SIEMENS

# Lighting Control with Maintained Relays

## Application Notes

## Application 2462

### Table of Contents

# Overview

Application Application 2462 is a maintained relay lighting control application. It can control up to 8 (1 DO per) lighting circuits and has limited temperature control capability. This capability is only used to tell a field panel when it needs to turn ON the air handling unit that controls the temperature in the room and when to turn it off.

Each lighting circuit is commanded ON/OFF by a single DO. When a DO is ON, the corresponding lighting circuit is ON. When the same DO is OFF, the corresponding lighting circuit is OFF.

The lighting circuits can be blinked at the end of a mode. Blinking is the turning of the lights OFF and ON to warn people in the room that the lights are going to shut off indefinitely. The lighting circuits can be controlled by a variety of different light switches. Light Switches can be momentary contact push-buttons, people sensors (maintained contacts) and master off switches (maintained contacts that also make use of the off/on transition under certain circumstances). This application can also do simple light harvesting.

Light switches also function as additional Night Override buttons during Night Mode. During Graveyard Mode, only one type of light switch can send an override request (momentary contact push-button on RTS when it is configured as a light switch).

In addition to the normal day and night modes, this application also supports a Graveyard mode. The Graveyard mode is primarily for security making their rounds at night in a building. In this mode, the security people can turn on the lights in a room for a short period of time to make sure that the room is secure.

## Hardware Inputs

### Analog

- Room temperature sensor
- Room temperature set point dial (optional)
- Light Harvesting, up to two (selectable – 0 to 10 V or 4 to 20 mA)

If AI 3 and AI 4 are used as analog inputs for light harvesting, DI 3 and DI 4 cannot be used for digital input, and vice versa.

### Digital

- Night mode override (optional)
- Wall switch (optional)
- Light switch (Up to six light switch(es) (if DI 1 is used as a light switch, it can only be a momentary contact type light switch).

## Hardware Outputs

### Analog

- Spare (0 to 10 V — three available)

### Digital

- Lighting Circuit (8 DOs; 8 Lighting Circuits, 1 DO per)

# Sequence of Operation

| | 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** [b] **(D/P)** | 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. |
| TEC0485R1 | | *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* | |

**Figure 1. Application 2462 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.

During night or graveyard modes, when a D/P switch has been left on, but the lights that it controls are now off either due to a mode change or an override timer timing out, this D/P switch’s lights can get turned back on again without anyone touching the D/P switch. This could happen if someone pushed the push-button on a RTS. During night or graveyard mode, application 2462 will always interpret a push of the push-button on an RTS as an override request. This means that NGT OVRD (Point 21) will switch to DAY, and the controller will read the On position of the D/P switch as a request to turn on the lights (because in Day Mode, a D/P switch is a simple on/off switch). In this case, the lights in that area of the building controlled by the D/P switch would turn on even though no one touched the D/P switch. Depending on the intentions of the person pressing the push-button on the RTS, this feature can either be useful, or something to be avoided by making sure the D/P switch is not left in the ON position.

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 1.

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 *Lighting Control with a Master Off Switch* 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. AI 3 and AI 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 8 lighting circuits or any subset of them. (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 8 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 8 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 8 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 8 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 8 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 8 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 8 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 1. 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 2. 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 | LC5 |
| 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.

## Lighting Circuits

Lighting Circuit 1 can be controlled by multiple light switches at the same time based on Enable Order, see Figure 1. 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, 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.)

Lighting Circuits 2, 3, 4, 5, 6, 7 and 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.

## Definition of MODE Point

In Application 2462, the DAY.NGT point is not used. A virtual AO point, MODE (Point 10) is used instead. The table shows the values of MODE and the names of the modes that correspond.

| Value | MODE (0)[a] |
|---|---|
| 0 | Day Mode |
| 1 | Night Mode |
| 2 | Graveyard Mode |

[a] The default value of MODE = 0.

For the rest of this document, the *names* of modes will be used instead of numeric values (for example, MODE = Night instead of MODE = 1). This should make the application easier to understand.

The values of MODE are not additive. If MODE is greater than 2, 0 displays and the application treats it as though it were set to 0.

For MODE, Day and Night modes are the same as in other TEC applications.

Graveyard mode allows the application to turn the lights on for a short period of time. The Graveyard mode covers the late night situation when the only people in the building are the security people. During the Graveyard mode, when the security people are making their rounds in the building, they will need to have lights on for a few minutes in a particular area of the building so that can see that the area is secure.

### DAY, Night and Graveyard Modes

The application is in Day mode when MODE = DAY.

The application is in the night mode when MODE = NIGHT and NGT OVRD (Point 21) = NIGHT.

The application is in Graveyard mode when MODE = GRAVEYARD and NGT OVRD = NIGHT.

The application is in the night override mode when MODE = NIGHT or GRAVEYARD and NGT OVRD = DAY. The application operates the same in the night override mode as it does in Day mode.

## Day and Night Modes

The operational mode status of the space is determined by the status of MODE (Point 10). Control of this point differs depending on whether it is being controlled by a wall switch or by a field panel. If a wall switch is controlling this point, it should **not** also be controlled by a field panel.

When a wall switch is physically connected to the termination strip on the controller at DI 2 and WALL SWITCH (Point 18) equals YES, the controller monitors the status of DI 2. When the status of DI 2 is ON (the switch is closed), MODE is set to Day mode. When the status of DI 2 is OFF (the switch is open), MODE is set to Night mode. The wall switch cannot send the application into Graveyard mode.

When WALL SWITCH equals NO, the controller does not monitor the status of the wall switch, even if one is connected to it. If the controller is operating stand-alone it stays in Day mode all the time. If the controller is operating with centralized control (connected to a field panel), then the field panel can send an operator or PPCL command to override the status of MODE. Refer to *Powers Process Control Language (PPCL) User's Manual (125-1896)* and *Field Panel User's Manual (125-3000)* for more information.

When WALL SWITCH = NO, that does not necessarily mean that DI 2 is a spare DI. It may still be operating as a light switch. When DI 2 is not a wall switch, it can be either a timed light switch, a direct light switch or a direct/pulsed light switch. It is possible for DI 2 to be a wall switch and a light switch at the same time. This only true if DI 2 is a direct light switch. DI 2 cannot be a timed light switch and a Wall switch at the same time or a direct/pulsed light switch and a wall switch at the same time.

## Control Temperature Setpoints

The application has a number of different room temperature setpoints in it (DAY HTG STPT, NGT CLG STPT, RM STPT DIAL, etc.). The application actually controls to CTL STPT (Point 92). CTL STPT will get set to different values depending on different circumstances.

**CTL STPT is Overridden** — When CTL STPT is overridden, CTL STPT will equal its overridden value and the application will have no effect on the value of CTL STPT. Also when CTL STPT is overridden, CTL STPT will always have a status of Normal, even if the Status of RM STPT DIAL is Failed.

**Night mode** — In night mode, CTL STPT holds the value of NGT CLG STPT (Point 08) or NGT HTG STPT (Point 09). This is true whether or not a setpoint dial is being used. Also during night mode, CTL STPT will always have a status of Normal, even if the status of RM STPT DIAL is Failed. (Note: This is also how the value of CTL STPT is chosen during Graveyard mode.)

**Day mode (setpoint dial not used)** — When a setpoint dial is not being used in Day mode or night override mode, then CTL STPT holds the value of DAY CLG STPT (Point 06) or DAY HTG STPT (Point 07). Also, CTL STPT will always have a Status of Normal, even if the Status of RM STPT DIAL is Failed.

**Room Temperature Setpoint Dial** — When STPT DIAL (Point 14) = NO, a room temperature setpoint dial is not being used. A setpoint dial is being used when STPT DIAL = YES. When a setpoint dial is present, it is only used when both of the following 2 conditions hold:

- the controller is in the Day mode or the Night Override Mode.
- CTL STPT is not overridden.

If these 2 conditions are both true, then:

When RM STPT DIAL has a status of Normal, CTL STPT will have a status of Normal. The current value of RM STPT DIAL will be used to determine the value of CTL STPT.

When RM STPT DIAL has a status of Failed and RM STPT DIAL is overridden, CTL STPT will have a status of Normal. The current value of RM STPT DIAL will be used to determine the value of CTL STPT.

When RM STPT DIAL has a status of Failed and RM STPT DIAL is not overridden, CTL STPT will have a status of Failed. The last known good value of RM STPT DIAL will be used to determine the value of CTL STPT.

When a setpoint dial is being used, the actual value of CTL STPT will depend on whether or not a there is a deadband being used. The next two sections explain this in more detail. In both sections the following assumptions are made:

- A setpoint dial is being used.
- The controller is in Day mode.
- CTL STPT is not overridden.

**Setpoint dial used without a deadband**

When DAY HTG STPT equals DAY CLG STPT, a setpoint deadband is not being used. (A space where the deadband is not used may be more comfortable than a space where the deadband is being used.) If a setpoint deadband is not being used, then:

1. CTL STPT will equal RM STPT MAX (Point 12) if RM STPT DIAL > RM STPT MAX.
2. CTL STPT will equal RM STPT MIN (Point 11) if RM STPT DIAL < RM STPT MIN.
3. Otherwise, CTL STPT will equal RM STPT DIAL.

**Setpoint dial used with a deadband**

When DAY HTG STPT does not equal DAY CLG STPT, a setpoint deadband (or zero energy band) is being used. (A space where the deadband is used can be more energy efficient than a space where the deadband is not being used.) If a setpoint deadband is being used when HEAT.COOL (Point 5) equals HEAT:

1. If RM STPT DIAL > than RM STPT MAX, then:
    a. If [RM STPT MAX – 0.5 * (DAY CLG STPT – DAY HTG STPT)] > RM STPT MAX, then CTL STPT will equal RM STPT MAX.
    b. If [RM STPT MAX – 0.5 * (DAY CLG STPT – DAY HTG STPT)] < RM STPT MIN, then CTL STPT will equal RM STPT MIN.
    c. Other wise, CTL STPT will equal RM STPT MAX – 0.5 * (DAY CLG STPT – DAY HTG STPT).
2. If RM STPT DIAL < than RM STPT MIN, then:

a. If [RM STPT MIN – 0.5 * (DAY CLG STPT – DAY HTG STPT)] > RM STPT MAX, then CTL STPT will equal RM STPT MAX.

b. If [RM STPT MIN – 0.5 * (DAY CLG STPT – DAY HTG STPT)] < RM STPT MIN, then CTL STPT will equal RM STPT MIN.

c. Other wise, CTL STPT will equal RM STPT MIN – 0.5 * (DAY CLG STPT – DAY HTG STPT).

3. If RM STPT MAX > RM STPT DIAL > RM STPT MIN, then:

a. If [RM STPT DIAL – 0.5 * (DAY CLG STPT – DAY HTG STPT)] > RM STPT MAX, then CTL STPT will equal RM STPT MAX.

b. If [RM STPT DIAL – 0.5 * (DAY CLG STPT – DAY HTG STPT)] < RM STPT MIN, then CTL STPT will equal RM STPT MIN

c. Other wise, CTL STPT will equal RM STPT DIAL – 0.5 * (DAY CLG STPT – DAY HTG STPT).

When HEAT.COOL (Point 5) = COOL:

1. If RM STPT DIAL > than RM STPT MAX, then:

a. If [RM STPT MAX + 0.5 * (DAY CLG STPT – DAY HTG STPT)] > RM STPT MAX, then CTL STPT will equal RM STPT MAX.

b. If [RM STPT MAX + 0.5 * (DAY CLG STPT – DAY HTG STPT)] < RM STPT MIN, then CTL STPT will equal RM STPT MIN.

c. Other wise, CTL STPT will equal RM STPT MAX + 0.5 * (DAY CLG STPT – DAY HTG STPT).

2. If RM STPT DIAL < than RM STPT MIN, then:

a. If [RM STPT MIN + 0.5 * (DAY CLG STPT – DAY HTG STPT)] > RM STPT MAX, then CTL STPT will equal RM STPT MAX.

b. If [RM STPT MIN + 0.5 * (DAY CLG STPT – DAY HTG STPT)] < RM STPT MIN, then CTL STPT will equal RM STPT MIN.

c. Other wise, CTL STPT will equal RM STPT MIN + 0.5 * (DAY CLG STPT – DAY HTG STPT).

3. If RM STPT MAX > RM STPT DIAL > RM STPT MIN, then:

a. If [RM STPT DIAL + 0.5 * (DAY CLG STPT – DAY HTG STPT)] > RM STPT MAX, then CTL STPT will equal RM STPT MAX.

b. If [RM STPT DIAL + 0.5 * (DAY CLG STPT – DAY HTG STPT)] < RM STPT MIN, then CTL STPT will equal RM STPT MIN.

c. Other wise, CTL STPT will equal RM STPT DIAL + 0.5 * (DAY CLG STPT – DAY HTG STPT).

## Room Temperature, Room Temperature Offset and CTL TEMP

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

Room Temperature Offset, RMTMP OFFSET (Point 66), is a user-adjustable offset that will compensate for deviations between the value of ROOM TEMP (Point 4) and the actual room temperature.

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 CTL STPT.

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

CTL TEMP (Point 78) = ROOM TMP (Point 4) + RMTMP OFFSET (Point 66).

If CTL TEMP is not overridden, then:

- If ROOM TEMP has a status of Normal, then CTL TEMP will also have a status of Normal. The current value of ROOM TEMP will be used to determine the value of CTL TEMP.
- If ROOM TEMP has a status of Failed and ROOM TEMP is overridden, then CTL TEMP will have a status of Normal. The current value of ROOM TEMP will be used to determine the value of CTL TEMP.
- If ROOM TEMP has a status of Failed and ROOM TEMP is not overridden, then CTL TEMP will have 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 the points, ROOM TEMP and RMTMP OFFSET, have no effect on the value of CTL TEMP.
- The status of CTL TEMP will always equal Normal, even if ROOM TEMP is Failed.

## Night Override

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 (Point 20), by pressing the override switch, a room occupant can reset the controller to Day mode for the amount of time set in OVRD TIME. The status of NGT OVRD (Point 21) changes to DAY and remains there until 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 effects the controller when in Night mode or Graveyard mode.

In Application 2462, the night override button is not the only thing that can initiate a night override request; light switches can do it too. What happens when a light switch initiates a night override request depends on the type of light switch that triggers the night override.

When MODE (Point 10) equals night and a push-button (a timed DI) is pressed to turn on a light, this is also a night override request. NGT OVRD will change from NIGHT to DAY. The night override period lasts for the amount of time stored in OVRD TIME. Once the night override period has expired, NGT OVRD changes from DAY back to NIGHT.

During the night mode the master off switch (a direct/pulsed DI) can also trigger a night override period to occur. In order for the master off switch to initiate a night override period, it must be turned off and then turned back on. When this happens, NGT OVRD will change from NIGHT to DAY. The night override period lasts for the amount of time stored in OVRD TIME. Once the night override period has expired, NGT OVRD changes from DAY back to NIGHT.

If a people sensor detects people in the room (the direct DI is in the ON position) during the night mode, this will initiate a night override request. The night override period will remain in effect until the people sensor detects that the space has been vacant for at least the amount of time that is stored in AFTER TIME (Point 71). (This is the same thing as saying that the direct DI must be opened for at least the length of time that is stored in AFTER TIME.)

If a night override request happens during the middle of a night override period, then the effect is to lengthen the night override period.
For example, let's say that OVRD TIME is 2 hours and that the application has been in a night override period for 1 hour. If at this time, somebody pushes the night override button, then the application will remain in the night override period for two more hours. This means that the night override period will last a total of three hours.

If the night override button (or push-button light switch or master off switch) and the people sensor both request a night override, then the night override period will expire only if the following 2 conditions have been met.

- The night override button (or push-button light switch or master off switch) does not request another night override for at least the amount of time stored in OVRD TIME.
- The room has been vacant for at least the amount of time that is stored in AFTER TIME.

If the application is in the middle of a night override period and MODE (Point 10) indicates that Day mode has begun, then NGT OVRD will immediately change from DAY to NIGHT, and the night override period will end abruptly. If the application is in the middle of a night override period and MODE indicates that Graveyard mode has begun, then NGT OVRD will remain equal to DAY and the night override period will run to completion.

The night override switch can initiate a night override period when MODE equals NIGHT or GRAVEYARD. Any light switches present can only initiate a night override period when MODE equals NIGHT. The light switches cannot initiate a night override period during the Graveyard mode.

The light harvesting AIs (and the virtual DIs associated with them) are not used to make a night override request.

## Heating/Cooling Switchover

This section describes how the heating/cooling switchover feature works when both heating and cooling are enabled (HC.ENDIS (Point 91) = 3). If all of the following conditions are met for the length of time set in SWITCH TIME (Point 86), the controller switches from heating to cooling mode by setting HEAT.COOL (Point 5) to COOL:

- HTG LOOPOUT (Point 80) < SWITCH LIMIT (Point 85).
- CTL TEMP (Point 78) > CTL STPT (Point 92) by at least the value set in SWITCH DBAND (Point 90).
- CTL TEMP > the appropriate cooling setpoint minus SWITCH DBAND.

If all of 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 (Point 79) < SWITCH LIMIT.
- CTL TEMP < CTL STPT by at least the value set SWITCH DBAND.
- CTL TEMP < the appropriate heating setpoint plus SWITCH DBAND.

Application 2462 performs heating/cooling switchover based on room load. To perform heating/cooling switchover based on some other criteria, such as time of year, outside air temperature or supply air temperature, unbundle HEAT.COOL at a field panel and use PPCL to control it.

**Heating only** - set HC.ENDIS = 1.

**Cooling only** - set HC.ENDIS = 2.

## Control Loops

Application 2462 is controlled by two Proportional, Integral, and Derivative (PID) control loops; a room temperature heating loop and a room temperature cooling loop. Each loop uses CTL STPT (Point 92) and CTL TEMP (Point 78) to modulate the value of its respective loopout, CLG LOOPOUT (Point 79) or HTG LOOPOUT (Point 80).

The cooling loop is active whenever HEAT.COOL (Point 5) = COOL.

The heating loop is active whenever HEAT.COOL = HEAT.

Loops contain advanced PID algorithms that limit the changes of their loopouts (CLG LOOPOUT and HTG LOOPOUT) when the temperature is close to setpoint. In Application 2462 the only purpose for the PID loops is to help the Heating /Cooling Switchover mechanism determine whether to set HEAT.COOL to HEAT or COOL.

## AHU Required

Application 2462 does not do any temperature control. However, it does control the value of a point called AHU REQUIRED (Point 70). This point can be unbundled at a field panel and used to cycle an air handling unit in order to satisfy the temperature needs of the space.

During Day mode (or night override mode), AHU REQUIRED will be ON if CYCLE AHU (Point 65) = NO.

If CYCLE AHU = YES, AHU REQUIRED will be controlled the same way it would be controlled in the night mode.

During Night mode the way AHU REQUIRED is controlled will depend on the value of HEAT.COOL (Point 5).

- When HEAT.COOL = COOL at night, AHU REQUIRED is ON if CTL TEMP (Point 78) is greater than CTL STPT (Point 92). AHU REQUIRED will equal OFF if CTL TEMP is less than CTL STPT – TEMP DB (Point 66). Otherwise, the status of AHU CONTROL will remain unchanged.
- When HEAT.COOL = HEAT at night, AHU REQUIRED = ON if CTL TEMP is less than CTL STPT. AHU REQUIRED = OFF if CTL TEMP is greater than CTL STPT + TEMP DB. Otherwise, the status of AHU CONTROL will remain unchanged.
- During the Graveyard mode, AHU REQUIRED is controlled the same as it is during the Night mode.

## Lighting Control with a Momentary Push-button

### Day Mode Operation

If the button is not pushed, the lights will not turn on. When a push-button is pushed, when MODE (Point 10) = DAY, the lights that it controls will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and then shut off indefinitely. If DAY ON TIME = 0, then when the button is pushed, the lights will stay on for the entire Day mode.

If the lights have been on for less than DAY ON TIME and MODE changes value, then the lights will blink and shut off.

### Night Mode/Night Override Mode Operation

If the button is not pushed, the lights will not turn on.

When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, this will cause NGT OVRD to change to DAY and the night override period will be in effect. The lights controlled by the push-button will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and then shut off indefinitely. If DAY ON TIME = 0, then when the button is pushed, the lights will stay on for the entire night override mode.

If the lights are on and MODE changes value, then the lights will blink and shut off.

### Graveyard Mode Operation

When a push-button is pushed, when MODE = GRVYD, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and then shut off indefinitely. If GRVYD ONTIME = 0, then when the button is pushed, the lights will stay on for the entire Graveyard mode. If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

## Lighting Control with Light Harvesting

This section describes how a lighting circuit is controlled when the only light switch controlling it is a Light Harvesting AI.

### Day Mode Operation/Night Override Mode

Day mode (or Night Override mode) — If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1, then Day (Night Override) mode operates as follows:

- If AI 3 is less than LO LITE AI 3 (Point 60), VDI 3 (Point 22) is closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 is opened. Otherwise, VDI 3 remains unchanged.
- When VDI 3 is closed, LC1 COMMAND (Point 55) is on and lighting circuit 1 is on.
- When VDI 3 is opened, LC1 COMMAND is off and lighting circuit 1 is off.
- When VDI 3 changes from closed to opened, the lights will blink before shutting off.
- If the lights are on and MODE changes value, the lights will blink before shutting off.

1. VDI stands for virtual digital input.

2. If AI 3 is not used for light harvesting, VDI 3 has no effect on the lighting circuits, even if VD1 3 is overridden.

3. Virtual DI 3 and DI 3 are not the same thing. DI 3 (Point 25) is physical DI 3. Virtual DI 3 (VDI 3) is the virtual DI that is used to control lighting circuits when AI 3 is used for light harvesting.

### Night Mode/Graveyard Mode

If light harvesting is the only thing controlling the on/off status of the light circuits, then the lights will be off in the night mode and Graveyard mode.

## Lighting Control with a Master Off Switch

A common use for a direct/pulsed DI is as a master off switch. This section describes how a lighting circuit is controlled when the only light switch controlling it is a master off switch

If a direct/pulsed switch is left in it's on position and in Night mode or Graveyard mode (lights are off), when the push-button on the RTS is pressed (sending an override request) the lights will turn on and remain on for OVRD TIME.

## Day Mode Operation/Night Override Mode Operation

During Day mode or Night Override mode, the lights will be on when the master off switch is on (the direct/pulsed DI is closed) and off when the master off switch is off (the direct/pulsed DI is opened).

If MODE changes value while the lights are on, the lights will blink and shut off, unless MODE changes to Day mode. When MODE changes to DAY, the lights will turn on or stay on without blinking.

When the master off switch is first turned off, the lights will blink before shutting off.

## Night Mode Operation

When MODE = NIGHT and NGT OVRD = NIGHT, the lights will be off if the master off switch is in the off position.

The lights will also be off if the master off switch is in the on position from having been left on from earlier in the day (switched on in Day mode and then left on after the transition to Night mode). However, if the master off switch is turned off and then back on in Night mode (or if it is simply turned on), NGT OVRD changes from DAY to NIGHT and the lights will operate the way they do in Night Override mode.

## Graveyard Mode Operation

During Graveyard mode, the lights will be off if the master off switch is off.

If the master off switch was on before Graveyard mode began, and remains on in Graveyard mode without ever having shut off, then the lights will be off in Graveyard mode.

If the master off switch is turned off and then back on during the graveyard mode, the lights will remain on for the length of time that is stored in the point GRVYD ONTIME (Point 17). Once this time expires the lights will blink and shut off. If GRVYD ONTIME (Point 17) is 0, then once the lights turn on, they will remain on for the entire Graveyard mode.

If MODE changes value while the lights are on, the lights will blink and shut off, unless MODE changes to Day mode. When MODE changes to DAY, the lights will turn on or stay on without blinking.

# Lighting Control with a People Sensor

A common use for a direct DI is a people sensor. This section describes how a lighting circuit is controlled when the only light switch controlling it is a people sensor.

When a lighting circuit is only being controlled by a people sensor, the lights will be on whenever there are people in the room (when the direct DI is closed), and the lights will be off whenever there are no people in the room (when the direct DI is opened). This will be true regardless of the value of MODE (Point 10).

If there are people in the room when MODE changes value, the lights will remain on without blinking.

When the people sensor first senses people are no longer in the room, the lights will blink and then shut off until the people sensor senses people in the room.

# Lighting Control with a Momentary Push-button and a People Sensor

This section describes how a lighting circuit is controlled when both a momentary push-button and a people sensor are controlling it.

## Day Mode Operation

When the people sensor senses people (the direct DI is closed) and the push-button is pushed, then when MODE (Point 10) = DAY, the lights will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and then shut off indefinitely. If DAY ON TIME = 0, then when the button is pushed, the lights will stay on for the entire Day mode.

If the lights have been on for less than DAY ON TIME and MODE changes value, the lights will blink and shut off.

If the people sensor does not sense people (the direct DI is opened), the lights will be off even if the button is pushed.

If the lights are on and the people sensor stops sensing people, the lights will blink and shut off indefinitely.

If the people sensor is sensing people, but the button is not pushed, the lights will not turn on.

## Night Mode/Night Override Mode Operation

If the people sensor is not sensing people (the direct DI is opened), the lights will be off.

If the people sensor was sensing people but is not sensing people anymore, the lights will blink and shut off.

If the people sensor is sensing people, then:

- If the button is not pushed, the lights will not turn on.
- When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, NGT OVRD changes to DAY and the Night Override period will be in effect. The lights controlled by the push-button will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and shut off indefinitely. If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Night Override mode.

If the lights are on and MODE changes value, the lights will blink and shut off.

## Graveyard Mode Operation

If the people sensor is not sensing people (the direct DI is opened), the lights will be off.

If the people sensor was sensing people but is not sensing people anymore, the lights will blink and shut off.

If the people sensor is sensing people, then:

- If he button is not pushed, the lights will not turn on.
- When a push-button is pushed, when MODE = GRVYD, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and shut off indefinitely. If GRVYD ONTIME = 0, when the button is pushed, the lights will stay on for the entire Graveyard mode.

If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

# Lighting Control with a Momentary Push-button and a Master Off Switch

The master off switch is a direct/pulsed DI. In this configuration, the pulsed part of the direct pulsed DI is not used and the master off switch behaves like an ordinary on/off switch.

This section describes how a lighting circuit is controlled when both a momentary push-button and a master off switch are controlling it.

## Day Mode Operation

If the lights are on and the master off switch (direct/pulsed DI) is turned off, the lights will blink and shut off.

If the master off switch is in the off position, the lights will stay off even if the button is pushed.

If the master off switch is in the on position, then:

- If the button is not pushed, the lights will remain off.
- When the push-button is pushed, when MODE (Point 10) = DAY, the lights will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and shut off indefinitely. If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Day mode.
- If the lights have been on for less than DAY ON TIME and MODE changes value, the lights will blink and shut off.

## Night Mode/Night Override Mode Operation

If the lights are on and the master off switch (direct/pulsed DI) is turned off, the lights will blink and shut off.

If the master off switch is in the off position, the lights will stay off even if the button is pushed.

If the master off switch is in the on position, then:

- If the button is not pushed, the lights will remain off.
- When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, NGT OVRD changes to DAY and the Night Override period will be in effect. The lights controlled by the push-buttonon will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and shut off indefinitely. If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Night Override mode.
- If the lights are on and MODE changes value, the lights will blink and shut off.

## Graveyard Mode Operation

If the lights are on and the master off switch (direct/pulsed DI) is turned off, the lights will blink and shut off.

If the master off switch is in the off position, the lights will stay off even if the button is pushed.

If the master off switch is in the on position, then:

- If the button is not pushed, the lights will remain off.
- When a push-button is pushed, when MODE = GRVYD, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and shut off indefinitely. If GRVYD ONTIME = 0, when the button is pushed, the lights will stay on for the entire Graveyard mode.
- If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

# Lighting Control with a People Sensor and Light Harvesting

This section describes how a lighting circuit is controlled when both a light harvesting AI and a people sensor are controlling it.

If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1, then the lights are controlled as follows:

- If AI 3 is less than LO LITE AI 3 (Point 60), VDI 3 (Point 22) will be closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 will be opened. Otherwise, VDI 3 will remain unchanged.

- When VDI 3 is opened, LC1 COMMAND (Point 55) will be off and lighting circuit 1 will be off.
- When VDI 3 is closed, LC1 COMMAND will be on and lighting circuit 1 will be on if the people sensor senses people in the room. If VDI 3 is closed and the people sensor does not sense people in the room, LC1 COMMAND will be OFF and lighting circuit 1 will be off.
- If VDI 3 opens or if the people sensor stops sensing people, the lights will blink before shutting off.
- If the lights are on and MODE changes value, the lights will not blink and will not shut off. In order for the lights to be on the people sensor must be sensing people in the room and this application will not turn off the lights when a people sensor senses people in the room.

## Lighting Control with a People Sensor and Master Off Switch

The master off switch is a direct/pulsed DI. In this configuration, the pulsed part of the direct pulsed DI is not used and the master off switch behaves like an ordinary on/off switch.

This section describes how a lighting circuit is controlled when both a people sensor and a master off switch are controlling it.

If the master off switch is off, LC1 COMMAND (Point 55) will be off and lighting circuit 1 will be off.

When the master off switch is ON, LC1 COMMAND will be on and lighting circuit 1 will be on if the people sensor senses people in the room. If the people sensor does not sense people in the room, LC1 COMMAND will be OFF and lighting circuit 1 will be off.

If the people sensor stops sensing people, the lights will blink before shutting off indefinitely.

If the master off switch is turned off, the lights will blink and shut off indefinitely.

If the lights are on and MODE changes value, the lights will not blink and will not shut off. In order for the lights to be on the people sensor must be sensing people in the room and this application will not turn off the lights when a people sensor senses people in the room.

## Lighting Control with Light Harvesting and a Master Off Switch

This section describes how a lighting circuit is controlled when both a light harvesting AI and a master off switch are controlling it.

If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1, then the lights are controlled as follows:

If AI 3 is less than LO LITE AI 3 (Point 60), VDI 3 (Point 22) will be closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 will be opened. Otherwise, VDI 3 will remain unchanged.

## Day Mode Operation/Night Override Mode Operation

During the Day mode or the Night Override mode, if VDI 3 is opened, LC1 COMMAND (Point 55) will be off and lighting circuit 1 will be off. If VDI 3 is closed, the lights will be on when the master off switch is on (the direct/pulsed DI is closed) and off when the master off switch is off (the direct/pulsed DI is opened).

If VDI 3 opens, the lights will blink before shutting off.

When the master off switch is first turned off, the lights will blink before shutting off.

If MODE changes value while the lights are on, the lights will blink and shut off, unless MODE changes to Day mode. When MODE changes to DAY, the lights will turn on or stay on without blinking.

## Night Mode Operation

When MODE = NIGHT and NGT OVRD = NIGHT, the lights will be off. If VDI 3 is closed and the master off switch is turned off and then back on, NGT OVRD changes from NIGHT to DAY. The lights will then operate the way that they do in Night Override mode.

## Graveyard Mode Operation

During Graveyard mode, the lights will be off if the master off switch is off and/or if VDI 3 is opened.

If the master off switch was on before Graveyard mode began, and remains on in Graveyard mode without ever having shut off, the lights will be off in Graveyard mode.

If the master off switch is turned off and then back on during Graveyard mode and if VDI 3 is closed, the lights will remain on for the length of time stored in GRVYD ONTIME (Point 17). Once this time expires the lights will blink and shut off. If GRVYD ONTIME (Point 17) = 0, once the lights turn on, they will remain on for the entire Graveyard mode.

If MODE changes value while the lights are on, the lights will blink and shut off, unless MODE changes to Day mode. When MODE changes to DAY, the lights will turn on or stay on without blinking.

# Lighting Control with Light Harvesting and a Momentary Push-button

This section describes how a lighting circuit is controlled when a light harvesting AI and a momentary push-button are both controlling it.

If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1. The lights are controlled as follows:

If AI 3 is less than LO LITE AI 3 (Point 60) then VDI 3 (Point 22) will be closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 will be opened. Otherwise, VDI 3 will remain unchanged.

Regardless of the mode, if the lights are on, they will blink and shut off if at least *one* of the following events occurs:

- VDI 3 opens.
- The amount of time for the lights to be on when the button is pushed expires.
- MODE changes value.

Regardless of the mode, the lights will be remain off if at least *one* of the following events is occurring:

- VID 3 is opened. (The background lighting is high enough that the lights do not need to turn on).
- The push-button that turns the lights on is not pushed.

When VDI 3 is closed (indicates low background light level), the lights will be on if the push-button is pushed. How long the lights stay on depends on the mode; Day, Night, Night Override or Graveyard mode.

## Day Mode Operation

When a push-button is pushed, when MODE (Point 10) = DAY, the lights that it controls will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and shut off indefinitely.

If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire day mode.

If the lights have been on for less than DAY ON TIME and MODE changes value, the lights will blink and shut off.

## Night Mode/Night Override Mode Operation

When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, NGT OVRD changes to DAY and the Night Override period will be in effect. The lights controlled by the push-button will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and shut off indefinitely. If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Night Override mode.

If the lights are on and MODE changes value, the lights will blink and shut off.

## Graveyard Mode Operation

When a push-button is pushed, when MODE = GRVYD, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and then shut off indefinitely. If GRVYD ONTIME = 0, when the button is pushed, the lights will stay on for the entire graveyard mode.

If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

## Lighting Control with a People Sensor, Light Harvesting and Master Off Switch

The master off switch is a direct/pulsed DI. In this configuration, the pulsed part of the direct pulsed DI is not used and the master off switch behaves like an ordinary on/off switch.

This section describes how a lighting circuit is controlled when a light harvesting AI, a people sensor and a master off switch are all controlling it.

If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1, then the lights are controlled as follows:

If AI 3 is less than LO LITE AI 3 (Point 60), VDI 3 (Point 22) is closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 is opened. Otherwise, VDI 3 will remain unchanged.

When VDI 3 is opened, LC1 COMMAND (Point 55) will be off and lighting circuit 1 will be off. If the master off switch is off, LC1 COMMAND (Point 55) will be off and lighting circuit 1 will be off.

When VDI 3 is closed and the master off switch is ON, LC1 COMMAND will be on and lighting circuit 1 will be on if the people sensor senses people in the room. If the people sensor does not sense people in the room, LC1 COMMAND will be OFF and lighting circuit 1 will be off.

If VDI 3 opens or if the people sensor stops sensing people, the lights will blink before shutting off.

If the master off switch is turned off, the lights will blink and then shut off indefinitely.

If the lights are on and MODE changes value, the lights will not blink and they will not shut off. In order for the lights to be on the people sensor must be sensing people in the room and this application will not turn off the lights when a people sensor senses people in the room.

## Lighting Control with Light Harvesting, a Master Off Switch and a Momentary Push-button

The master off switch is a direct/pulsed DI. In this configuration, the pulsed part of the direct pulsed DI is not used and the master off switch behaves like an ordinary on/off switch.

This section describes how a lighting circuit is controlled when a light harvesting AI, a master off switch and a momentary push-button are all controlling it.

If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1, then the lights are controlled as follows:

If AI 3 is less than LO LITE AI 3 (Point 60), VDI 3 (Point 22) is closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 is opened. Otherwise, VDI 3 will remain unchanged.

Regardless of the mode, if the lights are on, they will blink and shut off if at least *one* of the following events occurs:

- VDI 3 opens.
- The master off switch is turned off.
- The amount of time for the lights to be on when the button is pushed expires.
- MODE changes value.

Regardless of the mode, the lights will remain off if at least *one* of the following events is occurring:

- VDI 3 is opened. (The background lighting is high enough that the lights do not need to turn on).
- The master off switch is off.
- The push-button that turns the lights on is not pushed.

When both of the following conditions are true:

- VDI 3 is closed (indicates low background light level).
- The master off switch is in the on position.

Then the lights will be on if the push-button is pushed. How long the lights will stay on depends on the mode.

## Day Mode Operation

When a push-button is pushed, when MODE (Point 10) = DAY, the lights that it controls will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and then shut off indefinitely. If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Day mode.

If the lights have been on for less than DAY ON TIME and MODE changes value, the lights will blink and shut off.

## Night Mode/Night Override Mode Operation

When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, NGT OVRD changes to DAY and the Night Override period will be in effect. The lights controlled by the push-button will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and shut off indefinitely. If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Night Override mode.

If the lights are on and MODE changes value, the lights will blink and shut off.

## Graveyard Mode Operation

When a push-button is pushed, when MODE = GRVYD and NGT OVRD = NIGHT, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and shut off indefinitely.
If GRVYD ONTIME = 0, when the button is pushed, the lights will stay on for the entire Graveyard mode.

If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

# Lighting Control with a People Sensor, Light Harvesting and a Momentary Push-button

This section describes how a lighting circuit is controlled when a light harvesting AI, a people sensor and a momentary push-button are all controlling it.

If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1, then the lights are controlled as follows:

If AI 3 is less than LO LITE AI 3 (Point 60), VDI 3 (Point 22) is closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 is opened. Otherwise, VDI 3 will remain unchanged.

Regardless of the mode, if the lights are on, they will blink and shut off if at least *one* of the following events occurs:

- VDI 3 opens.
- The people sensor stops sensing people.
- The amount of time for the lights to be on when the button is pushed expires.
- MODE changes value.

Regardless of the mode, the lights will be remain off if at least *one* of the following events is occurring:

- VID 3 is opened. (The background lighting is high enough that the lights do not need to turn on).
- The people sensor is not sensing people in the space.
- The push button that turns on the lights is not pushed.

When both of the following conditions are true:

- VDI 3 is closed (indicates low background light level).
- The people sensor senses people in the room.

Then the lights will be on if the push-button is pushed. How long the lights will stay on depends on the mode.

## Day Mode Operation

When a push-button is pushed, when MODE (Point 10) = DAY, the lights that it controls will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and shut off indefinitely.
If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Day mode.

If the lights have been on for less than DAY ON TIME and MODE changes value, the lights will blink and shut off.

## Night Mode/Night Override Mode Operation

When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, NGT OVRD changes to DAY and the Night Override period will be in effect. The lights controlled by the push-button will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and shut off indefinitely.
If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Night Override mode.

If the lights are on and MODE changes value, the lights will blink and shut off.

## Graveyard Mode Operation

When a push-button is pushed, when MODE = GRVYD, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and shut off indefinitely.
If GRVYD ONTIME = 0, when the button is pushed, the lights will stay on for the entire Graveyard mode.

If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

# Lighting Control with a People Sensor, Master Off Switch and a Momentary Push-button

The master off switch is a direct/pulsed DI. In this configuration, the pulsed part of the direct pulsed DI is not used and the master off switch behaves like an ordinary on/off switch.

This section describes how a lighting circuit is controlled when a people sensor, a master off switch and a momentary push-button are all controlling it.

Regardless of the mode, if the lights are on, they will blink and shut off if at least *one* of the following events occurs:

- The master off switch is turned off.
- The people sensor stops sensing people.
- The amount of time for the lights to be on when the button is pushed expires.

- MODE changes value.

Regardless of the mode, the lights will be remain off if at least *one* of the following events is occurring:

- The master off switch is off.
- The people sensor is not sensing people in the space.
- The push button that turns on the lights is not pushed.

When both of the following conditions are true:

- The master off switch is in the on position.
- The people sensor senses people in the room.

Then the lights will be on if the push button is pushed. How long the lights will stay on depends on the mode.

## Day Mode Operation

When a push-button is pushed, when MODE (Point 10) = DAY, the lights that it controls will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and shut off indefinitely.
If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Day mode.

If the lights have been on for less than DAY ON TIME and MODE changes value, the lights will blink and shut off.

## Night Mode/Night Override Mode Operation

When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, NGT OVRD changes to DAY and the Night Override period will be in effect. The lights controlled by the push-button will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and shut off indefinitely.
If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Night Override mode.

If the lights are on and MODE changes value, the lights will blink and shut off.

## Graveyard Mode Operation

When a push-button is pushed, when MODE = GRVYD, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and shut off indefinitely.
If GRVYD ONTIME = 0, when the button is pushed, the lights will stay on for the entire Graveyard mode.

If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

## Lighting Control with a People Sensor, Light Harvesting, Master Off Switch and a Momentary Push-button

The master off switch is a direct/pulsed DI. In this configuration, the pulsed part of the direct pulsed DI is not used and the master off switch behaves like an ordinary on/off switch.

This section describes how a lighting circuit is controlled when a light harvesting AI, a people sensor, a master off switch and a momentary push-button are all controlling it.

If AI 3 (Point 15) is a light harvesting AI that is controlling lighting circuit 1, then the lights are controlled as follows:

If AI 3 is less than LO LITE AI 3 (Point 60), VDI 3 (Point 22) is closed. If AI 3 is greater than HI LITE AI 3 (Point 59), VDI 3 is opened. Otherwise, VDI 3 will remain unchanged.

Regardless of the mode, if the lights are on, they will blink and shut off if at least *one* of the following events occurs:

- VDI 3 opens.
- The master off switch is turned off.
- The people sensor stops sensing people.
- The amount of time for the lights to be on when the button is pushed expires.
- MODE changes value.

Regardless of the mode, the lights will be remain off if at least *one* of the following events is occurring:

- VDI 3 is opened. (The background lighting is high enough that the lights do not need to turn on).
- The master off switch is off.
- The people sensor is not sensing people in the space.
- The push button that turns on the lights is not pushed.

When all of the following conditions are true:

- VDI 3 is closed (indicates low background light level).
- The master off switch is in the on position.
- The people sensor senses people in the room.

Then the lights will be on if the push button is pushed. How long the lights will stay on depends on the mode.

## Day Mode Operation

When a push-button is pushed, when MODE (Point 10) = DAY, the lights that it controls will be on for the amount of time stored in DAY ON TIME (Point 16). Once this time expires, the lights will blink and shut off indefinitely.
If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Day mode.

If the lights have been on for less than DAY ON TIME and MODE changes value, the lights will blink and shut off.

## Night Mode/Night Override Mode Operation

When a push-button is pushed, when MODE (Point 10) = NIGHT and NGT OVRD (Point 21) = NIGHT, NGT OVRD changes to DAY and the Night Override period will be in effect. The lights controlled by the push-button will be on for the amount of time stored in DAY ON TIME or OVRD TIME (Point 20), whichever is shorter. Once this time expires, the lights will blink and shut off indefinitely.
If DAY ON TIME = 0, when the button is pushed, the lights will stay on for the entire Night Override mode.

If the lights are on and MODE changes value, the lights will blink and shut off.

## Graveyard Mode Operation

When a push-button is pushed, when MODE = GRVYD, the lights that it controls will be on for the amount of time stored in GRVYD ONTIME (Point 17). Once this time expires, the lights will blink and shut off indefinitely.
If GRVYD ONTIME = 0, when the button is pushed, the lights will stay on for the entire Graveyard mode.

If the lights have been on for less than GRVYD ONTIME and MODE changes value, the lights will blink and shut off.

# Lighting Circuit Control

This section will use lighting circuit 1 as an example.

## Normal Control

Lighting circuit one is under normal control when it is not blinking. When this is the case, lighting circuit one will be on when LC1 COMMAND (Point 55) is ON. When LC1 COMMAND is OFF, lighting circuit 1 will be off.

LC1 COMMAND controls the on/off state of lighting circuit 1 by controlling DO 1 (Point 41). When LC1 COMMAND changes from OFF to ON, DO 1 will turn on. When LC1 COMMAND changes from ON to OFF, DO 1 will turn off.

## Blinking

Lighting circuit 1 blinks by turning OFF and ON in rapid succession. This is to warn people in the room that the lights are about to turn off indefinitely.

During 1 blink, lighting circuit 1 will be on for BLINK ON TM (Point 48) and off for BLINK OFF TIME (Point 49). This sequence will repeat for the number of times in NO OF BLINKS (Point 51).

NO OF BLINKS (Point 51) determines whether lights Blink before turning off. 0 = no blinks.

Blinking will occur if:

1. The lights are ON and MODE changes value.

2. A light switch causes the lights to turn off.
   For example, when a push-button light switch is pushed (a timed DI), this causes the lights to turn ON. When this time expires, the lights will blink and then shut off indefinitely.

Once a blink sequence begins, it will operate to completion. For example, if the lights are blinking and somebody pushes a button to turn the lights on, the lights will continue to blink and the on command from the push-button will be ignored. However, if somebody pushes a button after the blink sequence has completed, the lights will turn back on.

If there are no push-button DIs (timed DIs) controlling lighting circuit 1 and a people sensor (direct DI) is being used to control lighting circuit 1, then the lights will stay on as long as there are people in the room, the lights will not blink, even if MODE changes state. The lights will blink as soon as the people sensor stops sensing people in the room.

For example, the master off switch (a direct/pulsed DI) is controlling lighting circuit 1 and that neither a people sensor (a direct DI) or a push-button (a timed DI) are controlling lighting circuit 1. If this is the case, then if MODE changes value while the light are on, the lights will blink and shut off, unless MODE changes to Day mode. When MODE changes to DAY, the lights will turn on or stay on without blinking.

## Other Lighting Circuits

LC2 COMMAND (Point 56) controls lighting circuit 2. When DO 2 turns ON the lights turn on. When DO 2 turns OFF the lights turn off.

LC3 COMMAND (Point 56) controls lighting circuit 3. When DO 3 turns ON the lights turn on. When DO 3 turns OFF the lights turn off.

LC4 COMMAND (Point 58) controls lighting circuit 4. When DO 3 turns ON the lights turn on. When DO 3 turns OFF the lights turn off.

LC5 COMMAND (Point 74) controls lighting circuit 5. When DO 5 turns ON the lights turn on. When DO 5 turns OFF the lights turn off.

LC6 COMMAND (Point 75) controls lighting circuit 6. When DO 6 turns ON the lights turn on. When DO 6 turns OFF the lights turn off.

LC7 COMMAND (Point 76) controls lighting circuit 7. When DO 7 turns ON the lights turn on. When DO 7 turns OFF the lights turn off.

LC8 COMMAND (Point 77) controls lighting circuit 8. When DO 8 turns ON the lights turn on. When DO 8 turns OFF the lights turn off.

## Application Notes

1. LOOP TIME (Point 98) is adjustable. Default = 5 seconds which can be shortened if desired for crisper response when turning lights on/off.

2. The controller, as shipped from the factory, keeps all associated equipment OFF. See the *Start-up Procedures* for information on how to release the controller and its equipment to application control.

3. Spare DOs can be used as auxiliary points that are controlled by the field panel after being defined in the field panel's database. However, they cannot be used as auxiliary motor points.

4. In Night or Graveyard modes, if a D/P switch is on but the lights are off (that is, the manual position of the switch has been left in the ON position but the lights have since turned off due to a mode change), any push of an override push-button on the RTS will make the D/P switch's lights come back on, and they will stay on for OVRD TIME.

## Wiring Diagram

**CAUTION:**

The Controller's DOs control 24 Vac loads only. The maximum rating is 12 VA for each DO. Use an interposing 220 V 4-relay module for any of the following:

- VA requirements higher than the maximum
- 110 or 220 Vac
- DC power

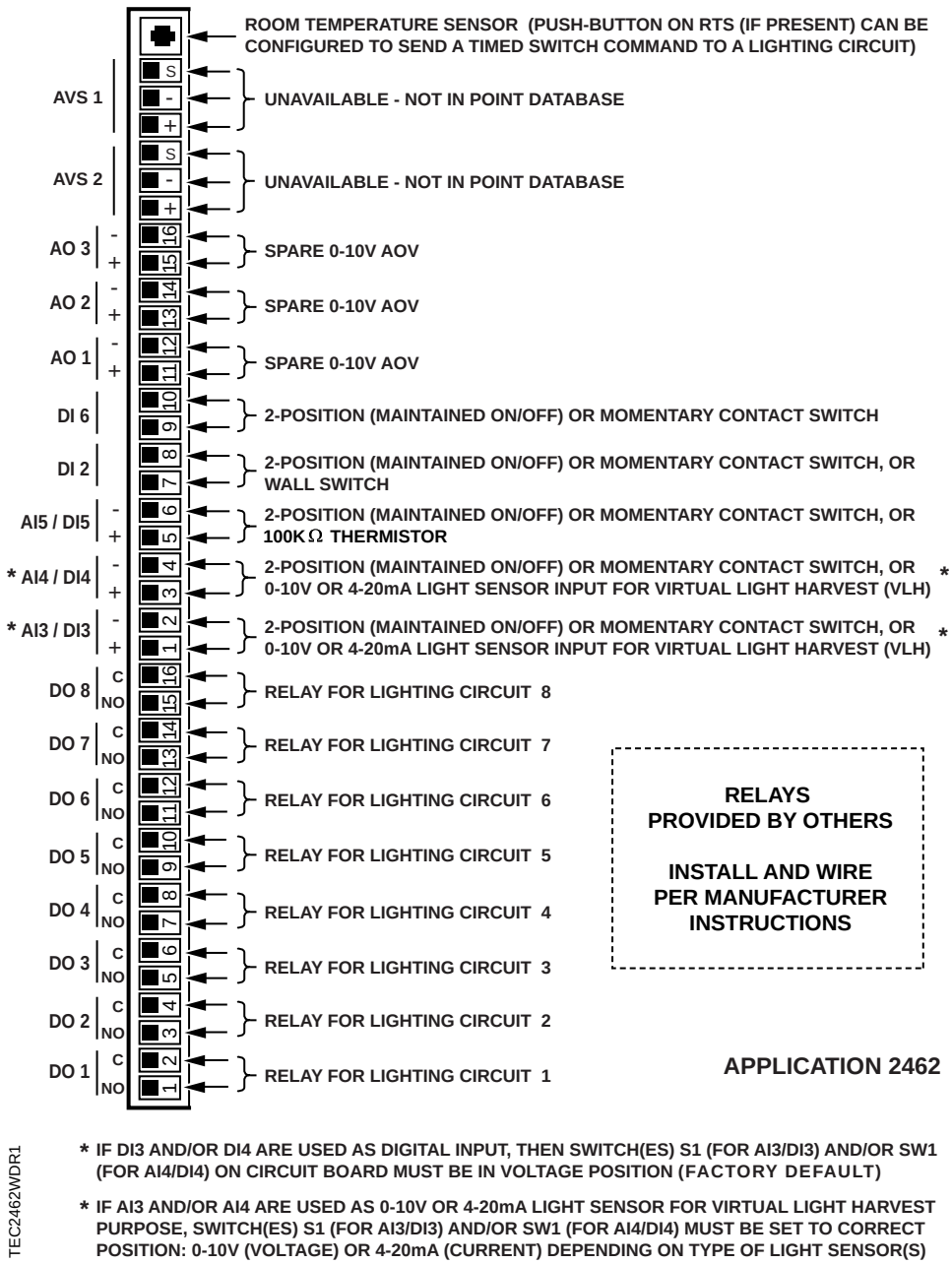


**Figure 2. Application 2462 Wiring Diagram.**

**Table 3. Application 2462 Point Database.**

| Point Number | Descriptor | Factory Default (SI Units) | Eng Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|---|---|---|---|---|---|---|---|
| 1 | CTLR ADDRESS | 99 | – | 1 | 0 | – | – |
| 2 | APPLICATION | 2466 | – | 1 | 0 | – | – |
| 3 | TEMP OFFSET | 0.0 (0.0) | DEG F (DEG C) | 0.25 (0.14) | -31.75 (-17.78) | – | – |
| {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) | – | – |
| {10} | MODE | 0 | – | 1 | 0 | – | – |
| 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} | AI 3 | 100 | PCT | 0.4 | 0 | – | – |
| 16 | DAY ON TIME | 0 | HRS | 1 | 0 | – | – |
| 17 | GRVYD ONTIME | 0 | MIN | 1 | 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} | VDI 3 | OPENED | – | – | – | CLOSED | OPENED |
| {23} | VDI 4 | OPENED | – | – | – | CLOSED | OPENED |

***continued on next page...***

**Table 3. Application 2462 Point Database.** ***(continued)***

| Point Number | Descriptor | Factory Default (SI Units) | Eng Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|---|---|---|---|---|---|---|---|
| {24} | DI 2 | OFF | – | – | – | ON | OFF |
| {25} | DI 3 | OFF | – | – | – | ON | OFF |
| {26} | DI 4 | OFF | – | – | – | ON | OFF |
| {27} | DI 5 | OFF | – | – | – | ON | OFF |
| {28} | DI 6 | OFF | – | – | – | ON | OFF |
| 30 | DI 1 USE | 0 | – | 1 | 0 | – | – |
| 31 | DI 2 TYPE | 0 | – | 1 | 0 | – | – |
| 32 | DI 2 USE | 0 | – | 1 | 0 | – | – |
| 33 | AI.DI 3 TYPE | 0 | – | 1 | 0 | – | – |
| 34 | DI 3 USE | 0 | – | 1 | 0 | – | – |
| 35 | AI.DI 4 TYPE | 0 | – | 1 | 0 | – | – |
| 36 | DI 4 USE | 0 | – | 1 | 0 | – | – |
| 37 | AI.DI 5 TYPE | 0 | – | 1 | 0 | – | – |
| 38 | DI 5 USE | 0 | – | 1 | 0 | – | – |
| 39 | DI 6 TYPE | 0 | – | 1 | 0 | – | – |
| 40 | DI 6 USE | 0 | – | 1 | 0 | – | – |
| {41} | DO 1 | OFF | – | – | – | ON | OFF |
| {42} | DO 2 | OFF | – | – | – | ON | OFF |
| {43} | DO 3 | OFF | – | – | – | ON | OFF |
| {44} | DO 4 | OFF | – | – | – | ON | OFF |
| {45} | DO 5 | OFF | – | – | – | ON | OFF |
| {46} | DO 6 | OFF | – | – | – | ON | OFF |
| {47} | DO 7 | OFF | – | – | – | ON | OFF |
| 48 | BLINK ON TM | 2 | SEC | 0.1 | 0 | – | – |
| 49 | BLINK OFF TM | 0.2 | SEC | 0.1 | 0 | – | – |
| {50} | DO 8 | OFF | – | – | – | ON | OFF |
| 51 | NO OF BLINKS | 0 | – | 1 | 0 | – | – |
| {52} | AOV1 | 0 | VOLTS | 0.01 | 0 | – | – |
| {53} | AOV2 | 0 | VOLTS | 0.01 | 0 | – | – |
| {54} | AOV3 | 0 | VOLTS | 0.01 | 0 | – | – |

***continued on next page...***

**Table 3. Application 2462 Point Database.** ***(continued)***

| Point Number | Descriptor | Factory Default (SI Units) | Eng Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|---|---|---|---|---|---|---|---|
| {55} | LC1 COMMAND | OFF | – | – | – | ON | OFF |
| {56} | LC2 COMMAND | OFF | – | – | – | ON | OFF |
| {57} | LC3 COMMAND | OFF | – | – | – | ON | OFF |
| {58} | LC4 COMMAND | OFF | – | – | – | ON | OFF |
| 59 | HI LITE AI 3 | 70 | PCT | 0.4 | 0 | – | – |
| 60 | LO LITE AI 3 | 30 | PCT | 0.4 | 0 | – | – |
| 61 | HI LITE AI 4 | 70 | PCT | 0.4 | 0 | – | – |
| 62 | LO LITE AI 4 | 30 | PCT | 0.4 | 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 | CYCLE AHU | NO | – | – | – | YES | NO |
| 66 | TEMP DB | 2.0 (1.12) | DEG F (DEG C) | 0.25 (0.14) | 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 | – | – |
| 70 | AHU REQUIRED | OFF | – | – | – | ON | OFF |
| 71 | AFTER TIME | 10 | MIN | 1 | 0 | – | – |
| 73 | DO DIR. REV | 0 | – | 1 | 0 | – | – |
| {74} | LC5 COMMAND | OFF | – | – | – | ON | OFF |
| {75} | LC6 COMMAND | OFF | – | – | – | ON | OFF |
| {76} | LC7 COMMAND | OFF | – | – | – | ON | OFF |
| {77} | LC8 COMMAND | OFF | – | – | – | ON | OFF |
| {78} | CTL TEMP | 74.0 (23.44888) | DEG F (DEG C) | 0.25 (0.14) | 48.0 (8.88888) | – | – |

***continued on next page...***

**Table 3. Application 2462 Point Database.** ***(continued)***

| Point Number | Descriptor | Factory Default (SI Units) | Eng Units (SI Units) | Slope (SI Units) | Intercept (SI Units) | On Text | Off Text |
|---|---|---|---|---|---|---|---|
| {79} | CLG LOOPOUT | 0 | PCT | 0.4 | 0 | – | – |
| {80} | HTG LOOPOUT | 0 | PCT | 0.4 | 0 | – | – |
| {81} | AI 4 | 100 | PCT | 0.4 | 0 | – | – |
| {82} | AUX TEMP AI5 | 74.0 (23.495556) | DEG F (DEG C) | 0.5 (0.28) | 37.5 (3.055556) | – | – |
| 85 | SWITCH LIMIT | 5.2 | PCT | 0.4 | 0 | – | – |
| 86 | SWITCH TIME | 10 | MIN | 1 | 0 | – | – |
| 90 | SWITCH DBAND | 1.0 (0.56) | DEG F (DEG C) | 0.25 (0.14) | 0 | – | – |
| 91 | HC.ENDIS | 3 | – | 1 | 1 | – | – |
| {92} | CTL STPT | 74.0 (23.44888) | DEG F (DEG C) | 0.25 (0.14) | 48.0 (8.88888) | – | – |
| 98 | LOOP TIME | 5 | SEC | 1 | 0 | – | – |
| {99} | ERROR STATUS | 0 | – | 1 | 0 | – | – |