



Design Standard

Lighting - Lighting Controls

This standard was revised on January 22, 2021, and the latest changes are underlined. Please refer to Part 16 of this standard for full revision history.

PART 1 - GENERAL CONTROLS

- 1.01 All spaces shall comply with the latest currently adopted version by the State of Texas of ASHRAE 90.1.
- 1.02 Lighting controls shall be designed to be intuitive to multiple end users who may or may not be familiar with the space.
- 1.03 The use of combination/multi-function type switch (tap for ON or OFF, press for Raise or Lower is not acceptable.
- 1.04 Control station buttons shall be engraved or labeled to indicate function.

PART 2 - INTERIOR CONTROLS

- 2.01 Design Interior Controls that comply with energy code requirements applicable to the project.
- 2.02 Acceptable manufactures for Building Level Lighting Control Systems are:
 - A. Crestron
 - B. Lutron
- 2.03 Switches with dimming function shall have low-end trim set to no less than 5% of full lumen output of attached fixture.
- 2.04 Control Systems must be re-configurable or re-zone-able post installation without need to move wires.

PART 3 - NETWORK COMPATIBILITY

- 3.01 In general, lighting control systems will not be networked to the Building Automation system. However, specified manufacturers and their products shall be able to communicate using native BACnet for future connectivity. Each panel shall be able to connect to the Building Automation System network and shall allow programming of groups and viewing of status via the BAS software. Small site lighting panels will not be required to be BACnet compatible.
- 3.02 Systems must be capable of single-pane-of-glass login for multiple building monitoring as well as command and control.



PART 4 - OCCUPANCY SENSORS/VACANCY SENSORS

- 4.01** Adjust time-out settings for vacancy sensors to optimize energy savings, relamping cost, and customer satisfaction. The following optimal settings have been determined:
- A. Occupancy/vacancy sensors shall be “dual technology” type, with dry contacts for HVAC system integration.
 - B. Classrooms, private offices, open offices, laboratories and restrooms: longest time-out setting, but not more than 30 minutes.
 - C. Break rooms, storage rooms: 5 minute time-out setting.
 - D. Conference rooms: 10 minute time out setting.
 - E. Corridors, lobbies: 15 minute time out setting.

PART 5 - LIGHTING IN CORRIDORS

- 5.01** Occupancy sensors only, no manual controls. In corridors design un-switched “night lighting” luminaires at the entrance/exit to the corridor and at major corridor intersections. In spaces with more than one personnel entrance, design the lighting controls so any required manual control will be available at each entrance.

PART 6 - MECHANICAL, ELECTRICAL, AND COMMUNICATIONS EQUIPMENT ROOMS

- 6.01** No automatic controls, wall mounted manual switches at all entries.
- 6.02** Lighting shall operate when normal power is interrupted.

PART 7 - LABORATORIES

- 7.01** Ambient lighting is to be controlled from ceiling or wall mounted occupancy sensors as well as the master lighting control switch(es) to manually turn the lights on and off.

PART 8 - OFFICES/CONFERENCE ROOMS

- 8.01** Smaller offices, where cubicle partitions are not used, shall utilize wall-mounted vacancy sensors. In larger (multi-occupant) offices, a combination of ceiling and wall mounted sensors shall be used to ensure adequate coverage.
- 8.02** In offices with glass walls, care shall be taken to position any occupancy sensor(s) such that corridor traffic does not trigger false occupancy detection.
- 8.03** The intent is that a room occupant will be required to turn the lights on manually when entering a room and have the ability to turn the lights off while in the room or upon leaving the room.



- 8.04 Lights will time off if the occupant leaves the room without manually turning the lights off. "Time-Delay-Off" feature shall be set for less than 15 minutes.

PART 9 - INTERIOR STAIRWELLS

- 9.01 Light fixtures are to remain illuminated at all times. In an effort to conserve energy each fixture will be fitted with an integral occupancy sensor in order to provide dual lighting levels. Reduced lighting levels shall not be less than minimum egress lighting levels, in the event of occupancy sensor failure.

PART 10 - EXTERIOR CONTROLS

- 10.01 In general, exterior fixtures shall be controlled via photocells with a manual override switch¹. This control system shall stand alone and be separate from building automation controls or building lighting controls, but shall provide signal to building automation system to indicate operation status. Design exterior lighting controls that comply with energy code requirements applicable to the project. Control exterior lighting to be on at dusk and off at dawn by means of a photocells and time clock combination through a HAND-OFF-AUTO selector switch and lighting contactor; where HAND bypasses photocell.
- 10.02 The use of timeclocks to control exterior lighting circuits is prohibited.¹

PART 11 - CLASSROOM AND STUDENT PRESENTATION SPACES

- 11.01 Lighting controls consist of On/Off control at entry door, preset control at presenters location (ON/Bright mode - all ceiling lights on 100%, Medium mode - lights dim to 70% and lights in front of screen/whiteboard to off (light above a presentation podium/lectern should remain on), Low/Dim mode - lights in front of screen/whiteboard/ceiling mounted video projector turn off (light above a presentation podium/lectern should remain on), , others dim to 30%, and Off mode- all lights off) and a rocker switch or separate 2 button raise lower switch that can adjust the light level of the presets.
- 11.02 If chalkboard/whiteboard lights are installed a separate two button switch is installed at the presenter's location to operate lights ON/OFF, lights will also go OFF from the master switch in the Low/Dim mode as well in the Off mode and from the entry door switch(s). Switches at entry doors to be 2 buttons ON (all ceiling fixtures at 100%)/OFF (all fixtures in room off), the preset and dimming switches are located near the lectern.
- 11.03 Lights will time off if the occupant leaves the room without manually turning the lights off. "Time-Delay-Off" feature shall be set for less than 15 minutes.

PART 12 - DAYLIGHT HARVESTING

- 12.01 Daylight harvesting shall be implemented in areas required by ASHRAE 90.1.



PART 13 - WIRING DIAGRAMS

- 13.01** The engineer shall provide wiring diagrams of the lighting controls on the electrical drawings for each type of space being controlled. Include enlarged detail of control stations to indicate desired labeling/engraving of button functions.
- 13.02** Electrical lighting plans shall include the following:
- A. Distinct symbology to distinguish between different types of occupancy sensors.
 - B. Wiring: line voltage vs. low voltage vs wireless.
 - C. Location and orientation of each product.
 - D. Typical wiring diagrams of lighting control devices in different applications.
 - E. A lighting control matrix to indicate lighting control performance.
 - F. A switch schedule for all low voltage switches identifying what each switch controls.
- 13.03** In lieu of a complete conduit system, the lighting control CAT 5 control cables and the Class 2 dimming control wires can be installed in a skeletal type conduit system using plastic push-on bushings on conduit ends and appropriate supports from building structure or bridle rings/J-Hooks that are attached to building structure, spaced no farther than 5' apart and 10" minimum above ceiling tiles.
- 13.04** The use of Factory Terminated CAT5 control cables is preferred. If field terminated cables are used, they shall be tested and test results are to be provided to lighting control commissioning agent.

PART 14 - CLOSEOUT DOCUMENTS

- 14.01** Close out documents shall include:
- A. Lighting Controls manual included in the O&M manual.
 - B. As-built record drawings showing final installed condition.
 - C. Any lighting control drawings produced by the Lighting Controls manufacturer vendor.
 - D. A record of the schedules/settings programmed into the Lighting Controls system.
 - E. The lighting controls manufacturer shall certify in writing that the installed system meets all performance criteria.
 - F. The engineer shall provide a written sequence of operations on the electrical drawings for each type of space being controlled.



PART 15 - OWNER TRAINING/COMMISSIONING

- 15.01 Projects shall include a manufacturer authorized service technician to meet the contractor on-site prior to the completion of the installation of lighting systems. The manufacturer authorized technician will meet with the following Texas A&M University employees:
 - A. UES (Utilities and Energy Service) Personnel.
 - B. Building Proctors.
 - C. SSC Employees.
 - D. EHS (Environmental and Health Safety).
- 15.02 The manufacturer authorized technician shall provide an additional follow-up programming session within 3 months after the initial programming with Texas A&M University UES Personnel.
- 15.03 Provide accurate as-built documentation reflecting the latest programming requirements.

PART 16 – REVISIONS TO DESIGN STANDARD

Revision #	Date	Location	Brief Description
1	1/20/2021	Part 10	Use of timeclocks prohibited