

TBP Digital Thermostats with Display

TBP is a digital instrument to measure and control any load through a switching relay (potential free). The wide possibility of programming makes this device a multifunction instrument with high flexibility; this is actually possible thanks to the display in sequence of the parameters, which make this instrument easy to program.





The readout of the given data and setup parameters, is made through 3 digit display with a linearizing software for PTC and it is supported by four indicators that directly show the state of the outputs (therefore helping the operator during the programming stage). Through four switches it is possible to enter directly in the set-up procedure as well as in the temperature differential adjustment, meanwhile the programming and configuration menu can be reached only via a user selectable password, in order to avoid accidental changes in the set-up.



Features

- 230Vac Power Supply
- Highly Flexible
- Step by step Programming through Display
- Custom Configuration
- 3 Digit Display
- DIN-rail Mounting

Model Type	Model	Description
	TBP-10S-M0P	Electronic Thermostat with Display, PTC Sensor Input, 230Vac Power Supply
	TBP-10S-M0D	Electronic Thermostat with Display, 0..10V Sensor Input, 230Vac Power Supply
Technical Data	Power Supply	230Vac -10/+10%, max 1.5VA
	Input	TBP-10S-M0P: 1 x Resistive PTC 2k Ohm TBP-10S-M0D: 1 x 0..10V Input
	Output	1 x 5A resistive 250Vac SPDT Relay
	Differential	Adjustable 0..25.5°C
	Communication	RS-485 Modbus
	Display	3 Digits
	Resolution	Unitary, with a user selectable decimal point
	Full Scale	Customisable
	Mounting	DIN rail
	Housing	ABS V0
	Dimensions	W52.5 x H90 x D73 mm

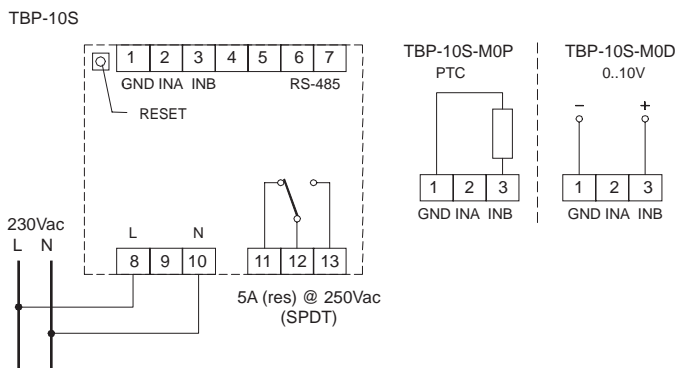
Relay Output	<p>This instrument allows configuring the state of the relay in the following cases:</p> <ul style="list-style-type: none"> - Probe error - Temperature differential selection with respect to the set-point (symmetrical or not) - Minimum time for operation and stop. <p>It is possible to program the delay of the initial activation of the relay (default pre-set at four seconds) to reduce the effects a possible inrush current generated in case an electric motor is connected as a load</p>
Data Processing	<p>All the set data, including the sensors linearizing tables, are stored in a non-volatile memory present on the device: in this way it is possible to update the tables, to customize and to adapt them to other types of probes. The memory is initially loaded in factory with standard data stored inside the microprocessor in order to avoid an uncertain (and complicated) programming; possible up-dates and/or following changes are made through a serial connection with a PC that sets the instrument.</p> <p>The device provides an RS485 interface port which gives the possibility to connect several instruments on the same net bus (MODBus), through which the configuration as well as the calibration are made in an automatic fashion (advanced feature).</p>
Key Description	<p>The 4 keys in the front panel are:-</p> <ul style="list-style-type: none">  SETPOINT - Access to the programming menu (if pressed at least 3 seconds) - Exit from programming and configuration menu  TO INCREASE THE SELECTED VALUE  TO DECREASE THE SELECTED VALUE  TEMPERATURE DIFFERENTIAL ADJUSTMENT (when pressed for 2 seconds) - Confirmation of the selected value - Access to the configuration menu (if pressed at least 3 seconds)
Access through Password	<p>If the device requires a password for entering a menu (see notes) proceed as follows:</p> <p>Press key "S1/MD" or "S2/OK" for at least three seconds according to which menu is required (programming or configuration): on the display appears "SEt PAS".</p> <p>Press key "S2/OK": on the display the value " 0 " flashes. Press keys "UP" or "DOWN" to enter password, then "S2/OK" to enter the menu.</p> <p>Press "S1/MD" to exit the selected menu: the display shows the actual temperature.</p> <p>The default password is " 0 ".</p>
New Password Setup	<p>To set up a new password press for at least three seconds the key "S1/MD": the display shows "SEt Min", which gives the access to the programming menu.</p> <p>Press the "UP" key until the function "nuo PAS" appears.</p> <p>Then press the key "S2/OK": the stored password flashes, so it can be changed by using the keys "UP" or "DOWN".</p> <p>Press "S2/OK" to store the new password, then press "S1/MD" to exit the programming menu: the display will show the actual temperature.</p>
Setpoint	<p>To adjust the Set Point press the key "S1/MD": the display shows the value previously stored.</p> <p>Press the key "UP" or "DOWN" to increase or reduce the value; press again key "S2/OK" to store the relay intervention point (Set Point): the display will show the actual temperature.</p>
Temperature Differential Setup	<p>In order to adjust the temperature differential press for at least 2 seconds the key "S2/OK": the display will show the value previously stored.</p> <p>Use the keys "UP" or "DOWN" to change the temperature differential and then press key "S2/OK" to store the new value: the display will show the actual temperature.</p>
Setup Example	<p>Digital filter setup (nuM FIL)</p> <p>Press for at least 3 seconds key "S1/MD": the programming menu is reached and the display shows "SEt Min". Press the key "UP" until the words "nuM FIL" appear on the display; now press "S2/OK": the stored value flashes and it can be changed with the keys "UP" or "DOWN".</p> <p>Press "S2/OK" to store the new value, then press "S1/MD" to exit the programming menu: the display will show the actual temperature.</p>

Description of Errors

There are 3 possible indications of error on the display:

- "---", when the input signal is lower than the minimum visualizable value;
- "EEE", when the input signal is higher than the maximum visualizable value;
- "Er.2", when the input signal is absent (e.g. when the sensor is disconnected).

Wiring Diagram



Parameter Description

SEt PAS - Setup

Password: value inserted to enter the programming menu.

SEt Min - Minimum Set Point: minimum value that can be set through the keyboard.

SEt MAS - Maximum Set Point: maximum value that can be set through the keyboard.

LEt Min - Minimum visualized input: minimum value indicated on the display.

LEt MAS - Maximum visualized input: the maximum value indicated on the display.

inP 0°C - Display indication with input = 0 (V, mA, °C): value indicated on the display when the device measures 0 in the relevant measurement units (V, mA, °C).

inP FSC - Display indication with input = full scale: value indicated on the display when the device reaches the maximum measurable value in the relevant measurement units.

OFS In.1 - Probe n.1 offset with input = 0: allows modifying the value shown on the display at the probe n.1 minimum value.

SPn In.1 - Probe n.1 span with input = 999: allows modifying the value shown on the display at the probe n.1 maximum value.

OFS In.2 - Probe n.2 offset with input = 0: allows modifying the value shown on the display at the probe n.2 minimum value.

SPn In.2 - Probe n.2 span with input = 999: allows modifying the value shown on the display at the probe n.2 maximum value.

nuM FIL - Digital filter: input averaging number: this value allows to set an averaging calculation on the input signal in order to display a more stable value on the display.

Adr Mdb - Serial address for the net MODBus connection: is the value for identifying every single device connected on the net (the number must be different for each device).

LEFT KEY					
Display	Programming functions	Note	Select. val.	Units	Default
SEt PAS	Setup of programming password	4	0 999	-	0
SEt Min	Minimum set-point setup		-99 999	(**)	-9.9
SEt MAS	Maximum set-point setup		-99 999	(**)	99.9
LEt Min	Minimum value shown		-99 999	(**)	-9.9
LEt MAS	Maximum value shown		-99 999	(**)	99.9
inP 0°C	Display indication with input = 0 (V, mA o °C)		-99 MIL	(**)	0
inP FSC	Display indication with input = full scale		-99 MIL	(**)	100
OFS In.1	Probe n.1 offset with input = 0		-99 999	(**)	0
SPn In.1	Probe n.1 span with input = 999		-99 999	(**)	999
OFS In.2	Probe n.2 offset with input = 0	1	-99 999	(**)	0
SPn In.2	Probe n.2 span with input = 999	1	-99 999	(**)	999
nuM FIL	Digitale filter: input averaging number		1 8	-	8
Adr Mdb	Serial address for connection in the MODBus net		0 31	-	1
ISr rL.1	Hysteresis relay n.1	2	0 250	(**)	0.2
ISr rL.2	Hysteresis relay n.2 (not yet available)	3	0 250	(**)	1.0
SEC rL.1	Relay n.1 minimum time for work or stop	2, 4	0 250	seconds	10
SEC rL.2	Relay n.2 minimum time for work or stop	3, 4	0 250	seconds	10
rit rEL	Delay on relay turn-on	4	0 250	seconds	4
nuo PAS	Programming password modification	4	0 999	-	0

(*) Select only: 1 for PTC version
0 for PT100 version
1 or 0 in 0 .. 10V= and 0 .. 20mA= versions according to the wired sensor.

(**) Unity or decimal display according to decimal point setup (SEt dEC function).

St rL.1 - Relay n.1

hysteresis: this value sets a differential on the input n. 1 value in order to avoid relay contacts "chattering".

St rL.1 - Relay n.2

hysteresis (not available):

this value sets a differential on the input n.2 value in order to avoid relay contacts "chattering".

SEC rL.1 - Relay n.1 minimum work or stop time: is the minimum time that passes between the relay n.1 actions.

rit rEL - Delay on the relay start up: time between the instrument start up and relay activation.

nuo PAS - Password

Control: value for changing the password to enter the programming and configuration menu.

SEt PAS - Setup Password: is the value to use for entering the configuration menu (same as the programming menu).

Mod SEt - Relay operation mode: allows setting up the operation of the relay, combining the running of one with respect to the other.

Mod ISt - Relay hysteresis type selection: allows setting up the hysteresis type of the relay (positive, negative or symmetric).

SEL SCA - Temperature scale selection: allows to set up the scale in °C or °F.

SEL dEC - Decimal point selection: allows display of the decimal point for the measured value.

Mod rL.1 - Relay n.1 operation mode: sets relay n.1 in order to work in a direct or inverted mode.

Mod rL.2 - Relay n.2 operation mode (not available yet): sets relay n.2 in order to work in a direct or inverted mode.

Mod Ld.1 - Operation mode of led n.1 combined with relay n.1: allows to select the turning on and off of led n.1 according to the state of relay n.1.

Mod Ld.2 - Operation mode of led n.2 combined with relay n.2: allows to select the turning on and off of led n.2 according to the state of relay n.2.

Err rL.1 - Relay n.1 operation mode on probe error: this parameter is used for setting the relay n.1 state in case of sensor failure (a message of error (Er.2) appears on the display).

Err rL.2 - Relay n.2 operation mode on probe error: this parameter is used for setting the relay n.2 state in case of sensor failure (a message of error (Er.2) appears on the display).

nuM Err - Error allowed between two readings: is the difference to set between a reading and the following in order to display an error message.

RIGHT KEY				
Display	Setup functions	Note	Value setup	Default
SEt PAS	Setup password		0 999	0
Mod SEt	Operation mode of the relay (relay n.2 not avail.)	2, 3	0 2 free sets 1 2 set a finestr 2 1 set + 1 posit. diff. 3 1 set + 1 negat. diff.	0
Mod ISt	Relay hysteresis type selection		0 Hyst. Symmetrical 1 Hysteresis positive 2 Hysteresis negative	0
SEL SCA	Temperature scale selection		0 Deg. Centigrade (°C) 1 Deg. Fahrenheit (°F)	0
SEL dEC	Decimal point selection		0 Without decimals 1 With decimals	(*)
Mod rL.1	Relay n.1 operation mode		0 Not qualified 1 Relay direct 2 Relay inverted	1
Mod rL.2	Relay n.2 operation mode (not yet available)		0 Not qualified 1 Relay direct 2 Relay inverted	0
Mod Ld.1	Operation mode of led n.1 combined to relay n.1	2	0 Direct led 1 Inverted led	0
Mod Ld.2	Operation mode of led n.2 combined to relay n.2	3	0 Direct led 1 Inverted led	1
Err rL.1	Relay n.1 operation mode on probe error	2	0 relay Off 1 relay On	0
Err rL.2	Relay n.2 operation mode on probe error	3	0 relay Off 1 relay On	0
nuM Err	Error allowed between 2 following readings		0 80	20

Notes (table):

- 1: only when probe no 2 is enabled
- 2: only when relay no 1 is enabled
- 3: only when relay no 2 (not yet available) is enabled
- 4: unit display even when decimal selection is enabled.

Notes: In the view of a constant development of their products, the manufacturer reserves the right for changing technical data and features without prior notice. The consumer is guaranteed against any lack of conformity for 24 months from the time of delivery, according to the European Directive 1999/44/EC. The full text of guarantee is available on request from the seller.