Room Pressurization Controller with Humidity Control – Electronic Output

This section presents start-up procedures for the Room Pressurization Controller with Humidity Control – Electronic Output. Refer to Figure 1.

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 balancing, tuning, etc.).

Verify power to controller

Verify that the Room Pressurization Controller with Humidity Control – Electronic 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 *System 600 Maintenance and Troubleshooting Manual* (125-1855) for troubleshooting information.

NOTE: The Controller Interface Software (CIS) used with the Room Pressurization Controller with Humidity Control – Electronic Output firmware revision RW10 or higher must be Rev. 2.0 or greater. Voyager's point database may also be used for start-up.

Verify slave mode application number

1. Verify that the point APPLICATION (number 2) is set to 2394 (slave mode).

2. Display the STARTUP report.

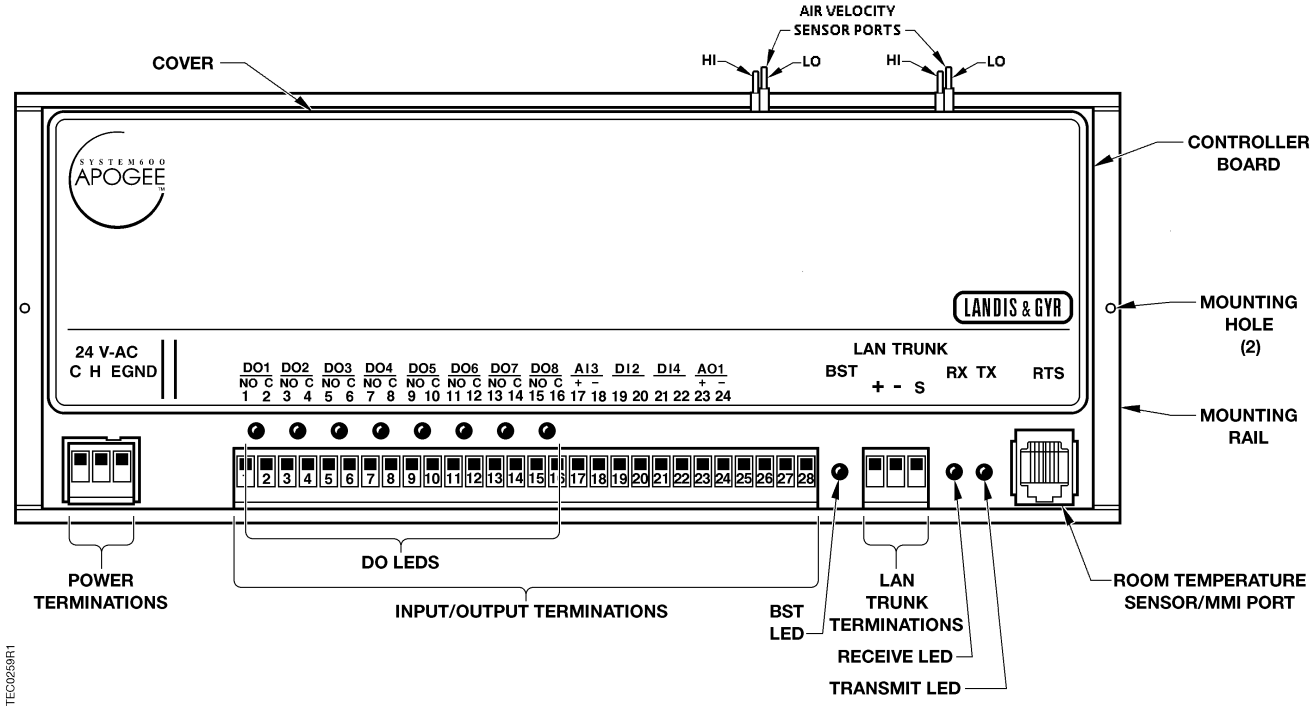

Figure 1. Room Pressurization Controller with Humidity Control – Electronic Output.

Set motor timing and damper actuator rotation angle

The run time of each actuator is indicated by the points MTR1 TIMING (number 51), MTR2 TIMING (number 55), and MTR3 TIMING (number 39).

Follow these steps to set the point(s) for motor timing:

NOTE: Check with the box manufacturer's local representative and/or the terminal box submittals to confirm the damper actuator rotation angle.

1. If Motor 1 and Motor 2 are damper actuators, then use Table 1 to set MTR1 TIMING and MTR2 TIMING.

2. If Motor 3 is a valve actuator, then use Table 2 to set MTR3 TIMING.

Table 1. Damper Actuator Run Time.

Damper Actuator	Setting (seconds)	
	50 Hz	60 Hz
349-0100	113	90
SQR 81.1	155	130

Table 2. Valve Actuator Run Time.

Valve Actuator	Setting (seconds)	
	50 Hz	60 Hz
SQS 82	155	130
Powers VE 339 series actuator with a 1/2 in. (13 mm) stroke (used with Powertop valves)	25	21
Powers VE 339 series actuator with a 3/4 in. (19 mm) stroke[1]	38	32

[1] Settings given are for Johnson and Honeywell valves with a 3/4" stroke. Stroke may be from 1/2" to 3/4", depending on the model. Consult the manufacturer's valve literature for actual stroke and calculate the setting accordingly.

Enable Autozero Modules

If Autozero Modules are used, then enable them by setting the point CAL MODULE (number 87) to YES.

NOTE: For a controller used without Autozero Modules, the damper is commanded closed to get a zero airflow reading during calibration. For a controller used with Autozero Modules, the damper is closed only for the first calibration after controller start-up, initialization, or return from power loss. Every subsequent calibration occurs without closing the damper. Calibration of a hot water valve (if used) is done by commanding the valve to closed. Calibration of the valve is not affected by the presence of Autozero Modules.

Select automatic calibration option

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

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

1. Select the automatic calibration option desired from Table 3 that best meets your job requirements.

2. Set CAL SETUP to the value chosen.

Table 3. CAL SETUP Options.

CAL SETUP Options	Description
0	Calibration occurs ONLY when the point CAL AIR (number 94) is set to YES.
1	Calibration occurs when the field panel commands an occupied/unoccupied or 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 the point CTLR ADDRESS (number 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 occupied/unoccupied or 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 the point CAL TIMER (number 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**.

Set controller address

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

Set the controller address by setting the point CTLR ADDRESS (number 1) to the appropriate number (00-31 if an LCTLR point will be defined for this controller).

Set application

Set the point APPLICATION (number 2) to the appropriate Room Pressurization Controller with Humidity Control – Electronic Output application. Refer to Table 4 for application names and numbers.

Table 4. Room Pressurization Controller with Humidity Control – Electronic Output Applications.

Application	Revision RW10 or higher
Variable Air Volume Room Pressurization with Hot Water Reheat and Relative Humidity Control	2336
Constant Volume Room Pressurization with Hot Water Reheat and Relative Humidity Control	2338
Slave Mode	2394

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 OVERVIEW report appears and the calibration cycle begins.

The air velocity sensor calibration cycle begins within three minutes of an application start-up or initialization, depending on the address. After this delay, the calibration cycle takes from 2 to 5 minutes to complete. The air dampers close during this first calibration.

At the start of the calibration cycle, the controller automatically sets the point CAL AIR (number 94) to YES. When the cycle is complete, it sets CAL AIR to NO.

You must wait until the calibration cycle is complete (CAL AIR is set to NO) before continuing with this start-up procedure.

Enable actuators

The point MTR SETUP (number 58) determines which actuators will be controlled by the application.

The default value for MTR SETUP is 0.

Set MTR SETUP to the appropriate value from Table 5.

Table 5. Motor Enable/Reverse Values for MTR SETUP.

	Motor 1 Enabled			**Motor 1 Enabled and Reversed**			**Motor 1 Not Used**		
	Motor 2 Not Used	**Motor 2 Enabled**	**Motor 2 Enabled and Reversed**	**Motor 2 Not Used**	**Motor 2 Enabled**	**Motor 2 Enabled and Reversed**	**Motor 2 Not Used**	**Motor 2 Enabled**	**Motor 2 Enabled and Reversed**
Motor 3 Not Used	1	5	13	3	7	15	0	4	12
Motor 3 Enabled	17	21	29	19	23	31	16	20	28
Motor 3 Enabled and Reversed	49	53	61	51	55	63	48	52	60

Set override time

Follow these steps to set the override time:

1. Display the STARTUP report.

2. If using night/unoccupied override, then set the point OVRD TIME (number 20) to the number of whole hours that an override should last. If set at zero (the default), then night/unoccupied override is disabled.

Enable wall switch

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

Set fail-safe mode

In the event that either air velocity sensor ceases to function, the point FAIL MODE (number 40) causes the dampers to either fail OPEN or CLOSED. Set FAIL MODE to the fail-safe position desired for the dampers.

Set tracking options

The tracking control strategy is determined by setting the points TRACK MODE (number 3) and TRACKING (number 82).

For set point tracking, set TRACKING to STPT.

When TRACK MODE is set to ETS (Exhaust Tracks Supply), the exhaust volume set point is calculated as the supply volume set point plus/minus the point VOLUME OFFST (number 88).

When TRACK MODE is set to STE (Supply Tracks Exhaust), the supply volume set point is calculated as the exhaust volume set point plus/minus VOLUME OFFST. If TRACK MODE is set to STE, then the flow minimums and maximums will apply to the exhaust flow.

Set TRACK MODE to the appropriate value.

For flow tracking, set TRACKING to FLOW.

When TRACK MODE is set to ETS (Exhaust Tracks Supply), the exhaust volume set point is calculated as the actual supply flow plus/minus VOLUME OFFST.

When TRACK MODE is set to STE (Supply Tracks Exhaust), the supply volume set point is calculated as the actual exhaust flow plus/minus VOLUME OFFST. If TRACK MODE is set to STE, then the flow minimums and maximums will apply to the exhaust flow.

Set TRACK MODE to the appropriate value.

NOTE: Set point tracking provides smoother control. Flow tracking provides an additional safety - if the lead flow (supply if ETS, or exhaust if STE) can not make its set point for mechanical reasons, then the tracking flow will track the actual lead flow and flow differential can be maintained. Flow tracking is more difficult and time consuming to tune.

Set pressure control

Follow these steps to set the pressure control:

CAUTION:

Do not set the point VOLUME OFFST (number 88) greater than the point CTL FLOW MAX (number 77).

1. Set VOLUME OFFST to the flow difference between supply and exhaust required to maintain the specified pressure differential.

2. Set the point POS.NEG (number 25) as follows:

   - If positive pressure is to be maintained, then set POS.NEG to **POS**.
   - If negative pressure is to be maintained, then set POS.NEG to **NEG**.

Set alarm function

Follow these steps to set the alarm function:

1. The alarming function works as follows:

   The point ALARM OUT (number 50) will turn ON if the point ACTUAL OFFST (number 83) is more than the value of the point OFFSET LMT (number 61) away from the point VOLUME OFFST (number 88) (with the correct sign) for longer than the point ALARM DELAY (number 62).

   Example: If VOLUME OFFST = 100 CFM, POS.NEG = NEG, OFFSET LMT = 50, and ALARM DELAY = 20 seconds, then the alarm DO will turn ON if ACTUAL OFFST is above -50 or below -150 CFM for more than 20 seconds.

   Set OFFSET LMT and ALARM DELAY as appropriate.

2. Set the point ACTIVE.NTRAL (number 10) as follows:

   - To enable alarming and positive or negative pressure control, set ACTIVE.NTRAL to **ACTIVE**.
   - To disable alarming and use neutral pressure control, set ACTIVE.NTRAL to **NTRAL**.

Set UNOCC and OCC airflow set points

Application 2338

NOTE: The point UNOCC FLOW (number 31) must be set equal to or less than the point OCC FLOW (number 32).

Follow these steps to set the unoccupied and occupied airflow set points:

1. Set UNOCC FLOW to the desired/specified unoccupied airflow set point.

2. Set OCC FLOW to the desired/specified occupied airflow set point.

For example, if the controller is required to maintain a constant volume of 2500 CFM during occupied mode and 1500 CFM during unoccupied mode, then set OCC FLOW to 2500 CFM and set UNOCC FLOW to 1500 CFM.

NOTE: If the point TRACK MODE (number 3) equals Supply Tracks Exhaust (STE), then these airflow set points apply to the exhaust flow calculations. If the specifications call for the occupied and unoccupied flows to apply to the supply flow and negative pressurization is to be used, then set the occupied and unoccupied flow points higher by the amount of the point
VOLUME OFFST (number 88).

Set MIN and MAX airflow set points

Application 2336

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

Follow these steps to set the minimum and maximum airflow set points:

1. Set the point CLG FLOW MIN (number 31) to the desired/specified minimum cooling airflow set point.

2. Set the point CLG FLOW MAX (number 32) to the desired/specified maximum cooling airflow set point.

3. Set the point HTG FLOW MIN (number 33) to the desired/specified minimum heating airflow set point.

4. Set the point HTG FLOW MAX (number 34) to the desired/specified maximum heating airflow set point.

NOTE: If the point TRACK MODE (number 3) equals Supply Tracks Exhaust (STE), then these minimums and maximums apply to the exhaust flow calculations. If the specifications call for a minimum supply airflow and negative pressurization is to be used, then set the minimums higher than the minimum specified flow by the amount of the point VOLUME OFFST (number 88).

Set duct areas

Set the duct areas 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 of the exhaust duct. Press **<ENTER>**. The software prompts you for the dimensions of the duct.

3. Enter the exhaust duct dimensions as prompted. Press **<ENTER>** after each dimension you enter.

4. At the Duct Dimensions Menu, use the arrow keys to select the applicable duct shape of the supply duct. Press **<ENTER>**. The software prompts you for the dimensions of the duct.

5. Enter the supply duct dimensions as prompted. Press **<ENTER>** after each dimension you enter.

NOTE: When entering the LCTLR point for a Room Pressurization Controller at the field panel, do not enter a duct area. (Choose **N**, for None, when asked for the duct shape.) This controller does not send the value of air volume to the field panel in velocity (FPM). Instead, it uses volume (CFM) so a conversion is not necessary.

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 it is to be used by the controller, then set the point STPT DIAL (number 14) to YES; otherwise, set STPT DIAL to NO.

   Application 2336: NOTE: If STPT DIAL is set to YES, then the points DAY CLG STPT (number 6) and DAY HTG STPT (number 7) will not be used. The value of the point RM STPT DIAL (number 13) will be used.

   Application 2338: NOTE: If STPT DIAL is set to YES, then the points OCC CLG STPT (number 6) and OCC HTG STPT (number 7) will not be used. The value of RM STPT DIAL will be used.

3. If the room temperature sensor has a set point dial and it 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.

4. If there is no set point dial on the room temperature sensor or if the existing set point dial is not to be used, then verify that STPT DIAL is set to NO.

   Set the following points to the appropriate values:

   Application 2336:

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

   Application 2338:

   - OCC CLG STPT (number 6)
   - OCC HTG STPT (number 7)
   - UOC CLG STPT (number 8)
   - UOC HTG STPT (number 9)

Set humidity set point

Set the point ROOM RH STPT (number 16) to the desired value in %.

Set low flow limit

Set the point LOW FLOW (number 84) to the CFM value below which the RH valve is closed.

Disable interaction protection

Set the point RH LIMIT (number 91) to 100%, if monitoring humidity only. Refer to the application description for more information on temperature/humidity interaction protection.

Set up the AO

Set the point AO DIR.REV (number 98) to 1 if the humidity valve is normally open, otherwise leave it at 0.

Set the point AOV1 START (number 56) to the lowest voltage that causes the actuator to move.

Set the point AOV1 SPAN (number 57) to the range, in volts, over which the humidity valve operates.

Set flow coefficients

Follow these steps to set the flow coefficients:

1. Display the BALANCING report.

2. Set the points SUP FLO COEF (number 36) and EXH FLO COEF (number 54) to the appropriate values found in Table 6. This value is a starting point for the air balancer.

Use the following formula to fine tune the flow coefficient:

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 points EXH AIR VOL (number 30) and SUP AIR VOL (number 35) of the TEC. If the TEC volume is not within 2% of the actual volume, then repeat the procedure until it is within 2%.

NOTE: It is extremely important that the flow readings are accurate.

Table 6. Box Manufacturer Flow Coefficients.

Box Manufacturer	Sensor Type	Flow Coefficient
Anemostat	2-pipe sensor without orifice 2-pipe sensor with orifice Spider sensor without orifice Spider sensor with orifice	0.79 0.59 0.73 0.39
Carnes	2-pipe sensor Flow cross	0.66 0.59
Carrier		0.59
Continental Air Products		0.79
E.H. Price		0.78
Environmental Technologies		0.79
Hart & Cooley/Tuttle & Bailey	Flow cross Orifice	0.59 0.73
Krueger		0.68
Metal Aire		0.72
Nailor Industries		0.69
Redd-I-Inc.		0.59
Tempmaster		0.73
Titus		0.60
Trane		0.66

Commissioning

After all the points have been set up, follow these procedures to verify that the application is controlling properly:

1. Confirm that the differential flow control is acceptable at minimum and maximum cooling, by monitoring the point ACTUAL OFFST (number 83).

2. Confirm that the points EXH AIR VOL (number 30) and SUP AIR VOL (number 35) match the true flows (as measured with other instrumentation) at both minimum and maximum cooling.

3. Confirm acceptable pressure control by using a differential pressure sensor, air velocity measurement in cracked doorway, a slip of paper in a cracked doorway, etc. If pressure is not great enough, increase the value of the point VOLUME OFFST (number 88).

4. Confirm that the alarm indication (alarm light or DO8) goes ON when an alarm condition is simulated. (Command one of the flow set points to an out of range value to create an alarm condition.) Confirm that the alarm

indication goes away when the alarm condition is removed (flow set point is released).

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 balancing, tuning, etc.).

Room Pressurization Controller with Humidity Control – Electronic Output start-up is complete.