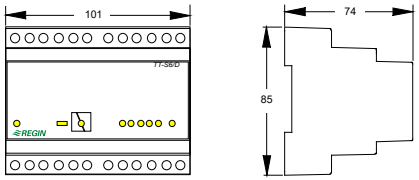
TT-S6/D



IMPORTANT: Read these instructions before installation and wiring of the product.

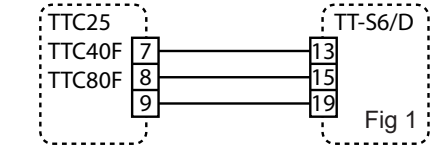


Fig 1

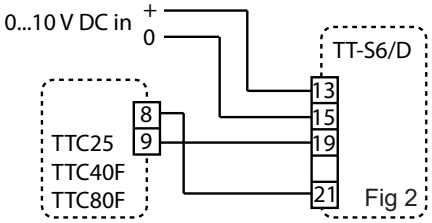


Fig 2

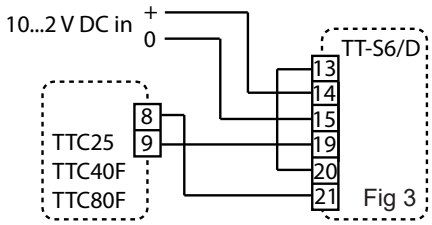


Fig 3

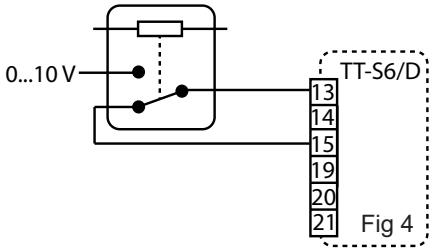


Fig 4

REGIN
Box 116 428 22 KÅLLERED SWEDEN
Tel +46 (0)31 720 02 00 Fax +46 (0)31 720 02 50

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INSTRUCTION

Step controller for electric heating

TT-S6/D is a micro-processor based step controller designed for use together with Regin's TTC controllers. It has a control input signal of 0...10V DC. It has six relay outputs for controlling six heater groups. Alternatively it can control five heater groups and use the sixth relay for run-on time delay for heater aftercooling. The TT-S6-T/D can be set to control either a heater with equal loads giving 5 or 6 steps or a heater where the load is binary divided giving 31 or 63 steps.
The TT-S6/D also has a 0...10V DC output for controlling a triac controller for smoothing the power output between the relay steps.
The maximum number of relay steps can be limited using a switch on the front.
TT-S6/D is built for DIN-rail mounting with all settings accessible on the front.

Installation

Mount the TT-S6/D on a DIN-rail in a cabinet or other enclosure.
Protection class: IP20.
Ambient temperature: 0...50°C.

Wiring

Supply voltage
Supply voltage: 24V AC +/-15% 50...60Hz.
Power consumption: 6 VA.
Terminal 23 = Phase.
Terminal 24 = Neutral.
Relay outputs
Relays 1 - 5, SPST with a common supply pole. 240V AC 2A total.
Relay 6, SPDT. 240V AC 2A.
When the heater is binary divided the loads must be wired in rising size with the smallest load on relay 1.
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 of the fan on shutting down the system.
Control input
Control voltage 0...10V DC from a TTC25, TTC40F or TTC80F controller, or other controller with a 0...10V output.
Terminal 13 = 0 - 10V DC input.
Terminal 15 = Signal neutral

INSTRUCTION

Control output
The control output is used to control a triac controller that will give 0...100% power between each relay step. The load connected to the triac controller should have the same size as the load connected to relay 1.
Terminal 19 = 0...10V DC output.
Terminal 21 = Signal neutral.
Signal converter
TT-S6/D contains a signal converter that converts a 10 - 2V DC input signal to a 0 - 10V DC output signal.
This is used when TT-S6-T/D is controlled by for example TA-controllers with a 10 - 2V DC output.
Terminal 14 = 10 - 2V DC input
Terminal 20 = 0 - 10V DC output, connect to terminal 13.

Settings

Maximum number of permitted relay steps
With the rotary switch you choose if relay 6 is to be used for power output or for fan control, and the maximum number of relay steps to be used.
To ensure correct control it is important that the switch is correctly set.
Position T is the starting position for the built-in test function.
Binary - Sequential switch
Set to S if all the load is divided into equal parts.
Set to B if the load is Binary divided, i.e. if the parts have the size-ratio of 1:2:4:8:16(:32).

Figures

Fig 1: TT-S6/D and TTC25/TTC40F/TTC80F
Fig 2: TT-S6/D and external 0...10 V control signal
Fig 3: TT-S6/D and external 10...2 V control signal
Fig 4: Control signal wiring when using relay 6 for shutdown cooling

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	

REGIN
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Function

Six part loads in sequence or binary without fan control
On an increasing input signal TT-S6/D will first increase the 0...10V output signal. If the power demand becomes so large that the output signal would need to be larger than 10V, the TT-S6-T/D will activate the first relay. The output is held at 0V for 10 seconds and is then set to an output corresponding to the part of the output signal that would have been larger than 10V.
In order to get the best control possible the TT-S6/D automatically sets the amplification between the input signal and the output signal to suit the maximum number of relay outputs used. At an input signal of 10V the number of relays set on the rotary switch will be activated and the output signal will be at 10V.
TT-S6/D will only increase or decrease the relay outputs by one at a time with a time delay of 10 seconds between steps.
At an abrupt loss of input signal, for example at shutdown ot the system, TT-S6/D will set the output to 0V and deactivate all the relays.

Five part loads in sequence or binary with fan control
Relay 6 can be used for run-on time delay to ensure adequate cooling of the heater on shutdown. Wire the relay to the fan motor relay. If the system is shut down when the input signal is >0V the signal will fall abruptly. This will make the TT-S6/D set the output signal to 0V and deactivate all the relays except relay 6 that will be kept activated for a further 3 minutes.
To ensure that the control signal really is 0, the input 13 should be shorted to signal neutral when the system is shut down. See fig. 4.
Other functions as for six part loads described above.

Test function

Turn off the supply voltage to TT-S6/D and set the rotary switch to position T. The setting of the Binary/sequence switch does not influence the test function.
Reconnect the supply voltage.
All relays should be deactivated and the output signal equal to the input signal (updated every 10 seconds).
N.B. It is normal for the LEDs to wink faintly even when they are unactivated.
Move the rotary switch clockwise one step. Relay 1 is activated and the output signal is 1V.
Continue to twist the switch in a clockwise direction. For each step up to step 6 the activated relay will move up one step (moving dot) and the output signal will increase by 1V/step.
At position 7 all relays are deactivated and the output voltage is 7V.
At position 8 (position 0 in the fan sector) relay 6 is activated and the output voltage is 8V.
For higher positions the relays R1 to R5 will be activated in sequence (thermometer style) and the output voltage will increase by 1V/step.
At position 10 (position 2 in the fan sector) the output voltage is 10V.
For positions higher than 10 the output voltage will be 0V.
For positions higher than 13 (position 5 in the fan sector) only relay 6 will be activated and the output voltage is 0 V.
On completion of the test function, turn off the supply voltage to the TT-S6/D and set the switches to positions suitable for the installation.
Reconnect the supply voltage.

CE information

This product carries the CE-mark. For more information, see www.regincontrols.com.