

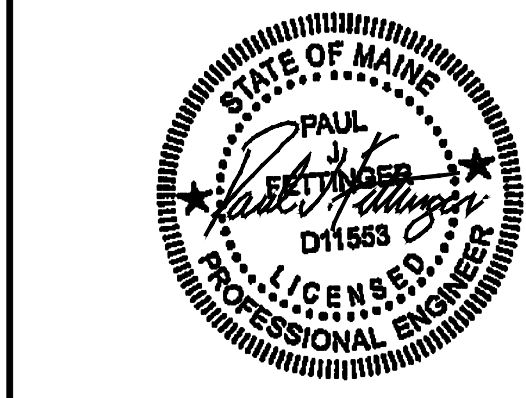
DIVISION 16 - ELECTRICAL SECTION 16010 GENERAL PROVISIONS	A. Refer to individual Sections of Division 16. PART 3 - EXECUTION 3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION	A. Excavating and Backfilling: 1. The Electrical Contractor shall do all excavating and backfilling required for the installation of any and all parts of his work requiring excavation. He shall also do all sheathing and bracing required for the installation of his work. He shall provide and operate pumping equipment, if required, to keep the trenches free of standing water. All work shall comply with requirements given in Section 02200. 2. The above shall include all excavation of character, including rock, if encountered. Contractor shall visit the premises and determine for himself, by actual observations, boring, or other means, the nature of the soil conditions. The cost of all such inspections, borings, etc., shall be borne by the Contractor. Exact locations and relations of all excavations are to be so conducted that no walls or footings shall be disturbed or injured in any way. 3. Remove all surplus earth not needed for filling and dispose of same as specified under architectural division of work. 4. All backfilling shall be thoroughly tamped and settled in a manner as is proper for the particular type of work. 5. Where it is necessary to install work on or across roads, pavements, curbs, sidewalks, etc., this Contractor shall restore the present construction to its original or better condition if disturbed by his operator at no additional cost to the Owner. B. Application, Installation: 1. In the event that conflicts, if any, cannot be settled rapidly and amicably between the affected trades, with work proceeding in a workmanlike manner, then the Architect/Engineer shall decide which work is to be reticulated and his judgment shall be final and binding on this Contractor. 2. No measurements of a Drawing by scale shall be used as a dimension to work by. The Drawings are not intended to show complete or accurate details of the building in every respect. Exact locations and relations are to be defined in the field and shall be satisfactory to the Architect/Engineer. This Contractor shall take all field measurements and shall be responsible therefore. 3. Compare Drawings and Specifications, checking all measurements and determine intent of Contract Documents. Discrepancies shall be brought to the Architect/Engineer's attention for interpretation prior to any installation. 4. The right is reserved to make any reasonable change in location of outlets and equipment prior to roughing-in without involving additional expense. Any change from the Electrical Drawings as is necessary to make the work of this Contractor conform to the building as constructed and to fit the work of other trades shall be included in Contractor's Contract and installed without extra cost. C. FIELD QUALITY CONTROL A. Testing: 1. After wires are in place and connected to devices and equipment, the system shall be tested for shorts and grounds. 2. All hot wires, if shorted or grounded, shall be removed and replaced. 3. A voltage test shall be made at the last outlet on each circuit. If drop in potential is excessive, Contractor will be required to correct the condition by locating partly grounded conductor or high resistance splice. 4. All grounds, shorts and high resistance splices shall be rectified. 5. Any wiring device, electrical apparatus or lighting fixture furnished under this Contract, if grounded or shorted on any integral "live" part, shall be removed and the trouble rectified by replacing all defective parts or materials as directed. 6. Service ground to be tested per National Electrical Code requirement. Grounding pole of all receptacles to be tested. 7. All motors shall be tested under load with ammeter readings taken in each phase, and the RPM of motors recorded at the time. All motors shall be tested for correct direction or rotation. Electrical Contractor shall be responsible for the correctness of all motors and shall verify that proper overload devices have been installed. 8. All meters, instruments, cable connections, equipment or apparatus necessary for making all tests, shall be furnished by this Contractor at his own expense. 9. Contractor shall submit proof of all tests to the Architect before final acceptance of the work. 3.03 ADJUST AND CLEAN A. Cleaning Equipment, Completed Work and Premises: After the completion of all installation by each system shall be thorough cleaning of all paint, oil, and other foreign material. Contractor shall also clean all foreign paint, grease, oil, dirt, labels and stickers, etc., from all fixtures, equipment, etc. The Contractor shall remove all rubbish, debris, etc., accumulated from his operations from the premises. B. Demonstration: At the conclusion of the work and before final contract payment is made demonstrate and explain to the Using Agency's personnel, the function, operation and maintenance of all equipment and systems installed by this Division of the work and provide a copy of all tests performed. C. Protect all equipment and systems against harmful exposures to, or accumulations of dust and moisture, floor covering, carpeting, etc., from other trades and clean and restore damaged finishes as may be required to place installations in a "like-new" condition before acceptance by the Architect. 3.04 SCHEDULES A. Equipment Schedules: See Drawings for schedules of lighting fixtures, motor and equipment connections, switchboard, panelboards, distribution equipment, and related items. 3.05 APPROVALS A. Obtain all permits and approvals from the governing bodies which have jurisdiction over this project. 3.06 IDENTIFICATION AND TAGGING A. Provide all distribution switches and/or circuit breakers, starters, etc., whether individually mounted in panelboards, switchboards, etc., with suitable identification. The designation, using proper nomenclature, shall indicate the load served. Provide all feeders with suitable identification tags as to their designation in all junction boxes, pull boxes, girth splices through which they pass, and at their terminal points of connection. Identification of distribution switches or circuit breakers in panelboards shall be by means of panelboard directories. Identification of distribution switches or circuit breakers or starters individually mounted in switchboards shall be by means of engraved lamocoid nameplates permanently fastened on the front face of the housing, showing 1/4" high white lettering on a black background. Identification of feed cables shall be by means of engraved fiber tags suitably fastened to the cables. 3.07 SLEEVES A. Provide coring in walls and floor slabs for the passage of all conduits, pipes and ducts installed. B. Cored holes in floor shall be provided with sleeves extended one inch above finished floor level and made watertight. 3.08 PAINTING A. All equipment, panelboards, switchboards, etc., shall be factory finished in baked enamel or lacquer, or as specified. Standard factory finishes shall be approved. Any scratches shall be neatly touched up by the installing Contractor. B. All metal work installed by this Contractor exposed to the weather and not factory finished shall be painted with two coats of oil paint of color selected by Architect. C. All finished painting shall comply with the Painting Section of the Specifications. 3.09 CUTTING AND PATCHING A. Perform all cutting and patching required to complete the Work, except where specifically shown on the Architectural or Structural Drawings. B. Refer to Section 01070 for additional requirements. 3.10 TEMPORARY ELECTRICAL SERVICE A. The electrical contractor shall provide temporary electrical wiring for construction use as follows: 1. Temporary service entrance and feeder as required with a fused main disconnect. 2. The electrical contractor shall provide temporary lighting and power throughout the space as required for construction use. 3. Contractor shall utilize existing electrical utilities where ever feasible. 3.11 STRUCTURAL CONDITIONS: A. Notching and boring of structural members will not be permitted. If any conduit, boxes, etc. need to be hung from structural steel, only hang from top flange of beams and top chords, and only panel points of joists and trusses.	"SWD". 3. Circuit breakers shall be as manufactured by Cutler Hammer, Square D, General Electric or Siemens ITE. Where existing equipment is being utilized, new circuit breakers shall be provided of type, size, manufacturer and AIC rating to match existing. M. Motors, Control Panels, Etc.: 1. Check the Drawings and Specifications covering all branches of the work to ascertain what equipment is furnished by others. It will be this Contractor's responsibility to furnish the necessary labor and materials to receive and wire said equipment. Check the Plumbing and Mechanical Drawings and Division 15 of the Specifications carefully for wiring by the Electrical Contractor. N. Motor Starters: Furnish, install, and wire all motor starters as shown on Drawings. Characteristics are as follows: 1. Each 3 phase starter shall be in NEMA 1 enclosure, combination, magnetic across the line as scheduled on the Drawings. Each starter shall have H.O.A. feature and 120 volt control transformer. 2. Each starter for 120 volt motors as shown shall be in NEMA 1 enclosure and of the thermal toggle type. Where pilot lights are indicated, same shall be built into enclosure. Flush boxes shall be provided where starters are shown in finished areas. 3. Starters shall be as manufactured by Cutler Hammer, Square D, or General Electric or Siemens ITE. O. Floor boxes: Furnish, install, and wire all floor boxes as shown on Drawings. Characteristics are as follows: 1. Floor boxes shall be stamped steel with adjustable floor leveling screws as manufactured by Wiremold 885B shallow service type. 2. Provide Wiremold 895T/CAL 5 1/4" carpet flange for all specialty floor installations including through floor applications. 3. Finish shall be brushed brass. PART 3 - EXECUTION 3.01 PREPARATION/INSTALLATION/APPLICATION A. Conduit: 1. Installation - conduit: a. Conduit to be run exposed in unfinished areas such as mechanical, electrical room, stock rooms, and Urban Outfitters Sales floors. All other conduit shall be concealed. Provide trapeze support structure as detailed on electrical drawings to carry all exposed conduit back to stock area and back of house. b. Run parallel or perpendicular to exterior walls of building. c. Locate to avoid equipment, fixtures, ductwork, piping, etc. d. Layout and install work in advance of the laying of floors, walls, etc., and furnish and install all sleeves that may be required for openings through floors, walls, etc. e. Where conduit is to be run exposed, furnish and install all inserts and clamps for the supporting of conduit. f. If contractor does not properly install all sleeves and inserts he will be required to do so. Contractor shall receive approval from the architect later at his own expense, and to the satisfaction of the Architect. Do not obstruct openings or passageways. g. Where conduit passes through floors or through smoke and fire walls, space between conduit and floor or wall shall be filled with cement grout. h. Radius of bends shall be not less than six(6) times internal diameter. Any run of conduit shall not include more than the equivalent of four(4) quarter bends. i. Sales floor of Urban Outfitters shall be completely hard piped with EMT. MC cable or flexible conduit shall not be utilized except where specifically detailed. Layout of conduit must be reviewed with general contractor and UO CPM to confirm layout is acceptable. Conduit routing on the sales floor is an aesthetic piece of the architectural design of the store. Contractor shall receive approval from the architect and construction manager prior to any installation of conduit on the sales floor. k. Provide expansion fittings for all conduits at expansion joints. l. MC cable may be utilized within wall cavities and back of house areas where permitted by local code authorities. 2. Cutting Conduit: a. Measure and cut conduit from job site conditions, not from Drawings. b. Conduit shall be cut square and butted solely into fittings. c. On rigid conduit, cut conduit full and clean with sharp dies. Remove ends of pipe after cutting and before assembly to remove burrs. d. Ream thin-wall conduit (EMT) after it is cut. 3. Liquid Tight and Flexible Conduit: a. Liquid tight conduit shall be installed in such a manner that liquids tend to run off the surfaces and not drain toward the fittings. b. All runs of flexible conduit shall be as short as practical, of the same size as the conduit it extends and with enough slack to allow for movement of the structure. A minimum of 24 inches of flexible conduit shall be installed. c. Where the fittings are brought into an enclosure with a knockout, an insulated throat type fitting with liquid sealed "O" ring shall be used. d. Flexible metal conduit shall be installed for all final equipment connections to transformers, light fixtures (lay-in type) and all other devices where so required. 4. Type of Conduit: a. The following areas shall be galvanized steel heavy wall conduit or IMC: 1) In earth fill. 2) Exposed in wet areas. 3) Exposed outdoors (Provide watertight fittings & boxes). 4) Outside masonry walls. 5) Within building confined run in concrete slab. Couplings for conduit run in precast concrete shall be coated tight. b. Conduit run in dry areas within building cavities shall be EMT. Dry areas are inside partitions, ceiling soffits and areas not subject to moisture or damage. Outside walls are not considered dry areas. 5. Supporting of Conduit: a. All conduits must be independently supported from structure. No conduits shall be supported from the ventilating ducts, ceiling hangers, mechanical piping or their hangers. b. All support and hangers shall be sized and smaller shall be supported every five feet with one hole straps with clamp backs. Perforated strap hangers will not be permitted. c. Hangers shall be proportioned for the weight of the conduit(s) supported. All rods, clamps and anchors shall be galvanized, hot-dip galvanized, plated or painted. Where factory supplied, with one of the above rust resistant finishes, all field cuts and threads are to be painted and covered with a grey finishing paint. d. Trapeze type hangers may be used where severe conditions occur at the same elevation. The spacing of such trapeze hangers shall be determined by the electrical code spacing requirements for the smallest conduit in the run. e. Approved type inserts for support of work in cast or concrete construction. f. Approved type steel beam clamps in the case of steel construction. 6. Where holes or recesses must be cut in walls, floors, ceilings, or any part of the building to admit apparatus, conduit or other work of this Contractor, he must have it done by a competent mechanic in a neat and workmanlike manner. The portions must be restored to their original condition at the expense of this Contractor. This Contractor shall provide for all of his own cutting and patching. 7. All conduits run in or below any grade slab shall be heavy wall conduit and entirely encased in 2" of concrete. In no case shall conduit be laid in fill below slab. Conduit shown as plastic shall be schedule 40. 8. 3/4"D. minimum conduit shall be utilized. 9. Provide: a. Supplementary angles, channels, plates, etc., where supports are required to strengthen building's structural members, spanning the space and attached to building structural members, by welding, bolting or with concrete anchors. b. All rods, angles, rails, struts, brace plates, platforms, etc. c. Supports, clamps, threaded rods, turnbuckles, anchors, etc., and all miscellaneous specialties for the attachment of hangers and supports to the structure. 10. Unless otherwise noted on the Drawings, the following shall apply: a. Conduit outlets shall be placed on separate circuits from motor and lighting outlets. b. Motors shall be placed on separate circuits from lighting outlets. c. Convenience outlets shall not be installed back to back. B. Motor and Equipment Wiring: 1. Unless indicated otherwise perform the following: a. Connect and wire to each motor and piece of electrically operated equipment shown on the Drawings or as specified in these Specifications. b. Furnish, install and connect all starters, controller selector switches, pilot lights, pushbuttons/stations for each motor and piece of electrically operated equipment shown on Drawings, or as specified in the Specifications, unless otherwise indicated.	Furnish and install all wiring from the current source to all starters and from starters to motors, except in the case of factory installed wiring packaged equipment. Wire to the line side of all prewired equipment. d. Furnish and install a disconnect switch ahead of all prewired packaged equipment. Coordinate with Mechanical Trades Contractor. e. Install all roughing-in pertaining to each item of equipment furnished under other Sections of the Specifications or by the Owner. Locations of electrical outlets for this equipment are indicated on the Drawings in their approximate locations. The supplier of every item of equipment will furnish dimensional drawings accurately locating all roughing-in required for his equipment. f. Receive, set and align motors which are shipped loose if local union or trade jurisdiction practice requires doing so. g. Conductors and cables shall not be installed in conduit or raceways for all mechanical equipment as indicated and scheduled on the Drawings. 2. If a disconnect switch is required by the enclosing code and not indicated on the Drawings or in the Specifications, it shall be furnished and installed. 3. Where specific locations of switches and starters are not shown on the Drawings, these shall be placed near the motor. C. Thermostats: 1. Refer to energy management section of specifications for thermostat specification as well as details on plan drawings for energy management system. 2. Provide a 4" square backbox with plaster extension ring with 3/4" conduit and associated wiring from each thermostat to appropriate mechanical equipment. Refer to wiring diagrams on drawings for additional information. C. Conductors, Cables: 1. Except where otherwise shown on the drawings all wiring shall be installed in conduit. 2. Lubricant and cables shall not be installed in conduit or raceways until same are free from moisture and debris. 3. Leave a minimum of six inch(6") length of cable and conductor slack at each outlet. D. Expansion Fittings: 1. Expansion fittings shall be installed in all conduits crossing expansion joints. Refer to Architectural drawings for locations. E. Prohibited wiring methods: 1. BX, AC, NM, NMC, NMS, UF, USE, SE, FCC. SECTION 16400 SERVICE AND DISTRIBUTION PART 1 - GENERAL 1.01 RELATED DOCUMENTS A. The General Conditions, Supplementary Conditions, and General Requirements apply to the Work specified in this Section. B. Section 16010, "General Provisions - Electrical", applies to the work specified in this Section. 1.02 DESCRIPTION A. Work Included: 1. Complete electrical service and secondary distribution system. All charges by the Local Utility Company for construction related work. Owner charges will be paid by the Owner. 2. System Grounding per the local Utility Company and the N.E.C. 3. Main distribution and lighting panelsboards as scheduled. 4. Utility approved current transformers and meter fittings. 5. Utility Company transformer support pad and primary conduit(s). 6. Complete secondary 120/208 volt, 3 phase, 4 wire or 277/480 volt, 3 phase, 3 wire 60 hertz service from the secondary side of pad mounted transformer into the building main service overcurrent protective device. 7. Tenant metering where shown and required. PART 2 - PRODUCTS 2.01 EQUIPMENT A. Main Distribution Panelboards: 1. Shall be as scheduled on the drawings. 2. Panelboard shall be enclosed in steel cabinet of rigidity and gauge of steel per UL Standard 450 for cabinets. 3. Acceptable manufacturers are Cutler Hammer, Siemens ITE, General Electric and Square D. 4. Bus structure shall be copper not exceeding density of 1000 amps per square inch of cross section. Buss supports shall be adequate to withstand 42,000 amperes symmetrical short circuit stresses minimum. Provide with a copper ground bus. The ground bus shall be fastened and bonded to the framing member in an approved manner. The ground bus shall be grounded in a manner meeting all code requirements. 5. Panelboard shall be braced for short circuit capacities as scheduled by the local Utility Company; however, the minimum bracing shall be 42,000 A.I.C. symmetrical. 6. Each circuit breaker shall be equipped with an approved nameplate which indicates the name of the equipment (motor, panelboard, etc.) to which the feeder conductors are connected. B. Building Main Panelboard and metering room: For metering room or on the exterior wall a mounting panel with all meter equipment for mounting thereon the associated Utility Company's meter requirements. C. Lighting and Appliance Panelboards: 1. Analysis shall be type indicated on the Drawings, with main lugs, main breakers, bolt-on branch breakers, spares and spaces as scheduled. Ground fault interrupter (GFI) circuit breakers shall be provided where noted. 2. Panels shall comply with U.S. Federal Specification WP115a, Type 1, Class I. Where applicable, provide with copper bus of density not exceeding 1000 amps per square inch. 3. The Electrical Contractor shall balance all circuits within 10 % phase to phase. All conductors shall be continuous without splicing from last outlet to their terminals in cabinet. All circuit conductors in panels shall be installed with sufficient amount of length to reach the most remote breaker connection from its point of entrance. 4. Panelboard fronts shall be fabricated from a flat piece of full finished code gauge sheet steel with door cut out leaving a trim of proper width around the door. Provide a latching mechanism controlled by a chromium plated stainless steel handle on doors twenty-four inches(24") or over in height. All Locks to be keyed alike to the panel manufacturer's standard key. Two(2) Keys shall be furnished with each cabinet. 5. Contractor shall provide a directory of circuits for cabinet. Directory shall be typewritten on separate sheets of paper and numbered. Directory frame, lock, hinges, etc., are to be secured in inside of door and trim in such a manner that screws, holes or welds, etc., are not visible on the door panel or trim. 6. The width and height of cabinets shall be sufficient to provide a wiring gutter at the two sides and at the top and bottom of not less than 4". Additional width or height shall be provided, if required for entering conduits. Additional wiring gutter space shall be provided, if required for main or sub-feeder cables passing through to feed other cabinets. 7. Where 2 or 3 pole breaker units are called for, they shall be one unit with common trim and not single pole units with handle ties. Capacity of main busses shall be as shown on the Drawings. 8. Provide with a copper ground bus. The ground bus shall be fastened and bonded to the framing member in an approved manner. The ground bus shall be grounded in a manner meeting all code requirements. 9. Provide with a copper isolated ground bus where specifically indicated on the panel schedules. The ground bus shall be isolated from the framing member in an approved manner. The ground bus shall be grounded in a manner meeting all code requirements. Provide an isolated ground conductor to point of service ground within raceway(s) containing feeder conductors. 10. Acceptable manufacturers are Cutler Hammer, Square D, General Electric and Siemens ITE. 11. Panels shall be braced for short circuit capacities as scheduled by the local Utility Company with no less than 14,000 AIC for 277/480 volt panelboards and 10,000 AIC for 120/208 volt panelboards. All panelboards shall be fully rated for the available fault current. 12. All breakers utilized for switching lighting shall be labeled switching duty type. D. TRANSFORMERS 1. All transformers shall be 115 degree C temperature rise above a 40 degree C ambient. 2. Sound levels shall not exceed Nema Standards. 3. All windings shall be aluminum. 4. All transformers shall be energy star compliant and NEMA TP-1 rated for energy efficiency. 5. Unless otherwise specified pad for floor mounting of each transformer. Provide a vibration isolation pad for each transformer. 6. Provide a conduit with grounding electrode sized per NEC to point of service ground. 7. Acceptable manufacturers are Cutler Hammer, Square D, General Electric and Siemens ITE. Transformer shall match panelboard manufacturer.
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NewStudio
4431 Lake Avenue South
White Bear Lake, MN 55110

ph: 651.207.5527 | f: 651.207.8247

ANTHROPOLOGIE

60 Pearl Street
Portland, ME 04101



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