

ELECTRONIC ROOM THERMOSTATS

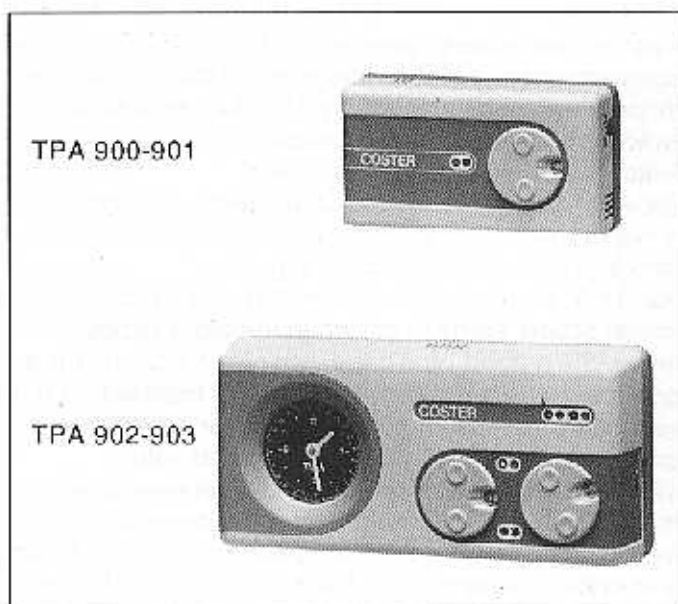
TPA 900 - 901 TPA 902 - 903

- Power supply 220/240 V AC
- Proportional control action
- One SPDT output

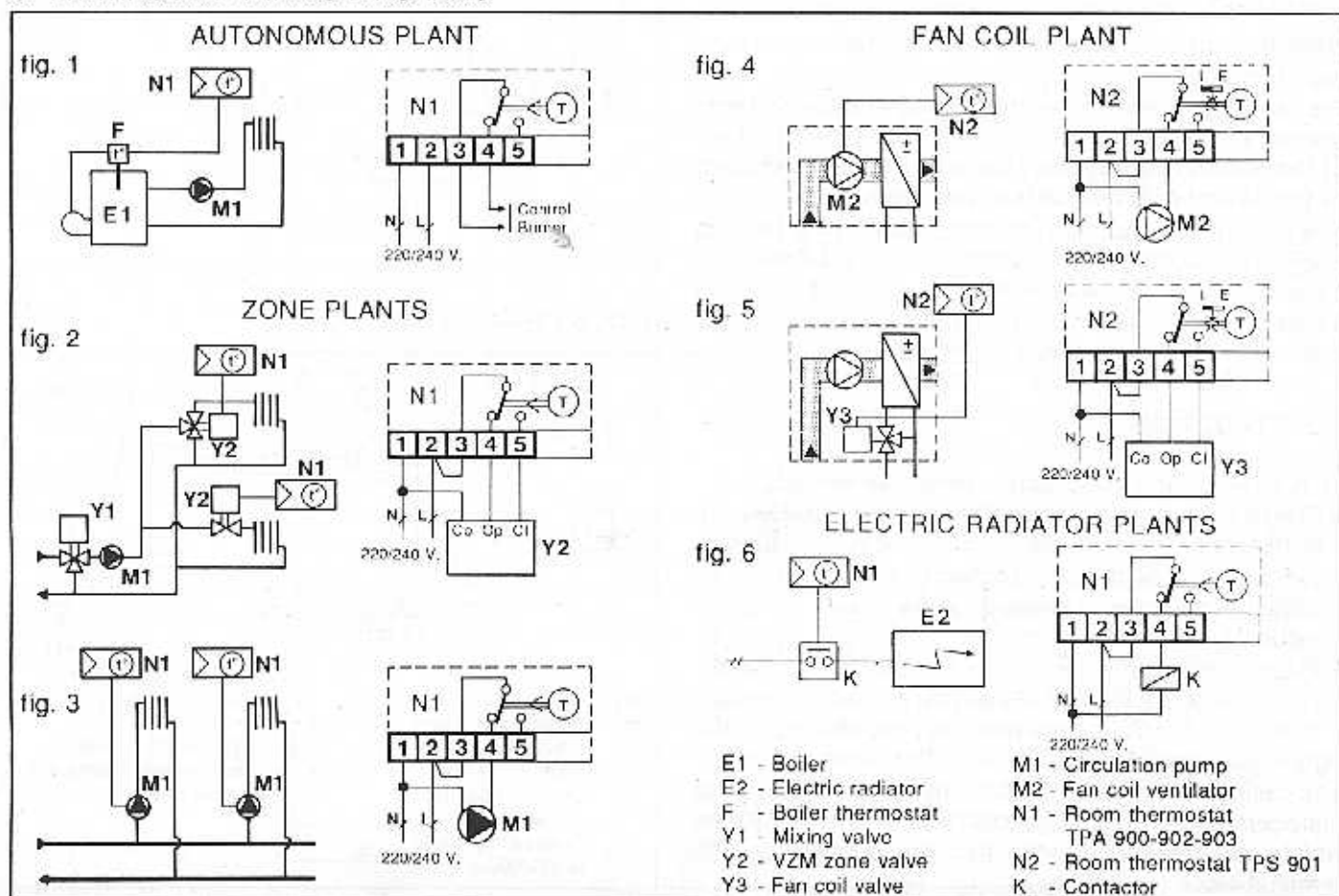
APPLICATION

The electronic room thermostats in the TPA range are designed for the control of room temperature in small- or medium-size heating, air conditioning or mixed systems:

- Apartments with independent heating
 - Apartments with zoned heating
 - Private residences
 - Single units in industrial premises
- They are suitable for the ON-OFF control of:
- Gas boilers with atmospheric burners
 - Gas or gas oil burners with blown air
 - Zone valves with 2- or 3-position control
 - Circulation pumps
 - Fan coils
 - Electric radiators
 - Air conditioning units



OPERATING AND WIRING DIAGRAMS



In order to adapt the thermostat to the thermal inertia of the plant, a trimmer on the electronic circuit is accessible for the adjustment of the ON-OFF times of the half load ($t^{\circ} = T^{\circ}$) operating cycle.

The room temperature is measured by means of an NTC thermistor.

The electronic circuit is energised by 220/240 V AC through a transformer and therefore insulated from the mains supply.

INSTALLATION

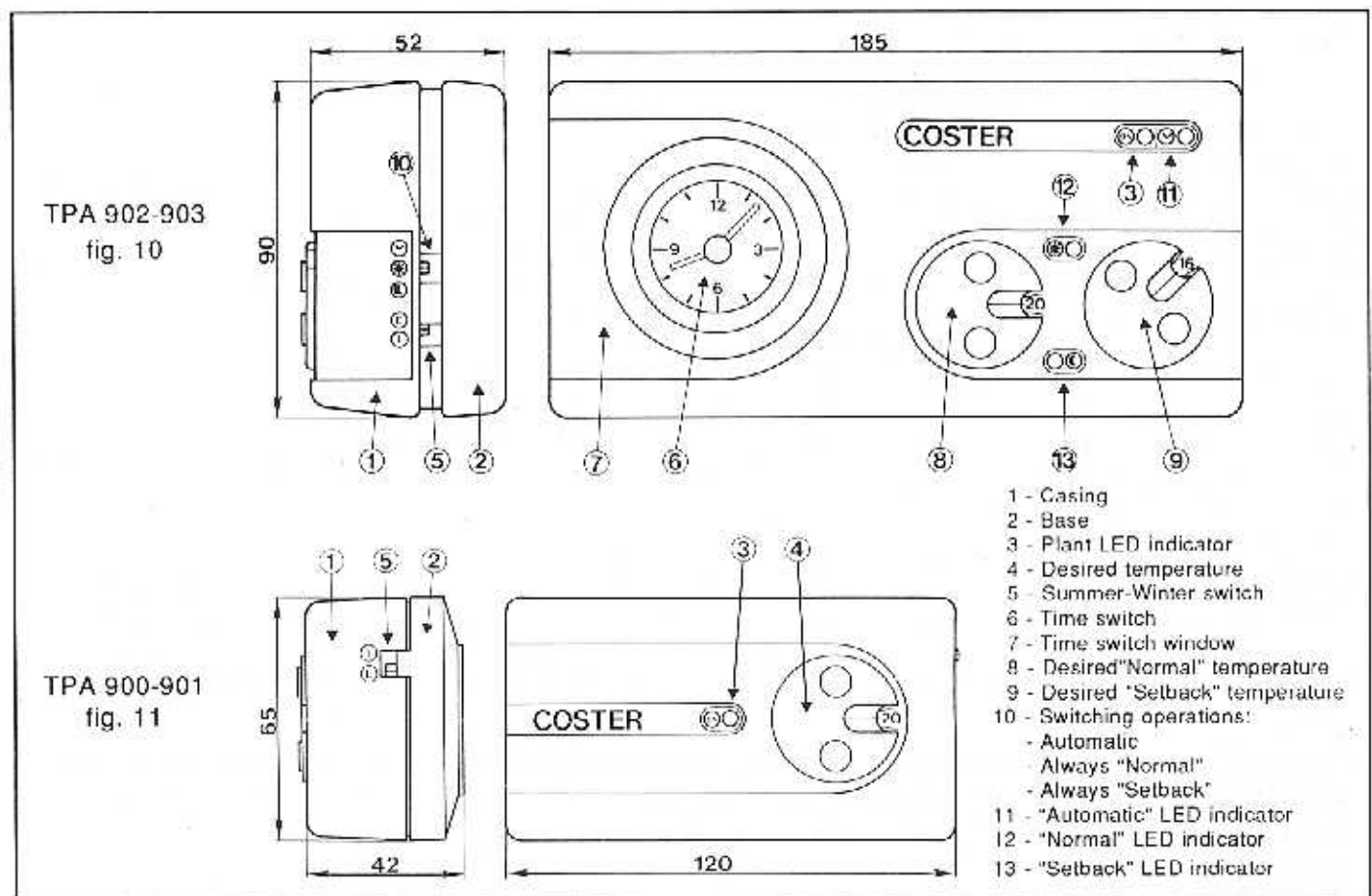
TPA 90 thermostats must be installed at a height of 1.5 - 1.6 metres from the floor, at a point on an internal wall of the room which best represents the average temperature. It must be as far as possible from windows, doors and sources of heat, and corners, shelves and curtains must be avoided.

- Remove the base from the casing by pressing with the hands on the two longer sides of the latter.
- Fix the base to the wall utilizing the screw holes provided and taking care to pass the electric cables through the appropriate conduit entry.
- Make the connections according to the wiring diagrams and observing any local safety regulations.
- Set the adaptation trimmer in accordance with the type of plant to be controlled and replace the casing on the base.

TECHNICAL DATA

Power supply:	220/240 V AC
Frequency:	50/60 Hz
Consumption:	
- TPA 900-901	1 VA
- TPA 902-903	4 VA
Output contacts:	
- rated voltage	250 V
- rated current	5(3) Amp
Temperature setting range:	5 - 30° C
Proportional band:	$\pm 1^{\circ}$ C
Operating cycle at half load:	4 - 12 minutes
Time switch power reserve:	72 hours
Minimum time-setting interval:	
- 24-hour TPA 902	20 min
- 7-day TPA 903	2 hours
Ambient temperature limits:	
- operating	0 - 45° C
- storage	-20 to +60° C
Room humidity:	G (DIN 40040)
Protection:	
- TPA 900-901	IP 30
- TPA 902-903	IP 20
Weight:	
- TPA 900-901	0.25 kg
- TPA 902-903	0.45 kg

OVERALL DIMENSIONS



MODELS

- TPA 900 - Thermostat
- TPA 901 - Thermostat with Summer-Winter switch
- TPA 902 - Thermostat with quartz 24-hour time switch
- TPA 903 - Thermostat with quartz 7-day time switch

On request:

- TPA 902-903 with Summer-Winter switch
- TPA 900-901-902-903 with remote sensor SDA 010 or SDA 020 for two monitoring points

OPERATION

A normal thermostat switches ON and OFF when the room temperature t° is higher or lower than the desired temperature T° by a value equal to half its differential. Switches ON when $t^{\circ} = T^{\circ} - 1/2 \Delta t^{\circ}$
Switches OFF when $t^{\circ} = T^{\circ} + 1/2 \Delta t^{\circ}$

The thermal inertia of the plant tends, inevitably, to increase the real differential, generating wide oscillations in the room temperature (fig. 7).

The TPA 90 electronic thermostat, with proportional control action, starts to act when the room temperature enters the proportional band $Bp = T^{\circ} \pm 1^{\circ}\text{C}$ and therefore before the desired temperature is reached. In this way they progressively reduce the variations in room temperature until it reached the desired value.

Within the proportional band the ratio between the times of switching ON and switching OFF depends on the error between the desired temperature and the actual temperature measured by the sensor. When the room temperature is at the desired value (half load) TPA 90 comes into action with ON-OFF commands of equal duration thereby maintaining the heating media at an average temperature.

We can say, therefore, that the TPA 90 electronic thermostat programmes its control not only in function of the actual room temperature but also in function of the speed of its variation over time.

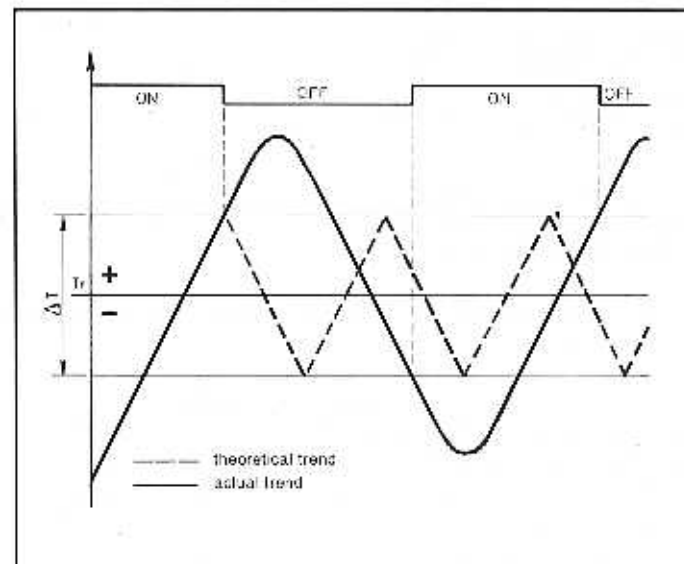
The enormous variations in temperature of the heating media, typical of systems controlled by traditional thermostats, are in this way drastically reduced, with the consequent elimination of oscillations in room temperature.

CONSTRUCTION

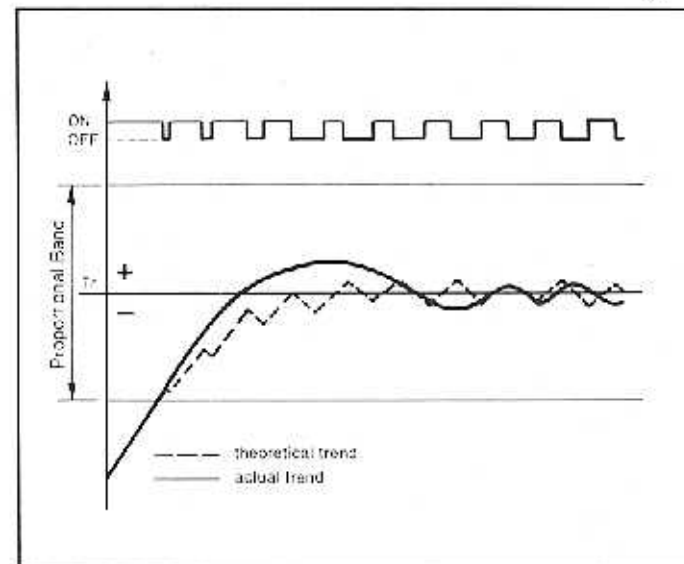
TPA 90 electronic thermostats comprise two parts:

- Plastic base suitable for wall mounting complete with: terminal block for the electrical connections, protected against accidental contacts; conduit entry for cables from rear; standard screw holes for panel mounting if required.
- Plastic casing which encloses the electronic circuit; on the fascia are located the setting and adjusting controls, the LED indicators and the time switch; on the right-hand side are found the operations switches. The casing is secured to the base by means of four snap fasteners and the electrical contacts are made by pins which are pressed directly into the sockets on the terminal block.

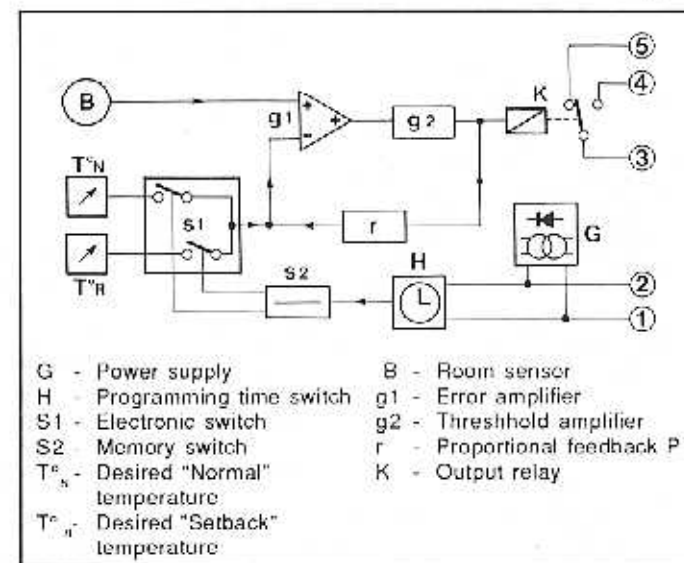
VARIATIONS IN ROOM TEMPERATURE WITH A NORMAL THERMOSTAT fig. 7



VARIATIONS IN ROOM TEMPERATURE WITH A TPA 90 THERMOSTAT fig. 8



BLOCK DIAGRAM fig. 9



REMOTE SENSOR

TPA 90 thermostats with remote sensor can be installed anywhere because they are supplied without the internal sensitive component and with two terminals 6 and 7 for the electrical connections to the sensor (fig. 12).

To install the sensor the same criteria for its location described under INSTALLATION must be observed.

In particularly large spaces it is advisable to use two SDA 020 sensors connected in series or four SDA 010 sensors connected in series/parallel, and located so as to monitor the average temperature of the room.

SETTING AND ADJUSTMENTS

- Before replacing the TPA 90 thermostat on its base, set the times (minutes) of the half-load operating cycle by means of the trimmer inserted in the printed circuit. In this way the thermostat will adapt to the thermal inertia of the system.

Indicative setting values are:

- Gasboilers with atmospheric burners	8
- Blown air burners	12
- Zone valves and circulation pumps	4 - 8
- Fan coils/convectors and electric radiators	4
- Air conditioning	8

- Programming of time switch:

Open the protective door by turning it to the left.

By means of the probe housed under the door,

move all the segments in the sector corresponding to the "Normal" operating periods towards the outside; these periods will be signified by the exposure of red zones.

The 24-hour time switch has segments equivalent to 10 minutes each with a minimum interval between two successive time periods of 20 minutes.

The 7-day time switch has segments of one hour each with a minimum interval of two hours.

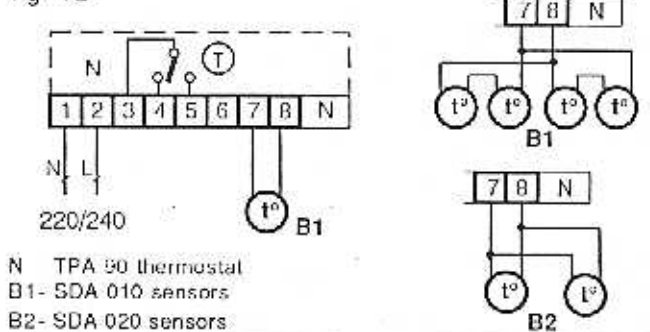
Setting the actual time of day: the dial can be rotated either clockwise or anticlockwise.

24-hour dial: rotate the minute hand, by means of the front window, so as to make the actual time of day coincide with both the index mark at top left (24-hour dial) and with the hour and minute hands.

7-day dial: rotate the minute hand, by means of the front window, so as to make the beginning of the actual day sector coincide with the index mark; continue to rotate the minute hand until the actual time of day coincides with both the index mark and the hour and minute hands.

- Setting of desired temperature: the setting range of the desired temperature can be limited by means of the two pins housed at the side of the terminal block. Extract the setting knob and, using the probe, insert the pins in the holes corresponding to the temperature values desired.

fig. 12



TESTING

TPA 900-901 ("Winter" operation)

- Seasonal switch (5) on 1
- Set (4) to maximum value: the system should be switched on and LED (3) lit.
- Set (4) to minimum value: the system should be switched off and LED (3) out.

TPA 901 ("Summer" operation)

- Seasonal switch (5) on E.
- Set (4) to minimum value: the system should be switched on and LED (3) lit.
- Set (4) to maximum value: the system should be switched off and LED (3) out.

TPA 902-903

- Set the operating period times on time switch and set the operations switch (10) on Automatic. LED (11) should be lit.
- Set "Normal" temperature knob to maximum and "Setback" temperature knob to minimum.
- Set the time switch dial to "Normal" operating period. The result should be: LED (12) lit with system operating and LED (3) lit.
- Set the time switch dial to "Setback" operating period. The result should be: LED (13) lit with system switched off and LED (3) lit.
- Set the operations switch on "Constant normal". LED (12) should be lit. With (8) at maximum the result should be: system operating and LED (3) lit. With (8) at minimum: system switched off and LED (3) out.
- Set the operations switch on "Constant Setback". LED (13) should be lit. With (9) at maximum the result should be: system operating and LED (3) lit. With (9) at minimum: system switched off and LED (3) out.

IN VIEW OF THE PROPORTIONAL CONTROL ACTION OF THE TPA 90 THERMOSTATS, THE ON-OFF SWITCHINGS ARE NOT IMMEDIATE, BUT MAY BE DELAYED FOR UP TO A MAXIMUM OF A FEW MINUTES.

COSTER

GLE CONTROLS
TEMPERATURE
ENERGY

20132 Milan
Via San G.B. De La Salle 4/a

Head Office & Sales
Tel. 02/2593841 - 2 - 3 - 4
Telefax. 02/2593845

LOCAL DISTRIBUTOR:

25046 Edolo (BS)
Via Gen. Treboldi 190/192

Factory
Tel. 0364/71480 - 71988
Telefax. 0364/72615

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