

# SIEMENS



## **BACnet PTEC Controller Terminal Box (VAV) Slave Mode, Application 6687**

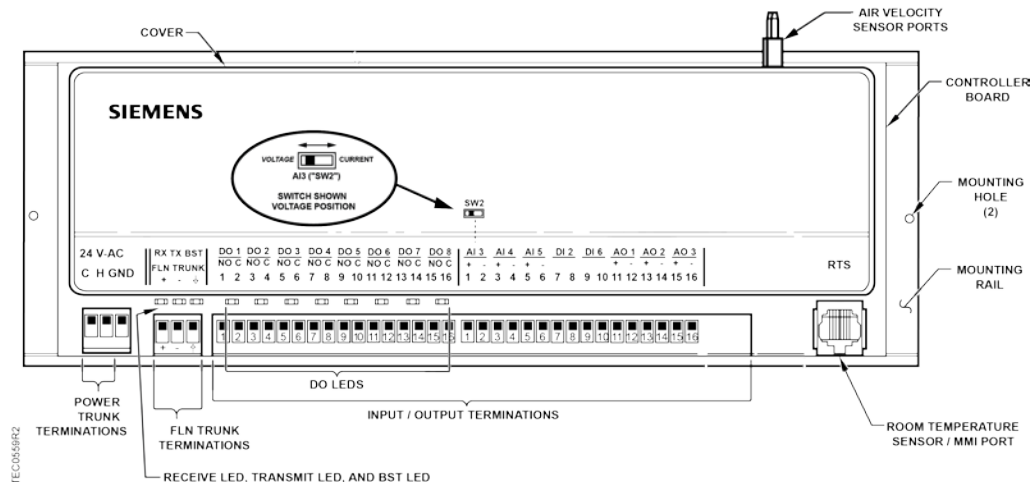
### **Application Note**



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## Overview



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

Application 6687 is the slave mode application for the Siemens BACnet PTEC Terminal Box (VAV) Controller (550-495PA). 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.).

## BACnet

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

Air velocity sensor  
Room temperature sensor  
Room temperature setpoint dial  
Temperature sensor (two) (10K or 100K  $\Omega$  thermistor)  
Analog sensor (0-10Vdc or 4-20 mA)

### Digital

Night/Unoccupied mode override  
Wall switch (DI 2)  
Digital Input (DI 6)

## Hardware Outputs

### Analog

Analog Output (AOV1, AOV2, AOV3)

### Digital

Damper actuator (Motor 1) (DO 1/DO 2)  
Motor 2 actuator (DO 3/DO 4)  
Motor 3 actuator (DO 5/DO 6)  
Digital Outputs (DOs)

## 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 |                               |         |                      |
|---|-------------------------------|---------|----------------------|
|   | MTR SETUP Value <sup>a)</sup> |         |                      |
|   | Disabled                      | Enabled | Enabled and Reversed |
| Motor 1                                   | 0                             | 1       | 3                    |
| Motor 2                                   | 0                             | 4       | 12                   |
| Motor 3                                   | 0                             | 16      | 48                   |

<sup>a)</sup> The values in this table are additive and must be added per the requirements of the job.

**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 CO2 for additive values of 1, 2 and 4.

| SENSOR SEL<br>Value *<br>(additive) | Description<br>(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 $\Omega$ )<br>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 CO2

RM CO2 displays the CO<sub>2</sub> value in units of parts-per-million (PPM). RM CO2 (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.

## Room DEW POINT

The controller provides a calculation for DEW POINT temperature in Fahrenheit degrees (or Celsius degrees) using room temperature (using CLT TEMP) and room humidity (using RM RH). This calculation is valid for ranges of 55°F (12.8°C) to 95°F (35°C) and 20 to 100% relative humidity.

## 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 6687 Point Database

| Object Type <sup>1</sup> | Object Instance (Point Number) | 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              | 6687                                    | --                   | 0-32767   | --          | --            |
| AO                       | 3                              | RMTMP OFFSET             | 0.0 (0.0)                               | DEG F (DEG C)        | -31.75-32 | --          | --            |
| AI                       | {04}                           | ROOM TEMP                | 74.0 (23.44888)                         | DEG F (DEG C)        | 48-111.75 | --          | --            |
| BI                       | {10}                           | DI 6                     | OFF                                     | --                   | Binary    | ON          | OFF           |
| AI                       | {13}                           | RM STPT DIAL             | 74.0 (23.44888)                         | DEG F (DEG C)        | 48-111.75 | --          | --            |
| AI                       | {15}                           | AUX TEMP AI5             | 74.0 (23.495556)                        | DEG F (DEG C)        | 37.5-165  | --          | --            |
| BO                       | 18                             | WALL SWITCH              | NO                                      | --                   | Binary    | YES         | NO            |
| BI                       | {19}                           | DI OVRD SW               | OFF                                     | --                   | Binary    | ON          | OFF           |
| BI                       | {24}                           | DI 2                     | OFF                                     | --                   | Binary    | ON          | OFF           |
| BI                       | {25}                           | DI 5                     | OFF                                     | --                   | Binary    | ON          | OFF           |
| BO                       | {29}                           | DAY.NGT                  | DAY                                     | --                   | Binary    | NIGHT       | DAY           |
| AI                       | {35}                           | AIR VOLUME               | 0 (0.0)                                 | CFM ( LPS)           | 0-131068  | --          | --            |
| AO                       | 36                             | FLOW COEFF               | 1                                       | --                   | 0-2.55    | --          | --            |
| AO                       | {37}                           | MTR3 COMD                | 0                                       | PCT                  | 0-102     | --          | --            |
| AO                       | {38}                           | MTR3 POS                 | 0                                       | PCT                  | 0-102     | --          | --            |
| AO                       | 39                             | MTR3 TIMING              | 130                                     | SEC                  | 0-511     | --          | --            |
| BI                       | {40}                           | DI 4                     | OFF                                     | --                   | Binary    | ON          | OFF           |
| 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           |
| BI                       | {47}                           | DI 3                     | OFF                                     | --                   | Binary    | ON          | OFF           |
| AO                       | {48}                           | MTR1 COMD                | 0                                       | PCT                  | 0-102     | --          | --            |
| AO                       | {49}                           | MTR1 POS                 | 0                                       | PCT                  | 0-102     | --          | --            |
| AI                       | {50}                           | AI 4                     | 74.0 (23.495556)                        | DEG F (DEG C)        | 37.5-165  | --          | --            |
| AO                       | 51                             | MTR1 TIMING              | 95                                      | SEC                  | 0-511     | --          | --            |

| Object Type <sup>1</sup> | Object Instance (Point Number) | Object Name (Descriptor) | Factory Default (SI Units) <sup>2</sup> | Eng Units (SI Units) | Range     | Active Text | Inactive Text |
|--------------------------|--------------------------------|--------------------------|---|----------------------|-----------|-------------|---------------|
| AO                       | {52}                           | MTR2 COMD                | 0                                       | PCT                  | 0-102     | --          | --            |
| AO                       | {53}                           | MTR2 POS                 | 0                                       | PCT                  | 0-102     | --          | --            |
| AI                       | {54}                           | AI3                      | 0                                       | PCT                  | 0-102     | --          | --            |
| AO                       | 55                             | MTR2 TIMING              | 130                                     | SEC                  | 0-511     | --          | --            |
| AO                       | 56                             | DPR1 ROT ANG             | 90                                      | --                   | 0-255     | --          | --            |
| AO                       | 57                             | DPR2 ROT ANG             | 90                                      | --                   | 0-255     | --          | --            |
| AO                       | 58                             | MTR SETUP                | 0                                       | --                   | 0-255     | --          | --            |
| AO                       | 59                             | DO DIR. REV              | 0                                       | --                   | 0-255     | --          | --            |
| AO                       | {66}                           | AOV 1                    | 0                                       | VOLTS                | 0-10.23   | --          | --            |
| AO                       | {70}                           | AOV 2                    | 0                                       | VOLTS                | 0-10.23   | --          | --            |
| AO                       | {78}                           | CTL TEMP                 | 74.0<br>(23.44888)                      | DEG F<br>(DEG C)     | 48-111.75 | --          | --            |
| BO                       | 87                             | CAL MODULE               | NO                                      | --                   | Binary    | YES         | NO            |
| AO                       | {91}                           | AOV 3                    | 0                                       | VOLTS                | 0-10.23   | --          | --            |
| BO                       | {94}                           | CAL AIR                  | NO                                      | --                   | Binary    | YES         | NO            |
| AO                       | 95                             | CAL SETUP                | 4                                       | --                   | 0-255     | --          | --            |
| AO                       | 96                             | CAL TIMER                | 12                                      | HRS                  | 0-255     | --          | --            |
| AO                       | 97                             | DUCT AREA                | 1.0<br>(0.09292)                        | SQ. FT<br>(SQ M)     | 0-6.375   | --          | --            |
| AO                       | {99}                           | ERROR STATUS             | 0                                       | --                   | 0-255     | --          | --            |
| BO                       | {102}                          | DO 7                     | OFF                                     | --                   | Binary    | ON          | OFF           |
| BO                       | {103}                          | DO 8                     | OFF                                     | --                   | Binary    | ON          | OFF           |
| AO                       | 124                            | SENSOR SEL               | 0                                       | --                   | 0-255     | --          | --            |
| AI                       | {125}                          | RM CO2                   | 1000                                    | PPM                  | 0-8191    | --          | --            |
| AI                       | {126}                          | RM RH                    | 50                                      | PCT                  | 0-102     | --          | --            |
| BO                       | {127}                          | PPCL STATE               | EMPTY                                   | --                   | Binary    | LOADED      | EMPTY         |

<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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