SIEMENS

Start-up for Custom Solutions Application 2414

VAV Parallel Fan Powered with Electric Reheat and Modified Damper Sequence

TEC- 0147.11

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Verifying Power to Controller

NOTES: The Controller Interface Software (CIS) used to configure the controller must be Rev. 2.0 or greater.

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

Verify that the Controller is powered up by checking the BST LED (Figure 1) to make sure it is flashing. If it does not flash On/Off once per second, refer to the *APOGEE Automation Service Procedures* on InfoLink for troubleshooting information.

Enabling Damper Actuator

Using the portable operator's terminal, follow these steps to set the damper actuator running time:

1. Verify that APPLICATION (Point 2) is set to 2091 (slave mode).
2. Display the STARTUP report.
3. Set MTR1 TIMING (Point 51) to the correct running time of the actuator. Refer to Table 1.

Table 1. Damper Actuator Run Time.

Damper Actuator	Setting (seconds)	
	50 Hz	**60 Hz**
349-0101	106	88
GDE 131.1U	108	90
GDE 131.1P	108	90
GLB 131.1P	150	125
[1]GBB 171.1U	150	150
[2]GDE 161.1P	108	90
[2]GLB 161.1P	150	125

[1] GBB 171.1U run time is independent of Hz.
[2] Analog output 0-10V.

Note: See the Manufacturer Installed Controls (MIC) web page on Landscape (http://landscape.us.abatos.com/mic/) for specific manufacturers' damper opening details (90°/60°/etc.).

4. If the damper rotation angle is a value other than 90°, then set DPR1 ROT ANG (Point 56) to the appropriate value.

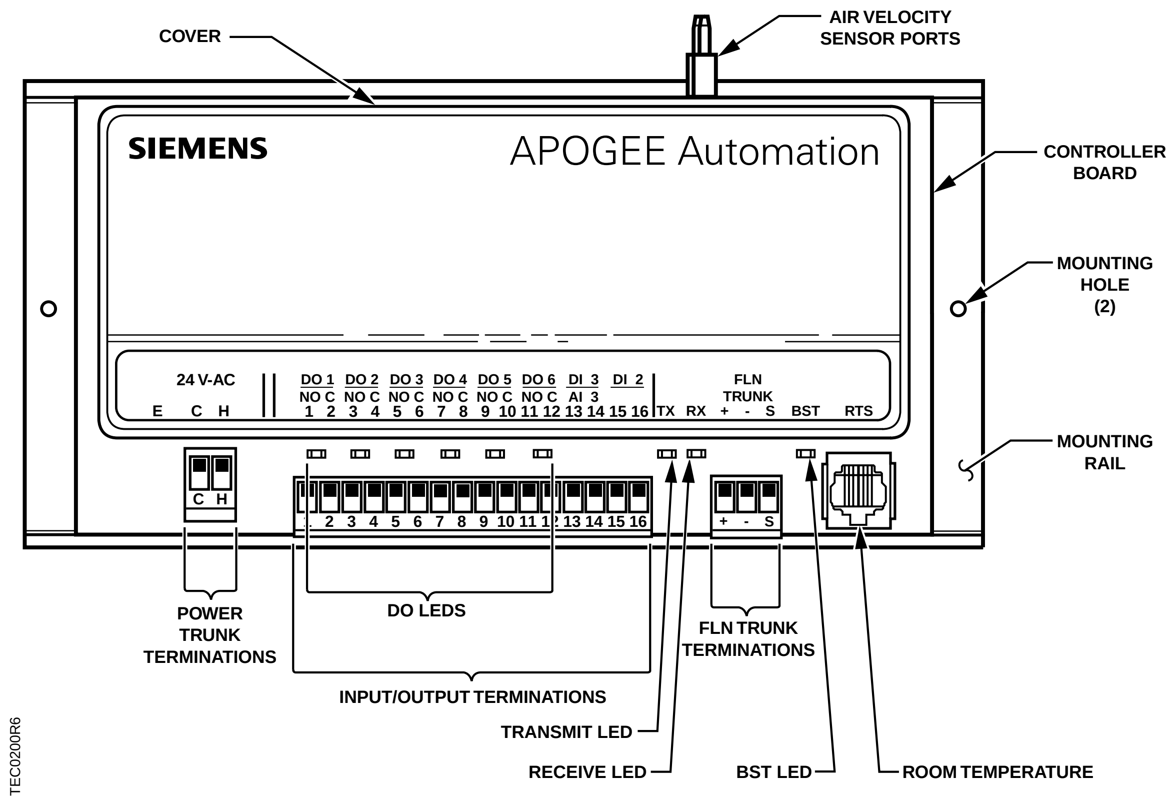

Figure 1. VAV Controller with Parallel Fan, Electric Reheat and Modified Damper Sequence – Elect. Output

1. Enable the damper actuator by setting MTR SETUP (Point 58) to 1. Verify that the damper closes completely. If it does not close completely, reverse the action of the damper actuator by setting MTR SETUP to 3.

2. If the damper still does not close completely, then the actuator has been installed or set up incorrectly. Refer to the damper actuator installation instructions, set up information, or the *APOGEE Automation Service Procedures* on InfoLink for more information.

Setting Application

NOTE: If you are going to enter an LCTLR point at the field panel, then keep track of the application, override time, controller address, duct shape, and duct dimensions you enter at the portable operator's terminal. You will be required to enter these values again at the field panel.

Set APPLICATION (Point 2) to 2414.

Waiting for AVS Calibration – 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 the AVS calibration cycle begins.

The air velocity sensor calibration cycle takes from 2 to 5 minutes to complete. The air damper closes during calibration.

At the start of the calibration cycle, the controller automatically sets CAL AIR (Point 94) to YES. When the cycle is complete, it sets CAL AIR to NO. Wait until the calibration cycle is complete (CAL AIR is set to NO) before continuing with the start-up procedures.

Selecting Automatic Calibration Option

In order to choose the most efficient method of triggering the calibration routine, follow this procedure to set CAL SETUP (Point 95):

NOTE: The air velocity sensor must be calibrated at least once every 24 hours. Make sure the sensor has been calibrated before balancing takes place as this affects the balancer's results.

1. Display the first report in the REPORTS selection box. (The report will be named "VAV*app*", where *app* is a description of the particular application you are using.)

2. View Table 2 and then set CAL SETUP to the automatic calibration option that best meets your job requirements.

Table 2. CAL SETUP Options.

CAL SETUP Options	Description
0	Calibration occurs ONLY when CAL AIR (Point 94) is set to YES.
1	Calibration occurs when the field panel commands a day/night mode changeover. Actual calibration is subject to a time delay of 0, 1, 2, or 3 minutes. This delay is determined by CTLR ADDRESS (Point 1) divided by 4 and the remainder is the time delay in minutes. **Example:** If CTLR ADDRESS = 11, then the controller will wait 3 minutes (11 ÷ 4 = 2 **R3**) after it receives the day/night mode changeover command before beginning the calibration routine.
2	Calibration occurs immediately after the override switch is depressed.
4 (factory default value)	Calibration occurs on the time interval set in CAL TIMER (Point 96). For example, if CAL TIMER = 12, then the calibration period is 12 hours. Actual calibration is subject to a time delay based on the value of CTLR ADDRESS. Refer to the example in Option 1. This is the recommended option when using a controller with an Autozero Module.

NOTE: Options can be combined by summing their numbers. For example, to calibrate as in Options 1 and 2, set CAL SETUP to 3.

Setting Room Temperature Set Points

1. Display the SETPOINTS report.

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

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

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

4. Set the following points to the appropriate values:

   - DAY CLG STPT (Point 6)
   - DAY HTG STPT (Point 7)
   - NGT CLG STPT (Point 8)
   - NGT HTG STPT (Point 9)

5. If the room temperature sensor has a set point dial and the set point dial is to be used, set RM STPT MIN (Point 11) and RM STPT MAX (Point 12) for the minimum and 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.

Setting Override Time

1. Display the STARTUP report.

2. If using night override, set OVRD TIME (Point 20) to the number of whole hours an override should last. If left at zero (default), night override is disabled.

Setting Stages of Electric Reheat

Check the hardware to verify the number of stages of electric reheat used. Set STAGE COUNT (Point 88) to this value.

Setting Delay Time

The supply damper will remain shut for a certain period of time after the DAY.NGT point (Point 29) switches from NIGHT to DAY before it starts modulating. This amount of time is stored in DELAY TIME (Point 54). Enter the desired value for DELAY TIME.

Setting Controller Address

Set CTLR ADDRESS (Point 1) to the appropriate number. (Each controller must have a unique address. Normal values are **00** to **31**, but the controller will accept values as high as 98.)

Setting Duct Area

Set the duct area by following these steps:

1. Using the portable operator's terminal, press <F4> to display the Duct Dimensions Menu.
2. At the Duct Dimensions Menu, use the arrow keys to select the applicable duct shape. Press <ENTER>. The software prompts you for the dimensions of the duct.
3. Enter the dimensions as prompted. Press <ENTER> after each dimension you enter.

Setting Flow Coefficient

Follow these steps to set the flow coefficient:

1. Display the BALANCING report.
2. Set FLOW COEFF (Point 36) to the appropriate value found in Tables 3 through 5. This value is a starting point for the air balancer.
3. To fine tune the flow coefficient use the following formula:

   new flow coefficient = (actual volume ÷ TEC volume) × old flow coefficient

The actual volume is the actual value obtained from the balancer's measurements. The TEC volume is the value obtained from AIR VOLUME (Point 35). If necessary, repeat the procedure until the TEC volume is within 5% of the actual volume.

Table 3. Suggested TEC Initial Flow Coefficients for VAV Manufacturer and Box Sizes.

	Air velocity sensor type	Round ductwork (inlet) sizes in inches.												
		4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**14**	**16**	**18**	**19**	**20**
Anemostat	**PX-2 cross, "P" range**		0.77	0.74	0.75	0.78	0.74	0.81	0.81	0.85	0.80			
Anemostat	**Traverse, "H" range**		0.77	0.74	0.75	0.78	0.74	0.81	0.81	0.85	0.80			
Anemostat	**PX-2 cross, "Q" range**		0.56	0.51	0.56	0.57	0.59	0.60	0.64	0.65	0.72			
Anemostat	**Traverse, "L" range**		0.51	0.51	0.56	0.57	0.59	0.60	0.64	0.65	0.72			
Carrier	**Linear averaging**	0.75	0.71	0.64	0.63	0.62	0.62	0.61	0.61	0.58	0.54	0.58		
Carnes	**"Standard sensor"**		0.77	0.70	0.69	0.68		0.67	0.69	0.69	0.70			
Carnes	**"Cross-flow sensor"**		0.68	0.60	0.65	0.68		0.65	0.68	0.70	0.69			
Continental	**AVS model "RSZ"**			0.73		0.67		0.72	0.64	0.62	0.57		0.99	0.99
E.H. Price	**CP101**	1.04	0.83	0.64	0.68	0.66	0.72	0.75	0.80	0.85	0.80			
Environmental Tech.	**sdr, vfr, cfr**	0.79	0.78	0.59		0.62		0.64	0.65	0.66	0.66		0.59	0.66
Tuttle & Bailey/ SIEMENS	**"Flo-cross" sensor (supply)**	0.69	0.67	0.60	0.56	0.57		0.56	0.60	0.57	0.60	0.58		
Tuttle & Bailey/ SIEMENS	**Flo-cross w/ total**	0.59	0.55	0.50							0.51			
Tuttle & Bailey/ SIEMENS	**Orifice ring flow sensor (exhaust)**	0.70		0.70		0.75		0.75	0.67	0.67	0.67			
Krueger	**General sensor**	0.77	0.73	0.66	0.68	0.70	0.68	0.69		0.67				
Metal Ind. Fan powered only.	**Fvi, fc, sv, rt, th, ct, dd (6 DO)**									0.70	0.70			
Metal Ind. VAV & dual duct.	**fvi, fc, sv, rt, th, ct, dd (6 DO)**								0.50					
*** Metal Ind. Dual duct only**	**fvi, fc, sv, rt, th, ct, dd (8 DO)**			0.74		0.68		0.72						
Nailor Industries	**Flow sensor**	0.74		0.73		0.75		0.64						
Pottorff Inc.	**TU-100**			0.85		0.95		0.82	0.91	0.89	0.88			
Reddi-I-Inc.	**Flowmaster**			0.66		0.60		0.61	0.55	0.58	0.65			
Titus Inc.	**Flowcross**	0.92	0.81	0.63	0.61	0.64	0.62	0.63	0.64					
Trane (Rushville)	**Air-valve (ring type)**		0.64	0.60		0.64		0.65	0.65	0.65				
Tempmaster/York	**All VAV, DD round**	0.81	0.76		0.70	0.71		0.65	0.65	0.72	0.73			
Tempmaster/York	**All VAV, DD Oval**													
Warren Tech.	**Kreuter SSS series**			1.00		1.00		1.00	1.00	1.00	1.00			

* Inlet "Low Flow" air sensors should not be used if flow is less than 300 FPM.

NOTE: Refer to Voyager for additional flow coefficient information.

Table 4. Suggested TEC Initial Flow Coefficients for VAV Manufacturer and Box Sizes.

	Air velocity sensor type	Rectangular ductwork (inlet) sizes in inches													
		4x7	4x10	6x9	6x12	6x15	8x11	8x14	8x17	8x20	8x24	9x12	9x14	19(-3)	22(-3)
Anemostat	PX-2 cross, "P" range														
Anemostat	Traverse, "H" range														
Anemostat	PX-2 cross, "Q" range														
Anemostat	Traverse, "L" range														
Carrier	Linear averaging														
Carnes	"Standard sensor"											0.68			
Carnes	"Cross-flow sensor"											0.65			
Continental	AVS model "RSZ"														
E.H. Price	CP101														
***Environmental Tech.	sdr, vfr, cfr													0.61	0.64
Krueger	General sensor														
Metal Ind. Fan powered only.	Fvi, fc, sv, rt, th, ct, dd (6 DO)														
Metal Ind. VAV & dual duct.	fvi, fc, sv, rt, th, ct, dd (6 DO)														
* Metal Ind. Dual duct only.	fvi, fc, sv, rt, th, ct, dd (8 DO)														
Nailor Industries	Flow sensor														
Pottorff Inc.	TU-100														
Reddi-I-Inc.	Flowmaster														
Titus Inc.	Flowcross														
Trane (Rushville)	Air-valve (ring type)														
Tempmaster/York	All VAV, DD round														
**Tempmaster/York	All VAV, DD Oval	0.72	0.73	0.73	0.73	0.72	0.73	0.74	0.72	0.72	0.74				
Warren Tech.	Kreuter SSS series														

* Inlet "Low Flow" air sensors should not be used if flow is less than 300 FPM.
** Tempmaster oval duct area and COF were calculated as rectangular duct shapes.
***ETI 19" has a rectangular area of 2.72 sq/ft. ETI 22" (32.25" X 15.875") rectangular area is 3.555 sq/ft.

NOTE: Refer to Voyager for additional flow coefficient information.

Table 5. Suggested TEC Initial Flow Coefficients for VAV Manufacturer and Box Sizes.

	Air velocity sensor type	Rectangular ductwork (inlet) sizes In Inches									Oval sizes		
		12x14	12x16	12x18	12x28	12x24	16x18	16x24	16x28	20x26	12"	14"	16"
Anemostat	PX-2 cross, "P" range							0.79					
Anemostat	Traverse, "H" range												
Anemostat	PX-2 cross, "Q" range												
Anemostat	Traverse, "L" range												
Carrier	Linear averaging												
Carnes	"Standard sensor"						0.68	0.75					
Carnes	"Cross-flow sensor"						0.70	0.75					
Continental	AVS model "RSZ"												
E.H. Price	CP101		0.76					0.76					
Krueger	General sensor							0.71					
Metal Ind. Fan powered only.	fvi, fc, sv, rt, th, ct, dd												
	(6 DO)												
Metal Ind. VAV & dual duct.	fvi, fc, sv, rt, th, ct, dd	0.56	0.57	0.58	0.62	0.57				0.58	0.50	0.70	0.70
	(6 DO)												
* Metal Ind. Dual duct only	fvi, fc, sv, rt, th, ct, dd									0.60	0.64	0.67	0.68
	(8 DO)												
Nailor Industries	Flow sensor										0.58	0.63	0.68
Pottorff Inc.	TU-100							0.80					
Reddi-I-Inc.	Flowmaster												
Titus Inc.	Flowcross												
Trane(Rushville)	Air-valve (ring type)												
Tempmaster/York	All VAV, DD round												
**Tempmaster/York	All VAV, DD Oval												
Warren Tech.	Kreuter SSS series												

* Inlet "Low Flow" air sensors should not be used if flow is less than 300 FPM.
** Tempmaster oval duct area and COF were calculated as rectangular duct shapes.

NOTE: Refer to Voyager for additional flow coefficient information.

Setting MIN and MAX Airflow Set Points

NOTE: The maximum flow must be greater than or equal to the minimum flow.

1. Set CLG FLOW MIN (Point 31) to the desired minimum cooling airflow set point.
2. Set CLG FLOW MAX (Point 32) to the desired maximum cooling airflow set point.
3. Set HTG FLOW MIN (Point 33) to the desired minimum heating airflow set point.
4. Set HTG FLOW MAX (Point 34) to the desired maximum heating airflow set point.

Enabling the Wall Switch

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

The start-up is complete.

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