SIEMENS

Siemens BACnet Actuator—Electronic Output

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 controllers.

If WinCIS does not communicate (through the HMI port / RTS sensor), try a different baud rate. The default baud rate is 1200 (allowable baud rates are: 1200, 9600, 19200, 38400 and 76800).

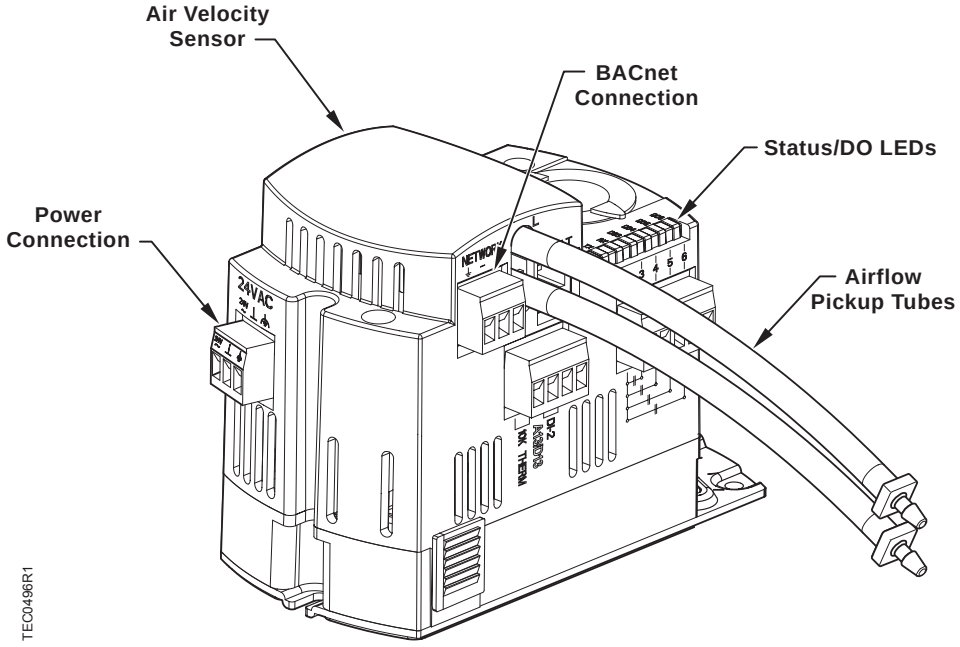

Figure 1. Siemens BACnet Actuator.

Communication and DO Indicators

The BACnet actuator has LEDs to indicate communication (yellow) and DO (digital output) status (green).

The RX LED will flash for data packets received by the actuator from the MS/TP network. The TX LED will flash for data packets sent by the actuator to the MS/TP network. Each DO (3 to 6) has an associated LED located above its termination point. This LED point is on when the associated DO is commanded ON, otherwise it is OFF. The BACnet actuator will attempt to communicate with other devices as soon as it powers up. The TX LED will start flashing as it attempts to connect and transfer data.

Setting Controller Address

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

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

Set the controller address and MS/TP network baud rate prior to connecting the controller to the network.

The start-up is complete.

Setting the Application

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

Table 1. Siemens BACnet Actuator—Electronic Output Applications.

Application Description	Application Number
VAV Cooling Only	2560
VAV Cooling or Heating	2561
VAV with Electric Reheat or Baseboard Radiation	2562
VAV with Hot Water Reheat	2563
VAV Series Fan Powered with Electric Reheat	2564
VAV Series Fan Powered with Hot Water Reheat	2565
VAV Parallel Fan Powered with Electric Reheat	2566
VAV Parallel Fan Powered with Hot Water Reheat	2567
VAV Slave Mode	2597

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.

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
- MTR 2 TIMING
- MTR 3 TIMING

Your application may not have or use all three points.

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

Table 2. Damper Actuator Run Time.

Damper Actuator	Setting (seconds)	
	50 Hz	60 Hz
GDE131.1	125	90
GLB131.1	150	125

Table 3. Valve Actuator Run Time.

Valve Actuator	Setting (seconds)	
	50 Hz	60 Hz
SSB81U, floating control fail in place	180	150

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Table 3. Valve Actuator Run Time. ***(continued)***

Valve Actuator	Setting (seconds)	
	50 Hz	60 Hz
SSC81U, floating control fail in place	150	125
SSC81.5U, floating control fail-safe	125	125
SQS85.53U, floating control spring return	35	30

Specifying Motor Setup

CAUTION:

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

MTR SETUP determines which actuators are controlled by the application and whether they are direct or reverse acting. Set MTR SETUP according to Table 4.

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

Table 4. Motor Enable/Reverse Values for MTR SETUP (Point 58).

		Motor 1 (Damper)	
		Enabled	Enabled and Reversed
Motor 2	Not Used	1 (default)	3
	Enabled	5	7
	Enabled and Reversed	13	15

Verifying Actuator Setup

1. Command all actuators closed. Verify that they close and remain closed. If not, adjust the setting for MTR SETUP according to Table 4.

2. If any of the actuators still do not close completely, then the actuators have been installed or set up incorrectly. See the installation instructions, the iKnow Troubleshooting Tool, or contact Field Support.

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 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 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 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

- 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.

Enabling Wall Switch

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

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)	$(\pi \times R^2)/144$	Width x Height/144
Area in Sq. M (Dimensions in centimeters)	$(\pi \times R^2)/10{,}000$	Width x Height/10,000

Setting Flow Coefficient

1. Set FLOW COEFF 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:

   new flow coefficient = (actual volume / TEC volume) x 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 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
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 to the desired minimum cooling airflow setpoint.
2. Set CLG FLOW MAX to the desired maximum cooling airflow setpoint.

Applications 2561 - 2567:

3. Set HTG FLOW MIN to the desired minimum heating airflow setpoint.
4. Set HTG FLOW MAX to the desired maximum heating airflow setpoint.

For Applications 2562, 2563, 2564, and 2566, HTG FLOW MAX should be less than CLG FLOW MAX. Otherwise, cold supply air may cool rather than heat the space in heating mode. A typical setting for HTG FLOW MAX is 50% or less of CLG FLOW MAX.

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)

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

Performing the Automated Checkout

The Siemens BACnet Actuator has a built-in checkout procedure that can be manually initiated at any time after the controller has been installed. This procedure tests all of the necessary I/O and ensures the controller has the ability to operate within the set airflow range, between CLG FLOW MIN (Point 31) and CLG FLOW MAX (Point 32).

To perform the checkout procedure, set CHK OUT (Point 66) to YES. When the procedure has completed, CHK OUT returns to NO and the results are displayed in CHK STATUS (Point 70), Table 7.

Table 7. Possible Failure Value and Description.

CHK STATUS Values (Point 70)	Description
-1	Checkout procedure has not been run since last controller initialization.
0	No errors found.
1	RTS failed.
2	Room Setpoint dial failed [If STPT DIAL (Point 14) = YES].

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Table 7. Possible Failure Value and Description. ***(continued)***

CHK STATUS Values (Point 70)	Description
4	AVS failed.
8	Controller could not reach CLG FLOW MIN or below.
16	Controller could not reach CLG FLOW MAX or above.

Multiple failures are added together and displayed as one value. For example, if the RTS failed (1) and the controller could not reach CLG FLOW MAX (16), CHK STATUS displays 17.

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, default = VAV CTLR (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.

The startup is complete upon completion of BACnet parameters configuration.