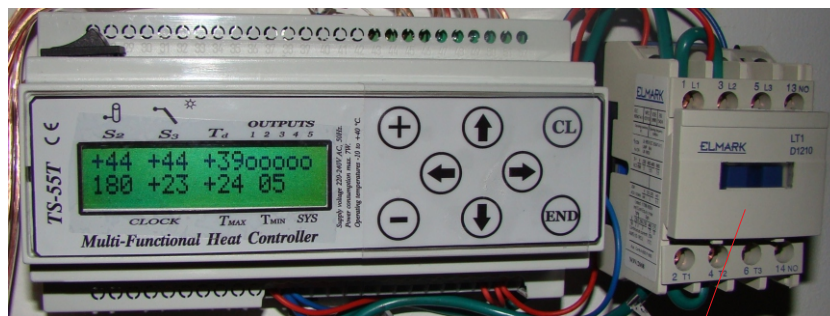
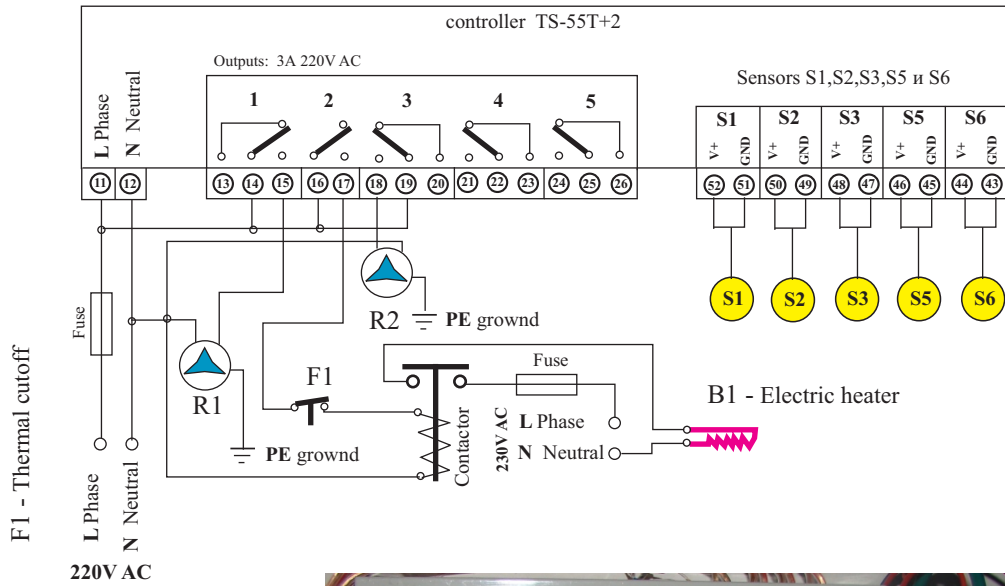


**Use a weekly temperature timer to control temperature in the water heater.  
Additional heating of two alternative heat sources - solar collector,  
local (or central) water heating, boiler or fireplace.**

I will use the wiring diagram and management shown in a file + 2\_b1.pdf, but will add:

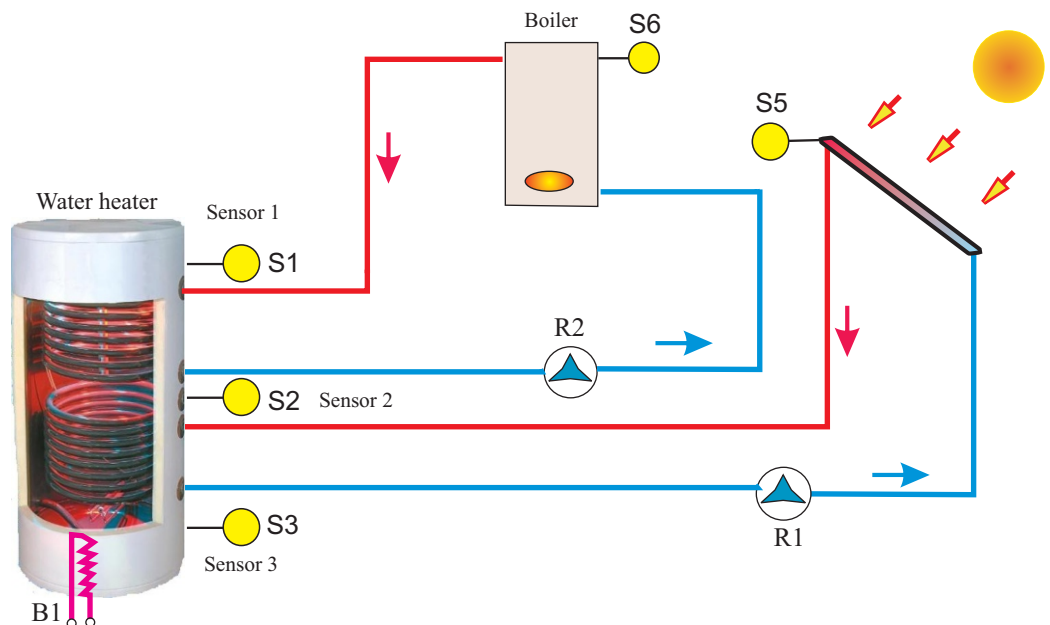
- To output 1 water pump for the first differential thermostat.
- To output 2 contactor for switching the electric heater in the boiler.
- To output 3 water pump for second differential thermostat.

**Electric scheme**



Contactor

**Functional scheme**



R1, R2-Water pumps.  
 F1-Termal cutoff.  
 B1-Electric heater.  
 S1, S5-Sensors.  
 TD1-Temperature difference to TURN ON the pump.

**Programming:**

1. Set the time and date.
2. Set the timer program if necessary.
3. Program the top table in the controller.
4. Perform calibration of the sensors.
5. Select "Automatic mode".

**TURN ON / TURN OFF outputs:**

**Output 1:**

If (S5-S2)>10° C then the output is TURN ON.  
 If (S5-S2)<3° C then the output is TURN OFF.

**Исход 2:**

In accordance with the timer program.

**Исход 3:**

If (S6-S1)>8° C then the output is TURN ON.  
 If (S6-S1)<4° C then the output is TURN OFF.

We will use:

- The condition differential output of channel 1.
- Logical function "OR" for channel 1.
- The condition output of channel 2, for control with weekly temperature timers 1, 2 and 3.
- Logical function "OR" for channel 2.
- The condition differential output of channel 3.
- Logical function "OR" for channel 3.

The below 2 rows of functional table must be set as follows:  
 (You only need to enroll only numbers with circle - the other is established by RESET.)

	1	2	3	4	5	6	7	8
Td1-8: Td1,Td2,Td3 Td4,Td5,Td6,Td7,Td8	(60)	(40)	(75)	05	05	05	05	05
U1-8: u1 u2 u3 u4 u5 u6 u7 u8	0	0	0	0	0	0	0	0

u1-u8 are the numbers of outputs, used into timers 1 to 8. If the output is different from '0' then the corresponding row is used by the clock time, for set indication output. Ux must be from 0 to 5.

This table should be write into the controller as using functional table (see TS-plus2).  
 You only need to enroll only numbers with circles (the other is established by RESET).

Table setup of the differential regulators, logical functions and thermostats						
Row from the table for programming	Output number:					Note
	1	2	3	4	5	
Top Level - °C Top level thermostats XX=2 до 90°C	90	90	90	90	90	Temperature to TURN ON the conditional output of the thermostat
Top Level-Sensor S Sensor for thermostat top level S=0-6	0	0	0	0	0	
Low Level - °C Low level thermostats XX=2 до 90°C	05	05	05	05	05	Temperature to TURN ON the conditional output of the thermostat
Low Level-Sensor Sensor for thermostat top level S=0-6	0	(3)	0	0	0	
Differential regulator ON TEMPERATURE 2 - 90°C	(10)	05	(8)	05	05	Temperature difference ST-SP to TURN ON the conditional output of the regulator
Differential regulator OFF TEMPERATURE 2 - 90°C	(03)	02	(4)	02	02	Temperature difference ST-SP to TURN OFF the conditional output of the regulator
Differential regulator sensor ST 0 - 6	(5)	0	(6)	0	0	Sensor heat source *
Differential regulator sensor SP 0 - 6	(2)	0	(1)	0	0	Sensory hot-receiver *
Used logical function AND, OR	0	0	0	0	0	A(AND) / O(OR)

\* - Do not put ST = SP !

Log in the row from functional table "SET TIMER" and program the timers 1.2 and 3:

Timer 1	Td1 ON/OFF1 DAY 12345      Choice of day (s) of the week
	Td1 ON1 HR MN    Hour and minutes for the establishment Td=Td1. 03 00
	Td1 OFF1 HR MN   Hour and minutes for the establishment Td=05. 05 55
Timer 2	Td2 ON/OFF2 DAY 1234567    Choice of day (s) of the week
	Td2 ON2 HR MN    Hour and minutes for the establishment Td=Td2. 11 00
	Td2 OFF2 HR MN   Hour and minutes for the establishment Td=05. 19 00
Timer 3	Td3 ON/OFF3 DAY 6            Choice of day (s) of the week
	Td3 ON3 HR MN    Hour and minutes for the establishment Td=Td3. 02 00
	Td3 OFF3 HR MN   Hour and minutes for the establishment Td=05. 05 55
Timer 4	Td4 ON/OFF4 DAY 6            Choice of day (s) of the week
	Td4 ON4 HR MN    Hour and minutes for the establishment Td=Td3. ?? ?? Not used.
	Td4 OFF4 HR MN   Hour and minutes to TURN OFF of the output. ?? ?? Not used.
Timer 5	Td5 ON/OFF5 DAY 6            Choice of day (s) of the week
	Td5 ON5 HR MN    Hour and minutes for the establishment Td=Td3. ?? ?? Not used.
	Td5 OFF5 HR MN   Hour and minutes to TURN OFF of the output. ?? ?? Not used.
Timer 6	Td6 ON/OFF6 DAY 6            Choice of day (s) of the week
	Td6 ON6 HR MN    Hour and minutes for the establishment Td=Td3. ?? ?? Not used.
	Td6 OFF6 HR MN   Hour and minutes to TURN OFF of the output. ?? ?? Not used.
Timer 7	Td7 ON/OFF7 DAY 6            Choice of day (s) of the week
	Td7 ON7 HR MN    Hour and minutes for the establishment Td=Td3. ?? ?? Not used.
	Td7 OFF7 HR MN   Hour and minutes to TURN OFF of the output. ?? ?? Not used.
Timer 8	Td8 ON/OFF8 DAY 6            Choice of day (s) of the week
	Td8 ON8 HR MN    Hour and minutes for the establishment Td=Td3. ?? ?? Not used.
	Td8 OFF8 HR MN   Hour and minutes to TURN OFF of the output. ?? ?? Not used.

In the days Monday to Friday the Timer 1 will set in 3.00 hours Td = 60 ° C (desired temperature in the water heater).  
If sensor 3 measures the temperature less than 60 ° C in the range of 3.00 to 5.55 hours then output 2 will be set in 1.  
If sensor 3 measures the temperature greater than 60 ° C in the range from 3.00 to 5.55 hours then conditioned output 2 will be set to 0.  
At 5.55 hours timer 1 will establish Td = 05 ° C (desired temperature in the water heater). Surely sensor 3 will show higher temperature and output 2 will be set to 0.

In the days Monday to Sunday the timer 2 will establish at 11.00 hours Td = 40 ° C (desired temperature in the water heater).  
If sensor 3 measures the temperature less than 40 ° C in the range of 11.00 to 19.00 hours then output 2 will be set in 1.  
If sensor 3 measures the temperature greater than 40 ° C in the range from 11.00 to 19.00 hours then conditioned output 2 will be set to 0.  
At 19.00 hours timer 1 will establish Td = 05 ° C (desired temperature in the water heater). Surely sensor 3 will show higher temperature and output 2 will be set to 0.

In the days Saturday the timer 3 will set in 02.00 hours Td = 75 ° C (desired temperature in the water heater).  
If sensor 3 measures the temperature less than 75 ° C in the range of 02.00 to 05.55 hours then output 2 will be set in 1.  
If sensor 3 measures the temperature greater than 75 ° C in the range from 02.00 to 05.55 hours then conditioned output 2 will be set to 0.  
At 05.55 hours timer 1 will establish Td = 05 ° C (desired temperature in the water heater). Surely sensor 3 will show higher temperature and output 2 will be set to 0.