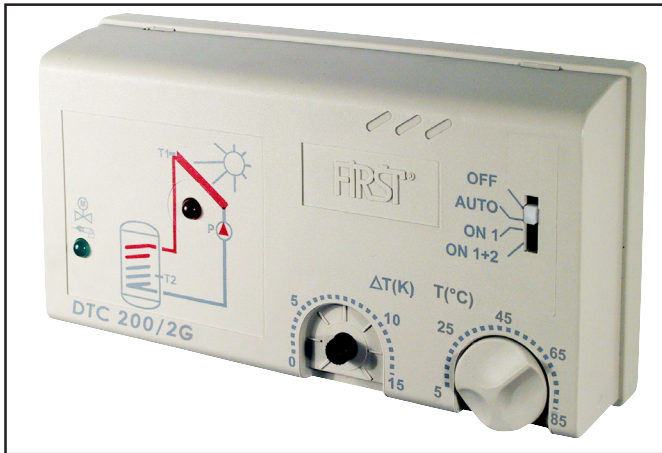


### DTC 200/2G

Differential thermostat can be used for:

- Heating sanitary water with possibility to control the burner.
- Cooling living space with blowing the cool outside air into the living space



#### ⚠ WARNING!

Installation instructions are meant for specialist. All examples listed in the instructions are merely indicative. The manufacturer accepts no responsibility for incorrect hydraulic connection of machine parts of installations should comply with all safety regulations defined by law and the rules. Carefully read the instructions to make good use of the product.

#### INFORMATION FOR ORDER:

#### CODE

**DTC 200/2G** ..... 13017  
 The set consists of:  
 Differential thermostat DTC 200/2G, sensor BSF1, sensor KF, mounting kit, installation instructions and instruction for use

**Tube TV2** ..... 27080  
 (1/2", l=100mm, inner diameter 14mm)

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#### WITH DIFFERENTIAL THERMOSTAT ARE THREE POSSIBLE WAY OF USE:

##### 1. HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH CONTROLLING THE HEATING SOURCE (BURNER).

Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump. If it necessary turns ON or OFF the heating source (burner).

##### 2. HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH ADDITIONAL HEATING WITH ELECTRICAL HEATER.


Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump. In case that the primary heating source (solar collectors, boilers...) has not enough energy, water in water tank is heated with electrical heater.

##### 3. COOLING LIVING SPACE WITH BLOWING THE COOL OUTSIDE AIR INTO THE LIVING SPACE

Differential thermostat controls the ventilator.

We reserve the right to modify the instructions and the technical data of the product without prior notice.

**Technical data: DTC 200/2G**

**Dimensions:** 80x150x42 mm  
**Weight:** 0,43 kg  
**Protection degree:** IP 40/ DIN 40050  
**Heat class:** B  
**Type of thermostat:** P  
**Range of measuring temperature:** -40°C ... +120°C  
**Setting working regime:**  
 With jumpers (heating or cooling)  
**Limitation of temperature (depends of working regime):**  
 Tmax: 5°C ... 85°C (heating regime)  
 Tmin: 5°C ... 85°C (cooling regime)  
**Temperature difference setting:** 0K ... 15K  
**Hysteresis of thermostat:** 1K-2K  
**Temperature of ambient:** 0°C ... 40°C  
**Outputs:** 2 relay outputs: 230V ~, 50Hz, 6(1)A, working contact SPST :  
 - controlling the electric motor actuated ball valve and pump  
 - burner  
**Inputs:** 2 - sensors  
 - BSF1- PVC cable (1,5m long) - DHWT sensor  
 - KF - silicon cable (2m long) - collector's or boiler's sensor  
**Supply voltage:** 230V ~, 50Hz  
**Power consumption:** 4VA  
**Humidity:** 5% - 70% (brez kondenza)  
**Storage temperature:** 0°C-70°C  
 For housing is used material with resistance PTI=175>250  
**Mounting:** on the wall  
**Recommendable cables:**  
 sensors cables: J-Y (St) 1X 2X0,6  
 pump cables: H03VV-F 3x0,75

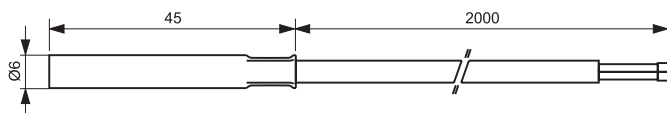
**SENSORS TESTING:**

For testing purposes of working of differential thermostat sensors are simulated with resistors. Values of the resistors are stated in the following table:

Temp. (°C)	R <sub>T</sub> (Ω)	Temp. (°C)	R <sub>T</sub> (Ω)	Temp. (°C)	R <sub>T</sub> (Ω)
-50	1040,51	-5	1578,51	40	2229,63
-45	1094,70	0	1645,27	45	2308,96
-40	1150,29	5	1713,43	50	2389,69
-35	1207,27	10	1782,98	55	2471,81
-30	1265,65	15	1863,93	60	2555,33
-25	1325,43	20	1926,28	65	2640,24
-20	1386,61	25	2000,02	70	2726,56
-15	1449,18	30	2075,16	75	2814,26
-10	1513,14	35	2151,70	80	2903,37

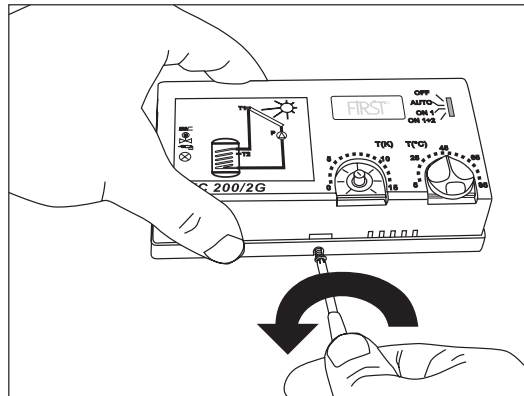
Temp. (°C)	R <sub>T</sub> (Ω)
85	2993,87
90	3085,77
95	3179,07
100	3273,76
105	3369,85
110	3467,33
115	3566,21
120	3666,49
125	3768,16

**SENSOR DIMENSIONS:**

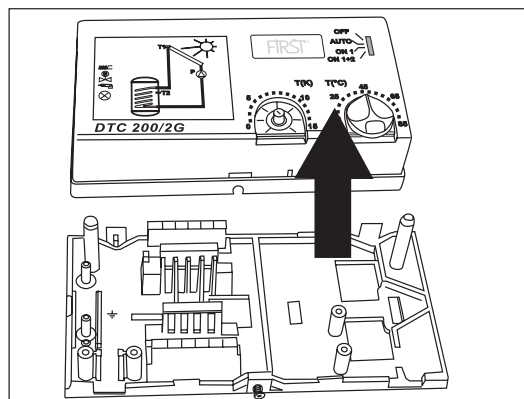


l=1,5m sensor BSF1, PVC, (gray cable) - DHWT sensor  
 l=2m sensor KF, silicon (red cable) - collector's or boiler's sensor

**INSTALLATION OF THERMOSTAT**

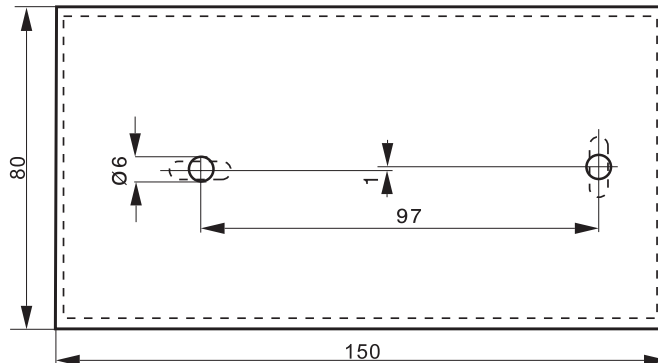


1.) Unscrew the screw from bottom part of thermostat's housing.

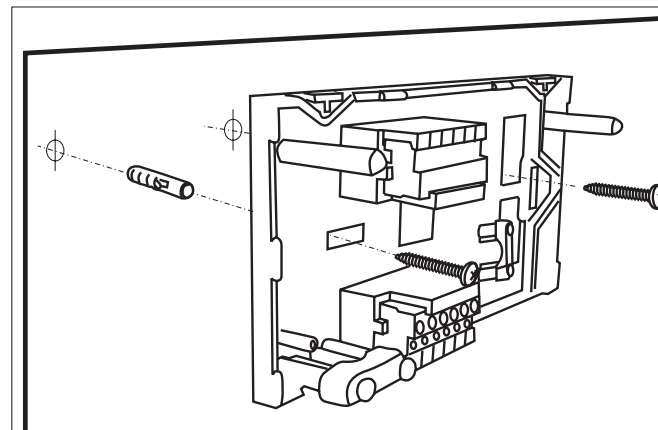


2.) Remove the thermostat's cover.

**Installation of housing bottom on the wall**



With the printable template on the packaging drill two holes (Ø6mm) on the wall.

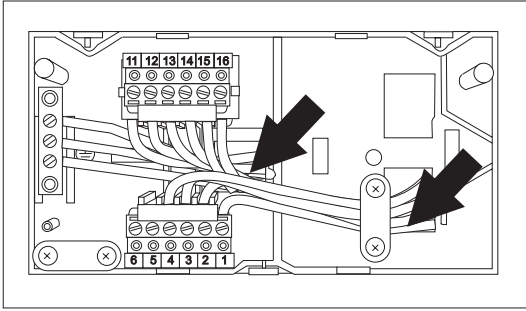


Put the enclosed two wall inserts into drilled holes (Ø6mm) and with two screws mount the housing bottom on the wall. Do not mount the thermostat under water dropping.

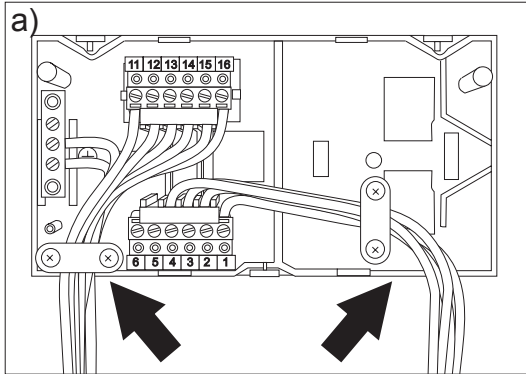
**ELECTRICAL CABLES CONNECTION**

**1. Flush mounted connection**

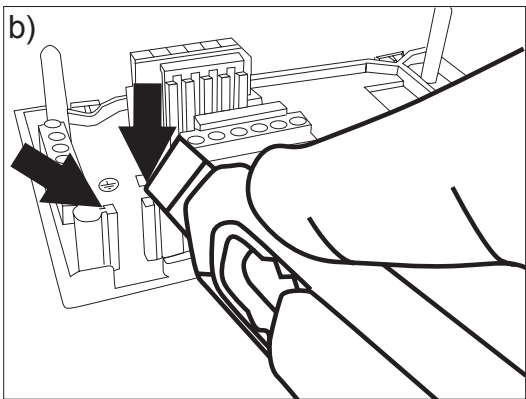
Cables in the wall case lead through the holes in the bottom of thermostat.



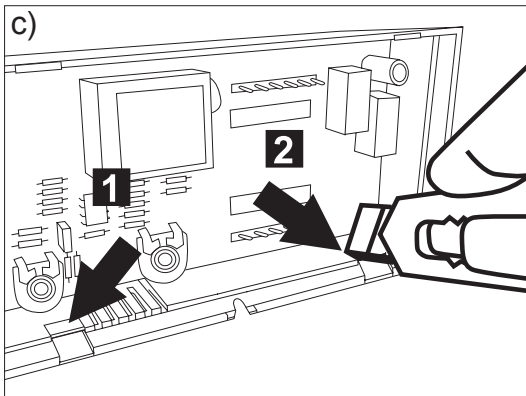
**2. On-wall connection**



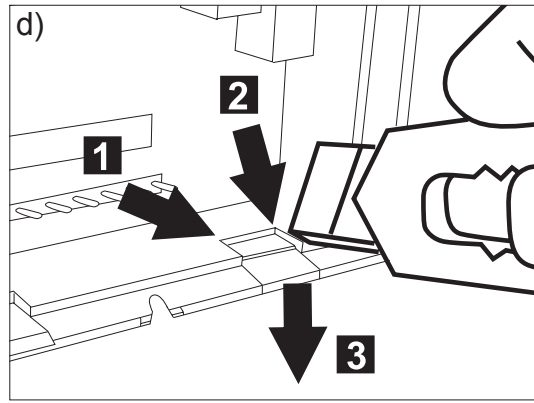
a) Lead cables into the thermostat housing like as shown on the picture. On one side lead the sensor cables and on the other the rest. With two discharger screw the cables very tight to prevent the extraction.



b) If it's not enough space for cables, use the knife and widen the lead.



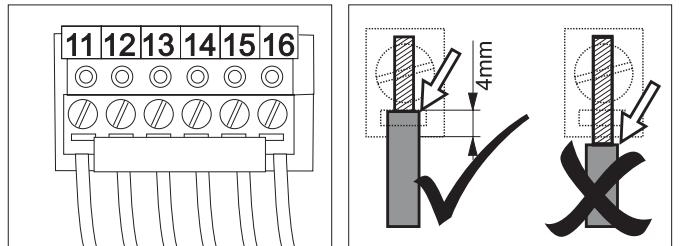
c) Cut the holes for cables lead on the housing cover



d) Use the knife and cut on spots 1 and 2 and brake remain.

**ELECTRICAL CONNECTION:**

⚠ Before each interventions in the thermostat first disconnect the main power!



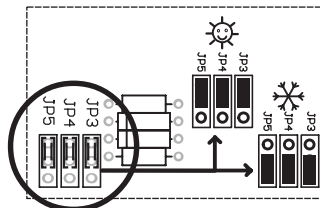
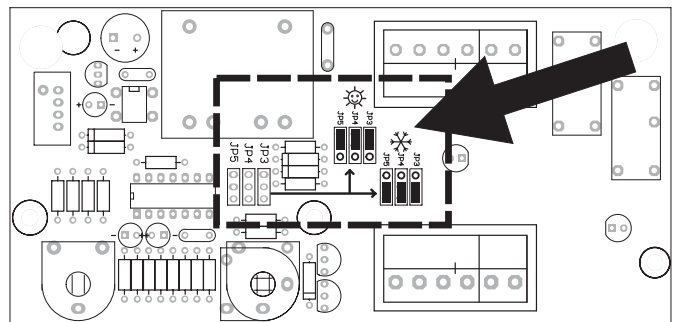
**Non-isolated part of the conductor must be in the terminal housing!**

**CHOOSING WORKING REGIME**

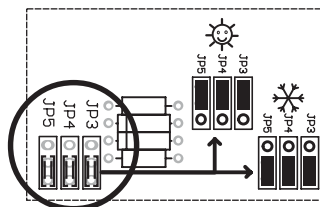
Before first use the working regime must be selected. It is set by jumpers on the electronic circuit.

Differential thermostat can be used for:

- Heating sanitary water with possibility to control the burner.
- Cooling living space with blowing the cool outside air into the living space



If it's used for heating, the jumpers must be in position "sun" (factory settings)



If it's used for cooling, the jumpers must be in the position "snowflake"

# 1. HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH CONTROLLING THE HEATING SOURCE (BURNER).

## 1.1 BASICS

Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump. If it necessary turns ON or OFF the heating source (burner).

### The thermostat enables setting of two parameters:

1. Regulation of maximum temperature in hot water tank from 5° to 85°C. This temperature is defined by T2 sensor witch is generally mounted in upper third of heat exchanger.

### 2. Regulation of difference for exchanger from 0K to 15K.

With these regulation you define how much the value of the source temperature (collector, boiler,...) should exceed the temperature of water around the exchanger in hot water tank, that the thermostat opens the valve and activates the pump. The difference is set in relation to the volume of heat losses of the system which depend on lengths of pipelines from source to hot water tank and on pipeline insulation.

## 1.2 OPERATION

DTC 200/2G single differential thermostat measures the temperature of heating source (collectors, boiler, ...) and in user (hot water tank).

Heating effect is provided, when heating source temperature is higher than the temperature of the user (water in hot water tank). Consequently minimum difference should be 3K-5K. Recommendable minimal value is 5K.

When the temperature of the source exceeds the temperature around the user for pre-set difference opens the electric motor actuated ball valve and switches the pump.

The thermostat switches off the pump if pre-set temperature is reached in hot water tank (adjustable from 5° to 85°C).

If it's need for heating the hot water tank and the temperature of heating source (boiler) is to low, then thermostat switch on the burner of the boiler and when the conditions of the difference is assured, pump is switch on.

The burner is always on, when the heating is needed.

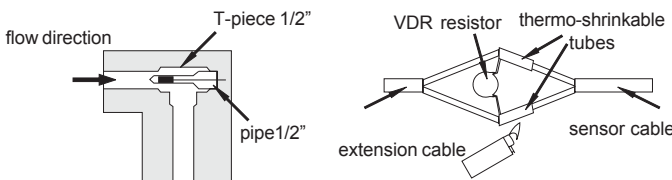
## 1.3 SENSOR INSTALLATION

### T1 SENSOR'S INSTALLATION INTO SOLAR COLLECTOR OR BOILER:

**Use KF sensors with silicon cable insulation (RED colour)!**

Install it as immersion sensor in collecting pipe at the top of the collectors or boiler in provided sleeve. Sensor connect on the terminals 1 and 2. Use the cable J-Y (St) 1X 2X0,6.

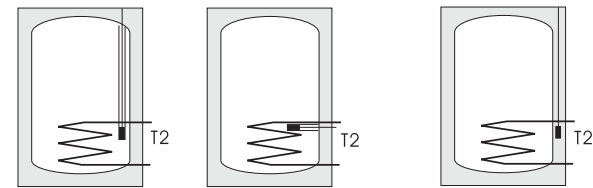
For cables longer than 15m we recommend over-voltage protection with VDR resistor. For over voltage protection is recommended use of armoured cable and it must be earthing.



### T2 SENSOR'S INSTALLATION INTO DOMESTIC HOT WATER TANK (DHWT):

**Use BSF1 sensors with PVC cable insulation (GRAY colour)!**

Install T2 sensor to provided place in hot water tank or on hot water tank wall under isolation as contact sensor in upper part of exchanger. When sensor is mounted as contact one we recommend to coat it with heat conducting paste or liquid metal.



In special purpose vertical or horizontal tube (sensor should be protected against accidental extraction).

On hot water tank with clip, wire and spring strip (use paste for better heat transmission).

### WARNING!

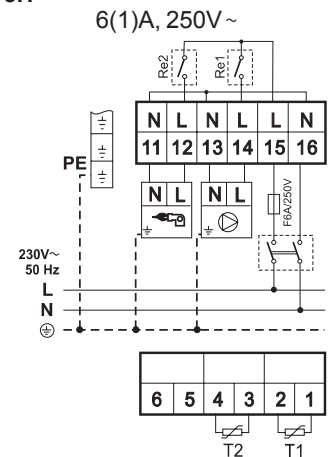
**At mounting protect sensors against ambient influence and assure suitable mechanical protection.**

## ELECTRIC CONNECTION

**Before each intervention in the thermostat first disconnect the main power!**

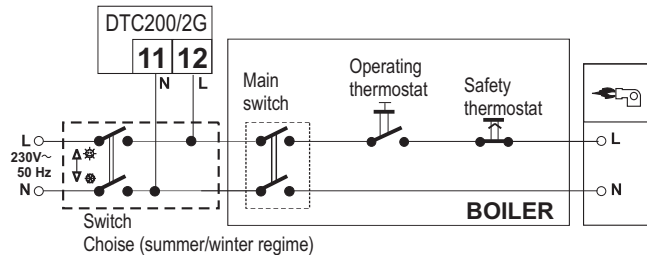
Grounding wires should be connected to special terminal pins situated on left side of terminal strips.

The thermostat is designed for fixed installation. When performing electric installation, an element should be inserted which enables at least 3 mm separation of thermostat from the mains (switch or socket). Prior to each intervention in the thermostat, first disconnect it from the mains.



TERMINAL	CONNECTION
1,2	sensor T1 - heating source (collector, boiler...)
3,4	sensor T2 - hot water tank
11	N - neutral - burner
12	L - phase - burner, 6(1)A, 250V ~, 50Hz
13	N - neutral pump
14	L - phase - pump 6(1)A, 250V ~, 50Hz
15	L - phase mains 230V ~, 50Hz
16	N - neutral mains 230V ~, 50Hz

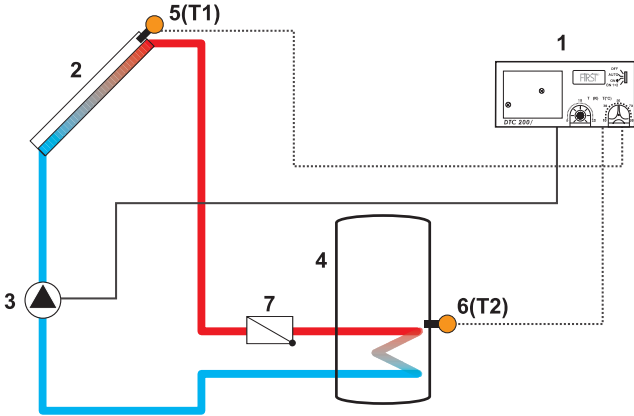
## BURNER control



**1.5 EXAMPLES OF USE**

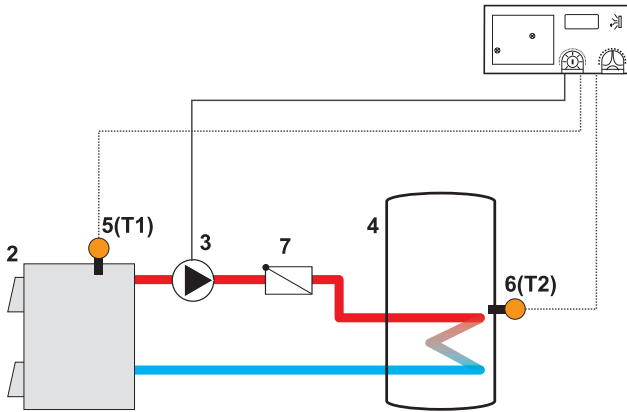
**example: 1**

Heating sanitary water with solar collectors.

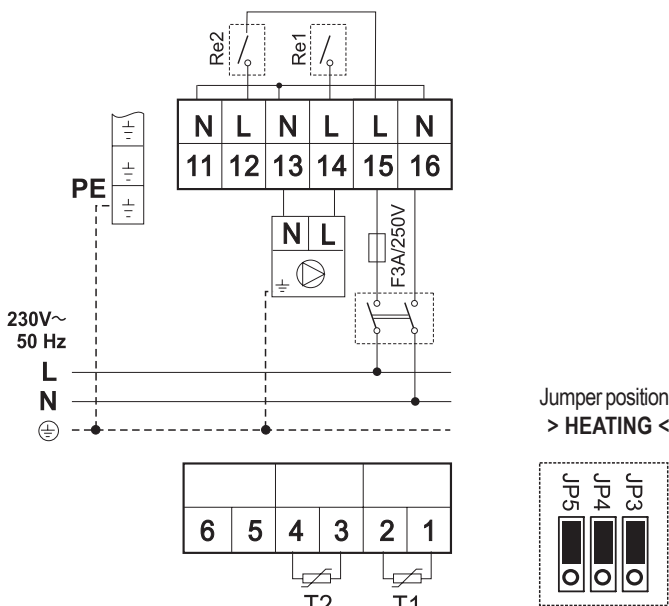


**example: 2**

Heating sanitary water with solid fuel boiler.

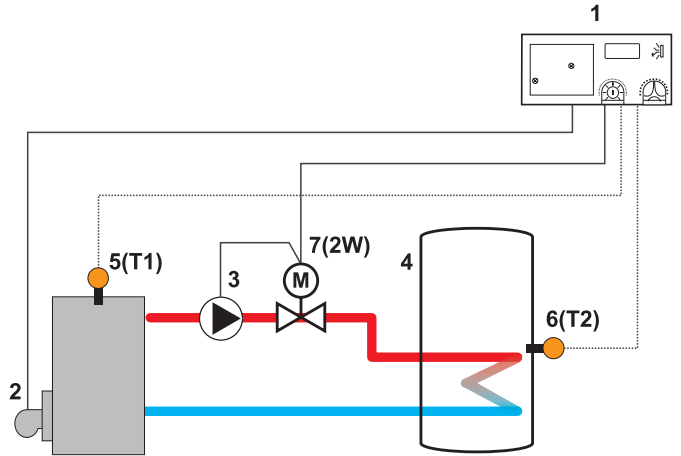


**Electric connection for examples 1 and 2**

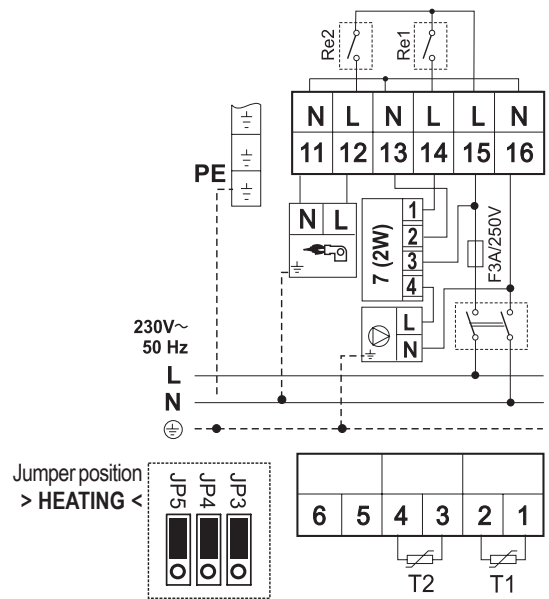


**example: 3**

Heating sanitary water with oil or gas burner.

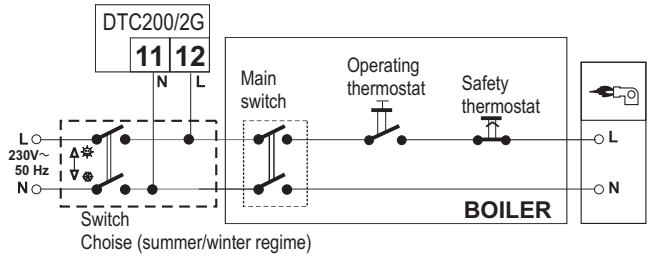


**Electric connection for example 3**



7 (2W) - Electric motor actuated ball valve  
EMV 110..series 602, 502

**BURNER control**





## 2. HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH ADDITIONAL HEATING WITH ELECTRICAL HEATER.

Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump. In case that the primary heating source (solar collectors, boilers...) has not enough energy, water in water tank is after-heated with electrical heater.

### 2.1 BASICS

The thermostat enables setting two parameters:

#### 1. Regulation of maximum temperature in hot water tank from 5° to 85°C.

This temperature is defined by T2 sensor which is generally mounted in upper third of heat exchanger.

#### 2. Regulation of difference for exchanger from 0K to 15K.

With these regulation you define how much the value of the source temperature (collector, boiler,...) should exceed the temperature of water around the exchanger in hot water tank, that the thermostat opens the valve and activates the pump.

The difference is set in relation to the volume of heat losses of the system which depend on lengths of pipelines from source to hot water tank and on pipeline insulation.

### 2.2 OPERATION

DTC 200/2G single differential thermostat measures the temperature of heating source (collectors, boiler, ...) and in user (hot water tank).

Heating effect is provided, when heating source temperature is higher than the temperature of the user (water in hot water tank). Consequently minimum difference should be 3K-5K. Recommendable minimal value is 5K.

When the temperature of the source exceeds the temperature around the user for pre-set difference opens the electric motor actuated ball valve and switches the pump.

The thermostat switches off the pump if pre-set temperature is reached in hot water tank (adjustable from 5° to 85°C).

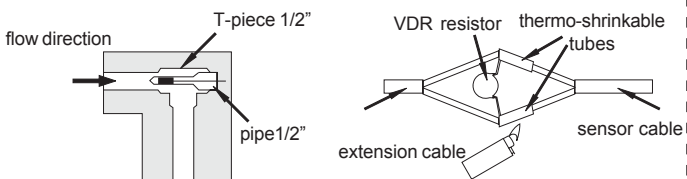
If it's need for heating the hot water tank and the temperature of heating source (boiler) is too low, then thermostat switch on electrical heater. Electrical heater after-heats water to desire temperature.

Electrical heater is active, when the primary heating source is inactive - they never work at same time. Priority has main heating source (collector, boiler, ...).

### 2.3 SENSORS INSTALLATION

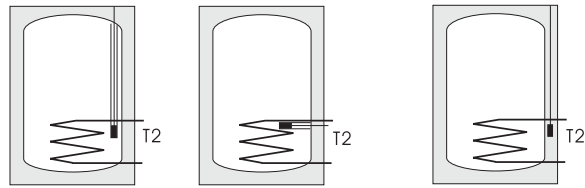
Install it as immersion sensor in collecting pipe at the top of the collectors or boiler in provided sleeve. Connect sensor on the terminals 1 and 2. Use the cable J-Y (St) 1X 2X0,6.

For cables longer than 15m we recommend over-voltage protection with VDR resistor. For over voltage protection is recommended use of armoured cable and it must be earthed.



### SENSORS INSTALLATION IN HOT WATER TANK:

Install T2 sensor to provided place in hot water tank or on hot water tank wall under isolation as contact sensor in upper part of exchanger. When sensor is mounted as contact one we recommend to coat it with heat conducting paste or liquid metal.



In special purpose vertical or horizontal tube (sensor should be protected against accidental extraction).

On hot water tank with clip, wire and spring strip (use paste for better heat transmission).

### WARNING!

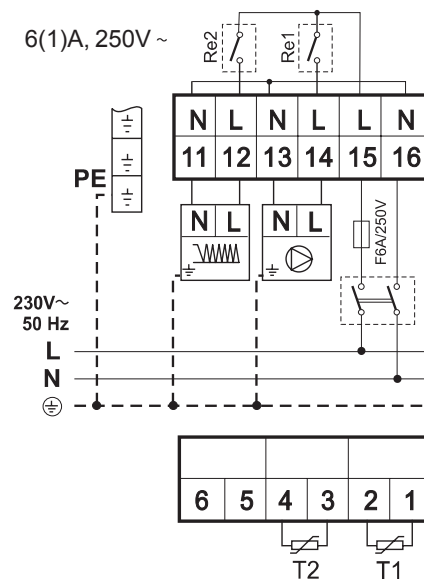
At mounting protect sensors against atmosphere influence and assure suitable mechanical protection.

### ELECTRIC CONNECTION

⚠ Before each intervention in the thermostat first disconnect the main power!

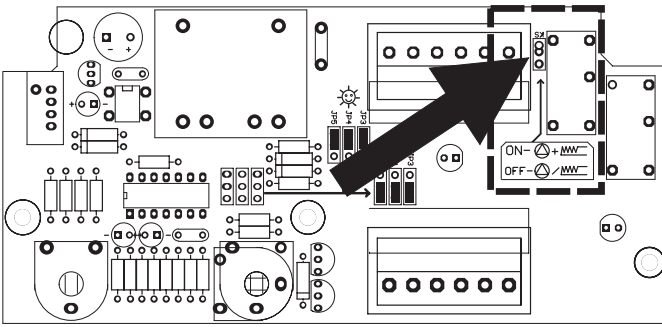
Grounding wires should be connected to special terminal pins situated on left side of terminal strips.

⚠ The thermostat is designed for fixed installation. When performing electric installation, an element should be inserted which enables at least 3 mm separation of thermostat from the mains (switch or socket). Prior to each intervention in the thermostat, first disconnect it from the mains.

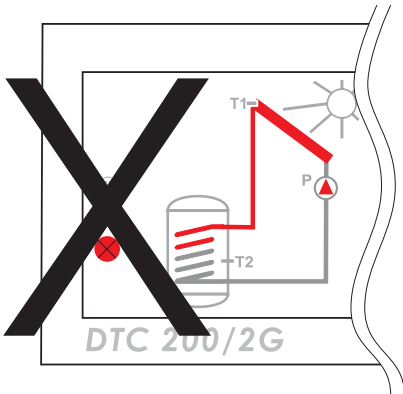


TERMINAL	CONNECTION
1,2	sensor T1 - heating source (collector, boiler...)
3,4	sensor T2 - hot water tank
11	N - neutral - el. heater
12	L - phase - el. heater, 6(1)A, 250V~, 50Hz
13	N - neutral pump
14	L - phase - pump 6(1)A, 250V~, 50Hz
15	L - phase mains 230V~, 50Hz
16	N - neutral mains 230V~, 50Hz

For this way of use, you have to cut jumper, which is shown on lower picture.



This action causes activity for only one heating source. They never work at the same time. Priority has pump for solar heating. If there is not enough solar energy, el. heater heats water.



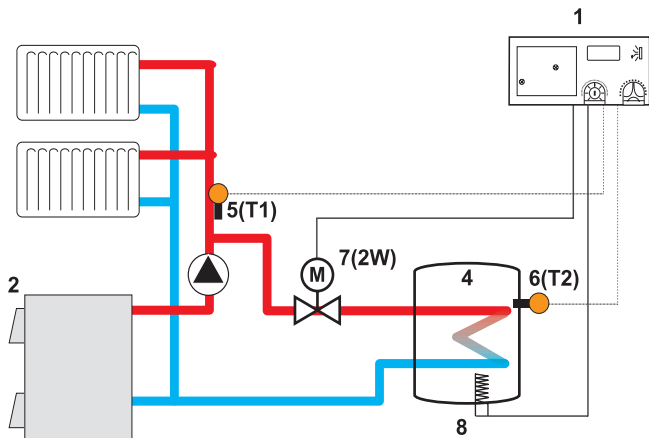
**WARNING:**

In this way of use, the LED indicator does not show working of el. heater. It shows only need for heating sanitary water.

**2.5 EXAMPLES OF USE**

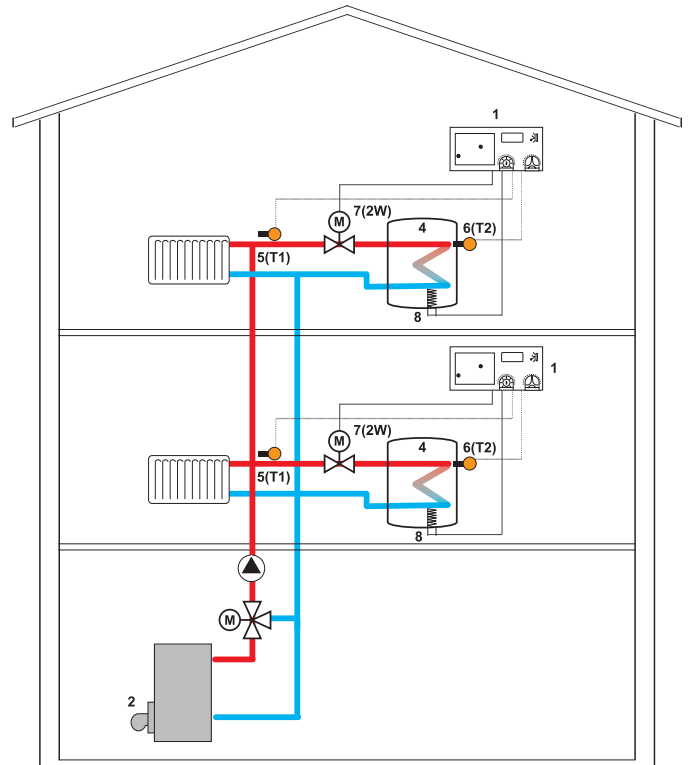
**example: 4**

Heating water with solid fuel boiler. When there is not enough energy, the water in storage tank is after-heated by el. heater.

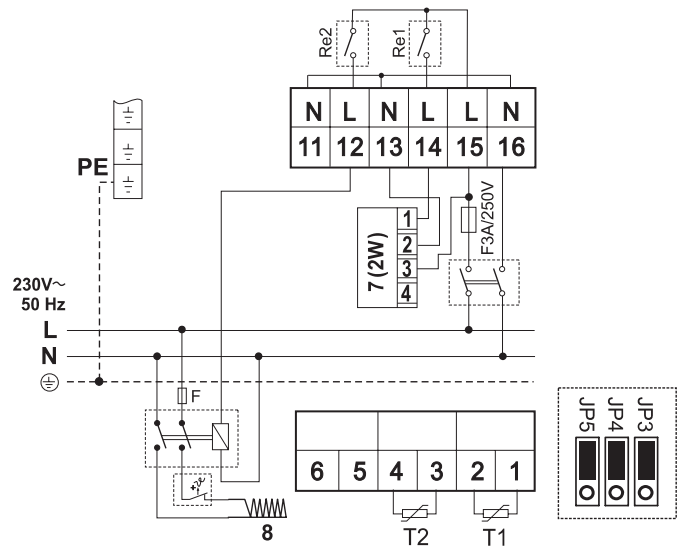


**example: 5**

Heating sanitary water by central heating water. When energy of central heating water is too low, the water in storage tank is after-heated by el. heater.



**Electric connection for example 4 and 5**



7 (2W) - Electric motor actuated ball valve EMV 110..series 602, 502

Jumper position > HEATING <

### 3. COOLING LIVING SPACE WITH BLOWING THE COOL OUTSIDE AIR INTO THE LIVING SPACE

Differential thermostat controls the ventilator.

#### 3.1 BASICS

The thermostat enables setting two parameters:

##### 1. Regulation of minimum temperature in living space 5° to 85°C.

This temperature is defined by T2 sensor which is generally mounted in reference position in the room.

##### 2. Regulation of difference of outside and inside temperature 0K to 15K.

With this regulation you define how much the value of the source temperature (outside air) should be lower than inside temperature that thermostat switches on the ventilator.

#### 3.2 OPERATION

DTC 200/2G single differential thermostat measures the temperature of outside air and inside air.

Cooling effect is provided, when cooling source temperature is lower than the temperature of inside air. Consequently minimum difference should be 2K.

When the temperature of outside air is below the temperature of inside air the ventilator switches on.

The thermostat switches off the ventilator if pre-set minimum temperature is reached (adjustable from 5° to 85°C).

#### 3.3 SENSORS INSTALLATION

##### Installation of outside sensor T1

Install it next to entrance of suction opening of the ventilator or next to entrance of suction channel.

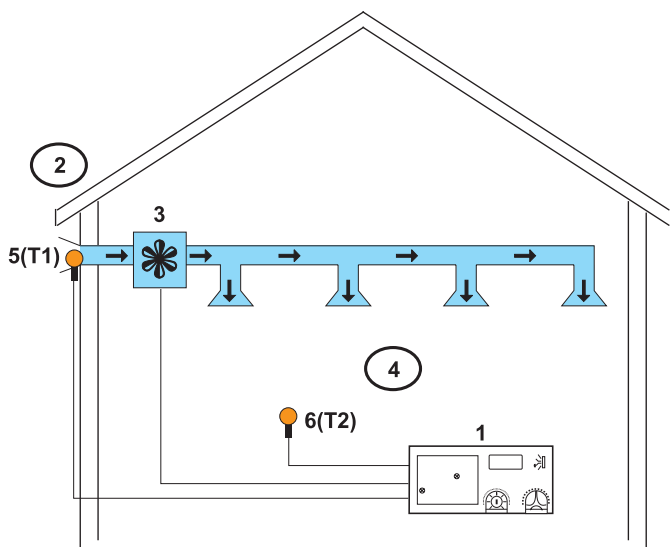
##### Installation of inside sensor T2

Install it on desired height, approximately on the centre in the room space at least 0,5m from the ceiling. If not install correctly the sensor will not detect real room temperature.

#### 3.4 EXAMPLES OF USE

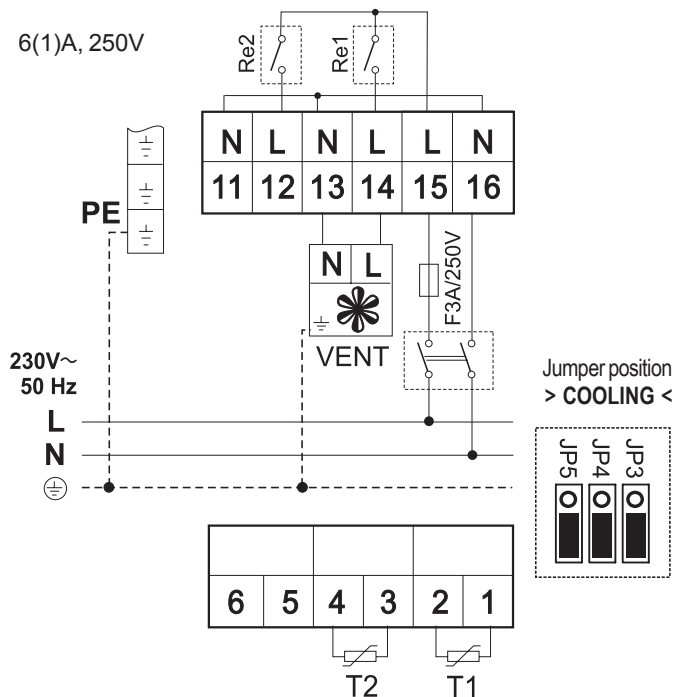
##### example: 6

Cooling living space with blowing the cool outside air into the living space



#### 3.5 ELECTRIC CONNECTION

⚠ Before each interventions in the thermostat first disconnect the main power!



Grounding wires should be connected to special terminal pins situated on left side of terminal strips.

⚠ The thermostat is designed for fixed installation. When performing electric installation, an element should be inserted which enables at least 3 mm separation of thermostat from the mains (switch or socket). Prior to each intervention in the thermostat, first disconnect it from the mains.

TERMINAL	CONNECTION
1,2	sensor T1 - cooling source (outside air)
3,4	sensor T2 - ambient
11	N - neutral - not in the function
12	L - phase - not in the function
13	N - neutral - ventilator
14	L - phase - ventilator 6(1)A, 250V~, 50Hz
15	L - phase mains 230V~, 50Hz
16	N - neutral mains 230V~, 50Hz