SIEMENS

BACnet Terminal Box Controller—Electronic Output

Start-up Procedures

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Before You Begin

CAUTION:

Do not perform an update command on a BACnet MS/TP TEC from the Field Panel or from within Insight. This feature is not currently supported.

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

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

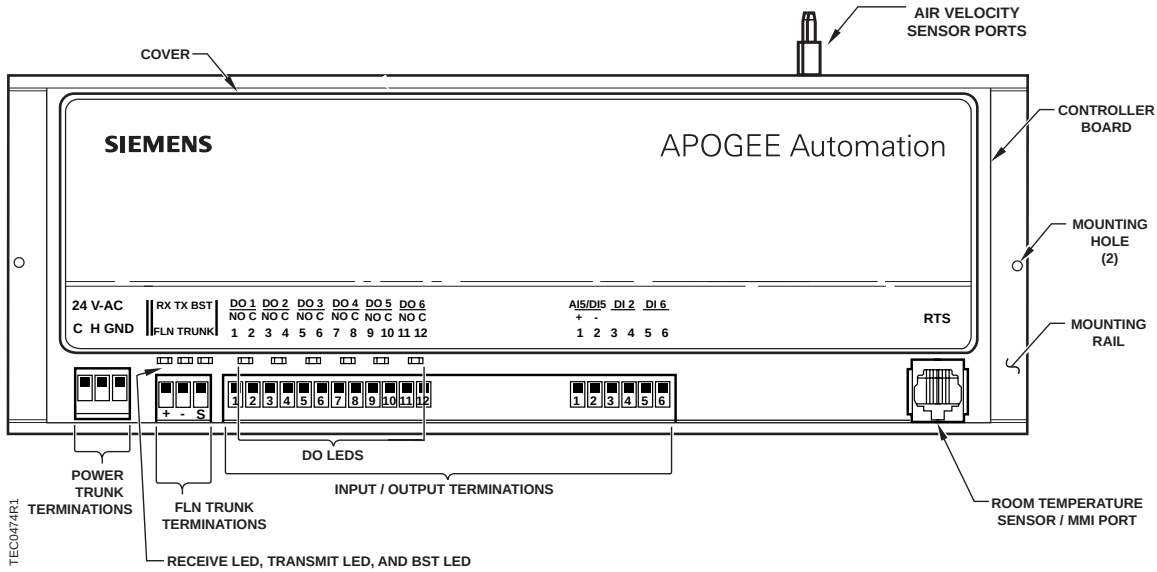

Figure 1. BACnet Terminal Box Controller—Electronic Output.

Enabling Actuators

CAUTION:

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

The points that determine actuator run times are:

- MTR 1 TIMING (Point 51)
- MTR 2 TIMING (Point 55)

- MTR 3 TIMING (Point 39)

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 Point Number 56 (and/or 57 if present) to the appropriate value. The names of these points vary. (PTS4 rotation angle is 90°.)

Table 1. Damper Actuator Run Time.

Damper Actuator	Setting (seconds)	
	50 Hz	60 Hz
GDE131.1	125	90
GLB131.1	150	125
PTS4 electronic-to-pneumatic transducer from ACT	–	90

Table 2. Valve Actuator Run Time.

Valve Actuator	Setting (seconds)	
	50 Hz	60 Hz
SSB81U, floating control fail in place	180	150
SSC81U, floating control fail in place	150	125
SSC81.5U, floating control fail-safe	125	125
SQS85.53U, floating control spring return	35	30
PTS4 electronic-to-pneumatic transducer from ACT	–	90

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 Controller Address

Set the controller address by setting CTLR ADDRESS (Point 1) to the appropriate number.

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.

The start-up is complete.

Setting the Application

Add the TEC to your job database and select one of the following applications.

Table 4. BACnet Terminal Box Controller—Electronic Output Applications.

Application Description	Application Number
VAV Cooling Only	2510
VAV Cooling or Heating	2511
VAV with Electric Reheat or Baseboard Radiation	2512

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Table 4. BACnet Terminal Box Controller—Electronic Output Applications. ***(continued)***

VAV with Hot Water Reheat	2513
VAV Series Fan Powered with Electric Reheat	2514
VAV Series Fan Powered with Hot Water Reheat	2515
VAV Parallel Fan Powered with Electric Reheat	2516
VAV Parallel Fan Powered with Hot Water Reheat	2517
VAV Slave Mode	2587

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 (Point 94) 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, Point 88 (if present) refers to electric heat stages or the number of valves used (enabled).

Water or Steam Valves: If Point 88 is present and defines the number of valves used (enabled), set it to the correct number.

Electric Heat applications only: Check the hardware to verify the number of electric heat stages wired to the controller. Set STAGE COUNT (Point 88) 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 5, set CAL SETUP (Point 95) to the value that best meets your job requirements.
2. If appropriate, change CAL TIMER (Point 96) 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 5. 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

Points 6, 7, 8, and 9 are the room temperature setpoints. The following list shows the function of each point (point names vary per application):

- Point 6: DAY (or OCC) cooling setpoint.
- Point 7: DAY (or OCC) heating setpoint.
- Point 8: NGT (or UOC) cooling setpoint.
- Point 9: NGT (or UOC) heating setpoint.

1. If the room temperature sensor has a setpoint dial that will be used, set STPT DIAL (Point 14) to **YES**. Otherwise set STPT DIAL to **NO**.
2. Set Points 6 through 9 to desired values. (Points 7 and 9 are not present in certain cooling only applications.)

If STPT DIAL is set to YES, Points 6 and 7 can be skipped; the value of RM STPT DIAL (Point 13) is used instead.

3. Set RM STPT MIN (Point 11) and RM STPT MAX (Point 12) for the minimum and the maximum allowable room temperature setpoint values respectively. Valid values range from 55°F to 95°F (13°C 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 (Point 20) to the number of whole hours that an override should last. If OVRD TIME equals 0 (default), this feature is disabled.

Enabling Wall Switch

If a wall switch is used for day/night (occ/unocc) control, enable it by setting WALL SWITCH (Point 18) to **YES**.

Setting Duct Area

If provided, enter the duct area (sq ft or sq m) into Point 97 (and also into Point 60 in applications where Point 60 is named HTGDUCT AREA) and continue to *Setting Flow Coefficient*.

If you do not know the duct area, follow these steps:

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 (Point 36) to the appropriate value found in Table 6. This value is a starting point for the air balancer.

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

   The actual volume is the actual value obtained from the balancer's measurements. The TEC volume is the value obtained from AIR VOLUME (Point 35).

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

Table 6. 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

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Table 6. Box Manufacturer Flow Coefficients. ***(continued)***

Manufacturer	Sensor Type	Value
Nailor Industries		0.69
Titus		0.60
Trane		0.66

Setting Airflow Setpoints

Maximum flow(s) must be set ≥ minimum flow(s).

1. Set CLG FLOW MIN (Point 31) to the desired minimum cooling airflow setpoint.
2. Set CLG FLOW MAX (Point 32) to the desired maximum cooling airflow setpoint.

Applications 2511–2517:

3. Set HTG FLOW MIN (Point 33) to the desired minimum heating airflow setpoint.
4. Set HTG FLOW MAX (Point 34) to the desired maximum heating airflow setpoint.

CAUTION:

If using electric heat in a unit without a terminal fan, **do not** set HTG FLOW MIN to 0. Equipment damage may occur at 0 cfm with electric heat ON.

Setting Room Temperature Offset (optional)

When the room has stabilized (within 5°F) take a precision temperature reading at the room temperature sensor. Record the difference between this reading and the value of ROOM TEMP (Point 4) in RMTMP OFFSET (Point 3).

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 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 must be unchecked and the conversion must be handled in the Field Panel.

Using WinCIS: From the Device menu, select Device Properties to configure BACnet parameters.

1. **Object Name** – unique to BACnet network, default = VAV CTLR (12 character RAD50 limit).
2. **Object ID** – unique to BACnet network, valid values = 0 to 4,194,303.
3. **Description** – description of controller (60 character limit).
4. **Location** – physical location of controller (60 character limit).
5. **Baud Rate** – options; 9600, 19200, 38400 or 76800, default = 19200.
6. **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.
7. Press the '**Write**' button — the controller accepts the configuration values and then resets.

The startup is complete upon completion of BACnet parameters configuration.

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