

**WEATHER COMPENSATOR  
FOR CONTROL OF VALVE OR BURNER**



**RTE 97 Eng.**

- Power supply 230 V ac
- Control of flow temperature in relation to outside temperature.
- PI control action
- One modulating output for control of valve with reversible actuator or On-Off for control of burner
- One On-Off output for control of pump or burner in relation to programmed times
- Analogue time switch to select Normal and Setback room temperature
- Voltage-free output contacts : rating 250 V, (1) A
- Adjustment of heating curve to compensate for weather variations in intermediate seasons
- Possibility of adjusting value of desired room temperature by remote control

**APPLICATION**

RTE 97 controller is designed for weather compensation in centralized heating plants in medium- and large-size buildings, such as :

- Apartment blocks
- Schools and public buildings
- Commercial and administrative centres

It is suitable for all climatic zones and for any type of heating media : panels, radiators, fan coils.

It controls mixing or diverting valves operated by reversible electric actuators with three-wire control and opening times of from 2 to 60 minutes, or the boiler burner.

**MODELS**

**RTE 972** : with 24-hour time switch

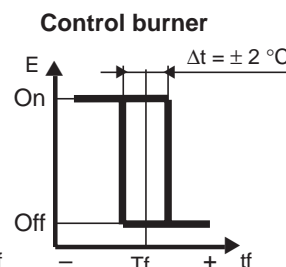
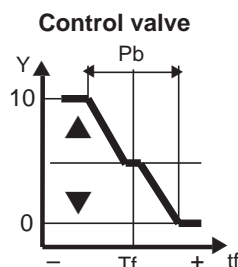
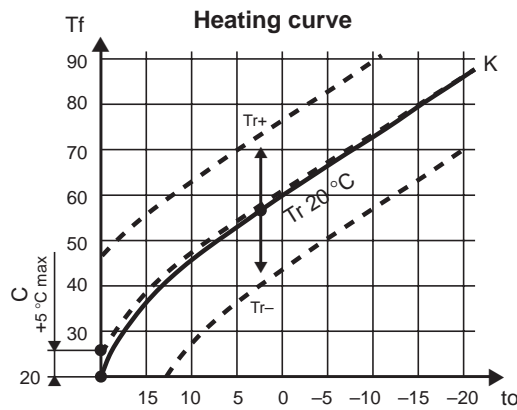
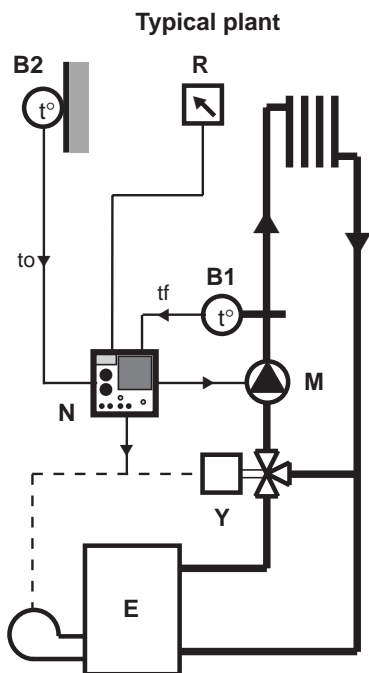
**RTE 973** : with 7-day time switch

**ACCESSORIES**

N°	Description	Type	Sensing element	Code	Data sheet
1	<b>ESSENTIAL ACCESSORIES:</b> Surface plant flow temperature detector or immersion	<b>SCH 100</b>	Ni 100 Ω	B1	N 130
1	Outside temperature detector	<b>SIH 100</b>	Ni 100 Ω	B1	N 140
	<b>OPTIONAL ACCESSORIES:</b>				
1	Remote control	<b>SAE 100</b>	Ni 100 Ω	B2	N 120
		<b>CDB 340</b>	-	R	N 710

**OPERATIONAL DIAGRAM**

fig. 1



- B1 - Flow detector
- B2 - Outside detector
- R - Remote control
- C - Adjustment curve
- E - Boiler
- M - Pump
- N - RTE 97.. controller
- Y - Valve
- 0 - Valve closed
- 10 - Valve open
- Pb - Proportional band
- Δt - On-Off differential
- On - Burner On
- Off - Burner Off
- Tr - Desired room temperature
- to - Actual outside temperature
- tf - Actual flow temperature
- Tf - Desired flow temperature

**OPERATION**

**TEMPERATURE CONTROL**

Detector **B1** measures the flow temperature **tf** and detector **B2** measures the outside temperature **to**.

RTE 97 establishes the desired value of the flow temperature **Tf** in relation to the outside temperature **to** and the heating curve (fig. 5) set by means of the potentiometer **K** (fig. 2.3).

The heating curve set in this way refers to a desired room temperature of 20 °C and can be adjusted by a parallel shift by means of the two values : **Normal "Sun"**(fig. 2.8) and **Setback "Moon"** (fig. 2.7).

In the event of a difference between the actual temperature **tf** and the desired temperature **Tf**, RTE 97 produces a modulating signal with PI control action for the control of valve **Y**, or an On-Off signal for the control of the burner.

The control parameters, Proportional band and Neutral zone are automatically set by the controller.

The point of origin of the heating curve **To** = 20 °C can be adjusted by means of the potentiometer **C** (fig. 2.2), thereby increasing the flow temperature to compensate for weather variations in the intermediate seasons due to reduced periods of heating.

**TIMED CONTROL**

RTE 97 is able to control an On-Off output which operates with the programme times used. It can be used for the control of the plant circulation pump: in the Normal "Sun" periods contacts 8-10 are closed, while in the Setback "Moon" periods contacts 8-10 are open.

**CONSTRUCTION**

RTE 97 controller is constructed in a standard 144 x 144 (DIN 43700) case (fig. 4). The case is in shockproof plastic material and contains, on its base, the two terminal blocks into which the connecting tabs of the printed circuit are inserted. **The electronic part is constructed according to CEI (Italian Electrotechnical Committee) standards** as a single module comprising the printed circuit and the controls facia; it is inserted into the case using slight pressure.

The cover, in transparent plastic, can be hinged on the left or right side of the case.

RTE 97 is suitable for wall or panel mounting (fig. 4).

**INSTALLATION**

**RTE 97 CONTROLLER**

It must be installed in a dry location with a temperature not above 35 °C and as far as possible from any leakages or sprays of water. **If installed in locations classified as "dangerous" it must be mounted inside a cabinet for electrical appliances constructed according to the regulations in force for the type of danger concerned.**

In any event, the electrical connections must be made strictly according to the wiring diagrams (fig. 6) **and in observance of the safety regulations in force.**

**FLOW DETECTOR SCH 100 OR SIH 100**

If the circulation pump is on the flow pipe, the detector must be mounted downstream of this. If the pump is on the return pipe, it must be mounted downstream of the control valve and at a minimum distance of 1.5 metres from it so that is not affected by indirect thermal effects and because, before reaching that point, the water has not become properly mixed.

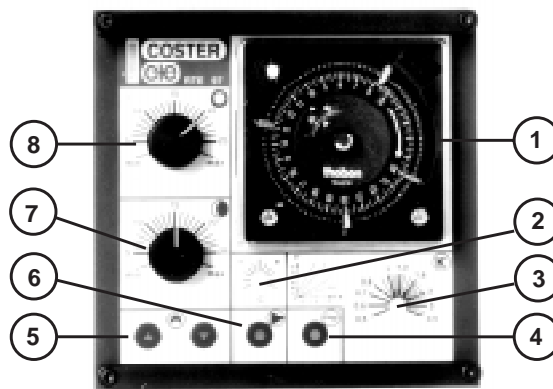
**OUTSIDE DETECTOR SAE 100**

This must be installed outside the building on the north or north-west side, at a height from the ground of not less than 3 metres to protect it from tampering and to allow better monitoring of the weather conditions.

It must be protected from direct sunlight and be as far as possible from windows, doors, chimneys, etc which can create direct thermal disturbances.

**FACIA**

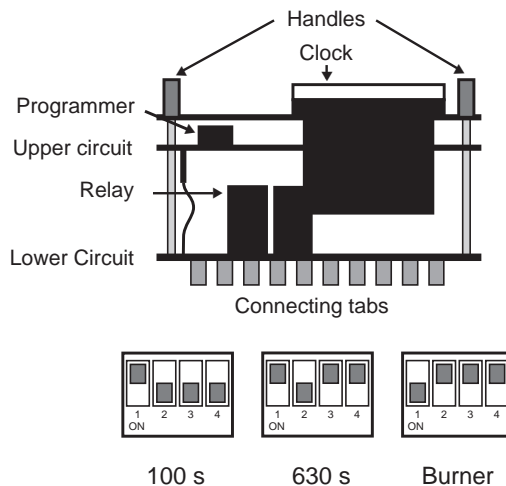
fig. 2



- 1 – Time switch
- 2 – Adjustment curve
- 3 – Plant factor K
- 4 – Power LED
- 5 – Opens-Closes LED
- 6 – Pump LED
- 7 – Setback "Moon" temperature
- 8 – Normal "Sun" temperature

**PROGRAMMER ACTUATOR SPEED**

fig. 3



**TESTING**

- With a multimeter check the connections made :
  - Check power supply : with multimeter in V ac mode, position the probes between terminals 2-3 and 3-7 (only if the output is powered at 230 V ac); the two measurements should be 230 V.
  - Check the detectors : with multimeter in Ohms mode, position the probes between the terminals : 11-12 (outside detector B2): 90 to 120 Ω ; 13-14 (flow detector B1): 100 to 150 Ω.
  - Check actuator : make sure that the electrical connections are correct.
- Check direction of actuator run :
  - Position the potentiometers "Sun" (fig. 2.8), "Moon" (fig. 2.7) and K (fig. 2.3) to maximum : the actuator should open the valve.
  - Set the potentiometers to minimum : the actuator should close the valve.
  - If the actuator moves in a direction opposite to the above, reverse the Opens and Closes connections.

**SETTING**

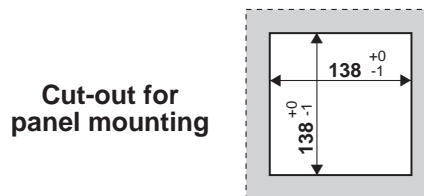
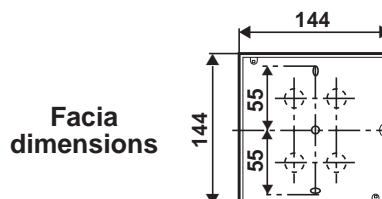
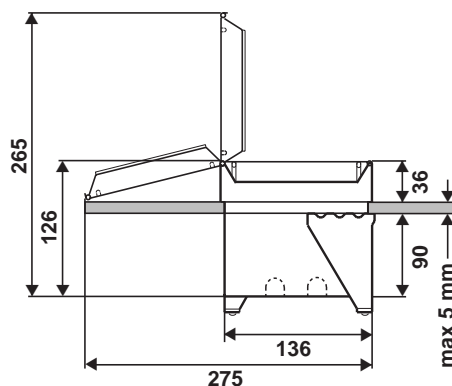
- Adapt the controller to the speed of the actuator using the programmer inserted in the upper printed circuit (fig. 3).
- Set the value of the the plant K factor (fig. 2.3) according to the climatic zone, or choose the heating curve (fig. 5) in relation to the design temperature.
- Set the desired Normal and Setback room temperatures with the respective potentiometers "Sun" (fig. 2.8) and "Moon" (fig. 2.7).
- Set the Normal and Setback programmes on the time switch (fig. 2.1) :
  - Red riders : start of Normal mode.
  - Green riders : start of Setback mode.
- Set the correct time on the dial of the 24-hour time switch and the correct time and day on the 7-day one.
- Adjust, if necessary, the slope of the heating curve with the potentiometer C (fig. 2.2).

**TECHNICAL DATA**

Power supply :	230 V ac
Frequency	50 to 60 Hz
Consumption	4 VA
Electromagnetic compatibility	CEE 93/68
Output contacts :	
– maximum switched voltage	250 V ac
– maximum switched current	5 (1) A
Setting range :	
– Normal and Setback room temperature	0 to 30 °C
– K factor	0.5 to 3.5
– adjustment C curve	± 5 °C
Time switch :	
– power reserve	100 h
– dial	24-hour or 7-day
– minimum daily interval	15 min.
– minimum weekly interval	4 h
Suitable actuators	100 to 630 s
Room temperature :	
– operating	0 to +45 °C
– storage	– 25 to +60 °C
Room humidity	class F (DIN 40040)
Protection	IP 40
Weight	1.2 Kg

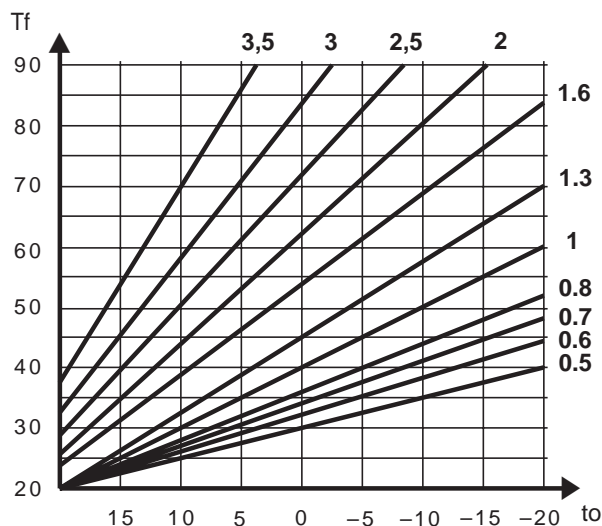
**OVERALL DIMENSIONS**

fig. 4



**HEATING CURVE**

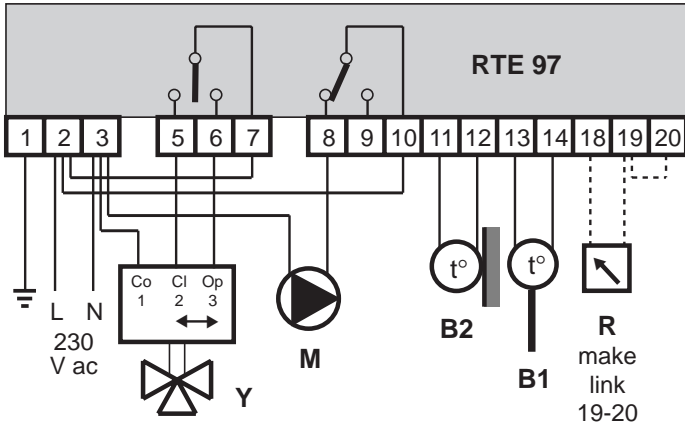
fig. 5



**WIRING DIAGRAMS**

fig. 6

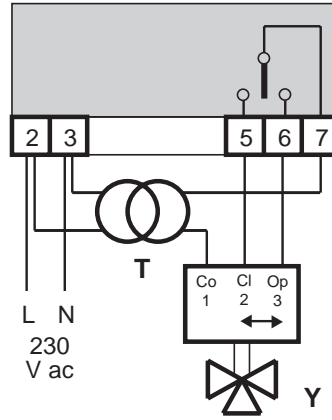
**General layout**



B1 – Flow detector  
B2 – Outside detector

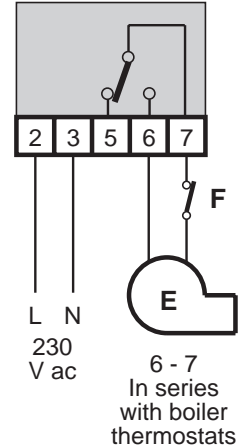
E – Burner  
M – Plant pump  
R – Remote control

**Control of actuator with voltage other than 230 V**



Y – Valve  
T – Transformer

**Control burner**



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