SIEMENS

VAV BACnet ASC Controller: Application 2557 — 0 to 10 V Series Fan and 3-Stage Electric Heat

Start-up Procedures

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Before You Begin

WinCIS version 2.1.4 or later must be used to configure Siemens Building Technologies BACnet TECs.

If WinCIS does not communicate (through the HMI port / RTS sensor), try a different baud rate. The default baud rate is 1200.

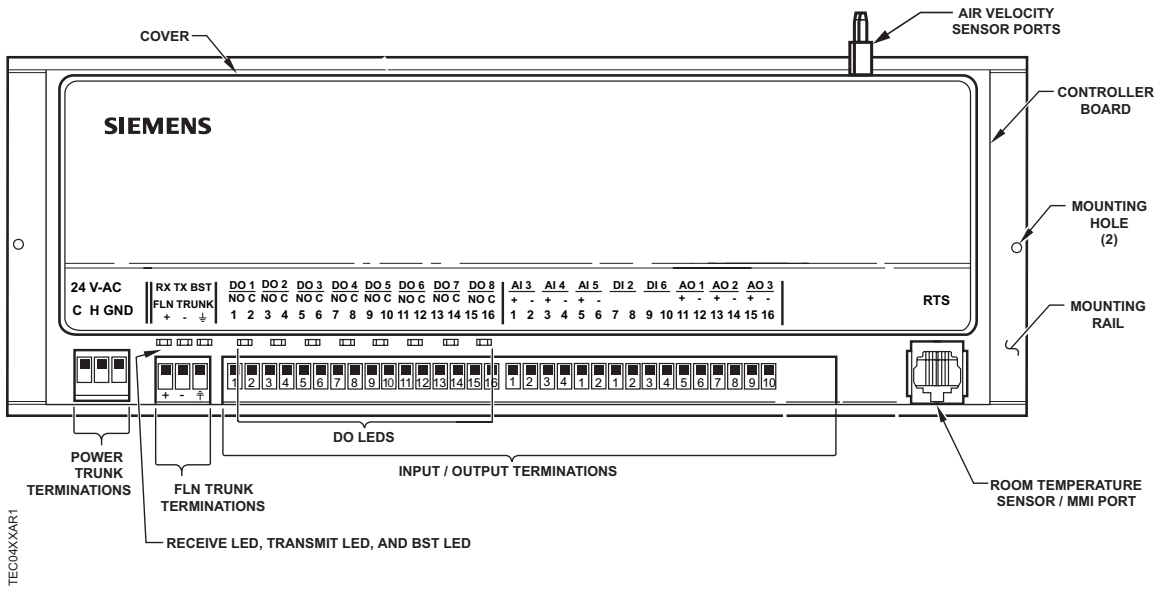

Figure 1. VAV BACnet ASC Controller: Application 2557 — 0 to 10 V Series Fan and 3-Stage Electric Heat.

Enabling Actuators

CAUTION:

The controller's DOs control only 24 Vac loads. The maximum rating is 12 VA for each DO.

Using an appropriate controller communication tool:

The points that determine actuator run times are:

- MTR 1 TIMING
- MTR 2 TIMING

- MTR 3 TIMING

Your application may not have or use all three points.

1. Use Table 1 and/or Table 2 to set run time(s) for the actuator(s) used by your application.
2. For damper rotation angles other than 90°, set DMPR ROT ANG to the appropriate value. The names of these points vary. (PTS4 rotation angle is 90°.)

Table 1. Damper Actuator Run Time.

Damper	Setting (seconds)	
Actuator	50 Hz	60 Hz
349-0101	106	88
GDE 131.1U	108	90
GDE 131.1P	108	90
GLB 131.1P	150	125
1GBB 171.1U	150	150
2GDE 161.1P	108	90
2GLB 161.1P	150	125

Table 2. Valve Actuator Run Time.

Valve	Setting (seconds)	
Actuator	50 Hz	60 Hz
SSB81U (Powermite – MZ Series)	180	150
SQS 82	155	130
SQS 65U (analog output 0 to 10V)	35	30
SQS 65.5U (analog output 0 to 10V)	35	30
SSB 61U (analog output 0 to 10V)	N/A	150

Specifying Motor Setup

CAUTION:

If an Autozero Module is used, do not enable MTR3 (valve 2).

MTR SETUP (Point 58) determines which actuators are controlled by the application and whether they are direct or reverse acting. Set MTR SETUP according to Table 3.

When MTR SETUP is changed, all enabled actuators will calibrate. Wait until each actuator has completed its calibration before continuing.

Table 3. Motor Enable/Reverse Values for MTR SETUP (Point 58).

	Motor 1 Enabled			Motor 1 Enabled and Reversed			Motor 1 Not Used		
	Motor 2 Not Used	Motor 2 Enabled	Motor 2 Enabled and Reversed	Motor 2 Not Used	Motor 2 Enabled	Motor 2 Enabled and Reversed	Motor 2 Not Used	Motor 2 Enabled	Motor 2 Enabled and Reversed
Motor 3 Not Used	1	5	13	3	7	15	0	4	12
Motor 3 Enabled	17	21	29	19	23	31	16	20	28
Motor 3 Enabled and Reversed	49	53	61	51	55	63	48	52	60

Setting the Application

Add the TEC to your job database and select Application 2557.

After you set the application, the controller goes through a shut-down/load sequence as it switches from slave mode to the application selected. After the application loads, the calibration cycle begins.

At the start of the calibration cycle, the controller automatically sets CAL AIR to YES. When the cycle is complete, CAL AIR returns to NO.

The air velocity sensor calibration cycle begins within three minutes of an application start-up or initialization, depending on the controller's address. After this delay, the calibration cycle takes from 2 to 5 minutes to complete. The air damper closes during this first calibration.

You can continue the startup procedure while calibration is underway. However, the controller will ignore commands to control end devices (such as the damper) until calibration of the air velocity sensor is finished.

Setting Number of Heat Stages or Valves

Depending on the application, HTG STG CNT or VLV CNT (if present) refers to electric heat stages or valves used (enabled), some point names may vary.

- For water or steam valve applications, set VLV CNT to the number of valves used (1 or 2).
- For electric heat applications, check the hardware to verify the number of electric heat stages wired to the controller (1 to 3) and set HTG STG CNT to this value.

CAUTION:

For installations using electric heat coils, never set min airflow settings to 0. Equipment damage can occur if electric heat is on without airflow.

Enabling Autozero Module

If an Autozero Module is used, enable it by setting CAL MODULE (Point 87) to **YES**.

CAUTION:

If an Autozero Module is used, do not enable MTR3 (valve 2).

For a controller without an Autozero Module, the damper is commanded closed to get a zero airflow reading during calibration. For a controller with an Autozero Module, the damper is closed only for the first calibration after controller initialization or power up.

Selecting Automatic Calibration Option

1. Using Table 4, set CAL SETUP to the value that best meets your job requirements.
2. If appropriate, change CAL TIMER from the default of 12 hours. This setting applies only if your choice for CAL SETUP includes Option 4.

The air velocity sensor must be calibrated at least once every 24 hours. Make sure that the sensor has been calibrated before balancing takes place, as this will affect the balancer's results.

Table 4. CAL SETUP Options.

CAL SETUP (Point 95)	Description
0	Calibration occurs ONLY when the point CAL AIR (Point 94) is set to YES.
1	Calibration occurs when the field panel commands a day/night mode changeover. Actual calibration is subject to a time delay of 0, 1, 2, or 3 minutes. This delay is determined by the point CTLR ADDRESS (Point 1) divided by 4. The remainder is the time delay in minutes. **Example:** If CTLR ADDRESS = 11, then the controller will wait 3 minutes (11 ÷ 4 = 2 **R3**) after it receives the day/night mode changeover command before beginning the calibration routine.
2	Calibration occurs immediately after the override switch is depressed.
4 (factory default value)	Calibration occurs on the time interval set in the point CAL TIMER (Point 96). For example, if CAL TIMER = 12, then the calibration period is 12 hours. Actual calibration is subject to a time delay based on the value of CTLR ADDRESS. See the example in Option 1. This is the recommended option when using a controller with an Autozero Module.

Options can be combined by summing their numbers. For example, to calibrate as in Options 1 and 2, set CAL SETUP to **3**.

Setting Room Temperature Setpoints

- DAY (or OCC) cooling setpoint
- DAY (or OCC) heating setpoint
- NGT (or UOC) cooling setpoint
- NGT (or UOC) heating setpoint

1. If the room temperature sensor has a setpoint dial that will be used, set STPT DIAL to YES. Otherwise set STPT DIAL to NO.
2. Set the room temperature setpoints to the desired values. (some points are not present in certain cooling only applications.)

If STPT DIAL is set to YES, do not set the DAY (or OCC) setpoints; the value of RM STPT DIAL will be used for these points.

3. Set RM STPT MIN and RM STPT MAX for the minimum and maximum allowable room temperature setpoint values, respectively. Valid values range from 55° to 95°F (13° to 35°C). Default values are 55°F (13°C) for RM STPT MIN and 90°F (32°C) for RM STPT MAX.

Setting Override Time

If using night/unoccupied override, set OVRD TIME to the number of whole hours that an override should last. If OVRD TIME equals 0 (default), this feature is disabled.

Setting FAN MODE

Set FAN MODE to the desired value, CONST or VARI. (VARI is the default, and means variable volume; CONST means constant volume.)

Setting Fan Flow Points (STAGE COUNT less than 3)

If STAGE COUNT (Point 88) equals 3, continue to the next section *Setting Fan Flow Points (STAGE COUNT equals 3)*.

1. Set FAN FLO CMAX to the maximum desired value that FAN FLOW should be during the occupied cooling mode. FAN FLO CMAX is also the value of FAN FLOW if FAN MODE equals CONST and the fan is ON.

2. Do one of the following:

   - If FAN MODE equals VARI, proceed with step 3 of this section.
   - If FAN MODE equals CONST, and STAGE COUNT equals 2, skip to step 4.
   - If FAN MODE equals CONST but STAGE COUNT is less than 2, skip steps 2 through 4, but READ THE NOTE at the end of this section, and then go to the *Setting FAN TIME* section.

3. Enter into FAN FLOW MIN the minimum value that you want FAN FLOW to be during the occupied heating and cooling modes.

4. Enter into FAN FLO HMAX the maximum value that you want FAN FLOW to be during the occupied heating mode.

If FAN MODE = CONST, it is STRONGLY recommended that FAN FLO MID be set equal to or greater than FAN FLO HMAX.

Setting Fan Flow Points (STAGE COUNT equals 3)

1. Set FAN FLO CMAX to the maximum desired value that FAN FLOW should be during the occupied cooling mode. FAN FLO CMAX is also the value of FAN FLOW if FAN MODE equals CONST and the fan is ON.

2. Do one of the following:

   - If FAN MODE equals VARI, proceed with step 3 of this section.
   - If FAN MODE equals CONST, and STAGE COUNT equals 2, skip to step 4.
   - If FAN MODE equals CONST but STAGE COUNT is less than 2, skip steps 2 through 4, but READ THE NOTE at the end of this section, and then go to the *Setting FAN TIME* section.

3. Enter into FAN FLOW MIN the minimum value that you want FAN FLOW to be during the occupied heating and cooling modes.

4. Enter into FAN FLO HMAX the maximum value that you want FAN FLOW to be during the occupied heating mode.

5. If you do not want any heating stage to modulate until the airflow out of the fan is equal to FAN FLO HMAX, then set both FAN FLOW MID and FAN FLO MORE equal to or greater than FAN FLO HMAX. Proceed to the *Setting FAN TIME* section.

6. If you want the 1st heating stage to be able to time modulate at a lower airflow than the 2nd heating stage does and if you want the 2nd heating stage to be able to time modulate at a lower airflow that than the 3rd heating stage does then set FAN FLO MORE less than FAN FLO HMAX and set FAN FLOW MID less than FAN FLO MORE.

   When the fan flow points are set this way, the 1st stage of heat can time modulate when FAN FLOW becomes equal to or greater than FAN FLOW MID, the 2nd stage of heat will be allowed to time modulate when FAN FLOW becomes equal to or greater than FAN FLOW MORE and the 3rd stage of heat can time modulate when FAN FLOW becomes equal to or greater than FAN FLOW HMAX. Proceed to the *Setting FAN TIME* section.

7. If you want the 1st heating stage to be able to time modulate at a lower airflow than the 2nd heating stage does and if you want the 2nd heating stage to time modulate at the same airflow that the 3rd heating stage does then set FAN FLO MID less than FAN FLO HMAX and set FAN FLO MORE greater than FAN FLO HMAX.

   When the fan flow points are set this way, then the 1st stage of heat will be allowed to time modulate when FAN FLOW becomes equal to or greater than FAN FLOW MID, while the 2nd and 3rd stages of heat will not be allowed to time modulate until FAN FLOW becomes equal to or greater than FAN FLOW HMAX. Proceed to the *Setting FAN TIME* section.

8. If you want the 1st heating stage to time modulate at the same airflow that the 2nd heating stage does and if you want the 2nd heating stage to time modulate at a lower airflow than the 3rd heating stage does then set FAN FLO MID greater than FAN FLO HMAX and set FAN FLO MORE less than FAN FLO HMAX. (Alternatively, you can get the same results by setting FAN FLOW MID less than FAN FLO HMAX and setting FAN FLO MORE less than FAN FLOW MID.)

   When the fan flow points are set this way, then the 1st and 2nd stages of heat won't be allowed to time modulate until FAN FLOW becomes equal to or greater than FAN FLO MORE while the 3rd stage of heat will not be allowed to time modulate until FAN FLOW becomes equal to or greater than FAN FLOW HMAX.

If FAN MODE = CONST, it is STRONGLY recommended that both FAN FLO MID and FAN FLO MORE be set equal to or greater than FAN FLO HMAX.

Setting FAN TIME

FAN TIME is used as a speed limit. It means different things under different circumstances.

- When FAN TIME is set to be less than LOOP TIME (regardless of the value of STAGE COUNT, the application does not use FAN TIME. When this occurs, FAN FLOW can change its value as fast as the Heating PID Loop wants it to change.

- When FAN MODE equals CONST, FAN TIME is not used (regardless of the value of STAGE TIME). This is because FAN TIME is not needed for constant volume fans.

The following two bullet items describe how FAN TIME functions when FAN TIME is set to equal to or greater than LOOP TIME and FAN MODE equals VARI.

- When STAGE COUNT equals 1, OR, when STAGE COUNT equals 2 and FAN FLOW MID is equal to or greater than FAN FLO HMAX, FAN FLOW is not allowed to change from FAN FLOW MIN to FAN FLO HMAX (or vice versa) faster than the length of time set in FAN TIME.

- When STAGE COUNT equals 2 and FAN FLOW MID is less than FAN FLO HMAX, FAN FLOW is not allowed to change from FAN FLOW MIN to FAN FLOW MID (or vice versa) faster than the length of time set in FAN TIME. Also, under these conditions, the same length of time is required for FAN FLOW to change from FAN FLOW MID to FAN FLO HMAX (or vice versa).

The rest of the bullet items in this section describe how FAN TIME functions when STAGE COUNT is 3. If you have set STAGE COUNT to be less than 3, you can skip the remainder of this section and proceed to the next section. Otherwise, enter a value for FAN TIME.

- When STAGE COUNT equals 3 and FAN FLOW MID and FAN FLO MORE are both greater than or equal to FAN FLO HMAX, FAN FLOW is not allowed to change from FAN FLOW MIN to FAN FLO HMAX (or vice versa) faster than the length of time set in FAN TIME.

- When STAGE COUNT equals 3, and FAN FLOW MID is less than FAN FLO HMAX, and FAN FLO MORE is greater than or equal to FAN FLO HMAX, FAN FLOW is not allowed to change from FAN FLOW MIN to FAN FLOW MID (or vice versa) faster than the length of time set in FAN TIME. Also, under these conditions, the same length of time is required for FAN FLOW to change from FAN FLOW MID to FAN FLO HMAX (or vice versa).
- When STAGE COUNT equals 3, and FAN FLOW MID is greater than or equal to FAN FLO HMAX, and FAN FLO MORE is less than FAN FLO HMAX, FAN FLOW is not allowed to change from FAN FLOW MIN to FAN FLO MORE (or vice versa) faster than the length of time set in FAN TIME. Also, under these conditions, the same length of time is required for FAN FLOW to change from FAN FLO MORE to FAN FLO HMAX (or vice versa).
- When STAGE COUNT equals 3, and FAN FLOW MID is less than both FAN FLO MORE and FAN FLO HMAX, and FAN FLO MORE is less than FAN FLO HMAX, FAN FLOW is not allowed to change from FAN FLOW MIN to FAN FLOW MID (or vice versa) faster than the length of time set in FAN TIME. Also, the same length of time as stored in FAN TIME is required for FAN FLOW to change from FAN FLOW MID to FAN FLO MORE (or vice versa). Furthermore, under these conditions, the same length of time as stored in FAN TIME is required for FAN FLOW to change from FAN FLO MORE to FAN FLO HMAX (or vice versa).

Setting Stage Times

1. If STAGE COUNT equals 2 or 3, enter into STG 1 TIME the amount of time HEAT STAGE 1 must be ON before HEAT STAGE 2 may turn ON.
2. If STAGE COUNT equals 2, enter into STG 2 TIME the amount of time HEAT STAGE 2 must be OFF before HEAT STAGE 1 may turn OFF.

   If STAGE COUNT equals 3, then enter into STG 2 TIME the amount of time HEAT STAGE 2 must be OFF before HEAT STAGE 1 may turn OFF and the amount of time that HEAT STAGE 2 must be on before HEAT STAGE 3 may turn ON.
3. If STAGE COUNT equals 3, then enter into STG 3 TIME the amount of time HEAT STAGE 3 must be OFF before HEAT STAGE 2 may turn OFF.

Setting HTG DBAND

BASE DO6 cannot turn ON in the unoccupied mode unless CTL TEMP < CTL STPT − HTG DBAND.

Enter the desired value for HTG DBAND.

Setting MORN DBAND

At the beginning of the occupied mode WARMUP (Point 60) cannot turn ON unless CTL TEMP < CTL STPT − MORN DBAND.

Enter the desired value for MORN DBAND.

Setting TEMP HLIMIT and TEMP LLIMIT

The supply air damper cannot modulate in the unoccupied mode until CTL TEMP rises above TEMP HLIMIT.

1. Enter the desired value for TEMP HLIMIT.

   The electric heat will not be allowed to time modulate in the unoccupied mode until CTL TEMP drops below TEMP LLIMIT.

2. Enter the desired value for TEMP LLIMIT.

Setting the Heat Sequencing Points (STAGE COUNT less than 3)

If STAGE COUNT equals 3, continue to *Setting the Heat Sequencing Points (STAGE COUNT equals 3)*.

When FAN MODE equals CONST, the airflow out of the fan is constant at FAN FLO CMAX. In this case, the electric heat works best if FLOW END (Point 17) is set equal to 0.

- If FAN MODE equals CONST, enter the desired value for FLOW END and skip the rest of this section. If FAN MODE equals VARI, continue with the rest of this section.

When Application 2557 is configured with only one stage of electric heat (STAGE COUNT, equals 1), FAN FLOW will be set equal to FAN FLO HMAX and the heat stage will time modulate whenever HTG LOOPOUT is equal to or greater than FLOW END.

- Enter the desired value for FLOW END and skip the rest of this section. (If you are not sure where to set FLOW END, try setting it to 33.)

If the application is configured with two stages of electric heat (STAGE COUNT equals 2), and FAN FLOW MID is set equal to or greater than FAN FLO HMAX, FAN FLOW will be set equal to FAN FLO HMAX (and both heat stages will time modulate) whenever HTG LOOPOUT is equal to or greater than FLOW END.

- Enter the desired value for FLOW END and skip the rest of this section. (If you are not sure where to set FLOW END, it is recommended that you set it to 33.)

If the application is configured with two stages of electric heat, and FAN FLOW MID is set less than FAN FLO HMAX, then the following four conditions and caution apply:

- When HTG LOOPOUT is equal to FLOW 1 END, FAN FLOW will be set equal to FAN FLOW MID.
- When HTG LOOPOUT is between FLOW 1 END and FLOW 2 START, HEAT STAGE 1 will time modulate.
- When HTG LOOPOUT goes from FLOW 2 START to FLOW END, FAN FLOW will go from FAN FLOW MID to FAN FLO HMAX.
- When HTG LOOPOUT is greater than FLOW END, HEAT STAGE 2 will time modulate.

CAUTION:

Make sure that FLOW 1 END < FLOW 2 START < FLOW END. If this is not done, the application can lock up. (For example, if FLOW 2 START is < FLOW 1 END, the fan flow and electric heat will remain frozen in place indefinitely.)

Set FLOW 1 END, FLOW 2 START, and FLOW END to the desired values. (If you are not sure what value to set these points to, it is recommended that you set FLOW 1 END to 25, FLOW 2 START to 50 and FLOW END to 75).

Setting the Heat Sequencing Points (STAGE COUNT equals 3)

When FAN MODE equals CONST, the airflow out of the fan is constant at FAN FLO CMAX. In this case, the electric heat works best if FLOW END is set equal to 0.

- If FAN MODE equals CONST, enter the desired value for FLOW END and skip the rest of this section. If FAN MODE equals VARI, continue with the rest of this section.

If the application is configured with three stages of electric heat (STAGE COUNT equals 3), and FAN FLOW MID and FAN FLO MORE are both set equal to or greater than FAN FLO HMAX, FAN FLOW will be set equal to FAN FLO HMAX (and all three heat stages will be allowed to time modulate) whenever HTG LOOPOUT is equal to or greater than FLOW END.

- Enter the desired value for FLOW END and skip the rest of this section. (If you are not sure where to set FLOW END, it is recommended that you set it to 25.)

If the application is configured with three stages of electric heat, and FAN FLOW MID is set less than FAN FLO HMAX, and FAN FLO MORE is greater than or equal to FAN FLO HMAX, then the following four conditions and caution apply:

- When HTG LOOPOUT is equal to FLOW 1 END, FAN FLOW will be set equal to FAN FLOW MID.

- When HTG LOOPOUT is between FLOW 1 END and FLOW 2 START, HEAT STAGE 1 will time modulate.
- When HTG LOOPOUT goes from FLOW 2 START to FLOW 2 END, FAN FLOW will go from FAN FLOW MID to FAN FLO HMAX.
- When HTG LOOPOUT is greater than FLOW 2 END, HEAT STAGE 2 and HEAT STAGE 3 will time modulate.

CAUTION:

Make sure that FLOW 1 END < FLOW 2 START < FLOW END. If this is not done, the application can lock up. (For example, if FLOW 2 START is < FLOW 1 END, the fan flow and electric heat will remain frozen in place indefinitely.)

Set FLOW 1 END, FLOW 2 START, and FLOW 2 END to the desired values and skip the rest of this section. (If you are not sure what value to set these points to, it is recommended that you set FLOW 1 END to 20, FLOW 2 START to 40, and FLOW 2 END to 60.)

If the application is configured with three stages of electric heat, and FAN FLOW MID is set greater than or equal to FAN FLO HMAX, and FAN FLO MORE is less than FAN FLO HMAX, then the following four conditions and caution apply:

- When HTG LOOPOUT is equal to FLOW 1 END, FAN FLOW will be set equal to FAN FLO MORE.
- When HTG LOOPOUT is between FLOW 1 END and FLOW 3 START, HEAT STAGE 1 and HEAT STAGE 2 will time modulate.
- When HTG LOOPOUT goes from FLOW 3 START to FLOW END, FAN FLOW will go from FAN FLO MORE to FAN FLO HMAX.
- When HTG LOOPOUT is greater than FLOW END, HEAT STAGE 3 will time modulate.

CAUTION:

Make sure that FLOW 1 END < FLOW 3 START < FLOW END. If this is not done, the application can lock up. (For example, if FLOW END is < FLOW 3 START, the fan flow and electric heat will remain frozen in place indefinitely.)

Set FLOW 1 END, FLOW 3 START, and FLOW END to the desired values and skip the rest of this section. (If you are not sure what value to set these points to, it is recommended that you set FLOW 1 END to 20, FLOW 3 START to 60, and FLOW END equal to 80.)

If the application is configured with three stages of electric heat, FAN FLOW MID is set less than both FAN FLO MORE and FAN FLO HMAX and FAN FLO MORE is less than FAN FLO HMAX, then the following six conditions and caution apply:

- When HTG LOOPOUT is equal to FLOW 1 END, FAN FLOW will be set equal to FAN FLOW MID.

- When HTG LOOPOUT is between FLOW 1 END and FLOW 2 START, HEAT STAGE 1 will time modulate.
- When HTG LOOPOUT goes from FLOW 2 START to FLOW 2 END, FAN FLOW will go from FAN FLOW MID to FAN FLO MORE
- When HTG LOOPOUT is between FLOW 2 END and FLOW 3 START, HEAT STAGE 2 will time modulate.
- When HTG LOOPOUT goes from FLOW 3 START to FLOW END, FAN FLOW will go from FAN FLO MORE to FAN FLO HMAX.
- When HTG LOOPOUT is greater than FLOW END, HEAT STAGE 3 will time modulate.

CAUTION:

Make sure that FLOW 1 END < FLOW 2 START < FLOW 2 END < FLOW 3 START < FLOW END. If this is not done, the application can lock up. (For example, if FLOW 3 START is < FLOW 2 END, the fan flow and electric heat will remain frozen in place indefinitely.).

Set FLOW 1 END, FLOW 2 START, FLOW 2 END, FLOW 3 START and FLOW END to the desired values. (If you are not sure what value to set these points to, it is recommended that you set FLOW 1 END to 10, FLOW 2 START to 30, FLOW 2 END equal to 45, FLOW 3 START equal to 65 and FLOW END equal to 80.)

Setting Box Size

One of the functions of Application 2557 is to determine the proper airflow value for the terminal box's VAV fan. This value is stored in FAN FLOW (Point 33). Once a value for FAN FLOW has been determined, a Table Statement embedded in the application's firmware uses it to determine the proper value for FAN AOV1. The application actually contains 4 such Table Statements, but only one will be used. Selecting the correct Table Statement depends on the value of BOX SIZE.

- BOX SIZE should be set to 3, 5, or 7 when a Nailor box is using a of size 3, 5, or 7. When this is done, the application will use 1 of 3 pre-coded Table Statements with pre-determined FAN AOV1 voltage levels that correspond to airflow values of FAN FLOW. The voltage and flow values in these pre-coded Table Statements are fixed and cannot be changed by the user.
- BOX SIZE should be set to 0 when a box other than a Nailor box is being used, or when a Nailor Box is using a size other than 3, 5 or 7. When this is done, the application uses an embedded, general purpose Table Statement to adjust the value of FAN AOV1 based on the value of FAN FLOW. The flow and voltage values of this table statement are not pre-coded and must be entered into the controller.

Enter the desired value for BOX SIZE.

If BOX SIZE is set to a value other than 0, READ THE NOTE at the end of this section, then proceed with Setting Controller Address.

If BOX SIZE is set to 0, the controller needs to have the following fan AOV Table Statement parameters entered into it:

- FLO LO – This is the lowest flow the fan can produce. (FLO LO must be equal to or less than FAN FLOW MIN.

CAUTION:

Make sure that FLO LO is high enough that the fan can actually maintain it. If FLO LO is set too low, the fan could shut off without the application being aware of it. If this happens, there is a possibility that the electric heat could turn on while the fan is off. Consult with the fan manufacturer to find out what the lowest airflow is that the fan can maintain.

- FLO LO VOLTS – This is the voltage value that FAN AOV1 must have in order to get the fan to produce the amount of airflow that is stored in FLO LO.
- FLO HI – This is the highest flow that the fan can produce. FLO HI must be set greater than or equal to both FAN FLO HMAX and FAN FLO CMAX.
- FLO HI VOLTS – This is the voltage value that FAN AOV1 must have in order to get the fan to produce the amount of airflow that is stored in FLO HI.

Enter the desired values for FLO LO, FLO HI, FLO LO VOLTS and FLO HI VOLTS.

When properly set up, the Table Statement works as follows:

- When FAN FLOW is equal to or less than FLO LO, FAN AOV1 will be set to FAN LO VOLTS.
- When FAN FLOW is equal to or greater than FAN HI, FAN AOV1 will be set to FAN HI VOLTS.
- When FAN FLOW is in between FLO LO and FLO HI, the Table Statement will use linear interpolation to set the value of FAN AOV1 to a value that is between FAN LO VOLTS and FAN HI VOLTS.

Once FAN AOV1 is set to a particular voltage, this signal is sent to an intelligent motor controller that controls the fan and which is provided by others. This controller must be configured to know what airflow corresponds to a given voltage of FAN AOV1. Consult the operating instructions provided by the manufacturer of the intelligent motor controller for proper set-up information.

Setting Controller Address

Set the controller address by setting CTLR ADDRESS to the appropriate number, see *Configuring BACnet Parameters*.

For BACnet TECs, the controller address is the same as the BACnet MAC address.

Except for BACnet controllers, update each controller at the field panel immediately after you have completed the controller start-up procedures and made all other changes to the controller's point database, including balancing, tuning, etc.

Setting Duct Area

If provided, enter the duct area (sq ft or sq m) into DUCT AREA (and also into HTGDUCT AREA, where applicable) and continue to *Setting Flow Coefficient*.

If you do not know the duct area, use the following table:

Area =	Round Duct	Rectangular Duct
Area in Sq. Ft. (Dimensions in inches)	$(\pi \times R^2)/144$	Length x Height/144
Area in Sq. M (Dimensions in centimeters)	$(\pi \times R^2)/10{,}000$	Length x Height/10,000

Setting Flow Coefficient

1. Set FLOW COEFF to the appropriate value found in Table 5. This value is a starting point for the air balancer.

2. To fine tune the flow coefficient use the following formula:

   new flow coefficient = (actual volume ÷ TEC volume) × old flow coefficient

   The actual volume is the actual value obtained from the balancer's measurements. The TEC volume is the value obtained from AIR VOLUME.

3. If the TEC volume is not within 5% of the actual volume, repeat the procedure until it is within 5%.

Table 5. Box Manufacturer Flow Coefficients.

Manufacturer	Sensor Type	Value
Anemostat	2-pipe without orifice 2-pipe with orifice Spider without orifice Spider with orifice	0.79 0.59 0.73 0.39
Carnes	2-pipe Flow cross	0.66 0.59
Carrier		0.59
E.H. Price / Siemens Building Technologies Lab Terminal Boxes		0.78
Environmental Technologies		0.79
Krueger		0.68
Metal Aire		0.72
Nailor Industries		0.69
Titus		0.60
Trane		0.66

Set MIN and MAX Airflow Setpoints

The maximum flow must be greater than or equal to the minimum flow.

1. Set CTL FLOW MIN to the desired minimum airflow setpoint. (This will be used as both the heating and cooling minimum airflow.)
2. Set CLG FLOW MAX to the desired maximum cooling airflow setpoint.
3. Set HTG FLOW MAX to the desired maximum heating airflow setpoint.

Enabling Wall Switch

If a wall switch is used for day/night (occ/unocc) control, enable it by setting WALL SWITCH to YES.

Setting Room Temperature Offset (optional)

The Room Temperature Offset feature is optional.

When the room has stabilized to within 5°F, take a precision temperature reading at the room temperature sensor, record any difference between this reading and the value of ROOM TEMP and set this difference value (to the nearest 0.25°F) into RMTMP OFFSET.

Example

If the actual room temperature is 72.0°F, and the value of ROOM TEMP is 73.0°F, then the value entered into RMTMP OFFSET is –1.0. In this case, the value of ROOM TEMP would read 73.0°F, but the value of CTL TEMP would read 72.0°F.

CTL TEMP = ROOM TEMP + RMTMP OFFSET

Configuring BACnet Parameters

WinCIS version 2.1.4 or later must be used to configure Siemens Building Technologies BACnet MS/TP TECs.

Do not check the Metric checkbox in the Device Properties dialogue box if the controller is communicating through the MS/TP driver in the Field Panel. Metric can be checked only if the controller is communicating through a router. If you need metric and the controller is communicating through the MS/TP driver in the Field Panel, then the Metric checkbox in the Device Properties dialogue box must be unchecked and the conversion must be handled in the Field Panel.

Using WinCIS, do the following:

1. From the **Device** menu, select **Device Properties** to configure BACnet parameters.
    - **Object Name** – unique to BACnet network, (12 character RAD50 limit).
    - **Object ID** – unique to BACnet network, valid values = 0 to 4,194,303.
    - **Description** – description of controller (60 character limit).
    - **Location** – physical location of controller (60 character limit).
    - **Baud Rate** – options; 9600, 19200, 38400 or 76800, default = 19200.
    - **MSTP Master/Slave** – do **one** of the following:
        - Check the Slave checkbox if the controller communicates with a Field Panel using the MS/TP driver.
        - Uncheck the Slave checkbox if the controller is communicating through a router.
2. Press the '**Write**' button — the controller accepts the configuration values and then resets.

When the BACnet MS/TP TEC is successfully installed, the RX and TX LEDs flash On/Off very rapidly and continuously.

Start-up Notes

1. Under certain circumstances, how Application 2557 controls depends on whether VAV AHU is ON or OFF. When VAV AHU is ON, the application interprets this to mean that the central air handling unit that this terminal box is connected to is ON. Likewise, when VAV AHU is OFF, the application interprets this to mean that the central air handling unit is OFF.

2. Application 2557 only reacts to VAV AHU; it does not command it. In order to command VAV AHU, this point needs to be unbundled at a field panel and PPCL written to control it. (See the Control Loops section in the application bulletin for more information on how the application uses VAV AHU.)