

Start-up Procedures for Project SEA-082498-1

TEC 0545.11

Table of Contents

Unit Vent Small Point Controller – 0-10V Output	2
Verify power to controller	2
Set controller address and application	2
Set the LTDT contact usage and value	3
Set the DX cooling timers.....	3
Set the sensor type	4
Set the discharge air setpoint.....	4
Set room temperature set points.....	4
Set the mixed air setpoint.....	5
Set outdoor air damper minimum position.....	5
Set valve configuration.....	5
Enable face-bypass damper	5
Enable wall switch.....	5
Set override time	5
Enable auxiliary radiation	6
Enable electric heat.....	6
Enable closure of 2-position valve.....	6
Set start and span of voltages for the 0-10V actuators	6
Set AO DIR.REV	7
Enable night heating	7
Enable night cooling.....	7
Set DO DIR.REV	8
Set gains	8

Unit Vent Small Point Controller – 0-10V Output

This section presents start-up procedures for the Unit Vent SPC – 0-10V Output. Refer to Figure 1.

- NOTES:**
1. Update each controller at the field panel immediately after you complete the controller start-up procedures, and have made all other changes to the controller's point database (including tuning, etc.).
 2. If free cooling is desired, then add the appropriate PPCL statements at the field panel to command the point FREE CLG (number 23) to ON when free cooling is available and OFF when it is not available.

Verify power to controller

Verify that the Unit Vent SPC – 0-10V Output is powered up. Check that the BST LED on the controller is flashing. If the BST LED does not flash ON/OFF once per second, then refer to the *APOGEE Automation Service Procedures Manual* (125-3013) for troubleshooting information.

NOTE: The Controller Interface Software (CIS) used with the Unit Vent SPC – 0-10V Output must be Rev. 2.0 or greater.

Set controller address and application

Using the portable operator's terminal, set the controller address and application following these steps:

1. Display the STARTUP report.
2. Set the point CTRLR ADDRESS (number 1) to the appropriate address number.
3. Set the point APPLICATION (number 2) to the appropriate Unit Vent SPC – 0-10V Output application. Refer to Table 1 for application names and numbers.

Table 1. Unit Vent SPC – 0-10V Output Applications.

Application	Revision UE10 or Higher
Heating and/or Chilled Water Cooling, ASHRAE Cycles I and II	2354
Heating and/or Chilled Water Cooling, ASHRAE Cycle III	2355
Heating and DX Cooling, ASHRAE Cycles I and II	2356
Heating and DX Cooling, ASHRAE Cycle III	2357
Slave Mode	2384

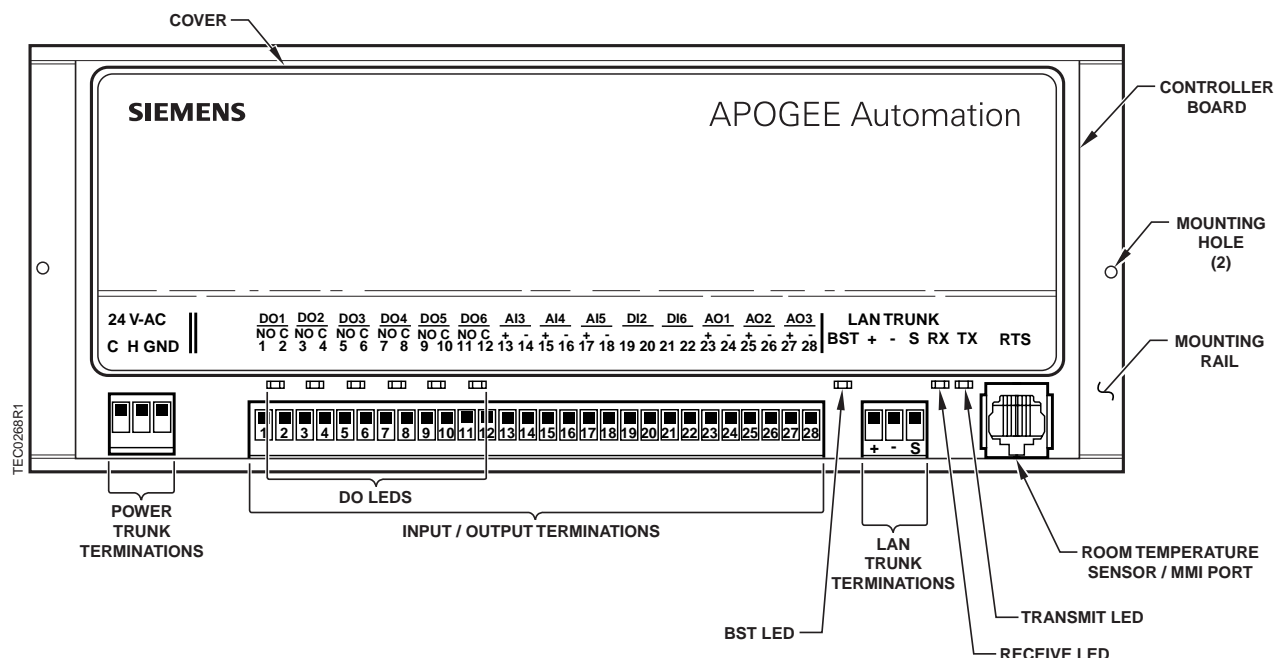


Figure 1. Unit Vent SPC – 0-10V Output.

After you set the application, the controller will go through a shut-down/load sequence as it switches from slave mode to the application selected. After the application loads and the OVERVIEW report appears, change to the UECYC I.II report (if in application 2354), the UECYC III report (if in application 2355), the UECYC I.II DX report (if in application 2356), or the UECYC III DX report (if in application 2357) and continue with the following procedures.

Set LTDT USED value and LTDT CONTACT configuration

If a low temperature detector is being used, then set the point LTDT USED (number 56) to YES. If a low temperature detector is not being used, then set the point LTDT USED to NO.

The TEC needs to know whether the low temperature detector is Normally Closed or Normally Opened. If it is Normally Closed, then set the point LTDT CONTACT (number 52) to NCLOSE. If it is Normally Opened, then set the point LTDT CONTACT to NOPEN.

Set the DX cooling timers

Applications 2356 and 2357 only: Determine the minimum on-time desired for the DX cooling. Set CMP MIN ON (number 76) to this value.

Determine the minimum off-time desired for the DX cooling. Set CMP MIN OFF (number 75) to this value.

Set the sensor type

Application 2355 only: If the heating and cooling PID loops are controlling the discharge temperature, then set SENSOR TYPE (number 51) to DISCH. (This is referred to as **discharge sensor control** in the remainder of this document.)

If the heating and cooling PID loops are controlling the room temperature, then leave SENSOR TYPE at its default value of ROOM. (This is referred to **room sensor control** in the remainder of this document.)

Set the discharge air setpoint

Application 2355 (discharge sensor control) only: Set the point, DISCH STPT (number 03), to the desired value.

Set room temperature set points

Follow these steps to set the room temperature set points:

1. Display the SETPOINTS report.
2. If the room temperature sensor has a set point dial, and if the point RM STPT DIAL (number 13) is to be used by the controller, then set the point STPT DIAL (number 14) to YES; otherwise, set STPT DIAL to NO.

NOTE: If STPT DIAL is set to YES, then the points DAY HTG STPT (number 7) and DAY CLG STPT (number 6) will not be used. Instead, the value of RM STPT DIAL will be used.

If there is no set point dial on the room temperature sensor, then verify that STPT DIAL is set to NO.

3. Set the following points to the appropriate values:
 - DAY CLG STPT (number 6)
 - DAY HTG STPT (number 7)
 - NGT CLG STPT (number 8)
 - NGT HTG STPT (number 9)
4. If the room temperature sensor has a set point dial and the set point dial is to be used, then set the points RM STPT MIN (number 11) and RM STPT MAX (number 12) for the minimum and the maximum allowable room temperature set point values, respectively. Valid values range from 55° to 95°F (13° to 35°C). Common values for these points are 65°F (18°C) for RM STPT MIN and 80°F (27°C) for RM STPT MAX.

Application 2355 Note: These set points still need to be set in application 2355, even if discharge sensor control is being used. This is because the fan logic and the warm-up/cool-down logic in application 2355 use these set points.

Set the mixed air setpoint

Applications 2355 and 2357: Set the point, MA STPT (number 93), to the desired value.

Set outdoor air damper minimum position

Follow these steps to set the outdoor air damper minimum position:

1. Display the STARTUP report.
2. If the minimum position for the outdoor air damper is a value other than the default value of 14.8%, then set the point OADPR MINPOS (number 10) as follows:
 - For ASHRAE Cycle I, set OADPR MINPOS to 100% open.
 - For ASHRAE Cycle II or III, consult the job documentation for the appropriate value.

Set valve configuration

Applications 2354 and 2355: If the unit has 1 valve that controls a coil that changes from heating to cooling depending on the season (a 2-pipe heat/cool configuration), then set the point 1 VLV HTGCLG (number 16) to YES.

For all other units, leave 1 VLV HTGCLG at its default value of NO.

Enable face-bypass damper

Applications 2354, 2355, 256, and 257: If the unit has a face-bypass damper, then set the point FBP.MODVALVE (number 17) to FBP.

For all other units, leave FBP.MODVALVE at its default value of VALVE.

Enable wall switch

If a wall switch is used for day/night control, then enable it by setting the point WALL SWITCH (number 18) to YES.

Otherwise, leave WALL SWITCH at its default value of NO.

Set override time

If using night override, then set the point OVRD TIME (number 20) to the number of whole hours that an override should last. Otherwise, leave OVRD TIME at its default value of 1 (night override is disabled).

Enable auxiliary radiation

Applications 2354, 2355, 2356, and 2357: If the unit has auxiliary radiation that will be controlled by DO 1, then set the point AUX.NOAUX (number 22) to AUX.

For all other units, leave AUX.NOAUX at its default value of NOAUX.

Enable electric heat

Applications 2354, 2355, 2356, and 2357: If the unit has electric heating coils that will be controlled by DOs, then set the point ELEC.NOELEC (number 27) to ELEC.

If the unit has valve control, then leave ELEC.NOELEC at its default value of NOELEC.

Enable closure of 2-position valve

Applications 2354, 2355, 2356, and 2357: If the unit has a face-bypass damper and 2-position valves, then set the point FBP.2PSVCTL (number 28) to ENABLE to allow the 2-position valve to close when the face-bypass damper is at the bypass closed position.

For all other units, leave FBP.2PSVCTL at its default position of DISABL.

Set start and span of voltages for the 0-10V actuators

Depending on the actuators you are using, set points listed in Table 2 to the appropriate starting voltage position and the voltage range for the actuators.

NOTE: The maximum voltage output for the AOs is 10V. Therefore, the starting voltages and the voltage ranges **must not** exceed 10V. The controller **will not** control the valve or damper actuator beyond 10V.

Table 2. Start and Span Voltages for Actuators.

Descriptor	Point Number	Siemens Business Technologies P/N SQB 61.1	Barber-Coleman P/N MP5433
		Voltage Range	
AOV1 SPAN AOV2 SPAN AOV3 SPAN	31 33 35	10 (default)	3
		Starting Voltage	
AOV1 START AOV2 START AOV3 START	32 34 36	0 (default)	6

Set AO DIR.REV

If the normal (de-energized) state of all of the devices controlled by AOs is direct-acting, then leave the point AO DIR.REV (number 37) at its default value of 0.

Otherwise, reverse the action of the appropriate AO, or combination of AOs, as follows:

1. Add the values in Table 3 for each AO you wish to make reverse-acting.
2. Set AO DIR.REV to this value.

Table 3. AO DIR.REV Values.

Reverse-Acting AO	Value
AO 1	1
AO 2	2
AO 3	4

Enable night heating

If using hot water heat, then leave the point NGT HW HTG (number 53) at its default position of YES, which will open the hot water valve during night mode.

If using steam or electric heat, then set NGT HW HTG to NO.

Enable night cooling

If cooling is desired during night mode, then set the point NGT CLG MODE (number 54) to YES.

NOTE: For cooling only units, NGT CLG MODE **must be** set to YES to enable cooling in the night mode.

Otherwise, leave NGT CLG MODE at its default value of NO.

Set DO DIR.REV

If the normal (de-energized) state of all of the devices controlled by DOs is direct-acting, then leave the point DO DIR.REV (number 59) at its default value of 0.

Otherwise, reverse the action of the devices as follows:

1. Add the values in Table 4 for each DO you wish to make reverse-acting.
2. Set DO DIR.REV to this value.

Table 4. DO DIR.REV Values.

Reverse-Acting DO	Value
DO 1	32
DO 2	16
DO 3	8
DO 4	4
DO 5	2
DO 6	1
DO 7	64
DO 8	128

Set gains

Display the TUNING report. Set the P, I, and D gains for the system. Refer to the appropriate table as follows:

- Applications 2354 and 2356 (ASHRAE Cycles I and II): Table 5.
- Applications 2355 (room sensor control) and 2357 (ASHRAE Cycle III): Table 6.
- Applications 2355 (discharge sensor control): Table 7.

Table 5. Recommended P, I, and D Gains for Applications 2354 and 2356.

Hardware Configuration	ASHRAE Cycles I and II (SI Units)							
	Cooling Loop		Heating Loop		Room Loop		Auxiliary Loop	
	63	CLG P GAIN	67	HTG P GAIN	71	ROOM P GAIN	81	AUX P GAIN
	64	CLG I GAIN	68	HTG I GAIN	72	ROOM I GAIN	82	AUX I GAIN
	65	CLG D GAIN	69	HTG D GAIN	73	ROOM D GAIN	83	AUX D GAIN
	66	CLG BIAS	70	HTG BIAS	74	ROOM BIAS	84	AUX BIAS
VALVES								
Steam	Does not apply.		0.4 (0.72) 0.015 (0.027) 5 (9) 50		2.3 (4.14) 0.00504 (0.009072) 76 (136.8) 72 (22.38)		0.4 (0.72) 0.00099 (0.001782) 50 (80) 0	
HW	Does not apply.		0.06 (1.08) 0.02 (0.036) 15 (27) 50		2.3 (4.14) 0.00504 (0.009072) 76 (136.8) 72 (22.38)		0.04 (0.72) 0.00099 (0.001782) 50 (80) 0	
CHW	1.6 (2.88) 0.05 (0.09) 10 (18) 50		Does not apply.		2.3 (4.14) 0.00504 (0.009072) 76 (136.8) 72 (22.38)		Does not apply.	
DAMPERS								
FBP Steam	Does not apply.		0.3 (0.54) 0.02 (0.036) 0 50		2.3 (4.14) 0.00504 (0.009072) 76 (136.8) 72 (22.38)		Does not apply.	
FBP HW	Does not apply.		0.5 (0.9) 0.03 (0.054) 0 50		2.3 (4.14) 0.00504 (0.009072) 76 (136.8) 72 (22.38)		Does not apply.	
FBP CHW	0.6 (1.08) 0.04 (0.072) 0 50		Does not apply.		2.3 (4.14) 0.00504 (0.009072) 76 (136.8) 72 (22.38)		Does not apply.	
ELECTRIC								
3 Steps	Does not apply.		1 (1.8) 0.02 (0.036) 10 (18) 50		2.3 (4.14) 0.00504 (0.009072) 76 (136.8) 72 (22.38)		Does not apply.	
DX								
DX	10 (18) 0.02 (0.036) 200 (360) 50		Does not apply.		Does not apply.		Does not apply.	

Table 6. Recommended P, I, and D Gains for Applications 2355 (room sensor control) and 2357.

Hardware Configuration	ASHRAE Cycle III (SI Units)					
	Cooling Loop		Heating Loop		Mixed Air Loop	
	63	CLG P GAIN	67	HTG P GAIN	81	MA P GAIN
	64	CLG I GAIN	68	HTG I GAIN	82	MA I GAIN
	65	CLG D GAIN	69	HTG D GAIN	83	MA D GAIN
	66	CLG BIAS	70	HTG BIAS	84	MA BIAS
VALVES						
Steam	Does not apply.		2.5 (4.5) 0.005 (0.009) 127 (228.6) 50		Does not apply.	
HW	Does not apply.		5 (9) 0.008 (0.0144) 250 (450) 50		Does not apply.	
CHW	8 (14.4) 0.01 (0.018) 250 (450) 0		Does not apply.		Does not apply.	
DAMPERS						
Mixed Air	Does not apply.		Does not apply.		1 (1.8) 0.05004 (0.090072) 0 14.8	
FBP Steam	Does not apply.		2.5 (4.5) 0.005 (0.009) 127 (228.6) 50		Does not apply.	
FBP HW	Does not apply.		5 (9) 0.008 (0.0144) 250 (450) 50		Does not apply.	
FBP CHW	8 (14.4) 0.01 (0.018) 250 (450) 0		Does not apply.		Does not apply.	
ELECTRIC						
3 Steps	Does not apply.		5 (9) 0.008 (0.0144) 250 (450) 50		Does not apply.	
DX						
DX	10 (18) 0.02 (0.036) 200 (360) 50		Does not apply.		Does not apply.	

Table 7. Recommended P, I, and D Gains for Application 2355. (discharge sensor control).

Hardware Configuration	ASHRAE Cycles III (SI Units)					
	Cooling Loop		Heating Loop		Mixed Air Loop	
	63	CLG P GAIN	67	HTG P GAIN	81	MA P GAIN
	64	CLG I GAIN	68	HTG I GAIN	82	MA I GAIN
	65	CLG D GAIN	69	HTG D GAIN	83	MA D GAIN
	66	CLG BIAS	70	HTG BIAS	84	MA BIAS
VALVES						
Steam	Does not apply.		0.4 (0.72) 0.015 (0.027) 5 (9) 50		Does not apply.	
HW	Does not apply.		0.06 (1.08) 0.02 (0.036) 15 (27) 50		Does not apply.	
CHW	1.6 (2.88) 0.05 (0.09) 10 (18) 50		Does not apply.		Does not apply.	
DAMPERS						
Mixed Air	Does not apply.		Does not apply.		1 (1.8) 0.05004 (0.090072) 0 14.8	
FBP Steam	Does not apply.		0.3 (0.54) 0.02 (0.036) 0 50		Does not apply.	
FBP HW	Does not apply.		0.5 (0.9) 0.03 (0.054) 0 50		Does not apply.	
FBP CHW	0.6 (1.08) 0.04 (0.072) 0 50		Does not apply.		Does not apply.	
ELECTRIC						
3 Steps	Does not apply.		1 (1.8) 0.02 (0.036) 10 (18) 50		Does not apply.	
DX						
DX	Does not apply.		Does not apply.		Does not apply.	

NOTE: Update each controller at the field panel immediately after you complete the controller start-up procedures, and have made all other changes to the controller's point database (including tuning, etc.).

Unit Vent SPC – 0-10V Output start-up is complete.