

## Application 2304 VAV Series Two-Speed Fan Powered with Hot Water Reheat and Discharge Air Flow Monitoring

### Overview

In application 2304, the controller modulates the supply air damper of the terminal box for cooling and modulates a heating valve for heating. When in heating, the terminal box either maintains minimum air flow or modulates the supply air damper. The terminal box also has a series fan for air circulation. The application uses two digital outputs to allow for two fan speeds. In order for the terminal box to work properly, the central air handling unit must provide supply air.

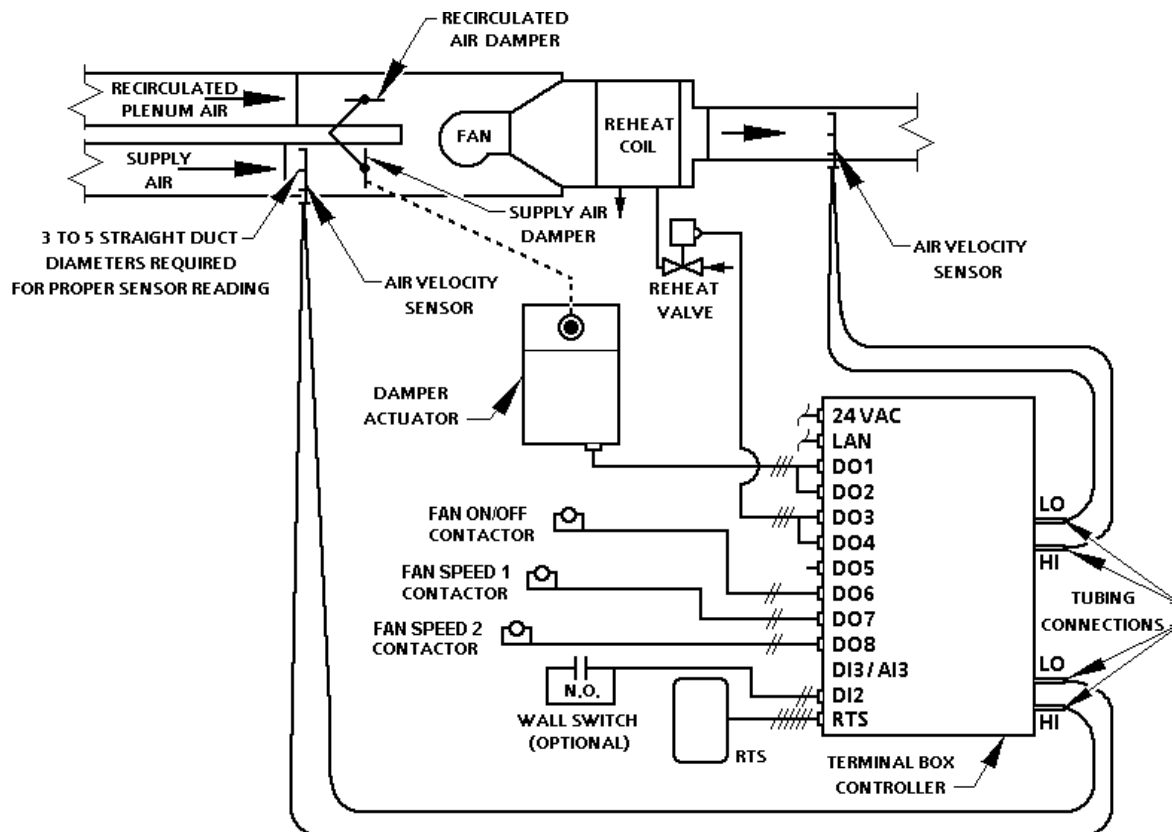
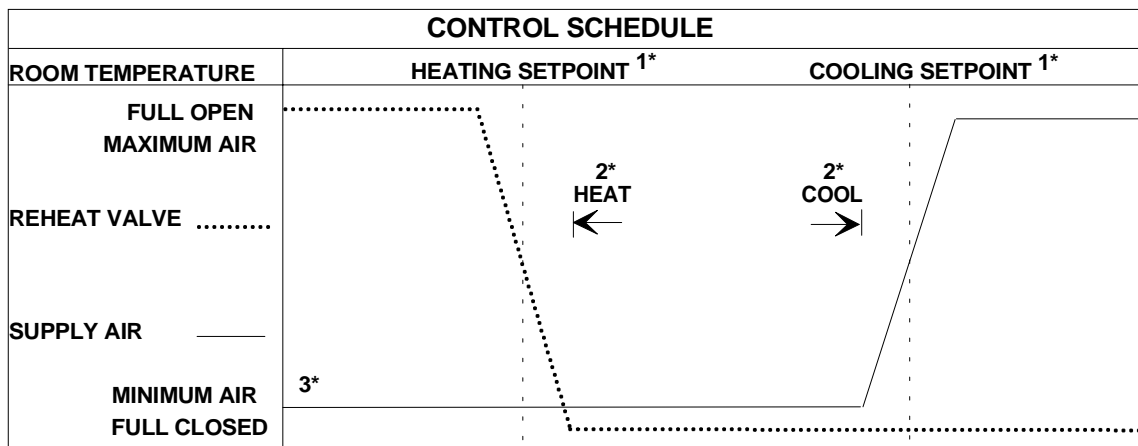


Figure 2304-1. Application 2304 Control Drawing.



**NOTES:**

1. Refer to Sequence of Operation, "Control temperature set points."
2. Refer to Sequence of Operation, "Heating/Cooling switch over."
3. The air flow is shown at minimum flow throughout the entire heating mode.

**Figure 2304-2. Application 2304 Control Schedule.**

*Hardware inputs*

**analog**

- 2 air velocity sensors
- room temperature sensor
- room temperature set point dial (optional)

**digital**

- night mode override (optional)
- wall switch (optional)

*Hardware outputs*

**analog**

- none

**digital**

- damper actuator
- fan on/off
- fan speed 2
- valve actuator

*Ordering notes*

VAV with Two-Speed Series Fan – Electronic Output

Custom Solution #208

Refer to *System 600 Configuration and Sizing Guidelines* (125-1830) for product numbers.

damper actuator

Terminal Equipment Controller room temperature sensor

valve actuator

*Point database*

Table 2304-1 presents the point database information for Application 2304. Each point number is represented on a line in the point database table.

## Sequence of Operation

The following paragraphs present the sequence of operation for Application 2304, "VAV Series Two-Speed Fan Powered with Hot Water Reheat and Discharge Air Flow Monitoring".

### *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, the point CTL STPT (number 92) holds the value of the point DAY CLG STPT (number 6) or 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 (number 92) holds the value of the point RM STPT DIAL (number 13).

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 (number 92) holds the value of the point NGT CLG STPT (number 8) or NGT HTG STPT (number 9).

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

### *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 2304-1 and 2304-3), 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), then 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), then DAY.NGT will be set to NIGHT indicating that the controller is in night mode.

When WALL SWITCH (number 18) equals NO, the controller does not monitor the status of the wall switch, even if one is connected to it. In this case, 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 the point DAY.NGT (number 29). Refer to 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 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. After the override time elapses, the controller returns to unoccupied mode and the status of NGT OVRD changes back to NIGHT.

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

*Heating/cooling  
switchover*

The heating/cooling switchover determines whether the controller is in heating or cooling mode by monitoring the room temperature and the demand for heating and cooling (as determined by the temperature control loops).

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

- The point HTG LOOPOUT (number 80) is less than the point SWITCH LIMIT (number 85).
- The point CTL TEMP (number 78) is above the point CTL STPT (number 92) by at least the value set in the point SWITCH DBAND (number 90).
- CTL TEMP (number 78) is greater than the appropriate cooling set point (DAY CLG STPT (number 6) or NGT CLG STPT (number 8)) minus SWITCH DBAND (number 90).

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

- The point CLG LOOPOUT (number 79) is less than SWITCH LIMIT (number 85).
- CTL TEMP (number 78) is below CTL STPT (number 92) by at least the value set in SWITCH DBAND (number 90).
- CTL TEMP (number 78) is less than the appropriate heating set point (DAY HTG STPT (number 7) or NGT HTG STPT (number 9)) plus SWITCH DBAND (number 90).

*Control loops*

The terminal box is controlled by three Proportional, Integral, and Derivative (PID) control loops; two temperature loops and one flow loop.

**Temperature loops** – The two temperature loops are a cooling loop and a heating loop. The active temperature loop maintains room temperature at the value in the point CTL STPT (number 92). Refer to "Control Temperature Set Points".

In the cooling mode, the cooling loop uses the value of the points CTL STPT (number92) and CTL TEMP (number 78) to generate the point CLG LOOPOUT (number 79).

In the heating mode, the heating loop uses the value of CTL STPT (number92) and CTL TEMP (number 78) to generate the point HTG LOOPOUT (number 83).

**Flow loop** – In the cooling mode, the flow loop maintains the minimum air flow and maximum air flow between the points CLG FLOW MIN (number 31) and CLG FLOW MAX (number 32). In the heating mode, the flow loop maintains the minimum air flow out of the terminal box equal to the point HTG FLOW MIN (number 33).

In the cooling mode, the point CTL FLOW MIN (number 76) holds the value of CLG FLOW MIN (number31), and the point CTL FLOW MAX (number 77) holds the value of CLG FLOW MAX (number32).

In the heating mode, CTL FLOW MIN (number76) holds the value of HTG FLOW MIN (number33), and CTL FLOW MAX (number77) holds the value of HTG FLOW MAX (number34).

You can set CLG FLOW MIN (number31) equal to, but not greater than, CLG FLOW MAX (number32) and set HTG FLOW MIN (number33) equal to, but not greater than, HTG FLOW MAX (number34) . If this is done, then the flow loop becomes constant volume with the temperature control being done by the heating valve.

In the cooling mode, the point FLOW STPT (number 93) is the result of scaling the point CLG LOOPOUT (number 79) to the appropriate range of values determined by CLG FLOW MIN (number31) and CLG FLOW MAX (number32). In order to scale it, CLG LOOPOUT (number 79) is multiplied by the range (MAX - MIN) and then added to the minimum set point. When CLG FLOW MIN (number31) does not equal to 0 CFM, then FLOW STPT (number93) does not equal CLG LOOPOUT (number 79).

The minimum set point is  $(\text{CLG FLOW MIN} / \text{CLG FLOW MAX}) \times 100\%$  flow.

The FLOW STPT is  $[\text{CLG LOOPOUT} \times (100\% - \text{minimum set point})] + \text{minimum set point}$ .

For example:

If CLG FLOW MIN = 200 CFM and CLG FLOW MAX = 1000 CFM, then the minimum set point is  $(200 \text{ CFM} / 1000 \text{ CFM}) \times 100\% \text{ flow} = 20\%$ .

When CLG LOOPOUT is 0%, FLOW STPT equals 20% flow.  $[0\% \times (100\% - 20\%)] + 20\% = 20\%$ . This ensures that the air flow out of the terminal box is no less than CLG FLOW MIN.

When CLG LOOPOUT is 50%, FLOW STPT equals 60% flow.  $[50\% \times (100\% - 20\%)] + 20\% = 60\%$ .

When CLG LOOPOUT is 100%, FLOW STPT equals 100% flow.  $[100\% \times (100\% - 20\%)] + 20\% = 100\%$ . This ensures that the air flow out of the terminal box is no more than CLG FLOW MAX.

In the heating mode, FLOW STPT (number93) equals the minimum set point which is  $(HTG FLOW MIN / HTG FLOW MAX) \times 100\%$ .

The flow loop maintains FLOW STPT (number93) by modulating the point DMPR COMD (number 48).

The point FLOW (number 75) is the input value for the flow loop. It is calculated as a percentage based on where the point AIR VOLUME (number 35) is between 0 CFM and CTL FLOW MAX (number77). In the following text, this percentage will be referred to as % flow.

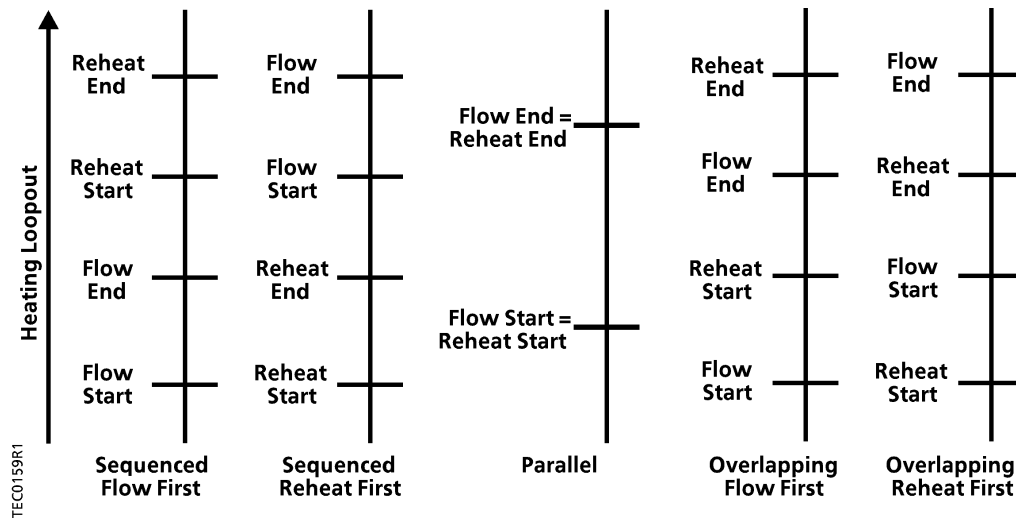
- If AIR VOLUME equals to 0 CFM, then FLOW is 0% flow.
- If AIR VOLUME equals CTL FLOW MAX (number77), then FLOW is 100% flow.

#### *Hot water reheat*

The heating loop modulates the point VLV COMD (number 52) in order to warm up the room. In cooling mode, the heating valve is closed.

In heating mode, this application includes logic that allows the flow loop to operate either in sequence, parallel, or overlapping with the hot water valve. this algorithm is very similar to the spring range sequencing of valves and dampers. Portions of the output of the heating loop, point HTG LOOPOUT (number 80), will drive both the flow loop and the hot water valve from 0 to 100%.

The following ladder diagram, Figure 2304-3, shows sequenced, parallel, and overlapping flow loop operations with electric reheat. The vertical bars show HTG LOOPOUT (number 80) from 0 to 100%. The horizontal bars (reheat start, flow start, etc.) show the action that occurs when the loop output rises above the horizontal bar.



**Figure 2304-3. Sequenced, Parallel, and Overlapping Flow Loop Operations with Hot Water Reheat.**

#### *Fan operation*

The point FAN (number 46) controls the ON/OFF status of the fan. It is ON during the day and cycles ON and OFF at night to maintain the room temperature.

The Fan has two speeds at which it can operate, the summer speed and the winter speed. Which speed the fan will use is determined by the point SUM.WNT (number 3). When in SUM (summer) mode the summer fan speed DO-7 (number 47) is turned ON, and the winter fan speed DO-8 (number 50) is turned OFF. When in WNT (winter) mode the summer fan speed DO-7 is turned OFF, and the winter fan speed DO-8 is turned ON.

The SUM.WNT point is not changed by the application and must be set and changed by the user.



#### **CAUTION:**

**On series fan powered terminal boxes, the terminal box fan must be controlled/interlocked to start either before or at the same time as the central air handler. Failure to do so may cause the terminal box fan to rotate backwards and cause consequent damage at start up.**

#### *Supply air flow (primary air)*

If the value in percentage of the point PRIMARY AIR (number 35) is less than the value stored in the point PRIME MIN (number 81), then PRIMARY AIR will be set to 0 CFM.

#### *Total discharge air flow*

If the value in percentage of the point TOTAL AIR (number 30) is less than the



*(total air)*

value stored in the point TOT MIN (number 82), then PRIMARY AIR will be set to 0 CFM.

TOTAL AIR is used to monitor the total discharge air flow of the fan. (For indication only).

#### *Calibration*

**Air Velocity Transducer** - Calibration of the controller's internal air velocity transducers is periodically required to maintain accurate air velocity readings and damper position. The point CAL SETUP (number 95) is set with the desired calibration option during controller startup. Depending upon the value of CAL SETUP, calibration may be set to take place automatically or manually when the override switch is pressed on the room temperature sensor. If the status of the point CAL AIR (number 94) is YES, then calibration is in progress. The damper is commanded closed to get a zero air flow reading during calibration.

**Hot water valve** - Calibration of a hot water valve is done automatically during the Air Velocity calibration by commanding the valve to closed.

If the point CAL SETUP (number 95) has a value of 8, calibration will take place automatically when the point DAY.NGT (number 29) is switched to NIGHT mode. The point FAN (number 47) will be set to OFF and calibration will begin.

At the end of a calibration sequence, CAL AIR returns to NO automatically. A status of NO indicates that the controller is not in a calibration sequence.

#### *Fail-safe operation*

If the air velocity sensor fails, then the controller uses pressure dependent control. The temperature loop controls the operation of the damper.

If the room temperature sensor fails and the points ROOM TEMP (number 4) and CTL TEMP (number 78) are not being overridden, then the controller operates using the last known temperature value.

#### *Application notes*

1. 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. If the point FLOW (number 75) is oscillating while the point FLOW STPT (number 93) is constant, then the flow loop requires tuning.
2. The Terminal Box Controller - Electronic Output, as shipped from the factory, keeps all associated equipment OFF. The controller and its equipment are released to application control at start-up.

**CAUTION:**

The Constant Volume and Humidity Controller controls 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 (P/N 540-147).

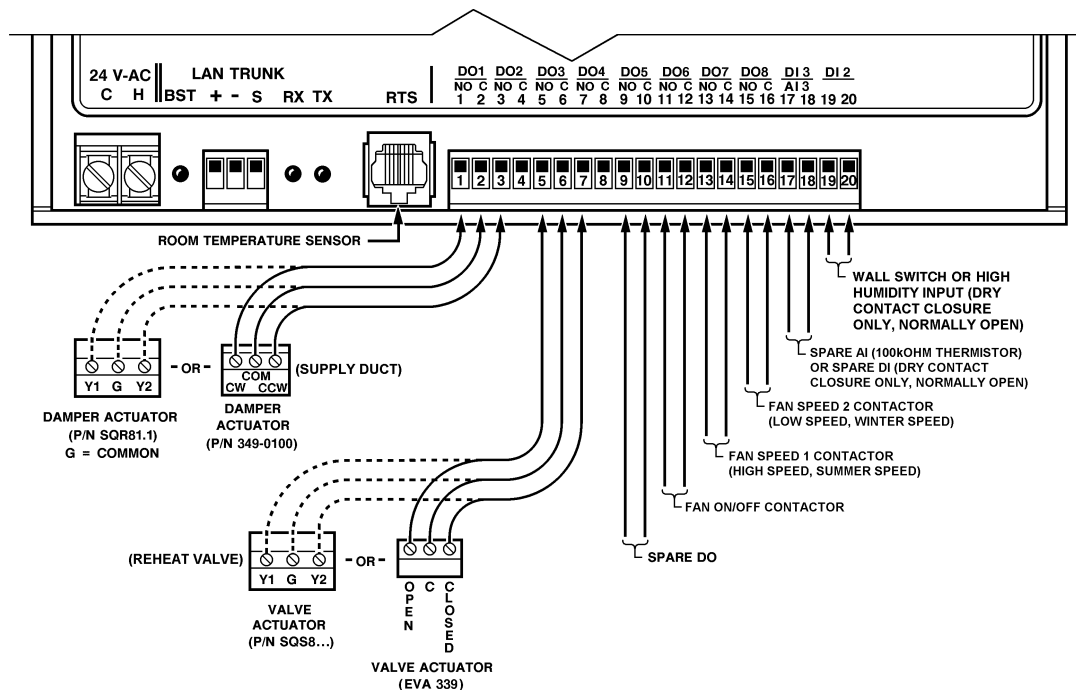


Figure 2304-4. Application 2304 Wiring Diagram.

**Table 2304-1. Point Database for Application 2304.**

| 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  | 2293                       |                        | 1                | 0                    |         |          |
| {03}         | WNT.SUM      | WNT                        |                        |                  |                      | SUM     | WNT      |
| {04}         | ROOM TEMP    | 74.00 (23.44888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| {05}         | HEAT.COOL    | COOL                       |                        |                  |                      | HEAT    | COOL     |
| 06           | DAY CLG STPT | 74.00 (23.44888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| 07           | DAY HTG STPT | 70.00 (21.20888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| 08           | NGT CLG STPT | 100.00 (38.00888)          | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| 09           | NGT HTG STPT | 55.00 (12.80888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| 11           | RM STPT MIN  | 55.00 (12.80888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| 12           | RM STPT MAX  | 90.00 (32.40888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| {13}         | RM STPT DIAL | 74.00 (23.44888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| 14           | STPT DIAL    | NO                         |                        |                  |                      | YES     | NO       |
| {15}         | AUX TEMP     | 74.0 (23.495556)           | DEG F (DEG C)          | 0.5 (0.280000)   | 37.5 (3.055556)      |         |          |
| 16           | FLOW START   | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| 17           | FLOW END     | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| 18           | WALL SWITCH  | NO                         |                        |                  |                      | YES     | NO       |
| {19}         | DI OVRD SW   | OFF                        |                        |                  |                      | ON      | OFF      |
| 20           | OVRD TIME    | 0                          | HRS                    | 1                | 0                    |         |          |
| {21}         | NGT OVRD     | NIGHT                      |                        |                  |                      | NIGHT   | DAY      |
| 22           | REHEAT START | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| 23           | REHEAT END   | 100.0                      | PCT                    | 0.4              | 0.0                  |         |          |
| {24}         | DI 2         | OFF                        |                        |                  |                      | ON      | OFF      |
| {25}         | DI 3         | OFF                        |                        |                  |                      | ON      | OFF      |
| 26           | SERIES ON    | 20.0                       | PCT                    | 0.4              | 0.0                  |         |          |
| 27           | SERIES OFF   | 10.0                       | PCT                    | 0.4              | 0.0                  |         |          |
| {29}         | DAY.NGT      | DAY                        |                        |                  |                      | NIGHT   | DAY      |
| {30}         | TOTAL AIR    | 0 (0.0000)                 | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |
| 31           | CLG FLOW MIN | 220 (103.8180)             | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |
| 32           | CLG FLOW MAX | 2200 (1038.1799)           | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |
| 33           | HTG FLOW MIN | 220 (103.8180)             | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |
| 34           | HTG FLOW MAX | 2200 (1038.1799)           | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |

**NOTES:**

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

**Table 2304-1. Point Database for Application 2304.**

| Point Number | Descriptor   | Factory Default (SI Units) | Engr. Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|--------------|--------------|----------------------------|------------------------|------------------|----------------------|---------|----------|
| {35}         | PRIMARY AIR  | 0 (0.0000)                 | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |
| 36           | PRI FLO COEF | 1.00                       |                        | 0.01             | 0.00                 |         |          |
| {41}         | 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      |
| {46}         | FAN          | OFF                        |                        |                  |                      | ON      | OFF      |
| {47}         | DO 7         | OFF                        |                        |                  |                      | ON      | OFF      |
| {48}         | DMPR COMD    | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| {49}         | DMPR POS     | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| {50}         | DO 8         | OFF                        |                        |                  |                      | ON      | OFF      |
| 51           | MTR1 TIMING  | 95                         | SEC                    | 1                | 0                    |         |          |
| {52}         | VLV COMD     | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| {53}         | VLV POS      | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| 54           | TOT FLO COEF | 1.00                       |                        | 0.01             | 0.00                 |         |          |
| 55           | MTR2 TIMING  | 130                        | SEC                    | 1                | 0                    |         |          |
| 56           | DMPR ROT ANG | 90                         |                        | 1                | 0                    |         |          |
| 58           | MTR SETUP    | 0                          |                        | 1                | 0                    |         |          |
| 59           | DO DIR. REV  | 0                          |                        | 1                | 0                    |         |          |
| 60           | TOTDUCT AREA | 1.000 (0.092920)           | SQ. FT (SQ M)          | 0.025 (0.002323) | 0.000 (0.000000)     |         |          |
| 63           | CLG P GAIN   | 20.00 (36.00)              |                        | 0.25 (0.45)      | 0.00 (0.00)          |         |          |
| 64           | CLG I GAIN   | 0.010 (0.0180)             |                        | 0.001 (0.0018)   | 0.000 (0.0000)       |         |          |
| 65           | CLG D GAIN   | 0 (0.0)                    |                        | 2 (3.6)          | 0 (0.0)              |         |          |
| 66           | CLG BIAS     | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| 67           | HTG P GAIN   | 10.00 (18.00)              |                        | 0.25 (0.45)      | 0.00 (0.00)          |         |          |
| 68           | HTG I GAIN   | 0.010 (0.0180)             |                        | 0.001 (0.0018)   | 0.000 (0.0000)       |         |          |
| 69           | HTG D GAIN   | 0 (0.0)                    |                        | 2 (3.6)          | 0 (0.0)              |         |          |
| 70           | HTG BIAS     | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| 71           | FLOW P GAIN  | 0.00                       |                        | 0.05             | 0.00                 |         |          |
| 72           | FLOW I GAIN  | 0.010                      |                        | 0.001            | 0.000                |         |          |
| 73           | FLOW D GAIN  | 0                          |                        | 2                | 0                    |         |          |
| 74           | FLOW BIAS    | 50.0                       | PCT                    | 0.4              | 0.0                  |         |          |

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2. A single value in a column means that the value is the same in English units and in SI units.
3. Point numbers that appear in brackets {} may be unbundled at the field panel.

**Table 2304-1. Point Database for Application 2304.**

| Point Number | Descriptor   | Factory Default (SI Units) | Engr. Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|--------------|--------------|----------------------------|------------------------|------------------|----------------------|---------|----------|
| {75}         | FLOW         | 0.00                       | PCT                    | 0.25             | 0.00                 |         |          |
| {76}         | CTL FLOW MIN | 220 (103.8180)             | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |
| {77}         | CTL FLOW MAX | 2200 (1038.1799)           | CFM ( LPS)             | 4 (1.8876)       | 0 (0.0000)           |         |          |
| {78}         | CTL TEMP     | 74.00 (23.44888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| {79}         | CLG LOOPOUT  | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| {80}         | HTG LOOPOUT  | 0.0                        | PCT                    | 0.4              | 0.0                  |         |          |
| 81           | PRIM MIN     | 10.00                      | PCT                    | 0.25             | 0.00                 |         |          |
| 82           | TOT MIN      | 10.00                      | PCT                    | 0.25             | 0.00                 |         |          |
| 83           | STAGE FAN    | 10.0                       | PCT                    | 0.4              | 0.0                  |         |          |
| 85           | SWITCH LIMIT | 5.2                        | PCT                    | 0.4              | 0.0                  |         |          |
| 86           | SWITCH TIME  | 10                         | MIN                    | 1                | 0                    |         |          |
| 90           | SWITCH DBAND | 1.00 (0.56)                | DEG F (DEG C)          | 0.25 (0.14)      | 0.00 (0.00)          |         |          |
| {91}         | TOTAL VOLUME | 0 (0)                      | CF ( L)                | 4 (113)          | 0 (0)                |         |          |
| {92}         | CTL STPT     | 74.00 (23.44888)           | DEG F (DEG C)          | 0.25 (0.14000)   | 48.00 (8.88888)      |         |          |
| {93}         | FLOW STPT    | 0.00                       | PCT                    | 0.25             | 0.00                 |         |          |
| {94}         | CAL AIR      | NO                         |                        |                  |                      | YES     | NO       |
| 95           | CAL SETUP    | 4                          |                        | 1                | 0                    |         |          |
| 96           | CAL TIMER    | 12                         | HRS                    | 1                | 0                    |         |          |
| 97           | PRIDUCT AREA | 1.000 (0.092920)           | SQ. FT (SQ M)          | 0.025 (0.002323) | 0.000 (0.000000)     |         |          |
| 98           | LOOP TIME    | 5                          | SEC                    | 1                | 0                    |         |          |
| {99}         | ERROR STATUS | 0                          |                        | 1                | 0                    |         |          |

**NOTES:**

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