

SIEMENS



BACnet Fume Hood Controller

Vertical Sash with Damper or Venturi Air Valve and 2-Position Constant Volume with Damper

Owner's Manual

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How To Use This Manual

This manual is written for the owner and user of the BACnet Fume Hood Controller. It is designed to help you become familiar with the Siemens BACnet Fume Hood Controller and its applications.

This section covers manual organization, manual conventions, symbols used in the manual, and other information that will help you use this manual.

Manual Organization


This manual contains the following chapters:

- *Chapter 1 - Hardware*, describes the hardware components and the accessories that are used with the BACnet Fume Hood Controller.
- *Chapter 2 - Applications*, describes the control applications available in the model of the BACnet Fume Hood Controller includes a terminal block for wireable input/output connections.
- *Chapter 3 - Point Database*, defines the point database descriptors and includes address and applications.
- *Chapter 4 - Basic Service and Maintenance*, describes basic corrective measures you can take should you encounter a problem when using the BACnet Fume Hood Controller. For issues not covered in this chapter, consult your local Siemens Industry representative.
- The *Glossary* describes the terms and acronyms used in this manual.
- The *Index* helps you locate information presented in this manual.




Manual Conventions

The following table lists conventions to help you use this manual in a quick and efficient manner.

| Convention | Examples |
|---|--|
| Numbered Lists (1, 2, 3...) indicate a procedure with sequential steps. | 1. Turn OFF power to the field panel. 2. Turn ON power to the field panel. 3. Contact the local Siemens Industry representative. |
| Conditions that must be completed or met before beginning a task are designated with a ▷. Intermediate results (what will happen following the execution of a step), are designated with a ⇨. Results, which inform the user that a task was completed successfully, are designated with a ⇒. | ▷Composer software is properly installed. ▷A Valid license is available. 1. Select Start > Programs > Siemens > GMS > Composer . ⇨The Project Management window displays. 2. Open an existing project or create a new one. ⇒The project window displays. |
| Actions that should be performed are specified in boldface font. | Type F for Field panels. Click OK to save changes and close the dialog box. |
| Error and system messages are displayed in Courier New font. | The message <code>Report Definition successfully renamed</code> displays in the status bar. |
| New terms appearing for the first time are italicized. | The field panel continuously executes a user-defined set of instructions called the <i>control program</i> . |

| Convention | Examples |
|---|---|
|  | This symbol signifies Notes. Notes provide additional information or helpful hints. |
| Cross references to other information are indicated with an arrow and the page number, enclosed in brackets: [→92] | For more information on creating flowcharts, see Flowcharts [→92]. |
| Placeholders indicate text that can vary based on your selection. Placeholders are specified by italicized letters, and enclosed with brackets []. | Type A C D H [<i>username</i>] [<i>field panel #</i>]. |

The following table lists the safety symbols used in this manual to draw attention to important information.

| Symbol | Meaning | Description |
|---|---------|---|
| NOTICE | CAUTION | Equipment damage may occur if a procedure or instruction is not followed as specified. (For online documentation, the NOTICE displays in white with a blue background.) |
|  | CAUTION | Minor or moderate injury may occur if a procedure or instruction is not followed as specified. |
|  | WARNING | Personal injury or property damage may occur if a procedure or instruction is not followed as specified. |
|  | DANGER | Electric shock, death, or severe property damage may occur if a procedure or instruction is not followed as specified. |

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Chapter 1 – Product Overview

The Fume Hood Controller is a multi-application equipment controller designed to provide Direct Digital Control (DDC) for various types of Variable Air Volume (VAV) and 2-position fume hoods.

- The controller can operate as an independent, stand-alone, DDC room controller or it can be networked with a field panel.
- The controller provides all termination, input/output, system and local communication connections.
- The controller hardware consists of the controller with cover and mounting bracket (see Figure BACnet Fume Hood Controller).

The controller board is the central computing/controlling component of the system.

The following applications are covered:

Vertical Sash

- Vertical Sash with Damper (Application 6741)
- Vertical Sash with Venturi (Application 6742)

2-Position CV with Damper

- 2-Position with a Constant Volume (Application 6740)
- Slave Mode (Application 6700)

Hardware Inputs

Analog

| | |
|---|--|
| Air velocity sensor(s) – (second sensor available for field use) | Application 6740 Application 6741 Application 6742 |
| (Optional) Differential pressure transmitter/Linear Flow input (Vortex Shedder) | Application 6740 Application 6741 Application 6742 |
| External face area | Application 6741 Application 6742 |
| Vertical sash sensor(s) | Application 6741 Application 6742 |

Digital

| | |
|---|--------------------------------------|
| ATTN.UNATTN (through DI 2) | Application 6741 Application 6742 |
| OCC.UNOCC (through DI 2) | Application 6741 Application 6742 |
| <i>(Optional)</i> High/Low select (through DI 2) | Application 6740 |
| OCC Face Velocity Setpoint (through ODP – optional) | Application 6741 Application 6742 |
| <i>(Optional)</i> Startup Mode (through DI 4) | Application 6740 |
| <i>(Optional)</i> Remote Emergency Purge (through DI 6) | Application 6741 Application 6742 |

Hardware Outputs

Analog

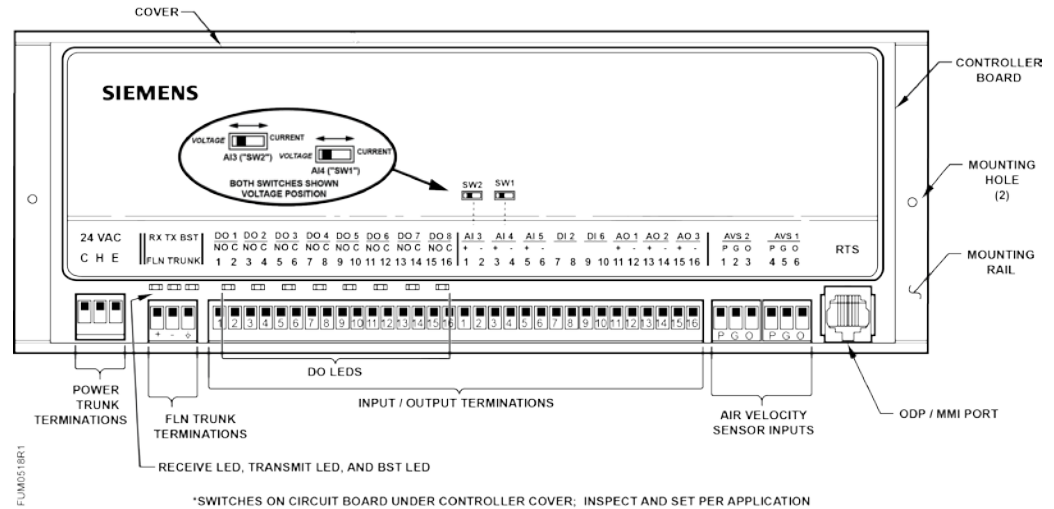
| | |
|---------------------------------|--|
| AO 3 Analog Actuation | Application 6742 |
| Operator Display Panel (ODP) | Application 6740 Application 6741 Application 6742 |
| AO 2 (flow signal, 1 to 10 Vdc) | Application 6740 Application 6741 Application 6742 |

Digital

| | |
|--|--|
| Autozero Solenoid in Offboard Air Module (DO 8) | Application 6740 Application 6741 Application 6742 |
| <i>(Optional)</i> Alarm (DO 7) | Application 6740 Application 6741 Application 6742 |
| <i>(Optional)</i> OFF Mode (DO 6) | Application 6740 Application 6741 Application 6742 |
| HI/LO Indication (DO 5) | Application 6740 |
| Exhaust damper (DO 1 and DO 2, Floating Control Actuation) | Application 6740 Application 6741 |

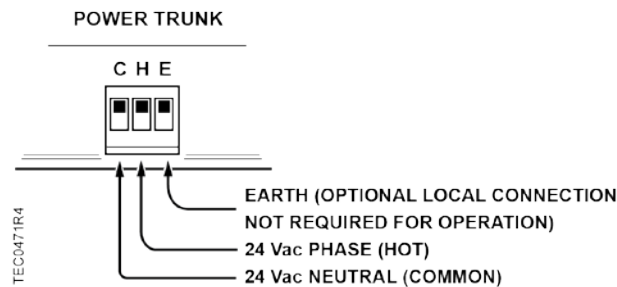
Ordering Notes

| | |
|---|------------------------|
| BACnet Fume Hood Controller - Vertical Sash Configuration with Damper or Venturi Air Valve, 2 Position CV with Damper | 570-00701, 570-00701PA |
|---|------------------------|



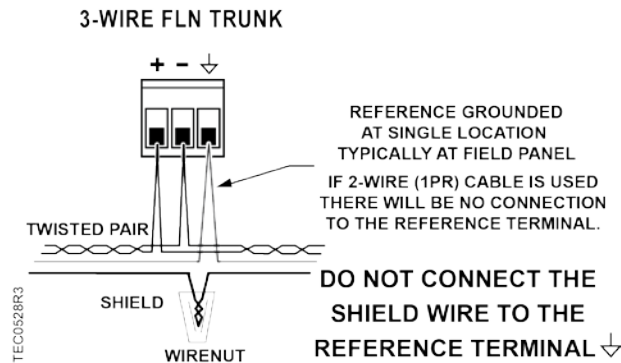
Generic Controller I/O Layout. See *Wiring Diagram* for application specific details.

Power Wiring



Communication Wiring

The controller connects to the field panel by means of a Floor Level Network (FLN) trunk. Communication wiring connects to the three screw terminals on the controller labeled "+" (positive), "-" (negative), and "↓" (reference).



Controller LED Indicators

The controller has eleven Light Emitting Diode (LED) indicators (see Figure BACnet Fume Hood Controller). Table *Controller LEDs* lists the type, the abbreviation on the controller, and the indication of each LED.

| Controller LEDs. | | | |
|----------------------------|---------------------|------------|---|
| LED Type | Label (if present)* | LED Number | Indication |
| DO | DO1 - DO8 | 1 – 8 | Indicates the ON/OFF status of the DO associated with it. A glowing LED indicates that the DO is energized. |
| Receive | RX | 9 | Indicates, when flashing, that the controller is receiving information from the field panel. |
| Transmit | TX | 10 | Indicates, when flashing, that the controller is transmitting information to the field panel. |
| BST "Basic Sanity Test" | BST | 11 | Indicates, when flashing ON and OFF once per second, that the controller is functioning properly. |

Actuators

Actuators used with the BACnet Fume Hood Controller include electronic damper motor. This actuator is controlled by the controller to position the damper or air valve.

Related Equipment

- Operator Display Panel (ODP)
- Sash sensors
- Laboratory Exhaust Air Terminal
- Differential Pressure Transmitter
- Venturi air valves
- Air flow sensors

Contact your local Siemens Industry representative for product numbers and more information.

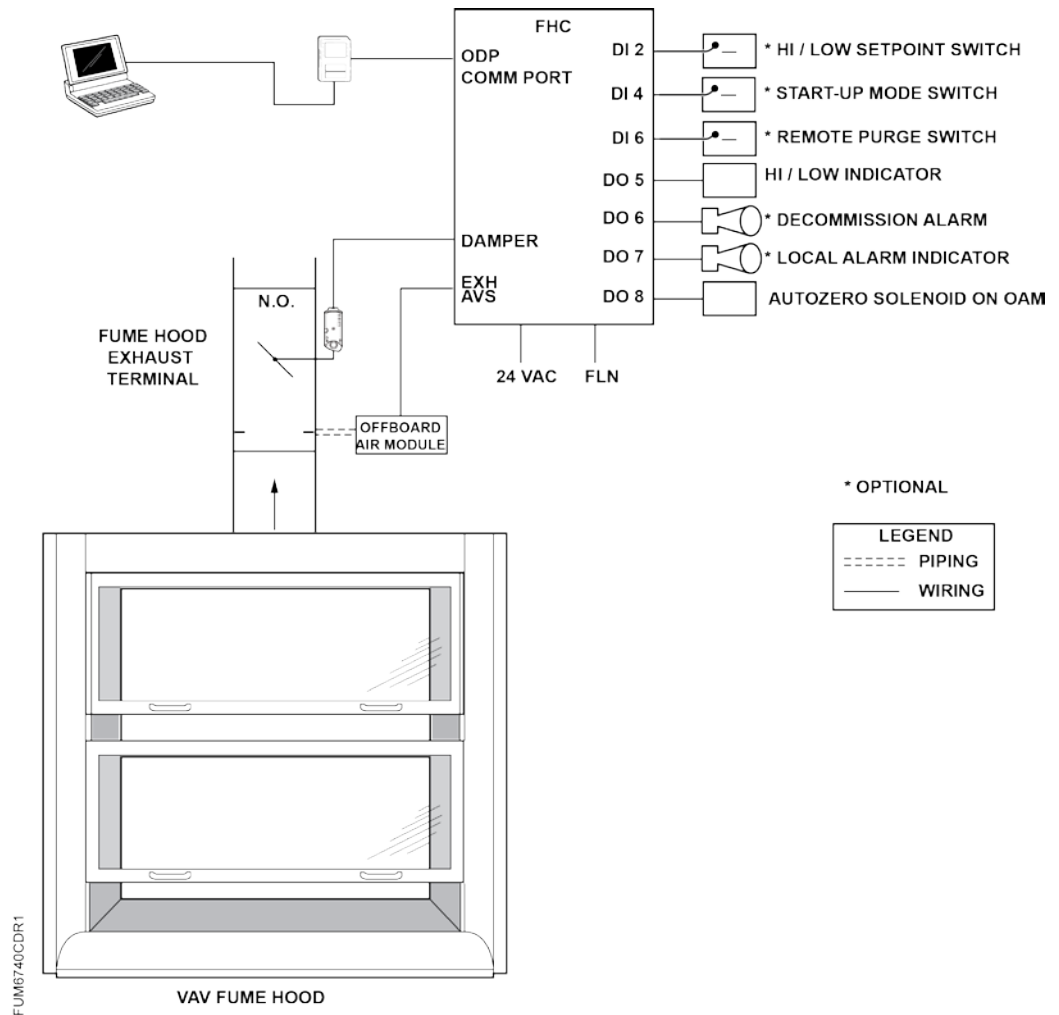
Chapter 2 – Applications

Basic Operation

The BACnet Fume Hood controller provides Direct Digital Control (DDC) technology for pressure independent Variable Air Volume (VAV) and Constant Volume (CV) laboratory fume hood applications.

Application 6740 Fume Hood Controller 2-Position Constant Volume

This application is designed for use with a constant volume or two-position fume hood in a manifold fume hood exhaust system. Two-position fume hoods have an individual exhaust damper connected to a central fan. The application modulates the exhaust flow control device to maintain a high or low flow setpoint based on inputs from the ODP (Operator's Display Panel), digital input, an exhaust airflow sensor, and the controller setpoints.



Application 6740 Control Diagram.

Application 6742 Fume Hood Controller Vertical Sash Configuration with Venturi Air Valve

Application 6741 and Application 6742 are designed for use with a wide range of fume hood sash configurations connected to a manifold fume hood exhaust system. The sash configurations include:

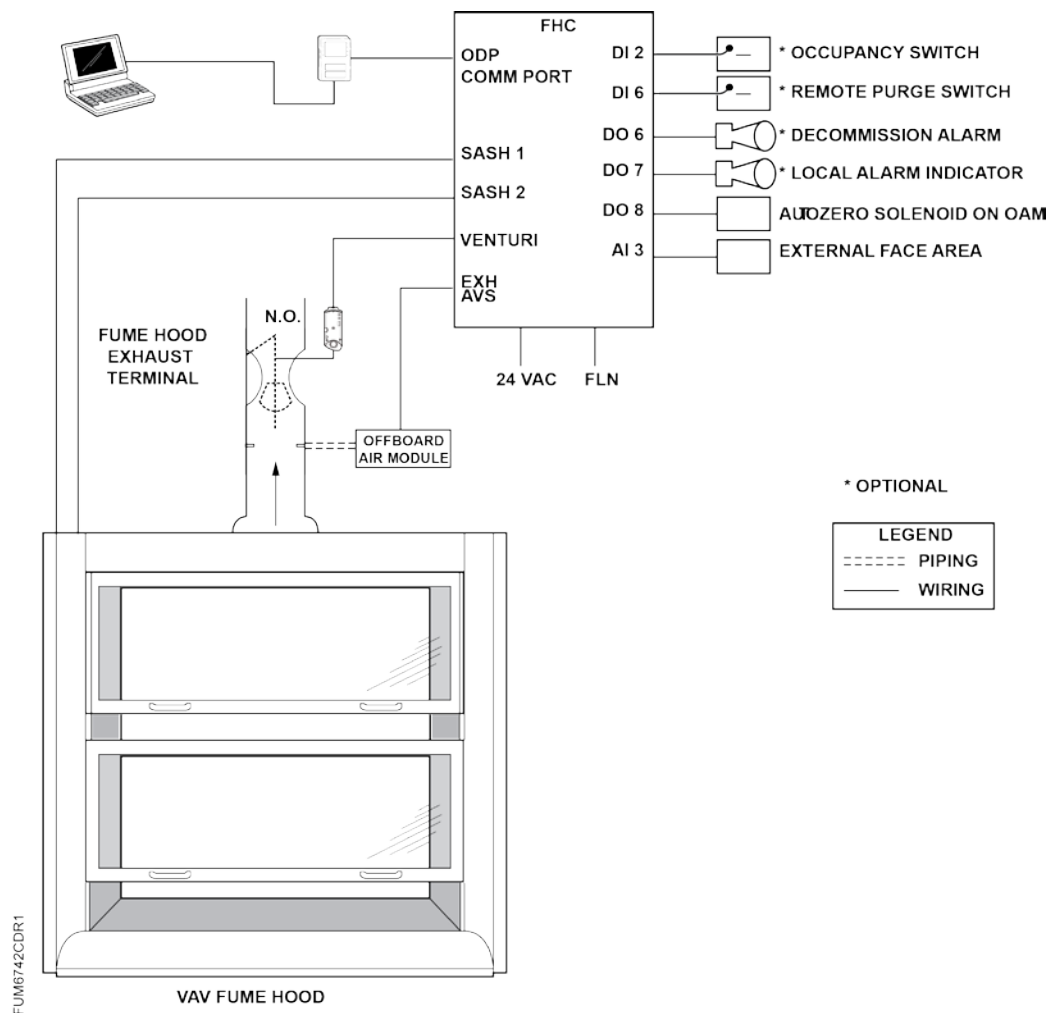
- Bench style fume hoods – single vertical sash
- Dual Bench style fume hoods – side-by-side single vertical sash
- Floor Mounted style fume hoods – two vertical sashes, one on top of the other



⚠ WARNING

The application cannot detect a broken wire to the analog input for the second sash.

An external sash aggregating device should be used to calculate the face area for all fume hoods with more than one sash.



Application 6742 Control Drawing.



Application 6700 Slave Mode

Application 6700 is the slave mode application for the BACnet Fume Hood Controller (see *Ordering Notes* for product numbers). Slave mode is the default application that comes up when power is first applied to the controller. Slave mode provides no control. Its purpose is to allow the operator to perform equipment checkout before a control application is put into effect and to set some basic controller parameters (CTRL ADDRESS, APPLICATION, and so on).

Chapter 3 – Point Database

Chapter 3 presents a description of the BACnet Fume Hood Controller point database, including point descriptors, point addresses, and a listing of applications in which each point is found.

| Descriptor | Address ¹ | Application | Description |
|--------------|----------------------|------------------|---|
| CTLR ADDRESS | 01 | All | Identifies the controller on the FLN trunk. |
| APPLICATION | 02 | All | Identifies the program running in the controller. |
| FACE VEL | 04 | 6741, 6742 | The calculated average air velocity through the face of the fume hood. |
| LOW ALM | 05 | 6740, 6741, 6742 | Displays an ON or OFF status. When the face velocity goes below the value specified at LOW ALM LMT for the time specified in ALARM TIME, the point goes into an alarm state (ON); the red LED is illuminated, the alarm sounds, and the message LOW Face Velocity displays at the ODP. (Application 6740 uses exhaust flow.) |
| HIGH ALM | 06 | 6740, 6741, 6742 | Displays an ON or OFF status. When the face velocity goes above the value specified at HI ALM LMT for the item specified in ALARM TIME, the point goes into an alarm state (ON); the red LED is illuminated, the alarm sounds, and the message HIGH FACE VELOCITY displays at the ODP. (Application 6740 uses exhaust flow.) |
| EMER ALM | 07 | 6740, 6741, 6742 | Displays an ON or OFF status that indicates if the EMERGENCY PURGE button on the ODP has been pressed. When the operator presses the EMERGENCY PURGE button, the point is ON, the red LED is illuminated, the alarm sounds, and EEE and EMERGENCY MODE display at the ODP. If pressed again, then the point is OFF. This point can be commanded by a field panel. |
| GEN FAILURE | 08 | 6740, 6741, 6742 | Indicates a hardware failure (for example, the sash sensor) with an ON or OFF status. The red LED is illuminated; the alarm sounds, and FFF and GENERAL FAILURE display at the ODP. |
| HI ALM LMT | 10 | 6740, 6741, 6742 | The value above FVEL STPT, in percent, at which the red LED and audible alarm are activated on the ODP. This point is the setpoint for HIGH ALM. Valid values: 100 through 255%. (Application 6740 uses EXH STPT.) |
| HI WARN LMT | 11 | 6740, 6741, 6742 | The value above FVEL STPT, in percent, at which the yellow LED is illuminated on the ODP. Valid values: 100 through 255%. (Application 6740 uses EXH STPT.) |
| LOW WARN LMT | 12 | 6740, 6741, 6742 | The value below FVEL STPT, in percent, at which the yellow LED is illuminated on the ODP. Valid values: 0 through 100%. (Application 6740 uses EXH STPT.) |
| LOW ALM LMT | 13 | 6740, 6741, 6742 | The value below FVEL STPT, in percent, at which the red LED and audible alarm activates on the ODP. This point is the setpoint for LOW ALM. Valid values: 0 through 100%. (Application 6740 uses exhaust flow.) |
| EMER TIMER | 14 | 6740, 6741, 6742 | When EMER ALM is set to ON, the time set for EMER TIMER is used as the length of time the EXH FLOW is commanded to full flow (the damper is full open). After the time in EMER TIMER times out, the EXH FLOW is controlled to the value set in EMER STPT. Valid values: 0 through 32, |

| Descriptor | Address ¹ | Application | Description |
|--------------|----------------------|------------------|---|
| | | | 767 seconds. |
| EMER STPT | 15 | 6740, 6741, 6742 | A value of the preset FVEL STPT, in percent, that the controller uses as the setpoint when EMER ALM is ON. (Application 6740 uses EXH STPT.) |
| LOW WARN | 16 | 6740, 6741, 6742 | Displays an ON or OFF status. When the face velocity goes below the value specified at LOW WARN LMT for the time specified in ALARM TIME, the point goes into a warning state (ON); the yellow LED is illuminated at the ODP. |
| HIGH WARN | 17 | 6740, 6741, 6742 | Displays an ON or OFF status. When the face velocity goes above the value specified at HI WARN LMT for the time specified in ALARM TIME, the point goes into a warning state (ON), the yellow LED is illuminated at the ODP. |
| ALARM TIME | 18 | 6740, 6741, 6742 | Time delay for the red and yellow alarm LEDs used to eliminate sudden changes and false alarms. The average face velocity must rise above any of the set limits (for example, HI ALM LMT) for the amount of time specified at this point before the ODP indicates an alarm condition. |
| FLOW MAX | 18 | 6741, 6742 | Maximum flow setpoint allowed. FLOW MAX will override the FVEL STPT if the calculated FLOW STPT is greater than FLOW MAX. |
| ALM AKNLG | 19 | 6740, 6741, 6742 | Displays an ON or OFF status that indicates the Horn Silence button has been pressed at the ODP to acknowledge an alarm condition. The point will reset when the alarm condition clears or another alarm is initiated. |
| OCC.UNOCC | 20 | 6741, 6742 | OCC or UNOCC point controls which face velocity setpoint to use; OCC FV SET or UNOCC FV SET. |
| STARTUP MODE | 21 | 6740, 6741, 6742 | Toggles the ODP from normal operation to OFF mode. In OFF mode, the alarms do not sound, the ODP displays OFF and the RED LED is on. |
| LEFT SWITCH | 22 | 6741, 6742, 6700 | Indicates if the left auxiliary button on the ODP has been pressed. This is a toggle action digital input; when pressed, the point is ON. If pressed again, the point is OFF. |
| ODP STPT SW | 22 | 6740 | Indicates if the left button on the ODP has been pressed. This is a toggle action digital input; when pressed, the controller changes between HI and LOW flow setpoints. |
| RIGHT SWITCH | 23 | All | Indicates if the right auxiliary button on the ODP has been pressed. This is a toggle action digital input; when pressed, the point is ON. If pressed again, the point is OFF. |
| ATN.UNATTN | 24 | 6741, 6742 | ATTN or UNATTN point controls the mode of operation for the sash alert function. |
| AT ALRT AREA | 25 | 6741, 6742 | The open area in square feet (SQM) at which the Sash Alert feature will start beeping the horn during attended operation. |
| UN ALRT AREA | 26 | 6741, 6742 | The open area in square feet (SQM) at which the Sash Alert feature will start beeping the horn during unattended operation. |
| OPEN TIME | 27 | 6741, 6742 | When SASH OP ALRT is on, you can silence the alert for the time entered in OPEN TIME. |
| SASH TONE | 28 | 6741, 6742 | ON or OFF point controls if the ODP will beep for the SASH ALRT function or if the alarm will just be passed to the network. |
| SASH OP ALRT | 30 | 6741, 6742 | This point turns ON when the face area is larger than UN |

| Descriptor | Address ¹ | Application | Description |
|--------------|----------------------|------------------|---|
| | | | ALRT AREA or AT ALRT AREA depending on the state of ATTN.UNATTN. |
| EXH VOL | 31 | All | The calculated value, in CFM (LPS), of the exhaust airflow. |
| FLOW COEF | 32 | All | Gain factor for the flow sensor. |
| DUCT AREA | 33 | All | Area of the duct, in square feet (SQM), where the air velocity sensor is located. |
| TRANS RANGE | 34 | 6740, 6741, 6742 | The maximum range, in inches of water (PA), of the differential pressure transmitter. Standard values are 0.1 (25.3), 0.25 (62.275), 0.5 (124.55), and 1.0 (253). |
| LINEAR FL RG | 35 | 6740, 6741, 6742 | When AI 3 is used as a linear flow sensor input, this value is the maximum range of the input. |
| AVS2 PRESS | 36 | All | The pressure that is applied to AVS2. |
| DI 2 | 37 | 6741, 6742, 6700 | Actual status of a contact connected to the controller at DI 2. ON indicates that the contact is closed; OFF indicates that the contact is open. If a wall switch is used, it is connected to DI 2. |
| DI 2 STPT SW | 37 | 6740 | Digital input for dry contact connection to control the HI/LOW flow setpoint of the controller. |
| DI 6 | 38 | All | Actual status of a contact connected to the controller. ON indicates that the contact is closed; OFF indicates that the contact is open. Actual status of a contact connected to the controller. ON indicates that the contact is closed; OFF indicates that the contact is open. |
| AO 1 | 39 | All | Spare analog output is a 0 to 10 Vdc output. |
| AO 3 | 40 | 6740, 6741, 6700 | Spare analog output is a 0 to 10 Vdc output. |
| EXH AO3 | 40 | 6742 | Control signal for Venturi General Exhaust Valve (0 - 10V). |
| EXH DO1 | 41 | 6740, 6741 | Digital output 1 and 2 are used to control a floating point actuator. |
| DO 1 | 41 | 6742, 6700 | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| RETC DO 2 | 42 | 6740, 6741 | Digital output 1 and 2 are used to control a floating point actuator. |
| DO 2 | 42 | 6742, 6700 | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| DO 3 | 43 | All | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| DO 4 | 44 | All | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| DO 5 | 45 | 6741, 6742, 6700 | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| HI.LOW DO5 | 45 | 6740 | Digital output that follows the HI/LOW flow setpoint. |
| DECOM DO6 | 46 | 6740, 6741, 6742 | Digital output that turns on when a decommissioned hood is used. |
| DO 6 | 46 | 6700 | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| ALARM DO7 | 47 | 6740, 6741, 6742 | Intended to drive local alarm device (horn, light, and so on.). Function set up by setting alarm enable points. |

| Descriptor | Address ¹ | Application | Description |
|--------------|----------------------|------------------|--|
| DO 7 | 47 | 6700 | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| AUTOZERO DO8 | 48 | 6740, 6741, 6742 | Drives the Offboard Air Module(s) in order to calibrate the flow sensor(s). Do not use or manually set this point. |
| DO 8 | 48 | 6700 | Spare digital output controls a 24 Vdc load with an ON or OFF status. |
| AI 3 | 49 | 6741, 6742 | Optional input for External Face Area or Airflow sensor. |
| AI 3 | 49 | 6700, 6740 | Optional input for Airflow sensor or spare analog input (0 – 10V or 4-20 mA). |
| AI 4 | 50 | 6741, 6742 | Sash sensor 2 input or spare analog input (0 - 10V or 4-20 mA). |
| AI 4 | 50 | 6700,, 6740 | Startup DI 4 (Point 56) or spare analog input (0 – 10V or 4-20 mA). |
| AI 5 | 51 | 6741, 6742 | Sash sensor 1 input. |
| AI 5 | 51 | 6700, 6740 | Spare analog input, 10K Ω . |
| VERT SASH1 | 52 | 6741, 6742 | Current position, in inches (cm), of the vertical sash wired as sash 1 at the controller board. If not physically wired to the controller, this point may display as 'failed'. |
| VERT SASH2 | 53 | 6741, 6742 | Current position, in inches (cm), of the vertical sash wired as sash 2 at the controller board. If not physically wired to the controller, this point may appear as 'failed'. |
| FACE AREA | 54 | 6741, 6742 | The open area, in square feet (SQM), of the fume hood face, which includes the fixed area and accounts for the bypass area. |
| CAL SASH POS | 55 | 6741, 6742 | User defined value used during calibration of the sash sensor to describe the current position of the sash, in inches (cm). |
| CAL SASH LOC | 56 | 6741, 6742 | User defined value (MIN or MAX) used during the calibration sequence to indicate if the minimum or maximum sash position is being calibrated. |
| DI 4 | 56 | 6740 | DI determines if DI 4 is used to change the STARTUP MODE. |
| CAL SASH NUM | 57 | 6741, 6742 | The number of the sash being calibrated. Valid values: 1 to 5. |
| DMPR COMD | 58 | 6740, 6741, 6742 | The commanded position of the damper. |
| INVERT DO2 | 59 | 6740, 6741 | Setting to NCLOSE allows the controller to operate industry standard floating control actuators. Setting this point may stop the failsafe operation from functioning. |
| AVS FAILMODE | 60 | 6740, 6741, 6742 | Indicates the desired position of the damper if the airflow sensor(s) fail. Valid values: CLOSED or OPEN. |
| EXH P GAIN | 61 | 6740, 6741, 6742 | The proportional gain value for the fume hood flow control loop. |
| EXH I GAIN | 62 | 6740, 6741, 6742 | The integral gain value for the fume hood flow control loop. |
| EXH D GAIN | 63 | 6740, 6741, 6742 | The derivative gain value for the fume hood flow control loop. |
| FIXED AREA | 64 | 6741, 6742 | Open area of the fume hood, in square feet (SQM), that remains the same regardless of sash position. |
| VERT WIDTH1 | 65 | 6741, 6742 | Defines the overall width of the vertical sash wired to sash 1 |

| Descriptor | Address ¹ | Application | Description |
|--------------|----------------------|------------------|--|
| | | | at the controller board. |
| VERT WIDTH2 | 66 | 6741, 6742 | Defines the overall width of the vertical sash wired to sash 2 at the controller board. |
| VSASH HGHT1 | 67 | 6741, 6742 | Defines the overall height of the vertical sash wired to sash 1 at the controller board. |
| VSASH HGHT2 | 68 | 6741, 6742 | Defines the overall height of the vertical sash wired to sash 2 at the controller board. |
| TRACK HEIGHT | 69 | 6741, 6742 | Measurement, in inches (cm), of the vertical track in a multi-vertical sash fume hood. |
| BYPASS HGHT | 70 | 6741, 6742 | The height of the bypass opening of the fume hood. |
| BYPASS OPEN | 71 | 6741, 6742 | The effective bypass area in percent. |
| FAIL AREA | 72 | 6741, 6742 | When a sash sensor fails, the controller controls to the face area defined by this point. |
| EXTERNAL A | 73 | 6741, 6742 | When AI 3 is used to input an external face area, the value is displayed here. |
| MAX EXT AREA | 74 | 6741, 6742 | Scaling for the external face area Analog Input (AI 3) point. |
| MIN EXTVOLTS | 75 | 6741, 6742 | Minimum voltage value for external face area input range (typically 0.0V or 1.0V). |
| CAL EXH VLV | 78 | 6742 | YES or NO point used to calibrate EXH AO3 to the associated flow rate. |
| STARTUP DI4 | 78 | 6740 | Determines if DI4 is used to change the STARTUP MODE. |
| EXH VLV STAT | 79 | 6742 | PASS or FAIL point used to indicate if the last calibration attempt passed. |
| EXH MAX | 80 | 6741, 6742, 6700 | Maximum flow setpoint allowed. EXH MAX will override the FVEL STPT if the calculated FLOW STPT is greater than EXH MAX. |
| EXH HI STPT | 80 | 6740 | The high flow setpoint used in EXH STPT. |
| EXH MIN | 81 | 6741, 6742, 6700 | Minimum flow setpoint allowed. EXH MIN will override the FVEL STPT if the calculated FLOW STPT is less than EXH MIN. |
| EXH LO STPT | 81 | 6740 | The low flow setpoint used in EXH STPT. |
| FVEL STPT | 83 | 6741, 6742 | The face velocity setpoint in feet per minute (m/s) that is maintained by the Fume Hood Controller. Valid values: 0 through 225 ft/min (0-1.2954 m/s). |
| OCC FV SET | 84 | 6741, 6742 | The face velocity setpoint during occupied operation. |
| UNOC FV SET | 85 | 6741, 6742 | The face velocity setpoint during unoccupied operation. |
| OCC LOW FV | 86 | 6741, 6742 | (Optional) The low face velocity setpoint during occupied operation. |
| OCC HIGH FV | 87 | 6741, 6742 | (Optional) The high face velocity setpoint during occupied operation. |
| OCC DELAY | 88 | 6741, 6742 | This point delays the OCC.UNOCC function, a user defined number of seconds, when the controller is in UNATTN mode. |
| EXH SIG AO2 | 89 | 6740, 6741, 6742 | Indicates the exhaust flow setpoint. The output is 1 to 10 Vdc, which corresponds to 0 to AO2 RANGE. |
| AO2 | 89 | 6700 | Spare analog output is a 9 to 10 Vdc output. |

| Descriptor | Address ¹ | Application | Description |
|--------------|----------------------|------------------|--|
| AO2 RANGE | 90 | 6741, 6742 | Scaling for the Analog Output (AO2) point. To get the correct output, the slope and intercept of this point must match the point database of the room controller. |
| AO2 DEADBAND | 91 | 6740, 6741, 6742 | When EXH FLOW and FLOW STPT are different by more than the AO2 DEADBAND, the AO2 FLOW SIG changes from setpoint to actual flow. |
| AO2 V MIN | 92 | 6740, 6741, 6742 | Minimum voltage value for fume hood output range (typically 0.0V or 1.0V). |
| CAL AIR | 94 | All | YES commands the controller to go through calibration sequence for the air velocity transducers. YES is also displayed when the calibration sequence is started automatically. CAL AIR automatically returns to NO after the calibration sequence is completed. Valid input: YES or NO. |
| CAL SETUP | 95 | All | The configuration setup code for the calibration sequence options. |
| CAL TIMER | 96 | All | Time interval, in hours, between the calibration sequence initiations if a timed calibration option is selected in CAL SETUP. |
| AVS1 PRESS | 97 | All | The pressure that is applied to AVS1. |
| LOOP TIME | 98 | 6741, 6742 | The time, in tenths of a second, between control loop calculations. |
| ERROR STATUS | 99 | All | The status code that indicates any errors detected during controller power-up. |
| DISPLAY WT | 106 | 6740, 6741, 6742 | Factor used to filter out large changes in the value of FACE VEL that is displayed at the ODP. This value is a percent that is used to average a portion of the current average face velocity with a portion of the previous average face velocity. The value of this point is a percentage of the current average face velocity. (Application 6740 uses EXH VOL.) |
| DISPLAY RES | 107 | 6740, 6741, 6742 | A change of value (COV) limit for the face velocity displayed at the ODP. The display does not update unless the change in face velocity exceeds this value. |
| BLANK DISPLY | 108 | 6740, 6741, 6742 | When set to YES, the face velocity does not display at the ODP. |
| LAMP TEST | 109 | 6740, 6741, 6742 | Turns on all lights, prompts, and the audible alarm at the ODP. |
| ENG UNITS | 110 | 6740, 6741, 6742 | Toggles the display of the ODP from feet per minute to meters per second. Toggling this point does not change the displayed value at the portable operator's terminal. |
| TABLE VOLTS | 118 | 6740, 6741, 6742 | The database point used to view and edit the internal Venturi calibration data. |
| TABLE FLOW | 119 | 6740, 6741, 6742 | The database point used to view and edit the internal Venturi calibration data. |
| V TABLE PT | 120 | 6740, 6741, 6742 | The database point used to view and edit the internal Venturi calibration data. |
| HI LIMIT | 121 | 6740, 6741, 6742 | Determines when the flow PID will "coast" if near setpoint. |
| LO LIMIT | 122 | 6740, 6741, 6742 | Determines when the flow PID will "coast" if near setpoint. |
| EMER DI6 | 123 | 6740, 6741, 6742 | Remote initiation of the Emergency Purge functionality. |
| OPEN LOOP | 124 | 6742 | The controller does not use feedback to reposition the air |

| Descriptor | Address ¹ | Application | Description |
|--------------|----------------------|------------------|--|
| | | | valve. |
| ODP DISPLAY | 125 | 6740 | Controls the function of the ODP display. It will display either CFM divided by 10 or HI FLOW / LO FLOW. |
| AVE FACE VEL | 126 | 6741, 6742 | The filtered face velocity that displays on the ODP. |
| AVE EXH VOL | 126 | 6740 | The filtered exhaust volume that displays on the ODP. |
| PPCL STATE | 127 | 6740, 6741, 6742 | Indicates that customized programming has been added in addition to the normal control strategy of the application being used. This point is read as LOADED or EMPTY. A status of LOADED indicates that there is PPCL programming in the controller, and it is providing unique control to meet a customer's job specification. A status of EMPTY indicates that no unique programming is present. |

¹⁾ Points not listed are not used in this application.

Chapter 4 – Basic Service and Maintenance

This chapter describes corrective measures you can take should you encounter a problem when using a BACnet Fume Hood Controller.

You are not required to do any controller troubleshooting. You may want to contact your local Siemens Industry representative if a problem occurs or you have any questions about the controller.



NOTE:

When troubleshooting, record the problem and what actions were performed immediately before the problem occurred. Being able to describe the problem in detail is important should you need assistance from your local Siemens Industry representative.

Basic Service Information

Always remove power to the BACnet Fume Hood Controller when installing or replacing it. Since the controller does not have a power switch, the recommended method of removing power to a locally powered controller is to turn OFF the power to the 24 Vac transformer. The recommended method of removing power to a controller on a power cable (even to service a single controller) is to turn OFF the power at the transformer.



NOTE:

When removing power to a controller to perform maintenance or service, make sure that the person in charge of the facility is aware of this and that appropriate steps are taken to keep the building in control.

Never remove the cover from the BACnet Fume Hood Controller. There are no serviceable parts inside. If a problem is found with this device, contact your local Siemens Industry representative for replacement. An anti-static wrist strap is recommended when installing or replacing controllers.

Preventive Maintenance

Most controller components are designed so that, under normal circumstances, they do not require preventive maintenance. Periodic inspections, voltage checks, and point checks are normally not required. The rugged design makes most preventive maintenance unnecessary. However, devices that are exposed to dusty or dirty environments may require periodic cleaning to function properly.

Safety Features

The controller board stores the controller's address, applications, and point values. In the event of a power failure or a reset, these values are retrieved from the controller's permanent memory and are used by the controller unless overridden by a field panel. If one of the following conditions occurs, the controller will activate safety features present in its fail-safe mode.

- Sensor failure.
- Loss of power. Upon controller power loss, communication with the controller is also lost. The controller will appear as failed (*F*) at the field panel.

Glossary

This glossary contains the collected terms and acronyms that are used in Siemens BACnet PTEC and TEC Controllers. For definitions of point database descriptors, see Chapter 3 - Point Database, in this manual.

airflow

Rate at which a volume of air moves through a duct. Usually expressed in cubic feet per minute (cfm) or liters per second (lps).

algorithm

Mathematical formula and control logic that uses varying inputs to calculate an output value.

AVS

Air Velocity Sensor. An electronic device that converts differential pressure from a pilot tube or multi-point pickup to an analog rate of fluid flow (air velocity in fpm, m/s) to provide calculations of air volume rate (cfm, lps) in a duct. The air velocity sensor may be an external device or an internal component of a controller.

centralized control

Type of control offered by a controller that is connected by means of Field Level Network (FLN).

cfm

Cubic Feet per Minute.

Chilled Beam

A cooling device that provides a cooling system by taking care of both the sensible and latent heat gains of a room in a single package by a series of chilled water coils mounted near or in the ceiling. Coupled with a CV or VAV terminal ventilation system, a chilled beam induces air movement over the coil in the way that it discharges fresh air into the room. This allows for both fresh air and cooling to be taken care of at the same time.

control loop

An algorithm, such as PI or PID, that is used to control an output based on a setpoint and an input reading from a sensor.

CO₂

Carbon dioxide, a naturally occurring chemical compound composed of two oxygen atoms and a single carbon atom. Among other production sources, carbon dioxide is produced as the result of breathing of humans and animals and can therefore be an indirect indication of the concentration of humans in a zone.

CV

Constant air volume. Ventilation system that provides a fixed air volume supplied to and exhausted from the rooms served. The fixed volume may be different during occupied and unoccupied times

Demand Control Ventilation

A control algorithm that provides for the control or reduction of outdoor air intake below design rates when the actual occupancy of spaces served by the system is at less than design occupancy.

DCV

Demand Control Ventilation.

DDC

Direct Digital Control.

Direct digital control

The automated control of a condition or process by a digital device (computer).

DO

Digital Output. Physical output point that sends a two-state signal (ON/OFF, OPEN/CLOSED, YES/NO).

English units

The foot-pound-second system of units for weights and measurements.

equipment controller

FLN device, such as a BACnet PTEC or ATEC, that provides individual room or mechanical equipment control or additional point capacity to a field panel.

field panel

A DDC control device containing a microprocessor for centralized control and monitoring of system components and equipment controllers.

Floating Control

The combination of a modulating controlled device with the use of a pair of two position outputs. The control signal will either activate one or the other outputs to drive the controlled device towards its open or closed position. When both outputs are off, the controlled device maintains its last position. Also referred to as tri-state control.

FLN

Field Level Network. Network consisting of equipment controllers, FLN end devices, fume hoods, and so on.

lps

Liters per Second.

loopout

Output of the control loop expressed as a percentage.

Heat pump

An HVAC device used for both space heating and space cooling. When a heat pump is used for heating, it employs the same basic refrigeration-type cycle used by an air conditioner but in the opposite direction, releasing heat into the conditioned-space rather than the surrounding environment. In this use, heat pumps generally draw heat from the cooler external air or from the ground.

HMI

Human Machine Interface. Terminal and its interface program that allows you to communicate with a field panel or equipment controller.

Occupancy sensor

A control device that detects presence of people in a space by using infrared or ultrasonic technology. Occupancy sensors are used to save energy by controlling lighting and temperature and, along with CO2 sensors, to provide control input of demand control ventilation (DCV) algorithms.

override switch

Button on a room temperature sensor that an occupant can press to change the status of a room from unoccupied to occupied (or from night to day) for a predetermined time.

pressure dependent

Variable Air Volume (VAV) room temperature control system in which the temperature drives a damper such that the air volume delivered to the space at any damper position is dependent on the duct static pressure.

pressure independent

Variable Air Volume (VAV) room temperature control system in which the temperature drives an airflow setpoint such that the air volume delivered to the space is independent of variations in the duct static pressure.

PID

Proportional, Integral, Derivative.

RTS

Room Temperature Sensor.

setpoint

Data point that stores a value such as a temperature setting. In contrast, points that monitor inputs, such as temperature, report actual values.

SI units

Système International d'Unités. The international metric system.

slave mode

Default application that displays when power is first applied to an equipment controller. No control action is initiated in the slave mode. Input and output points in the slave application can be monitored or controlled by a field panel (or by PPCL in a BACnet PTEC controller).

stand-alone control

Type of control offered by a controller that is providing independent DDC control to a space.

Terminal Equipment Controller

Siemens Industry, Inc. product family of equipment controllers that house the applications software used to control terminal units, such as heat pumps, VAV terminal boxes, fan coil units, unit ventilators, and so on.

UI

Universal Input. Can be used as an AI or DI. An AI input is a point receiving a signal that represents a condition that has more than two states. A DI input is a physical input point that receives a two-state signal.

unbundle

Term used to describe the entering of a point that resides in a controller's database into the field panel's database so that it can be monitored and controlled from the field panel.

VAV

Variable air volume. Ventilation system that changes the amount of air supplied to and exhausted from the rooms served.

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