20 S2 Room temperature controller 900610

Use of the application program

Product family:	Heating, Air conditioning, Ventilation
Product family:	Thermostat
Manufacturer:	Siemens
Name:	**Temperature controller UP 231/3**
Design:	**DELTA profil**

Colour	Order-Nr.
pearl grey	5WG1 231-2AB03
titanium white	5WG1 231-2AB13
anthracite	5WG1 231-2AB23
silver	5WG1 231-2AB73

Design: **DELTA style**

Colour	Order-Nr.
titanium white	5WG1 231-2EB13
basalt black	5WG1 231-2EB23

Note: The UP 231/3 requires a bus coupler UP 114 from BCU 2.0 release 8 or BCU 2.1 release 0 onwards!

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1. Functional description

The application program “20 S2 Room temperature controller 900610” has several function blocks which can be combined with each other in different ways to make the following functions available:

- Operation via centre rockers (main rockers):
  - Switching (On, Off, Toggle),
  - dimming,
  - value,
  - shutter control.
- 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.
- Room temperature control, adjustable as:
  - Heating with adaptive control (for floor-heating) **and** heating with two-step control (for radiator heating),
  - Heating (floor-heating) **and** cooling with adaptive control **and** cooling with two-step control (for radiator heating),
  - heating with two-step control,
  - heating with adaptive control,
  - heating **and** cooling with adaptive control, cooling with adaptive control,
  - service station.

The room temperature control includes the following subfunctions:

- Room temperature measurement via the internal temperature sensor,
- room temperature measurement via the external temperature sensor,
- calculation of the actual value (evaluated by the internal and external sensor, temperature offset),
- setpoint adjustment via the outer left push button and display for setpoint adjustment,
- toggling the operating mode of the controller via the outer right push button and displays for standby, comfort, night and building security mode,
- additional immediate transmission of an On respectively an Off telegram (via object 3 to superpose flashings of LEDs) each time the outer right push button is depressed,
- setpoint calculation (depending on the current operating mode of the controller),
- timed-out removal of night reduction (extended comfort mode),
- continuous-action, adaptive control for heating / cooling with continuous control value output (in %) or switching control value output (On / Off),
- control output heating or cooling with Continuous-action control value with two-fold sequence control as a supplementary equipment (can be employed e.g. for simultaneous floor- and radiator heating),
- additional two-step control for heating (with an adjustable setpoint contrary to the setpoint of the adaptive control, which can be employed e.g. for simultaneous floor- and radiator heating),
- no room temperature control when used merely as a “service station” for another room temperature controller.

Note:
The application program „20 S2 Room temperature controller 900610" can only be used in connection with a multiswitch UP 231/3 with UP 114 (BCU2).
The communication objects and parameters used with the application program „20 S2 Room temperature controller 900610“ sometimes differ considerably from those of the application programs „11 S1 T-ctrl 210B01“ respectively „..210B03“ for the room temperature controllers UP 251 to UP 252 and from the application programs „20 S2 Room temperature controller 90060x“ for the multiswitch UP 231 with PI-control. This must be considered when configuring individual room controls (particularly when switching between operational modes).

2. Main push buttons and LED-displays

2.1. Main push buttons

The multiswitch has two broad 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 sent or received at last.
The operation of both the upper and lower push buttons is always sent via a separate object. During normal operation (no toggling), both objects are linked with the same address.

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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.

2.2. LED-displays

Types of display
The temperature controller UP 231/3 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, pre-selected 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 231/3 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.

3. Room temperature control

3.1. Adaptive continuous-action controller

Controlling the room temperature can be realised via an adaptive continuous-action controller and/or a two-point controller. The control can be set only for “heating” or only for “cooling” or for “heating and cooling”. During this it can be pre-selected whether only one of the two controllers shall be active or whether both the adaptive controller and the two-point controller are involved in controlling the room temperature. Further can be set whether the control can be operated by three operating modes (comfort, night, building security mode) or by four operating modes (comfort, standby, night and building security mode). The adaptive continuous-action controller follows the “model reference pattern”, calculating and optimising its parameters itself. Its control performance can be compared with that of a well adjusted PI-controller. The control value calculated in accordance with the actual value and the setpoint can be downloaded via the bus as a continuous-action control value or as a pulse width modulated On/Off command (EIS1).

3.2. Two-point controller

Besides the adaptive continuous-action controller the multiswitch UP 231/3 has a two-point controller. So long as the setpoint is not changed this two-point controller is activated only in discreet time intervals to determine the current control value. The duration of this cycle can be set in the parameter list.

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The setpoint of the two-point controller is determined by the setpoint of the adaptive controller with the addition of an adjustable positive or negative offset. Thus the setpoint of the two-point controller is in fact bound to the setpoint of the adaptive continuous-action controller, but it can also be higher or lower. The hysteresis of the two-point controller can also be set in the parameter list. With the operating mode “cooling” being activated the two-point controller is always switched off.
The additional two-point controller can be used e.g. to control the control valves of the radiator, the adaptive continuous-action controller is employed for controlling the control valve of a floor heating in the same room.

3.3. Calculation of actual value

Internal sensor
The temperature controller within the multiswitch UP 231/3 includes a balanced built-in temperature sensor for determining the room temperature
within the range from 0°C up to +40°C with a resolution of 0,1 °C. The actual internal value can be adjusted to environmental influences (e.g. cold exterior walls) via 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 temperature sensor
Furthermore the multiswitch UP 231/3 is kitted out with an additional object for the temperature value measured by an external temperature 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 231/3 stores the last received external temperature value so that the program has a sensible starting value straightaway 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.

3.4. 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.

3.5. Operational modes

Comfort mode
This operating mode is displayed by the appropriate LED (outer right rocker, upper contact). The setpoint of the comfort operating mode depends upon whether heating or cooling is set and whether a dead zone between heating and cooling without or with rise of the setpoint is set in the parameter list. If a dead zone without rise of the setpoint exists the setpoint for the comfort mode always corresponds to the “internal base setpoint” (see diagram 1) independently from heating or cooling. If a dead zone with rise of the setpoint exists the comfort mode setpoint also corresponds to the internal base setpoint if the heating mode is set. But if the cooling mode is set the setpoint is determined by the internal base setpoint and the dead zone set in the parameter list (see diagram 2). If the actual value of the room temperature rests within the dead zone the room is neither heated nor cooled (both control valves are closed), i.e. the dead zone contributes

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to economise energy and ensures that the heating and cooling valve are never open at the same time. If a dead zone without rise of the setpoint exists the actual value of the room temperature also may differ from the setpoint for the comfort mode at most by half the value of the dead zone upwards or downwards.

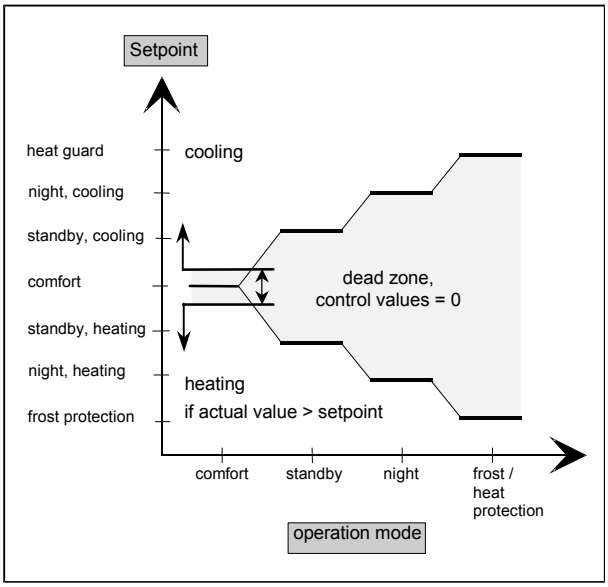

Diagram 1: Setpoints if a dead zone without rise of setpoint exists

It is possible to toggle durably from the operating mode “standby” to the operating mode “comfort” by an action of the outer right push button. If the operating mode “night” is active it is also possible to toggle to the “comfort mode” by an action of the upper contact of the outer right push button, however that’s only possible for a limited scope of time (adjustable “extension of comfort mode”). If the outer right push button is depressed again while the comfort extension mode is running, the comfort extension is restarted again each time. Depressing the right outer push button stops the comfort mode extension prematurely. Once the set time period has elapsed and the extended comfort mode has been stopped by a push button action, the program reverts to the “Night” mode.

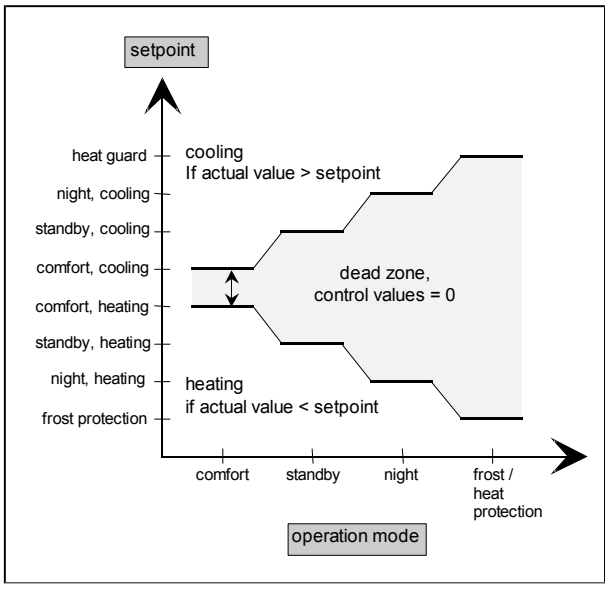

Diagram 2: Setpoints if a dead zone with rise of setpoint exists

Operating mode “standby”

This operating mode is displayed by the appropriate LED (outer right rocker, lower contact). The setpoint of the “standby operating mode” depends upon whether heating or cooling is set and whether a dead zone between heating and cooling without or with rise of the setpoint is set in the parameter list. If a dead zone without rise of the setpoint exists the setpoint for the comfort mode always corresponds to the “internal base setpoint” less the temperature reduction concerning the standby mode and to the “internal base setpoint” plus the temperature rise concerning the cooling mode (see diagram 1). If a dead zone with rise of the setpoint exists the standby mode setpoint also corresponds to the internal base setpoint less the temperature reduction for standby if the heating mode is set. But if the cooling mode is set the setpoint is determined by the internal base setpoint plus the dead zone value concerning the standby mode (see diagram 2) The values for reduction and rise can be adjusted.

It is possible to toggle from the operating mode “comfort” to the operating mode “standby” by an action of the bottom of the outer right push button. But from the operating mode “comfort extension” it is only possible to revert to the “night mode” by an action of the outer right push button.

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Night mode
This operational mode is displayed by the appropriate LED (outer right LED of the row of LEDs). The setpoint for “Night” mode is dependent on whether the heating or cooling mode is active and whether a dead zone between heating and cooling without or with rise of the setpoint is set in the parameter list. If a dead zone without rise of the setpoint exists the setpoint for the night mode corresponds to the “internal base setpoint” less the night temperature reduction concerning the heating mode and to the “internal base setpoint” plus the night temperature rise concerning the cooling mode (see diagram 1). If a dead zone with rise of the setpoint exists the night mode setpoint also corresponds to the internal base setpoint less the night temperature reduction if the heating mode is set. But if the cooling mode is set the setpoint is determined by the internal base setpoint plus the dead zone value plus night rise (see diagram 2). The values for reduction and rise in the night mode can be adjusted. Toggling to this operating mode is only possible via an command telegram “Night mode On” or by stopping respectively exiting the comfort extension mode.

Building protection mode (Frost/heat protection)
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”.

Permanent frost protection mode
If the frost protection mode of the room temperature control shall be permanently set (e.g. during a holiday leave), the special communication object “permanent frost protection” can be used. If the operating mode “building protection mode” is set via this object, it can also be used to unset it. Telegrams of time switches, presence detectors and window contacts which influence the “normal objects” to control the operating mode are ignored as long as the object “permanent frost protection” is activated. If “permanent frost protection” is disabled the room temperature controller takes the operating mode “standby”.

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 3 respectively 4 operating modes will then be displayed cyclically one after the other (the appropriate LED is gleaming). Then the operating mode which is displayed while releasing the button will be activated. Via this function a controller taking the operating mode “permanent frost protection” can be made switching to another operating mode.

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 windows have been closed (i.e. both window objects are set to logic 1) the saved mode (which was set before opening a window) or the mode changed via the bus during the opening process (by a time program e.g.) is retrieved. An additional parameter takes on controlling whether toggling to the building protection mode is invoked at once or only after a time interval which has been set in the parameter list, so that it is possible to ignore it if a window is opened briefly.

Presence
In order to make it possible to employ the controller in rooms it contains in addition an object for the status “Presence”. If the object value “1” is received via this object and the mode of the controller is set to “standby”, the program is switched to “Comfort” mode. If the object value “0” is received, the program switches to “Standby” mode.
If the mode of the controller is set to “Night mode” or a command telegram is received for switching the controller to "Night” mode, but “Presence” is reported via the presence object, the controller internally toggles to “comfort extension”. A switching command to "Night” mode” is stored temporarily and only becomes effective if the object value “0” has been received via this presence object (this corresponds to a termination of the extended comfort mode).

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3.6. Toggling / Status of the controller operating mode

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 corresponding 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 = dew point alarm
Bit 5: 1 = heating mode, 0 = cooling mode
Bit 6: 1 = regulator on, 0 = regulator off
Bit 7: 1 = frost alarm:

	Bit								Hex
Operating mode	7	6	5	4	3	2	1	0	value
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
Regulator off	0	**0**	0	0	0	0	0	0	00

3.7. Control value output

In the adaptive controller it can be set whether the control value for heating or cooling shall be limited to an upper and/or a lower value or if the output type shall be normal or inverted (the inverted output corresponds to a reverse action of the control value). Furthermore it can be set whether the control value has to be transmitted as a continuous value in percent (see diagram 3) or as a switching command On/Off.
The control value is converted to pulse width modulated switching commands (see diagram 4) while the output of switching commands On/Off is happening. The time interval per cycle (period) needed for this conversion can be set in the parameter list.

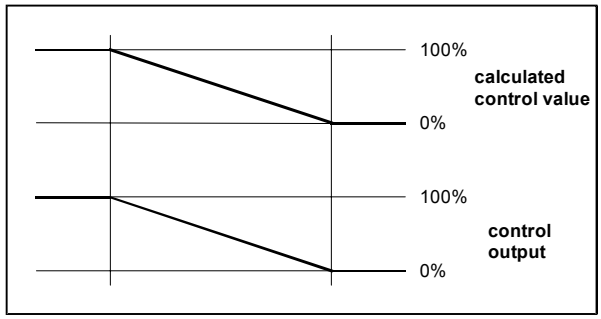

Diagram 3: Continuous output of the control value

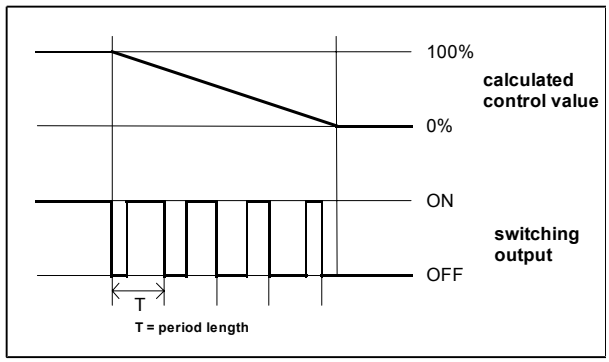

Diagram 4: Switching output of the control value

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3.8. Sequence control

If a room can be heated in two different ways (e.g. via a floor heating **and** a radiator heating) it is recommended to control the two heat sources not in parallel but in sequence, i.e. one after the other. If the room temperature lies below the setpoint first of all the valve of the floor heating is opened. If this valve has 100% opened and it is not yet warm enough the valve of the radiator opens as well. But if there is too much heat in the room first the valve of the radiator is closed and only in succession the valve of the radiator closes step by step. In the room temperature controller of the UP 231/3 it can be set whether a sequence control shall be realised for heating or for cooling. If a sequence control is realised the internal control value calculated by the controller is converted to two output values (control value sequence 1 and sequence 2). During this the minimum internal control value for the manipulated variable "sequence 2" can be set (see diagram 5).

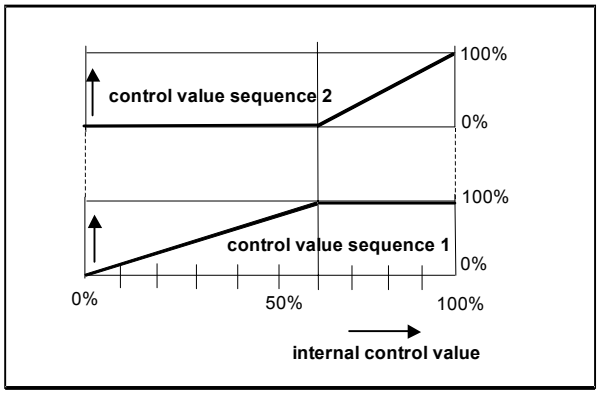

Diagram 5: manipulated variables
in case of sequence control

3.9. Service station

Via the parameter window "configuration" the operating mode of the controller of the UP 231/3 can be set to "service station". Via this operating mode the UP 231/3 is employed for measuring the room temperature and as a display and operation device for any room temperature control performed by another device (e.g. a functional controller). Via this the UP 231/3 transmits the measured room temperature as well as any push button action for toggling between the comfort and standby mode and for adjusting the setpoint of the controller via the bus. Furthermore via the bus it receives the information from the controller which LED has to be switched on to display the operating mode and to display the adjustment of the setpoint.

After pre-selecting the operating mode "service station" there can be additionally set via the parameter window "status parameter" and there via the parameter "perform setpoint calculation: Yes/No" if only the value for the adjustment of the setpoint set in the UP 231/3 has to be transmitted or if the current setpoint derived from the basic setpoint, the adjustment of the setpoint which has been set and the operating mode of the controller which has been set has to be calculated and downloaded to the controller.
Depending on whether a calculation of the setpoint shall be performed or not performed the types and numbers of communication objects displayed in the ETS menus, parameter windows and parameters become adjusted.

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4. Communication objects and parameters

Maximum number of group addresses: 45
Maximum number of associations: 45

Note

Number and description of the communication objects displayed in the ETS menus may vary because they depend on the settings of the parameters.

Phys.Addr.	Program			
	no.	Object name	Function	Type
	01.01.001	20 S2 Room temperature controller 900610		
	0	Switching main rocker left up	On / Off (Toggle)	1 Bit
	1	Switching main rocker left down	On / Off (Toggle)	1 Bit
	2	Switching main rocker right up	On / Off (Toggle)	1 Bit
	3	Switching main rocker right down	On / Off (Toggle)	1 Bit
	4	Actual temperature value	sensor intern + sensor extern	2 Byte
	5	Actual temperature value int. sensor	Actual value of int. sensor	2 Byte
	6	Actual temperature value ext. sensor	Actual value of ext. sensor	2 Byte
	7	Base-setpoint	Base-setpoint in °C	2 Byte
	8	Setpoint adjustment	Adjustment in Kelvin	2 Byte
	9	Setpoint	Actual setpoint	2 Byte
	10	Status	8-bit Status	1 Byte
	11	Comfort	On / Off	1 Bit
	12	Standby	On / Off	1 Bit
	13	Night reduction	On / Off	1 Bit
	14	Frost protection	On / Off	1 Bit
	15	Dew point alarm	On / Off	1 Bit
	16	Heating / cooling	1=Heating / 0=Cooling	1 Bit
	17	PI-controller	On / Off	1 Bit
	18	Frost alarm	On / Off	1 Bit
	19	Control value heating sequence 1	Continuous	1 Byte
	20	Control value cooling	Continuous	1 Byte
	21	Presence	Presence	1 Bit
	22	Control value of additional 2-point-controller	Switching	1 Bit
	23	Window contact I	1=Open / 0=Closed	1 Bit
	24	Window contact II	1=Open / 0=Closed	1 Bit
	25	Display object 1	LED-display	1 Bit
	26	Display object 2	LED-display	1 Bit
	27	Display object 3	LED-display	1 Bit
	28	Continuous frost protection	Continuous frost protection	1 Bit
	29	Control value heating sequence 2	Continuous	1 Byte

Obj	Object name	Function	Type	Flag
0	a) Switching main rocker left up b) Dimming On/Off main rocker left c) Value main rocker left up d) Louvres main rocker left	a) On/Off (Toggle) b) On/Off (Toggle) c) 8-bit Value d) Up/Down	1 Bit 1 Bit 1 Byte 1 Bit	KSÜA KSÜA KSÜA KSÜA
a) In response to a push button action this object is employed as a switching object for the upper left main rocker. An “ON or OFF telegram” is sent depending on the configuration respectively on the current switching condition b) In response to a short push button action this object is employed as a switching object for the left main rocker. In case of the standard configuration the following applies: In response to an action on the top an “ON telegram” is sent via this object and an “OFF telegram” in response to an action at the bottom. If the “TOGGLE” configuration is set either an “ON or an OFF telegram” is sent (toggle), depending on the prevailing switching condition. c) Via the group address of this object a value telegram is sent in response to an action of the top of the left main rocker d) In response to a short push-button action this object is employed for stopping a shutter movement respectively as a switching object for louvre adjustment. Conditions during shutter movement: A short depression on a contact (at the top or at the bottom) stops the movement. Conditions in case of shutter idleness: an action at the top opens the louvre with an “OFF telegram” by one step and an action at the bottom closes the louvre with an “ON telegram” by one step.				
1	a) Switching main rocker left down b) Dimming main rocker left c) Value main rocker left down d) Shutter main rocker left	a) On/Off (Toggle) b) Brighter / Darker c) 8-bit Value d) Up/Down	1 Bit 4 Bit 1 Byte 1 Bit	KSÜA KSÜA KSÜA KSÜA
a) In response to a push button action this object is employed as a switching object for the bottom of the left main rocker. An “ON or OFF telegram” is sent depending on the configuration respectively on the current switching condition. b) In response to a long push button action this object is employed as a dimming object for the left main rocker. In case of that the following applies: In response to a long action on the upper rocker contact a “dimming-brighter-telegram” is sent via this object and a “dimming-darker-telegram” in response to a long action at the bottom. c) Via the group address of this object a value telegram is sent in response to an action of the left main rocker at the bottom. d) In response to a long push-button action this object is employed as a switching object for shutter movement. In case of the standard configuration the following applies: By an action at the top the shutter moves upwards via an “OFF telegram” and by an action at the bottom the shutter moves downwards via an “ON telegram”. A short action on a contact during the shutter movement stops the movement.				

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Obj	Object name	Function	Type	Flag
2	a) Switching main rocker right up b) Dimming On/Off main rocker right c) Value main rocker left up d) Louvres main rocker right	a) On/Off (Toggle) b) On/Off (Toggle) c) 8-bit Value d) Open/ Close	1 Bit 1 Bit 1 Byte 1 Bit	KSÜA KSÜA KSÜA KSÜA
a) In response to a push button action this object is employed as a switching object for the top of the right main rocker. An "ON or OFF telegram" is sent depending on the configuration respectively on the current switching condition b) In response to a short push button action this object is employed as a switching object for the right main rocker. In case of the standard configuration the following applies: In response to an action at the top an "ON telegram" is sent via this object and an "OFF telegram" in response to an action at the bottom. If the "TOGGLE" configuration is set, depending on the prevailing switching condition either an "ON or an OFF telegram" is sent (toggle). c) Via the group address of this object a value telegram is sent in response to an action of the top of the right main rocker. d) In response to a short push-button action this object is employed for stopping a shutter movement respectively as a switching object for louvre adjustment. Conditions during shutter movement: A short action of a contact (at the top or at the bottom) stops the movement. Conditions in case of shutter idleness: An action at the top opens the louvre with an "OFF telegram" by one step and an action at the bottom closes the louvre with an "ON telegram" by one step.			
3	a) Switching main rocker right down b) Dimming main rocker right c) Value main rocker right down d) Shutter main rocker right	a) On/Off (Toggle) b) Brighter / Darker c) 8-bit Value d) Up/Down	1 Bit 4 Bit 1 Bit 1 Bit	KSÜA KSÜA KSÜA KSÜA
a) In response to a push button action this object is employed as a switching object for the bottom of the right main rocker. An "ON or OFF telegram" is sent depending on the configuration respectively on the current switching condition b) In response to a long push button action this object is employed as a dimming object for the left main rocker. In case of that the following applies: In response to a long depression on the top of the rocker contact a "dimming-brighter-telegram" is sent via this object and a "dimming-darker-telegram" in response to a long action at the bottom. c) Via the group address of this object a value telegram is sent in response to an action of the bottom of the right main rocker d) In response to a long push-button depression this object is employed as a switching object for shutter movement. In case of the standard configuration the following applies: By an action at the top the shutter moves upwards via an "OFF telegram" and by an action at the bottom the shutter moves downwards via an "ON telegram". A short depression on a contact during the shutter movement stops the movement.			

Obj	Object name	Function	Type	Flag
4	Actual temperature value	Sensor intern + Sensor extern	2 Byte	KÜAL
This object contains the current actual value of the temperature for the controller. The value is calculated, if need be with consideration of the parameterisable "Weighting" function, from the values measured by the internal and external sensors and transmitted automatically in case of a change.				
5	Actual temperature int. sensor	Actual value of int. Sensor	2 Byte	KÜAL
This object contains the current actual value of the temperature of the internal sensor. Via an offset which can be set in the parameter list the measured value can be corrected (adjusted) if needed.				
6	Actual temperature ext. sensor	Actual value of ext. Sensor	2 Byte	KSÜAL
This object contains the current actual value of the temperature of the external sensor. Via an offset which can be set in the parameter list the measured value can be corrected (adjusted) if needed. Cyclical read telegrams can also be sent via this object to the external temperature sensor so that it returns its current actual value. In case of a bus voltage failure the value which has been measured at last is saved so that it is available as a starting value immediately on bus voltage recovery (first query of the external sensor two minutes after restarting).				
7	Base- setpoint	Base- setpoint in °C	2 Byte	KSÜAL
Via this object the basic setpoint can be changed via the bus by a telegram.				
8	Setpoint adjustment	Adjustment in Kelvin	2 Byte	KSÜAL
Via this object any change of the setpoint adjustment is reported. If a value is received via the object of the setpoint adjustment the program calculates the adjustment step resulting from that. If the received value does not exactly correspond to the one of the five values of the adjustment steps which can be displayed the next possible value is assumed, displayed and sent back.				
9	Setpoint	Actual setpoint	2 Byte	KÜAL
This object contains the current actual value of the room temperature. It depends on the current operating mode (e.g. standby mode).				
10	Status	8-bit Status	1 Byte	KSÜAL
This object contains the current state of the controller which is reported automatically if there are changes of 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 = heating mode, 0 = cooling mode Bit 6: 1 = controller On, 0 = controller Off Bit 7: 1 = frost alarm				

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Obj	Object name	Function	Type	Flag
11	Comfort	On / Off	1 Bit	KSÜAL
Using this object, the “comfort” operating mode can be set via the bus. On receipt of an “On” signal, the “Comfort” mode is switched on and the previously active operating mode is switched off.				
12	Standby	On / Off	1 Bit	KSÜAL
Using this object, the “standby” operating mode can be set via the bus. On receipt of an “On” signal, the “standby” mode is switched on and the previously active operating mode is switched off. If the controller is set to “Comfort mode extension”, it is only possible to switch to “Standby” mode via this object.				
13	Night reduction	On / Off	1 Bit	KSÜAL
Using this object, the “night reduction” operating mode (night mode) can be set via the bus. On receipt of an “On” signal, the “night reduction” mode is switched on and the previously active operating mode is switched off.				
14	Frost protection	On / Off	1 Bit	KSÜAL
Using this object, the “frost” operating mode can be set via the bus. On receipt of an “On” signal, the “frost protection” mode is switched on and the previously active operating mode is switched off.				
15	a) Dew point alarm b) two-point controller	a) On / Off b) On / Off	1 Bit	KSÜAL
a) A dew point alarm that has been sent by a dew point sensor can be received via this object and displayed via an LED if the cooling mode is employed. b) The two-point controller can be switched on respectively off via this object if the heating mode is employed.				
16	Heating / cooling	1 = Heating / 0 = Cooling	1 Bit	KÜAL
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	a) PI- controller b) Controller (Panel)	a) On / Off b) On / Off	1 Bit	KSÜAL
a) The adaptive continuous-action control can be switched on or off via this object a) If the UP 231/3 is used as a service station the service mode can be released / suspended via this object.				
18	Frost alarm	On / Off	1 Bit	KÜAL
If the measured temperature falls below the set value the frost alarm is sent automatically.				

Obj	Object name	Function	Type	Flag
19	a) Control value heating b) Control value heating c) Control value heating sequence 1	a) Continuous b) Switching c) Continuous	1 Byte 1 Bit 1 Byte	KÜAL
a) Via this object the output of the manipulated variable is carried out as a percent value in case of a continuous-action control in the heating mode. The object type (function) is determined via the parameter “type of the output of the manipulated variable”. b) Via this object the output of the manipulated variable is carried out as a switching command On/Off in case of a continuous-action control in the heating mode. c) The output of the manipulated variable is carried out in case of sequence control in the heating mode via this object. Note: This object does not appear in the list of objects if either only the cooling mode is set or if only a two-step control is established.				
20	a) Control value cooling b) Control value cooling c) Control value cooling sequence 1	a) Continuous b) Switching c) Continuous	1 Byte 1 Bit 1 Byte	KÜAL
a) Via this object the output of the manipulated variable is carried out as a percent value in case of a continuous-action control in the cooling mode. The object type (function) is determined via the parameter “type of the output of the manipulated variable”. b) Via this object the output of the manipulated variable is carried out as a switching command On/Off in case of a continuous-action control with output of the switching value in the cooling mode. c) The output of the manipulated variable is carried out in case of sequence control in the cooling mode via this object. Note: This object does not appear in the list of objects if only the heating mode is set.				
21	Presence	Presence	1 Bit	KSÜAL
If a telegram with the object value “1” is received via this object the “comfort mode” is activated and remains in this mode until a telegram with the object value “0” is received via this object. Any telegrams that have been previously received via the bus for switching the controller to the “Standby” or “Night” mode are stored temporarily and not carried out until this.				
22	Control value of additional two-point controller	Switching	1 Bit	KSÜAL
Via this object the output of the manipulated variable of the additional two-point controller is carried out.				
23	Window contact I	1 = Open / 0 =Closed	1 Bit	KSÜAL
The status of window I can be received via this object. If the object value = 1 (window open), the room 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	Window contact II	1 = Open / 0 =Closed	1 Bit	KSÜAL
The status of window II can be received via this object. If the object value = 1 (window open), the room 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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Obj	Object name	Function	Type	Flag
25	Display object 1	LED- display	1 Bit	KSÜAL
Via this object the status of an additional object 1 can be assigned to a LED for display tasks.				
26	Display object 2	LED- display	1 Bit	KSÜAL
Via this object the status of an additional object 2 can be assigned to a LED for display tasks.				
27	Display object 3	LED- display	1 Bit	KSÜAL
Via this object the status of an additional object 3 can be assigned to a LED for display tasks. Alternatively a "1" can be sent via this object when the outer right rocker (comfort) is depressed at the top and a "0" on an action at the bottom (standby) (can be set in the parameter window "configuration"). Via this object both the mode of the room temperature control can be set to "comfort" and the lighting with constant light control can be switched on by entering a room or depressing the comfort push button if a link is established between this object and the two objects "comfort" and "automatic" of the switching/dimming actuator with constant light control (e.g. N 526/2). Leaving the room and depressing the standby push button leads to setting the room temperature control mode to "standby" and to switching off the lighting with constant light control.				
28	Continuous frost protection	Continuous frost protection	1 Bit	KSÜAL
Via this object the operating mode of the controller can be permanently set to frost/heat protection. Then it cannot be set to another operating mode by another operating mode object. If the "permanent frost protection" is disabled the controller automatically sets the operating mode "standby" . In case of being absent for a larger scope of time e.g. all rooms can be permanently set to "frost/heat protection" via this object, although a time program / time switch is still active or a presence detector responds.				
29	a) Control value heating sequence 2 b) Control value cooling sequence 2	a) Continuous b) Continuous	1 Byte 1 Byte	KSÜAL
Via this object the output of the manipulated variable of the second sequence is carried out if a sequence control for heating or cooling is set.				

5. Parameter windows

Note

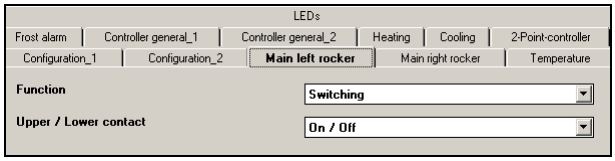
Number and description of the communication objects displayed in the ETS menus may vary because they depend on the settings of the parameters. Thus another parameter window (e.g. "LEDs2") may be faded in if there is no space left for other parameters due to dynamic displays on the first parameter window.

5.1. Main rocker left / right

Note

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

5.1.1 Switching



Parameters	Settings
Function	**Switching** Value Shutter Dimming with stop telegram Dimming with cyclical sending
Via this parameter the function "switching" is set for the main left rocker. Depending on which function is set for this parameter the object types in the list of objects change automatically.	
Upper / Lower contact	**On / Off** Off / On Toggle / Toggle
Via this parameter the function for the upper and lower contacts of the main rocker are set. In the default setting an "ON telegram is sent in response to an action of the upper contact and an "OFF telegram" is sent in response to an action of the lower contact. If the "toggle/toggle" setting is selected it's depending on the current status of the object whether an "On telegram" or an "OFF telegram" is sent in response to an action of one of the contacts (toggling).	

5.1.2 Send value

Parameters	Settings
Value upper contact (0-255)	**255**
Via this parameter an 8-bit value is set for the upper contact and sent in response to an action of the rocker. The range of values is 0 up to 255 (0=0%, 255=100%).	
Value lower contact (0-255)	**255**
Via this parameter an 8-bit value is set for the lower contact and sent in response to an action of the rocker. The range of values is 0 up to 255 (0=0%, 255=100%).	

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5.1.3 Shutter

Parameters	Settings
Upper / Lower contact	**Up / Down** Down / Up
Via this parameter the function for the upper and lower contacts of the rocker are set. In the default setting a short action of the upper contact induces the louvre via an “OFF telegram” to open by one step. An action of the lower contact of the rocker induces the louvre via an “ON telegram” to close by one step. A long action of the upper contact makes the shutter move upwards via an “OFF telegram” and a long action of lower contact makes the shutter move downwards via an “ON telegram”.	
Long switch operation min.	0,3; 0,4; **0,5** ; 0,6; 0,8; 1,0; 1,2; 1,5; 2,0; 2,5; 3,0; 4,0; 5,0; 6,0; 7,0 seconds
Via this parameter the time limit for short/long rocker action is set. Keeping a rocker contact depressed longer than the time that has been set is recognised as a long push button action by the software.	

5.1.4 Dimming with stop telegram

Parameters	Settings
Upper / Lower contact	**On / Off** Toggle / Toggle
Via this parameter the function for the upper and lower contacts of the rocker are set. In the default setting “On/Off” an “ON telegram” is sent in response to a short action of the upper rocker contact. An “OFF telegram” is sent in response to a short action of the lower contact. If a long action of the push button is recognised a “dimming-brighter-telegram” is sent in response to an action at the top and a “dimming-darker-telegram” is sent in response to an action at the bottom. If the rocker is released a “stop telegram” is sent. If the “toggle/toggle” setting is selected it’s depending on the current status of the object whether an “On telegram” or an “OFF telegram” is sent in response to an action of one of the contacts (toggling). The dimming function is preserved as in the setting “On/Off”.	
Long switch operation min.	0,3; 0,4; **0,5** ; 0,6; 0,8; 1,0; 1,2; 1,5; 2,0; 2,5; 3,0; 4,0; 5,0; 6,0; 7,0 seconds
Via this parameter the time limit for short/long rocker action is set.	

5.1.5 Dimming with cyclical sending

Parameters	Settings
Upper / Lower contact	**On / Off** Toggle / Toggle
Via this parameter the function for the upper and lower contacts of the main rocker are set. In the default setting an “ON telegram” is sent in response to a short action of the upper contact. An “OFF telegram” is sent in response to a short action of the lower contact. If a long depression is recognised (see parameter: “long rocker depression”) “dimming-darker-telegrams” are sent in response to an action at the top and “dimming-darker-telegrams” are sent in response to an action at the bottom in time intervals which can be set in the parameter list until the push button is released. If the “toggle/toggle” setting is selected it’s depending on the current status of the object whether an “On telegram” or an “OFF telegram” (toggling) is sent in response to a short action of one of the contacts (toggling). The dimming function is preserved as in the setting “On/Off”.	
Long switch operation	adjust by 1/2 adjust by 1/4 **adjust by 1/8** adjust by 1/16 adjust by 1/32 adjust by 100%
What adjustment of the brightness value shall be achieved when a long push button action is recognised can be set here. In the setting “adjustment by 1/8” 8 dimming telegrams have to be sent to dim from 0 to 100%.	
Long switch operation min.	0,3; 0,4; **0,5** ; 0,6; 0,8; 1,0; 1,2; 1,5; 2,0; 2,5; 3,0; 4,0; 5,0; 6,0; 7,0 seconds
Via this parameter the time limit for short/long rocker depression is set. Keeping a rocker contact depressed longer than the time that has been set is recognised as a long push button action by the software.	
Interval for cyclical sending	0,3; 0,4; **0,5** ; 0,6; 0,8; 1,0; 1,2; 1,5; 2,0; 2,5; 3,0; 4,0; 5,0; 6,0; 7,0 seconds
The send repetition time for cyclical sending is set with a long push button action here. When setting the duration for cyclical sending, the bus load and the selected dimming period of the dimmer should be taken into consideration.	

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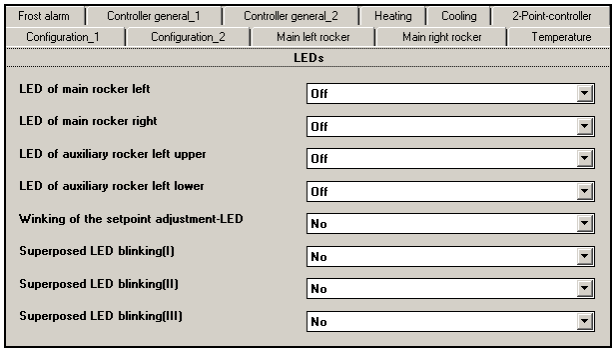
5.2. LEDs



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 auxiliary rocker left upper	**Off** On via object via object (inverted) via object winking via object winking (inverted)
LED auxiliary rocker left lower	**Off** On via object via object (inverted) via object winking via object winking (inverted)

Via this parameter the function of a LED is set. In the settings "via object…" the parameter window changes automatically and an object can be assigned to the selected LED via the parameter "object number" which is additionally displayed.
The following objects can be assigned to a LED for display via their number:
Nr. 0 switching / dimming / louvre
Nr. 1 shutter
Nr. 2 switching / dimming / louvre
Nr. 3 shutter
Nr. 11 comfort-mode
Nr. 12 standby- mode
Nr. 13 night- mode
Nr. 14 frost-/heat- mode
Nr. 15 dew point alarm
Nr. 16 heating/cooling / two-point-controller / On/Off
Nr. 17 controller On/Off
Nr. 18 frost alarm
Nr. 19 control value heating
Nr. 20 control value cooling
Nr. 21 presence
Nr. 22 control value two-point-controller
Nr. 23 status window 1
Nr. 24 status window 2
Nr. 25 display object 1
Nr. 26 display object 2
Nr. 27 display object 3
Nr. 28 permanent frost protection
Nr. 29 control value sequence 2
If the objects 19, 20 or 29 are assigned to a LED the LED = Off only if the control value is set to 0% and the LED = On if the control value is set >0%.

Winking of the setpoint adjustment- LED	**No** via object via object (inverted)

Via this parameter the LED displaying the current setpoint adjustment can be overridden by an object with its ON or OFF condition displayed by the flashing of the actual setpoint adjustment LED.
In the settings "via object…" the parameter window changes. The parameter "object number" is additionally displayed and an object can be assigned to the selected LED via this parameter.

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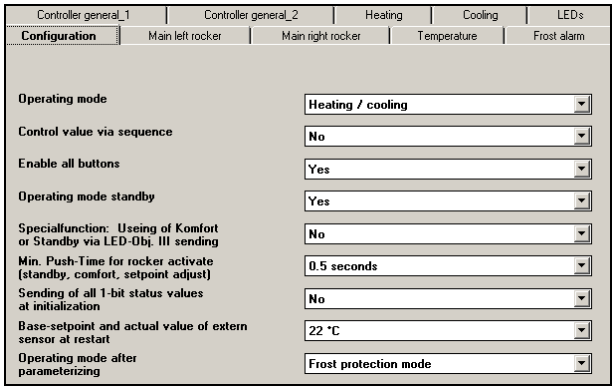
Parameters	Settings
Superposed LED blinking (I)	**No** Yes
Superposed LED blinking (II)	**No** Yes
Superposed LED blinking (III)	**No** Yes
Via this parameter the LED displaying the current state can be overridden by another object with its ON or OFF condition displayed by an overriding flashing. In the settings “Yes” the parameter window changes and the additional parameter ”LED” and “Object number” are displayed. Via the parameter “LED” a LED can be selected. Via the parameter “object number” an object can be assigned to the selected LED.	

5.3. Configuration



Parameter	Einstellungen
Operating mode	1) Heating/2-point-heating 2) Heating/cooling 2-point-heating 3) 2-point-heating 4) Heating 5) **Heating / cooling** 6) Cooling 7) Service station
Via this parameter the operating mode of the room temperature controller is set. The parameter windows and the objects of the object table change automatically depending on the settings which have been selected. Afterwards all parameters, possibly assigned to two parameter windows, are specified for “configuration”.	
Control value via sequence	**No** Yes
Whether a sequence control is wanted can be set here. If that shall be so, a query is additionally displayed whether the sequence control shall be applied for heating or for cooling.	

Parameters	Settings
Enable all buttons	**Yes** No
Via this parameter the push buttons (i.e. each of the 8 rocker contacts) can be enabled altogether (setting “Yes”) or one by one (setting “No”). If “No” is selected all 8 contacts are displayed and can then be enabled one by one.	
Operating mode standby	**Yes** No
Here can be set whether the setpoint of the room temperature shall be controlled via 3 or 4 operating modes, i.e. whether the toggling from the “comfort mode” to the “night mode” can be directly realised or the “standby mode” must be enabled before.	
Special function: Using of comfort or Standby via LED- Obj. III sending	**No** Yes
Here can be set that via this object a “1” respectively a “0” is sent at once in response to each action of the contacts for “Comfort” or “Standby”. The LED object III can be then used for switching the lighting with constant light control on or off via a switching / dimming actuator N 526/2.	
Min. Push- Time for rocker activate (standby, comfort, setpoint adjust)	0,2 seconds **0,5 seconds** 1,0 seconds
In order to prevent triggering off operating mode alterations or setpoint alterations by accidentally touching a rocker contact here can be set how long a contact must be depressed to trigger off an action.	
Sending of all 1- bit status values at initialisation	**No** Yes
Here can be set whether all 1-bit status values shall be sent in response to each restart of the UP 231/3. If the setting “Yes” is selected take care of the bus load!	
Base- setpoint and actual value of extern	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
Here can be set what value shall be set for the basic setpoint and the external actual value to set out sensible values which can be used by the program immediately when restarting (bus voltage recovery). If the basic setpoint can be adjusted via the respective object via telegram, “value at voltage failure is to save” has to be set.	
Operating mode after parameterising	**Frost protection mode** Night mode Standby mode Comfort mode
The operating mode after downloading the parameters which have been adjusted can be set here.	

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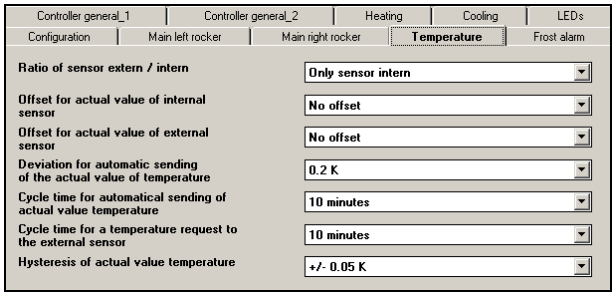
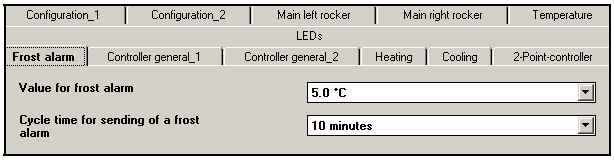
5.4. Temperature



Parameters	Settings
Ratio of sensor external / internal	Only sensor external 90% / 10% 80% / 20% 70% / 30% 60% / 40% 50% / 50% 40% / 60% 30% / 70% 20% / 80% 10% / 90% **Only sensor internal**
Via this parameter it is possible to select what proportion (weighting) of the actual values of the external and internal sensor is used to calculate the total actual value The first value refers to the weighting of the external sensor	
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; **No offset** -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; **No offset** -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 the actual value of temperature	0,1K**; 0,2K** ; 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 automatic sending of actual value temperature	5; 6; 7; 8; 9; **10** ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 minutes; 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 a temperature request to the external sensor	5; 6; 7; 8; 9; **10** ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 minutes; inactive
The time interval for the query of the external actual value is set here.	
Hysteresis of actual value temperature	+/- 0,01K +/- 0,03K **+/- 0,05K** +/- 0,07K
A hysteresis can be set via this parameter. It prevents slight temperature fluctuations permanently producing new actual values.	

5.5. Frost alarm



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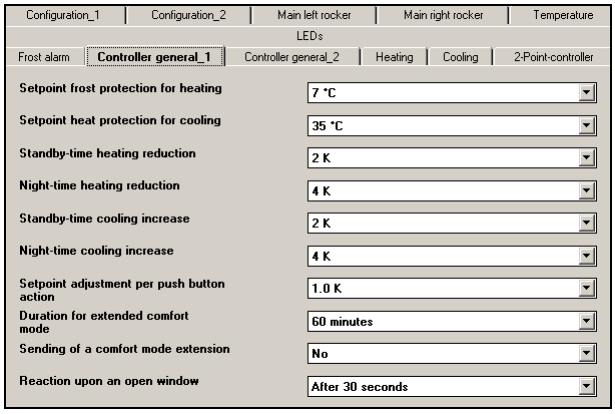
Parameters	Settings
Value for frost alarm	0 °C, 0,5 °C; 1,0 °C; 1,5 °C; 2,0 °C; 2,5 °C; 3,0 °C; 3,5 °C; 4,0 °C; 4,5 °C; **5,0 °C**
This parameter defines the lower limit that the temperature must drop to before the controller sends a frost alarm.	
Cycle time for sending of a frost alarm	5; 6; 7; 8; 9; **10** ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 minutes; 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.	

5.6. Controller general 1



Parameters	Settings
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. 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. 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** ; 3K; 4 K; 5 K;
This parameter is used to determine what value the setpoint temperature should be decreased by if the operating mode switches from “Comfort” mode to “Standby” mode while in heating mode.	

Parameters	Settings
Night- time heating reduction	1 K; 2 K; 3K; **4 K** ; 5 K;
This parameter is used to determine what value the setpoint temperature should be decreased by if the operating mode switches from “Comfort” mode to “Night” mode while in heating mode.	
Standby- time cooling increase	1 K; **2 K** ; 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 cooling mode.	
Night- time cooling increase	1 K; 2 K; 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 “Night” mode while in cooling mode.	
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 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, **60**, 90, 120 minutes, inactive, continuous
The duration of the comfort mode extension is set in this parameter. If the “Night” mode is active and the outer right button is pressed at the top, 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 button is pressed again while the comfort mode extension is still active, the comfort period begins again. Pressing the outer right button at the bottom ends the comfort mode extension and reactivates the controller’s “night mode” .	
Sending of a comfort mode extension	**Yes** No
Via this parameter it can be set whether the new status shall be sent or not sent when the “extended comfort mode” (toggling between “night mode” and “comfort mode”) begins and ends.	
Reaction upon an open window	At once **After 30 seconds**
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 either immediately or after 30 seconds.	

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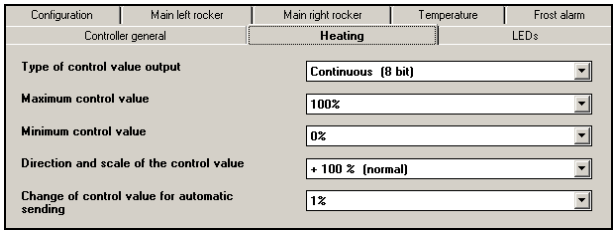
Parameters	Settings
Assignment of control values to objects heating and cooling	Both on object heating (special function) **Separate**
It can be defined here whether the output of the control values is carried out via the respective objects (object 19 for control values for heat and object 20 for control values for cool) or globally via the object for heat (19).	
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
It is possible to specify the time interval for sending the control values in addition to them being sent automatically when there is a change.	
Dead zone between heating and cooling	**without change of setpoint:** 0,5 K; 1,0 K; 1,5 K; **2,0 K**; 2,5 K; 3,0 K; 3,5 K; 4,0 K; 4,5 K; 5,0 K ; increase setpoint: 0,5 K; 1,0 K; 1,5 K; 2,0 K; 2,5 K; 3,0 K; 3,5 K; 4,0 K; 4,5 K; 5,0 K ;
The dead zone between heat and cool is set in this parameter. On the one hand the dead zone should prevent the controller from continuously switching between heating and cooling mode when there are slight temperature fluctuations. On the other hand it helps economising energy consumption: as long as the room temperature rests within the limits of the dead zone the room is neither heated nor cooled. It can be specified furthermore whether a) one half of the dead zone shall be below the setpoint of the comfort mode and the other half above it or b) it shall be completely above it. In case of a) toggling the controller automatically from the heating to the cooling mode does not cause any setpoint adjustment for the comfort mode. In case of b) however toggling to the cooling mode causes an increase of the setpoint of the comfort mode by the same value as the selected dead zone.	

5.7. Heating / Cooling

Note

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



5.7.1 Continuous control value output

Parameters	Settings
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%; 4%; 5%; 7%; 10%; 15%; 20%; 25%; 30%; 35%; 40%; 45%; 50%; 55%; 60%; 65%; 70%; 75%; 80%; 85%; 90%; 95%; **100%** ;
An upper limiting value for the control value can be set via this parameter.	
Minimum control value	**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%;
A lower limiting value for the control value can be set via this parameter.	
Direction and scale or the control value	+1%; +2%; +3%; +4%; +5%; +7%; +10%; +15%; +20%; +30%; +40%; +50%; +60%; +70%; +80%; +85%; +90%; +95%; **+100% (normal)** -1%; -2%; -3%; -4%; -5%; -7%; -10%; -15%; -20%; -20%; -30%; -40%; -50%; -60%; -70%; -80%; -85%; -90%; -95%; -100%; (invertiert)
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 reversed (inverted). By reducing the percentage figure, a compression (scaling) of the control value is achieved. The setting depends on the used type of valve respectively actuator.	
Change of control value for automatic sending	**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%;
It can be determined in this parameter which control value change causes the control value to be sent automatically.	

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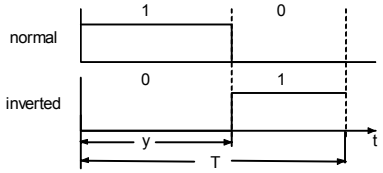
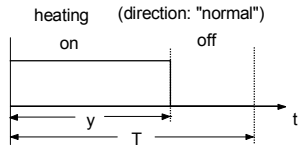
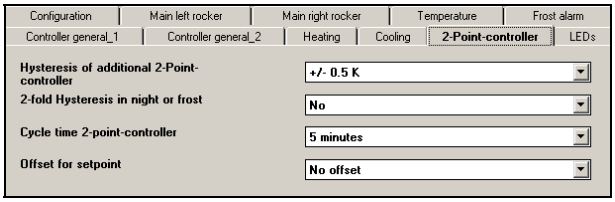
5.7.2 Switching control value output

Parameters	Settings
Direction of the control value	**Normal** Inverted
The format of the control value output is defined in this parameter. If “normal” is selected, the output of the control value is carried out according to the calculated control value. In the “inverted” setting, the direction of the control value is reversed.  T : Period duration of the control value output y : Calculated control value The setting in this parameter is dependent on the type of valve or actuator that is used.	
Always On from	1%; 5%; 10%; 20%; 30%; 40%; 50%; 60%; 70%;80%; **90%**; 95%; 99%; 100% **control value**
It is specified here what percentage of the control value output is always “On“. To reduce the switching frequency, it can be adapted to the valve characteristic.	
Always Off until	1% ; 5%; **10%**; 20%; 30%; 40%; 50%; 60%; 70%;80%; 90%; 95%; 99%; 100% **control value**
It is specified here what percentage of the control value output is always “Off”. To reduce the switching frequency, it can be adapted to the valve characteristic.	
Period duration of control value output	10s ; 30s; 1; 2; 3; 4; 5; 6; 7; 8; **10** ; 12; 15; 20; 25; 30; 35; 40; 60; 90; 120; 150; 180 minutes
This parameter determines the period duration of the control value output. The control value corresponds to the pulse factor (time factor) between “On (1)” and “Off (0)” within the period.  y : Control value as % of the period duration T : Period duration of the control value output Caution: The period duration should not be shorter than the switching time of the two-point valves. Attention should also be paid to the bus load when selecting the settings 10s and 30s.	

5.7.3 Control value output as sequence

Parameters	Settings
Internal threshold of output, for Starting of sequence 2 [%]	5...95 **50**
Via this parameter the minimum control value for the beginning of sequence 2 of the controller output is set . The desired value has to be entered into the parameter box.	
Change of control value for automatic sending	**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%;
It is possible to set here the control value adjustment which causes the control value of sequence 1 to be sent automatically.	
Change of control value for automatic sending	**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%;
It is possible to set here the control value adjustment which causes the control value of sequence 1 to be sent automatically.	

5.8. Two-point controller



Parameters	Settings
Hysteresis of additional 2- Point- controller	+/-0,1K; +/-0,2K; +/-0,3K; +/-0,4K; **+/-0,5K** ; +/-0,6K; +/-0,7K; +/-1,0K; +/-1,2K; +/-1,5K; +/-1,7K; +/-2,0K; +/-2,2K; +/-2,5K;
The switching hysteresis of the two-point controller is set here. If the hysteresis is smaller the deviations of the setpoint of the room temperature are kept within smaller limits, but the switching frequency of the controller is increased as well.	
2- fold Hysteresis in night or frost	**No** Yes
It can be specified here that twice as many fluctuations (hysteresis) is the room temperature are permitted during night operation or frost protection mode in order to save heating energy. This only applies in the case of two- step control.	

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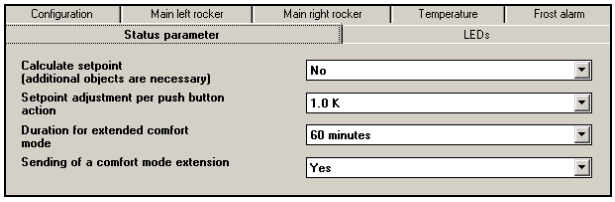
Parameters	Settings
Cycle time 2- point controller	2; 3; 4; **5**; 6; 7; 8; 9; 10 ; 12; 15; 17; 20; 25; 30; 40; 50; 60; 90; 120 minutes; continuous
Once the time interval set in this parameter has elapsed, the two-point controller is reactivated (i.e. the two-step control is only implemented e.g. every 5 minutes). Via the hysteresis and the cycle time the maximum deviations of the room temperature from its setpoint can be controlled.	
Offset for setpoint	-4,0K; -3,5K; -3,0K; -2,5K; -2,0K; -1,5K; -1,0K; -0,5K; No offset ; +0,5K; +1,0K; +1,5K; +2,0K; +2,5K; +3,0K; +3,5K;
The two-point controller uses the setpoint value of the adaptive controller. The setpoint of the two-point controller can be adjusted if need be via the offset so that the setpoint can be changed.	

5.9. Status parameter

Note

The parameter windows “status parameters” are only displayed if the UP 231/3 has been configured as “service station”. All parameters which are displayed in the parameter windows but not described below are specified in the parameter windows “controllers in general” and are described there.



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.	