SIEMENS

Lighting Control—with Latched or Maintained Relays

Start-up Procedures

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Before You Begin

Application 2461 uses "latched" relays. When starting up a controller that will be running Application 2461, the relays that energize the lighting circuit(s) should be in an OFF state. This is because the controller does not detect the latched state of the relay on startup (i.e., whether it is on or off).

Verify that the controller is powered up. Check to see if the BST LED (Figure 1) on the controller is flashing. If the BST LED does not flash ON/OFF once per second, see the *APOGEE Automation Service Procedures* on InfoLink for troubleshooting information. 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.

If you are going to enter an LCTLR point at the field panel, keep track of the controller address, application, and override time you enter at the portable operator's terminal. You will be required to enter these values again at the field panel.

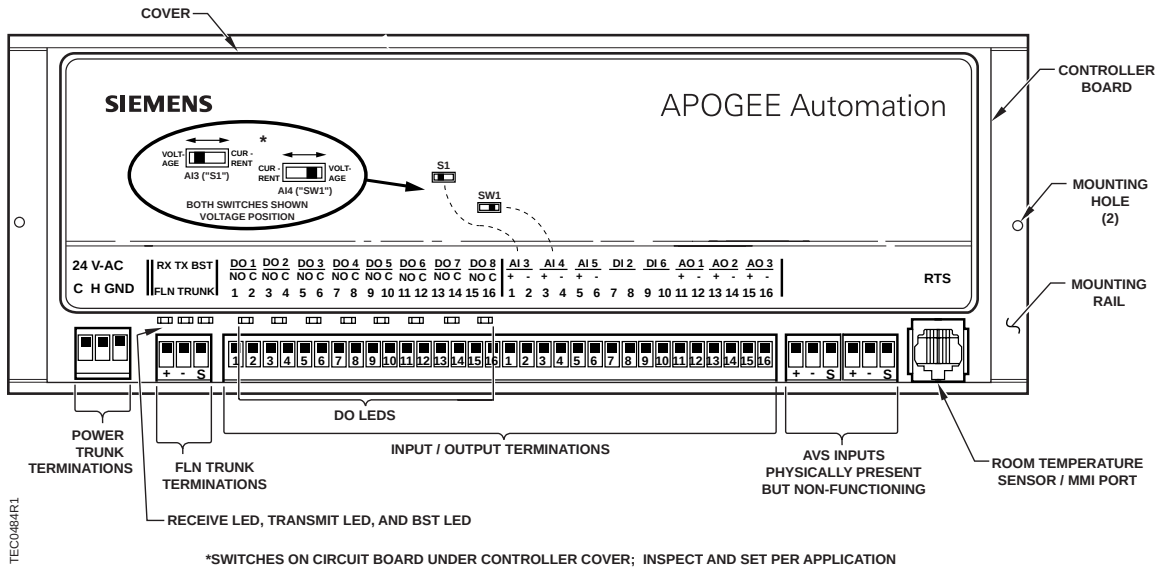

Figure 1. Lighting Control with Latched or Maintained DOs.

Setting Controller Address

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

Setting the Application

Add the TEC to your job database and select one of the following applications.

Table 1. Lighting Control Applications.

Application Description	Application Number
Lighting Control with Latched DOs	2461
Lighting Control with Maintained Contact DOs	2462
Slave Mode	2466

Set Application (Point 2) to the application number that you have chosen.

Setting Room Temperature Setpoints

Points 6, 7, 8, and 9 are the room temperature setpoints. The following list shows the function of each point (point names vary per application):

- Point 6: DAY (or OCC) cooling setpoint.
- Point 7: DAY (or OCC) heating setpoint.
- Point 8: NGT (or UOC) cooling setpoint.
- Point 9: NGT (or UOC) heating setpoint.

1. If the room temperature sensor has a setpoint dial that will be used, set STPT DIAL (Point 14) to **YES**. Otherwise set STPT DIAL to **NO**.
2. Set Points 6 through 9 to desired values.

If STPT DIAL is set to YES, Points 6 and 7 can be skipped; the value of RM STPT DIAL (Point 13) is used instead.

3. 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°F to 95°F (13°C to 35°C). Default values are 55°F (13°C) for RM STPT MIN and 90°F (32°C) for RM STPT MAX.

If STPT DIAL is set to YES and DAY CLG STPT is equal to DAY HTG STPT, DAY HTG STPT and DAY CLG STPT will not be used. Only the value of RM STPT DIAL will be used, and CTL STPT (Point 92) will be set equal to RM STPT DIAL.

However, if STPT DIAL is set to YES and DAY CLG STPT is not equal to DAY HTG STPT, DAY CLG STPT and DAY HTG STPT will be used to set up a temperature deadband (or zero energy band) around RM STPT DIAL. (This deadband can help reduce energy use.) When HEAT.COOL (Point 5) = HEAT, CTL STPT will be set equal to RM STPT DIAL – 0.5 * (DAY CLG STPT – DAY HTG STPT) and when HEAT.COOL = COOL, CTL STPT will be set equal to RM STPT DIAL + 0.5 * (DAY CLG STPT – DAY HTG STPT).

Whether or not there is a temperature deadband around RM STPT DIAL, the application limits CTL STPT to the temperature range of RM STPT MIN to RM STPT MAX.

Setting HC.ENDIS

HC.ENDIS (Point 91) determines whether the application is heating only, cooling only, or if it uses both heating and cooling modes.

Set HC.ENDIS to the desired value.

The default value for HC.ENDIS is 3, both heating and cooling are enabled. 1 = heating only; 2 = cooling only.

Setting Override Time

If using night/unoccupied override, set OVRD TIME (Point 20) 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 (occ/unocc) control, enable it by setting WALL SWITCH (Point 18) to **YES**.

Setting Room Temperature Offset (optional)

TEMP OFFSET (Point 3) is a user-adjustable offset that compensates for deciations between the value of ROOM TEMP (Point 4) and the actual room temperature. This corrected value displays in CTL TEMP (Point 78).

CTL TEMP (Point 78) = ROOM TEMP (Point 4) + TEMP OFFSET (Point 3)

For example; if the actual room temperature is 72.0°F and the value of ROOM TEMP is 73.0°F, then the value entered into TEMP OFFSET is -1.0. In this case, ROOM TEMP displays 73.0°F and CTL TEMP displays the calculated offset, 72.0°F.

Lighting Control

The next couple of sections provide background information about lighting control. Then the remainder of the document is about lighting control startup.

	Switch Type	Day Mode MODE (Point 10) = 0	Transition to Night	Night Mode MODE (Point 10) = 1	Transition to Grave	Graveyard Mode MODE (Point 10) = 2	Transition to Day Any/all active override timers set to 0
ENABLE ORDER ↓ f	**Virtual Light Harvesting (VLH)** [a]	Simple ON/OFF (or provides on/off enabling to another switch)	On' lights turn off. (or provides on/off enabling to another switch)	Lights are off. (or provides on/off enabling to another switch)	On' lights turn off. (or provides on/off enabling to another switch)	Lights are off. (or provides on/off enabling to another switch)	**VLH** If enabling another switch, provides on/off enabling.
		AHU action depends on CYCLE AHU (Point 65)	*Never an override request // AHU REQUIRED (Point 70) cycles based on temperature* **NOTE:** Shaded areas and italic text in this table refer only to AHU operation -- not to lighting control.				
	Direct/Pulsed (D/P) [b]	Simple ON/OFF	On' lights turn off (or provides on/off enabling to another switch)	Off unless turned on or 'flicked' on, then on for OVRD TIME or DAY ON TIME (which-ever is less) unless turned back off. Or, provides simple on/off enabling for another switch.	On' lights turn off (or provides on/off enabling to another switch)	Off unless turned on or 'flicked' on, then on for GRVYD ONTIME unless turned back off. Or, provides simple on/off enabling for another switch.	**D/P** **If** a light is on, it will stay on.
		AHU action depends on CYCLE AHU (Point 65)	*AHU action follows the status of AHU REQUIRED*	*Flick = override request* [e]	*An active override request continues into Grave*	*New override requests are ignored*	
	Direct [c]	Simple ON/OFF	On' lights stay on (or provides on/off enabling to Timed switch)	Simple on/off (or provides on/off enabling to Timed switch)	On' lights stay on (or provides on/off enabling to Timed switch)	Simple on/off (or provides on/off enabling to Timed switch)	**Direct** If a light is on, it will stay on.
		AHU action depends on CYCLE AHU (Point 65)	*AHU action depends on CYCLE AHU (Point 65)*	*On = override request* [e]	*An active override request continues into Grave*	*New override requests are ignored*	
	Timed [d]	A push of the button = lights on for DAY ON TIME	On' lights turn off	A push of the button = lights on for OVRD TIME or DAY ON TIME (whichever is less)	On' lights turn off	A push of the button = lights on for GRVYD ONTIME	**Timed** If a light is on, it will turn off.
		AHU action depends on CYCLE AHU (Point 65)	*AHU action follows the status of AHU REQUIRED*	*A push of the button activates the AHU for OVRD TIME*	*An active override request continues into Grave*	*New override requests ignored except DI 1 (push-button on RTS) which results in OVRD TIME*	

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Figure 2. Application 2461 Action Table.

a. Virtual Light Harvesting (VLH) switch. AI.DI TYPE point must be set to **4**. VLH requires 0-10V or 4-20mA light sensor(s) input into AI 3 and/or AI 4. If AI 3 and AI 4 are used for VLH, DI 3 and DI 4 are unavailable for other purposes.

LOW SWITCH PRIORITY: If both VDI 3 and VDI 4 (Point 22 and Point 23) try to control the same light circuit, VDI 4 is ignored.

AI 5 can be 100K ohm thermistor (but not VLH switch). If thermistor, AI.DI 5 TYPE (Point 37) must be set to 4, and DI 5 is unavailable.

b. Direct/Pulsed (D/P) switch (aka "Master-Off" switch). DI TYPE point must be set to **2**. Inputs: DI 2 through DI 6. DI 2 can be a D/P switch or Wall Switch, but not at the same time. A D/P switch is a simple 2-position ON/OFF switch but with an additional 'Flick-a-Switch' function. Flick a switch simply means to turn the switch off and then back on, like you would need to do if it had been left in the ON position from earlier in the day but the lights had since turned off due to a mode change. When this switch is used in Night or Graveyard modes, the lights turn on for a timed amount of time and not

indefinitely. In addition to this “Flick-a-Switch” function, a D/P switch also works well as an enable switch for an on/off people sensor (i.e., a Direct switch) or a Timed switch (see “ENABLE ORDER”). A D/P switch probably should not be used as a people sensor.

LOW SWITCH PRIORITY: Two or more D/P switches can NOT control the same light circuit(s) (LC). Example: if D/P switches are wired to DI 3 and DI 5, and each is configured to control LC2, then only DI 3 controls LC2, while DI 5 is ignored.

c. Direct switch. DI TYPE point must be set to **1**. A simple 2-position ON/OFF switch, like a manual toggle or an automatic people sensor. Inputs: DI 2 through DI 6. DI 2 can be a Direct switch AND a Wall Switch at the same time.

   LOW SWITCH PRIORITY: Two or more Direct switches can NOT control the same light circuit(s) (LC). Example: if Direct switches are wired to DI 3 and DI 5, and each is configured to control LC2, then only DI 3 controls LC2, while DI 5 is ignored.

d. Timed switch. This is a momentary contact push-button. DI TYPE point must be set to **3**. A push of the button resets a timer and will turn the lights on for DAY ON TIME (Point 16) in Day Mode; DAY ON TIME or OVRD TIME (Point 20), whichever is less, in Night Mode; and GRVYD ONTIME (Point 17) in Graveyard Mode.

   - **DAY ON TIME** can be set for 1 to 18 hrs or to 0 (default) for infinity
   - **OVRD TIME** can be set for 1 to 18 hrs or to 0 (default); if set to 0, OVRD TIME is disabled
   - **GRVYD ONTIME** can be set for 1 to 255 minutes or to 0 (default) for infinity

   Inputs: DI 1 through DI 6. If DI 1 (the push-button on the RTS) is used for lighting control, it can only be a Timed switch (there is no DI 1 TYPE point in the database). DI 2 can be a Timed switch or a Wall Switch, but not at the same time.

   SWITCH PRIORITY: None. You can have multiple push-button Timed switches controlling the same light circuit(s). Every time one of the push-buttons is pushed, the timer is reset.

e. In Night Mode, when an override request is made, the length of the override (in terms of AHU action) depends on the type of switch making the request. In Night Mode, Timed and D/P switches will activate the AHU for OVRD TIME, whereas a Direct switch override lasts until the switch is turned off + AFTER TIME (Point 71).

If AFTER TIME is set to 0, then a Direct switch will not activate the AHU at all during Night Mode; this option can be considered for energy savings.

A special case exists in Night Mode if a D/P switch is used to enable another switch. Although the enabled switch controls the lights, the D/P switch—if turned on or “flicked”—will send a new override request to the AHU, resetting the override timer to OVRD TIME. This is true even when the switch being enabled is off and its lights are off. Also, if a D/P switch happens to get “flicked” while enabling a Timed switch, the Timed switch’s lights will go off if they were on, and the Timed switch will need to be pushed again to turn the lights back on.

f. **ENABLE ORDER:** A **single switch type** can be wired into a single DI to control one or more light circuits. Or, **more than one switch type** can be wired into multiple DIs (one switch type per DI) to control one or more light circuit(s). When two different switch types are controlling the same light circuit(s), only one is allowed to control the lights directly. The other switch is merely an on/off enable switch for the switch that directly controls the lights. If the enabling switch is on, then the switch being enabled can turn the lights on and off. If the enabling switch is off, then the enabled switch is disabled and has no effect on the lights. When switch(es) are being used to enable another switch, an Enable Order must be followed, see Figure 2.

   For example, a Direct switch can enable a Timed switch, but a Timed switch cannot enable a Direct switch. Another possible example would be a VLH switch and a Direct switch both being used to enable a Timed switch. Another example would be a D/P switch enabling a Timed switch. Any combination is possible so long as the Enable Order is followed. Note that a Timed switch, if used with another switch or switches, will always be the last switch in the Enable Order. Therefore, a Timed switch cannot be used to enable another switch. Note also that just because a great number of switch enabling and lighting circuit control combinations are possible, not all will have a practical use.

Light Switches

This application supports a number of different types of light switches.

The following is a brief explanation of how these light switches operate.

Timed DIs – A timed DI is a momentary contact DI that resets a timer when it is closed. The lights that this DI controls will be on for the length of time in the timer. A common use of a timed DI is as a push-button. In this application bulletin, timed DI and momentary contact push-button will be used interchangeably. DIs 1 through 6 can be timed DIs.

If DI 2 is used as a timed DI, it cannot also be used as a Wall Switch.

Direct DIs – A direct DI is basically a simple on/off switch. The lights this DI controls will be on when the DI is on (closed) and off when the DI is off (Opened). A common use of a Direct DI is a people sensor. In this application, direct DI and people sensor will be used interchangeably. DIs 2 through 6 can be direct DIs.

Direct/Pulsed DIs – A direct/pulsed DI has some of the characteristics of an on/off switch and some of the characteristics of a momentary contact DI. See for more information on how a direct/pulsed DI works. A common use for a direct/pulsed DI is as a master off switch. In this application, direct/pulsed DI and master off switch will be used interchangeably. DIs 2 through 6 can be direct/pulsed DIs.

If DI 2 is used as a direct/pulsed DI, it cannot also be used as a Wall Switch.

Light Harvesting AIs – A light harvesting AI is used to turn off lights when the background lighting level is high and turn lights on when the background lighting level is low. AIs 3 and 4 can be used as light harvesting AIs.

Light Control Configuration Restrictions

This application can support a variety of different lighting control configurations. However, there are limitations to these lighting control configurations.

Light Switches

If DI 1 (Point 19, the push-button on the RTS) is used in lighting control, it can only be used as a timed DI (a momentary contact push-button). It can be configured to control all lighting circuits or any subset of them, Application 2461 = 4 and Application 2462 = 8. (DI 1 can function as a night override switch and as a push-button light switch at the same time.)

If DI 2 (Point 24) is used in lighting control, it can be a timed DI (a push-button), a direct DI (a maintained contact people sensor, or a direct/pulsed DI (a maintained contact master off switch, that also uses the off/on transition as a control signal). It can be configured to control all lighting circuits or any subset of them.

If DI 2 is configured as a direct DI, it can also be used as a wall switch at the same time. DI 2 cannot be both a timed DI light switch and a wall switch at the same time. Also, DI 2 cannot be both a direct/pulsed DI and a wall switch at the same time.

If DI 3 (Point 25) is used in lighting control, it can be a timed DI (a push-button), a direct DI (a maintained contact people sensor, or a direct/pulsed DI (a maintained contact master off switch, that also uses the off/on transition as a control signal). It can be configured to control all lighting circuits or any subset of them.

If AI 3 (Point 15) is used as a light harvesting AI, then virtual DI 3 (VDI 3 (Point 22)) can be used to control the lighting circuits. It can be configured to control all lighting circuits or any subset of them.

Since AI 3 and DI 3 share the same terminations, AI 3 and DI 3 cannot be used at the same time.

The way the application is designed, if AI 3 is not used in light harvesting, then virtual DI 3 (VDI 3) has no effect on the lighting control (or anything else), even if it is overridden.

If DI 4 (Point 26) is used in lighting control, it can be a timed DI (a push-button), a direct DI (a maintained contact people sensor, or a direct/pulsed DI (a maintained contact master off switch, that also uses the off/on transition as a control signal). It can be configured to control all lighting circuits or any subset of them.

If AI 4 (Point 81) is used as a light harvesting AI, then virtual DI 4 (VDI 4 (point 23)) can be used to control the lighting circuits. It can be configured to control all lighting circuits or any subset of them.

Since AI 4 and DI 4 share the same terminations, AI 4 and DI 4 cannot be used at the same time.

The way the application is designed, if AI 4 is not used in light harvesting, then virtual DI 4 (VDI 4) has no effect on the lighting control (or anything else), even if it is overridden.

If DI 5 (Point 27) is used in lighting control, it can be a timed DI (a push-button), a direct DI (a maintained contact people sensor, or a direct/pulsed DI (a maintained contact master off switch, that also uses the off/on transition as a control signal). It can be configured to control all lighting circuits or any subset of them.

AI 5 (Point 82) cannot be used for light harvesting. However, if a thermistor is connected to AI 5, this application will monitor that temperature. Since AI 5 and DI 5 share the same terminations, it means that if a thermistor is connected to AI 5, DI 5 is unavailable for lighting control.

If DI 6 (Point 28) is used in lighting control, it can be a timed DI (a push-button), a direct DI (a maintained contact people sensor, or a direct/pulsed DI (a maintained contact master off switch, that also uses the off/on transition as a control signal.) It can be configured to control all lighting circuits or any subset of them.

A DI can only be one type of light switch. For example, DI 2 cannot be configured to be a timed DI and a direct DI at the same time.

Table 2. TYPE Point Values.

Value[a]	**TYPE Point Description** [b]
0	Spare
1	Direct
2	Direct/Pulsed
3	Timed
4	Analog-Light Harvest (AI3 and/or AI4 only)
4	100K ohm Thermistor (AI5 only)

[a] Values are NOT additive.

[b] DI 1 TYPE, DI 2 TYPE and DI3 TYPE etc. are examples of TYPE points.

Table 3. USE Point Values.

Value[a]	**USE Point Description** [b]
0	No light circuit
1	Lighting Circuit 1 (LC1)
2	LC2
4	LC3
8	LC4
16[c]	LC5

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Table 3. USE Point Values. ***(continued)***

Value[a]	USE Point Description [b]
32	LC6
64	LC7
128	LC8

[a] Values are Additive. A value of 9 = LC1 and LC4.

[b] DI 1 USE, DI 2 USE and DI 3 USE, etc. are examples of USE points.

[c] A value of 16 or higher only applies to Application 2462.

Lighting Circuits

Lighting Circuit 1 can be controlled by multiple light switches at the same time based on Enable Order, see Figure 2. These light switches can be different types of switches. At the same time, lighting circuit 1 can be controlled by:

- 1 people sensor (1 direct DI)
- 1 master off switch (1 direct / pulsed DI)
- 1 light harvesting AI (and its corresponding virtual DI)
- As many timed DIs (push-buttons) as are physically available

Lighting circuit 1 can also be controlled by a subset of these:

- If 2 or more direct DIs are configured to control lighting circuit 1, the lowest numbered DI controls lighting circuit 1.

  The other DIs will be ignored.
  For example, if DIs 2, 4 and 5 are configured as direct DIs that are all controlling lighting circuit 1, then DI 2 controls lighting circuit 1 and DIs 4 and 5 won't.

- If 2 or more direct/pulsed DIs are configured to control lighting circuit 1, the lowest numbered DI controls lighting circuit 1.

  The other DIs will be ignored.
  For example, if DIs 3, 5 and 6 are configured as direct/pulsed DIs that are all controlling lighting circuit 1, DI 3 controls lighting circuit 1 and DIs 5 and 6 won't.

- If both AI 3 and AI 4 are configured as light harvesting AIs that control lighting circuit 1, AI 3 will be the light harvesting AI that controls lighting circuit 1 and AI 4 will not.

As stated above, lighting circuit 1 can be controlled at the same time by as many timed DIs (push-buttons) as are physically available.

For example, if only using timed DIs, then if DIs 1 thru 6 are all configured to control lighting circuit 1, the application will use all 6 DIs to control lighting circuit 1. The on time for lighting circuit 1 will be reset by the last button pushed.

If, on the other hand, DI 3 is being used as a people sensor (a direct DI), there are only 5 DIs on the TEC that can be used as timed DIs to control lighting circuit 1 (DIs 1, 2, 4, 5 and 6.)

In Application 2461 lighting Circuits 2 through 4 have the same configuration restrictions as lighting circuit 1. In Application 2462 lighting Circuits 2 through 8 have the same configuration restrictions as lighting circuit 1.

Other Configuration Considerations

- The application can support multiple people sensors (direct DIs) provided that they are controlling different lighting circuits. For example, it is permissible to configure DI 3 as a people sensor (direct DI) that is controlling lighting circuit 2 and DI 6 as a people sensor that is controlling lighting circuits 1 and 4.
- The application can support multiple master off switches (direct / pulsed DIs) provided that they are controlling different lighting circuits. For example, it is permissible to configure DI 3 as a master off switch (direct / pulsed DI) that is controlling lighting circuits 2, and 4, DI 5 as a master off switch that is controlling lighting circuit 3 and DI 6 as a master off switch that is controlling lighting circuit 1.
- The application can support AI 3 and AI 4 as both being light harvesting AIs at the same time, provided these AIs are controlling different lighting circuits. For example, it is permissible for AI 3 to be configured as a lighting harvesting AI that is controlling lighting circuits 1, 2 and 4 and AI 4 as a light harvesting AI that is controlling lighting circuit 3.

Setting Lighting Controls

In Application 2461 only, DOs used for lighting control are locked out and cannot be overridden, but LCx COMMAND points (Point 55 through Point 58) are command-able (override-able) and can be used to manually control the lights on or off if necessary.

Set DI 1 USE

DI 1 is the Night override switch on the RTS. In the database, it is DI OVRD SW (Point 19). DI 1 can also be used as a light switch. (There is no point in the database call DI 1 TYPE, this is because if DI 1 is used as a light switch, it must be a timed DI (a momentary contact push-button)

The following table shows the permissible values that DI 1 USE can have, and which lighting circuits DI 1 will control when DI 1 USE is set to a particular value. In the table, the number in parenthesis is the default value for DI 1 USE.

Table 4. Application 2461.

Value[a]	DI 1 USE (0)[b]
0	DI 1 does not control a lighting circuit.
1	DI 1 controls Lighting Circuit 1 (DOs 1 and 2)
2	DI 1 controls Lighting Circuit 2 (DOs 3 and 4)
4	DI 1 controls Lighting Circuit 3 (DOs 5 and 6)
8	DI 1 controls Lighting Circuit 4 (DOs 7 and 8)

[a] The values of DI 1 USE are additive.

[b] If DI 1 USE is greater than 16, the application will treat it as though it were set to 0.

Table 5. Application 2462.

Value[a]	DI 1 USE (0)[b]
0	DI 1 does not control a lighting circuit.
1	DI 1 controls Lighting Circuit 1 (DO 1)
2	DI 1 controls Lighting Circuit 2 (DO 2)
4	DI 1 controls Lighting Circuit 3 (DO 3)
8	DI 1 controls Lighting Circuit 4 (DO 4)
16	DI 1 controls Lighting Circuit 5 (DO 5)
32	DI 1 controls Lighting Circuit 6 (DO 6)
64	DI 1 controls Lighting Circuit 7 (DO 7)
128	DI 1 controls Lighting Circuit 8 (DO 8)

[a] The values of DI 1 USE are additive.

[b] If DI 1 USE is greater than 255, the application will use the last known “good” value.

Set DI 1 USE to the desired value.

Set DI 2 TYPE

DI 2 TYPE (Point 31) determines whether or not DI 2 is used as a light switch in lighting control. If DI 2 is used in lighting control, then DI 2 TYPE will determine what type of light switch DI 2 is. The following table shows the permissible values that DI 2 TYPE can have, and what type of light switch DI 2 (point 24) will be when DI 2 TYPE is set to a particular value. In the table, the number in parenthesis is the default value for DI 2 TYPE.

Value[a]	DI 2 TYPE (0)[b]
0	DI 2 is not used in lighting control.[c]
1	DI 2 is a direct DI.
2	DI 2 is a direct / pulsed DI.
3	DI 2 is a timed DI

[a] The values of DI 2 TYPE are not additive.

[b] If DI 2 TYPE is greater than 3, it displays 0 and the application will treat it as though it were set to 0.

[c] Not necessarily a spare DI. It may still be used as a Wall Switch.

Set DI 2 TYPE to the desired value.

It is permissible for DI 2 to be used as both a light switch and a wall switch at the same time, provided that it is a direct DI light switch. If DI 2 is a timed DI or a direct/pulsed DI light switch, then it cannot also be a wall switch.

Set DI 2 USE

A point closely associated with DI 2 TYPE is DI 2 USE (Point 32). When DI 2 (Point 24) is used as a light switch, DI 2 USE determines which lighting circuits DI 2 controls.

The following table shows the permissible values that DI 2 USE can have, and which lighting circuits DI 2 will control when DI 2 USE is set to a particular value. In the table, the number in parenthesis is the default value for DI 2 USE.

Table 6. Application 2461.

Value[a]	DI 2 USE (0)[b]
0	DI 2 does not control a lighting circuit.
1	DI 2 controls Lighting Circuit 1 (DOs 1 and 2)

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Table 6. Application 2461. ***(continued)***

Value[a]	DI 2 USE (0)[b]
2	DI 2 controls Lighting Circuit 2 (DOs 3 and 4)
4	DI 2 controls Lighting Circuit 3 (DOs 5 and 6)
8	DI 2 controls Lighting Circuit 4 (DOs 7 and 8)

[a] The values of DI 2 USE are additive.

[b] If DI 2 USE is set greater than 15, it displays 0 and the application will treat it as though it were set to 0.

Table 7. Application 2462.

Value[a]	DI 2 USE (0)[b]
0	DI 2 does not control a lighting circuit.
1	DI 2 controls Lighting Circuit 1 (DO 1)
2	DI 2 controls Lighting Circuit 2 (DO 2)
4	DI 2 controls Lighting Circuit 3 (DO 3)
8	DI 2 controls Lighting Circuit 4 (DO 4)
16	DI 2 controls Lighting Circuit 5 (DO 5)
32	DI 2 controls Lighting Circuit 6 (DO 6)
64	DI 2 controls Lighting Circuit 7 (DO 7)
128	DI 2 controls Lighting Circuit 8 (DO 8)

[a] The values of DI 2 USE are additive.

[b] If DI 2 USE is greater than 255, the application will use the last known "good" value.

DI 2 TYPE and DI 2 USE work together as follows:

If DI 2 TYPE is set to 1 and DI 2 USE is set to 5, DI 2 is a direct DI (an on/off switch) which controls Lighting circuits 1 and 3. If DI 2 TYPE is set to 3 and DI 2 USE is set to 8, DI 2 is a pulsed DI (a push-button that controls lighting circuit 4.

If DI 2 USE is set to 0, DI 2 is not used in lighting control regardless of the value of DI 2 TYPE. (In other words, when DI 2 USE is zero, the application will treat DI 2 TYPE as though it were set to zero as well.)

If DI 2 TYPE is set to 0, DI 2 is not used in lighting control regardless of the value of DI 2 USE.

Set DI 2 USE to the desired value.

Set AI.DI 3 TYPE

AI.DI 3 TYPE (Point 33) determines whether or not AI 3 (Point 15) or DI 3 (Point 25) is used as a light switch in lighting control. If AI 3 or DI 3 is used in lighting control, AI.DI 3 TYPE will determine what type of light switch AI 3 or DI 3 is.

The following table shows the values AI.DI 3 TYPE can have, and what type of light switch AI 3 or DI 3 will be when AI.DI 3 TYPE is set to a particular value. In the table, the number in parenthesis is the default value for AI.DI 3 TYPE.

Value[a]	AI.DI 3 TYPE (0)[b]
0	AI 3 /DI 3 is a spare AI / DI.
1	DI 3 is a direct DI.
2	DI 3 is a direct / pulsed DI.
3	DI 3 is a timed DI
4	AI 3 is an Analog Input used for light harvesting. In this case, AI 3 is associated with VDI 3.

[a] The values of AI.DI 3 TYPE are not additive.

[b] If AI.DI 3 TYPE is greater than 4, it displays 0 and the application will treat it as though it were set to 0.

Set AI.DI 3 TYPE to the desired value.

AI 3 and DI 3 share terminations on the TEC. When AI 3 is being used, DI 3 is unavailable. Likewise, when DI 3 is being used, AI 3 is unavailable.

Set DI 3 USE

A point closely associated with AI.DI 3 TYPE is DI 3 USE (Point 40). When AI 3 (Point 15) or DI 3 (Point 25) is used as a light switch, DI 3 USE determines which lighting circuits that AI 3 or DI 3 controls.

If AI 3 is used in lighting control (for Light Harvesting), it will be VDI 3 (Point 22) and not AI 3 that controls the lighting circuits.

DI 3 and VDI 3 are not the same thing. DI 3 is physical DI 3 on the TEC. VDI 3 is a virtual DI that is associated with AI 3 when AI 3 is used in light harvesting.)

The following table shows the values DI 3 USE can have, and which lighting circuits AI 3 or DI 3 will control when DI 3 USE is set to a particular value. In the table, the number in parenthesis is the default value for DI 3 USE.

Table 8. Application 2461.

Value[a]	DI 3 USE (0)[b]
0	Neither DI 3 nor VDI 3 controls a lighting circuit.
1	Either DI 3 OR VDI 3 controls Lighting Circuit 1 (DOs 1 and 2)
2	Either DI 3 OR VDI 3 controls Lighting Circuit 2 (DOs 3 and 4)
4	Either DI 3 OR VDI 3 controls Lighting Circuit 3 (DOs 5 and 6)
8	Either DI 3 OR VDI 3 controls Lighting Circuit 4 (DOs 7 and 8)

[a] The values of DI 3 USE are additive.

[b] If DI 3 USE is set greater than 15, it will display a zero on the display and the application will treat it as though it were set to 0.

Table 9. Application 2462.

Value[a]	DI 3 USE (0)[b]
0	Neither DI 3 nor VDI 3 controls a lighting circuit.
1	Either DI 3 OR VDI 3 controls Lighting Circuit 1 (DO 1)
2	Either DI 3 OR VDI 3 controls Lighting Circuit 2 (DO 2)
4	Either DI 3 OR VDI 3 controls Lighting Circuit 3 (DO 3)
8	Either DI 3 OR VDI 3 controls Lighting Circuit 4 (DO 4)
16	Either DI 3 OR VDI 3 controls Lighting Circuit 5 (DO 5)
32	Either DI 3 OR VDI 3 controls Lighting Circuit 6 (DO 6)
64	Either DI 3 OR VDI 3 controls Lighting Circuit 7 (DO 7)
128	Either DI 3 OR VDI 3 controls Lighting Circuit 8 (DO 8)

[a] The values of DI 3 USE are additive.

[b] If DI 3 USE is greater than 255, the application will use the last known “good” value.

AI.DI 3 TYPE and DI 3 USE work together as follows:

- If AI.DI 3 TYPE is set to 1 and DI 3 USE is set to 5, DI 3 is a direct DI (an on/off switch) which controls lighting circuits 1 and 3. If AI.DI 3 TYPE is set to 3 and DI 3 USE is set to 8, DI 3 is a timed DI (a push-button) that controls lighting circuit 4.
- If AI.DI 3 TYPE is set to 4 and DI 3 USE is set to 9, AI 3 is an AI used for light harvesting and is associated with VDI 3. VDI 3 controls lighting circuits 1 and 4. (VDI 3 stands for Virtual Digital Input 3.) When VDI 3 is used, it behaves like a direct DI. If AI.DI 3 TYPE is not set to 4, then VDI 3 is unusable.
- If DI 3 USE is set to 0, AI/DI 3 and VDI 3 are not used in lighting control regardless of the value of AI.DI 3 TYPE. AI/DI 3 becomes a spare AI/DI and VDI 3 becomes unusable. (In other words, when DI 3 USE is zero, the application will treat AI.DI 3 TYPE as though it were set to zero as well.)

- If AI.DI 3 TYPE is set to 0, then AI/DI 3 is a spare regardless of the value of DI 3 USE. Also, VDI 3 becomes unusable. (In other words, when AI.DI 3 TYPE is zero, the application will treat DI 3 USE as though it were set to zero as well.)

Set DI 3 USE to the desired value.

Set AI.DI 4 TYPE

AI.DI 4 TYPE (Point 35) determines whether or not AI 4 (Point 81) or DI 4 (Point 26) is used as a light switch in lighting control. If AI 4 or DI 4 is used in lighting control, AI.DI 4 TYPE will determine what type of light switch AI 4 or DI 4 is.

The following table shows the values AI.DI 4 TYPE can have, and what type of light switch AI 4 or DI 4 will be when AI.DI 4 TYPE is set to a particular value. In the table, the number in parenthesis is the default value for AI.DI 4 TYPE.

Value[a]	AI.DI 4 TYPE (0)[b]
0	AI 4 /DI 4 is a spare AI / DI.
1	DI 4 is a direct DI.
2	DI 4 is a direct / pulsed DI.
3	DI 4 is a timed DI
4	AI 4 is an Analog Input used for light harvesting. In this case, AI 4 is associated with VDI 4.

[a] The values of AI.DI 4 TYPE are not additive.

[b] If AI.DI 4 TYPE is greater than 4, then it will display a 0 and the application will treat it as though it were set to 0.

Set AI.DI 4 TYPE to the desired value.

AI 4 and DI 4 share terminations on the TEC. Therefore, when AI 4 is being used, DI 4 is unavailable. Likewise, when DI 4 is being used, AI 4 is unavailable.

Set DI 4 USE

A point closely associated with AI.DI 4 TYPE is DI 4 USE (Point 36). When AI 4 (Point 81) or DI 4 (Point 26) is used as a light switch, DI 4 USE determines which lighting circuits that AI 4 or DI 4 controls.

If AI 4 is used in lighting control (for Light Harvesting), it will be VDI 4 (Point 23) and not AI 4 that controls the lighting circuits.

DI 4 and VDI 4 are not the same thing. DI 4 is physical DI 4 on the TEC. VDI 4 is a virtual DI that is associated with AI 4 when AI 4 is used in light harvesting.)

The following table shows the values DI 4 USE can have, and which lighting circuits AI 4 or DI 4 will control when DI 4 USE is set to a particular value. In the table, the number in parenthesis is the default value for DI 4 USE.

Table 10. Application 2461.

Value[a]	DI 4 USE (0)[b]
0	Neither DI 4 nor VDI 4 controls a lighting circuit.
1	Either DI 4 OR VDI 4 controls Lighting Circuit 1 (DOs 1 and 2)
2	Either DI 4 OR VDI 4 controls Lighting Circuit 2 (DOs 3 and 4)
4	Either DI 4 OR VDI 4 controls Lighting Circuit 3 (DOs 5 and 6)
8	Either DI 4 OR VDI 4 controls Lighting Circuit 4 (DOs 7 and 8)

[a] The values of DI 4 USE are additive.

[b] If DI 4 USE is set greater than 15, it will display a zero on the display and the application will treat it as though it were set to 0.

Table 11. Application 2462.

Value[a]	DI 4 USE (0)[b]
0	Neither DI 4 nor VDI 4 controls a lighting circuit.
1	Either DI 4 OR VDI 4 controls Lighting Circuit 1 (DO 1)
2	Either DI 4 OR VDI 4 controls Lighting Circuit 2 (DO 2)
4	Either DI 4 OR VDI 4 controls Lighting Circuit 3 (DO 3)
8	Either DI 4 OR VDI 4 controls Lighting Circuit 4 (DO 4)
16	Either DI 4 OR VDI 4 controls Lighting Circuit 5 (DO 5)
32	Either DI 4 OR VDI 4 controls Lighting Circuit 6 (DO 6)
64	Either DI 4 OR VDI 4 controls Lighting Circuit 7 (DO 7)
128	Either DI 4 OR VDI 4 controls Lighting Circuit 8 (DO 8)

[a] The values of DI 4 USE are additive.

[b] If DI 4 USE is greater than 255, the application will use the last known “good” value.

AI.DI 4 TYPE and DI 4 USE work together as follows:

- If AI.DI 4 TYPE is set to 1 and DI 4 USE is set to 5, DI 4 is a direct DI (an on/off switch) which controls lighting circuits 1 and 3. If AI.DI 4 TYPE is set to 3 and DI 4 USE is set to 8, DI 4 is a timed DI (a push-button) that controls lighting circuit 4.
- If AI.DI 4 TYPE is set to 4 and DI 4 USE is set to 9, AI 4 is an AI used for light harvesting and is associated with VDI 4. VDI 4 controls lighting circuits 1 and 4. (VDI 4 stands for Virtual Digital Input 3.) When VDI 4 is used, it behaves like a direct DI. If AI.DI 4 TYPE is not set to 4, then VDI 4 is unusable.
- If DI 4 USE is set to 0, AI/DI 4 and VDI 4 are not used in lighting control regardless of the value of AI.DI 4 TYPE. AI/DI 4 becomes a spare AI/DI and VDI 4 becomes unusable. (In other words, when DI 4 USE is zero, the application will treat AI.DI 4 TYPE as though it were set to zero as well.)
- If AI.DI 4 TYPE is set to 0, AI/DI 4 is a spare regardless of the value of DI 4 USE. Also, VDI 4 becomes unusable. (In other words, when AI.DI 4 TYPE is zero, the application will treat DI 4 USE as though it were set to zero as well.)

Set DI 4 USE to the desired value.

Set AI.DI 5 TYPE

AI.DI 5 TYPE (Point 37) determines whether or not DI 5 (Point 27) is used as a light switch in lighting control. If DI 5 is used in lighting control, AI.DI 5 TYPE will determine what type of light switch DI 5 is.

The following table shows the values AI.DI 5 TYPE can have, and what type of light switch DI 5 will be when AI.DI 5 TYPE is set to a particular value. In the table, the number in parenthesis is the default value for AI.DI 5 TYPE.

Value[a]	AI.DI 5 TYPE (0)[b]
0	AI 5 /DI 5 is a spare AI / DI.
1	DI 5 is a direct DI.
2	DI 5 is a direct / pulsed DI.
3	DI 5 is a timed DI
4	AI 5 is a thermistor

[a] The values of AI.DI 5 TYPE are not additive.

[b] If AI.DI 5 TYPE is greater than 4, then it will display a 0 and the application will treat it as though it were set to 0.

Set AI.DI 5 TYPE to the desired value.

AI 5 and DI 5 share terminations on the TEC. Therefore, when AI 5 is being used as a thermistor, DI 5 is unavailable as a light switch. Likewise, when DI 5 is being used, AI 5 is unavailable.

Set DI 5 USE

A point closely associated with AI.DI 5 TYPE (Point 37) is DI 5 USE (Point 38).

The Table below shows what is enabled when a particular point is at a particular value.

Table 12. Application 2461.

Value[a]	DI 5 USE (0)[b]
0	DI 5 does not control a lighting circuit.
1	DI 5 controls Lighting Circuit 1 (DOs 1 and 2)
2	DI 5 controls Lighting Circuit 2 (DOs 3 and 4)
4	DI 5 controls Lighting Circuit 3 (DOs 5 and 6)
8	DI 5 controls Lighting Circuit 4 (DOs 7 and 8)

[a] The values of DI 5 USE are additive.

[b] If DI 5 USE is set greater than 15, it displays 0 and the application will treat it as though it were set to 0.

Table 13. Application 2462.

Value[a]	DI 5 USE (0)[b]
0	DI 5 does not control a lighting circuit.
1	DI 5 controls Lighting Circuit 1 (DO 1)
2	DI 5 controls Lighting Circuit 2 (DO 2)
4	DI 5 controls Lighting Circuit 3 (DO 3)
8	DI 5 controls Lighting Circuit 4 (DO 4)
16	DI 5 controls Lighting Circuit 4 (DO 5)
32	DI 5 controls Lighting Circuit 4 (DO 6)
64	DI 5 controls Lighting Circuit 4 (DO 7)
128	DI 5 controls Lighting Circuit 4 (DO 8)

[a] The values of DI 5 USE are additive.

[b] If DI 5 USE is greater than 255, the application will use the last known “good” value.

AI.DI 5 TYPE and DI 5 USE work together as follows:

- If AI.DI 5 TYPE is set to 1 and DI 5 USE is set to 5, DI 5 is a direct DI (an on/off switch) which controls lighting circuits 1 and 3. If AI.DI 5 TYPE is set to 3 and DI 5 USE is set to 8, DI 5 is a timed DI (a push-button) that controls Lighting Circuit 4.
- If DI 5 USE is set to 0, DI 5 is not used in lighting control regardless of the value of AI.DI 5 TYPE. If AI.DI 5 TYPE is set to 4 while DI 5 USE is set to 0, the application will use AI 5 as a thermistor for temperature control. Otherwise, the application will treat AI.DI5 TYPE as though it was set to zero.

- If AI.DI 5 TYPE is set to 0, AI/DI 5 is not used in lighting control regardless of the value of DI 5 USE. (In other words, when AI.DI 5 TYPE is zero, the application will treat DI 5 USE as though it were set to zero as well.)
- If AI.DI 5 TYPE is set to 4, AI/DI 5 is not used for lighting control regardless of the value of DI 5 USE. (In other words, when AI.DI 5 TYPE is 4, the application will treat DI 5 USE as though it were set to zero.)

Set DI 5 USE to the desired value.

Set DI 6 TYPE

DI 6 TYPE (Point 39) determines whether or not DI 6 is used as a light switch in lighting control. If DI 6 is used in lighting control, DI 6 TYPE will determine what type of light switch DI 6 is.

The following table shows the values DI 6 TYPE can have, and what type of light switch DI 6 (point 28) will be when DI 6 TYPE is set to a particular value. In the table, the number in parenthesis is the default value for DI 6 TYPE.

Value[a]	DI 6 TYPE (0)[b]
0	DI 6 is not used in lighting control.
1	DI 6 is a direct DI.
2	DI 6 is a direct / pulsed DI.
3	DI 6 is a timed DI

[a] The values of DI 6 TYPE are not additive.

[b] If DI 6 TYPE is greater than 3, it displays 0 and the application will treat it as though it were set to 0.

Set DI 6 TYPE to the desired value.

Set DI 6 USE

A point closely associated with DI 6 TYPE is DI 6 USE (Point 40). When DI 6 (Point 28) is used as a light switch, DI 6 USE determines which lighting circuits that DI 6 controls.

The following table shows the values DI 6 USE can have, and which lighting circuits DI 6 will control when DI 6 USE is set to a particular value. In the table, the number in parenthesis is the default value for DI 6 USE.

Table 14. Application 2461.

Value[a]	DI 6 USE (0)[b]
0	DI 6 does not control a lighting circuit.
1	DI 6 controls Lighting Circuit 1 (DOs 1 and 2)
2	DI 6 controls Lighting Circuit 2 (DOs 3 and 4)
4	DI 6 controls Lighting Circuit 3 (DOs 5 and 6)
8	DI 6 controls Lighting Circuit 4 (DOs 7 and 8)

[a] The values of DI 6 USE are additive.

[b] If DI 6 USE is set greater than 15, it displays 0 and the application will treat it as though it were set to 0.

Table 15. Application 2462.

Value[a]	DI 6 USE (0)[b]
0	DI 6 does not control a lighting circuit.
1	DI 6 controls Lighting Circuit 1 (DO 1)
2	DI 6 controls Lighting Circuit 2 (DO 2)
4	DI 6 controls Lighting Circuit 3 (DO 3)
8	DI 6 controls Lighting Circuit 4 (DO 4)
16	DI 6 controls Lighting Circuit 4 (DO 5)
32	DI 6 controls Lighting Circuit 4 (DO 6)
64	DI 6 controls Lighting Circuit 4 (DO 7)
128	DI 6 controls Lighting Circuit 4 (DO 8)

[a] The values of DI 6 USE are additive.

[b] If DI 6 USE is greater than 255, the application will use the last known “good” value.

DI 6 TYPE and DI 6 USE work together as follows:

- If DI 6 TYPE is set to 1 and DI 6 USE is set to 5, DI 6 is a direct DI (an on/off switch) which controls Lighting circuits 1 and 3. If DI 6 TYPE is set to 3 and DI 6 USE is set to 8, DI 6 is a pulsed DI (a push-button) that controls lighting circuit 4.
- If DI 6 USE is set to 0, DI 6 is not used in lighting control regardless of the value of DI 6 TYPE. (In other words, when DI 6 USE is zero, the application will treat DI 6 TYPE as though it were set to zero as well.)

- If DI 6 TYPE is set to 0, DI 6 is not used in lighting control regardless of the value of DI 6 USE. (In other words, when DI 6 TYPE is zero, the application will treat DI 6 USE as though it were set to zero as well.)

Set DI 6 USE to the desired value.

Set HI LITE 3 and LO LITE 3

When AI 3 (Point 15) is used in light harvesting, then:

- VDI 3 (Point 22) will be OPENED if AI 3 is greater than HI LITE 3 (Point 59). (The lighting circuits controlled by AI 3/VDI 3 will be off.)
- VDI 3 will be CLOSED is AI 3 is less than LO LITE 3 (Point 60). (The lighting circuits controlled by AI 3/VDI 3 will be on.)

Otherwise, VDI 3 will remain unchanged. (The lighting circuits controlled by AI 3/VDI 3 will be unchanged.)

Set HI LITE 3 and LO LITE 3 to their desired values.

Set HI LITE 4 and LO LITE 4

When AI 4 (Point 81) is used in light harvesting, then:

- VDI 4 (Point 23) will be OPENED if AI 4 is greater than HI LITE 4 (Point 62). (The lighting circuits controlled by AI 4/VDI 4 will be off.)
- VDI 4 will be CLOSED is AI 4 is less than LO LITE 4 (Point 62). (The lighting circuits controlled by AI 4/VDI 4 will be on.)

Otherwise, VDI 4will remain unchanged. (The lighting circuits controlled by AI 4 / VDI 4 will be unchanged.)

Set HI LITE 4 and LO LITE 4 to their desired values.

Set DAY ON TIME

When a momentary contact push-button (a timed DI) is pushed during the day mode, the lights that this button controls will be on for the amount of time stored in DAY ON TIME (Point 16). When DAY ON TIME is set to zero, then when the button is pushed, the lights will be on for the entire day mode.

Set DAY ON TIME to the desired value in hours.

DAY ON TIME has another use. If the momentary contact push-button is pushed during the night override mode, the lights it controls will be on for DAY ON TIME or OVRD TIME (Point 20), whichever expires first.

Set GRVYD ONTIME

When a momentary contact push-button (a timed DI) is pushed during the grave yard mode, the lights that this button controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). When GRVYD ONTIME is set to zero, then when the button is pushed, the lights will be on for the entire Graveyard mode.

Set GRVYD ONTIME to the desired value in minutes.

GRVYD ONTIME has another use. If the momentary contact push-button is pushed during the Graveyard mode, the lights it controls will be on for GRVYD ONTIME. If GRVYD ONTIME is set to zero, when the button is pushed, the lights will be on for the entire Graveyard mode.

Set AFTER TIME

When there is a people sensor (a direct DI) controlling at least one lighting circuit, that people sensor also functions as a night override switch. In that case, the night override period will not end until the people sensor has stopped sensing people for at least the amount of time stored in AFTER TIME (Point 71). (The night override period will not end until the direct DI has been opened for at least the amount of time stored in AFTER TIME.)

AFTER TIME default is 10 minutes. Setting AFTER TIME to 0 will prohibit the people sensor from sending an override request to the AHU, however, the lights will still turn on when the people sensor is activated. Setting AFTER TIME to 0 might reduce energy consumption since the AHU is not sent into override every time a people sensor is activated.

Set AFTER TIME to the desired value.

Set NO OF BLINKS

When a blink sequence occurs, the lighting circuit will blink for the number of times that is stored in NO OF BLINKS (Point 51).

The default setting for BLINK ON TM (Point 48) = 2 seconds and BLINK OFF TM (Point 49) = .2 seconds. These settings can be changed if desired.

Set NO OF BLINKS to the desired value.

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 startup is complete.