SIEMENS

Application 2306
TEC Custom Solutions Unit Vent with Humidity Control

This document contains the following topics:

Overview

In Application 2306, the Unit Vent with Humidity Control controls a unit ventilator equipped with a chilled water coil for cooling and dehumidification, and/or a heating coil, which may be hot water or steam. Heating only and cooling only units can also be controlled with this application by overriding HEAT.COOL (Point 5). A humidifier is also controlled to maintain relative humidity.

Other features available in this application include night mode override, free-cooling, and dehumidification mode.

This application controls room temperature by directly modulating the coil control devices and outdoor air damper. 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 in sequence with the coils to maintain room temperature. The outdoor air damper may also be two-position. The unit ventilator fan is also controlled in this application.

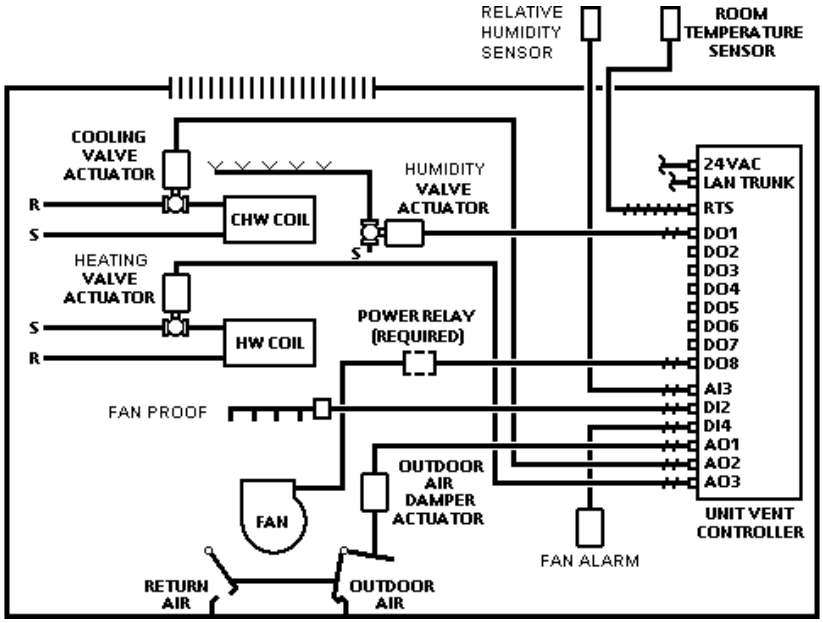


Figure 2306-1. Application 2306 Control Drawing with Heating and Cooling Coils, Modulating Damper, and 2-Position Humidifier.

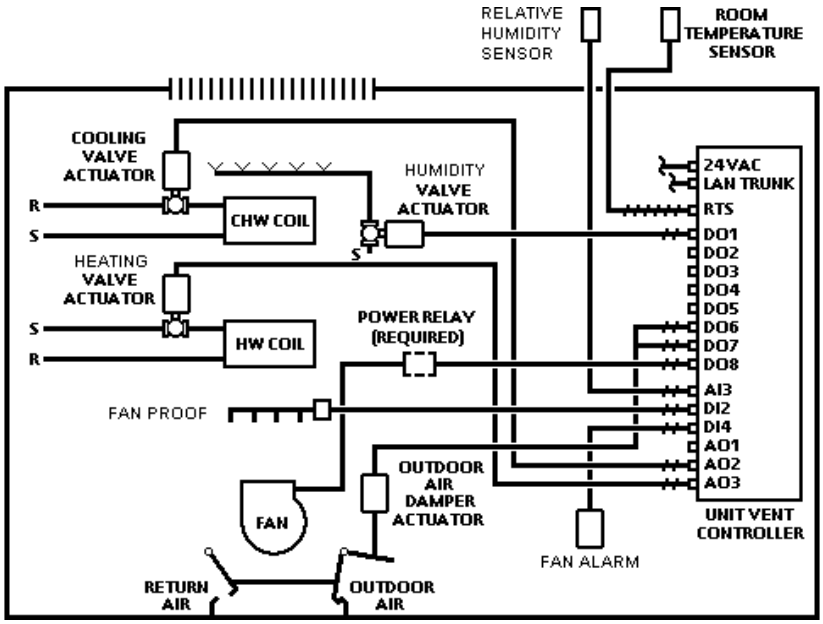


Figure 2306-2. Application 2306 Control Drawing with Heating and Cooling Coils, 2-Position Damper, and 2-Position Humidifier.

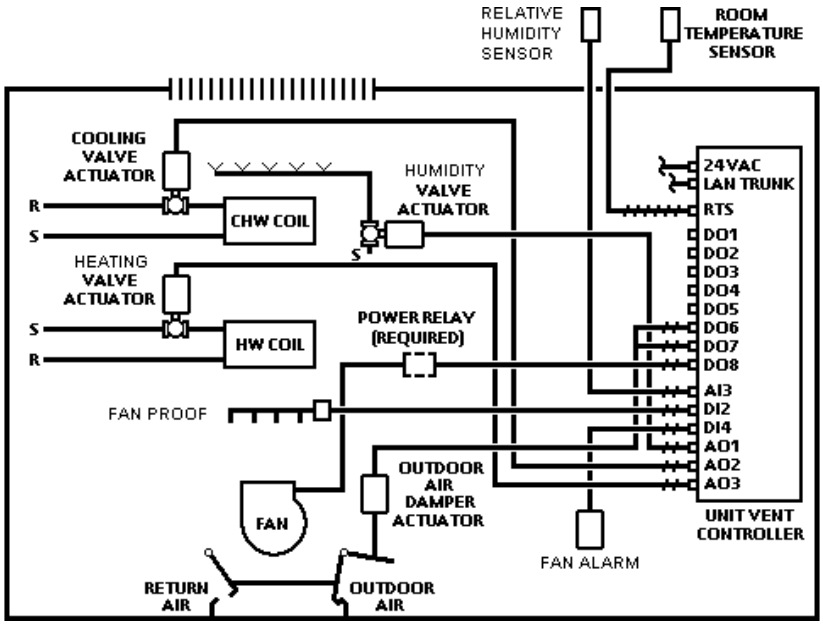


Figure 2306-3. Application 2306 Control Drawing with Heating and Cooling Coils, 2-Position Damper, and Modulating Humidifier.

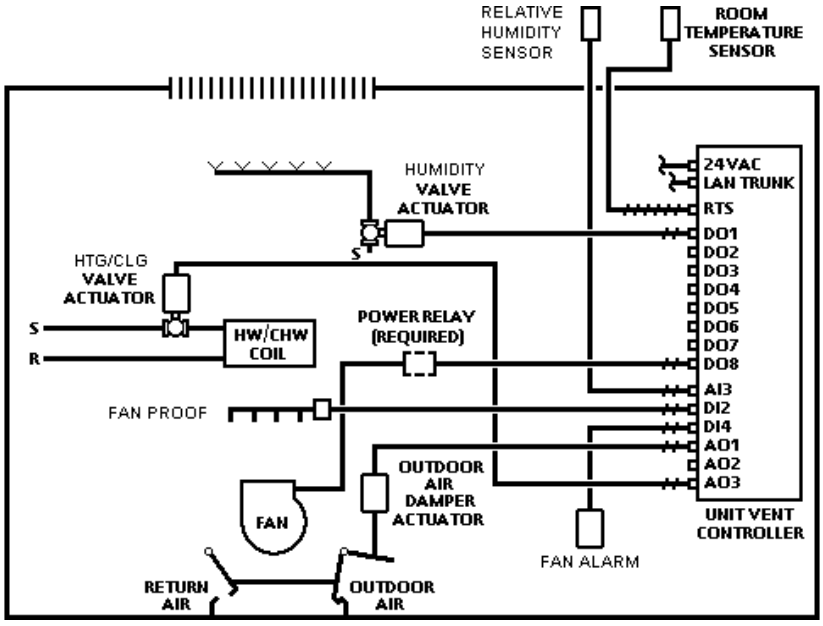


Figure 2306-4. Application 2306 Control Drawing with 2-Pipe Coil, Modulating Damper, and 2-Position Humidifier.

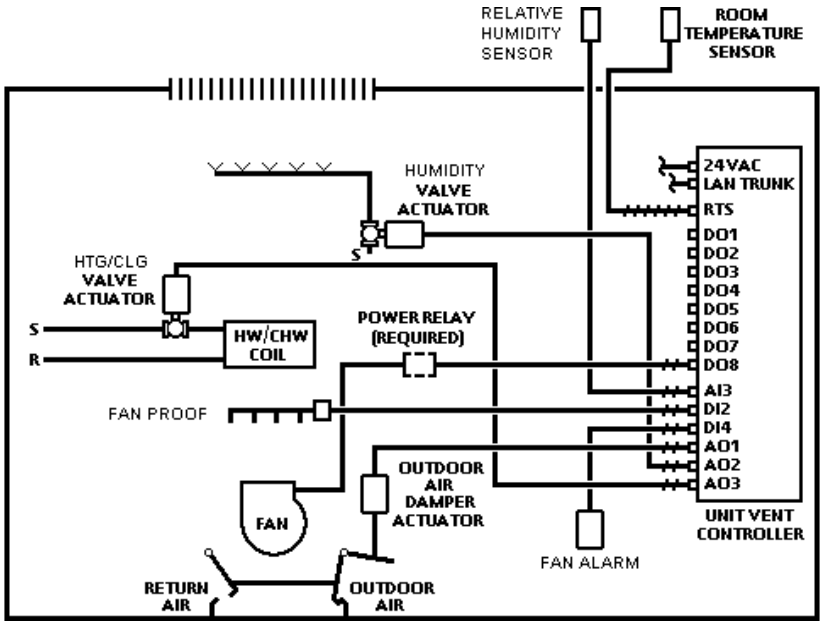


Figure 2306-5. Application 2306 Control Drawing with 2-Pipe Coil, Modulating Damper, and Modulating Humidifier.

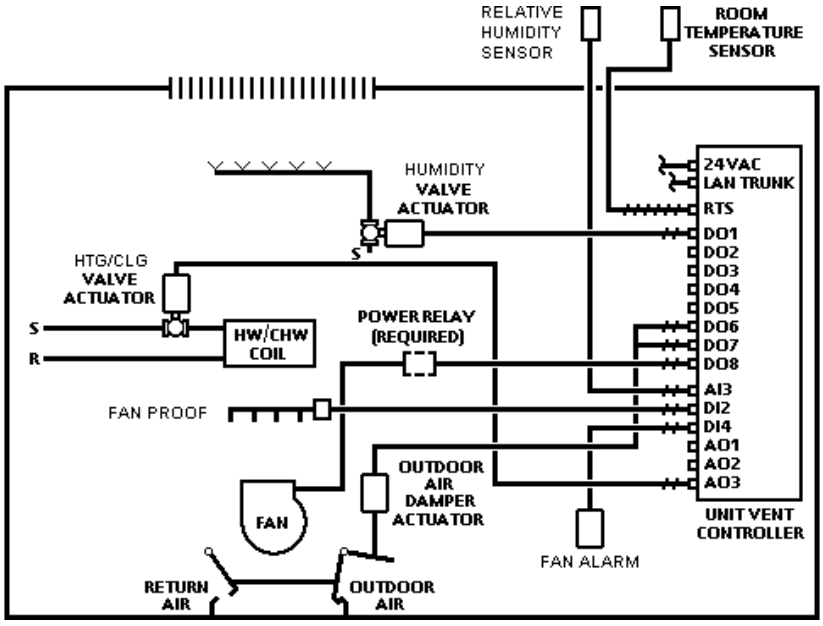


Figure 2306-6. Application 2306 Control Drawing with 2-Pipe Coil, 2-Position Damper, and 2-Position Humidifier.

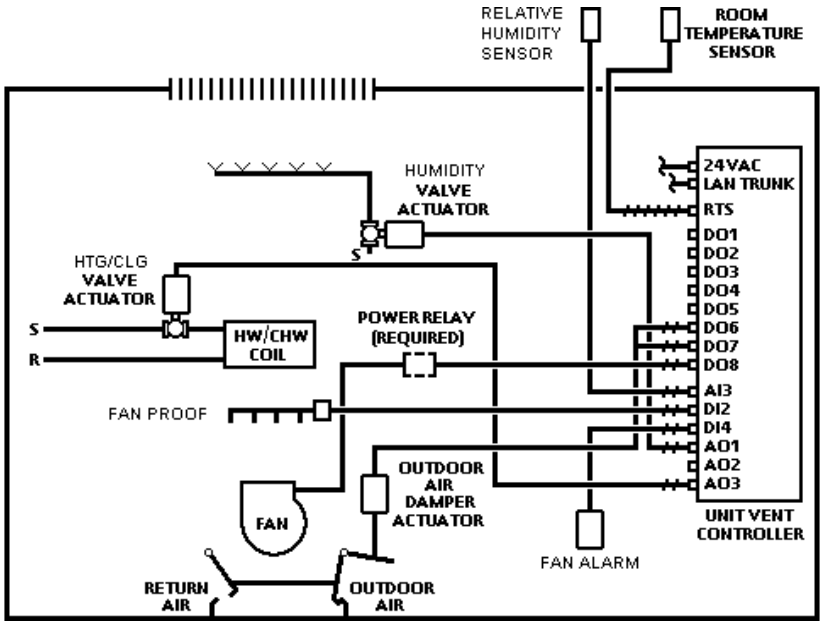
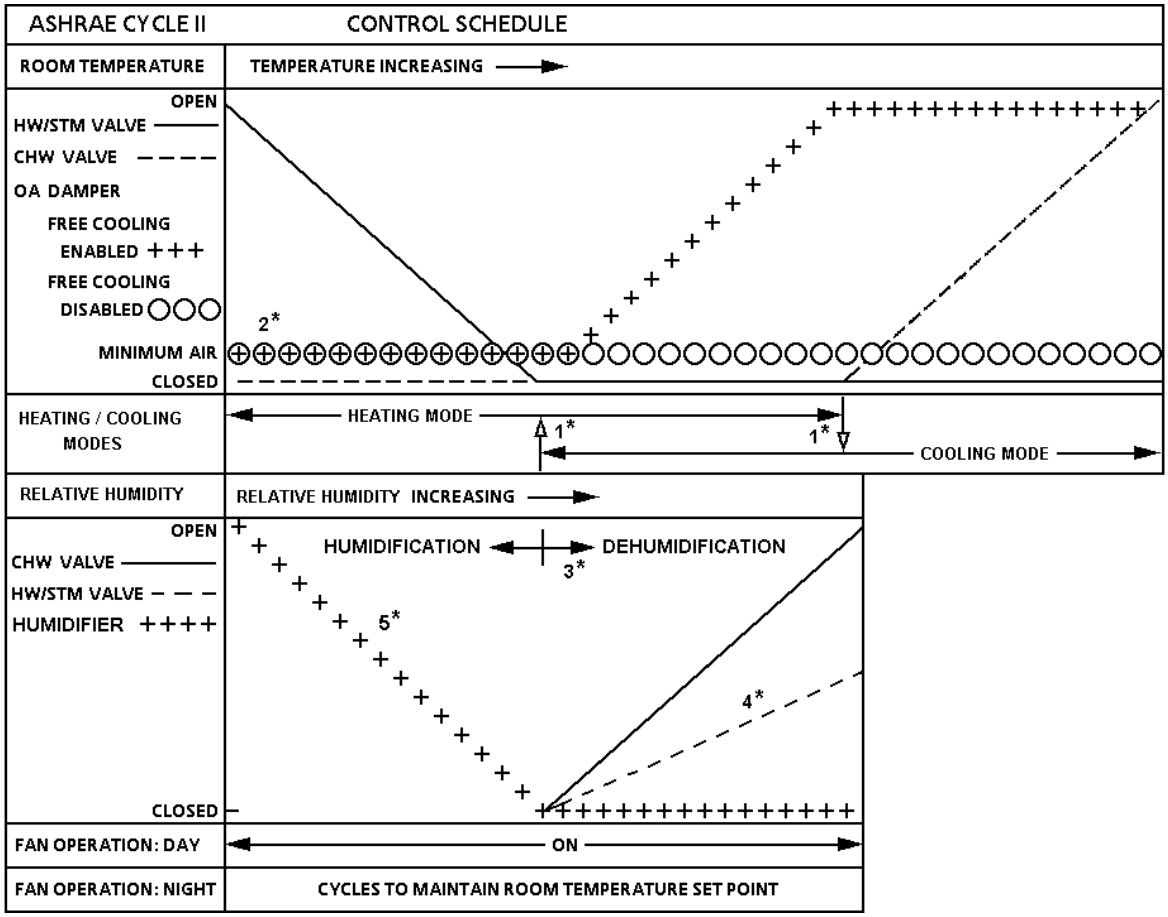
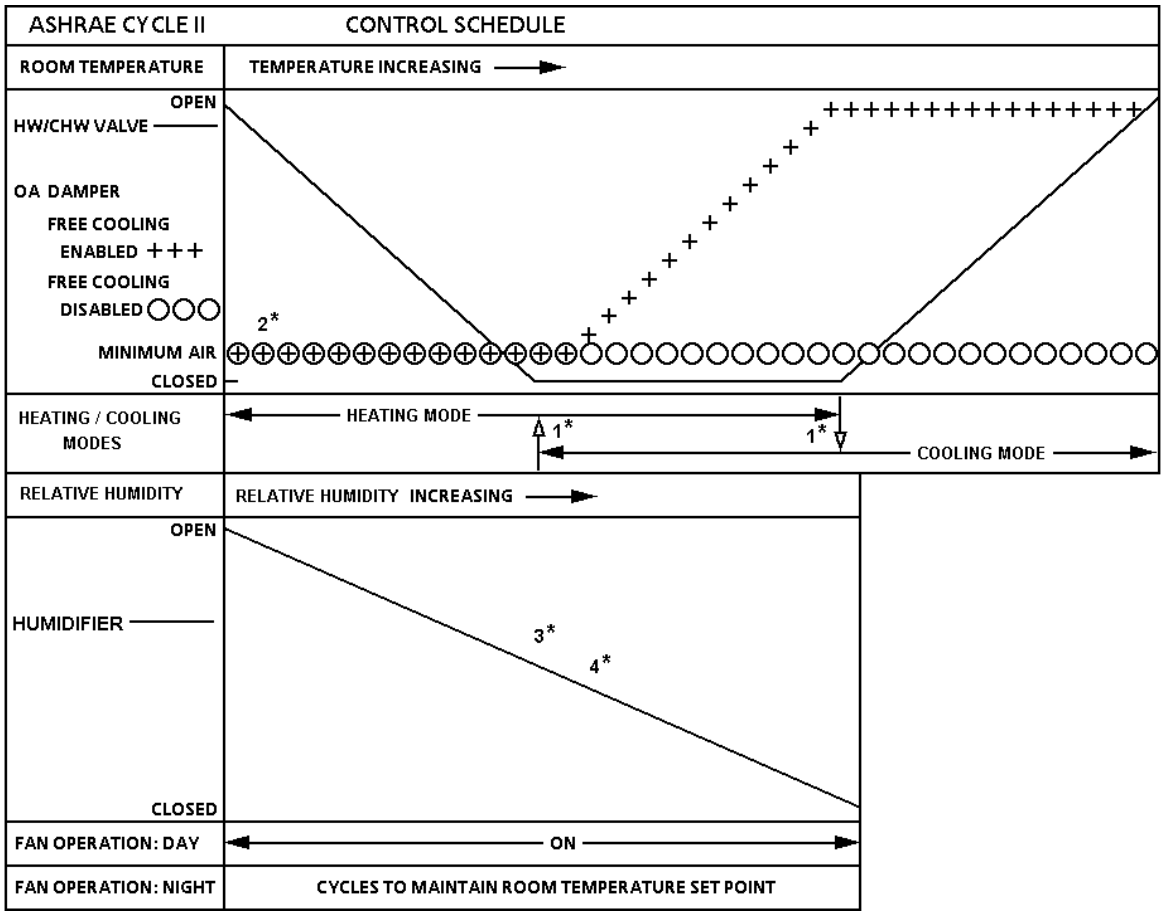


Figure 2306-7. Application 2306 Control Drawing with 2-Pipe Coil, 2-Position Damper, and Modulating Humidifier.



1. Refer to *Heating/Cooling Switchover* for more information.
2. Modulating damper is shown. If damper is two-position, then it will be open during day mode and closed during night mode.
3. Refer to *Humidity Control* for explanation of dehumidification sequence.
4. Heating valve position is shown with DEHUM COEFF (Point 87) = 0.5. Refer to *Humidity Control* for more information.
5. Modulating humidifier is shown. If humidifier is on/off, then it will be controlled using a pulse-width modulation scheme. Refer to *2-Position Humidifier Control*.

Figure 2306-8. Application 2306 Control Schedule with 4-Pipe Configuration.



1. Heating/cooling switchover will only occur when commanded by a field panel, based on coil water temperature.
2. Modulating damper is shown. If damper is two-position, then it will be open during day mode and closed during night mode.
3. Dehumidification sequence is not executed when unit is 2-pipe heating/cooling.
4. Modulating humidifier is shown. If humidifier is on/off, then it will be controlled using a pulse-width modulation scheme. Refer to *2-Position Humidifier Control*.

Figure 2306-9. Application 2306 Control Schedule with 2-Pipe Configuration.

Hardware Inputs

Analog

- Relative Humidity Sensor
- Room Temperature Sensor
- Room Temperature Set Point Dial (optional)

Digital

- Fan Alarm or Free-Cooling Indicator
- Fan Proof or Heat/Cool Indicator
- Night Mode Override (optional)

Hardware Outputs

The following list of devices can be used by this application depending on your hardware configuration:

Analog (0-10V)

- Cooling Valve Actuator
- Heating Valve Actuator
- Heating/Cooling Valve Actuator (optional)
- Humidity Valve Actuator (optional)
- Outdoor Air Damper Actuator (optional)

Digital

- Humidifier (2-position, optional)
- Outdoor Air Damper (2 DOs, optional)
- Unit Fan

Ordering Notes

Custom Solution number 209

Point Database

Table 2306-1 presents the point database information for Application 2306.

Sequence of Operation

The following paragraphs present the sequence of operation for Application 2306, “Unit Vent with Relative Humidity Control”.

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.

Day and Night Modes

The day/night status of the space is determined by the status of DAY.NGT (Point 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.

If the controller is operating stand-alone, then the controller stays in day mode all the time. If the controller is operating with centralized control (that is, it is connected to a field panel), then the field panel can send an operator or PPCL command to override the status of DAY.NGT. Refer to *Powers Process Control Language (PPCL) User’s Manual* (125-1896) and *Field Panel User’s Manual* (125-1895) 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 OVRD TIME (Point 20), then by pressing the override switch a room occupant can reset the controller to day operational mode of the time period that is set in OVRD TIME. The status of NGT OVRD (Point 21) changes to DAY. After the override time elapses, 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.

Valve Configuration

Definition of “2-pipe heat/cool”:

- If the unit has one valve, controlling a coil that may have hot water or chilled water, depending on the season, then 1 VLV HTGCLG (Point 16) is set to YES. This configuration is often referred to as “2-pipe heat/cool”.

If the unit has any other setup, then 1 VLV HTGCLG is set to NO. This includes units which are heating or cooling only and units with a heating and a cooling coil (often referred to as “4-pipe”).

Day Heating Operation

In day heating operation, if the controller is not in dehumidification mode, it maintains the room temperature at the value stored in CTL STPT (Point 92) by modulating the heating coil based on the difference between the control temperature point, CTL TEMP (Point 78), and CTL STPT. If CTL TEMP goes below CTL STPT, then the heating valve actuator opens. If CTL TEMP goes above CTL STPT, then the heating valve closes.

If the controller is in dehumidification mode, it maintains the room temperature at the value stored in CTL STPT by doing the same as above, but the heating coil will be opened by an additional amount to counter the cooling effect of the cooling coil being open for dehumidification. If the cooling coil is open 20%, then the heating coil will be opened by 20% times DEHUM COEFF (Point 87) beyond the position required, for room temperature control.

If controlled by DOs, the damper will be closed at night and open during the day. If controlled by AO-1, and FREE CLG (Point 23) is disabled, then the damper will be kept at the outdoor air damper minimum position during the day. If FREE CLG is enabled, then the damper is sequenced from 100% to the outdoor air damper minimum position before the heating valve opens.

Day Cooling Operation

In day cooling operation if the controller is not in dehumidification mode it maintains the room temperature at the value stored in CTL STPT (Point 92) by modulating the available coil control device based on the difference between the control temperature point, CTL TEMP (Point 78), and CTL STPT. If CTL TEMP goes above CTL STPT, then the cooling valve actuator opens. If CTL TEMP goes below CTL STPT, then the cooling valve closes.

If the controller is in dehumidification mode, then the cooling coil position is set to satisfy either the cooling demand or the dehumidification demand, whichever is greater. If the dehumidification demand is greater than the cooling demand, then the heating coil is opened to counter the additional cooling of the cooling coil. Refer to *Humidity Control*. If the cooling coil is open to 50% for dehumidification control, and the temperature demand is for 20% cooling, then the heating valve will be set to 15% [(50% - 20%) times DEHUM COEFF (Point 87) (default = 0.5) = 15%]. In other words, the cooling valve is opened 30% beyond the cooling requirement, so the heating coil is opened 15% to counter the excess cooling.

If controlled by DOs, the damper will be closed at night and open during the day. If controlled by AO-1, and FREE CLG (Point 23) is disabled, then the damper will be kept at the outdoor air damper minimum position during the day. If FREE CLG is enabled, then the damper is sequenced from the outdoor air damper minimum position to 100% before the cooling valve opens for cooling. The damper will sequence open only to satisfy cooling demand, not dehumidification demand.

Night Heating Operation

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 heating actuator is opened. When the fan turns OFF, the heating is closed. If NGT HW HTG (Point 53) is set to YES, (for hot water coils), then the heating actuator is kept open at all times during the night.

In night heating operation, the controller operates as follows:

- For units with hot water coils, NGT HW HTG must be set to YES, so that the valve will be positioned to full open. (Helps to protect the coil from freezing.)
- For units with steam coils, NGT HW HTG must be set to NO, so that the coil 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.

NOTE: When a 2-pipe heat/cool configuration is used (1 VLV HTGCLG (Point 16) is set to YES), NGT HW HTG should be set to YES. The 2-pipe heat/cool coil will then stay open during both night heating and night cooling.

Night Cooling Operation

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

- For units with hot water coils, NGT HW HTG (Point 53) must be set to YES so that the valve will be positioned to full open. (Helps to protect the coil from freezing.)
- For units with steam coils, NGT HW HTG must be set to NO so that the heating coils can be kept OFF.

In night cooling operation, the controller operates as follows:

- 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
  - cooling turns ON
- If CTL TEMP drops below NGT CLG STPT, then:
  - the fan turns OFF
  - cooling turns OFF
- When NGT CLG MODE (Point 54) is set to NO, the unit will operate in heating mode only at night.

NOTE: When a 2-pipe heat/cool configuration is used (1 VLV HTGCLG (Point 16) is set to YES), NGT HW HTG should be set to YES. The 2-pipe heat/cool coil will then stay open during both night heating and night cooling.

Humidity Control

Relative humidity is controlled in two ways, controlling a humidifier, and controlling heating and cooling coils simultaneously for dehumidification. Which humidity control sequence is used is determined by HUM.DEHUM (Point 27).

If HUM.DEHUM = HUM, then the humidity will be controlled by modulating the humidifier. Refer to *Control Loops*. If HUM.DEHUM is not overridden, then the controller will set it to HUM if RH LOOPOUT (Point 77) is positive and to DEHUM if RH LOOPOUT is negative. The switchover between HUM and DEHUM modes is not immediate. RH LOOPOUT must be less than 0% for the length of time held in SWITCH TIME (Point 86) before HUM.DEHUM will change to DEHUM. RH LOOPOUT must be greater than 0% for SWITCH TIME before DEHUM will change to HUM.

If HUM.DEHUM = DEHUM, then the humidity will be controlled by modulating both coils simultaneously for dehumidification. In cooling mode, the cooling coil is positioned to either the cooling demand or the dehumidification demand (negative RH loopout), whichever is greater. In heating mode, the cooling coil is positioned according to the demand for humidification. The heating coil is positioned to both counter the cooling effect of the cooling coil (in order to keep the discharge temperature constant) and to control room temperature. Refer to *Figures 2306-8* and *2306-9* for more sequencing information. The DEHUM COEFF (Point 87) represents the ratio of the effectiveness of the cooling coil to that of the heating coil. If opening the cooling coil to 50% and the heating coil to 25% causes the discharge temperature to stay constant, then DEHUM COEFF should be set to 0.5. The heating valve dehumidification position is the cooling valve position times DEHUM COEFF. In heating mode, the heating valve will actually be set to the heating valve demand for temperature control plus the dehumidification position. In cooling mode, the heating valve will be positioned open only if the dehumidification demand exceeds the cooling demand and then only to the difference between these two demands times DEHUM COEFF.

If DEHUM MODE (Point 28) is disabled, 1 VLV HTGCLG (Point 16) = YES, or if HUM.DEHUM is overridden to HUM, then the controller will not enter dehumidification mode.

There is no relative humidity control in night mode.

Heating/Cooling Switchover

If STAND ALONE (Point 89) = YES and a 2-pipe heating/cooling coil is being controlled (1 VLV HTGCLG (Point 16) = YES), then DI 2 is used to determine the heat/cool mode. Otherwise, for 2-pipe heating/cooling units (1 VLV HTGCLG = YES), the switchover between heating and cooling must be controlled by the field panel which commands HEAT.COOL (Point 5).

For all other units (1 VLV HTGCLG = NO and STAND ALONE = NO), the heating/cooling switchover is determined as follows:

If 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 to COOL:

- The HTG LOOPOUT (Point 80) is below 50%, if FREE CLG (Point 23) = DISABL, or below SWITCH LIMIT (Point 85) if FREE CLG = ENABL.
- The 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 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 CLG LOOPOUT (Point 79) is below 50%, if FREE CLG = DISABL, or below SWITCH LIMIT if FREE CLG = ENABL.
- 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 three Proportional, Integral, and Derivative (PID) control loops; a heating loop, a cooling loop, and a relative humidity loop.

Heating Loop – The heating loop uses the value of CTL STPT (Point 92) and CTL TEMP (Point 78) to modulate the value of HTG LOOPOUT(Point 80). The HTG OUTPUT (Point 60) and OA DMPR POS (Point 62), the heating valve and outdoor air damper positions, are calculated from HTG LOOPOUT.

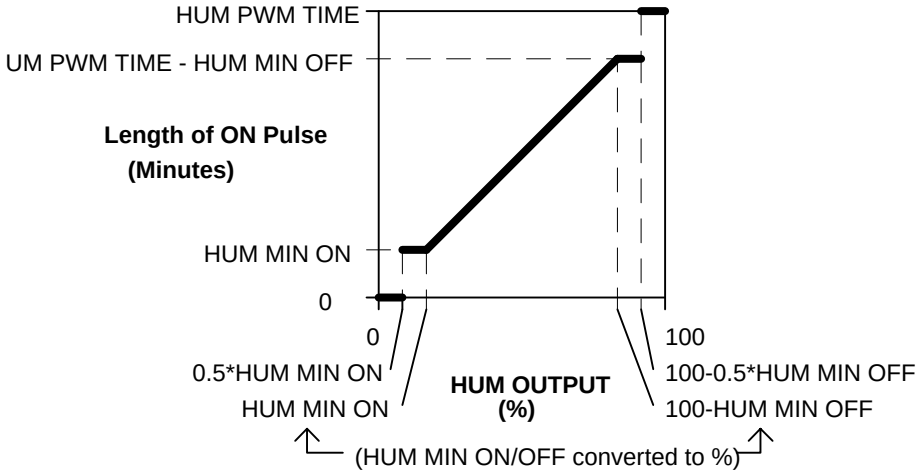
Cooling Loop – The cooling loop uses the value of CTL STPT and CTL TEMP to modulate the value of CLG LOOPOUT (Point 79). The CLG OUTPUT (Point 61) and OA DMPR POS, the cooling valve and outdoor air damper positions, are calculated from CLG LOOPOUT.

Relative Humidity Loop – The relative humidity loop uses the values of ROOM RH (Point 15) and RH STPT (Point 93) to modulate the value of RH LOOPOUT (Point 77). If RH LOOPOUT is positive, then it is used to modulate the humidity valve, HUM OUTPUT (Point 55). If RH LOOPOUT is negative, then it is used for dehumidification, as described in the *Humidity Control* section.

2-position Humidifier Control

If HUMID AO.DO (Point 17) = DO, then DO1 is used to turn the humidifier on and off.

A pulse-width modulation scheme is used. Once the humidifier DO point has been turned on, it is kept on for at least the minimum on-time. However, if the demand is below a certain point, then the DO will not be turned on at all, because turning the humidifier on for its minimum on-time will provide too much humidification.



The DO is never on for less than HUM MIN ON (Point 95)
(except when it is not turned on at all) and never off for less than HUM MIN OFF (Point 96).

Fan Operation

In day mode, FAN (Point 50), 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. If any stage of electric heat is ON, then the fan will be ON. The fan remains ON for 30 seconds after the last stage of electric heat is turned 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.

Stand-alone Mode

If there is no field panel connected to the equipment controller, then STAND ALONE (Point 89) should be set to YES.

When STAND ALONE = YES, DI 2, FAN PRF.HTCL (Point 24), is used to indicate the heat/cool mode when a 2-pipe heat/cool coil is being controlled (1 VLV HTGCLG = YES). DI 4, FAN ALM.FRCL (Point 26) is used to indicate whether free-cooling is available.

If STAND ALONE = NO, then DI 2 (FAN PRF.HTCL) is used for fan proof indication and DI 4 (FAN ALM.FRCL) is used for a fan alarm indication.

Fail-safe Operation

The Unit Vent with Humidity Control has a fail-safe operation that can be triggered by room temperature sensor failure.

If the room temperature sensor input to the Unit Vent with Humidity Control fails, then the controller goes through the following shutdown sequence:

1. Outdoor air damper is closed.
2. Heating is full ON.
3. Cooling is full OFF.
4. Fan is OFF.
5. Humidifier is OFF.

If the failed room temperature sensor returns, then normal control resumes.

If the set point dial fails, then its last valid value will continue to be used.

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.

In network mode (STAND ALONE (Point 89) = NO) FAN PRF.HTCL (Point 24) and FAN ALM.FRCL (Point 26) are provided for monitoring only. They do not affect the control sequence.

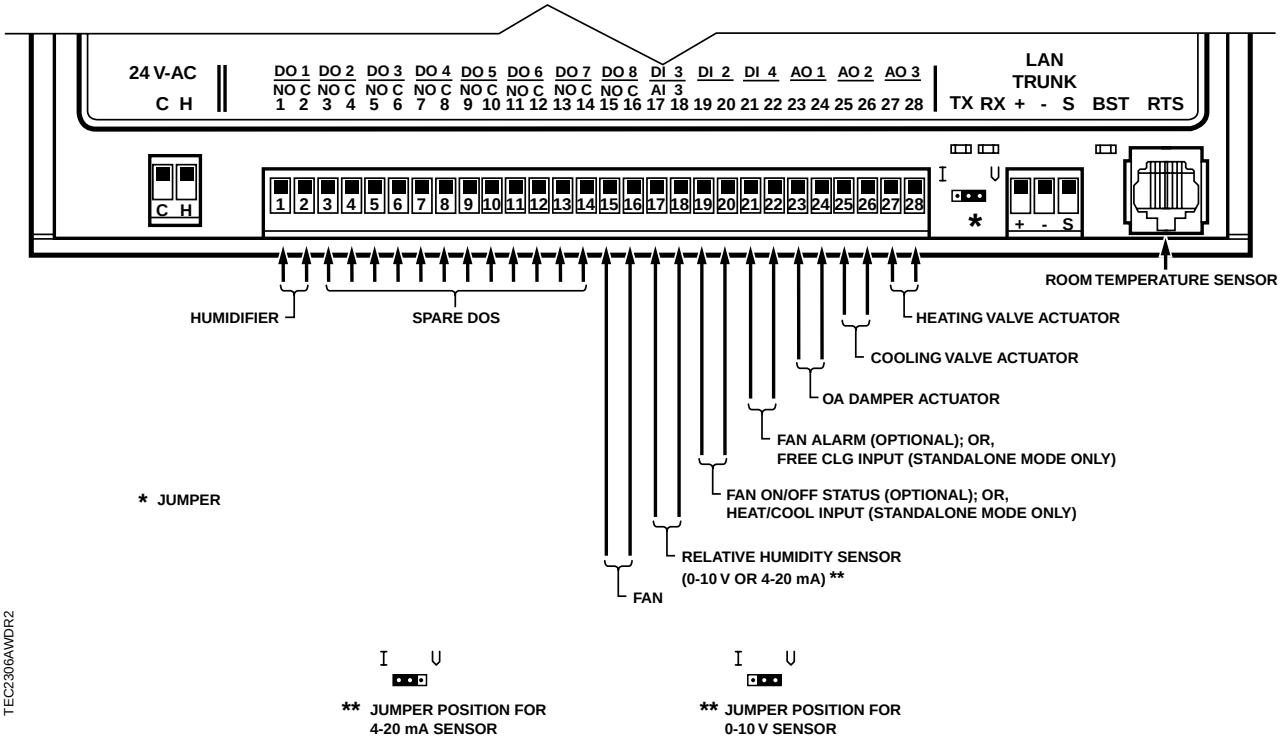
Application Notes

1. If the unit ventilator cycles excessively, 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 the *APOGEE Automation Service Procedures Manual* in InfoLink for more information.
2. The Unit Vent with Humidity Control, as shipped from the factory, keeps all associated equipment OFF. Refer to the TEC Custom Solutions Start-up Documentation for this controller.
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 states.

Wiring Diagrams

The point wiring for Application 2306 is shown in Figures 2306-10 through 2306-16. The example in Figure 2306-17 **must** be followed if a 4-20 mA relative humidity sensor is used at AI 3.

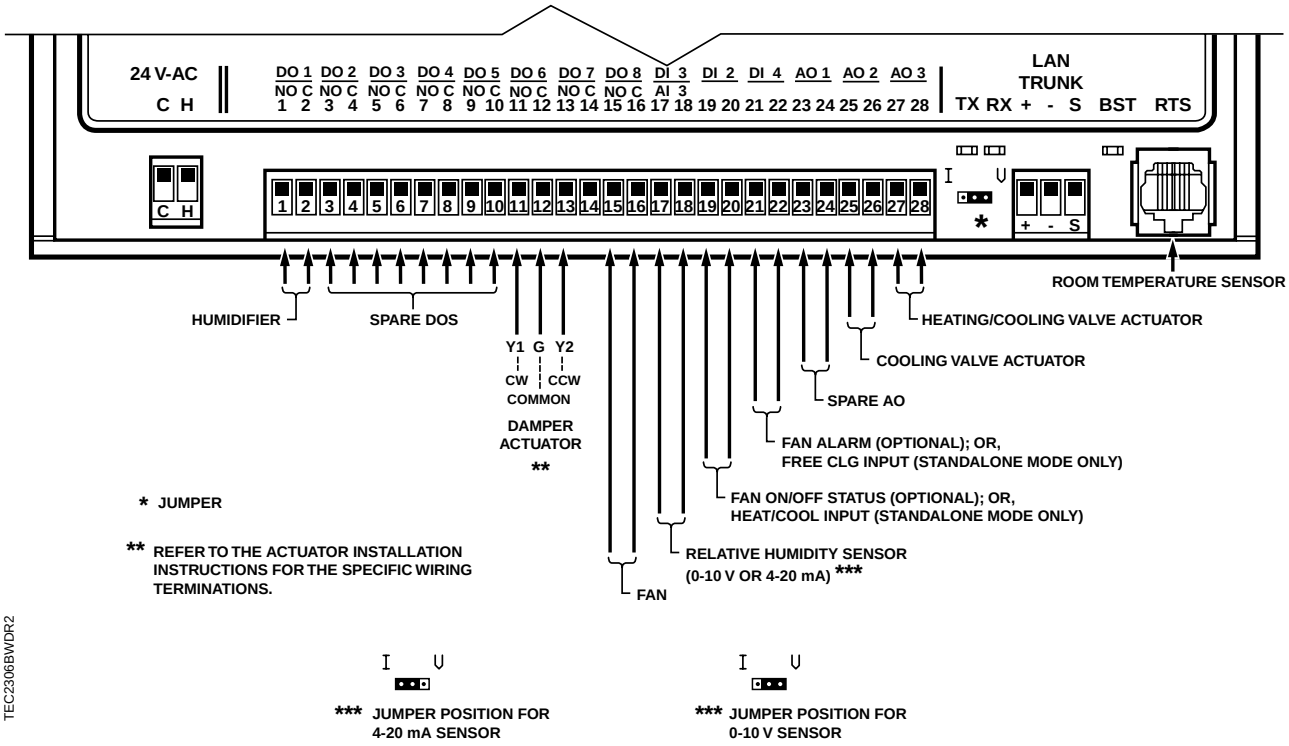
CAUTION:
The Unit Vent Controller's Digital Outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. For higher VA requirements, 110 or 220 Vac requirements, or DC power requirements, use an interposing 220 V 4-relay module.



WARNING:
If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result. See *Figure 2306-17*.

Figure 2306-10. Application 2306 Wiring Diagram with AO-Controlled Heating and Cooling Valve and Damper Actuators, and DO-Controlled Humidifier.

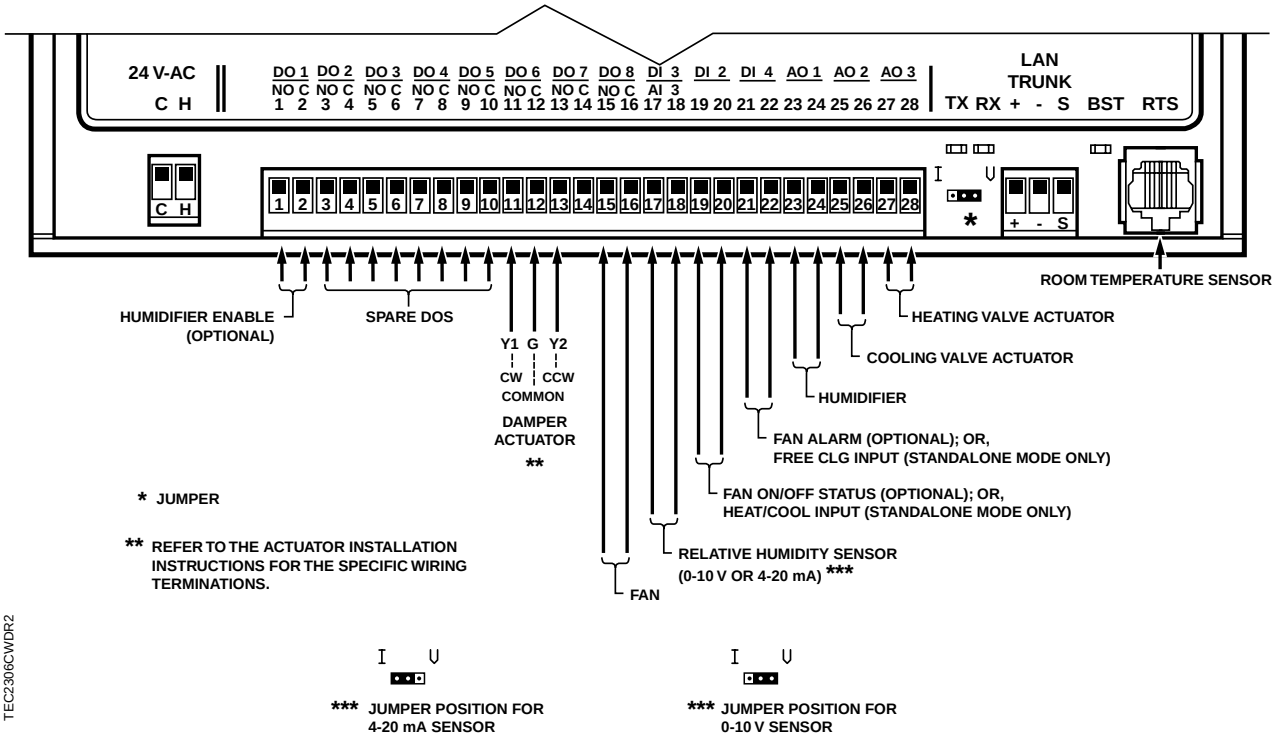
CAUTION:
The Unit Vent Controller's Digital Outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. For higher VA requirements, 110 or 220 Vac requirements, or DC power requirements, use an interposing 220 V 4-relay module.



WARNING:
If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result. See *Figure 2306-17*.

Figure 2306-11. Application 2306 Wiring Diagram with AO-Controlled Heating and Cooling Valve Actuators, and DO-Controlled Damper Actuator and Humidifier.

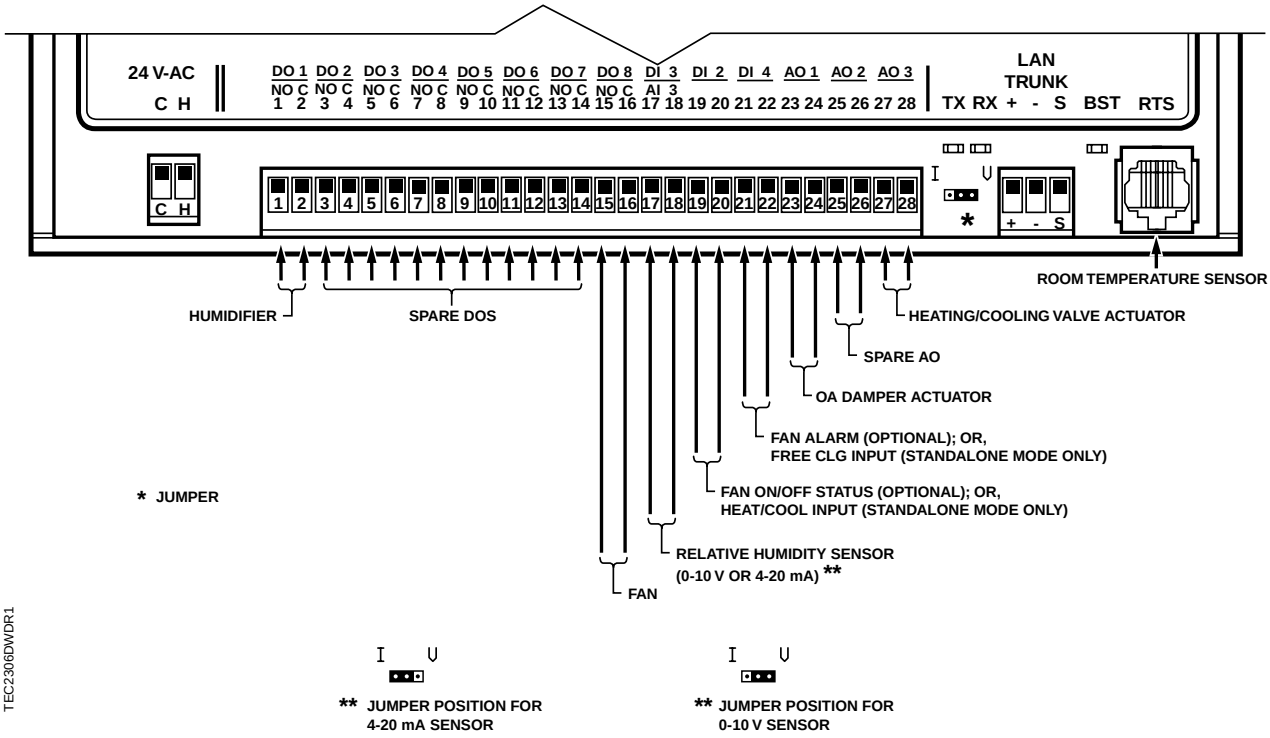
CAUTION:
The Unit Vent Controller's Digital Outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. For higher VA requirements, 110 or 220 Vac requirements, or DC power requirements, use an interposing 220 V 4-relay module.



WARNING:
If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result. See *Figure 2306-17*.

Figure 2306-12. Application 2306 Wiring Diagram with AO-Controlled Heating and Cooling Valve Actuators and Humidifier, and DO-Controlled Damper Actuator.

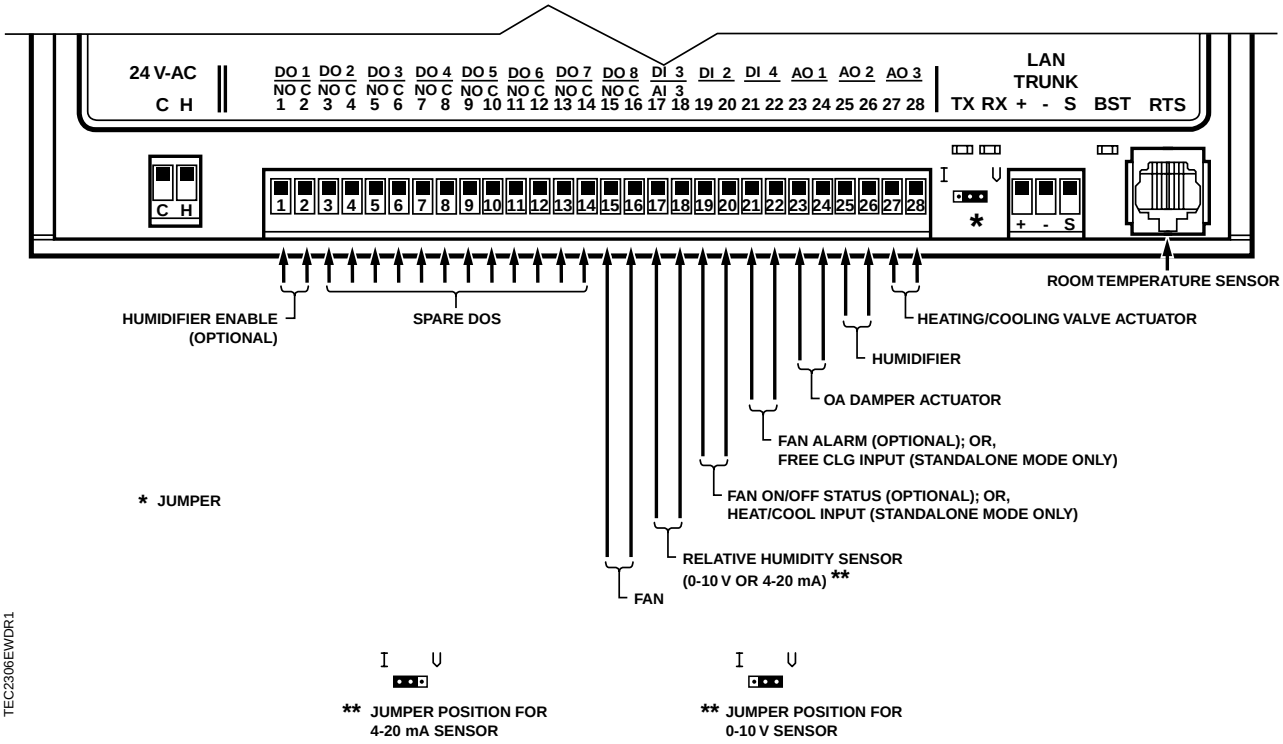
CAUTION:
The Unit Vent Controller's Digital Outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. For higher VA requirements, 110 or 220 Vac requirements, or DC power requirements, use an interposing 220 V 4-relay module.



WARNING:
If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result. See *Figure 2306-17*.

Figure 2306-13. Application 2306 Wiring Diagram with AO-Controlled Heating/Cooling Valve and Damper Actuators, and DO-Controlled Humidifier.

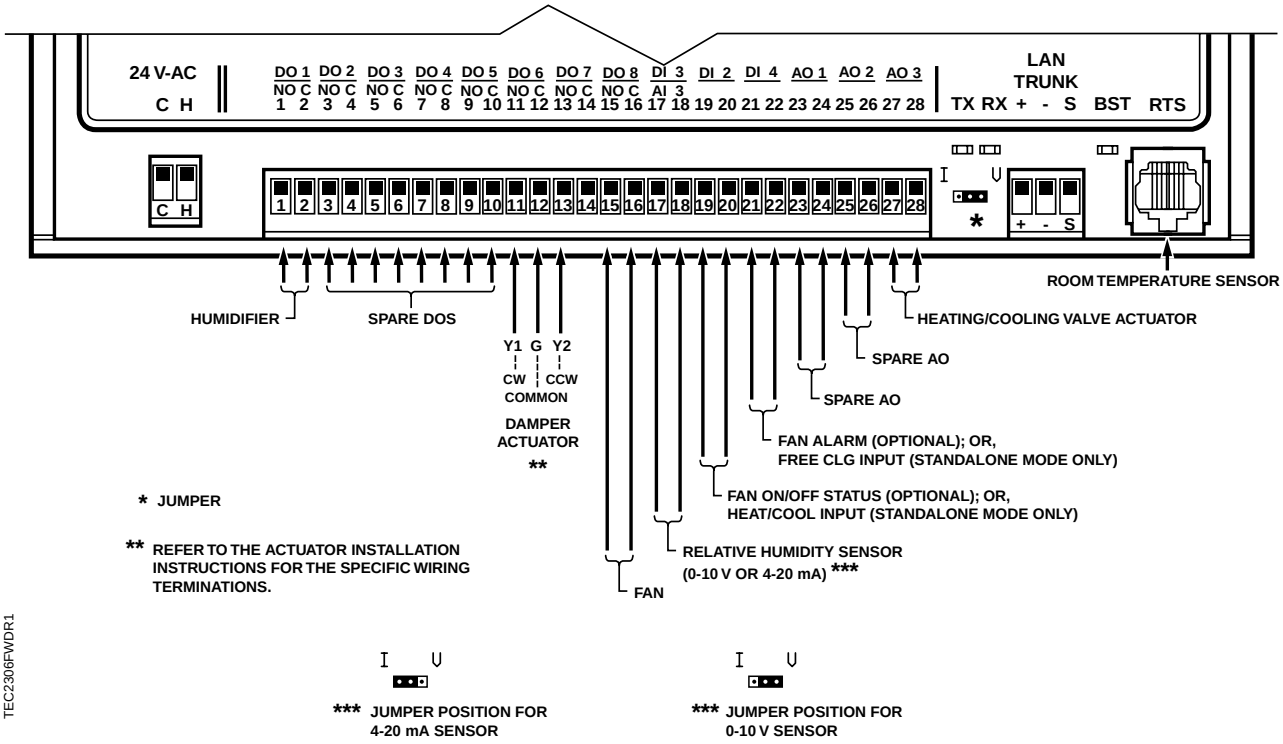
CAUTION:
The Unit Vent Controller's Digital Outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. For higher VA requirements, 110 or 220 Vac requirements, or DC power requirements, use an interposing 220 V 4-relay module.



WARNING:
If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result. See *Figure 2306-17*.

Figure 2306-14. Application 2306 Wiring Diagram with AO-Controlled Heating/Cooling Valve and Damper Actuators and Humidifier.

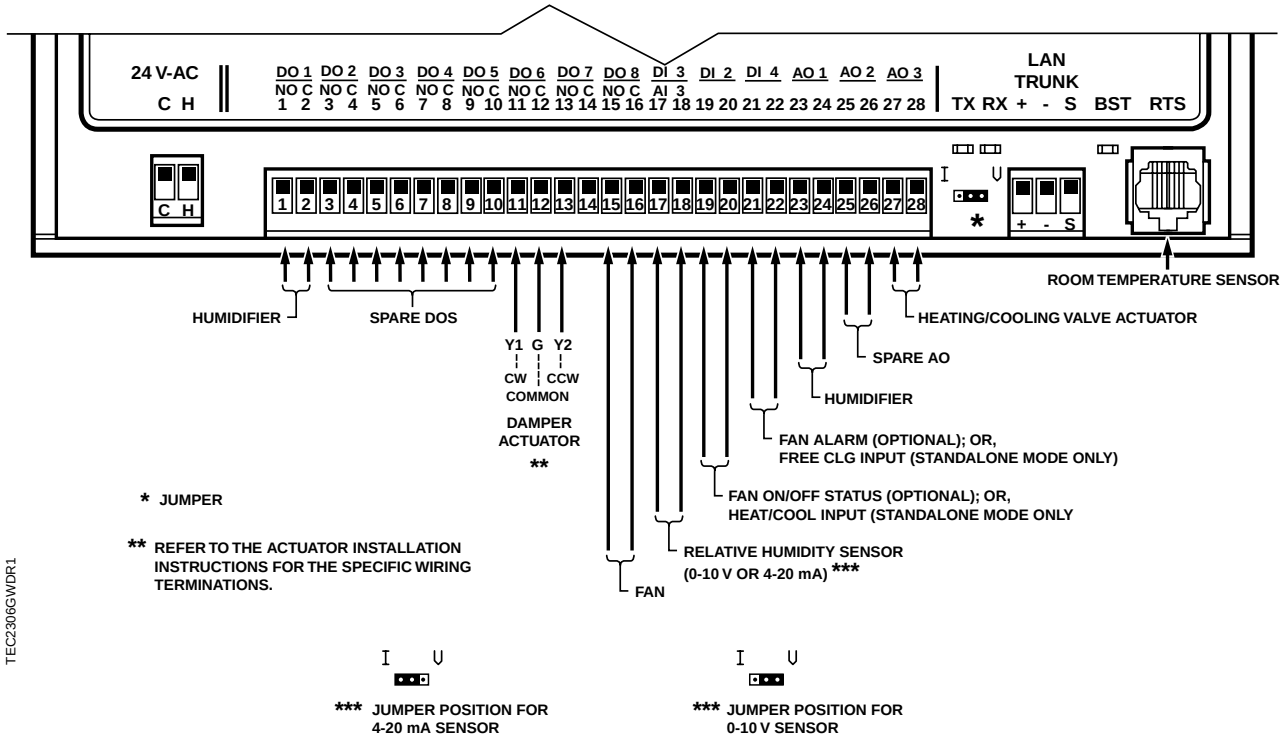
CAUTION:
The Unit Vent Controller's Digital Outputs (DOs) control 24 Vac loads only. The maximum rating is 12 VA for each DO. For higher VA requirements, 110 or 220 Vac requirements, or DC power requirements, use an interposing 220 V 4-relay module.



WARNING:
If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result. See *Figure 2306-17*.

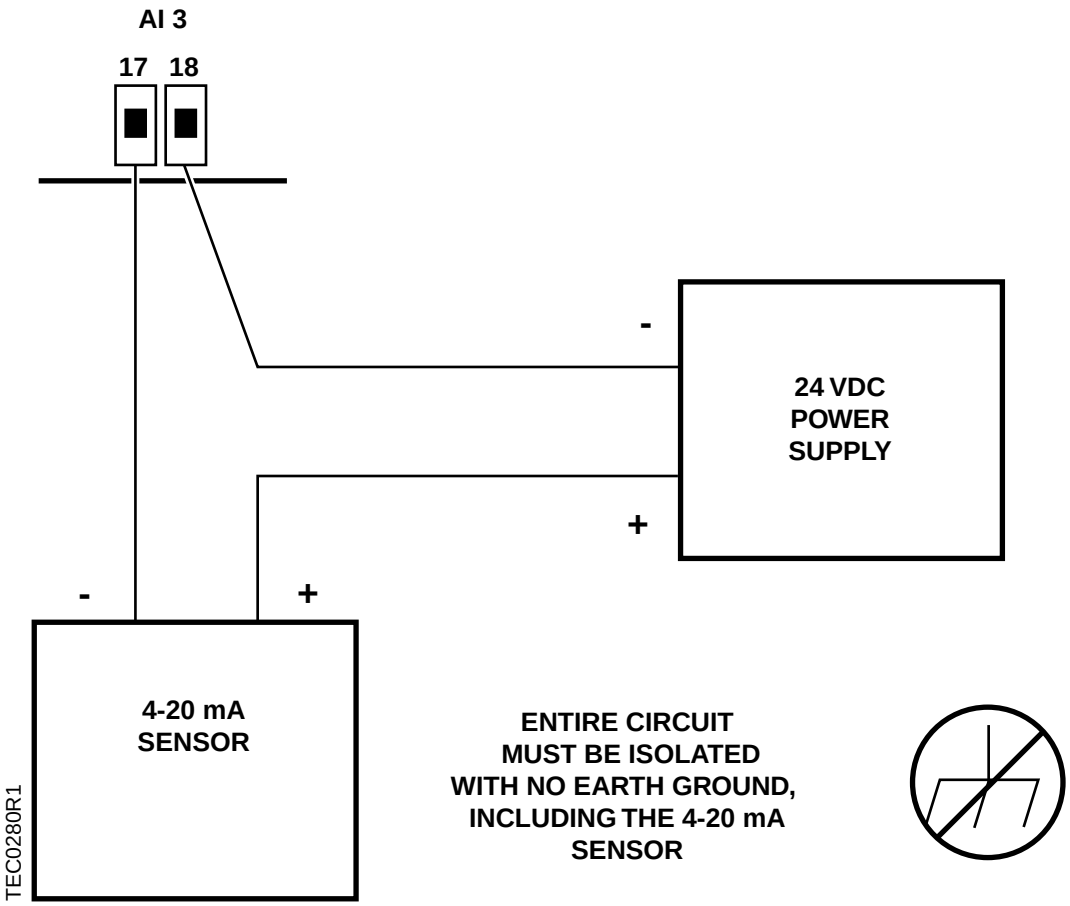
Figure 2306-15. Application 2306 Wiring Diagram with AO Controlled Heating/Cooling Valve Actuator, and DO-Controlled Damper Actuator and Humidifier.

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, or DC power requirements, use an interposing 220 V 4-relay module.



WARNING:
If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result. See *Figure 2306-17*.

Figure 2306-16. Application 2306 Wiring Diagram with AO-Controlled Heating/Cooling Valve Actuator and Humidifier, and DO-Controlled Damper Actuator.



WARNING:

If a 4-20 mA relative humidity sensor is used, then special wiring requirements are necessary for AI 3 or damage to the controller may result.

Figure 2306-17. Wiring Diagram for AI 3 if a 4-20 mA Sensor is Used.

Table 2306-1. Point Database for Application 2306.

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	2398	--	1	0	--	--
{04}	ROOM TEMP	74.00 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
{05}	HEAT.COOL	COOL	--	--	--	HEAT	COOL
06	DAY CLG STPT	74.00 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
07	DAY HTG STPT	70.00 (21.21)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
08	NGT CLG STPT	82.00 (27.93)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
09	NGT HTG STPT	65.00 (18.41)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
{10}	OADPR MINPOS	14.8	PCT	0.4	0.0	--	--
11	RM STPT MIN	55.00 (12.81)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
12	RM STPT MAX	90.00 (32.41)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
{13}	RM STPT DIAL	74.00 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
14	STPT DIAL	NO	--	--	--	YES	NO
{15}	ROOM RH	0.0	PCT	0.4	0.0	--	--
16	1 VLV HTGCLG	NO	--	--	--	YES	NO
17	DAMPER AO.DO	DO	--	--	--	AO	DO
18	WALL SWITCH	NO	--	--	--	YES	NO
{19}	DI WALL SW	OFF	--	--	--	ON	OFF
22	HUMID AO.DO	DO	--	--	--	AO	DO

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. Numbered points that appear in brackets { } may be unbundled at the field panel.

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Table 2306-1. Point Database for Application 2306.

Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
{23}	FREE CLG	DISABL	--	--	--	ENABLE	DISABL
{24}	FAN PRF.HTCL	OFF	--	--	--	ON	OFF
{26}	FAN ALM.FRCL	OFF	--	--	--	ON	OFF
{27}	HUM.DEHUM	HUM	--	--	--	DEHUM	HUM
{28}	DEHUM MODE	DISABL	--	--	--	ENABLE	DISABL
{29}	DAY.NGT	DAY	--	--	--	NIGHT	DAY
31	AOV1 SPAN	10.00	VOLTS	0.01	0.00	--	--
32	AOV1 START	0.00	VOLTS	0.01	0.00	--	--
33	AOV2 SPAN	10.00	VOLTS	0.01	0.00	--	--
34	AOV2 START	0.00	VOLTS	0.01	0.00	--	--
35	AOV3 SPAN	10.00	VOLTS	0.01	0.00	--	--
36	AOV3 START	0.00	VOLTS	0.01	0.00	--	--
37	AO DIR.REV	0	--	1	0	--	--
{38}	AOV1	0.00	VOLTS	0.01	0.00	--	--
{39}	AOV2	0.00	VOLTS	0.01	0.00	--	--
{40}	AOV3	0.00	VOLTS	0.01	0.00	--	--
{41}	HUM DO 1	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

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3. Numbered points that appear in brackets { } may be unbundled at the field panel.

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Table 2306-1. Point Database for Application 2306.

Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
{46}	DPR OPEN DO6	OFF	--	--	--	ON	OFF
{47}	DPR CLOS DO7	OFF	--	--	--	ON	OFF
{50}	FAN DO 8	OFF	--	--	--	ON	OFF
53	NGT HW HTG	YES	--	--	--	YES	NO
54	NGT CLG MODE	NO	--	--	--	YES	NO
{55}	HUM OUTPUT	0.0	PCT	0.4	0.0	--	--
57	HUM PWM TIME	10	MIN	1	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 (0.00)	--	--
64	CLG I GAIN	0.0500 (0.0900)	--	0.0005 (0.0009)	0.0000 (0.0000)	--	--
65	CLG D GAIN	10 (18.0)	--	2 (3.6)	0 (0.0)	--	--
66	CLG BIAS	0.0	PCT	0.2	0.0	--	--
67	HTG P GAIN	0.40 (0.72)	--	0.05 (0.09)	0.00 (0.00)	--	--
68	HTG I GAIN	0.0150 (0.02700)	--	0.0002 (0.00036)	0.0000 (0.00000)	--	--
69	HTG D GAIN	5 (9.0)	--	1 (1.8)	0 (0.0)	--	--
70	HTG BIAS	0.0	PCT	0.2	0.0	--	--
{77}	RH LOOPOUT	0.0	PCT	0.2	-100.0	--	--
{78}	CTL TEMP	74.00 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--

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. Numbered points that appear in brackets { } may be unbundled at the field panel.

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Table 2306-1. Point Database for Application 2306.

Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
{79}	CLG LOOPOUT	0.0	PCT	0.2	0.0	--	--
{80}	HTG LOOPOUT	0.0	PCT	0.2	0.0	--	--
81	RH P GAIN	5.00 (9.00)	--	0.25 (0.45)	0.00 (0.00)	--	--
82	RH I GAIN	0.010 (0.0180)	--	0.001 (0.0018)	0.000 (0.0000)	--	--
83	RH D GAIN	0 (0.0)	--	2 (3.6)	0 (0.0)	--	--
84	RH BIAS	0.0	PCT	0.2	-100.0	--	--
85	SWITCH LIMIT	4.8	PCT	0.4	0.0	--	--
86	SWITCH TIME	10	MIN	1	0	--	--
87	DEHUM COEFF	0.50	--	0.01	0.00	--	--
88	NGT DBAND	3.00 (1.68)	DEG F (DEG C)	0.25 (0.14)	0.00 (0.00)	--	--
89	STAND ALONE	NO	--	--	--	YES	NO
90	SWITCH DBAND	2.00 (1.12)	DEG F (DEG C)	0.25 (0.14)	0.00 (0.00)	--	--
{92}	CTL STPT	74.00 (23.45)	DEG F (DEG C)	0.25 (0.14)	48.00 (8.89)	--	--
{93}	RH STPT	50.0	PCT	0.4	0.0	--	--
95	HUM MIN ON	1.0	MIN	0.1	0.0	--	--
96	HUM MIN OFF	1.0	MIN	0.1	0.0	--	--
97	AI3 VOLT.CUR	VOLT	--	--	--	CURENT	VOLT
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 Points that appear in brackets { } may be unbundled at the field panel.