ESCO™

ES-11W

TEMPERATURE CONTROLLER

USER MANUAL

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1. DESCRIPTION

Universal controller designed for temperature control in heating or cooling mode. It allows you to maintain the desired temperature by controlling the receiver accordingly. In addition, it has a MIN / MAX temperature alarm function with relay output and a beep sounder. Equipped with a high power relay output relay (maximum 4500W resistive load). The controller was designed in an industrial IP65 enclosure for harsh working conditions. It is resistant to dirt, high humidity and low temperatures. The kit includes a stainless steel temperature sensor. The most important features:
- measuring range -50.0 ... + 150.0 ° C
- 2 relay outputs (control, alarm)
- IP65 enclosure
- large, readable display with color graphic icons
- info function (MIN / MAX temperature memory and receiver operating time)
- eco mode
- manual mode
- logical input
- temperature alarm and sensor failure with sounder
- protection against unauthorized access to menus and settings
Relay 30A

2. SPECIFICATIONS.

Input:	2 temperature sensors: NTC 5kΩ by 25°C digital input
Measuring range:	-50...+150°C
Measuring accuracy:	±0,5°C
Sampling period:	330 ms
Display resolution:	0,1°C in whole range
Display:	LED, 4 digits, 14mm height with graphic icons
Control form:	ON-OFF with hysteresis
Prodtection class:	IP65 / II
Power supply:	230VAC ±15% or 12VAC/DC or 24VAC/DC, max 3VA
Operating conditions:	-20...60°C; 0...100%RH (non-condensing)
Storage conditions:	-40...85°C; 0...85%RH (non-condensing)

3. OUTPUTS CARRYING CAPACITY.

Output:	Relay:	Maximum load (inductive cos φ=0.4) eg. motor, aggregate:	Maximum load (resistive) eg. Heater:
♨ ❄ Heating/cooling	30A 250VAC, 2HP electrical life: 10^5 cykli	1500W	4500W
⚠ alarm	8A 250VAC, 0.5HP elektrical life: 10^5 cykli	400W	1800W

4. CONENT SET.

- microprocessor controller ES-11H
- Temperature sensor with 2 meter cable
- instruction manual / warranty card

5. CONTROLLER HANDLING.

5.1 SAFETY RULES.

⚠ Attention: Electrical equipment under voltage!
Please read the operating instructions carefully before installation and ensure that the unit is disconnected from the mains.

Assembly should be carried out by a person with appropriate electrical power.
Before starting the controller check the correct electrical connections.
The electrical installation in which the regulator works must be protected by a fuse according to the load applied. The controller can directly control a single phase receiver up to 4.5kW at resistive load.
For external power supplies, use an external electromagnetic or semiconductor contactor.
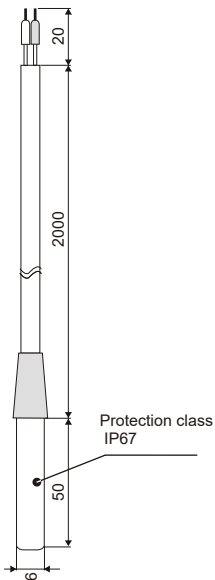
5.2 MOUNTING.

The controller is designed for use in harsh environmental conditions. It has class IP65 protection and is resistant to dirt, high humidity and low temperatures. The ambient conditions are given in the technical data table.
Fix the regulator on the wall using screws or dowels acc. Spacing as in the figure below. The temperature sensor must be mounted at the measurement site. The sensor tip is made of stainless steel AISI304.
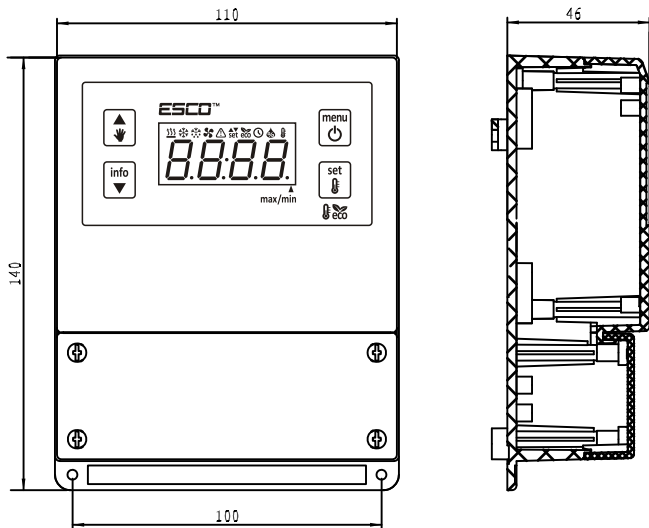The temperature sensor does not require polarization of the wires. You can extend the sensor cable to 80m using standard electrical wires, but with a cross section of not less than $0.75mm^2$.

5.3 DIMENSIONS.

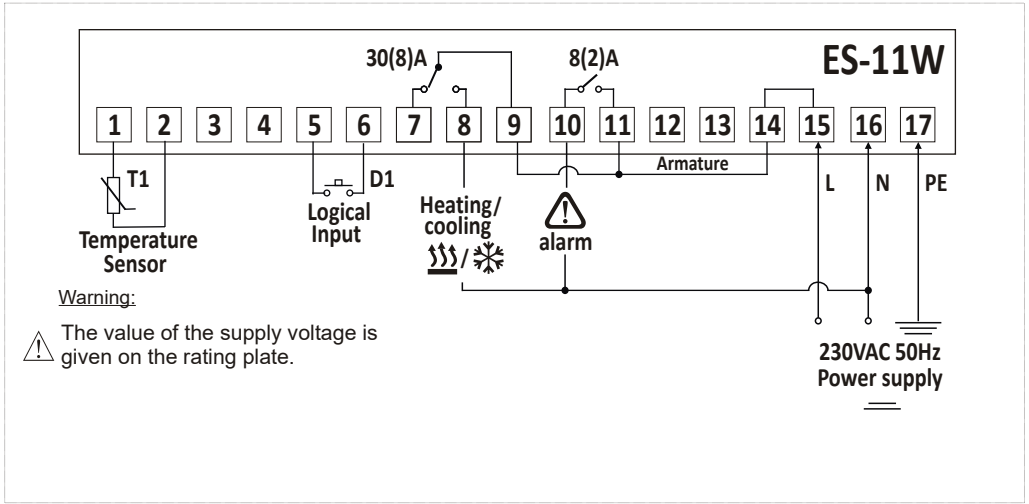Temperature sensor: Controller:

5.4 DIGITAL INPUT.

Warning:

⚠ The value of the supply voltage is given on the rating plate.

Connect the connecting cables through the cable glands and tighten them firmly to obtain a full tightness of the gland. Secure the wiring harness with clamping sleeves. The screw terminals of the controller allow connection of a cable with a maximum cross-section of 4mm2.
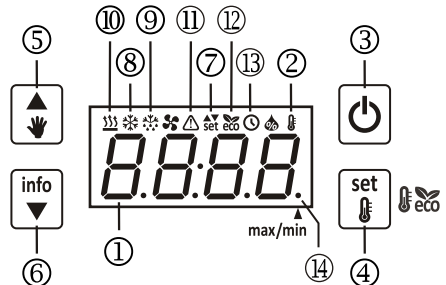
Comments:
- connecting the mains voltage 230V to the measuring terminals 13-18 causes damage to the regulator and the risk of electric shock
- The "L" phase circuit terminals 9-10 are connected internally to the driver board
- neutral terminals "N" 4-7-12 are connected internally to the driver board
- main relay heating / cooling is potential-free. If the controller is to directly control a single-phase heating / cooling device from a 230VAC network, make a 2-9 jumper to supply the "L" phase to the relay. After the jumper is made when the relay is activated on terminal 3, the phase appears.
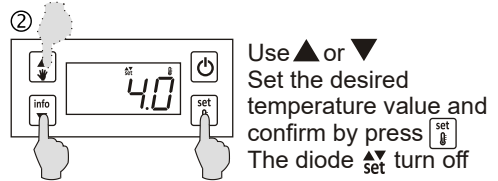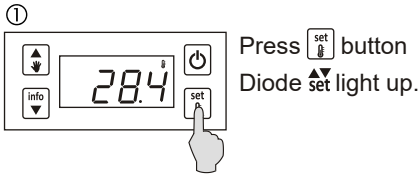- alarm relay is not potential-free. Activation on terminal 8 shows the phase.

6. OPERATING.

6.1 FRONT PANEL.

① Temperature display

② Temperature indicator

③ Button on / off controller
Press 5 sec. To enter the configuration parameter menu.

④ Temperature setting button
Press 3 sec. To enable / disable T1/T2eco setting

⑤ Button to increase the value
Press 3sec. To enable / disable manual mode

⑥ Button to decrease the value
Press to launch the "info"

⑦ Signaling temperature setting

⑧ Signaling cooling operation. LIGHT: ON; FLASH: waiting to start

⑨ Signaling defrost operation LIGHTS: ON; FLASH: manual defrost cycle

⑩ Signaling the heating operation LIGHT: on; FLASH: waiting to start

⑪ Signaling of alarm states. FLASH: active alarm

⑫ Information on maintaining the second temperature setting T2eco

⑬ "Info" function: total operating time of the control output
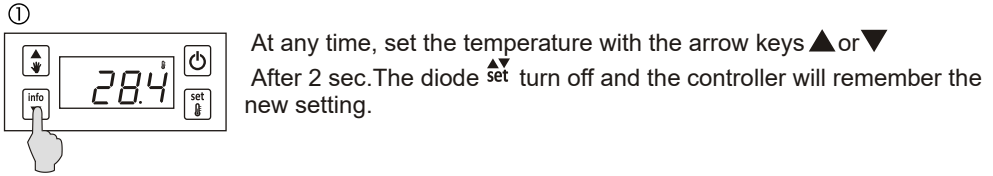
⑭ "Info" function: minimum / maximum recorded temperature

6.2 TEMPERATURE SETTING.

① Press [set] button
Diode set light up.

② Use ▲ or ▼
Set the desired
temperature value and
confirm by press [set]
The diode set turn off

6.3 CHANGE TEMPERATURE when SMART function is active (parameter F84 = 1).

The SMART function allows you to change the temperature quickly without pressing the SET
button. This is a very useful feature for users who often change the temperature.
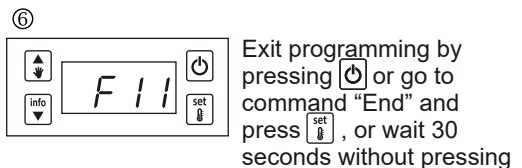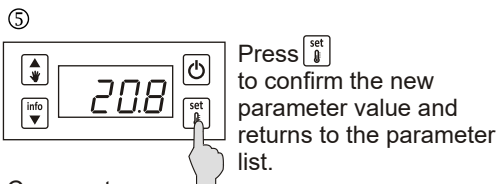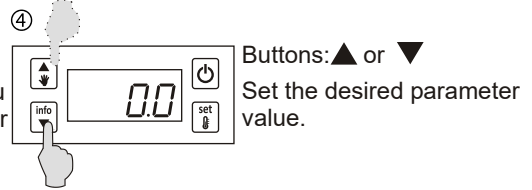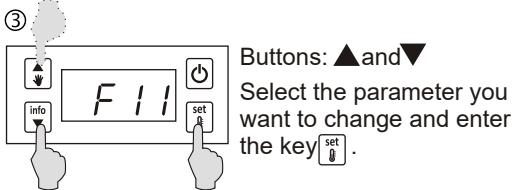
① At any time, set the temperature with the arrow keys ▲ or ▼
After 2 sec.The diode set turn off and the controller will remember the
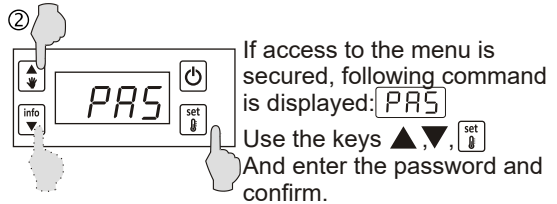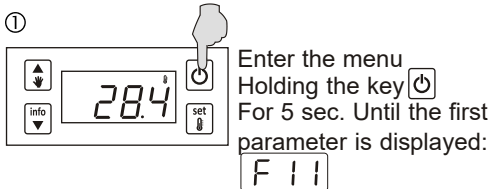new setting.

Comments:
- To cancel the setting, press the key at any time [⏻]
- change of setting is limited by parameters F13 and F14
- to change the T2eco setting, activate the T2eco level with the button [set] (the LED is on 🌿)
And then follow. Points 1, 2 above.

Information:
To quickly increase or decrease the setting values: Hold down ▲ or ▼

6.4 PROGRAMMING PARAMETERS.

① Enter the menu
Holding the key [⏻]
For 5 sec. Until the first
parameter is displayed:
F 11

② If access to the menu is
secured, following command
is displayed: PAS
Use the keys ▲,▼, [set]
And enter the password and
confirm.

③ Buttons: ▲ and ▼
Select the parameter you
want to change and enter
the key [set] .

④ Buttons: ▲ or ▼
Set the desired parameter
value.

⑤ Press [set]
to confirm the new
parameter value and
returns to the parameter
list.

⑥ Exit programming by
pressing [⏻] or go to
command "End" and
press [set] , or wait 30
seconds without pressing

Comments:
- to cancel the parameter setting, press the key [⏻]

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6.5 DESCRIPTION OF THE PARAMETERS.

Code:	Description:	Range:	Default:
F11	Set value of temperature T1. Limited by F14 and F13	F14...F13	0.0°C
F12	Hysteresis value (adjustment accuracy).	0.1...20.0	1.0°C
F13	Maximum temperature value that can be set by the user.	-50.0...150.0	150.0°C
F14	The minimum temperature that the user can set.	-50.0...150.0	-50.0°C
F15	High temperature alarm. F15 = OFF - alarm disabled	-50.0...150.0°C	OFF
F16	Low temperature alarm. F16 = OFF - alarm disabled	-50.0...150.0°C	OFF
F17	Delay for high and low temperature alarms.	0.1...99.9	15.0min
F19	Calibration of the temperature sensor. This is the value of the scale Chamber sensor relative to the actual measured temperature.	-20.0...+20.0	0.0°C
F21	Delay for switching on the control output when the unit is turned on.	0.0...10.0	0.0min
F25	Duration of "eco" mode after startup. After starting The regulator maintains the temperature T2eco, later T1. F25 = 0 - no function; F25 = 999.9 - continuous "eco" mode with T2eco setting	0.0...999.9	0.0min
F29	Control output mode. COOL = cooling; HEAT = heating	COOL/HEAT	HEAT
F31	Interval between defrost cycles (for refrigeration applications).	0.1...99.9	12.0min
F33	Maximum defrost cycle time (for refrigeration applications).	1...99	30min
F35	Method of control of defrost cycles. OFF-defrost off, 1 - automatically, from time to time equal to F31. 2 - automatically, if the total compressor operating time is reached Value equal to F31	OFF, 1, 2	OFF
F50	Logical input D1: 0 - not used; 1 - alarm when closed; 2 - alarm When shorted with sustained alarm signaling; 3 - alarm when Open; 4 - alarm when open with alarm signaling; 5 - activation of "eco" mode; 6 - on / off button; 7 - manual mode activation	0...7	0
F52	How to protect the system and devices connected to the output Regulatory when activating the temperature alarm: 0 - output off, 1 - control output on, 2 - alarm does not affect the operation of the control output	0...2	0
F57	Alarm output contacts: 0 - Normally open contacts, Shorted during an alarm; 1 - normally closed, open during alarm	0,1	0
F59	Setting value of temperature T2eco in "eco" mode	-50.0...150.0	0.0°C
F80	Password access to the configuration menu. OFF - password protection inactive. F80 = 0000 - password reset	0000...9999	OFF
F82	Display resolution: 0 = 0.1 ° C; 1 = 1 ° C	0, 1	0
F83	Sound signaling during alarms: 0 - silenced buzzer; 1 - active buzzer	0, 1	1
F84	SMART function: 0 - active; 1 - inactive Allows for quick temperature change with arrows.	0, 1	0
F85	Manual mode: 0 - not active; 1 - start of the defrost process; 2 - activation of control output 3 - activation of alarm output	0...3	0
F86	Duration of the manual mode. F86 = 99:59 - time unlimited	99:59	00:30min
F87	Protection of button functions for user: 0 = no protection, 1= button [set] inactive, 2 = button [⬍] inactive, 3 = buttons [set] , [⬍] inactive	0...3	0
F88	Info function: 1 - active; 0 - inactive	0...1	1
F98	Reserved.	-	-
F99	Controller test. To test, disconnect the output device!	-	-
End	Exit.		

6.6 TEMPERATURE ADJUSTMENT.

The controller is used to keep the temperature T with the set hysteresis ΔT in refrigeration or heating equipment. The actuator is controlled by a relay output and the temperature is measured by a temperature sensor.
Principle of operation of temperature control in cooling and heating:
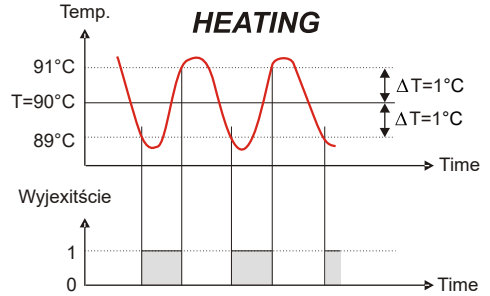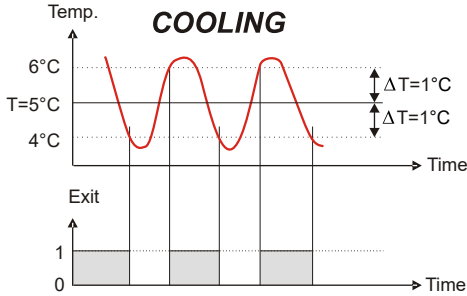
6.7 "ECO" MODE - control with two temperature settings T1 / T2

The basic function of the controller is to maintain the temperature. By default, the regulator keeps the temperature at T1. However, at any time, the user can start the "eco" mode and switch the temperature to T2eco (eg night mode). Just press the button for 3sec. (LED indicates whether "eco" mode is active). When parameter F25 is set, the controller can automatically switch to "eco" mode every time the device is started.
Then the temperature is adjusted in two steps:
- preheating / cooling (T2eco level)
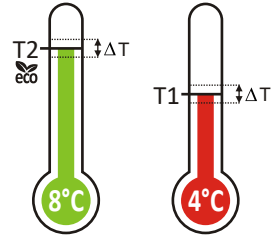
Each time the receiver is started, in the first stage, the regulator seeks to reach the temperature T2eco, and then, after the time F25, sets the temperature at T1. Switching between levels allows the button (press 3sec.) Or the external button / circuit connected to the logic input (only if parameter F50 = 5).
When using any timer, giving a signal to the logic input, you can trigger the "eco" mode and maintain the temperature depending on the time and day of the week. Example:
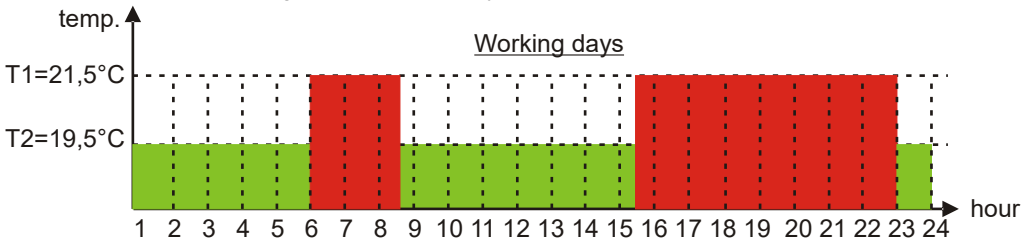
6.8 MANUAL MODE.

Manual mode enables the activation of outputs or functions from the keyboard (press [⬍] for 3sec.). Depending on the setting of the F85 parameter, the control outputs can be switched on at any time in F86. Example:
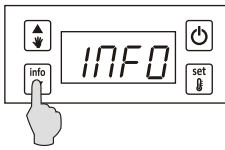- heating element is attached to the control output, which maintains the temperature of the fruit pulp
- stirrer is connected to the alarm output
- Push button [⬍] to launch the mixer for 1 minute to mix the batch

information:
- Manual mode can be activated remotely from the external button / circuit connected to logic input D1 (when F50 = 7).
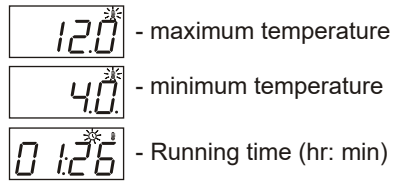
6.9 INFO FUNCTION - MEMORY OF WORKING PARAMETERS

The ES-11H controller continuously monitors the workflow. It stores the minimum and maximum temperature and the main output time.

To view data from memory press info
The command is displayed: $INFO$

Press info , to display:

12.0 - maximum temperature

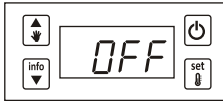4.0 - minimum temperature

$01:26$ - Running time (hr: min)

To exit INFO press ⏻ or wait 5sec. Without pressing the keys.
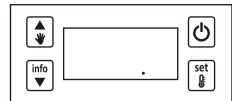To clear the memory, turn the regulator off by pressing the button ⏻ or reset the power.

6.10 MODE DISABLED - "OFF"

When the controller is deactivated with the button ⏻ , the controller switches to the

It'll display Message OFF: OFF

And after 5s. The controller will go into off

Comments:
- power failure does not change the on / off mode
- in off mode the control circuits can be live. **Do not tamper with the cables and do not tamper with the mains before any tampering.**

6.11 PASSWORD, LOCK BUTTONS.

Access to the configuration parameter menu, can be password protected against unauthorized changes by unauthorized users. Once the password has been set in parameter F80, a message is PAS
displayed each time you enter the menu, which will prevent you from changing the parameters without entering a password. In the F87 parameter, the installer can limit the functions of the buttons for the user and not allow, for example, changes in the set temperature T1 / T2.

6.12 ALARM TEMPERATURES AND ALARM COMMUNICATIONS.

Parameters can set high and low alarms (F15 and F16) and alarm delay (F17). At the time of a temperature alarm, sensor failure, or digital input activation, the indicator ⚠ will blink, the beep will sound (when F83 = 1) and the control outputs will be deactivated.

Statement	Cause	Output work status
$ALd1$	Activation of logic input	Output active or inactive (parameter F50)
$ALt1$	Temperature sensor error: OPE - break in the circuit SHr - compact circuit	Inactive output
$ALH1$	High temperature alarm	Outputs active or inactive (parameter F52)
$ALLo$	Low temperature alarm	Outputs active or inactive (parameter F52)

You can set the F52 parameter to protect the system and devices connected to the control output when the temperature alarm is activated.

7. LOGICAL INPUT.

The controller has a logic input D1 for signaling alarms, eg a system breakdown, a pressure switch or a safety thermostat, etc., or remotely run some functions. Depending on the setting of the F50 parameter, activating the D1 input can remotely change the temperature level, control the outputs, or turn on / off the controller.