

ESCO™

PT-10D

TEMPERATURE CONTROLLER



Version 2.0

USER MANUAL / WARRANTY

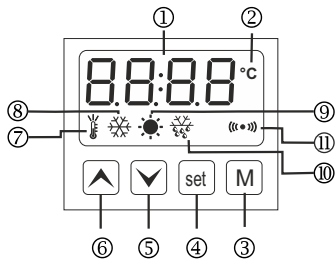
1. SPECIFICATIONS

Input:	temperature sensor: Pt100 (two- or three-wire) digital input (normally opened or normally closed)
Measuring range:	-30...+370°C
Measuring accuracy:	±0,5% of range +/-1 digit
Sampling period:	330 ms
Display resolution:	0,1°C in whole range
Setting resolution:	0,1°C in whole range
Display:	LED, 4 digits, 11mm height with graphic icons
Control form:	ON-OFF with hysteresis
Degree and protection class:	IP65 / II
Power supply:	230VAC ±15% or 12VAC/DC or 24VAC/DC, max 3VA
Operation conditions:	-5...60°C; 0...85%RH (non-condensing)
Storage conditions:	-40...85°C; 0...85%RH (non-condensing)

2. OUTPUT CARRYING CAPACITY.

Output:	Relay:	Maximum resistive load (for example heater):	Maximum inductive load (for example engine):
	30A 250V~ 10 ⁵ cycles	20A, 4500W	8A, 1500W, 2HP(2KM)

3. FRON PANEL.



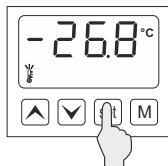
- ① temperature display
- ② temperature unit indicator
- ③ entry to the parameters menu
- ④ temperature setting button
- ⑤ button increasing the value
- ⑥ button decreasing the value pressing for more than 5 sec. forces defrosting cycle (for cooling applications)

- ⑦ temperature setting signalling
- ⑧ output signalling in cooling mode.
LIGHTS: output active; BLINKS: output waits for start-up (see: F21)
- ⑨ output signalling in heating mode.
LIGHTS: output active; BLINKS: output waits for start-up (see: F21)
- ⑩ defrosting signalling. LIGHTS: automatic defrost mode ; BLINKS: manual defrosting
- ⑪ emergency states signalling. BLINKS: alarm active

4. CONTROLLER HANDLING.

4.1. TEMPERATURE SETTING.

①

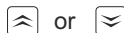


Press **set** button for 2 seconds.

Diode  lights up.

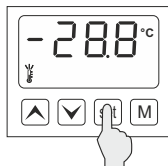


Using:



set the desired temperature value.

③



Confirm the setting with **set** button.

Diode  goes off.

Remarks:

- press **M** button in any time to cancel the setting
- the setting change can be limited by F13 and F14 parameters

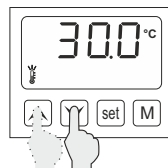
Information:

To improve quick increasing or decreasing the settings values hold the  or  button constantly for at least 1 sec.

4.2. TEMPERATURE SETTING, when the SMART function is active (parameter F84=1)

TEMPERATURE SETTING, when the SMART function is active (parameter F84=1).

①



Set the temperature with  or  pointer in any time. Diode  goes off after 2 sec. and the controller saves the new setting.

Remarks:

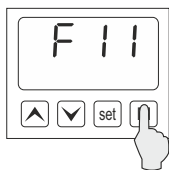
- press **M** in any time to cancel the setting
- the setting change can be limited by F13 and F14 parameters

Information:

To improve quick increasing or decreasing settings values hold  or  button constantly for at least 1 sec.

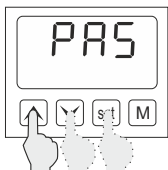
4.3. PARAMETERS PROGRAMMING.

①



Enter the menu holding **M** key for 5 sec., until **F 11** command displays.

②



If the access is protected,, **PAS** Command displays.

Remarks:

- press **M** button to cancel parameter setting

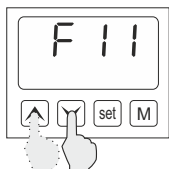
Information:

To improve quick increasing or decreasing settings values hold **↑** or **↓** button constantly for at least 1 sec.

Using **↑**, **↓** and **set** Buttons enter the password and confirm with **set** key.

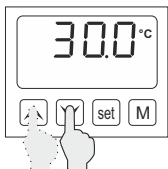
Using **↑** or **↓** button set the desired parameter value.

③

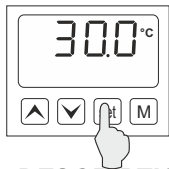


Using **↑** or **↓** choose the parameter you want to change and enter with **set** key.

④

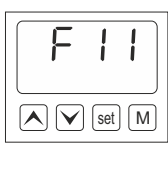


⑤



Using **set** key confirm the new parameter value and return to the parameter list.

⑥



Finish programming pressing **M** button or enter the "End" command and press **set** key or wait 30 sec. without pressing any button.

4.3. DESCRIPTION OF THE PARAMETERS.

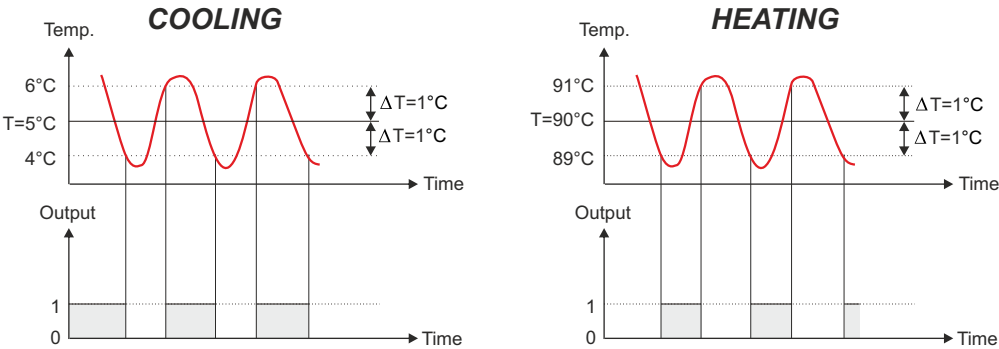
Group:	Code:	Description:	Range:	Default:	Units:
Adjustment	F11	Temperature setting value. Range of changes is limited by the F14 and F13 parameters.	F14...F13	0.0	°C
	F12	Hysteresis (temperature control accuracy).	0.1...20.0	1.0	°C
	F13	Maximum temperature value possible to set by the user.	-30.0...370.0	370.0	°C
	F14	Minimum temperature value possible to set by the user.	-30.0...370.0	-30.0	°C
	F15	High temperature alarm. F15=OFF – alarm off	-30.0...370.0	OFF	°C
	F16	Low temperature alarm. F16=OFF – alarm off	-30.0...370.0	OFF	°C
	F17	High and low temperature switching delay.	0.1...99.9	15	Minutes
Output	F19	Temperature sensor calibration. This is the value of rescaling the temperature sensor in relation to actually measured temperature.	-20.0...+20.0	0.0	°C
	F21	Main output minimal down time. It also means the delay time of switching the output on after giving power supply. Parameter protects devices, for example engine from too frequent switching in case of power failure. The recommended setting is 3 minutes in cooling system with compressor.	0.0...10.0	0.0	Minutes
	F29	Control output work mode: COOLING/HEATING	COOL/HEAT	HEAT	-
Cooling applications	F31 - F37	parameters for cooling applications:			
	F31	Interval between defrosting cycles.	0.1...99.9	12.0	Hours
	F33	Maximum defrosting cycle length.	1...99	30	Minutes
	F34	Dripping time of the evaporator after defrosting cycle. It is also the delay time of switching the compressor on after defrosting.	0...99	5	Minutes
	F35	Defrosting cycles control method. OFF - defrosting off , 1 - automatically, from time to time equals to F31, 2 - automatically, if the total time of compressor operation reaches the value equal to F31	OFF,1, 2	OFF	-
Input D1	F37	Compressor turned on during the defrosting cycle: 0 - NO, 1 - YES	0, 1	0	-
	F50	Digital input D1: 0 - unused; 1 - alarm when compacted; 2 - alarm when compacted with maintenance of alarm signalling; 3 - alarm when opened; 4 - alarm when opened with maintenance of alarm signalling	0...4	0	-
Others	F80	Password to access the configuration menu. OFF - password protection inactive. F80 = 0000 - no password	0000...9999	OFF	-
	F82	Display resolution: 0=0,1°C; 1=1°C	0, 1	0	-
	F83	Sound signalling when an alarm: 0 - buzzer muted; 1 - buzzer active	0, 1	1	-
	F84	SMART function: 0 - active; 1 - inactive You can change temperature quickly using the pointers with no need of pressing 'set' button.	0, 1	0	-
	F98	Reserved.	-	-	-
	F99	Controller test. Disconnect output device to make the test! Otherwise the system can crash	-	-	-
	End	Exit the menu.	-	-	-

5. GENERAL DESCRIPTION.

5.1. ADJUSTMENT.

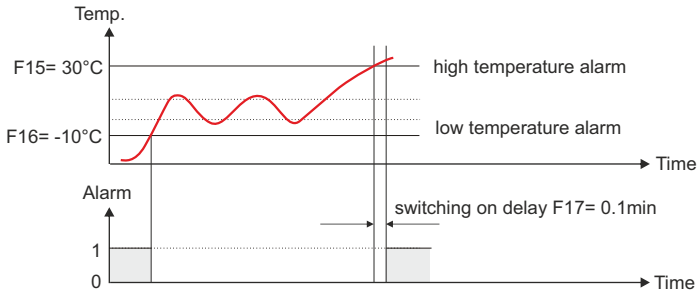
Controller is used to maintain T temperature with set hysteresis T in heating or cooling devices. Relay output controls the actuator and the temperature measurement is made by the temperature sensor.

The principle of operation of the temperature control by cooling and heating:



5.2. TEMPERATURE ALARM.

You can set upper and lower alarm threshold in controller parameters (F15 and F16 parameters), after exceeding which the high or low temperature alarm turns on.



The alarm is turned on after the delay time (F17 parameter). Recommended time setting is 15 minutes, so that the alarm does not turn on too often in case of rapid temperature jumps. The delay can be reduced to the minimum, i.e. 6 seconds (0,1min.), if the temperature does not change abruptly. The alarm is signalled by internal buzzer or commands on the display:

- high temperature alarm **ALH**

- low temperature alarm **ALL**

Buzzer can be muted by pushing any button lub turned off permanently in F83 parameter.

5.3. DIGITAL INPUT.

Controller has digital input D1 for emergency states signalling, for example system failure, pressure control activation or safety thermostat, etc. Input type (normally opened, normally closed) is programmed by F50 parameter. After input activation controller turns off the output and turns on the alarm signal (beep) and the display indicates AL.d1. code. Emergency state sound signalling can be maintained, until the alarm reset by using the buttons (F50=2 or 4).

5.4 DEFROSTING (for cooling applications).

Defrosting cycle is performed by the stoppage of the compressor. Cycles control is performed automatically and run:

- periodically, from time to time (F35=1)
- according to the total compressor run time (F35=2). (The lower load of the cooling system, the less often defrosting cycles occur).

The end of the defrosting cycle comes after passing F33 time.

In difficult working conditions, if there is a need of an additional evaporar defrosting, Process can be started manually pressing  button for 5 sec. "Defrosting" diode blinks during the manual defrosting cycle.

6. ALARM MESSAGES.

When alarm activates the indicator «(••)» starts blinking and the sound signaller (beep) will be activated (when F83=1). According to the occurence controller turns on/off output and the front panel displays one of the following alarm messages:

Statement	Occurence	Control output operation
	Bistate input activation.	Input inactive
	Chamber sensor error: OPE - open circuit SHr - short circuit	Input inactive
	High temperature alarm	No influence
	Low temperature alarm	No influence

7. INSTALLATION.

Be aware of the conditions where the controller operates. Install in a place, where there is not too high temperature and humidity and no condensation. Should be ventilated in order to remove the heat.

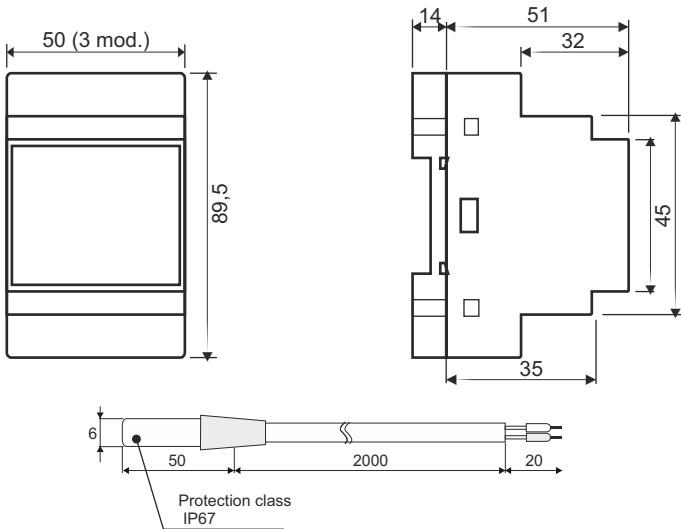
ATTENTION!

It is not allowed to work with electric cables when the device is energized.

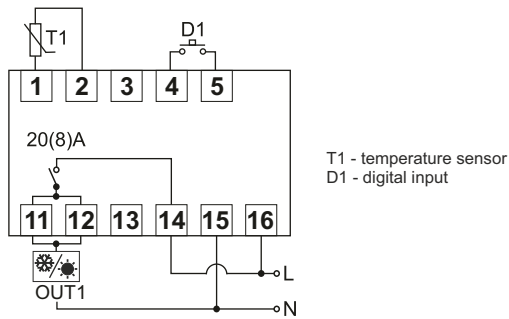
You should avoid crossing wires using short connections. We recommend securing the source of controller power supply and temperature sensor input against electrical interference.

8. MOUNTING.

Mounting on a DIN rail(TS35), 50 cm width (3 modules).

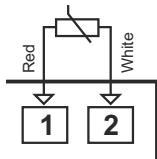


9. WIRING DIAGRAM.

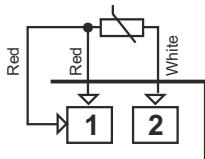


Pt-100 temperature sensor connecting

Two-wire sensor:



Three-wire sensor:

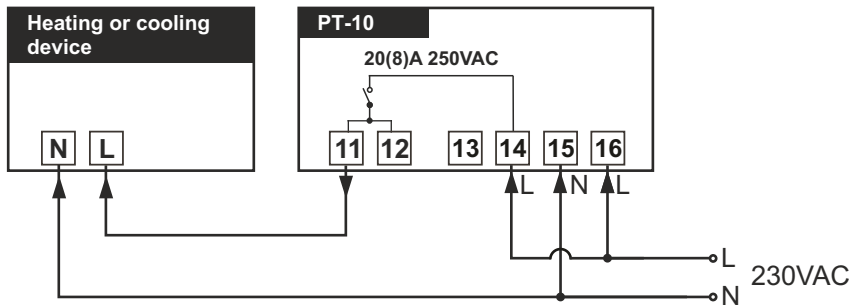


Remarks:

- If you want to extend the Pt-100 sensor use an electric wire of the same diameter and minimum 1mm2 cross-section.
- If the total length of the sensor cable is greater than 30m it is recommended to use the controller with cable length compensation, e.g. EMKO ESM-4410.

CONNECTING OF RECEIVING DEVICES

Make sure that the electrical parameters of the device correspond to the parameters of the controller (maximum voltage, current rating, power).
Diagram of connecting the heating device (for example boiler, heater) or cooling (for example fan, circulating pump):



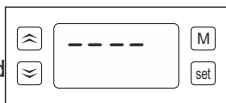
10. FACTORY SETTINGS.

If you forgot your password to the configuration menu or the timer after a power failure or a short circuit displays **memory error** **EOI** you can restore default parameter settings:



Turn off the timer. Then press both buttons   at one time and switch the power supply on holding the buttons..
Command: **CLr**
clear" displays.

②



"CLr" command disappears after 5 seconds and four horizontal pointers display. Then release the buttons and the controller restores factory settings and goes into normal operation mode.