Model

TRO24T4XYZ3
with 7 Day Schedule

Description

The TRO24T4XYZ3 is a combination controller and thermostat . The VAV Thermostat Controller is designed for simple and accurate control of any variable air volume box in a number of zone control configurations. Its field configurable algorithms enable versatile implementation of required control sequences.
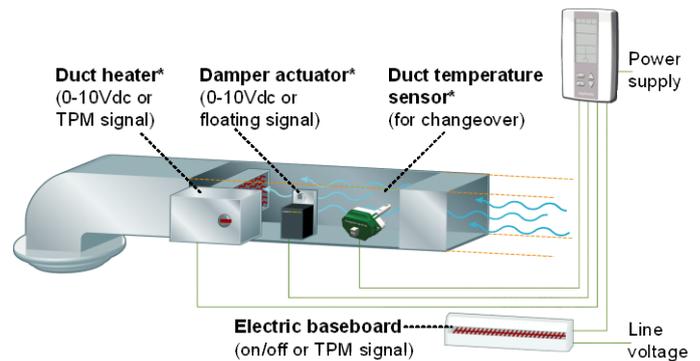
Applications

- Cooling only with or without terminal reheat
- Heating/cooling with or without auto-changeover and terminal reheat
- Pressure dependent or pressure independent
- Single duct or dual duct
- Serial or parallel fan power boxes (on/off or ECM)
- Supply and exhaust applications
- Auxiliary heating sources, such as electric baseboards, can also be applied

Features

- Backlit LCD with simple icon and text driven menus
- Configurable inputs and outputs
- 7 day Programmable Schedule
- 2 or 4 daily events
- Temporary Setpoint Override
- Precise temperature control with programmable PI function
- Selectable Fahrenheit or Celsius scale
- Manual night set back override
- Multi level lockable access menu and setpoint
- Selectable internal or external temperature sensor (10 KΩ)
- Changeover by contact or external temperature sensor
- Pressure sensor input with air flow program
- Selectable proportional control band and dead band
- Anti-freeze protection

TRO24T4XYZ3

Typical Application

VAV applications incorporate a central unit that delivers a controlled volume of air, which can be cooled or heated, to multiple zones. Each zone incorporates a VAV control box with a motorized damper to adjust the flow of air to the controlled zone based on the demand. Some configurations include one or more of the following: air flow pressure sensor, fan, duct heater, duct temperature sensor, and auxiliary heat (e.g. baseboard).

Duct heater* (0-10Vdc or TPM signal) — Damper actuator* (0-10Vdc or floating signal) — Duct temperature sensor* (for changeover) — Power supply — Electric baseboard (on/off or TPM signal) — Line voltage

Consult www.neptronic.com for details on these Neptronic products.

Technical Specifications

Description	TRO24T4XYZ3
Inputs	3 Universal analog inputs: 0-10Vdc, Thermistor (10k Type 3), or digital input (dry contact) Available for sensors: external temperature, changeover, night set back or pressure
Outputs	2 Analog outputs: 0-10Vdc or 2-10Vdc selectable (2mA max.) 4 TRIAC outputs: on/off, pulse 0 or 24Vac (250 mA max.), or 2 floating outputs
Power supply	22 to 26Vac 50/60Hz
Power consumption	1VA
Setpoint range	10ºC to 40ºC [50ºF to 104ºF]
External sensor range	-40ºC to 100ºC [-40ºF to 212ºF]
Control accuracy	Temperature: ±0.4ºC [0.8ºF]
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 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]

Description	TRO24T4XYZ3
Dimensions A = 2.85" | 73mm B = 4.85" | 123mm C = 1.00" | 24mm D = 2.36" | 60mm E = 3.27" | 83mm	

Wiring

We strongly recommend that all Neptronic products be wired to a separate grounded transformer and that transformer shall service only Neptronic products. This precaution will prevent interference with, and/or possible damage to incompatible equipment.

	Terminal Description	Details
1	Common	
2	Common	
3	Common	
4	24 Vac	
5	24 Vac	
6	TRIAC output 1 (TO1)	**Floating 1** (applies to pins 6-8 if set to *"FLT"* at step 8) TO1 = close TO2= open
7	External 24 Vac for TO1 & TO2 (if JP2 set to B&C)	
8	TRIAC output 2 (TO2)	
9	TRIAC output 3 (TO3)	**Floating 2** (applies to pins 9-11 if set to *"FLT"* at step 16) TO3 = close TO4= open
10	External 24 Vac for TO3 & TO4 (if JP1 set to B&C)	
11	TRIAC output 4 (TO4)	
12	Analog input 1 (AI1)	see step 32 and DIP switch (DS2 – 1&2)
13	Analog input 2 (AI2)	see step 33 and DIP switch (DS2 – 3&4)
14	Analog input 3 (AI3)	see step 34 and DIP switch (DS2 – 5&6)
15	Analog output 1 (AO1)	see step 24
16	Analog output 2 (AO2)	see step 25

Jumpers

Jumpers		Description
JP1	Output Signal Selector TO3 and TO4	A&B = Internal: TRIAC output signal is linked to internal 24 Vac (same as thermostat)
JP2	Output Signal Selector TO1 and TO2	B&C = External: TRIAC output signal is linked to external 24 Vac (different than thermostat)

DS1 - Mode Selector

DIP Switches		ON	OFF
1	Mode	Programming Mode	Operation Mode
2	Not used	-	-
3	Not used	-	-

DS2 – Analog Input Type

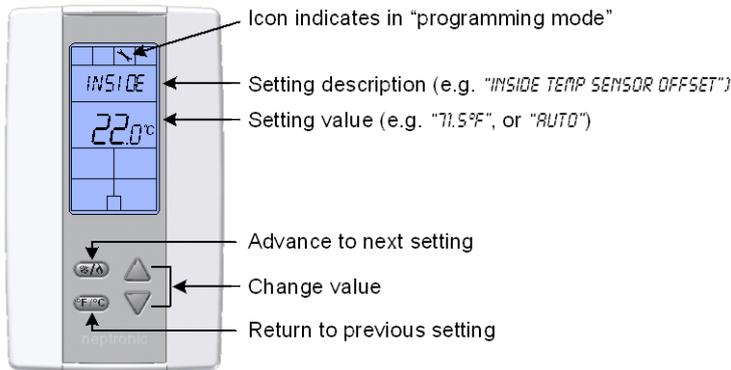| Description	AI1 (step 32)		AI2 (step 33)		AI3 (step 34)	
	1	**2**	**3**	**4**	**5**	**6**
Thermistor 10kΩ / dry contact	ON	OFF	ON	OFF	ON	OFF
Analog 0-10Vdc (only if input set to *"PRSD"* or *"PRSA"*)	OFF	ON	OFF	ON	OFF	ON

Mounting Instructions

⚠️ **CAUTION: Remove power to avoid a risk of malfunction.**

A. Remove the captive screw that's holding the base and the front cover of the unit together.
B. Lift the front cover of the unit to separate it from the base.
C. Pull all wires through the holes in the base.
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.
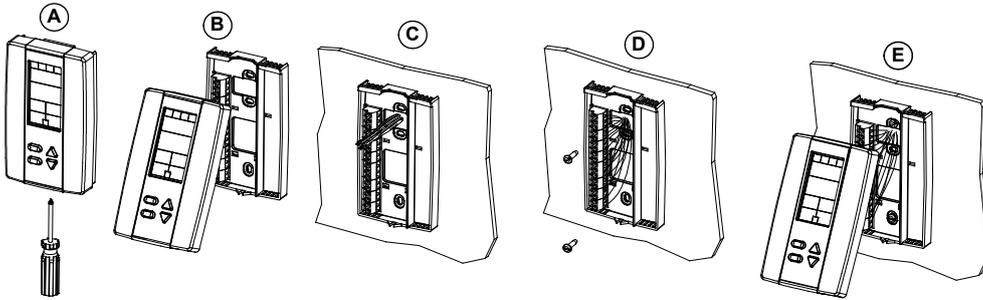
Programming Mode

ℹ️ *The Mode Selector DIP switch (DS1) must be set to the "ON" position (Programming Mode). Refer to Wiring on page 2. To exit, set DIP switch back to the "OFF" position (Operation Mode). All changes will be saved.*

Icon indicates in "programming mode"

Setting description (e.g. *"INSIDE TEMP SENSOR OFFSET"*)

Setting value (e.g. *"71.5°F"*, or *"AUTO"*)

Advance to next setting

Change value

Return to previous setting

Symbols used in this Manual

Symbol	Description	Symbol	Description
	Single Duct	AO1	Analog Output 1
	Temperature	AO2	Analog Output 2
	Heating	AI1	Analog Input 1
	Cooling	AI2	Analog Input 2
TO1	TRIAC Output 1	AI3	Analog Input 3
TO2	TRIAC Output 2	≈	Air Flow
TO3	TRIAC Output 3	EVENT	Schedule (Event)
TO4	TRIAC Output 4		Timer/Clock

Setpoint and User Control

1. "INSIDE TEMP SENSOR OFFSET"

Range:	10 to 40ºC	[50 to 104ºF]
Offset:	Max. ± 5ºC	
Increment:	0.1ºC	[0.2ºF]

Compare the displayed temperature reading with a known value from a thermometer. To offset or calibrate the sensor, use the arrows key to set the desired temperature reading. This is useful for thermostats installed in areas where the temperature read is slightly different than the room's actual temperature. For example, a thermostat placed right under the air diffuser. If the thermostat is set to use an external temperature sensor (**EtS** at Step 27, 28 or 29), the thermostat displays "OFF".

2. "ENABLE ON OFF CONTROL MODE"

Default:	Yes (Enable)
Range:	Yes / No

If you select Yes, the user can set the unit to "Off" via the Control Mode (see page 19). If you select No, the "Off" selection does not appear in the Control Mode.

TRIAC Output 1 (TO1)

3. "SELECT TO1 OUTPUT SIGNAL"

Default:	FLt (floating)
Range:	FLt (floating), OnOf (on/off), PULs (pulsed)

Select the desired signal from the available options.

- If you select FLt, ramp TO1 will be used for TO2. TO1 ramp will be set to close and TO2 will be set to open.
- If you select PULs, only the Heating 1 and Heating 2 ramps will be available at Step 4.

4. "SELECT TO1 SIGNAL RAMP"

Default:	Cr1 (Cooling ramp 1)
Range:	Cr1, Cr2, Hr1, Hr2, COr, OFF

Select the desired ramp from the available options.

- If you selected FLt at Step 3, ramp TO1 will be used for TO2. TO1 ramp will be set to close and TO2 will be set to open.
- If you selected PULs at Step 3, only Heating Ramp 1 and Heating Ramp 2 will be available.

If you selected OnOf at Step 3, go to Step 7.
If you selected PULs at Step 3, or OFF at this step, go to Step 8.
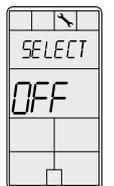
Cooling Ramp 1	Cooling Ramp 2	Heating Ramp 1	Heating Ramp 2	Changeover Ramp	Off
SELECT Cr 1	SELECT Cr2	SELECT Hr 1	SELECT Hr2	SELECT COr	SELECT OFF

5. "SET FLOATING TIME IN SECONDS"

Default:	100 seconds
Range:	15 to 250 seconds
Increment:	5 seconds

This option appears only if you selected **FLt** (Floating) at Step 3. Set the desired value for floating time signal.

6. "SELECT MOTOR DIRECT REVERSE"

Default:	Dir (Direct)
Range:	Dir (Direct) or Rev (Reverse)

Set the motor direction to either Direct (clockwise, 0 to 90°), or Reverse (counter clockwise, 90 to 0°). **Go to Step 11**.

7. "SELECT TO1 CLOSE PERCENT"

Default:	40% of demand
Range:	20%, 40%, 60%, 80%

This option appears if you selected **OnOf** at Step 3. Select the percentage at which you want TO1 to close (at % of demand of the ramp selected at Step 4). Contact automatically opens at 0% of the demand.

TRIAC Output 2 (TO2)

8. "SELECT TO2 OUTPUT SIGNAL"

(TO2) Default: OnOf (on/off)
Range: OnOf (on/off), PULs (pulsed)

Select the desired signal from the available options.

- *If you select PULs, only the Heating 1 and Heating 2 ramps will be available at Step 9.*
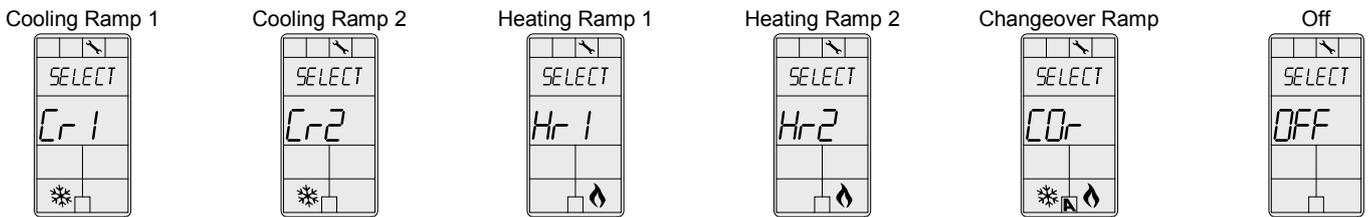
9. "SELECT TO2 SIGNAL RAMP"

(TO2) Default: Cr1 (Cooling ramp 1)
Range: Cr1, Cr2, Hr1, Hr2, COr, OFF

Select the desired ramp from the available options.

- *If you selected PULs at Step 8, only Heating Ramp 1 and Heating Ramp 2 will be available.*

If you selected PULs at Step 8, or OFF at this step, go to Step 11.

Cooling Ramp 1	Cooling Ramp 2	Heating Ramp 1	Heating Ramp 2	Changeover Ramp	Off
SELECT Cr1	SELECT Cr2	SELECT Hr1	SELECT Hr2	SELECT COr	SELECT OFF

10. "SELECT TO2 CLOSE PERCENT"

(TO2) Default: 40% of demand
Range: 20%, 40%, 60%, 80%

This option appears if you selected **OnOf** at Step 8. Select the percentage at which you want TO2 to close (at % of demand of the ramp selected at Step 9). Contact automatically opens at 0% of the demand.

TRIAC Output 3 (TO3)

11. "SELECT TO3 OUTPUT SIGNAL"

(TO3) Default: OnOf (on/off)
Range: FLt (floating), OnOf (on/off), PULs (pulsed)

Select the desired signal from the available options.

- *If you select FLt, ramp TO3 will be used for TO4. TO3 ramp will be set to close and TO4 will be set to open.*
- *If you select PULs, only the Heating 1 and Heating 2 ramps will be available at Step 4.*
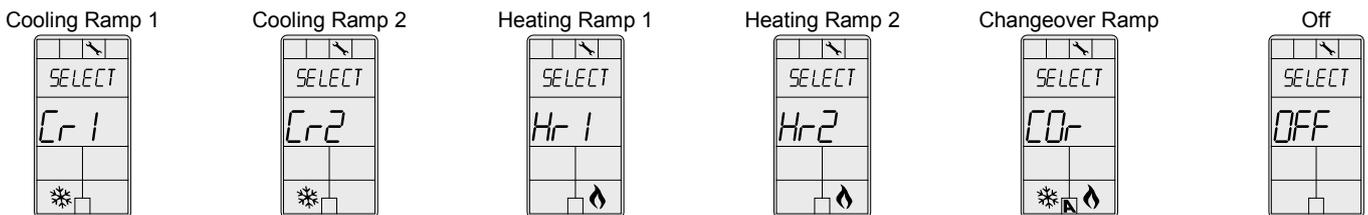
12. "SELECT TO3 SIGNAL RAMP"

(TO3) Default: Hr1 (Heating ramp 1)
Range: Cr1, Cr2, Hr1, Hr2, COr, OFF

Select the desired ramp from the available options.

- *If you selected FLt at Step 11, ramp TO1 will be used for TO2. TO1 ramp will be set to close and TO2 will be set to open.*
- *If you selected PULs at Step 11, only Heating Ramp 1 and Heating Ramp 2 will be available.*

If you selected OnOf at Step 11, go to Step 15.
If you selected PULs at Step 11, or OFF at this step, go to Step 16.

Cooling Ramp 1	Cooling Ramp 2	Heating Ramp 1	Heating Ramp 2	Changeover Ramp	Off
SELECT Cr1	SELECT Cr2	SELECT Hr1	SELECT Hr2	SELECT COr	SELECT OFF

13. "SET FLOATING TIME IN SECONDS"

(TO3)
Default:	100 seconds
Range:	15 to 250 seconds
Increment:	5 seconds

This option appears only if you selected **FLt** (Floating) at Step 11. Set the desired value for floating time signal.

14. "SELECT MOTOR DIRECT REVERSE"

(TO3)
Default:	Dir (Direct)
Range:	Dir (Direct) or Rev (Reverse)

Set the motor direction to either Direct (clockwise, 0 to 90°), or Reverse (counter clockwise, 90 to 0°). **Go to Step 19**.

15. "SELECT TO3 CLOSE PERCENT"

(TO3)
Default:	40% of demand
Range:	20%, 40%, 60%, 80%

This option appears if you selected **OnOf** at Step 11. Select the percentage at which you want TO3 to close (at % of demand of the ramp selected at Step 12). Contact automatically opens at 0% of the demand.

TRIAC Output 4 (TO4)

16. "SELECT TO4 OUTPUT SIGNAL"

(TO4)
Default:	OnOf (on/off)
Range:	OnOf (on/off), PULs (pulsed)

Select the desired signal from the available options.

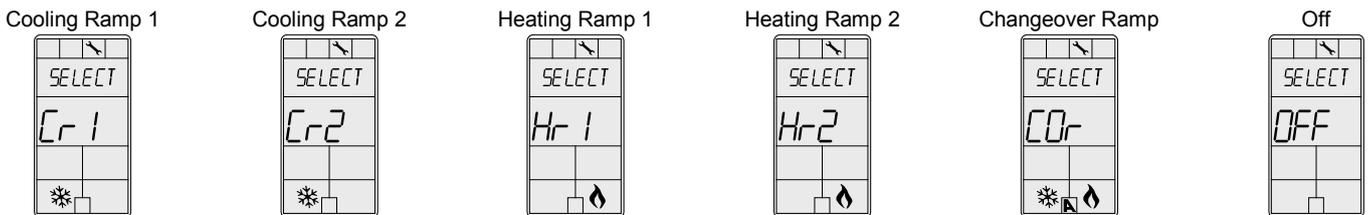- *If you select PULs, only the Heating 1 and Heating 2 ramps will be available at Step 17.*

17. "SELECT TO4 SIGNAL RAMP"

(TO4)
Default:	Hr2 (Heating ramp 2)
Range:	Cr1, Cr2, Hr1, Hr2, COr, OFF

Select the desired ramp from the available options.

- *If you selected PULs at Step 16, only Heating Ramp 1 and Heating Ramp 2 will be available.*

If you selected PULs at Step 8, or OFF at this step, go to Step 19.

Cooling Ramp 1	Cooling Ramp 2	Heating Ramp 1	Heating Ramp 2	Changeover Ramp	Off
SELECT Cr 1 ❄	SELECT Cr2 ❄	SELECT Hr 1 🔥	SELECT Hr2 🔥	SELECT COr ❄🔥	SELECT OFF

18. "SELECT TO4 CLOSE PERCENT"

(TO4)
Default:	40% of demand
Range:	20%, 40%, 60%, 80%

This option appears if you selected **OnOf** at Step 16. Select the percentage at which you want TO2 to close (at % of demand of the ramp selected at Step 17). Contact automatically opens at 0% of the demand.
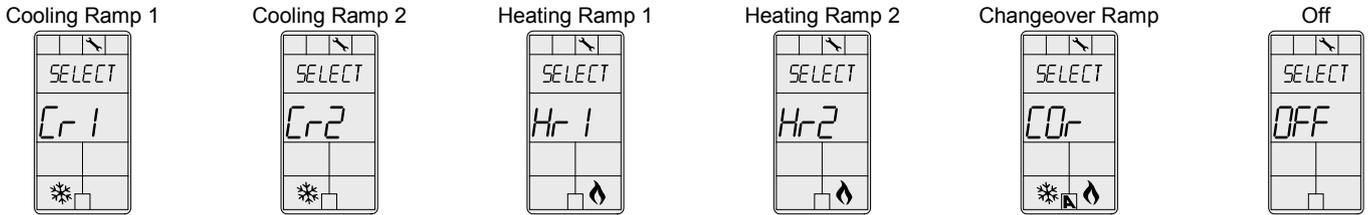
Analog Outputs (AO1 and AO2)

19. SELECT AO1 ANALOG RAMP"

(AO1)
Default:	Cr1 (Cooling ramp 1)
Range:	Cr1, Cr2, Hr1, Hr2, COr, OFF

Select the desired ramp from the available options.

Cooling Ramp 1	Cooling Ramp 2	Heating Ramp 1	Heating Ramp 2	Changeover Ramp	Off
SELECT Cr 1	SELECT Cr2	SELECT Hr 1	SELECT Hr2	SELECT COr	SELECT OFF

20. SELECT AO2 ANALOG RAMP"

(AO2)
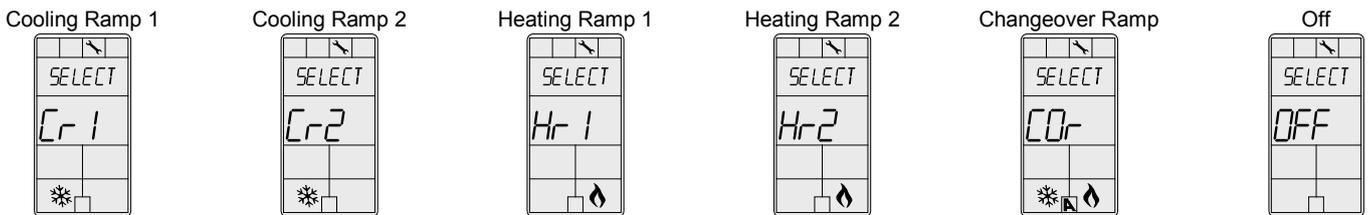|	
Default:	Hr1 (Heating ramp 1)
Range:	Cr1, Cr2, Hr1, Hr2, COr, OFF

Select the desired ramp from the available options.

If you selected OFF for AO1, go to Step 24.
If you selected OFF for both AO1 and AO2, go to Step 27.

Cooling Ramp 1	Cooling Ramp 2	Heating Ramp 1	Heating Ramp 2	Changeover Ramp	Off
SELECT Cr 1	SELECT Cr2	SELECT Hr 1	SELECT Hr2	SELECT COr	SELECT OFF

21. "MIN VDC ANALOG AO1 OUTPUT"

(AO1)
Default:	0.0 Volt
Range:	0.0 to 10.0 Volts
Increment:	0.1 Volt

This option does not appear if the signal ramp for AO1 is set to **OFF** (Step 19). Select the desired minimum voltage ("zero" value) for the AO1 ramp. The minimum value is restricted by the maximum value (Step 22). In other words, the minimum value should be less than the maximum value.

22. "MAX VDC ANALOG AO1 OUTPUT"

(AO1)
Default:	10.0 Volts
Range:	0.0 to 10.0 Volts
Increment:	0.1 Volt

This option does not appear if the signal ramp for AO1 is set to **OFF** (Step 19). Select the desired maximum voltage ("span" value) for the AO1 ramp. The maximum value is restricted by the minimum value (Step 21). In other words, the maximum value should not be less than the minimum value.

23. "MIN POS AO1 OUTPUT PERCENT"

(AO1)
Default:	0%
Range:	0 to 100%
Increment:	5%

This option does not appear if the signal ramp for AO1 is set to **OFF** (Step 19). Select the desired minimum position of the AO1 analog output.

24. "MIN VDC ANALOG AO2 OUTPUT"

(AO2)
Default:	0.0 Volt
Range:	0.0 to 10.0 Volts
Increment:	0.1 Volt

This option does not appear if the signal ramp for AO2 is set to **OFF** (Step 20). Select the desired minimum voltage ("zero" value) for the AO2 ramp. The minimum value is restricted by the maximum value (Step 25). In other words, the minimum value should be less than the maximum value.

25. "MAX VDC ANALOG AO2 OUTPUT"

(AO2)

Default:	10.0 Volts
Range:	0.0 to 10.0 Volts
Increment:	0.1 Volt

This option does not appear if the signal ramp for AO2 is set to **OF**F (Step 20). Select the desired maximum voltage ("span" value) for the AO2 ramp. The maximum value is restricted by the minimum value (Step 24). In other words, the maximum value should not be less than the minimum value.

26. "MIN POS AO2 OUTPUT PERCENT"

(AO2)

Default:	0%
Range:	0 to 100%
Increment:	5%

This option does not appear if the signal ramp for AO2 is set to **OFF** (Step 20). Select the desired minimum position of the AO2 analog output.

Analog Inputs (AI1 to AI3)

27. "SELECT AI1 INPUT SIGNAL"

(AI1)

Default:	OFF
Range:	OFF, SENs, NoCl, NoHt, EtS, PrSd, PrSa

Select the input signal type for AI1 (analog input 1).

- *If NoCL is selected: heating mode activates when the contact is closed and cooling mode activates when the contact is opened.*
- *If NoHt is selected: cooling mode activates when the contact is closed and heating mode activates when the contact is opened.*
- *If SENs is selected: heating mode activates when the temperature read by the external sensor is above the Changeover Setpoint and cooling mode activates when the temperature read by the external sensor is below the Changeover Setpoint (see Step 31).*
- *If PrSd or PrSa is selected in a pressure independent VAV system, you must perform a calibration by using the Air Flow Program Mode (Operation Mode) on page 11.*

Off	External Changeover Sensor 10kΩ	Changeover Contact Normally Cool	Changeover Contact Normally Heat
SELECT OFF	SELECT SENs	SELECT NoCL	SELECT NoHt

External Temperature Sensor 10kΩ	Differential Pressure Sensor (0-10Vdc, PrSd=1-V if P=1)	Velocity Pressure Sensor (0-10Vdc, PrSa 10V=Vnom)
SELECT EtS	SELECT PrSd	SELECT PrSa

28. "SELECT AI2 INPUT SIGNAL"

(AI2)

Default:	OFF
Range:	OFF, SENs, NoCl, NoHt, EtS, PrSd, PrSa

Select the input signal type for AI2 (analog input 2). Same options as in Step 27.

- *The AI1 input signal has priority over AI2. If you select the same input signal type as AI1, AI2 will not be functional.*

29. "SELECT AI3 INPUT SIGNAL"

(AI3)

Default:	OFF
Range:	OFF, SENs, NoCl, NoHt, EtS, PrSd, PrSa

Select the input signal type for AI3 (analog input 3). Same options as in Step 27.

- *The AI1and AI2 input signals have priority over AI3. If you select the same input signal type as AI1 or AI2, AI3 will not be functional.*

30. "EXTERN TEMPER SENSOR OFFSET"

Range:	0 to 50ºC	[41 to 122ºF]Max. ± 5ºC
Offset:	0.1ºC	[0.2ºF]
Increment:		

This option appears if you've set one of the analog inputs to **EtS** (External temperature sensor) in Step 27, 28 or 29. When the thermostat is connected to the appropriate analog input (AI1, AI2, or AI3), the display shows the temperature read by the external temperature sensor. Adjust the offset by comparing it with a known value (e.g. thermometer). If the sensor is not connected or short circuited, the display is blank "Error".

31. "CH OVER SETPNT TEMPER"

Default:	24ºC	[82ºF]	
Range:	10 to 40ºC	[50 to 104ºF]0.5ºC	[1ºF]
Increment:			

This option appears if you've set one of the analog inputs to **SENs** (External changeover sensor) in Step 27, 28 or 29. Set the desired changeover temperature setpoint. Please note that the heating mode activates when the temperature read by the external sensor is above the Changeover Setpoint and cooling mode activates when the temperature read by the external sensor is below the Changeover Setpoint.

32. "PRESSUR INDEPEN OUTPUT"

Default:	FLt.1 (floating 1)
Range:	FLt.1, FLt.2, ANL.1, ANL.2

This option appears if you've set one of the analog inputs to either **PrSd** or **PrSa** (pressure sensor) in Step 27, 28 or 29. Select which output is affected by pressure (connected to the actuator). These selections may vary based on options selected at Step 3 and 11.

Floating 1 (TO1 & TO2) — PRESSUR FLt.1
Floating 2 (TO3 & TO4) — PRESSUR FLt.2
Analog 1 (AO1) — PRESSUR ANL.1
Analog 2 (AO2) — PRESSUR ANL.2

33. "CONTROL RAMP CH OVER"

Default:	2.0ºC	[4ºF]
Range:	0.5 to 5.0ºC	[1 to 10ºF]
Increment:	0.5ºC	[1ºF]

Select the desired proportional band value of the changeover ramp. The cooling❄ and heating◊ symbols are also displayed.

34. "CONTROL RAMP 1 HEATING"

Default:	2.0ºC	[4ºF]
Range:	0.5 to 5.0ºC	[1 to 10ºF]
Increment:	0.5ºC	[1ºF]

Select the desired proportional band value of the heating ramp 1. The heating◊ symbol is also displayed.

35. "CONTROL RAMP 2 HEATING"

Default:	2.0ºC	[4ºF]
Range:	0.5 to 5.0ºC	[1 to 10ºF]
Increment:	0.5ºC	[1ºF]

Select the desired proportional band value of the heating ramp 2. The heating◊ symbol is also displayed.

36. "CONTROL RAMP 1 COOLING"

Default:	2.0ºC	[4ºF]
Range:	0.5 to 5.0ºC	[1 to 10ºF]
Increment:	0.5ºC	[1ºF]

Select the desired proportional band value of the cooling ramp 1. The cooling❄ symbol is also displayed.

37. "CONTROL RAMP 2 COOLING"

Default:	2.0ºC	[4ºF]
Range:	0.5 to 5.0ºC	[1 to 10ºF]
Increment:	0.5ºC	[1ºF]

Select the desired proportional band value of the cooling ramp 2. The cooling❄ symbol is also displayed.

38. "CONTROL DEAD BAND CH OVER"

Default:	0.3ºC	[0.6ºF]
Range:	0 to 5.0ºC	[0 to 10ºF]
Increment:	0.1ºC	[0.2ºF]

Select the desired dead band value of the changeover ramp. The cooling☀ and heating◊ symbols are also displayed.

39. "CONTROL DEAD BAND 1 HEATING"

Default:	0.3ºC	[0.6ºF]
Range:	0 to 5.0ºC	[0 to 10ºF]
Increment:	0.1ºC	[0.2ºF]

Select the desired dead band value of the heating ramp 1. The heating◊ symbol is also displayed.

40. "CONTROL DEAD BAND 2 HEATING"

Default:	0.3ºC	[0.6ºF]
Range:	0 to 5.0ºC	[0 to 10ºF]
Increment:	0.1ºC	[0.2ºF]

Select the desired dead band value of the heating ramp 2. The heating◊ symbol is also displayed.

41. "CONTROL DEAD BAND 1 COOLING"

Default:	0.3ºC	[0.6ºF]
Range:	0 to 5.0ºC	[0 to 10ºF]
Increment:	0.1ºC	[0.2ºF]

Select the desired dead band value of the cooling ramp 1. The cooling☀ symbol is also displayed.

42. "CONTROL DEAD BAND 2 COOLING"

Default:	0.3ºC	[0.6ºF]
Range:	0 to 5.0ºC	[0 to 10ºF]
Increment:	0.1ºC	[0.2ºF]

Select the desired dead band value of the cooling ramp 2. The cooling☀ symbol is also displayed.

43. "COOLING ANTI CYCLE MINUTES"

Default:	2 minutes
Range:	0 to 15 minutes
Increment:	1 minute

To protect the compressor, set the delay in minutes before activating or reactivating the cooling contact.

44. "ADJUST INTGRAL TIME IN SECONDS"

Default:	0 seconds
Range:	0 to 250 seconds
Increment:	5 seconds

Set the desired value for the integration factor compensation.

45. "ENABLE ANTI FREEZE PROTECT"

Default:	No (disabled)
Range:	No, Yes

If this option is enabled, heating starts automatically when the temperature drops to 4ºC [39ºF], even if the thermostat is in OFF mode. Once the temperature reaches 5ºC [41ºF], the heating stops.

Air Flow Program Mode (Operation Mode)

This menu is accessible through normal operation mode.

1. The Mode Selector DIP switch (DS1) must be set to the "OFF" position (Operation Mode). Refer to Wiring on page 2.
2. Press the ⊛/◊ and ℉/°C keys for 5 seconds. The *"ENTER PASSWORD"* screen appears.
3. Enter the password (**637**) within 1 minute. Use the △ and ▽ arrow keys to increase or decrease the value and the 🐾 ⊛/◊ buttons to toggle between the digits. If you enter the wrong password, the thermostat displays "**Eror**" and returns to Operation Mode.
4. Use the same menu operations as described in Programming Mode on page 3.

The thermostat will return to normal mode if you navigate through the entire menu and do not make any selection, or if you do not press any key for 5 minutes. The changed values will be saved automatically.

46. "INSIDE TEMP SENSOR OFFSET"

Range:	10 to 40ºC [50 to 104ºF]
Offset:	Max ± 5ºC
Increment:	0.1ºC [0.2ºF]

Compare the displayed temperature reading with a known value from a thermometer. To offset or calibrate the sensor, use the arrows key to set the desired temperature reading. This is useful for thermostats installed in areas where the temperature read is slightly different than the room's actual temperature. For example, a thermostat placed right under the air diffuser.

If the thermostat is set to use an external temperature sensor (EtS at Step 27, 28 or 29 of programming mode on page 8), the thermostat displays "OFF".

47. "EXTERN TEMPER SENSOR OFFSET"

Range:	0 to 50ºC [41 to 122.0ºF]
Offset:	Max ± 5ºC
Increment:	0.1ºC [0.2ºF]

This option appears if you've set one of the analog inputs to **EtS** (External temperature sensor) in Step 27, 28 or 29 of programming mode on page 8. When the thermostat is connected to the appropriate analog input (AI1, AI2, or AI3), the display shows the temperature read by the external temperature sensor. Adjust the offset by comparing it with a known value (e.g. thermometer). If the sensor is not connected or short circuited, the display is blank "Error".

48. "PRESSURE FILTER TIME IN SECONDS"

Default:	2 seconds
Range:	1 to 10 seconds
Increment:	1 second

This option appears if you have set one of the analog inputs to **PrSd** or **PrSa** in Step 27, 28, or 29. Set the time in seconds of the numeric filter applied to the pressure analog input. The numeric filter stabilizes the reading and slows down the answer of the system.

49. "AIR FLOW INTGRAL TIME IN SECONDS"

Default:	0 minutes
Range:	0 to 60 minutes
Increment:	1 minute

Set the time in minutes for the integration factor compensation.

50. "ADJUST AIRFLOW KFACTOR VNOM"

Default:	1200
Range:	100 to 9995
Increment:	5

Set the value of the K-Factor or the V nominal according to your pressure sensor selection (**PrSd** or **PrSa** in Step 27, 28 or 29 or programming mode on page 8).

- If Differential Pressure Sensor **(PrSd)**: $V = k\sqrt{\Delta P}$ when $\Delta P=1$ (10.00V)
- If Velocity Pressure Snesor **(PrSa)**: Vnom =10.00V

51. "MINIMUM COOLING AIRFLOW"

Default:	100
Range:	0 to "maximum cooling airflow"
Increment:	5

Select the desired value of the minimum airflow in cooling. The minimum value is restricted by the maximum value (Step 52).

52. "MAXIMUM COOLING AIRFLOW"

Default:	1000
Range:	"minimum cooling airflow" to "K-Factor or V nominal"
Increment:	5

Select the desired value of the maximum airflow in cooling. The maximum value is restricted by the minimum value (Step 51).

53. "MINIMUM HEATING AIRFLOW"

Default:	100
Range:	0 to "maximum heating airflow"
Increment:	5

Select the desired value of the minimum airflow in heating. The minimum value is restricted by the maximum value (Step 54).

54. "MAXIMUM HEATING AIRFLOW"

Default:	1000
Range:	"minimum heating airflow" to "K-Factor or V nominal"
Increment:	5

Select the desired value of the maximum airflow in heating. The maximum value is restricted by the minimum value (Step 53).

55. "ENABLE AIRFLOW BALANCE"

Default:	No
Range:	No, Yes

If you do not need to balance system, select **No**. This will exit the Air Flow and BACnet Setup menu and return to operation mode. If you want to balance system, select **Yes**. In this case, continue to the next step and if no action occurs for 30 minutes, changed values will be saved and the thermostat will exit the Air Flow Setup menu and return to operation mode.

56. "MINIMUM AIRFLOW"

Range:	0 to "K-Factor or V nominal"
Offset:	Max. ± ½ value
Increment:	1

The thermostat displays the minimum airflow detected by the pressure sensor. The thermostat will send a signal to the actuator to close the VAV box at minimum airflow. When the value on thermostat is stable, adjust the calibration of the sensor by comparing it with the reading on a manometer or a balometer. If you can't stabilize the system, you may need to increase the filter time value (Step 48).

57. "MAXIMUM AIRFLOW"

Range:	0 to "K-Factor or V nominal"
Offset:	Max. ± ½ value
Increment:	1

The thermostat displays the maximum airflow detected by the pressure sensor. The thermostat will send a signal to the actuator to open the VAV box at maximum airflow. When the value on thermostat is stable, adjust the calibration of the sensor by comparing it with the reading on a manometer or a balometer. If you can't stabilize the system, you may need to increase the filter time value (Step 48). **Return to Step 55**. To exit the Air Flow Setup mode, set the Mode Selector DIP switch (DS1) must be set to "ON" position (Programming Mode).

Scheduling Mode Selection

This menu is accessible through normal operation mode.
1. The Mode Selector DIP switch (DS1) must be set to "OFF" position (Operation Mode). Refer to Wiring on page 2.
2. Press the ⌾ button for 5 seconds, the ↘ symbol is displayed indicating that the Scheduling Mode has been activated.
3. Use the △ and ▽ arrow keys to increase or decrease the values.
4. Press the ⌾ and ⌾ buttons to navigate through the program functions.

The thermostat will return to normal mode if you navigate through the entire menu and do not make any selection, or if you do not press any key for 5 minutes. The changed values will be saved automatically.

Time and Date

1. "SET TIME DISPLAY FORMAT"

Default: 24
Range: 12 hours, 24 hours
Selection: Desired time format

Select the desired time format.

2. "SET HOURS"

Range: 00 to 23 hours
Increment: 1 hour
Selection: Time in hours

Set the time in hours.

3. "SET MINUTES"

Range: 00 to 59 minutes
Increment: 1 minute
Selection: Time in minutes

Set the time in minutes.

4. "ENTER YEAR"

Default: 2010
Range: 2010 to 2099
Increment: 1
Selection: Year

Select the year.

5. "ENTER MONTH"

Range: 01 to 12 (January to December)
Increment: 1 month
Selection: Month

Select the month.

6. "ENTER DAY"

Range: 01 to 31 days
Increment: 1 day
Selection: Day

Select the day.

Scheduling and Internal Setpoint

7. "USED TIME SCHEDULE"

Default:	No
Range:	Yes, No
Selection - No:	Proceed to adjust the intern setpoint at Step 8 "adjust intern sepnt".
Selection - Yes:	Proceed to schedule events at Step 9 "select 2 or 4 events per day"

Select whether you want to schedule events or not.

8. "ADJUST INTERN SEPNT"

Default:	22ºC	[72ºF]
Range:	10 to 40ºC	[50 to 104ºF]
Increment:	0.5ºC	[1ºF]
Selection:	Desired setpoint and proceed to Step 29 "user setpnt locked".	

Event Settings

9. "SELECT 2 OR 4 EVENTS PER DAY"

Default:	2 Events
Range:	2 Events, 4 Events
Display:	☼☽ , ⌂☼⌂☽
Selection - 2 Events:	Refer to Step 10 "6:00, e1"
Selection - 4 Events:	Refer to Step 16 "6:00, e1".

Select the desired number of events per day. You can choose between 2 events or 4 events per day. This selection will be applied for each day of the week.

Event 1 (2 Events/Day)

10. "6:00, E1"

Default:	6:00
Range:	00:00 to Monday Event 2, start time -15 minutes
Increment:	15 minutes
Display:	MO, E1, ☼

Set the start time for Event 1 on Monday. The Monday Event 1 temperature setting will be effective from the time that is set here until the time set for the Event 2 on Monday.

11. "ADJUST EVENT 1 COOLING SEPNT"

Default:	22ºC	[72ºF]
Range:	10 to 40ºC	[50 to 104ºF], Off
Increment:	0.5ºC	[1ºF]
Display:	MO, E1, ☼, ❄	
Selection - Off:	Proceed to Event 2 settings at Step 13, "20:00, e2".	

Select the desired cooling temperature setpoint for the duration of Event 1. The minimum value is restricted by the Event 1 heating setpoint, Step 12 "adjust event 1 heating sepnt".

- *If you select the Off option, the thermostat will be off for this duration.*

12. "ADJUST EVENT 1 HEATING SEPNT"

Default:	20ºC	[68ºF]
Range:	10 to 40ºC	[50 to 104ºF]
Increment:	0.5ºC	[1ºF]
Display:	MO, E1, ☼, ◊	

Select the desired heating temperature setpoint for the duration of Event 1. The maximum value is restricted by the cooling setpoint of Event 1, Step 11 "adjust event 1 cooling sepnt".

Event 2 (2 Events/Day)

13. "20:00, E2"

Default:	20:00
Range:	Monday Event 1 +15 minutes, Monday 23:45
Increment:	15 minutes
Display:	MO, E2, ☽

Set the start time for Event 2 on Monday. The Monday Event 2 temperature setting will be effective from the time that is set here until the time set for the Event 1 on Tuesday.

14. "ADJUST EVENT 2 COOLING SEPNT"

Default:	28ºC	[82ºF]
Range:	10 to 40ºC	[50 to 104ºF], Off
Increment:	0.5ºC	[1ºF]
Display:	MO, E2, ☽, ❄	
Selection: Off:	Proceed to the copy schedule section at Step 28 "copy schedul".	

Select the desired cooling temperature setpoint for the duration of Event 2. The minimum value is restricted by the Event 2 heating setpoint, Step 15 "adjust event 2 heating sepnt".

- *If you select the Off option, the thermostat will be off for this duration.*

15. "ADJUST EVENT 2 HEATING SEPNT"

Default:	16ºC	[68ºF]
Range:	10 to 40ºC	[50 to 104ºF]
Increment:	0.5ºC	[1ºF]
Display:	MO, E2, ☽, 🔥	

Select the desired heating temperature setpoint for the duration of Event 2. The maximum value is restricted by the cooling setpoint of Event 2, Step 14 "adjust event 2 cooling sepnt".

Event 1 (4 Events/Day)

16. "6:00, E1"

Default:	06:00
Range:	00:00 to Monday Event 2, start time -15 minutes
Increment:	15 minutes
Display:	MO, E1, ☼

This option appears if you have selected 4 events at Step 9. Set the start time for event 1 on Monday. The Monday Event 1 temperature setting will be effective from the time that is set here until the time set for the Event 2 on Monday.

17. "ADJUST EVENT 1 COOLING SEPNT"

Default:	22ºC	[72ºF]
Range:	10 to 40ºC	[50 to 104ºF], Off
Increment:	0.5ºC	[1ºF]
Display:	MO, E1, ☼, ❄	
Selection - Off:	Proceed to Event 2 settings at Step 19 "20:00, e2".	

Select the desired cooling temperature setpoint for the duration of Event 1. The minimum value is restricted by the Event 1 heating setpoint, Step 18 "adjust event 1 heating sepnt".

- *If you select the Off option, the thermostat will be off for this duration.*

18. "ADJUST EVENT 1 HEATING SEPNT"

Default:	20ºC	[68ºF]
Range:	10 to 40ºC	[50 to 104ºF]
Increment:	0.5ºC	[1ºF]
Display:	MO, E1, ☼, 🔥	

Select the desired heating temperature setpoint for the duration of Event 1. The maximum value is restricted by the cooling setpoint of Event 1, Step 17 "adjust event 1 cooling sepnt".

Event 2 (4 Events/Day)

19. "20:00, E2"

Default:	20:00	
Range:	Monday Event 1 start time +15 minutes, Event 3 start time -15 minutes	
Increment:	15 minutes	
Display:	MO, E2, ☼	

Set the start time for Event 2 on Monday. The Monday Event 2 temperature setting will be effective from the time that is set here until the time set for the Event 3 on Monday.

20. "ADJUST EVENT 2 COOLING SEPNT"

Default:	28ºC	[82ºF]
Range:	10 to 40ºC	[50 to 104ºF], Off
Increment:	0.5ºC	[1ºF]
Display:	MO, E2, ☼ , ❄	
Selection - Off:	Proceed to Event 3 settings at Step 22 "22;00, e3".	

Select the desired cooling temperature setpoint for the duration of Event 2. The minimum value is restricted by the Event 2 heating setpoint, Step 21 "adjust event 2 heating sepnt".

- *If you select the Off option, the thermostat will be off for this duration.*

21. "ADJUST EVENT 2 HEATING SEPNT"

Default:	16ºC	[68ºF]
Range:	10 to 40ºC	[50 to 104ºF]
Increment:	0.5ºC	[1ºF]
Display:	MO, E2, ☼ , 🔥	

Select the desired heating temperature setpoint for the duration of Event 2. The maximum value is restricted by the cooling setpoint of Event 2, Step 20 "adjust event 2 cooling sepnt".

Event 3 (4 Events/Day)

22. "22:00, E3"

Default:	22:00	
Range:	Monday Event 2 start time +15 minutes, Event 4 start time -15 minutes	
Increment:	15 minutes	
Display:	MO, E3, 🌙	

Set the start time for Event 3 on Monday. The Monday Event 3 temperature setting will be effective from the time that is set here until the time set for the Event 4 on Monday.

23. "ADJUST EVENT 3 COOLING SEPNT"

Default:	22ºC	[72ºF]
Range:	10 to 40ºC	[50 to 104ºF], Off
Increment:	0.5ºC	[1ºF]
Display:	MO, E3, 🌙 , ❄	
Selection - Off:	Proceed to Event 4 options at Step 25 "23:45, e4"	

Select the desired cooling temperature setpoint for the duration of Event 3. The minimum value is restricted by the Event 3 heating setpoint, Step 24 "adjust event 3 heating sepnt".

- *If you select the Off option, thermostat will be off for this duration.*

24. "ADJUST EVENT 3 HEATING SEPNT"

Default:	20ºC	[68ºF]
Range:	10 to 40ºC	[50 to 104ºF]
Increment:	0.5ºC	[1ºF]
Display:	MO, E3, 🌙 , 🔥	

Select the desired heating temperature setpoint for the duration of Event 3. The maximum value is restricted by the cooling setpoint of Event 3, Step 23 "adjust event 3 cooling sepnt".

Event 4 (4 Events/Day)

25. "23:45, E4"

Default:	23:45	
Range:	Monday Event 3 +15 minutes, Monday 23:45	
Increment:	15 minutes	
Display:	MO, E4, ☽	

Set the start time for Event 4 on Monday. The Monday Event 4 temperature setting will be effective from the time that is set here until the time set for the Event 1 on Tuesday.

26. "ADJUST EVENT 4 COOLING SEPNT"

Default:	28ºC	[82ºF]
Range:	10 to 40ºC	[50 to 104ºF], Off
Increment:	0.5ºC	[1ºF]
Display:	MO, E4, ☽,❅	
Selection - Off:	Proceed to copy schedule section at Step 28 "copy schedul".	

Select the desired cooling temperature setpoint for the duration of Event 4. The minimum value is restricted by the Event 4 heating setpoint, Step 27 "adjust event 4 heating sepnt".

- *If you select the Off option, the thermostat will be off for this duration.*

27. "ADJUST EVENT 4 HEATING SEPNT"

Default:	16ºC	[68ºF]
Range:	10 to 40ºC	[50 to 104ºF]
Increment:	0.5ºC	[1ºF]
Display:	MO, E4, ☽, 🔥	

Select the desired heating temperature setpoint for the duration of Event 4. The maximum value is restricted by the cooling setpoint of Event 4, Step 26 "adjust event 4 cooling sepnt".

Copy Schedule

The Copy Schedule program function enables you to copy the schedule of a particular day to another day, for example, copy Monday's schedule to Tuesday.

28. "COPY SCHEDUL"

Default:	No
Range:	Yes, No
Selection - Yes:	The schedule of the day that you want to copy appears on the display. The day to which you want to copy the schedule to is highlighted.
Selection - No:	Set the schedule for the day by choosing the 2 Events or 4 Events options as you want.

29. "USER SETPNT LOCKED"

Default:	No (Unlocked)
Range:	Yes, No
Selection - Yes:	The user setpoint option is locked and the user cannot adjust the desired setpoint temperature. A lock symbol 🔒 appears, to indicate that the setpoint is locked.
Selection - No:	The user setpoint option is not locked and the user can adjust the desired setpoint temperature.

30. "ADJUST TEMPER CONTROL MODE"

Default:	Auto (Automatic)
Range:	Auto (Automatic), On (Cooling or Heating), Heat (Heating Only), Cool (Cooling Only)

Select the control mode that you want to authorize to the user. To authorize all the available modes, select Auto (Automatic Mode).

31. "USER CONTROL MODE LOCKED"

Default:	No (unlocked)
Range:	Yes, No
Selection - Yes:	The control mode is locked and the user cannot change any settings.
Selection - No:	The user will be able to make changes.

Set this option to indicate whether the user can make any changes to the control mode or not.

32. "QUIT"

Default:	Yes (Quit)
Range:	Yes, No
Selection - Yes:	You will exit from the Scheduling Mode and return to the Operation Mode.
Selection - No:	You will remain in the Scheduling Mode.

Select whether you want to continue working in the Scheduling Mode or exit. If you want to revise your schedule, start over from Step 1 "Set time display format".

Operation Mode

The Mode Selector DIP switch (DS1) must be set to the "OFF" position (Operation Mode). Refer to Wiring on page 2.
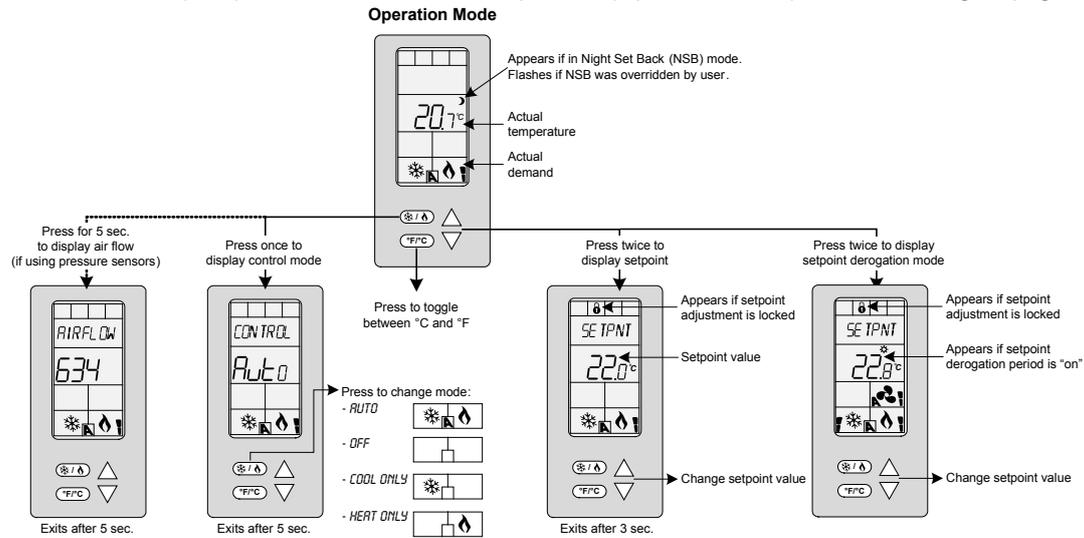
Power Up

Upon power up, the LCD illuminates and all segments appear for 2 seconds. The thermostat then displays its current version for 2 seconds.

LCD Backlight

Pressing any key on the thermostat illuminates the LCD for 4 seconds.

Temperature

The thermostat always displays the temperature reading. If the sensor is disconnected or short circuited, then "OFF" and "- - -" are displayed. To toggle the temperature scale between ºC and ºF, press the ⓕ/ºⓒ key.

Setpoint

To display the setpoint, press the △ or ▽ key twice. The setpoint appears for 5 seconds. To adjust the setpoint, press the arrow keys while the temperature is displayed. If the setpoint adjustment has been locked (Step 29 on page 17), the lock 🔒 symbol appears.

Setpoint Derogation Mode

This function is only available if you have set the **used time schedule** option to **Yes** at Step 7 on page 14. If the schedule is triggered, the thermostat enters the Setpoint Derogation Mode (the ☼ symbol appears) and uses the schedule's heating and cooling setpoints (see pages 14 to 17).

The user can press the △ or ▽ key twice to adjust the setpoint if the option is not locked or set to **No** (unlocked) at Step 29 on page 15. The ☼ symbol flashes to indicate that the setpoint derogation period has begun. If the event symbol does not flash, it means that the derogation period is complete or that the adjustment is locked at Step 29 in Scheduling Mode Selection on page 17. If the setpoint is locked, a 🔒 symbol and "*SETPNT LOCKED*" message appear.

Control Mode

To access the Control Mode, press the ⓦ/◊ key. The Control Mode appears for 5 seconds. Press the ⓦ/◊ key to scroll through the following control modes. These options can vary depending on the options selected at Steps 2 in Programming Mode and 30 in Scheduling Mode Selection.

- Auto (Automatic Cooling or Heating)
- Cooling only (on)
- Heating only (on)
- OFF

Air Flow

This function is only available if you've set one of the analog inputs to either **PrSd** or **PrSa** (pressure sensor) in Step 27, 28 or 29 on page 8. Press and hold the ⓦ/◊ key for 5 seconds to display the airflow value.

Notes

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