SIEMENS

BACnet PTEC Controller

Dual Duct 2 AVS - Constant Volume One Inlet and One Outlet Sensor with Optional Reheat, Application 6566

Application Note

140-0996
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Building Technologies

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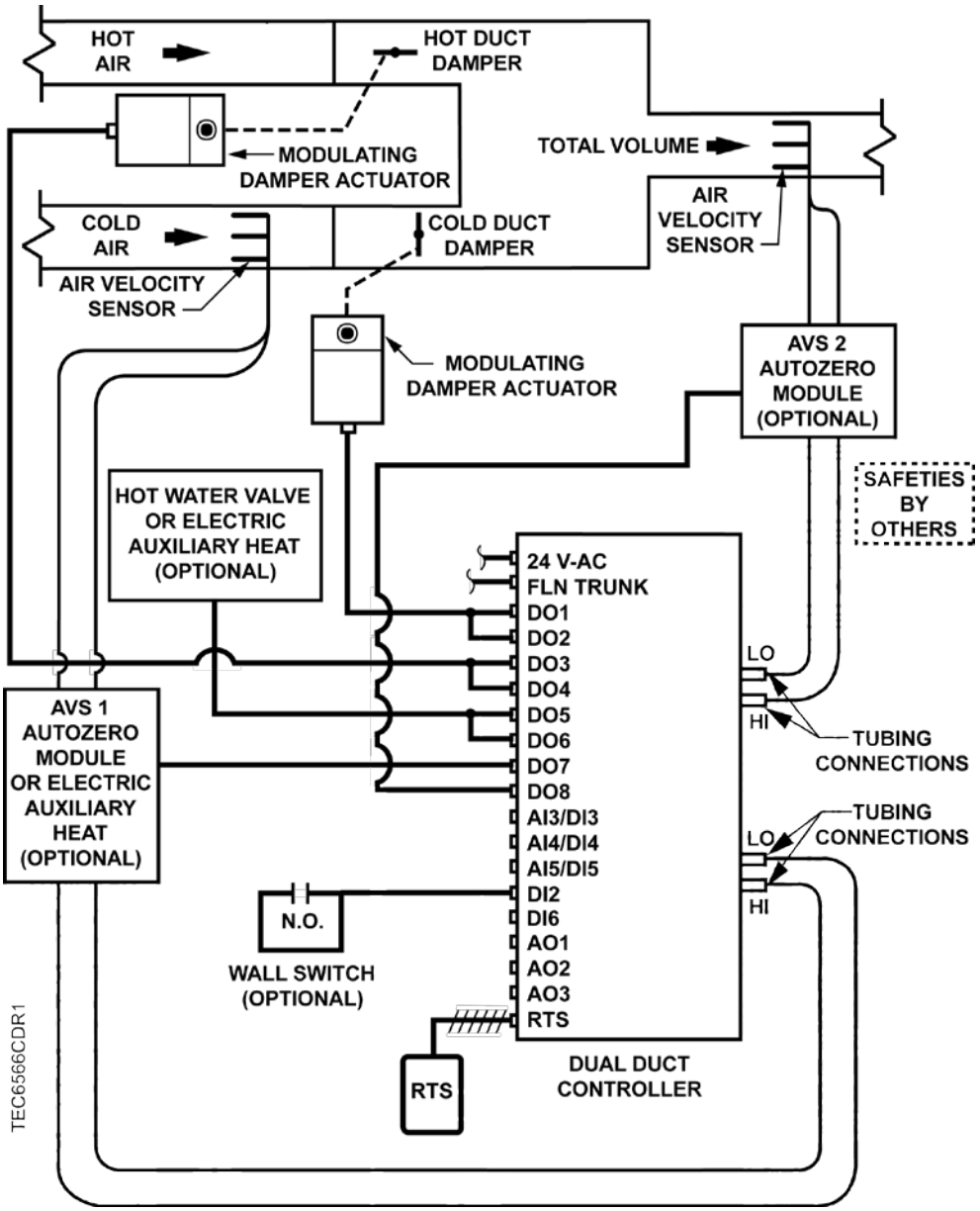
Overview

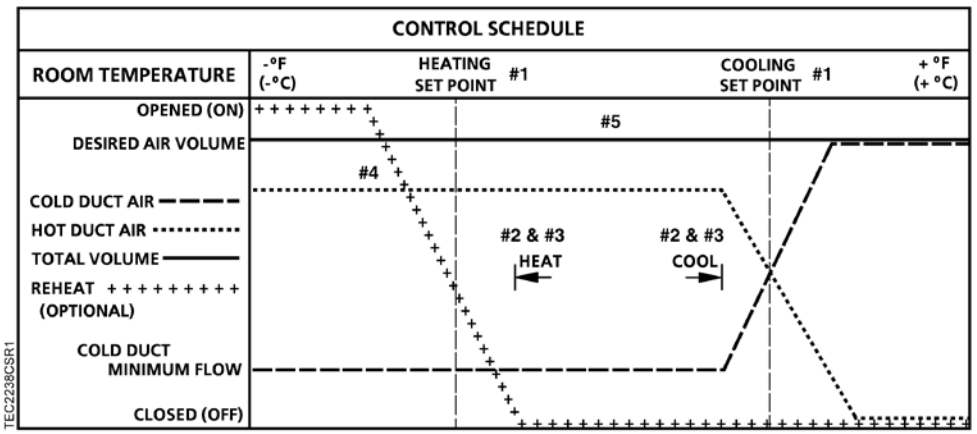
NOTE:
For information on applications with Firmware Revision B*x*40 or earlier, see InfoLink and/or Asset Portal for documentation.

In Application 6566, the controller provides independent control of the hot duct and the cold duct inlet dampers to provide a constant volume of air to the space during occupied periods and a lower constant volume of air during unoccupied periods.

In cooling mode, the cold duct damper is modulated to maintain the room temperature setpoint and the hot duct damper is modulated to maintain the volume setpoint. In heating mode, the hot duct damper is modulated to maintain the volume setpoint. The controller modulates an optional hot water valve or up to three stages of electric reheat to maintain the room temperature setpoint.



Application 6566 Control Diagram.



Application 6566 Control Schedule.

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 (two required)
- Room temperature sensor
- Room temperature setpoint dial (optional)

Digital

- Unoccupied mode override (optional)
- Wall switch (optional)

Hardware Outputs

Analog

- Spare AO 1, AO 2, and AO 3 (0-10V)

Digital

- Damper actuator (two required)
- Stage 1 electric heat (optional)
- Stage 2 electric heat (optional)
- Stage 3 electric heat (optional) or Autozero modules (optional)
- Valve actuator (optional)

Ordering Notes

550-497P	Siemens BACnet PTEC Dual Duct Controller
540-507N	Siemens BACnet PTEC Dual Duct Controller with Autozero Module

Sequence of Operation

The following paragraphs present the sequence of operation for Application 6566 -- One Inlet and One Outlet Sensor with Optional Reheat.

Control Volume Setpoints

NOTE:
The following guidelines apply to the control volume setpoints, OCC FLOW and UNOCC FLOW:

- Do not set OCC FLOW to 0 cfm (0 lps).
- The value of OCC FLOW must be greater than or equal to the value of UNOCC FLOW.
- If desired, the values of OCC FLOW and UNOCC FLOW may be set equal to each other.

Depending on the controller's current operational mode (occupied or unoccupied), the control volume setpoints are as follows:

Occupied Cooling Mode – In occupied cooling mode, the controller resets CLG FLO STPT to ensure that the room temperature setpoint is satisfied, provided that the airflow from cold duct does not exceed the value of OCC FLOW. The controller resets HTG FLO STPT to ensure that the total flow provided by the dual duct is equal to the value of OCC FLOW.

Occupied Heating Mode – The cold duct will provide the air in CLG FLOW MIN. The controller will then try to provide enough air from the hot duct to ensure that the total air flowing out of the dual duct terminal box equals OCC FLOW. If the hot duct is unable to provide enough airflow to satisfy this requirement, the controller modulates the cold duct damper to make up the difference.

Unoccupied Cooling Mode – In unoccupied cooling mode, the controller resets the value of CLG FLO STPT to ensure that the room temperature setpoint is satisfied, provided that the airflow from the cold duct does not exceed the value of UNOCC FLOW. The controller then resets the value of HTG FLO STPT to ensure that the total flow provided by dual duct is equal to the value of UNOCC FLOW.

Unoccupied Heating Mode – In unoccupied heating mode, the controller provides as much airflow as possible from the hot duct to satisfy the flow requirements of UNOCC FLOW. If the hot duct is unable to provide enough airflow to satisfy this requirement, then the controller modulates the cold duct damper to make up the difference.

Control Temperature Setpoints

This application has a number of different room temperature setpoints (DAY HTG STPT, NGT CLG STPT, RM STPT DIAL, etc.). The application actually controls using the CTL STPT. CTL STPT is set to different values depending on its override status, the time of day, whether or not a temperature deadband (zero energy band) has been configured, and the type of RTS used.

CTL STPT is Overridden:

If CTL STPT is overridden, that value is used regardless of any other settings. This disables the setpoint deadband feature.

CTL STPT in Night Mode:

The controller is in Night Mode if DAY.NGT = NGT and NGT OVRD = NGT.

When the controller is in night mode, CTL STPT holds the value of NGT CLG STPT or NGT HTG STPT depending on the value of HEAT.COOL. When the controller is in night mode the value of RM STPT DIAL is ignored.

CTL STPT in Day Mode:

The controller is in Day Mode if DAY.NGT = DAY or NGT OVRD = DAY.

Without setpoint dial:

When the controller is in day mode and STPT DIAL = NO, CTL STPT holds the value of DAY CLG STPT or DAY HTG STPT depending on the value of HEAT.COOL.

With setpoint dial:

When the controller is in day mode and STPT DIAL = YES. CTL STPT is set based on the value of the setpoint dial and the setpoint deadband.

The setpoint deadband exists to allow the controller to provide a separation of the heating and cooling temperature setpoints when a setpoint dial is enabled.

The setpoint deadband is the difference between the cooling and heating day setpoints (DAY CLG STPT - DAY HTG STPT). The setpoint deadband can be disabled by setting DAY HTG STPT equal to DAY CLG STPT. When DAY HTG STPT does not equal DAY CLG STPT, a setpoint deadband (or zero energy band) is used.

The following values are used in the calculation of CTL STPT:

- *Dial value* is the value of RM STPT DIAL limited between the value of RM STPT MIN and RM STPT MAX.
- *Deadband* is the value of the difference between DAY CLG STPT and DAY HTG STPT, half of which is applied to establish the current heating and cooling setpoints.
  - *Deadband* = (DAY CLG STPT – DAY HTG STPT)

CTL STPT is calculated as follows:

With Deadband disabled:

CTL STPT = *Dial value*

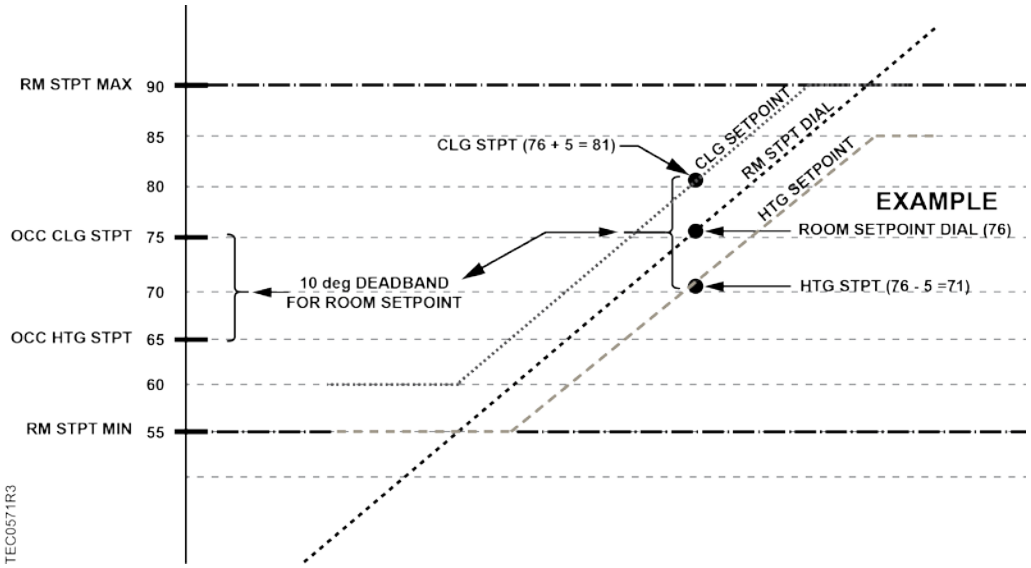
With Deadband enabled in Heat Mode:

CTL STPT = *Dial value* – 0.5 * *Deadband* (limited between the value of RM STPT MIN and RM STPT MAX)

With Deadband enabled in Cool Mode:

CTL STPT = *Dial value* + 0.5 * *Deadband* (limited between the value of RM STPT MIN and RM STPT MAX)

NOTE:
If RM STPT DIAL is failed, it maintains the last known value.



Room Temperature, Room Temperature Offset and CTL TEMP

ROOM TEMP is the temperature that is being sensed by the room temperature sensor (RTS).

RMTMP OFFSET (or TEMP OFFSET) is a user-adjustable offset that will compensate for deviations between the value of ROOM TEMP and the actual room temperature.

CTL TEMP is the room temperature that is used for control purposes. In other words, what the application is trying to do is to maintain CTL TEMP at the control setpoint.

When CTL TEMP is not overridden, CTL TEMP and ROOM TEMP are related by the following equation:

CTL TEMP = ROOM TEMP + RMTMP OFFSET (or TEMP OFFSET)

If CTL TEMP is not overridden, then:

- The current value of ROOM TEMP (normal or overridden) is used to determine the value of CTL TEMP.
- If ROOM TEMP has a status of Failed, then last known good value of ROOM TEMP is used to determine the value of CTL TEMP.

Night Mode Override Switch

If an override switch is present on the room temperature sensor and a value (in hours) other than zero has been entered into OVRD TIME, pressing the override switch will reset the controller to DAY operational mode for the time period that is set in OVRD TIME. The status of NGT OVRD changes to DAY. After the override time elapses, the controller returns to night mode and the status of NGT OVRD changes back to NIGHT.

The override switch on the room sensor will only affect the controller when it is in night mode.

Heating/Cooling Switchover

The heating/cooling switchover determines whether the controller is in heating or cooling mode by monitoring the room temperature and the demand for heating and cooling (as determined by the temperature control loops).

If the following conditions are met for the length of time set in SWITCH TIME, the controller switches from heating to cooling mode by setting HEAT.COOL to COOL:

- HTG LOOPOUT < 5.2%.
- CTL TEMP > CTL STPT by at least the value set in SWITCH DBAND.
- CTL TEMP > the appropriate cooling setpoint minus SWITCH DBAND.

If AUX HTG USED = YES, and the following conditions are met for the length of time set in SWITCH TIME, the controller switches from cooling to heating mode by setting HEAT.COOL to HEAT:

- CLG LOOPOUT < 5.2%.
- CTL TEMP < CTL STPT by at least the value set SWITCH DBAND.
- CTL TEMP < the appropriate heating setpoint plus SWITCH DBAND.

Occupied and Unoccupied Modes

The occupied/unoccupied status of the space is determined by the status of OCC.UNOCC. The control of this point differs depending on whether the controller is monitoring the status of a wall switch or if the controller is connected to a field panel.

When a wall switch is physically connected to the termination strip on the controller at DI 2 and WALL SWITCH = YES, the controller monitors the status of DI 2. When the status of DI 2 is ON (the switch is closed), OCC.UNOCC will be set to OCC indicating that the controller is in occupied mode. When the status of DI 2 is OFF (the switch is open), OCC.UNOCC will be set to UNOCC indicating that the controller is in unoccupied mode.

When WALL SWITCH = NO, the controller does not monitor the status of the wall switch, even if one is connected to it. In this case, if the controller is operating stand-alone, the controller stays in occupied mode all the time. If the controller is operating with centralized control (connected to a field panel), the field panel can send an operator or PPCL command to override the status of OCC.UNOCC. See the APOGEE Powers Process Control Language (PPCL) User's Manual (125-1896) and the APOGEE P2 ALN Field Panel User's Manual (125-3019) or the APOGEE BACnet ALN Field Panel User's Manual (125-3020) (125-3019 or 125-3020) for more information.

Unoccupied Mode Override Switch

If an override switch is present on the room temperature sensor and a value (in hours) other than zero has been entered into OVRD TIME, then by pressing the override switch, a room occupant can reset the controller to occupied mode for the length of time set in OVRD TIME. The status of UNOCC OVRD changes to OCC and remains there until OVRD TIME elapses, at which point UNOCC OVRD changes back to UNOCC and the controller returns to unoccupied mode.

NOTE:
Only during unoccupied mode (MODE = Unoccupied) can a room sensor's override switch set the controller to occupied mode; if MODE equals anything other than Unoccupied, UNOCC OVRD will equal UNOCC.

Control Loops

The dual duct is controlled by four Proportional, Integral, and Derivative (PID) control loops: two temperature loops and two flow loops.

Temperature Loops – The two temperature loops are a cooling loop and a heating loop. The active temperature loop maintains CTL STPT. See Control Temperature Setpoints.

In cooling mode, the output of the cooling loop, CLG LOOPOUT, resets CLG FLO STPT to satisfy the space temperature setpoint, provided that the airflow out of the cold duct does not exceed the value of OCC FLOW in occupied mode or UNOCC FLOW in unoccupied mode. The controller then resets HTG FLO STPT in order to make sure that the airflow out of the box is equal to OCC FLOW in occupied mode or UNOCC FLOW in unoccupied mode.

In heating mode, HTG LOOPOUT, controls the auxiliary heat (if used). If auxiliary heat is not used, this application only operates in cooling mode (that is, the application sets HEAT.COOL to COOL) and the heating loop is disabled.

During occupancy for heating and cooling modes, the minimum amount of air allowed from the cold duct is CLG FLOW MIN. During unoccupied periods for these modes, the airflow from the cold duct will be allowed to reach 0 cfm.

Flow Loops – The two flow loops are a cooling flow loop and a heating flow loop.

The cooling flow loop maintains CLG FLO STPT by modulating the cold duct damper point, CLG DMP CMD. During occupancy, the cooling flow loop maintains the cold duct airflow between the value of CLG FLOW MIN and the value of CLG FLOW MAX. During unoccupied periods, the cooling flow loop maintains the cold duct airflow between 0 cfm and the value of CLG FLOW MAX.

CLG FLOW is the input value for the cooling flow loop. It is calculated as a percentage based on where CLG VOLUME is between 0 cfm and the value of CLG FLOW MAX.

- If CLG VOLUME = 0 cfm, CLG FLOW is 0%.
- If CLG VOLUME = CLG FLOW MAX, CLG FLOW is 100%.

The heating flow loop maintains HTG FLO STPT by modulating HTG DMP CMD. During occupancy, the heating flow loop maintains the hot duct airflow between 0 cfm and the value of HTG FLOW MAX. During unoccupied periods, the heating flow loop maintains the hot duct airflow between 0 cfm and HTG FLOW MAX.

HTG FLOW is the input value for the heating flow loop. It is calculated as a percentage based on where TOT VOLUME is between 0 cfm and the value of OCC FLOW.

- If TOT VOLUME = 0 cfm, HTG FLOW is 0%.
- If TOT VOLUME = OCC FLOW, HTG FLOW is 100%.

To enhance stable flow control, an advanced algorithm is used to calculate a controllable setpoint as the value approaches zero cfm (lps).

Cooling Operation

In occupied cooling mode CLG LOOPOUT, is used to calculate the setpoint for the cooling flow loop, CLG FLO STPT. This flow loop maintains the space temperature. In this mode, the cooling flow loop limits the airflow supplied by the cold duct to the value of OCC FLOW. The minimum airflow from the cold duct will be CLG FLOW MIN in the occupied cooling mode. The heating flow loop provides any make up air that is necessary to ensure that the airflow from the dual duct box is equal to OCC FLOW. When the cooling loop provides an airflow equal to OCC FLOW from the cold duct, the heating flow loop sets HTG DMP CMD to 0% open, causing the hot duct damper to close.

In unoccupied cooling mode, CLG LOOPOUT, multiplied by a scaling factor, becomes the set point for CLG FLO STPT. This flow loop maintains the space temperature. In this mode, the scaling factor, UNOCC FLOW ÷ OCC FLOW, limits the airflow supplied by the cold duct to the value of UNOCC FLOW. This limit is in effect even if it means that the space gets too warm. The heating flow loop provides any make up air that is necessary to ensure that the airflow from the dual duct box is equal to UNOCC FLOW. When the cooling loop provides an airflow equal to UNOCC FLOW from the cold duct, the heating flow loop modulates HTG DMP CMD to 0% open, causing the hot duct damper to close.

The following two situations could occur in cooling mode. However, they are most likely to occur in occupied periods.

1. When the cooling load is light, the cooling loop calls for the cold duct to provide very little air. To maintain a constant volume from the dual duct box, the majority of the air volume from the dual duct box must come from the hot duct. If the hot duct is unable to provide this air, the cold duct makes up the difference, even though the cooling loop calls for the cold duct to close.
2. When the cooling load is heavy, the hot duct must be closed or nearly closed to allow the space to be cooled. The majority of the air volume from the dual duct box must be supplied by the cold duct. If the cold duct is unable to provide this air, the hot duct makes up the difference, even though the temperature requirements of the space call for the hot duct to close.

Heating Operation

In occupied heating mode, the heating flow loop modulates HTG DMP CMD to ensure that the airflow from the dual duct box is equal to the value of OCC FLOW. The cold duct damper is set to provide the cooling minimum flow. If the hot duct is unable to provide enough flow so that the total flow is equal to occupied flow, the cooling flow damper will open to make up the difference.

In unoccupied heating mode, the heating flow loop modulates the HTG DMP CMD to ensure that the airflow from the dual duct box is equal to the value of UNOCC FLOW. If the hot duct is unable to provide this airflow, the cold duct damper is modulated in order to make up the difference. If the hot duct is able to provide this airflow on its own, CLG DMP CMD = 0% open, causing the cold duct damper to close.

In heating mode, the output of the heating loop, HTG LOOPOUT, controls the auxiliary heat (if used). If auxiliary heat is not used, the application sets HEAT.COOL to COOL. The application then operates in cooling mode and the heating loop is disabled.

See Optional Auxiliary Heat [→ 14] for more information.

Optional Auxiliary Heat

If AUX HTG USED = YES, this application also controls auxiliary heat. The value of AUX HTG TYPE indicates the type of auxiliary heat control. If AUX HTG USED = NO, no auxiliary heat is used and HEAT.COOL is automatically set to COOL.

⚠ CAUTION

If using electric heat, verify that the equipment is supplied with safeties by others to ensure that there is airflow across the heating coils when they are to be energized or equipment damage may result.

Do not set TOT FLOW MIN to zero.

Hot Water Auxiliary Heat – If AUX HTG TYPE = HW, the application controls auxiliary hot water heat. The heating loop modulates the heating valve point, VALVE COMD in order to warm the space. When the controller is in cooling mode, the heating valve is closed.

Electric Auxiliary Heat – If AUX HTG TYPE = ELEC, the heating loop controls up to three stages of electric reheat to warm up the room. The electric reheat is time modulated using a duty cycle as shown in the following example. When the controller is in cooling mode, the electric heat is OFF at all times. STAGE COUNT must be set equal to the number of stages of electric reheat being used.

Example

If the duty cycle is 10 minutes (STAGE TIME = 10 minutes) and the heating loop is calling for 60% of heating (HTG LOOPOUT = 60%), for every 10-minute period, the stages of electric auxiliary heat cycle as follows:

	Stage 1: minutes		Stage 2: minutes		Stage 3: minutes	
	ON	OFF	ON	OFF	ON	OFF
With 1 stage of electric heat:	6	4	--	--	--	--
With 2 stages of electric heat:	10	0	2	8	--	--
With 3 stages of electric heat:	10	0	8	2	0	10

NOTE:
If three stages of electric heat are used, Autozero Modules cannot be used. If two stages or less are used, Autozero Modules can be used.

Calibration

Calibration of the controller's internal air velocity sensor(s) is periodically required to maintain accurate air velocity readings. CAL SETUP is set with the desired calibration option during controller startup.

Depending on the value of CAL SETUP, calibration may be set to take place automatically or manually. If CAL AIR = YES, calibration is in progress.

NOTE:
The first time after startup or initialization, the controller will calibrate the dampers as if not using Autozero Modules, although the Autozero Modules will be activated. All subsequent calibrations will use the Autozero Modules only.

Calibration of the valve is not affected by the presence of Autozero Modules.

At the end of a calibration sequence, CAL AIR automatically returns to NO. A status of NO indicates that the controller is not in a calibration sequence.

The Autozero Modules are used during calibration when they are wired to DO 7 and DO 8 and CAL MODULE = YES.

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%.

AI 4/AI 5 OFFSET (Optional)

AI 4 OFFSET works like RMTMP OFFSET. It can be used to calibrate AI 4 aux temp sensor input if necessary. The actual temperature plus AI 4 OFFSET will equal AI 4 display temperature.

AI 5 OFFSET works the same as AI 4 OFFSET.

Room Unit Operation

Stat Supervision

STAT SUPV is a configurable, enumerated point (values are additive). This point tells the controller how to handle loss of data when used with a digital room unit.

Room Temperature

- When the digital room unit (Series 2200/2300) is used, STAT SUPV enables loss of communications indication:
  - Temperature sensing with a value of 1.
  - Relative humidity sensing (from the room unit) with a value of 2.
  - CO2 sensing (from the room unit) with a value of 4.
- Communication for Series 2200 sensor baud rate must be set to 1200.
- When the analog room unit (Series 1000/2000) is used, default temperature sensing (0) is enabled (relative humidity and CO2 sensing are not available on the room units and should not be selected with STAT SUPV).

Other Inputs (only available on Digital Room Unit)

- Use the following table to enable communications supervision of room temperature, relative humidity or CO2 for additive values of 2 or 4.

STAT SUPV Value * (additive)	Description (include values to enable feature)
1	Room temperature sensing
2	Relative Humidity (RH) sensing
4	CO_2 sensing

⚠ CAUTION

Digital Room Units that have the RH and/or the CO2 feature will always update the present value and put the associated points (RM TEMP, RM RH, and RM CO2) in override mode, preventing external (or PPCL) commands from being used. STAT SUPV is only provided to allow these points to report a FAIL mode when the room unit fails to update these points.

If an alternative source is selected you must insure that the room unit is not provided with the same sensor option.

See *Sensors and Transducers Configuration and Sizing* for part numbers and ordering information.

Room CO2

RM CO2 displays the CO_2 value in units of parts-per-million (PPM). RM CO2 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.

Fail Mode Operation

If the air velocity sensor points, HTG VOLUME and/or CLG VOLUME are failed, the dampers are controlled in one of two ways:

- If FAIL MODE = OPEN, the controller sets CLG DMP CMD and HTG DMP CMD to 100% open.
- If FAIL MODE = CLOSED, the controller sets CLG DMP CMD and HTG DMP CMD to 0% open.

If the temperature sensor fails, the controller operates using the last known temperature value.

Application Notes

- If the temperature swings in the room are excessive or there is trouble maintaining the setpoint, then either the cooling loop, the heating loop, or both need to be tuned. If CLG FLOW is oscillating while CLG FLOW STPT is constant, then the flow loop requires tuning. If HTG FLOW is oscillating while HTG FLO STPT is constant, the heating flow loop requires tuning.
- The controller as shipped from the factory keeps all associated equipment OFF. See the *Start-up* document for how to release the controller and its equipment to application control.
- Spare DOs can be used as auxiliary points that are controlled by the field panel after being defined in the field panel's database. DO 5 and DO 6 may be used as auxiliary motor points. If using a pair of spare DOs to control a motor, you must unbundle the corresponding motor command point.

For more information, contact your nearest Siemens Industry, Inc. representative.

Wiring Diagrams

⚠ CAUTION

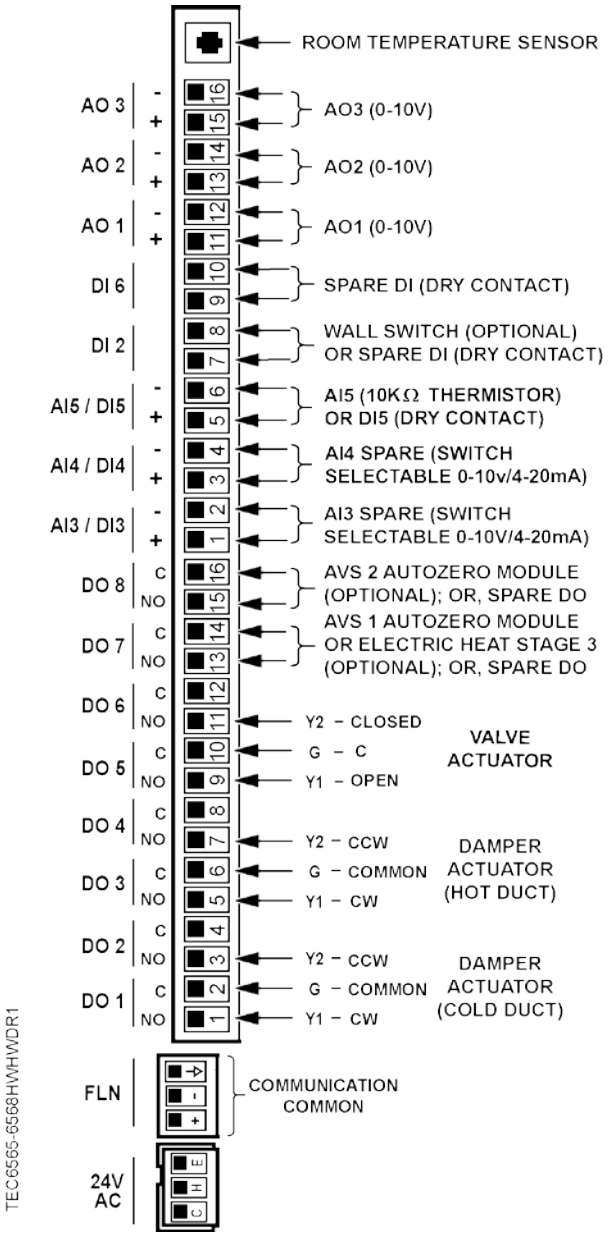
The controller’s DOs control 24 Vac loads only. The maximum rating is 12 VA for each DO. An external interposing relay is required for any of the following:

• VA requirements higher than the maximum

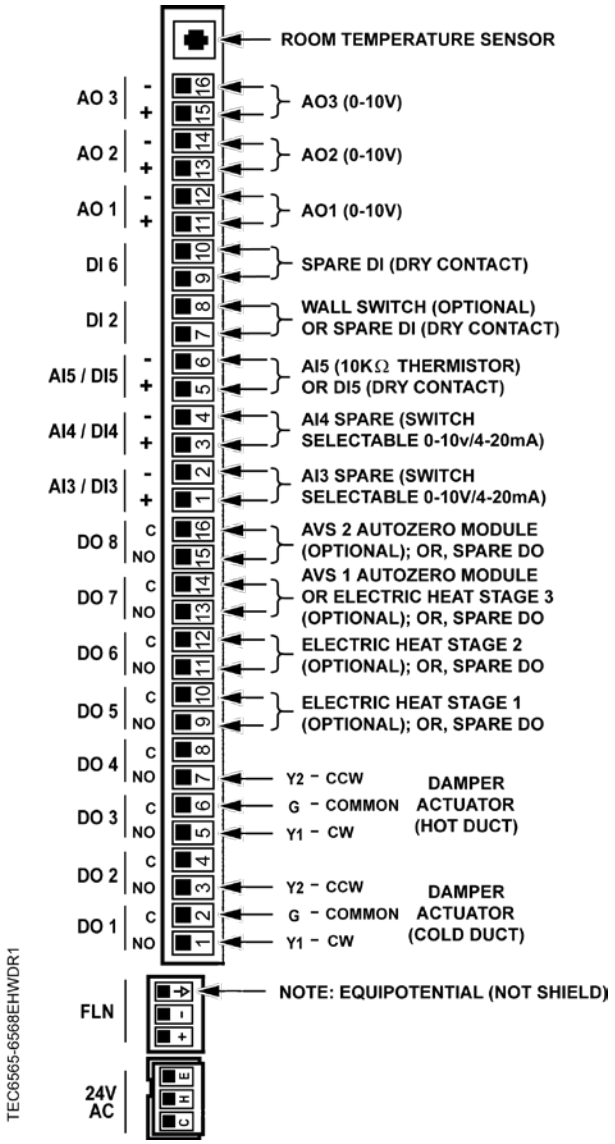
• 110 or 220 Vac requirements

• DC power requirements

• Separate transformers used to power the load
(for example part number 540-147, Terminal Equipment Controller Relay Module)



Applications 6565, 6566, 6567, and 6568 with Hot Water Reheat.



Applications 6565, 6566, 6567, and 6568 with Electric Auxiliary Reheat.

Application 6566 Point Database

Object Type	Object Instance (Point Number)	Object Name (Descriptor)	Factory Default (SI Units)	Eng Units (SI Units)	Range	Active Text	Inactive Text
AO	1	CTLR ADDRESS	99	--	0-255	--	--
AO	2	APPLICATION	6593	--	0-32767	--	--
AI	{04}	ROOM TEMP	74.0 (23.44888)	DEG F (DEG C)	48-111.75	--	--
BO	{05}	HEAT.COOL	COOL	--	Binary	HEAT	COOL
AO	{06}	OCC CLG STPT	74.0 (23.44888)	DEG F (DEG C)	48-111.75	--	--
AO	{07}	OCC HTG STPT	70.0 (21.20888)	DEG F (DEG C)	48-111.75	--	--
AO	{08}	UOC CLG STPT	82.0 (27.92888)	DEG F (DEG C)	48-111.75	--	--
AO	{09}	UOC HTG STPT	65.0 (18.40888)	DEG F (DEG C)	48-111.75	--	--
AO	{11}	RM STPT MIN	55.0 (12.80888)	DEG F (DEG C)	48-111.75	--	--
AO	{12}	RM STPT MAX	90.0 (32.40888)	DEG F (DEG C)	48-111.75	--	--
AI	{13}	RM STPT DIAL	74.0 (23.44888)	DEG F (DEG C)	48-111.75	--	--
BO	{14}	STPT DIAL	NO	--	Binary	YES	NO
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
AO	{20}	OVRD TIME	0	HRS	0-255	--	--
BO	{21}	UNOCC OVRD	UNOCC	--	Binary	UNOCC	OCC
BI	{24}	DI 2	OFF	--	Binary	ON	OFF
BI	{25}	DI 3	OFF	--	Binary	ON	OFF
AO	{26}	HTGFLO PGAIN	0	--	0-51.15	--	--
AO	{27}	HTGFLO IGAIN	0.018	--	0-1.023	--	--
AO	{28}	HTGFLO DGAIN	0	--	0-510	--	--

Object Type	Object Instance (Point Number)	Object Name (Descriptor)	Factory Default (SI Units)	Eng Units (SI Units)	Range	Active Text	Inactive Text
BO	{29}	OCC.UNOCC	OCC	--	Binary	UNOCC	OCC
AI	{30}	TOT VOLUME	0 (0.0)	CFM (LPS)	0-131068	--	--
AO	{31}	UNOCC FLOW	220 (103.818)	CFM (LPS)	0-131068	--	--
AO	{32}	OCC FLOW	2200 (1038.18)	CFM (LPS)	0-131068	--	--
AI	{35}	CLG VOLUME	0 (0.0)	CFM (LPS)	0-131068	--	--
AO	{36}	CLG FLO COEF	1	--	0-2.55	--	--
AO	{37}	VALVE COMD	0	PCT	0-102	--	--
AO	{38}	VALVE POS	0	PCT	0-102	--	--
AO	{39}	MTR3 TIMING	130	SEC	0-511	--	--
BO	{40}	FAIL MODE	OPEN	--	Binary	CLOSE	OPEN
BO	{41}	DO 1	OFF	--	Binary	ON	OFF
BO	{42}	DO 2	OFF	--	Binary	ON	OFF
BO	{43}	DO 3	OFF	--	Binary	ON	OFF
BO	{44}	DO 4	OFF	--	Binary	ON	OFF
BO	{45}	DO 5	OFF	--	Binary	ON	OFF
BO	{46}	DO 6	OFF	--	Binary	ON	OFF
BO	{47}	DO 7	OFF	--	Binary	ON	OFF
AO	{48}	CLG DMP CMD	0	PCT	0-102	--	--
AO	{49}	CLG DMP POS	0	PCT	0-102	--	--
BO	{50}	DO 8	OFF	--	Binary	ON	OFF
AO	{51}	MTR1 TIMING	95	SEC	0-511	--	--
AO	{52}	HTG DMP CMD	0	PCT	0-102	--	--
AO	{53}	HTG DMP POS	0	PCT	0-102	--	--
AO	{54}	TOT FLO COEF	1	--	0-2.55	--	--
AO	{55}	MTR2 TIMING	95	SEC	0-511	--	--
AO	{56}	DPR1 ROT ANG	90	--	0-255	--	--

Object Type	Object Instance (Point Number)	Object Name (Descriptor)	Factory Default (SI Units)	Eng Units (SI Units)	Range	Active Text	Inactive Text
AO	{57}	DPR2 ROT ANG	90	--	0-255	--	--
AO	{58}	MTR SETUP	0	--	0-255	--	--
AO	{59}	DO DIR. REV	0	--	0-255	--	--
AO	{60}	TOTDUCT AREA	1.0 (0.09292)	SQ. FT (SQ M)	0-6.375	--	--
AO	{63}	CLG P GAIN	20.0 (36.0)	--	0-63.75	--	--
AO	{64}	CLG I GAIN	0.012 (0.0216)	--	0-1.023	--	--
AO	{65}	CLG D GAIN	0 (0.0)	--	0-510	--	--
AO	{66}	CLG BIAS	50	PCT	0-102	--	--
AO	{67}	HTG P GAIN	10.0 (18.0)	--	0-63.75	--	--
AO	{68}	HTG I GAIN	0.012 (0.0216)	--	0-1.023	--	--
AO	{69}	HTG D GAIN	0 (0.0)	--	0-510	--	--
AO	{70}	HTG BIAS	50	PCT	0-102	--	--
AO	{71}	CLGFLO PGAIN	0	--	0-51.15	--	--
AO	{72}	CLGFLO IGAIN	0.018	--	0-1.023	--	--
AO	{73}	CLGFLO DGAIN	0	--	0-510	--	--
AO	{74}	HTG FLOW	0	PCT	0-1023.75	--	--
AO	{75}	CLG FLOW	0	PCT	0-1023.75	--	--
AO	{78}	CTL TEMP	74.0 (23.44888)	DEG F (DEG C)	48-111.75	--	--
AO	{79}	CLG LOOPOUT	50	PCT	0-102	--	--
AO	{80}	HTG LOOPOUT	0	PCT	0-102	--	--
AO	{81}	AVG HEAT OUT	0	PCT	0-409.2	--	--
BO	{82}	AUX HTG USED	NO	--	Binary	YES	NO
BO	{83}	AUX HTG TYPE	ELEC	--	Binary	ELEC	HW
BO	{84}	DMPR STATUS	CAL	--	Binary	RECAL	CAL

Object Type	Object Instance (Point Number)	Object Name (Descriptor)	Factory Default (SI Units)	Eng Units (SI Units)	Range	Active Text	Inactive Text
AO	{85}	HTG FLO STPT	0	PCT	0-255.75	--	--
AO	{86}	SWITCH TIME	10	MIN	0-255	--	--
BO	{87}	CAL MODULE	NO	--	Binary	YES	NO
AO	{88}	STAGE COUNT	1	--	0-255	--	--
AO	{89}	STAGE TIME	10	MIN	0-255	--	--
AO	{90}	SWITCH DBAND	1.0 (0.56)	DEG F (DEG C)	0-63.75	--	--
AO	{91}	CLG FLOW MIN	220 (103.818)	CFM (LPS)	0-131068	--	--
AO	{92}	CTL STPT	74.0 (23.44888)	DEG F (DEG C)	48-111.75	--	--
AO	{93}	CLG FLO STPT	0	PCT	0-255.75	--	--
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}	CLGDUCT AREA	1.0 (0.09292)	SQ. FT (SQ M)	0-6.375	--	--
AO	{98}	LOOP TIME	5	SEC	0-255	--	--
AO	{99}	ERROR STATUS	0	--	0-255	--	--
AO	{102}	AOV 1	0	VOLTS	0-10.23	--	--
AO	{103}	AOV 2	0	VOLTS	0-10.23	--	--
AO	{104}	AOV 3	0	VOLTS	0-10.23	--	--
AI	{105}	AI 3	0	PCT	0-102	--	--
AI	{106}	AI 4	0	PCT	0-102	--	--
AO	{107}	RMTMP OFFSET	0.0 (0.0)	DEG F (DEG C)	-63.75	--	--
BI	{108}	DI 4	OFF	--	Binary	ON	OFF
BI	{109}	DI 5	OFF	--	Binary	ON	OFF
BI	{110}	DI 6	OFF	--	Binary	ON	OFF
AO	{123}	AI 5 OFFSET	0.0 (0.0)	DEG F (DEG C)	-63.75	--	--
AO	{124}	STAT SUPV	0	--	0-255	--	--
AI	{125}	RM CO2	1000	PPM	0-8191	--	--
AI	{126}	RM RH	50	PCT	0-102	--	--

Object Type	Object Instance (Point Number)	Object Name (Descriptor)	Factory Default (SI Units)	Eng Units (SI Units)	Range	Active Text	Inactive Text
BO	{127}	PPCL STATE	EMPTY	--	Binary	LOADED	EMPTY

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