SIEMENS

BACnet PTEC Controller

Unit Conditioner Heating and Cooling Controller with Multi-Speed Fan, ON/OFF Switch, and Occupancy Sensor

Start-up Procedures

140-1177
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Restricted

Building Technologies

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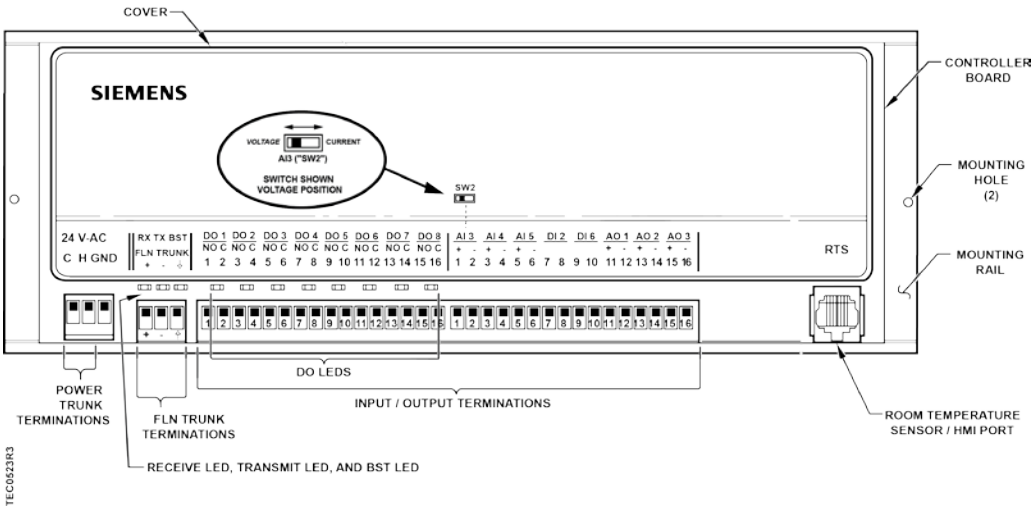
Before You Begin

NOTE:
For information on applications with Firmware Revision B*x*40 or earlier, see InfoLink and/or Asset Portal for documentation.

NOTE:
WCIS version 4.0 or later must be used to configure and auto-address Siemens BACnet MS/TP Equipment Controllers.

If you need metric units and the controller is communicating through the MS/TP driver in the field panel, uncheck the Metric check box. The conversion must be handled in the field panel.



Generic Controller I/O Layout. See *Wiring Diagram* for application specific details.

NOTE:
Digital Room Units (Firmware Revision 26 and later) will update their controlled inputs without putting them Out Of Service. However, a command from an external source through the digital room unit will put the associated BACnet Input point Out Of Service.

Communication and DO Indicators

The Siemens BACnet PTEC Unit Conditioner Heating and Cooling Controller with Multi-Speed Fan, ON/OFF Switch, and Occupancy Sensor has LEDs to indicate communication (yellow) and DO (digital output) status BST (yellow).

The RX LED will flash for data packets received by the controller from the MS/TP network. The TX LED will flash for data packets sent by the controller to the MS/TP network. Each DO 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 PTEC will automatically detect the MS/TP baud rate at start up and will communicate with other devices when configured as a master MS/TP device (address 1 through 127). The TX LED will start flashing as it attempts to communicate with other devices.

Room Unit Identification

- For Analog Room Units – The revision number is visually identified by its case.
- For Digital Room Units (Firmware Revision 25 or earlier) – The revision number displays for 5 seconds when the room unit is first powered up. These room units will display `laptop` when a laptop is connected and will no longer update room temperature sensor values.
- For Digital Room Units (Firmware Revision 26 and later) – The revision number displays for 5 seconds when the room unit is first powered up or when a laptop is disconnected. These room units will continue to display and update the room temperature sensor values when a laptop is connected.

Setting the Application

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

Application Description	Application Number
Unit Conditioner Heating and Cooling with Multi-Speed Fan, ON/OFF Switch, and Occupancy Sensor	6611
Slave Mode	6697

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.

Setting Room Temperature Offset (optional)

Enter plus or minus corrections for room temperature sensor in RMTMP OFFSET.

When the room temperature (or location of auxiliary sensor, if selected) has stabilized, take a precision temperature reading over a period of time at the temperature sensor, record any difference between this reading and the value of ROOM TEMP (or AI4 or AUX TEMP AI5) and set this difference value (to the nearest 0.25°F (0.14°C)) into RMTMP OFFSET.

Example

If the actual room temperature is 72.0°F (22.2°C), but the value of ROOM TEMP is showing 73.0°F (23.8°C), then the value to be entered into RMTMP OFFSET (or TEMP OFFSET) would be –1.0 (negative 1 degree). In this case, ROOM TEMP would read the raw value 73.0°F (23.8°C), but CTL TEMP would equal 72.0°F (22.2°C).

CTL TEMP = ROOM TEMP + RMTMP OFFSET (or TEMP OFFSET)

OR

When TEMP CONFIG = 4 or 5:

CTL TEMP = AUX TEMP AI5 + RMTMP OFFSET

OR

CTL TMP = AI4 + RMTMP OFFSET

Setting Room Temperature Setpoints (Digital and Analog Room Units)

Set the following basic control temperature setpoints:

- Day (or OCC) cooling setpoint: DAY CLG STPT (default 74°)
- Day (or OCC) heating setpoint: DAY HTG STPT
- Night (or UOC) cooling setpoint: NGT CLG STPT
- Night (or UOC) heating setpoint: NGT HTG STPT

If STPT DIAL is set to NO, CTL STPT will use the above setpoint depending on the HEAT.COOL mode and the day/night mode.

Setting STPT SPAN

Set STPT SPAN = 0 for Room Unit setpoint use as standard (absolute values for example, 74 F). For configurations for warmer/cooler (per *Selecting Options for Room Unit Setpoints*), set STPT SPAN = 1 degree or greater (for example, STPT SPAN = 2 will allow -2 to +2 degrees from the current heating or cooling setpoint).

Selecting Options for Room Unit Setpoints

In addition to the base room temperature setpoints that should be entered above, when STPT DIAL = YES, the following options are provided for room units using Standard/Absolute or Warmer/Cooler temperature setpoints, depending on the room unit provided.

The following sections provide the setup configurations based on desired room unit setpoint option:

- Standard/Absolute Setpoints Mode (Digital Room Units [➞ 8])
- Warmer/Cooling Setpoints Mode (Digital Room Units [➞ 8])
- Standard/Absolute Setpoints Mode (Analog or Digital Room Units [➞ 9])
- Warmer/Cooling Setpoints Mode (Analog Room Units) [➞ 10]

NOTE:
For all of these configurations, if a zero shift of setpoint is desired or specified when changing from heating to cooling, set DAY CLG STPT = DAY HTG STPT. This may not be in compliance with various energy and control standards.

Standard/Absolute Setpoint Mode (Digital Room Unit)

Digital Room Unit (2200/2300 Series Firmware Revision 26 and later)

The setpoint value entered on the room unit will be equal to the RM STPT DIAL and will be used for CTL STPT.

1. Set STPT DIAL = **YES**.
2. Set STPT SPAN = **0**.
3. Set SENSOR SEL = **1** (additive value)
   Enables Room Unit Temperature and setpoint options. Other room unit options can then be added as needed. See *Setting SENSOR SEL*.
4. Set RM STPT MIN and RM STPT MAX to a limit range for setpoint adjustment.
5. Set DAY CLG STPT and DAY HTG STPT to the initial values to be used by the room unit and to establish the heating/cooling setpoint and shift.

Configuration values used by the digital room unit are sent from the points configured above in the PTEC and do not need to be individually entered into the room unit. These include, SET PT MIN, SET PT MAX and SEL PT DIS (display option).

Example

DAY CLG STPT = 74, DAY HTG STPT = 70

In cooling mode, the current room setpoint in RM STPT DIAL displays when you press a setpoint UP/DOWN button. You can change the displayed value and the RM STPT DIAL value within the min/max limits.

When you press the UP button to the new cooling setpoint of 78 (an increase from the base cooling setpoint of plus 4 degrees), it will be displayed in RM STPT DIAL. When the controller switches to heating mode, the RM STPT DIAL will display the DAY HTG STPT, also offset by plus 4 degrees (74).

In this Standard/Absolute configuration, the value of RM STPT DIAL will display the actual control setpoint.

Warmer/Cooler Setpoint Mode (Digital Room Unit)

Digital Room Unit (2200/2300 Series Firmware Revision 26 and later)

NOTE:
The revision number displays for 5 seconds when the room unit is first powered up or when a laptop is disconnected.
Digital Room Units (Firmware Revision 26 and later) will continue to display and update the room temperature sensor values when a laptop is connected.

The room unit setpoint shift (warmer/cooler) will be used to set the RM STPT DIAL temperature and will be used for CTL STPT.

1. Set STPT DIAL = **YES**.
2. Set STPT SPAN = **1** (or greater).
3. Set SENSOR SEL = **1** (additive value)
   Enables Room Unit Temperature and setpoint options. Other room unit options can then be added as needed. See *Setting SENSOR SEL*.

4. Set RM STPT MIN and RM STPT MAX to a limit range for setpoint adjustment.
5. Set DAY CLG STPT and DAY HTG STPT to the initial values to be used by the room unit and to establish the initial heating/cooling setpoint shift.

Configuration values used by the digital room unit are sent from the points configured above in the PTEC and do not need to be individually entered into the room unit. These include, SET PT MIN, SET PT MAX and SEL PT DIS (display option).

Example

DAY CLG STPT = 74, DAY HTG STPT = 70; STPT SPAN = 2

In cooling mode, this warmer/cooler configuration, when you press the UP or DOWN button, the graphic display will indicate the current shift, if any. You can change the graphic display two steps UP or DOWN. You press UP (warmer) by two steps (maximum shift allowed with the setup). The RM STPT DIAL will display the new cooling setpoint of 76; (a shift from the base cooling setpoint of 2 degrees). When the controller switches to heating mode, the RM STPT DIAL will display the DAY HTG STPT, also offset by plus 2 degrees (72), while the room unit graphic display will maintain its + 2 shift.

RM STPT DIAL value will be limited to RM STPT MIN and RM STPT MAX values.

In this warmer/cooler configuration, the value of RM STPT DIAL will display the actual control setpoint.

Standard/Absolute Setpoint Mode (Analog or Digital Room Unit)

Analog (1000 Series) or Digital Room Units (Firmware Revision 25 or earlier)

NOTE:
The revision number displays for 5 seconds when the room unit is first powered up.

For the configuration for these devices, the CTL STPT is an offset calculation from the value set on the room unit. This offset is established by the difference between the DAY CLG STPT and the DAY HTG STPT. The value on the RM STPT DIAL, as set by the room unit, is the midpoint of this offset.

1. Set STPT DIAL = **YES**.
2. Set STPT SPAN = **0**.
3. Do one of the following:
   - Digital Room Unit: Set SENSOR SEL = **1** for Digital Room units (additive value)
     Enables Room Unit Temperature and setpoint options. Other room unit options can then be added as needed. See *Setting SENSOR SEL*.
   - Analog Room Unit: Set SENSOR SEL = **0** for Analog Room units (additive value)
     Disables Digital Room Unit Temperature and setpoint options. Other sensor select options for type of thermistor used can then be added as needed.

See *Setting SENSOR SEL*.

4. Set RM STPT MIN and RM STPT MAX to limit range for setpoint adjustment.
5. Set DAY CLG STPT and DAY HTG STPT to establish the heating/cooling deadband only (actual value are not used to establish CTL STPT).

Example

DAY CLG STPT = 74, DAY HTG STPT = 70

This provides a setpoint deadband of 4 degrees.

In either cooling or heating mode, the RM STPT DIAL will display the value set by the room unit (limited by RM STPT MIN and MAX).

- In cooling mode, CTL STPT will be RM STPT DIAL + 0.5 * setpoint deadband
- In the heating mode, CTL STPT will be RM STPT DIAL – 0.5 * setpoint deadband

Example

When the user selects a setpoint on the room unit of 78 degrees it will be displayed in RM STPT DIAL. However, the control setpoint will be offset from this value. In cooling mode, CTL STPT will be 78 + 2 = 80 degrees, and in heating mode CTL STPT will be 78-2 = 76 degrees.

The displayed temperature setpoint on the room unit and the value of RM STPT DIAL will display MID POINT of the actual control setpoints.

Warmer/Cooler Setpoint Mode (Analog Room Unit Only)

Analog Room Unit (1000 Series)

The room unit setpoint shift (warmer/cooler) will be used to set the RM STPT DIAL temperature and will be used for CTL STPT.

1. Set STPT DIAL = **YES**.
2. Set STPT SPAN = **1** (or greater).
3. Set SENSOR SEL = **0** (additive value)
   Disables Digital Room Unit Temperature and setpoint options. Other sensor select options for type of thermistor used can then be added as needed. See *Setting SENSOR SEL*.
4. In this option, RM STPT MIN and RM STPT MAX are not used to limit setpoint range (this is accomplished by the STPT SPAN adjustment).
5. Set DAY CLG STPT and DAY HTG STPT to the initial values to be used by the room unit and to establish the initial heating/cooling setpoint shift.

The analog room unit setpoint slider is mapped to + and – the STPT SPAN configured.

When the slider is at mid point, there is no shift in cooling or heating setpoint used by CTL STPT and displayed in RM STPT DIAL.

Example

DAY CLG STPT = 74, DAY HTG STPT = 70; STPT SPAN = 4

In cooling mode, In this warmer/cooler configuration, when the user moves the slider half way up to the top (a 2 degree shift), the CTL STPT and RM STPT DIAL will display the new cooling setpoint of 76 (a shift from the base cooling setpoint of 2 degrees).

When the controller switches to heating mode, CTL STPT and RM STPT DIAL will display the DAY HTG STPT also offset by plus 2 degrees (72) while the slide remains at the previous position.

In this warmer/cooler configuration, the value of RM STPT DIAL will display the actual control setpoint.

Setting SENSOR SEL

SENSOR SEL is a configurable, enumerated point (values are additive). This point tells the controller what type of room unit is being used and how to handle loss of data. It also provides the ability to enable the optional RH, and CO2 sensors and which thermistor type is connected.

Room Temperature, Setpoint, RH and CO2

- When the digital room unit (Series 2200/2300) is used, SENSOR SEL selects the source temperature and setpoint and enables a loss of communications indication:
  - Temperature/Setpoint enable and supervision for fail communications (temperature) with a value of 1.
  - Relative humidity enable and supervision for fail communications with a value of 2.
  - CO2 enable and supervision for fail communications with a value of 4.
- When the analog room unit (Series 1000/2000) is used, default temperature sensing (0) from an analog room unit is enabled (relative humidity and CO2 sensing are not available and should not be selected).

Thermistor Inputs

- Default for either input is 10K.
- To enable 100K thermistor on input, see the following table for additive values of 8 or 16.

Other Inputs (only available on Digital Room Unit)

- Use the following table to select and enable communications supervision of room temperature/setpoint dial, relative humidity or CO2 for additive values of 1, 2 and 4.

SENSOR SEL Value * (additive)	Description (include values to enable feature)
1	Select Digital Room Unit (for temperature sensing and setpoint dial)
2	Relative Humidity (RH) sensing
4	CO_2 sensing
8	If short board: 100K Ω thermistor on AI 3 (else input is 10K Ω) If long board: 100K Ω thermistor on AI 5 (else input is 10K Ω)
16	Long board only: 100K Ω thermistor on AI 4 (else input is 10K Ω)

Room DEW POINT

When the SENSOR SEL enables the relative humidity sensor, the controller will calculate a DEW POINT for information and use when the application is adopted

(PPCL) for chilled ceiling configurations. Calculations will be based on valid (or overridden) values of the control temperature (CTL TEMP) and room humidity (RM RH).

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.

NOTE:
If both a DI override switch (see *Configuring DI 2*) and the PIR sensor (see *Configuring DI 3*) will be configured to send the controller into Unoccupied Override mode, this mode will be maintained for the length of time set in either OVRD TIME or PIR TIME.

OVRD TIME should be configured with this in mind.

Setting Calibration Interval

Set CAL TIMER to the time interval that will trigger calibration of the damper and/or valve(s). The default is 12 hours.

Configuring DI 2

DI 2 CONFIG determines how this application uses DI 2.

Specify DI 2's usage by setting DI 2 CONFIG according to the Table *DI 2 Configuration*.

DI 2 Configuration.	
DI 2 Used As:	**Setting**
Spare DI or Wall Switch (Occ/Unocc Switch)	0
Normally Open Safety DI Contact	1
Normally Closed Safety DI Contact	2
ON/OFF Mode Switch	3

Configuring DI 2 Alarm Level

If DI 2 CONFIG was set to either 1 or 2, DI 2 is being used by the application as a safety input.

DI 2 can then be configured to trigger different types of alarms depending on the value of SAFETY SET 2.

- If DI 2 will not be used for alarming, set SAFETY SET 2 to **0**.
- If DI 2 is to trigger a low level alarm, set SAFETY SET 2 to **1**. (Application 6611 only monitors low-level alarms; control is not affected.)

- If DI 2 is to trigger a medium level alarm, set SAFETY SET 2 to **2**. (When a medium level alarm occurs, the application shuts down all equipment it is controlling except the fan.)
- If DI 2 is to trigger a high level alarm, set SAFETY SET 2 to **3**. (When a high level alarm occurs, the application shuts down all equipment it is controlling including the fan.)

Enabling a Wall Switch

If DI 2 CONFIG was set to 0, DI 2 can be used as a wall switch.

If DI 2 is being used as a wall switch for occupied/unoccupied control, enable it by setting WALL SWITCH to **YES**.

If WALL SWITCH = NO and DI 2 CONFIG = 0, then DI 2 is a spare DI.

Configuring DI 3

Application 6611 supports the use of an occupancy sensor connected to DI 3 (PIR DI 3). This sensor can be used to send the application into the Off Override mode and/or the Unoccupied Override mode. The way DI 3 is used depends on the value of PIR ENABLE.

- If DI 3 is to be used as a spare DI, set PIR ENABLE to **0**.
- If DI 3 is to be used for the Unoccupied Override mode only, set PIR ENABLE to **1**.
- If DI 3 is to be used for the Off Override mode only, set PIR ENABLE to **2**.
- If DI 3 is to be used for both the Unoccupied Override mode and the Off Override mode, set PIR ENABLE to **3**.

Setting PIR TIME

PIR TIME works with the occupancy sensor connected to DI 3. If the sensor detects occupancy, the application will remain in the configured mode(s)—Off Override, Unocc Override, or both—for the amount of time stored in PIR TIME. Enter the desired value (in minutes) for PIR TIME.

NOTE:
If both the DI override switch and the PIR sensor have been configured to send the controller into Unoccupied Override mode, this mode will be maintained for the length of time set in either OVRD TIME or PIR TIME, respectively.

OVRD TIME and PIR TIME should be configured with this in mind.

Configuring AI 5/DI 5

AUX TMP AI 5 and DI 5 occupy the same physical point on the controller; therefore, AI 5 and DI 5 cannot both be used at the same time. The way AI 5/DI 5 is used depends on the value of AIDI5 CONFIG.

- If AI 5/DI 5 will be used as a spare, set AIDI5 CONFIG to **0**.
- If DI 5 will be used as a Normally Opened safety DI contact, set AIDI5 CONFIG to **1**.

- If DI 5 will be used as a Normally Closed safety DI contact, set AIDI5 CONFIG to **2**.
- If AI 5 will be used as an auxiliary temperature sensor input (whose value is stored in AUX TMP AI 5), set AIDI5 CONFIG to **3**.

Setting the Alarm Level of DI 5

If AIDI5 CONFIG was set to either 1 or 2, DI 5 is being used by the application as a safety input. DI 5 can then be configured to trigger different types of alarms depending on the value of SAFETY SET 1. See *Configuring DI 3* for effect of setting SAFETY SET 1.

- If DI 5 will not be used for alarming, set SAFETY SET 1 to **0**.
- If DI 5 is to trigger a low level alarm, set SAFETY SET 1 to **1**.
- If DI 5 is to trigger a medium level alarm, set SAFETY SET 1 to **2**.
- If DI 5 is to trigger a high level alarm, set SAFETY SET 1 to **3**.

Specifying Temperature Control

The application uses CTL TEMP as the input to the temperature PID control loop. The CTL TEMP derives from ROOM TEMP. The source for ROOM TEMP is specified by TEMP CONFIG.

TEMP CONFIG Value	Function	Note
1 (default)	room temperature input from external source	Room unit or network command
4	Use thermistor input from AI4	range limited to 48 to 95°F for control
5	Use thermistor input from AUX TEMP AI5	range limited to 48 to 95°F for control (also see AI5/DI5 CONFIG to set as temp input)
Other values	Invalid	Firmware will revert to default value (1)

If AIDI5 CONFIG was set to 3, AI 5 is being used by the application as an auxiliary temperature input (whose value is stored in AUX TMP AI5). If desired, this application can control this temperature by using an input into the heating and cooling temperature PID loops.

If this application is to control AUX TMP AI5, set TEMP SOURCE to **AUX**.

When TEMP SOURCE = AUX, the optional offset in RMTMP OFFSET will be applied to AUX TEMP AI5 to be used in CTL TEMP.

If this application only monitors AUX TMP AI5 or if AI 5 is not being used, set TEMP SOURCE to **ROOM**. (When TEMP SOURCE equals ROOM, the application uses ROOM TEMP as an input into the heating and cooling temperature PID loops.)

Configuring DI 6

The way DI 6 is used depends on the value of DI6 CONFIG .

- If DI 6 is to be used as a spare DI, set DI6 CONFIG to **0**.
- If DI 6 is to be used as a Normally Opened safety DI contact, set DI6 CONFIG to **1**.
- If DI 6 is to be used as a Normally Closed safety DI contact, set DI6 CONFIG to **2**.
- If DI 6 is to be used as an HEAT/COOL Switch, set DI6 CONFIG to **3**.

Configuring DI 6 Alarm Level

If DI6 CONFIG was set to either 1 or 2, DI 6 is being used by the application as a safety input.

DI 6 can be configured to trigger different types of alarms depending on the value of SAFETY SET 3. See *Configuring DI 3* for effect of setting SAFETY SET 3.

- If DI 6 is not to be used for alarming, set SAFETY SET 3 to **0**.
- If DI 6 is to trigger a low level alarm, set SAFETY SET 3 to **1**.
- If DI 6 is to trigger a medium level alarm, set SAFETY SET 3 to **2**.
- If DI 6 is to trigger a high level alarm, set SAFETY SET 3 to **3**.

Setting the Number of Fan Speeds

Application 6611 can control from 1 to 3 fan speeds using DOs 4, 5 and 6.
Enter the desired number of fan speeds into FAN SPD CNT.

NOTE:
DO 4 can be spare if the high fan speed is not used; DO 5 can be spare if the medium fan speed is not used. The firmware does not support the use of DO 6 as a spare even if the application is configured to keep the fan completely OFF (FAN SPD CNT = 0).

Specifying Fan Mode

Any available fan speed can either be controlled automatically or with the proper type of thermostat, cycled manually by using a pushbutton connected to DI 4.

- If automatic fan speed control is desired, set FAN MODE to **AUTO**.
- If manual control is desired, set FAN MODE to **MANUAL**.

NOTE:
The next four sections only apply if FAN MODE equals AUTO. If FAN MODE equals MANUAL, they can be skipped.

Specifying Control of Fan Speed in Heating Mode

On some jobs, the fan speed must be controlled automatically based on temperature PID loop outputs in both the heating and cooling modes. (The loop outputs are HTG LOOPOUT for the heating mode, and CLG LOOPOUT for the cooling mode.)

On other jobs, this type of automatic fan speed control is only required in the cooling mode (HEAT.COOL = COOL). On these jobs, when HEAT.COOL = HEAT, Application 6611 will set the fan at a particular speed (low, medium or high) and keep it there throughout the entire heating mode.

If this application is to control the fan speed automatically off of HTG LOOPOUT while in heating mode, set HTG MOD FAN to **YES**. If the fan speed is to remain constant while in heating mode, set HTG MOD FAN to **NO**.

Setting Fan Speed in Heating Mode

If HTG MOD FAN was set equal to NO in the previous section, the application needs to know at what speed to set the fan when HEAT.COOL equals HEAT:

- Set HTG FAN SPD to 0 for OFF (all fan speed DOs being used are OFF)
- Set HTG FAN SPD to 1 for low speed
- Set HTG FAN SPD to 2 for medium speed
- Set HTG FAN SPD to 3 for high speed

Setting Fan Speed Switching Values

The application needs to know what values of CLG LOOPOUT to use to change the fan speed from OFF to low speed, then to medium speed, and then to high speed while the application is in cooling mode. (If HTG MOD FAN was set to YES, HTG LOOPOUT will use these same fan switching values in the heating mode.)

In the cooling mode:

- The fan will go from OFF to low speed when CLG LOOPOUT rises above FAN LO ON.
  Enter the desired value for FAN LO ON. The fan will shut back off again when CLG LOOPOUT drops below FAN LO ON – 5%. For example, if FAN LO ON equals 20%, the fan will go to low speed when CLG LOOPOUT rises above 20%, and will shut back off when CLG LOOPOUT drops below 15%.
- The fan will go from low speed to medium speed when CLG LOOPOUT rises above FAN MED ON.
  Enter the desired value for FAN MED ON. The fan will return to low speed when CLG LOOPOUT drops below FAN MED ON – 5%.
- The fan will go from medium speed to high speed when CLG LOOPOUT rises above FAN HI ON.
  Enter the desired value for FAN HI ON. The fan will return to low speed when CLG LOOPOUT drops below FAN HI ON – 5%.

Setting Fan Override Time

The occupancy sensor connected to PIR DI 3 sends the application into either OFF override mode (OFF OVRD = ON) or unoccupied override mode (UNOCC OVRD = OCC), if the space temperature is far away from the setpoint. The fan is set to its highest available speed for the amount of time stored in FAN OVRD TIM before it is released back to normal control.

Enter the desired time value for FAN OVRD TIM.

Configuring the Variable Speed Drive

If the application is controlling a fan variable speed drive, it needs to know the corresponding voltages the drive will use to control the speed of the fan. Set AOV 1 FN HI to the voltage value that corresponds to the highest desired speed. Set AOV 1 FN OFF to the voltage value that turns the variable speed drive OFF.

Application 6611 also needs to know the desired speed at which to run the variable speed drive when the application detects a high-level alarm (ALARM = 3). Set AOV 1 FN ALM to this voltage value.

Setting Voltages for the Modulating Spring-Return Heating Valve

Application 6611 can control a modulating, spring-return heating valve on AOV 2. It needs to know the voltages at which the valve is fully opened and fully closed.

- Enter the voltage value that sends the valve completely opened into AOV 2 OPEN.
- Enter the voltage value that completely closes the valve into AOV 2 CLOSE.

Setting Voltages for the Modulating Spring-Return Cooling Valve

Application 6611 can control a modulating, spring-return cooling valve on AOV 3. It needs to know the voltages at which the valve is fully opened and fully closed.

- Enter the voltage value that sends the valve completely opened into AOV 3 OPEN.
- Enter the voltage value that completely closes the valve into AOV 3 CLOSE.

Setting the Number of Heating, Cooling, or Heating/Cooling Stages

Application 6611 can control up to 3 ON/OFF (2-position) stages for temperature control. These stages can be heating only stages, cooling only stages, or heating/cooling stages (for example: electric heat; DX cooling; or 2-position valves).

Enter the number of stages into STAGE COUNT.

NOTE:
If a floating control valve has been configured to use DOs 1 and 2, STAGE COUNT can only be set to 0 or 1. If a floating control valve has not been configured, STAGE COUNT can be set to any value from 0 to 3.

Specifying the Stage Type

NOTE:
This section, as well as the five sections that follow, only apply if STAGE COUNT is not 0.
If STAGE COUNT = 0, you can skip forward to *Setting VALVE TYPE*.

As previously stated, Application 6611 can control up to three ON/OFF stages that can be heating only stages, cooling only stages, or heating/cooling stages. The application knows what type of ON/OFF stage it is controlling by looking at the value of STAGE TYPE.

- If no ON/OFF stages are being controlled, set STAGE TYPE to **0**.
- If heating only stages are being controlled, set STAGE TYPE to **1**.
- If cooling only stages are being controlled, set STAGE TYPE to **2**.
- If heating/cooling stages are being controlled, set STAGE TYPE to **3**.

- If the application will use DO 2 as a cooling stage and DO 3 as a heating stage, set STAGE TYPE to **4**.

Setting Heating Stage Time

If the application is controlling any heating stages, they must stay ON for at least the amount of time stored in H STG TIME before they are allowed to change state. For example, if stages 1 and 2 are ON and stage 3 is OFF, the amount of time in H STG TIME must elapse before the heating stages can change to all stages ON, or to stage 1 ON and stages 2 and 3 OFF.

Enter the desired time value, in minutes, into H STG TIME.

Setting Cooling Stage Time

If the application is controlling any cooling stages, they must stay ON for at least the amount of time stored in C STG TIME before they are allowed to change state. For instance, if stage 1 is ON, stage 2 is OFF, and stage 3 is OFF, the amount of time in C STG TIME must elapse before the cooling stages can change to all stages OFF, or to stages 1 and 2 ON and stage 3 OFF.

Enter the desired time value, in minutes, into C STG TIME.

Setting Stage Off Delay

When FAN SPEED changes to 0 (OFF), or when the controller changes from ON to OFF mode (both ON.OFF and OFF OVRD = OFF), the fan remains ON until any configured heating or cooling stages turn OFF. The stage(s) may or may not turn OFF immediately depending on whether the time set in STG OFF DLAY has elapsed.

STG OFF DLAY is reset every time a heating or cooling stage changes status (turns ON or OFF). If the amount of time since a heating or cooling stage change is less than the amount of time set in STG OFF DLAY (at a time when FAN SPEED is set to 0 or the controller is sent to OFF mode), the time remaining in STG OFF DLAY must elapse before the fan and any heating or cooling stage(s) may be ON are turned OFF.

Enter the desired Fan OFF stage delay value, in minutes, into STG OFF DLAY.

⚠ CAUTION

Entering a value of 0 would allow the fan and stages to always turn OFF immediately.

Equipment damage can occur.

Setting the Heating Stage Switching Values

The application needs to know the values of HTG LOOPOUT it can use to turn ON and OFF the heating stages it is controlling.

- The 1st stage of heating will turn ON when HTG LOOPOUT rises above HTG 1 ON.
  Enter the desired value for HTG 1 ON. (This heating stage will shut OFF when HTG LOOPOUT drops below HTG 1 ON after H STG TIME has expired.)

- The 2nd stage of heating will turn ON when HTG LOOPOUT rises above HTG 2 ON.
  Enter the desired value for HTG 2 ON. (This heating stage will shut OFF when HTG LOOPOUT drops below HTG 2 ON after H STG TIME has expired.)
- The 3rd stage of heating will turn ON when HTG LOOPOUT rises above HTG 3 ON.
  Enter the desired value for HTG 3 ON. (This heating stage will shut OFF when HTG LOOPOUT drops below HTG 3 ON after H STG TIME has expired.)

Setting the Cooling Stage Switching Values

The application needs to know the values of CLG LOOPOUT it can use to turn ON and OFF the cooling stages it is controlling.

- The 1st stage of cooling will turn ON when CLG LOOPOUT rises above CLG 1 ON.
  Enter the desired value for CLG 1 ON. (This cooling stage will shut OFF when CLG LOOPOUT drops below CLG 1 ON after C STG TIME has expired.)
- The 2nd stage of cooling will turn ON when CLG LOOPOUT rises above CLG 2 ON.
  Enter the desired value for CLG 2 ON. (This cooling stage will shut OFF when CLG LOOPOUT drops below CLG 2 ON after C STG TIME has expired.)
- The 3rd stage of cooling will turn ON when CLG LOOPOUT rises above CLG 3 ON.
  Enter the desired value for CLG 3 ON. (This cooling stage will shut OFF when CLG LOOPOUT drops below CLG 3 ON after C STG TIME has expired.)

The next four sections apply only if a floating control valve is being used (STAGE COUNT must be 0 or 1). If a floating control valve is not being used, set MTR SETUP to 0 and skip these sections.

Setting VALVE TYPE

Application 6611 can control a floating control valve that is run on DO 1 and DO 2. This valve can either be a heating only valve, a cooling only valve, or a heating/cooling valve. The application knows the type of valve by looking at the value of VALVE TYPE.

- If a modulating floating control valve is not being used, set VALVE TYPE to **0**.
- If the valve is a heating only valve, set VALVE TYPE to **1**.
- If the valve is a cooling only valve, set VALVE TYPE to **2**.
- If the valve is a combination heating/cooling valve, set VALVE TYPE to **3**.

Setting MTR SETUP

MTR SETUP determines whether or not a modulating floating control valve is being used and if it is direct-acting or reverse-acting.

- If a modulating floating control valve is not being used, set MTR SETUP to **0**.
- If a modulating floating control valve is being used and is direct-acting, set MTR SETUP to **1**.
- If a modulating floating control valve is being used and is reverse-acting, set MTR SETUP to **3**.

Setting Motor Timing

If a modulating, floating control valve is being used, the run time needs to be specified. The run time is the time it takes the valve to go from completely closed to completely open (and vice versa). This time is stored in MTR TIMING. The Table *Valve Actuator Run Times* lists run times of some commonly used valves.

Set MTR TIMING to the proper value.

Valve Actuator Run Times		
Valve Actuator	Setting (seconds)	
	50 Hz	60 Hz
SSB81U (Powermite – MZ Series)	180	150
SQS 82	155	130

Verifying Actuator Setup

If used, verify that that the floating control valve closes when commanded and remains closed as follows:

- If the valve is enabled as direct-acting and does not close, reverse the action of the valve by setting MTR SETUP to **3**.
- If the valve is enabled as reverse-acting and does not close, reverse the action of the valve by setting MTR SETUP to **1**.

If the floating control valve still does not close completely, then it has been installed or set up incorrectly. See the Installation Instructions (550-146), the iKnow Troubleshooting Tool, or contact Field Support.

Setting Controller Address

1. In WCIS select **View > Edit/View Reports**.
2. Select a report from list and click **Apply**.
3. Set CTLR ADDRESS to the BACnet MS/TP MAC address. (0 through 127 = Master; 128 through 254 = Slave).

NOTE:
See the *WCIS Online Help* for instructions on auto-addressing on the network. Otherwise, set the controller address and MS/TP network baud rate prior to connecting the controller to the network. See Configuring BACnet Parameters [→ 21].

Configuring BACnet Parameters

Using WCIS, do the following:

1. From the **Device** menu, select **Device Properties** to configure BACnet parameters.
2. In the **Object** section, enter information for the following fields:
   - **Name** – unique to BACnet network, (12 alphanumeric character limit).
   - **ID** – unique to BACnet network (valid values are 0 through 4,194,303).
   - **Description** – description of controller (60 alphanumeric character limit).
   - **Location** – physical location of controller (60 alphanumeric character limit).
3. In the **BACNet Communication Settings** section:
   - **Set the CIS/MMI Command Priority to the desired value.**
   - Set **Baud Rate** to the MS/TP network baud rate. Options are; 9600, 19200, 38400 or 76800 (default is19200).
4. In the **MSTP Slave** section:
   - Check the box for a slave device.
   - Set the **MAC Master Node** number.
5. In the **Device Settings** section (configuring the Room Unit port), do one of the following:
   – If using a sensing only Room Unit, the baud rate can be 1200 to 76800. For optimal use with WCIS use **38400**.
   – If using a communicating digital Room Unit, the baud rate must be set to **1200**.
6. 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 rapidly and continuously (indicating proper communication with other devices on the network).

Auto Discover and Auto Addressing

An improved commissioning workflow has been designed for all BACnet PTEC controllers (standard 66xx applications) along with WCIS (Revision 4.0 and later). This provides the option to use the MS/TP network (using the field panel or a router) and the WCIS tool to discover and auto-address each controller. For more information, see the *WCIS Online Help*.

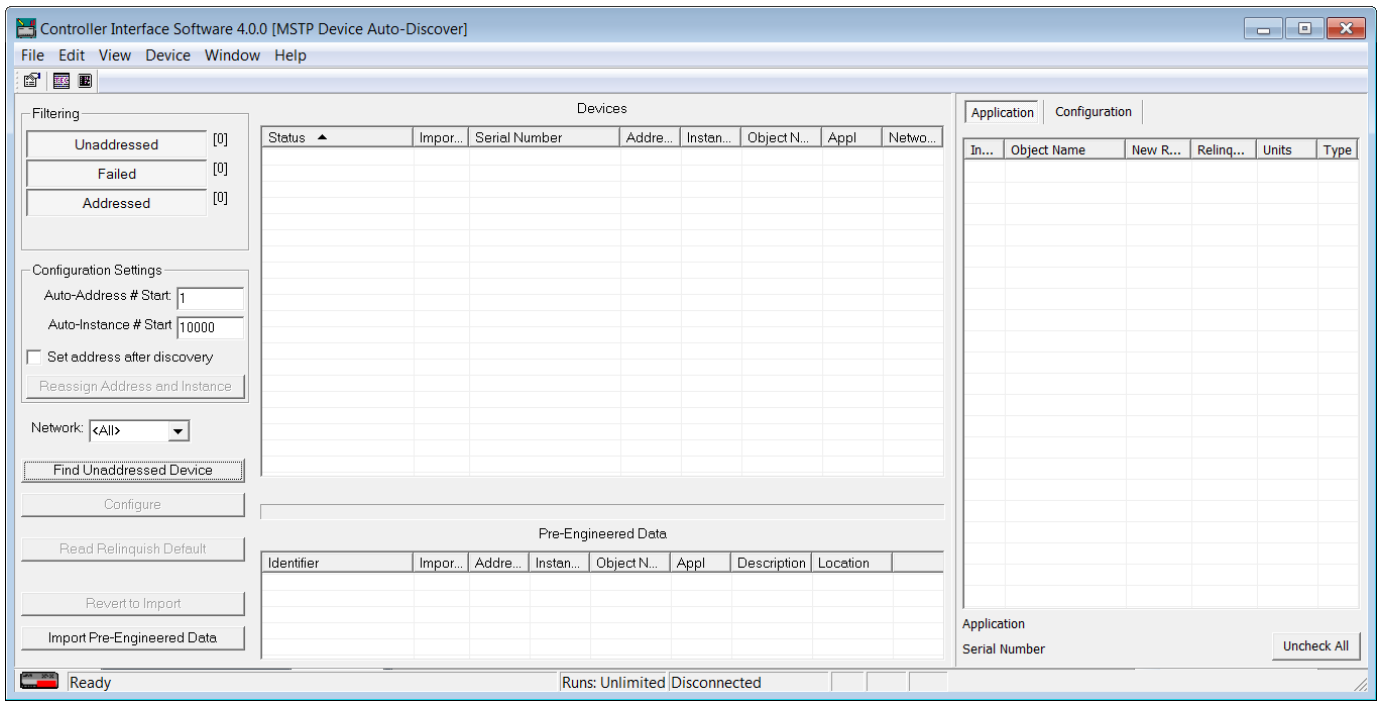
NOTE:
The current workflow will continue to support setting the baud rate and address for each controller using the HMI port or at the room unit.

▷ All BACnet PTEC controllers (standard 66xx applications) will have an internal unique serial number and a two part serial number label.

1. Connect WCIS to the field panel or use a router connected to MS/TP network.
2. Assign one PTEC a valid address (using the serial number). This will establish and set the baud rate for the entire network.

Auto Discovery allows you to automatically discover and identify PTEC controller devices on the BACnet MS/TP Network. There are two basic configurations:

- Devices not configured with an address. (Devices are discovered by their unique serial number.)
- Devices configured with an address and available for modification.



Filtering

These buttons allow you to select what you see in the Auto-discovery window. All three buttons are selected by default.

- **Unaddressed** - Displays unaddressed devices
- **Failed** - Displays failed devices
- **Addressed** - Displays addressed devices

Configuration Settings

- **Auto Address # Start** - Beginning address number. An address is reserved for each discovered device starting with this number.
- **Auto Instance # Start** - Beginning instance number. An instance number is reserved for each discovered device starting with this number.
- **Reassign Address and Instance** (pull-down menu) - Reassigns the address and instance number of the selected device(s).
- **Reassign Address Only** (pull-down menu) - Reassigns the address of the selected device(s).
- **Reassign Instance Only** (pull-down menu) - Reassigns the instance of the selected device(s).

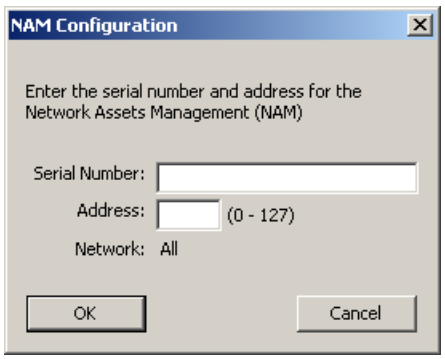
Auto-Discovery

- **Network** (pull-down menu) - Allows you to enter or select a specific network, if multiple networks are available.
- **Find Unaddressed Device** - Searches the connected network for all devices (addressed and unaddressed).
- **Configure** - Sends modified application data to the controller(s).
- **Relinquish Default** - Refreshes relinquish default column of the Application tab with values from the controller.
- **Revert to Import** - Returns to Pre-Engineered Data after changes have been made.
- **Import Pre-Engineered Data** - A .csv file can be used to set initial values in the controller. The file can be taken from Commissioning Tool or exported from Excel. See Commissioning a Controller [➞ 26].

Auto-Discovery Procedure

- Click **Find Unaddressed Device**.

  ⇨ If a NAM device is not defined, the **NAM Configuration** window displays. (NAM - Network Asset Manager; All new TECs can be assigned as a NAM.)

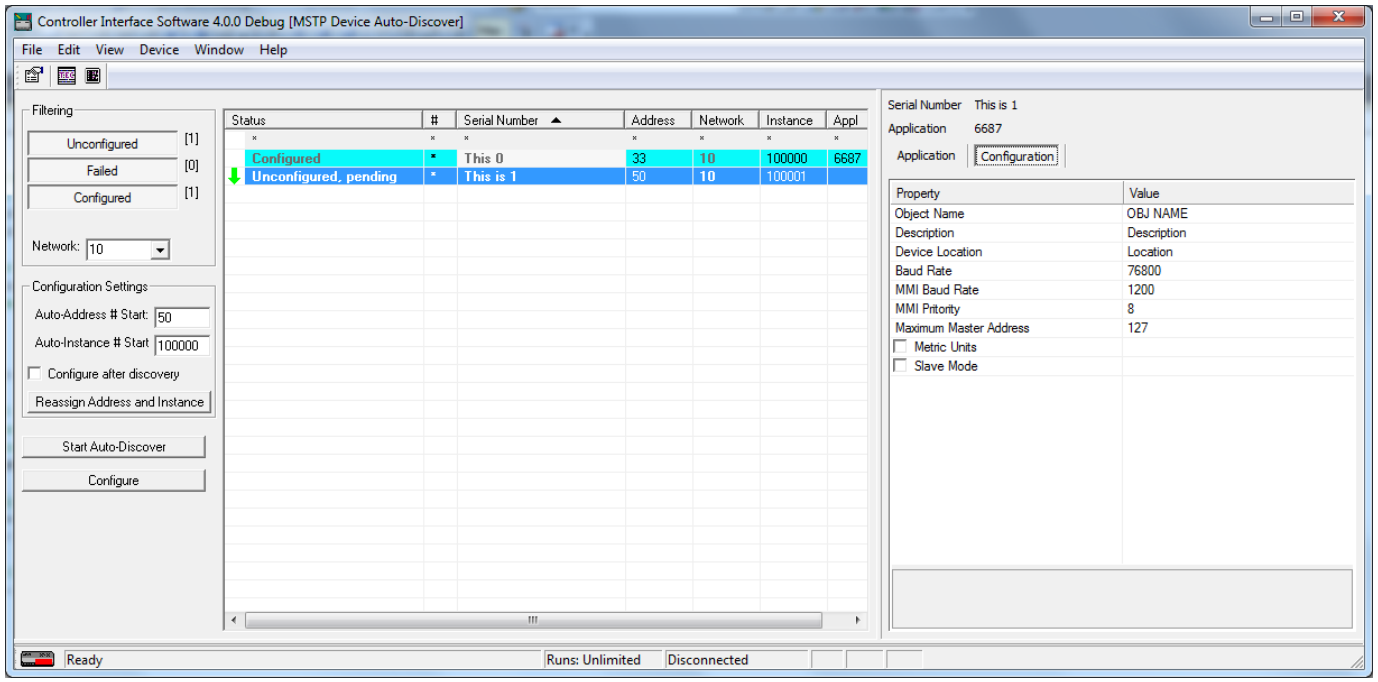


  - Enter the serial number (found on print from electrician).
  - Enter a unique (unused) address (0 - 127).
  - Click **OK**.

⇨ The device will be assigned as the NAM for the network with the address you specified.

⇨ The NAM device will auto-discover all other devices on the network.

⇨ WCIS will display all devices.

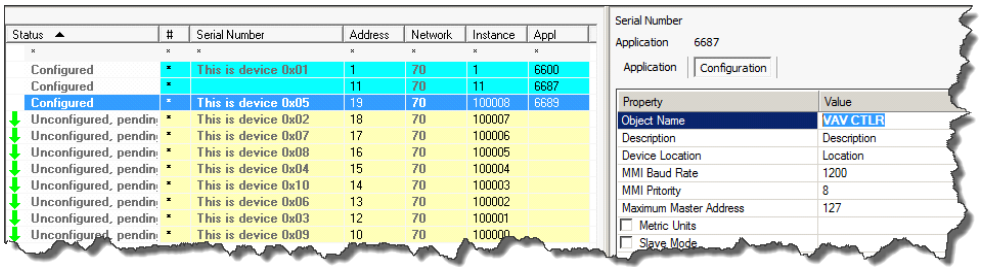


Configuring discovered devices

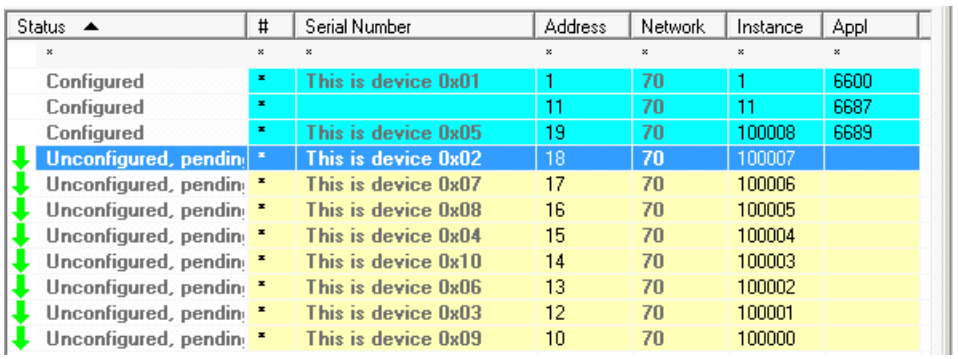
Each device on the network must have unique identifiers in the following fields:

- Address
- Instance
- Object Name - 30 alphanumeric character limit for Siemens field panels.

1. To change any of these fields, click in that field and enter the desired value.



2. When all fields are defined, click **Configure**.



⇨ All devices defined properly will display `Addressed`.

⇨ If a device has not been defined properly, it will display `Unaddressed` and the problem field displays red text.

Status	#	Serial Number ▲	Address	Network	Instance	Appl
*	*	*	*	*	*	*
Configured	*	This 0	33	10	4194303	6607
Configured, failed	*	This is 1	33	10	100000	6687

3. Correct any issues and click **Configure**.

Commissioning a Controller

Learning the Application Point Team

Once a device has been addressed, select your application.

- Do one of the following:
  - Right-click in the **Application** column and select the desired Application from the menu.
  - Click **Configure** to load the device for your application.
  - Right-click on the controller and select **Learn Point Team Descriptor**.

Import Data

1. Click the **Import Data** button.
   ⇨ The **Import Configuration Data** dialog box displays.
2. Browse to the desired .csv file and click **Open**.

⇨ The imported files are listed in the **Pre-Engineered Data** section of the Auto-Discovery window.

Each line in the window is a grouping of data for a controller.

Assigning Import Data to controller.

1. Click in the **Import ID** column of the desired controller in the devices section.
2. Select the appropriate **Import ID number** of the Pre-Engineered Data you want to assign.

⇨ The Application and Configuration tabs will update with the new (Pre-Engineered) data. You can manually change/update any data.

Assigning Import Data to Multiple Controllers

1. Click on the desired **Import Data** from the list in the Pre-Engineered Data section.
2. Select all desired controllers in the Devices window.
3. Right-click the selection in the Devices window and then select **Assign Import Data from Import ID x** in the pop-menu.
4. Click **Configure**.

⇨ The Application will load into each controller selected. The Application and Configuration tabs will update with the new (Pre-Engineered) data.

Commissioning Multiple Controllers

If you're commissioning multiple controllers with the same application all values can be loaded to each controller selected.

You can multi-select by holding either the SHIFT or CTRL key and clicking on multiple controllers listed.

You can configure values for multiple controllers with different applications by first selecting and making changes to one controller and then selecting all controllers and clicking Configure.

NOTE:
Once you select multiple controllers with different applications the Application tab goes blank. However, WCIS retains all changes and send the data for all selected controllers.

Flashing Controller Firmware

FLT Procedure

Use the Firmware Loading Tool (FLT) for this procedure.

1. Connect to RTS port of PTEC.
2. Set Communications to **1200 baud** and **ID**.
3. Click the **Identify** button in FLT.
4. Browse for new firmware.
5. Select **Load**.

WCIS Procedure

1. Connect to device.
2. From the **Device** menu, select, **Load TEC Firmware**.
   ⇨ The **Load TEC Firmware** dialog box displays.
3. Click the **Browse** button.
4. Select the firmware.
5. Select **Load**.

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