

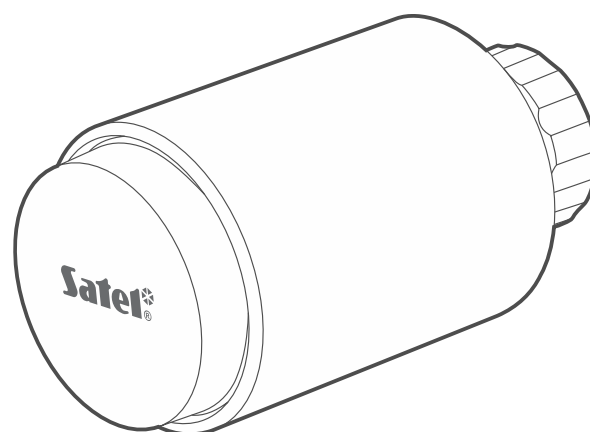
**abox2**

Wireless radiator thermostat

**ART-210**

Firmware version 1.00

**EN**



**CE**

art-210\_pl 07/24

**Satel** 

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## IMPORTANT

The device should be installed by qualified personnel.

Prior to installation, please read carefully this manual.

Changes, modifications or repairs not authorized by the manufacturer shall void your rights under the warranty.

Description of symbols on the device:



The device meets the requirements of the applicable EU directives.



The device is designed for indoor installation.



The device must not be disposed of with other municipal waste. It should be disposed of in accordance with the existing rules for environment protection (the device was placed on the market after 13 August 2005).



The device meets the technical regulations of the Eurasian Customs Union.

SATEL aims to continually improve the quality of its products, which may result in changes in their technical specifications and software. Current information about the changes being introduced is available on our website.

Please visit us at:

<https://support.satel.pl>

**Hereby, SATEL sp. z o.o. declares that the radio equipment type ART-210 is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: [www.satel.pl/ce](http://www.satel.pl/ce)**

**In the EU, this radio equipment is only permitted to operate in the 868 MHz frequency band.**

The following symbols may be used in this manual:



- note,



- caution.

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The ART-210 radiator thermostat is used to regulate room temperature which helps to reduce energy consumption. The thermostat allows you to control the radiator valve remotely and manually. It is designed to work within the ABAX 2 two-way wireless system. It is supported by:

- ACU-220 / ACU-280 controller with firmware version 6.08 (or newer),
- ARU-200 repeater.



*The thermostat is not supported by the ACU-220 / ACU-280 controller connected to a VERSA series control panel.*

## 1 Features

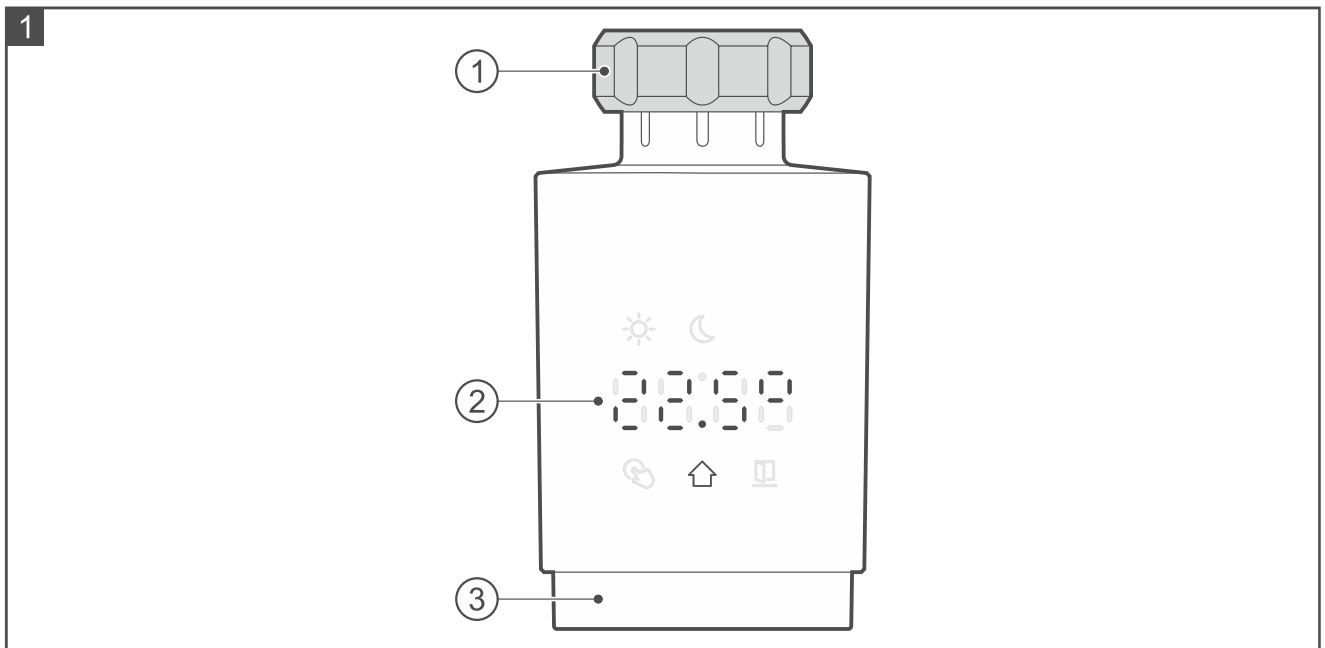
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- Temperature setting in the range from 5°C to 30°C.
- 3 operating modes.
- Remote control or manual control.
- Boost Heat function for fast heating.
- Capability to close the valve manually.
- Anti-scale function.
- Open window detection.
- Anti-freeze protection.
- Child Lock.
- Built-in temperature sensor (measuring range: -10 °C...+55°C).
- Capability to use an external temperature sensor (other ABAX 2 device).
- LED display for easier control and configuration.
- Capability to rotate the messages on display by 180°.
- Encrypted two-way radio communication in the 868 MHz / 915 MHz frequency band (AES standard).
- Transmission channel diversity – 4 channels for automatic selection of the one that will enable transmission without interference with other signals in the 868 MHz / 915 MHz frequency band.
- Device firmware updated remotely.
- *ECO* option for longer battery life.
- Battery status control.
- Installation on valves with the M30x1.5mm threaded connection.
- Capability to install on Danfoss RA, Danfoss RAV and Danfoss RAVL valves (adapters provided).
- Reducer ring provided for easier installation on valves with smaller diameter.

## 2 Description

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The ART-210 thermostat occupies one position on the list of wireless devices.



- ① union nut.
- ② LED display.
- ③ knob.

### LED display

Normally, the display is off. Touch the knob (Fig. 2) to turn on the display.

After turning on, the display shows temperature in degrees Celsius from the selected sensor (Fig. 1). Symbols and messages are also shown on the display.

The display will be turned off after 20 seconds since your last activity using the knob.

### Symbols on the display

- temperature set for the *Comfort temperature* operating mode is displayed.
- temperature set for the *Economy temperature* operating mode is displayed.
- temperature / valve position set manually is displayed.
- temperature from the sensor is displayed.
- open window has been detected and the valve is closed.

### Messages on the display

- thermostat ready for calibration to be started. Press the knob to start the calibration.
- thermostat adaptation in progress.
- the knob is blocked. Press and hold the knob for 3 seconds to unblock it. The knob can be unblocked if it has been blocked manually. If it has been blocked remotely, it cannot be unblocked manually.
- low batteries (battery voltage dropped below 2.3 V). Replace the batteries.
- anti-freeze protection is enabled.
- Boost Heat is enabled (number at the end is the number of minutes until the end of the function). If you want to stop the Boost Heat, press and hold the knob for 3 seconds.
- valve is closed. Press or turn the knob to open the valve.

- F 1 trouble with changing the valve position. Make sure the thermostat is mounted correctly on the valve and check the valve operation or restart the thermostat (remove the batteries and insert them again).
- F 2 incorrect operating range of the thermostat (calibration failure). Make sure the thermostat is mounted correctly on the valve or restart the thermostat (remove the batteries and insert them again).
- F 3 valve control disabled to protect against complete battery discharge (battery voltage dropped below 2.2 V). Replace the batteries.
- F 5 problem with the knob.
- F 6 motor error.
- F 7 internal error.
- F 8 unable to fully close the valve (calibration failure). Make sure the thermostat is mounted correctly on the valve or restart the thermostat (remove the batteries and insert them again).

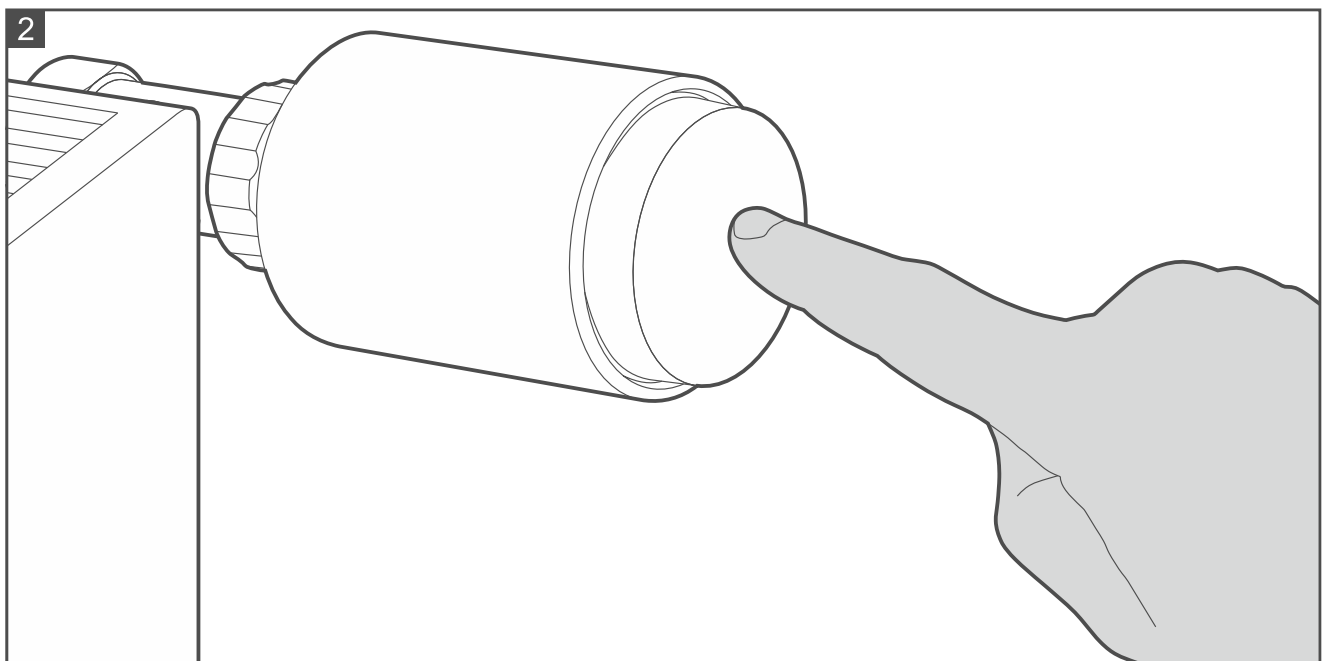


The events labelled as F 1, F 2, F 3, F 5, F 6, F 7 and F 8 will be indicated in the ABAX 2 system as no communication with the thermostat.

### Units

- °C temperature is displayed in degrees Celsius.
- % valve position is displayed in percent (0P – valve fully closed; 100P – valve fully open).

### Knob



**Press** (Fig. 2) – turn on the display / change the operating mode / confirm new temperature settings or valve position.

**Press and hold for 3 seconds** – block the knob / unblock the knob / edit temperature for the selected operating mode / stop the Boost Heat.

**Turn right** – temperature up / open the valve.

**Turn left** – temperature down / close the valve.

**Press and turn right** – start the Boost Heat function.

**Press and turn left** – fully close the valve.

## Radio communication



The thermostat connects to the controller at regular time intervals to provide information about its state (periodical communication). Additional communication takes place when the ART-210 thermostat is sending to the controller the settings adjusted manually.



## Energy saving mode (ECO)

If you want to prolong the battery life, you can enable the *ECO* option in the device. When the *ECO* option is enabled, the periodical communication takes place every 3 minutes. This can significantly increase the battery life.

## Battery status control

The thermostat is monitoring the battery voltage. When the battery voltage is lower than 2.3 V, i.e. the batteries are low:

- the   message is shown after turning on the display,
- each radio transmission contains information about low battery.

When the battery voltage drops below 2.2 V, the thermostat will disable the valve control in order to protect the battery from complete discharge. The   message will be displayed and the valve will be set in the 25% open position.

## Operating modes

**Comfort temperature** – thermostat is to maintain room temperature at a comfortable level. This mode can be enabled remotely or manually.



**Economy temperature** – thermostat is to maintain temperature at an energy-efficient level (e.g. when household members are at work or asleep at night). This mode can be enabled remotely or manually.

**Manual** – thermostat is to maintain the set temperature / radiator valve is to be set in a given position. This mode can be enabled remotely or manually but the temperature / valve position can only be set manually.





*The Manual operating mode can be enabled remotely if the controller is connected to a SATEL alarm control panel. If the operating mode was enabled remotely, the thermostat can only be controlled manually. Remote control is possible only after the mode is disabled remotely.*

## Thermostat calibration

When calibrating, the thermostat adjusts its actuator stroke to the radiator valve stroke. During calibration, the thermostat operating range is defined (the valve end positions, where: 0% = valve fully closed, 100% = valve fully open). The thermostat must be calibrated after it is mounted on the valve and each time after batteries are replaced. The   message will be shown on the LED display when calibration is required.

## Thermostat adaptation

After it is started, the thermostat will analyze which valve position is optimal to heat the room to set temperature. If the valve is not open enough, heating up the room takes too long. If the valve is open too much, the room heats up fast but the temperature continues to rise beyond the set value and the room becomes too hot. This is repeated whenever the thermostat detects that the conditions in the room have changed in a way that can affect its operation. During adaptation, whenever the knob is pressed, the   message will be displayed alternately with the temperature registered by the sensor.

## Boost Heat

If the room temperature is too low and uncomfortable, you can enable the Boost Heat function to heat the room faster. The valve will be fully open for 15 minutes. When this function is enabled, whenever the knob is pressed, the countdown to the end of the function will be displayed alternately with the temperature registered by the sensor.

You can turn off the function yourself (see: *Knob* p. 4). If you do, the preset operating mode will be reactivated.




*The Boost Heat function has the highest priority. When it is enabled, other functions and settings are ignored.*



## Anti-scale protection

Scale can build up inside the valve when it remains unused for a long time. To prevent it, the thermostat will fully open the valve once every two weeks.

## Open window detection

The thermostat can detect a sudden drop in temperature. When it does, it is interpreted as detecting an open window. The radiator valve will then be closed for 30 minutes or until the thermostat detects a rise in temperature. When an open window is detected and the valve is closed, it will be indicated by the  symbol on the LED display.


## Anti-freeze protection

When temperature drops below 5°C, the thermostat will open the valve to prevent the radiator from freezing. The valve will remain open until the thermostat operating mode is changed or temperature rises to 8°C. When the protection is activated, the  -  - message will be displayed. The information about the protection being activated is sent to the controller during periodical communication.

## Temperature measurement correction

The thermostat can correct the temperature information provided by the internal sensor. The correction can be made in the range of  $\pm 3.5^{\circ}\text{C}$ .

## Child Lock

You can disable the knob to prevent the settings from being accidentally changed (e.g. by children at play). The knob can be disabled manually (see: *Disabling the knob (child lock)*) or remotely. If the knob was disabled remotely, it cannot be enabled manually. When the knob is disabled, the  message will be displayed after it is pressed.

## 3 Installation

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**There is a danger of battery explosion when using a different battery than recommended by the manufacturer, or handling the battery improperly. Do not crush the battery, cut it or expose it to high temperatures (throw it into the fire, put it in the oven, etc.).**

**Do not expose the battery to very low pressure due to the risk of battery explosion or leakage of flammable liquid or gas.**

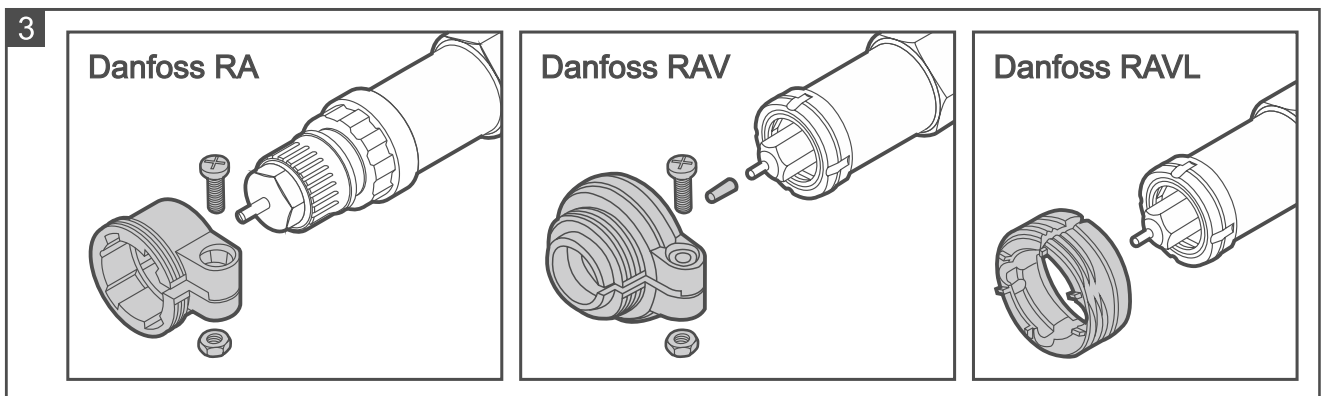
**Be particularly careful during installation and replacement of the battery. The manufacturer is not liable for the consequences of incorrect installation of the battery.**



**The used batteries must not be discarded, but should be disposed of in accordance with the existing rules for environment protection.**

### 3.1 Tips for installation

- The thermostat should be installed indoors, in spaces with normal air humidity.
- When selecting a place of installation, consider the radio communication range. The thermostat must be located within the radio range of the ABAX 2 controller.
- Thick walls, metal partitions, etc. reduce the range of the radio signal.
- Use the ARF-200 tester to test the radio signal strength. Place the tester close to the valve on which you want to install the thermostat. If the radio signal level indicated by the tester is higher than 40%, you can install the thermostat there.
- The thermostat is fitted for radiator valves with the M30 x 1.5 mm threaded connection. It is compatible with most radiator valves on the market.
- In order to install the thermostat on the Danfoss RA, Danfoss RAV or Danfoss RAVL valve, use one of the provided adapters (Fig. 3).
- The thermostat should be installed in such a way to ensure display visibility and knob accessibility.
- You do not need any special tools to install the thermostat. Draining the heating system is not required.
- Before you remove the old thermostatic head, make sure to turn it several times from minimum to maximum position and back. Unscrew the old thermostat when it is in the maximum position. When the thermostat is removed, the valve pin should be fully extended.




### 3.2 Mounting

1. Remove the thermostat cover (Fig. 4).
2. Install two 1.5 V LR6 AA alkaline batteries (they are not supplied with the thermostat).

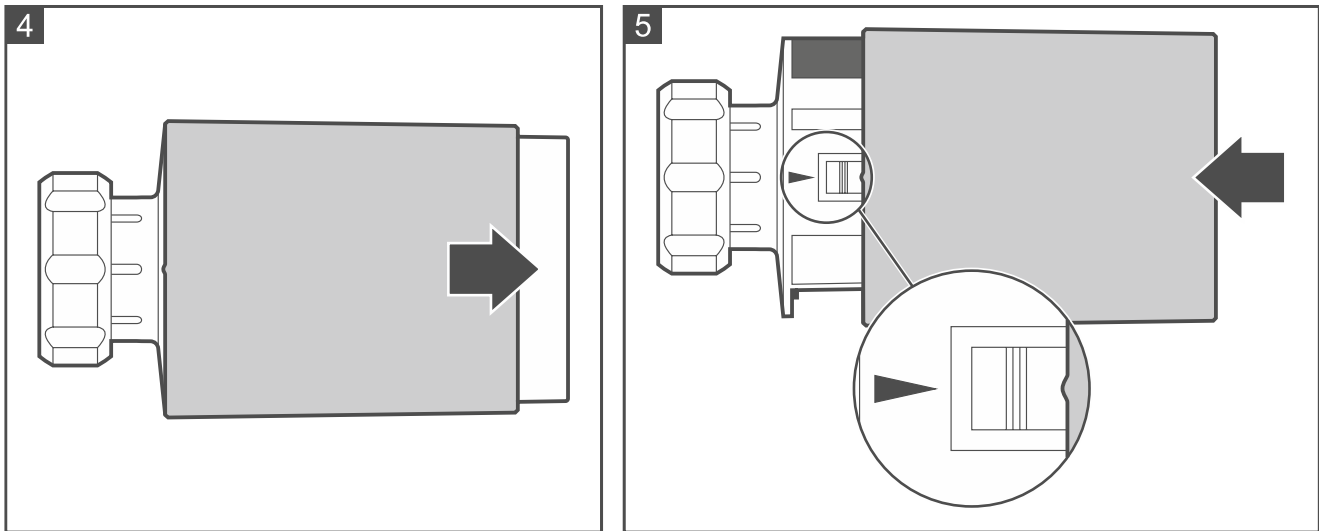


*When the batteries are installed, the actuator rod that moves the valve pin is completely withheld inside the thermostat cover. If the actuator rod is not completely withheld inside the cover, remove the batteries and install them again.*

*After the thermostat has started, the  message will be displayed. The message indicates that the thermostat is ready for calibration.*

3. Add the thermostat to the wireless system (see the ABAX 2 controller manual). The sticker with the serial number required for registration of the thermostat in the system can be found on the thermostat body.

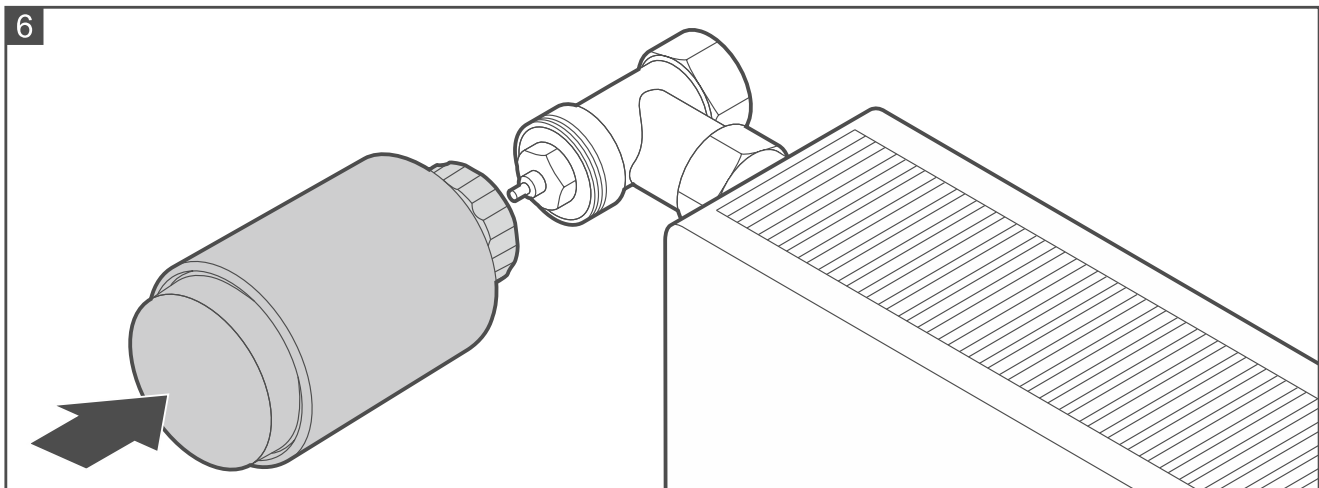
4. Replace the thermostat cover. The marks on the body and cover will help you replace the cover correctly (Fig. 5).

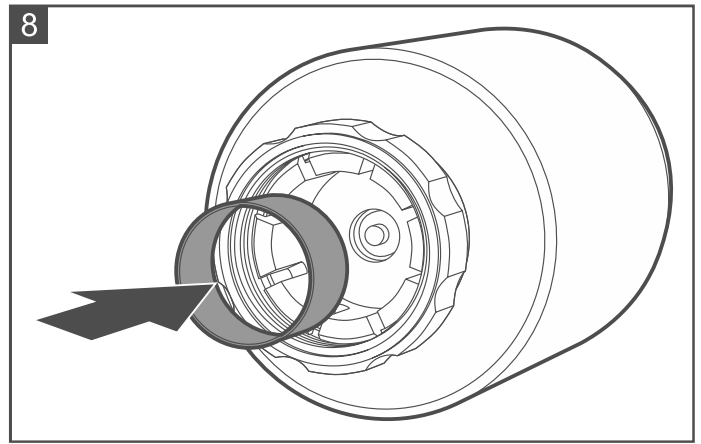
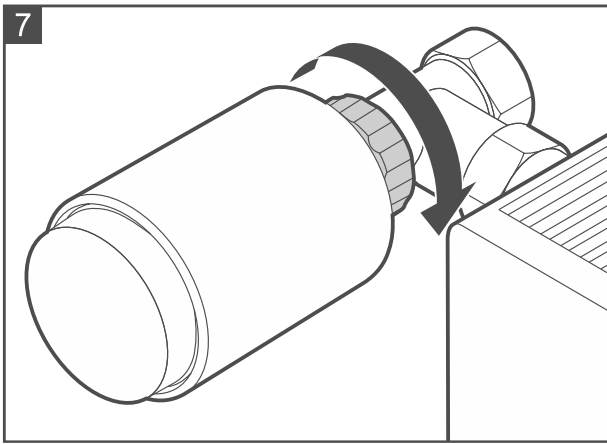


5. Mount the thermostat on the valve (see: *Mounting on M30x1.5 mm valve*, *Mounting on Danfoss RA valve*, *Mounting on Danfoss RAV valve* or *Mounting on Danfoss RAVL valve*).
6. Press the knob. The thermostat will be calibrated.

### Mounting on M30x1.5 mm valve

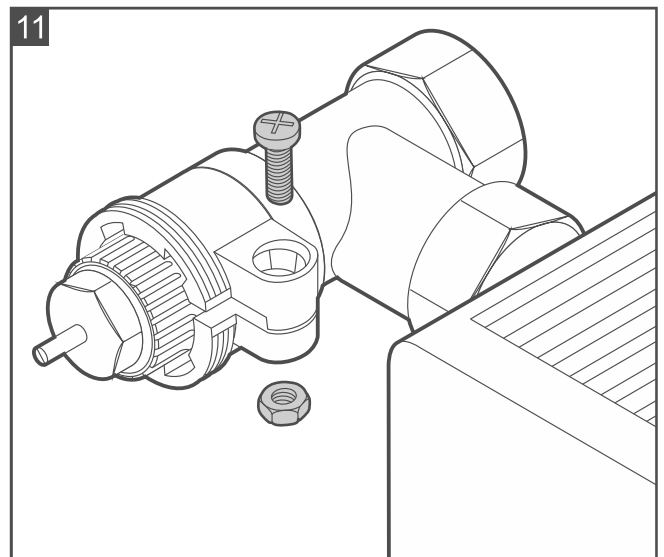
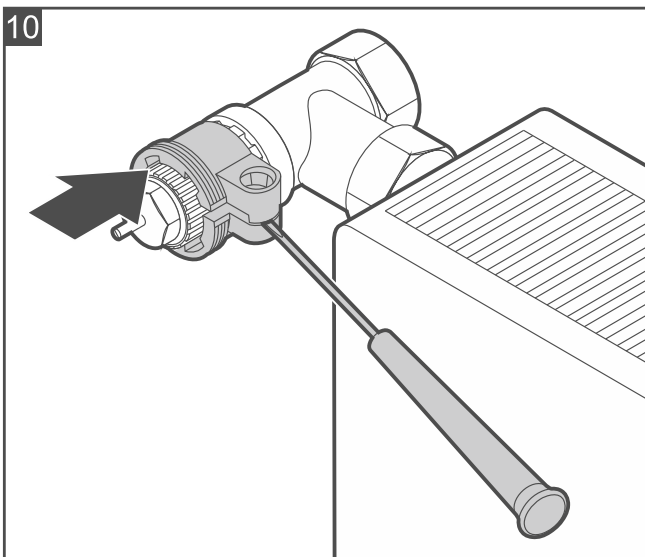
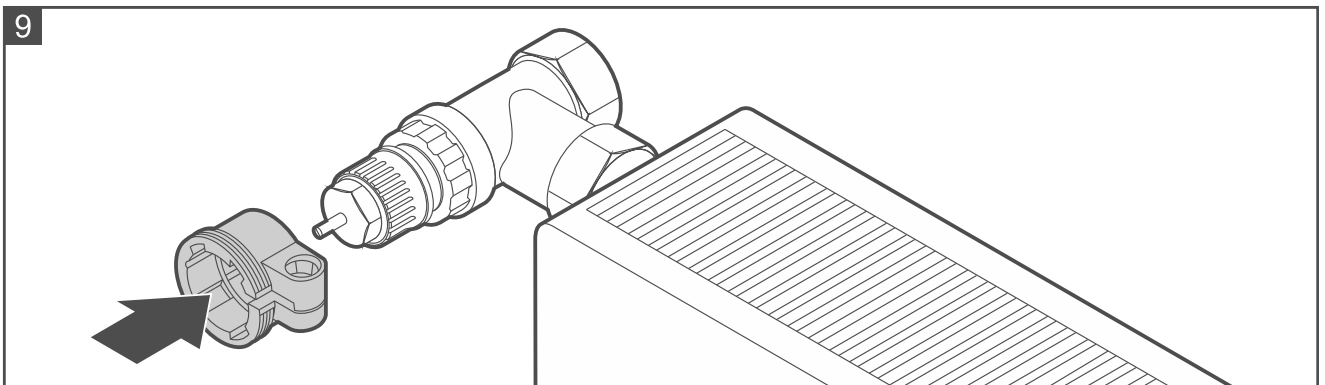
1. Place the thermostat on the valve (Fig. 6).
2. Tighten the thermostat on the valve (Fig. 7).
3. If the thermostat is seated loosely on the valve, use the reducer ring. Unscrew the thermostat, place the reducer ring inside its flange (Fig. 8), then repeat points 1 and 2.



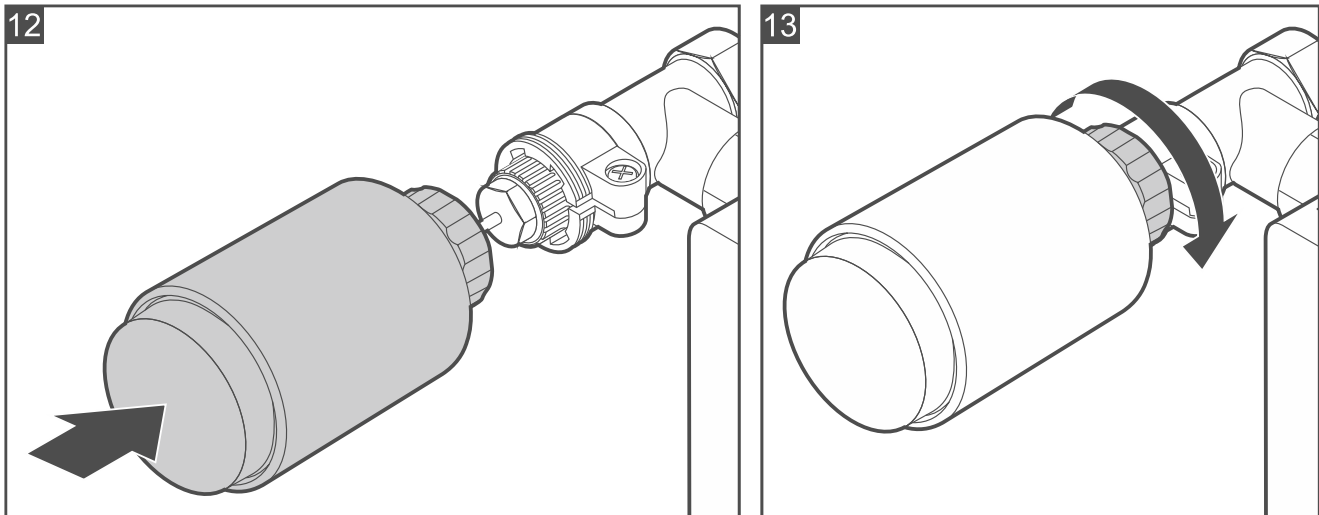


### Mounting on Danfoss RA valve

1. Fasten the adapter on the valve.
  - 1.1. Place the adapter on the valve (Fig. 9).
  - 1.2. Bend open the adapter clamp with a screwdriver and press the adapter against the valve flange (Fig. 10). Make sure the bumps inside the adapter line up with the notches on the valve body.
  - 1.3. Secure the adapter clamp with a screw (Fig. 11).



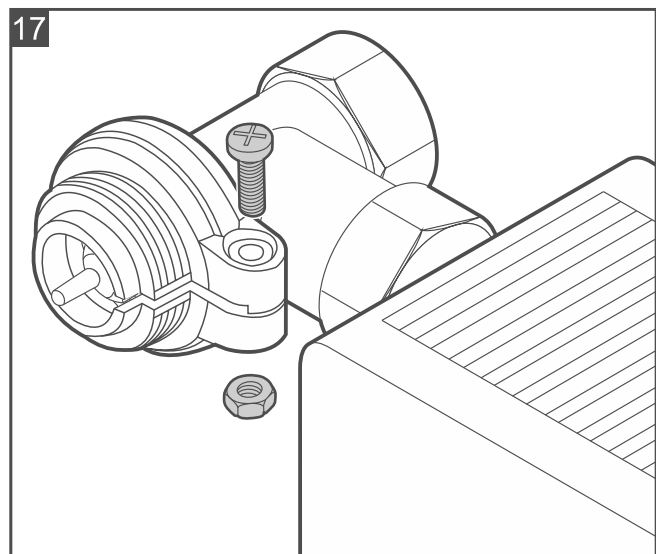
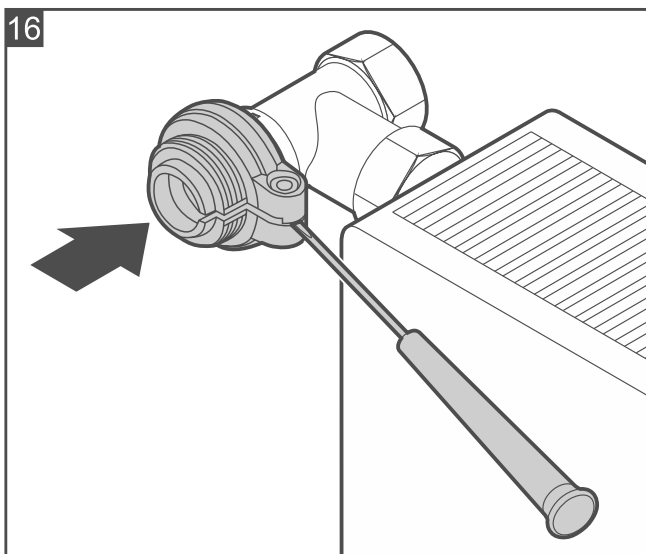
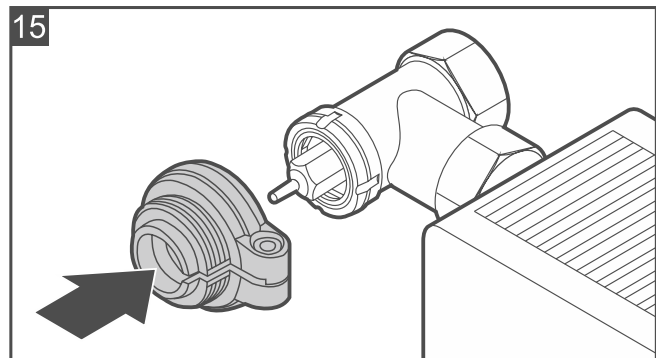
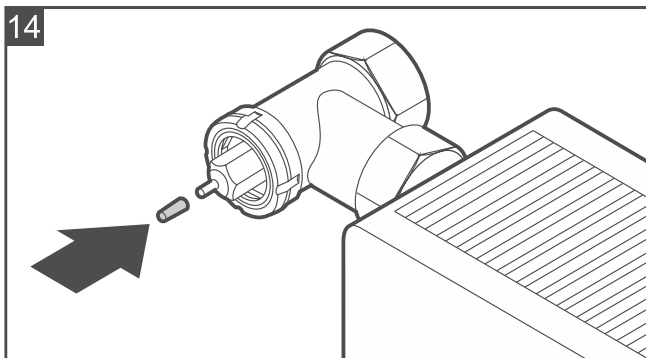
2. Place the thermostat on the valve (Fig. 12).
3. Tighten the thermostat on the adapter (Fig. 13).



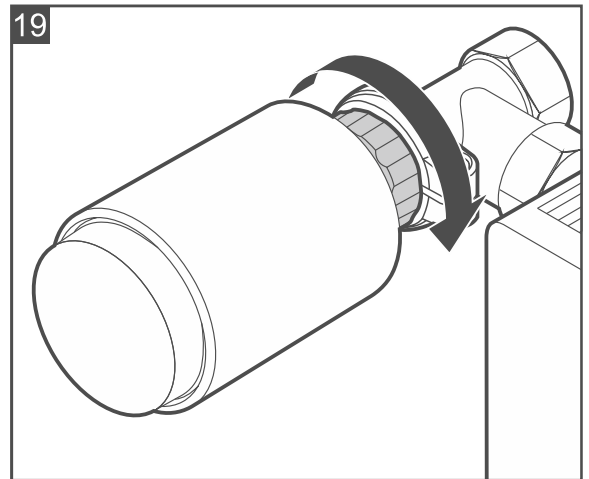
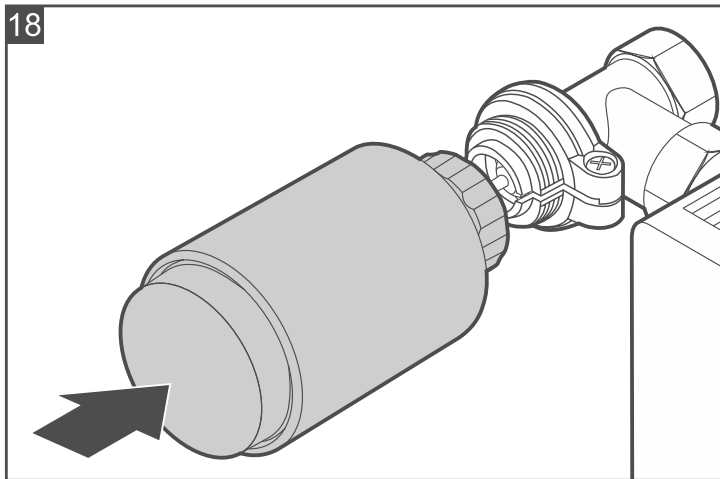
4. If the thermostat is seated loosely on the valve, use the reducer ring. Unscrew the thermostat, place the reducer ring inside its flange (Fig. 8), then repeat points 2 and 3.

### Mounting on Danfoss RAV valve

1. Place the cap on the valve pin (Fig. 14).
2. Fasten the adapter on the valve.
  - 3.1. Place the adapter on the valve (Fig. 15).
  - 3.2. Bend open the adapter clamp with a screwdriver and press the adapter against the valve flange face (Fig. 16).
  - 3.3. Secure the adapter clamp with a screw (Fig. 17).



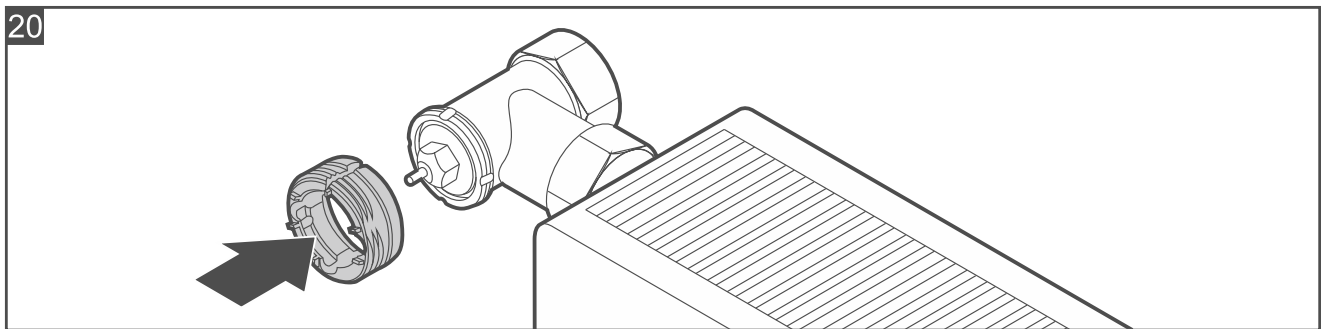
3. Place the thermostat on the valve (Fig. 18).



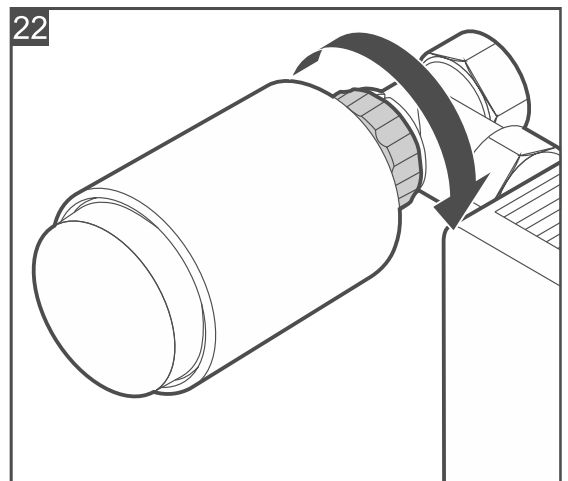
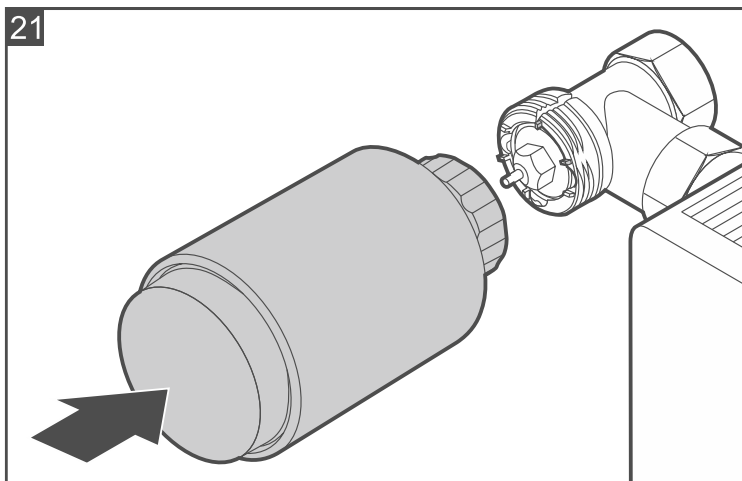
4. Tighten the thermostat on the adapter (Fig. 19).
5. If the thermostat is seated loosely on the valve, use the reducer ring. Unscrew the thermostat, place the reducer ring inside its flange (Fig. 8), then repeat points 3 and 4.

### Mounting on Danfoss RAVL valve

1. Mount the adapter on the valve. Press it against the valve flange face (Fig. 20).



2. Place the thermostat on the valve (Fig. 21).
3. Tighten the thermostat on the adapter (Fig. 22).



4. If the thermostat is seated loosely on the valve, use the reducer ring. Unscrew the thermostat, place the reducer ring inside its flange (Fig. 8), then repeat points 2 and 3.

## 4 Programming the settings

For description of how to program the thermostat settings, please refer to the ABAX 2 controller manual.

## 5 Manual control



*If you remove the batteries within 10 seconds since your last activity, the changes will not be saved.*

### 5.1 Changing the operating mode

1. Press the knob to turn on the display.
2. Keep pressing the knob until the temperature / valve position for the operating mode you want to enable is displayed (☀️ - comfort temperature; 🌙 - economy temperature; 🖱️ - manual).
3. Wait 10 seconds. The temperature from the selected sensor will be displayed.

### 5.2 Temporarily setting other temperature



*This temporary temperature will be used until the operating mode is changed.*

*If the Manual operating mode is enabled, then its settings will be changed.*

1. Press the knob to turn on the display.
2. Press the knob to display the currently set temperature.
3. Turn the knob to set the new temperature.
4. Press the knob to confirm the change.

### 5.3 Changing the selected operating mode settings

1. Press the knob to turn on the display.
2. Keep pressing the knob until the temperature / valve position for the operating mode you want to edit is displayed.
3. Press and hold the knob for 3 seconds. The temperature / valve position will start flashing on the display.
4. Turn the knob to set the new value.



*For the Manual operating mode you can press and hold the knob to switch between the temperature (°C) and the valve position (°C).*

5. Press the knob to confirm the change.
6. Keep pressing the knob until the temperature / valve position for the operating mode you want to enable is displayed.

### 5.4 Starting the Boost Heat function

Press the knob and turn right. The 🌡️ ⏱️ message will be shown on the display. The number at the end is the number of minutes until the end of the function.

### 5.5 Stopping the Boost Heat function

If you want to stop the Boost Heat before the end of 15 minutes, press the knob and hold for 3 seconds. The temperature from the sensor will be shown on the display.

### 5.6 Fully closing the valve

Press the knob and turn left. The 🌡️ 🚪 message will be shown on the display.

## 5.7 Disabling the knob (child lock)



You can block the knob when the LED display is turned off or it shows temperature from the sensor (🏠 symbol).

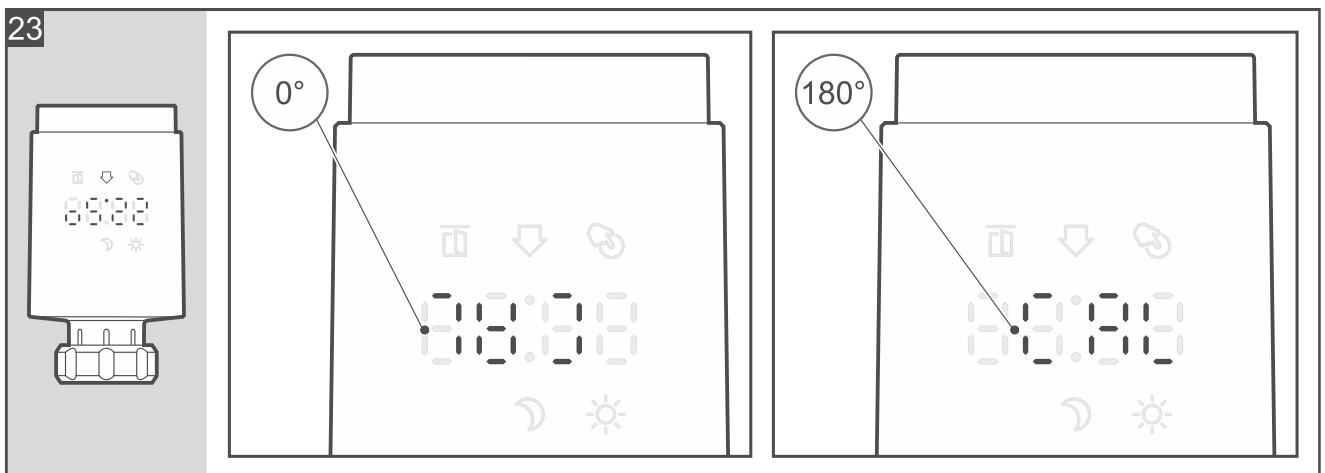
Press the knob and hold for 3 seconds. The 🏠 🌡️ message will be shown on the display.

## 5.8 Unblocking the knob

Press the knob and hold for 3 seconds. The temperature from the sensor will be shown on the display.

## 5.9 Rotating the temperature / messages on the display

1. Remove the thermostat cover (Fig. 4).
2. Remove the batteries.
3. Install the batteries again. The 🏠 🌡️ message will be displayed.
4. Press and hold the knob for 5 seconds. The message on the display will be rotated by 180° (Fig. 23).
5. Replace the thermostat cover (Fig. 5).



## 6 Restoring the default settings

1. Remove the thermostat cover (Fig. 4).
2. Remove the batteries.
3. Press and hold the knob.
4. While holding the knob, install the batteries. The LED display test will be started (the LEDs on the display will be turned on and off).
5. Release the knob and wait until the test is complete (the display will turn off).
6. Press the knob.
7. Remove the batteries and install the batteries again. The 🏠 🌡️ message will be shown on the display.
8. Replace the thermostat cover (Fig. 5).

## 7 Specifications

Operating frequency band ..... 868.0 MHz ÷ 868.6 MHz / 915 MHz – 928 MHz

## Radio communication range (in open area)

ACU-220.....	up to 1000 m
ACU-280.....	up to 500 m
Batteries.....	2 x 1.5 V LR6 AA
Battery life expectancy.....	up to 2 years
Standby current consumption.....	74 $\mu$ A
Temperature measurement range.....	-10°C...+50°C
Temperature measurement accuracy.....	$\pm$ 0.1°C
Temperature adjustment range.....	5°C...30°C
Temperature adjustment accuracy.....	$\pm$ 0.5°C
Operating temperature range.....	-10°C...+50°C
Maximum humidity.....	93 $\pm$ 3%
Enclosure dimensions.....	$\varnothing$ 56 x 97 mm
Weight.....	166 g