Programmable weekly thermostat TT1

-high aesthetic level - use of uniform design of sensors and electrical installation
-easy installation in a standard electrical installation box
-room, floor or combined function thermostat
-the possibility of setting the temperature control in the range of 5 ÷ 40 °C
-operating modes: weekly, individual, daily, holiday, temporary, tempering
-selection of heating or cooling mode, selection of external temperature sensors, external contact control, prediction function, limitations adjustable temperatures, frost protection, valve protection, output function inversion, automatic winter/summer time transition, language selection (CZ, EN), holiday database (CZ, weekly mode)
-backup with standard CR2032 batteries

Description

The device serves for temperature control in interiors with high aesthetic requirements. It can be used for various types of heat sources, cooling devices and control valves. Its output is designed as a switching relay contact, which is safely galvanically isolated from both the power supply and the internal circuits of the connected control unit. This allows the use of potential-free switching or switching of various voltages incl. 230 VAC at phases different from the supply voltage. The thermostat's electronics consists of two parts. The display part with the graphic LCD and control buttons is installed on the PCB inside the enclosure, while the power part with terminal blocks is housed in a box, which is inserted in a deep installation box. Both parts are interconnected with a flat conductor inserted in an insulating plate, which ensures safe isolation between the power part from the rest of the device. The internal temperature sensor is integrated in the metal housing on the front panel; moreover, the device allows connecting a single external temperature sensor or external potential-free control contact.
CAUTION! The metal housing with temperature sensor is not a button , DO NOT PRESS OR PUSH!!!

Available modes:

- Room thermostat: temperature is measured by the internal sensor and the device controls the interior temperature.
- Floor thermostat: temperature is measured by the external sensor integrated in the floor and the device controls the floor temperature.
- Combined thermostat: both internal and external sensors are used and the device controls the interior temperature; the external sensor monitors the minimum/maximum floor temperature.

The thermostat can be easily switched to one of six modes:

1. **Weekly:** the device works as per the time profile programmed for working days (Mon-Fri), weekend (Sat-Sun) or holidays (with Czech localization). For working days and weekends, up to 10 time stamps can be programmed separately.
2. **Individual:** the device works as per time profiles programmed for individual days (Mon-Sun). For each day, up to 10 time stamps can be programmed separately.
3. **Daily:** the device works as per the time profile, which is identical for every day of the week. Up to 10 time stamps can be programmed.
4. **Holiday:** the device controls the temperature to a fixed preset value up until the return time, which is programmed when selecting the mode. After that, the device reverts to the previously selected mode.
5. **Temporary:** the device controls the temperature to a fixed preset value up until the selected time. After that, the device reverts to the previously selected mode. This mode is used in cases when the temporary interval is shorter than 24 hours.
6. **Tempering:** the device controls the temperature to a fixed preset value without any programmed end time. This mode is used in cases when the return is not planned and it is necessary to maintain a constant temperature.

In the 1st and 2nd modes, up to 10 time stamps can be programmed in the minimum intervals of 10 min. with the maximum temperature range of 5...40°C (this depends on the temperature limits of the selected sensor).

The operationconditions are met by conventional, chemically non-aggressive environment, in which neither attendance nor maintenance is required by the transducers.

Overview of types

Type	Type of external temperature sensor *
TT1 - PA - xx	Pt 1000 (3850 ppm)
TT1 - KTY - xx	KTY81-210
TT1 - NTC10K - xx	NTC 10k, B25/85 = 3977
TT1 - NTC100K - xx	NTC 100k, B25/85 = 4380

xx = desired design and color

* The external sensor is not included and needs to be ordered separately; the recommended type for TT1-PA is: SK2PA - 2SS - y (y = cable length in meters).

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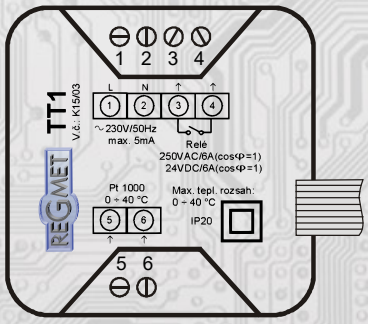
Basic technical parameters:

Supply voltage / current consumption	230 V / 50 Hz ±10% / max. 5 mA
Range of measurement / setting (T_{min} ÷ T_{max})	0 ÷ 40 °C / 5 ÷ 40 °C
Temperature resolution / setting	0,1 °C / 0,5 °C
Max. error of temperature measurement	± 1°C **
Stabilization time	min. 3 h **
Sensing period of temperature measurement	15 s
Type of regulation	Optional PI / two-state
Proportional PWM output of PI regulation	0 – 100% with step 10%
Action period and period of PWM output PI regulation	Optional 10 min / 20min / 30min
Hysteresis of two-state regulation	Optional 0,5°C/1°C/1,5°C/2°C/2,5°C/3°C
Action period of two-state regulation	15s
Maximum switched voltage / switched current	250 VAC / 6 A (cos φ = 1) 24 VDC / 6 A (cos φ = 1)
Max. switched power of relay	1500 VA / 150 W
Min. lifetime (number of cycles)	10 x 10^6
Galvanic separation of relay output	yes < 250V
Max. protection	16 A
Number of modes	6
Max. number of timestamps per day	10 (minimal interval 10 min.)
Clock running backup	CR2032 / cca 30 days
Range of working temperature / humidity	0 ÷ 40 °C / 0 ÷ 95 %RH without condensation
Range of storage temperature / humidity	-20 ÷ 50 °C / 0 ÷ 95 %RH without condensation
Protection level	IP20 (according to EN 60529)
Type of terminal board	CZM (conductors max. 1.5 mm²)
construction of the control device	Separate control device
Action type	1
Degree of pollution	2
Rated impulse voltage	2,5 kV
Overvoltage category	I
Software class	Class A control functions

Note: The maximum time during which the ambient temperature can be higher than Tmax after the influence of the control device cannot be clearly determined, as it depends on the design and properties of the entire heating system and all the elements and materials contained in it.

** : See: Description of settings and functions:, Internal Sensor Offset !!!

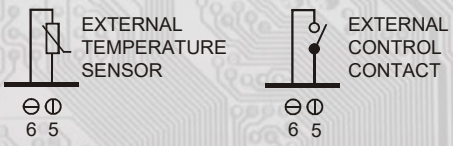
Layout of connecting terminals and connectors (fig. 1):



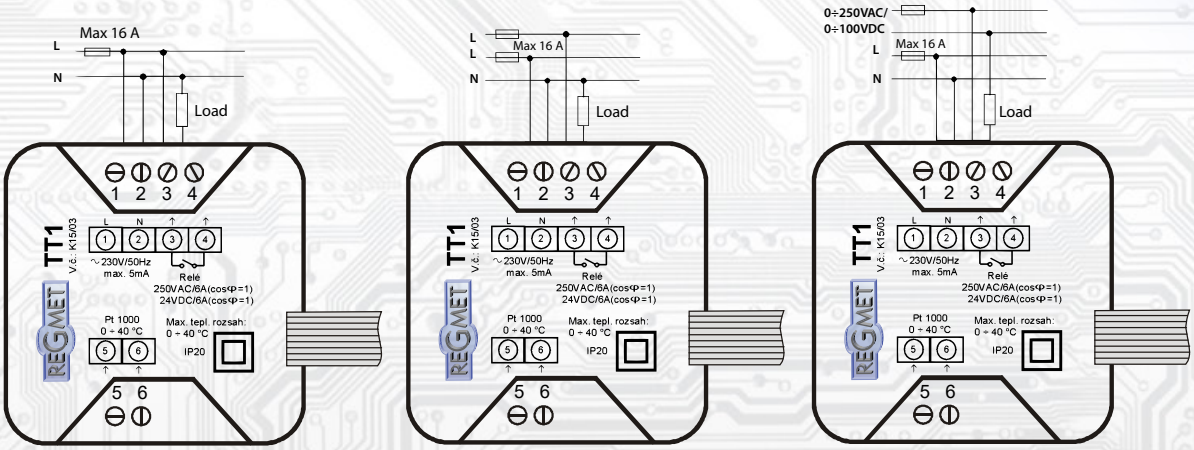
Terminals 1 and 2..... power supply 230 V / 50 Hz
Terminals 3 and 4..... potential-free switching contacts of the relay (A phase and a neutral must not be connected to the terminals at the same time!)
Terminals 5 and 6..... input of an external temperature sensor or potential-free control contact

Power terminals, relay contacts and contacts of input ext. sensors / control contact are galvanically separated from each other.

Input signal connection options (fig.2):



Possibilities of connecting the output - switching contacts of the relay (fig.3):



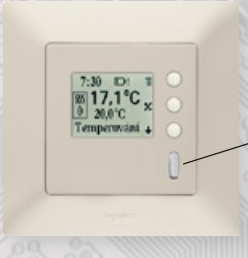
Description of settings and functions:

After connecting the power supply, the display shows language selection; highlight the required langue using arrow buttons and confirm by pressing the button. ↵ After that, the settings of current time and date are displayed. The highlighted parts ▲ can be edited by pressing the buttons ↵ . The buttons + and − allow increasing/decreasing the value and the button ↵ confirming the selection. Buttons ← and → are used to switch to another editable part. After setting the current time and date, confirm a save the selection by pressing the button ▸ ⮥ . The date and time can be edited at any time in the menu **Settings→Date/time.** After this initial setup, the display switches to the basic screen.

In the initial condition, the thermostat is set to room heating mode with PI control, with a control period of 10 min., and tempering mode to 20°C. This means that only the interior temperature is measured and controlled to 20°C without any time profiles.
In the left part of the upper line, the current time is displayed with the weekday (Mon-Sun) or "Sv" if the day is a holiday. The largest digits show the main temperature value, which is the interior temperature in this case. Below this, the secondary temperature value is displayed (in this case, the required interior temperature).
The lower line shows the current mode (Tempering in this case).
On the left of the main/secondary values, the current output status is displayed by the relevant symbol. The symbol ≋ indicates that the heating mode is selected; the symbol ❄ indicates the cooling mode. The digit below this symbol shows the current level of control. For PI control, the shortest interval between switching the relay on and off is 1 minute (PI control period = 10 min.) to prevent the relay from frequent clicking. "0" means that the output has not been active for at least 10 minutes "1" means that the output has been active for 1 minute and inactive for another 9 minutes. "2" means that the output has been active for 2 minutes and inactive for another 8 minutes. "10" means that the output has been active for at least 10 minutes. If the parameters of the heating system allow this, these intervals can be extended by adjusting the PI control period to 20 min. or 30 min. For two-state control, "0" means inactive output, "1" means active output.
The button ↓ allows quick selection of one of the six modes; the symbol ✳ highlights the last selected mode. Use the buttons ↑ and ↓ to highlight ▸ the new mode and press the button ↵ to confirm the selection and return back to the basic display.
The ✂ button allows to quickly change the target temperature. In the modes with adjustable time stamps (weekly/individual/daily), this change is only effective up until the new stamp. In the modes without adjustable time stamps (holiday/temporary/tempering), this change is effective permanently until another mode is selected. After confirming the new value by pressing the button **OK**, the device returns to the basic display.

The button ≣ enters the menu. Use the mark " ▸ " to select the required menu item and confirm with button ↵ ; the highlighted items ✳ are active and stored in the memory. The first menu ▸ ("Date") displays the current date, ▸ "Mode" allows editing the modes and the ▸ "Settings" menu is used to set the thermostat parameters. By selecting ▸ "Back", the device returns one step back and, eventually, enters the basic display. If no buttons are used for more than 30 seconds, the device returns to the basic display.

Warning!



Temperature sensor
Don´t touch (there is no button!)

Description of buttons and their functions

The device has 3 buttons, whose functions vary depending on the current mode.

- ☰ entering the device menu
- ✳ quick change of target temperature
- 🡻 quick mode selection
- 🡹 , 🡻 shift to higher/lower menu items
- 🡸 , 🡺 shift to the left/right when setting date/time and viewing profile chart
- ↵ confirmation of new value marked with ▸ or old value marked with ✳ , with return back by one menu level up
- OK confirmation of new value with return back by one menu level… return back by one menu level up
- ⮥ leaving the menu item one level up
- \+ , − increasing/decreasing value

Highlighting menu items

- ✳ highlighting the currently selected value or function
- ▸ highlighting a value or function when scrolling a menu
- ▲ the highlighted numerical value can be edited by pressing button ↵

Menu diagram for Settings:

Setting	Date/time	Choice time + date					
	Language	Czech					
		English					
	Advanced	Enter password **1212**	Internal sensor	Temp. Limits	Minimum	5 ÷ 30 [°C]	
					Maximum	10 ÷ 40 [°C]	
				Offset	-10 ÷ +10 [°C]		
				Back			
			External input	Connection	No		
					Temp. sensor		
					Digital input		
				Temp. Limits	Minimum	5 ÷ 30 [°C]	
					Maximum	10 ÷ 40 [°C]	
				Offset	-10 ÷ +10 [°C]		
				Digital input	Auto/tempering		
					Auto/deily		
					Heating/cooling		
				Invert. input	Yes		
					No		
				Back			
			Regulation	State	ON		
					OFF		
				Source	Internal sensor		
					External sensor		
					int. + Ext sensor		
				Display of temperatures	Internal + external		
					Internal + required		
					External + required		
				Type	PI		
					Two-state		
				Slope	Integration constant		
					2-4-8-16-32-64-128		
				Period	10 - 20 - 30 [min]		
				Hysteresis	0,5-1-1,5-2-2,5-3 [°C]		
				Back			
			Function mode	Heating			
				Cooling			
			Holidays	Yes			
				No			
			Sommer/winter time	Yes			
				No			
			Valve protect.	ON			
				OFF			
			Invert. output	Yes			
				No			
			Default setting	Write	Yes	Really write down	Yes
				Default settings?	No	default settings?	No
			Changing of password	Changing of password **1212**	Confirm new password?	Yes	
						No	
			Back				
	Back						
Back							

Date/time:
Editing date or time.

Language:
Language selection for texts shown on the display. If English is selected, the thermostat will not accept any holidays.

Settings→Advanced:
The user should not make any changes here as all the parameters are usually set up during installation of the device by a professional. And that's why access to advanced settings is password protected.
Unqualified intervention may result in malfunction of thermostat control!
Before accessing the advanced menu, the device asks for a password. In the default state, the factory password is 1212. After entering the correct password and confirming it, the next part of the menu becomes available. The password can be changed in Settings→Advanced→Change password.

Internal sensor→Temperature limits:
Here, temperature limits are selected for the user setting of the interior temperature in the maximum range. Minimum = 5°C, Maximum = 40°C.
If, for example, the user requires that they are able to set the interior temperature (e.g. during tempering), set Internal sensor→ Temp. limits→Minimum to 10°C (save by pressing OK) and Internal sensor→Temp. limits→Maximum to 25°C (press again OK to save).

Internal sensor→Offset:
Since the device has its own power consumption and the temperature sensor is part of the thermostat, the measured temperature is influenced by the energy radiating from the device. After installation of the device and tempering for at least 3 hours, the difference between the measured and actual values stabilizes at a constant value and can be compensated by setting the measured temperature offset in the max. range of ±10°C. The factory-preset offset is -5.0°C but the necessary value depends on the particular design, wall material and position..Example: if, after tempering the device (min. 3 hours), it seems that the measured value is higher by 0.5°C, set the offset to -5.5°C (the factory-preset offset is -5.0°C); the device will display and control the actual room temperature.

External input→Connection:
No = no temperature sensor or control contact is connected to the external input, the device only works as interior thermostat.
Temp. sensor = an external temperature sensor (mostly for floor temperature) is connected to the external input. Based on detailed settings, the device may work as a combined thermostat or floor thermostat.
Digital input = a **potential-free contact (switch) is connected to the external input, which can be used (depending on detailed settings) for remote selection of the tempering mode** (e.g. frost protection with a window contact), mode or switch between modes Heating and Cooling.

External input→ Temp. limits:
The item is accessible only if is selected External Input→Connection→Temp. sensor.
Here, temperature limits are selected for the user setting of the interior temperature in the maximum range: Minimum = 5°C, Maximum = 40°C.
If, for example, the device is programmed as a floor thermostat (only controlling the floor temperature) and it is required that the user is able set the floor temperature in the range from 10°C (e.g. for tempering) to 35°C, set the ***External input→Temp. limits→ Minimum to 10°C*** (save by pressing) and set the ***External input→Temp. limits→Maximum to 35°C*** (save by pressing). If the device is programmed as a controlled thermostat, then these temperature limits are used to limit the floor temperature to prevent overheating or undercooling of the floor.

External input →Offset:
The item is accessible only if is selected External Input→Connection→Temp. sensor.
The offset of the measured floor temperature can be entered here in a maximum range of ± 10°C.

External input → Digital input:
The item is accessible only if is selected External Input→Connection→Digital.input.
In this case, you can select the thermostat's behaviour after actuating the external switch connected to terminals Nos. 5, 6. (or off, see External input →Invert. input).
Heating/cooling = by actuating the external switch, the thermostat switches to the cooling mode for control of the air-conditioning unit.
Auto/Temper. = by actuating the external switch, the thermostat switches to tempering mode, after releasing the switch, it switches back to the original mode
Auto/Daily = by actuating the external switch, the thermostat switches to daily mode, after releasing the switch, it switches back to the original mode.

External input → Invert. input:
The item is accessible only if is selected External Input→Connection→Digital.input..
No = switching on the external switch changes the function according to External input → Digital input.
Yes = switching off the external switch changes the function according to External input → Digital input.

Regulation→Status:
The regulation is switched on or off here. If On is selected, the device works as a thermostat, if Off is selected, the device only displays the temperature, but does not regulate it.

Regulation→Source:
The source of input values for regulation is selected here, i.e. whether the device will work as a room thermostat, a floor thermostat, or a combined thermostat.
Internal sensor = an internal sensor is used to measure the temperature and the device regulates the interior temperature.
External sensor = an external sensor built into the floor is used to measure the temperature, and the device regulates the temperature of the floor. An item is only accessible if it is selected ***External Input→Connection→Temp. sensor.***
Int+Ext sensors = Both internal and external sensors are used and the device controls the interior temperature; the external sensor monitors the min./max. floor temperature. This item is only accessible if ***External Input→Connection→Temp. sensor*** is selected..

Regulation→ Display of temperatures:
Here you can select the values displayed in the field for the main and secondary values, respectively.
Int+Required = The main value is the temperature of interior, the secondary value is the temperature setpoint.
Ext+Required = The main value is the temperature from external sensor (floor), the secondary value is the temperature setpoint..
An item is only accessible if it is selected ***External Input→Connection→Temp. sensor.***
Int+Ext = The main value is the temperature of interior, the secondary value is the temperature from external sensor (floor).
An item is only accessible if it is selected ***External Input→Connection→Temp. sensor.***

Regulation→Type:
Here you can select the type of regulation.
PI = proportional PI type with adjustable slope and period
Two-stage = on/off with adjustable hysteresis

Regulation→Slope:
selection of the controller's integration constant (Ti = 2, 4, 8, 16, 32, 64, 128); only for PI control.
In general, the lower this constant the steeper the rise to the desired temperature but also the larger overshoots of the setpoint. The higher constant the slower the rise to the desired temperature and the smaller overshoots. The factory-preset value is 16, which should be suitable for usual heating systems.

Regulation→Periode:
Only for PI control, this allows setting the PWM output period to 10min/20min/30min. Longer period means lower frequency of relay switching. If the setting is 10 min., the relay switches once in 10 minutes maximum, for 30 min. it is 30 minutes. This setting depends on the heating system's response; if the response is quick, it is recommended to use a shorter interval.

Regulation→Hysteresis:
Only for two-state control: selection of controlled temperature hysteresis: 0.5°C / 1°C / 1.5°C / 2°C / 2.5°C / 3°C.
If two-state control with hysteresis of 1°C is selected, the relay will switch on/off, for examle by required temperature 22°C, will switch on/off in range 21,5°C to 22,5°C.

Mode of function:
Here you can choose whether the thermostat regulates heating or cooling.
Heating = standard function of the thermostat to control the heating.
Cooling = on summer days, when the thermostat can be used to regulate cooling devices.

Holidays:
Here you can choose whether the thermostat will accept holidays. Yes = if the Czech language is selected, then with the selected Weekly or Daily mode, holidays valid in the Czech Republic will be accepted (1.1, 1.5., 8.5., 5.7., 6.7., 28.9., 28.10., 17.11., 25.12., 26.12 .). No = the thermostat will not accept holidays.

Summer/Winter Time:
Yes = the thermostat adjusts the clock itself when switching to summer or winter time
No = the thermostat ignores the time change.

Valve protection:
ON = if the output has not been switched on in the last 168 hours, the relay switches on for 3 minutes to prevent valves from blocking in case long periods of inactivity.
OFF= valve protection is switched off.

Invert. output:
No = normal state of the output, if the display shows that the output is active, then the output relay is closed.
YES = the output relay switches conversely. - If the display shows that the output is active, the output relay is switched off. This output setting can be used e.g. to control valves, which are open without voltage..

Default settings:
Here it is possible to reset the device to the default state in which it is set by the manufacturer. By default, the thermostat is set as room in heating mode with PI regulation, with a PI regulation period of 10 minutes and in Tempering mode at 20°C. This means that it only measures the interior temperature and regulates it to 20°C without time profiles.

Changing of password:
Here it is possible to change the password for Advanced settings.
The factory default password is 1212.
If the password has been changed, it remains even after entering Default settings.

Menu diagram for Mode

Mode	Weekly	Working days	Tag Editor
		Weekend	Tag Editor
		Activate	Confirm.of choice
		Back	
	Individual	Monday	Tag Editor
		Tuesday	Tag Editor
		Wednesday	Tag Editor
		Thursday	Tag Editor
		Friday	Tag Editor
		Saturday	Tag Editor
		Sunday	Tag Editor
		Holiday	Tag Editor
		Activate	Confirm.of choice
		Back	
	Daily	Profile	Tag Editor
		Activate	Confirm.of choice
		Back	
	Holiday	Required temp.	Choice of temp.
		Activate	Confirm.of choice
		Back	
	Temporary	Required temp.	Choice of temp.
		Activate	Confirm.of choice
		Back	
	Tempering	Required temp.	Choice of temp.
		Activate	Confirm.of choice
		Back	
	Back		

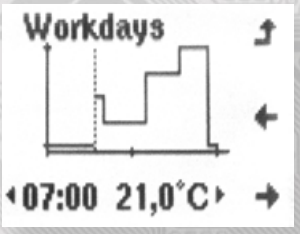
All the profiles are set separately for the Heating and Cooling mode respectively. This mean that if the basic display shows the symbol, the profiles will be set for the heating mode. If it is required that the thermostat is also used for cooling, you must set and confirm the selection *Settings→Advanced→ Function mode Cooling* (symbol shown in the basic display) and set the profiles for this mode.

Weekly mode:
The device works as per the time profile programmed for working days (Mon-Fri), weekend (Sat-Sun) or holidays in the Czech Republic, if the Czech language is selected and this function is enabled in *Settings→Advanced→Holidays*. In such case, the thermostat works as per the weekend profile. For working days and weekends, up to 10 time stamps can be programmed separately.

Setting a profile for working day:
→Mode→Weekly→Working days

Up to 10 time stamps with the desired temperature can be set. For example:
07:00 21,0°C (the device starts controlling at 7:00 to 21°C)
08:00 19,0°C (at 8:00, the device stops controlling to 21°C and starts controlling to 19°C after the temperature drops to this value)
15:00 21,0°C (the device starts controlling at 15:00 to 21°C)
21:30 18,0°C (at 21:30, the device stops controlling to 21°C and starts controlling to 18°C after the temperature drops to this value)

By highlighting the time stamp with the ▸ symbol and pressing the ↵ button, the time stamp can be edited. The temperature is set in 0.5°C steps in the range defined in *→Settings→Advanced→Internal sensor→Temperature limits*, with maximum range of 5 ÷ 40°C. Time can be edited in 10min. steps. New values are saved by pressing **OK**.
If you need to delete any stamp, highlight ▸ Deleting a press ↵ to enter the Deleting stamps menu.
By highlighting the time stamp with the ▸ symbol and pressing , the selected stamp is deleted.
If you need to add a stamp, select ▸ Add, press ↵ to enter the Editing menu for the new stamp and save the new values by pressing **OK**. By selecting ▸ Graph and pressing ↵, you can view a graphical representation of the working day profile.



By pressing ← and →, you can scroll between individual stamps; the time and temperature of the selected stamp is shown on the bottom line. By pressing ↑, you can return back. Using the same procedure, you can set the profiles for weekend or holidays. By selecting ▸ *Activate and pressing* ↵, you activate given profile. By selecting ▸ *Back and pressing* ↵, you return back by one menu level (this applies for the entire menu: by selecting ▸ Back, you can return one step back).

Individual mode:
The device works as per the time profile programmed separately for each day (Mon-Sun) and holidays in the Czech Republic, if the Czech language is selected and this function is enabled in ≡ *Settings→Advanced→Holidays*.
For each day, up to 10 time stamps can be programmed separately. Settings of the profiles are identical to working days in the weekly mode. If the same profile is required for multiple days, it is possible to copy that profile to the required days when editing the profile. Example: if the same profile is required for Mon/Wed/Fri, set the time stamps for Monday, select ▸ Copy to a confirm by pressing ↵ to copy this profile to Wed; just select ▸ *Wednesday* and confirm by pressing ↵. Then select ▸ Friday and confirm by pressing ↵ to copy the profile to Friday..

Daily mode:
The device works as per the time profile, which is identical for every day of the week. Up to 10 time stamps can be programmed. Settings of the profiles are identical to working days in the weekly mode.

Holiday mode:
The device controls the temperature to a preset value up until the return time, which is programmed when activating the mode. At the set date and hour, the device returns back to the previously set mode. By selecting ▸ Desired and pressing ↵, you can set the temperature setpoint for the entire period of absence; confirm by pressing **OK**.

Temporary mode:
The device controls the temperature to a preset value up until the selected time. This mode is used in cases when the temporary interval is shorter than 24 hours. After this time elapses, the device reverts to the previously selected mode. By selecting ▸ Desired and pressing ↵, you can set the temperature setpoint; confirm by pressing **OK**.

Tempering mode:
The device controls the temperature to a preset value without any programmed end time. This mode is used in cases when the return is not planned and it is necessary to maintain a constant temperature. By selecting ▸ Desired and pressing ↵, you can set the temperature setpoint; confirm by pressing **OK**

Description of fault states, their indication and device behaviour:

After random reset of the device, the display shows the screen for date/time setting and the device works in the tempering mode. After setting current date and time, you can select the required mode.

E, E In case of the setting *Control→Source→ Int+Ext sensor,* this indicates exceeding the max. temperature on the external temperature sensor (which is set here: *External input→Temp. limits→Maximum*). The device stops heating/cooling until the external sensor temperature drops down to an acceptable level.

X, X It means that the regulation is switched off (*Regulatione→Status→ Off*).

SENS At the main value, this indicates that the measuring range is significantly exceeded, or the internal temperature sensor is faulty in case of setting *Control→ Temp. display→ Int+Setpoint or Control→ Temp. display→ Int+Ext*; the device stops heating/cooling until the measured temperature approaches the measuring range or a repair is made (exchange of internal temperature sensor by the manufacturer). This may also indicate that the measuring range is significantly exceeded, or the external temperature sensor is disconnected or short-circted in case of setting *Control→ Temp. display→ Ent+Setpoint*; the device stops heating/cooling until the measured temperature approches the measuring range or a repair is made (exchange of external temperature sensor by the manufacturer). Until that time, the device can operate in a provisional condition by setting *Control→Source→ Internal sensor;* in this mode, the devices only controls using the internal temperture sensor.

SENS At the minor value, this may also indicate that the measuring range is significantly exceeded, or the external temperature sensor is disconnected or short-circuited in case of setting *Control→ Source→ Int +Ent. sensor*; the device stops heating/cooling until the measured temperature approaches the measuring range or a repair is made (exchange of external temperature sensor by the manufacturer). Until that time, the device can operate in a provisional condition by setting *Control→Source→ Internal sensor*; in this mode, the devices only controls using the internal temperature sensor.

! The backup battery is depleted. Install a new CR2032 battery.

Reset of the device:

If it happens that the device appears to be inoperable, reset it using the following procedure:
1. The device is disconnected from the supply voltage.
2. The backup battery is removed and after a few seconds it is inserted again.
3. The device is connected to the supply voltage.
After resetting the device, the date and time setting screen appears on the display and the device adjusts to Tempering mode. After setting the current date and time, the desired mode is selected. Only if resetting the device does not help, the device is sent to the supplier or manufacturer for repair.