

Application 2348 Unit Vent Controller with Free Cooling, Night Purge and Dehumidification — 0-10V Output

Overview

In Application 2348, the Unit Vent Controller controls a unit ventilator with numerous features, including:

- Morning warm-up/cool-down
- Night mode override
- Free cooling
- Night purge
- Dehumidification during the day in the cooling season
- Auxiliary radiation in heating mode

Temperature control can be achieved with **one** of the following:

- Modulating face and bypass damper with 2-position heating and cooling valve(s).
- 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 accomplishes dehumidification by using full mechanical cooling and shutting the outside air damper.

Night purge is accomplished by turning the fan on and setting the outside air damper to its fully opened position.

This application can determine whether free cooling is available if a field panel sends it the outside air temperature. When free cooling is available, the outside air damper can be modulated as a source of free cooling.

The unit ventilator fan is also controlled in this application.

Refer to Figures 2348-1 through 2348-3.

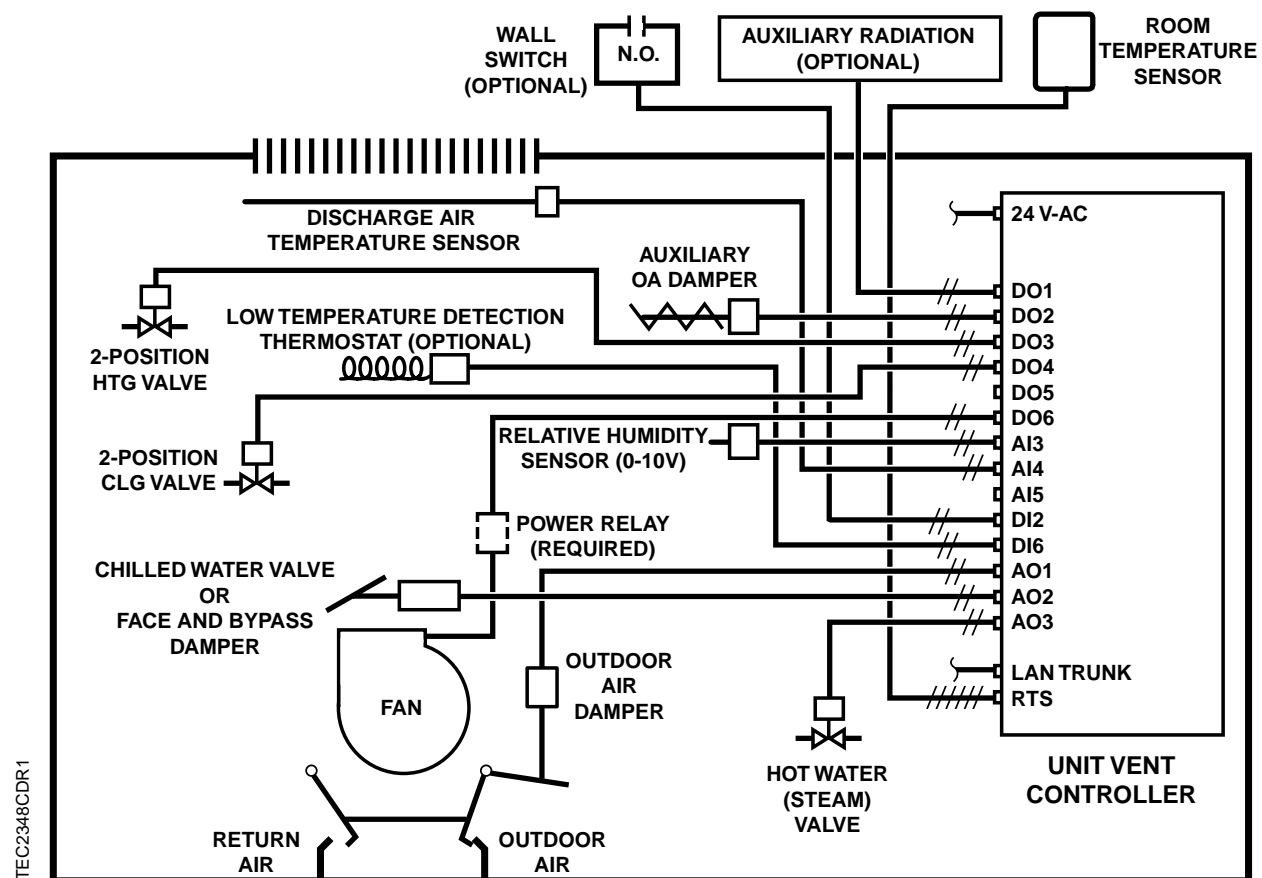
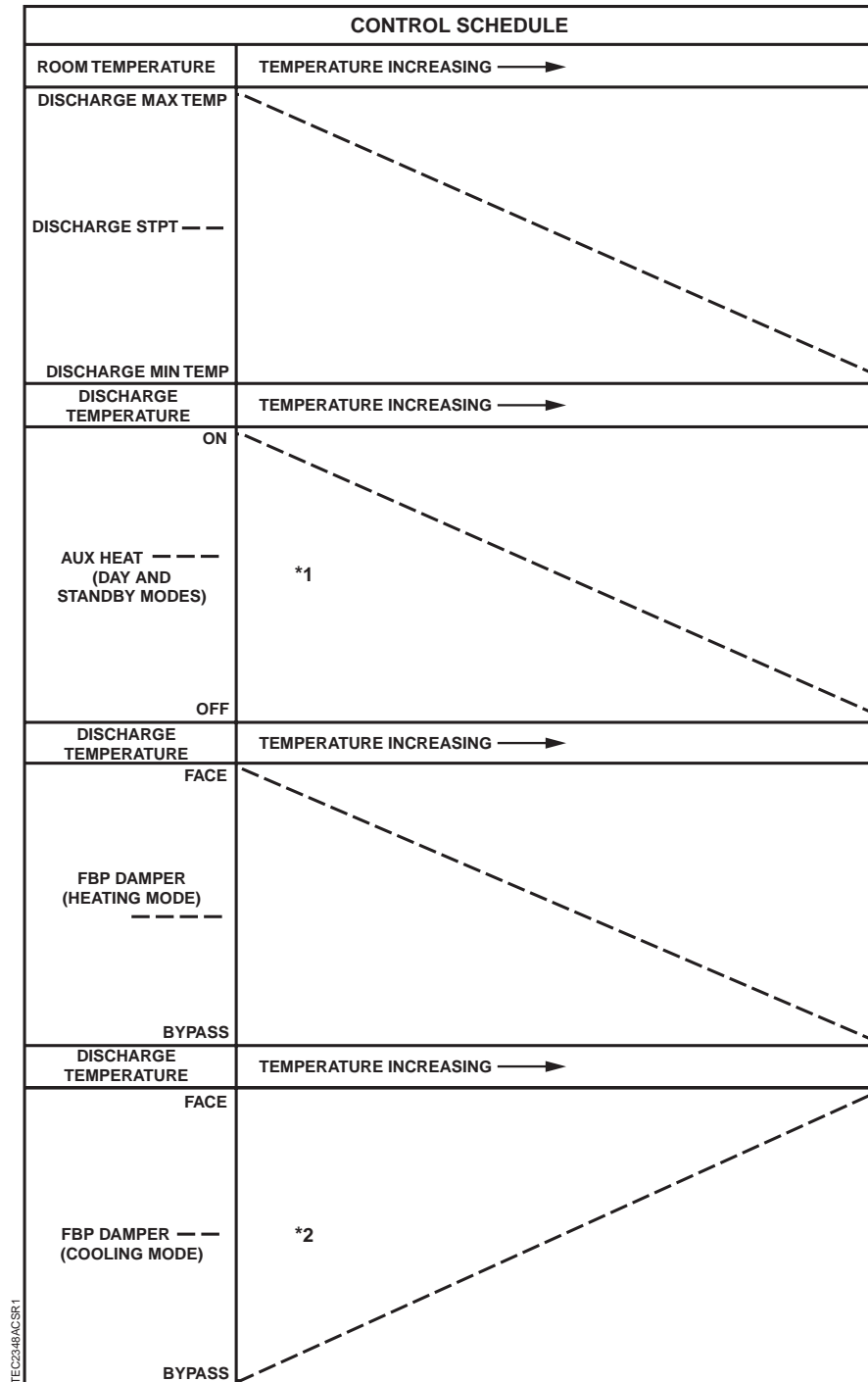
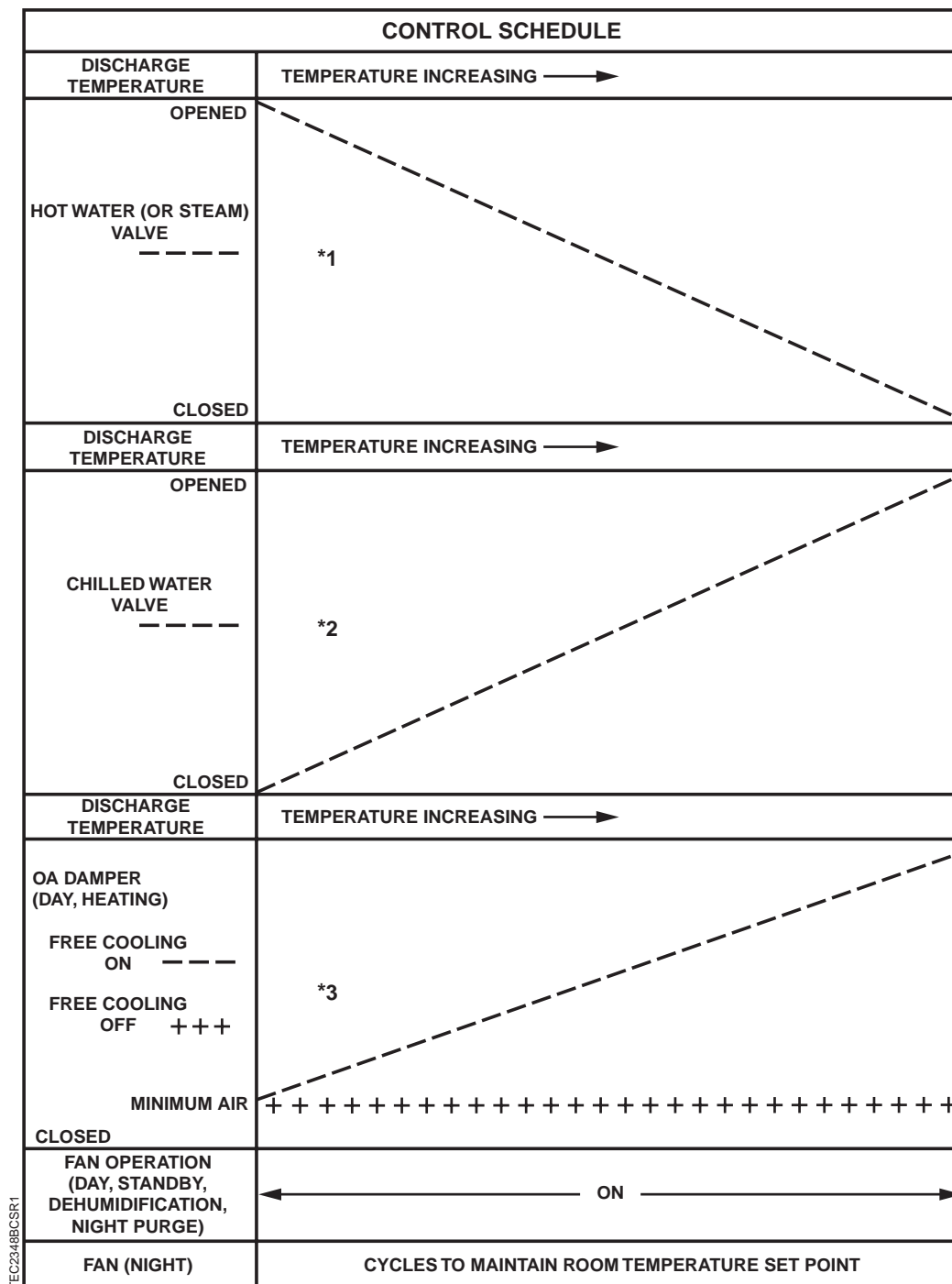


Figure 2348-1. Application 2348 Control Drawing.



1. Auxiliary radiation (AUX HEAT) is shown for day and standby modes only. During night heating mode, auxiliary radiation cycles with the fan. During warm-up, it is ON all the time. During dehumidification, it is OFF.
2. When dehumidification is needed, the FBP damper is in the face position.

Figure 2348-2. Application 2348 Control Schedules.



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1. During dehumidification the hot water (or steam) valve is shut.
2. During dehumidification the chilled water valve is fully opened.
3. During day cooling mode, the OA damper is at minimum position. During night mode, standby, warm-up or cool-down, the OA damper is shut. The OA damper is also shut when dehumidification is needed.

Figure 2348-3. Application 2348 Control Schedules (continued).

Hardware inputs

Analog

- Discharge air temperature sensor
- Relative humidity 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

Sequence of Operation

The following paragraphs present the sequence of operation for Application 2348, "Unit Vent Controller with Free Cooling, Night Purge and Dehumidification."

Control temperature set points

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

Day Mode – In day mode, CTL STPT holds the value of the point DAY CLG STPT (number 6) or the point DAY HTG STPT (number 7). If the room temperature sensor has a set point dial and the point STPT DIAL (number 14) is set to YES, then CTL STPT holds the value of the point RM STPT DIAL (number 13). Refer to the *Day cooling set point schedule* section of this document for more information.

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

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

NOTE: The value of the point CTL TEMP (number 77) is the same as the value of the point ROOM TEMP (number 4), unless CTL TEMP is overridden.

Day cooling set point schedule

If desired, the point DAY CLG STPT (number 6) can be reset based on the outside air temperature in the following ways:

- When the point OA TEMP (number 73) is less than or equal to the point MIN OA TEMP (number 74), DAY CLG STPT will be set equal to the point MIN CLG STPT (number 56).
- When the point OA TEMP is greater than or equal to the point MAX OA TEMP (number 75), DAY CLG STPT will be set equal to the point MAX CLG STPT (number 57).
- When the point OA TEMP is between MIN OA TEMP and MAX OA TEMP, DAY CLG STPT will be set equal to a value between MIN CLG STPT and MAX CLG STPT, just like a PPCL table statement.

If the point STPT DIAL is set to NO, and MAX CLG STPT is set equal to MIN CLG STPT, then DAY CLG STPT will remain constant.

If the point STPT DIAL (number 14) is set to YES, then this feature is not used. Instead, the DAY CLG STPT will be set to the value of the room set point dial. (See the control temperature set points section of this document for more information.)

Day and night modes

The day/night status of the space is determined by the status of the point DAY.NGT (number 29). The control of this point differs depending on whether the controller is monitoring the status of a wall switch or if the controller is connected to a field panel.

When a wall switch is physically connected to the termination strip on the controller at DI 2 (Figures 2348-1 and 2348-4), and the point WALL SWITCH (number 18) equals YES, the controller monitors the status of DI 2. When the status of the point DI 2 (number 24) is ON (the switch is closed), DAY.NGT will be set to DAY indicating that the controller is in day mode. When the status of DI 2 is OFF (the switch is open), DAY.NGT will be set to NIGHT, indicating that the controller is in the night mode.

When WALL SWITCH equals NO, the controller does not monitor the status of the wall switch, even if one is connected to it. In this case, and if the controller is operating stand-alone (that is, not connected to a field panel), then the controller stays in day mode all the time. If the controller is operating with centralized control (connected to a field panel), then the field panel can send a PPCL DAY/NIGHT command to override the status of the point DAY.NGT. Refer to *Powers Process Control Language (PPCL) User's Manual* (125-1896) for more information.

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 the point OVRD TIME (number 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 the point NGT OVRD (number 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.

Free cooling control

This feature tells the application whether free cooling is available by setting the value of the FREE CLG point (number 23) as follows:

- If the point OA TEMP (number 73) is greater than the point UPPER LIMIT (number 97), then the point FREE CLG is shut OFF. If OA TEMP is less than the point LOWER LIMIT (number 96), then FREE CLG is turned ON.

Day heating operation

In day heating operation, the controller maintains the room temperature at the value stored in the point CTL STPT (number 92) by operating as follows:

- The room PID controller adjusts the DISCH STPT (number 93) which is used in the heating PID loop. (The heating PID loop controls the supply air temperature in heating mode.)
- The heating PID loop modulates the heating. (If a face and bypass damper is used, modulating the heating means modulating the FBP damper 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 that the heating valve is modulated.)
- Auxiliary radiation (if provided) is controlled using a pulse-width modulation algorithm. The auxiliary radiation will be on for a percentage of the time held in the point AUX HTG TIMR (number 55). The on-time is based on the difference between DISCH STPT and the AUX D STPT (number 91). If DISCH STPT goes below AUX D STPT, then the on-time of the auxiliary radiation decreases. If the reverse occurs, then the on-time increases.
- If free cooling is not available (FREE CLG (number 23) is NO), then the outside air damper is commanded to minimum position. (OA DMPR POS (number 58) is set equal to OADPR MINPOS (number 10)).
- If free cooling is available (FREE CLG (number 23) is YES), then the outside air damper is modulated by the heating PID loop. Specifically, as HTG LOOPOUT (number 79) goes from 50% to 0%, OA DMPR POS goes from minimum position to 100% open. OA DMPR POS will remain equal to minimum position as long as HTG LOOPOUT is equal to or greater than 50%.

Keep in mind that dehumidification does not occur during the day heating mode.

Standby heating operation

The standby heating mode can only be entered into at night. In this mode the controller maintains the room temperature at the value stored in the point CTL STPT (number 92) by doing the following:

- The room PID controller adjusts the DISCH STPT (number 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 modulating the FBP damper 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 that the heating valve is modulated.)

- Auxiliary radiation (if provided) will be controlled using a pulse-width modulation algorithm. The auxiliary radiation will be on for a percentage of the time held in the point AUX HTG TIMR (number 55). The on-time is based on the difference between DISCH STPT and the AUX D STPT (number 91). If DISCH STPT goes below AUX D STPT, then the on-time of the auxiliary radiation decreases. If the reverse occurs, then the on-time increases.
- The outside air damper remains shut during standby heating operation.

Remember that dehumidification does not occur in the standby heating mode.

Dehumidification determination

This feature determines whether dehumidification is needed by controlling the value of the point DEHUMIDIFY (number 50). DEHUMIDIFY is turned ON only if **all** of the following conditions are true:

- The relative humidity sensor (RH, number 15) is NORMAL.
- Mechanical cooling is available (MECH CLG, number 51) is ON).
- CTL TEMP (number 77) is greater than 70°F.
- There is high relative humidity in the space. (RH is greater than RH HI LIMIT (number 83)).

Dehumidification does not occur if the point DEHUMIDIFY is turned OFF. DEHUMIDIFY will be OFF if **at least one** of the following conditions is true:

- The relative humidity sensor is FAILED.
- Mechanical cooling is unavailable. (MECH CLG is OFF).
- CTL TEMP is less than or equal to 70°F.
- There is low relative humidity in the space. (RH is less than RH LO LIMIT (number 84)).

NOTE: If RH is less than or equal to RH HI LIMIT but greater than or equal to RH LO LIMIT (number 84), then DEHUMIDIFY will be left in its last commanded state.

Day cooling operation

When dehumidification is not needed during day cooling operation, the controller maintains the room temperature at the value stored in the point CTL STPT (number 92) by doing the following:

- The room PID controller adjusts the DISCH STPT (number 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 modulating the damper 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 that the cooling valve is modulated.)
- The outside air damper is sent to minimum position. (OA DMPR POS (number 58) is set equal to OADPR MINPOS (number 10)).

When dehumidification is needed during day cooling the following events occur:

- Full mechanical cooling is used. (If a face and bypass damper is used, full mechanical cooling means setting the damper to the full face position while the 2-position cooling valve is fully opened. If a modulating chilled water valve is used, full mechanical cooling means that the cooling valve is fully opened.)
- The outside air damper is shut.

NOTE: When dehumidification is occurring no actual temperature control is going on. The space won't get "too cold" however, because dehumidification is shut off if the room temperature (CTL TEMP, number 77) drops below 70°F.

Standby cooling operation

The standby cooling mode can only be entered into at night. In standby cooling mode, the controller maintains the room temperature at the value stored in the point CTL STPT (number 92) by doing the following:

- The room PID controller adjusts the DISCH STPT (number 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 modulating the damper 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 that the cooling valve is modulated.)
- The outside air damper is kept shut.

Dehumidification does not occur during the standby cooling mode.

Night heating operation

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

- If the point CTL TEMP (number 77) drops below the value of the point NGT HTG STPT (number 9) minus the value of the point NGT DBAND (number 88), then:
 - The fan turns ON.
 - Full heating is used.
(If a face and bypass damper is used, full heating means the FBP damper is set to full face position while the 2-position heating valve is fully opened. If a modulating hot water valve is used, full heating means that the heating valve is fully opened.)

- If CTL TEMP rises above NGT HTG STPT, then:
 - The fan turns OFF.
 - No heating is used. This means the FBP damper is set to full bypass position. The htg/clg valve will be fully closed 2 minutes after the FBP damper is in the full bypass position under the following 2 circumstances:
 - a. The point FBP.2PSVCTL (number 30) is set to ENABLE.
 - b. The point FBP.2PSVCTL is set to DISABLE and OA TEMP (number 73) is greater than DISABLE TEMP (number 66).

Otherwise, this valve will remain opened.

If a modulating hot water valve is used, no heating means that the heating valve is fully closed.

Other points to keep in mind with night heating operation:

- For units with steam, NGT HW HTG must be set to NO, so that the coils can be cycled.
- The controller may switch to cooling mode when appropriate if the point NGT CLG MODE (number 53) is set to YES.
- Heating only is provided when NGT CLG MODE is set to NO.
- When the fan turns ON the auxiliary radiation is turned on. When the fan turns OFF the auxiliary radiation is turned off.
- The outside air damper is shut.
- Dehumidification does not occur.

Night purge determination and control

Night purge takes advantage of free cooling at night. Night purge is allowed only if **all** of the following 6 conditions are true:

1. It's the cooling mode (HEAT.COOL (number 5) is COOL).
2. It's NIGHT (DAY.NGT (number 29) equals NIGHT and NGT OVRD (number 21) equals NIGHT).
3. The application is not in the standby mode (STANDBY (number 49) is OFF).
4. The customer wants the night purge feature to be operational (COOLDOWN (number 52) is ENABLE).
5. The space temperature (CTL TEMP, number 77) is greater than or equal to 75°F.
6. The space temperature (CTL TEMP) is greater than or equal to DAY CLG STPT (number 6).

Night purge is not allowed if **one or more** of the following 6 conditions are true:

1. It's the heating mode (HEAT.COOL (number 5) is HEAT).
2. It's day (DAY.NGT (number 29) equals DAY or NGT OVRD (number 21) equals DAY).
3. The application is in the standby mode (STANDBY, number 49) is ON).

4. The customer doesn't want the night purge feature to be operational (COOLDOWN (number 52) is DISABLE).
5. The space temperature (CTL TEMP, number 77) is less than 75°F.
6. The space temperature (CTL TEMP) is less than DAY CLG STPT (number 6).

During night purge:

- The FAN is ON.
- The OA DAMPR is fully opened.
- All valves are closed. (This is true whether they are heating or cooling, modulating or 2-position, 2-pipe or 4-pipe.)
- A face and bypass damper if used is set to the full bypass position.
- Any auxiliary radiation is shut OFF.
- No dehumidification occurs.

When night purge is over, normal night cooling operation resumes. (See next section for more information on night cooling operation).

Night cooling operation

This section describes what happens during night cooling when night purge is not in effect. For more information on night purge, refer to the previous section, *Night purge determination and control*.

Night cooling tip:

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

In night cooling operation, the controller operates as follows:

- If the point CTL TEMP (number 77) rises above the sum of the points NGT CLG STPT (number 8) and NGT DBAND (number 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 the 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. The 2-position cooling valve will fully close 2 minutes after the FBP damper is commanded to full bypass if the point FBP.2PSVCTL (number 30) is set to ENABLE. Otherwise, this valve will remain opened.)

If a modulating chilled water valve is used, no cooling means that the cooling valve is fully closed.

Other things to keep in mind with night cooling operation:

- When the point NGT CLG MODE (number 53) is set to NO, the unit will operate in night heating mode only.
- During night cooling, the outside air damper is shut.
- No dehumidification occurs in the night cooling mode.

Heating/cooling switchover

Heating/cooling switchover will be skipped in this application if a combination htg/clg valve is used. The HEAT.COOL point must be adjusted by the field panel in this case. When a combination htg/clg valve is used, the point 1 VLV HTGCLG (number 16) will be set to YES.

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

- The point HTG LOOPOUT (number 79) is below 50% if free cooling is not available, (the point FREE CLG (number 23) is set to NO), or below SWITCH LIMIT (number 85) if free cooling is available.
- The point CTL TEMP (number 77) is greater than the sum of the points CTL STPT (number 92) plus SWITCH DBAND (number 90).
- CTL TEMP is greater than the appropriate cooling set point minus SWITCH DBAND.

If 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:

- The point CLG LOOPOUT (number 78) is below 50% if free cooling is available, (the point FREE CLG (number 23) is set to NO), or below SWITCH LIMIT (number 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 the point NGT CLG MODE (number 53), 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 the point CTL STPT (number 92) and the point CTL TEMP (number 77) to modulate the value of the point DISCH STPT (number 93). The discharge set point will not be adjusted above DSH MAX TEMP (number 95) or below DSH MIN TEMP (number 94).

Heating Loop – The heating loop uses the value of the point DISCH STPT (number 93) and the point DISCH TEMP (number 47) to modulate the value of the point HTG LOOPOUT (number 79).

Cooling Loop – The cooling loop uses the value of DISCH STPT and DISCH TEMP to modulate the value of the point CLG LOOPOUT (number 78).

Aux Loop – The auxiliary loop uses difference between AUX D STPT (number 91) and DISCH STPT to control the auxiliary space heating.

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 the point CTL STPT (number 92) plus or minus the value of the point MORN DBAND (number 89). In morning cool-down, the outdoor air damper is opened if the point FREE CLG (number 23) is set to ENABLE.

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.

Fan operation

The point FAN (number 46), is ON all of the time during the following modes:

- Day mode (DAY.NGT (number 29) is DAY or NGT OVRD (number 21) is DAY.)
- Night purge mode (See *Night purge determination and control* section of this document for information on when the night purge mode occurs.)
- Standby mode (STANDBY (number 49) is ON.)
- Dehumidification mode (DEHUMIDIFY (number 50) is ON.)

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 the points CTL STPT (number 92) minus NGT DBAND (number 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.

Auxiliary damper control

The auxiliary damper is connected to AUX DAMPER (number 42). During the day mode, this damper is opened. At night, it is closed.

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 (number 27) connected to DI 6 (number 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 (number 28).

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 what is meant by Shutdown:

- The OA damper is closed.
- The aux damper turns OFF.
- 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.)

If modulating valves are used rather than an FBP damper with 2-position valves, then the heating valve is opened and the cooling valve is shut.

The following table lists what happens when certain failure modes display:

Safety/Failure	APP 2348 Safety Sequence
LTDT = ON	"Shutdown"
FAN ALARM = ON	"Shutdown"
Disch/MA sensor fails	If last valid value was greater than 150 degrees: Fan turns on, and the face and bypass damper is placed in the bypass position. If a modulating heating valve is used, it is shut. Everything else operates as in the shutdown mode. 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 either the cooling loop, the heating loop or both need to be tuned. Refer to *APOGEE Automation Service Procedures Manual* (125-3013) 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.

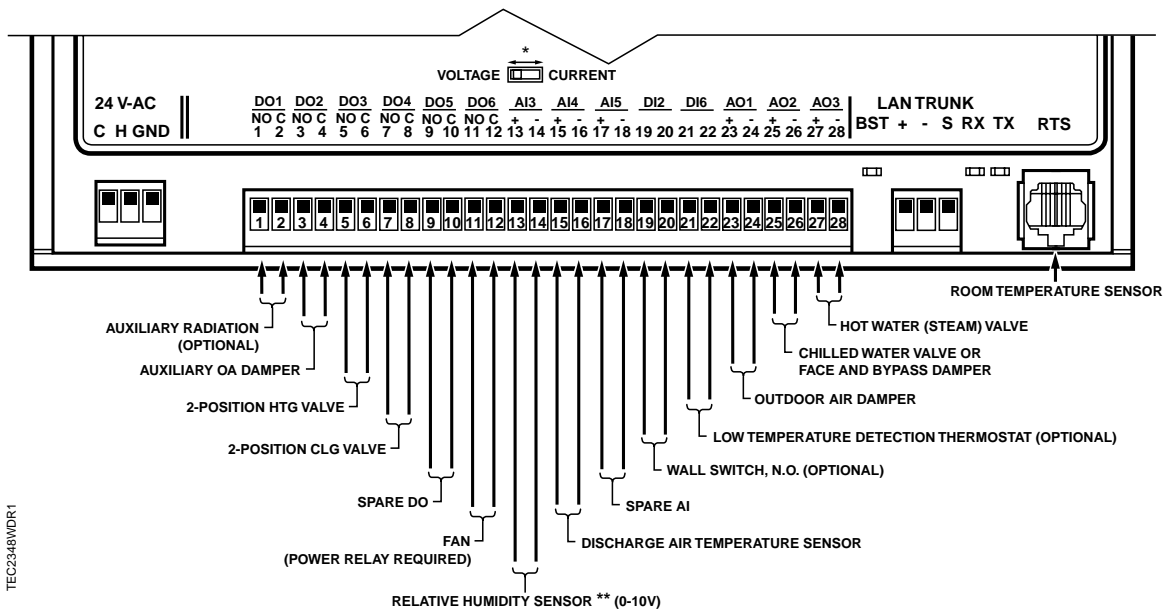
Wiring diagrams

The point wiring for Application 2348 is shown in Figure 2348-4.



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.

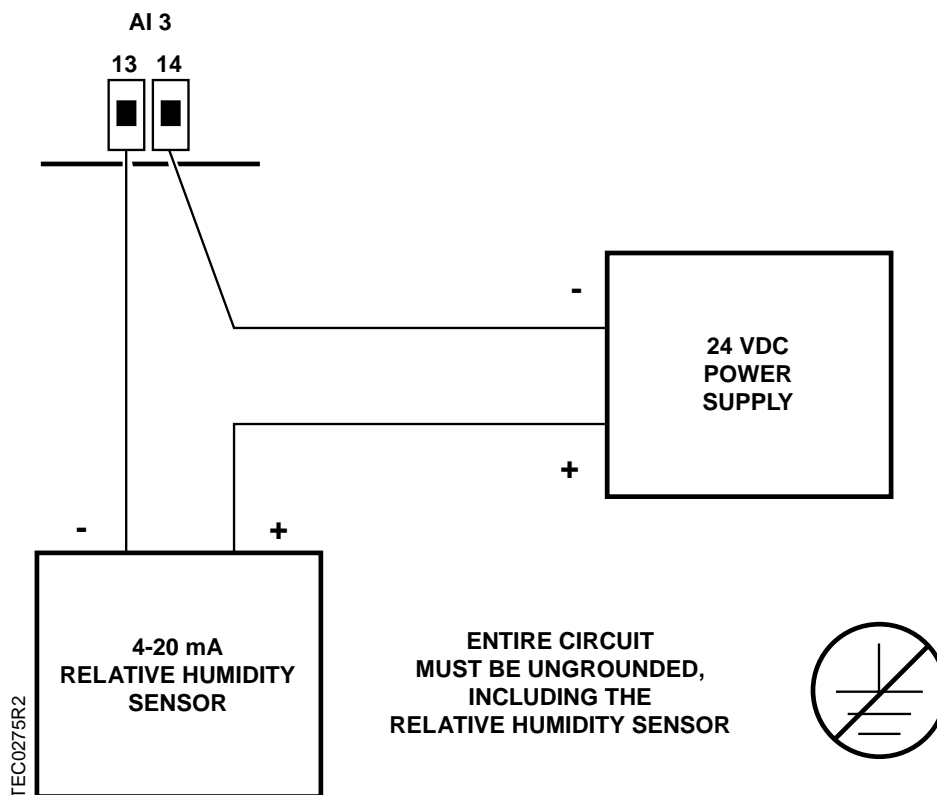


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* If AI 3 monitors a 0-10 volt sensor, then dip-switch located behind AI 3 on controller's circuit board (under controller assembly's cover) must be set to the left (voltage position). If AI 3 monitors a 4-20 mA sensor, this dip-switch must be set to right (current position).

**A 4-20 mA relative humidity sensor, if used, requires special wiring requirements. Refer to Figure 2348-5.

Figure 2348-4. Application 2348 wiring diagram.



NOTE: Each 4-20 mA sensor requires a dedicated 24V DC power supply.

Figure 2348-5. Wiring Diagram for AI 3 if 4-20 mA Sensor is Used.

Table 2348-1. Point Database for Application 2348.

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}	WRMUP.COOLDN	OFF	--	--	--	ON	OFF
{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	0.0	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}	RH	0.0	PCT	0.4	0.0	--	--
16	1 VLV HTGCLG	NO	--	--	--	YES	NO
17	FBP.MODVALVE	VALVE	--	--	--	FBP	VALVE
18	WALL SWITCH	NO	--	--	--	YES	NO
{19}	DI OVRD SW	OFF	--	--	--	ON	OFF
20	OVRD TIME	1	HRS	1	0	--	--
{21}	NGT OVRD	DAY	--	--	--	NIGHT	DAY
22	AUX.NOAUX	NOAUX	--	--	--	AUX	NOAUX
{23}	FREE CLG	DISABL	--	--	--	ENABLE	DISABL
{24}	DI 2	OFF	--	--	--	ON	OFF
{25}	NIGHT PURGE	OFF	--	--	--	ON	OFF
{26}	DI 6	OFF	--	--	--	ON	OFF
{27}	LOW TEMP DET	OFF	--	--	--	ON	OFF
28	LTDT CONTACT	NCLOSE	--	--	--	NCLOSE	NOPEN
{29}	DAY.NGT	DAY	--	--	--	NIGHT	DAY
30	FBP.2PSVCTL	DISABL	--	--	--	ENABLE	DISABL
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	--	--
35	AOV3 SPAN	10.0	VOLTS	0.01	0.0	--	--

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3. Point numbers that appear in brackets {} may be unbundled at the field panel.

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Table 2348-1. Point Database for Application 2348.

Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
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}	AUX DAMPER	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}	AI 5	74.0 (23.496)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{49}	STANDBY	OFF	--	--	--	ON	OFF
{50}	DEHUMIDIFY	OFF	--	--	--	ON	OFF
{51}	MECH CLG	OFF	--	--	--	ON	OFF
{52}	COOLDOWN	DISABL	--	--	--	ENABLE	DISABL
53	NGT CLG MODE	YES	--	--	--	YES	NO
{54}	AUX OUTPUT	0.0	PCT	0.4	0.0	--	--
55	AUX HTG TIMR	10	MIN	1	0	--	--
{56}	MIN CLG STPT	70.0 (21.21)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
{57}	MAX CLG STPT	78.0 (25.69)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
{58}	OA DMPR POS	0.0	PCT	0.4	0.0	--	--
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	CLG P GAIN	1.6 (2.88)	--	0.2 (0.36)	0.0	--	--
63	CLG I GAIN	0.05 (0.09)	--	0.0005 (0.0009)	0.0	--	--
64	CLG D GAIN	10 (18.0)	--	2 (3.6)	0	--	--
65	ENABLE TEMP	33.0 (18.48)	DEG F (DEG C)	0.5 (0.28)	0.0	--	--
66	DISABLE TEMP	35.0 (19.6)	DEG F (DEG C)	0.5 (0.28)	0.0	--	--
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	--	--
70	ROOM P GAIN	2.3 (4.14)	--	0.05 (0.09)	0.0	--	--

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Table 2348-1. Point Database for Application 2348.

Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
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	--	--
{73}	OA TEMP	65.0 (36.4)	DEG F (DEG C)	0.5 (0.28)	0.0	--	--
{74}	MIN OA TEMP	55.0 (30.8)	DEG F (DEG C)	0.5 (0.28)	0.0	--	--
{75}	MAX OA TEMP	75.0 (42.0)	DEG F (DEG C)	0.5 (0.28)	0.0	--	--
{76}	AUX LOOPOUT	0.0	PCT	0.2	0.0	--	--
{77}	CTL TEMP	74.0 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.0(8.89)	--	--
{78}	CLG LOOPOUT	0.0	PCT	0.2	0.0	--	--
{79}	HTG LOOPOUT	0.0	PCT	0.2	0.0	--	--
{80}	AUX P GAIN	0.2 (0.36)	--	0.02 (0.036)	0.0	--	--
{81}	AUX I GAIN	0.00054 (0.000972)	--	0.00009 (0.000162)	0.0	--	--
{82}	AUX D GAIN	24 (43.2)	--	1 (1.8)	0	--	--
83	RH HI LIMIT	50.0	PCT	0.4	0.0	--	--
84	RH LO LIMIT	30.0	PCT	0.4	0.0	--	--
85	SWITCH LIMIT	4.8	PCT	0.4	0.0	--	--
86	SWITCH TIME	10	MIN	1	0	--	--
87	NGT HW HTG	YES	--	--	--	YES	NO
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	AUX D STPT	80.0 (26.856)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{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}	LOWER LIMIT	55.0 (30.8)	DEG F (DEG C)	0.5 (0.28)	0.0	--	--
{97}	UPPER LIMIT	75.0 (42.0)	DEG F (DEG C)	0.5 (0.28)	0.0	--	--
98	LOOP TIME	5	SEC	1	0	--	--
{99}	ERROR STATUS	0	--	1	0	--	--

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