

TT-S6/D is a microprocessor based step controller for controlling electric heaters etc. The step controller is controlled by a 0...10V signal from a TTC25/TTC40F regulator or from another controller or DDC.

- * 6 steps in sequence or 64 steps binary.
- * Input signal 0...10V.
- * Analogue output for control of TTC25/40F integrated with step activation.
- * Supply-air fan provides run on time delay.
- * Settable limit for number of steps.
- * Built-in test facility for simple start-up testing.

Function

TT-S6 is a step-controller designed for controlling electric heaters etc. It can also be used to step-control cooling processes. It has six relay outputs for controlling heater groups and an analogue output for sequential control of electric heaters. Alternatively the sixth relay can be used as a run on time relay for heater after-cooling. In this case the step-controller works with five steps.

Operating mode and step setting

The operating mode is selected by means of the slide switch on the front, binary or in sequence. In the sequential mode (S) the six (five) steps are activated one after the other. In binary mode (B) TT-S6/D can control up to 64 (32) steps. The figures in brackets refer to number of steps when using the after-cooling function of the sixth relay. The required number of steps is set by means of the rotating switch on the front.

Supply-air fan provides run on time as required

When heating is required the input signal exceeds zero, relay 6 will be activated for a three-minute run on time once the unit is switched off.

The relay contact is wired to the control circuit of the supply-air fan to provide aftercooling. If no heating is required when the unit is switched off, the run on time function will not be activated since it is not necessary.

Time delays

In order to reduce start-up time while still maintaining stable control, the TT-S6/D has a specially developed time-delay function for activating/deactivating output steps. When increasing or decreasing power output there is a 10 second delay between steps. For change of direction (from increase to decrease or vice-versa) there is a 30 second delay.

Heater power-distribution

To achieve more balanced control the analogue output on the TT-S6/D is used for continuous control of part of the heater via TTC25/TTC40F. The remainder is controlled by means of output steps from the step controller. When running in sequential mode (S) all loads in the heater should be of equal size. When running in binary mode the first load on the step controller should be of the same size as the part-load controlled by the TTC25/40F. For running in binary mode with part of the load being controlled continuously the heater must be split 1+1+2+4+8+16+32. At three-phase 400V the TT-S6/D in conjunction with TTC40F, can control (binary) up to 1600kW and at three-phase 230V up to 960kW.

Controlling together with TTC25/TTC40F

TTC25/TTC40F has a built-in temperature controller which is connected to the control input of TT-S6/D. The analogue output of the step controller is connected to the power control input of TTC25/40F which is run together with the step control to equalize the relay steps.

When increased power is required the output to the power control of TTC25/40F is increased. When this is at full power the step controller activates the next step at the same time as the power control output to TTC25/40F is set to zero.

Increased power requirement is provided by an increase in output from TTC25/TTC40F.

The corresponding function in reverse applies in the event of reduced power requirement.

Controlling from a controller/ DDC

TT-S6/D can also be controlled by a 0...10V signal from a DDC or other controller.

When a part of the heater is to be controlled continuously the analogue output on the TT-S6/D is connected to TTC25X / 40FX.

Test function

If the rotary switch is set to T on start up the TT-S6/D will start in test mode. In test mode the relays are force activated by turning the rotary switch. Also, the analogue output signal will be incremented by 1 V / step.

To exit test mode, restart with the switch set to a position other than T.

Technical data

General

Supply voltage	24 V AC +/- 15%, 50-60 Hz
Power consumption	6 VA
Ambient temperature	0...50°C
Storage temperature	-40...+50°C
Ambient humidity	Max 90%RH
Form of protection	IP20
Dimensions (w x h x d)	1 01 mm x 85 mm x 75 mm



This product conforms with the requirements of European EMC standards CENELEC EN 50081-1 and EN 50082-1, European LVD standards IEC 669-1 and IEC 669-2-1 and carries the CE mark.

Indicators

Red LED indicates activated output relay.
Red LED indicates power supply.

Input

Control input 0...10 V DC from TTC25/40F or other controller/DDC.

Outputs

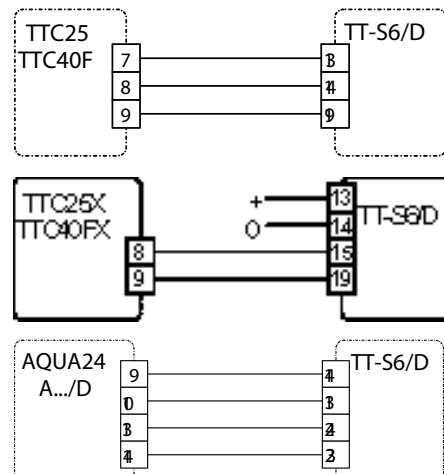
Control output 0...10V (When using TTC25/40F)
Relay contact data 2A, 250 V AC. Relays 1...5 are single pole closing with a common supply pole. Relay 6 is single pole change-over

Settings

Binary/sequential switch Binary (B), Sequential (S).
Rotary switch For setting the maximum number of output steps to be activated, 1...6. Relay 6 may, depending on the setting of the rotary switch, be used either as a sixth output relay or for run-on time delay to shut off the fan on shutting down the system.

Wiring

1 Relay 1 out	13 0 - 10V DC input	
2 Relay 2 out	14 Signal conv. 10-2V DC in	
3 Relay 3 out	15 Signal neutral	
4 Relay 4 out	16 Not connected	
5 Relay 5 out	17 Not connected	
6 Not connected	18 Not connected	
7 Relays 1-5 in common	19 0 - 10V DC output	
8 Not connected	20 Signal conv. 0-10V DC out	
9 Relay 6 common pole	21 Signal neutral	
10 Not connected	22 Not connected	
11 Relay 6 normally open	23 24V AC in	Supply voltage
12 Relay 6 normally closed	24 Neutral	voltage



Head Office Sweden

Phone: +46 31 720 02 00
Web: www.regin.se
Mail: info@regin.se

Sales Offices

France: +33 14 171 46 46
Hong Kong: +852 24 07 02 81
Singapore: +65 67 47 82 33
Germany: +49 30 77 99 40



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