

- C. Provide nameplate for each controller indicating room(s) controlled.
D. Install room controller wall-mounted indicating 46 inches above finished floor to the centerline of the box unless indicated otherwise.
- 3.08 CLOSURE
- A. Demonstrate proper operation of lighting control devices to the Owner and correct deficiencies or make adjustments as directed.
B. Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
C. Provide a written report of all program settings and photosensor settings to the Owner.

END OF SECTION

SECTION 262416 – PANELBOARDS

PART 1 GENERAL – NOT USED

PART 2 PRODUCTS

- 2.01 LIGHTING AND APPLIANCE PANELBOARDS
- A. Description: Square D Type NQ for 240 Volt Class and Square D Type NF for 600 Volt Class unless Protection Package is specified.
- B. Voltage, Phase, and Current Ratings: As indicated or otherwise required.
C. Short-Circuit Current Rating (SCCR): No less than the available fault current. The Contractor shall determine the available fault current where not indicated on the Drawings.
- D. Bussing: As indicated or otherwise required.
- E. Bonded Equipment Ground Bar: Provide for each panelboard.
- F. Isolated Ground Bar: Provide for each panelboard that serves isolated ground loads.
- G. Enclosures: Manufacturer's standard enclosure suitable for the environment in which the panelboard is installed; 5/8 inch deep, 20 inches wide unless indicated otherwise; surface or flush mounted as indicated.
- H. Cabinet Front: Surface or flush type as indicated with hinged door, flush lock, metal directory frame and finish in manufacturer's standard enamel.
- I. Circuit Breakers:
1. Built-in thermal-magnetic molded case circuit breakers with common trip handle for all poles.
 - a. Provide type SWD for lighting circuits.
 - b. Provide Type HACR for heating, air-conditioning, and refrigeration equipment circuits.
 - c. Provide Class A ground-fault interrupter (GFI) where indicated or otherwise required.
 - d. Provide ground-fault protection of equipment (GFPE) where serving feed circuits or otherwise required.
 - e. Provide combination type arc-fault circuit interrupter (AFCI) where indicated or otherwise required.
 - f. Provide dual-rated combination type arc-fault circuit interrupter (AFCI) and Class A ground-fault circuit interrupter (GFI) where indicated or otherwise required.
 2. Accessories:
 - a. Provide handle ties for circuit breakers serving multiple branch circuits.
 - b. Provide Square D #HLO1 handle clamps for circuit breakers denoted as "ILO" and for all fire protection and fire alarm equipment and all circuits serving emergency lighting.
 - c. Provide Square D #DHPF-2 power disconnect switch padlock attachment for circuit breakers denoted as "HPL" and for appliances without a local disconnecting means.
 3. Amp Interrupting Current (AIC) Rating: No less than the available fault current; fully rated for the maximum available fault current. The Contractor shall determine the available fault current where not indicated on the Drawings.
 4. Do not use multi-pole circuit breakers that mount in a 1-pole circuit breaker space (i.e. half-size circuit breakers).

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. Install panelboards 6 feet to top of panelboard but no less than 4 inches above floor.
- B. Provide 4-inch thick concrete housekeeping pad for surface-mounted panelboards installed within 4 inches of the floor.
- C. Provide fire plates for unused spaces in panelboards.
- D. Provide typed circuit directory and nameplate for each panelboard. Revise directory to reflect circulating changes required to balance phase loads.
- E. Provide five 1-inch square conduit or equivalent sized service panelboard to an accessible location above ceiling. Identify each as SPARE.
- F. Measure steady state load currents at each panelboard feeder and rearrange circuits as required to balance the phase loads to within 10 percent maximum imbalance. Maintain proper phasing for multiwire branch circuits.
- G. Provide nameplate indicating panelboard equipment designation for each panelboard.
- 3.02 ADDITIONAL INSTALLATION REQUIREMENTS FOR REMOTE CONTROLLED CIRCUIT BREAKER PANELBOARDS
- A. Hold meeting with the Owner.
- B. Determine and make adjustments requested by the Owner.
- C. Determine all timeclock settings such as ON and OFF times for each day of the week, holiday settings, latitude and longitude of the project site for astronomical features, etc.
- D. Determine all control settings such as on and off triggers, blink warnings, sweep settings, etc.
- E. Provide all control wiring and communications cabling, whether or not shown on the Drawings, per manufacturer's recommendations and as required for a complete and operational system.
- F. Program the entire system as established in meeting with the Owner.
- G. Demonstrate proper operation of remote controlled circuit breaker panelboard control system to the Owner and correct deficiencies or make adjustments as directed.
- H. Train Owner's personnel on operation, adjustment, programming, and maintenance of remote controlled circuit breaker panelboard control system.
- I. Provide a written report of all remote controlled circuit breaker panelboard control system program settings to the Owner.

END OF SECTION

SECTION 262701 – ELECTRICAL SERVICE ENTRANCE

PART 1 GENERAL

- 1.01 PRE-INSTALLATION MEETING: Confer with utility company one month prior to commencing work to review and coordinate all requirements and details.
- PART 2 PRODUCTS
- 2.01 INSTRUMENT TRANSFORMER CABINET: Steel metal cabinet with hinged door, provisions for locking and sealing, and conforming to all utility company requirements; size as required by utility company.
- 2.02 METER SOCKET: Furnished by utility company or the Electrical Contractor as specified by the utility company.
- 2.03 UTILITY TRANSFORMER PAD: Prefabricated precast concrete or cast-in-place transformer pad sized as required by the utility company. Construct in strict conformance with the utility company standards.
- 2.04 OTHER COMPONENTS: Provide all conduits, boxes, accessories, and components as required by utility company for a complete, functional, and safe installation.

END OF SECTION

SECTION 262717 – EQUIPMENT WIRING

PART 1 GENERAL

- 1.01 COORDINATION WITH OTHER TRADES
- A. Meet with all other trades before commencing any work and obtain and review shop drawings, product data, manufacturer's programs, and manufacturer's instructions for equipment furnished under other Sections.
- B. Determine all equipment connection locations and requirements and verify that proper power supply is available prior to subcontractor's ordering equipment.
- C. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- D. Verify and coordinate all requirements and installation details of all materials and equipment prior to rough-in.
- E. Verify proper voltage, phase, and current rating of power supply and immediately report any discrepancies to the Owner.
- F. Responsibility for verification of proper power supply voltage and any damage resulting from incorrect connections shall rest with this Contractor.
- G. Any conflicts arising from lack of coordination shall be this Contractor's responsibility.

PART 2 PRODUCTS

- 2.01 CORDS
- A. Description: Type SOW in conductor flexible cord Type SO for dry and damp locations or Type SOW-UL wet locations.
- B. Conductor Quantity: As required for the load served; include identified equipment grounding conductor.
- C. Conductor Insulation Rating: As required for the voltage of the load served.
- D. Conductor Ampacity: No less than the rating of the overcurrent protection device protecting the circuit.
- 2.02 CORD CAPS: Match cord cap to receptacle configuration at outlet provided for equipment.
- 2.03 OTHER MATERIALS: Provide all disconnect switches, wiring devices, conduit, wire and cable, and boxes required.

PART 3 EXECUTION

- 3.01 ELECTRICAL CONNECTIONS
- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use equipment flexible conduit with water-tight connections in damp or wet locations.
- C. Connect heat-producing equipment using wire and cable with insulation suitable for temperature encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-wired attachment plug is required.
- F. Install outlet strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block lumps to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Cut and seal conduit openings in freezer and cooler walls, floors, and ceilings where applicable.

END OF SECTION

SECTION 262728 – WIRING DEVICES

PART 1 GENERAL

- 1.01 PREPARATION: Contact the Architect to determine colors of all wiring devices, cover plates, and carpet and tile flanges, locations where stainless steel cover plates are required, and locations where carpet and tile flanges are required.

PART 2 PRODUCTS

- 2.01 RECEPTACLES
- A. Receptacles:
1. Color as selected by Architect.
 2. Provide tamper-resistant receptacles where denoted "TR" on the Drawings and otherwise required.
 3. Provide ground-fault circuit interrupter receptacles where denoted "GFCI" on the Drawings and otherwise required.
 4. Provide receptacles with controlled receptacle marking where denoted "CR" on the Drawings and where controlled by automatic shutoff controls.
 5. Provide identified weather-resistant receptacles for receptacles installed outdoors.
 6. NEMA 5-20R unless indicated otherwise.
 7. Standard NEMA 5-15R Duplex: Hubbell #J5362 unless indicated otherwise.
 8. Standard NEMA 5-20R Duplex: Hubbell #J5362 unless indicated otherwise.
 9. Interior GFCI Duplex: Hubbell #GF230 unless indicated otherwise.
 10. Exterior GFCI Duplex: Hubbell #GF230 unless indicated otherwise.
 11. Isolated Ground Duplex: Hubbell #GR3532 unless indicated otherwise.
 12. Isolated Ground Duplex: Hubbell #GR3532 unless indicated otherwise.
 13. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.
 14. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.
 15. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.
 16. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.
 17. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.
 18. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.
 19. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.
 20. GFI Duplex: Hubbell #GR3532 unless indicated otherwise.

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. Install switches with label oriented such that manufacturer, type, and size are easily read.
- END OF SECTION
- SECTION 262813 – FUSES
- PART 1 GENERAL – NOT USED
- PART 2 PRODUCTS
- 2.01 SAFETY SWITCHES
- A. 240 Volt Class: Square D Class 3130 general duty unless indicated otherwise.
- B. 600 Volt Class: Square D Class 3110 heavy duty unless indicated otherwise.
- C. Voltage, Phase, and Current Ratings: As indicated or otherwise required.
- D. Fuse Clips: Class R cartridge fuses clips where fuses are installed.
- E. Enclosures: Manufacturer's standard enclosure suitable for the environment in which the switch is installed.
- F. Accessories: Provide grounding kit for all enclosed switches.
- 2.02 BOX COVER UNITS: Busmann JESU unless indicated otherwise.
- 2.03 ENCLOSURES: Busmann JESU unless indicated otherwise.
- 2.04 WALL SWITCHES
- A. All Switches:
1. Color as selected by Architect.
 2. Horsepower rated when used as motor disconnecting means.
 3. Single Pole Toggle: Hubbell #J1221 unless indicated otherwise.
 4. Three-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 5. Four-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 6. Single Pole Toggle with Pilot Light: Hubbell #JBL1221FLC unless indicated otherwise.
 7. Single Pole Keyed: Hubbell #JBL1221 unless indicated otherwise.
 8. Three-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.
 9. Four-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. Enclosed Switches:
1. Install in locations that provide all working space required by NFPA 70.
 2. Install 5 feet to the operating handle.
 3. Install fuses in fusible disconnect switches.
 4. Provide nameplate indicating equipment designation, NEMA fuse class, and fuse size installed.
- B. Enclosed Switches Serving Elevator Controllers:
1. Coordinate all requirements with the elevator manufacturer prior to ordering and rough-in.
 2. Install within 24 inches of the latch (strike) side of the door to the machine room regardless of location shown on the Drawings.
 3. Coordinate all fuse ratings with the elevator manufacturer.
 4. Connect auxiliary contacts to the elevator manufacturer's recommendations.
 5. Wire the auxiliary contacts in accordance with the manufacturer's recommendations to prevent signaling the fire alarm system when the switch is manually opened.
 6. Coordinate the connection of auxiliary contacts and fire safety interface to the fire alarm system with the contractor installing the fire alarm system.

END OF SECTION

SECTION 262913 – ENCLOSED CONTROLLERS

PART 1 GENERAL

- 1.01 COORDINATION WITH OTHER TRADES
- A. Examine the Drawings of all trades and identify all motors that will require motor controllers.
- B. Coordinate with all trades and provide all required controllers whether or not specifically shown on the Drawings.
- C. Verify voltage, phase, and motor horsepower with the Contractor providing the motor.
- D. Coordinate control circuit voltages the all trades.

PART 2 PRODUCTS

- 2.01 FRACTIONAL HORSEPOWER MANUAL CONTROLLERS: Square D Class 2510 Type F with red pilot light and manufacturer's standard enclosure suitable for the environment in which the controller is installed.
- 2.02 AUTOMATIC CONTROLLERS
- A. All Automatic Controllers: All automatic controllers shall return to their previous operating mode upon restoration of power following a power failure.
- B. Full-Voltage Non-Reversing Controllers:
1. Description: Square D Class 8536 Type S unless indicated otherwise or otherwise required.
 2. Voltage, Phase, and Horsepower Ratings: As required for the controlled motor.
 3. Control Coil: Coordinate with the voltage of the control circuit.
 4. Overload Relay: Ambient compensated bimetallic with heaters sized per NFPA 70 requirements based on motor nameplate full-load amps (FLA).
 5. Control Power Transformer: Standard capacity with secondary voltage as required for the control circuit, fused primary, and fused secondary.
 6. Auxiliary Contacts: Two field-convertible.
 7. Operators: Cover-mounted around START-STOP pushbuttons with HAND-OFF-AUTO selector switch.
 8. Pilot Lights: Cover-mounted red ON and Green OFF.
 9. Enclosure: Manufacturer's standard enclosure suitable for the environment in which the controller is installed.
- C. Full-Voltage Non-Reversing Combination Controllers:
1. Description: Square D Class 8536 Type S unless indicated otherwise or otherwise required.
 2. Voltage, Phase, and Horsepower Ratings: As required for the controlled motor.
 3. Control Coil: Class R where indicated as fusible.
 4. Control Coil: Coordinate with the voltage of the control circuit.
 5. Overload Relay: Ambient compensated bimetallic with heaters sized per NFPA 70 requirements based on motor nameplate full-load amps (FLA).
 6. Control Power Transformer: Standard capacity with secondary voltage as required for the control circuit, fused primary, and fused secondary.
 7. Auxiliary Contacts: Two field-convertible.
 8. Operators: Cover-mounted around START-STOP pushbuttons with HAND-OFF-AUTO selector switch.
 9. Pilot Lights: Cover-mounted red ON and Green OFF.
 10. Enclosure: Manufacturer's standard enclosure suitable for the environment in which the controller is installed.
- D. Two-Speed Controllers: Two-speed controllers where indicated or required by connected equipment; include integral time delay transition between FAST and SLOW speeds.

PART 3 EXECUTION

- 3.01 EXAMINATION: Verify that outlet boxes are installed at proper heights and that openings are neatly cut and will be completely covered by the coverplates or flanges.
- 3.02 PREPARATION
- A. Provide extension rings to bring wall-mounted outlet boxes flush with finished surfaces.
- B. Adjust flange boxes to bring floor boxes flush with finished floor.
- 3.03 MOUNTING HEIGHTS
- A. General: All mounting heights are to the centerline of the outlet box.
- B. Receptacles:
1. Install receptacles at 18 inches above finished floor unless indicated otherwise.
 2. Install receptacles at countertops at the lesser of 44 inches above finished floor or 3 inches above any sideshelves or backsplashes unless indicated otherwise.
- C. Wall Switches: Install wall switches including wallbox dimmers, wall switch occupancy sensors, and low voltage switches associated with programmable relay points and room controllers at 48 inches above finished floor unless indicated otherwise.
- D. Telecommunications Outlets:
1. Install telecommunications outlets including telephone, data, and television outlets 18 inches above finished floor unless indicated otherwise.
 2. Install telephone outlets for side-reach and forward-reach wall telephone 48 inches above finished floor unless indicated otherwise.
- E. Modify mounting heights in masonry walls as required to locate the outlet box at the joint in the masonry unit to avoid masonry or split-cut masonry units.

PART 3 EXECUTION

- 3.01 ELECTRICAL CONNECTIONS
- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use equipment flexible conduit with water-tight connections in damp or wet locations.
- C. Connect heat-producing equipment using wire and cable with insulation suitable for temperature encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-wired attachment plug is required.
- F. Install outlet strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block lumps to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Cut and seal conduit openings in freezer and cooler walls, floors, and ceilings where applicable.

END OF SECTION

SECTION 262810 – INTERIOR LIGHTING

PART 1 GENERAL

- 1.01 QUALITY ASSURANCE
- A. Verify all ceiling systems for proper coordination of luminaires and accessories including any drywall frames, bar hangers, fuses, trim rings, etc. required for a complete, finished installation.
- B. Provide only luminaires that are listed for the environment in which they are installed.
- C. Luminaires shall carry damp location (D) or wet location ratings as required.
- D. Luminaires shall be installed ceiling (C) rated when recessed into insulated ceilings; coordinate locations of all insulated ceilings with the Architectural plans.
- E. Coordinate exact locations of all luminaires with the Architectural Reflected Ceiling Plan(s); luminaire locations on the Architectural Reflected Ceiling Plan(s) take precedence over locations indicated on the electrical lighting plans.
- F. Confirm all luminaire and accessory finishes with the Architect prior to ordering.
- G. Coordinate luminaire dimensions with the wall and/or ceiling thickness prior to ordering.
- H. Coordinate mounting location, number of faces, and directional arrows of exit signs as required to mark paths of egress to the satisfaction of the Authority Having Jurisdiction.
- PART 2 PRODUCTS
- 2.01 LUMINAIRES
- A. Provide as indicated on the Drawings.
- B. The acceptability of any substitute fixtures lies solely with the Architect and Engineer.
- C. The specified luminaire shall be provided at no additional cost where a substitute luminaire is not accepted by the Architect or Engineer.
- 2.02 NON-DIMMING BALLASTS, TRANSFORMERS, AND DRIVERS
- A. All Ballasts, Transformers, and Drivers:
1. Provide low-temperature ballasts when installed in locations where ambient temperature can fall below 10 degrees C (50 degrees F).
- B. Electronic Linear Fluorescent Ballasts:
1. Description: Osram SYLVANIA Quicktronic High Efficiency series unless indicated otherwise.

- H. Use flat-head screws, clips, and straps to fasten multi-outlet assembly channel to surfaces and use suitable insulating bushings and inserts at connections to outlets and corner fittings.
- END OF SECTION
- SECTION 262813 – FUSES
- PART 1 GENERAL – NOT USED
- PART 2 PRODUCTS
- 2.01 SAFETY SWITCHES
- A. 240 Volt Class: Square D Class 3130 general duty unless indicated otherwise.
- B. 600 Volt Class: Square D Class 3110 heavy duty unless indicated otherwise.
- C. Voltage, Phase, and Current Ratings: As indicated or otherwise required.
- D. Fuse Clips: Class R cartridge fuses clips where fuses are installed.
- E. Enclosures: Manufacturer's standard enclosure suitable for the environment in which the switch is installed.
- F. Accessories: Provide grounding kit for all enclosed switches.
- 2.02 BOX COVER UNITS: Busmann JESU unless indicated otherwise.
- 2.03 ENCLOSURES: Busmann JESU unless indicated otherwise.
- 2.04 WALL SWITCHES
- A. All Switches:
1. Color as selected by Architect.
 2. Horsepower rated when used as motor disconnecting means.
 3. Single Pole Toggle: Hubbell #J1221 unless indicated otherwise.
 4. Three-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 5. Four-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 6. Single Pole Toggle with Pilot Light: Hubbell #JBL1221FLC unless indicated otherwise.
 7. Single Pole Keyed: Hubbell #JBL1221 unless indicated otherwise.
 8. Three-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.
 9. Four-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. Install switches with label oriented such that manufacturer, type, and size are easily read.
- END OF SECTION
- SECTION 262818 – ENCLOSED SWITCHES
- PART 1 GENERAL – NOT USED
- PART 2 PRODUCTS
- 2.01 SAFETY SWITCHES
- A. 240 Volt Class: Square D Class 3130 general duty unless indicated otherwise.
- B. 600 Volt Class: Square D Class 3110 heavy duty unless indicated otherwise.
- C. Voltage, Phase, and Current Ratings: As indicated or otherwise required.
- D. Fuse Clips: Class R cartridge fuses clips where fuses are installed.
- E. Enclosures: Manufacturer's standard enclosure suitable for the environment in which the switch is installed.
- F. Accessories: Provide grounding kit for all enclosed switches.
- 2.02 BOX COVER UNITS: Busmann JESU unless indicated otherwise.
- 2.03 ENCLOSURES: Busmann JESU unless indicated otherwise.
- 2.04 WALL SWITCHES
- A. All Switches:
1. Color as selected by Architect.
 2. Horsepower rated when used as motor disconnecting means.
 3. Single Pole Toggle: Hubbell #J1221 unless indicated otherwise.
 4. Three-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 5. Four-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 6. Single Pole Toggle with Pilot Light: Hubbell #JBL1221FLC unless indicated otherwise.
 7. Single Pole Keyed: Hubbell #JBL1221 unless indicated otherwise.
 8. Three-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.
 9. Four-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. Install switches with label oriented such that manufacturer, type, and size are easily read.
- END OF SECTION
- SECTION 262818 – ENCLOSED SWITCHES
- PART 1 GENERAL – NOT USED
- PART 2 PRODUCTS
- 2.01 SAFETY SWITCHES
- A. 240 Volt Class: Square D Class 3130 general duty unless indicated otherwise.
- B. 600 Volt Class: Square D Class 3110 heavy duty unless indicated otherwise.
- C. Voltage, Phase, and Current Ratings: As indicated or otherwise required.
- D. Fuse Clips: Class R cartridge fuses clips where fuses are installed.
- E. Enclosures: Manufacturer's standard enclosure suitable for the environment in which the switch is installed.
- F. Accessories: Provide grounding kit for all enclosed switches.
- 2.02 BOX COVER UNITS: Busmann JESU unless indicated otherwise.
- 2.03 ENCLOSURES: Busmann JESU unless indicated otherwise.
- 2.04 WALL SWITCHES
- A. All Switches:
1. Color as selected by Architect.
 2. Horsepower rated when used as motor disconnecting means.
 3. Single Pole Toggle: Hubbell #J1221 unless indicated otherwise.
 4. Three-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 5. Four-Way Toggle: Hubbell #J1221 unless indicated otherwise.
 6. Single Pole Toggle with Pilot Light: Hubbell #JBL1221FLC unless indicated otherwise.
 7. Single Pole Keyed: Hubbell #JBL1221 unless indicated otherwise.
 8. Three-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.
 9. Four-Way Keyed: Hubbell #JBL1221 unless indicated otherwise.

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. Enclosed Switches:
1. Install in locations that provide all working space required by NFPA 70.
 2. Install 5 feet to the operating handle.
 3. Install fuses in fusible disconnect switches.
 4. Provide nameplate indicating equipment designation, NEMA fuse class, and fuse size installed.
- B. Enclosed Switches Serving Elevator Controllers:
1. Coordinate all requirements with the elevator manufacturer prior to ordering and rough-in.
 2. Install within 24 inches of the latch (strike) side of the door to the machine room regardless of location shown on the Drawings.
 3. Coordinate all fuse ratings with the elevator manufacturer.
 4. Connect auxiliary contacts to the elevator manufacturer's recommendations.
 5. Wire the auxiliary contacts in accordance with the manufacturer's recommendations to prevent signaling the fire alarm system when the switch is manually opened.
 6. Coordinate the connection of auxiliary contacts and fire safety interface to the fire alarm system with the contractor installing the fire alarm system.

END OF SECTION

SECTION 262913 – ENCLOSED CONTROLLERS

PART 1 GENERAL

- 1.01 COORDINATION WITH OTHER TRADES
- A. Examine the Drawings of all trades and identify all motors that will require motor controllers.
- B. Coordinate with all trades and provide all required controllers whether or not specifically shown on the Drawings.
- C. Verify voltage, phase, and motor horsepower with the Contractor providing the motor.
- D. Coordinate control circuit voltages the all trades.

PART 2 PRODUCTS

- 2.01 FRACTIONAL HORSEPOWER MANUAL CONTROLLERS: Square D Class 2510 Type F with red pilot light and manufacturer's standard enclosure suitable for the environment in which the controller is installed.
- 2.02 AUTOMATIC CONTROLLERS
- A. All Automatic Controllers: All automatic controllers shall return to their previous operating mode upon restoration of power following a power failure.
- B. Full-Voltage Non-Reversing Controllers:
1. Description: Square D Class 8536 Type S unless indicated otherwise or otherwise required.
 2. Voltage, Phase, and Horsepower Ratings: As required for the controlled motor.
 3. Control Coil: Coordinate with the voltage of the control circuit.
 4. Overload Relay: Ambient compensated bimetallic with heaters sized per NFPA 70 requirements based on motor nameplate full-load amps (FLA).
 5. Control Power Transformer: Standard capacity with secondary voltage as required for the control circuit, fused primary, and fused secondary.
 6. Auxiliary Contacts: Two field-convertible.
 7. Operators: Cover-mounted around START-STOP pushbuttons with HAND-OFF-AUTO selector switch.
 8. Pilot Lights: Cover-mounted red ON and Green OFF.
 9. Enclosure: Manufacturer's standard enclosure suitable for the environment in which the controller is installed.
- C. Full-Voltage Non-Reversing Combination Controllers:
1. Description: Square D Class 8536 Type S unless indicated otherwise or otherwise required.
 2. Voltage, Phase, and Horsepower Ratings: As required for the controlled motor.
 3. Control Coil: Class R where indicated as fusible.
 4. Control Coil: Coordinate with the voltage of the control circuit.
 5. Overload Relay: Ambient compensated bimetallic with heaters sized per NFPA 70 requirements based on motor nameplate full-load amps (FLA).
 6. Control Power Transformer: Standard capacity with secondary voltage as required for the control circuit, fused primary, and fused secondary.
 7. Auxiliary Contacts: Two field-convertible.
 8. Operators: Cover-mounted around START-STOP pushbuttons with HAND-OFF-AUTO selector switch.
 9. Pilot Lights: Cover-mounted red ON and Green OFF.
 10. Enclosure: Manufacturer's standard enclosure suitable for the environment in which the controller is installed.
- D. Two-Speed Controllers: Two-speed controllers where indicated or required by connected equipment; include integral time delay transition between FAST and SLOW speeds.

PART 3 EXECUTION

- 3.01 EXAMINATION: Verify that outlet boxes are installed at proper heights and that openings are neatly cut and will be completely covered by the coverplates or flanges.
- 3.02 PREPARATION
- A. Provide extension rings to bring wall-mounted outlet boxes flush with finished surfaces.
- B. Adjust flange boxes to bring floor boxes flush with finished floor.
- 3.03 MOUNTING HEIGHTS
- A. General: All mounting heights are to the centerline of the outlet box.
- B. Receptacles:
1. Install receptacles at 18 inches above finished floor unless indicated otherwise.
 2. Install receptacles at countertops at the lesser of 44 inches above finished floor or 3 inches above any sideshelves or backsplashes unless indicated otherwise.
- C. Wall Switches: Install wall switches including wallbox dimmers, wall switch occupancy sensors, and low voltage switches associated with programmable relay points and room controllers at 48 inches above finished floor unless indicated otherwise.
- D. Telecommunications Outlets:
1. Install telecommunications outlets including telephone, data, and television outlets 18 inches above finished floor unless indicated otherwise.
 2. Install telephone outlets for side-reach and forward-reach wall telephone 48 inches above finished floor unless indicated otherwise.
- E. Modify mounting heights in masonry walls as required to locate the outlet box at the joint in the masonry unit to avoid masonry or split-cut masonry units.

PART 3 EXECUTION

- 3.01 ELECTRICAL CONNECTIONS
- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use equipment flexible conduit with water-tight connections in damp or wet locations.
- C. Connect heat-producing equipment using wire and cable with insulation suitable for temperature encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-wired attachment plug is required.
- F. Install outlet strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block lumps to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Cut and seal conduit openings in freezer and cooler walls, floors, and ceilings where applicable.

END OF SECTION

SECTION 265600 – EXTERIOR LIGHTING

PART 1 GENERAL

- 1.01 QUALITY ASSURANCE
- A. Verify all ceiling systems for proper coordination of luminaires and accessories including any drywall frames, bar hangers, fuses, trim rings, etc. required for a complete, finished installation.
- B. Provide only luminaires that are listed for the environment in which they are installed.
- C. Luminaires shall carry damp location (D) or wet location ratings as required.
- D. Luminaires shall be installed ceiling (C) rated when recessed into insulated ceilings; coordinate locations of all insulated ceilings with the Architectural plans.
- E. Coordinate exact locations of all luminaires with the Architectural Reflected Ceiling Plan(s); luminaire locations on the Architectural Reflected Ceiling Plan(s) take precedence over locations indicated on the electrical lighting plans.
- F. Confirm all luminaire and accessory finishes with the Architect prior to ordering.
- G. Coordinate luminaire dimensions with the wall and/or ceiling thickness prior to ordering.
- H. Coordinate mounting location, number of faces, and directional arrows of exit signs as required to mark paths of egress to the satisfaction of the Authority Having Jurisdiction.
- PART 2 PRODUCTS
- 2.01 LUMINAIRES
- A. Provide as indicated on the Drawings.
- B. The acceptability of any substitute fixtures lies solely with the Architect and Engineer.
- C. The specified luminaire shall be provided at no additional cost where a substitute luminaire is not accepted by the Architect or Engineer.
- 2.02 NON-DIMMING BALLASTS, TRANSFORMERS, AND DRIVERS
- A. All Ballasts, Transformers, and Drivers:
1. Provide low-temperature ballasts when installed in locations where ambient temperature can fall below 10 degrees C (50 degrees F).
- B. Electronic Linear Fluorescent Ballasts:
1. Description: Osram SYLVANIA Quicktronic High Efficiency series unless indicated otherwise.

2. Voltage: Universal (120 through 277 volts).
3. Ballast Factor: Normal (0.85).
4. Total Harmonic Distortion: Less than 10 percent.
5. Sound Level Ratings: Class A.
6. Starting: Provide ballasts that provide rapid start unless indicated otherwise.
7. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.
- C. Electronic Compact Fluorescent Ballasts:
1. Description: Osram SYLVANIA Quicktronic Professional DULUX series unless indicated otherwise.
 2. Voltage: Universal (120 through 277 volts).
 3. Ballast Factor: Greater than 0.85.
 4. Total Harmonic Distortion: Less than 10 percent.
 5. Sound Level Ratings: Class A.
 6. Starting: Provide ballasts that provide rapid start unless indicated otherwise.
 7. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.
- D. Electronic Metal Halide Ballasts:
1. Provide all metal halide luminaires rated at 100 watts or less with electronic ballast with matched ANSI code to the associated lamp.
 2. Description: Osram SYLVANIA Quicktronic Metal Halide Professional DULUX series unless indicated otherwise.
 3. Voltage: Universal (120 through 277 volts).
 4. Ballast Factor: 1.0.
 5. Power Factor: Greater than 0.95.
 6. Total Harmonic Distortion: Less than 10 percent.
 7. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.
- E. Magnetic Metal Halide Ballasts:
1. Permitted only for metal halide luminaires rated greater than 100 watts.
 2. Description: Osram SYLVANIA Metalux series unless indicated otherwise with matched ANSI code to the associated lamp.
 3. Voltage: Multi-tap (120, 208, 240, 277, and 480 volts).
 4. Circuit Type: Constant Voltage Autotransformer (CVA).
 5. Power Factor: Greater than 0.95.
 6. Total Harmonic Distortion: Less than 10 percent.
 7. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.

- F. Low Voltage Transformers:
1. Description: Osram SYLVANIA Metalux series unless indicated otherwise with matched ANSI code to the associated lamp.
 2. Voltage: Multi-tap (120, 208, 240, 277, and 480 volts).
 3. Circuit Type: Constant Voltage Autotransformer (CVA).
 4. Power Factor: Greater than 0.95.
 5. Total Harmonic Distortion: Less than 10 percent.
 7. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.
- G. LED Drivers:
1. Provide all LED luminaires rated at 100 watts or less with LED drivers.
 2. Description: Osram SYLVANIA Quicktronic LED drivers unless indicated otherwise with matched ANSI code to the associated lamp.
 3. Voltage: Multi-tap (120, 208, 240, 277, and 480 volts).
 4. Circuit Type: Constant Voltage Autotransformer (CVA).
 5. Power Factor: Greater than 0.95.
 6. Total Harmonic Distortion: Less than 10 percent.
 7. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. All Dimming Ballasts and Drivers:
1. Provide all dimming ballasts/drivers in all fluorescent and LED luminaires controlled by wallbox dimmer switches or dimming systems whether or not specifically indicated within the specified luminaire's catalog number.
 2. All dimming ballasts/drivers shall be compatible with associated wallbox dimmer switch and associated system control units.
 3. Dimming Range: 100 percent to 5 percent.
 4. Voltage: Universal (120 through 277 volts).
 5. Power Factor: Greater than 0.95.
 6. Total Harmonic Distortion: Less than 10 percent.
 7. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.
- B. Fluorescent Dimming Ballasts:
1. Three-Wire Linear Fluorescent: Lutron HI-Lume 3J unless indicated otherwise.
 2. Three-Wire Compact Fluorescent: Lutron EcoSystem series unless indicated otherwise or as selected by the Owner.
 3. 0-10 Volt: Advance Mark 7 series unless indicated otherwise; ballast factor greater than or equal to 0.85.
 4. LED Dimming Ballasts and Drivers:
 - a. Description: Osram SYLVANIA DULUX series unless indicated otherwise.
 - b. Voltage: Universal (120 through 277 volts).
 - c. Ballast Factor: 1.0.
 - d. Total Harmonic Distortion: Less than 10 percent.
 - e. Accessories: Provide disconnecting means that opens all supply conductors including the neutral conductor.

PART 3 EXECUTION

- 3.01 INSTALLATION
- A. Enclosed Switches:
1. Install in locations that provide all working space required by