Fan Coil Thermostat

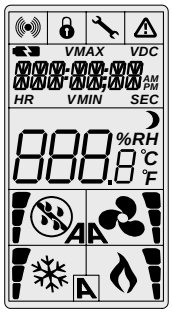
Features:

TFC24F3YZ1

- Attractive modern look with large LCD and backlight
- Icons driven information and 1 line of text information
- 2 Pipes ON/OFF or Floating or
  4 Pipes ON/OFF
- Auto fan and ON/OFF function enable or disable
- Precise achieve temperature control with programmable PI function
- Independent cooling & heating no occupancy set point
- Lockable Set point / Control mode
- Selectable internal or external temperature sensor
- Change over by contact or external temperature sensor
- Celsius or Fahrenheit scale selectable
- Anti-freeze protection

Technical Data	TFC24F3YZ1
Inputs	1 Digital input (24Vac or dry contact)
	1 Analog input (external temperature sensor 10Kohms)
	1 Analog input (change over 10Kohms or dry contact)
Outputs	3 Fan speed dry contracts 24Vac, 1A max 3A in-rush
	2 Triacs output (cooling and/or heating) 24Vac, 0.3A max fused / triac
Power supply	22 to 26 Vac 50/60Hz
Power consumption	1 VA max
Set point range	10ºC to 40ºC [50ºF to 104ºF]
Control accuracy	Temperature: ±0.4ºC [0.8ºF]
Proportional band	0.5ºC to 5ºC [1ºF to 10ºF] adjustable (heat/cool/reheat independent)
Dead band	0.3ºC to 5ºC [0.6ºF to 10ºF] adjustable (heat/cool/reheat independent)
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 (EN 60529)
Weight	160 g. [0.36 lb]

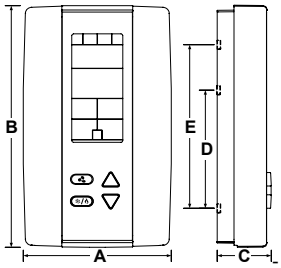
Presentation



Symbols on display

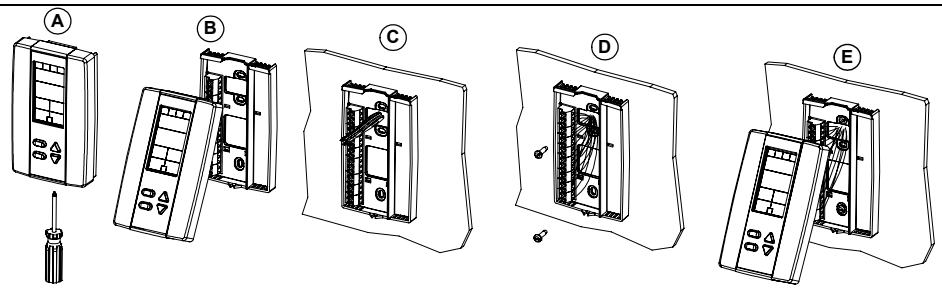
A	***Cooling ON 33,66,100% output A: Automatic***		***Menu set-up Lock***		***Energy saving mode***
A	***Heating ON 33,66,100% output A: Automatic***		***Programming mode (Technician setting)***	***°C or °F***	***ºC: Celsius scale ºF: Fahrenheit scale***
A	***Fan ON 3rd speed activated A: Automatic***		***Alarm status***		

Dimensions



Dimension	Inches	Metric (mm)
A	2.85	73
B	4.85	123
C	1.00	24
D	2.36	60
E	3.27	83

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

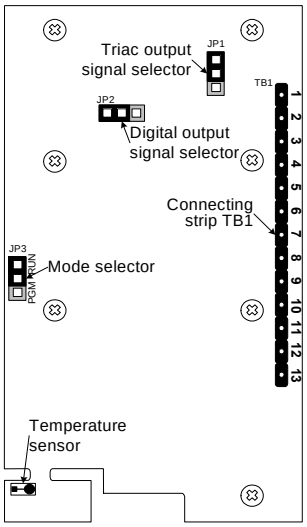
2 Pipe

Terminals		Fan option		On/Off			Floating		
				1 spd	2 spd	3 spd	1 spd	2 spd	3 spd
TB1	1	Common		Common			Common		
	2	24 Vac		24 Vac			24 Vac		
	3	Common Triac		Common Triac			Common Triac		
	4	Triac output 1 (TO1)	Floating output 1	2 Pipe on/off			2 Pipe floating (close)		
	5	Triac output 2 (TO2)		-			2 Pipe floating (open)		
	6	Not used		-			-		
	7	Common Relay		Common Relay			Common Relay		
	8	Digital output 1 (DO1)		-	-	High	-	-	High
	9	Digital output 2 (DO2)		-	High	Med	-	High	Med
	10	Digital output 3 (DO3)		1 spd	Low	Low	1 spd	Low	Low
	11	Occupancy Sensor (DI1)		Occupancy Sensor (optional)			Occupancy Sensor (optional)		
	12	External Temp. Sensor (AI1)		External Temp. Sensor (optional)			External Temp. Sensor (optional)		
	13	External Changeover (AI2)		External Changeover			External Changeover		

4 Pipe

Terminals		Fan option		Cool & Heat On/Off		
				1 spd	2 spd	3 spd
TB1	1	Common		Common		
	2	24 Vac		24 Vac		
	3	Common Triac		Common Triac		
	4	Triac output 1 (TO1)	Floating output 1	4 Pipe on/off cool		
	5	Triac output 2 (TO2)		4 Pipe (on/off or pulse) heat		
	6	Not used		-		
	7	Common Relay		Common Relay		
	8	Digital output 1 (DO1)		-	-	High
	9	Digital output 2 (DO2)		-	High	Med
	10	Digital output 3 (DO3)		1 spd	Low	Low
	11	Occupancy Sensor (DI1)		Occupancy Sensor (optional)		
	12	Ext. Temp Sensor (AI1)		External Temp. Sensor (optional)		
	13	External Changeover (AI2)		-		

Settings on PC Board



Triac Output Signal Selection (JP1)

JP1 24VAC COM	**Jumper (JP1) on 24Vac:** All triac output signal is linked to 24 Vac.	JP1 24VAC COM	**Jumper (JP1) on COMMON TRIAC:** All triac output signals are linked to common triac.

Digital Output Signal Selection (JP2)

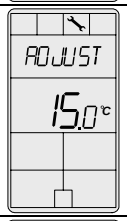
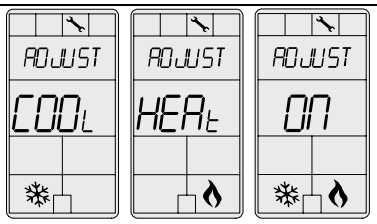
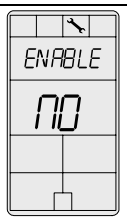
JP2 24VAC	**Jumper (JP2) on 24Vac:** All digital output signal is linked to 24 Vac.	JP2 COM	**Jumper (JP2) on COMMON RELAY:** All digital output signals are linked to common relay.

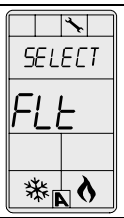
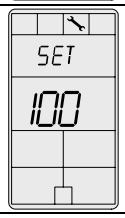
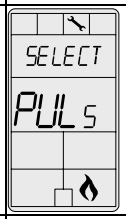
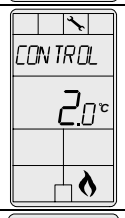
Mode Selection (JP3)

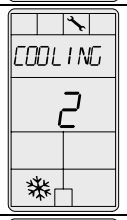
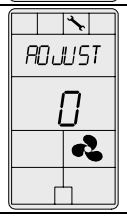
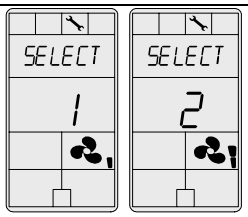
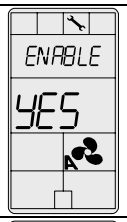
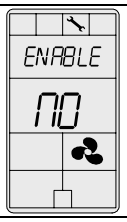
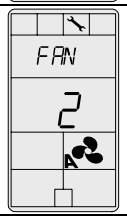
JP3 RUN PGM	**Jumper (JP3) on RUN:** Thermostat is in **operation mode**. Thermostat must be set in this mode to operate properly. If not locked, set point, control mode and speed fan (Heating & Cooling ON, Cooling only ON or Heating only ON) may be modified by end user.	JP3 RUN PGM	**Jumper (JP3) on PGM:** Thermostat is set in **Programming mode**. Refer to following section about all settings description

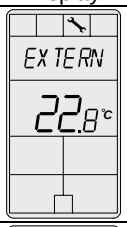
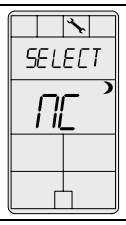
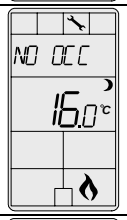
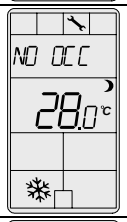
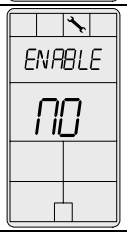
Programming Mode

When in this mode this symbol is displayed. Please press on button to advance to the next program function, 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.

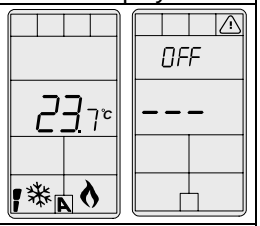
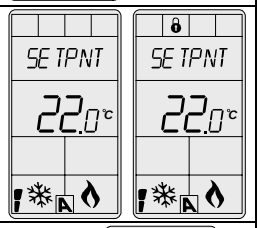
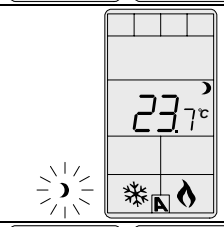
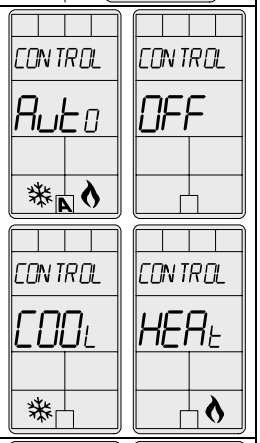
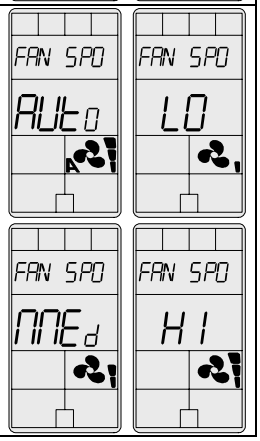
Step	Display	Description	Values
1		**Internal temperature sensor Calibration:** Display shows *"INSIDE TEMPER SENSOR OFFSET"* and temperature read by internal temperature sensor. You can adjust the calibration of the sensor by comparison with a known thermometer. For example if thermostat has been installed in an area where temperature is slightly different than the room typical temperature (thermostat place right under the air diffuser).	Range : 10 to 40ºC [50 to 104ºF] (max. offset ± 5 ºC) Increment: 0.1ºC [0.2ºF]
2		**Minimum set point:** Display shows *"ADJUST MINIMUM USER SETPNT"* and the minimum set point temperature. Please select the desired minimum set point temperature. The minimum value is restricted by the maximum value. (step #3).	Minimum range: 10 to 40ºC [50 to 104ºF] Increment: 0.5ºC [1ºF] *Default value: 15ºC [59ºF]*
3		**Maximum set point:** Display shows *"ADJUST MAXIMUM USER SETPNT"* and the maximum set point temperature. Please select the desired maximum set point temperature. The maximum value is restricted by the minimum value. (step #2)	Maximum range: 10 to 40ºC [50 to 104ºF] Increment: 0.5ºC [1ºF] *Default value: 30ºC [86ºF]*
4		**Locking the set point:** Display shows *"USER SETPNT LOCKED"* and the status of the function. You can lock or unlock the set point adjustment by end user. If locked, *"YES"* and lock symbol will appear.	 *Default value: Unlocked (NO)*
5		**Adjust internal set point:** Display shows *"ADJUST INTERN SETPNT"* and the set point temperature. Select the desired set point temperature; this one should be within the temperature range. Lock symbol will appear if the set point was locked at the previous step. Set point value is restricted by the minimum and maximum value. (step #2 & 3)	Set point range: 10 to 40ºC [50 to 104ºF] Increment: 0.5ºC [1ºF] *Default value: 22ºC [72ºF]*
6		**Adjust the control mode:** Display shows *"ADJUST TEMPER CONTROL MODE"*. Cooling and heating symbols are also displayed. Select which control mode you want to authorize: Automatic *cooling and heating*, 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*
7		**Set On/Off function enable or disable:** Display shows *"ENABLE ON OFF CONTROL MODE"*. You can enable or disable the On/Off function in control mode adjustment by end user.	 *Default value: Enable (YES)*
8		**Set 2 pipe or 4 pipe:** Display shows *"SELECT 2 PIPE 4 PIPE SYSTEM"*. Cooling and heating symbols are also displayed. 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 #13.**	 *Default value: 2 pipe*

Step	Display	Description	Values
9		**Set signal for 2 pipe system:** Display shows *"SELECT 2 PIPE SIGNAL"*. Cooling and heating symbols are also displayed. Select which signal output you want for your 2 pipe system. You can choose on/off or floating output. If you select on/off, **TO1** will be set in automatic heat/cool change over. If you select floating, **TO1** will be set close and **TO2** open. **If you have selected on/off signal, go directly to step #11.**	 *Default value: On/Off*
10		**Set floating time:** Display shows *"SET FLOATING TIME IN SECONDS"* and the floating time value (in seconds). Please select desired value of the floating time signal.	Range: 15 to 250 sec. Increment: 5 sec. *Default value: 100 sec.*
11		**Change over sensor selection:** Display shows *"CH OVER TEMPER SENSOR"*. Please select which sensor is rewired to the analog input: SENs (external change over sensor), NoCl (change over contact normally cool) or NoHt (change over contact normally heat). When normally cool "**NoCL**" is selected, if contact is closed heating mode will be activated, if contact is opened cooling mode will be activated. When normally heat "**NoHt**" is selected, if contact is closed cooling mode will be activated, if contact is opened heating mode will be activated. When change over external sensor "**SENs**" is selected, heating mode will be activated when temperature read by external sensor is above the Change Over Set Point temperature, and cooling mode will be activated when temperature read by external sensor is under, **see step #12.** **If "SENs" is not selected, go directly to step #14.**	  *Default value: SENs*
12		**Change over set point temperature:** (If "**SENs**" has been selected at step #11) Display shows *"CH OVER SETPNT TEMPER"* and the change over set point temperature. 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, and cooling mode will be activated when temperature read by external sensor is under. **Go to step #14.**	Range: 10 to 40ºC [50 to 104ºF] Increment: 0.5ºC [1ºF] *Default value: 24ºC [82ºF]*
13		**Set signal for 4 pipe heating system:** (If "**4P**" has been selected at step #8) Display shows *"SELECT 4 PIPE HEATING SIGNAL"*. Heating symbols is also displayed. Select which heating signal output you want for your 4 pipe system. You can choose on/off or pulse output. **TO1** will be set in cooling and **TO2** will be set in heating.	 *Default value: On/Off*
14		**Proportional band in heating:** Display shows *"CONTROL RAMP HEATING"* and the value of the heating proportional band, heating symbol is also displayed. Please select the desired value of heating proportional band.	Proportional band range : 0.5 to 5.0ºC [1 to 10ºF] Increment: 0.5ºC [1ºF] *Default value: 2.0ºC [4ºF]*
15		**Proportional band in cooling:** Display shows *"CONTROL RAMP COOLING"* and the value of the cooling proportional band, cooling symbol is also displayed. Please select the desired value of cooling proportional band.	Proportional band range : 0.5 to 5.0ºC [1 to 10ºF] Increment: 0.5ºC [1ºF] *Default value: 2.0ºC [4ºF]*
16		**Dead band in heating:** Display shows *"CONTROL DEAD BAND HEATING"* and the value of the heating dead band, heating symbol is also displayed. Please select the desired value of heating dead band.	Dead band range : 0.3 to 5.0ºC [0.6 to 10.0ºF] Increment: 0.1ºC [0.2ºF] *Default value: 0.3ºC [0.6ºF]*

Step	Display	Description	Values
17		**Dead band in cooling:** Display shows *"CONTROL DEAD BAND COOLING"* and the value of the cooling dead band, cooling symbol is also displayed. Please select the desired value of cooling dead band.	Dead band range : 0.3 to 5.0ºC [0.6 to 10.0ºF] Increment: 0.1ºC [0.2ºF] *Default value: 0.3ºC [0.6ºF]*
18		**Anti-cycling delay cooling contact (protection for compressor):** Display shows *"COOLING ANTI CYCLE MINUTES"* and the value (in minutes) of the delay to activate / reactivate cooling contact. Please select the desired value of the delay cooling contact.	Range: 0 to 15 min. Increment: 1 min. *Default value: 2 min.*
19		**Integration time factor setting:** Display shows *"ADJUST INTGRAL TIME IN SECONDS"* 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*
20		**Fan damping factor setting:** Display shows *"ADJUST DAMPING FACTOR SECONDS"* and the time in seconds for the damping factor which will slow down the effect in change of demand for fan speed. Please select the desired value of the damping factor.	Range: 0 to 10 seconds Increment: 1 seconds *Default value: 0 seconds*
21		**Fan speed signal:** Display shows *"SELECT FAN SPEED SIGNAL"* and the speed of the fan. Fan symbol is also displayed. Select which fan speed contact you want: 1 speed, 2 speed or 3 speed.	 *Default value: 3 fan speed contact*
22		**Set fan speed automatic mode enable or disable:** Display shows *"ENABLE FAN AUTO MODE"*. 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, go directly to step #24.**	 *Default value:* *Enable (YES)*
23		**Time out fan contact:** Display shows *"FAN AUTO TIMEOUT MINUTES"* and the automatic shutoff delay value (in minutes) when there is no demand. Please select the desired value of the automatic shutoff delay.	Range: 0 to 15 min. Increment: 1 min. *Default value: 2 min.*
24		**External sensor selection:** Display shows *"EXTERN SENSOR TEMPER"*. Please select which sensor is rewired to the analog input: OFF (input none rewired), t10.0 (external temperature sensor 10.0 **KΩ**) When nothing "**OFF**" is selected, the thermostat is controlled by is internal temperature sensor. When external sensor "**t10.0**" is selected, the thermostat is controlled by an external temperature sensor. **If you have selected OFF, go directly to step #26.**	 *Default value: Off*

Step	Display	Description	Values
25		**External temperature sensor Calibration:** Display shows *"EXTERN TEMPER SENSOR OFFSET"* and temperature read by external temperature sensor. If the sensor is not connected or short circuited, the display shows *"Eror"*. You can adjust the calibration of the external sensor by comparison with a known thermometer.	Range: 0 to 50ºC [41 to 122.0ºF] (max. offset ± 5 ºC) Increment: 0.1ºC [0.2ºF]
26		**Occupancy contact:** Display shows *"SELECT OCC CONTACT"*. Moon ☽ symbol is also displayed. You can choose NO (normally open) or NC (normally close) contact.	 *Default value: Normally open (NO)*
27		**No occupancy derogation time :** Display shows *"NO OCC DELAY OVERIDE MINUTES"* and the derogation time in minute. NSB ☽ symbol is also displayed. Please select the desired derogation time. If no derogation time is desired select "0".	Range: 0 to 180min. Increment: 15min. *Default value: 120 min.*
28		**Heating Set point during no occupancy:** Display shows *"NO OCC HEATING SETPNT"* and the value of the heating set point temperature during no occupancy period. Moon ☽ and heating symbols are also displayed. Please select the heating set point temperature during no occupancy. The maximum value is restricted by the no occupancy cooling set point. (step # 29)	Range: 10.0 to 40.0ºC [50 to 104ºF] Increment: 0.5ºC [1ºF] *Default value: 16.0ºC [61ºF]*
29		**Cooling set point during no occupancy:** Display shows *"NO OCC COOLING SETPNT"* and the value of the cooling set point temperature during no occupancy period. Moon ☽ and cooling symbols are also displayed. Please select the cooling set point temperature during no occupancy. The minimum value is restricted by the no occupancy heating set point. (step # 28)	Range: 10.0 to 40.0ºC [50 to 104ºF] Increment: 0.5ºC [1ºF] *Default value: 28.0ºC [82ºF]*
30		**Enable or disable anti-freeze protection:** Display shows *"ENABLE ANTI FREEZE PROTECT"*. You can enable or disable the Anti-freeze function. When enabled, if temperature drop to 4ºC [39ºF], heat and reheat will start even if thermostat is in OFF mode. Heat and reheat will stop when temperature reach 5ºC [41ºF].	 *Default value: Disable (NO)*

Operation mode

Step	Description	Display
A	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 4 buttons. LCD will light for 4 seconds. **Temperature display** In operation mode, thermostat will automatically display temperature read. If "**OFF**", "**- - -**" and alarm symbol are displayed, the temperature sensor is not connected or short circuited. To change the scale between ºC and ºF, press on both Δ and ∇ for 3 seconds.	
B	**<u>Temperature set point display and adjustment</u>** To display the set point, press two times on Δ or ∇. Set point will be displayed during 3 seconds. To adjust set point, press on Δ or ∇ while the temperature set point is displayed. *Note: If set point adjustment has been locked, symbol will be displayed.*	
C	**<u>No occupancy mode :</u>** When thermostat is in no occupancy mode, moon symbol ☽ is displayed, so set point for cooling and/or heating are increased as per the setting made in programming mode. If not locked, no occupancy mode can be derogated for a predetermined period by pressing onto any of the 3 buttons. During period of derogation the ☽ symbol will flash. If ☽ does not flash, the derogation period is finished or the no occupancy mode derogation has been locked in programming mode.	
D	**<u>Control mode selection :</u>** 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 ✓ Cooling and Heating OFF ✓ Cooling only ✓ Heating only *Note: These selections can vary according to the choice made on steps #6 & #7.*	
E	**<u>Fan speed mode selection:</u>** 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 *#21 &* #22.	

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 **<u>www.neptronic.com</u>**.