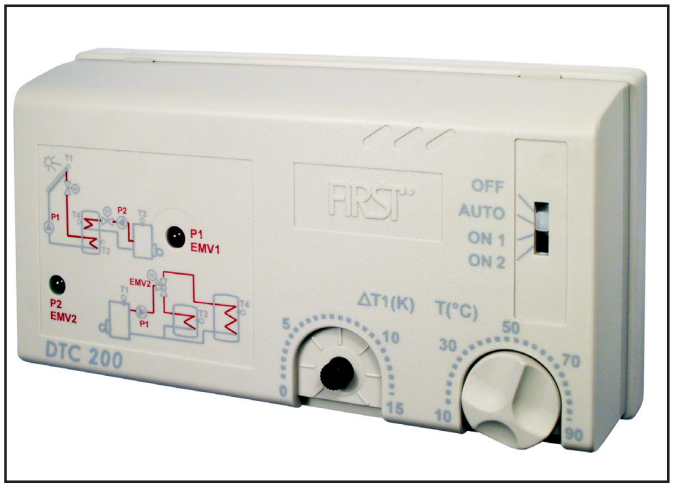
INSTALLATION INSTRUCTIONS

DTC 200

DTC 200 is a double differential thermostat used for domestic hot water heating.



⚠ 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**

DTC200/4 13020
The set consists of:
Differential thermostat DTC 200, 2 x sensor BSF1, 2 x sensor KF, 2 x mounting kit, installation instructions and instruction for use

DTC200 13018
The set consist of:
Differential thermostat DTC 200, installation instructions and instruction for use

Sensor BSF1 27072
KTY 10-6 PVC (1,5m), max 70°C

Sensor KF 27073
KTY 10-6 SILICON (2m), max 180°C

Mounting kit 27089

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

WITH DIFFERENTIAL THERMOSTAT ARE THREE POSSIBLE WAY OF USE:

SYSTEM 1 (two sensors)
Heating the domestic hot water from one heating source (solar collectors, boilers, heat pump...) with controlling the heating source (burner).

SYSTEM 2 (three sensors)
Heating the domestic hot water from one heating source (solar collectors, boilers, heat pump...) in:
- two water tank
- one hot water tank with two exchanger
- water tank and swimming pool

SYSTEM 3 (four sensors)
Heating the domestic hot water from two heating sources (collector, boiler, …) in one water tank.

INDEX:

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

P7-3703-08-DTC200-english-montaza

Technical data: DTC 200

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
Limitation of temperature (depends of working regime):
Tmax: 10°C ... 90°C
Temperature difference setting for primary heating circuit:
0K ... 15K
Temperature difference setting for secondary heating circuit:
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
Inputs: 4 - sensors
- BSF1- PVC cable (1,5m long) - DHWT sensor
- KF - silicon cable (2m long) - collector's and boiler's sensors

Supply voltage: 230V , 50Hz
Power consumption: 4VA
Humidity: 5% - 70% (without condense)
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 or electric motors ball valve's cables: H03VV-F 3x0,75

SENSORS TESTING:

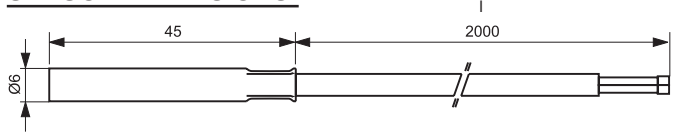
For testing purposes of working of differential thermostat sensors are simulated with resistors. Values of the resistors are stated in the following table:

Temp. (°C)	R_T (Ω)	Temp. (°C)	R_T (Ω)	Temp. (°C)	R_T (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_T (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

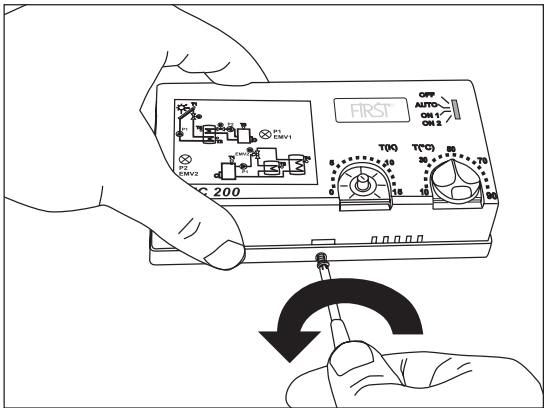
Do nepravilnega delovanja termostata pride v primerih, ko pride kratkega stika ali prekinitve kabla tipal (glej tabelo možnih okvar v navodilih za uporabnika).

SENSOR DIMENSIONS:

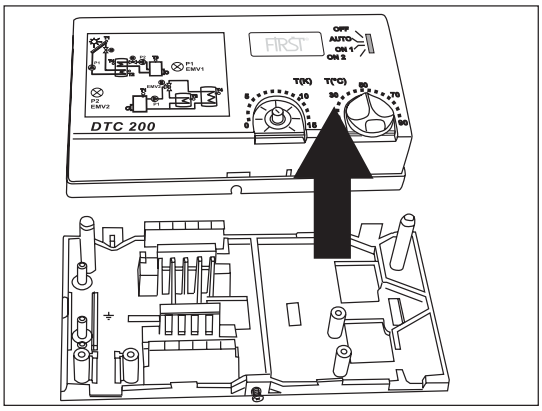


l=1,5m sensor BSF1, PVC, (grey cable) - DHWT
l=2m sensor KF, silicon (red cable) - collector, boiler

INSTALLATION OF THERMOSTAT

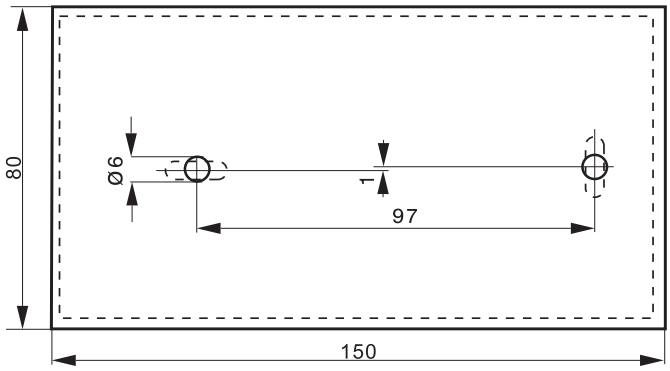


1.) Unscrew the screw from bottom part of thermostat's housing.

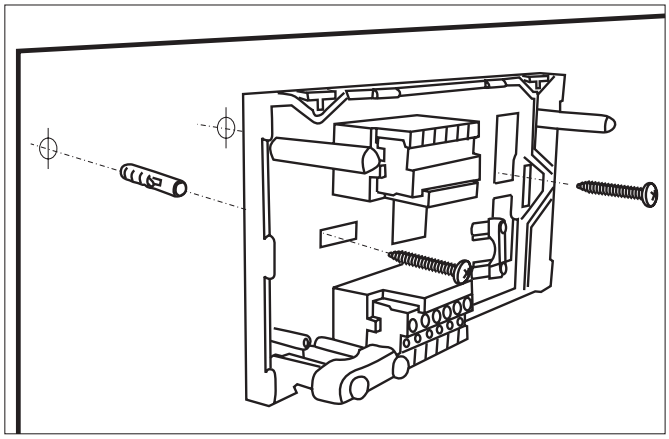


2.) Remove the thermostat's cover.

Installation of housing bottom on the wall



With the printable template on the packaging drill two holes (∅6mm) on the wall.



Put the enclosed two wall inserts into drilled holes (∅6mm) and with two screws mount the housing bottom on the wall. Do not mount the thermostat under water dropping.

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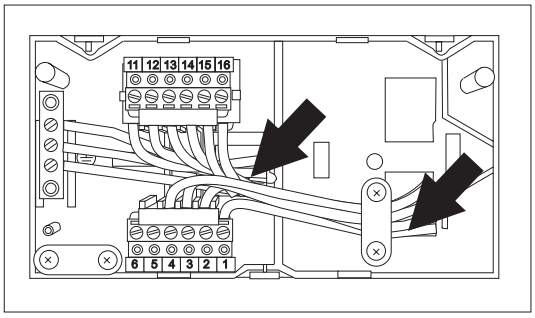
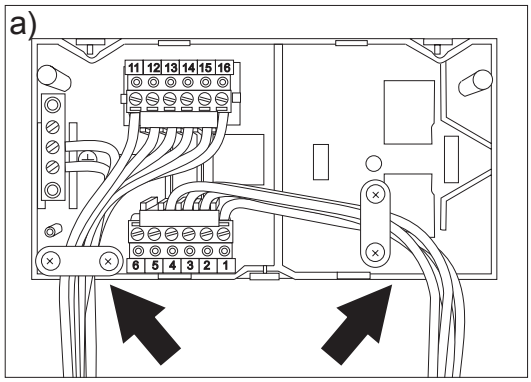
ELECTRICAL CABLES CONNECTION

1. Flush mounted connection

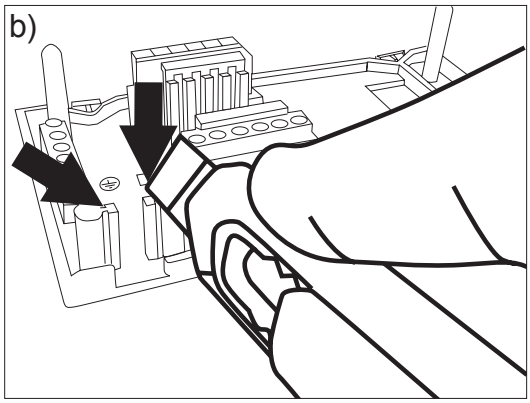
Cables in the wall case lead through the holes at the bottom of thermostat.



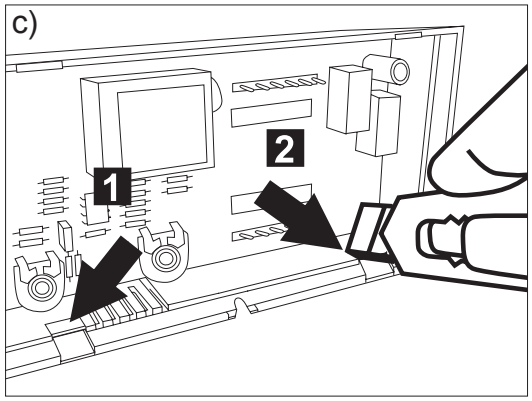
2. On-wall connection



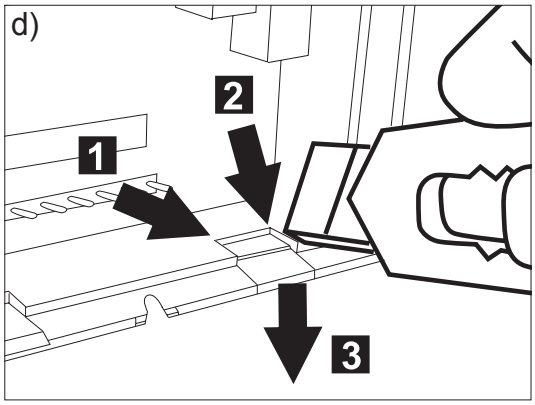
a) Lead cables into the thermostat housing like as shown on the picture. On one side lead the sensor cables and on the other the rest. With two discharger screw the cables very tight to prevent the extraction.



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



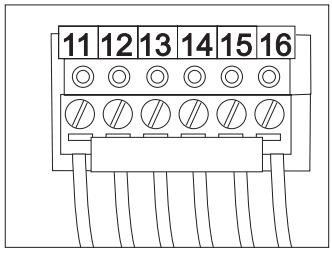
c) Cut the holes for cables lead on the housing cover

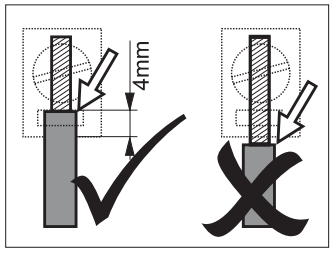


d) Use the knife and cut on spots 1 and 2 and brake remain.

ELECTRICAL CONNECTION:

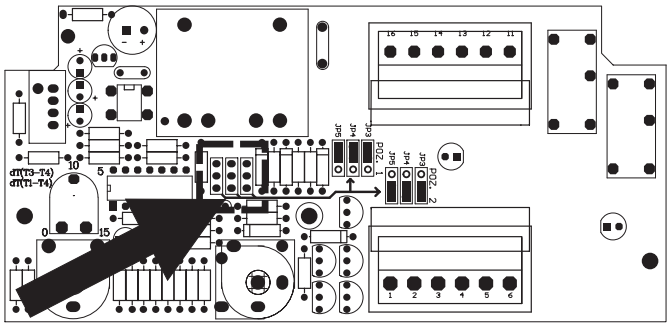
⚠ **Before each interventions in the thermostat first disconnect the main power!**





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

CHOOSING WORKING REGIME



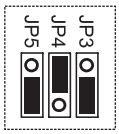
Choosing working regime

Before first of use, the working regime must be selected. It is set by jumpers in the electronic circuit. -

For each application is specific jumper position.

In further by every example is stated jumper's position.

for example:



Possible jumper's settings:

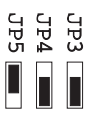
DTC 200 - 2 sensors
one heating circuit

DTC 200 - 3 sensors
two pumps

DTC 200 - 3 sensors
motor diverter valve and pump

DTC 200/4 - 4 sensors
two heating circuits without temperature limitation of collector's circuit

DTC 200/4 - 4 sensors
two heating circuits with temperature limitation of collector's circuit



DTC 200/4 - 4 sensors
two heating circuits collectors east-west

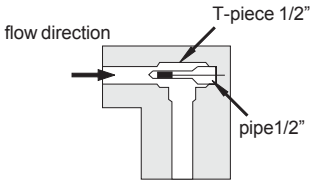
SENSORS INSTALLATION

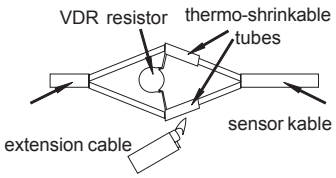
T1 AND T3 SENSORS INSTALLATION IN TO SOLAR COLLECTOR OR BOILER:

⚠ **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. Connect sensors on the terminals 1 and 2. Use sensors KF with red silicon cable and use cable type J-Y (St) 1X 2X0,6 for connection.

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.

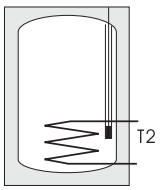




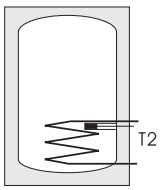
T2 AND T4 SENSORS INSTALLATION IN DOMESTIC HOT WATER TANK (DHWT):

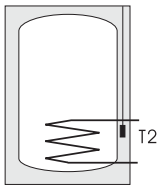
⚠ **Use BSF1 sensors with PVC cable insulation (GRAY colour)!**

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. Use sensors BSF1 with PVC cable.



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 suitabile mechanical protection.

DTC 200/ (2 sensors)

1. Heating the domestic hot water from one heating source (solar collectors, boilers, heat pump...) .

1.1 Basic

Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump.

The thermostat enables setting of two parameters:

1. Regulation of maximum temperature in hot water tank from 10° to 90°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 works as single differential thermostat, which 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.

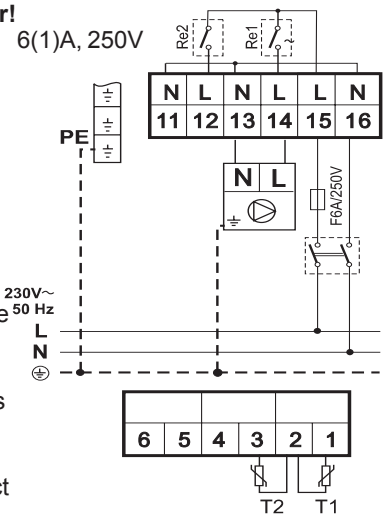
The thermostat switches off the pump if pre-set temperature is reached in hot water tank (adjustable from 10° to 90°C).

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.

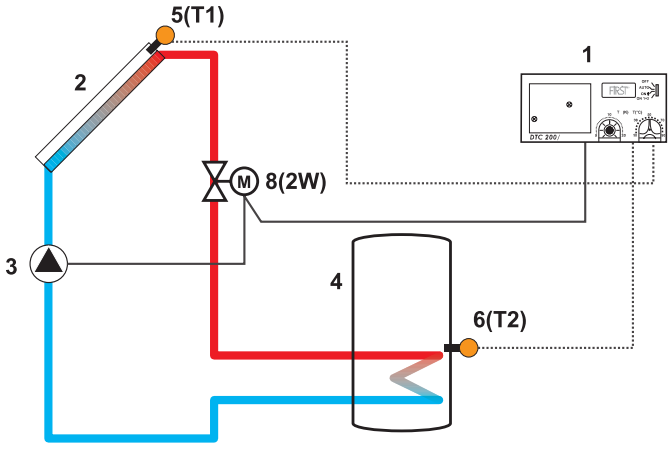


TERMINAL	CONNECTION
1,2	sensorT1 – heating source (collector, boiler, …)
2,3	sensor T2 – hot water tank
11	N – not in use
12	L - not in use
13	N - neutral
14	L - phase - pump 6(1)A, 250V ~, 50Hz
15	L – phase mains 230V ~, 50Hz
16	N – neutral mains 230V ~, 50Hz

1.5 EXAMPLES OF USE

example: 1

Heating sanitary water with solar collectors.



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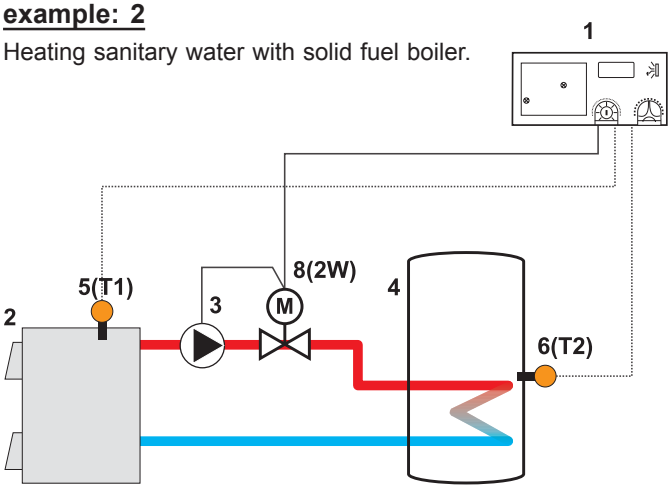
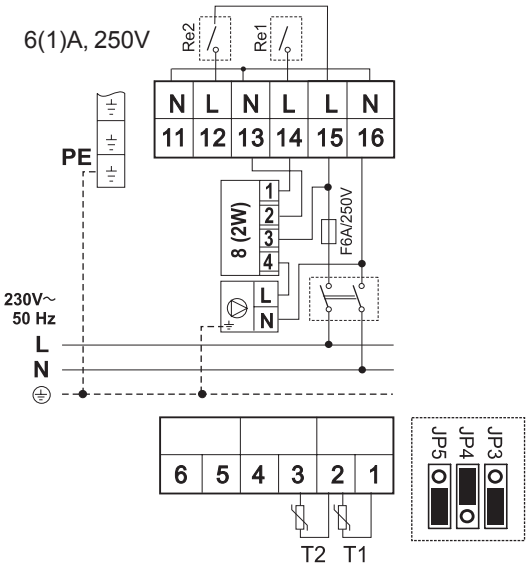
example: 2

Heating sanitary water with solid fuel boiler.



Electric connection for examples 1 and 2



8 (2W) - Electric motor actuated ball valve
EMV 110..series 602, 502

DTC 200 (3 sensors)

2. Heating the domestic hot water from one heating source (solar collectors, boilers, heat pump...) in two water tanks - DTC 200/ (3 sensors).

2.1 Basic

In this case of use is DTC200 in function of double differential thermostat. It is used for heating the domestic hot water in two water tanks from one heating source. This is convenient in cases when one water tank cannot accumulate whole energy from solar collectors. At weakly sunny days is assured enough heated water. Differential thermostat controls circulation pump and changeover motor valve for diverting or two motorised ball valves and two pumps for each water tank.

The thermostat enables setting two parameters:
1. Regulation of maximum temperature in hot water tanks from 10° to 90°C.
This temperature is defined by T2 and T4 sensors witch are generally mounted in upper third of heat exchangers.

2. Regulation of temperature difference between heating source (T1) and exchanger (T2) 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 double differential thermostat measures the temperature of heating source (collectors, boiler, ...) and in two users (hot water tank).
One of users has priority. Usually is smaller water tank or upper exchanger.
When the temperature is achieved, differential thermostat changeover heating to second user - second water tank, lower exchanger, swimming pool …

Differential makes changeover also in following cases:
1. Temperature of water in first water tank is achieved
2. Temperature of water in second water tank is lower than preset temperature

When the temperature in both water tanks is achieved, the pump is switch off.

The thermostat switches off the pump if pre-set temperature is reached in both hot water tanks (adjustable from 10° to 90°C).

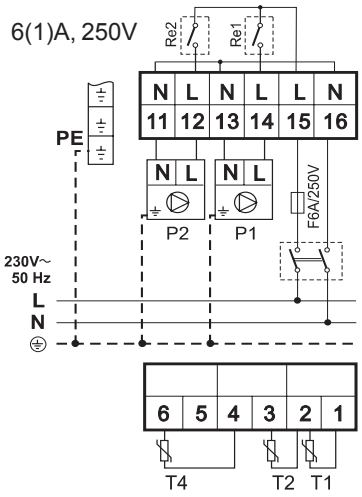
For this way of use you need three sensors (T1, T2 and T4). One is mounted in solar collector other two in upper third of individual exchangers in hot water tanks.
Sensors T1 and T2 are designed for controlling first heating circuit, which heats water in smaller water tank.
Sensors T1 and T4 are designed for controlling secondary heating circuit, which heats water in larger water tank or swimming pool.
Sensor T1 is collector's sensor.

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.

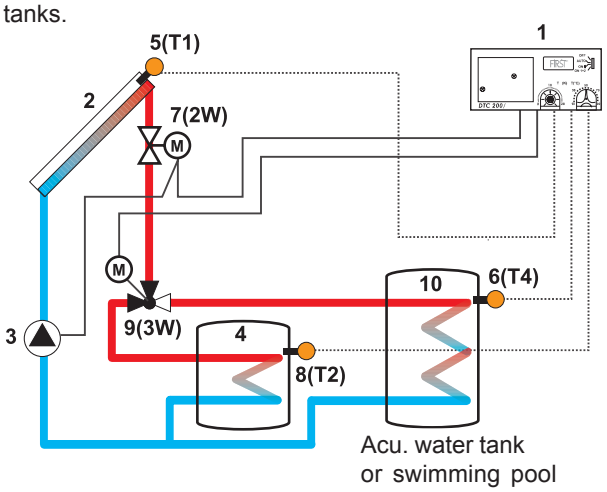


TERMINAL	CONNECTION
1,2	sensorT1 – heating source (collector, boiler, …)
2,3	sensor T2 – primary hot water tank
4,6	sensor T4 – secondary hot water tank
11	N - neutral
12	L - phase – secondary heating circuit 6(1)A, 250V ~, 50Hz
13	N - neutral
14	L - phase – primary heating circuit 6(1)A, 250V ~, 50Hz
15	L – phase mains 230V ~, 50Hz
16	N – neutral mains 230V ~, 50Hz

2.4 EXAMPLES OF USE

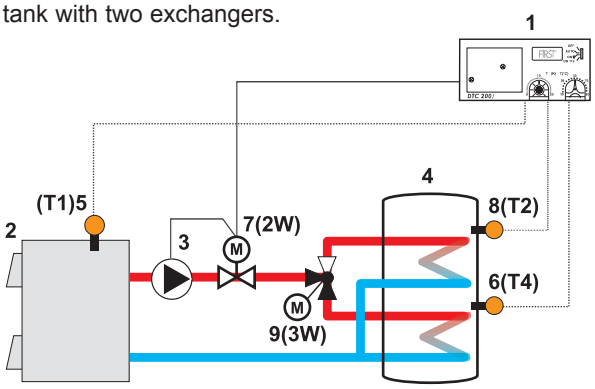
example: 3

Heating sanitary water with solar collectors into two hot water tanks.

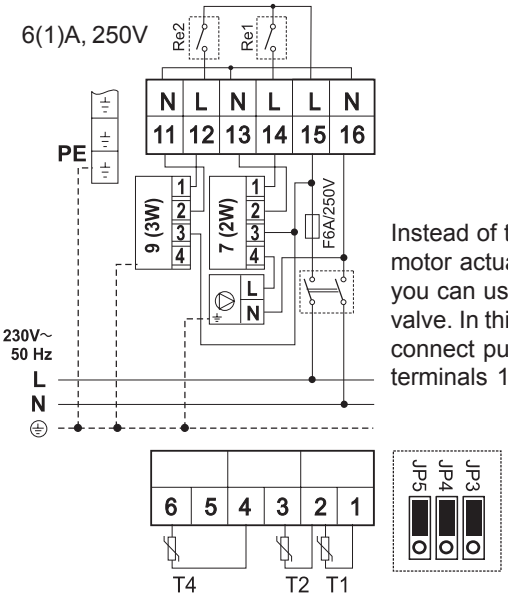


example: 4

Heating sanitary water with solid fuel boiler into one hot water tank with two exchangers.



Electri connection for examples 3 and 4

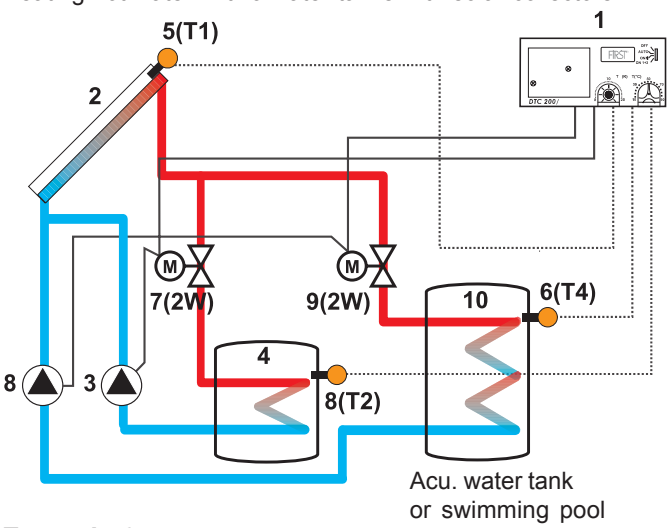


Instead of the electric motor actuated ball valve you can use non-return valve. In this case connect pump directly on terminals 13 and 14.

7 (2W) - Electric motor actuated ball valve
EMV 110 series 602, 502
9 (3W) - Electric motor diverter valve
EMV 110 316
ROTODIVERT

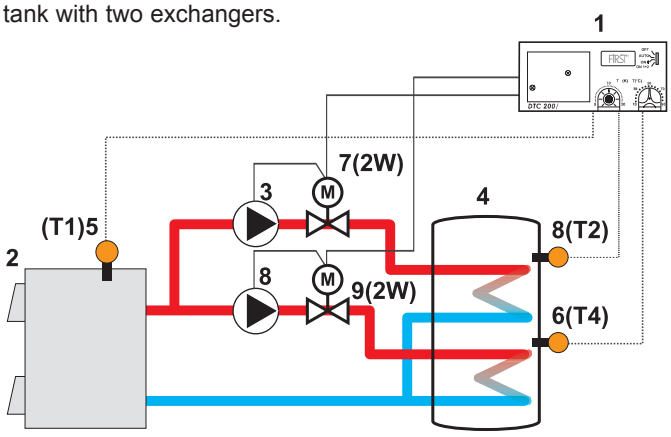
Example 5

Heating hot water in two water tanks with solar collectors.

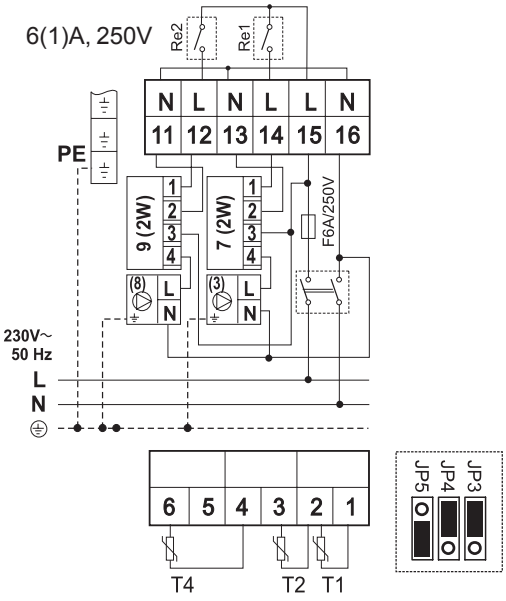


Example 6

Heating sanitary water with solid fuel boiler into one hot water tank with two exchangers.



Electric connection for examples 5 and 6



7 (2W) - Electric motor actuated ball valve
EMV 110 series 602, 502
9 (2W) - Electric motor actuated ball valve
EMV 110 series 602, 502

Instead of the electric motor actuated ball valves 7 and 9 you can use non-return valves. In this case connect pumps directly on terminals 11-12 and 13-14.

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DTC 200 (4 sensors)

3. Heating the domestic hot water from two heating sources (solar collectors, boilers, heat pump...) in one water tank - DTC 200 (4 sensors).

In this case of use is DTC200 in function of double differential thermostat. It is used for heating the domestic hot water in one water tanks from two heating sources (collector-boiler or collectors east-west). Differential thermostat controls motorised ball valves and pump for each heating circuit.

3.1 Basics

The thermostat enables setting two parameters:
1. Regulation of maximum temperature in hot water tanks from 10° to 90°C.
This temperature is defined by T2 and T4 sensors witch are generally mounted in upper third of heat exchangers.
2. Regulation of temperature difference between primary heating source (T1) and exchanger (T2) from 0K to 15K.
3. Regulation of temperature difference between secondary heating source (T3) and exchanger (T4) from 0K to 15K.

With these regulations 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 that depend on lengths of pipelines from source to hot water tank and on pipeline insulation.

3.2 Operation

DTC 200 is double differential thermostat measures the temperature of two heating sources (collectors, boilers,…) and of two spots in user (hot water tank). Heating effect is provided, when heating unit(heating element in hot water tank) exceeds the temperature of the user for set difference.
When the temperature of the source exceeds the temperature around the exchanger for set difference, the thermostat opens the valve (EMV110..) and activates the pump.
Thermostat closes the valve and switch of pump, when temperature difference is lower than pre-set value. Thermostat also switches off a pump if pre-set temperature is reached in hot water tank.
When pump operates for primary heating circuit (collectors), operation of after-heating circuit is prevented. This assures maximum energy savings during seasons and this also the main role of solar systems.

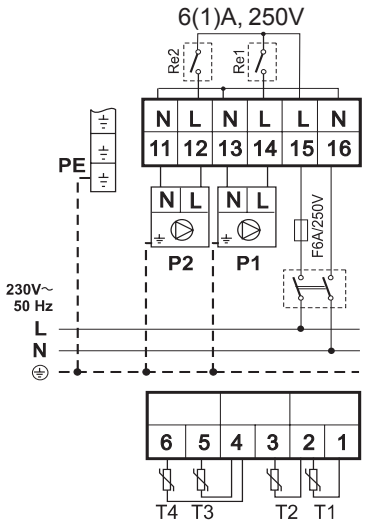
For those applications you need four sensors. Two of them are mounted into individual heating sources and two into upper half of individual exchangers in hot water tank. T1 and T2 are designed for primary (main) heating circuit which heats entire quantity of water in hot water tank (lower exchanger), where T1 is a sensor of heating source (generally collectors) and T2 is a sensor in lower part of hot water tank. T3 and T4 are designed for additional, i.e. after-heating circuit which additionally heats water in hot water tank (upper exchanger). T3 is a sensor of heating source (generally boiler) and T4 is a sensor in upper part of hot water tank.

3.3 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.

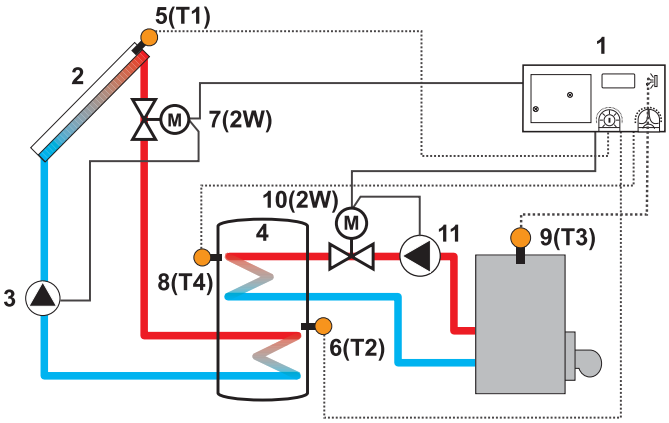


TERMINAL	CONNECTION
1,2	sensorT1 – primary heating source (collector, solid fuel boiler, …)
2,3	sensor T2 –hot water tank
4,5	Sensor T3 – secondary heating source (boiler,…)
4,6	sensor T4 – secondary hot water tank
11	N - neutral
12	L - phase – pump for primary circuit
13	N - neutral
14	L - phase – pump for secondary circuit
15	L – phase mains 230V ~, 50Hz
16	N – neutral mains 230V~ , 50Hz

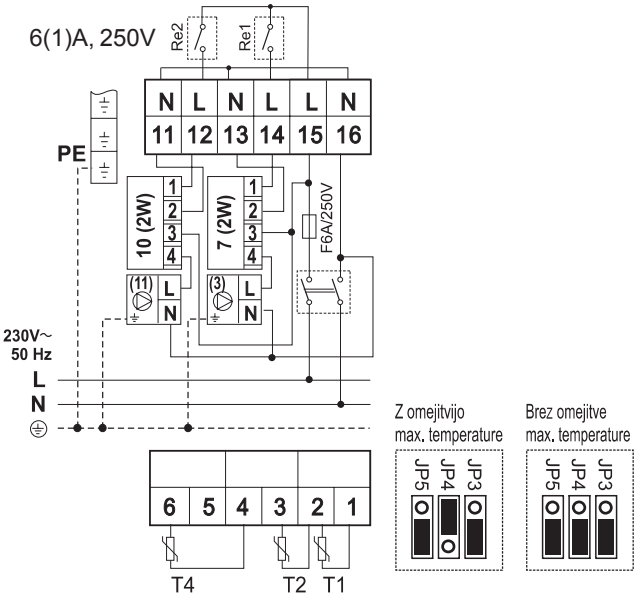
3.4 Examples of use

example 7

Heating sanitary water in one water tank with two exchangers with solar collectors and boiler.



Electric connection:

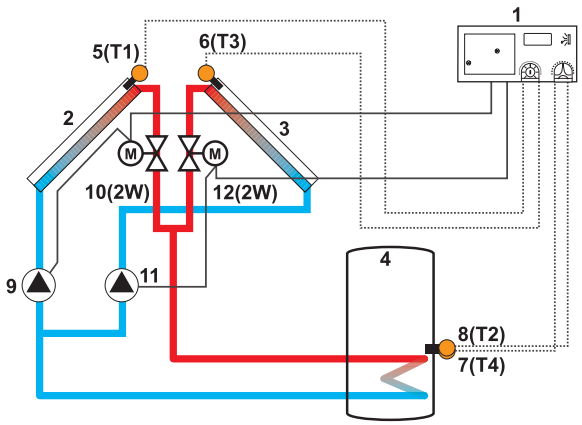


7 (2W) - Electric motor actuated ball valve
EMV 110 series 602, 502
10 (2W) Electric motor actuated ball valve
EMV 110 series 602, 502

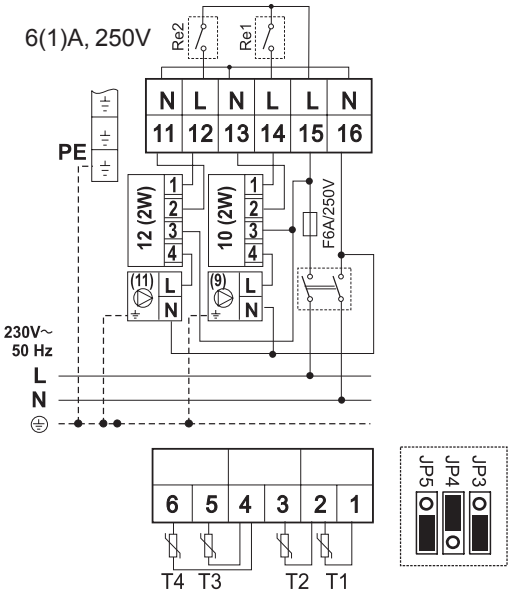
Instead of the electric motor actuated ball valves 7 and 10 you can use non-return valves. In this case connect pumps directly on terminals 11-12 and 13-14.

example 8

Heating sanitary water with collectors (east - west)



Electric connection:



10 (2W) - Electric motor actuated ball valve
EMV 110 series 602, 502
12 (2W) - Electric motor actuated ball valve
EMV 110 series 602, 502

Instead of the electric motor actuated ball valves 10 and 12 you can use non-return valves. In this case connect pumps directly on terminals 11-12 and 13-14.

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