

# SIEMENS



## BACnet PTEC Controller

### Heat Pump Multi-Stage Slave Mode, Application 6690

#### Application Note



# Table of Contents

**Overview ..... 4**

BACnet ..... 4

Hardware Inputs ..... 5

Hardware Outputs..... 5

Using Auxiliary Points ..... 5

Using the Controller as a Point Extension Device ..... 5

Room Unit Operation ..... 6

    Sensor Select ..... 6

    Room CO2..... 7

    Room RH..... 7

PPCL STATUS ..... 7

**Application 6690 Point Database ..... 8**

The diagram illustrates the Siemens TEC623N3 terminal block, a device used for terminating and connecting various signals. Key components and labels include:

- COVER**: The top protective cover of the unit.
- SIEMENS**: The manufacturer's logo.
- VOLTAGE** and **CURRENT** indicators: A switch labeled "AD ('SW2') SWITCH SHOWN VOLTAGE POSITION" allows selection between voltage and current measurement.
- SW2**: The physical switch for selecting voltage or current measurement.
- CONTROLLER BOARD**: The internal circuit board.
- MOUNTING HOLE (2)**: Two holes for mounting the unit.
- MOUNTING RAIL**: The rail used to mount the unit.
- RTS**: Remote Terminal Switch.
- 24 V-AC**: Power supply input.
- C. H. GND**: Common ground.
- RX TX BST**: Receive, Transmit, and Broadcast signal lines.
- DO 1 DO 2 DO 3 DO 4 DO 5 DO 6 DO 7 DO 8**: Digital Output lines.
- AI 3 AI 4 AI 5 DI 2 DI 6 AO 1 AO 2 AO 3**: Analog Input, Digital Input, and Analog Output lines.
- DO LEDS**: LEDs for Digital Output status.
- INPUT / OUTPUT TERMINATIONS**: Terminals for signal termination.
- POWER TRUNK TERMINATIONS**: Terminals for power trunk connections.
- FLN TRUNK TERMINATIONS**: Terminals for FLN trunk connections.
- RECEIVE LED, TRANSMIT LED, AND BST LED**: LEDs for Receive, Transmit, and Broadcast status.
- ROOM TEMPERATURE SENSOR / HMI PORT**: A port for temperature sensing or HMI connection.

Application 6690 is the slave mode application for the Siemens BACnet PTEC Heat Pump - Multi-Stage Controller (550-490PA). Slave mode is the default application that displays when power is first applied to the controller. Slave mode provides no control. Instead, it allows the operator to perform equipment checkout before a control application is put into effect and to set some basic controller parameters (CTRL ADDRESS, APPLICATION, etc.).

The controller communicates using BACnet MS/TP protocol for open communications on BACnet MS/TP networks.

Product	Supported BIBBs	BIBB Name
BTEC/PTEC	DS-RP-B B	Data Sharing-Read Property-B
	DS-RPM-B	Data Sharing-Read Property Multiple-B
	DS-WP-B	Data Sharing-Write Property-B
	DM-DDB-B	Device Management-Dynamic Device Binding-B
	DM-DOB-B	Device Management-Dynamic Object Binding-B
	DM-DCC-B	Device Management-Device Communication Control-B
	DM-RD-B	Device Management-Reinitialize Device-B
	DM-BR-B	Device Management-Backup and Restore-B
	DM-OCD-B	Device Management-Object Creation and Deletion-B

## Hardware Inputs

### Analog

Room temperature sensor  
Room temperature setpoint dial  
Auxiliary temperature sensor  
Room CO2  
Room Humidity

### Digital

DI override switch  
Wall switch (DI 2)  
Digital Inputs (2 to 5)

## Hardware Outputs

### Analog

Analog Output (3) (0-10V)

### Digital

Motor 1 (DO 1/DO 2)  
OR  
Digital Output (DO 1 through DO 8)

## Using Auxiliary Points

It is possible to have extra points available in addition to the ones used by the current application that is running in the controller. These extra points will be controlled by PPCL in the PTEC controller or by the field panel.

## Using the Controller as a Point Extension Device

If the controller is used only as a point extension device, with no existing control application is in effect, its application must be set to slave mode and the points can be controlled by PPCL in the PTEC or can be unbundled at the field panel. All of these points must be controlled from the field panel or with PPCL in the PTEC controller in order to be used. See the *Point Database* for more information.

For other combinations of DOs and motors, see the *Start-up Procedures* for complete motor enable/reverse procedures.

**NOTE:**

If using either a motor or DOs as auxiliary points, be sure to set MTR SETUP to the correct value. If using a pair of DOs to control a motor, the DOs cannot be unbundled or commanded separately.

Motor Enable/Reverse Values for MTR SETUP. (For Floating-Type Dampers Only).		
Motor 1 Not Used	Motor 1 Enabled	Motor 1 Enabled and Reversed
0	1	3

**Example**

If using DO 1 and DO 2 as the physical terminations for a direct acting motor, follow these steps:

1. Set MTR SETUP to 1 to enable the motor.
2. MTR1 COMD (DMPR COMD) can be controlled by PPCL in the PTEC or at the field panel.

**Floating Control Actuation Auto-correct**

In addition to the existing options for floating control actuator full stroke actions, all floating control actuators are provided with additional logic to fully drive open or closed when commanded to 100% or 0%.

## Room Unit Operation

**Sensor Select**

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 CO<sub>2</sub> 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 <sub>2</sub> sensing
8	If short board: 100K $\Omega$ thermistor on AI 3 (else input is 10K $\Omega$ ) If long board: 100K $\Omega$ thermistor on AI 5 (else input is 10K $\Omega$ )
16	Long board only: 100K $\Omega$ thermistor on AI 4 (else input is 10K $\Omega$ )

## Room CO<sub>2</sub>

RM CO<sub>2</sub> displays the CO<sub>2</sub> value in units of parts-per-million (PPM). RM CO<sub>2</sub> (from the digital 2200/2300 room units) can be used with PPCL in the PTEC controller or unbundled for control or monitoring purposes.

## Room RH

RM RH displays the relative humidity value in percent. RM RH can be used for PPCL in the PTEC or unbundled for control or monitoring purposes.

## PPCL STATUS

PPCL STATUS displays LOADED or EMPTY.

- LOADED = PPCL programming is present in the controller. A new application number must be assigned (12000 through 12999).
- EMPTY = NO PPCL programming is present.

The maximum number of PPCL dynamic points is 15.

## Application 6690 Point Database

Object Type <sup>1</sup>	Object Instance	Object Name (Descriptor)	Factory Default (SI Units) <sup>2</sup>	Eng Units (SI Units)	Range	Active Text	Inactive Text
AO	1	CTLR ADDRESS	255	--	0-255	--	--
AO	2	APPLICATION	6690	--	0-32767	--	--
AI	{04}	ROOM TEMP	74.0 (23.45)	DEG F (DEG C)	48-111.75	--	--
AI	{13}	RM STPT DIAL	74.0 (23.45)	DEG F (DEG C)	48-111.75	--	--
AI	{15}	AUX TEMP	74.0 (23.496)	DEG F (DEG C)	37.5-165	--	--
BO	18	WALL SWITCH	NO	--	Binary	YES	NO
BI	{19}	DI OVRD SW	OFF	--	Binary	ON	OFF
AO	22	RMTMP OFFSET	0.0 (0.0)	DEG F (DEG C)	-31.75-32	--	--
BI	{24}	DI 2	OFF	--	Binary	ON	OFF
BI	{25}	DI 5	OFF	--	Binary	ON	OFF
BI	{26}	DI 6	OFF	--	Binary	ON	OFF
BO	{29}	DAY.NGT	DAY	--	Binary	NIGHT	DAY
AO	{40}	AOV1	0	VOLTS	0-10.23	--	--
BO	{41}	DO 1	OFF	--	Binary	ON	OFF
BO	{42}	DO 2	OFF	--	Binary	ON	OFF
BO	{43}	DO 3	OFF	--	Binary	ON	OFF
BO	{44}	DO 4	OFF	--	Binary	ON	OFF
BO	{45}	DO 5	OFF	--	Binary	ON	OFF
BO	{46}	DO 6	OFF	--	Binary	ON	OFF
BO	{47}	DO 7	OFF	--	Binary	ON	OFF
AO	{48}	MTR1 COMD	0	PCT	0-102	--	--
AO	{49}	MTR1 POS	0	PCT	0-102	--	--
BO	{50}	DO 8	OFF	--	Binary	ON	OFF
AO	51	MTR1 TIMING	130	SEC	0-511	--	--
AI	{52}	AI 3	0	PCT	0-102	--	--
AI	{53}	AI 4	74.0 (23.496)	DEG F (DEG C)	37.5-165	--	--
AO	{54}	AOV2	0	VOLTS	0-10.23	--	--
BI	{55}	DI 3	OFF	--	Binary	ON	OFF
AO	56	DPR1 ROT ANG	90	--	0-255	--	--
BI	{57}	DI 4	OFF	--	Binary	ON	OFF
AO	58	MTR SETUP	0	--	0-255	--	--



Object Type <sup>1</sup>	Object Instance	Object Name (Descriptor)	Factory Default (SI Units) <sup>2</sup>	Eng Units (SI Units)	Range	Active Text	Inactive Text
AO	59	DO DIR.REV	0	--	0-255	--	--
AO	{78}	CTL TEMP	74.0 (23.45)	DEG F (DEG C)	48-111.75	--	--
AO	96	CAL TIMER	12	HRS	0-255	--	--
AO	{97}	AOV3	0	VOLTS	0-10.23	--	--
AO	{99}	ERROR STATUS	0	--	0-255	--	--
BO	{122}	PPCL STATE	EMPTY	--	Binary	LOADED	EMPTY
AI	{123}	RM CO2	1000	PPM	0-8191	--	--
AO	126	SENSOR SEL	0	--	0-255	--	--
AI	{127}	RM RH	50	PCT	0-102	--	--

<sup>1)</sup> Object Types are; Analog Input (AI), Analog Output (AO), Binary Input (BI) and Binary Output (BO).

<sup>2)</sup> A single value in a column means that the value is the same in English units and in SI units.

<sup>3)</sup> Point numbers that appear in brackets { } may be unbundled at the field panel.

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