

TT-S6/D

Step controller with 6 steps, binary or in sequence

TT-S6/D is a microprocessor-based step controller for control of electric heaters, etc. The step controller is controlled by a 0...10 V signal from a TTC25/ TTC40F/TTC80F electric heating controller or other controller.

- ✓ 6 steps in sequence or 63 steps binary
- ✓ Control signal 0...10V or 10...2V DC
- ✓ Analogue output for control of TTC25/ TTC40F/TTC80F integrated with step activation
- ✓ Supply air fan provides run-on-time delay
- ✓ Settable limit for number of steps
- ✓ Built-in testing function for simple start-up testing
- ✓ Intended for DIN-rail mounting

Overview

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 63 (31) 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.

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.

On each change up/down, a blocking function is activated for 30 seconds, preventing immediate (dis)connection of the latest output step to minimize the risk of unwanted instability.

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/TTC80F. 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/TTC40F/TTC80F. 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).

Example: At three-phase 400V the TT-S6/D combined with TTC40F, can control (binary) up to 1600kW and at three-phase 230V up to 960kW.

Controlling together with TTC25/TTC40F/TTC80F

TTC25/TTC40F/TTC80F 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/TTC40F/TTC80F 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/TTC40F/TTC80F 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/TTC40F/TTC80F is set to zero. Increased power requirement is provided by an increase in output from TTC25/TTC40F/TTC80F. The corresponding function in reverse applies in the event of reduced power requirement.

Controlling from a controller

TT-S6/D can also be controlled by a 0...10 V DC signal from a controller. Alternatively, a 10...2 V signal from e.g. a TA controller can be connected via the built-in signal converter (see next paragraph).

When a part of the heater is to be controlled continuously the analogue output on the TT-S6/D is connected to TTC25/TTC40F/TTC80F.

Signal converter

TT-S6/D has a built-in signal converter which converts a 10...2 V DC input signal to a 0...10 V DC output signal. It is used when TT-S6/D should be controlled by a controller with a 10...2 V DC output signal.

Technical data

Supply voltage	24 V AC \pm 15 %, 50...60 Hz
Power consumption	6 VA
Ambient temperature	0...50°C, non-condensing
Storage temperature	-40...50°C
Ambient humidity	Max. 90 % RH
Size (BxHxD)	101 mm (6 modules) x 85 mm x 75 mm
Protection class	IP20
Control input	0...10 V DC from TTC25/TTC40F/TTC80F or other controller or 10...2 V via the built-in signal converter
Control output	0...10 V DC to TTC25/TTC40F/TTC80F
Relay contact data	6 relays, single pole closing, 240 V AC 2 A total. Relays 1...5 have a common supply pole. Relay 6 is single pole change-over. When in a running mode where a cool-down period has been configured, relay 6 uses a run-on time delay when stopping and should be connected to the control circuit of the supply air fan.
Indicators	Red LED (6) indicates activated output relay Red LED indicates power supply

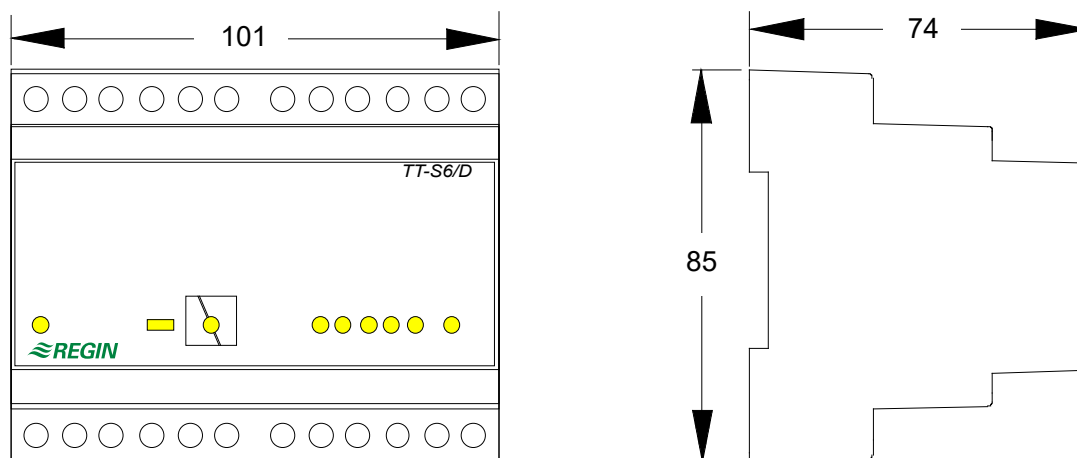
Settings

Binary/sequential switch	Binary (B), Sequential (S)
Rotary switch	For setting the maximum number of output steps to be activated (1...6). Depending on the setting, relay 6 may be used either as a sixth output relay or for run-on time delay to shut off the fan on shutting down the system. Position 0 is for activating the self-test function.



This product carries the CE mark. More information is available at www.regincontrols.com

Dimensions



Measurements in mm unless otherwise specified.

Wiring

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

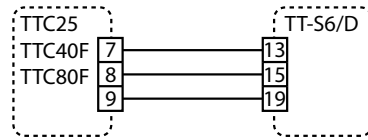


Fig 1: Wiring of TT-S6/D and TTC25/TTC40F/TTC80F.

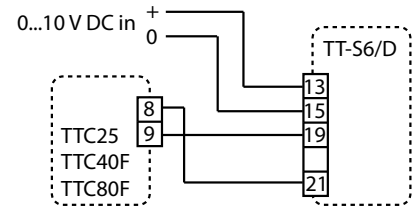


Fig 2: Wiring of TTC25/TTC40F/TTC80F and 0...10V DC control signal from an external source

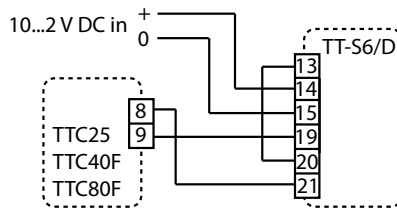


Fig 3: Wiring of TTC25/TTC40F/TTC80F and 10...2V DC control signal from an external source

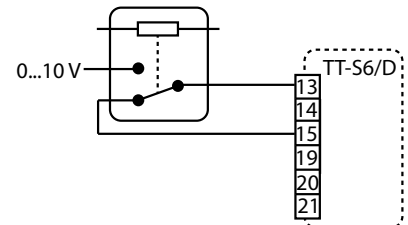


Fig 4: Control signal wiring when using relay 6 for shutdown cooling

Product documentation

The product documentation can be downloaded from www.regincontrols.com