

SIEMENS

BACnet PTEC Heat Pump Controller

Start-up Procedures

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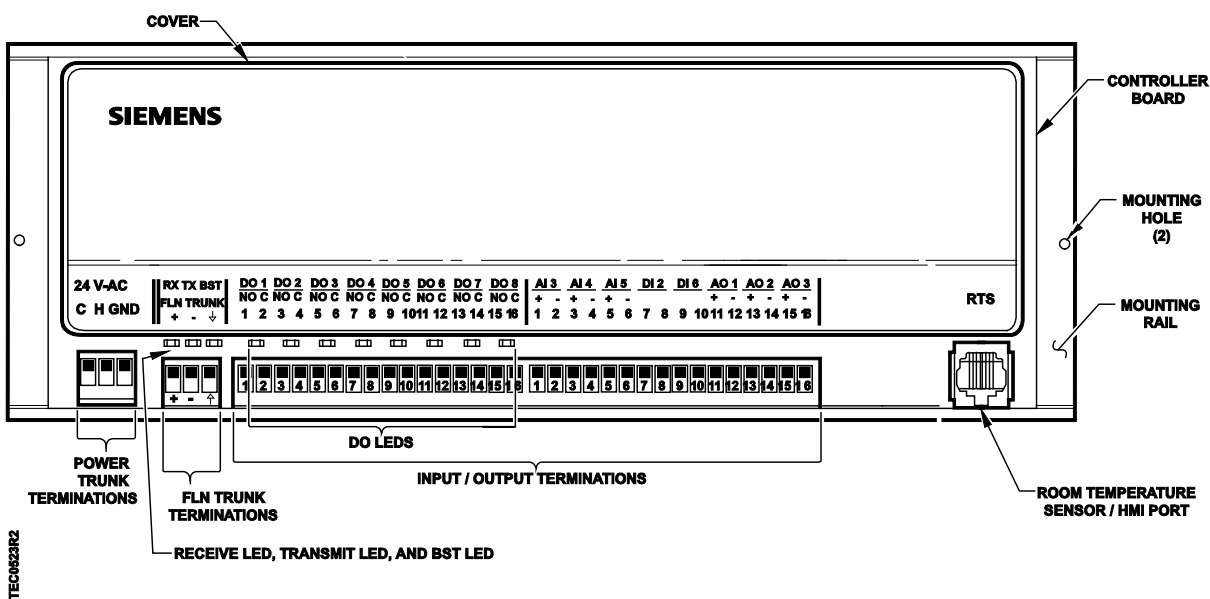
Before You Begin



NOTE:

WCIS version 3.0 or later must be used to configure Siemens BACnet MS/TP Equipment Controllers.

Do not check the Metric check box 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 check box in the Device Properties dialogue box must be unchecked and the conversion must be handled in the field panel.



BACnet Heat Pump Controller - Multi-Stage

Communication and DO Indicators

The Siemens BACnet PTEC Heat Pump Controller has LEDs to indicate communication (yellow) and DO (digital output) status BST (yellow).

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 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 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 the Application

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

Application	Revision BE20 or later
Multiple Compressor Heat Pump with Reversing Valve and Mixed Air Control	6573
Multiple Heating and Cooling Heat Pump with Mixed Air Control and Internal Reversing Valve	6574
Slave Mode	6590

The controller will go through a shut-down/load sequence as it switches from slave mode to the selected application.

Enabling Actuators



CAUTION

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

The point that determines actuator run times is:

- MTR TIMING
 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 DMPR ROT ANG to the appropriate value. The name of these points vary.

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

Specifying Motor Setup

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



NOTE:

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

Motor 1 Not Used	Motor 1 Enabled	Motor 1 Enabled and Reversed
0	1	3

For Spring-Return Damper (0 to 10V)

1. Set DAMPER TYPE to SPRING.
2. Do one of the following:
 - If the damper should open as the voltage increases (normally closed), leave AO DIR.REV at its default value of 0.
 - If the spring-return damper should close as the voltage increases (normally open), set AO DIR.REV to 1.

Setting DO DIR.REV

Application 6573:

If the normal (de-energized) state of the reversing valve is cooling, leave DO DIR.REV at its default value of 0.

If the normal (de-energized) state of the reversing valve is heating, set DO DIR.REV to 4.



NOTE:

When REV VALVE is changed from normally cooling to normally heating by setting DO DIR.REV to 4, its value will change to reflect the appropriate state of the reversing valve, HEAT/COOL.



CAUTION

If any changes are made to DO DIR.REV, cycle power/reset the controller.

Setting Number of Compressors

Application 6573:

If using one compressor, leave CMP TOTL at its default value of 1. Otherwise, set CMP TOTL to the number of compressors used. Valid entries are 0, 1, 2, or 3.

Application 6574:

If using one heating compressor, leave HTG CMP TOTL at its default value of 1. Otherwise, set HTG CMP TOTL to the number of compressors used for heating. Valid entries are 0, 1, or 2.

Setting Compressor Minimum OFF and ON Times

If the default values are not appropriate, display the main application report and set the points for compressor minimum OFF and ON times according to the specifications for the equipment being used:

Application 6573:

Compressor 1	CMP1MINOFF	default = 3 min
	CMP1 MIN ON	default = 3 min
Compressor 2	CMP2MINOFF	default = 3 min
	CMP2 MIN ON	default = 3 min
Compressor 3	CMP3MINOFF	default = 3 min
	CMP3 MIN ON	default = 3 min

Application 6574:

Cooling Compressor 1	CLG1 MIN OFF	default =3 min
	CLG1 MIN ON	default =3 min
Cooling Compressor 2	CLG2 MINOFF	default =3 min
	CLG2 MIN ON	default =3 min
Heating Compressor 1	HTG1 MIN OFF	default =3 min
	HTG1 MIN ON	default =3 min
Heating Compressor 2	HTG2 MIN OFF	default =3 min
	HTG2MIN ON	default =3 min

Setting Stages of Electric Heat and Cooling

Electric Heat:

Check the hardware to verify the number of electric heat stages wired to the controller and set EHTG STG CNT to this value. (If not using electric heat, set EHTG STG CNT to 0.)



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.

Cooling (Application 6574):

If using one cooling compressor, leave CLG CMP TOTL at its default value of 1. Otherwise, set CLG CMP TOTL to the number of compressors used for cooling. Valid entries are 0, 1, or 2.

Free Cooling:

If free cooling is not used, leave FREE CLG at its default value of DISABL.

If free cooling is desired, add the appropriate PPCL statements at the field panel to command FREE CLG on when free cooling is available and off when it is not available, and set FREE CLG to **ENABLE**.

Enabling Night Mixed Air Control

If mixed air control is desired during night mode, enable it by setting NGT MA CTL to **YES**.

Room Temperature Setpoints and STAT TYPE

Room Temperature Setpoints:

- DAYCLGSTPT
 - DAYHTGSTPT
 - NGTCLGSTPT
 - NGHTGSTPT
1. Set each room temperature setpoint to its desired value.
 2. If the room temperature sensor has a setpoint dial that will be used, set STPT DIAL to **YES**. Otherwise, set STPT DIAL to **NO**.
 3. If STPT DIAL = YES, set STAT TYPE to indicate the type of room sensor and setpoint control you will be using. Do one of the following: (If STPT DIAL = NO, skip to Step 4.)
 - For the “Relative Setpoint Adjustment” option used with room sensor part number SB1-0916 or SB1-1072 (with red and blue “warmer/cooler” slider and no preprinted 55 – 95°F temperature scale), set STAT TYPE to **OFFSET** and then skip to Step 5.
 - For regular Siemens Series x000 stats, set STAT TYPE to **NORMAL** (default) and proceed with Step 4.
 4. 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.
 5. If STAT TYPE = OFFSET, set STPT SPAN to the maximum number of degrees to be added to (or subtracted from) the Day Heating or Cooling setpoint.

For example, day cooling (when STAT TYPE = OFFSET):

DAY CLG STPT = 72

STPT SPAN = 4

Result: Setpoint dial adjustable range is 68 to 76°F.

Setting STAT SUPV

The point STAT SUPV is used when a digital room unit is used with the PTEC. The value set, allows the temperature, humidity, and CO2 subpoints to read failed when the room unit is not functioning or is disconnected.

If a value is not selected, the points will not fail. If you enable supervision for a feature that is not being used (such as humidity or CO2), that value always displays as failed.

- If a standard room unit (Series 1000 or 2000) is being used, STAT SUPV must be set to a value of 0 (zero).
- If the digital room unit (Series 2200 or 3200) is being used, STAT SUPV must be set to a value greater than 0 (zero).

Configure STAT SUPV using one of the following values:

Value	Description
1	Temperature sensing only
3	Temperature and Relative Humidity (RH) sensing
5	Temperature and CO ₂ sensing ^(a)
7	Temperature and Relative Humidity (RH) and CO ₂ sensing ^(a)

^(a) Currently not available, for future use.

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 to Cycle with Compressor

If the fan is to cycle during day mode with the compressor(s), set CYCLE FAN to **YES**. Otherwise, the fan will be on all the time in day mode.

Enabling Wall Switch

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

Otherwise, leave WALL SWITCH at its default value of **NO**.

Setting Room Temperature Offset (optional)

When the room has stabilized, take a precision temperature reading over a period of time 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 (0.14°C)) into RMTMP OFFSET.

Example

If the actual room temperature is 72.0°F (22.2°C), and the value of ROOM TEMP is 73.0°F (23.8°C), then the value entered into RMTMP OFFSET is -1.0. In this case, the value of ROOM TEMP would read the raw value 73.0°F (23.8°C), but the value of CTL TEMP would read 72.0°F (22.2°C).

$$\text{CTL TEMP} = \text{ROOM TEMP} + \text{RMTMP OFFSET}$$

Setting AI4/AI5 OFFSET

AI 5 OFFSET works like RMTMP OFFSET. It can be used to calibrate AI5 aux temp sensor input if necessary. The actual temperature plus AI 5 OFFSET will equal AI5 display temperature.

AI 4 OFFSET works exactly like AI 5 OFFSET.

Setting Suggested Point Values

The following table lists suggested point values for various heat pump configurations. Set these values as appropriate for your configuration.

Application 6573: Suggested Point Values for Heat Pump Configurations with 1 Compressor					
Point Number	Descriptor	1 Compressor 0 Elec Heat Stages	1 Compressor 1 Elec Heat Stages	1 Compressor 2 Elec Heat Stages	1 Compressor 3 Elec Heat Stages
61	FREE CLG ON	40%	40%	40%	35%
62	FREE CLG OFF	20%	20%	20%	15%
76	EHTG STG CNT	0	1	2	3
81	EHEAT 1 ON	–	80%	80%	70%
82	CMP1 ON	60%	60%	60%	55%
83	CMP1 OFF	40%	40%	40%	35%
84	RVAL SWITCH	30%	30%	30%	30%
85	SWITCH LIMIT	5%	5%	5%	5%
94	EHEAT 2 ON	–	–	98%	85%
95	EHEAT 3 ON	–	–	–	98%

Application 6573: Suggested Point Values for Heat Pump Configurations with 2 or 3 Compressors					
Point Number	Descriptor	2 Compressors 0 Elec Heat Stages	2 Compressors 2 Elec Heat Stages	3 Compressors 0 Elec Heat Stages	3 Compressors 1 Elec Heat Stage
16	CMP2 ON	70%	70%	70%	55%

Application 6573: Suggested Point Values for Heat Pump Configurations with 2 or 3 Compressors					
Point Number	Descriptor	2 Compressors 0 Elec Heat Stages	2 Compressors 2 Elec Heat Stages	3 Compressors 0 Elec Heat Stages	3 Compressors 1 Elec Heat Stage
17	CMP2 OFF	50%	50%	50%	40%
34	CMP3 ON	–	–	90%	70%
35	CMP3 OFF	–	–	70%	55%
61	FREE CLG ON	30%	30%	30%	25%
62	FREE CLG OFF	10%	10%	10%	10%
75	CMP TOTL	2	2	3	3
76	EHTG STG CNT	0	2	0	1
81	EHEAT 1 ON	–	85%	–	85%
82	CMP1 ON	50%	50%	50%	40%
83	CMP1 OFF	30%	30%	30%	25%
84	RVAL SWITCH	30%	30%	30%	30%
85	SWITCH LIMIT	5%	5%	5%	5%
94	EHEAT 2 ON	70%	98%	–	–

Application 6574: Suggested Point Values for Heat Pump Configurations with 0 or 1 Compressor				
Point Number	Descriptor	0 Heating Compressors 1 Cooling Compressor 1 Elec Heat Stage	0 Heating Compressors 2 Cooling Compressors 1 Elec Heat Stage	1 Heating Compressor 1 Cooling Compressor 0 Elec Heat Stages
30	CLG CMP1 ON	60%	50%	60%
31	CLG CMP1 OFF	40%	30%	40%
34	CLG CMP2 ON	–	70%	–
35	CLG CMP2 OFF	–	50%	–
61	FREE CLG ON	40%	30%	40%
62	FREE CLG OFF	20%	10%	20%

Application 6574: Suggested Point Values for Heat Pump Configurations with 0 or 1 Compressor				
Point Number	Descriptor	0 Heating Compressors 1 Cooling Compressor 1 Elec Heat Stage	0 Heating Compressors 2 Cooling Compressors 1 Elec Heat Stage	1 Heating Compressor 1 Cooling Compressor 0 Elec Heat Stages
75	HTG CMP TOTL	0	0	1
76	EHTG STG CNT	1	1	0
77	CLG CMP TOTL	1	2	1
81	ELEC HEAT ON	60%	60%	–
82	HTG CMP1 ON	40%	40%	60%
83	HTG CMP1 OFF	20%	20%	40%
85	SWITCH LIMIT	5%	5%	5%

Application 6574: Suggested Point Values for Heat Pump Configurations with 1 Heating and 1 or 2 Cooling Compressors				
Point Number	Descriptor	1 Heating Compressor 1 Cooling Compressor 1 Elec Heat Stage	1 Heating Compressor 2 Cooling Compressors 1 Elec Heat Stage	1 Heating Compressor 2 Cooling Compressors 0 Elec Heat Stages
30	CLG CMP1 ON	60%	50%	50%
31	CLG CMP1 OFF	40%	30%	30%
34	CLG CMP2 ON	–	70%	70%
35	CLG CMP2 OFF	–	50%	50%
61	FREE CLG ON	40%	30%	30%
62	FREE CLG OFF	20%	10%	10%
81	ELEC HEAT ON	80%	80%	–
82	HTG CMP1 ON	60%	60%	60%

Application 6574: Suggested Point Values for Heat Pump Configurations with 1 Heating and 1 or 2 Cooling Compressors				
Point Number	Descriptor	1 Heating Compressor 1 Cooling Compressor 1 Elec Heat Stage	1 Heating Compressor 2 Cooling Compressors 1 Elec Heat Stage	1 Heating Compressor 2 Cooling Compressors 0 Elec Heat Stages
83	HTG CMP1 OFF	40%	40%	40%
85	SWITCH LIMIT	5%	5%	5%

Application 6574: Suggested Point Values for Heat Pump Configurations with 2 Heating and 1 or 2 Cooling Compressors				
Point Number	Descriptor	2 Heating Compressors 1 Cooling Compressor 0 Elec Heat Stages	2 Heating Compressors 1 Cooling Compressor 1 Elec Heat Stage	2 Heating Compressors 2 Cooling Compressors 0 Elec Heat Stages
16	HTG CMP2 ON	70%	70%	70%
17	HTG CMP2 OFF	50%	50%	50%
30	CLG CMP1 ON	60%	60%	50%
31	CLG CMP1 OFF	40%	40%	30%
34	CLG CMP2 ON	–	–	70%
35	CLG CMP2 OFF	–	–	50%
61	FREE CLG ON	40%	40%	30%
62	FREE CLG OFF	20%	20%	10%
81	ELEC HEAT ON	–	90%	–
82	HTG CMP1 ON	50%	50%	50%
83	HTG CMP1 OFF	30%	30%	30%
85	SWITCH LIMIT	5%	5%	5%

HP DO OVRD

This application includes a setup point that enables or disables ON and OFF commands to critical DOs. Specifically, the fan and compressor(s) (and reversing valve in Application 6573) cannot be directly commanded ON or OFF unless the point HP DO OVRD is set to ENABLE. When HP DO OVRD is set to DISABL, commands to these critical DO points are ignored regardless of BACnet command priority. Commands to electric heat DOs and any spare DOs are always allowed. Physical points DO1 and DO2 can never be overridden when configured for motor control. However, the position of the attached motor is always commandable via DMPR CMD.



⚠ CAUTION

HP DO OVRD should be set to ENABLE only when there is a complete understanding of the consequences.

Since the direct control will override the applications minimum on and off time safeties, improper use of the DO commands can cause permanent equipment damage. Also, during normal daily operation, the override of critical DOs should only be done via a BACnet command. If a digital output is overridden via the MMI port, the point may be left in an incorrect internal state upon release. If during commissioning an override command must be issued via the MMI port, it is critical that the point be manually commanded off before the point is released.

- Set HP DO OVRD = DISABL to prevent all external commands from overriding the fan, compressor(s), or reversing valve DOs regardless of BACnet priority level. (This is the default mode).
- Set HP DO OVRD = ENABLE (READ THE CAUTION ABOVE! EQUIPMENT DAMAGE CAN OR WILL RESULT IF HP DO OVRD IS SET TO ENABLE INAPPROPRIATELY) to allow external commands *and PPCL (Added by JC, true statement?)* at any BACnet priority level to override the fan, compressor(s), or reversing valve DOs.

Configuring BACnet Parameters



NOTE:

WCIS version 3.0 or later must be used to configure Siemens BACnet MS/TP Equipment Controllers.

Do not check the Metric check box 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 check box in the Device Properties dialogue box must be unchecked and the conversion must be handled in the field panel.

Using WCIS, do the following:

1. From the **Device** menu, select **Device Properties** to configure BACnet parameters.

- **Object Name** – unique to BACnet network, (12 character limit).
 - **Object ID** – unique to BACnet network (valid values are 0 through 4,194,303).
 - **Description** – description of controller (60 character limit).
 - **Location** – physical location of controller (60 character limit).
 - **MSTP Network Baud Rate** – options; 9600, 19200, 38400 or 76800 (default is 19200).
2. Configuring the Room Unit port.
 - 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 Room Unit, the baud rate must be set to 1200.
 3. 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).

Setting Controller Address

Set CTLR ADDRESS to the BACnet MS/TP MAC address. (0 through 127 = Master; 128 through 254 = Slave).



NOTE:

Set the controller address and MS/TP network baud rate prior to connecting the controller to the network. See Configuring BACnet Parameters [→ 14].

Flashing Controller Firmware

FLT Procedure

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

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

WCIS Procedure

1. Connect to device.
2. Select **Load TEC Firmware** from Device pull-down menu.

3. Click the **Browse** button in Load TEC Firmware dialog box.
4. Select the firmware.
5. Select **Load**.