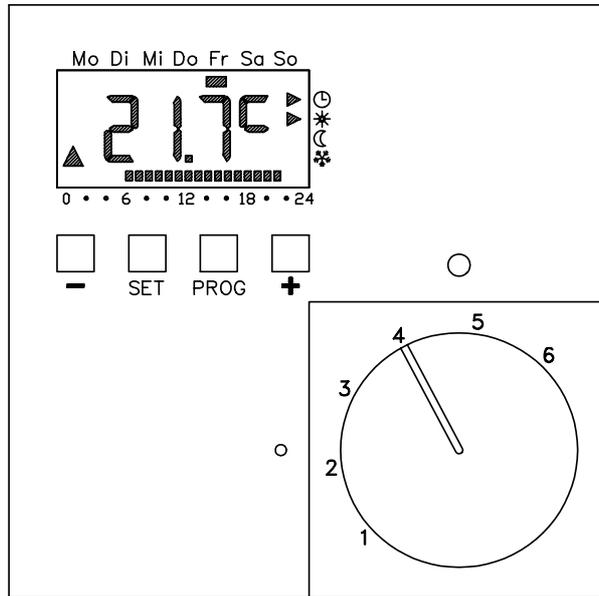




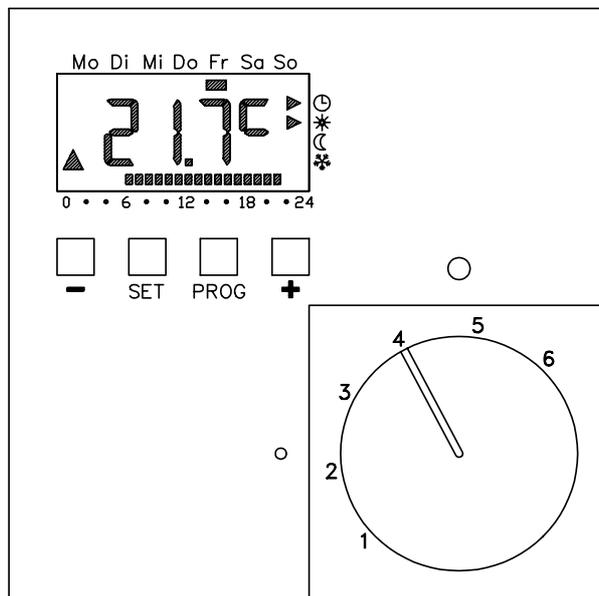
**User's Guide**

**SF 200.R16/1 Clock Thermostat**



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## **Description: SF 200.R16/1 CLOCK THERMOSTAT**

### **1. Short description**

The SF 200.R16/1 clock thermostat provides the following functions:

- Room temperature control using the internal temperature sensor.
  - Room temperature control using an external temperature sensor that measures the floor temperature and uses this as controlled variable.
  - Room temperature control using the internal temperature sensor. An external temperature sensor that measures the floor temperature limits the temperature for underfloor heating systems.
  - Party key that allows for an unscheduled increase of the temperature to a comfortable level for one, two, three or four hours.
  - Energy-saving key to lower the room temperature until the next switching time. This key can be used to switch the automatic control device to lowered operation until revoked (simple vacation function).
  - A time program with 32 individual switching times that can be arbitrarily assigned over the week. The standard program specified as factory setting can be customized by the user to satisfy the individual requirements.
- A vacation program that keeps the room temperature at a selected temperature level for a specified interval.
  - Automatic daylight saving / normal time change.
  - Automatic leap-year recognition and day of week calculation.
  - Initial heating time optimization (can be deactivated) to achieve the required room temperature at the selected time thanks to an earlier heating.
  - Keyboard locking.
  - Back-up power to bridge a power failure lasting up to four hours. The clock and the calendar continues to run during this phase. The set parameters and the programming are held for a maximum of 10 years.
  - LED display to show the provision of power.
  - Detection of breakage and short-circuit at the external sensor.

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  - LED display to show the provision of power.
  - Detection of breakage and short-circuit at the external sensor.

## 2. Operating elements and display

The bar at the upper display edge (1) displays the weekday.

The temperature (or the time) is displayed here (2).

The arrow (3) indicates the active heating (relay is on).

The bar at the lower display edge (4) indicates the time range for the comfort temperature of the associated day.

The + (8) or - (5) keys are used to set values such as time or temperature.

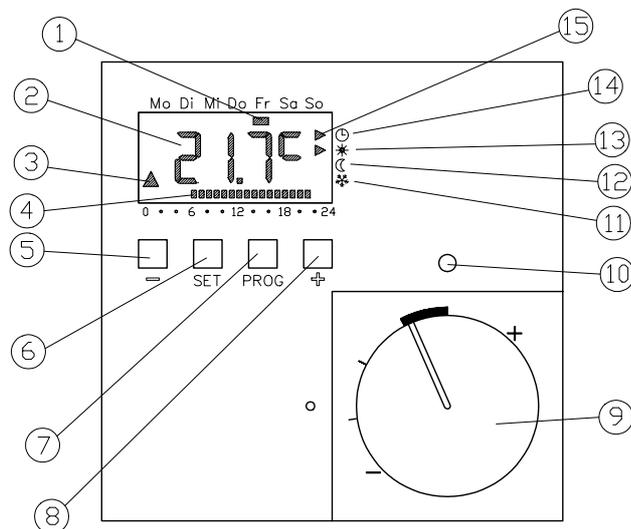
The SET key (6) is used to confirm the set values.

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The rotary button (9) is used to set the comfort temperature (the set temperature is displayed immediately for the normal display).

As with the arrow, the red LED (10) also displays the active heating and can also be seen at some distance and when dark.

The symbols for the various temperature levels (frost-prevention temperature (11), lowered temperature (12), comfort temperature (13) and control according to the time program (14)) are also displayed when active using arrows in the display (15).



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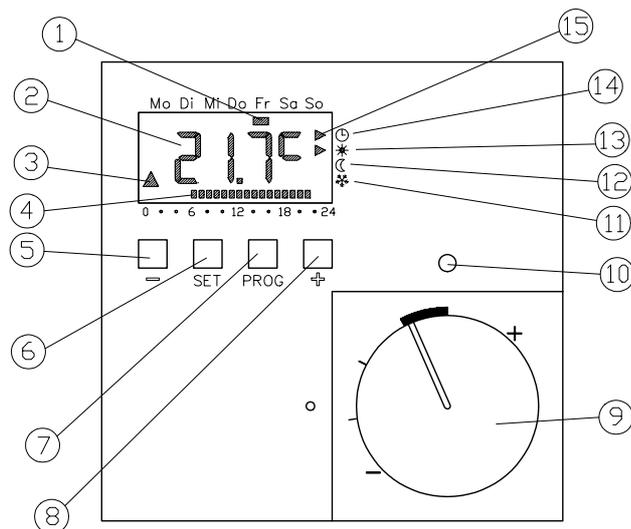
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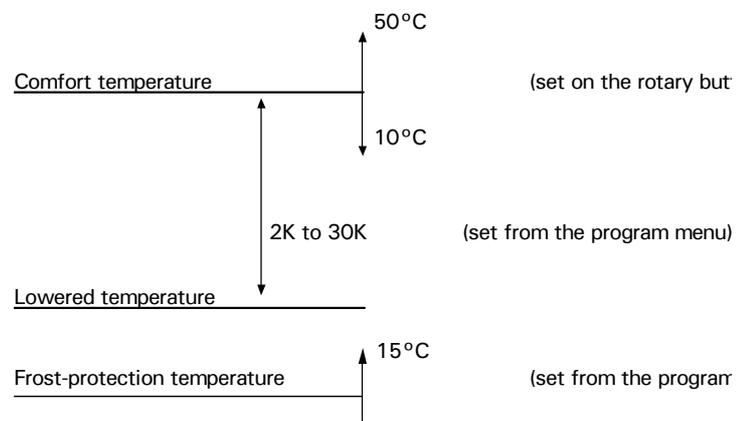
### 3. General function

#### 3.1 Setting the temperature

The automatic control device operates with three different set temperature levels (comfort temperature, lowered temperature and frost-prevention temperature).

The comfort temperature is set using the rotary button (9). This is always possible in the normal display. The comfort temperature is indicated with the setting in the display (in this case, the decimal point and the arrow on the symbol for the comfort temperature indicated on the right-hand display edge flash).

The lowered temperature is set in 0.5K steps from the program menu (see settings in the program menu) and is coupled relatively to the comfort temperature; i.e. a change of the comfort temperature simultaneously causes a corresponding change of the lowered temperature (also refer to the diagram below). The frost-prevention temperature (without coupling to the comfort temperature) is also set from the program menu.



**Note:** The lowered temperature is always automatically limited to a minimum of 5° C.

#### 3.2 Time program

To save energy, the automatic control device can be programmed so that at regular presence times the temperature is regulated to the comfort temperature and at other times to the lowered temperature. The active time program is indicated with an arrow in the display at the corresponding symbol (14). In addition, a second arrow indicates the currently regulated temperature level.

#### 3.3 Control behavior

Depending on the set desired temperature and the temperature at the selected sensor (internal or external), the relay, and thus the connected heating equipment, will be triggered appropriately. The LED (10) and an arrow in the display (3) indicate the triggering of the heating equipment.

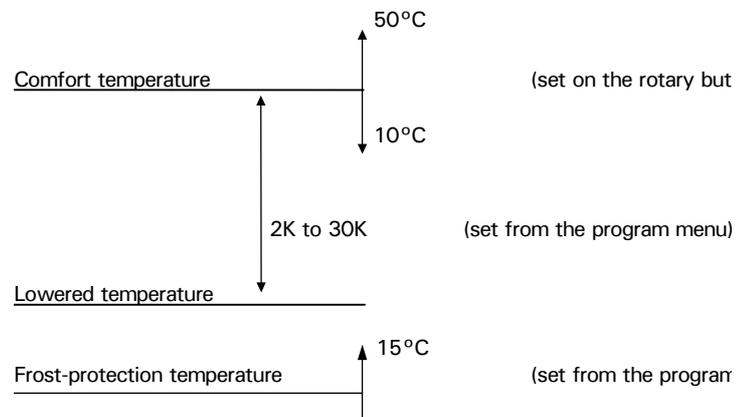
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## 4. Functions in the normal display

### 4.1 Party function (extend the heating phase)

If required, the comfort temperature can be extended or activated. This party function acts just once, the set time program runs after the extension has expired.

The party function is invoked with the + key (8).

Each additional pressing of the key extends the party function by 1 hour (to a maximum of 4 hours). The time starts to run when the key is pressed. The display returns to the normal display a few seconds after the last pressing of the key. The bar (4) at the lower display edge indicates the active party function. The selected time interval flashes.



The party function can be ended prematurely by pressing the PROG key (7).

### 4.2 Lowered function

The - key can be used to switch to the lowered temperature for a short or long time interval.

#### 4.2.1 Switching to the lowered temperature for a short time

Briefly pressing the - key switches the time program to the lowered temperature. This is displayed in the display with the arrow on the symbol for the lowered temperature and remains until the next time program point. The time program then resumes.



Pressing the PROG key causes a premature return to the time program.

- 6 -

## 4.2.2 Switching to the lowered temperature for a long time

Pressing the - key for more than 5 seconds switches the device permanently to the lowered temperature. This is indicated in the display with the arrow on the symbol for the lowered temperature. The arrow on the time program symbol disappears because the time program no longer acts.



Pressing the PROG key returns to the time program.

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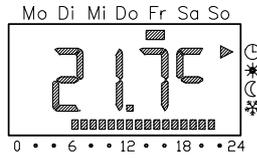
### 4.3 Specific temperature

A specific temperature can be temporarily set on the device if the temperature provided by the running time program is not appropriate.

This is activated by pressing the SET key. The temperature currently provided by time program flashes.



This can now be changed with the + and - keys. Pressing the SET key confirms the set new temperature. The temperature is regulated to this value until the next switching time of the time program at which time the temperature of the time program is resumed.



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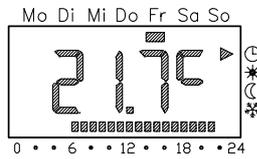
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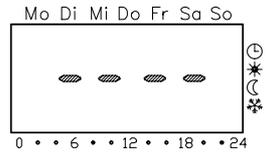


Pressing the PROG key causes a premature return to the time program.

### 4.4 Locking the keyboard

The keys can be locked to prevent unauthorized operation.

To do this, press the - and SET keys simultaneously for 5 seconds. The keys are then locked. The locking is indicated with dashes in the display. The locked device returns to the normal display when the keys are released.



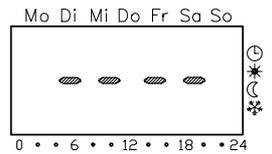
The dashes are also displayed when any key is pressed on the locked device, however the keys are not evaluated. The setpoint rotary button is not locked, i.e. the setpoint can still be changed.

The key locking is revoked by pressing the - and SET keys again for 5 seconds. The device returns to the normal display and then becomes available for full operation.

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## 5. Settings in the program menu

The following settings can be made in the program menu:

Time and date (Clock menu item)

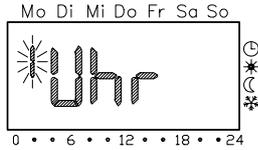
Temperature levels (tEMP menu item)

Time program (ProG menu item)

Vacation function (UrLb menu item)

Pressing the PROG key for 2 seconds opens the program menu.

The + and – keys are used to select the appropriate menu item; pressing the SET key makes the menu item available for changes.

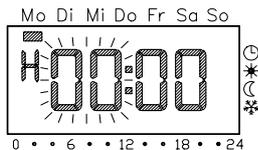


### 5.1 Setting the clock and date

**Note:** The clock is a week time switch that continues to operate for at least 4 hours after a power failure. The switch to and from daylight saving time is made automatically. The built-in calendar automatically handles leap years.

The hour display flashes when the SET key is used to select the Clock program item in the program menu.

The + or the – key can now be used to set the hour.



After the hours have been confirmed, the minutes start to flash. These are now set in the same way with the + and – keys and confirmed with SET.

If the date has already been set correctly, the clock setting can be exited here by pressing the PROG key.

Otherwise, the +, – and SET keys are used similarly to set the year, the month and the day. The weekday does not need to be set because it is determined automatically when the date is set.

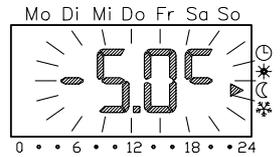
The program menu is exited by pressing the PROG key.

### 5.2 Setting temperature levels – tEMP menu item

**Note:** The comfort temperature can be set with the rotary button (also see desired temperature)

The lowered temperature (2 K...30 K relative to the comfort temperature) and the frost-prevention temperature (5° C...15° C absolute) are set here in the menu.

This requires that the tEMP item is selected in the program menu. Once this has been confirmed with SET, the displayed value and the arrow for the lowered temperature flash.



The + or the – key can now be used to set the lowered value.

After pressing the SET key to confirm, the value and the arrow for the frost-prevention temperature flash. The frost-prevention temperature is now set in the same manner with the + and – keys, and confirmed with SET.

The display automatically returns to the (Clock) program menu.

The program menu is exited by pressing the PROG key.

**Note:** The lowered temperature is automatically limited to a minimum of +5° C.

## 5. Settings in the program menu

The following settings can be made in the program menu:

Time and date (Clock menu item)

Temperature levels (tEMP menu item)

Time program (ProG menu item)

Vacation function (UrLb menu item)

Pressing the PROG key for 2 seconds opens the program menu.

The + and – keys are used to select the appropriate menu item; pressing the SET key makes the menu item available for changes.

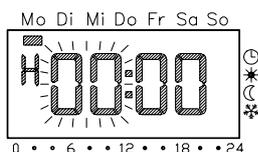


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The lowered temperature (2 K...30 K relative to the comfort temperature) and the frost-prevention temperature (5° C...15° C absolute) are set here in the menu.

This requires that the tEMP item is selected in the program menu. Once this has been confirmed with SET, the displayed value and the arrow for the lowered temperature flash.



The + or the – key can now be used to set the lowered value.

After pressing the SET key to confirm, the value and the arrow for the frost-prevention temperature flash. The frost-prevention temperature is now set in the same manner with the + and – keys, and confirmed with SET.

The display automatically returns to the (Clock) program menu.

The program menu is exited by pressing the PROG key.

**Note:** The lowered temperature is automatically limited to a minimum of +5° C.

### 5.3 Changing the time program – ProG menu item

The ProG menu item can be used to change the switching times of the clock thermostat. A maximum of 32 switching times are available. Each switching time specifies a time within a week when a switch between the comfort and lowered temperature is to occur.

After the commissioning, a time program with standard factory settings will be activated. This program has the following 14 switching times.

Week days	Time interval
Monday – Friday	6:00 – 22:00 comfort temperature
Saturday, Sunday	6:00 – 23:00 comfort temperature

These settings can be changed or extended as required.

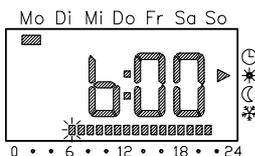
#### 5.3.1 Viewing switching times

To view the switching times, go to the **ProG** item in the program menu. Once this has been confirmed with SET, the first switching time will be displayed.

Press the + or – key to view the other switching times.

The switching times will be displayed in chronologically increasing sequence from Monday 00:00 to Sunday 23:50.

If still available, an "empty" switching time shown as ---:-- is provided at the end of the list.



### 5.3.2 Changing switching times

Press the SET key after selecting an existing switching time (see above).

The hour display flashes and can be changed with the + and – keys. Press the SET key to confirm the hour setting; the minute value then starts to flash.

This value can now be changed in 10-minute intervals with the + and – keys, and confirmed with the SET key.

The same procedure is used for the day selection and for the temperature selection. In the case of the day selection, the weekdays are shown first individually and then as groups Sa-Su, Mo-Fr, Mo-Sa, Mo-Su.

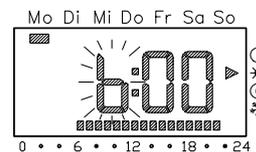
**Note:** Groups of days. If a group of days is selected, an individual program item with the specified time and the temperature level is created for each selected day of the group. The complete grouping cannot be changed, rather only the individual program items can be changed.

After the last confirmation with SET, the changed switching time will be stored and the next switching time in chronological sequence displayed.

#### 5.3.3 Deleting switching times

After selecting the switching time to be deleted (see above), press the + and – keys for more than 2 seconds.

The switching time will be deleted irrevocably and the next switching time in chronological sequence displayed.



### 5.3 Changing the time program – ProG menu item

The ProG menu item can be used to change the switching times of the clock thermostat. A maximum of 32 switching times are available. Each switching time specifies a time within a week when a switch between the comfort and lowered temperature is to occur.

After the commissioning, a time program with standard factory settings will be activated. This program has the following 14 switching times.

Week days	Time interval
Monday – Friday	6:00 – 22:00 comfort temperature
Saturday, Sunday	6:00 – 23:00 comfort temperature

These settings can be changed or extended as required.

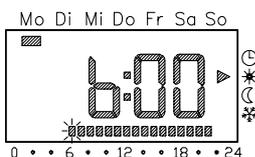
#### 5.3.1 Viewing switching times

To view the switching times, go to the **ProG** item in the program menu. Once this has been confirmed with SET, the first switching time will be displayed.

Press the + or – key to view the other switching times.

The switching times will be displayed in chronologically increasing sequence from Monday 00:00 to Sunday 23:50.

If still available, an "empty" switching time shown as ---:-- is provided at the end of the list.



### 5.3.2 Changing switching times

Press the SET key after selecting an existing switching time (see above).

The hour display flashes and can be changed with the + and – keys. Press the SET key to confirm the hour setting; the minute value then starts to flash.

This value can now be changed in 10-minute intervals with the + and – keys, and confirmed with the SET key.

The same procedure is used for the day selection and for the temperature selection. In the case of the day selection, the weekdays are shown first individually and then as groups Sa-Su, Mo-Fr, Mo-Sa, Mo-Su.

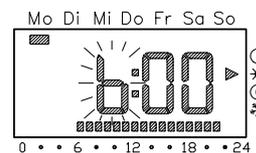
**Note:** Groups of days. If a group of days is selected, an individual program item with the specified time and the temperature level is created for each selected day of the group. The complete grouping cannot be changed, rather only the individual program items can be changed.

After the last confirmation with SET, the changed switching time will be stored and the next switching time in chronological sequence displayed.

#### 5.3.3 Deleting switching times

After selecting the switching time to be deleted (see above), press the + and – keys for more than 2 seconds.

The switching time will be deleted irrevocably and the next switching time in chronological sequence displayed.



### 5.3.4 Deleting all switching times

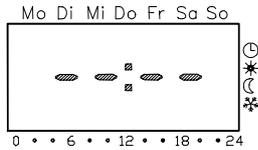
After selecting a switching time (see above), press the + and – keys for more than 10 seconds.

All switching times will be deleted irrevocably and the empty switching time will be displayed.

### 5.3.5 Adding a new switching time

After selecting the empty switching time (see above), press the SET key.

The hour display flashes and can be changed with the + and – keys. Press the SET key to confirm the hour setting; the minute value then starts to flash.



This value can now be changed in 10-minute intervals with the + and – keys and confirmed with the SET key.

The same procedure is used for the day selection and for the temperature selection. In the case of the day selection, the weekdays are shown first individually and then as groups Sa-Su, Mo-Fr, Mo-Sa, Mo-Su.

**Note:** Groups of days. If a group of days is selected, an individual program item with the specified time and the temperature level is created for each selected day of the group. The complete grouping cannot be changed, rather only the individual program items can be changed.

After the last confirmation with SET, the changed switching time will be stored and the next switching time in chronological sequence displayed.

### 5.3.6 Canceling time program settings

The PROG key can be used to cancel the settings for a switching time currently open for processing. Any previous changes will not be stored. Press the PROG key again to return to the program menu or to the normal display.

### 5.3.7 Special programming cases

No empty switching time will be offered if no further switching time is available.

If a group of days is programmed although insufficient switching times are available, **FULL** and the number of available switching times will be displayed. This allows the user to decide how many switching times are missing or whether he can make his required program using specific days.

If a group of days matches an existing switching time, the existing switching time will be overwritten without prompt.

If a new switching time is placed at the time of an existing switching time, the existing switching time will be overwritten without prompt.

If an existing switching time is changed and placed at a time already occupied by another existing switching time, the existing switching time will be overwritten without prompt.

Redundant switching times (switching times in the time program that do not cause any change of the temperature level) are not automatically detected or removed. The user himself must delete such switching times when free switching times are required.

### 5.3.4 Deleting all switching times

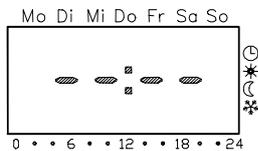
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The hour display flashes and can be changed with the + and – keys. Press the SET key to confirm the hour setting; the minute value then starts to flash.



This value can now be changed in 10-minute intervals with the + and – keys and confirmed with the SET key.

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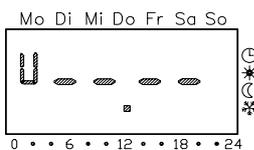
Redundant switching times (switching times in the time program that do not cause any change of the temperature level) are not automatically detected or removed. The user himself must delete such switching times when free switching times are required.

## 5.4 Vacation function

The device provides with the **UrLb** menu item a vacation function. This allows the time program to be suspended for a maximum period of one year. To ensure that the vacation program does not repeat itself every year, it will be deleted automatically when the vacation period expires.

### 5.4.1 Setting the vacation period

First select the **UrLb** item in the program menu. Once this has been confirmed with **SET**, either a previously programmed vacation start or an "empty" vacation program will be displayed.



Press the **SET** key to automatically accept the current date as vacation begin.

The **+** and **-** keys can now be used to change the month (flashing).

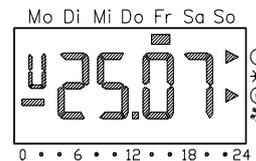
After confirming the month with **SET**, the day of the vacation start can be changed similarly.

After confirming the day with the **SET** key, the display switches to vacation end (automatically initialized with the date of the vacation start).



The **+** and **-** keys can now be used to change the month (flashing).

After confirming the month with **SET**, the day of the vacation end can be changed similarly.



Press **SET** again to set similarly the temperature level (comfort, lowering or frost-prevention temperature) to be maintained during the vacation period.

Press **SET** again to close the setting of the vacation program.

Press the **PROG** key to exit the program menu.

When the date of the automatic control device reaches 0:00 am on the specified vacation day, the system will be regulated to the set temperature level. The active vacation program with the end date is now displayed in the display.

### 5.4.2 Deleting a vacation period

To completely delete a specified vacation period, the two **+** and **-** keys must be pressed together for more than 2 seconds when the vacation start or end is displayed. The automatic control device deletes the vacation period and returns automatically to the menu selection.

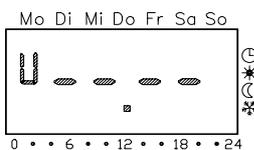
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## **6. Failure causes and their rectification**

### **6.1 No display**

Should a power failure occur, to save energy, although the device no longer makes any display, the internal clock will continue to run for at least 4 hours.

Consequently, first test whether the cause for the power failure lies in the distribution cabinet (Circuit-breakers and ground-fault circuit interrupter activated?). If everything is correct there and no general power failure has occurred, please contact your electrician so that he can find the cause.

Warning: The device operates with line voltage. You must not open it yourself!

### **6.2 FAIL displayed**

The external sensor attached to the device is defective. In this case; call your electrician so that he can find and correct the cause.

Warning: The device operates with line voltage. You must not open it yourself!

### **6.3 -- -- displayed when a key is pressed**

The keyboard of the device is locked. If required, unlock the keyboard as described in Section 4.4.

## **6.4 Output is not triggered**

If the output is not triggered as expected, this can have several causes. A set minimum switching time, a set upper or lower limit temperature may still be acting. It is also possible that the device briefly triggered the output to avoid the load from sticking (actuators).

Wait several minutes to determine whether the output assumes the expected state. If this does not occur, please contact your electrician so that he can find the cause.

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## Installation and commissioning guide

### 7.0 Fields of application

The SF 200.R16/1 clock thermostat is used to control the temperature for single rooms in residential or office buildings.

The combination of internal room and/or external temperature sensors makes the device particularly suitable for underfloor heating control.

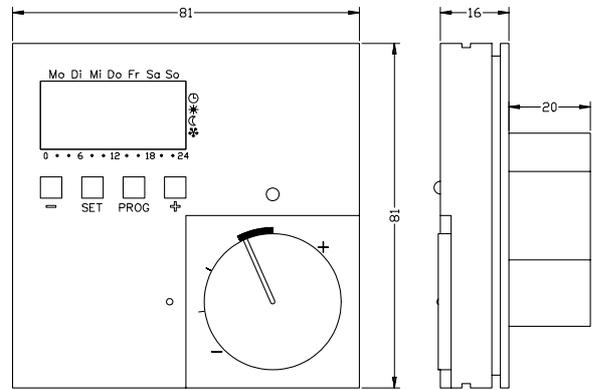
## 8. Assembly and installation

### 8.1 Assembly

**Note:** The assembly and connection of electrical devices may only be performed by trained electricians.

The automatic control device is designed for installation in flush-type boxes. It is divided into two units. The recessed part that contains the power electronics and the connections, and which extends into the flush-type box, and the actual controller with the operating elements that is snapped onto the lower part.

### Dimensions (mm):



### For optimum operation, please observe the following notes:

- An installation height of approximately 1.50 m is recommended to allow the room temperature to be measured correctly.
- The device should not be subject to direct sunshine or placed near other heat sources (such as electrical stoves, televisions or heating radiators).
- Similarly, the device should not be placed near windows or doors (draughts) or mounted on external walls.
- The external sensor (floor sensor) must also be located so that the sensor can record the temperature of the component to be measured (medium) as accurately as possible (do not install in edge areas).

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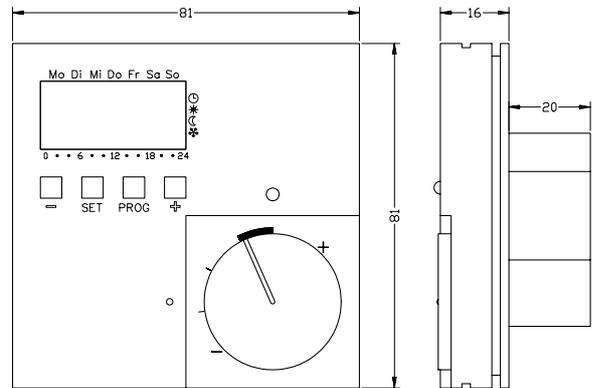
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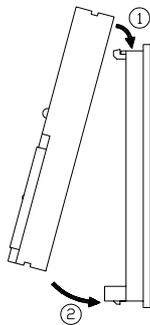


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## 8.2 Assembly steps

1. Connect the wires to the terminals in the recessed part (observe the wiring diagram in Section 8.4).
2. Install and screw the recessed part in the flush-type box (note the installation direction, terminals at the top).
3. Place the upper part on the recessed part (first attach the upper hook and then snap it down, see diagram).



## 8.3 Installation notes

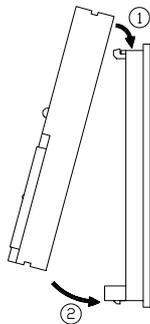
**Warning: Connection errors can cause failure of the automatic control device! No liability will be assumed for damage caused by incorrect connection and/or improper handling!**

- Switch off the power before working on the device!
- Only authorized specialists may perform the installation and service!
- The connection must be made in accordance with the included circuit diagram.
- The device is designed for connection to permanent wiring in closed dry rooms.
- In addition, adequate protection to prevent the inadvertent loosening of all connection wires should be provided in conformance with the requirements of EN 60730, Part 1. This, for example, can be done by attaching wires with cable binders.
- VDE 0100, EN 60730 Part 1, and the regulations of the local power utility company must be observed.
- If the device does not function, first check that the connections are correct and power is present.

- 14 -

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- 14 -

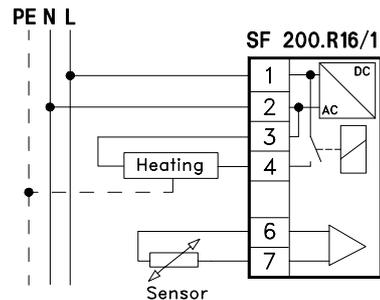
## External Sensor

- The sensor line is live line voltage! The installation notes are observed.
- To avoid interference, the sensor wire should not be laid together with other conducting wires.
- If the external sensor is used as floor sensor, it must be installed in a conduit. If an open conduit is used, this must be closed with plugs to prevent any tile cement or screed from entering the conduit.

## 8.4 Connection

All connection terminals are equipped with slotted screws. A normal screwdriver with 3 mm blade can be used to tighten the screws.

Wiring diagram



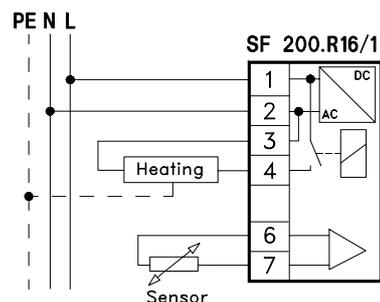
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### 8.5 Range limitation

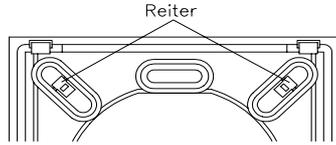
If the complete setpoint adjustment range of the rotary button should not be used, this range can be limited mechanically.

To do this, remove the rotary button. Turn the rotary button to a position that will later lie within the restricted range. Note this position. Use a screwdriver to raise the rotary button at the opening opposite the mark.

**Note:** The rotary button can only be removed once!

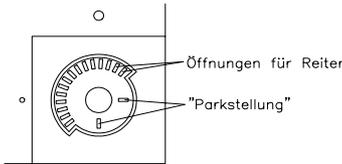
Remove two riders from the lower housing (see the following diagram).

Insert the riders with the narrow side down in the openings located under the button.



Orient yourself on the visible scale when you attach the upper and lower riders.

Finally, the button must be attached at the original position.



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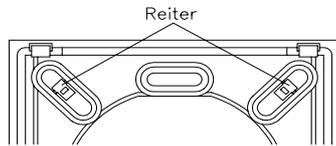
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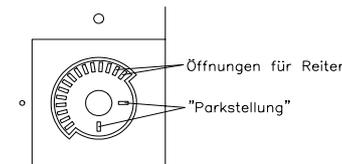
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Orient yourself on the visible scale when you attach the upper and lower riders.

Finally, the button must be attached at the original position.



**Note:** The button must be attached in this position otherwise the scale will not agree.

### 9. Commissioning

During the commissioning and after a reset, the device automatically begins with the clock setting because the clock has not yet been set.

The flashing hour display indicates that the clock has not yet been set.

Use the + or - key to set the hour.

After confirming the hours, the minutes start to flash. These are then set similarly with the + and - keys, and confirmed with SET.



The year, the month and the day are then set similarly with the +, - and SET keys. Because the weekday is determined automatically by the date, it does not need to be set.

**Note:** Because the clock must be set completely for the initial commissioning or after a reset, the PROG key cannot be used to exit the clock setting in this situation. Rather, after the clock has been set completely, the device automatically returns to the setpoint first set on the rotary button in the normal display (flashing decimal point and arrow on the comfort temperature symbol) and after several seconds the actual temperature on the selected sensor will be displayed.

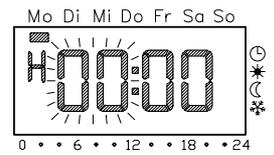
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## 10. Initial settings in the parameter menu

**Note:** Because under some circumstances incorrect settings will no longer permit any proper control operation, changes in this menu should only be made by specialists.

The factory settings are set so that proper operation is guaranteed, even without any modifications in the parameter menu. However, if certain control parameters need to be customized, these settings can be made here.

The following parameters can be set or displayed:

=	Software version
n (normal)	Normal display (desired temperature, actual temperature, time)
b (operation)	Operating mode (internal or external sensor)
d (diff)	Switching difference = hysteresis
F (frost-prevention)	Activate/deactivate the frost-prevention temperature
o (upper limit)	Limit temperature (upper limit value)
u (lower limit)	Limit temperature (lower limit value)
S (sensor)	Temperature at the external sensor
t (time)	Minimum switching duration in seconds [s]
A (compensation)	Sensor compensation to compensate for any building effects
E (early)	Initial heating optimization
r (ramp)	Gradient of the initial heating optimization in minutes per Kelvin [min/K]
U (clock change.)	Activate/deactivate the daylight saving setting
G (running accuracy of the clock)	Correction value for the running accuracy in seconds per day [s/d]

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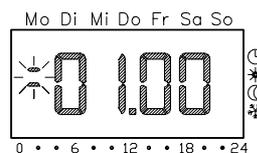
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G (running accuracy of the clock)	Correction value for the running accuracy in seconds per day [s/d]

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To simplify the assignment, the listed alphabetic letter is shown at the upper left of the display. The associated value is shown in the four large digits on the right-hand side.

To switch to the installation menu, the SET and PROG keys must be pressed together for more than 5 seconds in the normal display.

The + and - keys can be used to display the parameters.



Press the SET key to open the associated parameter for change; the parameter value will flash.

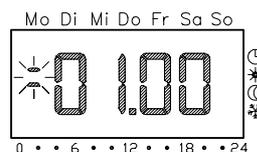
When a parameter is changed with + or - and confirmed with SET, the parameter menu automatically advances to the next parameter.

Important: Any changes made to parameters are performed immediately, i.e. the parameter will be changed, irrespective of whether the parameter opened for change is exited with SET, PROG or automatically (time-out).

To simplify the assignment, the listed alphabetic letter is shown at the upper left of the display. The associated value is shown in the four large digits on the right-hand side.

To switch to the installation menu, the SET and PROG keys must be pressed together for more than 5 seconds in the normal display.

The + and - keys can be used to display the parameters.



Press the SET key to open the associated parameter for change; the parameter value will flash.

When a parameter is changed with + or - and confirmed with SET, the parameter menu automatically advances to the next parameter.

Important: Any changes made to parameters are performed immediately, i.e. the parameter will be changed, irrespective of whether the parameter opened for change is exited with SET, PROG or automatically (time-out).

### 10.1 Software version (=)

This menu item can be used to fetch the currently installed software version.

**Note:** For technical problems, always specify the version of the software installed in the automatic control device.

### 10.2 Normal display (n)

This parameter can be used to select the normal display of the automatic control device. This information is then always shown on the display provided no menu is currently selected and no vacation program is active.

Normal display	Display
Current actual temperature	Is*
Current time	Clock
Current desired temperature	Set

### 10.3 Operating mode (b)

This parameter is used to select the specific function for the clock thermostat. This is used to specify the sensor selection for the temperature control and the limit function.

---

\* Factory setting

Reference variable	Operating mode	Floor temperature limit	Display
External sensor	Heating	—	<b>E.Hc*</b>
Internal sensor		External sensor	<b>IE.Hc</b>
Internal sensor		—	<b>I.Hc</b>

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This menu item can be used to fetch the currently installed software version.

**Note:** For technical problems, always specify the version of the software installed in the automatic control device.

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\* Factory setting

Reference variable	Operating mode	Floor temperature limit	Display
External sensor	Heating	—	<b>E.Hc*</b>
Internal sensor		External sensor	<b>IE.Hc</b>
Internal sensor		—	<b>I.Hc</b>

#### **10.4 Switching difference (d)**

This parameter defines the switching difference (hysteresis) of the control function. If the current actual temperature lies above the desired temperature by the value set here, the output will be switched off. If the actual temperature falls below the setpoint by the value set here, the output will be switched on.

The factory setting for the switching difference is  $\pm 0.2^{\circ}\text{C}$

#### **10.5 Frost-prevention temperature (F)**

This function is the only way of permanently activating the frost-prevention temperature. This prevents an inadvertent activation from causing damage.

The frost-prevention temperature that was set under the temperature levels can be activated or deactivated here (On / OFF). The frost-prevention function will be activated when this setting in the "On" position is confirmed with SET.

To deactivate, the corresponding input must be confirmed with "OFF". After deactivating the frost-prevention function, the automatic control device operates in the permanent lowering operation.

#### **10.6 Upper limit temperature (o)**

This parameter allows a specific upper limit to be set for temperature on the external sensor. When the limit function is activated (operating mode with limit function selected), the output will be deactivated when the temperature measured on the external sensor exceeds the temperature set here.

The possible setting range is  $+25^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$ .

The factory setting for the upper limit temperature is  $45^{\circ}\text{C}$ .

The limit function does not have any switching difference, i.e. switching occurs immediately when the limit value is exceeded or undershot. Similarly, the minimum switching duration is ignored.

#### **10.7 Lower limit temperature (u)**

This parameter allows a specific lower limit to be set for temperature on the external sensor. When the limit function is activated (operating mode with limit function selected), the output will be activated when the temperature measured on the external sensor falls below the temperature set here.

The possible setting range is  $+5^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .

The factory setting for the lower limit temperature is  $15^{\circ}\text{C}$ .

The limit function does not have any switching difference, i.e. switching occurs immediately when the limit value is exceeded or undershot. Similarly, the minimum switching duration is ignored.

#### **10.8 Temperature at the external sensor (S)**

If an operating mode that requires an external sensor is selected, the current temperature value will be displayed with this menu item. If an operating mode that only runs with the internal sensor is selected, "--.--" will appear in the display. No change can be made to this value.

**Note:** Provided it has been configured, the external sensor will be continually monitored for break and short-circuit. If a fault occurs, the control output will be disabled and FAIL shown in the display.

#### **10.9 Minimum switching duration (t)**

To prevent frequent switching of the output, this parameter can be used to specify a minimum activation duration. This time specifies the minimum time that the output should remain activated when a request caused the output to be activated.

The + and – keys can be used to set this parameter in the range between 20 seconds and 500 seconds in steps of 10 seconds.

The factory setting for the minimum switching duration is 20 seconds.

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#### **10.4 Switching difference (d)**

This parameter defines the switching difference (hysteresis) of the control function. If the current actual temperature lies above the desired temperature by the value set here, the output will be switched off. If the actual temperature falls below the setpoint by the value set here, the output will be switched on.

The factory setting for the switching difference is  $\pm 0.2^{\circ}\text{C}$

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This function is the only way of permanently activating the frost-prevention temperature. This prevents an inadvertent activation from causing damage.

The frost-prevention temperature that was set under the temperature levels can be activated or deactivated here (On / OFF). The frost-prevention function will be activated when this setting in the "On" position is confirmed with SET.

To deactivate, the corresponding input must be confirmed with "OFF". After deactivating the frost-prevention function, the automatic control device operates in the permanent lowering operation.

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This parameter allows a specific upper limit to be set for temperature on the external sensor. When the limit function is activated (operating mode with limit function selected), the output will be deactivated when the temperature measured on the external sensor exceeds the temperature set here.

The possible setting range is  $+25^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$ .

The factory setting for the upper limit temperature is  $45^{\circ}\text{C}$ .

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This parameter allows a specific lower limit to be set for temperature on the external sensor. When the limit function is activated (operating mode with limit function selected), the output will be activated when the temperature measured on the external sensor falls below the temperature set here.

The possible setting range is  $+5^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .

The factory setting for the lower limit temperature is  $15^{\circ}\text{C}$ .

The limit function does not have any switching difference, i.e. switching occurs immediately when the limit value is exceeded or undershot. Similarly, the minimum switching duration is ignored.

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If an operating mode that requires an external sensor is selected, the current temperature value will be displayed with this menu item. If an operating mode that only runs with the internal sensor is selected, "--.--" will appear in the display. No change can be made to this value.

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The + and – keys can be used to set this parameter in the range between 20 seconds and 500 seconds in steps of 10 seconds.

The factory setting for the minimum switching duration is 20 seconds.

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#### 10.10 Sensor compensation (A)

This parameter can be used to move the measured actual temperature by  $\pm 3.0$  Kelvin. This correction can be used to compensate for measuring differences caused by the unfavorable placement of the automatic control device.

The value set here is always used for the active sensor currently used for the temperature control. Depending on the selected operating mode, this can be either the internal or the external temperature sensor.

The factory setting for the sensor compensation is 0.0 Kelvin.

#### 10.11 Initial heating optimization (E)

The initial heating optimization uses previous initial heating actions to determine the time-related characteristic of the room and uses this value to calculate the required lead time that is needed to reach the desired temperature on time.

This parameter can be used to activate (On) or deactivate (OFF) the automatic initial heating optimization. If the initial heating optimization has been deactivated, switching is done as specified by the time program.

The initial heating optimization is deactivated as factory setting (OFF).

#### 10.12 Gradient of the initial heating optimization (r)

This menu item can be used to check the current gradient used to calculate the lead time. The time in minutes required to heat the room by one Kelvin (1K) is displayed. No setting can be made.

If the initial heating optimization is activated, this gradient will always be recalculated for the transition from a lowered phase to a comfort phase.

As factory setting, the initial heating optimization starts with a gradient of 15 minutes per Kelvin.

\* Factory setting

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The value set here is always used for the active sensor currently used for the temperature control. Depending on the selected operating mode, this can be either the internal or the external temperature sensor.

The factory setting for the sensor compensation is 0.0 Kelvin.

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This parameter can be used to activate (On) or deactivate (OFF) the automatic initial heating optimization. If the initial heating optimization has been deactivated, switching is done as specified by the time program.

The initial heating optimization is deactivated as factory setting (OFF).

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If the initial heating optimization is activated, this gradient will always be recalculated for the transition from a lowered phase to a comfort phase.

As factory setting, the initial heating optimization starts with a gradient of 15 minutes per Kelvin.

\* Factory setting

#### 10.13 Daylight saving change (U)

This menu item can be used to activate or deactivate the automatic daylight saving change. If daylight saving change is activated, the automatic control device changes the time as appropriate for Central Europe.

Control for	Start of daylight saving	End of daylight saving	Display
Central Europe	Last Sunday in March from 2 am to 3 am	Last Sunday in October from 3 am to 2 am	On*
Off	-	-	OFF

**Note:** If the daylight saving function is deactivated (OFF), the clock time will not be changed automatically. In this case, the clock time must be changed manually.

#### 10.14 Running accuracy of the clock (G)

This item specifies a factory setting as correction value for the running accuracy of the clock. The value represents the correction amount in seconds per day and cannot be changed.

#### 11. Reset (reset all settings)

If the + and - keys are pressed together for more than 10 seconds in the normal display, all parameter settings and programming will be cleared and reset to the factory standard values (exception: running accuracy of the clock). The automatic control device then performs its display test and provides the clock setting for commissioning (see Commissioning).

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**Note:** If the daylight saving function is deactivated (OFF), the clock time will not be changed automatically. In this case, the clock time must be changed manually.

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This item specifies a factory setting as correction value for the running accuracy of the clock. The value represents the correction amount in seconds per day and cannot be changed.

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## 12. Technical data

<b>Type</b>	<b>SF 200.R16/1</b>
Temperature ranges	+10 ... +50° C (comfort temperature) +5 ... +15° C (frost-prevention temperature) +25 ... +55° C (upper limit temperature) +5 ... +35° C (lower limit temperature) Each increment 0.5 K
Temperature Setback	2K ... 30K, adjustable
Tolerance of Sensor	± 1K
Temp. switching difference	±0.1 ... ±1.3 K, parameterizable Increment 0.1 K
Sensor	Semiconductor sensor (KTY) internal or external or internal + external (the external sensor is in the scope of delivery)
Time function	Electronic time switch with week program, automatic daylight-saving change
Time program switching points	32, freely assignable over the week Increment 10 minutes
Power reserve	Minimum 4 hours using Gold-Cap
Operational voltage	230 VAC (± 10%), 50 Hz
Power consumption	Approx. 1 W
Control output	Relay, potential applied with L

Max. permitted switching current	16 A, 230 VAC, (cos φ = 1)
Minimum switching duration	20 seconds to 500 seconds Increment 10 seconds
Electrical connections	Screw-terminals with slotted screw (0.5 ... 2.5 mm <sup>2</sup> )
Method of operation	1.C (no limiter method of operation)
Impulse voltage withstand level	4.0 kV
Pollution severity	2
Permitted ambient temperature	0 ... +40° C
Housing:	
Material	Upper part ABS (impact resistant, fire-inhibiting) Lower part PA6 GF30
Dimensions	81 x 81 x 16 (36) mm
Mounting	on flush-type box
Cable routing	from flush-type box
Degree of protection	IP 30
Safety class	II
Weight	Approx. 120 g

Subject to change without prior notice

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## 12. Technical data

<b>Type</b>	<b>SF 200.R16/1</b>
Temperature ranges	+10 ... +50° C (comfort temperature) +5 ... +15° C (frost-prevention temperature) +25 ... +55° C (upper limit temperature) +5 ... +35° C (lower limit temperature) Each increment 0.5 K
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