B 351
18.12.01

ELECTRONIC CONTROLLERS OF AMBIENT TEMPERATURE

RTA ... C1 Eng.

DISCONTINUED PRODUCT

TO SEE A SUITABLE REPLACEMENT PRODUCT

- **1 On-Off output**
- **1 On-Off output with proportional cycle P**
- **1 Modulating output with PI control action**
- **Temperature sensing element NTC 10 kΩ incorporated**

CE

1. APPLICATION

RTA temperature controllers are designed for the control of ambient temperature in heating zones in e.g. : hotels and guest houses, residential complexes, commercial and public offices, schools.
They can be used :
– As single controllers without timed event programming.

They are suitable for control of:
RTA 140 – Power supply 230 or 24 V~, max 5(3) A for control of fans, pumps, burners or air conditioning units.

RTA 141 – 1 modulating valve with 3-wire electric control 24 V~, capacity 300 mA (Heating)

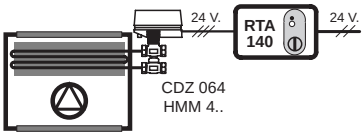
2. MODELS

Model	Outputs	Type of load
RTA 140 **RTA 141**	1 On-Off relay 1 triac modulating	24 V~ or 230 V~ max. 5(3) A. 3-wire 24 V ~ max. 7 W.

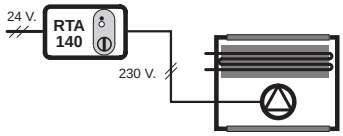
3. OPERATIONAL DIAGRAMS

TYPICAL APPLICATIONS

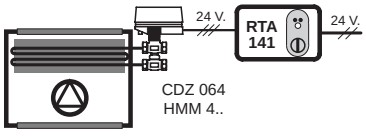
On-Off control 3-wire valve (hot)



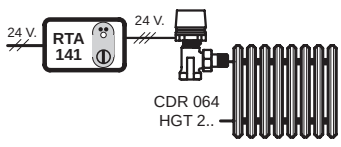
On-Off control fan (hot)



Modulating control 3-wire valve (hot)



Modulating control 3-wire valve (hot)



4. TECHNICAL DATA

- **Electrical**

Power supply	24 V~±10%	– maximum switching current	5 (3) A
Frequency	50 ... 60 Hz	Powered triac output (RTA 141):	
Consumption	4 VA	– output voltage	24 V~
Electromagnetic compatibility	CEE 93/68	– maximum switching voltage	300 mA.
On-Off SPDT output (RTA 140):		Control range :	
– maximum switching voltage	250 V~	– heating	5 ... 35°C

– time actuator run (RTA 141)	60 -180 s
– half-load cycle (RTA 140)	10 - 30 min.
– proportional band	± 0.5-1-2-3 °C
– integral time (RTA 141)	10 - 30 min.
Ambient temperature :	
– operation	0 ... 45 °C
– storage	– 20 ... + 60 °C
Construction standards	Italian Electrotech. Committee (CEI)
Protection	IP 30
Dimensions	130 x 80 x 35 mm
Weight	170 g

5. CHOICE IN RELATION TO ZONE

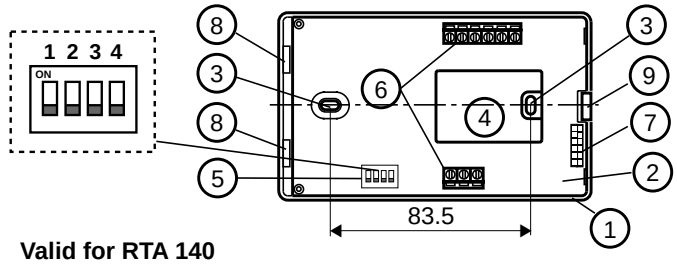
- Radiators with:
  - 2-port valves + 3-wire or electrothermal actuator(230/24 V~) — **RTA 140** On-Off of 1 or more valves in parallel (max 5).
  - 2-port valves + 3-wire actuator (24 V~) — **RTA 141** 1 valve modulating.
- Fan coil with :
  - Control fan at 230 V~ — **RTA 140** On-Off of 1 or more fans in parallel (max 500 W).
  - 4-port valve + 3-wire or electrothermal actuator (230/24V~) — **RTA 140** On-Off of 1 or more valves in parallel
  - 4-port valve + 3-wire actuator (24 V~) — **RTA 141** 1 valve modulating.
- Circulation pumps at 230 V~ — **RTA 140** On-Off (max. 500 W).
- Burners or autonomous boilers at 230 V~ — **RTA 140** On-Off (max. 500 W).

6. INSTALLATION

RTA 14. controllers must be installed at a height of 1.5...1.6 meters from the floor, on an internal wall of the space, at a point which represents the average temperature. It must be as far as possible from windows,doors and heat sources and must not be sited behind curtains or in corners.

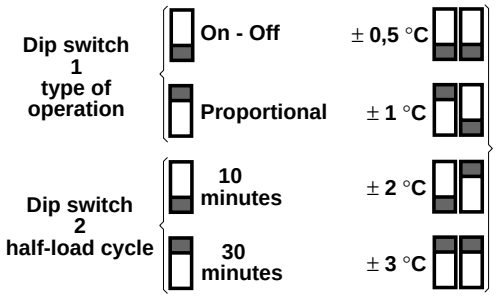
- Separate the base and cover by releasing the securing clip (7.9).
- Fix the base to the wall or to the flush-mounting patress using the screw holes provided.
- Carry out the wiring according to the diagrams (9) and in strict observance of the safety regulations in force.
- Replace the cover on base and close the two parts together carefully until they snap into place.

7. JUMPERS

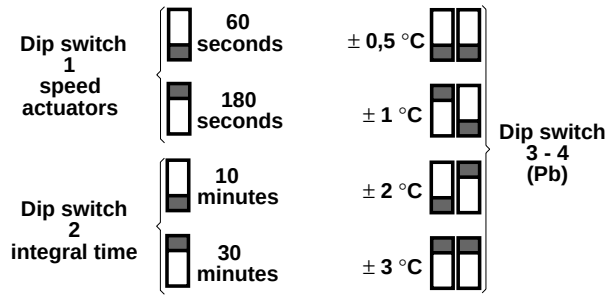


1 – Base terminal block
2 – Printed circuit
3 – Holes for fixing screws
4 – Cable entry knockout
5 – Dip switch functions
6 – Terminal blocks
7 – Cover connections
8 – Cover/base hinge elements
9 – Cover/base securing catch

Valid for RTA 140

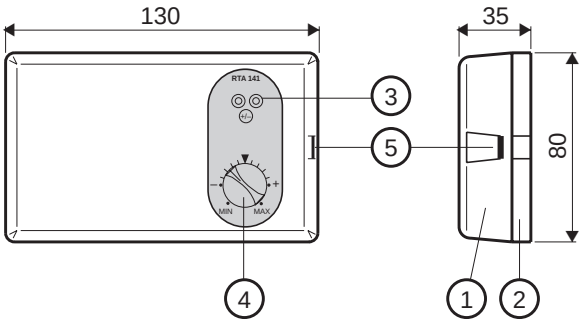


Valid for RTA 141



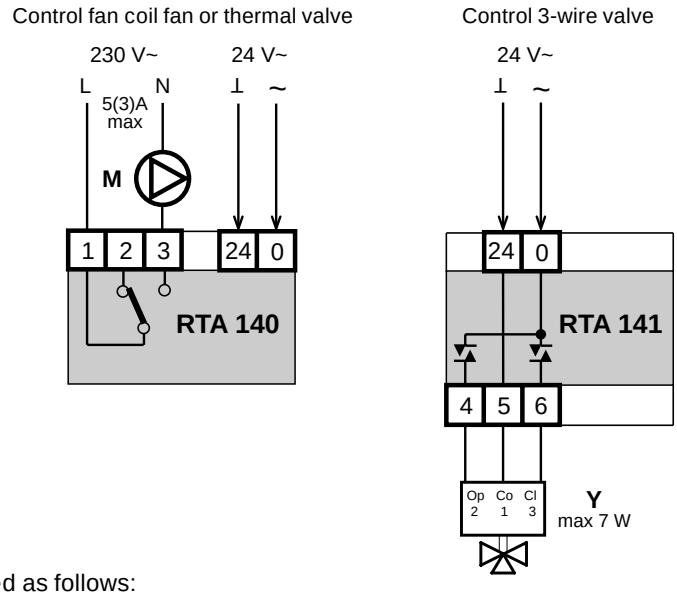
OPERATION WARNING (only for RTA 140):
Dip 1 on On-Off: = dip switch 3/4 is the differential, excludes automatically dip switch 2 (half-load cycle).
Dip 1 on proportional: On-Off with proportional cycle = dip switch 3/4 Pb + dip switch 2 cycle at half load.

8. OVERALL DIMENSIONS



1 – Cover
2 – Terminal blocks base
3 – Output LEDs
4 – Settings knob
5 – Cover/base securing catch

9. WIRING DIAGRAMS



10. WIRING

Proceed as follows:

- Separate base from cover
- Fix base to wall making sure the surface is flat
- Carry out the wiring according to the diagram and in observance of the regulations inforce, using following cable types:
  - 1.5 mm² cross-section for power supply
  - 1.5 mm² for actuators.

Warning:

If the controller is mounted on a flush-mounting patress it may happen that the sensing element becomes cooled by cold air from the electric cable ducting. In this event the bottom of the controller base must be insulated.

11. OPERATION

RTA ... are electronic temperature controllers with microprocessors. Some setting data is pre-set and can be adjusted by means of the dip switches located on the printed circuit.

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

11.1 Temperature monitoring

Ambient temperature is measured by the incorporated NTC 10 kΩ sensing element. The value of the desired temperature can be adjusted by the knob on the facia : central reference = 20 °C; each scale division corresponds to a variation of ± 1 °C.

On the controllers it is possible to limit the range of the setting knob mechanically by means of two stops to be inserted in the holes provided on the facia.

11.2 Operating features

Modulating output with PI control action (RTA 141):

The controller compares the actual temperature value (t°), measured by the detector, with the desired value (T°). In the event of a difference, the controller calculates the output value (opening of valve 0...100%) in relation to the amount of the difference and of the proportional band (Pb). The continuation of the difference is corrected by the integral function (It) which adjusts, over time, the calculated position of the valve (It = 10 - 30 min).

To position the valve at the calculated value, the controller sends to it opening or closing signals (3-wire control), modulated over time, according to the actuator speed (60 - 180 s).

The proportional band, the integral time and the actuator speed can all be adjusted.

On-Off output with P control action (RTA 140):

The controller calculates the value of the output using the same criteria as modulating controllers and converts it into On and Off output controls. When the output is 0% the control is always Off; when it is 100% the control is always On; when it is 50% the duration of the On control is equal to the duration of the Off control on the basis of the "half-load operating cycle" set (e.g. 10 min = 5 min On and 5 min Off).

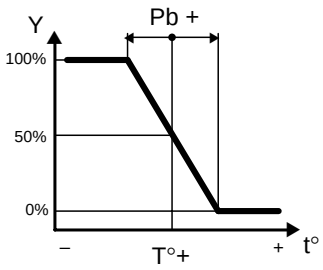
With this system the effective hysterisis is much narrower than the proportional band Pb set and the ambient temperature is much more stable.

On-Off output (RTA 140):

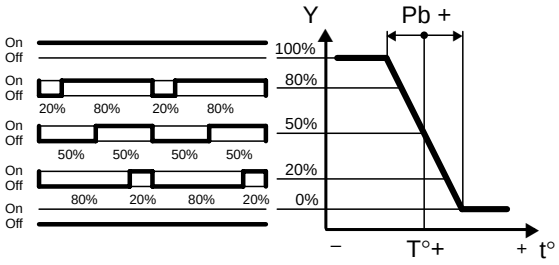
The controller compares the value of the actual temperature (t°) measured by the detector, with the desired value (T°). In the presence of a difference equal to the differential (Δt°) set by dip switches 3 and 4 the switch is thrown to On or Off.

11.3 Operating diagrams

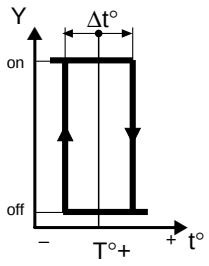
RTA 141
Modulating output



RTA 140
On-Off output with proportional cycle



RTA 140
On-Off output



T° – desired temperature value
t° – actual temperature
Y – control signal

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