SIEMENS

TEC Controller

Terminal Box (VAV) - Parallel Fan with Electric Reheat, Application 2026

Application Note

140-1055
2015-10-05

Building Technologies

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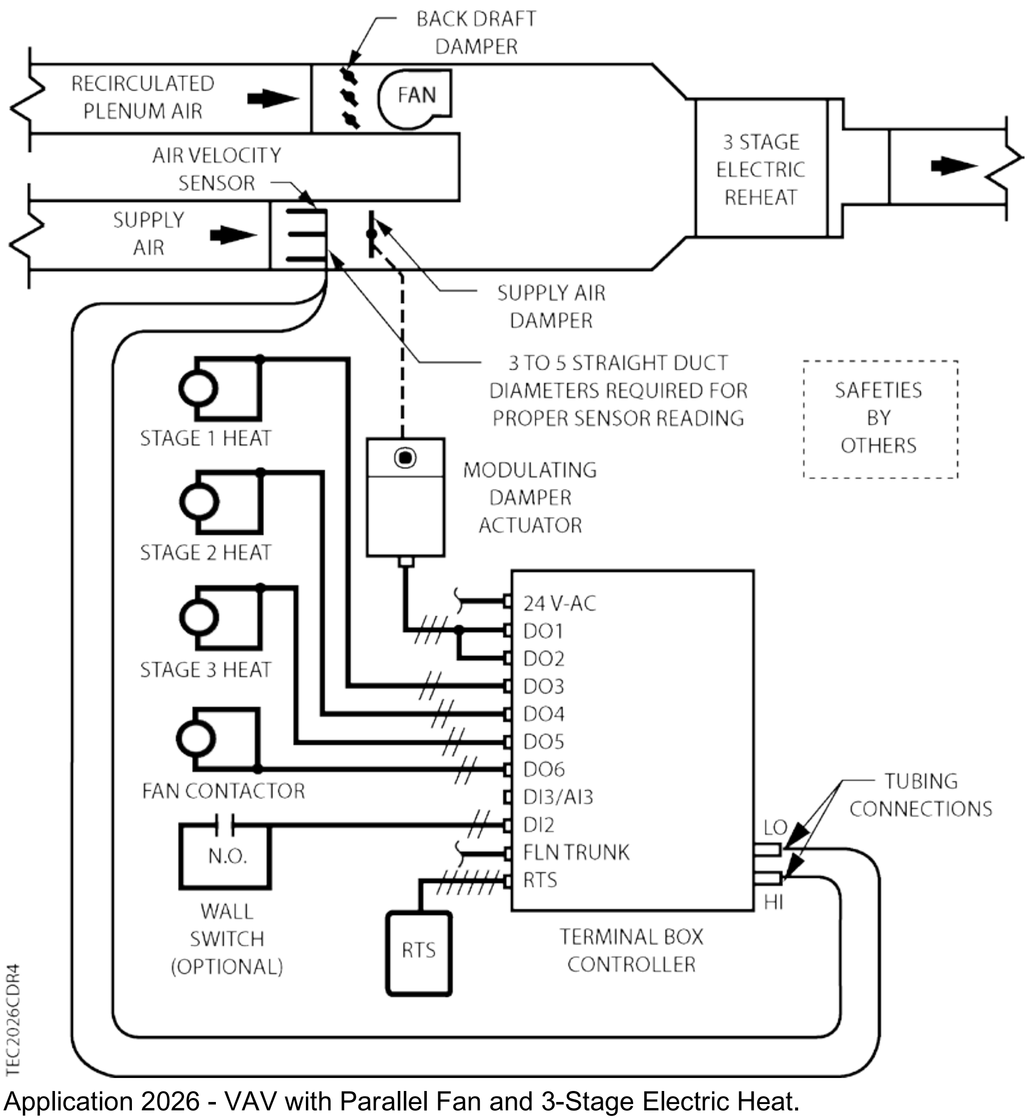
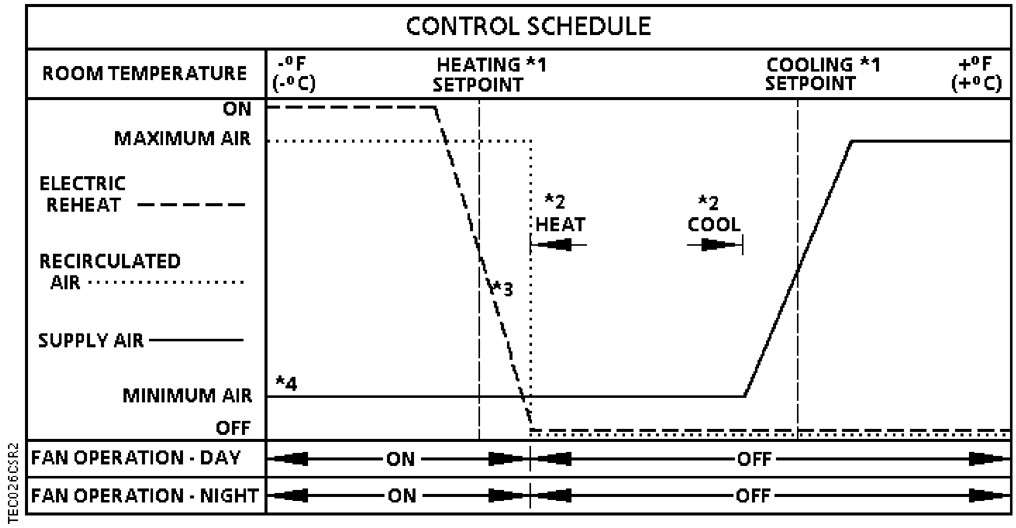
Overview

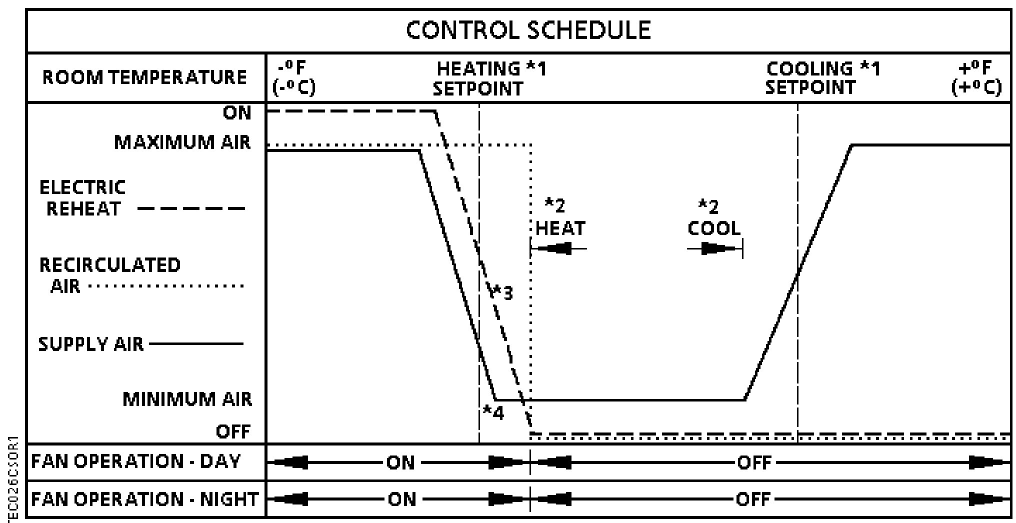
In Application 2026, the controller modulates the supply air damper of the terminal box for cooling and controls stages of electric reheat for heating. When in heating, the terminal box either maintains minimum airflow or modulates the supply air damper. Application 2026 has a parallel fan that re-circulates the room air in heating mode. In order for the terminal box to work properly, the central air-handling unit must provide supply air.



Application 2026 - VAV with Parallel Fan and 3-Stage Electric Heat.



Application 2026 Control Schedule with Minimum Supply Air in Heating Mode.



Application 2026 Heating Mode Control Schedule with Modulating Supply Air in Heating Mode.

NOTES:
1. See *Control Temperature Setpoints*.
2. See *Heating/Cooling Switchover*.
3. The electric reheat is time modulated. This allows it to be controlled proportionally rather than with deadbands.
4. *(Optional)* The airflow is shown modulating in the entire heating mode. (Default settings must be changed.) The airflow can operate sequenced, parallel, or overlapping with the reheat coil. See *Sequencing Logic*.

NOTE:
(Optional) The airflow is shown operating parallel with the electric reheat. See Sequencing Logic [➙ 12].

Hardware Inputs

Analog

- Air velocity sensor
- Room temperature sensor
- *(Optional)* Room temperature setpoint dial
- *(Optional)* Auxiliary temperature sensor (100K Ω thermistor)

Digital

- *(Optional)* Night/Unoccupied mode override
- *(Optional)* Wall switch

Hardware Outputs

Analog

- None

Digital

- Damper actuator (DO 1/DO 2)
- Parallel fan (DO 6)
- *(Optional)* Stage 1 electric heat or spare DO 3
- *(Optional)* Stage 2 electric heat or spare DO 4
- *(Optional)* Stage 3 electric heat or spare DO 5
- *(Optional)* Spare DOs

Ordering Notes

540-100N	TEC Terminal Box Controller

Sequence of Operation

The following paragraphs present the sequence of operation for Application 2026, VAV with Electric Heat and Parallel Fan.

Control Temperature Setpoints

This application has a number of different room temperature setpoints (DAY HTG STPT, NGT CLG STPT, RM STPT DIAL, and so on.). The application actually controls using the CTL STPT. CTL STPT is set to different values depending on its override status, the time of day, whether or not a temperature deadband (zero energy band) has been configured, and the type of RTS used.

CTL STPT is Overridden

If CTL STPT is overridden, that value is used regardless of any other settings. This disables the setpoint deadband feature.

CTL STPT in Night Mode:

The controller is in Night mode if DAY.NGT = NGT and NGT OVRD = NGT.

When the controller is in Night mode, CTL STPT holds the value of NGT CLG STPT or NGT HTG STPT depending on the value of HEAT.COOL. When the controller is in Night mode the value of RM STPT DIAL is ignored.

CTL STPT in Day Mode:

The controller is in Day mode if DAY.NGT = DAY or NGT OVRD = DAY.

Without setpoint dial:

When the controller is in Day mode and STPT DIAL = NO, CTL STPT holds the value of DAY CLG STPT or DAY HTG STPT depending on the value of HEAT.COOL.

With setpoint dial:

When the controller is in Day mode and STPT DIAL = YES. CTL STPT is set based on the value of the setpoint dial and the setpoint deadband.

The setpoint deadband exists to allow the controller to provide a separation of the heating and cooling temperature setpoints when a setpoint dial is enabled.

The setpoint deadband is the difference between the cooling and heating day setpoints (DAY CLG STPT - DAY HTG STPT). The setpoint deadband can be disabled by setting DAY HTG STPT equal to DAY CLG STPT. When DAY HTG STPT does not equal DAY CLG STPT, a setpoint deadband (or zero energy band) is used.

The following values are used in the calculation of CTL STPT:

- *Dial value* is the value of RM STPT DIAL limited between the value of RM STPT MIN and RM STPT MAX.
- *Deadband* is the value of the difference between DAY CLG STPT and DAY HTG STPT, half of which is applied to establish the current heating and cooling setpoints.
  - *Deadband* = (DAY CLG STPT – DAY HTG STPT)

CTL STPT is calculated as follows:

With Deadband disabled:

CTL STPT = *Dial value*

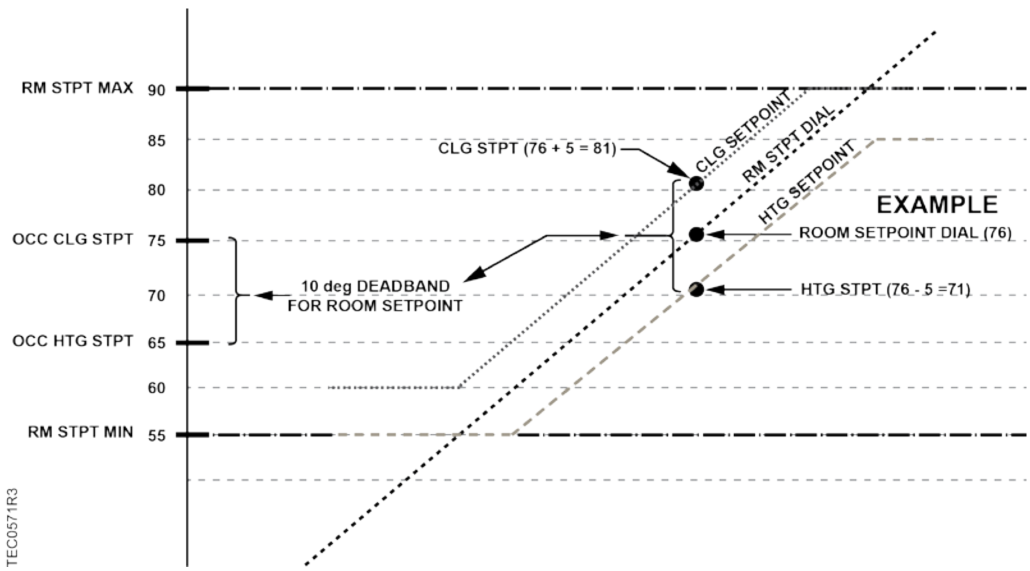
With Deadband enabled in Heat Mode:

CTL STPT = *Dial value* – 0.5 * *Deadband* (limited between the value of RM STPT MIN and RM STPT MAX)

With Deadband enabled in Cool Mode:

CTL STPT = *Dial value* + 0.5 * *Deadband* (limited between the value of RM STPT MIN and RM STPT MAX)

NOTE:
If RM STPT DIAL is failed, it maintains the last known value.



Room Temperature and CTL TEMP

ROOM TEMP is the temperature that is being sensed by the room temperature sensor (RTS).

CTL TEMP is the room temperature that is used for control purposes. In other words, what the application is trying to do is to maintain CTL TEMP at the control setpoint.

When CTL TEMP is not overridden, CTL TEMP and ROOM TEMP are related by the following equation:

If CTL TEMP is not overridden then,

- The current value of ROOM TEMP (normal or overridden) will be used to determine the value of CTL TEMP.
- If ROOM TEMP has a status of Failed the last known good value of ROOM TEMP will be used to determine the value of CTL TEMP.

If CTL TEMP is overridden then,

- CTL TEMP equals its overridden value and ROOM TEMP has no effect on the value of CTL TEMP.

Day and Night Modes

The day/night status of the space is determined by the status of DAY.NGT. 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 (see the *Control Diagram* in the Overview section), and WALL SWITCH = YES, the controller monitors the status of DI 2 . When the status of DI 2 is ON (the switch is closed), then DAY.NGT is set to DAY indicating that the controller is in day mode. When the status is OFF (the switch is open), then DAY.NGT is set to NIGHT indicating that the controller is in night mode.

When WALL SWITCH = 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, then the controller stays in day mode all the time. If the controller is operating with centralized control (that is, it is connected to a field panel), then the field panel can send an operator or PPCL command to override the status of DAY.NGT.

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, pressing the override switch resets the controller to DAY operational mode for the time period that is set in OVRD TIME. The status of NGT OVRD changes to DAY. After the override time elapses, the controller returns to night mode and the status of NGT OVRD changes back to NIGHT.

The override switch on the room sensor only affects the controller when it is in Night mode.

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, the controller switches from heating to cooling mode by setting HEAT.COOL to COOL:

- HTG LOOPOUT < SWITCH LIMIT.
- CTL TEMP > CTL STPT by at least the value set in SWITCH DBAND.
- CTL TEMP > the appropriate (defined in *Control Temperature Setpoints* section) cooling setpoint minus SWITCH DBAND.

If 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 < SWITCH LIMIT.
- CTL TEMP < CTL STPT by at least the value set SWITCH DBAND.
- CTL TEMP < the appropriate (defined in *Control Temperature Setpoints* section) heating setpoint plus SWITCH DBAND.

When the controller switches to heating mode, the span would be applied to the DAY HTG STPT (70°F) and you are able to adjust the heating setpoint from 68°F to 72°F.

Digital Room Units (2200/2300 Series)

The digital room unit will display a graphical bar indicating the number of steps above or below the current operating temperature setpoint. When the controller switches modes (heating to cooling) the span adjustment set will be applied to the new heating/cooling mode center value.

Analog Room Units (1000 Series)

When the controller switches to heating mode, the span is applied to the DAY HTG STPT (70°F) and you are able to adjust the heating setpoint from 68°F to 72°F.

Modulating Damper During Heating Mode (Optional)

⚠	⚠ CAUTION **The heating/cooling switchover mechanism is not affected by the air temperature in the supply duct.** Consequences

To change the value of HEAT.COOL based on the supply air temperature, you must command HEAT.COOL through PPCL. This is required when the flow loop is used as a source of cooling in cooling mode and a source of heat in heating mode (see Examples 1 through 3 in *Sequencing Logic*). If the flow loop is used in heating mode just to meet minimum air requirements, the heating/cooling switchover mechanism operates as described in this section to control HEAT.COOL (see Example 4 in *Sequencing Logic*).

Control Loops

The controller is controlled by three Proportional, Integral, and Derivative (PID) control loops; two temperature loops and a flow loop.

The two temperature loops are a cooling loop and a heating loop. The active temperature loop maintains room temperature at the value in CTL STPT. See *Control Temperature Setpoints*.

Advanced PID algorithm for the temperature control loops is employed to provide stability and to reduce unnecessary changes in the Flow setpoint when the room temperature is at or near the room temperature setpoint.

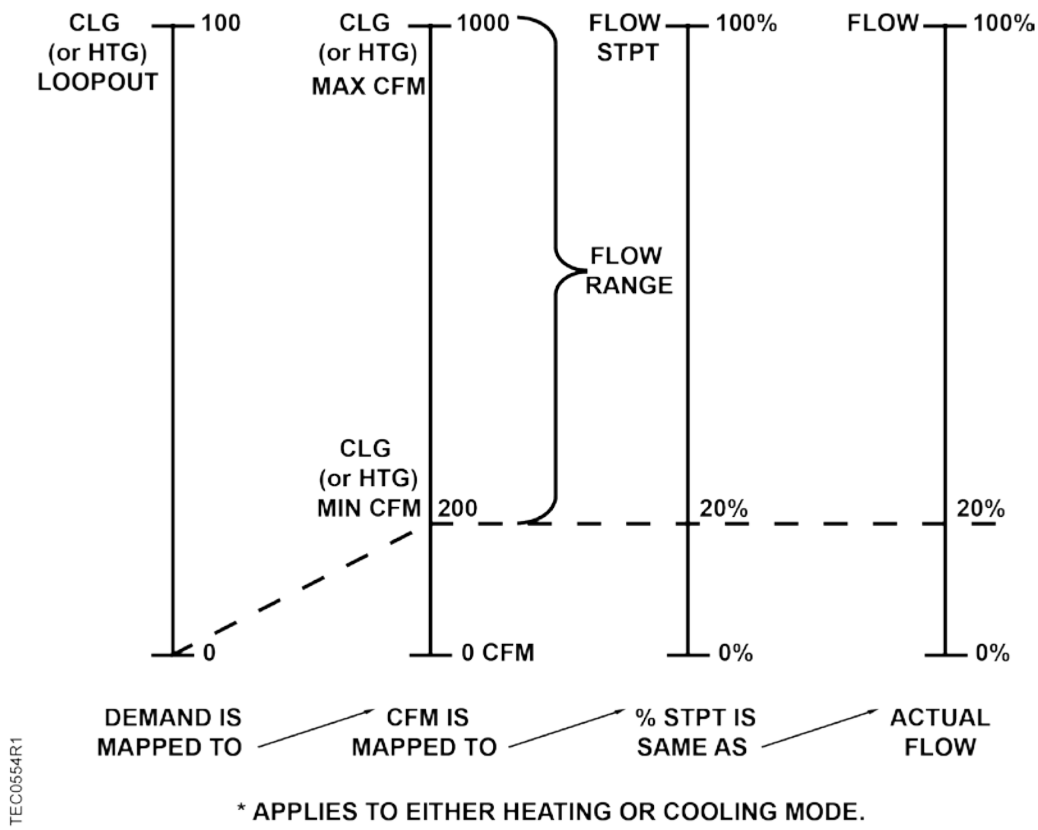
Cooling Loop – The cooling loop generates cooling loopout which is then used to generate FLOW STPT. FLOW STPT is the result of scaling the cooling loopout to the appropriate range of values determined by flow minimum (CLG FLOW MIN) and flow maximum (CLG FLOW MAX).

The following figure describes how the flow setpoint is calculated:

FLOW STPT = [CLG LOOPOUT × (100% – % minimum setpoint)] + % minimum setpoint.

Where percent minimum setpoint is:

% minimum setpoint = (CLG FLOW MIN/CLG FLOW MAX) x 100%



FLOW STPT and FLOW % are relative to MIN and MAX STPTS of corresponding heating or cooling mode.

Example

If CLG FLOW MIN = 200 cfm, and CLG FLOW MAX = 1000 cfm, the minimum flow setpoint is (200 cfm/000 cfm) × 100% flow = 20%.

When CLG LOOPOUT is 0%, FLOW STPT = 20% flow.
[0% × (100% – 20%)] + 20% = 20%

This ensures that the airflow out of the terminal box is no less than CLG FLOW MIN.

When CLG LOOPOUT is 50%, FLOW STPT = 60% flow.
[50% × (100% – 20%)] + 20% = 60%

When CLG LOOPOUT is 100%, FLOW STPT = 100% flow.
[100% × (100% – 20%)] + 20% = 100%

Heating Loop – If the controller is in heating mode, the operation of the flow loop is flexible. It can be set up to do one of the following:

- Option 1: Constantly maintain airflow out of the terminal box equal to CTL FLOW MIN.
- Option 2: Operate in sequence with the reheat.
- Option 3: Operate parallel with the reheat.
- Option 4: Overlap its operation with the operation of the electric reheat.

If Option 1 is chosen, HTG LOOPOUT controls the electric reheat in order to maintain the room temperature. If Options 2, 3, or 4 is chosen, HTG LOOPOUT controls both the flow loop setpoint (FLOW STPT) and the electric reheat in order to maintain the room temperature. See Sequencing Logic [➔ 12] for more information.

HTG LOOPOUT adjusts the value of FLOW STPT differently depending on which flow loop setup is chosen. However, the following rule applies no matter what setup is chosen.

In heating mode, FLOW STPT is never set below (CTL FLOW MIN/HTG FLOW MAX) × 100% flow or above 100% flow.

In heating mode, CTL FLOW MIN is equal to HTG FLOW MIN.

Flow Loop – The flow loop maintains FLOW STPT by modulating the supply air damper, DMPR COMD. The flow loop maintains the airflow between CTL FLOW MIN and CTL FLOW MAX.

To enhance stable flow control, an advanced algorithm is used to calculate a controllable setpoint as the value approaches zero cfm (lps).

When the controller is in cooling mode, CTL FLOW MIN = CLG FLOW MIN, and CTL FLOW MAX = CLG FLOW MAX.

When the controller is in heating mode, CTL FLOW MIN = HTG FLOW MIN, and CTL FLOW MAX = HTG FLOW MAX.

You can set CLG FLOW MIN equal to, but not greater than, CLG FLOW MAX. If the minimum and maximum values are set equal, the flow loop becomes a constant volume loop and loses its ability to control temperature.

FLOW is the input value for the flow loop. It is calculated as a percentage based on where AIR VOLUME is between 0 cfm and CTL FLOW MAX. This percentage is referred to as % flow.

- If AIR VOLUME = 0 cfm, FLOW is 0% flow.
- If AIR VOLUME = CTL FLOW MAX, FLOW is 100% flow.

The low limit of FLOW STPT is the percentage that corresponds to the volume given in CTL FLOW MIN. This percentage can be calculated as:

(CTL FLOW MIN/CTL FLOW MAX) × 100% flow

The flow loop ensures that the supply air will not be less than CTL FLOW MIN.

Example

If CTL FLOW MIN = 250 cfm, and CTL FLOW MAX = 1000 cfm,
the low limit of FLOW STPT = (250 cfm/1000 cfm) × 100% flow
= 0.25 × 100% flow
= 25% flow.
Since 25% of 1000 cfm = 250 cfm, the minimum airflow out of the terminal box will be 250 cfm.

Flow Control in Night Mode

When the controller is in the Night Mode, CTL FLOW MIN is determined differently. If the cooling demand is greater than zero, CLT FLOW MIN = CLG FLOW MIN. If the heating demand is greater than zero, CTL FLOW MIN = HTG FLOW MIN. When both cooling and heating demands are zero (the temperature is in the deadband between NGT CLG STPT and NGT HTG STPT), airflow is not required and CLT FLOW MIN is set to 0.

Sequencing Logic

NOTE:
Setting FLOW START = 0 and FLOW END = 100, provides modulating supply airflow during heating mode (HTG FLOW MIN to HTG FLOW MAX).

NOTE:
Sufficient airflow across the heating coil is required whenever it is energized. Ensure that the configuration for the parallel fan and for sequencing the supply flow with the heating coil provides the needed airflow.

In heating mode, this application includes logic that allows the flow loop to operate in sequence, parallel, or overlapping with the heating device. Selected portions of the output of the heating loop, HTG LOOPOUT, will drive both the flow loop and the heating from 0 to 100%. See the *Examples* section.

This section address sequencing the supply airflow and the heating coils. See Parallel Fan Operation [➔ 15] for additional configuration information.

In heating mode, this application includes logic that allows the supply airflow loop to operate in sequence, parallel, or overlapping with the heating coil. Portions of the output of the heating loop, HTG LOOPOUT, will drive both the supply airflow loop and the heating coil from 0 to 100%. See the *Examples* section.

- There is one stage of electric heat (STAGE COUNT = 1).
- The cycle time of the electric heat is 10 minutes (STAGE TIME = 10). (When this is done, FLOW STPT will equal 0 when HTG LOOPOUT = 0).

Examples

Example 1 (Airflow Sequenced First)

Assume that your system has electric heat that is to operate in sequence with the flow loop. If:

- FLOW START = 0%
- FLOW END = 50%
- REHEAT START = 50%
- REHEAT END = 100%

then,

- When HTG LOOPOUT = 0%, FLOW STPT will equal 0% flow.
- When HTG LOOPOUT = 25%, FLOW STPT will equal 50% flow.
- When HTG LOOPOUT ≥ 50%, FLOW STPT will equal 100% flow.
- When HTG LOOPOUT ≤ 50%, the electric heat will be off all the time.
- When HTG LOOPOUT = 75%, for every 10-minute period the electric heat will be on for 5 minutes and off for 5 minutes.
- When HTG LOOPOUT = 100%, the electric heat will be on all the time.

Example 2 (Airflow and Heat Sequenced Together)

Assume that your system has electric heat that is to operate in parallel with the flow loop. If:

- FLOW START = 0%
- FLOW END = 100%
- REHEAT START = 0%
- REHEAT END = 100%

then,

- When HTG LOOPOUT = 0%, FLOW STPT will equal 0% flow.
- When HTG LOOPOUT = 50%, FLOW STPT will equal 50% flow.
- When HTG LOOPOUT = 100%, FLOW STPT will equal 100% flow.
- When HTG LOOPOUT = 0%, the electric heat will be off all the time.
- When HTG LOOPOUT = 50%, for every 10-minute period the electric heat will be on for 5 minutes and off for 5 minutes.
- When HTG LOOPOUT = 100%, the electric heat will be on all the time.

Example 3 (Airflow Sequenced First with Overlap for Heating)

Assume that your system has electric heat that is to operate overlapping with the flow loop. If:

- FLOW START = 0%
- FLOW END = 75%
- REHEAT START = 25%
- REHEAT END = 100%

then,

- When HTG LOOPOUT = 0%, FLOW STPT will equal 0% flow.
- When HTG LOOPOUT = 37.5%, FLOW STPT will equal 50% flow.
- When HTG LOOPOUT ≥ 75%, FLOW STPT will equal 100% flow.
- When HTG LOOPOUT ≤ 25%, the electric heat will be off all the time.
- When HTG LOOPOUT = 62.5%, for every 10-minute period the electric heat will be on for 5 minutes and off for 5 minutes.
- When HTG LOOPOUT = 100%, the electric heat will be on all the time.

Another option that the sequencing logic provides is to have the flow loop provide an airflow equal to HTG FLOW MIN throughout the heating mode with all of the temperature control being done by the electric heat. The airflow minimum is maintained by setting the FLOW START and FLOW END to a value of 0%, resulting in the corresponding minimum flow throughout the entire heating mode, regardless of the value of HTG LOOPOUT. Example 4 clarifies this:

Example 4 (Airflow Remains Fixed; Heating Modulates)

If the job requirement specifies that the supply airflow in heating will remain fixed, set HTG FLOW MIN = HTG FLOW MAX so that the fixed value in heating is indicated. An alternative setting, would be to set FLOW START = FLOW MIN = 0, which would fix the flow at HTG FLOW MIN.

Assume that your system has electric heat that provides the temperature control in the heating mode, while the flow loop provides for the minimum air requirements.

- HTG FLOW MIN = 170 cfm
- HTG FLOW MAX = 1000 cfm
- STAGE COUNT = 1

- STAGE TIME = 10 minutes

If:

- FLOW START=0%
- FLOW END=0% (or/and HTG FLOW MIN = HTG FLOW MAX)
- REHEAT START = 0%
- REHEAT END = 100%

then,

- When HTG LOOPOUT = 0%, FLOW STPT will equal (170 cfm/1000 cfm) × 100% flow = 17% flow. This will cause the flow loop to maintain an airflow of 170 cfm out of the terminal box.
- When HTG LOOPOUT = 50%, FLOW STPT will equal 17% flow.
- When HTG LOOPOUT = 100%, FLOW STPT will equal 17% flow.
- When HTG LOOPOUT = 0%, the electric heat will be off all the time.
- When HTG LOOPOUT = 50%, for every 10-minute period the electric heat will be on for 5 minutes and off for 5 minutes.
- When HTG LOOPOUT = 100%, the electric heat will be on all the time.

Calibration

Calibration of the controller's internal air velocity sensor(s) is periodically required to maintain accurate air velocity readings. CAL SETUP is set with the desired calibration option during controller startup.

Depending on the value of CAL SETUP, calibration may be set to take place automatically or manually. If CAL AIR = YES, calibration is in progress.

The damper is commanded closed to get a zero airflow reading during calibration.

At the end of a calibration sequence, CAL AIR automatically returns to NO. A status of NO indicates that the controller is not in a calibration sequence.

Floating Control Actuation Auto-correct

In addition to the existing options for floating control actuator full stroke actions, all floating control actuators are provided with additional logic to fully drive open or closed when commanded to 100% or 0%.

Parallel Fan Operation

WARNING

Equipment damage will occur if sufficient airflow across the heating coils is not provided.

When the controller is in heating mode, the fan can be configured to operate two different ways in combination with the staged heating and supply airflow.

1. Fan configured to act as the first stage for heating (using the warmer plenum air). This mode can be applied for mechanical configurations where the heating coils are in the discharge airflow or as part of the return/plenum airflow.
2. Fan configured only to be energized if there is not adequate airflow from the supply air and the heating stages are required (using the supply air for required flow across the heating coils, and the fan to provide air if the supply flow is not sufficient).

This configuration should **only** be used when the mechanical arrangement is such that the heating coils are in the discharge airflow.

	⚠ CAUTION
	This fan configuration could cause damage, if the coils are in the return/plenum air path.

FAN CONFIGURED TO SUPPLEMENT SUPPLY AIRFLOW FOR THE HEATING COIL. (PARALLEL OFF > PARALLEL ON based on FLOW)

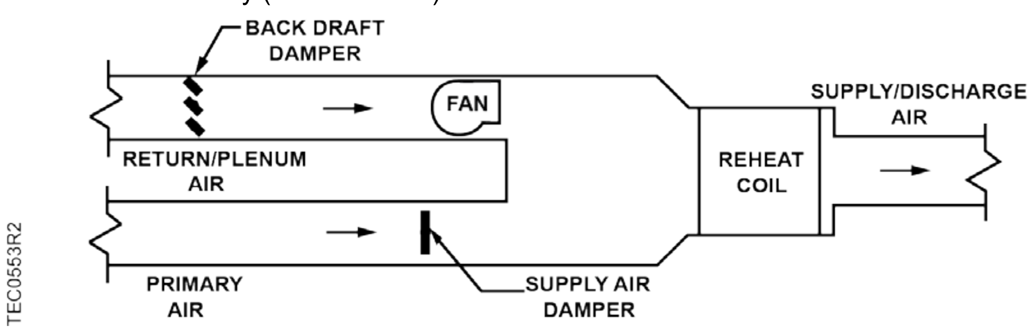
When the location of the heating coils are in the discharge airflow (fan flow is not necessary if there is sufficient supply airflow), this configuration can be used. This will allow the parallel fan to remain off when the air handling unit is supplying enough supply airflow for the heating coils.

Configure the reheat coil and supply flow based on heating demand.

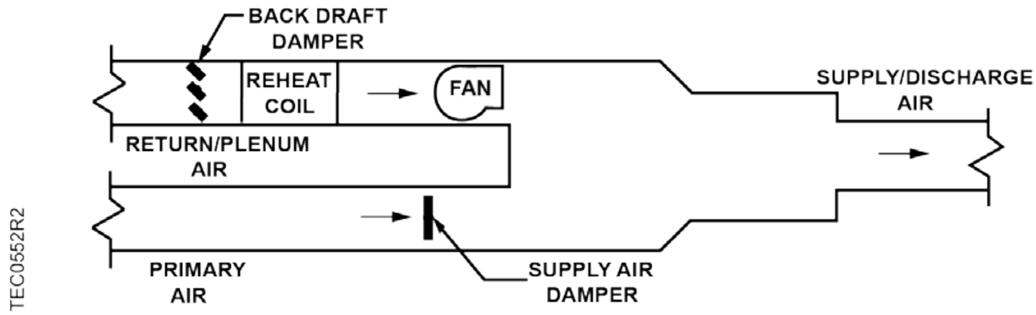
- REHEAT START and REHEAT END (as the only sources of heating) can be configured as specified within the HTG LOOPOUT span (for example, START = 0, END = 100).
- Set the airflow setpoints in the heating mode to ensure the required flow across the coils when the stages are activated.
  - If specified, a fixed value in heating mode can be configured (FLOW START=FLOW END, and HTG FLOW MIN=HTG FLOW MAX).
  - Additional flexibility and potential energy savings can result, if the HTG MIN and MAX are allowed to modulate in response to the heating demand. Along with setting these two flow ranges, the FLOW START and FLOW END should reflect the range of the increased flow in response to heating demand (for example, FLOW START = 0, FLOW END = 40).

Configure the fan based on supply airflow.

- When the parameter PARALLEL ON is less then PARALLEL OFF, the setpoints are in relation to the current supply airflow, where FLOW is from 0 to 100% (HTG FLOW MAX relating to 100%).
- As long as the flow is greater than PARALLEL OFF, the fan remains off.
- When the flow is less than PARALLEL ON and the application has energized a stage of heat, the fan will be turned on. When all stages are off, the fan turns off after a time delay (STAGE TIME).



Heating coil located in the supply (discharge) duct.



Heating coil located in the return/plenum air duct.

NOTE:
When a heating coil is external to the terminal unit (perimeter or heated beam/heated floor), the activation of the fan or primary airflow is not a major factor.

Fail Mode Operation

If the air velocity sensor fails, the controller uses pressure dependent control. The temperature loop controls the operation of the damper.

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

Application Notes

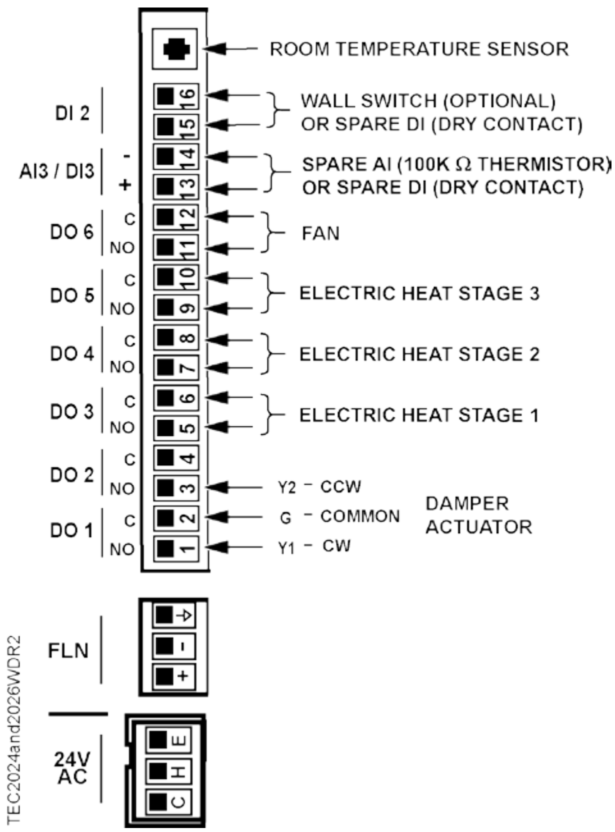
- If temperature swings in the room are excessive or there is trouble maintaining the setpoint, the cooling loop must be tuned. If FLOW is oscillating while FLOW STPT is constant, the flow loop requires tuning.
- The controller, as shipped from the factory, keeps all associated equipment OFF.

For more information, contact your local Siemens Industry representative.

Wiring Diagram

NOTE:
The controller's DOs control 24 Vac loads only. The maximum rating is 12 VA for each DO. An external interposing relay is required 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
(for example, part number 540-147, Terminal Equipment Controller Relay Module)



Application 2026 – Variable Air Volume Parallel Fan with Electric Reheat.

Application 2026 Point Database

Point Number	Descriptor	Factory Default (SI Units)[2]	Eng Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
1	CTLR ADDRESS	99	--	1	0	--	--
2	APPLICATION	2091	--	1	0	--	--
{04}	ROOM TEMP	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
{05}	HEAT.COOL	COOL	--	--	--	HEAT	COOL
6	DAY CLG STPT	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
7	DAY HTG STPT	70.0 (21.20888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
8	NGT CLG STPT	82.0 (27.92888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
9	NGT HTG STPT	65.0 (18.40888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
11	RM STPT MIN	55.0 (12.80888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
12	RM STPT MAX	90.0 (32.40888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
{13}	RM STPT DIAL	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
14	STPT DIAL	NO	--	--	--	YES	NO
{15}	AUX TEMP	74.0 (23.495556)	DEG F (DEG C)	0.5 (0.28)	37.5 (3.055556)	--	--
16	FLOW START	0	PCT	0.4	0	--	--
17	FLOW END	0	PCT	0.4	0	--	--
18	WALL SWITCH	NO	--	--	--	YES	NO
{19}	DI OVRD SW	OFF	--	--	--	ON	OFF
20	OVRD TIME	0	HRS	1	0	--	--
{21}	NGT OVRD	NIGHT	--	--	--	NIGHT	DAY
22	REHEAT START	0	PCT	0.4	0	--	--
23	REHEAT END	100	PCT	0.4	0	--	--
{24}	DI 2	OFF	--	--	--	ON	OFF
{25}	DI 3	OFF	--	--	--	ON	OFF
26	SERIES ON	20	PCT	0.4	0	--	--
27	SERIES OFF	10	PCT	0.4	0	--	--
28	PARALLEL ON	20	PCT	0.4	0	--	--
{29}	DAY.NGT	DAY	--	--	--	NIGHT	DAY
30	PARALLEL OFF	30	PCT	0.4	0	--	--

Point Number	Descriptor	Factory Default (SI Units)[2]	Eng Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
31	CLG FLOW MIN	220 (103.818)	CFM (LPS)	4 (1.8876)	0	--	--
32	CLG FLOW MAX	2200 (1038.18)	CFM (LPS)	4 (1.8876)	0	--	--
33	HTG FLOW MIN	220 (103.818)	CFM (LPS)	4 (1.8876)	0	--	--
34	HTG FLOW MAX	2200 (1038.18)	CFM (LPS)	4 (1.8876)	0	--	--
{35}	AIR VOLUME	0 (0.0)	CFM (LPS)	4 (1.8876)	0	--	--
36	FLOW COEFF	1	--	0.01	0	--	--
{41}	DO 1	OFF	--	--	--	ON	OFF
{42}	DO 2	OFF	--	--	--	ON	OFF
{43}	HEAT STAGE 1	OFF	--	--	--	ON	OFF
{44}	HEAT STAGE 2	OFF	--	--	--	ON	OFF
{45}	HEAT STAGE 3	OFF	--	--	--	ON	OFF
{46}	FAN	OFF	--	--	--	ON	OFF
{48}	DMPR COMD	0	PCT	0.4	0	--	--
{49}	DMPR POS	0	PCT	0.4	0	--	--
51	MTR1 TIMING	95	SEC	1	0	--	--
56	DMPR ROT ANG	90	--	1	0	--	--
58	MTR SETUP	0	--	1	0	--	--
59	DO DIR. REV	0	--	1	0	--	--
63	CLG P GAIN	20.0 (36.0)	--	0.25 (0.45)	0	--	--
64	CLG I GAIN	0.01 (0.018)	--	0.001 (0.0018)	0	--	--
65	CLG D GAIN	0 (0.0)	--	2 (3.6)	0	--	--
66	CLG BIAS	0	PCT	0.4	0	--	--
67	HTG P GAIN	10.0 (18.0)	--	0.25 (0.45)	0	--	--
68	HTG I GAIN	0.01 (0.018)	--	0.001 (0.0018)	0	--	--
69	HTG D GAIN	0 (0.0)	--	2 (3.6)	0	--	--
70	HTG BIAS	0	PCT	0.4	0	--	--
71	FLOW P GAIN	0	--	0.05	0	--	--
72	FLOW I GAIN	0.01	--	0.001	0	--	--
73	FLOW D GAIN	0	--	2	0	--	--
74	FLOW BIAS	50	PCT	0.4	0	--	--
{75}	FLOW	0	PCT	0.25	0	--	--
{76}	CTL FLOW MIN	220 (103.818)	CFM (LPS)	4 (1.8876)	0	--	--

Point Number	Descriptor	Factory Default (SI Units)[2]	Eng Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
{77}	CTL FLOW MAX	2200 (1038.18)	CFM (LPS)	4 (1.8876)	0	--	--
{78}	CTL TEMP	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
{79}	CLG LOOPOUT	0	PCT	0.4	0	--	--
{80}	HTG LOOPOUT	0	PCT	0.4	0	--	--
{81}	AVG HEAT OUT	0	PCT	0.4	0	--	--
82	STAGE MAX	90	PCT	0.4	0	--	--
83	STAGE MIN	10	PCT	0.4	0	--	--
85	SWITCH LIMIT	5.2	PCT	0.4	0	--	--
86	SWITCH TIME	10	MIN	1	0	--	--
88	STAGE COUNT	1	--	1	0	--	--
89	STAGE TIME	10	MIN	1	0	--	--
90	SWITCH DBAND	1.0 (0.56)	DEG F (DEG C)	0.25 (0.14)	0	--	--
{91}	TOTAL VOLUME	0 (0)	CF (L)	4 (113)	0	--	--
{92}	CTL STPT	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
{93}	FLOW STPT	0	PCT	0.25	0	--	--
{94}	CAL AIR	NO	--	--	--	YES	NO
95	CAL SETUP	4	--	1	0	--	--
96	CAL TIMER	12	HRS	1	0	--	--
97	DUCT AREA	1.0 (0.09292)	SQ. FT (SQ M)	0.025 (0.002323)	0	--	--
98	LOOP TIME	5	SEC	1	0	--	--
{99}	ERROR STATUS	0	--	1	0	--	--

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.

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