

INTIEL

THE ELECTRONICS ON YOUR SID

Controller for accumulation tanks

User's Manual



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PROGRAMMABLE CONTROLLER FOR ACCUMULATION TANKS

TECHNICAL DESCRIPTION



Safety instructions:

- Before installation, check the integrity of the unit and its connecting wires.
- In case of damaged can not be mounted to the removing of the fault.
- The installation and disassembly of the unit must be carried out by qualified personnel who have previously read the product manual.
- Mount in a dry and ventilated place away from heat sources and flammable gases or liquids.
- Make sure that the mains voltage matches the voltage on the rating plate of the unit.
- Use power consumers that match the power output of the appliance.
- In the event of malfunctioning, switch off the appliance immediately and seek authorized service for repair.
- In case of fire, use a fire extinguisher.
- For the purpose of environmental protection, do not throw away electrical appliances and their packaging marked with a symbol

crossed bin



Contents of the package:

- The controller
- Sensors type Pt 1000-2 pcs.
- User guide (warranty card)

1. Application

The controller is designed to manage the heating of an accumulating (buffer) tank in a central heating system.

In heating systems with a boiler, the accumulation tank makes the operation of the boiler smoother by reducing the number of switching ON and OFF due to the frequent consumption of hot water, in this way it works as a heat accumulator. This allows the boiler to operate at rated power and extends the heating time of the building when it cools down. The controller controls the pump between the boiler and the accumulation tank, gives a signal to turn the boiler ON or OFF, monitoring the temperature at the top and bottom of the tank.

2. How it works

The two temperature sensors are mounted respectively on the top and bottom of the tank, thereby to monitor the temperature of the output and return water.

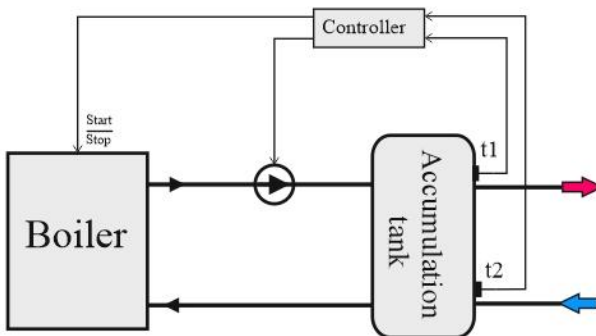
At a temperature in the upper part of the buffer tank t°_1 lower than the set t°_{1set} , the controller turns **ON** the boiler and the circulation pump.

If the temperature in the bottom part of the buffer tank t°_2 exceeds the set t°_{2set} , the controller turns **OFF** the boiler and the circulation pump.

By pressing and holding for more than 3 sec. the "■" button (fig. 2) activates the "STOP" mode, which stops the boiler and the pump regardless the current values of the temperatures. After releasing the button, an icon ■ lights up on the display. To exit this mode, press and hold the "■" button again.

The circulation pump remains running for 10 minutes after the controller send a stop signal.

Example connecting of the controller.



3. Front panel

The front panel contains the monitoring and control elements. These are a customized LED display with numbers and symbols and buttons. The appearance of the front panel is shown in **Figure 2**

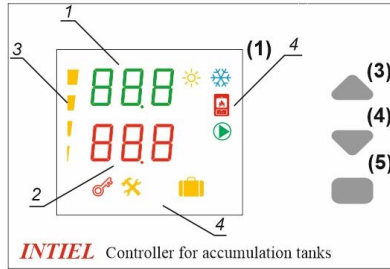
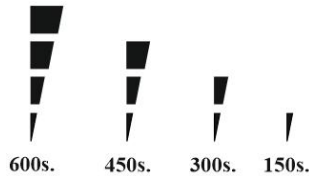








Fig.2


LED display (1). Provides visual information about the current values of the measured quantities and the status of the system, through symbols (**icons**), as well as the ability to set the controller through a user menu.

- 1 – Temperature indicator at the top of the accumulation tank t°_1 , as well as part of the menu showing the setting parameter;
- 2 – Temperature indicator at the bottom of the accumulation tank t°_2 , as well as part of the menu showing the value of the parameter to be set;
- 3 – The time for which the pump remains running after the controller sends a signal to stop the boiler and the pump.



4 – Icons to provide additional information about a finding of the system:

-  The temperature at the top of the tank is above **90 °C**;
-  The temperature at the bottom of the tank is below **15 °C**;
-  The circulation pump is on;
-  The boiler is on;
-  "STOP" mode is on
-  "Settings" menu;

 The button to access the "Settings" menu is disabled.

Button functions:

"▲" – (3) scroll forward in the menu, increase value;

"▼" – (4) scroll back in the menu, decrease value;


"■" – (5) access menu, select, save changes.

At temperatures outside the measurement range display shows:

– when any of the temperatures are higher than +130 °C appears "tHi" on the display;

– when any of the temperatures are lower than -30 °C appears "tLo" on the display.

4. Programming

After the power is turned on, the controller starts in the initial state, in which it displays the temperature at the top and bottom of the tank. To access the settings menu, press the button "■". Icon  lights up on the display.

Use buttons "▲" or "▼" to select a parameter. To change its value, press a button "■". The value will start flashing, you can change it using buttons "▲" and "▼".


To confirm and record in the memory, press the button "■".

All parameters, the range in which they can be changed as well their default values are described in Table 1.

To exit from the menu select "End SET" and press the button "■".

If no button is pressed for 15 seconds, the controller automatically exits from the menu. If this happens while changing a value (the value is flashing), then the change will not be stored in memory.

Lock menu access

The menu can be locked to prevent unintentional changes to settings. This is done by simultaneously pressing and holding for 2 seconds the buttons "▲" и "▼". After releasing the buttons, an icon  indicating activated protection lights up on the display.

To ensure optimum performance, the temperature setting at the bottom of the buffer tank must be higher than the temperature at the top. For this reason, a restriction is introduced and an error message „Err” will be displayed when trying to set a value for t_{1set}° higher than t_{2set}° .

It is possible to invert the **start** and **stop** signal to the boiler. Select "rEL" from the menu and press the "■" button. The display show:

"nO" - Normally open relay contact. The start signal to the boiler will be when the contact is closed (terminals 5 and 6);

"nC" – Normally closed relay contact. The start signal to the boiler will be when the contact is open.

5. Electrical connection

Electrical connection includes sensor connection, mains supply, controlled pump and electrical heaters according to **Figure 3**. The sensors are Pt1000 type non-polar.

If necessary, the connecting cables of the sensors can be extended, taking into account the total resistance of the two wires - sensitivity of the indication $1^{\circ}\text{C}/4\Omega$. A recommended length that does not affect the measurement is up to **100m**.

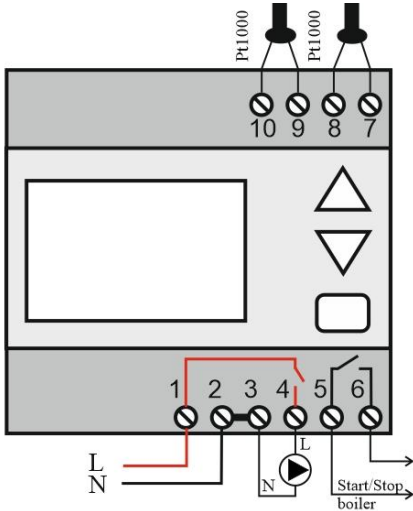


Fig.3

Terminals 8, 9 are input for the sensor from the tank $t^{\circ}1$.

Terminals 10, 11 are input for the sensor from the tank $t^{\circ}2$.

Terminals 1 and 2 are supplied with phase (L) and neutral (N) from the mains.

The pump is connected to terminals 3, 4, where zero and phase are output respectively. Terminals 5 and 6 are independent contacts for sending a *start / stop* signal to the boiler.

6. Technical data

Power supply	$\sim 230\text{V}/50\text{-}60\text{Hz}$
Switching current	3A (7A optional)/ $\sim 250\text{V}/50\text{-}60\text{Hz}$
Number of output contacts	two relays
Differential temperature	$2^{\circ} - 20^{\circ}\text{C}$
Sensor type	Pt1000 (-50° to $+250^{\circ}\text{C}$)
Current through the sensor	1mA
Measuring range	-30° to $+130^{\circ}\text{C}$
Display type	custom LED indication
Unit of measurement	1°C
Environmental temperature	$5^{\circ} - 35^{\circ}\text{C}$
Environmental Humidity	0 - 80%
Degree of protection	IP 20

Table 1

PARAMETER				
<i>Indication</i>	<i>Description</i>	<i>Range</i>	<i>Default settings</i>	<i>User settings</i>
t1u	t1 up – set temperature in the upper part of the tank, to start the boiler and the pump	0 ÷ 100 °C	65 °C	
t2d	t2 down – set temperature in the bottom part of the tank, to stop the boiler and the pump	t1u ÷ 100 °C	80 °C	
rEL	Relay output for stop and start signal to the boiler	nO – the boiler is ON when the contact is closed nC - the boiler is ON when the contact is open	nO	
T1 correct	Correction of the indication temperature T1	-10 ÷ 10 °C	0 °C	
T2 correct	Correction of the indication temperature T2	-10 ÷ 10 °C	0 °C	

7. Warranty

The warranty period is 24 months following the purchase date of the unit or its installation by an authorized Engineering company. The warranty is extended to the malfunctions that occur during the warranty period and are result of the production reasons or defective used parts.

The repairs during the warranty period can be done after correct filling of the manufacturer warranty card