**PART 1 - GENERAL**

1. **SUMMARY**
2. Section Includes:
3. Boxes, enclosures, keys and locks.
4. Receptacles and switches.
5. Identifications and signs.
6. Related Requirements:
7. Division 01 - General Requirements.
8. Division 26 – Electrical.
9. Division 27 – Communications.
10. Division 28 - Electronic Safety and Security.

**PART 2 - PRODUCTS**

1. **BOXES, ENCLOSURES, KEYS AND LOCKS**
2. Outlet Boxes and Fittings:
3. Outlet boxes installed in concealed Work shall be galvanized steel, pressed, or welded type, with knockouts.
4. In exposed Work, where conduit runs change direction or size, outlet boxes and conduit fittings shall be cast metal with threaded hubs cast integral with box or fitting.
5. Fittings shall be cast metal and non-corrosive. Ferrous metal fittings shall be cadmium-plated, or zinc galvanized. Castings shall be true to pattern, smooth, straight, with even edges and corners, of uniform thickness of metal, and shall be free of cracks, gas holes, flaws, excessive shrinkage, and burnt-out sand.
6. Covers for fittings shall be galvanized steel or non-corrosive aluminum and shall be designed for particular fitting installed.
7. Light fixture outlets shall be 4-inch octagon, 4-inch square, 2 1/8-inch deep or larger, depending upon number of conductors or conduits therein. Plaster rings shall be furnished with round opening with two ears drilled 2 23/32 inches center to center.
8. For local device outlets provide 4-inch square 2 1/8-inch deep, boxes for single gang, 5-inch square boxes for two-gang, and special solid gang boxes with gang plaster ring for more than two switches.
9. For TV outlets, and horns and strobes provide manufacturer’s supplied back box as needed. For television outlets, provide 4-gang deep boxes and 4-gang plaster rings.
10. Plaster rings shall be provided on flush-mounted outlet boxes except where otherwise indicated or specified. Plaster rings shall be same depth as finished surface. Install approved ring extension to obtain depth to finish surface.
11. In existing plywood wall or drywall construction, and where flexible steel conduit is fished into walls, single-gang and 2-gang outlets for wiring devices may be sectional steel boxes with plaster ears. Boxes shall be fastened to plywood with flat-head screws in each plaster ear screw hole. Boxes fastened to gypsum board shall be Gripsite, Raco, or equal.
12. Factory made knockout seals shall be installed to seal box knockouts, which are not intact.
13. Where flexible conduit is extended from flush outlet boxes, provide and install weatherproof universal box extension adapters.
14. Junction and Pull boxes:
15. Junction and pull boxes, in addition to those indicated, shall only be used in compliance with codes, recognized standards, and Contract Documents.
16. Interior and non-weatherproof boxes shall be constructed of blue or galvanized steel with ample laps, spot welded, and shall be rigid under torsion and deflecting forces. Boxes shall be furnished with auxiliary angle iron framing where necessary to ensure rigidity.
17. Covers shall be fastened to box with enough machine screws to ensure continuous contact all around. Flush type boxes shall be drilled and tapped for cover screws if boxes are not installed plumb. Surfaces of pull and junction boxes and covers shall be labeled in black marker ink designating system, panelboard and circuit designation contained in box. In exposed Work, designation shall be installed on inside of pullbox or junction box cover.
18. Weatherproof NEMA 3R pull and junction boxes shall conform to foregoing for interior boxes with following modifications:
19. Cover of flush mounting boxes shall be furnished with a weather-tight gasket cemented to, and trimmed even with, cover all around.
20. Surface or semi-flush mounting pull and junction boxes shall be UL, or another Nationally Recognized Testing Laboratory (NRTL) listed as rain-tight and shall be furnished complete with threaded conduit hubs.
21. Exposed portions of boxes shall be galvanized and finished with one prime coat and one coat of baked-on gray enamel, unless already furnished with factory baked-on finish.
22. Junction and pull boxes shall be rigidly fastened to structure and shall not depend on conduits for support.
23. Underground Concrete Pull Boxes:
24. Pre-cast concrete pull boxes. Concrete pull boxes shall be traffic type, reinforced for H-20 wheel loading, pre-cast concrete. Pull boxes with inside dimensions of 2 feet by 3 feet by 3 feet deep shall consist of a base section, top ring, and cover. Base section shall be furnished with 2 knockouts measuring 10 inches by 10 inches in each 3 feet side, and one 20 inches by 20 inches knockout in each 2-foot side. Pull boxes with inside dimension 4 feet by 4 feet by 4 feet deep shall consist of a base section, midsection, topping, and cover. Base section shall be furnished with 2 knockouts measuring 8-inch by 16-inch on each of two opposite sides, and one 20-inch by 20-inch knockout on each of other two opposite sides. Pull boxes shall be furnished with a minimum of 6-inch diameter sump knockout and one-inch diameter ground rod knockout. In pull boxes, furnish and install cable racks on walls. Racks shall be furnished with 3 porcelain cable holders on vertical steel mounting bars. Pull boxes shall be furnished with 3/4-inch diameter pull irons. Covers shall be traffic-type consisting of steel safety plate bolted to frame. Covers shall be marked as electrical, power, or signal as required.
25. Provide end bells in duct entrances. Terminate each metal conduit with insulated bushing provided with a grounding terminal.
26. Install pulling irons on opposite walls and below horizontal centerlines of ducts and bricked-up openings, and in bottom. Install pulling irons with each end hooked around a reinforcing bar.
27. Remove floor drain knockout and provide a depth of 24 inches of crushed rock below box extending a minimum of 12 inches beyond on all sides.
28. Permanently and effectively ground metal equipment cases, cable racks, and similar items in pull boxes to site grounding electrode system. Provide grounding conductor in compliance with CEC Article 250.
29. Provide 6-inch deep sand base under pull boxes.
30. Identify power and signal cables by tagging in manholes and pull boxes. Tie securely to cables with nylon cord.
31. Top of steel plate shall provide a minimum coefficient of static friction of 0.5 for either wet or dry locations, when tested for any shoe sole material. Test shall comply with ASTM D 1047 or F 489 or F 609 standards. Submit manufacturer’s test results for Architect’s review as part of materials and equipment submittals.
32. The use of underground extension boxes shall be limited to not more than 1 times the original depth of pull box.
33. Approved Products: Oldcastle Precast, Jensen Precast, Kistner, Western Precast, or OWNER approved equal.
34. Underground utility boxes shall be reinforced concrete with non-setting shoulders to prevent settlement following installation. Boxes shall be furnished with cast iron cover with finger hole, size as indicated on Drawings. Utility boxes shall be as manufactured by Quickset, Jensen, Western Precast, or equal.
35. Manholes, vaults, and pull boxes required by a utility company, and installed as part of this Contract, shall meet requirements of servicing utility company.
36. Floor Outlets:
37. Floor Outlets (except for extension outlets) shall be cast iron, watertight floor boxes with flush brass floor plates, and shall be set to finish flush with finish floor covering, whether it be carpeted, wood, resilient floor covering, or other finish materials.
    1. Floor boxes shall be used in offices, classrooms, and in library areas only.
    2. Approved Products: Harvey Hubbell Inc. B-2503, Thomas & Betts 640 series, Legrand Omnibox, or OWNER approved equal.
38. Telephones above floor outlets, where not subject to water, shall be provided with Harvey Hubbell Inc. SS-309B pedestals with SS309B plates. Refer to other Division 26 sections. Floor boxes shall be used in offices, classrooms and in Library areas only.
    1. Approved Products: Hubbell or approved equal.
39. Plugs above floor outlets where not subject to water shall be provided with pedestals and device plates. Refer to other Division 26 sections. Floor boxes shall be used in offices, classrooms, and library areas only.
    1. Approved products: Hubbell Inc. SC-3098; Device plates shall be Hubbell SS309D, or District approved equal.
40. Two gang and single box pedestal boxes shall be listed for wet locations where subject to water. Provide required cover plates.
    1. Floor outlets shall be used in Cafeteria, Cafeteria serving areas, or any areas where floors are subjected to water.
    2. Approved products: Single gang boxes - Hubbell SA-6687. Two gang boxes shall be Hubbell SA-6885, or OWNER approved equal.
41. Extension floor outlets shall be cast iron with cast iron covers, and 1/2-inch offset entries for above-floor conduit extensions; Boxes shall be designed to permit access to wiring without disturbing above-floor extensions and shall be set flush with finish floor.
42. Above floor service fittings for data outlets and surge suppression receptacles shall be faceplate interchangeable, die cast aluminum.
    1. Approved products: Hubbell SC3098 with cover plates SS309DS, or OWNER approved equal.
43. Floor Pockets – Plugging Boxes:
44. Three-Gang floor lighting pockets shall be flush floor type recess floor mounted enclosure, with cast iron floor plate and hinged cast iron door notched for cables.
45. Each floor pocket shall be provided with three 20-amp, 3 wire, 125-volt receptacles with matching caps.
46. Approved products: Hubbell Recessed Floor Boxes, C.W. Cole TLS 353-6, or equal, for wood floors and C.W. Cole TLS-353-6-C, or OWNER approved equal for concrete slabs.
47. Single Gang:
48. Receptacle floor pockets shall be single gang, flush floor type, with cast iron floor plate, hinged cast iron door notched for cable and cast-iron box. Provide each pocket with a standard, single grounding type receptacle unless otherwise indicated.
    1. Approved Products: C.W. Cole TLA-362-1-FE, or OWNER approved equal. For wood floors provide C.W. Cole TLS-362-1, or OWNER approved equal.
49. Microphone or projector floor pockets shall be single gang flush floor type with cast iron floor plate, hinged cast iron door, notched for cable and cast-iron box.
    1. Approved Products: C.W. Cole TLA-362-3-FE, C.W. Cole TLS-362-3, in wood floors, or OWNER approved equal.
50. Keys and Locks:
51. Provide two keys with furnished door locks, including cabinet door locks and switchboard locks, two keys for lock switches on switchboards or control panels, and two keys with interlocks or other furnished lock switches. Deliver keys to OAR.
52. Special keys and locks shall only be provided where specified. Locks shall be keyed to Corbin No. 60 or 70 as follows:
    1. Access to operate equipment shall be keyed to Corbin 60.
    2. Access to service areas shall be keyed to Corbin 70.
    3. **RECEPTACLES AND SWITCHES**
53. Receptacles:
54. Duplex receptacles shall be heavy-duty specification grade, grounding type. Terminal screws shall be wired on the side and back with internal screw pressure plates. Mounting strap shall feature heavy-duty brass construction. Receptacle back body shall be PVC. Receptacle face shall be ivory, impact resistant nylon. Receptacles shall have triple wipe brass power contacts.
    1. Approved products:

### NEMA # Pass & Seymour Hubbell Leviton

#### (20 amps) NEMA 5-20 PS5362-I HBL5362-I 5362-I

#### (15 amps) NEMA 5-15 PS5262-I HBL5262-I 5262-I

Equal products approved by OWNER may be acceptable.

1. Duplex receptacles on circuits supplied by panel boards with integral surge suppression shall be Pass & Seymour model number PS5262BL (blue), or OWNER approved equal.
2. Single receptacles shall be heavy-duty specification grade, grounding type. Terminal screws shall be back and side wire with internal screw pressure plates. Mounting strap shall feature heavy-duty brass construction. Receptacle back body shall be thermoplastic. Receptacle face shall be ivory, impact resistant nylon. Receptacles shall have triple wipe brass power contacts. For circuits consisting of one single receptacle only, ampere rating of receptacle shall be same as circuit breaker or fuse.
   1. Approved products:

### NEMA # Pass & Seymour Hubbell Leviton

#### (20 amps) NEMA 5-20R 5361-I HBL5361-I 5361-I

#### (15 amps) NEMA 5-15R 5261-I HBL5261-I 5261-I

Equal products approved by OWNER may be acceptable.

1. Single 15 and 20-amps receptacles on circuits supplied by panel boards with integral surge suppression shall be blue in color.
   1. Approved products: Pass & Seymour NEMA 5-20R model number 5361-BL (blue), NEMA 5-15R model number 5261-BL (blue), or OWNER approved equal.
2. Kiln and range receptacles, provide 3-pole, 4-wire, grounding type, rated 50 amps or as indicated on plans. Receptacle shall be rated 125/250 volts NEMA 14-50R. Provide 2-gang, stainless steel plates.
   1. Approved products:

NEMA # Pass & Seymour Hubbell Leviton

NEMA 14-50R 3894 HBL9450A 279

WALL PLATE SS703 S703 84026

Equal products approved by OWNER may be acceptable.

1. Dryer receptacles. Provide 3-wire, non-grounding type, rated 30 amps at 125/250 volts, NEMA 10-30R, with 2-gang stainless steel plates. Coordinate location of junction box with the work of Section 10 2815, Hand and Hair Dryers.
   1. Approved Products:

NEMA # Pass& Seymour Hubbell Leviton

NEMA 10-30R 3860 HBL9350 5207

WALL PLATE SS703 S703 84026

Equal products approved by OWNER may be acceptable.

1. Provide specification grade ground-fault circuit interrupter (GFCI) type receptacles in accordance with 2010 UL standards. GFCI receptacles shall have a trip indication light. Receptacle terminal screws shall be back and side wire with internal screw pressure plates. Test and reset buttons shall match device body and shall be ivory. GFCI receptacles shall be manufactured in standard configuration for installation with stainless steel smooth plates. Exterior mounted receptacles shall be mounted inside weatherproof enclosure.
   1. Approved products:

NEMA # Pass & Seymour Hubbell Leviton

##### NEMA 5-20R 2095-I GFR5352-IA 7899-I

##### NEMA 5-15R 1595-I GFR5252-IA 8598-I

Equal products approved by OWNER may be acceptable.

1. Provide weatherproof receptacles, except where otherwise indicated or specified, consisting of GFCI receptacles, as specified herein, and metal plates with die-cast lockable hinged lids and weatherproof mats; Standard duplex cover pass and Seymour CA8GV or equal. Standard GFCI cover pass and Seymour CA26GV or equal.

Tamper-resistant receptacles with thermoplastic dual mechanism shutter system to help prevent insertion of foreign objects. Receptacles shall have extra heavy-duty brass, one-piece mounting strap with integral ground. Receptacles shall be ivory color, impact resistant nylon face and back body.

a. Approved products:

NEMA # Pass & Seymour Arrow Hart Leviton

###### NEMA 5-20R TR63-I TR8300V 8300SGI

###### NEMA 5-15R TR62-I TR8200V 8200SGI

Equal products approved by OWNER may be acceptable.

1. Provide transient voltage surge suppression (TVSS) receptacles offering metal oxide varistors (MOVs) protecting normal and common modes, (L-N, L-G, N-G) with 500V suppressed voltage. TVSS devices shall offer 3-mode equal protection with 210 joules minimum per mode of energy absorption and 13,000-amp maximum surge capability. TVSS devices shall have 3 thermal fuses and two over-current protection fuses. TVSS devices shall have LED visual only surge status indicator to alert user to surge suppression circuit condition. Visual indicator will be illuminated (red) when power is on and surge suppression circuit is fully functional. Visual indicator will not be illuminated when power is off or unit experiences loss of surge suppression protection. Terminals shall be back and side wire including ground terminal. Color shall be blue.
   1. Approved Products

NEMA # Pass& Seymour Hubbell Leviton

NEMA 5-20R 5352BLSP HBL5360SA 5380B

NEMA 5-15R 5252BLSP HBL5260SA 5280B

Equal products approved by OWNER may be acceptable.

b. Receptacles within 6 feet of water fountains, counter tops or any source of water shall be GFCI type.

1. Switches
2. Local Switches:
3. Local switches shall be high strength thermoplastic toggle, industrial grade, rated 20 amps at 120-277 volts AC only, with plaster ears, external screw pressure plate back and side wired, and standard size composition cups which fully enclose mechanism. Switches shall be approved for installation at currents up to full rating on resistive, inductive, tungsten filament lamp and fluorescent lamp loads, and for up to 80 percent of rating for motor loads. Switches shall have oversized silver alloy contacts for long life and better heat dissipation. Provide switches as single pole, double pole, 3-way, 4-way, non-lock type. Provide non-lock type switches with ivory handles;

Pass & Seymour Hubbell Leviton

Single pole PS20AC1I HBL1221I 1221-2I

Double pole PS20AC2I HBL1222I 1222-2I

Three-way PS20AC3I HBL1223I 1223-2I

Four-way PS20AC4I HBL1224I 1224-2I

Equal products approved by OWNER may be acceptable.

1. Lock type switches shall be specification industrial grade, 20 amp, 120-277 volts with metal or nylon key guides with on/off indication, and operable by same key. Key shall be District standardized vertically oriented, tamper resistant, forked key with two each 5/16-inch long forks, 5/32-inch spacing between forks and 5/16-inch width overall.
   1. Approved products:

Pass & Seymour Hubbell Leviton

#### Single pole PS20AC1L w/#500 Key-2L HBL1221L 1221-2L

Double pole PS20AC2Lw/#500 Key HBL1222L 1222-2L

Three-way PS20AC3L w/#500 Key HBL1223L 1223-2L

Four Way PS20AC4L w/#500 Key HBL1224L 1224-2L

Equal products approved by OWNER may be acceptable.

1. Rotary lock switches shall incorporate a tumbler type lock to prevent unauthorized operation. Lock shall be tumbler type by Corbin, keyed to a HH41 key. Lock switch to be installed with pin tumblers facing downward. Key shall be removable in all positions. Each device shall be complete with 2 keys. Keys shall be delivered only to the OAR. Switches shall be rated at 20 amps, 120-volt or 277-volt AC. Switch plates shall be of stainless steel, engraved with on and off positions indicated.
   1. Approved products:

Pass & Seymour Hubbell Leviton

Single pole PS20AC1-KL HBL1221-RKL 1221-2KL

Double pole PS20AC2-KL HBL1222-RKL 1222-2KL

Three-way PS20AC3-KL HBL1223-RKL 1223-2KL

Four way PS20AC4-KL HBL1224-RKL 1224-2KL

Equal products approved by OWNER may be acceptable.

1. Pilot light switches shall be rated 20 amps and shall conform to specifications for local switches. Switches shall be furnished with red, Lexan handles that are lighted by LED lamps. Pilot light shall light when load is on. Pilot light 120-volt switches
   1. Approved products:

Pass& Seymour Hubbell Leviton

Single pole PS20AC1-RPL HBL1221-PL 1221-PLR

Double pole PS20AC2-RPL HBL1222-PL 1222-PLR

Three-way PS20AC3-RPL HBL1223-PL 1223-PLR

Equal products approved by OWNER may be acceptable.

* 1. 20 amps, 277 volts rated pilot light switches shall be single pole and shall conform to specifications for local switches, and the requirements of paragraph d above.

1. Approved Products:

Pass & Seymour Leviton Hubbell

#### PS20AC1-RPL 1221-7PR HBL1221-PL7

Provide remote control switches for mechanically held contactors arranged for 3-wire control, toggle type, momentary contact, single pole, 3-position with center off position, rated 20 amps at 120-277 volts AC only, with plaster ears, binding screws for side wiring, standard size composition cups which fully enclose mechanism, and ivory handles.

* 1. Approved products:

Pass & Seymour Hubbell Leviton

1251-I HBL1557-I 1285-I

Equal products approved by OWNER may be acceptable.

1. Provide remote control switches for magnetically held contactors arranged for 3-wire control, toggle type, maintained contact, single pole, 3-position with center off position, rated 20 amps at 120-277 volts AC only, with plaster ears, binding screws for side wiring, standard size composition cups which fully enclosed mechanism, and ivory handles.
   1. Approved products:

Pass and Seymour Hubbell Leviton

1225-I HBL 1385 1285-I

Equal products approved by OWNER may be acceptable.

1. Momentary Contact locking key type switch. 20A 120/277V center off. Key shall be District standardized vertically oriented, tamper resistant, forked key with two each 5/16” long forks, 5/32” spacing between forks and 5/16” width overall.
   1. Approved products:

Arrow Hart AH1995L w/ AH2000 key

Equal products approved by OWNER may be acceptable.

1. Momentary Contact switch low voltage 1 pole 3A 24VAC 3 position center off. Key for locking switch shall be District standardized vertically oriented, tamper resistant, forked key with two each 5/16” long forks, 5/31” spacing between forks and 5/16” width overall.
   1. Approved products:

Pass and Seymour Toggle 1081I, Locking 1081KGRY w/#500 Key

Equal products approved by OWNER may be acceptable.

1. Time Switches and Photoelectric Controls for existing construction.
2. Provide time switches with a 7-day, solid-state, electronic type capable of fully automatic or manual operation and housed in a sheet steel enclosure unless built into a panel or switch­board. Resistive or inductive contacts rated for 25-amps, each pole 240-VAC; 5-amps tungsten or 277-VAC pilot duty, each pole 240-VAC. Time switches to contain a non-volatile clock and non-volatile memory with a built-in rechargeable super capacitor power carry-over system. Battery carryover is not acceptable. Provide a minimum of 15 on/off set points per week. Timing to be in one-minute increments with a minimum on or off time of one minute. Time switch digital displays to indicate days of week, hours, and minutes. Display to contain a load status light to indicate when equipment is in operation.
3. Required :
4. Liquid crystal display panel.
5. Holiday scheduling: Up to 40 dates may be assigned special holiday schedules, up to one year in advance.
6. Automatically adjusts to and from daylight savings time and for leap year.
7. Contact ratings: 10 amp at 240 VAC.
8. Safety override switch for each circuit to either provide shut down of circuit or to override on.
9. Selective review: All or part of schedule shall be displayed at touch of a key.
10. Super Capacitor for power carry-over system.
11. Supply voltage: 120/277-Volt.
12. 365-day advance scheduling.
13. Approved products: Tork D2S-200 series, Intermatic, or OWNER approved equal.
14. Photoelectric control: Shall be rated 2,000 watts, 120V with single pole, single throw, normally closed contact, enclosed in a die-cast aluminum gasketed enclosure with 1/2-inch conduit fitting,
15. Approved products: Tork series 2100, or OWNER approved equal.
16. Telephone Dialers for Elevators:
    1. Provide telephone dialers; Viking Electronics Inc. Model K-1500-4, or equal, with PG-1 programmer one number dialers.
    2. Install dialers in elevator machine rooms and connect to a RJ-11 jack.
17. School Main Entrance Intercom Station: See other Division Sections.
    1. Single zone audio surveillance base station with talkback feature. Unit to be provided with a built-in speaker and microphone; Louroe Electronics API-TB, or equal.
    2. Two-way talk/listen flush-mounted, vandal-proof remote station with microphone, 3-inch speaker and call button mounted to 11 gage stainless steel faceplate: Louroe Electronics TLSP-PB, or equal. For surface mounted applications, provide Louroe Electronics TLMC, or equal.
    3. Provide wiring for base and remote stations as 2/C No. 18 unshielded for speaker and No. 22 drain; West Penn 360, or equal.
18. Emergency Lighting Control Unit
19. The Emergency Lighting Control Unit shall provide all required functionality to allow a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building.
20. The emergency lighting control unit shall allow control of emergency lighting fixture in tandem with normal lighting in an area while ensuring that emergency lighting will turn on immediately to full brightness upon loss of normal power supplying the control device. Emergency lighting operation shall be independent for each controlled area and shall not require a generalized power failure for proper operation.
21. The device shall have normally closed dry contacts capable of switching 10-amp emergency ballast loads at 120-277 VAC, 60 Hz., 2-amp tungsten loads at 120 VAC, 60Hz., LED loads at 120-277V VAC, 60 Hz
22. The device shall have universal rated voltage inputs provided for normal power sense and normal switched power at 120-277 VAC, 60 Hz.
23. The device shall provide separate LEDs to indicate the presence of normal and emergency power sources. The LEDs shall indicate the unit’s current operational mode (normal or emergency)
24. The device’s normal power input terminal shall be connected to the line side of the control device such that any upstream fault causing a loss of power, including the tripping of the branch circuit breaker, will force the unit into the emergency mode and turn on the emergency lighting.
25. The unit shall automatically switch emergency lighting on and off as normal lighting is switched. When normal power is not available, the unit shall force and hold emergency lighting on regardless of the state of any external control device until normal power is restored.
26. Approved products: Douglass, Lighting Control Design #GR 2001 series, or OWNER approved equal.
27. School Main Entrance Intercom Station: Refer to specification section 28 1000 – Access Control System.
    1. **IDENTIFICATION AND SIGNS**
28. Identification Plates:
29. Provide identification plates for the following unless otherwise specified, for switchboards, unit substations, motor control centers, control panels, push-button stations, time switches, contactors, motor starters, motor switches, panelboards, and terminal cabinets.
30. Identification plates shall be of plastic stock and shall adequately describe function, voltage and phase of identified equipment. Where identification plates are detailed or described on Drawings, inscription and size of letters shall be as indicated. For lighting and power panels, identification plates shall indicate panel designation, voltage, and phase of panel. For terminal cabinets, identification plates shall indicate system contained in terminal cabinet.
31. Identification plates shall be black-and-white nameplate stock of bakelite with characters cut through black exposing white. Plates shall be furnished with beveled edges and shall be securely fastened in place with No. 4 Phillips-head, cadmium-plated steel, self-tapping screws. Characters shall be 3/16 inch high, unless otherwise indicated.
32. Markings:
33. Install identification markings to surface-mounted starters, switches, disconnect switches, contactors, and other devices controlling motors and appliances. Provide abbreviations required along with an identifying number. Markings to be provided with locking type stencils using paint of a contrasting color. Figures shall be 3/8 inch high unless otherwise indicated. Dymo Industries Inc., self-sticking plastic labels, with embossed characters made with a typewriter may be installed instead of stencils and paint; p-touch self adhesive plastic, or Brother P-Touch self sticking laminated plastic labels may be installed.
34. High Voltage: High voltage switchboards, cabinets, boxes, and conduits exposed in accessible locations, including under buildings and in attics, are required to be marked "WARNING-HIGH VOLTAGE – ABOVE 600 VOLTS". Markings for switchboards shall consist of 18 gage steel, porcelain enamel sign of standard manufacture. Markings for boxes, cabinets, and conduits shall be by means of stenciling or printed self-adhesive markers, Westline Tel-A-Pipe, or equal. Provide letters of black on orange background and not less than 1-7/8 inches high. On conduit runs, install markings at intervals not exceeding 10 feet in any individual area. Markings shall be installed after other painting Work is complete.
35. Warning Signs:
36. Provide a warning sign on outside of each door or gate to rooms or enclosures containing high voltage equipment. Signs required reading, "WARNING - HIGH VOLTAGE - KEEP OUT". Provide 2-inch high lettering.
37. Provide a warning sign on each high-voltage non-load break disconnect and fused cutout (not oil filled). Signs required reading, "DO NOT OPEN UNDER LOAD". Provide 2-inch-high lettering.
38. Provide signs of standard manufacture, 18 gage steel, with porcelain enamel finish. Provide red lettering on a white background.

**PART 3 - EXECUTION**

* 1. **INSTALLATION AND SUPPORT OF BOXES**

1. Install outlet boxes flush with finished surface of wall or ceiling. Install plumb and securely fastened to structure, independent of conduit. Except where otherwise indicated, provide factory-fabricated adjustable attachment bar hangers between studs to support outlet boxes. When installation is performed in fire rated walls, maintain the wall’s rating integrity by means of approved fire stop methods.
2. Outlet boxes installed in suspended or furred ceilings with steel runner or furring channels shall be supported, except where otherwise indicated, by a Unistrut P-4000 Tessco A1200HS-10, Cooper B-Line B22s-HG, or OWNER approved equal channel spanning main ceiling runner channels. Each box shall be supported from its channel by a 3/8-inch 16 threaded steel rod with a Unistrut P-4008, OWNER approved equal; nut and a Tomic No. 711-B Adapta-Stud, or OWNER approved equal. Rod shall be tightened to a jamb fit with channel and its nut. Box shall be locked to rod by means of a 1/2-inch locknut on stud and a 3/8-inch 16 hex nut locking stud to rod.
3. Heights of outlets and equipment indicated on Drawings shall govern. In absence of such indications, following heights shall be maintained with heights measured to centerline unless otherwise noted:
4. Install wall-mounted switches at 48 inches above finished floor.
5. Outlet boxes for fire alarm pull stations shall be mounted at a mounting height above finished floor that ensures that the operating handle of the initiating device is no higher than 48 inches from finished floor.
6. Wall mounted fire alarm strobe or horn/strobe devices shall be mounted such that the entire lens is not less than 80 inches above finished floor. If ceiling heights allow, wall mounted appliances shall have bottom of lens a minimum of 80 inches but not more than 96 inches to the top of lens.
7. Install outdoor fire alarm audible devices or fire alarm sprinkler flow bells at least 10 feet but not more than 12 feet above finished floor to center. Provide STI or other OWNER approved protective covers as required in plans.
8. Voice evacuation speakers mounted indoors shall be mounted in ceiling space or if mounted on wall shall not be less than 10 feet to center above finished floor.
9. Install clocks and speakers, in classrooms and offices, 8 feet above finished floor. Unless otherwise indicated.
10. In rooms other than places of assembly such as, but not limited to, multipurpose rooms, auditoriums, and libraries, clock outlets and speakers in classrooms and offices shall be mounted 8 feet above finished floors. Other assembly areas such as gymnasiums shall be mounted 10 to 12 feet above finished floor. Provide STI, or equal protective covers for clocks when required.
11. Install fire alarm strobe lights 80 inches to bottom of light above finished floor.
12. Install outside bells and yard light outlets 4 feet above second floor level for 2 or more story buildings, 12 inches below top plate level for one story buildings without covered porch or arcade, and 12 inches below covered porch and arcade ceilings.
13. Install desk telephones, power receptacle outlets, and data outlets 15 inches above finished floor.
14. Install panelboards and terminal cabinets 6 feet 6 inches from finish floor to top of cabinet.
15. Install television outlets at a height corresponding to location of television monitor, or as indicated on plans.
16. The use of extension boxes shall be limited to not more than 1 times the original depth of junction box.
    1. **COVER PLATES**
17. Provide a plate on each switch, plug, pilot light, data, interphone, public telephone, and television outlet, and on existing and reset outlets where so indicated or required. Plates shall be of stainless steel unless otherwise specified.
18. Flush wiring device and signal system outlets indicated to be blank covered, shall be covered with blank stainless-steel plates. Flush lighting outlets to be blanked shall be covered with Wiremold 5736 steel covers, or equal, painted to match surrounding finish. Provide stainless steel covers to blank indicated or required surface-mounted outlets.
19. In the following cases, and at required locations. Switch and receptacle plates shall be engraved with the device(s), or fixtures being controlled, or as indicated:
20. Three-gang and larger gang switches in locations other than classrooms.
21. Lock switches.
22. Pilot switches.
23. Switches so located that operator cannot see fixtures, or items of equipment controlled while his hand is on the switch.
24. Switches not in same room with fixtures or items of unit heaters, air curtains, fly fans, etcetera.
25. Receptacles operating at other than 120 V shall be identified with the operating voltage.
26. Switches operating on 277 V shall be identified with the operating voltage.
27. Where indicated on Drawings.
28. Designations shall be as indicated on Drawings or as specified by Architect.
29. Standard GFI cover plates shall be Pass & Seymour 4600, or equal. GFI cover plates shall be provided with a CAM lock mechanism with two keys or a padlock hasp that does not protrude through the face of the cover and will allow the shank of locks keys.
    1. **IDENTIFICATION OF CIRCUITS AND EQUIPMENT**
30. Provide descriptive nameplates or tags permanently attached to switchboards, motor control centers, transformers, panelboards, circuit breakers, disconnect switches, starters, pushbutton control stations and other apparatus installed for operation or control of circuits, appliances, fire alarm control panel(s), fire alarm annunciator(s), power supplies, terminal cabinets, energy management control units, and Information technology system backbone and distribution equipment points.
31. Provide nameplates of engraved laminated plastic, or etched metal. Submit Shop Drawings denoting dimensions and format to Architect before installation. Fasten to equipment with escutcheon pins, rivets, self-tapping screws, or machine screws. Self-adhering or adhesive backed nameplates are not permitted.
32. Fasten tags to feeder wiring in conduits at every point where runs are broken or terminated, including pull wires in empty conduits. Indicate circuit, phase, and function. Tag branch circuits in panel boards and motor control centers. Tags may be manufactured of pressure-sensitive plastic or embossed self-attached stainless steel or brass ribbon.
33. Provide circuit identification cards and cardholders in all panel boards. Cardholders shall consist of metal frame retaining a clear plastic cover permanently attached to inside of panel door. List of circuits shall be typewritten on a card. Circuit description shall include name or number of circuit’s area and connected load.
34. Junction and pull boxes shall have covers stenciled with box number when indicated on Drawings, or circuit numbers according to panel schedules. Data shall be lettered in a conspicuous manner with a color contrasting with finish.
35. Name shall be correctly engraved, with a legend indicating function or areas, when required by codes or indicated on Drawings.
    1. **PROTECTION**
36. Protect Work of this section until Substantial Completion.
    1. **CLEANUP**
37. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

# END OF SECTION