

ELECTRONIC AMBIENT TEMPERATURE CONTROLLERS WITH SEASON SWITCHING



RTS ... C1 Eng.

- 1 On-Off output or 1 modulating & 1 On-Off
- 2 modulating outputs with PI control action & On-Off
- NTC 10 kW temperature sensing element incorporated
- Individual or centralized season switching



1. APPLICATION

RTS temperature controllers are designed for control of ambient temperature in heating and air conditioning plants in, for example

- hotels and guest houses
- residential complexes
- schools and public buildings.

They can be used:

- As single controllers without timed event programming.

They are suitable for:

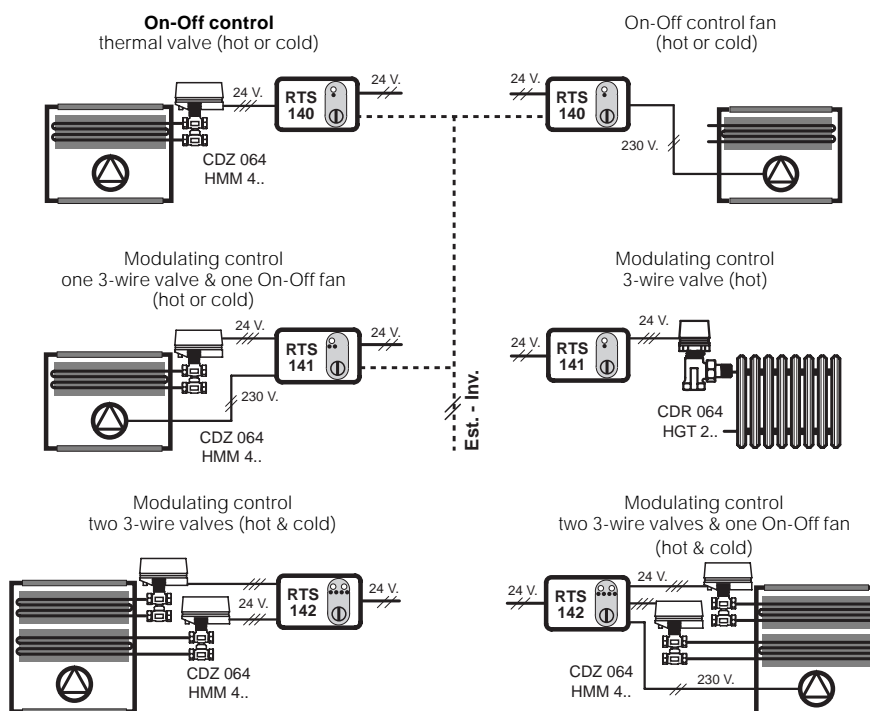
- RTS 140** – Electric load 230 or 24 V, max. 5(3) A, for control of fans, pumps, burners or air-conditioning units.
- RTS 141** – One modulating valve with 3-wire electric control & one electric load 230 or 24 V max. 5(3)A (Heating or Cooling).
- RTS 142** – Two modulating valves with 3-wire electric control (Heating or Cooling) & one electric load 230 or 24 V max. 5(3)A.

2. MODELS

Model	Outputs	Type of load	Season switch
RTS 140	1 On-Off relay (Heat. or Cool.)	24 or 230 V~ max. 5(3) A.	Local or centralized
RTS 141	1 triac modul. & 1 On-Off relay (Heat. or Cool.)	a 3-wire valve 24V max. 7 W. & 24 or 230 V~ max. 5 (3) A.	Local or centralized
RTS 142	2 triac modul. & 1 On-Off relay (Heat. or Cool.)	3-wire valve 24 V~ max. 7 W. & 24 or 230 V~ max. 5 (3) A.	Not applicable

3. OPERATION DIAGRAMS

TYPICAL APPLICATION



4. TECHNICAL DATA

• Electrical

Power supply	24 V~ ±10%	Measurement range	
Frequency	50...60 Hz	- winter	5...35°C
Consumption	4 VA	- summer	10...40 °C
Electromagnetic compatibility	CEE 93/68	- actuator run time (RTS 141 - 142)	60 -180 s
On-Off SPDT output (RTS 140):		- half-load cycle (RTS 140)	10 - 30 min.
- maximum switching voltage	250 V~	- proportional band	± 0.5-1-2-3 °C
- maximum switching current	5 (3) A	- integral time (RTS 141-142)	10 - 30 min.
Auxiliary On-Off output (RTS 141-142):		Ambient temperature :	
- maximum switching voltage	250 V~	- operation	0...45 °C
- maximum switching current	5(3) A	- storage	- 20...+60 °C
Triac outputs powered by 24 V~ (RTS 141-142):		Construction standards	Italian Electrotech. Comm. (CEI)
- output voltage	24 V~	Protection	IP 30
- maximum switching current	300 mA	Dimensions	130 x 80 x 35
		Weight	170 g

5. CHOICE IN RELATION TO TYPE OF PLANT

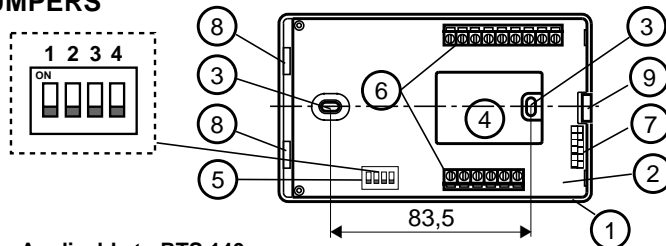
- Radiators with :
 - 2-port VR .valve + CRT 248 (230 V) electrothermal actuator **RTS 140** On-Off of 1 or more valves in parallel (max. 20)
 - 2-port VR .valve + CRZ 184 (24 V) 3-wire actuator + circolazione (possibly) circulation pump(500 W) **RTS 141** Modulating one valve & On-Off of one pump
- Fan-Coil with :
 - Control fan at 230 V **RTS 140** On-Off one or more fans in parallel (max. 500 W)
 - RV 4Z.. 4-port valve + CLT 248 (230 V) electrothermal actuator **RTS 140** On-Off one or more valves in parallel (max. 20)
 - RV 4AZ .. 4-port valve + CLZ 154 (24 V) 3-wire actuator + fan (max. 500 W) **RTS 141** Modulating 1 valve & On-Off 1 fan (hot or cold) actuator
 - Two RV 4Z ..4-port valves + CLZ 154 (24 V) three-wire actuator + fan (max. 500W) **RTS 142** Modulating 2 valves (hot and cold) and On-Off one fan
- Circulation pumps (230 V ~)
- Burners or independent boilers (230 V)
- Independent air-conditioning unit (230V)

6. INSTALLATION

RTS 14. controllers must be installed at a height of 1.5 ... 1.6 meters from the floor, on an internal wall of the space and at a point which represents the average temperature. They must be as far as possible from windows, doors and sources of heat and corners and curtains must be avoided.

- Separate base and cover by releasing the cover securing elements.
- Fix the base to the wall or to the panel-mounting patress using the pre-drilled holes.
- Make the electrical connections strictly in accordance with the wiring diagram (9) and in observance of the safety regulations in force.
- Replace cover on base and close the two parts carefully until they snap into place.

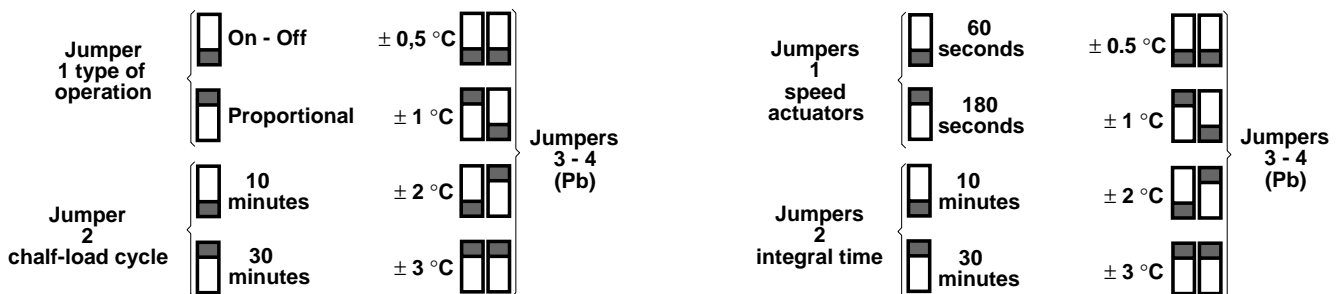
7. OPERATIONAL JUMPERS



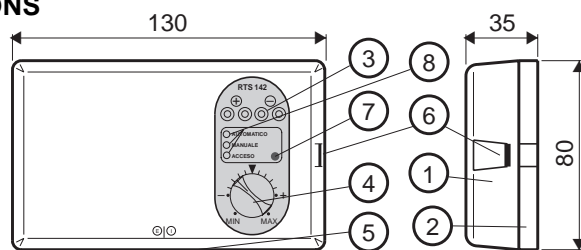
- 1 - Base
- 2 - Printed circuit
- 3 - Holes for fixing screws
- 4 - Cable entry
- 5 - Dip switch funzioni
- 6 - Terminal blocks
- 7 - Connections to cover
- 8 - Cover/base hinge elements
- 9 - Cover/base securing elements

Applicable to RTS 140

Applicable to RTS 141 - 142

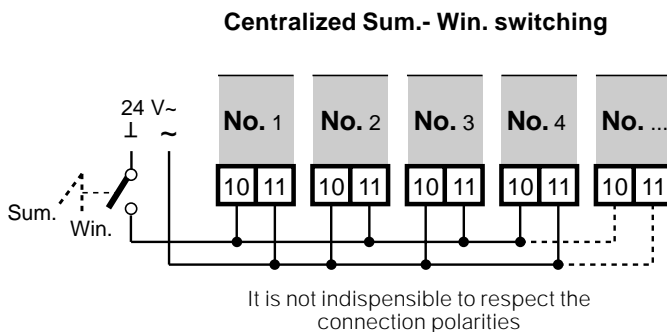
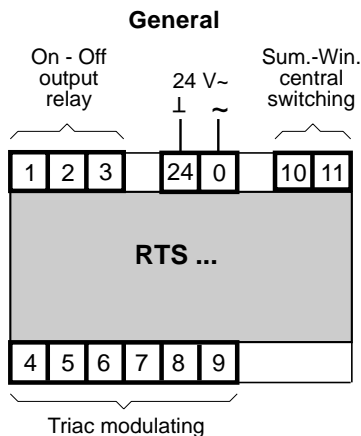


8. OVERALL DIMENSIONS

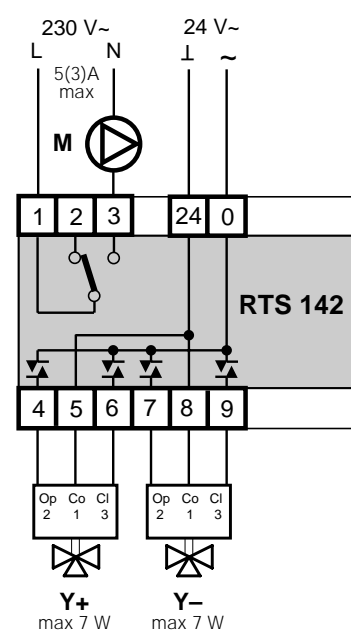
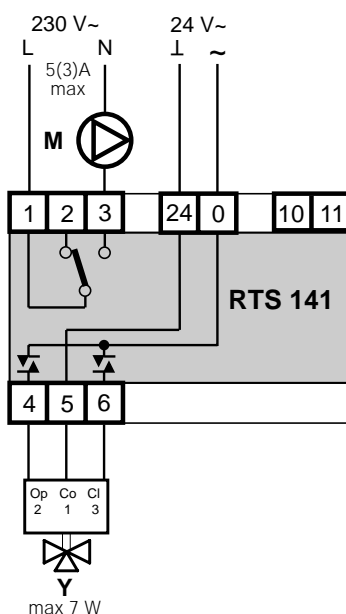
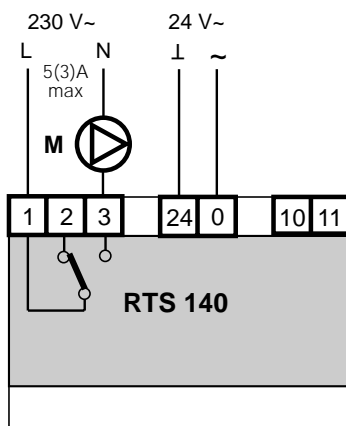


- 1 - Cover
- 2 - Base
- 3 - Output LEDs
- 4 - Setpoint adjuster
- 5 - Summer-Winter switch (RTS 1 output)
- 6 - Cover/base securing elements
- 7 - Summer-Winter switch (RTS 1 output)
- 8 - Cover/base securing elements

9. WIRING DIAGRAMS



Operation out



M – Fan coil fan
 N – RTS 14. controllers
 Y – Valve with 3-wire control
 Y+ – Heating valve with 3-wire control
 Y- – Cooling valve with 3-wire control

10. WIRING

Proceed as follows:

- **Separate base from cover**
- **Mount base on the wall, ensuring that the surface is flat**
- Carry out the wiring according to the diagram and in observance of the regulations in force, using the following cable types:
 - 1.5 mm² cross section for power supply
 - 1.5 mm² cross section for power to actuators

Warning:

If controller is installed on a panel-mounting patress it is possible that the sensing element will become cooled by cold air from the cable ducting. In this event the rear of the base must be thermally insulated.

It is advisable not to insert more than two cables in a single terminal of the controller and if necessary to use external junction boxes.

11. OPERATION

RTS are a range of electronic temperature controllers incorporating microprocessors. Certain of the pre-set data can be adjusted by means of the microswitches on the printed circuit.

In the presence of electrical disturbances the output controls of the controller may change their status but this will be restored automatically.

11.1 Temperature monitoring

Ambient temperature is measured by an incorporated NTC 10 kΩ sensing element. The value of the desired temperature (Heating or Cooling) can be adjusted by the incorporated setpoint adjuster. On the controllers it is possible to limit the adjustment range mechanically by means of two stops which can be inserted in the holes provided on the cover.

11.2 Operating features

Modulating outputs with PI control action:

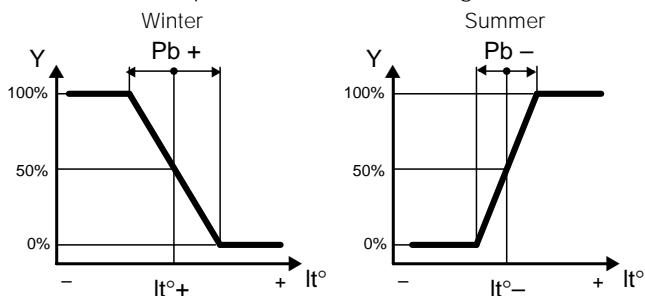
The controller compares the actual temperature value t° , measured by the detector, with the desired value T° . If there is a difference, the controller calculates the output value (valve opening 0 ... 100%) according to the amount of the difference and the proportional band Pb . If the difference persists, it is corrected by the integral function which adjusts, over time, the calculated position of the valve, in relation to the integral time It .

To position the valve at the calculated value, the controller sends opening or closing signals to the valve (three-wire control), modulated over time, in relation to the actuator speed (150 s).

Proportional band Pb , Integral time It and actuator speed can be adjusted.

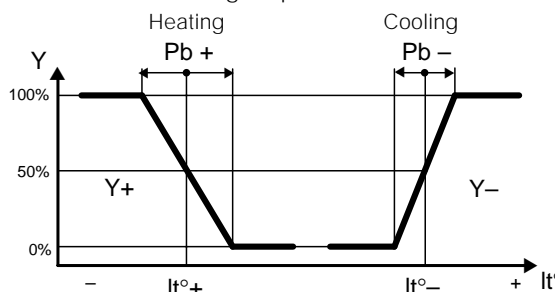
RTS 141

On-Off output with season switching
output with season switching



RTS 142

One modulating output and one On-Off



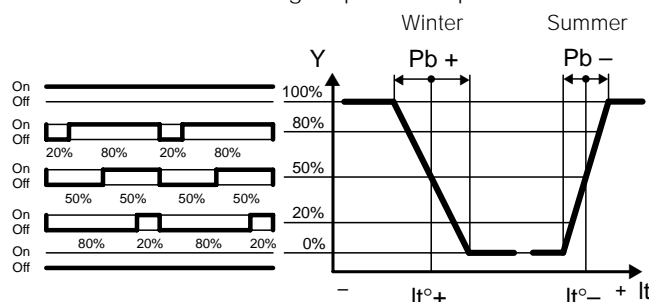
On-Off outputs with PI control action:

The controller calculates the output value using the same criteria as modulating controllers (PI control action) and converts it into On and Off output signals. When the output is 0% the signal is always Off; when it is 100% the signal is always On; when it is 50% the duration of the On signal is equal to the duration of the Off signal and the total time is "the half-load operating cycle" (e.g. 16 min. = 8 min. On and 8 min. Off).

With this system the effective hysteresis proves to be much narrower than the proportional band Pb set and the ambient temperature much more stable.

RTS 140

Two modulating outputs in sequence



Auxiliary On-Off output (only RTB 141-142):

Voltage-free contact suitable for control of fan coil fans or circulation pumps.

When the output is 0% the control is always Off; when it is 100% it is always On. The response of the contact is not immediate but there is a delay of four minutes between the On and Off status.

Sul fronte del regolatore c'è un tasto per la commutazione manuale del funzionamento dell'organo comandato: **AUTOMATICO** = il regolatore gestisce il contatto in funzione del carico termico dell'impianto.

MANUALE = la marcia e l'arresto dell'organo collegato viene gestita con il tasto del regolatore.

11.3 Season switching

In controllers with one output it is possible to invert the output action in order to pass from winter to summer operation, in two different ways:

- Single switching by means of the incorporated season switch.
- Centralized switching using a central switch which energises, in parallel at 24 V~, the terminals 4-5 of all the controllers. Without power it is "Heating" and with power "Cooling". With this type of switching all the controllers must remain in the "Winter" position.



20132 Milan Via San G.B. De La Salle, 4/a	Head Office & Sales Tel. +39.02.2722121 (TI) Tel. +39.02.45476193 (FW) Fax +39.02.2593645
00146 Rome Viale G. Marconi, 437	Reg. Off. Central & Southern Tel. +39.06.5573330 Fax +39.06.5566517
25048 Edolo (BS) Via Gen. Treboldi 190/192	Orders and Shipping Tel. +39.0364.7732.00/02 Fax +39.0364.770016
Web: www.coster.info	E-mail: info@coster.info



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