

TFC54F3X1



**Feature:**

- Selectable analog & digital output
- Selectable fan speed contact
- 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

Technical Data	TFC54F3X1
<b>Outputs</b>	2 Analog outputs (cooling and/or heating and/or change over 0-10VDC )
	3 Digital outputs (fan)
<b>Contact rating</b>	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
<b>Power supply</b>	22 to 26 VAC 50/60Hz
<b>Power consumption</b>	1 VA
<b>Set point range</b>	10°C to +35°C [50°F to 95°F]
<b>Display resolution</b>	+/-0.1°C [0.2°F]
<b>Control accuracy</b>	Temperature: +/-0.5°C [0.9°F] @ 22°C [71.6°F] typical calibrated
<b>External sensor thermistor</b>	Type G, 0°C [32°F] = 29.49 kΩ, 25°C [77°F] = 10 kΩ, 50°C [122°F] = 3.893 kΩ,
<b>Proportional band</b>	0.5 °C to 5°C [1°F to 10°F] adjustable
<b>Electrical connection</b>	0.8 mm <sup>2</sup> [18 AWG] minimum
<b>Operating temperature</b>	0°C to 50°C [32°F to 122°F]
<b>Storage temperature</b>	-30°C to +50°C [-22°F to +122°F]
<b>Relative Humidity</b>	5 to 95 % non condensing
<b>Degree of protection of housing</b>	IP 30 to EN 60529
<b>Weight</b>	80 g. [0.18 lb]

**Presentation**

<b>Symbols on display</b>			
	<b>Cooling ON</b> 100% output A: Automatic		<b>Menu set-up Lock ON</b>
	<b>Heating ON</b> 100% output A: Automatic		<b>Programming mode</b> (Technician setting)
	<b>Fan ON</b> 3 <sup>rd</sup> speed activated A: Automatic	<b>MIN</b> <b>MAX</b>	<b>Minimum/Maximum</b> set points
	<b>°C: Celsius scale</b> <b>°F: Fahrenheit scale</b>		<b>Energy saving mode ON</b>

**Dimensions**

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

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

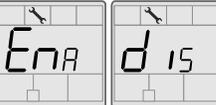
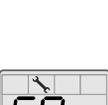
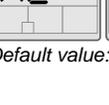
Terminals	Fan option	2 Pipe			4 Pipe		
		1 spd	2spd	3spd	1 spd	2spd	3spd
1	Common (COM)	Common					
2	24 Vac (24VAC)	24 Vac					
3	Sensor (EXT. TS)	Change over temp. sensor or contact			External temperature sensor		
4	NSB input (NSB. INP)	Night set back input					
5	Analog output 1 (AO1)	Cool/Heat			Heat		
6	Analog output 2 (AO2)	Reheat			Cool		
7	Digital output 1 (DO1)	-	-	High	-	-	High
8	Digital output 2 (DO2)	-	High	Medium	-	High	Medium
9	Digital output 3 (DO3)	1 speed	Low	Low	1 speed	Low	Low

Settings on PC Board

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

## Programming mode

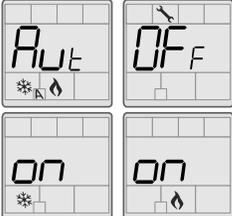
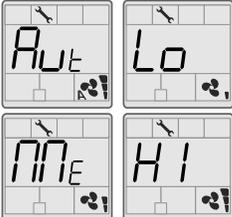
When in this mode this symbol  is displayed. Please press on button  to advance to the next program function, press on button  to return to preceding stage and press on button  or  to change value. You can leave the programming mode at any time, changed values will be recorded.

Step	Display	Description	Values
1		<b>Internal temperature sensor Calibration:</b> 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 40°C [50 to 104°F] (max offset ± 5°C) Increment: 0.1°C [0.2°F]
2		<b>Minimum set point:</b> 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		<b>Maximum set point</b> 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]
4A		<b>Locking the set point :</b> 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, <b>go directly to step #5.</b>	 Default value: Unlocked
4B		<b>Locking the set point (cont'd):</b> Select the desired locked set point temperature; this one should be within the temperature range.	Set point range : 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 22°C [72°F]
5		<b>Adjust the control mode:</b> Display switches between "Ctl" and "Aut". Select which control mode you want to authorize: Automatic, cooling or heating, heating only or cooling only. If you want to authorize this entire mode, choose Automatic mode.	 Default value: Automatic cooling and heating
6		<b>Set On/Off function enable or disable:</b> Display switches between "OFF" and "ena". You can enable or disable the Automatic mode adjustment by end user.	 Default value: Enable
7		<b>Set 2 pipes or 4 pipes:</b> Display switches between "Pno" and "2P". Select which number of pipes you want to use: 2 pipes or 4 pipes. If you have selected the 4 pipes, <b>go directly to step #12.</b>	 Default value: 2 pipe
8A		<b>Change over mode selection:</b> Display switches between "COc" and "nc". Please select mode of change over between contact normally cool or contact normally heat or external sensor. Note: This selection will affect "AO1". 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 #8B. <b>If "tS" is not selected, go directly to step #9.</b>	 Default value: Normally cool
8B		<b>Change over set point temperature:</b> (If "tS" has been selected at step #8A) 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".	 Range: 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F] Default value: 24°C [75°F]
8C		<b>Change over temperature sensor Calibration:</b> Display switches between "COs" and the temperature read by the change over temperature sensor (if connected). You can adjust the calibration of the change over sensor by comparison with a known thermometer.	 Range: 10 to 40°C [50 to 104°F] (max offset ± 5°C) Increment: 0.1°C [0.2°F] Display: 0°C [32°F], resistance will be infinite. 50°C [122°F], resistance will be short circuited.

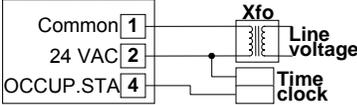
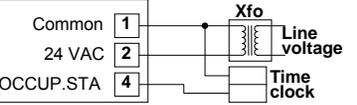
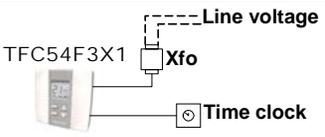
Step	Display	Description	Values
9		<b>Set local reheat On/Off or TPM:</b> (If you have selected 2pipe control mode at step #7) Display switches between "LHt" and "OFF". Select which signal output you want for TO2. You can choose OFF (no signal selected), ON analog heating only, ON analog heating & fan output.  If you select OFF (no local reheat), <b>go directly to step #14.</b>	 Default value: Off
10		<b>Proportional band for local reheat (TO2):</b> Display switches between "Pb.L" and the value of the local reheat proportional band, heating symbol is also displayed. Please select the desired value of local reheat 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]
11		<b>Dead band for local reheat (TO2):</b> Display switches between "db.L" and the value of the local reheat dead band, heating symbols are also displayed. Please select the desired value of local reheat dead band. <b>Go to step #14.</b>	 Proportional band range: 0.3 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]
12		<b>Internal/external temperature sensor selection:</b> Display switches between "tS" and "in" or "out". Please select internal or external sensor.	 Default value: Internal temperature sensor
13		<b>External temperature sensor Calibration:</b> 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.	 Range: 10 to 40°C [50 to 104°F] (max offset ± 5°C) Increment: 0.1°C [0.2°F] Display: 0°C [32°F], resistance will be infinite. 50°C [122°F], resistance will be short circuited.
14		<b>Proportional band 1 in heating:</b> Display switches between "Pb.1" and the value of the 1 <sup>st</sup> heating proportional band, heating symbol is also displayed. Please select the desired value of 1 <sup>st</sup> 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]
15		<b>Proportional band 1 in cooling:</b> Display switches between "Pb.1" and the value of the 1 <sup>st</sup> cooling proportional band, cooling symbol is also displayed. Please select the desired value of 1 <sup>st</sup> 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]
16		<b>Dead band in heating:</b> Display switches between "db.1" and the value of the dead band in heating, heating symbols are also displayed. Please select the desired value of dead band in heating.	 Proportional band range : 0.3 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]
17		<b>Dead band in cooling:</b> Display switches between "db.1" and the value of the dead band in cooling, cooling symbols are also displayed. Please select the desired value of dead band in cooling.	 Proportional band range : 0.3 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]
18		<b>Minimum position of Ao1 ramp:</b> 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. (This is the "zero" value) The minimum value is restricted by the maximum value. (step #19)	 Range: 0.0 to 10.0 Volt. Increment: 0.2 Volt. Default value: 0.0 Volt
19		<b>Maximum position of Ao1 ramp:</b> Display switches between "Ao.1" and the value of the maximum position of the Ao1 ramp. MAX symbol is also displayed. Please select the desired value of the minimum position of the Ao1 ramp. (This is the "span" value) The maximum value is restricted by the minimum value. (step #18)	 Range: 0.0 to 10.0 Volt. Increment: 0.1 Volt. Default value: 10.0 Volt
20		<b>Minimum position of Ao2 ramp:</b> 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. (This is the "zero" value) The minimum value is restricted by the maximum value. (step #21)	 Range: 0.0 to 10.0 Volt. Increment: 0.2 Volt. Default value: 0.0 Volt
21		<b>Maximum position of Ao2 ramp:</b> Display switches between "Ao.2" and the value of the maximum position of the Ao2 ramp. MAX symbol is also displayed. Please select the desired value of the minimum position of the Ao2 ramp. (This is the "span" value) The maximum value is restricted by the minimum value. (step #20)	 Range: 0.0 to 10.0 Volt. Increment: 0.1 Volt. Default value: 10.0 Volt
22		<b>Set fan speed automatic mode enable or disable:</b> Display switches between "FA n" and "ena". Fan symbol is also displayed. You can enable or disable the Automatic mode adjustment by end user. If you selected to disable the automatic mode, <b>go directly to step #24</b>	 Default value: Enable
23		<b>Time out fan contact:</b> Display switches between "Fto" and the automatic shutoff delay value (in minutes) when there is no demand. MIN and fan symbols are also displayed. Please select the desired value of the automatic shutoff delay.	 Range: 0 to 15 min. Increment: 1 min. Default value: 0 min.

Step	Display	Description	Values
24		<b>Fan speed contact:</b> Display switches between "FAn" and "SPd" and the speed of the fan. Fan symbol is also displayed. Select which speed contact you want: speed 1, speed 2 or speed 3.	 Default value: Hi speed (3)
25		<b>Night set back derogation time:</b> 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. If you select OFF, <b>go directly to step #1.</b>	 Range: OFF or 00 to 180 min. Increment: 15min. Default value: 120 min.
26		<b>Heating Set point during Night set back:</b> Display switches between "Stp" and the value of the heating set point temperature during night set back. NSB symbol and heating symbols are also displayed. Please select the heating set point temperature during night set back.	 Range: 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 16°C [61°F]
27		<b>Cooling Set point during Night set back:</b> Display switches between "Stp" and the value of the cooling set point temperature during night set back. NSB symbol and cooling symbols are also displayed. Please select the cooling set point temperature during night set back.	 Range: 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] Default value: 28°C [82°F]

Operation mode

Step	Description	Display
1	<p>At powering up, thermostat will light display and activate all LCD segments during 2 seconds.</p> <p><b>Illuminating the LCD.</b></p> <p>To illuminate the LCD, you just have to push onto <math>\Delta</math> or <math>\nabla</math> buttons. LCD will light for 8 seconds.</p> <p><b>Temperature display</b></p> <p>In operation mode, thermostat will automatically display temperature read.</p> <p>To change the scale between <math>^{\circ}\text{C}</math> and <math>^{\circ}\text{F}</math>, press on both <math>\Delta</math> and <math>\nabla</math> for 3 seconds.</p>	
2	<p><b>Set point display and adjustment:</b></p> <p>To display the set point, press two times on <math>\Delta</math> or <math>\nabla</math>. Set point will be displayed during 5 seconds. To adjust set point, press on <math>\Delta</math> or <math>\nabla</math> while the temperature set point is displayed.</p> <p><i>Note: If set point adjustment has been locked, <math>\mathcal{L}</math> symbol will be displayed.</i></p>	
3	<p><b>Night set back (NSB):</b></p> <p>When thermostat is in night set back mode, NSB <math>\curvearrowright</math> 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 4 buttons.</p> <p>During period of NSB derogation the <math>\curvearrowright</math> 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>	
4	<p><b>Control mode selection:</b></p> <p>To change the control mode, press on <math>\text{*/\text{A}}</math>. Control mode will be displayed during 5 seconds. You can choose one of the following:</p> <ul style="list-style-type: none"> <li>✓ Automatic Cooling or Heating</li> <li>✓ OFF (if not disable in programming mode)</li> <li>✓ Cooling only</li> <li>✓ Heating only</li> </ul> <p><i>Note: These selections can vary according to the choice made on step #5 &amp; 6.</i></p>	
5	<p><b>Fan speed mode selection:</b></p> <p>To change the fan speed mode, press on <math>\text{fan}</math>. Fan speed mode will be displayed during 5 seconds. You can choose one of the following:</p> <ul style="list-style-type: none"> <li>✓ Automatic speed (if not disable in programming mode)</li> <li>✓ Low speed</li> <li>✓ Medium speed</li> <li>✓ High speed</li> </ul> <p><i>Note: These selections can vary according to the choice made on step #22 &amp; 24.</i></p>	

Night set back

Wiring	Schematic
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Terminals TFC54F3X1</p>  </div> <div style="text-align: center;"> <p>or</p>  </div> </div>	

Notes:

#### 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](http://www.neptronic.com).