SIEMENS

TEC Custom Solutions Application 2429:

Series Fan VAV—Option for 0-10V Fan Speed Control—with HW Reheat, Spare AIs and AOVs, Optional Night Damper, and 2 AVS

TEC-0138.08

This document contains the following topics:

Overview

NOTE: For the latest on Custom Solution Applications and Controllers, visit the [Custom Solutions website](http://iknow.us.abatos.com/customsolutions/custom_solutions.htm).
(http://iknow.us.abatos.com/customsolutions/custom_solutions.htm)

In Application 2429, the controller modulates the supply air damper of the terminal box for cooling and modulates a hot water valve for heating. When in heating, the terminal box either maintains minimum airflow or modulates the supply air damper. At night, the supply air damper can be controlled normally as in day mode, or it can be shut. The terminal box also has a series fan for air circulation. In order for the terminal box to work properly, the central air handling unit must provide supply air. Refer to Figures 1 through 3.

The Custom Solutions TEC that runs application 2429 has spare analog inputs and outputs not used by application 2429. If desired, these can be unbundled and monitored/controlled from a field panel. FAN SPD A01 (Point 81) corresponds to the spare output at AO 1. By unbundling this point at the field panel and connecting a fan speed control device to AO 1, the user can have auxiliary fan speed control (requires some PPCL code to be written).

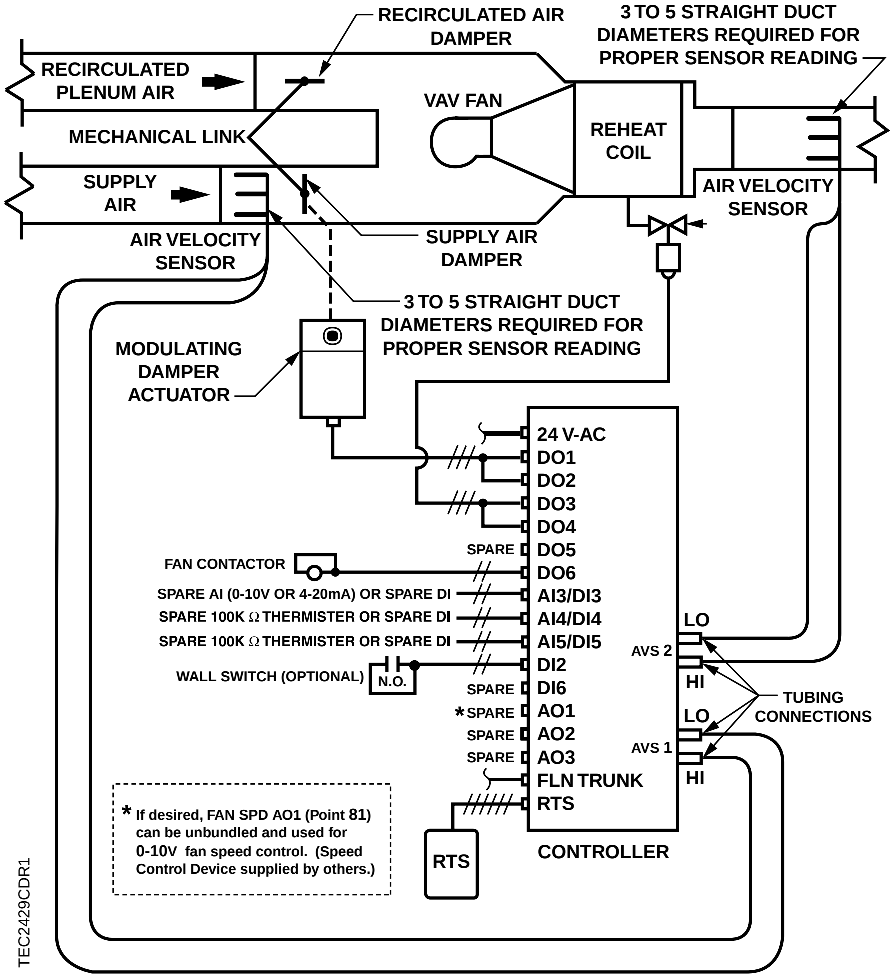
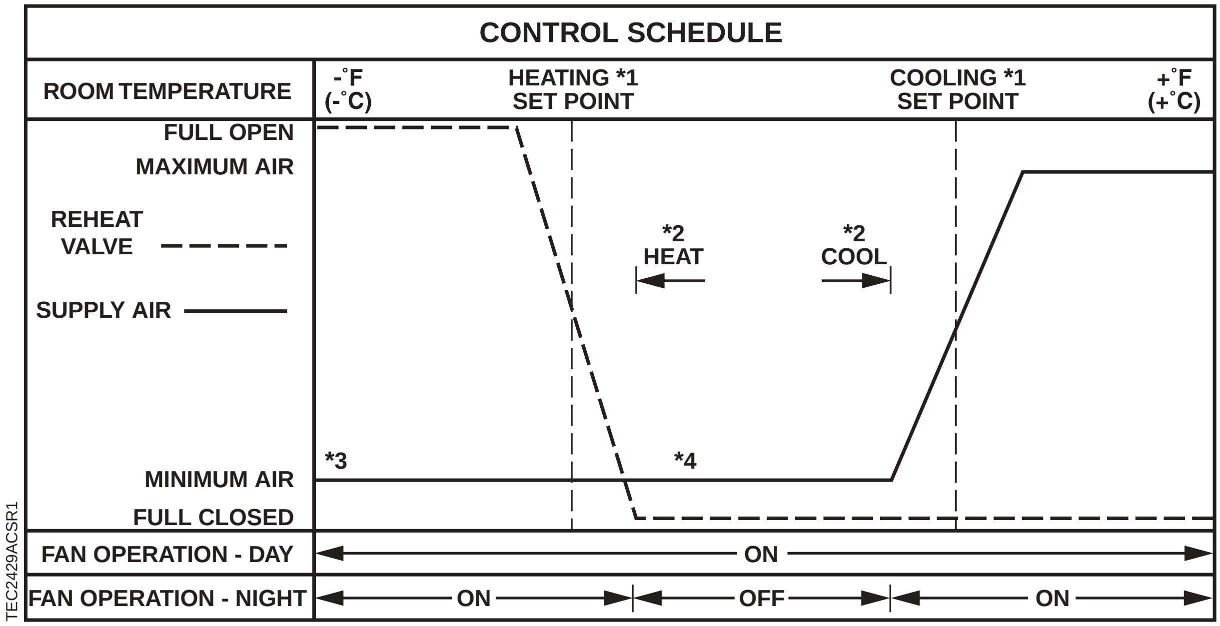
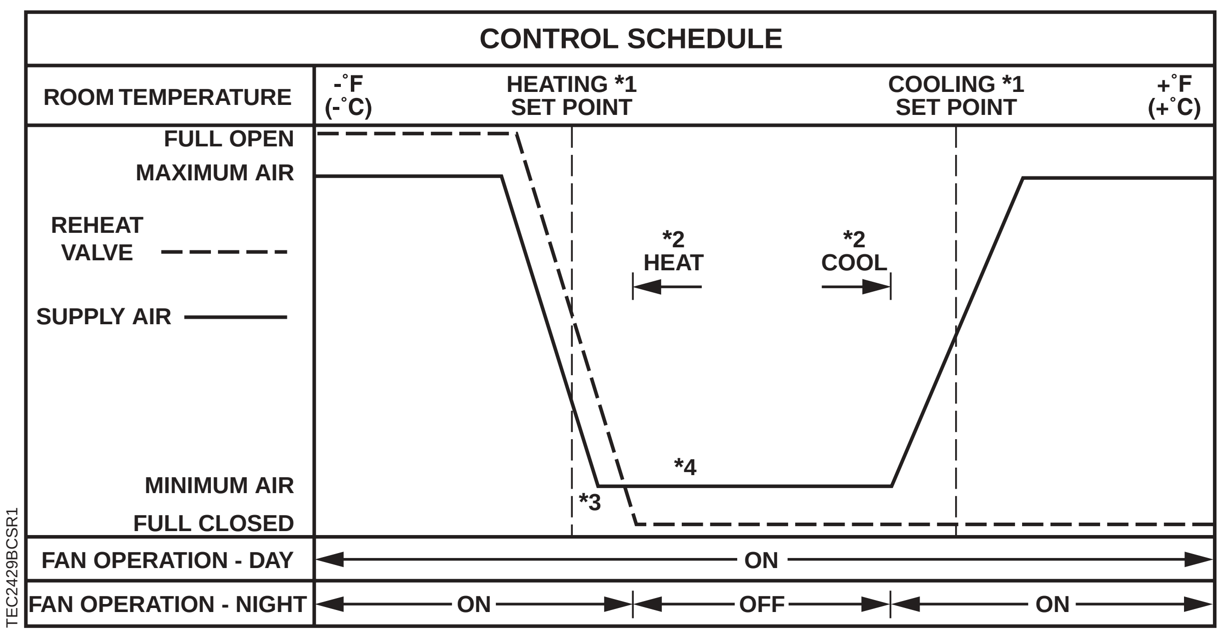


Figure 1. Application 2429 Control Drawing.



1. Refer to *Control Temperature Setpoints*.
2. Refer to *Heating/Cooling Switchover*.
3. The airflow is shown at minimum flow throughout the entire heating mode (default setting). The airflow can operate sequenced, parallel, or overlapping with the reheat valve (optional). Refer to *Sequencing Logic*.
4. **Note:** Damper control during day mode. The supply damper will also be controlled this way at night when NITE DAMPER (Point 3) = CONTRL. If NITE DAMPER = CLOSE during night mode, the supply damper will be completely shut.

Figure 2. Application 2429 Control Schedule.



1. Refer to Sequence of Operation, *Control Temperature Setpoints*.
2. Refer to Sequence of Operation, *Heating/Cooling Switchover*.
3. The airflow is shown operating parallel with the reheat valve (optional). The airflow can operate at minimum flow throughout the entire heating mode (default setting). Refer to *Sequencing Logic*.
4. **Note:** Damper control during day mode. The supply damper will also be controlled this way at night when NITE DAMPER (Point 3) = CONTRL. If NITE DAMPER = CLOSE during night mode, the supply damper will be completely shut.

Figure 3. Control Schedule with Modulating Damper in Heating Mode.

Hardware Inputs

Analog

- Air velocity sensor
- Room temperature sensor
- Room temperature setpoint dial (optional)

Digital

- Night mode override (optional)
- Wall switch (optional)

Hardware Outputs

Analog

- None

Digital

- Damper actuator
- Fan
- Valve actuator

Ordering Notes

You can order the Series Fan VAV Controller (with Option for 0-10V Fan Speed Control, HW Reheat, Spare AIs and AOVs, Optional Night Damper, and 2 AVS) as either of the following:

- Part No. 540-867B.
- Custom Solution 267.

Sequence of Operation

The following paragraphs present the sequence of operation for Application 2429, *Series Fan VAV—Option for 0-10V Fan Speed Control—with HW Reheat, Spare AIs and AOVs, Optional Night Damper, and 2 AVS*.

Control Temperature Setpoints

Depending on the controller's current operational mode (day or night), the control temperature setpoint, CTL STPT (Point 92) holds the value of one of the following setpoints:

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 setpoint dial and STPT DIAL (Point 14) is set to YES, then CTL STPT holds the value of RM STPT DIAL (Point 13).

If the setpoint 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.

When a wall switch is physically connected to the termination strip on the controller at DI 2 (Figures 1 and 5), and WALL SWITCH (Point 18) equals YES, the controller monitors the status of DI 2. When the status of DI 2 (Point 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), DAY.NGT will be set to NIGHT, indicating that the controller is in night mode.

When WALL SWITCH equals NO, the controller does not monitor the status of the wall switch, even if one is connected to it. In this case, and if the controller is operating stand-alone (not connected to a field panel), then the controller stays in day mode all the time. If the controller is operating with centralized control (connected to a field panel), then the field panel can send 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.

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

- HTG LOOPOUT (Point 80) is less than SWITCH LIMIT (Point 85).
- CTL TEMP (Point 78) is above CTL STPT (Point 92) by at least the value set in SWITCH DBAND (Point 90).
- CTL TEMP is greater than the appropriate cooling setpoint minus SWITCH DBAND.

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

- CLG LOOPOUT (Point 79) is less than SWITCH LIMIT.
- CTL TEMP is below CTL STPT by at least the value set SWITCH DBAND.
- CTL TEMP is less than the appropriate heating setpoint plus SWITCH DBAND.

Damper Modulation in Heating Mode (optional)

CAUTION:
The heating/cooling switchover mechanism explained above is not affected by the air temperature in the supply duct.

To change the value of HEAT.COOL (Point 5) based on the supply air temperature, you must command HEAT.COOL through PPCL. This is required when the flow loop will be used as a source of cooling in cooling mode and a source of heat in heating mode. (Refer to Examples 1-3 in *Sequencing Logic*.) If the flow loop is used in heating mode just to meet minimum air requirements, then the heating/cooling switchover mechanism operates as described in this section to control HEAT.COOL. (Refer to Example 4 in *Sequencing Logic*.)

Control Loops

The terminal box is controlled by three Proportional, Integral, and Derivative (PID) control loops. Two of these are temperature loops and the other is a 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 CTL STPT (Point 92). Refer to *Control Temperature Setpoints*.

Cooling Loop – The cooling loop generates CLG LOOPOUT (Point 79) which is used to calculate SUP FLOW STP (Point 93). SUP FLOW STP is the result of scaling the cooling loopout to the appropriate range of values as determined by CLG FLOW MAX (Point 32) and CLG FLOW MIN (Point 31), and as shown in the following equation:

$$\frac{[\text{CLG LOOPOUT} \times (\text{CLG FLOW MAX} - \text{CLG FLOW MIN})] + \text{CLG FLOW MIN}}{\text{CLG FLOW MAX}} \times 100\% = \text{SUP FLOW STP}$$

For example:

If CLG FLOW MIN = 200 CFM and CLG FLOW MAX = 1000 CFM, then,

when CLG LOOPOUT is 0%, SUP FLOW STP equals 20% flow.

$$\frac{[0\% \times (1000 - 200)] + 200}{1000} \times 100\% = 20\%$$

(This ensures that the airflow out of the terminal box is not less than CLG FLOW MIN.)

When CLG LOOPOUT is 50%, SUP FLOW STP equals 60% flow.

$$\frac{[50\% \times (1000 - 200)] + 200}{1000} \times 100\% = 60\%$$

When CLG LOOPOUT is 100%, SUP FLOW STP equals 100% flow.

$$\frac{[100\% \times (1000 - 200)] + 200}{1000} \times 100\% = 100\%$$

Heating Loop – If the controller is in heating mode, then the operation of the flow loop is flexible. It can be configured to do one of the following:

- Constantly maintain an airflow out of the terminal box equal to HTG FLOW MIN (Point 33).
- Operate in sequence with the hot water valve.
- Operate parallel with the hot water valve.
- Have its operation overlap with the operation of the hot water valve. Refer to *Sequencing Logic* for more information.

In the first option described above, HTG LOOPOUT (Point 80) maintains room temperature by controlling the hot water valve. In each of the last three options, HTG LOOPOUT maintains room temperature by controlling the hot water valve **and** by adjusting the flow loop setpoint (SUP FLOW STP). HTG LOOPOUT will adjust the value of SUP FLOW STP differently depending on which of the three options is chosen. However, the following rule applies no matter what setup is chosen:

In heating mode, SUP FLOW STP will never be set below:

(HTG FLOW MIN ÷ HTG FLOW MAX)×100% flow, or above 100% flow.

Refer to *Sequencing Logic* for more information.

Flow Loop

NOTE: This section explains flow loop operation during day mode and at night whenever NITE DAMPER (Point 3) equals CONTRL. If NITE DAMPER equals CLOSE, the application will shut the supply damper during night mode, disabling the flow loop (DMPR COMD, Point 48 equals 0).

By modulating the supply air damper point, DMPR COMD, the flow loop maintains airflow at SUP FLOW STP (Point 93), and keeps it within the range of CTL FLOW MIN to CTL FLOW MAX.

CTL FLOW MIN and CTL FLOW MAX equal CLG FLOW MIN and CLG FLOW MAX respectively during cooling mode. In heating mode, they equal HTG FLOW MIN and HTG FLOW MAX. You can set CLG FLOW MIN equal to, but not greater than CLG FLOW MAX, and you can set HTG FLOW MIN equal to, but not greater than HTG FLOW MAX. If the minimum and maximum values are set equal, the flow loop becomes a constant volume loop and its ability to control temperature is lost.

SUPPLY FLOW (Point 75) is the input value for the flow loop. It is calculated as a percentage based on where SUP AIR VOLUME (Point 35) is between 0 CFM and CTL FLOW MAX. For example:

- If SUP AIR VOLUME equals 0 CFM, SUPPLY FLOW will equal 0%
- If SUP AIR VOLUME equals CTL FLOW MAX, SUPPLY FLOW will equal 100%.

The low limit of SUP FLOW STP is the percentage that corresponds to the volume given in CTL FLOW MIN. This percentage can be calculated as:

(CTL FLOW MIN÷CTL FLOW MAX)×100% flow. The flow loop ensures that the supply air will not be less than CTL FLOW MIN.

For example:

If CTL FLOW MIN equals 250 CFM, and if CTL FLOW MAX equals 1000 CFM, then:

the low limit of SUP FLOW STP = (250 CFM÷1000 CFM)×100% flow
= 0.25×100% flow
= 25% flow.

Since 25% of 1000 CFM equals 250 CFM, the minimum airflow out of the terminal box will be 250 CFM.

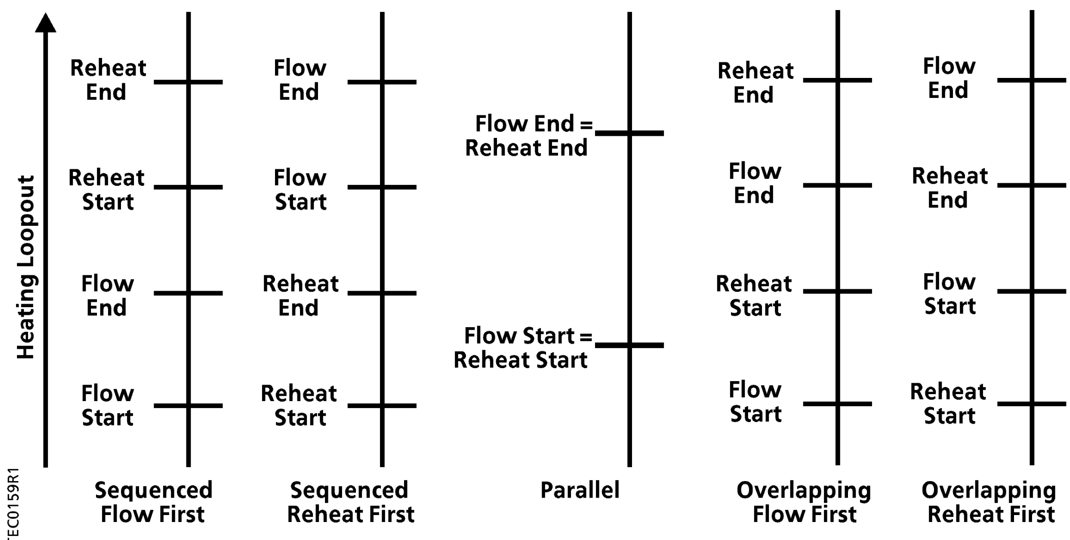
Hot Water Reheat

The heating loop modulates the heating valve to warm up the room. In cooling mode, the heating valve is closed.

Sequencing Logic (optional)

This application includes logic that allows the user to configure the flow loop to operate in sequence, in parallel, or overlapping with the hot water valve while in heating mode. The algorithm is similar to the spring range sequencing of valves and dampers. Portions of the output from the heating loop (HTG LOOPOUT, Point 80) drive both the flow loop and the hot water valve from 0 to 100%. Refer to Examples 1–3 that follow shortly. (For simplicity, assume in these examples that HTG FLOW MIN (Point 33) equals 0 CFM; when this is done, SUP FLOW STP (Point 93) equals 0 when HTG LOOPOUT equals 0).

NOTE: In application 2429, the default setting for both FLOW START (Point 16) and FLOW END (Point 17) is 0. In this configuration, the flow loop provides a steady minimum airflow equal to HTG FLOW MIN throughout the heating mode, while the hot water valve modulates the control temperature. Refer to Example 4.



The vertical bars show the output of heating loopout 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. The relative positions shown on the graphs are for illustration purposes only and may differ from actual examples.

Figure 4. Sequenced, Parallel, and Overlapping Flow Loop Operations with HW Reheat.

Example 1

Assume your system has a hot water valve operating in sequence with the flow loop:

If,

- FLOW START (Point 16) equals 0%
- FLOW END (Point 17) equals 50%
- REHEAT START (Point 22) equals 50%

- REHEAT END (Point 23) equals 100%

then,

- When HTG LOOPOUT equals 0%, SUP FLOW STP equals 0% flow.
- When HTG LOOPOUT equals 25%, SUP FLOW STP equals 50% flow.
- When HTG LOOPOUT is greater than or equal to 50%, SUP FLOW STP equals 100% flow.
- When HTG LOOPOUT is less than or equal to 50%, VLV COMD equals 0% open.
- When HTG LOOPOUT equals 75%, VLV COMD equals 50% open.
- When HTG LOOPOUT equals 100%, VLV COMD equals 100% open.

Example 2

Assume your system has a hot water valve operating in parallel with the flow loop:

If,

- FLOW START (Point 16) equals 0%
- FLOW END (Point 17) equals 100%
- REHEAT START (Point 22) equals 0%
- REHEAT END (Point 23) equals 100%

then,

- When HTG LOOPOUT equals 0%, SUP FLOW STP equals 0% flow.
- When HTG LOOPOUT equals 50%, SUP FLOW STP equals 50% flow.
- When HTG LOOPOUT equals 100%, SUP FLOW STP equals 100% flow.
- When HTG LOOPOUT equals 0%, VLV COMD equals 0% open.
- When HTG LOOPOUT equals 50%, VLV COMD equals 50% open.
- When HTG LOOPOUT equals 100%, VLV COMD equals 100% open.

Example 3

Assume your system as a hot water valve that operates overlapping with the flow loop:

If,

- FLOW START (Point 16) equals 0%
- FLOW END (Point 17) equals 75%
- REHEAT START (Point 22) equals 25%
- REHEAT END (Point 23) equals 100%

then,

- When HTG LOOPOUT equals 0%, SUP FLOW STP equals 0% flow.
- When HTG LOOPOUT equals 37.5%, SUP FLOW STP equals 50% flow.
- When HTG LOOPOUT is greater than or equal to 75%, SUP FLOW STP equals 100% flow.
- When HTG LOOPOUT is less than or equal to 25%, VLV COMD equals 0% open.
- When HTG LOOPOUT equals 62.5%, VLV COMD equals 50% open.
- When HTG LOOPOUT equals 100%, VLV COMD equals 100% open.

Example 4

Assume your system has a hot water valve that provides temperature control in heating mode while the flow loop provides the minimum required airflow. This is done by setting FLOW START and FLOW END to 0% (default) causing SUP FLOW STP to hold a minimum flow value equal to HTG FLOW MIN, regardless of HTG LOOPOUT's value.

NOTE: Setting Point 3 (NITE DAMPER) to CLOSE instructs the application to shut the supply damper at night, disabling the flow loop during night mode. (The default for NITE DAMPER = CONTRL.)

(In Example 4, assume HTG FLOW MIN = 170 CFM and HTG FLOW MAX = 1000 CFM.)

If,

- FLOW START (Point 16) equals 0%
- FLOW END (Point 17) equals 0%
- REHEAT START (Point 22) equals 0%
- REHEAT END (Point 23) equals 100%

then,

- When HTG LOOPOUT equals 0%, SUP FLOW STP equals
(170 CFM÷1000 CFM)×100% flow=17% flow.
(this causes the flow loop to maintain an airflow of 170 CFM out of the terminal box)

- When HTG LOOPOUT equals 50%, SUP FLOW STP equals 17% flow.
- When HTG LOOPOUT equals 100%, SUP FLOW STP equals 17% flow.
- When HTG LOOPOUT equals 0%, VLV COMD equals 0% open.
- When HTG LOOPOUT equals 50%, VLV COMD equals 50% open.
- When HTG LOOPOUT equals 100%, VLV COMD equals 100% open.

NOTE: During heating mode, the reheat valve is always controlled by the sequencing logic described in this section. The same is true for the flow loop but with one exception: the flow loop during heating mode is controlled by the sequencing logic as described in this section, **unless** NITE DAMPER (Point 3) has been set to CLOSE and the controller is operating in night mode. When NITE DAMPER is set to CLOSE, the application shuts the supply damper at night (DMPR COMD, Point 48 = 0), disabling the flow loop.

Calibration

Air Velocity Transducers – Calibration of the controller's internal air velocity transducers is periodically required to maintain accurate air velocity readings. By configuring CAL SETUP (Point 95) during controller startup, calibration can be set to take place automatically or manually. When calibration is in progress, CAL AIR (Point 94) is set to YES. (CAL AIR returns to NO automatically once calibration ends.) The supply damper is automatically commanded closed during calibration to get a zero airflow reading for SUP AIR VOL (Point 35).

NOTE: Application 2429 runs on a Custom Solution controller with multiple spare analog inputs and outputs. The first AO on the board has the corresponding database point FAN SPD AO1 (Point 81). This point is not used by application 2429, but it is possible to connect a variable fan-speed control device to terminal AO 1 and unbundle Point 81 at a field panel for use as a fan-speed controller. PPCL code needs to be written for the speed control device in order to turn the fan OFF at the beginning of the calibration sequence and release it after calibration ends. An example of this PPCL (in pseudo code form) is shown here:

```
100    IF (CAL AIR .EQ. YES .AND. FAN .EQ. OFF) THEN close device.
       ELSE Release device to normal control.
```

If a variable speed fan control device is not used, then the fan will be connected to DO 6. Application 2429 automatically turns DO 6 OFF when calibration starts and releases it to normal control after calibration ends.

Hot Water Valve – The hot water valve is commanded closed during calibration.

Fan Operation

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.

In day mode, FAN (Point 46), is ON all of the time. In night mode, the fan is controlled as follows:

The fan turns ON when **at least one** of the following two conditions is true:

1. The value of the hot water valve point (VLV COMD, Point 52) is greater than the value stored in STAGE FAN (Point 83).

2. The supply duct airflow (SUPPLY FLOW, Point 75) is greater than the value stored in SERIES ON (Point 26).

The fan turns OFF **only when both** of the following two conditions have been met:

1. The value of the hot water valve point (VLV COMD) is less than the value stored in SWITCH LIMIT (Point 85).
2. The supply duct airflow (SUPPLY FLOW) is less than the value stored in SERIES OFF (Point 27).

NOTE: The application does not provide fan speed control. However, it does feature spare analog outputs. If desired, one of these extra analog outputs can be unbundled and controlled from a field panel as a fan speed controller.

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, 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 setpoint, then either the cooling loop, the heating loop or both need to be tuned. If SUPPLY FLOW (Point 75) is oscillating while SUP FLOW STP (Point 93) is constant, then the flow loop requires tuning. Refer to *APOGEE Automation Service Procedures* on InfoLink for more information.

2. The controller as shipped from the factory keeps all associated equipment OFF. Refer to *APOGEE Automation Start-up Procedures* on InfoLink for information on how to release the controller and its equipment to application control.

3. Spare inputs AI/DI 3, AI/DI 4 and AI/DI 5 can be used as auxiliary points that are monitored by the TEC or monitored by the field panel after being defined in the field panel's database (whether these inputs operate as AIs or DIs depends on what type of device is hooked up to them). Spare outputs AO 1, AO 2, AO 3, and DO 5 can be also used as auxiliary points that are controlled by the field panel after being defined in the field panel’s database.

   Spare input DI 6 can be used as an auxiliary point this is monitored by the TEC or monitored by the field panel after being defined in the field panel's database.

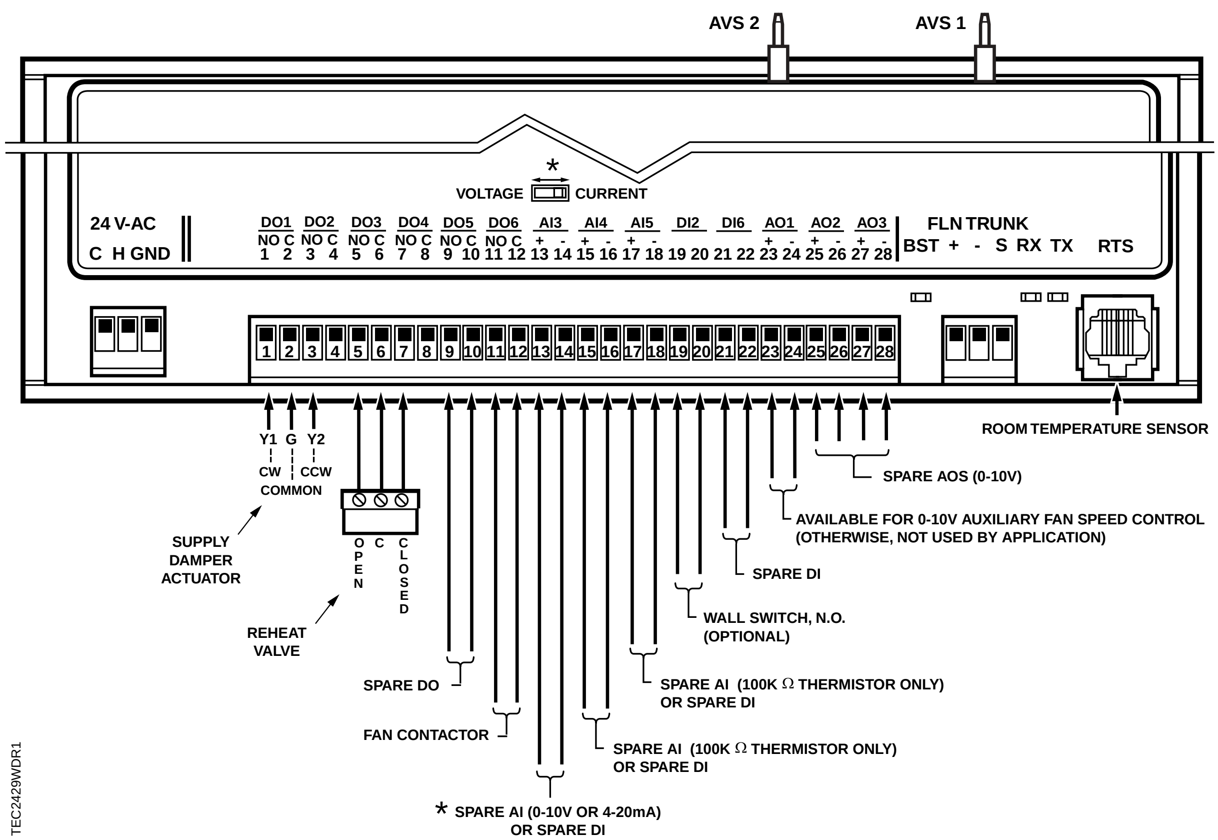
Wiring Diagram

CAUTION:

The controller's DOs control 24 Vac loads only. The maximum rating is 12 VA for each DO. Use an interposing 220V relay module (550-054) for any of the following:

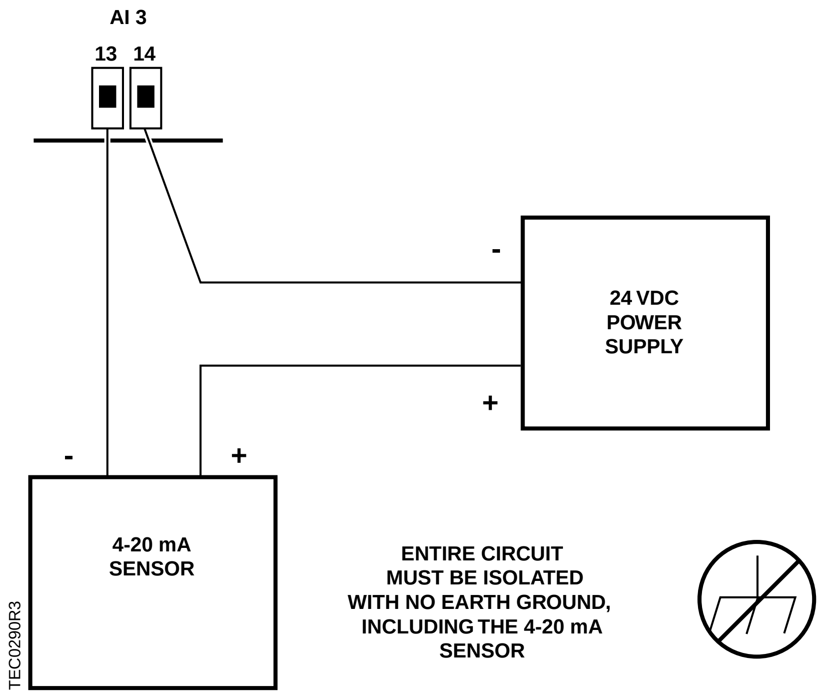
- VA requirements higher than the maximum
- 110 or 220 Vac requirements
- DC power requirements
- Separate transformers used to power the load

Consult with the local representative if terminations are missing or different.



* NOTE: If AI 3 is used for 0-10V or 4-20mA sensor input, the voltage/current dipswitch on the circuit board (behind AI 3 under the controller's cover) must be set accordingly.
IMPORTANT: 4-20 mA sensors require special wiring precautions. Refer to Figure 6.

Figure 5. Application 2429 Wiring Diagram.



NOTE: You can NOT use the same transformer to power the controller and a 4-20 mA sensor. The 4-20 mA sensor requires a <u>SEPARATE</u> dedicated power supply.

Figure 6. Special Wiring Requirements if 4-20 mA Temperature Sensor is used at AI 3.

CAUTION:

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

Point Database

Table 1. Point Database for Application 2429

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	2480	--	1	0	--	--
03	NITE DAMPER	CONTRL	--	--	--	CONTRL	CLOSE
{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	DAY CLG STPT	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
07	DAY HTG STPT	70.0 (21.20888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
08	NGT CLG STPT	82.0 (27.92888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
09	NGT HTG STPT	65.0 (18.40888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
{10}	DI 5	OFF	--	--	--	ON	OFF
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}	AI 3	29.2	PCT	0.4	0.0	--	--
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	--	--
28	DIS FLO COEF	1.0	--	0.01	0.0	--	--
{29}	DAY.NGT	DAY	--	--	--	NIGHT	DAY
{30}	DIS AIR VOL	0 (0.0)	CFM (LPS)	4 (1.8876)	0	--	--
31	CLG FLOW MIN	220 (103.818)	CFM (LPS)	4 (1.8876)	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 1. Point Database for Application 2429

Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
32	CLG FLOW MAX	2200 (1038.18)	CFM (LPS)	4 (1.8876)	0	--	--
33	HTG FLOW MIN	220 (103.818)	CFM (LPS)	4 (1.8876)	0	--	--
34	HTG FLOW MAX	2200 (1038.18)	CFM (LPS)	4 (1.8876)	0	--	--
{35}	SUP AIR VOL	0 (0.0)	CFM (LPS)	4 (1.8876)	0	--	--
36	SUP FLO COEF	1.0	--	0.01	0.0	--	--
{40}	DI 4	OFF	--	--	--	ON	OFF
{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}	DI 6	OFF	--	--	--	ON	OFF
{48}	DMPR COMD	0.0	PCT	0.4	0.0	--	--
{49}	DMPR POS	0.0	PCT	0.4	0.0	--	--
{50}	AI 4	37.5 (3.055556)	DEG F (DEG C)	0.5 (0.28)	37.5 (3.055556)	--	--
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}	AI 5	37.5 (3.055556)	DEG F (DEG C)	0.5 (0.28)	37.5 (3.055556)	--	--
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	DISCH AREA	16.0	PCT	0.4	0.0	--	--
63	CLG P GAIN	20.0 (36.0)	--	0.25 (0.45)	0.0	--	--
64	CLG I GAIN	0.01 (0.018)	--	0.001 (0.0018)	0.0	--	--
65	CLG D GAIN	0 (0.0)	--	2 (3.6)	0	--	--
66	CLG BIAS	0.0	PCT	0.4	0.0	--	--
67	HTG P GAIN	10.0 (18.0)	--	0.25 (0.45)	0.0	--	--
68	HTG I GAIN	0.01 (0.018)	--	0.001 (0.0018)	0.0	--	--
69	HTG D GAIN	0 (0.0)	--	2 (3.6)	0	--	--
70	HTG BIAS	0.0	PCT	0.4	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 1. Point Database for Application 2429

Point Number	Descriptor	Factory Default (SI Units)	Engr Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
71	FLOW P GAIN	0.0	--	0.05	0.0	--	--
72	FLOW I GAIN	0.01	--	0.001	0.0	--	--
73	FLOW D GAIN	0	--	2	0	--	--
74	FLOW BIAS	50.0	PCT	0.4	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}	CLG LOOPOUT	0.0	PCT	0.4	0.0	--	--
{80}	HTG LOOPOUT	0.0	PCT	0.4	0.0	--	--
{81}	FAN SPD A01	0.0	VOLTS	0.01	0.0	--	--
{82}	AOV 2	0.0	VOLTS	0.01	0.0	--	--
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	1.0 (0.56)	DEG F (DEG C)	0.25 (0.14)	0.0	--	--
{91}	AOV 3	0.0	VOLTS	0.01	0.0	--	--
{92}	CTL STPT	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
{93}	SUP FLOW STP	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	16.0	PCT	0.4	0.0	--	--
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 numbers that appear in brackets { } may be unbundled at the field panel.