# TEC Custom Solutions Application 2368: RPC Pneumatic Damper with Hot Water Reheat, Relative Humidity, and 3-Position Switch

**TEC-0628.08**

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This document contains the Application Documentation that is provided to the branch when information is requested regarding how these TEC applications work.

***Disclaimer:*** The electronic copy is the official copy and supersedes any printed copy.

Key words: TEC, Custom Solutions, Application, Constant Volume, Room Pressurization, Hot Water Reheat, Relative Humidity, 3-Position Switch, Pneumatic

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# 1. REVISION HISTORY

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# TEC Custom Solutions
# Application 2368

## RPC Pneumatic Damper with Hot Water Reheat, Relative Humidity, and 3-Position Switch

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## Overview

In Application 2368, the controller provides a constant volume of air to the room during occupied periods, and a lower constant volume of air to the room during unoccupied periods. It modulates a 0-10V reheat valve for room temperature control and a 0-10V humidification valve for relative humidity control. The controller also modulates the pneumatic supply and exhaust air dampers to maintain a fixed CFM differential between supply and exhaust air. The central air handling unit must provide both supply and exhaust air. Refer to Figures 2368-1 and 2368-2.

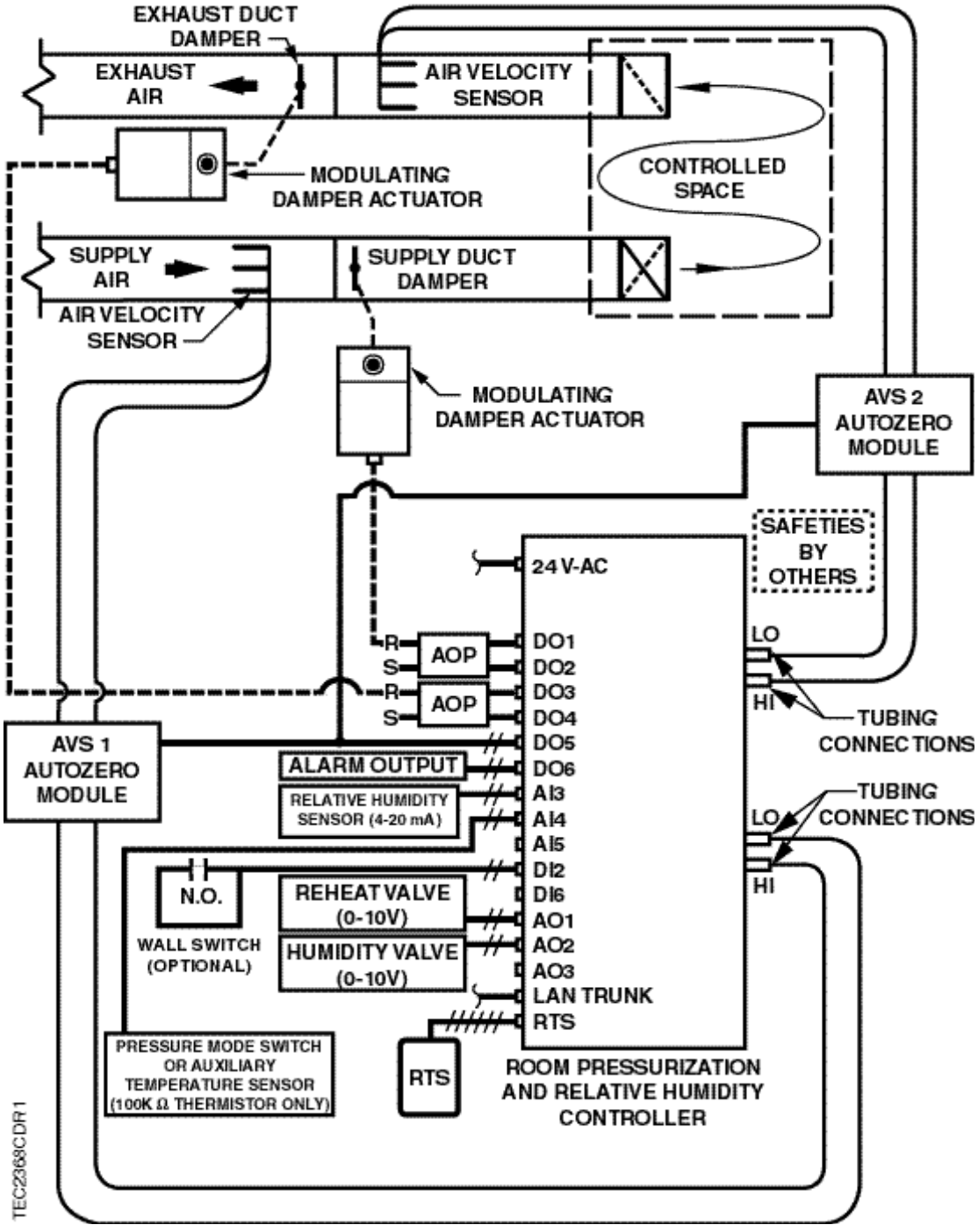
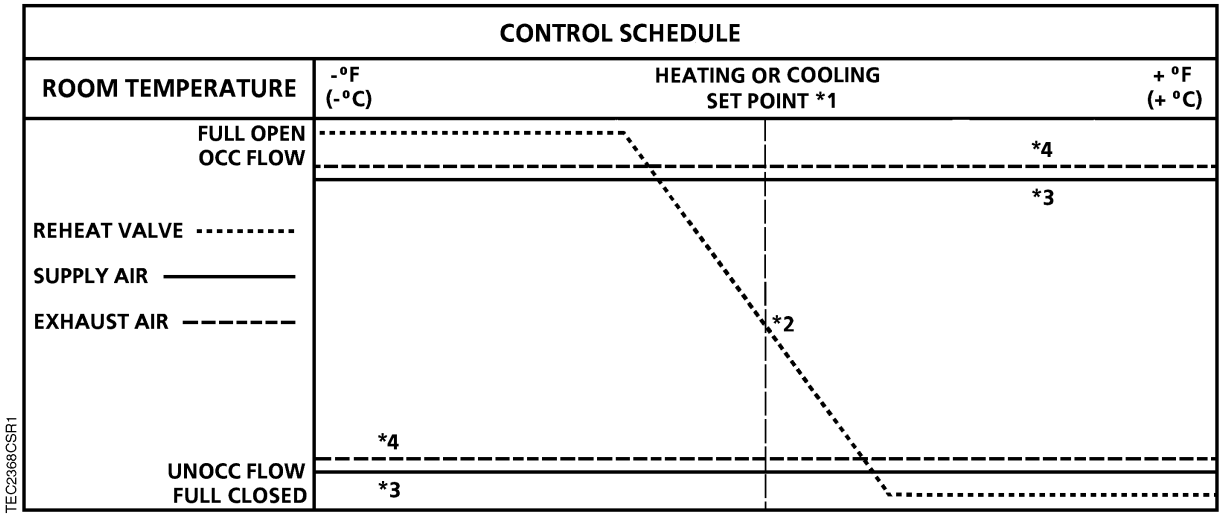



**Figure 2368-1. Application 2368 Control Drawing.**

**NOTE:** DI 2 can be configured for Wall Switch or High Humidity Switch




1. Refer to *Control Temperature Set Points* section.
2. Refer to *Hot Water Reheat* section (optional).
3. The supply airflow is shown at minimum and maximum flow. Refer to *Control Loops* section.
4. The exhaust airflow is shown with a negative pressure offset from the supply airflow. Refer to *Control Loops* section.

**Figure 2368-2. Application 2368 Control Schedule.**

## Hardware Inputs

Analog

- Air velocity sensor (2 required)
- Relative humidity sensor (4-20 mA)
- Room temperature sensor
- Room temperature set point dial (optional)
- Pressure mode switch or auxiliary temperature sensor (optional)

Digital

- Night mode override (optional)
- Wall switch or High Humidity Switch (optional)

## Hardware Outputs

Analog

- Electronic 0-10V humidity valve actuator
- Electronic 0-10V valve actuator (optional)

Digital

- Alarm output (optional)
- Autozero Module (optional, 2 required if used)
- Pneumatic damper actuator (2 required)

## Ordering Notes

RPC Assembly Part Number: 550-064.
The Custom Solution number is 243.

## Point Database

Table 2368-1 presents the point database information for Application 2368.

# Sequence of Operation

The following paragraphs present the sequence of operation for Application 2368, *RPC Pneumatic Damper with Hot Water Reheat, Relative Humidity, and 3-Position Switch*.

## Control temperature set points

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

**Occupied Mode –** In occupied mode, CTL STPT holds the value of OCC CLG STPT (point 6) in cooling mode or OCC HTG STPT (point 7) in heating mode. 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.

**Unoccupied Mode –** In unoccupied mode, CTL STPT holds the value of UOC CLG STPT (point 8) or UOC 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.

## Occupied and unoccupied modes

The occupied/unoccupied status of the space is determined by the value of OCC.UNOCC (point 29). The control of this point differs depending on whether the controller is monitoring the value 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 2368-1 and 2368-3), and WALL SWITCH (point 18) equals YES, the controller monitors DI 2 (point 22). When the value of DI 2 is ON (the switch is closed), OCC.UNOCC will be set to OCC, indicating that the controller is in occupied mode. When the value of DI 2 is OFF (the switch is open), OCC.UNOCC will be set to UNOCC, indicating that the controller is in unoccupied mode.

When WALL SWITCH equals NO, the controller uses DI 2 as a humidity safety cutoff. See *Fail-safe Operation* for more information.

In addition, if WALL SWITCH = NO and the controller is operating stand-alone, the controller stays in occupied mode all the time. If the controller is operating with centralized control (connected to a field panel), then the field panel can send an operator or PPCL command to override the value of OCC.UNOCC. Refer to *Powers Process Control Language (PPCL) User's Manual* (125-1896) for more information.

## Unoccupied mode override switch

If an override switch is present on the room temperature sensor and a value (in hours) other than zero has been set for OVRD TIME (point 20), then by pressing the override switch a room occupant can reset the controller to occupied operational mode for the time period that is set in OVRD TIME. The status of UNOCC OVRD (point 21) changes to OCC and remains there until after the override time elapses, at which time the controller returns to unoccupied mode and the value of UNOCC OVRD changes back to UNOCC.

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

## Tracking mode

TRACK MODE (point 3) determines which airflow set point will lead and which will follow.

- If TRACK MODE is set to ETS (Exhaust Tracks Supply), then the supply set point will be set to maintain occupancy requirements, and based on the supply, the exhaust flow set point will be calculated to maintain the volume offset. The supply leads and the exhaust follows.
- If TRACK MODE is set to STE (Supply Tracks Exhaust), then the exhaust set point will be set to maintain occupancy requirements, and based on the exhaust, the supply flow set point will be calculated to maintain the volume offset. The exhaust leads, the supply follows.

## Control volume set points

CTL FLOW MIN (point 76) holds the value of UNOCC FLOW (point 31). CTL FLOW MAX (point 77) holds the value of OCC FLOW (point 32).

The supply and exhaust flows are each maintained by modulating the supply and exhaust dampers, respectively. One flow is determined by the occupancy requirements, while the other is determined by the differential flow requirements for pressurization. TRACK MODE (point 3) determines which is which. Refer to the *Tracking mode* section for details on ETS and STE.

In occupied mode, SUP FLO STPT = 100% which corresponds to the value of OCC FLOW. In unoccupied mode, SUP FLO STPT = [(UNOCC FLOW / OCC FLOW) * 100%] which corresponds to the value of UNOCC FLOW.

**Differential Flow Set Point** – If TRACK MODE = ETS and ACTIVE.NTRAL (point 10) = ACTIVE, then EXH FLO STPT is calculated as follows:

The exhaust flow loop maintains a fixed VOLUME OFFST (point 88) in CFM (LPS) with a positive or negative, POS.NEG (point 23), differential between the supply and exhaust air volumes. This is accomplished using one of two tracking algorithms, determined by the value of TRACKING (point 84). If TRACKING is set to STPT, the exhaust set point tracks the supply set point.

For example:

- If OCC FLOW = 1000 CFM, and VOLUME OFFST = 100 CFM with POS.NEG set to NEG, then EXH FLO STPT is 10% more than SUP FLO STPT. (100 CFM / 1000 CFM) × 100% flow = 10%.
  - When SUP FLO STPT is 100%, EXH FLO STPT is 110%.
  - When SUP FLO STPT is 50%, EXH FLO STPT is 60%.
  - When SUP FLO STPT is 0%, EXH FLO STPT is 10%.
- With POS.NEG set to POS, the EXH FLO STPT is 10% less than the SUP FLO STPT. (100 CFM / 1000 CFM) × 100% flow = 10%.
  - When SUP FLO STPT is 100%, EXH FLO STPT is 90%.
  - When SUP FLO STPT is 50%, EXH FLO STPT is 40%.
  - When SUP FLO STPT is 10%, EXH FLO STPT is 0%.

**NOTE:** In this example, the controller would not allow SUP FLO STPT to fall below 10% because EXH FLO STPT cannot be less than 0%.

If ACTIVE.NTRAL = NTRAL, then EXH FLO STPT = SUP FLO STPT and VOLUME OFFST is not used.

If TRACKING equals FLOW, the exhaust set point tracks the actual supply flow, not the flow set point. Set point tracking typically provides more stable control. If the supply flow loop cannot maintain its set point, the flow tracking algorithm will maintain the flow differential.

If TRACK MODE = STE, then SUP FLO STPT is calculated as shown above.

## Control loops

The room pressurization is controlled by three Proportional, Integral, Derivative (PID) control loops: one temperature loop and two flow loops.

**Temperature Loop –** The temperature loop is a heating loop which operates in both heating and cooling modes. The heating loop generates HTG LOOPOUT (point 80) which is then used to control the heating valve in order to maintain the room temperature set in CTL STPT (point 92). Refer to the *Control temperature set points* section.

**Flow Loops –** The *supply flow loop* maintains SUP FLO STPT (point 93) by modulating the supply air damper. SUPPLY FLOW (point 75) is the input value for the supply flow loop and is dependent upon SUP AIR VOL (point 35) and OCC FLOW (point 32) according to the following formula:

$$\frac{\text{SUP AIR VOL}}{\text{CTL FLOW MAX}} \times 100\% = \text{SUPPLY FLOW}$$

- If SUP AIR VOL equals 0 CFM, then SUPPLY FLOW equals 0% flow.
- If SUP AIR VOL equals OCC FLOW, then SUPPLY FLOW equals 100% flow.

The *exhaust flow loop* maintains EXH FLO STPT (point 85) by modulating exhaust air damper. EXHAUST FLOW (point 74) is the input value for the exhaust flow loop and is dependent upon EXH AIR VOL (point 30) and OCC FLOW according to the following formula:

$$\frac{\text{EXH AIR VOL}}{\text{CTL FLOW MAX}} \times 100\% = \text{EXHAUST FLOW}$$

- If EXH AIR VOL equals 0 CFM, then EXHAUST FLOW equals 0% flow.
- If EXH AIR VOL equals OCC FLOW, then EXHAUST FLOW equals 100% flow.

**Humidity Loop –** The humidity loop and its associated control algorithm maintain the relative humidity, ROOM RH AI3 (point 15), at its set point, ROOM RH STPT (point 16). The humidity loop itself controls the specific humidity using SPEC HUM (point 33) and SPH CTL SET (point 37) by modulating the humidity valve. The specific humidity set point is reset to control relative humidity.

Relative humidity is affected by both the quantity of moisture in the air (specific humidity) and the temperature of the air. When the room temperature changes (rises), the relative humidity changes (decreases), even though the amount of moisture in the air stays the same. This is because relative humidity is the percentage ratio between the amount of moisture in the air and the amount of moisture the air can hold at a particular temperature. When the temperature rises, it is capable of holding more moisture, so the percentage ratio drops.

By controlling specific humidity, some of this interaction between temperature and relative humidity is eliminated. When the temperature set point is raised, the specific humidity set point is automatically recalculated to a higher level. This new level corresponds to the amount of moisture necessary to keep the relative humidity at its set point when the temperature reaches its new set point. The result is that both the temperature and the specific humidity will rise at the same time, while the relative humidity will stay constant.

The specific humidity and the specific humidity set point are constantly recalculated using the relative humidity and temperature readings and the relative humidity and temperature set points.

## Positive/negative pressure switchover

An optional pressure mode switch can be connected to the termination strip on the controller at AI 4. This switch is designed to let the controller know which pressure mode to use.

If PRES SWITCH (point 91) is set to YES, then in one position (*protective isolation*) POS.NEG (point 23) is set to POS, indicating that the controller is in the positive pressure mode and ACTIVE.NTRAL (point 10) is set to ACTIVE. In the second position, “neutral isolation”, ACTIVE.NTRAL is set to NTRAL. In the third position, “infectious isolation”, POS.NEG is set to NEG, indicating that the controller is in the negative pressure mode, and ACTIVE.NTRAL is set to ACTIVE.

When ACTIVE.NTRAL is set to ACTIVE, the differential flow alarm feature is enabled. When ACTIVE.NTRAL is set to NTRAL, the differential flow alarm feature is disabled. Refer to the *Differential flow alarm* section for more information.

If the pressure mode switch fails, PT FAIL COND (point 89) is set to ALARM. The controller continues to operate in the last known mode of operation (positive, negative, or neutral). Overriding POS.NEG will return PT FAIL COND (point 89) to NORMAL.

If PRES SWITCH is set to NO, then an auxiliary temperature sensor can be monitored on AI 4. AUX TEMP (47) holds the temperature reading.

## Differential flow alarm

When ALARM OUT (point 46) is enabled (ACTIVE.NTRAL = ACTIVE), its value changes from OFF to ON and DO 8 turns ON if either of the following conditions persist longer than the time value of ALARM DELAY (point 39):

- The value of ACTUAL OFFST (point 83) is greater than the sum of VOLUME OFFST (point 88) plus OFFSET LMT (point 38)
- The value of ACTUAL OFFST is less than the difference of VOLUME OFFST minus OFFSET LMT.

## Hot water reheat

**CAUTION**:

Do not set UNOCC FLOW (point 31) to 0 CFM. A minimum airflow should be provided across the heating coils when the heating valve is open.

The heating loop modulates the heating valve in both heating and cooling modes using a 0-10V output signal using HTG LOOPOUT (point 80).

## Pneumatic output modules

The controller uses Pneumatic Output Modules to modulate the control air pressure for the dampers. Each module does this by adding air to the control line using a supply solenoid, or removing air from the control line using a bleed solenoid. This is accomplished by commanding the appropriate loop output.

When a loopout (SUP LOOPOUT or EXH LOOPOUT, not HTG LOOPOUT) is a positive number, the supply solenoid opens. When it is a negative number, the bleed solenoid opens. The amount of time that the solenoid is open is determined by the value of the loopout. The greater the value, the longer the time the solenoid is open. Consider these examples:

- A value of 100 means that the supply solenoid is open for the full period of the loop time.
- A value of -100 means that the bleed solenoid is open for the full period of the loop time.
- A value of 50 means that the supply solenoid is open for one-half of the period of the loop time.
- A value of zero means that both solenoids are closed.

## Calibration

Calibration of the controller's internal air velocity transducers is periodically required to maintain accurate air velocity readings. CAL SETUP (point 95) is set with the desired calibration option during controller startup. Depending on 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 value of CAL AIR (point 94) is YES, then calibration is in progress.

- For a controller used without Autozero Modules, CAL MODULE (point 87) is set to NO, the dampers are commanded closed simultaneously to get zero airflow readings during calibration.
- For a controller used with Autozero Modules, CAL MODULE is set to YES, calibration occurs without closing the damper.

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

The Autozero Modules are used during calibration when they are wired to DO 7 and CAL MODULE is set to YES.

**NOTE:** The first time after start-up or initialization, the controller will calibrate the dampers as if not using Autozero Modules, although the Autozero Modules will be activated. All subsequent calibrations will use the Autozero Modules only.

## Temperature and humidity interaction protection

Under most conditions the interaction between temperature and relative humidity is prevented because specific humidity is used as the loop input instead of relative humidity. Refer to the *Control loops* section. Occasionally, additional protections are needed to prevent potentially undesirable conditions.

In some circumstances, the temperature loop is held constant while the humidity loop operates. In other circumstances, the humidity loop is held constant while the temperature loop operates. This protection only takes place when allowing both loops to operate simultaneously may lead to unacceptably high or low relative humidity levels.

The temperature loop is held still under the following conditions:

1. Both temperature and relative humidity are low, and both temperature and relative humidity set points are raised, or the temperature set point is raised while the relative humidity is more than RH LIMIT (point 17) below its set point. (If both loops are allowed to operate, the temperature loop may move faster than the humidity loop, which would cause the relative humidity to dip to unacceptably low levels.)

2. Both temperature and relative humidity are high, and both temperature and relative humidity set points are lowered, or the temperature set point is lowered while the relative humidity is more than RH LIMIT above its set point. (If both loops are allowed to operate, the temperature loop may move faster than the humidity loop, which would cause the relative humidity to rise to unacceptably high levels.)

The humidity loop is held constant under the following conditions (these are more rare):

1. Temperature is low and relative humidity is high, both temperature and relative humidity set points are raised, and the relative humidity set point, although it has been raised, is still far below the relative humidity. (It is possible that the specific humidity needs to increase to meet the new set point requirements, although the relative humidity needs to decrease. The humidity loop is held constant until the relative humidity is within RH LIMIT of the relative humidity set point to prevent the relative humidity from going even higher. This condition might occur in the winter on a night-to-day changeover.)

2. Temperature is high and relative humidity is low, both temperature and relative humidity set points are lowered, and the relative humidity set point, although it has been lowered, is still far above the relative humidity. (It is possible that the specific humidity needs to decrease to meet the new set point requirements, although the relative humidity needs to increase. The humidity loop is held constant until either the temperature reaches its set point, or the relative humidity is within RH LIMIT of the relative humidity set point to prevent the relative humidity from dropping any further.)

**NOTE:** When a loop is being held still, its set point is set equal to its input. Interaction protection can be prevented by setting RH LIMIT to 100%.

## Fail-safe operation

If either one of the air velocity sensors fail (SUP AIR VOL (point 35) or EXH AIR VOL (point 30)), then the supply and exhaust dampers are controlled as follows:

- If FAIL MODE (point 40) is set at OPEN, then the controller sets the supply and exhaust dampers open.
- If FAIL MODE is set at CLOSED, then the controller sets the supply and exhaust dampers closed.

The hot water valve continues to operate as normal.

If the room temperature sensor fails and ROOM TEMP (point 4) and CTL TEMP (point 78) are not overridden, the hot water valve moves to fully open. In ETS mode, the supply damper moves to the minimum airflow position while the exhaust damper continues to maintain a fixed CFM differential between the supply air volume and exhaust air volume. (In STE mode, exhaust moves to the minimum position while the supply follows to maintain the airflow differential.)

PT FAIL COND (point 89) is set to ALARM if:

- Either one of the air velocity sensors fail.
- The room temperature sensor fails (and neither ROOM TEMP nor CTL TEMP are overridden).
- PRES SWITCH (point 91) is set to YES and the pressure mode switch fails.
- There is no pressure mode switch attached to AI 4 and POS.NEG (point 23) is not overriden.

Otherwise a NORMAL value will be displayed.

If RM STPT DIAL (point 13) fails, the controller operates with the last known set point dial value.

If SUP AIR VOL (point 35) falls below the value held in LOW FLOW (point 79), the humidity valve will be closed to prevent condensation in the duct. The air volume must then rise above the value held in UNOCC FLOW (point 31) for the humidity control to be re-enabled.

If the point WALL SWITCH (point 18) is set to NO, then DI 2 functions as the High Humidity shut-off. If DI 2 is closed the humidity valve will be closed and the humidity loop is suspended to prevent wind-up. DI 2 is used to indicate a high duct humidity.

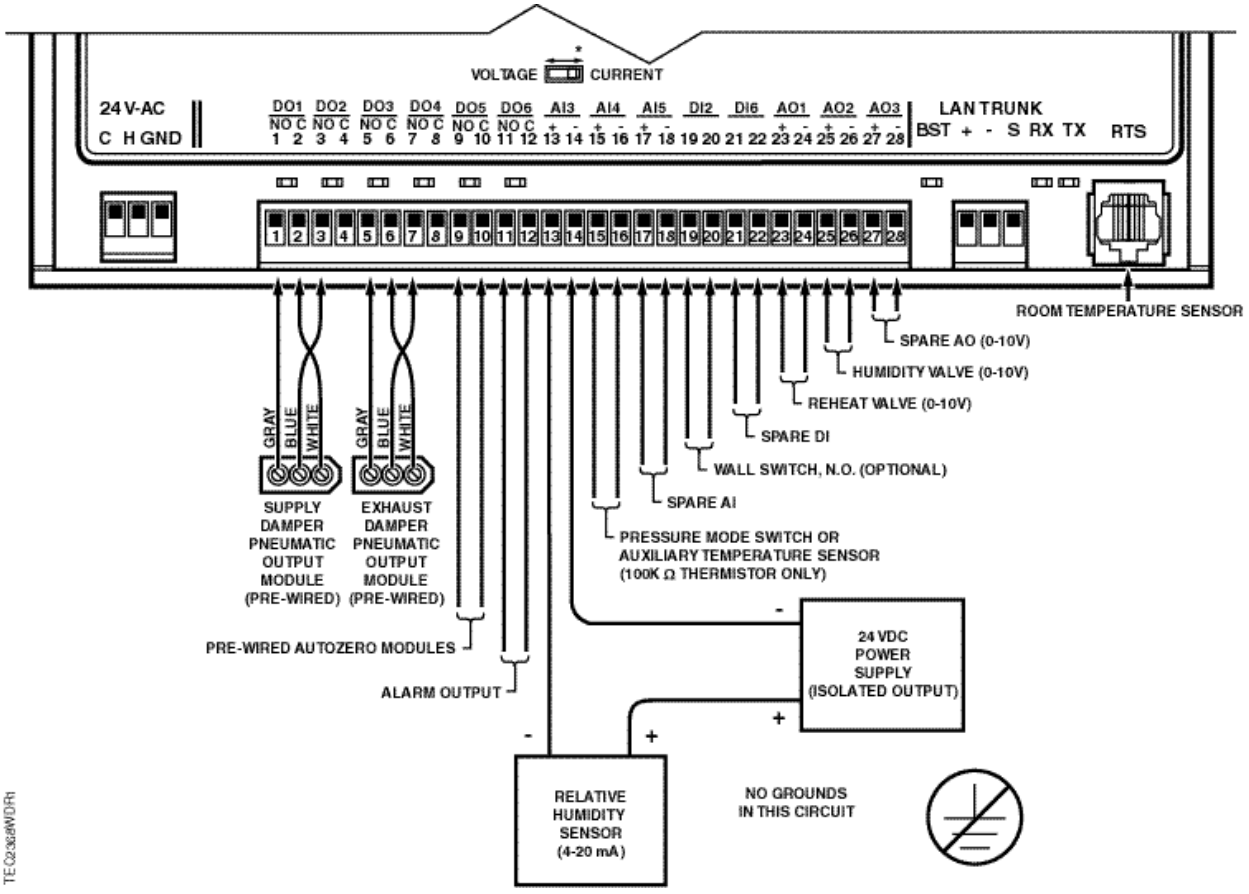
## Application notes

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 SUPPLY FLOW (point 75) is oscillating while SUP FLO STPT (point 93) is constant, then the supply flow loop requires tuning. If EXHAUST FLOW (point 74) is oscillating while EXH FLO STPT (point 85) is constant, then the exhaust flow loop requires tuning.

## Wiring diagram

**CAUTION**:

The 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 (P/N 550-054).




* A dip-switch located behind AI 3 on the controller's circuit board (under the controller assembly's cover) must be set to the right, or *current* position, if not there already. DI 2 can be configured for WALL SWITCH or HIGH HUMIDITY SWITCH

**Figure 2368-3. Application 2368 Wiring Diagram.**

**CAUTION:**

You can NOT use the same transformer to power the TEC and the 4-20 mA sensor. A **SEPARATE** power supply is required for the 4-20 mA sensor. Failure to follow these instructions will result in equipment damage.

**Table 2368-1. Point Database for Application 2368.**

| 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 | 2387 | -- | 1 | 0 | -- | -- |
| 03 | TRACK MODE | ETS | -- | -- | -- | STE | ETS |
| {04} | ROOM TEMP | 74.0 (23.44888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| {05} | HEAT.COOL | COOL | -- | -- | -- | HEAT | COOL |
| 06 | OCC CLG STPT | 74.0 (23.44888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| 07 | OCC HTG STPT | 70.0 (21.20888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| 08 | UOC CLG STPT | 82.0 (27.92888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| 09 | UOC HTG STPT | 65.0 (18.40888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| {10} | ACTIVE.NTRAL | NTRAL | -- | -- | -- | ACTIVE | NTRAL |
| 11 | RM STPT MIN | 55.0 (12.80888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| 12 | RM STPT MAX | 90.0 (32.40888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| {13} | RM STPT DIAL | 74.0 (23.44888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| 14 | STPT DIAL | NO | -- | -- | -- | YES | NO |
| {15} | ROOM RH AI3 | 29.2 | PCT | 0.4 | 0.0 | -- | -- |
| {16} | ROOM RH STPT | 50.0 | PCT | 0.4 | 0.0 | -- | -- |
| 17 | RH LIMIT | 2.0 | PCT | 0.4 | 0.0 | -- | -- |
| 18 | WALL SWITCH | NO | -- | -- | -- | YES | NO |
| {19} | DI OVRD SW | OFF | -- | -- | -- | ON | OFF |
| 20 | OVRD TIME | 1 | HRS | 1 | 0 | -- | -- |
| {21} | UNOCC OVRD | UNOCC | -- | -- | -- | UNOCC | OCC |
| {22} | DI 2 | OFF | -- | -- | -- | ON | OFF |
| {23} | POS.NEG | NEG | -- | -- | -- | POS | NEG |
| {24} | DI 5 | OFF | -- | -- | -- | ON | OFF |
| {25} | DI 6 | OFF | -- | -- | -- | ON | OFF |
| 26 | EXHFLO PGAIN | 1.0 | -- | 0.02 | 0.0 | -- | -- |
| 27 | EXHFLO IGAIN | 0.0 | -- | 0.0005 | 0.0 | -- | -- |
| 28 | EXHFLO DGAIN | 0 | -- | 1 | 0 | -- | -- |
| {29} | OCC.UNOCC | OCC | -- | -- | -- | UNOCC | OCC |

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

***continued on the next page…***

**Table 2368-1. Point Database for Application 2368.**

| Point Number | Descriptor | Factory Default (SI Units) | Engr Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|---|---|---|---|---|---|---|---|
| {30} | EXH AIR VOL | 0 (0.0) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| 31 | UNOCC FLOW | 220 (103.818) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| 32 | OCC FLOW | 2200 (1038.18) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| {33} | SPEC HUM | 0.0 | -- | 0.1 | 0.0 | -- | -- |
| {34} | SPEC HUM SET | 50.0 | -- | 0.1 | 0.0 | -- | -- |
| {35} | SUP AIR VOL | 0 (0.0) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| 36 | SUP FLO COEF | 1.0 | -- | 0.01 | 0.0 | -- | -- |
| {37} | SPH CTL SET | 50.0 | -- | 0.1 | 0.0 | -- | -- |
| 38 | OFFSET LMT | 16 (7.5504) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| 39 | ALARM DELAY | 10 | SEC | 1 | 0 | -- | -- |
| 40 | FAIL MODE | OPEN | -- | -- | -- | CLOSED | OPEN |
| {41} | VOL SUP ACT1 | CLOSED | -- | -- | -- | OPEN | CLOSED |
| {42} | VOL BLD ACT1 | OPEN | -- | -- | -- | CLOSED | OPEN |
| {43} | VOL SUP ACT2 | CLOSED | -- | -- | -- | OPEN | CLOSED |
| {44} | VOL BLD ACT2 | OPEN | -- | -- | -- | CLOSED | OPEN |
| {45} | AUTOZERO MOD | OFF | -- | -- | -- | ON | OFF |
| {46} | ALARM OUT | OFF | -- | -- | -- | ON | OFF |
| {47} | AUX TEMP | 74.0 (23.495556) | DEG F (DEG C) | 0.5 (0.28) | 37.5(3.055556) | -- | -- |
| 48 | AOV1 START | 0.0 | VOLTS | 0.01 | 0.0 | -- | -- |
| 49 | AOV1 SPAN | 10.0 | VOLTS | 0.01 | 0.0 | -- | -- |
| {50} | AI 5 | 74.0 (23.495556) | DEG F (DEG C) | 0.5 (0.28) | 37.5(3.055556) | -- | -- |
| {51} | AOV1 | 0.0 | VOLTS | 0.01 | 0.0 | -- | -- |
| {52} | AOV2 | 0.0 | VOLTS | 0.01 | 0.0 | -- | -- |
| {53} | AOV3 | 0.0 | VOLTS | 0.01 | 0.0 | -- | -- |
| 54 | EXH FLO COEF | 1.0 | -- | 0.01 | 0.0 | -- | -- |
| 55 | AO DIR.REV | 0 | -- | 1 | 0 | -- | -- |
| 56 | AOV2 START | 0.0 | VOLTS | 0.01 | 0.0 | -- | -- |
| 59 | EXH SETUP | NCLOSE | -- | -- | -- | NCLOSE | NOPEN |
| 60 | EXHDUCT AREA | 1.0 (0.09292) | SQ. FT (SQ M) | 0.025 (0.002323) | 0.0 | -- | -- |

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

***continued on the next page…***

**Table 2368-1. Point Database for Application 2368.**

| Point Number | Descriptor | Factory Default (SI Units) | Engr Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|---|---|---|---|---|---|---|---|
| 62 | SUP SETUP | NCLOSE | -- | -- | -- | NCLOSE | NOPEN |
| 63 | SPH P GAIN | 5.0 (9.0) | -- | 0.25 (0.45) | 0.0 | -- | -- |
| 64 | SPH I GAIN | 0.005 (0.009) | -- | 0.001 (0.0018) | 0.0 | -- | -- |
| 65 | SPH D GAIN | 0 (0.0) | -- | 2 (3.6) | 0 | -- | -- |
| 66 | AOV2 SPAN | 10.0 | VOLTS | 0.01 | 0.0 | -- | -- |
| 67 | HTG P GAIN | 1.215 (21.6972) | -- | 0.0225 (0.4018) | 0.0 | -- | -- |
| 68 | HTG I GAIN | 0.0005 | -- | 0.0005 | 0.0 | -- | -- |
| 69 | HTG D GAIN | 15 (26.784) | -- | 1 (1.7856) | 0 | -- | -- |
| 70 | HTG BIAS | 0.0 | PCT | 0.4 | 0.0 | -- | -- |
| 71 | SUPFLO PGAIN | 1.0 | -- | 0.02 | 0.0 | -- | -- |
| 72 | SUPFLO IGAIN | 0.0 | -- | 0.0005 | 0.0 | -- | -- |
| 73 | SUPFLO DGAIN | 0 | -- | 1 | 0 | -- | -- |
| {74} | EXHAUST FLOW | 0.0 | PCT | 0.25 | 0.0 | -- | -- |
| {75} | SUPPLY FLOW | 0.0 | PCT | 0.25 | 0.0 | -- | -- |
| {76} | CTL FLOW MIN | 220 (103.818) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| {77} | CTL FLOW MAX | 2200 (1038.18) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| {78} | CTL TEMP | 74.0 (23.44888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| 79 | LOW FLOW | 220 (103.818) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| {80} | HTG LOOPOUT | 0.0 | PCT | 0.4 | 0.0 | -- | -- |
| {81} | SUP LOOPOUT | -100 | -- | 1 | -100 | -- | -- |
| {82} | EXH LOOPOUT | -100 | -- | 1 | -100 | -- | -- |
| {83} | ACTUAL OFFST | 0 (0.0) | CFM ( LPS) | 4 (1.8876) | -8000(-3775.2) | -- | -- |
| 84 | TRACKING | STPT | -- | -- | -- | FLOW | STPT |
| {85} | EXH FLO STPT | 0.0 | PCT | 0.25 | 0.0 | -- | -- |
| {86} | HUM LOOPOUT | 0.0 | PCT | 0.4 | 0.0 | -- | -- |
| 87 | CAL MODULE | NO | -- | -- | -- | YES | NO |
| {88} | VOLUME OFFST | 0 (0.0) | CFM ( LPS) | 4 (1.8876) | 0 | -- | -- |
| {89} | PT FAIL COND | NORMAL | -- | -- | -- | ALARM | NORMAL |
| 91 | PRES SWITCH | YES | -- | -- | -- | YES | NO |

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

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**Table 2368-1. Point Database for Application 2368.**

| Point Number | Descriptor | Factory Default (SI Units) | Engr Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|---|---|---|---|---|---|---|---|
| {92} | CTL STPT | 74.0 (23.44888) | DEG F (DEG C) | 0.25 (0.14) | 48.0(8.88888) | -- | -- |
| {93} | SUP FLO STPT | 0.0 | PCT | 0.25 | 0.0 | -- | -- |
| {94} | CAL AIR | NO | -- | -- | -- | YES | NO |
| 95 | CAL SETUP | 4 | -- | 1 | 0 | -- | -- |
| 96 | CAL TIMER | 12 | HRS | 1 | 0 | -- | -- |
| 97 | SUPDUCT AREA | 1.0 (0.09292) | SQ. FT (SQ M) | 0.025 (0.002323) | 0.0 | -- | -- |
| 98 | LOOP TIME | 1.0 | SEC | 0.25 | 0.0 | -- | -- |
| {99} | ERROR STATUS | 0 | -- | 1 | 0 | -- | -- |

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