regulator switching PI regulator continuous2 level regulator switching 2 limits regulator	
This parameter is used to select a control algorithm for the cooling system and determines which data format is used to send the control value on the bus.		
Type of additional cooling system (Prop. band / Integration time)	air convector (4 K/90 min) Split Unit (4 / 90 min) cooling ceiling (5 K / 240 min) via control parameter	
This parameter is used to adapt the PI algorithm via field values from various cooling systems. If the setting "via control parameter" is selected, the control parameters can be set directly.		

2.5.3. Setpoints: Parameters

Heating-/Cooling	Setpoints	Mode	Measurement of actual value	Control value output
Base-setpoint for unit 1°C (7-40)	comfort opera	tion	21	
Increase cooling unit 0.1 K (0-200	in standby mo)	de	20	
Increase cooling during the night unit 0.1 K (0-200)		40		
Setpoint for frost unit 1*C (7-45)	protection (ca	oling)	35	
Distance from bas unit 0.1K (0-255)	sic to addition	al stage	20	
Range of setpoin	t adjustment		± 1.5 K	

210B04, 24 pages

Update: http://www.siemens.de/gamma

Technical manual

May 2011

12 S1 Temperature Control 210B04

Parameters	Settings	
Base setpoint for comfort operation unit 1°C (7-40)	21	
This parameter is used to calculate the setpoint values. The setpoints for comfort, standby and night mode are based on this value i.e. all these setpoints can be adjusted via this parameter. This value has the same meaning as the object "Base setpoint" whereby the object has a higher priority (see also the description for object no. 10).		
Increase cooling in standby mode unit 0.1 K (0-200)	20	
The temperature increase for st setting can be defined via this p Note: The temperature increase Value x 0.1 [Kelvin]:(20 x 0.1 K	andby mode in the "cooling" parameter. : is calculated as follows: = 2 K temperature increase).	
Increase cooling during the night unit 0.1 K (0-200)	40	
The temperature increase for night mode in the "cooling" setting can be defined via this parameter. Note: The temperature increase is calculated as follows: Value x 0.1 [Kelvin]:(40 x 0.1 K = 4 K temperature increase).		
Setpoint for heat protection (cooling) unit 1°C (7-45)	35	
The opening of a window that is monitored by a window contact causes the controller to switch to "Heat protection" in cooling mode. If "Heat protection" has been detected, the setpoint of the room temperature is increased to the value that is set here (default is 35°C). On the one hand, it prevents the energy for cooling from being wasted and on the other hand, it guarantees that the controller remains active and the room cannot cool down or heat up. The "Frost/heat protection" mode is indicated on the front panel of the controller by a red LED next to a corresponding pictogram.		
Distance from basic to additional stage unit 0.1 K (0-255)	20	
This parameter determines whether the starting point of the additional level is below or above the setpoint of the basic level for 2-level heating or cooling.		
Range of setpoint adjustment	0 (passive) ± 0.5 K; ± 1.0 K; ± 1.5 K ± 2.0 K; ± 2.5 K; ± 3.0 K; ± 3.5 K; ± 4.0 K; ± 4.5 K; ± 5.0 K	
The step width of the setpoint adjustment per notch of the rotary switch is set via this parameter. The selected value applies to both an upward (+) or downward (-) adjustment.		

2.5.4. Mode: Parameters

Heating:/Cooling Setpoints	Mode	Measurement of actual value Control value output
Choice among functions/object	ts	external button - access
Function of status object		Controller status (EIS 6)
Function of push button		normal
Behaviour of button if Obj. if night mode obj. is O		Clear button state
Behaviour of button if Obj. if comfort mode obj. is 0		Button state not changed
Duration of prolonged comfort mode unit 1 min (0-255) (0:infinite)		30
Closed loop control		active

Parameters	Settings		
Choice among functions/ objects	external button - access lockable additional stage		
Due to space restrictions in the controller, it is only possible to use the object "External button" or "Lockable additional stage" for 2-level operation.			
operation.	ing be accessed for z-level		
Function of status object	Controller status (EIS 6) Comfort mode (EIS 1) Standby mode (EIS 1) Night mode (EIS 1) Frost/heat protection (EIS 1) Dew point mode (EIS 1) Heating mode (EIS 1) Controller inactive mode (EIS 1) Erect 1 active [S 1]		
This parameter defines which s "Status" object.	This parameter defines which status information is sent in the "Status" object.		
Function of push button normal Button disabled			
The function of the presence button can be disabled via this parameter. In the setting "normal", the controller reacts to a push button action depending on the parameter settings. In the setting "Button disabled", the controller ignores all push button actions.			
Behaviour of button if night mode obj. is 0	Clear button state Button state restore		
This parameter determines whether the previous push button state is restored or deleted when night mode has ended. The controller can thus revert to comfort mode after night reduction if this mode was previously activated via a push button action.			
Behaviour of button if comfort mode obj. is 0	Button state not changed Clear button state		
This parameter specifies whether the push button state should be deleted via the object "Comfort mode" once comfort mode has ended. It is therefore possible for an external presence detector to reset any set presence both via the bus and the presence button.			

Parameters	Settings	
Duration of prolonged comfort mode unit 1 min (0-255) (0:infinite)	30	
If the presence button is pressed while in night mode or presence is reported by a presence detector, the comfort temperature is activated for the period set in this parameter.		
Closed loop control active inactive		
This parameter switches the closed loop control on or off.		

2.5.5. Measurement of actual value: Parameters

Heating-/Cooling Setpoints Mode	Measurement of actual value Control value output
Deviation for automatic sending unit 0.1K (0-255) (0:inactive)	1
Adjustment of actual value measurement	increase measurement value
Offset for measurement of actual value unit 0.1 K (0-127)	0

Parameters	Settings	
Deviation for automatic sending unit 0.1 K (0-255) (0:inactive)	1	
The room temperature is sent automatically if it changes by the set value.		
Adjustment of actual value measurement	increase measurement value decrease measurement value	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the room temperature that is measured externally is e.g. lower than the actual temperature in the controller, the setting "decrease measurement value" must be selected.		
Offset for measurement of actual value unit 0.1 K (0-127)	0	
If the room temperature that is measured externally deviates from the actual temperature in the controller, an adjustment can be made here. If the differential between the external measuring device and the temperature that is measured internally is e.g. 2°C, the value 20 must be entered here.		

2.5.6. Control value output: Parameters

Heating-/Cooling Setpoints Mode	Measurement of actual value Control value output
Direction of basic stage	normal
Direction of additional stage	normal
Deviation for automatic sending unit 1 % (0-100) (0:inactive)	1
Cycle time of switching control value unit 10 sec (1-255)	90
Cycle time for automatic sending	10 minutes
Control value output	at once

Parameters	Settings
Direction of basic stage	normal inverted
In the setting "normal", the closed loop control assumes that the valve is open at a control value of 100%. Various types of valves can therefore be adapted.	
Direction of additional stage	normal inverted
In the setting "normal", the closed loop control assumes that the valve is open at a control value of 100%. Various types of valves can therefore be adapted.	
Deviation for automatic sending unit 1 % (0-100) (0: inactive)	1
If the control value changes by the value that is set here, it is sent to the valve drive.	
Cycle time of switching control value unit 10 sec (1-255)	90
This parameter sets the period i.e. the interval in which a closed loop control is carried out via pulse width modulation (pulse duty factor: ON / OFF time). Note: The cycle time is calculated as follows: Value x 10 sec (90 x 10 sec = 900 sec cycle time).	
Cycle time for automatic sending	inactive 2 minutes 10 minutes 40 minutes
In addition to being sent automatically, the control value is sent after a change according to the time base that is set here.	
Control value output	at once limited to 1 telegram per minute
This parameter enables the automatic sending of the control value after a change to be limited to one telegram per minute. It is a good idea to filter telegrams if small proportional ranges are operated in larger projects so that the amount of telegrams on the bus is reduced.	

May 2011

12 S1 Temperature Control 210B04

3. Diagrams

3.1. PI controller in heating/cooling mode



Diagram 1: PI controller in heating mode



Diagram 2: PI controller in cooling mode



Diagram 3: PI controller in heating and cooling mode with automatic toggling





Technical manual

3.2. Control value output



Diagram 5: Continuous output of the control value



Diagram 6: Switching output of the control value

3.3. Setpoints of the operating modes

