

Sequences of Operation: Office Building Applications

Occupancy / Vacancy Sensor Applications

Per 2018 IECC C405.2.1

- 1 When lights are on, all non-emergency lights automatically turn off when occupancy is not detected by the occupancy sensor within [15 minutes].
- 2 If sensor has turned lights off and occupancy is detected within [60 seconds], then lights return to the last lighting level.
- 3 When lights are off, lights set to [manual on] or [automatic on set to [50%] power]. Per code, areas where manual-on operation would endanger the safety or security of the room or building occupants shall be full automatic-on.
- 4 Room thermostat to setback [5 degrees F] when occupancy is not detected by the occupancy sensor within [30 minutes].
- 5 Operating hours logged and reported in the EnergyCenter software for system learning and alerts. If lights are on for [60 minutes] during afterhours operation [9 PM], an alert shall be sent.

Daylight Sensor Applications

Per 2018 IECC C405.2.3 and C406.4

- 1 When the space is occupied, the daylight sensor automatically reduces power and dims the light fixtures to maintain a consistent [30] foot candle setting. The maximum [8] fixtures associated within the daylighting zone programmed to not exceed the maximum light level established by the daylight sensor.
- 2 Set dimming range from a maximum dimming level [100%] of the high-end trim setpoint to a minimum dimming level [10%] to avoid confusion among occupants. Note: Lights can be turned off if occupants are aware of the operations and energy savings benefits.

Thermostat Control

Per 2018 IECC C403.4

- 1 Local thermostat to have +/- [2 degrees F] local adjustment of normal occupied setpoint temperature.
- 2 When multiple sensors are utilized, the local thermostat to take the average of the connected room temperature sensors to call for heating or cooling within +/- [3 degrees F] deadband range.

Wireless Switch / Dimmer Lighting Control

Per 2018 IECC C405.2.2.2

- 1 Allow local dimming from [80%] high-end trim to [0%] in the room.
- 2 Support on/off switching.

Lighting and Thermostat Timeclock Control & Scheduling

Per 2018 IECC C405.2.2 and C405.2.6

- 1 Set high-end trim/institutional tuning maximum light level to [80%].
- 2 EnergyCenter software timeclock turns interior lights on to [50%] light level during scheduled normal hours of operation.
- 3 During scheduled unoccupied hours, all non-emergency interior lighting systems are [swept off] [dimmed to [30%]]. If occupancy is detected, the lights in the occupied rooms remain on and the occupancy will be logged.
- 4 Local manual overrides set to allow lights to remain on for [2 hours] maximum.
- 5 Exterior lights turned on/off via an astronomical timeclock. Lights turn on to [80%] [15 minutes] before sunset, and turn off [15 minutes] after sunrise.
- 6 Exterior lights grouped to enable automatic dimming from [100%] maximum to a minimum of [50%] between the hours of [12 AM] and [6 AM] with a manual override to full on. See IECC C405.2.6.3
- 7 Timeclock schedule to automatically setback room thermostats [5 degrees F] during unoccupied hours. Timeclock to reset thermostats to occupied mode [1 hour] prior to normal occupied operations.

Electrical Receptacle / Smart Outlet Plug Load Control

Per ASHRAE 90.1-2013, Section 8.4

- 1 Controlled electrical receptacles in a space to be automatically turned off within [20 minutes] when occupancy is not detected by the associated occupancy sensor.
- 2 During scheduled occupied hours, electrical receptacles to be automatic on within [30 seconds] when occupancy is detected.
- 3 During scheduled unoccupied hours, all controlled electrical receptacles are [swept off]. If occupancy is detected, the controlled receptacles in the occupied rooms remain on.
- 4 During scheduled unoccupied hours, electrical receptacles to be automatic on with a [5 minute delay] when occupancy is detected.
- 5 If electrical load exceeds [10 amps] at any receptacle, an alert shall be sent with location of the excessive load and time of occurrence.

Note: These sequences of operation are for general information purposes only, and are provided without any warranty as to accuracy, completeness, or otherwise. The user should read the applicable code requirements for their specific project requirements, and should consult with a professional engineer or other competent advisor to comply with local code requirements.

Sequences of Operation: Demand Response

Having the ability to manage your electricity consumption can allow a building owner/operator to reduce electrical consumption during periods of real-time pricing, critical-peak pricing, or time-of-use tariffs that may be charged by the local electric utility. Moreover, some utilities may offer incentive-based demand response programs to pay the building owner/operator if the building's electrical consumption can be reduced during certain periods of time throughout the year.

Participation in a demand response program may generate monthly incentive payments. Having an ability to reduce electrical consumption and potentially shift some of the electrical load, such as precooling the building, can positively impact the bottom line.

Even if your utility does not currently charge for real-time or critical-peak pricing, almost all have a ratchet charge that you pay on a 12-month basis just so that utility can "reserve" power for you. Autani's EnergyCenter helps reduce your risk and exposure to these higher utility charges.



Demand response programs can be initiated automatically through EnergyCenter and reward customers who voluntarily reduce their energy use during peak demand events.



Demand Response / Electrical Load Shedding

Per 2018 IECC C406.4

Upon notification of a demand response signal, the building [automatically] [manually] implements the following during the entire duration of the event via the EnergyCenter software:

- 1 Maximum light level set to [50%] in all essential spaces.
- 2 Non-essential space lighting is turned off.
- 3 Non-essential controlled electrical receptacles are turned off.

4 Essential controlled electrical receptacles are monitored with alerts set at [10 amps] to notify facilities management of excessive loads and their location.

5 For [3 hours] prior to the demand response event, disable local thermostat control and lower thermostat [5 degrees F] below normal setpoint temperature to pre-cool the building. During load shedding event, raise room thermostats [5 degrees F] above normal setpoint temperature and keep local thermostat control disabled .

6 Autani meters to report electrical load consumption and provide [5 minute] status alerts via the EnergyCenter software during the event.

