

DIGITAL WEATHER COMPENSATOR

RTE 953

- Power supply 230 Volt ac. Battery back up for 10 years
- Digital programming with four operating keys and 2-line backlight alphanumeric display
- Weather compensation with one PI modulating output for control of valve or On-Off control of boiler
- Possibility of adjusting flow temperature in relation to room temperature
- One On-Off output for control of pump or boiler as a function of program times and thermal demand of heating system
- Four time programs each with three On/Off periods available
- Voltage-free output contacts: capacity: 250 V, (1) A
- Adjustment of heating curve to compensate for weather variations during intermediate seasons
- Control of minimum and maximum flow temperature limits

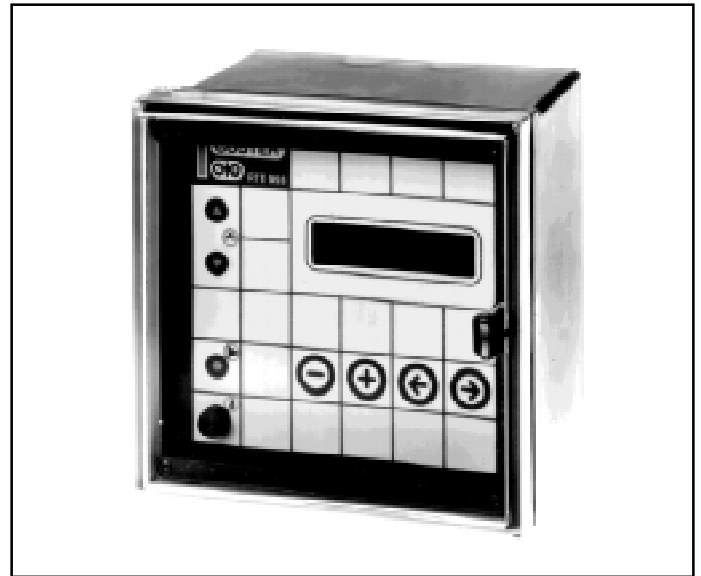
APPLICATION

RTE 953 weather compensator is designed for weather compensation in centralised heating systems in non-industrial buildings such as:

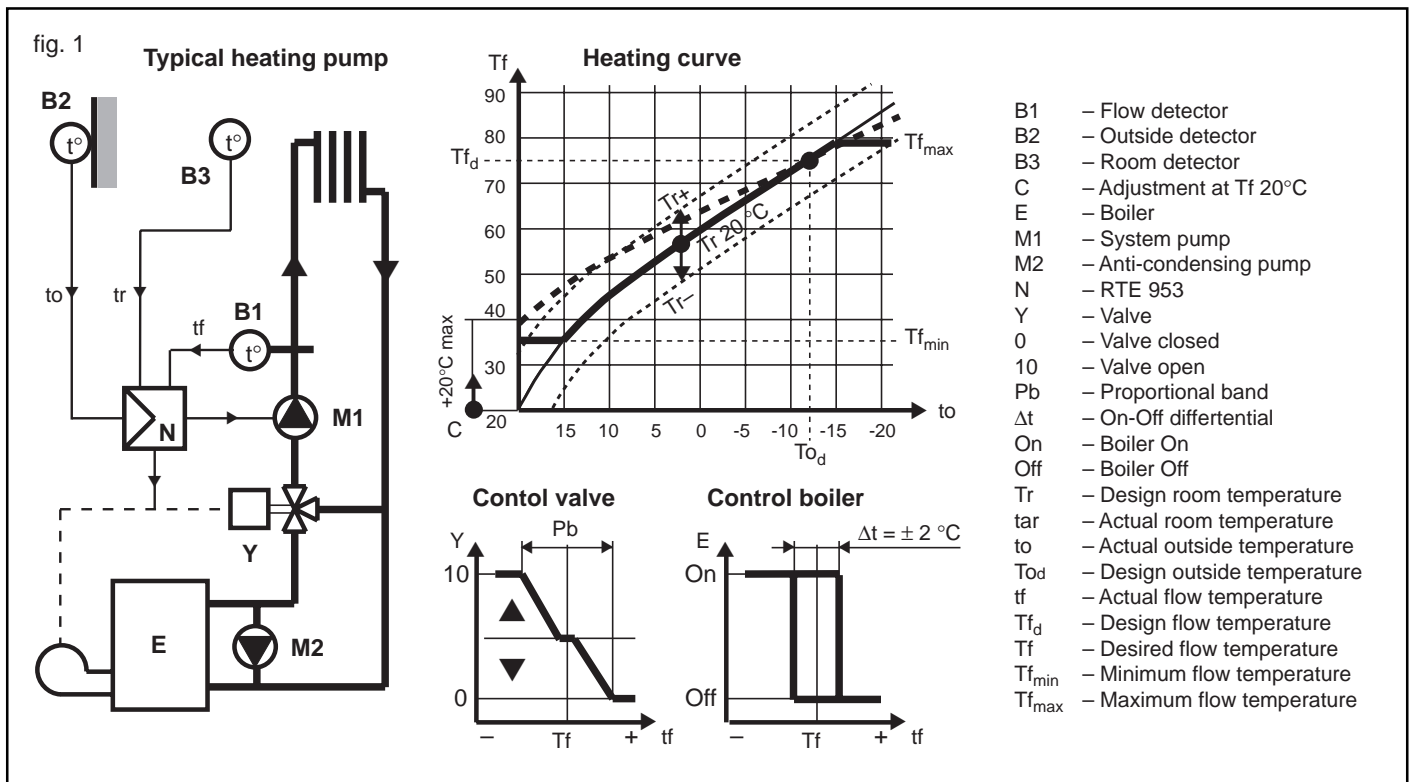
- Apartment blocks
- Schools and public buildings
- Commercial and administrative complexes

RTE 953 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 with running times of from 2 to 60 minutes; or the boiler directly.



SCHEMATIC DIAGRAMS



ACCESSORIES

No	Description	Model	Sens.g elem.	Code	Datasheet
1	Essential accessories: Surface flow temperature detector or immersion detector	SCH 010	NTC 10 kΩ	B1	N 130
1	Outside temperature detector	SIH 010	NTC 10 kΩ	B1	N 140
1	Optional accessories: Room temperature detector	SAE 001	NTC 1 kΩ	B2	N 120
1		SDA 010	NTC 10 kΩ	B3	N 110

OPERATION

Regulates the flow temperature in relation to outside temperature so as to provide a constant room temperature throughout the building.

All electronic functions of RTE 953 are processed by an HMOS microcontroller.

POWER SUPPLY

RTE 953 is energised by 220 / 240 V ac and is provided with a lithium battery which, should the mains supply fail, ensures the correct time of day and the memorisation of the data set for about ten years.

SECURITY JACK PLUG

On the RTE 953 facia is a jack plug (fig. 2 .4) which, if extracted, puts out of action the + and - keys thereby preventing any modification of the data.

In case of need, the technician responsible can utilise an internal link to restore the use of the keys even without the jack plug (fig. 3).

TEMPERATURE CONTROL

Detector B1 monitors the flow temperature t_f and detector B2 monitors outside temperature t_o .

RTE 953 modulates flow temperature (T_f) in relation to outside temperature (t_o) and heating curve (fig. 1) as set by design parameters (display pages 41,42,44):

- Type of heating media; panels, radiators, fan coils.
- Design outside temperature $T_{o,d}$
- Design flow temperature $T_{f,d}$

The heating curve set in this manner refers to a desired room temperature of 20 °C and can be adjusted by a parallel shift using the DAY (display page 2) and NIGHT (display page 3) values.

If these values are set at -- . - heating is excluded.

In event of a difference between actual temperature t_f and desired temperature T_f , RTE 953 produces a modulating signal with PI action for control of valve Y, or an On-Off signal for control of boiler (fig. 1).

The control parameters, Proportional Band and Neutral Zone, are automatically pre-set by RTE 953.

The point of origin of the heating curve $T_o = 20$ °C can be adjusted by setting an increase in flow temperature (display page 43) to compensate for weather variations during intermediate seasons due to reduced periods of heating.

ROOM AUTHORITY

When room sensor B3 is connected, RTE 953 compares the actual room temperature with the desired DAY, NIGHT or FROST PR. values according to the current mode. In the event of a variation, it produces an increase or a decrease in the T_f value calculated by the weather compensation function.

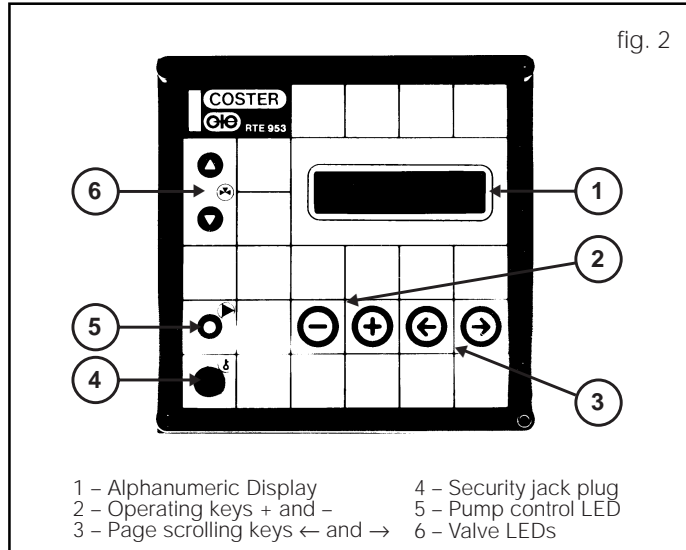
This variation depends on the room authority set: from 0 to 30 °C flow temperature variation for each °C variation in room temperature (display page 48)

LIMITS OF FLOW TEMPERATURE

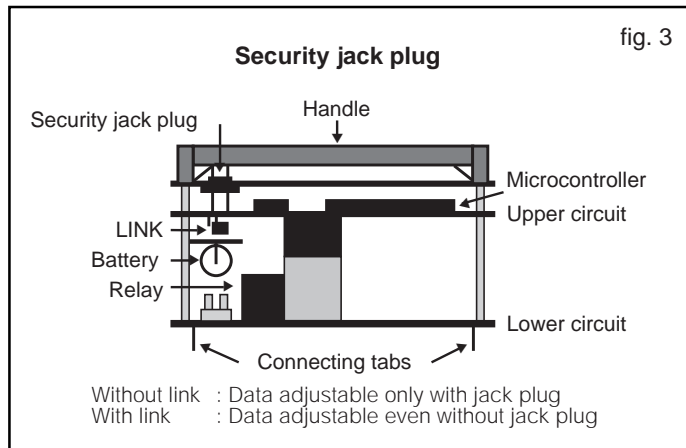
Minimum (display page 46) and maximum (display page 45) limits of flow temperature can be set :

- Minimum limit - Used in fan coil systems to avoid emission of cold air into room. Functions only in periods with DAY room temperature.
- Maximum limit - Used in panel systems to avoid dangerous overheating. Functions in any situation.

FACIA



INTERNAL LINK



PROGRAMS

The choice of program is made, with the + and - keys, on the 1st page of display. Eight operating programs can be used:

- 4 programs with daily times : P.1, P.2, P.3, P. 4
 - 1 Continuous DAY program : P.D.
 - 1 Continuous NIGHT program : P.N.
 - 1 FROST PROTECTION program : P.F.
 - 1 7-day program : WEEK
 - Daily programs: **P.1 to 4** (display pages 10 to 33).
- By assigning one of these programs (display page 1) the same operating times are applied to all days of the week. Each program can contain:
- from 1 to 3 On times : start of period at desired Day temperature.
 - from 1 to 3 Off times : start of period with desired Night temperature.

RTE 953 is preset to memorise the following times:

	P.1	P.2	P.3	P.4
On 1	07.00	08.00	06.00	06.00
Off 1	22.00	23.00	08.00	08.00
On 2	--- --	--- --	17.00	11.00
Off 2	--- --	--- --	22.00	14.00
On 3	--- --	--- --	--- --	17.00
Off 3	--- --	--- --	--- --	22.00

These times can be adjusted by 15 minutes at a time with the + and - keys.

When a pair of times, On and Off, is not used both must be cancelled by pressing the - key until -.- - appears on the display.

• Program: Continuous Day **P.D**

Provides Continuous operation at desired DAY temperature

• Program: Continuous Night **P.N.**

Provides continuous operation at desired NIGHT temperature

• Program: Frost Protection **P.F**

For prolonged periods of non-occupation provides continuous operation at a desired room temperature of 5 °C.

• 7-day program: **WEEK**

This is set by assigning to each day of the week one of the programs with daily times P.1 to P.4 or Continuous Day P.D. or Continuous Night P.N. or Frost Protection P.F. (display pages 34 to 40).

CONTROL WITH PROGRAMMED TIMES

RTE 953 is also able to control an On-Off output which operates with the program times used and according to the thermal demand of the heating system.

It can be used for the control of the heating system circulation pump.

- Switched on (contact closed) : In the Day periods

- Switched off (contact open) : In the Night and Frost Protection periods RTE 953 comes into action only when, for any reason whatsoever, it decides to re-open the valve, and remains in operation for at least 15 minutes.

CONSTRUCTION

RTE 953 is constructed in a DIN 43700 standard 144 x 144 casing (fig. 4). This is made from shock-proof plastic and contains, on the base, the two terminal blocks into which the connecting tabs of the printed circuit are inserted.

The electronic unit, which is fitted into the casing by means of slight pressure, is constructed according to Italian Electro-technical Committee (CEI) standards as a single unit comprising the printed circuit and the controls facia.

The cover, in transparent plastic, is hinged on the left of the casing and is provided with a mechanical closure. RTE 953 is suitable for wall and panel mounting (fig. 5).

INSTALLATION

RTE 953

This must be installed in a dry location with a temperature not above 35 °C, and away from water leakage or sprays.

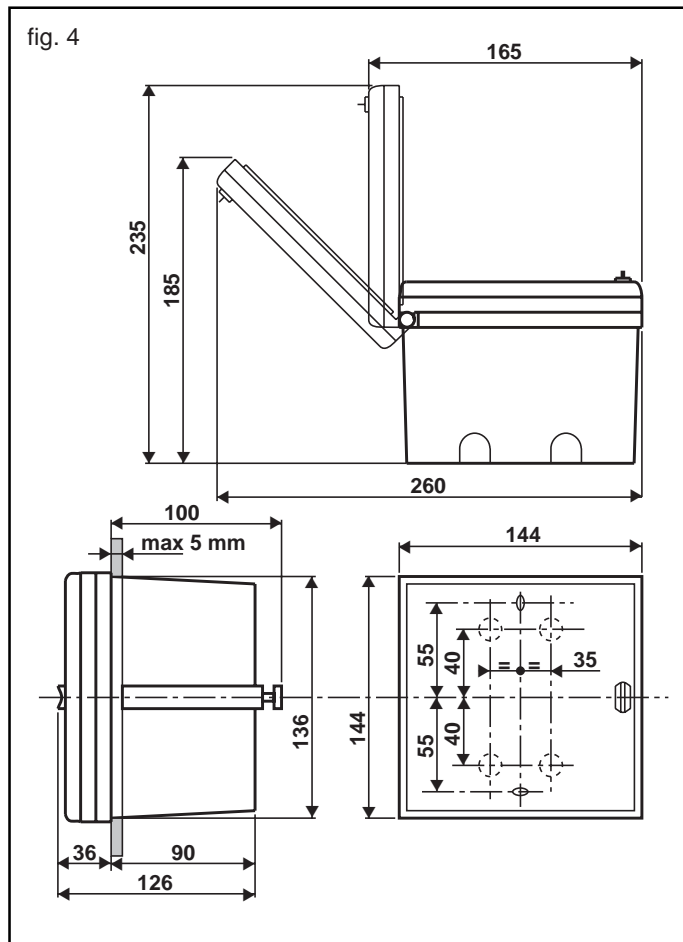
If installed in locations classified as "dangerous" it must be mounted inside a cabinet for electrical appliances constructed according to the regulations in force for the type of danger involved.

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.

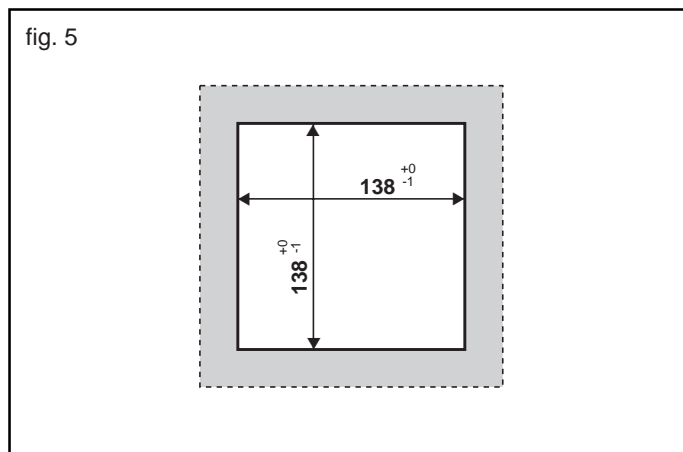
FLOW DETECTOR SCH 010 OR SIH 010

If circulation pump is on flow pipe, the detector must be installed downstream of pump. If pump is on return pipe, the detector must be installed downstream of control valve at a minimum distance of 1.5 meters so that it is not subject to indirect heat and also because, before reaching this point, the water is not sufficiently well mixed.

OVERALL DIMENSIONS



CUT-OUT FOR PANEL MOUNTING



OUTSIDE DETECTOR SAE 001

This must be installed outside the building on the north or north-west side, at a height from the ground of not less than three meters in order to prevent tampering and to allow better monitoring of changes in weather.

It must be protected from the sun's rays and be as far as possible from windows, doors, chimneys or other possible thermal disturbances.

ROOM DETECTOR SDA 010

This must be installed at a point from which it can monitor the average temperature of a representative room of the building, at a height of 1.5 to 1.6 metres from the floor, on an internal wall as far as possible from windows, doors, and possible sources of thermal disturbances, avoiding corners, shelving and curtains.

SETTING

Programming is set in a system of pages which can be scrolled on the luminous alphanumeric display by means of the ← and → keys (fig. 2.3).

The data are preset and can be adjusted, if the jack plug is inserted, by the + and – keys (fig. 2.2). Whichever page is displayed, at end of each hour the 1st page returns to display. To return rapidly to 1st page, press keys ← and → simultaneously.

Page	Display	Description
1	12.18 TUESDAY⁽¹⁾ Prg. P.1⁽²⁾ Mode D⁽³⁾	(1) Current day and time (2) Program chosen with + and –: – P.1 to 4 : With daily times – P.D. : Continuous Day – P.N. : Continuous Night – P.F. : Frost Protection – WEEK : 7-day (3) Current temperature mode: D : Day ; N : Night ; F : Frost Protection.
2	TR desired DAY : 20.0	Desired room temperature for Day mode
3	TR desired NIGHT : 16.0	Desired room temperature for Night mode. If desired heating system Off, set –.–.–.
4	T. flow : 65.0 T. outside : 05.0	Flow and outside temperatures measured by detectors
5	T. room measured : 19.8	Actual room temp. Appears only if detector B3 connected
6	T. room des: 20.0⁽¹⁾ T. flow cal : 68.5⁽²⁾	(1) Room temperature desired by current mode. (2) Flow temperature calculated by weather compensation function
7	Current HOUR 12	Adjustment of hour
8	Current MINUTES 18	Adjustment of minutes
9	Current DAY TUESDAY	Adjustment of day
10	PROGRAM P.1 TIME ON 1 07.00	Times of program P.1: ON – Start of period with desired Day temperature
11	PROGRAM P.1 TIME OFF 1 22.00	
12	PROGRAM P.1 TIME ON 2 –.–.–	OFF – Start of period with desired Night temperature Times adjustable 15 minutes
13	PROGRAM P.1 TIME OFF 2 –.–.–	
14	PROGRAM P.1 TIME ON 3 –.–.–	at a time with + and – keys When a time is not used it must be cancelled by pressing – key until –.–.– appears
15	PROGRAM P.1 TIME OFF 3 –.–.–	
A further 18 pages follow with programs P.2, P.3 and P.4		
34	7-DAY PROGRAM MONDAY P1	Program assigned to 1st day of week: – P.1 to 4 : with daily times – P.D : Continuous Day – P.N : Continuous Night – P.F. : Frost Protection
A further 6 pages follow for the other days of the week		
41	DESIGN T.outside – 05.0	Design outside temperature
42	DESIGN T. flow 80.0	Design flow temperature
43	Adjust. TF 20 20.0	Adjustment of flow temperature with outside temperature 20 °C

Page	Display	Description
44	HEATING SYSTEM RADIATORS	Type of heating media: panels radiators, fan-coils.
45	T. MAX. FLOW 99.0	Maximum limit of flow
46	T. MIN. FLOW 01.0	Minimum limit of flow. Only in Day mode
47	ACTUATOR 10.30	Type of output. On-Off: Press – key until BOILER appears. Modulating: Set running time of actuator
48	AUTHORITY T.R. 05.0	Variation in °C of flow temp. for each °C variation in room temper- ature. Appears only if B3 is connected
49	COSTER – RTE 953 Vers. 01	Identity card of controller.

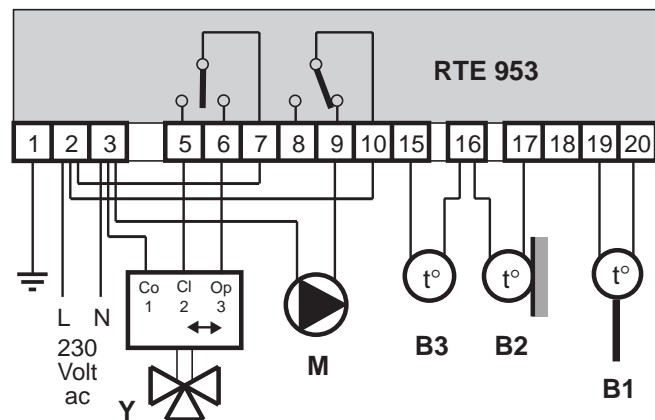
TECHNICAL DATA

Power supply	230 Volt ac
Frequency	50 to 60 Hz.
Consumption	5 VA
Output contacts:	
– maximum voltage applicable	250 Volt ac
– maximum capacity	5 (1) Amp
Setting range:	
– temp. room DAY and NIGHT	excluded to 30 °C
– temp. design outside	– 30 to + 10 °C
– temp. design flow	1 to 99 °C
– temp. maximum and minimum flow	1 to 99 °C
– adjustment of flow temp. at To 20 °C	20 to 40 °C
– actuator running time	2 to 60 min.
– room authority	0 to 30 °C
Room frost protection temperature	5 °C
Minimum interval between program times	15 minutes
Room temperature:	
– operating	0 to +45 °C
– storage	– 25 to +60 °C
Room humidity	class F (DIN 40040)
Protection	IP 40
Weight	1.1 kg

WIRING DIAGRAMS

fig. 6

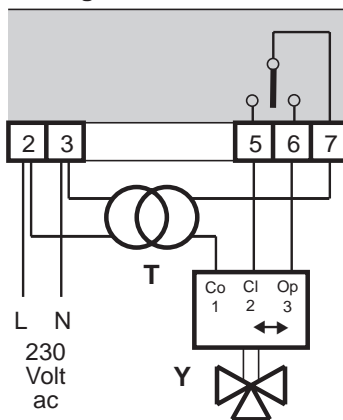
General layout



L – Line
N – Neutral
Y – Mixing valve

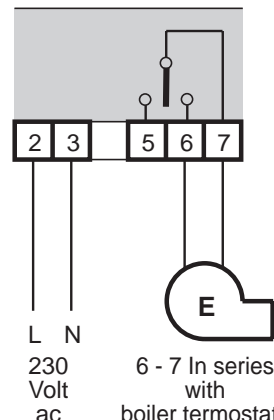
B1 – Flow detector
B2 – Outside detector
B3 – Room detector

Control actuator with voltage other than 230 Volt



E – Boiler
M – Heating system pump
T – Transformer

Control boiler



6 - 7 In series with boiler thermostats