SIEMENS

# Start-up Procedures for Small AHU Constant Volume Applications 2502 and 2503

## TEC 0844.11

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## Before You Begin

This section presents start-up procedures for the Small AHU Constant Volume Controller 0-10V Output. Refer to Figure 1.

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, then refer to the *APOGEE Automation Service Procedures* on Infolink for troubleshooting information.

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

## Setting Controller Address and Application

1. Set CTLR ADDRESS (Point 1) to the appropriate address number.

2. Set APPLICATION (Point 2) to the desired application. See Table 1. Wait for the application to load before continuing.

**Table 1. Small AHU Constant Volume Controller – 0-10V Output Applications.**

| Application Description | Application Number |
|---|---|
| Constant Volume AHU with Room and Supply Air Temperature Control | 2502 |
| Constant Volume AHU with Room Temperature Control | 2503 |
| Slave Mode | 2588 |

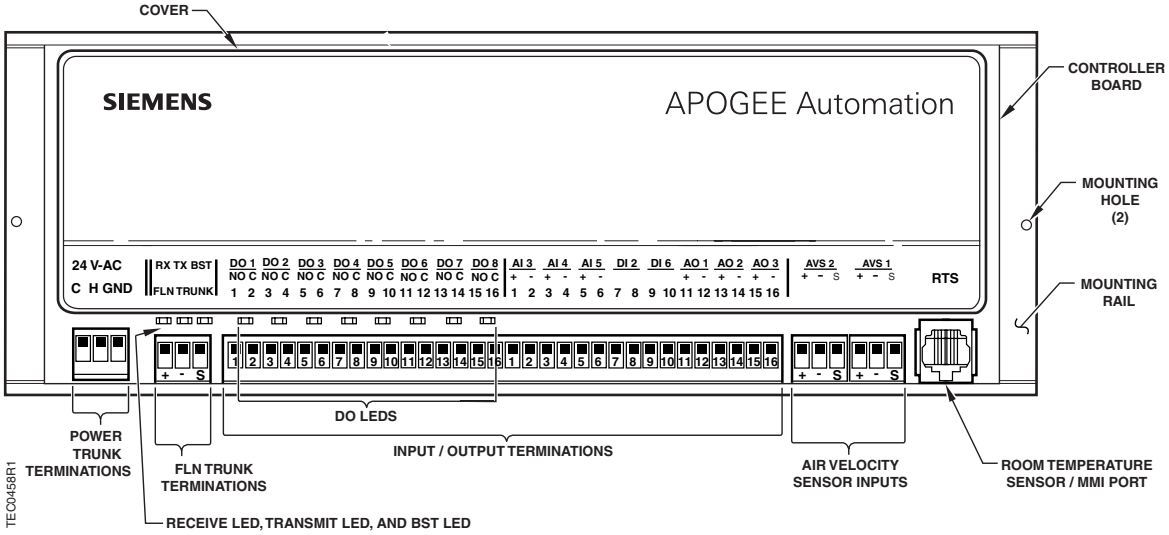


**Figure 1. Small AHU Constant Volume Controller-0-10V Output.**

## Shared I/O

The TEC upon which applications 2502 and 2503 reside has AIs and DIs that share the same terminations. This means that one or the other (but not both) can be used. Specifically, AI -3 shares terminations with DI 3 and AI 4 shares terminations with DI 4. Therefore, if AI 3 is being used, it means that DI 3 is unavailable for use (and vice versa). Likewise, if AI 4 is being used, it means that DI 4 is unavailable for use (and vice versa).

Furthermore, applications 2502 and 2503 use DI 3 as the general purpose alarm point. (In these applications the general purpose alarm is meant for such things as a smoke detector or a dirty filter alarm.) Therefore, if want to use AI 3, or use DI 3 for something other than the general purpose alarm, then you must disable the general purpose alarm feature. Refer to the next section of this document for information on how to do that.

**NOTE:** In application 2503, AI 5 shares terminations with DI 5. In application 2502, DI 5 is not available. This is because a supply air temperature sensor must be hooked up to AI 5 in order to get application 2502 to work properly.

## Enable/Disable Points

Not every feature included in Application 2502 and Application 2503 will be used on every job. Different jobs will use different features. Furthermore, when a feature is not used, you may want the I/O used to support that feature to be available for other uses. There is a way in applications 2502 and 2503 to enable and disable a number of features (and to make unused I/O available for other uses.) This is done with 3 enable/disable points. These points are DIALRM.ENDIS (Point 56), whose purpose is to determine whether or not a DI is being used as an alarm; MODE.ENDIS (Point 23), which indicates if UOC HTG, UOC CLG, WARMUP, and/or COOLDOWN modes are being used by the application; and HC.ENDIS (Point 22), which determines if the application is heating only, cooling only, or if it uses both heating and cooling modes. These points are analog points whose specific analog values determine whether or not certain features are being enabled or disabled.

Table 2 shows what is enabled when a particular point is at a particular value. (If a cell is filled with '--' it means that the point can not use the associated value. For example, HC.ENDIS can not equal 4.)

**Table 2. Enable/Disable Points in Application 2502 and 2503.**

| Point Value | DIALRM.ENDIS | MODE.ENDIS | HC.ENDIS |
|---|---|---|---|
| 0 | no enable | no enable | N/A |
| 1 | gen alarm enabled | uoc htg enabled | heating enabled |
| 2 | ltdt enabled | uoc clg enabled | cooling enabled |
| 4 | fan proof enabled | warmup enabled | -- |
| 8 | -- | cooldown enabled | -- |

DIALRM.ENDIS, MODE.ENDIS, and HC.ENDIS have default values.

- DIALRM.ENDIS (default = 7)

- MODE.ENDIS (default = 15)
- HC.ENDIS (default = 3)

The default value enables everything possible in the point. These points are additive: that is, if DIALRM.ENDIS has a value of 6, it means that the low temperature detector and the fan proof are enabled, while the general alarm is disabled.

**NOTE:** HC.ENDIS has an intercept of 1. Therefore, HC.ENDIS cannot be set to zero. HC.ENDIS was defined this way because it makes no sense to disable both heating and cooling on the same job. When HC.ENDIS has a value of 1, the application is heating only. When HC.ENDIS has a value of 2, the application is cooling only. When HC.ENDIS has a value of 3, the application uses both the heating and cooling modes. When the Application is set up as cooling only, AO-3 is a spare. Likewise, when the application is heating only, AO - 2 is a spare.

## Setting LTDT CONTACT Configuration

If a low temperature detector is being used, the TEC needs to know whether the low temperature detector is Normally Closed or Normally Opened. Set LTDT CONTACT (Point 52) accordingly to NCLOSE or NOPEN.

**NOTE:** If a low temperature detector is used, it is strongly recommended that it be a manual reset device. That is, if it goes into alarm, the device has to be manually reset for the alarm to clear.

## Setting GEN CONTACT Configuration

If the general alarm is being used, the TEC needs to know whether the items hooked up to GEN ALRM DI3 (Point 25) are Normally Closed or Normally Opened. Set GEN CONTACT (Point 55) accordingly to NCLOSE or NOPEN.

**NOTES:** It is strongly recommended that all of the devices hooked to GEN DI 3 be manual reset devices. That is, if a device goes into alarm, that device has to be manually reset for the alarm to clear.

A general alarm is for things like smoke detection, dirty filters, and high or low humidity. If used, these alarming devices share the same DI (DI3). If multiple devices are connected to DI3 when GEN CONTACT equals NCLOSE, they must be wired in **series** to each other and each must be configured to alarm when its contact **opens**. If multiple devices are connected to DI3 when GEN CONTACT equals NOPEN, they must be wired in **parallel** to each other and each must be configured to alarm when its contact **closes**.

## Setting PROOF TIME

If the fan is being proofed, set PROOF TIME (Point 57) to desired value (the default is 30 seconds).

**NOTE:** Any device that proofs the fan and that is connected to FAN DI 2 (Point 24) should not be a manual reset device. You want to give the fan a chance to proof without having to manually reset the device connected to DI 2.

## Setting Room Temperature Setpoints

1. Display the SETPOINTS report.

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

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

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

3. Set the following points to the appropriate values:

   - DAY CLG STPT (Point 6)
   - DAY HTG STPT (Point 7)
   - NGT CLG STPT (Point 8)
   - NGT HTG STPT (Point 9)
   - WRMUP STPT (Point 3)
   - COOLDN STPT (Point 10)

4. If the room temperature sensor has a setpoint dial and the setpoint dial is to be used, then set RM STPT MIN (Point 11) and RM STPT MAX (Point 12) for the minimum and the maximum allowable room temperature setpoint values, respectively. Valid values range from 55° to 95°F (13° to 35°C). Common values are 65°F (18°C) for RM STPT MIN and 80°F (27°C) for RM STPT MAX.

## Setting MINHTG SATSP and MAXHTG SATSP

**Application 2502 only:**

Set MINHTG SATSP (Point 94), to the lowest desired supply air temperature setpoint when the application is in the heating mode.

Set MAXHTG SATSP (Point 95), to the highest desired supply air temperature setpoint when the application is in the heating mode.

## Setting MINCLG SATSP and MAXCLG SATSP

**Application 2502 only:**

Set MINCLG SATSP (Point 96), to the lowest desired supply air temperature setpoint when the application is in the cooling mode.

Set MAXCLG SATSP (Point 97), to the highest desired supply air temperature setpoint when the application is in the cooling mode.

## Setting LTD SAH STPT, GEN SAH STPT and UOC SAH STPT

**Application 2502 only:**

LTD SAH STPT (Point 16) is setpoint used by the supply air temperature heating PID control loop when the low temperature detector has gone into alarm.

GEN SAH STPT (Point 17) is setpoint used by the supply air temperature heating PID control loop when a general alarm is occurring.

UOC SAH STPT (Point 17) is setpoint used by the supply air temperature heating PID control loop when a fan proof failure has occurred. It is also the setpoint used by the supply air temperature heating PID control loop during the unoccupied period when both UOC HTG (Point 53) and UOC CLG (Point 54) are OFF.

Set LTD SAH STPT, GEN SAH STPT and UOC SAH STPT to their desired values.

## Setting LTD CLG POS, GEN CLG POS and UOC CLG POS

Set LTD CLG POS, GEN CLG POS and UOC CLG POS to their desired values.

LTD CLG POS (Point 60) is the per cent open position the cooling valve will be sent to when the low temperature detector has gone into alarm.

GEN CLG POS (Point 61) is the per cent open position the cooling valve will be sent to when a general alarm is occurring.

UOC CLG POS (Point 62) is the per cent open position the cooling valve will be sent to when a fan proof failure has occurred. It is also the per cent open position the cooling valve will be sent to during the unoccupied period when both UOC HTG (Point 53) and UOC CLG (Point 54) are OFF.

## Setting LTD HTG POS, GEN HTG POS and UOC HTG POS

**Application 2503 only:**

Set LTD HTG POS, GEN HTG POS and UOC HTG POS to their desired values.

LTD HTG POS (Point 60) is the per cent open position the heating valve will be sent to when the low temperature detector has gone into alarm.

GEN HTG POS (Point 61) is the per cent open position the heating valve will be sent to when a general alarm is occurring.

UOC HTG POS (Point 62) is the per cent open position the heating valve will be sent to when a fan proof failure has occurred. It is also the per cent open position the heating valve will be sent to during the unoccupied period when both UOC HTG (Point 53) and UOC CLG (Point 54) are OFF.

## Setting Override Time

If using unoccupied override, then set OVRD TIME (Point 20) to the number of whole hours that an override should last. Otherwise, leave OVRD TIME at its default value of 0 (unoccupied override is disabled).

## Setting Start and Span of Voltages for the 0-10V Actuators

Depending on the actuators you are using, setpoints listed in Table 3 to the appropriate starting voltage position and the voltage range for the actuators.

**NOTES:** The maximum voltage output for the AOs is 10V. Therefore, the starting voltages and the voltage ranges must not exceed 10V. The controller will not control the actuator beyond 10V.

Applications 2502 and 2503 support only valve actuators, not damper actuators.

**Table 3. Start and Span Voltages for Actuators.**

| Descriptor | Point Number | Siemens Business Technologies P/N SQB 61.1 | Barber-Coleman P/N MP5433 |
|---|---|---|---|
| | | **Voltage Range** | |
| AOV2 SPAN<br>AOV3 SPAN | 33<br>35 | 10 (default) | 3 |
| | | **Starting Voltage** | |
| AOV2 START<br>AOV3 START | 34<br>36 | 0 (default) | 6 |

## Setting AO DIR.REV

If the normal (de-energized) state of all of the devices controlled by AOs is direct-acting, then leave AO DIR.REV (Point 37) at its default value of 0.

Otherwise, reverse the action of the appropriate AO, or combination of AOs, as follows:

1. Add the values in Table 3 for each AO you wish to make reverse-acting.
2. Set AO DIR.REV to this value.

**Example:** If you want AO 1 and AO 2 to be reverse-acting, set AO DIR.REV to 3.

**Table 3. AO DIR.REV Values.**

| Reverse-Acting AO | Value |
|---|---|
| AO 1 | 1 |
| AO 2 | 2 |
| AO 3 | 4 |

## Setting DO DIR.REV

If the normal (de-energized) state of all of the devices controlled by DOs is direct-acting, then leave DO DIR.REV (Point 59) at its default value of 0.

Otherwise, reverse the action of the devices as follows:

1. Add the values in Table 4 for each DO you wish to make reverse-acting.
2. Set DO DIR.REV to this value.

**Example:** If you want DO 5 and DO 6 to be reverse-acting, set DO DIR.REV to 3.

**Table 4. DO DIR.REV Values.**

| Reverse-Acting DO | Value |
|---|---|
| DO 1 | 32 |
| DO 2 | 16 |
| DO 3 | 8 |
| DO 4 | 4 |
| DO 5 | 2 |
| DO 6 | 1 |
| DO 7 | 64 |
| DO 8 | 128 |

## OA TEMP

Some of the actions of applications 2502 and 2503 depend on the outside air temperature. However, the TEC does not have an outside air temperature sensor connected to it. The way to get outside air temperature sensor information into these applications is to unbundle OA TEMP (Point 75) and adjust its value in a field panel.

## WRMUP.COOLDN

As an added safety, it is recommended to command WRMUP.COOLDN to OFF in the field panel when the desired occupancy time occurs. (This could be done in Time of Day Programming, for instance.) After commanding the WARMUP.COOLDN point to OFF, execute a release command at the field panel in order to release the control of the WRMUP.COOLDN point back to the TEC. This prevents the TEC from getting stuck in warmup or cooldown mode.

## Applications 2502/2503 and CSAL

Refer to the application bulletins for these applications to see how they relate to CSAL applications. See the sections titled *Application 2502 and CSAL Applications* and *Application 2503 and CSAL Applications*.

The Startup is complete.