# Fan Coil Thermostat
## Specification and Installation Instructions

**TFC54F3X1**

**Feature:**

- Selectable analog and 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
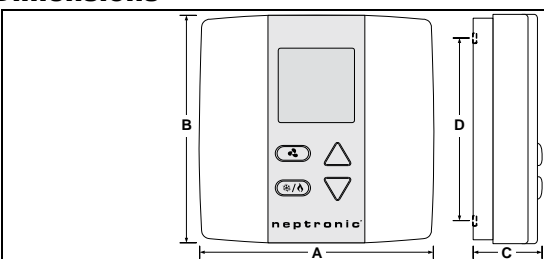- Change over by contact or external temperature sensor available

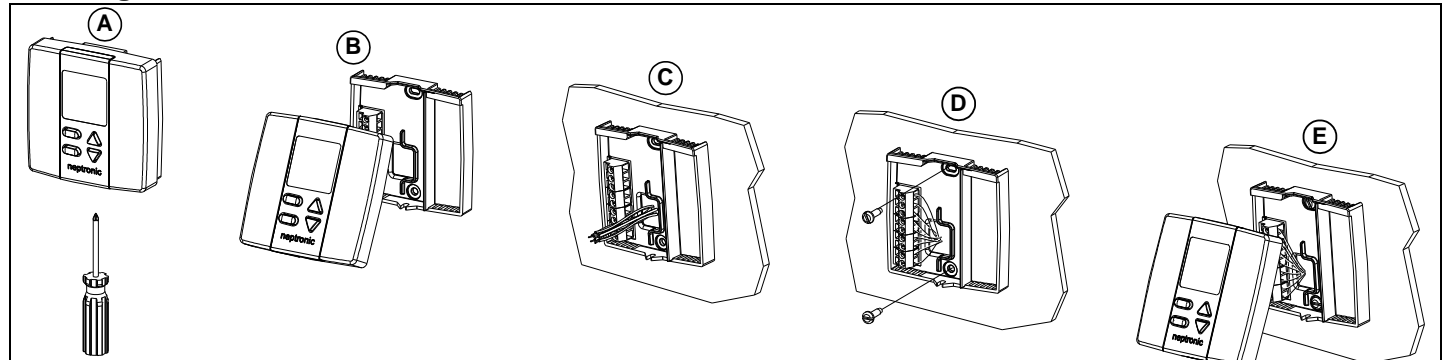| Technical Data | TFC54F3X1 |
|---|---|
| **Outputs** | 2 Analog outputs (cooling and/or heating and/or change over 0-10Vdc) |
| | 3 Digital outputs (fan) |
| **Contact rating** | Resistive load: rated load: 1.0 Amp / 24 VAC / VDC<br>Inductive load: rated load: 0.3 Amp / 24 VAC / VDC<br>maximum switching capacity: 30 VA / 24 W |
| **Power supply** | 22 to 26 Vac 50/60Hz |
| **Power consumption** | 1 VA |
| **Setpoint range** | 10ºC to +35ºC [50ºF to 95ºF] |
| **Display resolution** | +/-0.1ºC [0.2ºF] |
| **Control accuracy** | Temperature: +/-0.5ºC [0.9ºF] @ 22ºC [71.6ºF] typical calibrated |
| **External sensor thermistor** | Type G, 0ºC [32ºF] = 29.49 kΩ, 25ºC [77ºF] = 10 kΩ, 50ºC [122ºF] = 3.893 kΩ, |
| **Proportional band** | 0.5ºC to 5ºC [1ºF to 10ºF] adjustable |
| **Electrical connection** | 0.8 mm$^2$ [18 AWG] minimum |
| **Operating temperature** | 0ºC to 50ºC [32ºF to122ºF] |
| **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** | 80 g. [0.18 lb] |

## Presentation

*Symbols on display*

| | | | |
|---|---|---|---|
| | *Cooling ON*<br>*100% output*<br>*A: Automatic* | | *Menu set-up Lock ON* |
| | *Heating ON*<br>*100% output*<br>*A: Automatic* | | *Programming mode*<br>*(Technician setting)* |
| | *Fan ON*<br>*3rd speed activated*<br>*A: Automatic* | MIN<br>MAX | *Minimum/Maximum*<br>*setpoints* |
| ºC or ºF | *ºC: Celsius scale*<br>*ºF: Fahrenheit scale* | | *Energy saving mode ON* |

## Dimensions

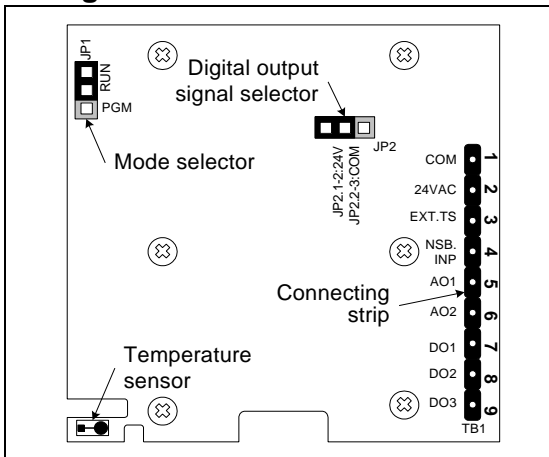| Dimension | Inches | Metric (mm) |
|---|---|---|
| **A** | 3.00 | 78 |
| **B** | 3.00 | 78 |
| **C** | 1.00 | 24 |
| **D** | 2.36 | 60 |

## 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** | **2 Pipe** | | | **4 Pipe** | | |
|---|---|---|---|---|---|---|---|
| | **Fan option** | **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 |
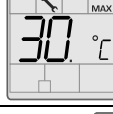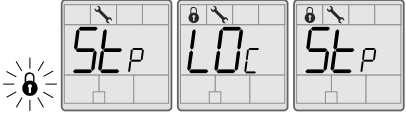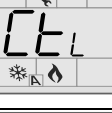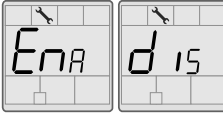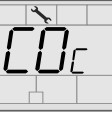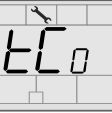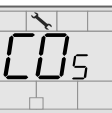
## Settings on PC Board



### Mode Selection (JP1)

| | |
|---|---|
| JP1 RUN PGM | **Jumper (JP1) on RUN:** Thermostat is in **operation mode**. Thermostat must be set in this mode to operate properly. If not locked, setpoint, control mode and speed fan (Heating & Cooling ON, Cooling only ON or Heating only ON) may be modified by end user. |
| JP1 RUN PGM | **Jumper (JP1) on PGM:** Thermostat is set in **Programming mode**. Refer to following section about all settings description |

### Digital output signal selection (JP2)

| | |
|---|---|
| JP2 24VAC | **Jumper (JP2) on 24Vac:** All digital output signal is linked to 24 Vac. |
| JP2 COM | **Jumper (JP2) on COM:** All digital output signal is linked to common. |

## 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.

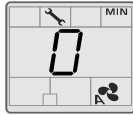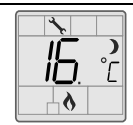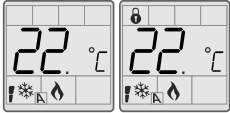| Step | Display | Description | Values |
|---|---|---|---|
| 1 | tS1 | **Internal temperature sensor Calibration:** Display switches between "**tS1**" and temperature read by internal temperature sensor. You can adjust the calibration of the sensor by comparison with a known thermometer. For example 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). | 22.0°C — Range: 10 to 40°C [50 to 104°F] (max offset ± 5°C) Increment: 0.1°C [0.2°F] |
| 2 | Stp MIN | **Minimum setpoint:** Display switches between "**Stp**" and the minimum setpoint temperature. **MIN** symbol is also displayed. Please select the desired minimum setpoint temperature. The minimum value is restricted by the maximum value (step #3) | 15.°C MIN — Minimum range 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] *Default value: 15°C [59°F]* |
| 3 | Stp MAX | **Maximum setpoint** Display switches between "**Stp**" and the maximum setpoint temperature. **MAX** symbol is also displayed. Please select the desired maximum setpoint temperature. The maximum value is restricted by the minimum value (step #2) | 30.°C MAX — Maximum range 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] *Default value: 30°C [86°F]* |
| 4A | LOc | **Locking the setpoint :** Display switches between "**LOc**" and "**Stp**". You can lock or unlock the setpoint adjustment by end user. If locked the lock symbol will appear. If you do not want to lock setpoint adjustment by end user, **go directly to step #5.** | Stp / LOc / Stp *Default value: Unlocked* |
| 4B | 22.°C | **Locking the setpoint (cont'd):** Select the desired locked setpoint temperature; this one should be within the temperature range. | Setpoint range : 10 to 35°C [50 to 95°F] Increment: 0.5°C [1°F] *Default value: 22°C [72°F]* |
| 5 | CtL ❄A🔥 | **Adjust the control mode:** 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. | Aut ❄A🔥 / on ❄🔥 / on 🔥 / on ❄ *Default value: Cooling only* |
| 6 | OFF | **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. | Ena / d is *Default value: Enable* |
| 7 | Pno | **Set 2 pipes or 4 pipes:** 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, **go directly to step #12.** | 2P / 4P *Default value: 2 pipe* |
| 8A | COc | **Change over mode selection:** 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 SetPoint temperature "**tCo**", and cooling mode will be activated when temperature read by external sensor is under "**tCo**", see step #8B. **If "tS" is not selected, go directly to step #9.** | nc / nh / tS *Default value:* Normally cool |
| 8B | tCo | **Change over setpoint temperature:** (If "**tS**" has been selected at step #8A) Display switches between "**tCo**" and the change over setpoint temperature selected. Please select the change over setpoint temperature. Note: heating mode will be activated when temperature read by external sensor is above the change over setpoint temperature "**tCo**", and cooling mode will be activated when temperature read by external sensor is under "**tCo**". | 24 °C — Range: 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F] *Default value: 24°C [75°F]* |
| 8C | COs | **Change over temperature sensor Calibration:** 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. | 50.0°C — 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. |

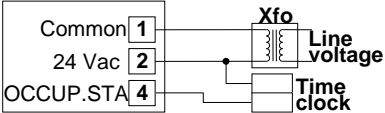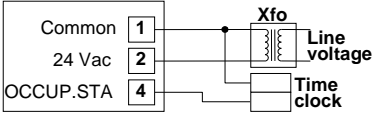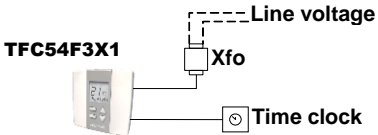| Step | Display | Description | Values | |
|------|---------|-------------|--------|--|
| 9 | **LHt** | **Set local reheat On/Off or TPM:** (If you have selected 2pipe control mode at step #7)<br>Display switches between "**LHt**" and "**OFF**".<br>Select which signal output you want for AO2. You can choose OFF (no signal selected), ON analog heating only, ON analog heating & fan output.<br><br>If you select OFF (no local reheat), **go directly to step #14.** | **OFF**   **on**   **on** <br>*Default value: Off* | |
| 10 | **PbL** | **Proportional band for local reheat (AO2):**<br>Display switches between "**Pb.L**" and the value of the local reheat proportional band, heating symbol is also displayed.<br>Please select the desired value of local reheat proportional band. | **2.0** <br>Proportional band range:<br>0.5 to 5.0ºC [1.0 to 10.0ºF]<br>Increment: 0.5ºC [1.0ºF]<br>*Default value: 2.0ºC [4.0ºF]* | |
| 11 | **dbL** | **Dead band for local reheat (AO2):**<br>Display switches between "**db. L**" and the value of the local reheat dead band, heating symbols are also displayed.<br>Please select the desired value of local reheat dead band.<br>**Go to step #14.** | **0.3ºC** <br>Proportional band range:<br>0.3 to 5.0ºC [0.6 to 10.0ºF]<br>Increment: 0.1ºC [0.2ºF]<br>*Default value: 0.3ºC [0.6ºF]* | |
| 12 | **tS** | **Internal/external temperature sensor selection:**<br>Display switches between "**tS**" and "**in**" or "**out**".<br>Please select internal or external sensor. | **In**   **Out** <br>*Default value: Internal temperature sensor* | |
| 13 | **tS2** | **External temperature sensor Calibration:**<br>Display switches between "**tS2**" and the temperature read by the external temperature sensor (if connected).<br>You can adjust the calibration of the external sensor by comparison with a known thermometer. | **50.0ºC** <br>Range: 10 to 40ºC [50 to 104ºF]<br>(max offset ± 5ºC)<br>Increment: 0.1ºC [0.2ºF]<br>Display:<br>0ºC [32ºF], resistance will be infinite.<br>50ºC [122ºF], resistance will be short circuited. | |
| 14 | **Pb.1** | **Proportional band 1 in heating:**<br>Display switches between "**Pb.1**" and the value of the 1st heating proportional band, heating symbol is also displayed.<br>Please select the desired value of 1st heating proportional band. | **2.0** <br>Proportional band range:<br>0.5 to 5.0ºC [1.0 to 10.0ºF]<br>Increment: 0.5ºC [1.0ºF]<br>*Default value: 2.0ºC [4.0ºF]* | |
| 15 | **Pb.1** | **Proportional band 1 in cooling:**<br>Display switches between "**Pb.1**" and the value of the 1st cooling proportional band, cooling symbol is also displayed.<br>Please select the desired value of 1st cooling proportional band. | **2.0** <br>Proportional band range:<br>0.5 to 5.0ºC [1.0 to 10.0ºF]<br>Increment: 0.5ºC [1.0ºF]<br>*Default value: 2.0ºC [4.0ºF]* | |
| 16 | **db.1** | **Dead band in heating:**<br>Display switches between "**db.1**" and the value of the dead band in heating, heating symbols are also displayed.<br>Please select the desired value of dead band in heating. | **0.3ºC** <br>Proportional band range :<br>0.3 to 5.0ºC [0.6 to 10.0ºF]<br>Increment: 0.1ºC [0.2ºF]<br>*Default value: 0.3ºC [0.6ºF]* | |
| 17 | **db.1** | **Dead band in cooling:**<br>Display switches between "**db.1**" and the value of the dead band in cooling, cooling symbols are also displayed.<br>Please select the desired value of dead band in cooling. | **0.3ºC** <br>Proportional band range :<br>0.3 to 5.0ºC [0.6 to 10.0ºF]<br>Increment: 0.1ºC [0.2ºF]<br>*Default value: 0.3ºC [0.6ºF]* | |
| 18 | **Ao.1** MIN | **Minimum position of Ao1 ramp:**<br>Display switches between "**Ao.1**" and the value of the minimum position of the Ao1 ramp. **MIN** symbol is also displayed.<br>Please select the desired value of the minimum position of the Ao1 ramp.<br>(This is the "zero" value)<br>The minimum value is restricted by the maximum value. (step #19) | **0.0** MIN<br>Range: 0.0 to 10.0 Volt.<br>Increment: 0.2 Volt.<br>*Default value: 0.0 Volt* | |
| 19 | **Ao.1** MAX | **Maximum position of Ao1 ramp:**<br>Display switches between "**Ao.1**" and the value of the maximum position of the Ao1 ramp. **MAX** symbol is also displayed.<br>Please select the desired value of the minimum position of the Ao1 ramp.<br>(This is the "span" value)<br>The maximum value is restricted by the minimum value. (step #18) | **10.0** MAX<br>Range: 0.0 to 10.0 Volt.<br>Increment: 0.1 Volt.<br>*Default value: 10.0 Volt* | |
| 20 | **Ao.2** MIN | **Minimum position of Ao2 ramp:**<br>Display switches between "**Ao.2**" and the value of the minimum position of the Ao2 ramp. **MIN** symbol is also displayed.<br>Please select the desired value of the minimum position of the Ao2 ramp.<br>(This is the "zero" value)<br>The minimum value is restricted by the maximum value. (step #21) | **0.0** MIN<br>Range: 0.0 to 10.0 Volt.<br>Increment: 0.2 Volt.<br>*Default value: 0.0 Volt* | |
| 21 | **Ao.2** MAX | **Maximum position of Ao2 ramp:**<br>Display switches between "**Ao.2**" and the value of the maximum position of the Ao2 ramp. **MAX** symbol is also displayed.<br>Please select the desired value of the minimum position of the Ao2 ramp.<br>(This is the "span" value)<br>The maximum value is restricted by the minimum value. (step #20) | **10.0** MAX<br>Range: 0.0 to 10.0 Volt.<br>Increment: 0.1 Volt.<br>*Default value: 10.0 Volt* | |
| 22 | **FAn** | **Set fan speed automatic mode enable or disable:**<br>Display switches between "**FAn**" and "**ena**". Fan ✲ symbol is also displayed.<br>You can enable or disable the Automatic mode adjustment by end user.<br>If you selected to disable the automatic mode, **go directly to step #24** | **EnA**   **dis** <br>*Default value: Enable* | |

| | | | | |
|---|---|---|---|---|
| **23** | Fto | **Time out fan contact:**<br>Display switches between "**Fto**" and the automatic shutoff delay value (in minutes) when there is no demand. **MIN** and fan symbols are also displayed.<br>Please select the desired value of the automatic shutoff delay. | 0 | Range: 0 to 15 min.<br>Increment: 1 min.<br>*Default value: 0 min.* |
| **24** | FAn | **Fan speed contact:**<br>Display switches between "**FAn**" and "**SPd**" and the speed of the fan. Fan symbol is also displayed.<br>Select which speed contact you want: speed 1, speed 2 or speed 3. | 1 2 3<br>*Default value: Hi speed (3)* | |
| **25** | nSb | **Night set back derogation time:**<br>Display switches between "**nSb**" and the derogation time in minute. **MIN** and NSB symbol is also displayed.<br>Please select the desired derogation time. If you select "**OFF**", the thermostat is off when NSB is activated.<br>If you select OFF, **go directly to step #1.** | 120 | Range: OFF or 00 to 180 min.<br>Increment: 15min.<br>*Default value: 120 min.* |
| **26** | StP | **Heating Setpoint during Night set back:**<br>Display switches between "**Stp**" and the value of the heating setpoint temperature during night set back. NSB and heating symbols are also displayed.<br>Please select the heating setpoint temperature during night set back. | 16 °C | Range: 10 to 35ºC [50 to 95ºF]<br>Increment: 0.5ºC [1ºF]<br>*Default value: 16ºC [61ºF]* |
| **27** | StP | **Cooling Setpoint during Night set back:**<br>Display switches between "**Stp**" and the value of the cooling setpoint temperature during night set back. NSB and cooling symbols are also displayed.<br>Please select the cooling setpoint temperature during night set back. | 28 °C | Range: 10 to 35ºC [50 to 95ºF]<br>Increment: 0.5ºC [1ºF]<br>*Default value: 28ºC [82ºF]* |

## 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 △ or ▽ buttons. LCD will light for 8 seconds. **Temperature display** In operation mode, thermostat will automatically display temperature read. To change the scale between ºC and ºF, press on both △ and ▽ for 3 seconds. | |
| 2 | **Setpoint display and adjustment:** To display the setpoint, press two times on △ or ▽ Setpoint will be displayed during 5 seconds. To adjust setpoint, press on △ or ▽ while the temperature setpoint is displayed. *Note: If setpoint adjustment has been locked,* 🔒 *symbol will be displayed.* | |
| 3 | **Night set back (NSB):** When thermostat is in night set back mode, NSB ➤ symbol is displayed, so setpoint 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 4 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 | **Control mode selection:** To change the control mode, press on ⊛/◊. Control mode will be displayed during 5 seconds. You can choose one of the following: ✓ Automatic Cooling or Heating ✓ OFF (if not disable in programming mode) ✓ Cooling only ✓ Heating only Note: These selections can vary according to the choice made on step #5 & 6. | |
| 5 | **Fan speed mode selection:** To change the fan speed mode, press on 🌀. Fan speed mode will be displayed during 5 seconds. You can choose one of the following: ✓ Automatic speed (if not disable in programming mode) ✓ Low speed ✓ Medium speed ✓ High speed Note: These selections can vary according to the choice made on step #22 & 24 | |

## Night set back

| Wiring | Schematic |
|--------|-----------|
| **Terminals TFC54F3X1** Common **1** — Xfo — Line voltage, 24 Vac **2**, OCCUP.STA **4** — Time clock  **or**  **Terminals TFC54F3X1** Common **1** — Xfo — Line voltage, 24 Vac **2**, OCCUP.STA **4** — Time clock | **TFC54F3X1** — Line voltage, Xfo, ⊙ Time clock |

**Notes**

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