SIEMENS

Dual Duct - Two Air Velocity Sensors

Application 67

Start-up Procedures

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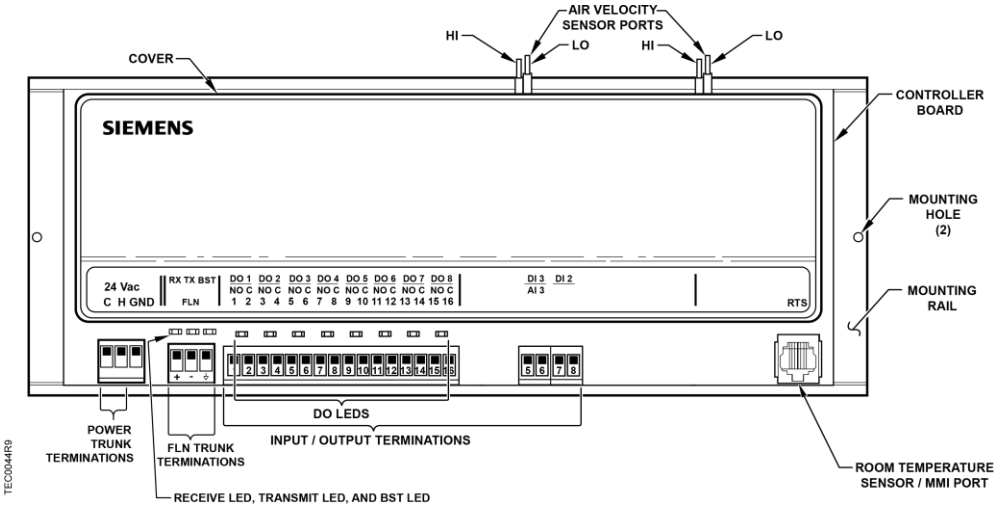
Before You Begin



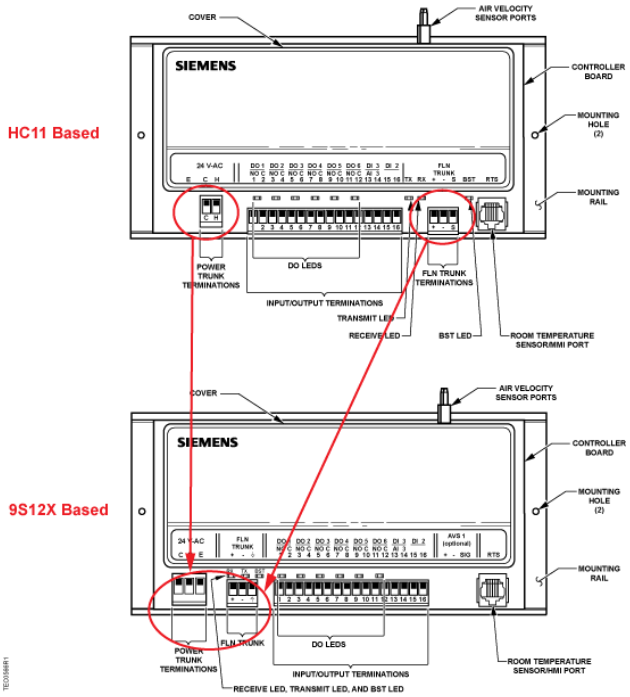
Generic Controller I/O Layout. See *Wiring Diagram* for application specific details.

Communication and DO Indicators

The Siemens TEC Dual Duct Controller - Two Air Velocity Sensors has LEDs to indicate communication (yellow) and DO (digital output) status BST (yellow).

Retrofitting a Controller

1. Disconnect the FLN from the existing TEC(s).
2. Apply power to the new TEC(s), do not connect the FLN.
3. Using WCIS, change the application number and address.
4. Verify subpoints only have default values.
5. Connect FLN trunk to the TEC(s).
6. Verify, initial values downloaded from the field panel.
7. From the workstation, verify communication.



Terminal location changes (example).

Verifying Power to the Controller

Verify that the controller 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, see the *iKnow Troubleshooting Tool* or contact Technical Support for troubleshooting information.

Verifying Slave Mode Application

1. Verify that APPLICATION is set to 67for Rev. DD06
2. Display the STARTUP report.

Enabling Actuators

⚠	**CAUTION**
	The controller's DOs control only 24 Vac loads. The maximum rating is 12 VA for each DO.

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

The points that determine actuator run times are:

- MTR 1 TIMING
- MTR 2 TIMING
- MTR 3 TIMING

Your application may not have or use all three points.

1. Use the Table *Damper Actuator Run Time* and/or the Table *Valve Actuator Run Time* to set run time(s) for the actuator(s) used by your application.
2. For damper rotation angles other than 90°, set points to the appropriate value. The names of these points vary. (PTS4 rotation angle is 90°.)

- If Motor 3 is a valve actuator, use the *Valve Actuator Run Time* to set MTR 3 TIMING.

Damper Actuator Run Time		
Damper	**Setting (seconds)**	
Actuator	50 Hz	60 Hz
GDE131.1	125	90
GLB131.1	150	125
PTS4 electronic-to- pneumatic transducer from ACT	-	90

Valve Actuator Run Time		
	Setting (seconds) [1]	
Valve Actuator	50 Hz	60 Hz
SSB81U, floating control fail in place	180	150
SSC81U, floating control fail in place	150	125
SSC81.5U, floating control fail-safe	125	125
SQS85.53U, floating control spring return	35	30

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.

Specifying Motor Setup

MTR SETUP determines which actuators are controlled by the application and whether they are direct or reverse acting.

Standard Configuration

Set MTR SETUP according to the Table *MTR SETUP Value for Most Common Configurations*.

NOTE:
The assumptions for this table are:
- Dampers are Normally Closed (NC)
- Heating valves are Normally Open (NO)

MTR SETUP Value for Most Common Configurations.				
Applications	Configurations			Value for MTR SETUP
	Motor 1	Motor 2	Motor 3	
all applications with valve	cooling damper (normally closed)	heating damper (normally closed)	heating valve (normally open)	53
all applications without valve	cooling damper (normally closed)	heating damper (normally closed)	spare	5

Non-Standard Configuration

If your application does not use one of the listed actuators in the Table *MTR SETUP Value for Most Common Configurations*, if one of your actuators has a different normal position than that listed in the Table *MTR SETUP Value for Most Common Configurations*, or if you want to use a spare motor, use the Table *Motor Enable/Reverse Value for MTR SETUP* to set MTR SETUP.

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

Verifying Actuator Setup

1. Command all actuators closed. Verify that they close and remain closed. If not, adjust the setting for MTR SETUP according to Table *MTR SETUP Values*.
2. If any of the actuators still do not close completely, then the actuators have been installed or set up incorrectly. See the Siemens TEC Dual Duct Controller - Two Air Velocity Sensors Installation Instructions (540-1022), the iKnow Troubleshooting Tool, or contact Field Support.

Setting the Application

Set APPLICATION to the Dual Duct 2 AVS Controller application.

Application Description	Revision DD06
VAV - with Two Inlet Sensors with Optional Reheat	67
Slave Mode	93

After you set the application, the controller goes 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, continue with the following procedures.

Setting Auxiliary Heat Options

1. If not using auxiliary heat (hot water or electric), set AUX HTG USED to **NO** and skip to Setting Hot and Cold Duct Temperatures [→ 10].
2. If using auxiliary heat (hot water or electric), set AUX HTG USED to **YES**.
3. If the auxiliary heat is hot water, then set AUX HTG TYPE to **HW** and skip to Setting Hot and Cold Duct Temperatures [→ 10].
4. If the auxiliary heat is electric, set AUX HTG TYPE to **ELEC**.

Setting Stages of Electric Reheat

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

	⚠ CAUTION
	If using electric reheat, do not set TOT FLOW MIN to 0 cfm (0 lps). Equipment damage may occur if the electric heat is on while the box is controlling at a total flow minimum of 0 cfm (0 lps).

Enabling Autozero Module

If an Autozero Module is used, enable it by setting CAL MODULE to **YES**.

	⚠ CAUTION
	If an Autozero Module is used, do not enable MTR3 (valve 2).

NOTE:
For a controller without an Autozero Module, the damper is commanded closed to get a zero airflow reading during calibration. For a controller with an Autozero Module, the damper is closed only for the first calibration after controller initialization or power up.

Selecting Automatic Calibration Option

1. Using the following table, set CAL SETUP to the value that best meets your job requirements.
2. If appropriate, change CAL TIMER from the default of 12 hours. This setting applies only if your choice for CAL SETUP includes Option 4.

NOTE:
The air velocity sensor should 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.

CAL SETUP Options.	
CAL SETUP (value)	**Description**
0	Calibration occurs ONLY when the point CAL AIR 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 the point CTLR ADDRESS divided by 4. 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 pressed.
4 (factory default value)	Calibration occurs on the time interval set in the point CAL TIMER. **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. See the example in Option 1.

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

Setting Room Temperature Setpoints

- Day (or OCC) cooling setpoint: DAY CLG STPT
- Day (or OCC) heating setpoint: DAY HTG STPT
- Night (or UOC) cooling setpoint: NGT CLG STPT
- Night (or UOC) heating setpoint: NGT HTG STPT

1. If the room temperature sensor has a setpoint dial that will be used, set STPT DIAL to **YES**. Otherwise, set STPT DIAL to **NO**.
   - Set RM STPT MIN and RM STPT MAX for the minimum and maximum allowable room temperature setpoint values, respectively. Valid values range from 55° to 95°F (13° to 35°C). Default values are 55°F (13°C) for RM STPT MIN and 90°F (32°C) for RM STPT MAX.
2. Setpoint dial configured with a heating/cooling deadband (default).

- To allow the controller to operate with a heating/cooling deadband (functioning the same as provided when the setpoint dial is not present), use the following configuration:
- Set the DAY HTG STPT less than the DAY CLG STPT by the deadband (or zero energy band) that is desired. (for example, DAY HTG STPT = 70°F; DAY CLG STPT = 74°F, providing a deadband of 4 degrees). Only the difference between these values is used to determine the setpoint that will be used.
- As described below, the setpoint(s) for heating/cooling will be 1/2 of the deadband above or below the setpoint dial value.

⇨ When HEAT.COOL equals HEAT, then:
⇨ CTL STPT will equal RM STPT DIAL – 0.5 * (DAY CLG STPT – DAY HTG STPT) and will be limited by RM STPT MIN and RM STPT MAX.
⇨ When HEAT.COOL equals COOL, then:
⇨ CTL STPT will equal RM STPT DIAL + 0.5 * (DAY CLG STPT – DAY HTG STPT) and will be limited by RM STPT MIN and RM STPT MAX.
NOTE: A space where the deadband is used can be more energy efficient than a space where the deadband is not being used.

3. Setpoint dial configured for zero heating/cooling deadband.
   - When the job specification requires a common heating and cooling temperature setpoint, use the following configuration:
   - Set DAY HTG STPT equal to DAY CLG STPT. This will configure the setpoint deadband equal to zero.
   - If a setpoint deadband equals zero, then:
     CTL STPT will equal RM STPT DIAL, and will be limited by RM STPT MIN and RM STPT MAX.
     NOTE: A space where the heating/cooling deadband is zero may be more comfortable than a space where the deadband is being used, but may use more energy.
4. Set the room temperature setpoints to the desired values. Heating setpoints are not present in cooling only applications.

Setting Override Time

If using night/unoccupied override, set OVRD TIME to the number of whole hours that an override should last. If OVRD TIME equals 0 (default), this feature is disabled.

Enabling Wall Switch

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

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

Setting Fail Mode

In the event that either air velocity sensor ceases to function, FAIL MODE causes the dampers to either **OPEN** or **CLOSE**. Set FAIL MODE to the fail-safe position desired for the dampers.

Setting Duct Area

If provided, enter the duct area (sq ft or sq m) into DUCT AREA and HTGDUCT AREA and continue to *Setting Flow Coefficient*.

If you do not know the duct area, use the following table:

Area =	Round Duct	Rectangular Duct
Area in Sq. Ft.	$(\pi \times R^2)/144$ (where π = 3.14 and R = radius of duct in inches)	Width x Height/144 (in inches)
Area in Sq. M	$(\pi \times R^2)/10{,}000$ (where π = 3.14 and R = radius of duct in centimeters)	Width x Height/10,000 (in centimeters)

Setting Flow Coefficient

1. Set CLG FLO COEFF and HTG FLO COEFF to the appropriate value found in *Box Manufacturer Flow Coefficients Table*. This value is a starting point for the air balancer.
2. To fine tune the flow coefficient, use the following formula:

   ⇨ **New Flow Coefficient = (Actual Volume ÷ Controller Volume) × Old Flow Coefficient**

   The actual volume is the value obtained from the balancer's measurements. The controller volume is the value obtained from HTG VOLUME or TOT VOLUME, depending on the application and CLG VOLUME.
3. If the controller volume is not within 5% of the actual volume, repeat this procedure until it is within 5%.

Box Manufacturer Flow Coefficients		
Manufacturer	**Sensor Type**	**Value**
Anemostat	2-pipe without orifice 2-pipe with orifice Spider without orifice Spider with orifice	0.79 0.59 0.73 0.39
Carnes	2-pipe Flow cross	0.66 0.59
Carrier		0.59
E.H. Price/Siemens Industry Terminal Boxes		0.78
Environmental Technologies		0.79
Krueger		0.68
Metal Aire		0.72
Nailor Industries		0.69
Titus		0.60
Trane		0.66

Setting Airflow Setpoints

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1. Set CLG FLOW MIN to the desired minimum cooling airflow from the cold duct in daytime cooling mode.
2. Set CLG FLOW MAX to the desired maximum cooling airflow from the cold duct in cooling mode.
3. Set TOT FLOW MIN to the desired minimum airflow needed for ventilation from the dual duct box.
4. Set HTG FLOW MAX to the desired maximum heating airflow from the hot duct in heating mode.

NOTE:
It is recommended that TOT FLOW MIN be set no greater than 0.3 times CLG FLOW MAX. If TOT FLOW MIN is set greater than this value, the flow loop becomes less stable. For example, if the maximum flow is to be 2500 cfm, TOT FLOW MIN should be set to no more than 750 cfm.

Setting Controller Address

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

Set the controller address by setting CTLR ADDRESS to the appropriate number. (Addresses 00 to 98 are valid; 00 to 31 are typically used.)

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.).

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Siemens Industry, Inc.
Building Technologies Division
1000 Deerfield Pkwy
Buffalo Grove IL 60089
Tel. +1 847-215-1000

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