SIEMENS

LCM-OAVS

Room Pressurization with Slow-acting Damper Actuation (One Exhaust, One Supply) and Hot Water Reheat

Owner's Manual

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Building Technologies

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How To Use This Manual

This manual is written for the owner and user of the LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat . It is designed to help you become familiar with the Siemens Laboratory Controller Module 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 LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat .
- *Chapter 2 - Applications,* describes the control applications available in the model of the Laboratory Controller Module 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 Laboratory Controller Module. 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.

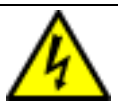
Manual Conventions

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 `Report Definition successfully renamed` displays in the status bar.

Convention	Examples
New terms appearing for the first time are italicized.	The field panel continuously executes a user-defined set of instructions called the *control program*.
	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** [*username*] [*field panel #]*.

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.

Your feedback is important to us. If you have comments about this manual, please submit them to SBT_technical.editor.us.sbt@siemens.com

Chapter 1 - Product Overview

The LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat is the Siemens Industry FLN controller used in pressure independent Variable Air Volume applications. It provides Direct Digital Control (DDC) for a number of applications.

- 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 LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat).
- The controller provides negative, positive, or neutral pressurization for laboratories (using volumetric tracking) to control airflow into or out of the laboratory from surrounding areas.
- Delivery of enough ventilation to the room to dilute air contaminants.
- Maintain the desired air temperature in the room.

The LCM is equipped with ventilation and pressurization alarms that are designed to fit into a safety program. When the ventilation system fails to function properly, the controller can detect and indicate the alarm condition throughout the facility. The controller can activate alarm devices in or near the room and broadcast that information through the Building Automation System (BAS) to the people designated to respond to the problem.

As part of a networked BAS, the LCM makes it possible for the maintenance staff to monitor, troubleshoot and adjust laboratory HVAC operation remotely. The BAS can collect and process data from the controller to generate longer-term records of laboratory operation. These records can be used as part of a building quality assurance program. Reports can also be tailored to serve as safety records, or for use in energy accounting.

To help you make the best use of your energy budget; the LCM has features that support reducing the ventilation rate during periods in which the laboratory is unoccupied.

The Laboratory Room Controller with Venturi Air Valves and OAVS can be used to control a lab room that has no supply air terminal box, or conversely, it can be used to control a lab room without a general exhaust terminal box. See your local Siemens Industry, Inc. representative for more information.

Configurations

The LCM is equipped to handle a variety of combinations of ventilation devices in one room. Each controller in your system is initially set up to cover the equipment installed at that time. Laboratory ventilation systems are known to change from time to time, usually as exhaust devices are added, or removed. This section explains various ways your LCM may be adapted to accommodate changes in the ventilation equipment. Contact your local Siemens Industry, Inc. representative for more specific information about your options.

The following applications are covered:

- Room Pressurization with Hot Water Reheat and Slow Supply Damper Actuation – RTS (Application 2923)
- Room Pressurization with Hot Water Reheat and Slow Supply Damper Actuation – including BTU Compensation (Application 2929)
- Slave Mode (Application 2997)

Hardware Inputs

Analog

Air velocity sensor (one or two depending on setup)	Application 2923 Application 2929
Fume hood controller input for FFM	Application 2923 Application 2929
Room temperature sensor	Application 2923 Application 2929
Discharge temperature sensor (10K Ω thermistor)	Application 2923 Application 2929

Digital

Occupancy button (option on room temperature sensor)	Application 2923 Application 2929
(Optional) Occupancy switch	Application 2923 Application 2929
Alarm switch	Application 2923 Application 2929

Hardware Outputs

Analog

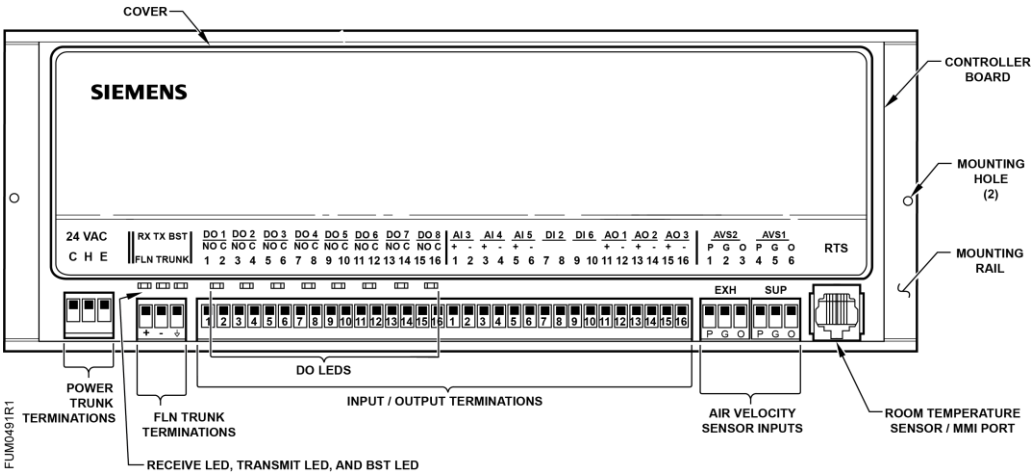
Reheat valve	Application 2923 Application 2929

Digital

Supply damper (two DOs)	Application 2923 Application 2929
General exhaust damper (two DOs)	Application 2923 Application 2929
Autozero solenoid in Offboard Air Module (DO 8)	Application 2923 Application 2929
(Optional) Alarm	Application 2923 Application 2929

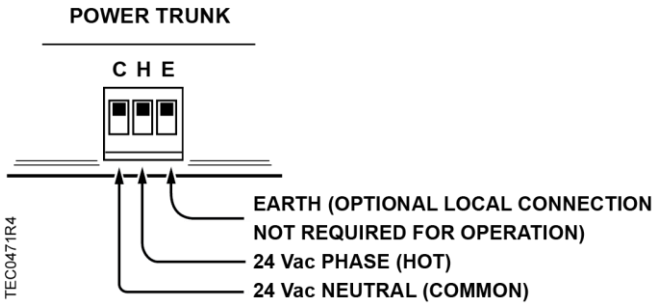
Ordering Notes

LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat	550-767FN



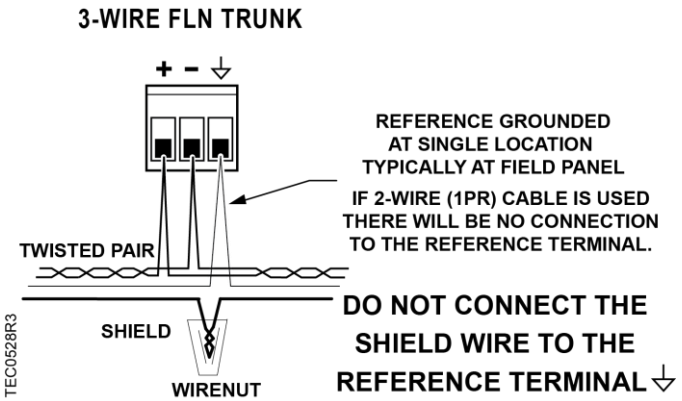
Generic Controller I/O Layout. See *Wiring Diagram* for application specific details.

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 FigureLCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat). 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.

Temperature Sensors

Temperature sensors used with the LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat include an electronic room temperature sensor and an optional duct temperature sensor.

Room Temperature Sensor

The controller room temperature sensor connects to the controller by means of a cable terminated at both ends with a six-conductor RJ-11 plug-in connector.

See the Ordering Notes section for the location of the room temperature sensor/Human Machine Interface (HMI) port.

NOTE:
When using a Series 2000 Room Thermostat:
During **unoccupied mode**, you cannot change the Room Setpoint using a Siemens Industry Series 2000 thermostat. Any attempt to change Room Setpoints during unoccupied mode using a Series 2000 stat will be ignored.

During **occupied mode**, the Room Setpoint can be changed using a Series 2000 stat, but if it is, then the controller initial values should be uploaded to the field panel. Otherwise the controller will not keep the adjusted Room Setpoint value upon return from a power failure.

Duct Temperature Sensor

An optional duct temperature sensor provides duct air temperature sensing inputs to the controller.

For more information about temperature sensors, contact your local Siemens Industry representative.

Discharge Temperature Sensor

An optional discharge temperature sensor provides BTU compensation sensing to the controller.

Actuators

Actuators used with the LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat include electronic damper motor. This actuator is controlled by the controller to position the damper or air valve.

Related Equipment

- Offboard Air Modules
- Duct temperature sensor (10K Ω thermistor) (optional)
- Discharge temperature sensor (10K Ω thermistor) (required for Application 2929 room temperature sensor)
- Venturi air valves
- Room temperature sensor

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

Chapter 2 - Applications

Basic Operation

The LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat provides Direct Digital Control (DDC) technology for pressure independent Variable Air Volume (VAV) and Constant Volume (CV) laboratory room applications.

Application 2923 LCM-OAVS Slow Damper

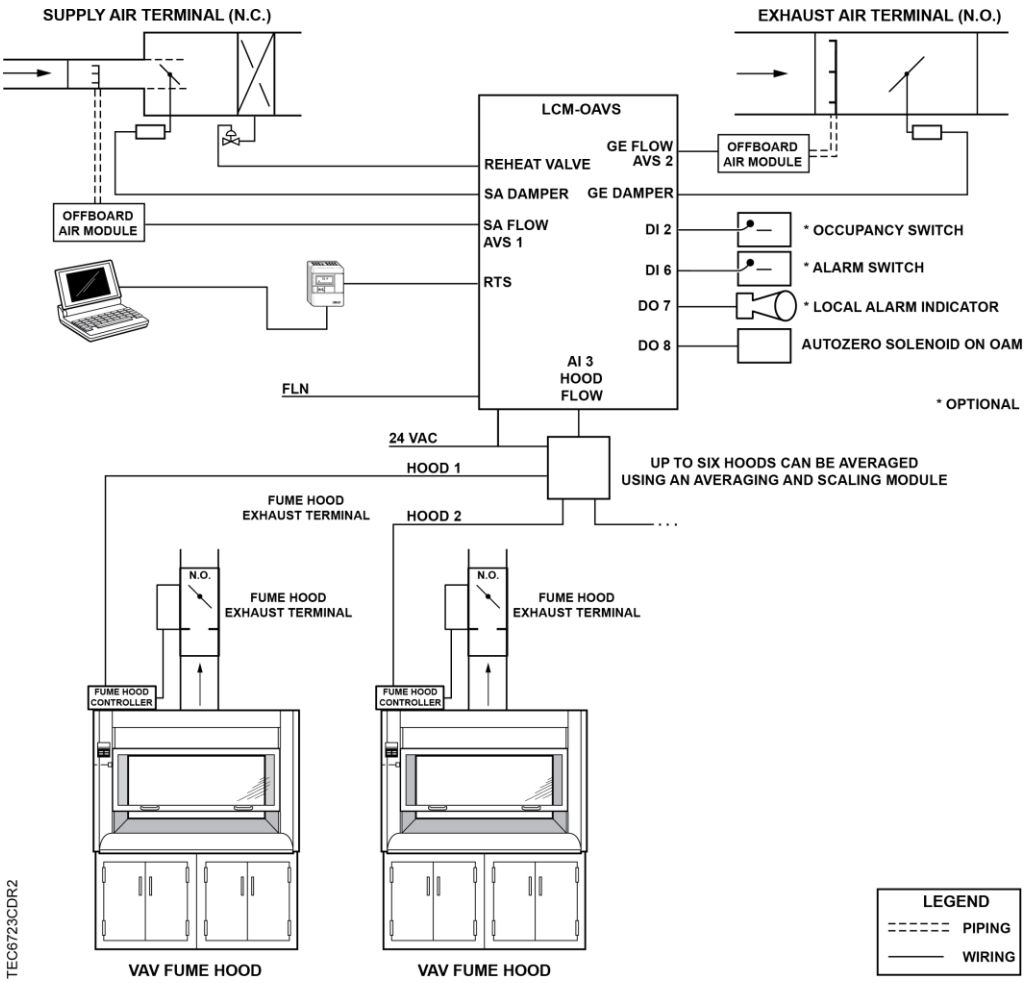
NOTE:
If desired, the LCM can be used without any fume hoods attached. In this case, MAX HOOD VOL should be set to 0 cfm to disable the alarming that would occur if MINHOODVOLTS is set to 1 Volt or more and the fume hood flow input drops below .4 Vdc.

Pressurization is controlled by maintaining a selected difference between supply and exhaust airflows.

Temperature control is determined by input from the Room Temperature Sensor (RTS).

The LCM controls pressure, ventilation, and temperature. When these functions conflict, the priorities are:

1. Pressurization
2. Ventilation (supply minimum may be overridden to maintain negative pressurization)
3. Temperature



Application 2923 Control Drawing.

Application 2929 LCM-OAVS Slow Damper, with BTU Compensation

NOTE:
If desired, the LCM can be used without any fume hoods attached. In this case, MAX HOOD VOL should be set to 0 cfm to disable the alarming that would occur if MINHOODVOLTS is set to 1 Volt or more and the fume hood flow input drops below .4 Vdc.

Pressurization is controlled by maintaining a selected difference between supply and exhaust airflows.

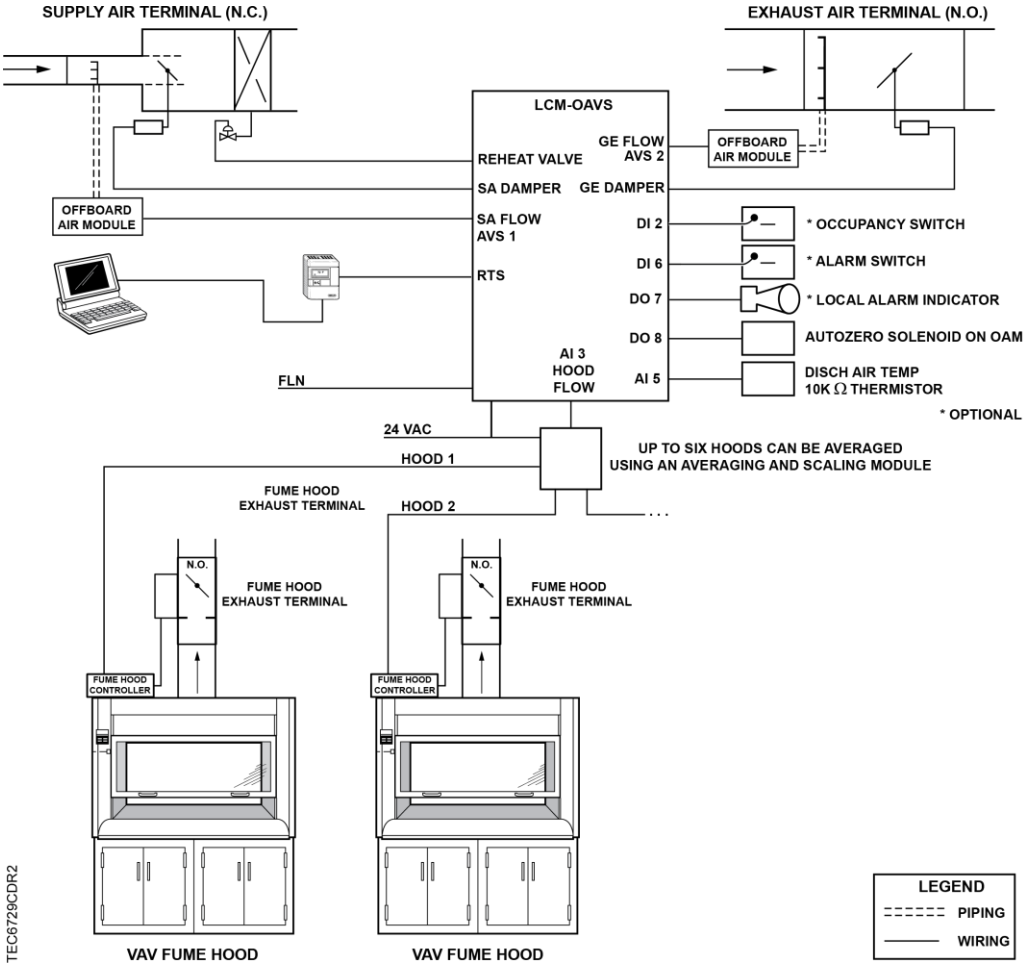
Temperature control is determined by input from the Room Temperature Sensor (RTS).

The discharge temperature setpoint is reset in sequence with the VAV flow to control the room temperature using a BTU Compensation algorithm. The discharge temperature is then controlled using the reheat coil.

The LCM controls pressure, ventilation, and temperature. When these functions conflict, the priorities are:

1. Pressurization

2. Ventilation (supply minimum may be overridden to maintain negative pressurization)
3. Temperature



Application 2929 Control Drawing.

Application 2997 Slave Mode

Overview

Application 2997 is the slave mode application for Laboratory Controller Module. Slave mode is the default application that opens when power is first applied to the controller. A controller in default state can also be used as a point extension device by unbundling spare I/O points at the field panel.

Using Auxiliary Points

It is possible to have extra points available in addition to those in use and/or reserved by the application running in the controller. If these extra points are to be controlled by a field panel, then they must be unbundled at the field panel.

Using the Controller as a Point Extension Device

If the controller is used only as a point extension device, with no control application in effect, its application must be set to slave mode and points must be unbundled at the field panel. All points must be controlled from the field panel in order to be used.

Chapter 3 - Point Database

Chapter 3 presents a description of the LCM-OAVS Room Pressurization with Slow-acting Damper Actuation (One Supply, One Exhaust) and Hot Water Reheat 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 LAN trunk.
APPLICATION	02	All	Identification number of the program running in the controller.
TEMP OFFSET	03	All	Room temperature offset is a user-adjustable offset that will compensate for deviations between ROOM TMP and CTL TEMP.
ROOM TEMP	{04}[2]	All	Actual reading from the room temperature sensor.
OCC DIF STPT	05	2923, 2929	The temperature setpoint, in degrees, that the controller maintains during occupied periods in cooling mode if a room temperature sensor setpoint dial is not present or is not used.
UOC DIF STPT	06	2923, 2929	The temperature setpoint, in degrees, that the controller maintains during unoccupied periods in cooling mode if a room temperature sensor setpoint dial is not present or is not used.
RM STPT MIN	07	2923, 2929	The minimum temperature setpoint, in degrees, that the controller can use from the setpoint dial. This overrides any temperature set point from the set point dial that falls below this minimum.
RM STPT MAX	08	2923, 2929	The maximum temperature setpoint in degrees that the controller can use from the setpoint dial. This overrides any temperature setpoint from the setpoint dial that falls above this maximum.
TEMP CTL VOL	{09}	2923, 2929	Amount of supply airflow that the temperature control sequence determines is necessary to regulate the room temperature.
OCC ENA	12	2923, 2929	An analog point that determines if and what occupancy button is enabled.
RM STPT	{13}[2]	All	The temperature setpoint, in degrees, from the room temperature sensor (not available on all temperature sensor models).
AI 4	{14}	All	Spare analog input (0-10V or 4-20 mA.
HOOD SIG AI3	{15}	2923, 2929	Voltage that tells the LCM how much air the fume hood(s) is exhausting.
AI 3	{15}	2997	Spare analog input (0-10V or 4-20 mA).
VENT ALM DEL	16	2923, 2929	Delay period that prevents “nuisance alarms” on the air change rate.
ALARM ENA	17	2923, 2929	An analog point that determines if and what alarm activates ALARM DO7.
START	18	2923	The starting point in the temperature control sequence for the reheat valve to supply heating to the room.

Descriptor	Address[1]	Application	Description
OCC BUTTON	{19}	All	State of the push button switch on the thermostat. The momentary switch is only ON when the button is pushed. The value of this point provides no information on the occupancy state of the room.
OCC.UNOCC	{21}	All	Indicates the mode in which the controller is operating. Occupied temperature setpoints will be used in OCC mode. Unoccupied temperature setpoints will be used in UNOCC mode. This point is normally set by the field panel.
VOL DIF ALM	{22}	2923, 2929	Alarm point. ON means room pressurization may not be adequate.
NET ALM CMD	{23}	All	Alarm data sent in to LCM from network.
OCC SWT DI2	{24}	2923, 2929	State of a switch wired to the LCM. Closed contact = ON = occupied.
DI 2	{24}	2997	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.
BUTTON CMD	{25}	All	The LCM's interpretation of Point 19. Records a user's request to change occupancy.
GEX P GAIN	26	2923, 2929	Feedback gain. Used to tune general exhaust flow control loop.
ALM SWIT DI6	{27}	2923, 2929	Set the controller to Supply Tracks Exhaust (negative pressurization) or Exhaust Tracks Supply (positive pressurization).
DI 6	{27}	2997	Actual status of a contact connected to the controller at DI 6. ON indicates that the contact is closed; OFF indicates that the contact is open.
TRACK MODE	28	2923, 2929	An occupancy input. This value comes to the LCM from the network or from a schedule.
NET OCC CMD	{29}	2923, 2929	An occupancy input. This value comes to the LCM from the network or from a schedule.
GEX AIR VOL	{30}	2923, 2929	Measured value of the airflow from the room through the general exhaust terminal.
AIR VOLUME 2	{30}	2997	Measured value of airflow in cfm (lps).
OCC SUP MAX	{31}	2923, 2929	The maximum amount of air in cfm (lps) to be supplied to the space during occupied periods.
OCC SUP MIN	{32}	2923, 2929	The minimum amount of air in cfm (lps) to be supplied to the space during occupied periods.
OCC GEX MAX	{33}	2923, 2929	The maximum amount of exhaust in cfm (lps) to be supplied to the space during occupied periods.
OCC GEX MIN	{34}	2923, 2929	The minimum amount of exhaust in cfm (lps) to be supplied to the space during occupied periods.
SUP AIR VOL	{35}	2923, 2929	Measured value of the supply airflow.
AIR VOLUME 1	{30}	2997	Measured value of airflow in cfm (lps).
SUP FLO COEFF	36	2923, 2929, 2997	Calibration factor for airflow.
FLOW COEFF 1	36	2997	Calibration factor for airflow.
REHEAT AO1	{37}	2923, 2929	Physical point that controls the reheat valve.
AO 1	{37}	2997	Analog output (0-10 Vdc) optional control.

Descriptor	Address[1]	Application	Description
DIF ALM DBD	38	2923, 2929	Setting for the controller's alarm; should be set lower than VOL DIF STPT to avoid losing pressurization completely.
DIF ALM DEL	39	2923, 2929	Alarm delay point to prevent "nuisance alarms" on the flow difference.
AVS FAIL MODE	40	2923, 2929	Indicates the desired position of the damper if the airflow sensor(s) fail. Valid input: CLOSED or OPEN.
DO 1	{41}	All	Digital output 1 controls a 24 Vac load with an ON or OFF status. If Motor 1 is enabled, then DO 1 is coupled with DO 2 to control an actuator.
DO 2	{42}	All	Digital output 2 controls a 24 Vac load with an ON or OFF status. If Motor 1 is enabled, then DO 2 is coupled with DO 1 to control an actuator.
DO 3	{43}	All	Digital output 3 controls a 24 Vac load with an ON or OFF status. If Motor 2 is enabled, then DO 3 is coupled with DO 4 to control an actuator.
DO 4	{44}	All	Digital output 4 controls a 24 Vac load with an ON or OFF status. If Motor 2 is enabled, then DO 3 is coupled with DO 4 to control an actuator.
TRACK METHOD	45	2923, 2929	Determines whether the controller uses FLOW or STPT flow tracking. When the value is STPT, the supply flow follows the GEN EXH STPT. When the value is FLOW, the supply flow follows GEN EXH VOL.
DO 5	{46}	All	Digital output 5 controls a 24 Vac load with an ON or OFF status. If Motor 2 is enabled, then DO 3 is coupled with DO 4 to control an actuator.
ALARM DO 7	{47}	2923, 2929	Intended to drive local alarm device (horn, light, etc.). Function set up by setting alarm enable points.
DO 7	{47}	2997	Digital output 7 controls a 24 Vac load with an ON or OFF status.
AUTOZERO DO8	{48}	2923, 2929	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}	2997	Digital output 8 controls a 24 Vac load with an ON or OFF status.
VALVE CMD	{49}	2923, 2929	State of the reheat valve. Represents how far the valve is open.
GEX DMP CMD	{50}	2923, 2929	The commanded position of the exhaust damper.
DISCH MIN	51	2929	Minimum discharge temperature setting.
MAX HOOD VOL	52	2923, 2929	The Fume Hood exhaust airflow value that corresponds to 10 Volts input signal. Must be setup to match the hood control equipment.
TOTL EXHAUST	{53}	2923, 2929	Point 30 + Point 52 + Point 89. This value is the sum of the measured value of the airflow from the room through the general exhaust terminal, the airflow through the fume hoods, and any exhaust flows not connected to the LCM.
GEX FLO COEF	54	2923, 2929	Calibration parameter for airflow sensor.
FLOW COEFF 2	54	2997	Calibration parameter for airflow sensor.
AO2	{55}	All	Control signal for Venturi Supply Valve (0 - 10V).

Descriptor	Address[1]	Application	Description
AO3	{56}	All	Control signal for Venturi General Exhaust Valve (0 - 10V).
VALVE CLOSED	57	2923, 2929	Setup point. Tells the LCM what voltage fully closes the reheat valve.
VALVE OPEN	58	2923, 2929	Setup point. Tells the LCM what voltage fully opens the reheat valve.
DISCH MAX	59	2929	Maximum discharge temperature setting.
GEXDUCT AREA	60	2923, 2929	Internal cross-sectional area of the general exhaust duct where the flow sensor is installed.
DUCT AREA 2	60	2997	Area, in square feet (square meters), of the duct where the air velocity sensor is located. This is a calculated value (calculated by the field panel or computer being used) that depends on duct shape and size. It is used in calculating all points in units of CFM, CF, LPS and L.
OTHER SUP	{61}	2923, 2929	Value of any supply airflows not connected to the LCM. Must be entered to the controller to account for flows it cannot detect.
SUP DMP CMD	{62}	2923, 2929	The commanded position of the supply damper.
ROOM P GAIN	65	2923, 2929	Proportional feedback gain used to tune the room temperature control.
ROOM I GAIN	66	2923, 2929	Integral feedback gain used to tune the room temperature control.
UOC GEX MAX	67	2923, 2929	Maximum general exhaust in unoccupied mode.
UOC GEX MIN	68	2923, 2929	Minimum general exhaust in unoccupied mode.
TOTL SUPPLY	{69}	2923, 2929	Point 35 + Point 61. This is the measured value of the airflow delivered to the room by the supply terminal, plus the value of any supply airflows not connected to the LCM.
SUP P GAIN	70	2923, 2929	Feedback gain. Used to tune supply flow control.
UOC SUP MAX	70	2923, 2929	Maximum supply in unoccupied mode.
UOC SUP MIN	72	2923, 2929	Minimum supply in unoccupied mode.
CTL STPT	{73}	2923, 2929	The setpoint for the Room Temperature PID Loop.
HOOD VOL	{74}	2923, 2929	The airflow signal from the fume hood(s).
DISCH STPT	{75}	2929	Discharge temperature setpoint.
VOLUME STATE	76	2923, 2929	Determines type of control, VAV or CV, during occupied and unoccupied modes.
DO 6	{77}	All	Digital output 6 controls a 24 Vac load with an ON or OFF status. If Motor 3 is enabled, then DO 5 is coupled with DO 6 to control an actuator.
CTL TEMP	{78}	All	The temperature input for the Room Temperature PID Loop.
TEMP LOOPOUT	{79}	2923, 2929	The value calculated by the room temperature PID algorithm. It indicates the thermal load on the room.
DISCH P GAIN	80	2929	The proportional feedback gain used to tune the discharge temperature control.
DISCH I GAIN	81	2929	The integral feedback gain used to tune the discharge temperature control.

Descriptor	Address[1]	Application	Description
VOL DIFFRNC	{83}	2923, 2929	The difference between measured airflow into the room, and measured airflow out. Equal to Point 53 through Point 69).
DISCH TEMP	{84}	2929	Discharge temp sensor input.
AI 5	{84}	2923, 2997	Spare Analog input, 10K Ω (default) or 100K software selectable thermistor.
GEX FLO STPT	{85}	2923, 2929	The desired value of the general exhaust. The controller selects the lowest value that will lead to adequate supply flow, and correct pressurization.
FAIL LIMIT	86	2923, 2929	Indicates when the air volume is too far away from setpoint.
VOL DIF STPT	{88}	2923, 2929	The desired value for the flow difference. This value can be selected and adjusted to achieve room pressurization.
OTHER EXH	{89}	2923, 2929	The value of any exhaust airflows not connected to the LCM. Must be entered to the controller to account for flows it cannot detect.
OC V ALM LVL	90	2923, 2929	Ventilation alarm level in occupied mode.
UC V ALM LVL	91	2923, 2929	Ventilation alarm level in unoccupied mode.
VENT ALM	{92}	2923, 2929	Alarm point indicates inadequate air change rate.
SUP FLO STPT	{93}	2923, 2929	The desired value of the supply flow, chosen by the controller, to achieve the correct flow difference for the room.
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.
SUPDUCT AREA	97	2923, 2929	Area, in square feet (square meters), of the supply duct where the air velocity sensor is located. This value is calculated by the field panel depending on duct shape and size. It is used in calculating all points in units of cfm, CF, lps, and L.
DUCT AREA 1	97	2997	Area, in square feet (square meters), of the supply duct where the air velocity sensor is located. This value is calculated by the field panel depending on duct shape and size. It is used in calculating all points in units of cfm, CF, lps, and L.
LOOP TIME	98	2923, 2929	The time, in seconds, between control loop calculations.
ERROR STATUS	{99}	All	The status code indicating any errors detected during controller power up. A status of 0 indicates there are no problems.
SENSOR SEL	104	All	Room unit configuration point and thermistor type selection, values are additive.
MODHTG FLO	106	2923, 2929	The minimum flow in feet per minute needed for safety purposes when using electric reheat.
DO DIR.REV	107	All	Reverses the output state for selected non-motor digital outputs.

Descriptor	Address[1]	Application	Description
RM RH	{108}	All	Room humidity when room unit is provided with humidity sensing.
FAIL TIME	109	2923, 2929	Indicates when the air volume is too far away from setpoint for too long.
MTR SETUP	110	2923, 2929	Sets the presence or absence of a motor and its direction of travel.
SUP DMP POS	111	2923, 2929	The current position of the supply damper motor in percent of full travel. This value is calculated based on motor run time.
MTR1 TMING	112	2923, 2929	The time required for Motor 1 to travel 90 degrees.
MTR1 ROT ANG	113	2923, 2929	The angle that Motor 1 rotates from fully closed to fully open.
GEX DMP POS	{114}	2923, 2929	The current position of the general exhaust damper motor in percent of full travel. This value is calculated based on motor run time.
MTR2 TIMING	115	2923, 2929	The time required for Motor 2 to travel 90 degrees.
MTR2 ROT ANG	116	2923, 2929	The angle that Motor 2 rotates from fully closed to fully open.
MINHOODVOLTS	117	2923, 2929	Minimum voltage value for fume hood input range (typically 0.0V or 1.0V.
RM CO2	{118}	All	A point can be unbundled in the controller for monitoring purposes. This point may be used in a control strategy as occupancy increases (CO2 levels increase) in the room being controlled.
SUP MAX RATE	125	2923, 2929	Slows down the supply actuator to match the speed of the general exhaust actuator.
GEX MAX RATE	126	2923, 2929	Slows down the general exhaust actuator to match the speed of the supply actuator.

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

2) Point numbers that appear in brackets { } may be unbundled at the field panel.

Chapter 4 – Basic Service and Maintenance

This chapter describes corrective measures you can take should you encounter a problem when using a Laboratory Controller Module.

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 Laboratory Controller Module 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 Laboratory Controller Module. 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.

CO_2

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, etc.

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

Systeme International d'Unites. 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, etc.

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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Building Technologies Division
1000 Deerfield Pkwy
Buffalo Grove IL 60089
Tel. +1 847-215-1000

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