DIGITAL PT713-EI THERMOSTAT PT713-EI FOR FLOOR HEATING

- maintaining minimum floor temperature
- monitoring maximum floor temperature
- PI regulation and predictive system
- backup in case of voltage failure > 100 hours
- direct installation on junction box
- well-arranged backlit display
- VENUS switch design
- including external sensor





DESCRIPTION

PT713-El is a digital thermostat with a room and floor sensor, specially designed for electric floor heating control. The internal-external sensor combination provides for the regulation (for setting, see page 8) of:

1) room temperature (internal sensor) - when comfortable room temperature is required;

- (external sensor) when comfortable room temperature is required; locate the external sensor in a suitable place where the measured values will not be distorted;
- 2) floor temperature (external sensor) suitable, for instance, for bathrooms where a warm floor is desirable, irrespective of the room temperature;
- 3) combined (both sensors)
 the internal sensor scans the room temperature, and the external one monitors the maximum floor temperature; comfortable room temperature is required, however, with simultaneous monitoring of the floor temperature (suitable for wooden and laminated floors).

Another advantage is the simple installation in KU/KP68 junction boxes by means of the PLUG-IN system; the possibility of setting 9 weekly programs with 6 temperature changes per day; regulation type selection (page 6); as well as other functions for efficient regulation of the floor heating.

INSTALLATION AND LOCATION

Install the <u>thermostat</u> in a suitable place (minimum height of 1.2-1.5 m above the floor) where its operation will not be affected by direct hot/cold air flows, sunshine or other disturbing influences. Do not mount the thermostat on an exterior wall either. In rooms with increased humidity (bathroom, kitchen), observe valid standards and install the thermostat as far from the bathtub, shower, basin or sink as possible.

The <u>external floor sensor</u> (type CT04-10k P, CYXY 2 x 0.5 mm, 10 k Ω , length 3 m, PVC plastic case) must be located in a flexible plastic tube embedded in the floor, as near to the surface as possible. The tube must be sealed and protected against in-leak of building materials so that the floor sensor can be replaced easily if need be. It must not run parallel with power conductors! It can be extended to a maximum length of 30 metres.

The installation must only be executed by a properly qualified person! Switch off power supply before installation!

- 1) Switch off the main circuit breaker.
- 2) Check that the junction box is placed parallel with the wall.
- 3) Separate the power part of the thermostat from its microprocessor (main) part; see Fig. 1.
- 4) Pull the connecting terminals out of the thermostat rear part, see Fig. 2.
- 5) Connect conductors to the terminals acc. to the wiring diagram below, see page 3 and Fig. 3.
- 6) Insert the terminals into the thermostat terminals and fasten the power part to the junction box, see Fig. 4 and 5.
- 7) Insert the main part connector into the power part and push it; the metal springs must fit in the given holes, see Fig. 6 and 7.
- 8) Switch on the main circuit breaker; the thermostat is ready for operation.

Note: We recommend you test correct connection after installation, see the TEST function (page 10).





BACKUP BATTERY (rechargeable NiMH):

The thermostat is equipped with a backup battery. The battery charging time is about 12 hours. In case of voltage failure, the device automatically operates on the backup battery (the relay is in the off state). Actual time is kept for more than 100 hours; the preset programs are kept permanently in the E-EPROM memory. When the voltage is restored, the thermostat returns to the last selected mode.

After the first connection of the thermostat, the backup battery is charged for about 12 hours!

PLUG-IN SYSTEM = quick and easy installation. The thermostat is divided into the power part and the main microprocessor part, which can be joined by simple insertion of the interconnecting terminals. The input conductors (or external sensor) are connected to the power part terminals and fastened to the junction box; then you can simply finish the installation by inserting the main part onto the power part.

LCD DESCRIPTION



- 1, Current date (in the PROG mode, selection of number of days for programming)
- 2, Operating modes OFF/PROG/AUTO/MANU/HOLIDAY
- 3, Current room temperature
- 4, Indication of room temperature measurement by the external sensor
- 5, Heating on indication
- 6, Button lock indication
- 7, CLOC mode indication (current date and time setting)

- 8, Required temperature and current time display / listing of operating modes (this line is explained in detail with every mode)
- Battery supply indication (in case of 230V/50Hz voltage failure, it is functional only after 1 day of operation, when the backup battery is charged!)
- 10, Indication of setting the external sensor as the floor one
- 11, Anti-freeze temperature of 3°C
- 12, Comfortable temperature in the MANU mode
- 13, Economical temperature in the MANU mode

DESCRIPTION OF CONTROL BUTTONS



MENU button:

short press = opens the main menu and confirmation (ENTER) long press (approx. 3 sec) = return from the main menu

+/- button:

basic mode = opens info (see page 9)
main menu =browse and set current values

simultaneous press of the MENU and - buttons (in basic mode) = key lock simultaneous press of the MENU and + buttons (in basic mode) = key unlock simultaneous press of the MENU and + / - buttons (in main menu) = return to basic mode

Note: The LCD backlight is activated by pressing any button!

By pressing any button, you activate the display backlight. Next, pressing the MENU button briefly, you enter the main menu, in which you can choose the operating modes.

AUTO The thermostat works according to the preset weekly program. AUTO Press the MENU button and choose the AUTO mode with the + / - buttons. Press MENU to confirm. AUE O AUTO OFF The thermostat is switched off until the next change given by the ΔΗΤΟ program. Press the MENU button and choose the AUTO OFF mode with the RUE O OFF + / - buttons. Press MENU to confirm. MANU 🔆 (default setting of 21°C) The thermostat works according to the preset temperature 💥 . which remains constant until the next manual change. MANU Press the MENU button and choose the MANU 🔆 mode with the NR_n U + / - buttons. Press MENU to confirm. ☀ **MANU** (default setting of 19°C) The thermostat works according to the preset temperature (which remains constant until the next manual change. Press the MENU button and choose the MANU (mode with the

+ / - buttons. Press MENU to confirm.

MANU OFF

The thermostat is switched off until the next manual change. Press the MENU button and choose the MAN OFF mode with the + / - buttons. Press MENU to confirm.

HOLIDAY IN THE AUTO MODE

The thermostat maintains the preset temperature until the given date and time. When the preset period expires, it returns to the AUTO mode automatically.

Press the MENU button and choose the AUTO mode with the + / - buttons. Press MENU to confirm.

The temperature value flashes on the LCD. Set the desired temperature with the +/ - buttons and press MENU to confirm it: next, set the hour, minute, day, month and year when your holiday ends; confirm each setting by pressing MENU.

After setting, the device automatically switches to the HOLIDAY mode within 1 minute! The holiday end date appears on the display!

Note: You can end the holiday mode at any time by choosing another mode (e.g., AUTO).

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HOLIDAY IN THE MANU 🔆 MODE

The thermostat maintains the preset temperature until the given date and time. When the preset period expires, it returns to the MANU 🔆 mode automatically.

Press the MENU button and choose the MANU 🔆 mode with the

+ / - buttons. Press MENU to confirm. The temperature value flashes on the LCD. Set the desired temperature with the +/ - buttons and press MENU to confirm it; next, set the hour, minute, day, month and year when your holiday ends; confirm each setting by pressing MENU. After setting, the device automatically switches to the HOLIDAY mode within 1 minute! The holiday end date appears on the LCD.

HOLIDAY IN THE MANU (MODE

The thermostat maintains the preset temperature until the given date and time. When the preset period expires, it returns to the MANU (mode automatically.

Press the MENU button and choose the MANU (mode with the + / - buttons. Press MENU to confirm.

Further setting is the same as for the MANU mode.

Note: You can end the holiday mode at any time by choosing another mode (e.g., AUTO).

CLOC

Setting the current date and time.

Press the MENU button and choose the CLOC mode with the + / - buttons. Press MENU to confirm.

The current hour value flashes on the LCD. Set the current hour and confirm it by pressing MENU then, set the minutes and seconds; next, the current date appears: again, set the current day, month and year with the + / - buttons. Confirm each setting by pressing MENU.

PROG

Setting of weekly programs (9 weekly programs are available, each with 6 changes per day).

Press the MENU and choose the PROG mode with the +/ - buttons. Press MENU to confirm.

P1 (the first weekly program) flashes on the LCD; press MENU to confirm it. The programmed day number flashes on the LCD, choose one of the options with the +/ - buttons (you can program "day after day", or Mon-Fri, Sat-Sun or Mon-Sun). Press MENU to confirm your choice.

The display shows U1 for setting the first temperature change; set the temperature with the + / - buttons and confirm with the MENU button. Set the switching time with the -/ - buttons and confirm with the MENU button again.

The display shows **U2** for setting the second temperature change. Follow the procedure for the first temperature change. In this way, you can set up to 6 temperature changes per day. To return to the basic mode, press the MENU and + / - buttons simultaneously.

EVEN / ODD WEEK SELECTION

The last 2 programs (PU = even, PL = odd) are intended for setting programs for even and odd weeks. This is suitable for shift operation in which you require a different temperature mode for every week. If you enable this function (see page 10), the PU and PL programs automatically alternate every week.

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Setting of the regulation parameters.

Press the MENU button and choose the CONST mode with the +/-

buttons. Press MENU to confirm it. The first parameter appears on the LCD.

1 MINIMUM REGULATED TEMPERATURE

Limitation of the minimum temperature adjustable.

It can be set within the range 3°C to 10°C.

Set the pertinent value with the +/ - buttons and press MENU to confirm.

2 MAXIMUM REGULATED TEMPERATURE

Limitation of the maximum temperature adjustable.

It can be set within the range 15°C to 99,5°C.

Set the pertinent value with the +/ - buttons and press MENU to confirm.

3 SELECTION OF PI REGULATION OR HYSTERESIS

Choose the regulation type with the +/ - buttons and press MENU to confirm.

If PI regulation is selected, constant 4 is automatically skipped, and constants 5, 6 and 7 appear, which apply to the PI regulation setting.

If hysteresis is selected, you can set values from 0.1 to 5 °C. If, for example, the hysteresis is 1 °C and the required temperature is 20 °C, the thermostat switches off at 20 °C and switches on again at 19 °C.

4 MINIMUM SWITCH-ON TIME IN HYSTERESIS

Here, you can set the minimum switch-on time of the heating device in hysteresis in minutes. It can be set within the range 1 to 5 minutes. Set the pertinent value with the + / - buttons and press MENU to confirm

5 TIME INTERVAL OF PI REGULATION

This can be set within the range 5 to 20 minutes. The interval value is given by the room thermal inertia.

For floor heating, the optimum setting is 10-15 minutes.

Set the pertinent value with the +/ - buttons and press MENU to confirm.

6 MINIMUM SWITCH-ON TIME OF HEATING DEVICE IN PI REGULATION

This can be set within the range 1 to 5 minutes. The setting is given by the type of heating system and depends on the selected time interval of PI regulation. For floor heating, the optimum setting is 4 minutes.

Set the pertinent value with the +/ - buttons and press MENU to confirm.

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7 PROPORTIONAL BAND IN PI REGULATION

This item determines the value from which the PI regulation starts operating. <u>Example:</u> The required temperature is 22.0 °C and the proportional band is 1.5 °C. Then, the source will fully heat up to 20.5 °C; once this temperature is reached, PI regulation starts operating. The proportional band can be set within the range **1 to 3** °C.



Set the pertinent value with the + / - buttons and press^{MENU} to confirm.

8 EXTERNAL SENSOR SELECTION

Select the external sensor according to the regulation type:

- 1, Regulation by room temperature the sensor is located in the room (selection - -)
- 2, Regulation by floor temperature the sensor is located in the floor (selection - -)
- 3, Monitoring of floor maximum temperature the sensor is located in the floor (selection 15 to 99.5°C)

Choose according to the type of use with the + / - buttons and press MENU to confirm. EXTERNAL SENSOR USED AS ROOM ONE:

EXTERNAL SENSOR USED AS ROO

- The external sensor, if connected, measures the temperature at the point of location (*suitable, for instance, for bathrooms, where you wish to have a warm floor irrespective of the room temperature*);

This use of the sensor is indicated by the \Leftrightarrow sign on the LCD.

EXTERNAL SENSOR USED AS FLOOR ONE (MAXIMUM FLOOR TEMPERATURE IS SET):

15...99,5°C The external sensor, if connected, monitors the floor temperature; the maximum permissible temperature is set for the floor heating ((you regulate with the room temperature, monitoring the floor temperature at the same time).



The floor (monitoring) sensor is indicated by the \cancel{III} sign on the LCD.

If the preset limit temperature is exceeded, the thermostat is switched off irrespective of the room temperature, and the STOP message appears on the LCD. Once the external sensor temperature drops by 0.5 °C, the heating device is switched on again. If the sensor is not connected or it is defective, the **C2.Err** error message appears on the LCD.

After connecting the external sensor, it is NECESSARY to RESET (see parameter 11)!

9 MINIMUM TEMPERATURE OF FLOOR HEATING

This setting can be used only if the external sensor is connected and the "**External sensor used as floor one**" function is selected. It determines the time interval during which the minimum floor temperature should be maintained. Thus, it is possible to maintain a comfortable floor temperature during the preset time. If the temperature drops below the given limit, the floor is automatically heated up to the minimum temperature.

Set the **beginning of the time interval for maintaining the minimum floor temperature** with the + / - buttons and press MENU to confirm.

Set the end of the time interval for maintaining the minimum floor temperature with the +/ - buttons and press MENU to confirm.

Set the **minimum floor temperature value** with the +/ - buttons and press MENU to confirm.

 $\underline{Note}:$ The example shows a setting where the floor temperature must not drop below 10 °C all day long.



10 CURRENT TEMPERATURE CORRECTION (internal sensor)

This is used for correcting the thermostat-measured temperature. The setting can be done only after 12 operating hours, when the internal sensor temperature has settled. Measure the room temperature with a thermometer; if it is different from that measured by the thermostat, set the correction within the range from -5 °C to +5 °C.

Set the pertinent value with the +/ - buttons and press MENU to confirm.

11 FIRMWARE VERSION / DEFAULT SETTING RECOVERY

Information on the firmware version. If you keep pressing the - button (approx. 3 sec), the RESET message briefly appears on the LCD, and the thermostat recovers the default settina!

You can exit the CONST mode at any time by simultaneously pressing the MENU and + / buttons (return to the basic mode).

OTHER FUNCTIONS

INFO

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By pressing the + / - buttons in the basic mode, you can view the following information:

REQUIRED TEMPERATURE

In the basic mode, press the + / - buttons. The LCD shows the required temperature value for the current operating mode (it can be changed with the +/ - buttons; in the AUTO mode, the change is short-term - until the next change in the program; in the MANU mode, the change is permanent). With another press of the MENU button, you can switch to:

SELECTED PROGRAM NUMBER - in the AUTO mode only

This is used for guick change of the program selected in the AUTO mode. If both P1 and P2 programs are preset, they can be changed, after a week for example, with the +/ - buttons.

With another press of the MENU button, you can switch to:

SUMMER MODE

Heating cannot be switched on in this mode. It can be used particularly in the summer period, where heating is not necessary. Enable the function with the +/ - buttons and choose A (the "SUMMER" message appears on the LCD);

Press the MENU button to confirm and switch to:

EARLY START OF HEATING – predictive system

This function guarantees you the required temperature at the required time. Within two operating days, the thermostat ascertains the temperature constants of the room, and then switches the heating in advance. The early start time is limited to 2 hours. You can enable it with the + / - buttons and the A selection;

Press the MENU button to confirm and switch to:







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AUTO



This function is effective provided you have set the PU (even week) and PL (odd week) programs, see page 5. Once you have chosen this function, the preset program will automatically alternate every week. This can be used particularly for shift operation, when you need a different temperature mode every week. You can enable it with the +/ - buttons and the A selection;

Press the MENU button to confirm and switch to:

" OPEN WINDOW " FUNCTION - automatic inhibition

If the room temperature abruptly falls by 1.2 °C within 10 minutes (owing to, for example, an open window), the heating is switched off. The INHIBITION message appears on the LCD. The mode is terminated if the temperature increases within 30 minutes, or if you open the main menu.

You can enable it with the +/ - buttons and the A selection;

Press the MENU button to confirm and switch to:

OPERATING HOURS

The LCD shows the operating hour value of the heating device. You can clear the counter by pressing the - button for 3 sec;

With another press of the MENU button, you can switch to:

TEST

The LCD shows the **TEST** message, which can be switched to the LCD test on/off with the + / • buttons (the output relay will be switched on/off several times).

We recommend using this function for the first use of the thermostat to check its correct connection!

With another press of the MENU button, you can view prior information if the external sensor is connected as the floor (monitoring) one:

CURRENT TEMPERATURE OF THE FLOOR SENSOR

This is enabled if the external sensor is connected as a floor one. The LCD shows the current temperature value of the floor sensor.

To return to the basic mode, keep pressing the MENU button (for approx. 3 sec)!









LOCK

In the basic mode, simultaneously press the ^{MENU} and — buttons, the buttons will lock (the key sign on the LCD). Unlocking can be done by simultaneously pressing the ^{MENU} and **+** buttons.

ANTI-FREEZE MODE

If the room temperature drops below 3 °C, the heating is switched on automatically (the \$\$ symbol appears on the LCD). As soon as the temperature increases, the device returns to the preset mode.

PROGRAM SETTING EXAMPLE

Program number P1												
Temp. period	U T [°C]	1 t [h]	U [°C] T	2 t [h]	U [0°] T	3 t [h]	U [0°] T	4 t [h]	U [0°] T	5 t [h]	U [0°] T	6 t [h]
Mon-Fri	23	6:00	19	9:00	21	13:00	23	16:00	25	18:00	19	22:00
Sat-Sun	23	8:00	20	11:00	23	15:00	19	21:00				

TABLE OF YOUR PROGRAMS

Program	Program number P1											
Temp. period	U T [°C]	1 t [h]	U [°C] T	2 t [h]	U [°C] T	3 t [h]	U T [°C]	4 t [h]	U [°C] T	5 t [h]	U [°C] T	6 t [h]
Mon-Fri												
Sat-Sun												
Program number P2												
Program	numbe	er				P2						
Program Temp. period	numbe U T [°C]	er 1 t [h]	U T [°C]	2 t [h]	U T [°C]	P2 3 t [h]	U T [°C]	4 t [h]	U T [°C]	5 t [h]	U T [°C]	6 t [h]
Program Temp. period Mon-Fri	numbe U T [°C]	er 1 t [h]	U T [°C]	2 t [h]	U T [°C]	P2 3 t [h]	U T [°C]	4 t [h]	U T [°C]	5 t [h]	U T [°C]	6 t [h]

WARRANTY CERTIFICATE (a 2-year warranty is granted for the product)					
Product number:	Date of sale:				
	Shop stamp:				
Checked by:					

Dimensions:

DIGITAL THERMOSTAT PT713-EI

Used for the control of electric floor heating (heating cables, mats, foils). It enables regulation according to the room temperature with possible floor temperature monitoring. The thermostat evaluates the thermal gradient of the room and is able to determine the time necessary to reach the required temperature (the "Early start of heating" function). The PI regulation system guarantees temperature increase and its subsequent maintenance at optimum power consumption.

Properties:

- 9 weekly programs with 6 temperature changes per day
- backlit display
- regulation type selection Pl regulation or HYSTERESIS
- heating source min. switch-on time setting
- predictive system (guarantees the specified temperature at the required time)
- operating modes: AUTO/MANU/OFF/HOLIDAY
- maximum floor temperature limit value setting
- minimum floor temperature limit value setting with possible specification of time interval for which the temperature should be maintained
- summer mode

External sensor:

included in the package type CT04-10k, CYXY 2 x 0.5 mm, 10 k Ω , length 3 m, PVC plastic case



Another advantage:

The thermostat can be located in the multiple frame of the VENUS design.











- even / odd week selection
- *open window" function (automatic inhibition upon abrupt temperature fall)
- quick change of the required temperature
- operating hours information
- TEST function for checking the correct connection
- child lock locking of keys
- backup in case of voltage failure for more than 100 hours
- simple installation (PLUG-IN system)
- elegant design of the VENUS switch series
- possibility to purchase an inner frame in a different colour (see the sample card at www.elbock.cz)

PI regulation – hysteresis comparison:



Technical parameters							
Power supply	230 V/ 50 Hz						
Number of adjustable temp.	6 different temp. per every day						
Hysteresis	0.1 to 5°C						
Minimum program time	10 minutes						
Adjustable temp. range	+3°C to 99.5°C						
Temperature setting	by 0.5°C						
Minimum indication step	0.1°C						
Measurement accuracy	± 0,5°C						
Backup battery	more than 100 hours						
Degree of protection	IP20						
Output	max.12A (potential-free contacts)						
Working temperature	0°C to +40°C						

In case of warranty or post-warrant service, send the product to the manufacturer's address.



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