

TE253 Modulating Programmable Digital Temperature Controller with P+I Heating/ Cooling Control with 3 Speed Fan

Description

The TE253 controller for a Fan Coil Unit is specifically designed to control a 6 port modulating valve for heating/cooling, and a 3 speed fan. They are fully configurable, standalone, a whole week, 5-2, 5-1-1, or 7-Day programmable digital thermostats with optional energy saving input interface.

The thermostat measures the temperature of a room with an integral sensor or a distant space with optional 10K external sensor, and then output 0-10Vdc signal by proportional integral algorithm to control a 6 port ball valve and output 24Vac signal to ramp 3 speed fan speeds in a fan coil unit system to maintain the room space at a desired set point temperature.

The thermostat features battery-backed real time clock providing separate programming 4 schedules and 4 timers for each day or periods of days of a week. The TE253 controller has a large LCD screen showing room temperature or set point, time, day, and related status. The thermostat also has optional digital inputs for detection devices such as room occupied/unoccupied detector to enhance energy savings.



Features

- Backlit display for clear readability
- Pre-set a whole week, 5-2, 5-1-1, or 7 day program that can be separate or whole week programmed for weekday and weekend with 4 daily schedules
- Modulates a 6 port ball valve to control heating/cooling output without the possibility of infiltration.
- 0 to 10Vdc control signal output on AO1
- Early fine tune function to ensure programmed temperature is reached by scheduled time
- 12- or 24- hour format with battery backed day and time
- The fan speed: 3 speed fan control with pilot 24Vac relay contact
- The ON/OFF button will turn the fan coil unit off and the valve will go to close position
- Room temperature or setpoint temperature selectable for display
- Full configurable parameters such as switching differential, cycle time, etc are set in 'Engineer Mode'
- Proportional plus integral (PI) algorithm applied to modulating control
- Optional Remote sensor (RS) input interface for connecting to 10K NTC3 remote temperature sensor
- Optional Energy Saving input (ESI) interface for connecting to hotel card key, occupied/unoccupied sensor, lighting interlock signal or window/door open detection to save energy
- Adjustable unoccupied setpoints for heating and cooling mode control
- Non-volatile memory (EEPROM) retains user settings during power loss with backup battery for 5 years

Specifications

- **Supply Voltage:** 24Vac (+/-10%), 50/60 Hz
- **Display Range:** 30 to 120.0 °C (-22.0 to 248.0 °F) with suitable sensor
- **Display Temperature Unit Resolution:** 0.1 °C/°F
- **Indication Accuracy:** +/-1.0 °C (1.8 °F) at 25 °C and output off
- **Set-point Range:** 0~50 °C / 32~122 °F (default-10~30 °C /50~86 °F, adjustable), 0.5 °C/°F per setting step
- **Set-point Adjust:** By up and down arrows buttons
- **Fan Button:** To toggle between fan modes Auto/Run
- **Remote Sensor (RS) Input Interface:** For connecting to external NTC Thermistor 10K ohm
- **Energy Savings Input (ESI) Interface:** For saving energy by entering into unoccupied mode when ESI is triggered by Normally open (N.O.) or normally closed (N.C.) dry contact
- **Valve Control:** 0-10V modulating output
- **Fan Control:** 3 speed on/off 24Vac
- **Analog Output Signal:** AO1, 0 to 10Vdc for controlling the 6-port valve
- **Digital Output Signal:** DO1, 3x contact closure 24vac
- **Dimensions:** 94 × 118 × 34 mm (W × H × D)
- **Mounting:** Mounts directly onto wall, panel, standard 65×65 mm junction box (hole pitch 60 mm) or standard 2×4 inch vertical junction box (hole pitch 83.5 mm)
- **Operating Ambient Temperature:** 0 - 50 °C, 5~95% RH (non-condensing)

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Energy Saving Occupied Unoccupied Schedule :

Temperature set point can be programmed for maximum 4 periods for a whole week, 5-2, 5-1-1, or each day.

Schedule	Period	Set point
1	Wake	Morning temperature
2	Leave	Daytime temperature
3	Return	Evening temperature
4	Sleep	Night temperature

Default Set Point Schedules - can be easily switched between °F or °C scales.

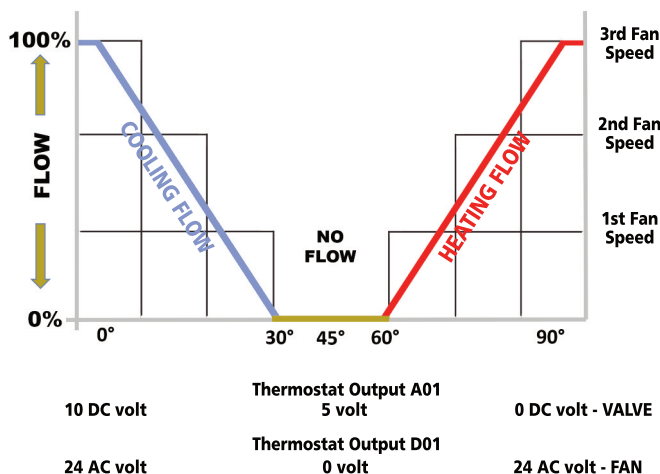
COOL	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Sch. 1 	6:00 26.0°C	6:00 26.0°C	6:00 26.0°C	6:00 26.0°C	6:00 26.0°C	6:00 26.0°C	6:00 26.0°C
Sch. 2 	8:00 29.5°C	8:00 29.5°C	8:00 29.5°C	8:00 29.5°C	8:00 29.5°C	8:00 29.5°C	8:00 29.5°C
Sch. 3 	18:00 26.0°C	18:00 26.0°C	18:00 26.0°C	18:00 26.0°C	18:00 26.0°C	18:00 26.0°C	18:00 26.0°C
Sch. 4 	22:00 26.0°C	22:00 26.0°C	22:00 26.0°C	22:00 26.0°C	22:00 26.0°C	22:00 26.0°C	22:00 26.0°C

HEAT	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Sch. 1 	6:00 21.0°C	6:00 21.0°C	6:00 21.0°C	6:00 21.0°C	6:00 21.0°C	6:00 21.0°C	6:00 21.0°C
Sch. 2 	8:00 16.0°C	8:00 16.0°C	8:00 16.0°C	8:00 16.0°C	8:00 16.0°C	8:00 16.0°C	8:00 16.0°C
Sch. 3 	18:00 21.0°C	18:00 21.0°C	18:00 21.0°C	18:00 21.0°C	18:00 21.0°C	18:00 21.0°C	18:00 21.0°C
Sch. 4 	22:00 16.0°C	22:00 16.0°C	22:00 16.0°C	22:00 16.0°C	22:00 16.0°C	22:00 16.0°C	22:00 16.0°C

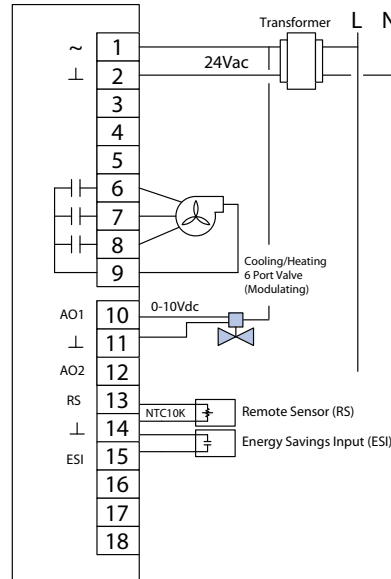
6 PORT VALVE VALVE POSITION INDICATOR (PATENT PENDING)



CONTROL OUTPUT FOR 6 PORT VALVE AND 3 SPEED FAN



Wiring Diagram



Wiring: Up to 18 screw-in terminals, each terminal capable of accepting 14 to 22 AWG wires or 1.5mm² wires.

Control Performance

Proportional plus integral (P+I) adaptive control with 0 - 10VDC output to control 6 port valves and 3 speed fan in sequence.

Energy Saving Input (ESI)

When using optional Energy Saving Input (ESI) interface unoccupied Set Points: Cooling: 28.0 / Heating: 15.0 are adjustable by engineering mode function

Thermostat control output for 6-port valve and ECM fan.

The TE253 room thermostat always outputs as follows:

- AO1 output 0Vdc - for 100% heating
- 5Vdc - for NO heat and NO cooling
- 10Vdc - for 100% cooling.

In combination with Spartan Peripheral Devices MS5320-OE actuator set to the counterclockwise (CCW) position will control as follows:

- With 0-5Vdc output - 90 to 45 degree rotation heating from 100% to 0%
- With 5Vdc to 10Vdc output - 45 to 0 degree rotation cooling from 0% to 100%.

Please observe heating/cooling piping connection orientation marker.

DO1 output is used for 3 speed fan controlled as per required demand, sequenced with heating or cooling flow.