neptronic®

Room controller Thermostat
Specification & Installation instructions

Feature:

TRO5404

- Selectable analog output
- Selectable Fahrenheit or Celsius scale
- Manual Night Set Back override
- Multi level lockable access menu
- Lockable Set point
- Selectable internal or external temperature sensor
  - ✓ Selectable external temperature sensor type (3.3 KΩ or 10 KΩ | Type 3 or Type G)
- Selectable proportional control band

Technical Data	TRO5404
Outputs	2 Analog Cooling outputs (0-10VDC)
	2 Analog Heating outputs (0-10VDC)
	0 or 22 VDC, TPM, (Time proportional modulation) 250 mA max.
Power supply	22 to 26 VAC 50/60Hz
Power consumption	2 VA
Set point range	10ºC to +35ºC [50ºF to 95ºF]
Control accuracy	Temperature: +/-0.2ºC [0.4ºF]
Proportional band	0.5 ºC to 4ºC [1 ºC to 8ºF] adjustable
Electrical connection	0.8 mm^2 [18 AWG] minimum
Operating temperature	0ºC to +50ºC [32ºF to +122ºF]
Storage temperature	-30ºC to +50ºC [-22ºF to +122ºF]
Relative Humidity	5 to 95 % non condensing
Degree of protection of housing	IP 30 to EN 60529
Weight	85 g. [0.2 lb]

Presentation

Symbols on display

Symbol	Description	Symbol	Description
❄️ A	Cooling ON A: Automatic	🔒	Menu set-up Lock ON
A 🔥	Heating ON A: Automatic	🔧	Programming mode
🌙	Energy saving mode ON	MIN MAX	Minimum/Maximum set points
ºC or ºF	ºC: Celsius scale ºF: Fahrenheit scale		

Dimensions

Dimension	Inches	Metric (mm)
A	3.00	78
B	3.00	78
C	1.00	24
D	2.36	60

Mounting Instructions
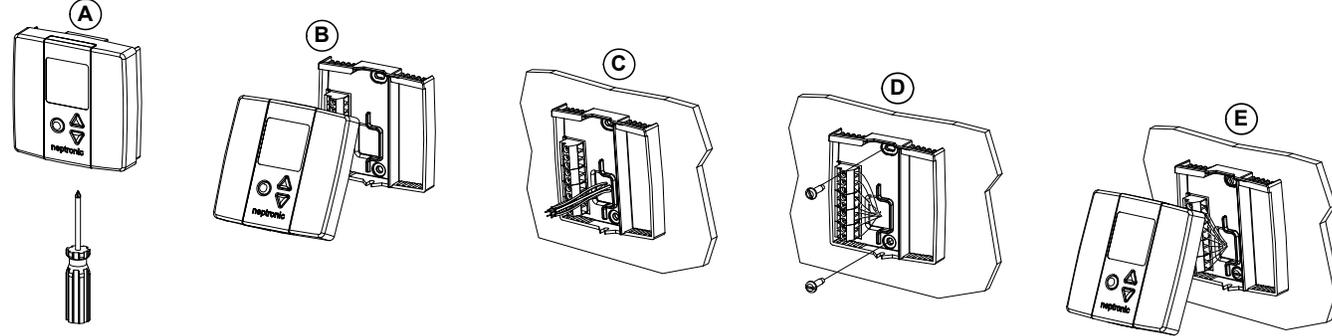
CAUTION: Risk of malfunction. Remove power prior to separate thermostat cover from its base.
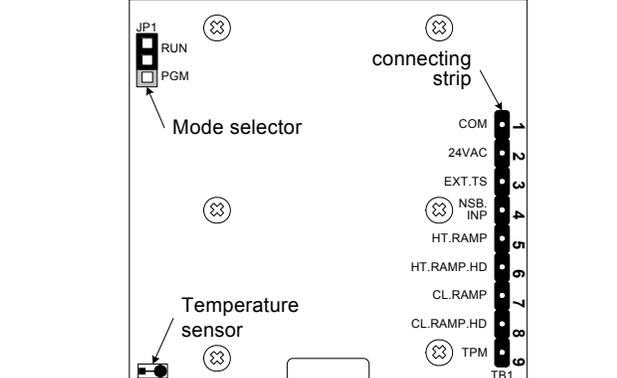A.   Remove the screw (captive) holding the base and the front cover of the thermostat.
B.   Lift the front cover of the thermostat to separate it from the base.
C.   Pull wire through the base hole.
D.   Secure the base to the wall using wall anchors and screws (supplied). Make the appropriate connections.
E.   Mount the control module on the base and secure using the screw.

Terminal description

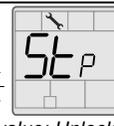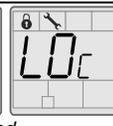| Terminals	TRO5404
1	Common
2	24 VAC
3	Exterior temperature sensor
4	Night set back input*
5	Heating ramp
6	Heating ramp high demand
7	Cooling ramp
8	Cooling ramp high demand
9	TPM (time proportional modulation)

*For a replacement in an existing night set back (NSB) loop with thermostat PTA, the NSB input, terminal #4, of the TRO should be isolated for a good performance.

Settings on PC Board

Mode Selection

Jumper (JP1) on RUN:
Thermostat is in **operation mode**.
Thermostat must be set in this mode to operate properly.
If not locked, set point and control mode (Heating & Cooling ON, Cooling only ON or Heating only ON) may be modified by end user.

Jumper (JP1) on PGM:
Thermostat is set in **Programming mode**.
Refer to following section about all settings description

Programming mode

When in this mode this symbol 🔧 is displayed. Please press on ○ button to advance to the next program function and press on Δ or ∇ to change value. You can leave the programming mode at any time, changed values will be recorded.

Step	Display	Description	Values
1		**Internal temperature sensor Calibration:** Display switches between "**tS1**" and temperature read by internal temperature sensor. You can adjust the calibration of the sensor by comparison with a known thermometer. For example if thermostat has been installed in an area where temperature is slightly different than the room typical temperature (thermostat place right under the air diffuser).	Range : 10 to 35ºC [50 to 95ºF] Increment:1ºC [1ºF] **NOTE: This thermostat has been calibrated at factory**
2A		**Locking the set point :** Display switches between "**LOc**" and "**Stp**". You can lock or unlock the set point adjustment by end user. If locked the lock symbol will appear. If you do not want to lock set point adjustment by end user, go directly to step #3.	*Default value: Unlocked*

Step	Display	Description	Values
2B	22. °C	**Locking the set point (cont'd):** Select the desired locked set point temperature; this one should be within the temperature range. Once locked set point temperature is selected, please go directly to step #5	Set point range : 10 to 35ºC [50 to 95ºF] Increment: 1ºC [1ºF] *Default value: 22ºC [72ºF]*
3	StP (MIN)	**Minimum set point:** Display switches between "**Stp**" and the minimum set point temperature. **MIN** symbol is also displayed. Please select the desired minimum set point temperature.	15. °C (MIN) Range for Minimum 10 to 34ºC [50 to 94ºF] Incrément1ºC [1ºF] *Default value: 15ºC [59ºF]*
4	StP (MAX)	**Maximum set point** Display switches between "**Stp**" and the maximum set point temperature. **MAX** symbol is also displayed. Please select the desired maximum set point temperature.	30. °C (MAX) Range for Maximum 11 to 35ºC [51 to 95ºF] Increment1ºC [1ºF] *Default value: 30ºC [86ºF]*
5A	LOc	**Locking the control mode:** Display switches between "**LOc**" and "**CtL**". You can lock or unlock selection of control mode by end user. If locked the lock symbol will appear. If you do not want to lock selection of control mode by end user, go directly to step #6.	CtL LOc CtL *Default value: Unlocked*
5B	CtL	**Locking the control mode (cont'd):** Display switches between "**CtL**" and "**Aut**". Select which control mode you want to authorize: Automatic cooling and heating, OFF cooling and heating, heating only or cooling only.	Aut OFF on on *Default value: Automatic cooling and heating*
6	Pbd	**Proportional band:** Display switches between "**Pbd**" and the value of the proportional band. Please select the desired value of proportional band.	4.0°C Proportional band range : 0.5 to 4.0ºC [1.0 to 8.0ºF] Increment: 0.5ºC [1.0ºF] *Default value: 2.0ºC [4.0ºF]*
7	CL. (MIN)	**Minimum position of 1st cooling ramp:** Display switches between "**CL.**" and the value of the minimum position of the 1st cooling ramp. **MIN** and cooling symbols are also displayed. Please select the desired value of the minimum position of the 1st cooling ramp.	0.0 (MIN) Range: 0.0 to 5.0 Volt. Increment: 0.2 Volt. *Default value: 0.0 Volt*
8	ht. (MIN)	**Minimum position of 1st heating ramp:** Display switches between "**ht.**" and the value of the minimum position of the 1st heating ramp. **MIN** and heating symbols are also displayed. Please select the desired value of the minimum position of the 1st heating ramp.	0.0 (MIN) Range: 0.0 to 5.0 Volt. Increment: 0.2 Volt. *Default value: 0.0 Volt*
9A	tS	**Internal/external temperature sensor selection:** Display switches between "**tS**" and "**in**" or "**out**". Please select internal or external sensor. If you select internal temperature sensor, go directly to step #10.	in Out *Default value: Internal temperature sensor*
9B	tS2	**External temperature sensor value:** If you select external temperature sensor, display will switch between "**tS2**" and the type of the external temperature sensor. Select the external sensor type. (see table below)	3.3 10.1 *Default value: 3.3 (sensor 3.3 KΩ)* **(With DS100 or WS100, set "tS2" to 3.3)**
9C	tS2	**External temperature sensor Calibration:** Display switches between "**tS2**" and the temperature read by the external temperature sensor (if connected). You can adjust the calibration of the external sensor by comparison with a known thermometer.	45.0°C Range: 5 to 45ºC [41 to 99.9ºF] Increment:1ºC [1ºF] 5.0ºC [41.0ºF], resistance will be infinite. 45.0ºC [99.9ºF], résistance will be short circuited.
10	nSb (MIN)	**Night set back derogation time :** Display switches between "**nSb**" and the derogation time in minute. **MIN** and NSB ☽ symbol is also displayed. Please select the desired derogation time, if no derogation time is desired select "**OFF**".	180 (MIN) Range: OFF or 30 to 180min. Increment: 15min. *Default value: 120 min.*
11	StP	**Cooling Set point during Night set back:** Display switches between "**Stp**" and the value of the cooling set point temperature during night set back. NSB ☽ and cooling symbols are also displayed. Please select the cooling set point temperature during night set back.	28. °C Range: 22 to 35ºC [72 to 95ºF] Increment: 1ºC [1ºF] *Default value: 28ºC [83ºF]*
12	StP	**Heating Set point during Night set back:** Display switches between "**Stp**" and the value of the heating set point temperature during night set back. NSB ☽ and heating symbols are also displayed. Please select the heating set point temperature during night set back.	16 °C Range: 10 to 22ºC [50 to 72ºF] Increment: 1ºC [1ºF] *Default values: 16ºC [61ºF]*

Temperature Vs Type of sensor / value (KΩ):

Temp.	3.3	10.1
5 ºC [41ºF]	8.380	23.460
10ºC [50ºF]	6.570	18.790
15ºC [59ºF]	5.186	15.130
20ºC [68ºF]	4.123	12.260
25ºC [77ºF]	3.300	10.000
30ºC [86ºF]	2.658	8.194
35ºC [95ºF]	2.155	6.752
40ºC [104ºF]	1.757	5.592
45ºC [113ºF]	1.441	4.655

Operation mode

Step	Description	Display
1	At powering up, thermostat will light display and activate all LCD segments during 2 seconds. **Illuminating the LCD.** To illuminate the LCD, you just have to push onto any of the 3 buttons. LCD will light for 8 seconds. **Temperature display** In operation mode, thermostat will automatically display temperature read. To change the scale between °C and °F, press on both ∆ and ∇ for 3 seconds.	
2	<u>Set point display and adjustment</u> To display the set point, press twice on the ∆ or ∇button. Set point is displayed for 5 seconds. To adjust set point, press on ∆ or ∇ while the temperature set point is displayed. *Note: If set point adjustment has been locked, 🔒 symbol will be displayed.*	
3	<u>Night set back (NSB) :</u> When thermostat is in night set back mode, NSB symbol ☽ is displayed, so set point for cooling and/or heating are increased as per the setting made in programming mode. If not locked, night set back can be derogated for a predetermined period by pressing onto any of the 3 buttons. During period of NSB derogation the ☽ symbol will flash. If NSB does not flash, the derogation period is finished or the Night set back derogation has been locked in programming mode.	
4	<u>Control mode selection :</u> To verify which control mode is set, press once onto the ◯ button. Control mode will be displayed during 5 seconds. To change of control mode, press on ∆ or ∇while control mode is displayed. You can choose one of the following: ✓ Automatic Cooling or Heating ✓ Cooling and Heating OFF ✓ Cooling only ✓ Heating only *Note: If control mode selection has been locked, 🔒 symbol will be displayed.*	

Typical Applications

Wiring	Schematic
Central Cooling and Heating terminal (0-10 VDC modulating electric heater and pulsed baseboard)	

| **Central Cooling and Heating and heating terminal with Night set back** (pulsed electric heater) | |

Recycling at end of life

At end of life, please return the thermostat to your Neptronic® local distributor for recycling. If you need to find the nearest Neptronic® authorized distributor, please consult **www.neptronic.com**.