



Features:

- Selectable analog & digital output
- Selectable Fahrenheit or Celsius scale
- Manual Night Set Back override (programmable)
- Multi level lockable access menu
- Lockable Set point / Control mode
- Selectable internal or external temperature sensor
- Selectable proportional control band & dead band
- Change over by contact or external temperature sensor available

TRO54P3X1

Technical Data	TRO54P3X1
Outputs	2 Analog programmable outputs (cooling and/or heating and/or change over 0-10 Vdc) 3 Digital programmable outputs (cooling and/or heating and/or change over dry contact)
Contact rating	Resistive load: rated load: 1.0 Amp / 24 Vac / Vdc Inductive load: rated load: 0.3 Amp / 24 Vac / Vdc maximum switching capacity: 30 VA / 24 W
Power supply	22 to 26 Vac 50/60Hz
Power consumption	1 VA
Set point range	10°C to 35°C [50°F to 95°F]
Control accuracy	Temperature: ±0.2°C [0.4°F]
Proportional band	0.5 °C to 5°C [1°F to 10°F] adjustable
Electrical connection	0.8 mm ² [18 AWG] minimum
Operating temperature	0°C to 50°C [32°F to 122°F]
Storage temperature	-30°C to 50°C [-22°F to 122°F]
Relative Humidity	5 to 95 % non condensing
Degree of protection of housing	IP 30 to EN 60529
Weight	80 g. [0.18 lb]

Presentation

Symbols on display	
	Cooling ON 100% output A: Automatic
	Heating ON 100% output A: Automatic
	Energy saving mode ON
	°C: Celsius scale °F: Fahrenheit scale
	Menu set-up Lock ON
	Programming mode (Technician setting)
	Minimum/Maximum set points
	Alarm

Dimensions

	<table border="1"> <thead> <tr> <th>Dimension</th> <th>Imperial (in)</th> <th>Metric (mm)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>3.00</td> <td>78</td> </tr> <tr> <td>B</td> <td>3.00</td> <td>78</td> </tr> <tr> <td>C</td> <td>1.00</td> <td>24</td> </tr> <tr> <td>D</td> <td>2.36</td> <td>60</td> </tr> </tbody> </table>	Dimension	Imperial (in)	Metric (mm)	A	3.00	78	B	3.00	78	C	1.00	24	D	2.36	60
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Mounting Instructions

CAUTION: Risk of malfunction. Remove power prior to separate thermostat cover from its base.

- Remove the screw (captive) holding the base and the front cover of the thermostat.
- Lift the front cover of the thermostat to separate it from the base.
- Pull wire through the base hole.
- Secure the base to the wall using wall anchors and screws (supplied). Make the appropriate connections.
- Mount the control module on the base and secure using the screw.

Terminal Description

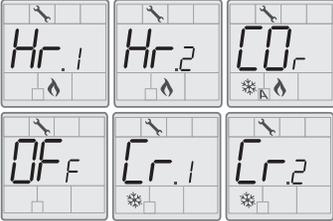
Terminals	TRO54P3X1
1	Common
2	24 Vac
3	Exterior temperature sensor
4	Night set back input
5	Analog output 1 (AO1)
6	Analog output 2 (AO2)
7	Digital output 1 (DO1)
8	Digital output 2 (DO2)
9	Digital output 3 (DO3)

Settings on PC Board

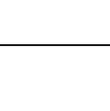
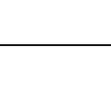
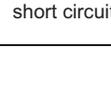
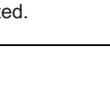
Mode Selection (JP1)	
	Jumper (JP1) on RUN: Thermostat is in operation mode . Thermostat must be set in this mode to operate properly. If not locked, set point, control mode and speed fan (Heating & Cooling ON, Cooling only ON or Heating only ON) may be modified by end user.
	Jumper (JP1) on PGM: Thermostat is set in Programming mode . Refer to following section about all settings description
Digital Output Signal Selection (JP2)	
	Jumper (JP2) on 24 Vac: All digital output signal is linked to 24 Vac.
	Jumper (JP2) on COM: All digital output signal is linked to common.

Programming Mode

When in this mode the  symbol is displayed. Press on the  button to advance to the next program function. Press on the button  to return to the previous function and press on the arrow buttons  or  to change values. You can exit the programming mode at any time. Changed values will automatically be recorded.

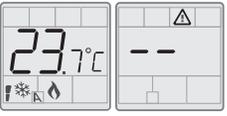
Step	Display	Description	Values
1		Internal temperature sensor Calibration: Display switches between "tS1" and temperature read by internal temperature sensor. You can adjust the calibration of the sensor by comparison with a known thermometer. For example if thermostat has been installed in an area where temperature is slightly different than the room typical temperature (thermostat place right under the air diffuser).	 Range: 5 to 45°C [41 to 99°F] Increment: 0.1°C [0.2°F] (max. offset ± 5°C) (Factory calibrated)
2		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. The minimum value is restricted by the maximum value (step #3).	 Minimum range 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 15°C [59°F]
3		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. The maximum value is restricted by the minimum value (step #2).	 Maximum range 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 30°C [86°F]
4		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.	 Default value: Unlocked
5		Locking the set point (cont'd): Select the desired locked set point temperature; this one should be within the temperature range. Setpoint value is restricted by the minimum and maximum value (step #2 & 3).	Set point range: 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 22°C [72°F]
6		Adjust the control mode: Display switches between "Ctl" and "Aut". Select which control mode you want to authorize: <ul style="list-style-type: none"> • Automatic, • Cooling or heating, • Heating only • Cooling only 	 Default value: Automatic cooling and heating
7		Set On/Off function enable or disable: Display switches between "OFF" and "ena". You can enable or disable the Automatic mode adjustment by end user.	 Default value: Enable
8		Contact 1 ramp: Display switches between "Ct.1" and the selected ramp. Selected the desired ramp for contact 1: <ul style="list-style-type: none"> • Heating ramp 1 (Hr.1) • Heating ramp 2 (Hr.2) • Change over ramp (COr) • Off • Cooling ramp 1 (Cr.1) • Cooling ramp 2 (Cr.2) If "OFF" is selected, go directly to step #11.	 Default value: Heating ramp 1
9		Contact 1 (Ct1) Close (CL) position: Display switches between "Ct1" and the value of the first contact close "CL". Heating or cooling symbol is also displayed. Please select which percentage you want contact 1 to close: 20% to 90% of the demand. <i>Note: The ramp will be the same as you choose at step #8.</i>	 Range: CL.2, .3, .4, .5, .6, .7, .8 or .9 Increment: 0.1 (10%) Default value: CL.5 (Contact close at 50% of the demand)
10		Contact 1 (Ct1) Open (OP) position: Display switches between "Ct1" and the value of the first contact open "OP". Heating or cooling symbol is also displayed. Please select which percentage you want contact 1 to open: 0% to 70% of the demand. <i>Note: The ramp will be the same as you choose at step #8.</i>	 Range: OP.0, .1, .2, .3, .4, .5, .6 or .7 Increment: 0.1 (10%) Default value: OP.2 (Contact open at 20% of the demand)

Step	Display	Description	Values
11		<p>Contact 2 ramp: Display switches between "Ct.2" and the selected ramp. Selected the desired ramp for contact 2:</p> <ul style="list-style-type: none"> • Heating ramp 1 (Hr.1) • Heating ramp 2 (Hr.2) • Off • Cooling ramp 1 (Cr.1) • Cooling ramp 2 (Cr.2) <p>If "OFF" is selected, go directly to step #14.</p>	 Default value: Cooling ramp 1
12		<p>Contact 2 (Ct2) Close (CL) position: Display switches between "Ct2" and the value of the second contact close "CL". Heating or cooling symbol is also displayed. Please select percentage you want contact 2 to close: 20% to 90% of the demand. Note: The ramp will be the same as you choose at step #11.</p>	 Range: CL.2, .3, .4, .5, .6, .7, .8 or .9 Increment: 0.1 (10%) Default value: CL.5 (Contact close at 50% of the demand)
13		<p>Contact 2 (Ct2) Open (OP) position: Display switches between "Ct2" and the value of the second contact open "OP". Heating or cooling symbol is also displayed. Please select which percentage you want contact 2 to open: 0% to 70% of the demand. Note: The ramp will be the same as you choose at step #11.</p>	 Range: OP.0, .1, .2, .3, .4, .5, .6 or .7 Increment: 0.1 (10%) Default value: OP.2 (Contact open at 20% of the demand)
14		<p>Contact 3 ramp: Display switches between "Ct.3" and the selected ramp. Selected the desired ramp for contact 3:</p> <ul style="list-style-type: none"> • Heating ramp 1 (Hr.1) • Heating ramp 2 (Hr.2) • Off • Cooling ramp 1 (Cr.1) • Cooling ramp 2 (Cr.2) <p>If "OFF" is selected, go directly to step #17.</p>	 Default value: Heating ramp 1
15		<p>Contact 3 (Ct3) close (CL) position: Display switches between "Ct3" and the value of the third contact close "CL". Heating or cooling symbol is also displayed. Please select percentage you want contact 3 to close: 20% to 90% of the demand. Note: The ramp will be the same as you choose at step #14.</p>	 Range: CL.2, .3, .4, .5, .6, .7, .8 or .9 Increment: 0.1 (10%) Default value: CL.9 (Contact close at 90% of the demand)
16		<p>Contact 3 (Ct3) open (OP) position: Display switches between "Ct3" and the value of the third contact open "OP". Heating or cooling symbol is also displayed. Please select which percentage you want contact 3 to open: 0% to 70% of the demand. Note: The ramp will be the same as you choose at step #14.</p>	 Range: OP.0, .1, .2, .3, .4, .5, .6 or .7 Increment: 0.1 (10%) Default value: OP.4 (Contact open at 40% of the demand)
17		<p>Ramp for analog output (Ao1): Display switches between "Ao1" and the selected ramp. Please select which ramp you want to use:</p> <ul style="list-style-type: none"> • Heating ramp 1 (Hr.1) • Heating ramp 2 (Hr.2) • Change over ramp (COr) • Cooling ramp 1 (Cr.1) • Cooling ramp 2 (Cr.2) 	 Default value: Heating ramp 1
18		<p>Minimum position of Ao1 ramp: Display switches between "Ao.1" and the value of the minimum position of the Ao1 ramp. MIN symbol is also displayed. Please select the desired value of the minimum position of the Ao1 ramp.</p>	 Range: 0.0 to 10.0 Volt Increment: 0.1 Volt Default value: 0.0 Volt
19		<p>Ramp for analog output (Ao2): Display switches between "Ao2" and the selected ramp. Please select which ramp you want to use:</p> <ul style="list-style-type: none"> • Heating ramp 1 (Hr.1) • Heating ramp 2 (Hr.2) • Cooling ramp 1 (Cr.1) • Cooling ramp 2 (Cr.2) 	 Default value: Cooling ramp 1
20		<p>Minimum position of Ao2 ramp: Display switches between "Ao.2" and the value of the minimum position of the Ao2 ramp. MIN symbol is also displayed. Please select the desired value of the minimum position of the Ao2 ramp.</p>	 Range: 0.0 to 10.0 Volt Increment: 0.1 Volt Default value: 0.0 Volt

Step	Display	Description	Values
21		Minimum position of cooling ramp in heating mode: Display switches between "out" and the value of the minimum position of the 1 st cooling ramp. MIN and cooling symbols are also displayed. Please select the desired value of the minimum position of 1 st cooling ramp when heat demand is present.	 Range: 0 to 100% Increment: 5% Default value: 0%
22		Proportional band 1 in heating: Display switches between "Pb.1" and the value of the 1 st heating proportional band, heating symbol is also displayed. Please select the desired value of 1 st heating proportional band.	 Proportional band range: 0.5 to 5.0°C [1.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 2.0°C [4.0°F]
23		Proportional band 1 in cooling: Display switches between "Pb.1" and the value of the 1 st cooling proportional band, cooling symbol is also displayed. Please select the desired value of 1 st cooling proportional band.	 Proportional band range: 0.5 to 5.0°C [1.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 2.0°C [4.0°F]
24		Dead band 1 in heating: Display switches between "db.1" and the value of the dead band 1 in heating, heating symbols are also displayed. Please select the desired value of dead band 1 in heating.	 Proportional band range: 0.5 to 5.0°C [1.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 0.5°C [1.0°F]
25		Dead band 1 in cooling: Display switches between "db.1" and the value of the dead band 1 in cooling, cooling symbols are also displayed. Please select the desired value of dead band 1 in cooling.	 Proportional band range: 0.5 to 5.0°C [1.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 0.5°C [1.0°F]
26		Proportional band 2 in heating: Display switches between "Pb.2" and the value of the 2 nd heating proportional band, heating symbol is also displayed. Please select the desired value of 2 nd heating proportional band.	 Proportional band range: 0.5 to 5.0°C [2.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 2.0°C [4.0°F]
27		Proportional band 2 in cooling: Display switches between "Pb.2" and the value of the 2 nd cooling proportional band, cooling symbol is also displayed. Please select the desired value of 2 nd cooling proportional band.	 Proportional band range: 0.5 to 5.0°C [2.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 2.0°C [4.0°F]
28		Dead band 2 in heating: Display switches between "db.2" and the value of the dead band 2 in heating, heating symbols are also displayed. Please select the desired value of dead band 2 in heating.	 Proportional band range: 0.5 to 5.0°C [2.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 1.0°C [2.0°F]
29		Dead band 2 in cooling: Display switches between "db.2" and the value of the dead band 2 in cooling, cooling symbols are also displayed. Please select the desired value of dead band 2 in cooling.	 Proportional band range : 0.5 to 5.0°C [2.0 to 10.0°F] Increment: 0.5°C [1.0°F] Default value: 1.0°C [2.0°F]
30		Delay cooling contact (protection for compressor): Display switches between "noc" and the value (in minutes) of the delay to activate / reactivate cooling contact. MIN and cooling symbols are also displayed. Please select the desired value of the delay cooling contact.	 Range: 0 to 15 min. Increment: 1 min. Default value: 2 min.
31		Integration time factor setting: Display switches between "Int" and the time in seconds for the integration factor compensation. Please select the desired value of the integration factor compensation.	Range: 0 to 250 seconds Increment: 5 seconds Default value: 0 seconds
32		Internal/external temperature sensor selection: (only if "COR" hasn't been selected at step #8 & #17) Display switches between "tS" and "in" or "out". Please select internal or external sensor. If you have selected "in", go directly to step #34.	  Default value: Internal temperature sensor
33		External temperature sensor Calibration: (only if "out" was selected at step #32) Display switches between "tS2" and the temperature read by the external temperature sensor (if connected). If the sensor is not connected or short circuited, the display shows "Err". You can adjust the calibration of the external sensor by comparison with a known thermometer.	 Range: 0 to 50°C [32 to 99.9°F] Increment: 0.1°C [0.2°F] Display: 0.0°C [32.0°F], resistance will be infinite. 50.0°C [99.9°F], resistance will be short circuited.
34		Change over mode selection: Display switches between "COc" and "tS". Please select mode of change over between contact normally cool or contact normally heat or external sensor. Note: This selection will affect "AO1" and/or "Ct1" if they are set in change over mode. If normally cool "nc" is selected, heating mode will be activated upon closing of contact. If normally heat "nh" is selected, cooling mode will be activated upon closing of contact. If external sensor "tS" is selected, heating mode will be activated when temperature read by external sensor is above the Change Over Set Point temperature "tCo", and cooling mode will be activated when temperature read by external sensor is under "tCo", see step #35. If "tS" is not selected, go directly to step #36.	   Default value: External sensor

Step	Display	Description	Values
35		<p>Change over set point temperature: (If "ts" has been selected at step #34) Display switches between "tCo" and the change over set point temperature selected. Please select the change over set point temperature. Note: heating mode will be activated when temperature read by external sensor is above the change Over Set Point temperature "tCo", and cooling mode will be activated when temperature read by external sensor is under "tCo".</p>	 <p>Range: 5 to 35°C [41 to 95°F] Increment: 1°C [1°F] Default value: 24°C [75°F]</p>
36		<p>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 you select "OFF", the thermostat is off when NSB is activated.</p>	 <p>Range: OFF or 0 to 180 min. Increment: 15min. Default value: 120 min.</p>
37		<p>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. The maximum value is restricted by the night set back cooling setpoint (step #38).</p>	 <p>Range: 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 16°C [61°F]</p>
38		<p>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. The minimum value is restricted by the night set back heating setpoint (step #37).</p>	 <p>Range: 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 28°C [82°F]</p>

Operation Mode

Step	Description	Display
A	<p>At power up, thermostat will light display and activate all LCD segments for 2 seconds.</p> <p>Illuminating the LCD To illuminate the LCD, simply push any of the 4 buttons. LCD will light for 4 seconds.</p> <p>Temperature display In operation mode, thermostat will automatically display temperature read. If "--" and alarm symbol are displayed, the temperature sensor is not connected or short circuited.</p> <p>To change the scale between °C and °F, press on  button.</p>	
B	<p>Set point display and adjustment:</p> <p>To display the set point, press twice on  or  button. Set point will be displayed during 5 seconds while blinking.</p> <p>To adjust set point, press on  or  while the temperature set point is displayed.</p> <p><i>Note: If set point adjustment has been locked,  symbol will be displayed.</i></p>	
C	<p>Night set back (NSB):</p> <p>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.</p> <p>If not locked, night set back can be derogated for a predetermined period by pressing onto any of the 3 buttons.</p> <p>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.</p>	
D	<p>Control mode selection:</p> <p>To verify which control mode is set, press once onto the  button. Control mode will be displayed during 3 seconds.</p> <p>To change of control mode, press on  while control mode is displayed. You can choose one of the following:</p> <ul style="list-style-type: none"> ✓ Automatic Cooling or Heating ✓ Cooling and Heating OFF ✓ Cooling only ✓ Heating only <p><i>Note: These selections can vary according to the choice made on steps #6 & #7.</i></p>	

Recycling at end of life

	<p>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.</p>
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