

# ***INTIEL***

***THE ELECTRONICS ON YOUR SIDE***

## **Solar System Controller** **INT0064**

**User's Manual**



## **I. Application**

The Controller INT0064 is designed to operate in solar panel installations mounted in family houses and hotels. It provides the necessary logic concerning obtaining a domestic hot water and premises heating by control of the water heater, the accumulating reservoir, the central heating and the temperature of the swimming pool.

## **II. Operation**

### **1. Water heater**

The domestic hot water is being prepared by means of a combined heating between the solar panel and electrical heating elements of the water heater. There are two temperature sensors mounted in the water heater – upper and lower one. The electrical heating elements are controlled by the upper sensor. It means that the electrical elements will be switched on when the temperature of the upper part of the water heater become lower than the assigned one, and they will be shut down if the temperature of the upper part is greater than the assigned one. The switching on of electrical heating elements is being shown by indication 18 (see Figure 1). The domestic hot water preparation by the solar panel is controlled by means of the lower temperature sensor and it is being started when the temperature of the lower part of the water heater drops down than its assigned level and in the same time a positive temperature difference exists between the temperature of the solar panel and the lower temperature sensor of the water heater which in fact is greater than the already assigned temperature difference ( $\Delta T$ ). The preparation of the hot water by the solar panel will be stopped in case one of the above mentioned conditions is not fulfilled. The heating provided by the solar panel is being shown by indication 17 (see Figure 1).

### **2. Accumulating reservoir**

The reservoir main function is to accumulate a heating energy from the solar panel system and to render it subsequently to the central heating system of the premises (house). A temperature sensor is to be mounted on the lower part of the accumulating reservoir. The heating of the solar system is started if:

- the domestic hot water preparation from the solar panel is switched off;
- the temperature of the accumulating reservoir is less than 80 °C;
- the temperature of the accumulating reservoir is less than the solar panel temperature.

The heating of the accumulating reservoir can be provided with higher or with lower priority to the swimming pool heating. The priority can be adjusted by button 13 (see Figure 1). When the lower priority is adjusted the heating of the accumulating reservoir will be started after the swimming pool reaches the assigned temperature level.

### **3. Swimming-pool**

The heating of the swimming-pool by the solar panel will be started when the water temperature of the swimming-pool is lower than the assigned one and the heating of the water heater by the solar panel is turned off. The heating of the swimming-pool will be started after the heating of the accumulating reservoir, in case a lower priority is adjusted. Indication 21 (see Figure 1) shows the swimming-pool heating.

### **4. Central heating**

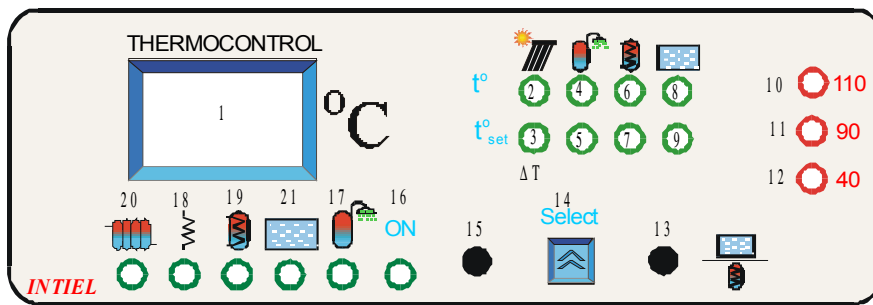
The temperature of the return boiler water is being observed by a temperature sensor installed on the return boiler water. In case the temperature of the accumulating reservoir is greater than the temperature of the returned boiler water it means that the accumulating reservoir will be included in the central heating circuit; on the contrary it will be excluded. It is being shown by light indication 20 .

**The solar panel controller has the following functions:**

- if the temperature of the solar panel exceeds 110 °C the red light indication (“110”) will be activated and it will be started by force the circulation through the swimming-pool and :
  - water heater, in case it is not reached the boundary temperature of 90 °C.
  - the accumulating reservoir in case its temperature is lower than 80 °C and the water heater is already exceeded its assignation. The circulation through the accumulating reservoir will be turned on after reaching the assignation of the swimming-pool temperature, in case a lower priority concerning the accumulating reservoir is adjusted.
- if the solar panel temperature is under 40 °C the red light indication “40” will be activated (see position 12 of Figure 1.). In this case the Controller does not allow the heating of consumers by the solar panel. During this mode the electrical heating elements of the water heater can operate only.
- observes the temperature of the water heater by means of its upper temperature sensor and if it exceeds 90 °C then the red light indication “90” appears (position 11 of Figure 1.) As a result of that the Controller stops the heating of the water heater provided by the electrical heating elements or by the solar panel.

**III. Signalization and buttons**

The locations of all indications are shown on Figure 1. bellow



**Figure.1**

1. Digital display
2. Index, showing the current temperature of the solar panel.
3. Index, showing the assigned level of the temperature difference between the water heater and the solar panel.
4. Index, showing the current water heater temperature.
5. Index, showing the assigned water heater temperature.
6. Index, showing the current temperature of the accumulating reservoir.
7. Index, showing the assigned temperature level of the accumulating reservoir.
8. Index, showing the current temperature of the swimming-pool.
9. Index, showing the assigned temperature level of the swimming-pool.
10. Indication of the solar panel temperature above 110 °C
11. Indication of the water heater temperature above 90 °C
12. Indication of the solar panel temperature bellow 40 °C
13. Button, adjusting the priority of the heating between the swimming-pool and accumulating reservoir.
14. Button, selecting the digital display showing data.
15. Button for turning on and turning off the solar panel heating
16. Indication for turned on solar panel heating
17. Indication for turned on pump of the water heater
18. Indication for turned on electrical heating of the water heater

- 19. Indication for turned on pump of the accumulating reservoir
- 20. Indication for turned on circulation pump of the central heating system
- 21. Indication for turned on pump of the swimming-pool

#### IV. Wiring

The Controller wiring is shown on Figure 2. below:

- 1 - Solar panel temperature sensor
- 2 - Water heater lower temperature sensor
- 3 - Water heater upper temperature sensor
- 4 - Accumulating reservoir temperature sensor
- 5 - Central heating system temperature sensor
- 6 - Swimming-pool temperature sensor

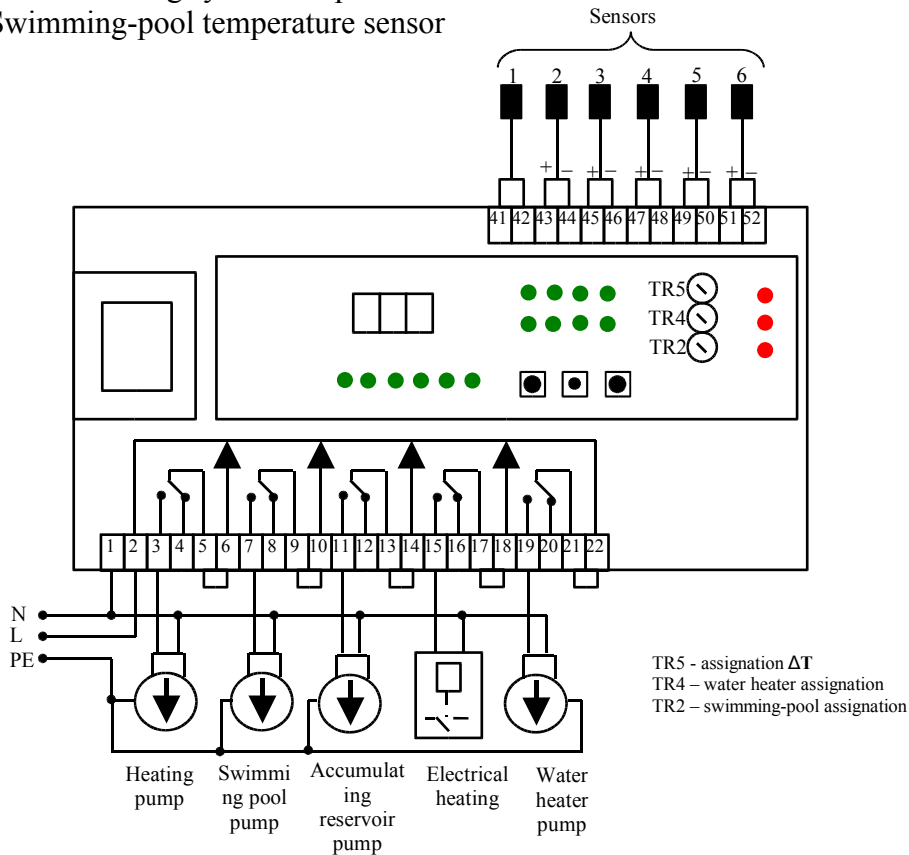


Figure.2

#### V. Sensors

The sensors and their terminals are shown on Figure 2., their types and places for connection are as follows:

- 1. Temperature sensor of the solar panel, type Pt-1000
- 2. Temperature sensor for a low water heater temperature, type LM335, which is to be mounted at the lower part of the water heater.
- 3. Temperature sensor for high water heater temperature, type LM335, which is to be mounted at the upper part of the water heater
- 4. Temperature sensor of the accumulating reservoir, type LM335, which is to be connected to the lower part of the reservoir.
- 5. Temperature sensor of the central heating system, type LM335, which is to be mounted on the pipe of the returned boiler water.
- 6. Temperature sensor of the swimming-pool, type LM335

The sensors can be prolonged, keeping their polarity order.

## VI. Installation

After connection to the power supply the following settings have to be provided (the setting elements are shown on Figure 2 and are approachable after removing the front panel of the Controller):

### 1. Fixing the temperature difference ( $\Delta T$ ) between the water heater temperature and the solar panel one.

- keep pressed "Select" button (position 14, Figure 1.) until the index  $\Delta T$  (position 3, Figure 1.) appears. Then by turning the element TR5 a temperature difference can be fixed in the range of 2 – 20 °C.

### 2. Fixing the desired water heater temperature.

- keep pressed "Select" button (position 14, Figure 1.) until the index of the water heater (position 5, Figure 1.) appears. Then by turning the element TR4 can be fixed the water heater temperature in the range of 40 – 80 °C.

### 3. Fixing the desired temperature of the swimming-pool.

- keep pressed "Select" button (position 14, Figure 1.) until the index of the swimming-pool appears (position 9, Figure 1.). Then by turning the element TR2 can be fixed the swimming-pool temperature in the range of 15 – 30 °C.

Elements TR5, TR4 and TR2 are located under the front panel of the Controller therefore its cover has to be removed carefully in order to gain access to them.

## VII. Technical data

Power supply	~230V/50Hz
Circulation pumps outlets	switching contacts 7A/250V
Heating elements outlets	switching contacts 7A/250V
Measure temperature range of the solar panel	(-50 °C) / (+ 200 °C)
Measure temperature range of all sensors LM335	(-40 °C) / (+100 °C)
Protection	IP20

## VIII. Example scheme for a providing domestic hot water, central heating and swimming-pool heating

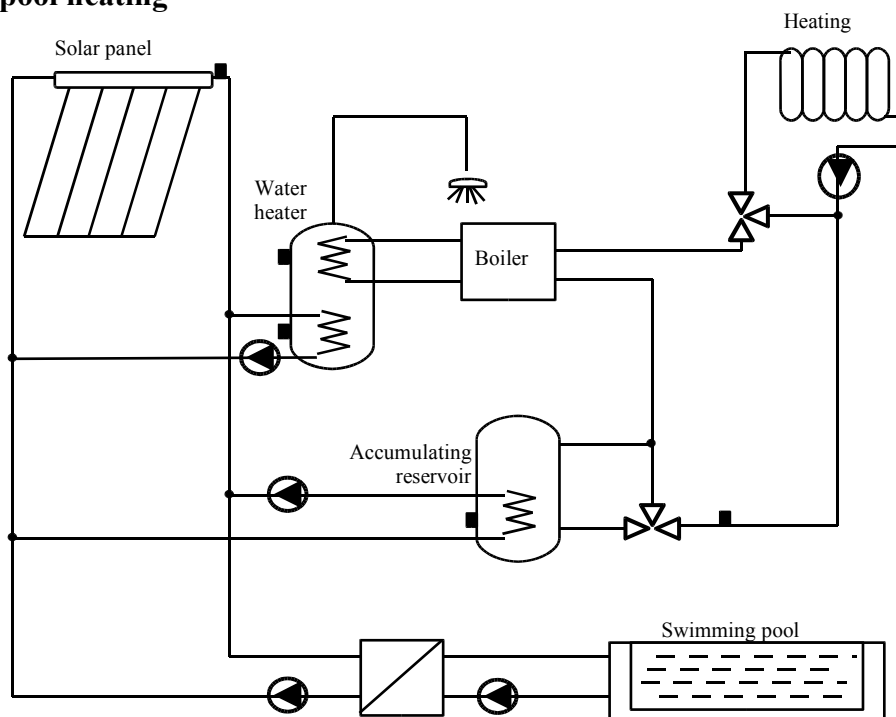


Figure. 3

## VI. Warranty

The warranty period is 24 months following the purchase date of the unit or its installation by an authorized Engineering Company, but not exceeding 28 months after the production date. 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 warranty does not relate to malfunctions corresponding to not-qualified installation, activities directed to the product body interference, not regular storage or transport.

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

### Warranty Card

<b>Manufacturer: INTIEL</b>	
<b>Product type</b>	<b>Solar System Controller INT0064</b>
<b>Production number</b>	
<b>Production date</b>	
<b>Dealer confirmation</b>	
<b>Purchase date</b>	
<b>Invoice number</b>	
<b>Dealer's name, address and stamp</b>	
<b>Seller's name and signature</b>	
<b>Installation Date</b>	
<b>Date</b>	
<b>Company (address, stamp)</b>	
<b>Installer's name and signature</b>	