SIEMENS

TEC Custom Solutions Application 2412:

Unit Vent with Mixed Air Sequence, Dehumidification, and Modulating Face & Bypass Damper

TEC-0572.08

This document contains the following topics:

- Wiring Diagram
- Point Database

Overview

In Application 2412, the Unit Vent Controller provides the following features:

- Morning warm-up/cool-down
- Night mode override
- Free cooling
- Dehumidification
- Auxiliary radiation in heating mode
- Modulating face and bypass damper
- Control of unit ventilator fan

Temperature control is accomplished using the following equipment:

- Modulating heating valve
- 2-position cooling valve
- Outside air damper
- Face and bypass damper

Application 2412 controls room temperature by setting the discharge set point and sending it to the heating and cooling PID loops, which control the coil devices.

This application uses an outdoor air damper for mixed air control. A PID loop maintains 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, the outdoor air damper is kept at minimum position; otherwise, it modulates to maintain the mixed air temperature set point.

For dehumidification, the outside air damper closes completely until the humidity drops to an acceptable level, after which normal control resumes.

Refer to Figures 2412-1 through 2412-9.

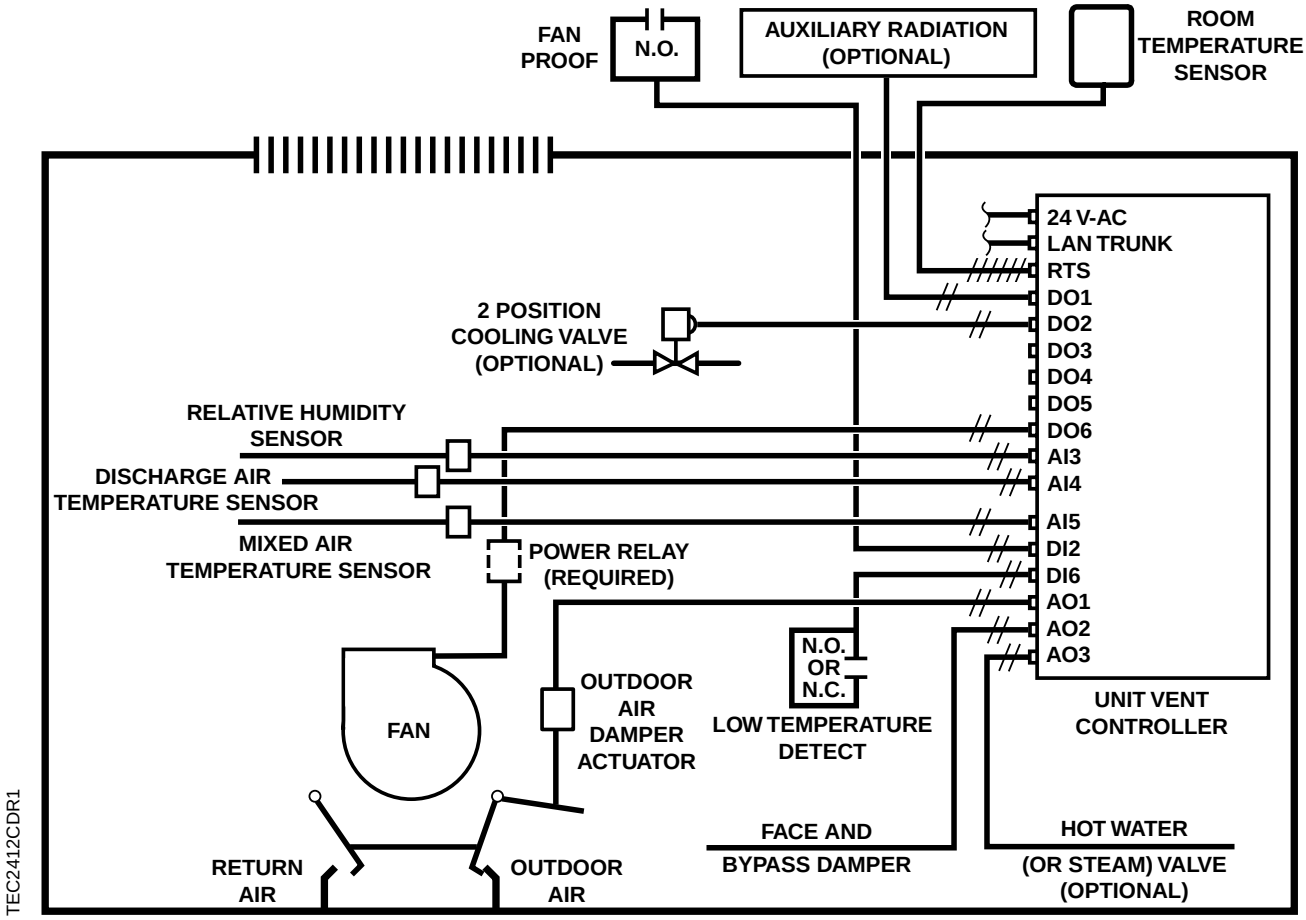
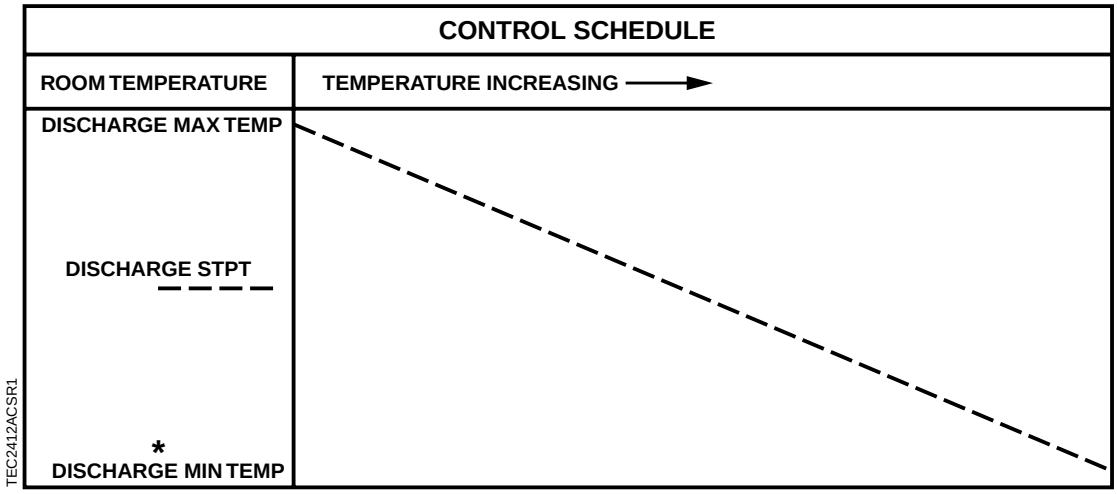


Figure 2412-1. Control Drawing for Application 2412.



* The discharge minimum temperature equals HTG DIS MIN (Point 74) in heating mode and CLG DIS MIN (Point 75) in cooling mode.

Figure 2412-2. Discharge Temperature Set Point.

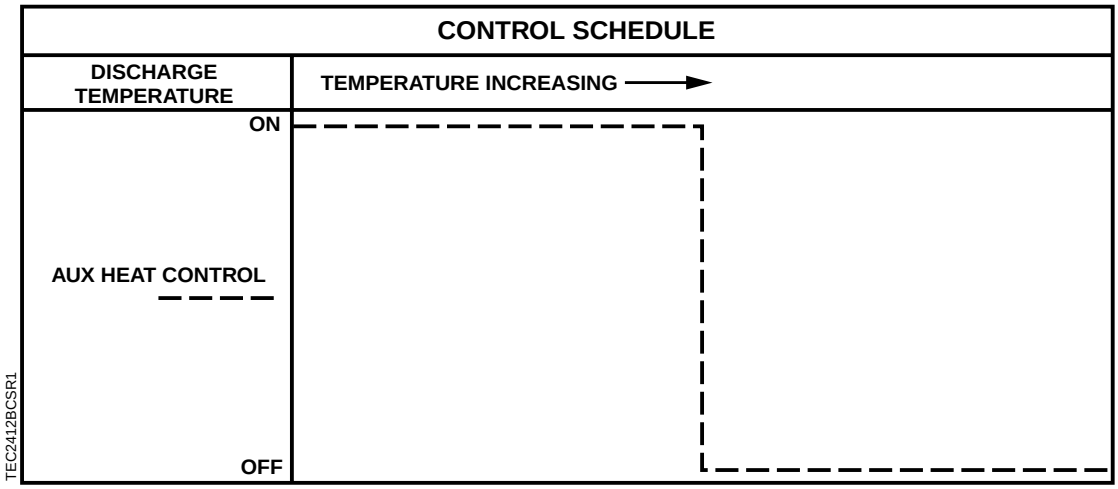


Figure 2412-3. Auxiliary Radiation.

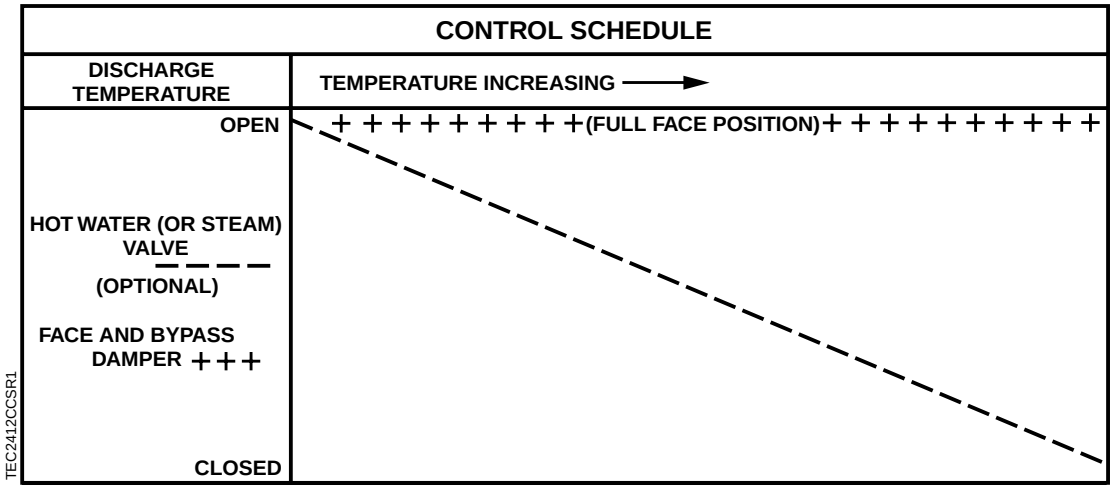


Figure 2412-4. Day Heating Mode with OA TEMP (Point 25) greater than 40 Deg. F.

NOTE: The fan is ON throughout the day.

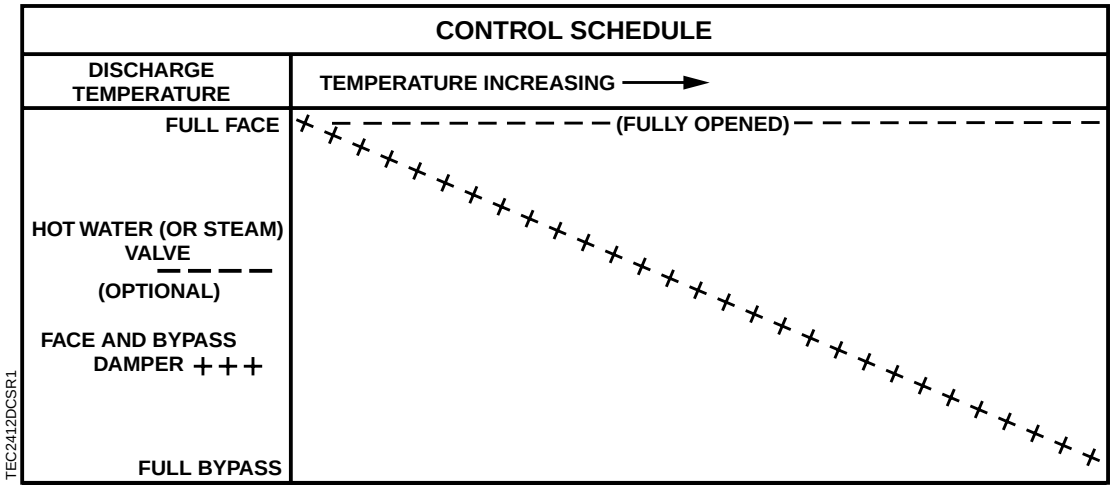


Figure 2412-5. Day Heating Mode with OA TEMP (Point 25) less than or equal to 40 Deg. F.

NOTE: The fan is ON throughout the day.

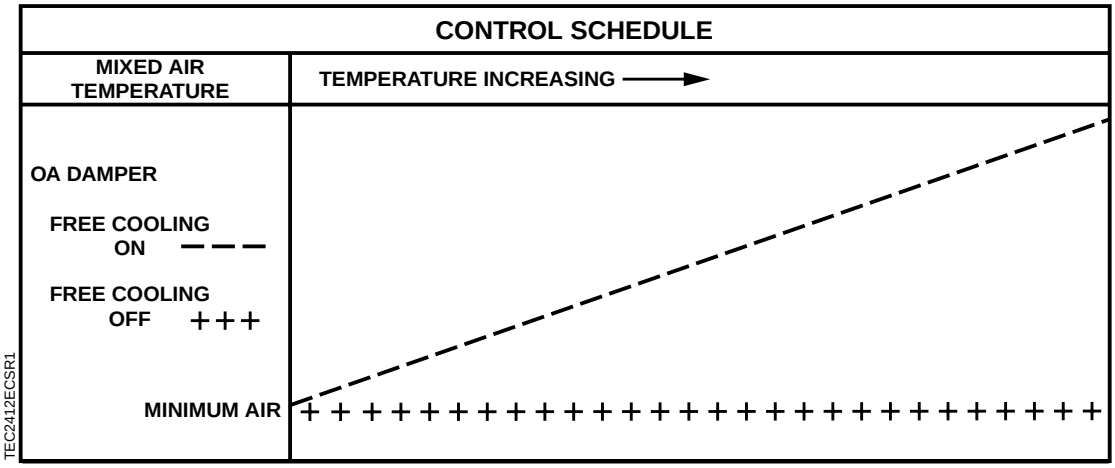


Figure 2412-6. Day Control of Outside Air Damper.

NOTE: When humidity is too high, the outside air damper is closed.

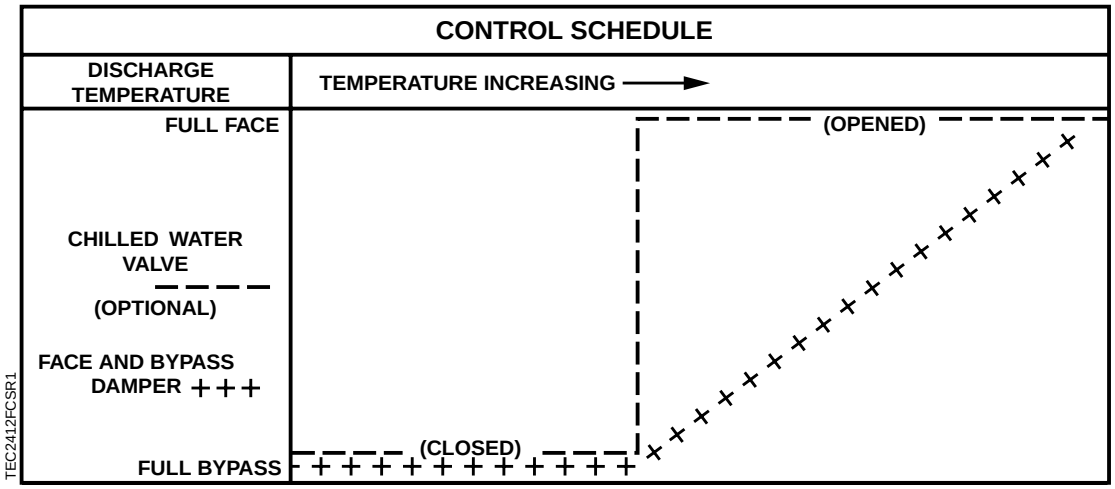


Figure 2412-7. Cooling Valve and Face & Bypass Damper Interaction in Day Cooling Mode.

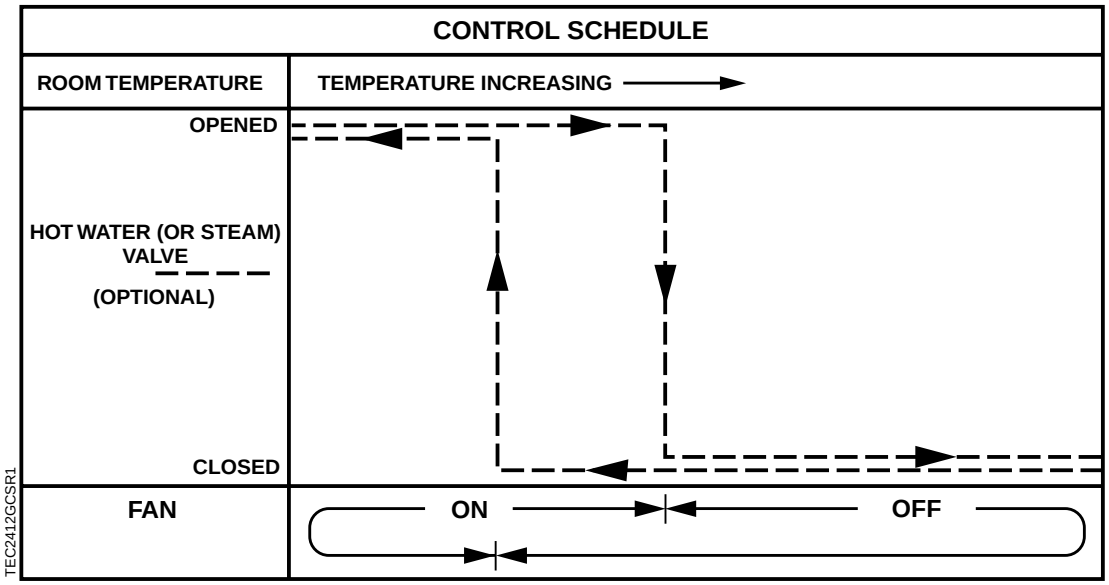
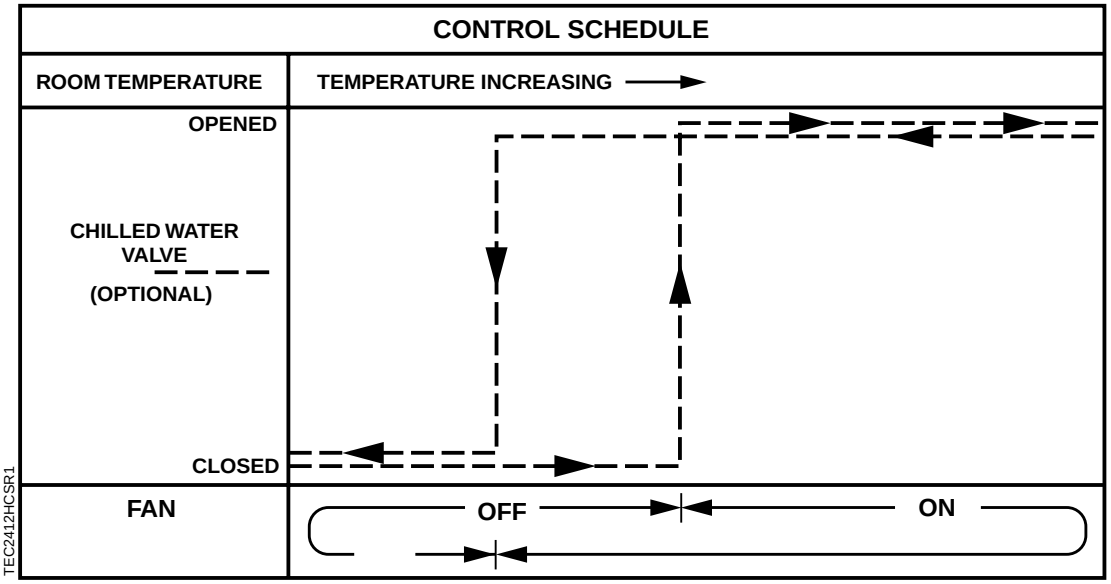


Figure 2412-8. Night Heating Mode with NGT HW HTG (Point 53) equal to NO. (If NGT HW HTG = YES, the Hot Water Valve is completely opened throughout Night Heating Mode.)



The Heating Valve is not shown. When NGT HW HTG (Point 53) equals NO, the hot water valve is shut throughout the night cooling mode. When NGT HW HTG equals YES, the hot water valve is completely opened throughout the night cooling mode.

Figure 2412-9. Night Cooling Mode. (Heating Valve not shown)

Hardware Inputs

Analog

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

Digital

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

Hardware Outputs

The following devices can be used by this application depending on your hardware configuration.

Analog (0 – 10V)

- Outdoor air damper actuator
- Heating valve
- Face and Bypass Damper

Digital

- Auxiliary radiation
- Unit fan
- 2-Position cooling valve

Ordering Notes

You can either order the Unit Vent Controller (Mixed Air Sequence, Dehumidification, and Modulating Face and Bypass Damper) as part number 540-863K, or, you can order it as Custom Solution 261.

Sequence of Operation

The following paragraphs present the sequence of operation for Application 2412, “Unit Vent with Mixed Air Sequence, Dehumidification and Modulating Face and Bypass Damper.”

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, 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 outside air damper or the MA STPT, depending on the circumstances.

Whenever the Space Relative Humidity is too high (DEHUMIDIFY (Point 28) is ON), the outside air damper is closed. When the Space Relative Humidity is at an acceptable level (DEHUMIDIFY is OFF), the outside air damper is controlled as follows:

- 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 a number of things:
  - Whether the MA CONTROL (Point 58) point is enabled or disabled
  - The status of the MA TEMP point
  - The value of the HEAT.COOL point

Cases 1 through 6 explain this in more detail.

CASE 1

MA CONTROL equals ENABLE, the MA TEMP point is NORMAL and the HEAT.COOL point is in the cooling mode.

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.

CASE 2

MA CONTROL equals ENABLE, the MA TEMP point is NORMAL and the HEAT.COOL point is in the heating mode.

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.

CASE 3

MA CONTROL equals ENABLE, the MA TEMP point is FAILED and the HEAT.COOL point is in the cooling mode.

The mixed air damper will remain at OADPR MINPOS.

Case 4

MA CONTROL equals DISABL and the Application is in the Cooling Mode.

When 2* CLG LOOPOUT is less than OADPR MIN POS, the Mixed Air Damper will be at OADPR MINPOS. As 2*CLG LOOPOUT goes from OADPR MIN POS to 100%, the Mixed Air Damper goes from OADPR MIN POS to 100 % OA. (This means that the Mixed Air Damper will be 100% open to outside air when CLG LOOPOUT is 50%.)

Case 5

MA CONTROL equals DISABL and the Application is in the Heating Mode.

When 2* (50 - HTG LOOPOUT) is less than OADPR MIN POS, the Mixed Air Damper will be at OADPR MINPOS. As 2* (50 - HTG LOOPOUT) goes from OADPR MIN POS to 100%, the Mixed Air Damper goes from OADPR MIN POS to 100 % OA. (This means that the Mixed Air Damper will be 100% open to outside air when HTG LOOPOUT is 0%.)

CASE 6

MA CONTROL equals ENABLE, the MA TEMP point is FAILED and the HEAT.COOL point is in the heating mode.

The mixed air damper control in this case is identical to the mixed air damper control in CASE 5.

MA OVERRIDE:
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.

Dehumidification Determination

This application determines whether dehumidification is needed by looking at the value of the DEHUMIDIFY point (Point 28). This section explains how the DEHUMIDIFY point gets set.

- DEHUMIDIFY will be OFF if the RH point has FAILED.
- DEHUMIDIFY will be OFF during warm-up or cool-down. (WRMUP.COOLDN is ON.)
- DEHUMIDIFY will be OFF at night. (That is, both DAY.NGT (Point 29) is NIGHT and NGT OVRD (Point 21) is NIGHT.)
- DEHUMIDIFY will be OFF if the space's relative humidity is low enough. (RH AI 3 (Point 15) is less than RH LO LIMIT (Point 17).)

DEHUMIDIFY will be commanded ON only if **all** of the following events occur:

- The RH AI 3 point is NORMAL.
- WARMUP.COOLDN is OFF.
- It is the day mode. (That is, either DAY.NGT is DAY or NGT OVRD is DAY.)

- RH AI 3 is greater than RH HI LIMIT (Point 16).
  (If RH AI 3 is greater than RH LO LIMIT but less than RH HI LIMIT, then the value of DEHUMIDIFY will remain unchanged.)

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.)
- When OA TEMP (Point 25) is below 40 deg. F. for longer than the time value stored in OAT TIME (Point 27), the heating PID loop modulates the face and bypass damper while the heating valve is fully opened. This type of heating valve / face and bypass interaction will remain in effect until OA TEMP remains above 40 Deg. F. for longer than OAT TIME.
- When OA TEMP (Point 25) is above 40 deg. F. for longer than the time value stored in OAT TIME (Point 27), the heating PID loop modulates the heating valve while the face and bypass damper is in the full face position. This type of heating valve / face and bypass interaction will remain in effect until OA TEMP remains below 40 Deg. F. for longer than OAT TIME.

  NOTE: OA TEMP must be adjusted from a field panel.

- The auxiliary radiation, if provided, is controlled using dead band control. Auxiliary radiation 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 (Point 41) will remain in its last commanded state. (HTG LOOPOUT is the output of the Heating PID loop.)

In the day heating mode the cooling valve is fully shut.

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 face and bypass damper. (During light cooling loads, the face and bypass damper will be modulated toward the bypass position. During heavy cooling loads, the face and bypass damper will be modulated toward the face position.)

- The cooling valve will be completely opened when the face and bypass damper is not in the full bypass position. (To maximize service life, the cooling valve will not open as soon as the command is given to open it. The command to open the cooling valve must remain in effect for at least the amount of time stored in CLG TIME (Point 73) before the cooling valve will be commanded open.)
- The cooling valve will be shut when the face and bypass damper is in the full bypass position. (To maximize service life, the cooling valve will not shut as soon as the command is given to shut it. The command to shut the cooling valve must remain in effect for at least the amount of time stored in CLG TIME (Point 73) before the cooling valve will be commanded shut.)
- During the day cooling mode, the heating valve will be shut and the auxiliary radiation will be off.

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 the night heating mode, 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.
  - The heating valve is fully opened.
  - The auxiliary radiation is turned ON.
  - The face and bypass damper is in the full face position.

- If CTL TEMP rises above NGT HTG STPT, then:
  - The fan turns OFF.
  - The auxiliary radiation is turned OFF.
  - If NGT HW HTG (Point 53) is NO, the heating valve is fully shut. If NGT HW HTG is YES, the heating valve remains fully opened.
  - The face and bypass damper is in the full bypass position provided that NGT HW HTG is set to NO. Otherwise, the face and bypass damper will remain in the full face position.

Other points to keep in mind during the night heating mode:

- The outside air damper is shut.
- 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 NGT CLG MODE (Point 54) is set to YES.
- Heating only is provided when NGT CLG MODE is set to NO.

Night Cooling Operation

In night cooling mode, NGT CLG MODE (Point 54) must be set to YES. (If NGT CLG MODE is set to NO, the unit will operate in night heating mode only.)

In the night cooling mode 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.
  - The cooling valve is fully opened.
  - The face and bypass damper is in the full face position.

- If CTL TEMP drops below NGT CLG STPT, then:
  - The fan turns OFF.
  - The cooling valve is fully shut.
  - The face and bypass damper is in the full bypass position provided that NGT HW HTG (Point 53) is set to NO. Otherwise, the face and bypass damper will remain in the full face position.

If NGT HW HTG (Point 53) is set to NO, then the hot water (steam) valve will be closed throughout the night cooling mode. If NGT HW HTG is set to YES, then the hot water (steam) valve will be opened throughout the night cooling mode.

The outside air damper is shut during the night cooling mode.

Heating/Cooling Switchover

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 setpoint will not be adjusted above DSH MAX TEMP (Point 95) or below DSH MIN TEMP (Point 94). In the heating mode, DSH MIN TEMP will be set equal to HTG DIS MIN (Point 74). In the cooling mode, DSH MIN TEMP will be set equal to CLG DIS MIN (Point 75).

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

This module controls the auxiliary radiation on DO 1 (DO 1 is called AUX RAD, Point 41).

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

If the controller is in night heating mode, the 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 it is 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, when dehumidification is not needed (DEHUMIDIFY (Point 28) is OFF), the fan only operates when required for heating or cooling.

When dehumidification is needed (DEHUMIDIFY is ON), the fan is on all of the time. This is true regardless of whether or not it is DAY or NIGHT.

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

If PROOF USED (Point 51) is set to NO, then this feature is not used.

If PROOF USED is set to YES, and the fan is on, then the FAN ALARM (Point 77) will be turned ON if DI 2 remains OFF for longer than the PROOF TIME (Point 22). (Note: Once ON, the only way to turn FAN ALARM OFF is manually. (It is recommended that you fix the problem that caused FAN ALARM to turn ON in the first place before manually commanding FAN ALARM to OFF.) After manually commanding FAN ALARM OFF, you must release FAN ALARM to NONE priority so the TEC can again control this point.)

When the fan is on and DI 2 is ON, FAN ALARM will not be commanded.

When the fan is off, the FAN ALARM will not be commanded.

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.

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

Safety/Failure	APP 2412 Safety Sequence
LTDT = ON	**"Shutdown"** * Close OA DMPR * Heating Valve fully opened * Cooling Valve fully shut * Fan OFF * Aux OFF * Face and Bypass Damper is set to Full Face Position
FAN ALARM = ON	**"Shutdown"** * Close OA DMPR * Heating Valve fully opened * Cooling Valve fully shut * Fan OFF * Aux OFF * Face and Bypass Damper is set to Full Face Position
Discharge sensor fails	If last valid value was greater than 150 degrees: * Close OA DMPR * Heating Valve fully closed * Cooling Valve fully shut * Fan ON * Aux OFF * Face and Bypass Damper is set to Full Bypass Position 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, normal control resumes.

If at least one of the safeties in the above table occurs, SAFETY MODE (Point 66) turns ON. If all of the safeties in the above table are cleared, SAFETY MODE turns OFF. Therefore, by checking the value of this point, you can tell whether or not a safety is occurring.

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 the temperature swings in the room are excessive, or there is trouble in maintaining the set point, then either the cooling loop, the heating loop or both need to be tuned. Refer to the *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 Diagram

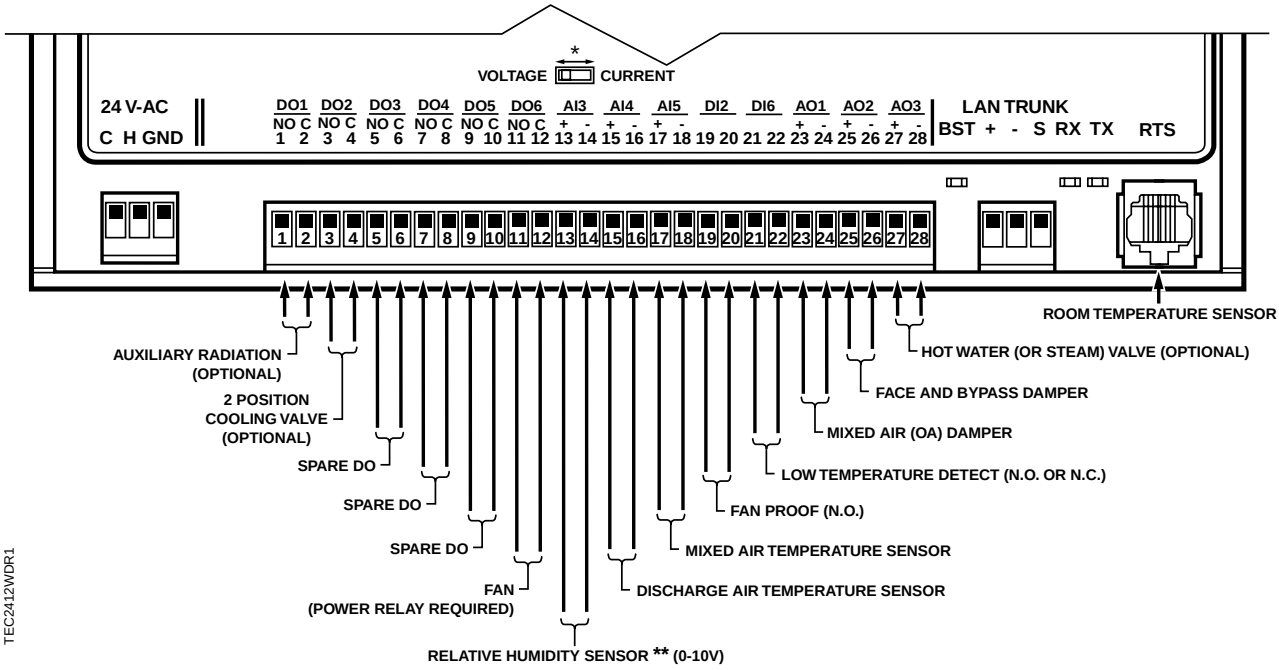
The point wiring for Application 2412 is shown in Figure 2412-10.

Wiring Diagram

CAUTION:

The controller's digital outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. Use an interposing 220 V 4-relay module for any of the following:

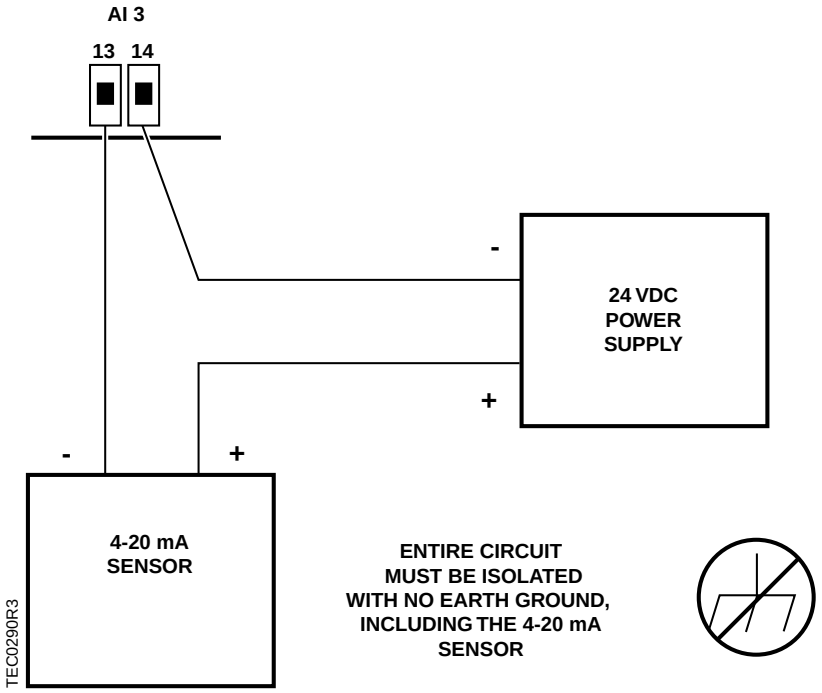
- VA requirements higher than the maximum
- 110 or 220 Vac requirements
- DC power requirements
- Separate transformers used to power the load



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

****** A 4-20 mA relative humidity sensor, if used, requires special wiring (see Figure 2412-11).

Figure 2412-10. Application 2412 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 2412-11. Special Wiring Requirements for 4-20 mA Sensor at AI3.

CAUTION:

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

Point Database

Point Database for Application 2412.

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}	RH AI 3	0.0	PCT	0.4	0.0	--	--
16	RH HI LIMIT	70.0	PCT	0.4	0.0	--	--
17	RH LO LIMIT	40.0	PCT	0.4	0.0	--	--
{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
{25}	OA TEMP	38.5 (3.616)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{26}	DI 6	OFF	--	--	--	ON	OFF
27	OAT TIME	120	SEC	1	0	--	--
{28}	DEHUMIDIFY	OFF	--	--	--	ON	OFF
{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	--	--

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Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
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	--	--
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}	DO 3	OFF	--	--	--	ON	OFF
{44}	DO 4	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	--	--
{58}	MA CONTROL	DISABL	--	--	--	ENABLE	DISABL
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

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Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
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	--	--
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	CLG TIME	30	SEC	1	0	--	--
74	HTG DIS MIN	60.0 (15.656)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
75	CLG DIS MIN	55.0 (12.856)	DEG F (DEG C)	0.5 (0.28)	37.5(3.056)	--	--
{76}	MODULATE	FBP	--	--	--	FBP	HVALVE
{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	--	--

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