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TT-S4/D
Step-controller, 4 steps
Binary or sequential

TT-S4/D is a micro-processor based step controller for controlling cooling or heating applications. The step-controller is controlled by a 0...10V signal from a TTC25/TTC40F or another controller/ DDC.

* 4 sequential steps or 15 binary steps

* Input signal 0...10 V and 10...2 V

* Analogue output for controlling a TTC25/40F in conjunction with output steps

* Settable limit for number of steps

* Built-in test facility for simple start-up testing

* Compact design for DIN-rail mounting with settings easily accessible on the front

Function

TT-S4/D is a step-controller designed primarily for control of electric heating. It can also step-control cooling units. The step-controller has four output relays and an analogue output for continuous control of electric heaters.

Function mode and number of steps
The function mode can be selected by means of a slide-switch on the front, sequential or binary. In sequential mode (S) the four output relays are activated one after the other. In binary mode (B) the TTS4/D gives 15 output steps. The required number of steps can be selected by means of the rotary switch on the front.

Time delays
In order to reduce start-up time and yet maintain stable control when running the TT-S4/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.

The system is unable to change direction, from increase to decrease or vice-versa, more frequently than every 30 seconds. At each change a shut-off function is activated for a period of 30 seconds which prevents immediate activation/deactivation of the previous step.

Heater configuration
In order to obtain more stable control the analogue output on the TT-S4/D is used for continuous control of part of the output of the heater via TTC25/TTC40F.Other part outputs are controlled via relays from the step controller.

In sequential mode (S) the five groups should be of equal size. In binary mode (B) the output of the first step should be of the same size as the part controlled by TTC25/TTC40F. In binary mode and with one part controlled by TTC25/TTC40F the heater should be devided in parts 1+1+2+4+8.
At three-phase 400V the TT-S4/D together with TTC40F can control (binary) up to 443kW and at three phase 230V up to 255kW.

Controlling together with TTC25/TTC40F
TTC25/TTC40F has a built-in temperature controller which is connected to the control input of TT-S4/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/TTC40F is set to zero.

Controlling together with TTC25/TTC40F

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 DDC

TT-S4/D can also be controlled by a 0...10 V or 10...2 V signal from a DDC or other controller.
When a part of the heater is to be controlled continuously the analogue output on the TT-S4/D is connected to a TTC25X / 40FX.

Test Function

If the maximum step switch is set to 0 at power up the TT-S4/D enters test mode.
By rotating the switch the output functions can be tested. With the sequential/binary switch set to S the relays are activated one after another and the analogue output is stepped up by 2.5V per step. With the switch set to B the relays are activated in a binary sequence.
When the switch is set to 0 the unit will leave test mode. The switch is then set to the maximum number of step to be used.

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

CE — 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

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Control input	0...10 or 10...2 V DC from TTC25/40F or other controller/DDC.

Outputs

Control output	0...10V (When using TTC25/40F)
Relay contact data	4 single pole closing relays. 240 V AC, 2A, the relays have a common supply pole.

Settings

Binary/sequential switch	Binary (B), Sequential (S).
Rotary switch	For setting the maximum number of output steps to be activated, 1...15. In S-mode setting the switch to 4 or higher will give 4 steps. Position 0 is for activating the self-test function.

Wiring and dimensions

No	Description	No	Description
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	Not connected	17	Not connected
6	Relays 1 - 4 common in	18	Not connected
7	Not connected	19	0...10V DC output
8	Not connected	20	Signal conv. 0...10V DC out
9	Not connected	21	Signal neutral
10	Not connected	22	Not connected
11	24V AC in (Supply voltage)	23	Not connected
12	Neutral (Supply voltage)	24	Not connected
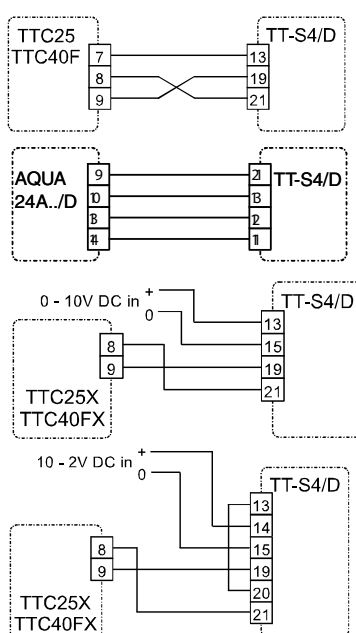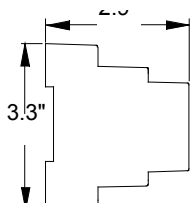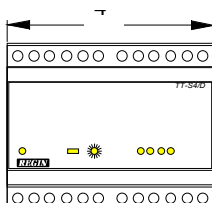
3.3"

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THE CHALLENGER IN BUILDING AUTOMATION