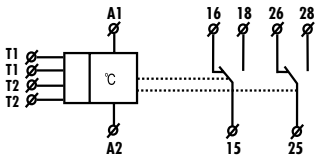
Multifunction digital thermostat TER-9

2M

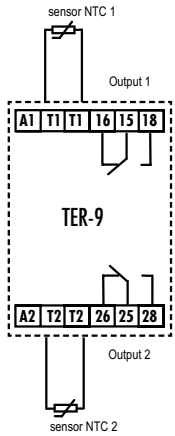
- digital thermostat with 6 functions and in-built time switch clock, with daily and weekly program (as SHT-1). Thermo functions can be managed also in real time
- complex control of heating and water heating in a house, solar heating....
- 2 thermostats in one, 2 temperature inputs, 2 outputs with potential free contact
- maximally universal and variable thermostat containing all common thermostatic functions
- functions: two independent thermostats, 1x dependent, differential thermostat, 2-stage thermostat, thermostat with dead zone, heating functions
- function of monitoring short-circuits or sensor disconnection
- program setting of output function, calibration of sensors according to reference temperature (offset)
- thermostat is inferior to a program of digital switch clock
- memory for the most often used temperatures
- zero error when value setting
- well-arranged display of set and measured data, illuminated LCD by backlight
- supply AC 230 V or AC/DC 24 V galvanically separated
- output contact 1x changeover 8 A / 250 V AC1 for each output
- 2-MODULE, DIN rail mounting

Technical parameters:	TER-9
Supply	
Number of function:	6
Supply terminals:	A1 - A2
Supply voltage:	AC 230 V or AC/DC 24 V, galvanically separated
Consumption:	max. 3.5 VA
Supply voltage tolerance:	-15 %; +10 %
Measuring circuit	
Measuring terminals:	T1-T1 and T2-T2
Temperature range:	-40.. +110 °C
Hysteresis (sensitivity):	adjustable in range 0.5 .. 5 K
Diference temperature:	adjustable 1 .. 20 °C
Sensor:	termistor NTC 12 kΩ at 25 °C
Sensor failure indication:	sign "Err"
Accuracy	
Measuring accuracy:	5 %
Repeat accuracy:	< 0.5 °C
Temperature dependance:	< 0.1 % / °C
Output	
Number of contacts:	1x changeover for each input, (AgNi)
Rated current:	8 A / AC1
Breaking capacity:	2500 VA / AC1, 240 W / DC
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Output indication:	symbol ON/OFF
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Other information	
Operating temperature:	-20.. +55 °C
Storage temperature:	-30.. +70 °C
Electrical strength:	4 kV (supply - contact)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5/ with sleeve max. 1x2.5
Dimensions:	90 x 35.6 x 64 mm, see page 90-92
Weight:	140 g
Standards:	EN 61812-1, EN 61010-1, EN 60730-2-9

Symbol

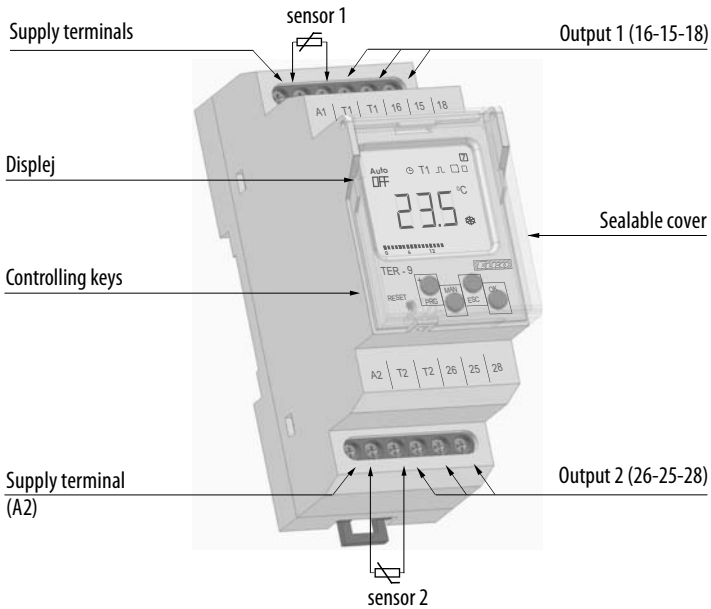


Connection



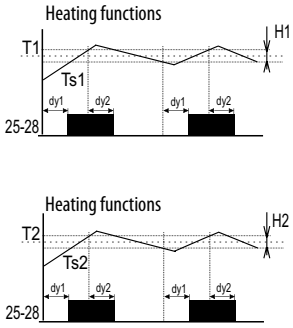
Note: The device is possible to operate with one sensor.In such case it is necessary to connect resistor10kΩ. This resistor is a part of delivery.

Description



THERMOSTATS

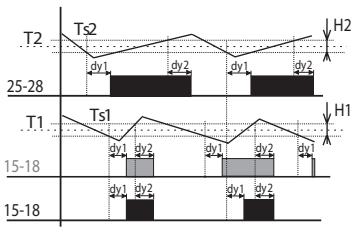
2 independent single-stage thermostat



Legend:
Ts1 - real (measured) temperature 1
Ts2 - real (measured) temperature 2
T1 - adjusted temperature T1
T2 - adjusted temperature T2
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1 - set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (for T1)
25-28 output contact (for T2)

Output contact switched until adjusted temperature is reached. Hysteresis eliminates frequent switching.
Heating/cooling function adjusted in the menu.

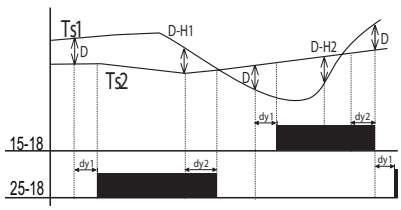
Dependent functions of 2 thermostats



Legend:
Ts1 - real (measured) temperature 1
Ts2 - real (measured) temperature 2
T1 - adjusted temperature T1
T2 - adjusted temperature T2
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
25-28 output contact (for T2)
15-18 výstupní kontakt (intersection T1 and T2)

Output 15-18 is closed, if temperature of both thermostats is bellow an adjusted level.
When any thermostat reaches adjusted level, the contact 15-18 open.
Serial inner connection of thermostats (logic function AND).

Differential thermostat

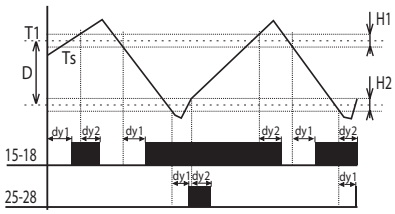


Legend:
Ts1 - real (measured) temperature T1
Ts2 - real (measured) temperature T2
D - adjusted difference
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (for T1)
25-28 output contact (for T2)

Switching of output corresponds with input, which has lower temperature when diffference is exceeded

differencial thermostat is used for keeping two identical temperature e.g. in heating systems (boiler and reservoir), solar systems (collector - reservoir, exchanger), water heating (water heater, water distribution)etc.

2-stage thermostat

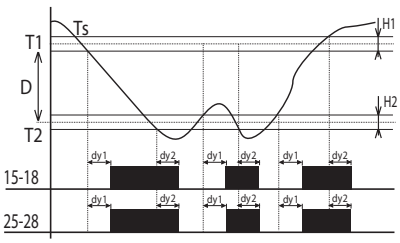


Legend:
Ts - real (measured) temperature
T1 - adjusted temperature
D - adjusted difference
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact
25-28 output contact

Typical example of use for two-stage thermostat is e.g in boiler-room, where there are two biolers from which one is main and the other one is auxiliary. The main boiler is managed according to set temperature and auxiliary boiler is switched in case temperature falls under set difference. Thus it helps to the main boiler in case outside temperature dramatically falls.

In the range of set difference (D) output 15-18 functions as normal thermostat to input 1 (type 1).
In case temperature falls under set difference, output 2 switches.

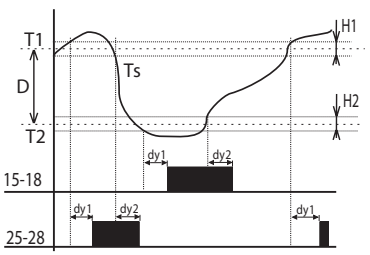
Thermostat with "WINDOW"



Legend:
Ts - real (measured) temperature
T1 - adjusted temperature MAX
T2 - adjusted temperature MIN (T2=T1-D)
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact
25-28 output contact

Output is closed (heating) only if temperature is within adjusted range.If temperature is out of range, the contact opens. T2 is set as T1-D.
The function is used for protection of gutters against freezing.

Thermostat with dead zone



Legend:
Ts - real (measured) temperature
T1 - adjusted temperature T1
T2- adjusted temperature T2 (T2=T1-D)
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (heating)
25-28 output contact (cooling)

In case of thermostat with a „dead zone" , it is possible to set temperature T1 and a difference (respectively a width of dead zone D). In case the temperature with set hysteresis H1 is lower than T1, output contact switches heating and when T1 is reached it opens. In case the temperature falls under T2, contact switches cooling and opens when T2 is reached. This function can be used for example for automatic air warming and cooling in ventilation so the sit is always within the range T1 and T2.