SIEMENS

Air Handling Unit Controller – Electronic Output

TEC 0807.11

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Verifying power to controller

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 balancing, tuning, etc.

Verify that the Small Point 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 Manual* (125-3013) for troubleshooting information.

NOTE: The Controller Interface Software (CIS) used with the Small Point Controller firmware revision UA10 or higher must be Rev. 2.0 or greater. Voyager's point database may also be used for start-up.

Verifying slave mode application number

1. Verify that the point APPLICATION (number 2) is set to 2393 (slave mode).
2. Display the STARTUP report.

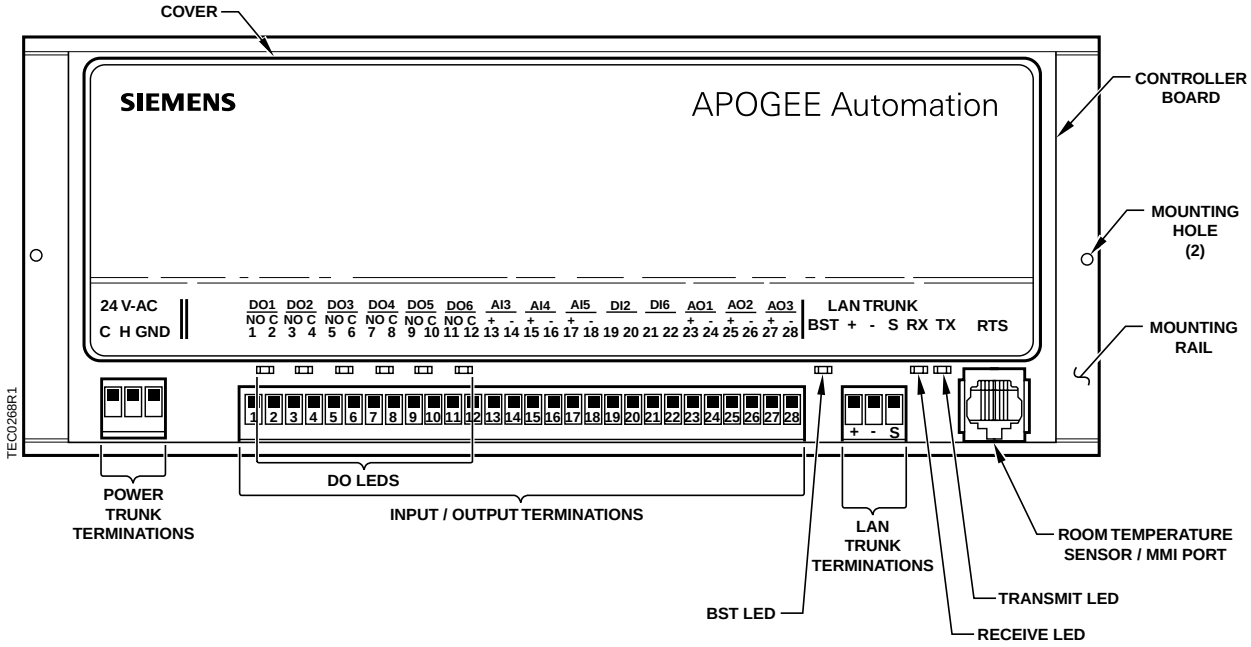

Figure 1. Small Point Controller.

Setting motor timing

The run time of each actuator is indicated by the points MTR1 TIMING (number 72) and MTR2 TIMING (number 76).

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

Table 1. 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.

Setting MTR SETUP

The point MTR SETUP (number 78) determines which actuators will be controlled by the application and whether they are direct or reverse-acting.

Standard Configuration – Refer to Table 2 to set MTR SETUP as follows:

1. Refer to Table 2 for the MTR SETUP values for the most common configuration based on each application.
2. Find the application you are setting up in Table 2.
3. Set MTR SETUP to the value given for that application.

NOTE: The assumptions for this table are:

- Cooling valves are Normally Closed (NC)
- Heating valves are Normally Open (NO)

Non-Standard Configuration – If your application does not use one of the listed actuators in Table 2, if one of your actuators has a different normal position than that listed in Table 2, or if you want to use a spare motor, then refer to Table 3 to set MTR SETUP as follows:

1. Choose the column that corresponds to how Motor 1 will be used in your application.
2. The column you have chosen is further divided into 3 rows based on how Motor 2 is to be used. Choose the row that corresponds to how Motor 2 will be used in your application.
3. Set MTR SETUP to the value of the number in the row and column you have chosen.

Table 2. MTR SETUP Value for Most Common Configurations.

Applications	Configurations		Value for MTR SETUP
	Motor 1	Motor 2	
2308	spare	heating valve (normally open)	12
2309	cooling valve (normally closed)	not available	1
2310	not available	not available	0
2311	cooling valve (normally closed)	heating valve (normally open)	13
2312	cooling valve (normally closed)	not available	1
2313	not available	not available	0

If any of the actuators do not close completely, then the actuators have been installed or set up incorrectly. Refer to the actuator installation instructions, set up information, Table 3, or the *Apogee Automation Service Procedures Manual* (125-3013) for more information.

Table 3. Motor Enable/Reverse Values for MTR SETUP.

	Motor 1 Not Used	Motor 1 Enabled	Motor 1 Enabled and Reversed
Motor 2 Not Used	0	1	3
Motor 2 Enabled	4	5	7
Motor 2 Enabled and Reversed	12	13	15

Setting DO DIR.REV

If the normal (de-energized) state of all of the devices controlled by DOs is off, then leave the point DO DIR.REV (number 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.

Table 4. DO DIR.REV Values.

Reverse-Acting DO	Value
DO1	32
DO2	16
DO3	8
DO4	4
DO5	2
DO6	1

NOTE: DO DIR.REV only affects DOs not being used for floating control actuators. Use the point MTR SETUP (number 78) to reverse the operation of an actuator.

Setting AO DIR.REV

If the normal (de-energized) state of all of the devices controlled by AOs is closed, then leave the point AO DIR.REV (number 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 5 for each AO you wish to make reverse-acting.

2. Set AO DIR.REV to this value.

Table 5. AO DIR.REV Values.

Reverse-Acting AO	Value
AO1	1
AO2	2
AO3	4

Setting 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).

Setting application

Set the point APPLICATION (number 2) to the appropriate Small Point Controller application. Refer to Table 6 for application names and numbers.

Table 6. Small Point Controller Applications.

Application	Revision UA10 or higher
VAV with CHW, HW, Economy Cycle & Static Pressure Control	2308
VAV with CHW, Electric Heat, Economy Cycle & Static Pressure Control	2309
VAV with DX Cooling, Electric or RC Heat, Static Pressure Control & Dump Back Damper	2310
CAV with CHW, HW, Economy Cycle & CO_2 Sensor	2311
CAV with CHW, Electric Heat, Economy Cycle & CO_2 Sensor	2312
CAV with DX Cooling, Electric or RC Heat, Economy Cycle & CO_2 Sensor	2313
Slave Mode	2393

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.

At the start of the calibration cycle, if the point MTR SETUP (number 78) is not 0, the controller automatically sets the point CAL DPR (number 94) to YES. When the cycle is complete, it sets CAL DPR to NO.

It is not necessary to wait until the calibration cycle is complete (CAL DPR is set to NO) before continuing with this start-up procedure.

Setting up for shutdown mode

Set the point SHUTDN TIME (number 60) to the amount of time that the fan should run after entering the shutdown mode.

Setting up for night purge mode

The point PURGE OK (number 82) must be commanded to YES by the field panel in order for purge mode to be enabled.

Set the point PURGE START (number 27) to the temperature that the point MAX RM TEMP (number 21) must rise above, before purge mode will start.

Set the point PURGE END (number 28) to the temperature that MAX RM TEMP must fall below, before purge mode will stop.

Setting up for re-circulation mode

Set the point RECIRC TIME (number 61) to the amount of time that the controller should stay in re-circulation mode before switching to either warm-up, cool-down, or normal mode.

Set the point HTG NEEDED (number 51) to the temperature that the return air temperature must be below when RECIRC TIME expires in order for the mode to change to warm-up.

Set the point CLG NEEDED (number 52) to the temperature that the return air temperature must be above when RECIRC TIME expires in order for the mode to change to cool-down.

Setting up for warm-up mode

The supply air temperature set point used in warm-up mode is determined by a table based on the return air temperature as follows:

- When the return air temperature rises to the point RAT HIH (number 47), the supply air set point drops to the point HSTP LO (number 12).
- When the return air temperature drops to the point RAT LOH (number 48), the supply air set point rises to the point HSTP HI (number 11).

Set these four points as required.

Setting up for cool-down mode

Application 2308: The supply air temperature set point used in cool-down mode is determined by a table based on the return air temperature as follows:

- When the return air temperature rises to the point RAT HIC (number 16), the supply air set point drops to the point CSTP LO (number 6).
- When the return air temperature drops to the point RAT LOC (number 17), the supply air set point rises to the point CSTP HI (number 5).

Set these four points as required.

Application 2313: The supply air cooling loopout used in cool-down mode is determined by a table based on the return air temperature as follows:

- When the return air temperature rises to the point RAT HIC (number 16), the point SA CLO (number 34) rises to 100%.
- When the return air temperature drops to the point RAT LOC (number 17), SA CLO drops to 0%.

Set RAT HIC and RAT LOC as required.

Setting up for occupied mode

Set the point OCC TIME (number 62) to the amount of time that the controller should stay in coast mode after entering the occupied mode.

The heating supply air temperature set point is determined by a table based on the point MAX RM TEMP (number 21) as follows:

- When MAX RM TEMP rises to the point RM HIH (number 49), the heating supply air temperature set point drops to the point HSTP LOO (number 14).
- When MAX RM TEMP drops to RM LOH (number 50), the minimum outside air damper position rises to HSTP HIO (number 13).

Set these four points as required.

Application 2308: The outside air damper position used in occupied mode (unless the damper position called for free cooling is greater) is determined by a table based on the speed of the fan as follows:

- When the fan speed rises to the point VSD HI (number 89), the outside air damper position drops to the point OA DPR LO (number 92).
- When the fan speed drops to the point VSD LO (number 90), the outside air damper position rises to the point OA DPR HI (number 91).

Set these four points as required.

The cooling supply air temperature set point is determined by a table based on MAX RM TEMP as follows:

- When MAX RM TEMP rises to the point RM HIC (number 18), the cooling supply air temperature set point drops to the point CSTP LOO (number 8).
- When MAX RM TEMP drops to the point RM LOC (number 19), the cooling supply air temperature set point rises to the point CSTP HIO (number 7).

Set these four points as required.

NOTE: HSTP HIO should be set lower than CSTP HIO and HSTP LOO should be set lower than CSTP LOO to ensure that the heating supply air set point will always be lower than the cooling supply air set point.

Application 2313: The minimum outside air damper position used in occupied mode is determined by a table based on the CO_2 reading as follows:

- When the fan speed rises to the point CO2 HI (number 89), the minimum outside air damper position rises to the point OA DPR HI (number 91).
- When the fan speed drops to the point CO2 LO (number 90), the minimum outside air damper position drops to the point OA DPR LO (number 92).

Set these four points as required.

The supply air cooling loopout is determined by a table based on MAX RM TEMP as follows:

- When MAX RM TEMP rises to the point RM HIC (number 18), the cooling supply air loopout rises to 100%.
- When MAX RM TEMP drops to the point RM LOC (number 19), the cooling supply air loopout drops to 0%.

Set RM HIC and RM LOC as required.

Setting mode control

Set the point TIME CLOCK (number 81) to NO if a field panel is used for mode control. Set TIME CLOCK to YES if DI 2 is used for mode control.

Setting static pressure sensor range

Applications 2308, 2309, and 2310: Set the point SP RANGE (number 79) to the high limit of the static pressure sensor being used. The sensor's range must be 0 to SP RANGE.

Setting CO_2 sensor range

Applications 2311, 2312, and 2313: Set the point CO2 RANGE (number 80) to the high limit of the CO_2 sensor being used. The sensor's range must be 0 to CO2 RANGE.

Setting fan proof time

Set the point ALARM TIME (number 63) to the amount of time to wait for the fan to proof after it is turned on, before the fan point is set to failed status (*F*).

Setting free cooling cutoff temperature

Set the point TOO HOT (number 23) to the temperature above which the outside air damper will not be used as a source of free cooling.

Setting up reversing valve

Applications 2310 and 2313: Set the point RV USED (number 87) to YES if a reversing valve is used.

Setting up heating stages

Applications 2309, 2310, 2312, and 2313: Set the point HTG STAGES (number 85) to the number of heating stages to be used (up to three if there is no reversing valve, up to two if there is a reversing valve).

Set the points HTG STG1 ON (number 30) and HTG STG2 ON (number 31) to the heating loopout values where the first and second stages of heating should turn on (the third stage, if used, turns on when the loopout reaches 96%).

NOTE: HTG STG1 ON must be greater than 5% and HTG STG2 ON must be less than 96%.

Setting up cooling stages

Applications 2310 and 2313: Set the point CLG STAGES (number 86) to the number of DX cooling stages to be used (up to 2).

Set the point CLG STG1 ON (number 32) to the cooling loopout value where the first stage of cooling should turn on (the second stage, if used, turns on when the loopout reaches 96%).

NOTE: CLG STG1 ON must be greater than 32%, less than 96%.

Setting up MIN ON and MIN OFF times

Applications 2310 and 2313: Set the points MIN ON (number 64) and MIN OFF (number 65) to the minimum on and off times for the cooling compressor.

Setting cooling low limit

Applications 2310 and 2313: Set the point LLIMIT (number 53) to return air temperature below which the cooling stages will not be allowed to turn on.

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.).

The Small Point Controller start-up is complete.