

**20 S2 Room temperature controller 900601****Use of the application program**

Product family: Heating, Air conditioning, Ventilation  
Product type: Thermostat  
Manufacturer: Siemens

Name: Temperature controller UP 231  
DELTA profil, pearl grey  
Order no.: 5WG1 231-2AB02

Name: Temperature controller UP 231  
DELTA profil, titanium white  
Order no.: 5WG1 231-2AB12

Name: Temperature controller UP 231  
DELTA profil, anthracite  
Order no.: 5WG1 231-2AB22

Name: Temperature controller  
DELTA profil, silver  
Order no.: 5WG1 231-2AB72

**Note:** The temperature controller UP 231  
requires a flush-mounted bus coupling  
unit UP 114 from release 8 onwards!

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## 20 S2 Room temperature controller 900601

### 1 Functional description

#### 1.1 Functional overview

The application program "20 S2 Room temperature controller 900601" has several function blocks which can be combined with each other in different ways to make the following functions available:

- Switching, dimming, shutter control or value output via the centre push buttons (main rockers)
- Room temperature control (heat, heat/cool, service station) with the subfunctions:
  - calculation of the setpoint value (dependent on the current operating state),
  - temperature measurement via the internal temperature sensor,
  - temperature measurement via the external temperature sensor,
  - calculation of the actual value (evaluated by the internal and external sensor, temperature offset),
  - outer left push button and display for setpoint adjustment,
  - outer right push button and display for standby/comfort mode,
  - timed-out removal of night reduction (extended comfort mode),
  - PI control for heating/cooling with continuous output of control values (in %) or switching output of control values (On / Off),
  - additional two-position control for heating at the same setpoint value as for PI control (can be used for example for simultaneous floor and radiator heating),
  - additional output of a switching command to open or close a ventilation flap: the flap is only opened at comfort mode and closed for all other operational modes,
  - no room temperature control when used as a "service station".
- Status display via LEDs
  - display of night and frost protection modes,
  - display of setpoint adjustment,
  - display of freely assignable communication objects via the LEDs in the outer and centre push buttons,
  - flashing of LEDs.

The communication objects and parameters used in the application program "20 S2 Room temperature controller 900601" sometimes differ considerably from those used in the application program "11 S1 T-ctrl 210B01" respectively "...210B03" for temperature controllers UP 251 to UP 252. This must be considered when configuring individual room controls (particularly when switching between operational modes).

#### 1.2 Main push buttons

The temperature controller has two wide push buttons in the centre (main rocker left/right) which can be assigned parameters for switching, dimming, value output and shutter control functions.

##### Switching:

By pressing the push button, the corresponding command (On/Off/Toggle) is sent with no distinction being made between a long or short push button action. The command is immediately sent when the rocker is pressed. The distinction as to whether an "On" or "Off" telegram is sent is dependent on whether the top or the bottom of the push button has been pressed and which parameters have been assigned. If the push button has been set to "Toggle" mode, when it has been pressed briefly, it sends the respective inverse command to the switching state of the switching object.

##### Dimming:

A distinction is made between a long and a short push button action. A short push button action sends a corresponding switch command (On, Off or Toggle). Dimming commands are sent if the push button is held down for a longer period (the duration of which can be set). The operational modes "Dimming with stop telegram" and "Dimming with cyclical sending" are available. For the function "Dimming with stop telegram" (change by 100%), if the push button is pressed for a long period, the room is dimmed brighter or darker until either the final brightness value is reached or the push button is released (stop telegram). With the function "Dimming with cyclical sending", a dimming command is sent at the set time intervals until the push button is released. The brightness adjustment can be selected per dimming telegram (e.g. change by 1/8 i.e. 8 dimming telegrams must be sent in order to dim from 0% to 100%).

##### Value:

With this function, a unique 8 bit value can be assigned to each contact (upper or lower) which is sent when the rocker is pressed.

##### Shutter:

A distinction is made between a long and short push button action. If the rocker is pressed briefly, a switching telegram is sent which adjusts the louvres or stops any movement of the shutter. In the event of a long switch operation, the shutter is raised or lowered depending on the parameters assigned. The distinction as to whether an "Up" or "Down" telegram is sent, is dependent on the operation of the rocker (upper or lower) and the parameters assigned. It is possible to choose between the parameter settings "Upper contact Up", "Lower contact Down" or vice versa.

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### 1.3 LED displays

#### Types of display

The temperature controller UP 231 has 13 LEDs. Using these LEDs, it is possible to display the operating state of the controller, the current setpoint adjustment and the status of the selected objects (e.g. the objects assigned to the main push buttons). Some LEDs can also be used as an orientation light (always ON).

The controller has 4 LEDs for displaying its operating state. However only one operating state can be active at a time. In the "Frost protection" mode, there is no display of the setpoint adjustment as it is regulated according to the fixed, preselected setpoint value for frost protection. Up to three external object values can be displayed by the flashing of any LED (apart from the LEDs for setpoint adjustment). The flashing function thus takes precedence over the basic function of the LED (e.g. always ON) i.e. if the respective object takes on the value 1, the LED begins to flash. If the value becomes 0 again, the LED lights up as before. (Note: if the controller is switched off, the LEDs still flash).

The LED which displays the current setpoint adjustment can also be set to flash. (Note: if the control is switched off, the flashing function remains activated).

#### Fault initialisation or internal error

The LEDs of the temperature controller UP 231 form a run light during initialisation that is extinguished once the initialisation has been run. If a fault occurs, the run light lights up until the problem has been resolved. If there is a fault in the application hardware (e.g. reset of the application hardware due to a lightning strike in the immediate vicinity), the fault is likewise displayed by the run light.

The fault is resolved by switching on / off the bus.

### 1.4 Room temperature control

It is only possible to control the room temperature by heating or heating/cooling. The operational states of comfort, standby, night and frost/heat protection are available for this.

The application program compares the actual temperature (actual value) recorded by the temperature controller with the required setpoint temperature (setpoint value) and then calculates the associated control value.

### 1.4.1 PI controller

The room temperature control is carried out by a PI controller. The characteristics of the PI controller are mainly determined by the proportional band and the reset time. Both these variables can be entered individually for heating and cooling in the relevant parameter window.

#### Limitation of the integral-action component

The integral action component can be limited by configuration. By that integral action and proportional action components together will never exceed 100% and the regulating output will respond at once in case of a declining setpoint deviation

#### Handling of the integral-action component for "Controller Off"

The integral-action component is reduced with a reset time modified by factor 10 and a system deviation of 1K.

#### Handling of the integral-action component for "Window Open"

As for the setting "Controller Off", the integral-action component is reduced but in this case it is also saved as the controller uses a new setpoint (heat or frost protection) for the setting "Window Open". If "Window Closed" is selected, the saved and partially or fully reduced component is written back into the controller. The control value thus only changes slightly when a window is opened temporarily.

### 1.4.2 Two-position controller

The temperature controller has two separate control functions – a PI-controller and a two-position controller. The two-position controller only becomes active at discrete intervals apart from when there is a change in the setpoint value. The duration of this cycle can be selected. No new setpoint is calculated between these intervals. The setpoint of the two-position controller is calculated from the setpoint of the PI controller plus an adjustable offset. The hysteresis of the two-position controller can likewise be assigned parameters. In the "Cool" operating mode, the two-position controller is always switched off. The additional two-position controller can be used e.g. for regulating the valve of a floor heating system while the PI controller is used to control the radiator valves in the same room.

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### 1.4.3 Calculation of actual value

#### Internal sensor

The temperature controller UP 231 contains an integrated, calibrated temperature sensor for detecting the room temperature in a range between 0°C and +40°C with a resolution of 0.1°C. This internal actual value can be adapted to the environmental influences (e.g. cold exterior wall) by means of an adjustable offset. If required, corrections are made to the temperature value that is measured via the internal sensor and it can be read or sent via a unique object. A parameterisable "Hysteresis" permanently prevents very small temperature fluctuations from becoming new actual values.

#### External sensor

Moreover the controller UP 231 has an additional object for the temperature value that is measured by an external sensor. If required, this object can send "Read signals" cyclically to the corresponding object of the external sensor so that it transfers the actual value. Fundamentally an external sensor should however automatically send each change in temperature. An adjustable offset can also be assigned to the external temperature value. In the event of a bus voltage failure, the controller UP 231 stores the last received external temperature value so that the program has a sensible starting value straightforwardly on bus voltage recovery and does not need to request this externally first.

#### Actual value

The program determines the current actual temperature value using the temperature values of the internal and external sensors as well as a parameterisable "Weighting" function. Using this function, it is determined what percentage of the external temperature is used when calculating the actual temperature value.

The actual temperature value can be read at any time via a unique object or sent automatically when there is a change in a parameterisable value.

### 1.4.4 Calculation of setpoint value

#### Base setpoint value

The setpoint value is determined from the current operational mode, the base setpoint value and if required a setpoint adjustment which must be taken into consideration.

The base setpoint is specified via the corresponding object but can also be set to a fixed value via a parameter. If there is a setpoint selection via the corresponding object, the value is automatically stored in the EEPROM in the event of bus voltage failure.

#### Setpoint adjustment

The specified base setpoint can be shifted manually via setpoint adjustment either 2 steps upwards (left outer rocker, upper contact) or downwards (left outer rocker, lower contact). The resulting value is described as an "Internal base setpoint". The setpoint adjustment is calculated from the number of steps up or down and from the parameterised change (steepness) per step (e.g. 1.5 Kelvin/step). 5 discrete setpoint adjustment values are produced (e.g. -3, -1.5, 0, +1.5, +3 Kelvin). Each change in the setpoint adjustment is automatically sent. If a value is received via the setpoint adjustment object, the resulting step is calculated and the corresponding LED is triggered. If the received value does not correspond exactly to one of the five discrete values than the next possible discrete value is selected, displayed and sent back.

### 1.4.5 Operational modes

#### Comfort mode

This operational mode is displayed by the relevant LED (right outer rocker, upper contact). The setpoint for comfort mode is dependent on whether the heating or cooling mode is active. If the heating mode is active, the setpoint corresponds to the internal base setpoint whereas for the cooling mode, the setpoint consists of the internal base setpoint and the parameterisable dead zone (if the controller is only assigned parameters for heating, then the dead zone has no effect). If the actual value of the room temperature lies above the "Internal base setpoint" but still below the "Internal base setpoint plus dead zone" (thus within the dead zone), the room is neither heated nor cooled (both valves are closed) i.e. the dead zone contributes to saving energy and moreover ensures that the heating and cooling valves are never open at the same time.

It is possible to toggle between the "Standby mode" and "Comfort mode" by pressing the top of the right outer push button. If the "Night mode" is active, then it is also possible to switch over to "Comfort mode" by pressing the right outer push button, whereby an "Extended comfort mode" can be set according to time. When the top of the right outer push button is pressed again, the extended comfort period starts from the beginning. If the bottom of the right outer push button is pressed, the extended comfort mode is stopped prematurely. Once the set time period has elapsed and the extended comfort mode has been stopped by push button, the program reverts to the "Night mode".

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### Standby mode

This operational mode is displayed by the corresponding LED (right outer rocker, lower contact). The setpoint for "Standby mode" is dependent on whether the heating or cooling mode is active. When the heating mode is active, the setpoint corresponds to the internal base setpoint minus the temperature reduction for standby mode whereas for cooling, the setpoint consists of the internal base setpoint, the dead zone and the rise in temperature for standby mode. It is possible to set the values for the rise and fall in temperature for standby mode. By pressing the bottom of the right outer push button, it is possible to switch from "Comfort mode" to "Standby mode". However by pressing the same button, it is only possible to switch between "Extended comfort mode" and "Night mode".

### Night mode

This operational mode is displayed by the corresponding LED (right outer LED of the row of LEDs). The setpoint for "Night mode" is dependent on whether the heating or cooling mode is active. When the heating mode is selected, the setpoint corresponds to the internal base setpoint minus the reduction for night mode whereas for cooling the setpoint consists of the internal base setpoint, the dead zone and the increase for night mode. It is possible to set the values for the reduction and increase for night mode. It is only possible to toggle in this mode via a command telegram "Night mode On" or as a result of the stopping or end of the extended comfort mode.

### Frost/heat protection mode

This operational mode is displayed by the corresponding LED (outer left LED of the row of LEDs). The setpoint in this mode is dependent on whether the heating or cooling mode is active. When the heating mode is selected, the setpoint corresponds to the adjustable value for "Frost protection" and when the cooling mode is active, it corresponds to the adjustable value for "Heat protection". It is only possible to toggle in this operational mode via a received command telegram "Frost/heat protection On" or via a received status telegram "Window Open".

### Changing the operational state manually

The control of the operational states is normally carried out via a timer, a time program or the control station of a building automation system. Using this special function, it is however possible to change the operational state of the controller manually using the push button for switching to comfort mode (top of right outer push button). To do this the rocker must be pressed for longer than 5 seconds. The 4 possible operational modes are then displayed cyclically one after the other (the corresponding LED lights up). The operational state that is displayed when the rocker is released then becomes active.

### Status of the windows

The evaluation of the window states enables the controller to react when the windows are opened. The controller has two window objects for this purpose. If one or both of the window objects are set to logic 1, the mode is switched to frost/heat protection i.e. the room temperature setpoint is set for heating to the value for frost protection and is set for cooling to the value for heat protection.

When a window is opened, the currently active operational mode is stored. If all the windows are closed again (i.e. both windows are set to logic 0), then the mode is switched back to the stored operational state (before the window was opened) or the operational state set during the window is opened. An additional parameter controls whether the opening of a window leads immediately or only after a specified time period to toggling to frost/heat protection mode, so that if necessary there is no reaction to a window being opened briefly.

### Presence

The controller contains in addition an object for the status "Presence" that can however only be used for the heating mode (not for heat/cool). If the object value "1" is received via this object, the program is switched to "Comfort mode". If the object value "0" is received, the program switches to "Standby mode".

If "Presence" is reported via the presence object and a command telegram is received for switching the controller to "Night mode", this command is stored temporarily and only becomes effective if the object value "0" was received via this presence object (this corresponds to a termination of the extended comfort mode).

### 1.4.6 Status objects

The temperature controller UP 231 has an 8 bit status object for setting the operational mode or for detecting the operational mode. The respective bit states of the 8 bit status object are only available via eight 1 bit objects. An ON switching command to the respective 1 bit object is sufficient for toggling between comfort, night, standby or frost protection modes. After a delay of approx. 2 seconds, the status objects are updated i.e. all the objects are automatically sent whose switching state has been changed by toggling to the new operational mode. If during the changeover the current operational mode is switched off and then the new one is switched on, the period between these two operations must be less than 2 seconds. If the previous operational mode is only switched off (or several bits in the 8 bit status object are set to the operational mode), the operating system is always switched to standby mode in order to guarantee a defined operating state. A change in the operational mode is always displayed immediately via the corre-

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sponding LED, however it is only taken over after approx. 2 seconds.

The frost alarm and heat/cool states are determined by the controller itself. The operational mode is always stored in the event of a bus voltage failure and reproduced on bus voltage recovery.

Each time the controller UP 231 is assigned new or different parameters, the initial starting value of the operational mode can be set.

Significance of the individual bits:

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 = dewpoint alarm  
 Bit 5: 1 = heating mode, 0 = cooling mode  
 Bit 6: 1 = regulator on, 0 = regulator off  
 Bit 7: 1 = frost alarm establishment of the 8-bit condition:

Operating mode	Bit								Hex value
	7	6	5	4	3	2	1	0	
Heating, comfort mode	0	1	1	0	0	0	0	1	61
Heating, standby mode	0	1	1	0	0	0	1	0	62
Heating, night mode	0	1	1	0	0	1	0	0	64
Heating, frost protect. mode	0	1	1	0	1	0	0	0	68
Frost alarm	1	1	1	x	x	x	x	x	(E0)
Cooling, comfort mode	0	1	0	0	0	0	0	1	41
Cooling, standby mode	0	1	0	0	0	0	1	0	42
Cooling, night mode	0	1	0	0	0	1	0	0	44
Cooling, frost protect. mode	0	1	0	0	1	0	0	0	48
Cooling, dewpoint alarm	0	1	0	1	0	0	0	0	50
Regulator off	0	0	0	0	0	0	0	0	00

## 2 Communication objects and parameters

Maximum number of group addresses: 45

Maximum number of associations: 45

## 2.1 Assigning parameters to the main rockers

## 2.1.1 Switching: Communication objects

Phys.Addr.	Program		
no.	Function	Object name	Type
---	---	20 S2 Room temperature controller 900601	
0	On / Off (Toggle)	switching main rocker left	1 Bit
2	On / Off (Toggle)	switching main rocker right	1 Bit
---	---	---	---

## Note:

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

Obj	Function	Object name	Type	Flag
0	On/Off(Toggle)	Switching main rocker left	1 Bit	CWTU
This object is used as a switching object for the main left rocker after a push button action.				
2	On/Off(Toggle)	Switching main rocker right	1 Bit	CWTU
This object is used as a switching object for the main right rocker after a push button action.				

## 2.1.2 Switching: Parameters

## Main rocker left/right

controller general 2	heat	cool	2 Point-controller	LEDs
Configuration	main rocker left	main rocker right	temperature	frostalarm
function	switching			
Upper / Lower contact	On / Off			

The function and the parameters in the parameter windows "Main rocker left" and "Main rocker right" are identical.

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Parameters	Settings
<b>Function</b>	<b>Switching</b> Value Shutter Dimming with stop telegram Dimming with cyclical sending
With this parameter, the "switching" function is set for the main left rocker. The object types in the object list change automatically depending on the function selected.	
<b>Upper / Lower contact</b>	<b>On / Off</b> Off / On Toggle / Toggle
This parameter determines the function of the upper and lower contacts of the main rocker. In the default setting, an "On" telegram is sent when the upper contact is pressed and an "Off" telegram is sent when the lower contact is pressed. If the setting "Toggle / Toggle" is selected, either an "On" or an "Off" telegram is sent, dependent on the current object status when a contact is pressed (toggling).	

### 2.1.3 Value: Communication objects

Phys.Addr.		Program	
no.	Function	Object name	Type
<input checked="" type="checkbox"/>	-----	20 S2 Room temperature controller 900601	
<input type="checkbox"/>	0	8-bit Value	Value main rocker left
<input type="checkbox"/>	2	8-bit value	value main rocker right
---	---	---	---

#### Note:

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

Obj	Function	Object name	Type	Flag
0	8-bit value	Value main rocker left	1 Byte	CWTU
A value telegram is sent via a group address in this object when the main left rocker is pressed. The values of the two contacts (upper / lower) are sent via the same object.				
2	8-bit value	Value main rocker right	1 Byte	CWTU
A value telegram is sent via a group address in this object when the main right rocker is pressed. The values of the two contacts (upper / lower) are sent via the same object.				

### 2.1.4 Value: Parameters

#### Main rocker left/right

Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	LEDs
Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm	
<b>Function</b>					<b>Value</b>
Value upper contact (0-255)					255
Value lower contact (0-255)					255

The function and the parameters of the parameter windows "Main rocker left" and "Main rocker right" are identical.

Parameters	Settings
<b>Function</b>	<b>Switching</b> <b>Value</b> Shutter Dimming with stop telegram Dimming with cyclical sending
With this parameter, the function "value" is set for the main left rocker. The object types in the object list change automatically depending on the function selected.	
<b>Value upper contact (0-255)</b>	<b>255</b>

<b>Value upper contact (0-255)</b>	<b>255</b>
An 8 bit value is set for the upper contact in this parameter which is sent when the rocker is pressed. The range covers the values 0 to 255 (0=0%, 255=100%).	
<b>Value lower contact (0-255)</b>	<b>255</b>

An 8 bit value is set for the lower contact in this parameter which is sent when the rocker is pressed. The range covers the values 0 to 255 (0=0%, 255=100%).

### 2.1.5 Shutter: Communication objects

Phys.Addr.		Program	
no.	Function	Object name	Type
<input checked="" type="checkbox"/>	-----	20 S2 Room temperature controller 900601	
<input type="checkbox"/>	0	Open/Closed	louvres main rocker left
<input type="checkbox"/>	1	Up/Down	shutter main rocker left
<input type="checkbox"/>	2	Open/Closed	louvres main rocker right
<input type="checkbox"/>	3	Up/Down	shutter main rocker right
---	---	---	---

#### Note:

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

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Obj	Function	Object name	Type	Flag
0	Open / Closed	Louvres main rocker left	1 Bit	CWTU
This object is used as a switching object for louvre adjustment after a short push button action. The following therefore applies: when the upper contact is pressed, the louvre is opened by a step with an "Off" telegram while pressing the lower contact closes the louvre by a step with an "On" telegram.				
1	Up / Down	Shutter main rocker left	1 Bit	CWTU
This object is used as a switching object for shutter movement after a long push button action. The following applies for the default setting: when the upper contact is pressed, the shutter is raised via an "Off" telegram and when the lower contact is pressed, the shutter is lowered via an "On" telegram. Pressing a contact briefly while the shutter is moving stops the movement.				
2	Open / Closed	Louvres main rocker right	1 Bit	CWTU
This object is used as a switching object for louvre adjustment after a short push button action. The following therefore applies: when the upper contact is pressed, the louvre is opened by a step with an "Off" telegram while pressing the lower contact closes the louvre by a step with an "On" telegram.				
3	Up / Down	Shutter main rocker right	1 Bit	CWTU
This object is used as a switching object for shutter movement after a long push button action. The following applies for the default setting: when the upper contact is pressed, the shutter is raised via an "Off" telegram and when the lower contact is pressed, the shutter is lowered via an "On" telegram. Pressing a contact briefly while the shutter is moving stops the movement.				

## 2.1.6 Shutter: Parameters

## Main rocker left/right

controller general 2	heat	cool	2 Point-controller	LEDs
Configuration	main rocker left	main rocker right	temperature	frostop
function	shutter			
Upper / Lower contact	Up / Down			
long switch operation min.	0.5 sec.			

The function and the parameters of the parameter windows "Main rocker left" and "Main rocker right" are identical.

Parameters	Settings
Function	Switching Value Shutter Dimming with stop telegram Dimming with cyclical sending
The function "shutter" is set with this parameter for the main left rocker. The parameter windows and the object types in the object list change automatically due to the setting.	
Upper / Lower contact	Up / Down Down / Up
This parameter defines the function for the upper and lower contacts of the rocker. In the default setting, if the upper contact is pressed briefly, the louvres are opened by a step due to an "Off" telegram. Pressing the lower contact of the rocker closes the louvres by a step with an "On" telegram. If the upper contact is pressed for a long period, the shutter is raised with an "Off" telegram while a long operation of the lower contact closes the shutter with an "On" telegram.	
Long switch operation min.	0.3; 0.4; <b>0.5</b> ; 0.6; 0.8; 1.0; 1.2; 1.5; 2.0; 2.5; 3.0; 4.0; 5.0; 6.0; 7.0 sec.
This parameter determines the time limit for short/long rocker operation. If a rocker contact is held down for longer than the set period, the software recognises this as a long switch operation.	

2.1.7 Dimming with stop telegram:  
Communication objects

Phys.Addr.	Program			
	no.	Function	Object name	Type
---	---	---	20 S2 Room temperature controller 900601	
---	0	On / Off (Toggle)	dimming On / Off main rocker left	1 Bit
---	1	Brighter / Darker	dimming main rocker left	4 Bit
---	2	On / Off (Toggle)	Dimming On / Off main rocker right	1 Bit
---	3	Brighter / Darker	Dimming main rocker right	4 Bit
---	---	---	---	---

## Note:

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

Obj	Function	Object name	Type	Flag
0	On/Off (Toggle)	Dimming On/Off main rocker left	1 Bit	CWTU
This object is used as a switching object for the main left rocker after a short push button action. The following applies when assigning the default parameters: when the upper contact is pressed, an "On" telegram is sent via this object whereas an "Off" telegram is sent when the lower rocker is pressed. If the "Toggle" setting is selected, either an "On" or an "Off" telegram is sent dependent on the current switching state (toggling).				

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Obj	Function	Object name	Type	Flag
1	Brighter / Darker	Dimming main rocker left	4 Bit	CWTU
		This object serves as a dimming object for the main left rocker after a long push button action. The following applies: if the upper rocker contact is pressed for a long period, a "Dimming brighter" telegram is sent via this object while a "Dimming darker" telegram is sent when the lower contact is pressed for a long period.		
2	On/Off (Toggle)	Dimming On/Off main rocker right	1 Bit	CWTU
		This object is used as a switching object for the main right rocker after a short push button action. The following applies when assigning the default parameters: when the upper contact is pressed, an "On" telegram is sent via this object whereas an "Off" telegram is sent when the lower rocker is pressed. If the "Toggle" setting is selected, either an "On" or an "Off" telegram is sent dependent on the current switching state (toggling).		
3	Brighter / Darker	Dimming main rocker right	4 Bit	CWTU
		This object serves as a dimming object for the main right rocker after a long push button action. The following applies: if the upper rocker contact is pressed for a long period, a "Dimming brighter" telegram is sent via this object while a "Dimming darker" telegram is sent when the lower contact is pressed for a long period.		

## 2.1.8 Dimming with stop telegram: Parameters

## Main rocker left/right

controller general 2	heat	cool	2 Point-controller	LEDs
Configuration	main rocker left	main rocker right	temperature	frostalarm
function	dimming with stop telegram			
Upper / Lower contact	On / Off			
long switch operation min.	0.5 sec.			

The function and the parameters of the parameter windows "Main rocker left" and "Main rocker right" are identical.

Parameters	Settings
Function	Switching Value Shutter <b>Dimming with stop telegram</b> Dimming with cyclical sending

The function "dimming with stop telegram" is set with this parameter for the main left rocker. The parameter windows and the object types in the object list change automatically due to the setting.

Parameters	Settings
Upper / Lower contact	On / Off Toggle / Toggle
	This parameter defines the function for the upper and lower contacts of the rocker. In the default setting "On / Off", if the upper rocker contact is pressed briefly, an "On" telegram is sent. When the lower contact of the rocker is pressed briefly, an "Off" telegram is sent. If a long switch operation is detected, a "Dimming brighter" telegram is sent when the upper contact is pressed while a "Dimming darker" telegram is sent when the lower contact is pressed. When the push button is released, a "Stop" telegram is sent. If the setting "Toggle / Toggle" is selected, if a contact is pressed briefly either an "On" telegram or an "Off" telegram is sent dependent on the current object state (toggling). The dimming function stays the same as for the setting "On / Off".
Long switch operation min.	0.3; 0.4; <b>0.5</b> ; 0.6; 0.8; 1.0; 1.2; 1.5; 2.0; 2.5; 3.0; 4.0; 5.0; 6.0; 7.0 sec.
	This parameter determines the time limit for short/long rocker operation.

## 2.1.9 Dimming with cyclical sending: Communication objects

Phys.Addr.	Program			Type
	no.	Function	Object name	
---	20 S2 Room temperature controller 900601			
0	On / Off (Toggle)	dimming On / Off main rocker left	1 Bit	
1	Brighter / Darker	dimming main rocker left	4 Bit	
2	On / Off (Toggle)	Dimming On / Off main rocker right	1 Bit	
3	Brighter / Darker	dimming main rocker right	4 Bit	
...	...	...	...	...

## Note:

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

Obj	Function	Object name	Type	Flag
0	On/Off (Toggle)	Dimming On/Off main rocker left	1 Bit	CWTU
		This object is used as a switching object for the main right rocker after a short push button action. The following applies when assigning the default parameters: when the upper contact is pressed, an "On" telegram is sent via this object whereas an "Off" telegram is sent when the lower rocker is pressed. If the "Toggle" setting is selected, either an "On" or an "Off" telegram is sent dependent on the current switching state (toggling).		
1	Brighter / Darker	Dimming main rocker left	4 Bit	CWTU
		This object serves as a dimming object for the main left rocker after a long push button action. The following applies: if the upper rocker contact is pressed for a long period, "Dimming brighter" telegrams are sent via this object while "Dimming darker" telegrams are sent when the lower contact is pressed for a long period.		

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Obj	Function	Object name	Type	Flag
2	On/Off (Toggle)	Dimming On/Off main rocker right	1 Bit	CWTU
3	Brighter / Darker	Dimming main rocker right	4 Bit	CWTU

This object is used as a switching object for the main right rocker after a short push button action. The following applies when assigning the default parameters: when the upper contact is pressed, an "On" telegram is sent via this object whereas an "Off" telegram is sent when the lower rocker is pressed. If the "Toggle" setting is selected, either an "On" or an "Off" telegram is sent dependent on the current switching state (toggling).

This object serves as a dimming object for the main right rocker after a long push button action. The following applies: if the upper rocker contact is pressed for a long period, "Dimming brighter" telegrams are sent via this object while "Dimming darker" telegrams are sent when the lower contact is pressed for a long period.

Parameters	Settings
upper contact is pressed and "Dimming darker" telegrams are sent when the lower contact is pressed. These telegrams are sent at specified intervals (see parameter "Duration of time for cyclical sending) until the push buttons are released again. If the setting "Toggle / Toggle" is selected, if a contact is pressed briefly, either an "On" or an "Off" telegram is sent, depending on the current object status (toggling). The dimming function stays the same as for the setting "On / Off".	
<b>Long switch operation</b>	adjust by 1/2 adjust by 1/4 <b>adjust by 1/8</b> adjust by 1/16 adjust by 1/32 (adjust by 100%)
It is possible to set in this parameter which brightness value adjustment should be carried out by a dimming telegram when a long switch operation is detected. In the setting "adjust by 1/8", 8 dimming telegrams must be sent until the room is dimmed from 0% to 100%.	
<b>Long switch operation min.</b>	0.3; 0.4; <b>0.5</b> ; 0.6; 0.8; 1.0; 1.2; 1.5; 2.0; 2.5; 3.0; 4.0; 5.0; 6.0; 7.0 sec.
This parameter determines the time limit for short/long rocker operation. If a rocker contact is held down for longer than the set period, the software recognises this as a long switch operation.	
<b>Interval for cyclical sending</b>	0.3; 0.4; <b>0.5</b> ; 0.6; 0.8; 1.0; 1.2; 1.5; 2.0; 2.5; 3.0; 4.0; 5.0; 6.0; 7.0 sec.
It is possible to set here the repetition rate for cyclical sending in the event of a long switch operation. When setting the duration for cyclical sending, attention should be paid to the bus load.	

## 2.1.10 Dimming with cyclical sending: Parameters

## Main rocker left/right

Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	LEDs
Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm	
Function	Dimming with cyclical sending				
Upper / Lower contact	On / Off				
Long switch operation	adjust by 1/8				
Long switch operation min.	0.5 seconds				
Interval for cyclical sending	0.5 seconds				

The function and the parameters of the parameter windows "Main rocker left" and "Main rocker right" are identical.

Parameters	Settings
<b>Function</b>	Switching Value Shutter Dimming with stop telegram <b>Dimming with cyclical sending</b>
The function "dimming with cyclical sending" is set with this parameter for the main left rocker. The parameter window and the object types in the object list change automatically due to the setting.	
<b>Upper / Lower contact</b>	On / Off Toggle / Toggle
This parameter defines the function of the upper and lower rocker contacts. In the default setting, an "On" telegram is sent when the upper contact is pressed briefly. An "Off" telegram is sent when the lower contact is pressed briefly. If a long operation is detected (see parameter: "Long switch operation"), "Dimming brighter" telegrams are sent when the	

## 2.2 Assigning parameters to LEDs

## 2.2.1 LED display: Communication objects

Phys.Addr.	Program				
		no.	Function	Object name	Type
<input checked="" type="checkbox"/> -----	20 S2 Room temperature controller 900601	---	---	---	---
---		---	---	---	---
<input checked="" type="checkbox"/> 25	LED-display	display object 1		1 Bit	
<input checked="" type="checkbox"/> 26	LED-display	display-object 2		1 Bit	
<input checked="" type="checkbox"/> 27	LED-display	display-object 3		1 Bit	

## Note:

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

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Obj	Function	Object name	Type	Flag
25	LED display	Display object 1	1 Bit	CWTUR
Via this object, it is possible to assign an LED for displaying the status of an additional object 1.				
26	LED display	Display object 2	1 Bit	CWTUR
Via this object, it is possible to assign an LED for displaying the status of an additional object 2.				
27	LED display	Display object 3	1 Bit	CWTUR
Via this object, it is possible to assign an LED for displaying the status of an additional object 3.				

### 2.2.2 LED display: Parameters

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm	LEDs
Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	
LED of main rocker left	Off				
LED of main rocker right	Off				
LED of auxiliary rocker left upper	Off				
LED of auxiliary rocker left lower	Off				
Winking of the setpoint adjustment-LED	No				
Superposed LED blinking(I)	No				
Superposed LED blinking(II)	No				
Superposed LED blinking(III)	No				

Parameters	Settings
LED of main rocker left	Off On via object via object (inverted) via object winking via object winking (inverted)
LED of main rocker right	Off On via object via object (inverted) via object winking via object winking (inverted)
LED of auxiliary rocker left upper	Off On via object via object (inverted) via object winking via object winking (inverted)
LED of auxiliary rocker left lower	Off On via object via object (inverted) via object winking via object winking (inverted)

Parameters	Settings
The function of an LED is set using these parameters. For the settings "via object ...", the parameter window changes automatically and an additional parameter "Object number" appears where the selected LED can be assigned an object.	
The following objects can be assigned an LED for display via their number:	
No. 0 switching dimming louvres	
No. 1 shutter	
No. 2 switching dimming louvres	
No. 3 shutter	
No. 11 comfort	
No. 12 standby	
No. 13 night reduction	
No. 14 frost protection	
No. 15 dew point / presence	
No. 16 heat/cool / 2-Point On-Off	
No. 17 controller On-Off	
No. 18 frost alarm	
No. 19 setpoint heat	
No. 20 setpoint cool	
No. 21 setpoint Clap	
No. 22 control value 2-point controller	
No. 23 window 1	
No. 24 window 2	
No. 25 display object 1	
No. 26 display object 2	
No. 27 display object 3	
If objects 19 or 20 are assigned an LED, only when the control value is 0% does the LED=Off and when the control value is >0% the LED=On.	
Winking of the setpoint adjustment LED	No via object via object (inverted)
Using this parameter, the LED which displays the current setpoint adjustment, can be assigned an object whose ON or OFF state is displayed by the flashing of the current LED for setpoint adjustment.	
For the settings "via object ...", the parameter window changes automatically and an additional parameter "Object number" appears where the selected LED can be assigned an object.	
Superposed LED blinking(I)	No Yes
Superposed LED blinking(II)	No Yes
Superposed LED blinking(III)	No Yes
In addition to the object whose status is displayed by the LED, a further object can be assigned to the LED using these parameters, whose ON or OFF state is displayed by the flashing of the LED.	
When the setting "Yes" is selected, the parameter window changes and the additional parameters "LED" and "Object number" appear. An LED can be selected in the "LED" parameter while the selected LED can be assigned an object in the "Object number" parameter.	

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## 2.3 Configuration: Parameters

Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	LEDs
Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm	
Operating mode	heating and cooling				
Sending of all 1-bit status values at initialization	No				
Enable all buttons	Yes				

Parameters	Settings
Operating mode	only heating <b>heating and cooling</b> service station
The operating mode of the temperature controller is set via this parameter. The parameter windows and the object types in the object list change automatically according to the setting.	
Sending of all 1 bit status values at initialization	No Yes
It can be determined here whether all the 1 bit status values are sent after each initialisation process. However if "Yes" is selected, attention should be paid to the bus load!	
Enable all buttons	Yes No
Each push button (i.e. each of the 8 rocker contacts) can be enabled individually using this parameter. The parameter window changes automatically according to the setting.	

## 2.4 Temperature: Parameters

Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	LEDs
Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm	
Ratio of sensor extern / intern	only sensor intern				
Offset for actual value of internal sensor	No offset				
Offset for actual value of external sensor	No offset				
Deviation for automatic sending of the actual value of temperature	0.2 K				
Cycle time for automatical sending of actual value temperature	10 minutes				
Cycle time for a temperature request to the external sensor	10 minutes				
Hysteresis of actual value temperature	+/- 0.05 K				

Parameters	Settings
Ratio of sensor extern / intern	only sensor extern 90% / 10% 80% / 20% 70% / 30% 60% / 40% 50% / 50% 40% / 60% 30% / 70% 20% / 80% 10% / 90% <b>only sensor intern</b>
Via this parameter, it can be set what proportion (weighting) of the actual values of the external and internal sensor is used in order to calculate the total actual value. The first value corresponds to the weighting of the external sensor.	

Parameters	Settings
Offset for actual value of internal sensor	+10K; +8.0K; +7.0K; +6.5K; +6.0K; +5.5K; +5.0K; +4.5K; +4.0K; +3.5K; +3.0K; +2.5K +2.0K; +1.5K; +1.2K; +1.0K; +0.8K; +0.6K; +0.5K; +0.4K; +0.3K; +0.2K; +0.1K; <b>No offset</b> -10K; -8.0K; -7.0K; -6.5K; -6.0K; -5.5K; -5.0K; -4.5K; -4.0K; -3.5K; -3.0K; -2.5K -2.0K; -1.5K; -1.2K; -1.0K; -0.8K; -0.6K; -0.5K; -0.4K; -0.3K; -0.2K; -0.1K;
It is possible to adapt the actual value of the internal sensor to the environmental influences (e.g. cold wall) via the offset.	
Offset for actual value of external sensor	+10K; +8.0K; +7.0K; +6.5K; +6.0K; +5.5K; +5.0K; +4.5K; +4.0K; +3.5K; +3.0K; +2.5K +2.0K; +1.5K; +1.2K; +1.0K; +0.8K; +0.6K; +0.5K; +0.4K; +0.3K; +0.2K; +0.1K; <b>No offset</b> -10K; -8.0K; -7.0K; -6.5K; -6.0K; -5.5K; -5.0K; -4.5K; -4.0K; -3.5K; -3.0K; -2.5K -2.0K; -1.5K; -1.2K; -1.0K; -0.8K; -0.6K; -0.5K; -0.4K; -0.3K; -0.2K; -0.1K;
It is possible to adapt the actual value of the external sensor to the environmental influences (e.g. cold wall) via the offset.	
Deviation for automatic sending of actual value of temperature	0.1K; <b>0.2K</b> ; 0.3K; 0.4K; 0.5K; 0.6K; 0.7K; 0.8K; 0.9K; 1.0K; 1.2K; 1.5K; 1.8K; 2.0K; 2.5K; 3.0K; 3.5K; 4.0K; 4.5K; 5.0K; inactive
It is possible to set here the temperature adjustment of the actual value which causes the actual value to be sent automatically.	
Cycle time for automatical sending of actual value temperature	5; 6; 7; 8; 9; <b>10</b> ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 min.; inactive
In this parameter the time interval is defined in which the actual value should be sent in addition to being sent automatically when there is a change.	
Cycle time for temperature request to the external sensor	5; 6; 7; 8; 9; <b>10</b> ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 min.; inactive
The time interval for the query of the extern actual value is set here.	
Hysteresis of actual value temperature	+/- 0.01 Kelvin +/- 0.03 Kelvin <b>+/- 0.05 Kelvin</b> +/- 0.07 Kelvin
A hysteresis can be set via this parameter. It prevents slight temperature fluctuations producing new actual values.	

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### 2.5 Frost alarm: Parameters

Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	LEDs									
Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm										
Value for frost alarm		5.0 °C												
Cycle time for sending of a frost alarm		10 minutes												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Parameters</th> <th style="width: 75%;">Settings</th> </tr> </thead> <tbody> <tr> <td>Value for frost alarm</td> <td>0 °C, 0.5 °C; 1.0 °C; 1.5 °C; 2.0 °C; 2.5 °C; 3.0 °C; 3.5 °C; 4.0 °C; 4.5 °C; 5.0 °C</td> </tr> <tr> <td>The temperature at which the controller sends a frost alarm can be defined in this parameter.</td> <td></td> </tr> <tr> <td>Cycle time for sending of a frost alarm</td> <td>5; 6; 7; 8; 9; 10; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 min.; inactive</td> </tr> <tr> <td>The transmission repetition rate for the frost alarm can be set here. In addition to being sent automatically when there is a change, the frost alarm is sent cyclically e.g. every 10 minutes.</td> <td></td> </tr> </tbody> </table>					Parameters	Settings	Value for frost alarm	0 °C, 0.5 °C; 1.0 °C; 1.5 °C; 2.0 °C; 2.5 °C; 3.0 °C; 3.5 °C; 4.0 °C; 4.5 °C; 5.0 °C	The temperature at which the controller sends a frost alarm can be defined in this parameter.		Cycle time for sending of a frost alarm	5; 6; 7; 8; 9; 10; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 min.; inactive	The transmission repetition rate for the frost alarm can be set here. In addition to being sent automatically when there is a change, the frost alarm is sent cyclically e.g. every 10 minutes.	
Parameters	Settings													
Value for frost alarm	0 °C, 0.5 °C; 1.0 °C; 1.5 °C; 2.0 °C; 2.5 °C; 3.0 °C; 3.5 °C; 4.0 °C; 4.5 °C; 5.0 °C													
The temperature at which the controller sends a frost alarm can be defined in this parameter.														
Cycle time for sending of a frost alarm	5; 6; 7; 8; 9; 10; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 min.; inactive													
The transmission repetition rate for the frost alarm can be set here. In addition to being sent automatically when there is a change, the frost alarm is sent cyclically e.g. every 10 minutes.														

### 2.6 Assigning parameters for heat/cool

#### 2.6.1 Heat/Cool: Communication objects

Phys.Addr.	Program	Object name	Type
no.	Function	Object name	Type
01.01.019	20 S2 Room temperature controller 900601		
...	...	...	...
4	sensor intern + sensor extern	Actual temperature value	2 Byte
5	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte
6	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte
7	Base-setpoint in °C	Base-setpoint	2 Byte
8	Adjustment in Kelvin	Setpoint adjustment	2 Byte
9	Actual setpoint	Setpoint	2 Byte
10	8-bit Status	Status	1 Byte
11	On / Off	Comfort	1 Bit
12	On / Off	Standby	1 Bit
13	On / Off	Night reduction	1 Bit
14	On / Off	Frost protection	1 Bit
15	On / Off	Dew point alarm	1 Bit
16	1=Heating / 0=Cooling	Heating / Cooling	1 Bit
17	On / Off	PI-controller	1 Bit
18	On / Off	Frost alarm	1 Bit
19	continuous	Control value heating	1 Byte
20	continuous	Control value cooling	1 Byte
21	1=Open / 0=Closed	Ventilating flap	1 Bit
22	Switching	Control value of additional 2-point-controller	1 Bit
23	1=Open / 0=Closed	Window contact I	1 Bit
24	1=Open / 0=Closed	Window contact II	1 Bit
...	...	...	...

#### Note:

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

Obj	Function	Object name	Type	Flag
4	Sensor intern + sensor extern	Actual temperature value	2 Byte	CTUR
This object contains the current total actual temperature value. The value is sent automatically when there is a change.				
5	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte	CTUR
This object contains the current actual temperature value of the internal sensor.				
6	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte	CWTUR
This object contains the current actual temperature value of the external sensor. Cyclical read telegrams can also be sent via this object to the external temperature sensor so that it returns its current actual value.				
7	Base-setpoint in °C	Base-setpoint	2 Byte	CWTUR
The base setpoint value can be changed by external setting telegrams via this object.				
Note: If the base setpoint value has to be changed via this object it is useful to set parameter "store value in case of voltage failure" in the configuration window "regulators in general 2" to make this value available for the regulator at once when the bus voltage recurs.				
8	Adjustment in Kelvin	Setpoint adjustment	2 Byte	CWTUR
Each change in the setpoint adjustment is sent via this object. If a value is received via the object for setpoint adjustment, the program calculates the resulting discrete value (step). If the value received does not correspond to one of the 5 discrete values then the next possible value is accepted, displayed and sent back.				
9	Actual setpoint	Setpoint	2 Byte	CTUR
This object contains the actual setpoint value for the room temperature. The setpoint is dependent on the current operating mode (e.g. standby mode).				
10	8 bit status	Status	1 Byte	CWTUR
This object contains the current status of the controller which is sent automatically when there is a change in the state. 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 = Heat mode, 0 = Cool mode Bit 6: 1 = Controller On, 0 = Controller Off Bit 7: 1 = Frost alarm				

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Obj	Function	Object name	Type	Flag
11	On / Off	Comfort	1 Bit	CWTUR
Using this object, the "Comfort" operating mode can be set via the bus. If a on-message is received the operating mode "comfort" is set and the previously busy operating mode is switched off. If the regulator is operating in the "night mode" it is possible to activate the extended comfort mode via this object.				
12	On / Off	Standby	1 Bit	CWTUR
Using this object, the "Standby" operating mode can be set via the bus. If a on-message is received the operating mode "standby" is set and the previously busy operating mode is switched off. If the regulator is operating in the "extended comfort mode" toggling to the standby mode is possible via this object exclusively.				
13	On / Off	Night reduction	1 Bit	CWTUR
Using this object, the "Night reduction" mode (night mode) can be set via the bus. If a on-message is received the operating mode "night reduction" is set and the previously busy operating mode is switched off. Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object, excluded by breaking off the extended comfort mode.				
14	On / Off	Frost protection	1 Bit	CWTUR
Using this object, the "Frost protection" mode can be set via the bus. If a on-message is received the operating mode "frost protection" is set and the previously busy operating mode is switched off. Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object.				
15	On / Off	Dew point alarm	1 Bit	CWTUR
A dew point alarm that has been sent by a dew point sensor can be received via this object and displayed via an LED.				
16	1=Heating, 0=Cooling	Heating / Cooling	1 Bit	CTUR
This object indicates whether the controller is in heating or cooling mode. If there is a change in the status, it is sent automatically.				
17	On / Off	PI controller	1 Bit	CTUR
It is possible to switch the PI controller on or off via this object.				
18	On / Off	Frost alarm	1 Bit	CTUR
The alarm is sent automatically if the measured temperature falls below the set value.				
19	continuous	Control value heating	1 Byte	CTUR
The control value of the heating mode is given via this object. The object type is determined in the parameter setting "Control value output". If the setting "Heating mode: Off" is selected when assigning parameters, this object does not appear in the object list.				

Obj	Function	Object name	Type	Flag
20	continuous	Control value cooling	1 Byte	CTUR
The control value of the cooling mode is given via this object. The object type is determined in the parameter setting "Control value output". If the setting "Cooling mode: Off" is selected when assigning parameters, this object does not appear in the object list.				
21	1 = Open / 0 = Closed	Ventilating flap	1 Bit	CTUR
A switching command can be given to a ventilating flap using this object. The object only works if the operating mode "cooling" is busy. This mode is opened in the "cooling mode comfort" condition or likewise with set "dew point alarm" (signal 1 is transmitted) and is closed if the conditions mentioned above are left. A busy window object (value = 1) also entails closing the flap. If the cooling mode is not configured at all, this object does not appear in the object list.				
22	Switching	Control value in additional with 2-Point controller	1 Bit	CWTUR
The control value of the additional 2-Point controller is displayed via this object.				
23	1 = Open/ 0 = Closed	Window contact I	1 Bit	CWTUR
The status of window contact I is received via this object. If the object value = 1 (window open), the temperature controller switches to "Frost/heat protection" mode and remains in this mode until the object value of window contact I or II is equal to "1".				
24	1 = Open/ 0 = Closed	Window contact II	1 Bit	CWTUR
The status of window contact II is received via this object. If the object value = 1 (window open), the temperature controller switches to "Frost/heat protection" mode and remains in this mode until the object value of window contact I or II is equal to "1".				

## 2.6.2 Controller general: Parameters

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Controller general	Controller general 2	Heating	Cooling	2-Point-Controller
Setpoint frost protection for heating	7 °C			
Setpoint heat protection for cooling	35 °C			
Standby-time heating reduction	2 K			
Night-time heating reduction	4 K			
Standby-time cooling increase	2 K			
Night-time cooling increase	4 K			
Setpoint adjustment per push button action	1.0 K			
Duration for extended comfort mode	60 minutes			
Evaluation of the window open time	after 30 seconds			
Assignment of control values to objects heating and cooling	separate			

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Parameters	Settings
<b>Setpoint frost protection heating</b>	5 °C; 6 °C; 7 °C ; 8 °C; 9 °C; 10 °C
The setpoint for frost protection is given using this parameter. If the actual room temperature value falls below the setpoint in heating mode, the controller switches to the "Frost protection" mode. The "Frost protection" mode is also activated if the status "Window Open" is received when the controller is in heating mode.	
<b>Setpoint heat protection cooling</b>	30 °C; 31 °C; 32 °C; 33 °C; 34 °C; <b>35 °C</b> ; 36 °C; 37 °C; 38 °C; 39 °C; 40 °C
The setpoint for heat protection is given using this parameter. If the actual room temperature value falls below the setpoint in cooling mode, the controller switches to the "Heat protection" mode. The "Heat protection" mode is also activated if the status "Window Open" is received when the controller is in cooling mode.	
<b>Standby-time heating reduction</b>	1 K; <b>2 K</b> ; 3K; 4 K; 5 K;
This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Standby" mode while in heating mode.	
<b>Night-time heating reduction</b>	1 K; 2 K; 3K; <b>4 K</b> ; 5 K;
This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Night" mode while in heating mode.	
<b>Standby-time cooling increase</b>	1 K; <b>2 K</b> ; 3 K; 4 K; 5 K;
This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Standby" mode while in cooling mode.	
<b>Night-time cooling increase</b>	1 K; 2 K; 3 K; <b>4 K</b> ; 5 K;
This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Night" mode while in cooling mode.	
<b>Setpoint adjustment per push button action</b>	0.2 K; 0.3 K; 0.4 K; 0.5 K; 0.6 K; 0.7 K; 0.8 K; 0.9 K; <b>1.0 K</b> ; 1.2 K; 1.5 K; 1.8 K; 2.0 K; 2.2 K; 2.5 K;
In this parameter the step width of the setpoint adjustment can be set per push button action. The specified value applies both to an adjustment upwards (+) and downwards (-).	

Parameters	Settings
<b>Duration for extended comfort mode</b>	5, 6, 7, 8, 9, 10, 12, 15, 17, 20, 25, 30, 40, 50, <b>60</b> , 90, 120min. inactive continuous
The duration of the extended comfort mode is set in this parameter. If the "Night" mode is active and the upper contact of the right outer rocker is pressed, the operating mode switches from "Night" mode to "Comfort" mode according to the time that is specified here. Once the time specified for the extended comfort mode has elapsed, the "Night" mode is reactivated. If the same rocker is pressed again while the extended comfort mode is still active, the comfort period restarts. Pressing the lower contact of the right outer rocker ends the extended comfort mode.	
<b>Evaluation of the window open time</b>	at once <b>after 30 sec.</b>
The time frame for the evaluation of the window status is specified in this parameter as either immediately or after 30 seconds. Depending on the setting selected, the status "Window Open" causes the setpoint in heating mode to be set to the value for frost protection and in cooling mode to be set to the value for heat protection.	
<b>Assignment of control values to objects heating and cooling</b>	both on object heating (special fkt.) <b>separate</b>
It can be defined here whether the output of the control values is carried out via the respective objects (object 19 for control values for heat and object 20 for control values for cool) or globally via the object for heat (19).	

## 2.6.3 Controller general 2: Parameters

Configuration	Main left rocker		Main right rocker		Frost alarm
Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	LEDs
Internal control mode (look at controller description)	I-part is not limited				
Duration for cyclical sending of control values	10 minutes				
Dead zone between heating und cooling	3.0 K				
Dead zone of controller	0.1 K				
maximum control deviation	10.0 K				
Base-setpoint and actual value of exten sensor at restart	22 °C				
Operating mode after parameterizing	frost protection mode				

Parameters	Settings
<b>Internal control mode (look at controller description)</b>	I-part is limited <b>I-part is not limited</b>
With this parameter the integral-action component of the PI controller can be limited that way that that integral action and proportional action components together will never exceed 100% and the regulating output will response at once in case of a declining setpoint deviation.	

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Parameters	Settings
Duration for cyclical sending of control values	5; 6; 7; 8; 9; <b>10</b> ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 min.; inactive
The time interval for sending the control values in addition to them being sent automatically when there is a change is specified here.	
Dead zone between heating and cooling	0.5 K; 0.6 K; 0.7 K; 0.8 K; 1.0 K; 1.2 K; 1.5 K; 2.0 K; 2.5 K; 3.0 K; 3.5 K; 4.0 K; 4.5 K; <b>5.0 K</b> ; 5.5 K; 6.0 K; 6.5 K; 7.0 K; 7.5 K; 8.0 K; 8.5 K; 9.0 K; 9.5 K; 10.0 K
The dead zone between heat and cool is set in this parameter. The dead zone should prevent the controller from continuously switching between heating and cooling mode when there are slight temperature fluctuations.	
Dead zone of controller	<b>0.1 K</b> ; 0.2 K; 0.3 K; 0.4 K; 0.5 K; 0.6 K; 0.7 K; 0.8 K; 1.0 K; 1.2 K; 1.5 K; 2.0 K; 2.5 K;
The dead zone of the controller is set in this parameter. If the control deviation (i.e. the differential between setpoint value and actual value) is less than the value preselected by the dead zone, the controller remains inactive.	
Maximum control deviation	0.5 K; 1.0 K; 2.0 K; 3.0 K; 4.0 K; 5.0 K; 6.0 K; 7.0 K; 8.0 K; 9.0 K; <b>10.0 K</b>
This parameter limits the control deviation to an adjustable value in order to avoid excessive fluctuations (e.g. for the setting "Window Open", the setpoint falls to the value for frost protection).	
Base setpoint and actual value of extern sensor at restart	5°C; 10°C; 13°C; 15°C; 16°C; 17°C; 18°C; 19°C; 20°C; 21°C; <b>22°C</b> ; 23°C; 24°C; 25°C; 27°C; 30°C; value at voltage failure is to save
This parameter is used to specify which value the base setpoint and the external actual value should accept so that the program has sensible starting values immediately on restart (bus voltage recovery). Concerning the setting: "save value in case of voltage failure" the default configuration for the first initialisation after establishing the program is 22°C. In general this configuration is only useful if the basic setpoint can be changed by external setting telegrams (object 7).	
Operating mode after parameterizing	<b>frost protection mode</b> night mode standby mode Comfort mode
It can be selected in this parameter which operating mode the program starts with after each (new) assignment of parameters.	

2.6.4 Heat/Cool: Parameters  
(with continuous control value output)

The function and parameters of the parameter window "Cool" are identical to "Heat".

Configuration	Main left rocker	Main right rocker	Temperature		Frost alarm
Controller general	Controller general 2	<b>Heating</b>	Cooling	2-Point-Controller	LEDs
Heating mode		<b>On</b>			
Proportional band		4.0 K			
Integration time		30 minutes			
Type of control value output		continuous (8 bit)			
Maximum control value		100%			
Minimum control value		0%			
Direction and scale of the control value		+ 100 % (normal)			
Change of control value for automatic sending		1%			

Parameters	Settings
Heating mode	<b>On</b> Off
The heating mode can be switched on or off manually via this parameter. If "Off" is selected, all the parameters in this parameter window and object 19 in the object list are no longer displayed. There is no control value output for heat.	
Proportional band	1.0 K; 1.1 K; 1.2 K; 1.3 K; 1.4 K; 1.5 K; 1.6 K; 1.7 K; 1.8 K; 2.0 K; 2.2 K; 2.5 K; 3.0 K; 3.5 K; <b>4.0 K</b> ; 4.5 K; 5.0 K;
The proportional band of the PI controller is set via this parameter. A proportional band of 4 K means that a control deviation of 4 K leads to a change in the control value by 100%.	
Integration time	5; 6; 7; 8; 9; 10; 12; 15; 17; 20; 25; <b>30</b> ; 40; 50; 60; 90; 120 min.; inactive
The integration time of the PI controller is specified via this parameter. An integration period of e.g. 10 minutes means that during this time the same size adjustment of the control value is carried out as by the proportional component.	
Type of control value output	continuous (8 bit) switching (1bit)
The type of control value output can be defined in this parameter. If "continuous" is selected, the output corresponds to the calculated control value with a resolution of 8 bit. When "switching" is selected, the output of the control value is carried out by pulse width modulation whereby the pulse factor between "On" and "Off" corresponds to the calculated control value.	
Maximum control value	0%; 1%; 2%; 3%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; <b>100%</b> ;
An upper limiting value for the control value can be set via this parameter.	

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Parameters	Settings
<b>Minimum control value</b>	<b>0%; 1%; 2%; 3%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; 100% ;</b>
A lower limiting value for the control value can be set via this parameter.	
<b>Direction and scale of the control value</b>	<b>+1%; +2%; +3%; +5%; +7%; +10%; +15%; +20%; +30%; +40%; +50%; +60%; +70%; +80%; +85%; +90%; +95%; +100%;(normal) -1%; -2%; -3%; -5%; -7%; -10%; -15%; -20%; -30%; -40%; -50%; -60%; -70%; -80%; -85%; -90%; -95%; -100%;(inverted)</b>
The format of the control value output is defined in this parameter. In the setting "100% normal", the controller assumes that the valve is open when the control value is +100%. If however the valve is closed, the control value must be inverted. By reducing the percentage figure, a compression (scaling) of the control value is achieved. It is therefore possible for example to control various types of valves.	
<b>Change of control value for automatic sending</b>	<b>1%; 2%; 3%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; 100%;</b>
It can be determined in this parameter which control value change causes the control value to be sent automatically.	

## 2.6.5 Heating / Cooling: Parameters (with switching control value output)

Configuration		Main left rocker		Main right rocker	
Controller general	Controller general 2	Heating	Cooling	2-Point-Controller	LEDs
Heating mode		On			
Proportional band		4.0 K			
Integration time		30 minutes			
Type of control value output		switching (1 bit)			
Maximum control value		100%			
Minimum control value		0%			
Direction of the control value		normal			
Always On from		100 % of control value			
Always Off until		1 % of control value			
Period duration of control value output		10 minutes			

Parameters	Settings
<b>Heating mode</b>	<b>On Off</b>
The heating mode can be switched on or off manually via this parameter. If "Off" is selected, all the parameters in this parameter window and object 19 in the object list are no longer displayed. There is no control value output for heat.	
<b>Proportional band</b>	<b>1.0 K; 1.1 K; 1.2 K; 1.3 K; 1.4 K; 1.5 K; 1.6 K; 1.7 K; 1.8 K; 2.0 K; 2.2 K; 2.5 K; 3.0 K; 3.5 K; <b>4.0 K</b> ; 4.5 K; 5.0 K;</b>
The proportional band of the PI controller is set via this parameter. A proportional band of 4 K means that a control deviation of 4 K leads to a change in the control value by 100%.	
<b>Integration time</b>	<b>5; 6; 7; 8; 9; 10; 12; 15; 17; 20; 25; <b>30</b>; 40; 50; 60; 90; 120 min.; inactive</b>
The integration time of the PI controller is specified via this parameter. An integration period of e.g. 10 minutes means that during this time the same size adjustment of the control value is carried out as by the proportional component.	
<b>Type of control value output</b>	<b>continuous (8 bit) switching (1 bit)</b>
The type of control value output can be defined in this parameter. If "continuous" is selected, the output corresponds to the calculated control value with a resolution of 8 bit. When "switching" is selected, the output of the control value is carried out by pulse width modulation whereby the pulse factor between "On" and "Off" corresponds to the calculated control value. In the setting "switching (1 bit)", the parameter window changes and additional parameters are displayed. The object type of the object "Control value heat (19)" changes to 1 bit.	
<b>Maximum control value</b>	<b>0%; 1%; 2%; 3%; 4%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; <b>100%</b> ;</b>
An upper limiting value of the control value can be set via this parameter.	
<b>Minimum control value</b>	<b>0%; 1%; 2%; 3%; 4%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; 100%;</b>
A lower limiting value of the control value can be set via this parameter.	

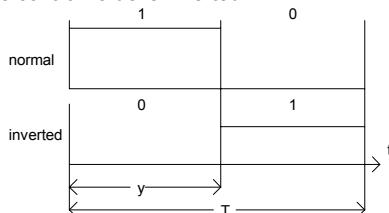
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Parameters	Settings
Direction of the control value	normal inverted

The format of the control value output is defined in this parameter. In the setting "normal" a control value complying with the calculated control value is passed off. In the setting "inverted" the control value is inverted.



T: duration of the control value output  
y: calculated control value

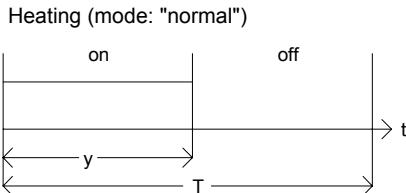
It is therefore possible for example to control various types of valves respectively actuator.

Always On from	1%; 5%; 10%; 20%; 30%; 40%; 50%; 60%; 70%; 80%; 90%; 95%; 99%; <b>100%; of control value</b>
It is specified here what percentage of the control value output is always "On".	
Always Off until	1%; 5%; 10%; 20%; 30%; 40%; 50%; 60%; 70%; 80%; 90%; 95%; 99%; 100%; of control value

It is specified here what percentage of the control value output is always "Off".

Period duration of control value output	10s (Bus load! Actuator!); 30s (Bus load! Actuator!); 1min. (take care of Actuator); 2min. (take care of Actuator); 3min. (take care of Actuator); 4min. (take care of Actuator); 5min. (take care of Actuator); 6; 7; 8; <b>10</b> ; 12; 15; 20; 25; 30; 35; 40; 60; 90; 120; 150; 180 min.
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In this parameter the duration of the control value output period is specified. The control value corresponds to the proportion of key depressions between "on (1)" and "off (0)" within the period.



y: calculated control value  
T: duration of the control value output

Attention: Take care that the duration of the period is not shorter than the switching interval of the two-state-valves. If 10s and 30s are set the bus load has to be considered additionally.

## 2.7 Assigning parameters for only heating

## 2.7.1 Only heating: Communication Objects

Phys.Addr.	Program no.	Function	Object name	Type
	01.01.019	20 S2 Room temperature controller 900601		
...	...	...	...	...
4	sensor intern + sensor extern	Actual temperature value	2 Byte	
5	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte	
6	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte	
7	Base-setpoint in °C	Base-setpoint	2 Byte	
8	Adjustment in Kelvin	Setpoint adjustment	2 Byte	
9	Actual setpoint	Setpoint	2 Byte	
10	8-bit Status	Status	1 Byte	
11	On / Off	Comfort	1 Bit	
12	On / Off	Standby	1 Bit	
13	On / Off	Night reduction	1 Bit	
14	On / Off	Frost protection	1 Bit	
15	On / Off	2-Point-controller	1 Bit	
16	Yes / No	Presence	1 Bit	
17	On / Off	Pi-controller	1 Bit	
18	On / Off	Frost alarm	1 Bit	
19	continuous	Control value heating	1 Byte	
22	Switching	Control value of additional 2-point-controller	1 Bit	
23	1=Open / 0=Closed	Window contact I	1 Bit	
24	1=Open / 0=Closed	Window contact II	1 Bit	

## Note:

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

Obj	Function	Object name	Type	Flag
4	Sensor intern + sensor extern	Actual temperature value	2 Byte	CTUR
This object contains the current actual temperature value. It is sent automatically when there is a change.				
5	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte	CTUR
This object contains the current actual temperature value for the internal sensor.				
6	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte	CWTUR
This object contains the current actual temperature value of the external sensor. Cyclical read telegrams can also be sent via this object to the external temperature sensor so that it returns its current actual value.				

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Obj	Function	Object name	Type	Flag
7	Base-setpoint in °C	Base-setpoint	2 Byte	CWTUR
The base setpoint value can be changed via external setting telegrams. Note: If the base setpoint value has to be changed via this object it is useful to set parameter "store value in case of voltage failure" in the configuration window "regulators in general 2" to make this value available for the regulator at once when the bus voltage recurs.				
8 Adjustment in Kelvin				
9	Setpoint adjustment	Setpoint	2 Byte	CWTUR
Each change in the setpoint adjustment is sent via this object. If a value is received via the object for setpoint adjustment, the program calculates the resulting discrete value (step). If the value received does not correspond to one of the 5 discrete values then the next possible value is accepted, displayed and sent back.				
10	Actual setpoint	Setpoint	2 Byte	CTUR
This object contains the actual setpoint value for the room temperature. The setpoint is dependent on the current operating mode (e.g. standby mode).				
11	8 bit status	Status	1 Byte	CWTUR
This object contains the current status of the controller which is sent automatically when there is a change in the state. 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 = Heat mode, 0 = Cool mode Bit 6: 1 = Controller On, 0 = Controller Off Bit 7: 1 = Frost alarm				
12	On / Off	Comfort	1 Bit	CWTUR
Using this object, the "Comfort" operating mode can be set via the bus. If a on-message is received the operating mode "comfort" is set and the previously busy operating mode is switched off. If the regulator is operating in the "nightmode" activating the extended comfort mode is possible via this object.				
13	On / Off	Standby	1 Bit	CWTUR
Using this object, the "Standby" operating mode can be set via the bus. If a on-message is received the operating mode "standby" is set and the previously busy operating mode is switched off. If the regulator is operating in the "extended comfort mode" toggling to the standby mode is possible via this object exclusively.				
14	On / Off	Night reduction	1 Bit	CWTUR
Using this object, the "Night reduction" operating mode can be set via the bus. If a on-message is received the operating mode "night reduction" is set and the previously busy operating mode is switched off. Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object, excluded by breaking off the extended comfort mode.				

Obj	Function	Object name	Type	Flag
14	On / Off	Frost protection	1 Bit	CWTUR
Using this object, the "Frost protection" operating mode can be set via the bus. If a on-message is received the operating mode "frost protection" is set and the previously busy operating mode is switched off. Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object.				
15	On / Off	2-Point-controller	1 Bit	CWTUR
The 2-Point controller can be switched on or off via this object.				
16	Yes / No	Presence	1 Bit	CWTUR
The "Comfort" mode can be switched on via this object and remains active until a telegram with the object value "0" is received via this object. Any telegrams that were previously received via the bus for toggling between standby or night modes are temporarily stored and only carried out at this point. This object is only available for the setting "only heating".				
17	On / Off	PI controller	1 Bit	CWTUR
It is possible to switch the PI controller on or off via this object.				
18	On / Off	Frost alarm	1 Bit	CTUR
The frost alarm is sent via this object. The alarm is sent automatically if the measured temperature falls below the set value.				
19	Continuous	Control value heating	1 Byte	CTUR
The control value of the heating mode is given via this object. The object type is determined in the parameter setting "Control value output".				
22	Switching	Control value of additional with 2-Point controller	1 Bit	CWTUR
The control value of the additional 2-Point controller is displayed via this object.				
23	1 = Open/ 0 = Closed	Window contact I	1 Bit	CWTUR
The status of window contact I is received via this object. If the object value = 1 (window open), the temperature controller switches to "Frost/heat protection" mode and remains in this mode until the object value of window contact I or II is equal to "1".				
24	1 = Open/ 0 = Closed	Window contact II	1 Bit	CWTUR
The status of window contact II is received via this object. If the object value = 1 (window open), the temperature controller switches to "Frost/heat protection" mode and remains in this mode until the object value of window contact I or II is equal to "1".				

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## 2.7.2 Controller general: Parameters

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Controller general	Controller general 2	Heating	2-Point-Controller	LEDs
Setpoint frost protection for heating	7 °C			
Standby-time heating reduction	2 K			
Night-time heating reduction	4 K			
Setpoint adjustment per push button action	1.0 K			
Duration for extended comfort mode	60 minutes			
Evaluation of the window open time	after 30 seconds			
Internal control mode (look at controller description)	I-part is not limited			
Duration for cyclical sending of control values	10 minutes			
Dead zone of controller	0.1 K			
maximum control deviation	10.0 K			

Parameters	Settings
Setpoint frost protection for heating	5 °C; 6 °C; 7 °C ; 8 °C; 9 °C; 10 °C
Standby-time heating reduction	1 K; 2 K ; 3 K; 4 K; 5 K;
Night-time heating reduction	1 K; 2 K; 3 K; 4 K ; 5 K;
Setpoint adjustment per push button action	0.2 K; 0.3 K; 0.4 K; 0.5 K; 0.6 K; 0.7 K; 0.8 K; 0.9 K; 1.0 K ; 1.2 K; 1.5; 1.8 K; 2.0 K; 2.2 K; 2.5 K;
In this parameter the step width of the setpoint adjustment can be set per push button action. The specified value applies both to an adjustment upwards (+) and downwards (-).	

Parameters	Settings
Duration for extended comfort mode	60 min. 90 min. 120 min. inactive continuous
Evaluation of the window open time	at once after 30 sec.
Internal control mode (look at controller description)	I-part is limited I-part is not limited
Duration for cyclical sending of control values	5; 6; 7; 8; 9; 10 ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 minutes; inactive
Dead zone of controller	0.1 K ; 0.2 K; 0.3 K; 0.4 K; 0.5 K; 0.6 K; 0.7 K; 0.8 K; 1.0 K; 1.2 K; 1.5 K; 2.0 K; 2.5 K;
maximum control deviation	0.5 K; 1.0 K; 2.0 K; 3.0 K; 4.0 K; 5.0 K; 6.0 K; 7.0 K; 8.0 K; 9.0 K; 10.0 K

The duration of the extended comfort mode is set in this parameter. If the "Night" mode is active and the upper contact of the right outer rocker is pressed, the operating mode switches from "Night" mode to "Comfort" mode according to the time that is specified here. Once the time specified for the extended comfort mode has elapsed, the "Night" mode is reactivated. If the same rocker is pressed again while the extended comfort mode is still active, the comfort period restarts. Pressing the lower contact of the right outer rocker ends the extended comfort mode.

The time frame for the evaluation of the window status is specified in this parameter. Depending on the setting selected, the status "Window Open" causes the setpoint in heating mode to be set to the value for frost protection and in cooling mode to be set to the value for heat protection as either immediately or after 30 seconds.

With this parameter the integral-action component of the PI controller can be limited that way that that integral action and proportional action components together will never exceed 100% and the regulating output will respond at once in case of a declining setpoint deviation.

The time interval for sending the control values in addition to them being sent automatically when there is a change is specified here.

The dead zone of the controller is set in this parameter. If the control deviation (i.e. the differential between setpoint value and actual value) is less than the value preselected by the dead zone, the controller remains inactive.

This parameter limits the control deviation to an adjustable value in order to avoid excessive fluctuations (e.g. for the setting "Window Open", the setpoint falls to the value for frost protection).

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### 2.7.3 Controller general 2: Parameters

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Controller general	<b>Controller general 2</b>	Heating	2-Point-Controller	LEDs
Base-setpoint and actual value of extern sensor at restart		22 °C		
Operating mode after parameterizing		frost protection mode		

Parameters	Settings
<b>Base-setpoint and actual value of extern sensor at restart</b>	5 °C; 10 °C; 13 °C; 15 °C; 16 °C; 17 °C; 18 °C; 19 °C; 20 °C; 21 °C; <b>22 °C</b> ; 23 °C; 24 °C; 25 °C; 27 °C; 30 °C; value at voltage failure is to save
This parameter is used to specify which value the base setpoint and the external actual value should accept so that the program has sensible starting values immediately on restart (bus voltage recovery). Concerning the setting: "save value in case of voltage failure" the default configuration for the first initialisation after establishing the program is 22°C. In general this configuration is only useful if the basic setpoint can be changed by external setting telegrams (object 7)	
<b>Operating mode after parameterising</b>	<b>frost protection mode</b> night mode standby mode Comfort mode
It can be selected in this parameter which operating mode the program starts with after each (new) assignment of parameters.	

### 2.7.4 Heating: Parameters (with continuous control value output)

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Controller general	Controller general 2	<b>Heating</b>	2-Point-Controller	LEDs
Heating mode	On			
Proportional band	4.0 K			
Integration time	30 minutes			
Type of control value output	continuous (8 bit)			
Maximum control value	100%			
Minimum control value	0%			
Direction and scale of the control value	+ 100 % (normal)			
Change of control value for automatic sending	1%			

Parameters	Settings
<b>Heating mode</b>	<b>On</b> Off
The heating mode can be switched on or off manually via this parameter. If "Off" is selected, all the parameters in this parameter window and object 19 in the object list are no longer displayed. There is no control value output for heat.	

Parameters	Settings
<b>Proportional band</b>	1.0 K; 1.1 K; 1.2 K; 1.3 K; 1.4 K; 1.5 K; 1.6 K; 1.7 K; 1.8 K; 2.0 K; 2.2 K; 2.5 K; 3.0 K; 3.5 K; <b>4.0 K</b> ; 4.5 K; 5.0 K;
The proportional band of the PI controller is set via this parameter. A proportional band of 4 K means that a control deviation of 4 K leads to a change in the control value by 100%.	
<b>Integration time</b>	5; 6; 7; 8; 9; 10; 12; 15; 17; 20; 25; <b>30</b> ; 40; 50; 60; 90; 120 minutes; inactive
The integration time of the PI controller is specified via this parameter. An integration period of e.g. 10 minutes means that during this time the same size adjustment of the control value is carried out as by the proportional component.	
<b>Type of control value output</b>	<b>continuous (8 bit)</b> switching (1 bit)
The type of control value output can be defined in this parameter. If "continuous" is selected, the output corresponds to the calculated control value with a resolution of 8 bit. When "switching" is selected, the output of the control value is carried out by pulse width modulation whereby the pulse factor between "On" and "Off" corresponds to the calculated control value. In the setting "switching (1 bit)", the parameter window changes and additional parameters are displayed. The object type of the object "Control value heat (19)" changes to 1 bit.	
<b>Maximum control value</b>	0%; 1%; 2%; 3%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; <b>100%</b> ;
An upper limiting value for the control value can be set via this parameter.	
<b>Minimum control value</b>	<b>0%</b> ; 1%; 2%; 3%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; 100%;
An lower limiting value for the control value can be set via this parameter.	
<b>Direction and scale of the control value</b>	+1%; +2%; +3%; +5%; +7%; +10%; +15%; +20%; +30%; +40%; +50%; +60%; +70%; +80%; +85%; +90%; +95%; <b>+100%</b> ; normal -1%; -2%; -3%; -5%; -7%; -10%; -15%; -20%; -20%; -30%; -40%; -50%; -60%; -70%; -80%; -85%; -90%; -95%; -100%; (inverted)
The format of the control value output is defined in this parameter. In the setting "100% normal", the controller assumes that the valve is open when the control value is +100%. If however the valve is closed, the control value must be inverted. By reducing the percentage figure, a compression (scaling) of the control value is achieved. It is therefore possible for example to control various types of valves.	

## Description of application program

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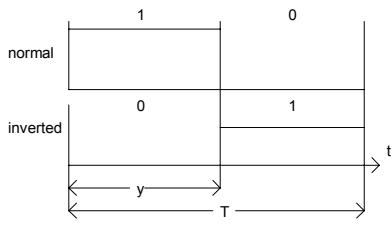
## 20 S2 Room temperature controller 900601

Parameters	Settings
<b>Change of control value for automatic sending</b>	1% ; 2% ; 3% ; 5% ; 7% ; 10% ; 15% ; 20% ; 25% ; 30% ; 35% ; 40% ; 45% ; 50% ; 55% ; 60% ; 65% ; 70% ; 75% ; 80% ; 85% ; 90% ; 95% ; 100% ; It can be determined in this parameter which control value change causes the control value to be sent automatically.

2.7.5 Heating: Parameters  
(with switching control value output)

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Controller general	Controller general 2	Heating	2-Point-Controller	LEDs
<b>Heating mode</b>	On			
Proportional band	4.0 K			
Integration time	30 minutes			
Type of control value output	switching (1 bit)			
Maximum control value	100%			
Minimum control value	0%			
Direction of the control value	normal			
Always On from	100 % of control value			
Always Off until	1 % of control value			
Period duration of control value output	10 minutes			

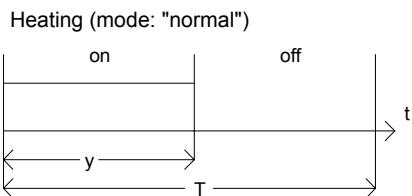
Parameters	Settings
<b>Heating mode</b>	On Off The heating mode can be switched on or off manually via this parameter. If "Off" is selected, all the parameters in this parameter window and object 19 in the object list are no longer displayed. There is no control value output for heat.
<b>Proportional band</b>	1.0 K; 1.1 K; 1.2 K; 1.3 K; 1.4 K; 1.5 K; 1.6 K; 1.7 K; 1.8 K; 2.0 K; 2.2 K; 2.5 K; 3.0 K; 3.5 K; <b>4.0 K</b> ; 4.5 K; 5.0 K; The proportional band of the PI controller is set via this parameter. A proportional band of 4 K means that a control deviation of 4 K leads to a change in the control value by 100%.
<b>Integration time</b>	5; 6; 7; 8; 9; 10 ; 12; 15; 17; 20; 25; <b>30</b> ; 40; 50; 60; 90; 120 min.; inactive The integration time of the PI controller is specified via this parameter. An integration period of e.g. 10 minutes means that during this time the same size adjustment of the control value is carried out as by the proportional component.

Parameters	Settings
<b>Type of control value output</b>	continuous (8 bit) <b>switching (1 bit)</b> The type of control value output can be defined in this parameter. If "continuous" is selected, the output corresponds to the calculated control value with a resolution of 8 bit. When "switching" is selected, the output of the control value is carried out by pulse width modulation whereby the pulse factor between "On" and "Off" corresponds to the calculated control value. In the setting "switching (1 bit)", the parameter window changes and additional parameters are displayed. The object type of the object "Control value heat (19)" changes to 1 bit.
<b>Maximum control value</b>	0%; 1%; 2% ; 3% ; 5% ; 7% ; 10% ; 15% ; 20% ; 25% ; 30% ; 35% ; 40% ; 45% ; 50% ; 55% ; 60% ; 65% ; 70% ; 75% ; 80% ; 85% ; 90% ; 95% ; <b>100%</b> ; An upper limiting value for the control value can be set via this parameter.
<b>Minimum control value</b>	0% ; 1%; 2% ; 3% ; 5% ; 7% ; 10% ; 15% ; 20% ; 25% ; 30% ; 35% ; 40% ; 45% ; 50% ; 55% ; 60% ; 65% ; 70% ; 75% ; 80% ; 85% ; 90% ; 95% ; 100%; A lower limiting value for the control value can be set via this parameter.
<b>Direction of the control value</b>	<b>normal</b> inverted The format of the control value output is defined in this parameter. In the setting "normal" a control value complying with the calculated control value is passed off. In the setting "inverted" the control value is inverted.
	 <p>T: duration of the control value output y: calculated control value</p>
<b>Always On from</b>	1%; 5%; 10%; 20%; 30%; 40%; 50%; 60%; 70%; 80%; 90%; 95%; 99%; <b>100% ; of control value</b> It is specified here what percentage of the control value output is always "On".
<b>Always Off until</b>	1% ; 5%; 10%; 20%; 30%; 40%; 50%; 60%; 70%; 80%; 90%; 95%; 99%; <b>100% ; of control value</b> It is specified here what percentage of the control value output is always "Off".

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Parameters	Settings
Period duration of control value output	10s ; 30s; 1; 2; 3; 4; 5; 6; 7; 8; <b>10</b> ; 12; 15; 20; 25; 30; 35; 40; 60; 90; 120; 150; 180 min.

In this parameter the duration of the control value output period is specified. The control value corresponds to the proportion of key depressions between "on (1)" and "off (0)" within the period.



y: calculated control value  
T: duration of the control value output

Attention: Take care that the duration of the period is not shorter than the switching interval of the two-position-valves. If 10s and 30s are set the bus load has to be considered additionally.

## 2.8 2-Point controller: Parameters

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Controller general	Controller general 2	Heating	<b>2-Point-Controller</b>	LEDs
Hysteresis of additional 2-Point-controller	+/- 0.5 K			
Cycle time 2-point-controller	5 minutes			
Offset for setpoint	No offset			

Parameters	Settings
Hysteresis of additional 2-Point controller	+/-0.1K; +/-0.2K; +/-0.3K; +/-0.4K; <b>+/-0.5K</b> ; +/-0.6K; +/-0.7K; +/-1.0K; +/-1.2K; +/-1.5K; +/-1.7K; +/-2.0K; +/-2.2K; +/-2.5K;
The switching hysteresis of the 2-Point controller is set here. It should reduce the switching frequency of the controller.	
Cycle time 2-Point controller	2; 3; 4; <b>5</b> ; 6; 7; 8; 9; 10 ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 min.; continuous
Once the time interval set in this parameter has elapsed, the 2-Point controller is reactivated (i.e. the two-step control is only implemented e.g. every 10 minutes).	
Offset for setpoint	-4.0K; -3.5K; -3.0K; -2.5K; -2.0K; -1.5K; -1.0K; -0.5K; <b>No offset</b> ; +0.5K; +1.0K; +1.5K; +2.0K; +2.5K; +3.0K; +3.5K;
The 2-Point controller uses the setpoint value of the PI controller. The setpoint can be adjusted via the offset so that it can be changed.	

## 2.9 Assigning parameters to the service station

### 2.9.1 Service station: Communication objects (without calculation of setpoint value)

Phys.Addr.	Program		
no.	Function	Object name	Type
<input checked="" type="checkbox"/> 01.01.019	20 S2 Room temperature controller	900601	
...	...	...	...
4	sensor intern + sensor extern	Actual temperature value	2 Byte
5	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte
6	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte
8	Adjustment in Kelvin	Setpoint adjustment	2 Byte
10	8-bit Status	Status	1 Byte
11	On / Off	Comfort	1 Bit
12	On / Off	Standby	1 Bit
13	On / Off	Night reduction	1 Bit
14	On / Off	Frost protection	1 Bit
17	On / Off	Controller (Tableau)	1 Bit
18	On / Off	Frost alarm	1 Bit

#### Note:

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

Obj	Function	Object name	Type	Flag
<b>4</b>	Sensor intern + sensor extern	Actual temperature value	2 Byte	CTUR
This object contains the current actual temperature value. The value is sent automatically when there is a change.				
<b>5</b>	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte	CTUR
This object contains the current actual temperature value of the internal sensor.				
<b>6</b>	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte	CWTUR
This object contains the current actual temperature value of the external sensor. Cyclical read telegrams can also be sent via this object to the external temperature sensor so that it returns its current actual value.				
<b>8</b>	Adjustment in Kelvin	Setpoint adjustment	2 Byte	CWTUR
Each change in the setpoint adjustment is sent via this object. If a value is received via the object for setpoint adjustment, the program calculates the resulting discrete value (step). If the value received does not correspond to one of the 5 discrete values then the next possible value is accepted, displayed and sent back.				

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Obj	Function	Object name	Type	Flag
10	8 bit status	Status	1 Byte	CWTUR
This object contains the current status of the controller which is sent automatically when there is a change in the state. 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 = Heat mode, 0 = Cool mode Bit 6: 1 = Controller On, 0 = Controller Off Bit 7: 1 = Frost alarm				
Using this object, the "Comfort" operating mode can be set via the bus. Using this object, the "Comfort" operating mode can be set via the bus. If a on-message is received the operating mode "comfort" is set and the previously busy operating mode is switched off. If the regulator is operating in the "night mode" activating the extended comfort mode is possible via this object.				
11	On / Off	Comfort	1 Bit	CWTUR
Using this object, the "Standby" operating mode can be set via the bus. If a on-message is received the operating mode "standby" is set and the previously busy operating mode is switched off. If the regulator is operating in the "night mode" toggling to the standby mode is possible via this object.				
12	On / Off	Standby	1 Bit	CWTUR
Using this object, the "Night reduction" operating mode can be set via the bus. If a on-message is received the operating mode "night reduction" is set and the previously busy operating mode is switched off. Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object, excluded by breaking off the extended comfort mode.				
13	On / Off	Night reduction	1 Bit	CWTUR
Using this object, the "Frost protection" operating mode can be set via the bus. If a on-message is received the operating mode "frost protection" is set and the previously busy operating mode is switched off. Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object.				
14	On / Off	Frost protection	1 Bit	CWTUR
It is possible to switch the PI controller on or off via this object.				
17	On / Off	Controller (Tableau)	1 Bit	CWTUR
The frost alarm is sent via this object. The alarm is sent automatically if the measured temperature falls below the set value.				

## 2.9.2 Status parameter: Parameters (without calculation of setpoint value)

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Status parameter				LEDs
Calculate setpoint (additional objects are necessary)	No			
Setpoint adjustment per push button action	1.0 K			
Duration for extended comfort mode	60 minutes			
Base-setpoint and actual value of extern sensor at restart	22 °C			
Operating mode after parameterizing	frost protection mode			

Parameters	Settings
Calculate setpoint (additional objects are necessary)	No Yes
It is possible to specify in this parameter whether the temperature controller should only be operated as a service station or should also carry out its own setpoint calculation.	
Setpoint adjustment per push button action	0.2 K; 0.3 K; 0.4 K; 0.5 K; 0.6 K; 0.7 K; 0.8 K; 0.9 K; <b>1.0 K</b> ; 1.2 K; 1.5 K; 1.8 K; 2.0 K; 2.2 K; 2.5 K;
In this parameter the step width of the setpoint adjustment can be set per push button action. The specified value applies both to an adjustment upwards (+) and downwards (-).	
Duration for extended comfort mode	5, 6, 7, 8, 9, 10, 12, 15, 17, 20, 25, 30, 40, 50, <b>60</b> , 90, 120 min. inactive continuous
The duration of the extended comfort mode is set in this parameter. If the "Night" mode is active and the upper contact of the right outer rocker is pressed, the operating mode switches from "Night" mode to "Comfort" mode according to the time that is specified here. Once the time specified for the extended comfort mode has elapsed, the "Night" mode is reactivated. If the same rocker is pressed again while the extended comfort mode is still active, the comfort period restarts. Pressing the lower contact of the right outer rocker is ends the extended comfort mode.	
Base-setpoint and actual value of extern sensor at restart	5 °C; 10 °C; 13 °C; 15 °C; 16 °C; 17 °C; 18 °C; 19 °C; 20 °C; 21 °C; <b>22 °C</b> ; 23 °C; 24 °C; 25 °C; 27 °C; 30 °C; value at voltage failure is to save
This parameter is used to specify which value the base set-point and the external actual value should accept so that the program has sensible starting values immediately on restart (bus voltage recovery). Concerning the setting: "save value in case of voltage failure" the default configuration for the first initialisation after establishing the program is 22°C. In general this configuration is only useful if the basic setpoint can be changed by external setting telegrams (object 7).	

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Parameters	Settings
Operating mode after parameterizing	frost protection mode night mode standby mode comfort mode
It can be selected in this parameter which operating mode the program starts with after each (new) assignment of parameters.	

## 2.9.3 Service station: Communication objects (with calculation of setpoint value)

Phys.Addr.	Program	Object name	Type
no.	Function	Object name	Type
01.01.019	20 S2 Room temperature controller 900601		
---	---	---	---
4	sensor intern + sensor extern	Actual temperature value	2 Byte
5	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte
6	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte
7	Base-setpoint in °C	Base-setpoint	2 Byte
8	Adjustment in Kelvin	Setpoint adjustment	2 Byte
9	Actual setpoint	Setpoint	2 Byte
10	8-bit Status	Status	1 Byte
11	On / Off	Comfort	1 Bit
12	On / Off	Standby	1 Bit
13	On / Off	Night reduction	1 Bit
14	On / Off	Frost protection	1 Bit
15	On / Off	Dew point alarm	1 Bit
16	1=Heating / 0=Cooling	Heating / Cooling	1 Bit
17	On / Off	Controller (Tableau)	1 Bit
18	On / Off	Frost alarm	1 Bit
23	1=Open / 0=Closed	Window contact I	1 Bit
24	1=Open / 0=Closed	Window contact II	1 Bit

## Note:

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

Obj	Function	Object name	Type	Flag
4	Sensor intern + sensor extern	Actual temperature value	2 Byte	CTUR
This object contains the current actual temperature value. The value is sent automatically when there is a change.				
5	Actual value of int. sensor	Actual temperature value int. sensor	2 Byte	CTUR
This object contains the current actual temperature value of the internal sensor.				
6	Actual value of ext. sensor	Actual temperature value ext. sensor	2 Byte	CWTUR
This object contains the current actual temperature value of the external sensor. Cyclical read telegrams can also be sent via this object to the external temperature sensor so that it returns its current actual value.				

Obj	Function	Object name	Type	Flag
7	Base-setpoint in °C	Base-setpoint	2 Byte	CWTUR

The base can be changed by external setting diagrams via this object.

Note: If the base setpoint value has to be changed via this object it is useful to set parameter "save value in case of voltage failure" in the configuration window "regulators in general 2" to make this value available for the regulator at once when the bus voltage recurs.

8	Adjustment in Kelvin	Setpoint adjustment	2 Byte	CWTUR
---	----------------------	---------------------	--------	-------

Each change in the setpoint adjustment is sent via this object. If a value is received via the object for setpoint adjustment, the program calculates the resulting discrete value (step) and activates the corresponding LED. If the value received does not correspond to one of the 5 discrete values then the next possible value is accepted, displayed and sent back.

9	Actual setpoint	Setpoint	2 Byte	CTUR
---	-----------------	----------	--------	------

This object contains the actual setpoint value for the room temperature. The setpoint is dependent on the current operating mode (e.g. standby mode).

10	8 bit Status	Status	1 Byte	CWTUR
----	--------------	--------	--------	-------

This object contains the current status of the controller which is sent automatically when there is a change in the state. 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 = Heat mode, 0 = Cool mode  
Bit 6: 1 = Controller On, 0 = Controller Off  
Bit 7: 1 = Frost alarm

11	On / Off	Comfort	1 Bit	CWTUR
----	----------	---------	-------	-------

Using this object, the "Comfort" operating mode can be set via the bus.

If a on-message is received the operating mode "comfort" is set and the previously busy operating mode is switched off. If the regulator is operating in the "night mode" toggling to the extended comfort mode is possible via this object.

12	On / Off	Standby	1 Bit	CWTUR
----	----------	---------	-------	-------

Using this object, the "Standby" operating mode can be set via the bus.

If a on-message is received the operating mode "comfort" is set and the previously busy operating mode is switched off. If the regulator is operating in the "extended comfort mode" toggling to the standby mode is possible via this object exclusively.

13	On / Off	Night reduction	1 Bit	CWTUR
----	----------	-----------------	-------	-------

Using this object, the "Night reduction" operating mode can be set via the bus. If a on-message is received the operating mode "night reduction" is set and the previously busy operating mode is switched off.

Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object, excluded by breaking off the extended comfort mode.

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Obj	Function	Object name	Type	Flag
14	On / Off	Frost protection	1 Bit	CWTUR
		Using this object, the "Frost protection" operating mode can be set via the bus. If a on-message is received the operating mode "frost protection" is set and the previously busy operating mode is switched off.		
		Toggling the regulator to this operating mode is not possible via rockers but exclusively via this object.		
15	On / Off	Dew point alarm	1 Bit	CWTUR
		A dew point alarm can be received via this object.		
16	1=Heating, 0=Cooling	Heating / Cooling	1 Bit	CTUR
		This object indicates whether the controller is in heating or cooling mode. If there is a change in the status, it is sent automatically.		
17	On / Off	Controller (Tableau)	1 Bit	CWTUR
		It is possible to switch the PI controller on or off via this object.		
18	On / Off	Frost alarm	1 Bit	CTUR
		The frost alarm is sent via this object. The alarm is sent automatically if the measured temperature falls below the set value.		
23	1 = Open / 0 = Closed	Window contact I	1 Bit	CWTUR
		The status of window contact I is received via this object. If the object value = 1 (window open), the temperature controller switches to "Frost/heat protection" mode and remains in this mode until the object value of window contact I or II is equal to "1".		
24	1 = Open / 0 = Closed	Window contact II	1 Bit	CWTUR
		The status of window contact II is received via this object. If the object value = 1 (window open), the temperature controller switches to "Frost/heat protection" mode and remains in this mode until the object value of window contact I or II is equal to "1".		

2.9.4 Status parameter: Parameters  
(with calculation of setpoint)

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Status parameter	Status parameter 2		LEDs	
Calculate setpoint (additional objects are necessary)	Yes			
Setpoint frost protection for heating	7 °C			
Setpoint heat protection for cooling	35 °C			
Standby-time heating reduction	2 K			
Night-time heating reduction	4 K			
Standby-time cooling increase	2 K			
Night-time cooling increase	4 K			
Setpoint adjustment per push button action	1.0 K			
Duration for extended comfort mode	60 minutes			
Evaluation of the window open time	after 30 seconds			

Parameters	Settings
Calculate setpoint (additional objects are necessary)	No Yes
	It is possible to specify in this parameter whether the temperature controller should only be operated as a service station or should also carry out its own setpoint calculation.
Setpoint frost protection for heating	5 °C; 6 °C; 7 °C ; 8 °C; 9 °C; 10 °C
	The setpoint for frost protection is given using this parameter. If the actual room temperature value falls below the setpoint in heating mode, the controller switches to the "Frost protection" mode. The "Frost protection" mode is also activated if the status "Window Open" is received when the controller is in heating mode.
Setpoint heat protection for cooling	30 °C; 31 °C; 32 °C; 33 °C; 34 °C; 35 °C ; 36 °C; 37 °C; 38 °C; 39 °C; 40 °C
	The setpoint for heat protection is given using this parameter. If the actual room temperature value falls below the setpoint in cooling mode, the controller switches to the "Heat protection" mode. The "Heat protection" mode is also activated if the status "Window Open" is received when the controller is in cooling mode.
Standby-time heating reduction	1 K; 2 K ; 3 K; 4 K; 5 K;
	This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Standby" mode while in heating mode.
Night-time heating reduc- tion	1 K; 2 K; 3 K; 4 K ; 5 K;
	This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Night" mode while in heating mode.

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Parameters	Settings
<b>Standby-time cooling increase</b>	1 K; 2 K; 3 K; 4 K; 5 K;
	This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Standby" mode while in cooling mode.
<b>Night-time cooling increase</b>	1 K; 2 K; 3 K; 4 K; 5 K;
	This parameter is used to determine what value the setpoint temperature should be increased by if the operating mode switches from "Comfort" mode to "Night" mode while in cooling mode.
<b>Setpoint adjustment per push button action</b>	0.2 K; 0.3 K; 0.4 K; 0.5 K; 0.6 K; 0.7 K; 0.8 K; 0.9 K; 1.0 K; 1.2 K; 1.5 K; 1.8 K; 2.0 K; 2.2 K; 2.5 K;
	In this parameter the step width of the setpoint adjustment can be set per push button action. The specified value applies both to an adjustment upwards (+) and downwards (-).
<b>Duration for extended comfort mode</b>	5, 6, 7, 8, 9, 10, 12, 15, 17, 20, 25, 30, 40, 50, 60, 90, 120 min. inactive continuous
	The duration of the extended comfort mode is set in this parameter. If the "Night" mode is active and the upper contact of the right outer rocker is pressed, the operating mode switches from "Night" mode to "Comfort" mode according to the time that is specified here. Once the time specified for the extended comfort mode has elapsed, the "Night" mode is reactivated. If the same rocker is pressed again while the extended comfort mode is still active, the comfort period restarts. Pressing the lower contact of the right outer rocker ends the extended comfort mode.
<b>Evaluation of the window open time</b>	at once after 30 seconds
	The time frame for the evaluation of the window status is specified in this parameter as either immediately or after 30 seconds. Depending on the setting selected, the status "Window Open" causes the setpoint in heating mode to be set to the value for frost protection and in cooling mode to be set to the value for heat protection.

## 2.9.5 Status parameter 2: Parameters (with calculation of setpoint value)

Configuration	Main left rocker	Main right rocker	Temperature	Frost alarm
Status parameter	Status parameter 2			LEDs
Dead zone between heating and cooling	5.0 K			
Base-setpoint and actual value of extern sensor at restart	22 °C			
Operating mode after parameterizing	frost protection mode			

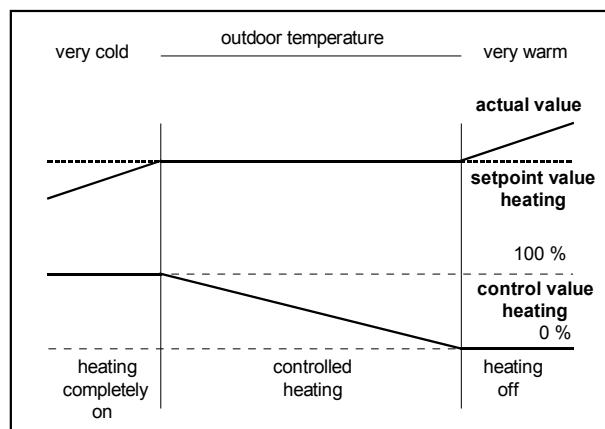
Parameters	Settings
<b>Dead zone between heating and cooling</b>	0.5 K; 0.6 K; 0.7 K; 0.8 K; 1.0 K; 1.2 K; 1.5 K; 2.0 K; 2.5 K; 3.0 K; 3.5 K; 4.0 K; 4.5 K; 5.0 K; 5.5 K; 6.0 K; 6.5 K; 7.0 K; 7.5 K; 8.0 K; 8.5 K; 9.0 K; 9.5 K; 10.0 K
	The dead zone between heat and cool is set in this parameter. The dead zone should prevent simultaneous heating and cooling.
<b>Base-setpoint and actual value of extern sensor at restart</b>	5 °C; 10 °C; 13 °C; 15 °C; 16 °C; 17 °C; 18 °C; 19 °C; 20 °C; 21 °C; 22 °C; 23 °C; 24 °C; 25 °C; 27 °C; 30 °C; value at voltage failure is to save
	This parameter is used to specify which value the base setpoint and the external actual value should accept so that the program has sensible starting values immediately on restart (bus voltage recovery). Concerning the setting: "save value in case of voltage failure" the default configuration for the first initialisation after establishing the program is 22°C. In general this configuration is only useful if the basic setpoint can be changed by external setting telegrams (object 7).
<b>Operating mode after parameterizing</b>	frost protection mode night mode standby mode Comfort mode
	It can be selected in this parameter which operating mode the program starts with after each (new) assignment of parameters.

## 20 S2 Room temperature controller 900601

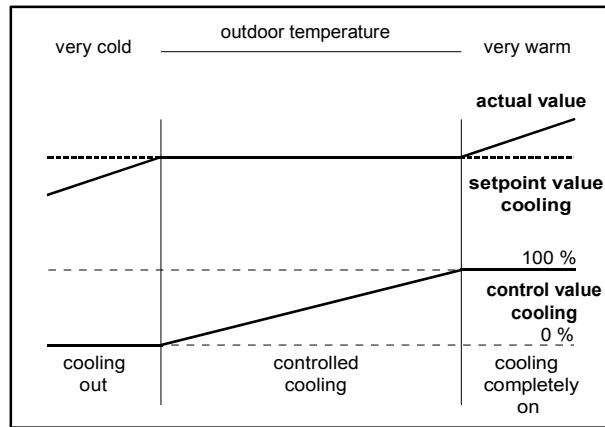
### 3 Diagrams

#### 3.1 PI-controller heating- / cooling mode

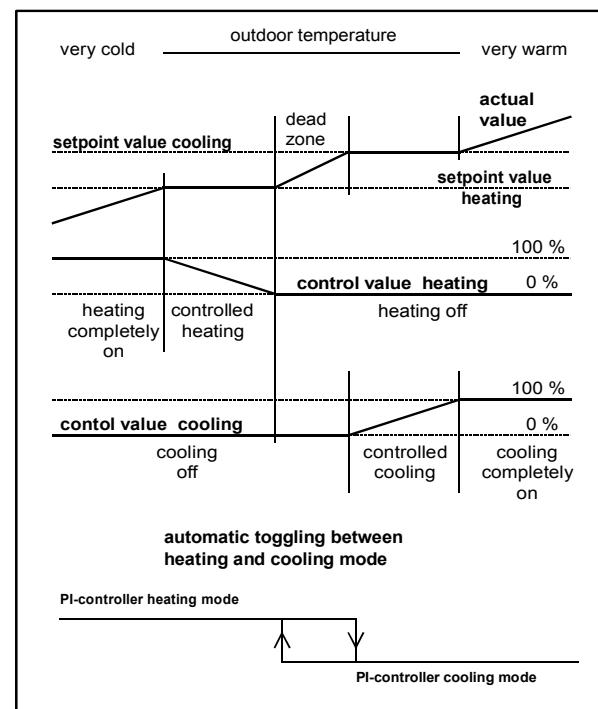
##### PI-controller heating mode



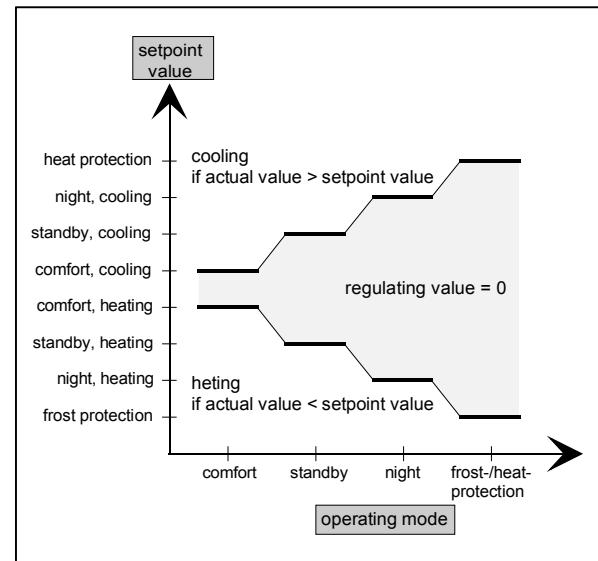
##### PI-controller in cooling mode



##### Automatically toggled PI-controller heating and cooling mode



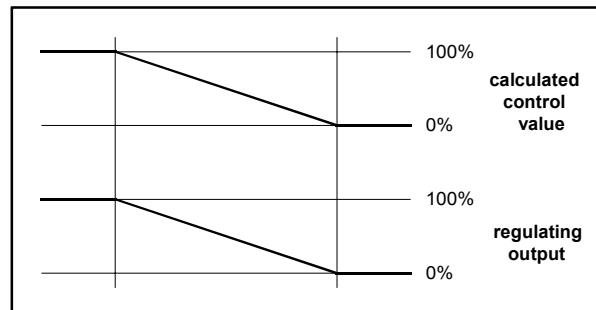
#### 3.2 Setpoint values of the operating modes



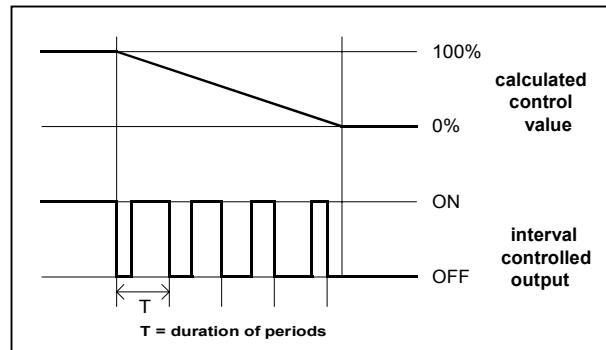
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### 3.3 Control value output

#### Continuous output of the control value

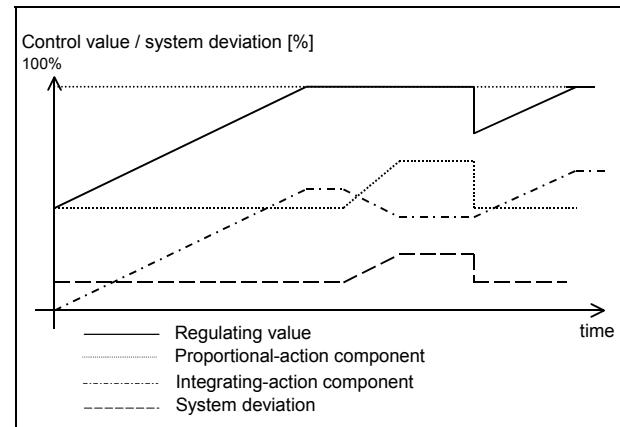


#### Interval controlled output of the control value

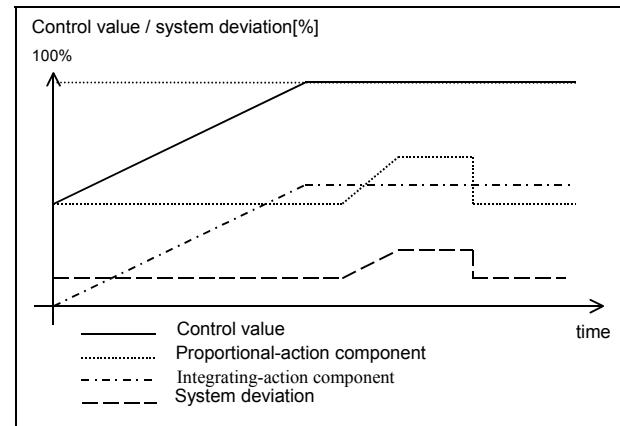


### 3.4 Limitation of the integral-action component

#### With limitation of the integral-action component



#### Without limitation of the integral-action component



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**Notes:**