Application 2268: Dual Duct Variable Air Volume – One Inlet and One Outlet Sensor with Optional Reheat

Overview

In Application 2268, the controller modulates two inlet damper actuators–one for the hot duct and one for the cold duct. In cooling mode, the controller modulates the cold duct damper to maintain the room temperature setpoint and modulates the hot duct damper to ensure minimum airflow. In heating mode, the controller modulates the hot duct damper in order to maintain the room temperature setpoint and modulates the cold duct damper to ensure minimum airflow. If auxiliary heat is used, the controller modulates an optional hot water valve or up to three stages of electric reheat to maintain the room temperature setpoint. See Figure 2268-1 and Figure 2268-2.

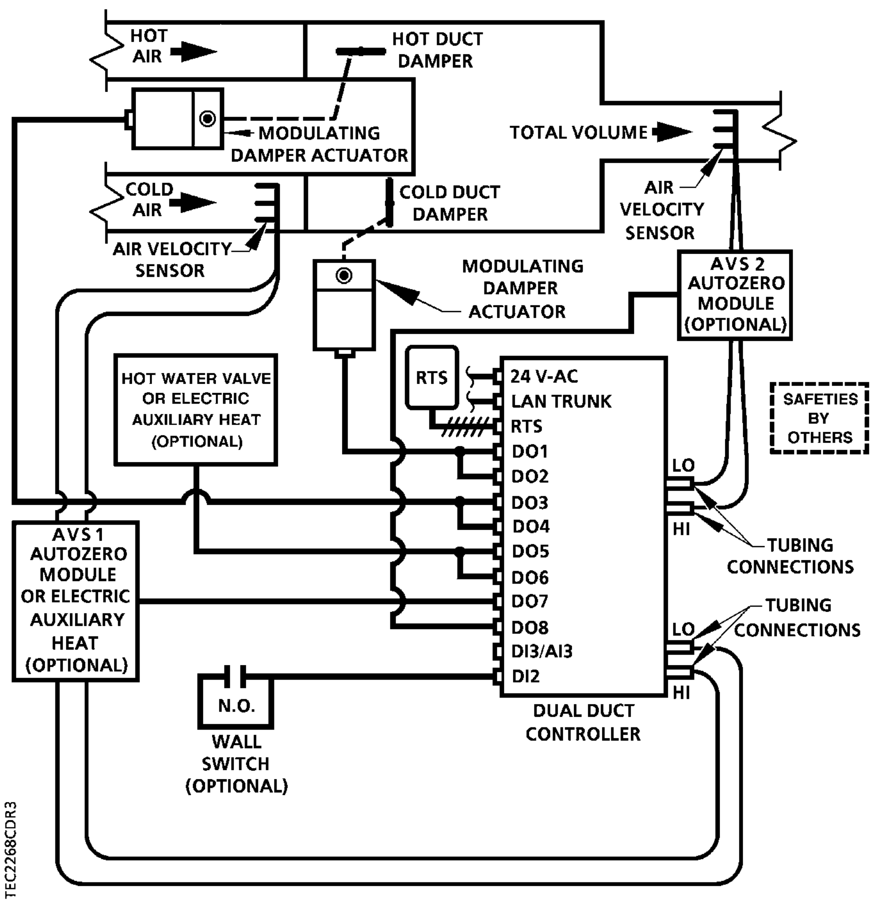
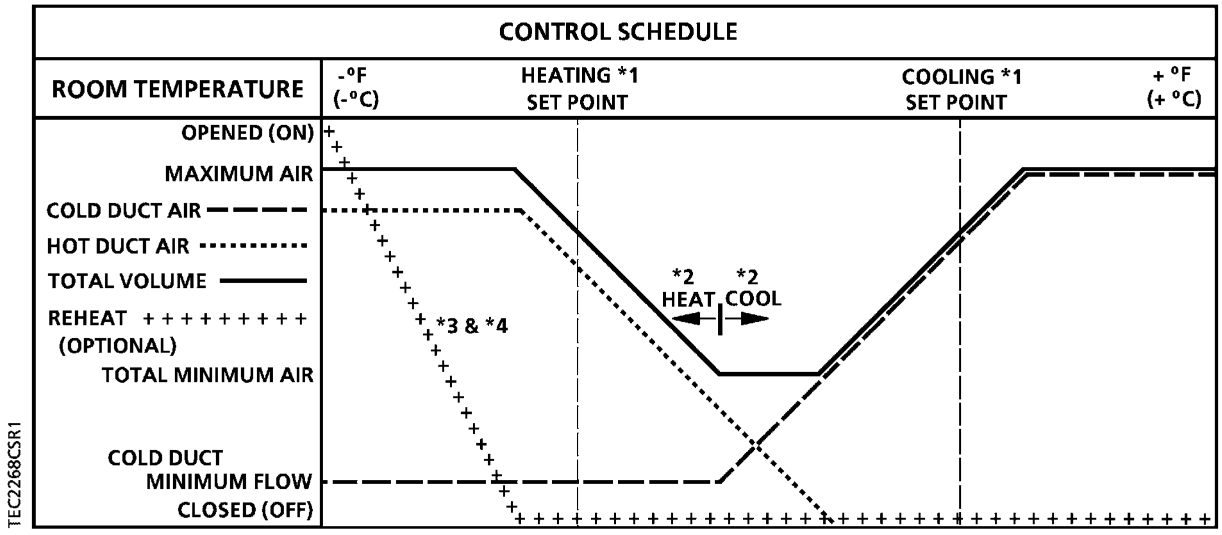


Figure 2268-1. Application 2268 Control Drawing.



1. See Sequence of Operation, Control Temperature Setpoints.
2. See Sequence of Operation, Heating/Cooling Switchover.
3. The reheat can be either a modulating valve or time modulated electric reheat. See Sequence of Operation, Optional Auxiliary Heat.
4. The reheat can be sequenced to operate either in series or in parallel with the hot duct damper. It is shown in series. See Sequencing Logic.

Figure 2268-2. Application 2268 Control Schedule.

Hardware Inputs

Analog

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

Digital

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

Hardware Outputs

Analog

- None

Digital

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

Ordering Notes

Dual Duct Controller–Two Air Velocity Sensors– Electronic Output (540-506)

Dual Duct Controller–Two Air Velocity Sensors– Electronic Output with Autozero Module* (540-507*)

*This controller is used in applications:

- Where it is not possible, due to operational restrictions, to calibrate the air velocity transducer by fully closing the damper (e.g., clean rooms, laboratories),
- When there is a minimum position damper stop.

See *APOGEE Automation Configuration and Sizing Guidelines* on InfoLink for product numbers.

Autozero Modules (optional)

Damper actuator (two required)

Terminal Equipment Controller room temperature sensor

Valve actuator (optional)

Point Database

Table 2268-1 presents the point database information for Application 2268.

Sequence of Operation

The following paragraphs present the sequence of operation for Application 2268, “Dual Duct Variable Air Volume–One Inlet and One Outlet Sensor with Optional Reheat.”

Control Temperature Setpoints

Depending on the controller’s current operational mode (day or night), CTL STPT (Point 92) holds the value of one of the following setpoints:

Day Mode – CTL STPT (Point 92) holds the value of DAY HTG STPT (Point 7) in heating mode or DAY CLG STPT (Point 6) in cooling mode. However, if the room temperature sensor has a setpoint dial and STPT DIAL (Point 14) = YES, CTL STPT holds the value of RM STPT DIAL (Point 13).

If the setpoint dial is used and RM STPT DIAL (Point 13) < RM STPT MIN (Point 11), CTL STPT holds the value of RM STPT MIN. If RM STPT DIAL > RM STPT MAX (Point 12), CTL STPT (Point 92) holds the value of RM STPT MAX.

Night Mode – CTL STPT (Point 92) holds the value of NGT HTG STPT (Point 9) in heating mode or NGT CLG STPT(Point 8) in cooling mode.

NOTE: The value of CTL TEMP (Point 78) is the same as ROOM TEMP (Point 4), unless CTL TEMP is overridden.

Day and Night Modes

The day/night status of the space is determined by the status of DAY.NGT (Point 29). 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 (Figure 2268-1, Figure 2268-4, and Figure 2268-5), and WALL SWITCH (Point 18) = YES, the controller monitors the status of DI 2. When the status of DI 2 (Point 24) is ON (the switch is closed), DAY.NGT (Point 29) will be set to DAY indicating that the controller is in day mode. When the status of DI 2 is OFF (the switch is open), DAY.NGT will be set to NIGHT indicating that the controller is in night mode.

When WALL SWITCH (Point 18) = 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 day mode all the time. If the controller is operating with centralized control (that is, connected to a field panel), the field panel can send an operator or PPCL command to override the status of DAY.NGT (Point 29). See *Powers Process Control Language (PPCL) User’s Manual* (125-1896) and *Field Panel User’s Manual* (125-1895) for more information.

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 (Point 20), 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 (Point 21) changes to DAY. After the override time elapses, the controller returns to night mode and the status of NGT OVRD changes back to NIGHT.

It is only when the controller is in night mode that the override switch on the room temperature sensor will have any effect on the controller.

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 (Point 86), the controller switches from heating to cooling mode by setting HEAT.COOL (Point 5) to COOL:

- HTG LOOPOUT (Point 80) < 5.2%.
- CTL TEMP (Point 78) > CTL STPT (Point 92) by at least the value set in SWITCH DBAND (Point 90).
- CTL TEMP (Point 78) > the appropriate cooling setpoint minus SWITCH DBAND (Point 90).

If AUX HTG USED (Point 82) is set to 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 (Point 79) < 5.2%.
- CTL TEMP (Point 78) < CTL STPT (Point 92) by at least the value set SWITCH DBAND (Point 90).
- CTL TEMP (Point 78) < the appropriate heating setpoint plus SWITCH DBAND (Point 90).

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 (Point 92). See *Control Temperature Setpoints*.

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

NOTE: The following guidelines apply to the control flow set up points, CLG FLOW MAX (Point 32) and TOT FLOW MAX (Point 34):

- Do not set CLG FLOW MAX to 0 cfm (0 lps).
- Do not set TOT FLOW MAX to 0 cfm (0 lps).

The cooling flow loop maintains CLG FLO STPT (Point 93) by modulating the cold duct damper point, CLG DMP CMD (Point 48). During day mode, the cooling flow loop maintains the cold duct airflow between the value of CLG FLOW MIN (Point 91) and the value of CLG FLOW MAX (Point 32). During night mode, the cooling flow loop maintains the cold duct airflow between 0 cfm and the value of CLG FLOW MAX.

CLG FLOW (Point 75) is the input value for the cooling flow loop. It is calculated as a percentage based on where CLG VOLUME (Point 35) is between 0 cfm and the value of CLG FLOW MAX (Point 32).

- If CLG VOLUME (Point 35) = 0 cfm, CLG FLOW (Point 75) is 0%.
- If CLG VOLUME (Point 35) = CLG FLOW MAX (Point 32), CLG FLOW (Point 75) is 100%.

The heating flow loop maintains TOT FLO STPT (Point 85) by modulating the hot duct damper point, HTG DMP CMD (Point 52). During day mode, the heating flow loop maintains the hot duct airflow between 0 cfm and the value of TOT FLOW MAX (Point 34). During night mode, the heating flow loop maintains the hot duct airflow between 0 cfm and TOT FLOW MAX.

TOT FLOW (Point 74) is the input value for the heating flow loop. It is calculated as a percentage based on where the value of TOT VOLUME (Point 30) is between the value of 0 cfm and TOT FLOW MAX (Point 34).

- If TOT VOLUME (Point 30) = 0 cfm, TOT FLOW (Point 74) is 0%.
- If TOT VOLUME (Point 30) = TOT FLOW MAX (Point 34), TOT FLOW (Point 74) is 100%.

Cooling Operation

The output of the cooling loop, CLG LOOPOUT (Point 79), is used to calculate the setpoint for the cooling flow loop, CLG FLO STPT (Point 93). This flow loop maintains the space temperature. The cooling flow loop limits the airflow supplied by the cold duct to the value of CLG FLOW MAX (Point 32). In day mode, the minimum airflow from the cold duct will be CLG FLOW MIN (Point 91). In night mode, the minimum airflow from the cold duct will be 0 cfm. The heating flow loop provides any make up air that is necessary to ensure that the airflow from the dual duct box is at least the value stored in TOT FLOW MIN (Point 33). When the cooling loop provides an airflow equal to or greater than the value of TOT FLOW MIN from the cold duct, the heating flow loop sets HTG DMP CMD (Point 52) to 0% open, causing the hot duct damper to close.

In day cooling mode (HEAT.COOL is set to COOL), the cooling flow loop controls the space temperature using the following calculation (scaling CLG LOOPOUT (Point 79) between CLG FLOW MIN (Point 91) and CLG FLOW MAX (Point 32)):

$$\text{CLG FLO STPT} = \frac{[(\text{CLG FLOW MAX} - \text{CLG FLOW MIN}) * \text{CLG LOOPOUT}] + 100 * \text{CLG FLOW MIN}]}{\text{CLG FLOW MAX}}$$

In night cooling mode, CLG FLO STPT (Point 93) is set to CLG LOOPOUT (Point 79).

Heating Operation

In both day and night heating modes, the value of the TOT FLO STPT (Point 85) depends on the value of HTG LOOPOUT (Point 80). Room temperature control is then done by the heating flow loop and the auxiliary heat working in sequence, simultaneously, or overlapping. See *Sequencing Logic* for more information.

In heating mode, the cooling flow loop is used to provide any additional air needed in order to ensure that the airflow out of the dual duct box is at least the same as the value stored in TOT FLOW MIN (Point 33). If the hot duct is unable to provide enough flow so that the total flow is equal to, or greater than, the TOT FLOW MIN, the cooling flow damper will open to make up the difference.

In day heating mode, the hot duct damper modulates the total flow to be between CLG FLOW MAX (Point 32) and either TOT FLOW MIN (Point 33) or CLG FLOW MIN (Point 91), whichever is greater. The cold duct damper is set to provide the cooling flow minimum.

Optional Auxiliary Heat

If AUX HTG USED (Point 82) = YES, this application also controls auxiliary heat. The value of AUX HTG TYPE (Point 83) indicates the type of auxiliary heat control. If AUX HTG USED = NO, no auxiliary heat is used.

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.

When using electric heat, do not set TOT FLOW MIN (Point 33) to zero.

Hot Water Auxiliary Heat – If AUX HTG TYPE (Point 83) = HW, the application controls auxiliary hot water heat. The heating loop modulates the heating valve point, VALVE COMD (Point 37) 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 (Point 83) = 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 (Point 88) must be set equal to the number of stages of electric reheat being used.

Example

If the duty cycle is 10 minutes (STAGE TIME (Point 89) is set to 10 minutes) and the heating loop is calling for 60% of heating (HTG LOOPOUT (Point 80) is set to 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 or less stages are used, Autozero Modules can be used.

Sequencing Logic (optional)

In heating mode, this application includes logic that allows the flow loop to operate either in sequence, parallel, or overlapping with the auxiliary reheat. This algorithm is very similar to the spring range sequencing of valves and dampers. Portions of the output of the heating loop, HTG LOOPOUT (Point 80), will drive both the flow loop setpoint and the auxiliary heat (if used) from 0 to 100%. See the following three examples. For simplicity, assume that in these examples:

- TOT FLOW MIN (Point 33) = 0 cfm
- AUX HTG USED (Point 82) = YES
- AUX HTG TYPE (Point 83) = HW, and there is a hot water valve for auxiliary heat. (When this is done, CLG FLO STPT (Point 93) will equal 0 when HTG LOOPOUT (Point 80) = 0).

The ladder diagrams in Figure 2268-3 shows sequenced, parallel, and overlapping flow loop operations with auxiliary reheat. The vertical bars show the output of heating loopout from 0 to 100%. The horizontal bars (reheat start, flow start, etc.) show the action that occurs when the loop output rises above the horizontal bar. The relative positions shown on the graphs are for illustration purposes only and may differ from the examples.

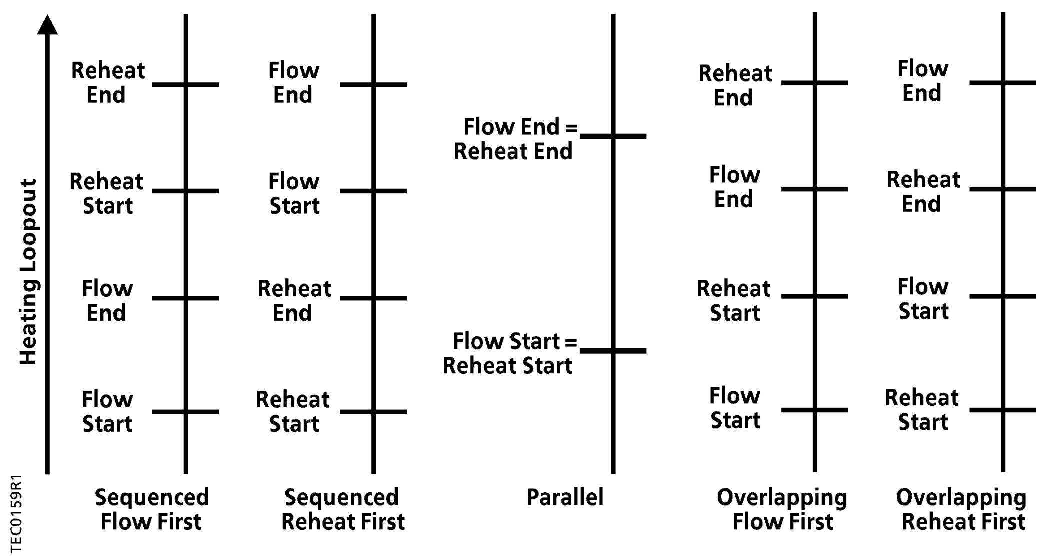


Figure 2268-3. Sequenced, Parallel, and Overlapping Flow Loop Operations with Reheat.

Example 1

Assume that your system has a hot water valve that is to operate in *sequence* with the flow loop. If,

- FLOW START (Point 16) = 0%
- FLOW END (Point 17) = 50%
- REHEAT START (Point 22) = 50%
- REHEAT END (Point 23) = 100%

then,

- When HTG LOOPOUT (Point 80) = 0%, CLG FLO STPT (Point 93) = 0% flow.
- When HTG LOOPOUT (Point 80) = 25%, CLG FLO STPT (Point 93) = 50% flow.
- When HTG LOOPOUT (Point 80) ≥ 50%,CLG FLO STPT (Point 93) = 100% flow.
- When HTG LOOPOUT (Point 80) ≤ 50%, VALVE COMD (Point 37) = 0% open.
- When HTG LOOPOUT (Point 80) = 75%, VALVE COMD (Point 37) = 50% open.
- When HTG LOOPOUT (Point 80) = 100%, VALVE COMD (Point 37) = 100% open.

Example 2

Assume that your system has a hot water valve that is to operate in *parallel* with the flow loop. If,

- FLOW START (Point 16) = 0%
- FLOW END (Point 17) = 100%
- REHEAT START (Point 22) = 0%
- REHEAT END (Point 23) = 100%

then,

- When HTG LOOPOUT (Point 80) = 0%, CLG FLO STPT (Point 93) = 0% flow.
- When HTG LOOPOUT (Point 80) = 50%, CLG FLO STPT (Point 93) = 50% flow.
- When HTG LOOPOUT (Point 80) = 100%, CLG FLO STPT (Point 93) = 100% flow.
- When HTG LOOPOUT (Point 80) = 0%, VALVE COMD (Point 37) = 0% open.
- When HTG LOOPOUT (Point 80) = 50%, VALVE COMD (Point 37) = 50% open.
- When HTG LOOPOUT (Point 80) = 100%, VALVE COMD (Point 37) = 100% open.

Example 3

Assume that your system has a hot water valve that is to operate *overlapping* with the flow loop. If,

- FLOW START (Point 16) = 0%
- FLOW END (Point 17) = 75%
- REHEAT START (Point 22) = 25%
- REHEAT END (Point 23) = 100%

then,

- When HTG LOOPOUT (Point 80) = 0%, CLG FLO STPT (Point 93) = 0% flow.
- When HTG LOOPOUT (Point 80) = 37.5%, CLG FLO STPT (Point 93) = 50% flow.
- When HTG LOOPOUT (Point 80) ≥ 75%, CLG FLO STPT (Point 93) = 100% flow.
- When HTG LOOPOUT (Point 80) ≤ 25%, VALVE COMD (Point 37) = 0% open.
- When HTG LOOPOUT (Point 80) = 62.5%, VALVE COMD (Point 37) = 50% open.
- When HTG LOOPOUT (Point 80) = 100%, VALVE COMD (Point 37) = 100% open.

Another option that the sequencing logic provides is to have the flow loop provide an airflow equal to TOT FLOW MIN (Point 33) throughout the heating mode with all of the temperature control being done by the hot water valve(s). The airflow minimum will be maintained by setting the FLOW START (Point 16) and FLOW END (Point 17) to 0% which will cause CLG FLO STPT (Point 93) to hold the value corresponding to minimum flow throughout the entire heating mode, regardless of the value of HTG LOOPOUT (Point 80).

Calibration

Air Velocity Transducer – Calibration of the controller's internal air velocity transducers is periodically required to maintain accurate air velocity readings. CAL SETUP (Point 95) is set with the desired calibration option during controller start-up. Depending upon the value of CAL SETUP, calibration may be set to take place automatically or manually when the override switch is pressed on the room temperature sensor. If the value of CAL AIR (Point 94) is YES, calibration is in progress.

- For a controller used without Autozero Modules (CAL MODULE (Point 87) = NO), the dampers are commanded closed simultaneously to get zero airflow readings during calibration.
- For a controller used with Autozero Modules (CAL MODULE (Point 87) = YES), calibration occurs without closing the dampers.

NOTE: The first time after start-up 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.

Hot Water Valve – Calibration of a hot water valve (if used) is performed simultaneously with calibration of the air velocity transducers and is accomplished by commanding the valve closed. Calibration of the valve is not affected by the presence of Autozero Modules.

At the end of a calibration sequence, CAL AIR (Point 94) returns to NO automatically. A value 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 (Point 87) is set to YES.

Damper Status Operation

Under normal operation DMPR STATUS (Point 84) reads CAL. However, when using Autozero Modules, it is possible after a period of operation for the calculated damper position points, CLG DMP POS (Point 49) and HTG DMP POS (Point 53), to differ from the actual (physical) damper position.

If this occurs, the controller will *automatically* compensate for any difference by setting DMPR STATUS (Point 84) to RECAL which readjusts the value of the damper position points.

DMPR STATUS (Point 84) will be set to RECAL and the cooling damper will be adjusted if the following conditions are true:

- CLG DMP POS (Point 49) and HTG DMP POS (Point 53) = 100%
- Cooling air velocity (CLG VOLUME (Point 35) ÷ CLGDUCT AREA (Point 97)) > 200 fpm (1.016 meters per second)
- CLG FLOW (Point 75) < CLG FLO STPT (Point 93)

- or -

- CLG DMP POS (Point 49) and HTG DMP POS (Point 53) = 0%
- Cooling air velocity (CLG VOLUME (Point 35) ÷ CLGDUCT AREA (Point 97)) > 200 fpm (1.016 meters per second)
- CLG FLOW (Point 75) > CLG FLO STPT (Point 93)

DMPR STATUS (Point 84) will be set to RECAL and the heating damper will be adjusted if the following conditions are true:

- CLG DMP POS (Point 49) and HTG DMP POS (Point 53) = 100%
- Total air velocity (TOT VOLUME (Point 30) ÷ TOTDUCT AREA (Point 60)) > 200 fpm (1.016 meters per second)
- TOT FLOW (Point 74) < TOT FLO STPT (Point 85)

- or -

- CLG DMP POS (Point 49) and HTG DMP POS (Point 53) = 0%
- Total air velocity (TOT VOLUME (Point 30) ÷ TOTDUCT AREA (Point 60)) > 200 fpm (1.016 meters per second)
- TOT FLOW (Point 74) > TOT FLO STPT (Point 85)

If DMPR STATUS (Point 84) has been changed to RECAL in response to one of the conditions described above, do one of the following:

1. If both flows are now being properly controlled, set DMPR STATUS to CAL and release it.
2. If one of the flows is still not being properly controlled (that is, one of the conditions described above is still present) or if it is important that the damper positions be accurate, initialize the controller.

If these steps do not fix the problem of maintaining either flow, a mechanical problem, such as insufficient airflow or static pressure, might exist.

Fail-safe Operation

If the air velocity sensor point, TOT VOLUME (Point 30) is failed, or if both air velocity sensor points (TOT VOLUME and CLG VOLUME (Point 35)) are failed, damper control depends on the status of HEAT.COOL (Point 5).

- If HEAT.COOL (Point 5) reads HEAT, the following occurs:
  - HTG DMP CMD (Point 52) is set equal to the total flow setpoint, TOT FLO STPT (Point 85),
  - CLG DMP CMD (Point 48) is set equal to 100% minus TOT FLO STPT (Point 85).

  This causes the hot duct and the cold duct dampers to be controlled as pressure dependent dampers by the heating temperature loop.
- If HEAT.COOL (Point 5) reads COOL, the following occurs:
  - CLG DMP CMD (Point 48) is set equal to the output of the cooling loop, CLG LOOPOUT (Point 79),
  - HTG DMP CMD (Point 52) is set equal to 100% minus CLG LOOPOUT (Point 79).

  This causes the hot duct and the cold duct dampers to be controlled as pressure dependent dampers by the cooling temperature loop.

If only the air velocity sensor point CLG VOLUME (Point 35) is failed, the heating damper is controlled normally. Control of the cold duct damper depends on the status of HEAT.COOL (Point 5) as follows:

- If HEAT.COOL (Point 5) reads HEAT, CLG DMP CMD (Point 48) is set to 0% open closing the cold duct damper.
- If HEAT.COOL (Point 5) reads COOL, CLG DMP CMD (Point 48) is set equal to the output of the cooling loop, CLG LOOPOUT (Point 79).

  This causes the cold duct damper to be controlled as a pressure dependent damper by the cooling temperature loop.

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

Application Notes

1. If temperature swings in the room are excessive or there is trouble maintaining the setpoint, the cooling loop, the heating loop, or both need to be tuned. If CLG FLOW (Point 75) is oscillating while CLG FLO STPT (Point 93) is constant, the cooling flow loop requires tuning. If TOT FLOW (Point 74) is oscillating while TOT FLO STPT (Point 85) is constant, the heating flow loop requires tuning. See *APOGEE Automation Service Procedures* on InfoLink for more information.

2. The Dual Duct Controller–Two Air Velocity Sensors–Electronic Output, as shipped from the factory, keeps all associated equipment OFF. See the Equipment Controllers tab in *APOGEE Automation Start-up Procedures* on InfoLink for information on how to release the controller and its equipment to application control.

3. 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.

Wiring Diagrams

Figure 2268-4 and Figure 2268-5 present the point wiring for Application 2268.

CAUTION:

The controller's DOs control 24 Vac loads only. The maximum rating is 12 VA for each DO. Use an interposing 220V 4-relay module 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

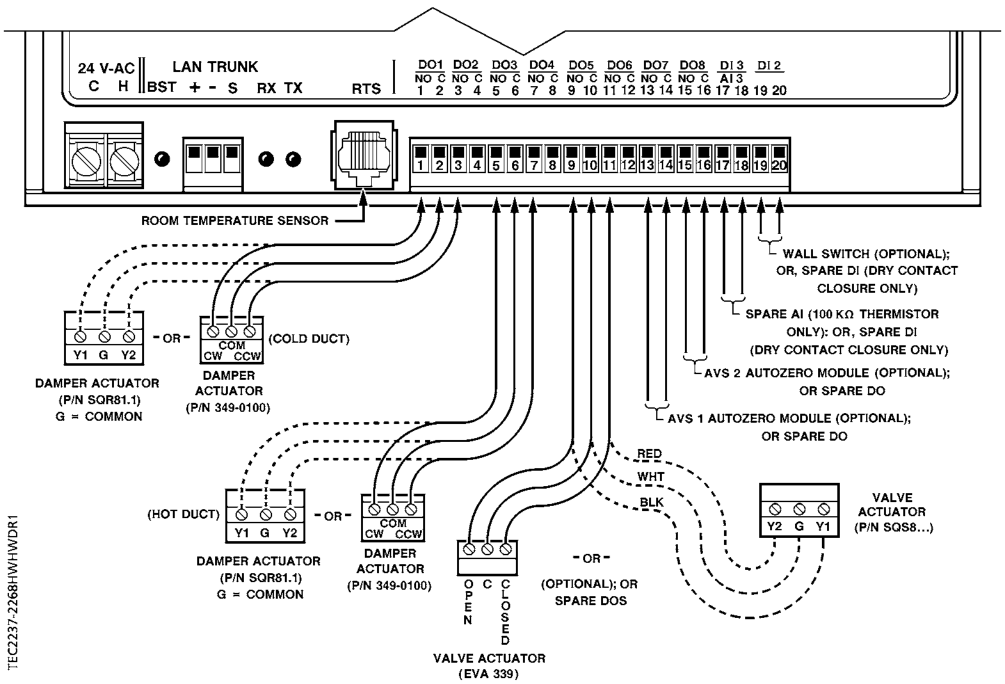


Figure 2268-4. Application 2268 Wiring Diagram with Hot Water Reheat.

CAUTION:

The controller's DOs control 24 Vac loads only. The maximum rating is 12 VA for each DO. Use an interposing 220V 4-relay module 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

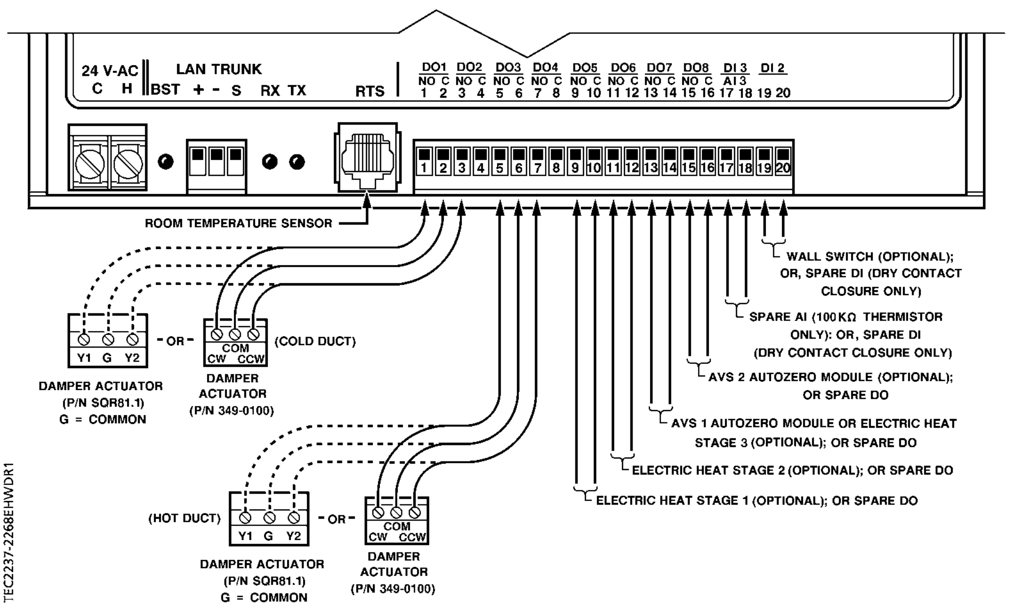


Figure 2268-5. Application 2268 Wiring Diagram with Electric Auxiliary Reheat.

Table 2268-1. Point Database for Application 2268.

Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
01	CTLR ADDRESS	99.000	–	1.000	0.000	–	–
02	APPLICATION	2293	–	1.000	0.000	–	–
{04}	ROOM TEMP	74.000 (23.449)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
{05}	HEAT.COOL	COOL	–	–	–	HEAT	COOL
06	DAY CLG STPT	74.000 (23.449)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
07	DAY HTG STPT	70.000 (21.209)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
08	NGT CLG STPT	82.000 (27.929)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
09	NGT HTG STPT	65.000 (18.409)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
11	RM STPT MIN	55.000 (12.809)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
12	RM STPT MAX	90.000 (32.409)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
{13}	RM STPT DIAL	74.000 (23.449)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
14	STPT DIAL	NO	–	–	–	YES	NO
{15}	AUX TEMP	74.000 (23.496)	DEG F (DEG C)	0.500 (0.280)	37.500 (3.056)	–	–
16	FLOW START	0.000	PCT	0.400	0.000	–	–
17	FLOW END	100.000	PCT	0.400	0.000	–	–
18	WALL SWITCH	NO	–	–	–	YES	NO
{19}	DI OVRD SW	OFF	–	–	–	ON	OFF
20	OVRD TIME	0.000	HRS	1.000	0.000	–	–
{21}	NGT OVRD	NIGHT	–	–	–	NIGHT	DAY
22	REHEAT START	50.000	PCT	0.400	0.000	–	–
23	REHEAT END	100.000	PCT	0.400	0.000	–	–
{24}	DI 2	OFF	–	–	–	ON	OFF
{25}	DI 3	OFF	–	–	–	ON	OFF
26	TOTFLO PGAIN	0.000	–	0.250	0.000	–	–

1. Points not listed are not used in this application.
2. A single value in a column means that the value is the same in English units and in SI units.
3. Point numbers that appear in brackets { } may be unbundled at the field panel.

continued on the next page…

Table 2268-1. Point Database for Application 2268.

Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
27	TOTFLO IGAIN	0.018	–	0.006	0.000	–	–
28	TOTFLO DGAIN	0.000	–	2.000	0.000	–	–
{29}	DAY.NGT	DAY	–	–	–	NIGHT	DAY
{30}	TOT VOLUME	0.000	CFM (LPS)	4.000 (1.8876)	0.000	–	–
{32}	CLG FLOW MAX	2200.000 (1038.180)	CFM (LPS)	4.000 (1.8876)	0.000	–	–
{33}	TOT FLOW MIN	220.000 (103.818)	CFM (LPS)	4.000 (1.8876)	0.000	–	–
{34}	TOT FLOW MAX	2200.000 (1038.180)	CFM (LPS)	4.000 (1.8876)	0.000	–	–
{35}	CLG VOLUME	0.000	CFM (LPS)	4.000 (1.8876)	0.000	–	–
36	CLG FLO COEF	1.000	–	0.010	0.000	–	–
{37}	VALVE COMD	0.000	PCT	0.400	0.000	–	–
{38}	VALVE POS	0.000	PCT	0.400	0.000	–	–
39	MTR3 TIMING	130.000	SEC	1.000	0.000	–	–
{41}	DO 1	OFF	–	–	–	ON	OFF
{42}	DO 2	OFF	–	–	–	ON	OFF
{43}	DO 3	OFF	–	–	–	ON	OFF
{44}	DO 4	OFF	–	–	–	ON	OFF
{45}	DO 5	OFF	–	–	–	ON	OFF
{46}	DO 6	OFF	–	–	–	ON	OFF
{47}	DO 7	OFF	–	–	–	ON	OFF
{48}	CLG DMP CMD	0.000	PCT	0.400	0.000	–	–
{49}	CLG DMP POS	0.000	PCT	0.400	0.000	–	–
{50}	DO 8	OFF	–	–	–	–	–
51	MTR1 TIMING	95.000	SEC	1.000	0.000	–	–
{52}	HTG DMP CMD	0.000	PCT	0.400	0.000	–	–
{53}	HTG DMP POS	0.000	PCT	0.400	0.000	–	–
54	TOT FLO COEF	1.000	–	0.010	0.000	–	–

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2. A single value in a column means that the value is the same in English units and in SI units.
3. Point numbers that appear in brackets { } may be unbundled at the field panel.

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Table 2268-1. Point Database for Application 2268.

Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
55	MTR2 TIMING	95.000	SEC	1.000	0.000	–	–
56	DPR1 ROT ANG	90.000	–	1.000	0.000	–	–
57	DPR2 ROT ANG	90.000	–	1.000	0.000	–	–
58	MTR SETUP	0.000	–	1.000	0.000	–	–
59	DO DIR.REV	0.000	–	1.000	0.000	–	–
60	TOTDUCT AREA	1.000 (0.093)	SQ. FT (SQ. M)	0.025 (0.002323)	0.000	–	–
63	CLG P GAIN	20.000 (36.000)	–	0.250 (0.140)	0.000	–	–
64	CLG I GAIN	0.012 (0.022)	–	0.006 (0.0108)	0.000	–	–
65	CLG D GAIN	0.000	–	2.000 (3.600)	0.000	–	–
66	CLG BIAS	50.000	PCT	0.400	0.000	–	–
67	HTG P GAIN	10.000 (18.000)	–	0.250 (0.140)	0.000	–	–
68	HTG I GAIN	0.012 (0.022)	–	0.006 (0.0108)	0.000	–	–
69	HTG D GAIN	0.000	–	2.000 (3.600)	0.000	–	–
70	HTG BIAS	50.000	PCT	0.400	0.000	–	–
71	CLGFLO PGAIN	0.000	–	0.250	0.000	–	–
72	CLGFLO IGAIN	0.018	–	0.006	0.000	–	–
73	CLGFLO DGAIN	0.000	–	2.000	0.000	–	–
{74}	TOT FLOW	0.000	PCT	1.000	0.000	–	–
{75}	CLG FLOW	0.000	PCT	1.000	0.000	–	–
{78}	CTL TEMP	74.000 (23.449)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
{79}	CLG LOOPOUT	50.000	PCT	0.400	0.000	–	–
{80}	HTG LOOPOUT	0.000	PCT	0.400	0.000	–	–
{81}	AVG HEAT OUT	0.000	–	2.000	0.000	–	–
82	AUX HTG USED	NO	–	–	–	YES	NO
83	AUX HTG TYPE	ELEC	–	–	–	ELEC	HW

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

Table 2268-1. Point Database for Application 2268.

Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
{84}	DMPR STATUS	CAL	–	–	–	RECAL	CAL
{85}	TOT FLO STPT	0.000	PCT	1.000	0.000	–	–
86	SWITCH TIME	10.000	MIN	1.000	0.000	–	–
87	CAL MODULE	NO	–	–	–	YES	NO
88	STAGE COUNT	1.000	–	1.000	0.000	–	–
89	STAGE TIME	10.000	MIN	1.000	0.000	–	–
90	SWITCH DBAND	1.000 (0.560)	DEG F (DEG C)	0.250 (0.140)	0.000	–	–
{91}	CLG FLOW MIN	220.000 (103.818)	CFM (LPS)	4.000 (1.8876)	0.000	–	–
{92}	CTL STPT	74.000 (23.449)	DEG F (DEG C)	0.250 (0.140)	48.000 (8.889)	–	–
{93}	CLG FLO STPT	0.000	PCT	1.000	0.000	–	–
{94}	CAL AIR	NO	–	–	–	YES	NO
95	CAL SETUP	4.000	–	1.000	0.000	–	–
96	CAL TIMER	12.000	HRS	1.000	0.000	–	–
97	CLGDUCT AREA	1.000 (0.093)	SQ. FT (SQ. M)	0.025 (0.002323)	0.000	–	–
98	LOOP TIME	5.000	SEC	1.000	0.000	–	–
{99}	ERROR STATUS	0.000	–	1.000	0.000	–	–

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