

# **Application 2341**

## **Unit Vent ASHRAE Cycle II with Mixed Air Sequence**

This document contains the following topics:

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  - Hardware Inputs
  - Hardware Outputs
  - Ordering Notes
- Sequence Of Operation
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  - Night Mode Override Switch
  - Mixed Air Control
  - Day Heating Operation
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  - Heating/Cooling Switchover
  - Control Loops
  - Morning Warm-Up/Cool-Down
  - Auxiliary Radiation Control
  - Fan Operation
  - Fan Alarm
  - Fail-Safe Operation
- Application Notes
- Wiring Diagrams
- Point Database

## Overview

In Application 2341, the Unit Vent Controller controls a unit ventilator with morning warm-up/cool-down, night mode override, free cooling, and auxiliary radiation in heating mode. Temperature control can be with:

- A modulating face and bypass damper with 2-position heating and cooling valve(s).

-or-

- Modulating heating and cooling valve(s).

This application controls room temperature indirectly by setting the discharge set point. This set point is sent to the heating and cooling PID loops, which directly control the coil devices.

This application also controls an outdoor air damper using mixed air control. This includes a PID loop to maintain the mixed air temperature. The free cooling/economizer function is turned on and off by the field panel using FREE CLG (Point 23). If free cooling is not available, then the outdoor air damper will be kept at minimum position; otherwise, the outdoor air damper will modulate to maintain the mixed air temperature set point. The unit ventilator fan is also controlled in this application. Refer to Figures 2341-1 through 2341-3.

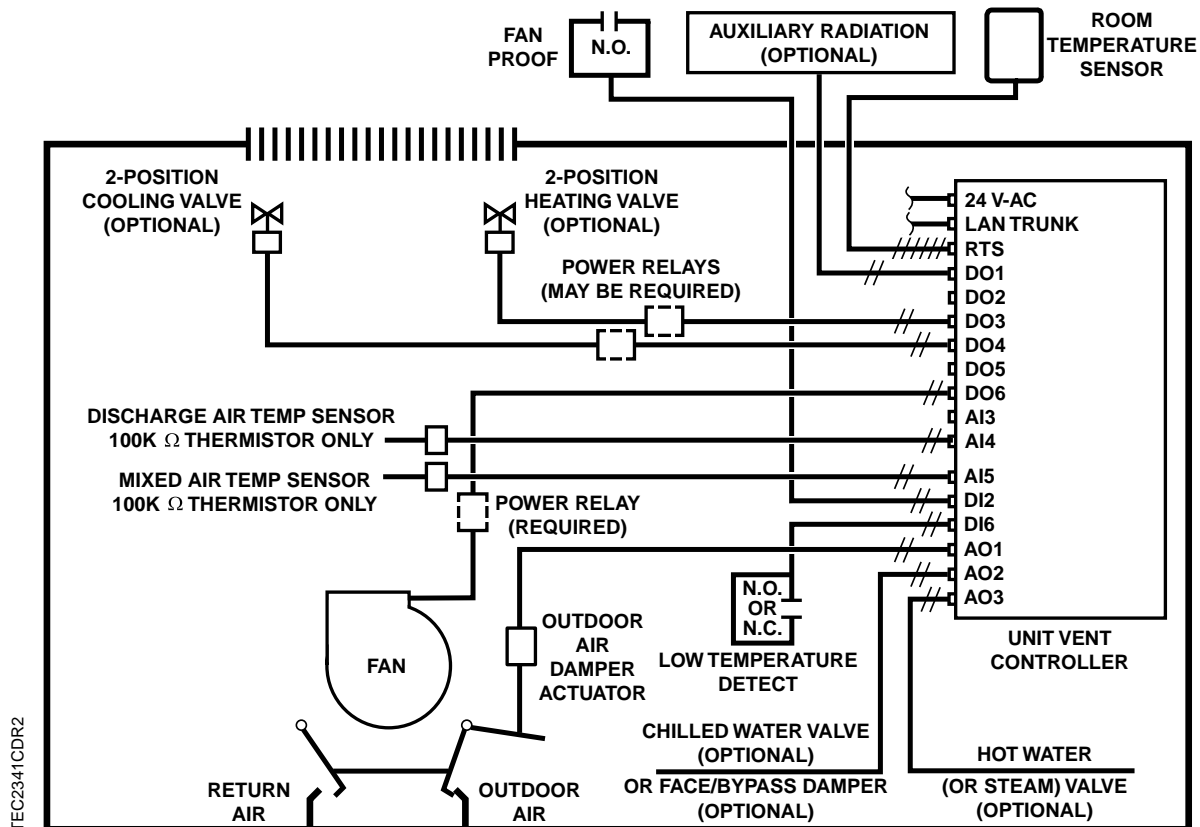
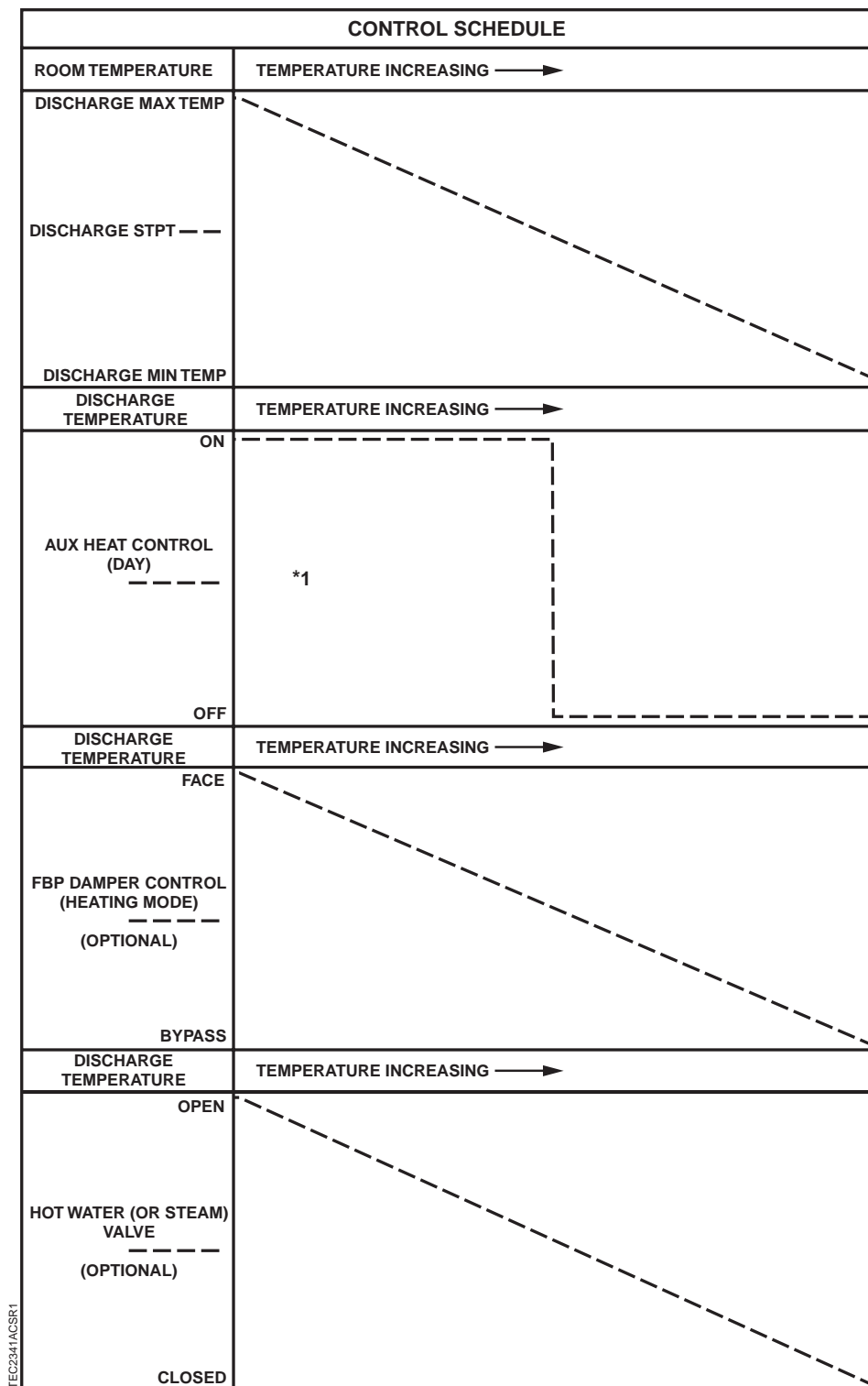


Figure 2341-1. Application 2341 Control Drawing.



1. Shown: aux heat control schedule for day heating mode only; in night heating mode, aux heat cycles with the fan.

**Figure 2341-2. Application 2341 Control Schedules.**

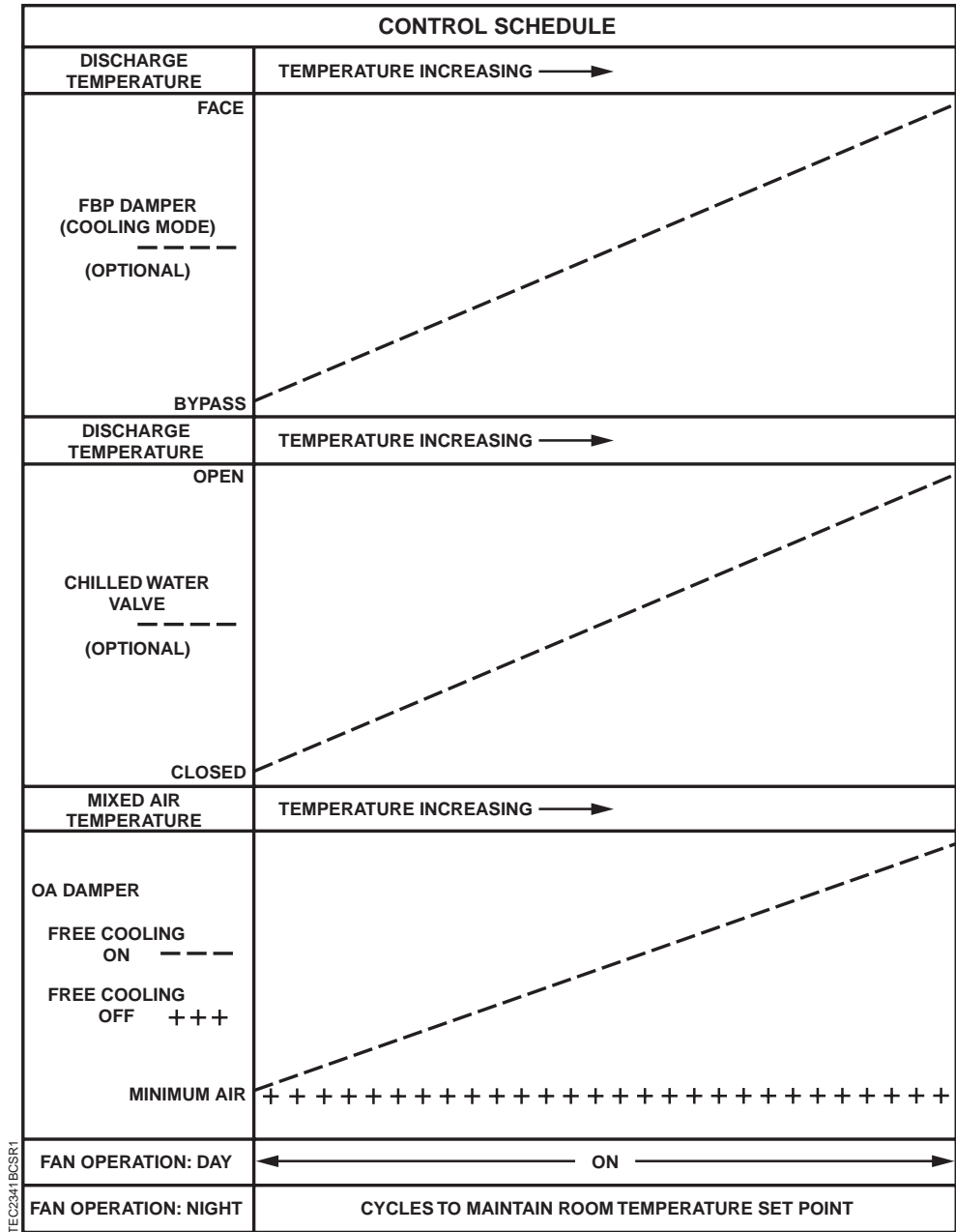


Figure 2341-3. Application 2341 Control Schedules (continued).

## Hardware Inputs

### Analog

- Discharge air temperature sensor
- Mixed air temperature sensor
- Room temperature sensor
- Room temperature set point dial (optional)

### Digital

- Night mode override (optional)
- Fan proof (optional)
- Low temperature detector (optional)

## Hardware Outputs

The following is a list of devices that can be used by this application depending on your hardware configuration.

### Analog (0-10V)

- Outdoor air damper actuator
- Heating valve
- Cooling valve
- Face and bypass damper

### Digital

- Auxiliary radiation
- 2-position cooling valve
- 2-position heating valve
- Unit fan

## Ordering Notes

You can order the Unit Vent controller with Mixed Air Sequence as custom solution number 229, or as Part No. 540-863C.

## Sequence of Operation

The following paragraphs present the sequence of operation for Application 2341, *Unit Vent ASHRAE Cycle II with Mixed Air Sequence*.

### Control Temperature Set Points

Depending on the controller's current operational mode (day or night), the control temperature set point, CTL STPT (Point 92) holds the value of one of the following set points:

**Day Mode** – In day mode, CTL STPT holds the value of DAY CLG STPT (Point 6) or DAY HTG STPT (Point 7). If the room temperature sensor has a set point dial and STPT DIAL (Point 14) is set to YES, then CTL STPT holds the value of RM STPT DIAL (Point 13).

If the set point dial is used and the value of RM STPT DIAL is less than the value of RM STPT MIN (Point 11), then CTL STPT holds the value of RM STPT MIN. If the value of RM STPT DIAL is greater than the value of RM STPT MAX (Point 12), then CTL STPT holds the value of RM STPT MAX.

**Night Mode** – In night mode, CTL STPT holds the value of NGT CLG STPT (Point 8) or NGT HTG STPT (Point 9).

**NOTE:** The value of CTL TEMP (Point 78) is the same as the value of ROOM TEMP (Point 4), unless CTL TEMP is overridden.

### Night Mode Override Switch

If an override switch is present on the room temperature sensor and a value (in hours) other than zero has been entered into OVRD TIME (Point 20), then by pressing the override switch a room occupant can reset the controller to day operational mode for the amount of time that is set in OVRD TIME. The status of NGT OVRD (Point 21) changes to DAY and remains there until the override time elapses, at which time the controller returns to night mode and the status of NGT OVRD changes back to NIGHT.

It is only when the controller is in night mode that the override switch on the room sensor will have any effect on the controller.

### Mixed Air Control

This feature performs mixed air control by adjusting either the MA STPT or the outside air damper position, depending on the circumstances.

At night, the outside air damper is closed.

The OA damper is also closed during warm-up or cool-down.

During the day when FREE CLG (Point 23) is NO, the OA damper is set to OADPR MINPOS (Point 10).

During the day when FREE CLG (Point 23) is YES, mixed air control depends on the value of the HEAT.COOL point.

If the application is in the day cooling mode and free cooling is available, the control will be as follows:

As CLG LOOPOUT (Point 79) goes from 0 to 50%, the MA STPT (Point 3) is adjusted from MAX MA STPT (Point 81) down to MIN MA STPT (Point 82). (MA STPT will equal MIN MA STPT when CLG LOOPOUT is 50% or greater.) If MA LOOPOUT (Point 18) is greater than OADPR MINPOS (Point 10), then the mixed air damper is under normal control of the mixed air PID loop. If MA LOOPOUT is less than or equal to OADPR MINPOS, then the mixed air damper is set equal to OA MINPOS.

If the application is in the day heating mode and free cooling is available, the control will be as follows:

As HTG LOOPOUT (Point 80) goes from 0 to 50%, the MA STPT is adjusted from MIN MA STPT up to MAX MA STPT. (MA STPT will equal MAX MA STPT when HTG LOOPOUT is 50% or greater.) If the mixed air override (MA OVERRIDE, (Point 91)) is ON, then the mixed air damper will be adjusted from OADPR MINPOS down to 0% opened when the MA TEMP goes from 50°F down to 40°F. If MA OVERRIDE is OFF and MA LOOPOUT is greater than OADR MINPOS, then the outside air damper is under normal control of the mixed air PID loop. If MA OVERRIDE is OFF and MA LOOPOUT is less than or equal to OADPR MINPOS, then the mixed air damper is set equal to OADPR MINPOS.

The mixed air control will go into override when MA TEMP drops below the value stored in MA LO LIMIT (Point 97). It will come out of override when MA TEMP remains greater than the value stored in MA HI LIMIT (Point 96) for longer than MA TIME. When MA TEMP is between MA LO LIMIT and MA HI LIMIT, the mixed air control's override status will remain in its last commanded state.

## Day Heating Operation

In day heating operation, the controller maintains the room temperature at the value stored in CTL STPT (Point 92) by doing the following:

- The room PID controller adjusts the DISCH STPT (Point 93) which is used in the heating PID loop. (The heating PID loop controls the supply air temperature in the heating mode.)
- The heating PID loop modulates the heating. (If a face and bypass damper is used, modulating the heating means that the FBP damper is modulated between full face and full bypass position while the 2-position heating valve is fully opened; if a modulating hot water valve is used, modulating the heating means the heating valve is modulated.)
- Auxiliary radiation, if provided, is controlled using dead band control. Auxiliary radiation, AUX RAD (Point 41) will be ON if HTG LOOPOUT (Point 80) is above AUX ON (Point 83) and OFF if HTG LOOPOUT is below AUX OFF (Point 84). If HTG LOOPOUT is between the values of AUX OFF and AUX ON, then AUX RAD will remain in its last commanded state. (HTG LOOPOUT is the output of the heating PID loop.)

Refer to the *Mixed Air Control* section of this document to find out how the outside air damper is controlled in day heating mode.

## Day Cooling Operation

In day cooling operation, the controller maintains the room temperature at the value stored in CTL STPT (Point 92) by doing the following:

- The room PID controller adjusts the DISCH STPT (Point 93) which is used in the cooling PID loop. (The cooling PID loop controls the supply air temperature in the cooling mode.)
- The cooling PID loop modulates the cooling. (If a face and bypass damper is used, modulating the cooling means that the FBP damper is modulated between full face and full bypass position while the 2-position cooling valve is fully opened; if a modulating chilled water valve is used, modulating the cooling means the cooling valve is modulated.)

Refer to the *Mixed air control* section of this document to find out how the outside air damper is controlled in day cooling mode.

## Night Heating Operation

In night heating operation, the controller operates as follows:

For units with steam, NGT HW HTG (Point 53) must be set to NO so that the coils can be cycled.

The controller may switch to cooling mode when appropriate if NGT CLG MODE (Point 54) is set to YES.

Heating only is provided when NGT CLG MODE is set to NO.

During night heating, the outside air damper is shut.

The controller maintains the room temperature at the value stored in CTL STPT (Point 92) by doing the following:

- If CTL TEMP (Point 78) drops below the value of NGT HTG STPT (Point 9) minus the value of NGT DBAND (Point 88), then:
  - The fan turns ON.
  - Heating turns ON.



- If CTL TEMP rises above NGT HTG STPT, then:
  - The fan turns OFF.
  - Heating turns OFF.

When the fan turns ON, the auxiliary radiation is turned ON. When the fan turns OFF, auxiliary radiation is turned OFF.

## Night Cooling Operation

In night cooling operation, the controller operates as follows:

For modulated hot water or steam, NGT HW HTG must be set to NO so that the heating coils can be kept shut.

When NGT CLG MODE (Point 54) is set to NO, the unit will operate in night heating mode only.

During night cooling, the outside air damper is shut.

The controller maintains the room temperature at the value stored in CTL STPT (Point 92) by doing the following:

- If CTL TEMP (Point 78) rises above the sum of NGT CLG STPT (Point 8) and NGT DBAND (Point 88), then:
  - The fan turns ON.
  - Full cooling is used.  
(If a face and bypass damper is used, full cooling means the damper is set to full face position while the 2-position cooling valve is fully opened. If a modulating chilled water valve is used, full cooling means that it is all the way opened.)
- If CTL TEMP drops below NGT CLG STPT, then:
  - The fan turns OFF.
  - No cooling is used.  
(If a face and bypass damper is used, no cooling means the damper is set to full bypass position while the 2-position cooling valve is fully shut. If a modulating chilled water valve is used, no cooling means that it is all the way closed.)

## Heating/Cooling Switchover

If a combination heating/cooling valve is used, then this feature is skipped in this application. The HEAT.COOL point must be adjusted by the field panel in this case. When a combination heating/cooling valve is used, 1 VLV HTGCLG (Point 16) will be set to YES.

If **all** of the following conditions are met for the length of time set in SWITCH TIME (Point 86), then the controller switches from heating to cooling mode by setting HEAT.COOL (Point 5) to COOL:

- HTG LOOPOUT (Point 80) is below 50% if free cooling is not available (FREE CLG (Point 23) is set to NO), or below SWITCH LIMIT (Point 85) if free cooling is available.
- CTL TEMP (Point 78) is greater than the sum of CTL STPT (Point 92) plus SWITCH DBAND (Point 90).
- CTL TEMP is greater than the appropriate cooling set point minus SWITCH DBAND.

If **all** of the following conditions are met for the length of time set in SWITCH TIME, then the controller switches from cooling to heating mode by setting HEAT.COOL to HEAT.

- CLG LOOPOUT (Point 79) is below 50% if free cooling is not available (FREE CLG (Point 23) is set to NO), or below SWITCH LIMIT (Point 85) if free cooling is available.
- CTL TEMP is less than CTL STPT minus SWITCH DBAND.
- CTL TEMP is less than the appropriate heating set point plus SWITCH DBAND.

If night cooling is not available, as indicated by NGT CLG MODE (Point 54), then the controller remains in heating mode during the night.

## Control Loops

The unit ventilator is controlled by four Proportional, Integral, and Derivative (PID) control loops: a room loop, a heating loop, a cooling loop, and a mixed air loop.

**Room Loop** – The heating loop uses the value of CTL STPT (Point 92) and CTL TEMP (Point 78) to modulate the value of DISCH STPT (Point 93). The discharge set point will not be adjusted above DSH MAX TEMP (Point 95) or below DSH MIN TEMP (Point 94).

**Heating Loop** – The heating loop uses the value of DISCH STPT (Point 93) and DISCH TEMP (Point 47) to modulate the value of HTG LOOPOUT (Point 80).

**Cooling Loop** – The cooling loop uses the value of DISCH STPT and DISCH TEMP to modulate the value of CLG LOOPOUT (Point 79).

**Mixed Air Loop** – The mixed air loop uses the values of MA STPT (Point 03) and MA TEMP (Point 48) to modulate the value of MA LOOPOUT (Point 18).

## Morning Warm-Up/Cool-Down

Morning warm-up or cool-down occurs after the controller switches from night mode to day mode, upon power-up, or if the controller is reset. During morning warm-up or cool-down, the controller provides maximum heating or cooling with the outdoor air damper closed until the temperature of the space reaches the value of CTL STPT (Point 92) plus or minus the value of MORN DBAND (Point 89).

In heating mode, normal day heating operation begins when the temperature of the room reaches the value of CTL STPT minus MORN DBAND. For example, if CTL STPT is 72°F (22.2°C) and MORN DBAND is 3°F (1.6°C), then normal day heating operation begins when the temperature of the room reaches 69°F (20.6°C).

In cooling mode, normal day cooling operation begins when the temperature of the room reaches the value of CTL STPT plus MORN DBAND.

## Auxiliary Radiation Control

This module controls the auxiliary radiation on DO 1 (DO 1 is called AUX RAD. It is point number 41.)

If AUX.NOAUX (Point 50) equals NOAUX, or if the controller is in cooling mode, then aux radiation DO 1 is OFF.

If the controller is in night heating mode, then aux radiation is ON when the FAN (Point 46) is ON and OFF when the FAN is OFF.

### DAY HEATING MODE:

The aux radiation (on DO 1) will be turned ON when the HTG LOOPOUT rises above the value stored in AUX ON (Point 83). Aux radiation will be turned OFF when the HTG LOOPOUT drops below the value stored in AUX OFF (Point 84). When HTG LOOPOUT is between the values AUX ON and AUX OFF, the aux radiation DO will remain in its last commanded state. (If it is already ON, it will remain ON. If already OFF, it will remain OFF.)

If WRMUP.COOLDN = ON in heating mode, then aux radiation will be turned fully ON.

## Fan Operation

In day mode, FAN (Point 46) is ON all of the time.

In night mode, the fan only operates when required for heating or cooling.

In night heating, the fan turns ON when the temperature drops below the value of CTL STPT (Point 92) minus NGT DBAND (Point 88). When the temperature rises above CTL STPT, the fan turns OFF.

In night cooling, the fan turns ON when the temperature rises above the value of CTL STPT plus NGT DBAND. When the temperature drops below CTL STPT, the fan turns OFF.

## Fan Alarm

This feature is not used if PROOF USED (Point 51) is set to NO.

If PROOF USED is set to YES, and the fan is ON, then FAN ALARM (Point 77) will be turned ON if DI 2 remains OFF longer than PROOF TIME (Point 22). When the fan is ON and DI 2 is ON, FAN ALARM will be OFF.

When the fan is OFF, FAN ALARM will be OFF.

## Fail-Safe Operation

The Unit Vent Controller has a fail-safe operation that can be triggered by several occurrences.

A low temperature detection thermostat, LOW TEMP DET (Point 52) connected to DI 6 (Point 26) can be used to signal the controller when the temperature, sensed by the LTDT, is below the low temperature limit. This LTDT can be either normally opened or normally closed, depending on the value of LTDT CONTACT (point 87).

**NOTE:** If an LTDT is not wired to DI 6, then LTDT CONTACT should be set to NOPEN in order to prevent the LTDT failure mode.

### Shutdown:

In the table below, Shutdown is mentioned often. Here is an explanation of Shutdown:

- The OA damper is closed.
- The fan is OFF.
- The auxiliary radiation is OFF.
- The face and bypass damper is opened to face.
- Any electric heat is OFF.
- If a 2-pipe, 2-position valve is used, it is opened (DO 4 is ON).
- If 4-pipe, 2-position valves are used, they are set as follows:
  - In the heating mode, the heating valve is opened while the cooling valve is shut (DO 3 is ON and DO 4 is OFF.)
  - In the cooling mode, the cooling valve is opened while the heating valve is shut (DO 3 is OFF and DO 4 is ON.)

The table below lists what happens when certain failure modes appear.

Safety/Failure	APP 2341 Safety Sequence
LTDT = ON	"Shutdown"
FAN ALARM = ON	"Shutdown"
Disch/MA sensor fails	If last valid value was greater than 150 degrees: Turn off heat and close OA DMPR. If sensor does not come back within 10 minutes, "Shutdown." If last valid value was less than 150 degrees, "Shutdown."
Room Temp. sensor fails	"Shutdown"
Any combination of the above	"Shutdown"

If the failures clear, then normal control resumes.

Analog and digital outputs cannot be commanded when the controller is in fail-safe mode; however, failed points may be overridden, allowing the controller to return from fail-safe mode. In this instance, room temperature control is not possible.

## Application Notes

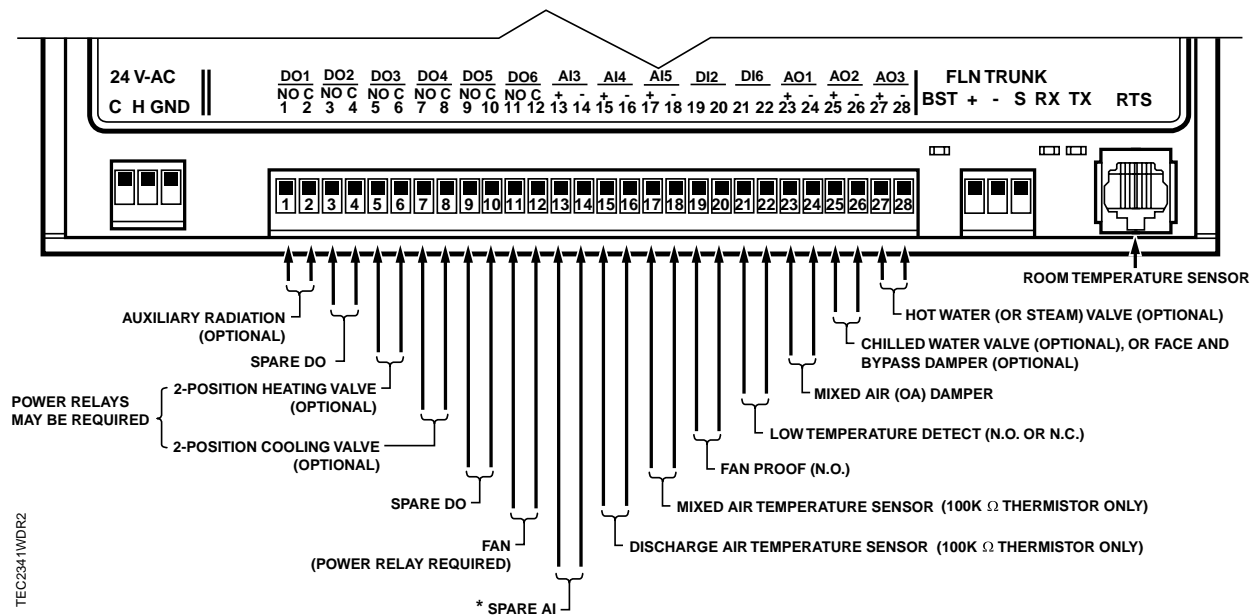
1. If the unit ventilator cycles excessively, or if the temperature swings in the room are excessive, or if there is trouble in maintaining the set point, then the cooling loop, the heating loop or both need to be tuned. Refer to *APOGEE Automation Service Procedures* on *InfoLink* for more information.
2. The Unit Vent Controller, as shipped from the factory, keeps all associated equipment OFF. Refer to the *Start-up* document for this controller for information on how to release the controller and its equipment to application control.
3. When the fan is manually switched OFF at the unit fan speed switch, the actuators should be wired so they return to their normal state.

## Wiring Diagrams



### CAUTION:

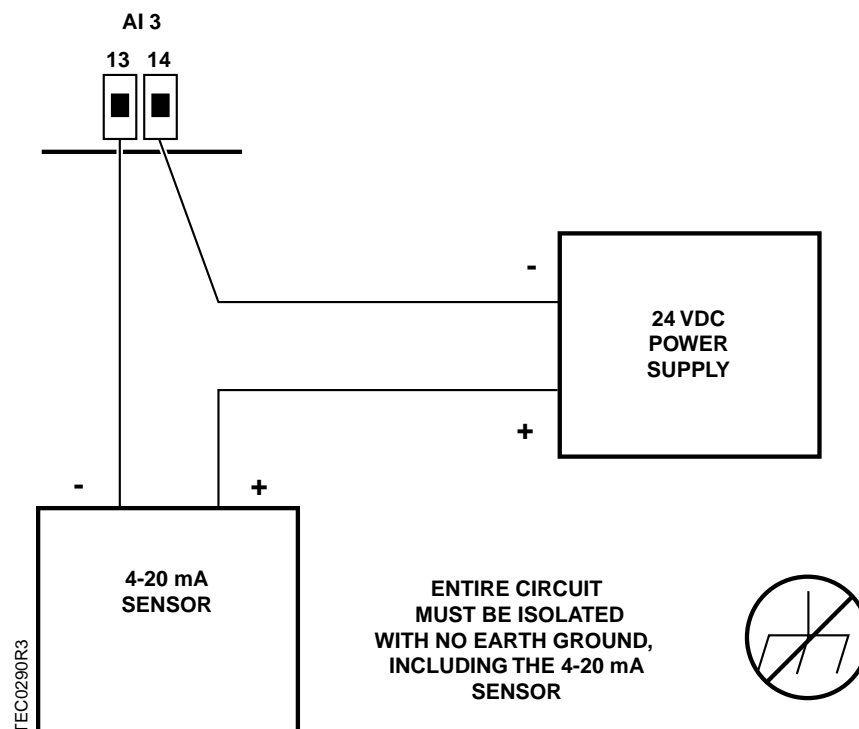
The Unit Vent Controller's Digital Outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. For higher VA requirements, 110 or 220 Vac requirements, separate requirements used to power the load, or DC power requirements, use an interposing 220 V 4-relay module (P/N 550-054).



\* A dip-switch behind AI 3 on the controller's circuit board (under the controller assembly's cover) must be set to the left (voltage position) or to the right (current position) if AI 3 is used to monitor a 0-10 V or a 4-20 mA sensor (see Figure 2341-5 for important wiring precautions if using a 4-20mA sensor on AI 3).

**NOTE:** On two pipe systems, if a Dual Temperature Valve is used, the Dual Temperature Valve must be connected to AO2.

**Figure 2341-4. Application 2341 Wiring Diagram.**



**NOTE:** You can NOT use the same transformer to power the controller and a 4-20 mA sensor. The 4-20 mA sensor requires a SEPARATE dedicated power supply.

**Figure 2341-5. Special Wiring Requirements if a 4-20 mA Sensor is Used at AI 3.**



**CAUTION:**

Equipment damage or loss of data may occur if the user does not follow procedure as specified.

## Point Database

**Table 2341-1. Point Database for Application 2341.**

Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
01	CTLR ADDRESS	99	--	1	0	--	--
02	APPLICATION	2384	--	1	0	--	--
{03}	MA STPT	55.0 (12.856)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{04}	ROOM TEMP	74.0 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
{05}	HEAT.COOL	COOL	--	--	--	HEAT	COOL
06	DAY CLG STPT	74.0 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
07	DAY HTG STPT	70.0 (21.21)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
08	NGT CLG STPT	82.0 (27.93)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
09	NGT HTG STPT	65.0 (18.41)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
10	OADPR MINPOS	14.8	PCT	0.4	0.0	--	--
11	RM STPT MIN	55.0 (12.81)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
12	RM STPT MAX	90.0 (32.41)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
{13}	RM STPT DIAL	74.0 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
14	STPT DIAL	NO	--	--	--	YES	NO
{15}	AI 3	0.0	PCT	0.4	0.0	--	--
16	1 VLV HTGCLG	NO	--	--	--	YES	NO
17	FBP.MODVALVE	VALVE	--	--	--	FBP	VALVE
{18}	MA LOOPOUT	0.0	PCT	0.4	0.0	--	--
{19}	DI OVRD SW	OFF	--	--	--	ON	OFF
20	OVRD TIME	1	HRS	1	0	--	--
{21}	NGT OVRD	DAY	--	--	--	NIGHT	DAY
22	PROOF TIME	30	SEC	1	0	--	--
{23}	FREE CLG	DISABL	--	--	--	ENABLE	DISABL
{24}	DI 2	OFF	--	--	--	ON	OFF
{26}	DI 6	OFF	--	--	--	ON	OFF
28	FBP.2PSVCTL	DISABL	--	--	--	ENABLE	DISABL
{29}	DAY.NGT	DAY	--	--	--	NIGHT	DAY
{30}	WRMUP.COOLDN	ON	--	--	--	ON	OFF
31	AOV1 SPAN	10.0	VOLTS	0.01	0.0	--	--
32	AOV1 START	0.0	VOLTS	0.01	0.0	--	--
33	AOV2 SPAN	10.0	VOLTS	0.01	0.0	--	--
34	AOV2 START	0.0	VOLTS	0.01	0.0	--	--

1. Points not listed are not used in this application.
2. A single value in a column means that the value is the same in English units and in SI units.
3. Point numbers that appear in brackets {} may be unbundled at the field panel.

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**Table 2341-1. Point Database for Application 2341.**

Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
35	AOV3 SPAN	10.0	VOLTS	0.01	0.0	--	--
36	AOV3 START	0.0	VOLTS	0.01	0.0	--	--
37	AO DIR.REV	0	--	1	0	--	--
{38}	AOV1	0.0	VOLTS	0.01	0.0	--	--
{39}	AOV2	0.0	VOLTS	0.01	0.0	--	--
{40}	AOV3	0.0	VOLTS	0.01	0.0	--	--
{41}	AUX RAD	OFF	--	--	--	ON	OFF
{42}	DO 2	OFF	--	--	--	ON	OFF
{43}	HTG 2POS VLV	OFF	--	--	--	ON	OFF
{44}	CLG 2POS VLV	OFF	--	--	--	ON	OFF
{45}	DO 5	OFF	--	--	--	ON	OFF
{46}	FAN	OFF	--	--	--	ON	OFF
{47}	DISCH TEMP	74.0 (23.496)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{48}	MA TEMP	74.0 (23.496)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
49	MA TIME	300	SEC	1	0	--	--
50	AUX.NOAUX	NOAUX	--	--	--	AUX	NOAUX
51	PROOF USED	NO	--	--	--	YES	NO
{52}	LOW TEMP DET	OFF	--	--	--	ON	OFF
53	NGT HW HTG	YES	--	--	--	YES	NO
54	NGT CLG MODE	NO	--	--	--	YES	NO
55	MA P GAIN	5.0 (9.0)	--	0.25 (0.45)	0.0	--	--
56	MA I GAIN	0.02 (0.036)	--	0.001 (0.0018)	0.0	--	--
57	MA D GAIN	0 (0.0)	--	2 (3.6)	0	--	--
59	DO DIR.REV	0	--	1	0	--	--
{60}	HTG OUTPUT	0.0	PCT	0.4	0.0	--	--
{61}	CLG OUTPUT	0.0	PCT	0.4	0.0	--	--
{62}	OA DMPR POS	0.0	PCT	0.4	0.0	--	--
63	CLG P GAIN	1.6 (2.88)	--	0.2 (0.36)	0.0	--	--
64	CLG I GAIN	0.05 (0.09)	--	0.0005 (0.0009)	0.0	--	--
65	CLG D GAIN	10 (18.0)	--	2 (3.6)	0	--	--
{66}	SAFETY MODE	OFF	--	--	--	ON	OFF
67	HTG P GAIN	0.4 (0.72)	--	0.05 (0.09)	0.0	--	--
68	HTG I GAIN	0.015 (0.027)	--	0.0002 (0.00036)	0.0	--	--
69	HTG D GAIN	5 (9.0)	--	1 (1.8)	0	--	--

1. Points not listed are not used in this application.
2. A single value in a column means that the value is the same in English units and in SI units.
3. Point numbers that appear in brackets {} may be unbundled at the field panel.

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**Table 2341-1. Point Database for Application 2341.**

Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
70	ROOM P GAIN	2.3 (4.14)	--	0.05 (0.09)	0.0	--	--
71	ROOM I GAIN	0.00504 (0.009072)	--	0.00009(0.000162)	0.0	--	--
72	ROOM D GAIN	76 (136.8)	--	2 (3.6)	0	--	--
{77}	FAN ALARM	OFF	--	--	--	ON	OFF
{78}	CTL TEMP	74.0 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
{79}	CLG LOOPOUT	0.0	PCT	0.2	0.0	--	--
{80}	HTG LOOPOUT	0.0	PCT	0.2	0.0	--	--
81	MAX MA STPT	70.0 (21.256)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
82	MIN MA STPT	55.0 (12.856)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
83	AUX ON	70.0	PCT	0.4	0.0	--	--
84	AUX OFF	40.0	PCT	0.4	0.0	--	--
85	SWITCH LIMIT	4.8	PCT	0.4	0.0	--	--
86	SWITCH TIME	10	MIN	1	0	--	--
87	LTDT CONTACT	NCLOSE	--	--	--	NCLOSE	NOPEN
88	NGT DBAND	3.0 (1.68)	DEG F (DEG C)	0.25 (0.14)	0.0	--	--
89	MORN DBAND	2.0 (1.12)	DEG F (DEG C)	0.25 (0.14)	0.0	--	--
90	SWITCH DBAND	2.0 (1.12)	DEG F (DEG C)	0.25 (0.14)	0.0	--	--
{91}	MA OVERRIDE	OFF	--	--	--	ON	OFF
{92}	CTL STPT	74.0 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
{93}	DISCH STPT	74.0 (23.496)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
94	DSH MIN TEMP	60.0 (15.656)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
95	DSH MAX TEMP	110.0 (43.656)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{96}	MA HI LIMIT	52.0 (11.176)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{97}	MA LO LIMIT	50.0 (10.056)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
98	LOOP TIME	5	SEC	1	0	--	--
{99}	ERROR STATUS	0	--	1	0	--	--

1. Points not listed are not used in this application.
2. A single value in a column means that the value is the same in English units and in SI units.
3. Point numbers that appear in brackets {} may be unbundled at the field panel.