**NOTE: THIS IS A SHORT FORM MASTER SPECIFICATION. IT SHALL BE USED FOR ALL APPLICABLE PROJECTS. IT IS THE RESPONSABILITY OF THE A/E VENDOR/SPECIFIER TO ADD, DELETE OR REVISE AS NECESSARY TO ADDRESS ACTUAL PROJECT REQUIREMENTS.**

# GENERAL

## RELATED DOCUMENTS

### The General Conditions and Supplementary Conditions are applicable to all contracts for the project.

## DESCRIPTION OF WORK

### The work included under this Section consists of providing all work, supervision, and construction procedures necessary for the installation of the complete electrical systems required by these specifications and/or shown on the drawings of the contract.

### Install and connect all appliances and equipment as specified and indicated for this project, in accordance with the manufacturer's instructions and recommendations. Furnish and install complete electric connections and devices as recommended by the manufacturer or required for proper operation.

## ACCESS TO EQUIPMENT

### Starters, switches, receptacles, pull boxes, etc., shall be located to provide for easy access for operations, repair and maintenance; if concealed, access doors shall be provided.

# SHOP DRAWINGS

## The Contractor shall furnish shop drawing portfolios and proper transmittal forms for all materials, equipment, and lighting fixtures to be incorporated in the work, in accordance with the General Conditions, Supplementary Conditions, and all other applicable Conditions.

## Shop drawings on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function properly as a system. A notation shall be made on each shop drawing submitted as to the items specific use, either by a particular type number referenced on the drawings or in the specifications, or by a reference to the applicable paragraph of the specifications or by a description of its specific location. The shop drawings shall be organized and bound into sets with each set collated.

## The Architect/Engineer shall have the final authority as to whether the fixture is equal to the specified item. The proposed substitution may also be rejected for the aesthetic value if felt necessary or desirable. In the event the proposed substitutions described are rejected, the Contractor shall furnish the specified item.

# CODES AND STANDARDS

## The electrical work shall be in accordance with all applicable state and local codes, building ordinances and the N.E.C. The electrical work shall merit the approval of the state and local enforcing authorities.

# PERMITS AND FEES

## The Contractor shall pay for all permits and/or fees required for the work.

# MATERIALS AND WORKMANSHIP

## All materials shall be new and of the quality specified. Materials shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. Electrical material and equipment used in the work shall meet the requirements as specified under paragraph three of this section, CODES AND STANDARDS.

## All work installed under this Division of the Specifications shall be first class and complete in both effectiveness and appearance, whether finally concealed or exposed, and shall be executed by experienced mechanics.

## Re-conditioned or re-furbished electrical is not allowed except by special permission of the AHJ and UNL Project Manager. In these rare circumstances, the reconditioned or re-furbished electrical shall be marked with the organization responsible for the reconditioning or re-furbishing of the electrical item. See NEC 2017 Art. 110.21(A)(2) for complete requirements of markings that must be present.

# INSTALLATION METHODS

## Conductors shall be installed in concealed raceways except as shown or specified on the Contract Documents. Exposed conduits and wires shall be installed parallel or perpendicular to all building surfaces. Conduits and wires in the space above ceilings shall be supported adequately and not laid on the top of ceiling systems. All conduits and wires installed above ceilings shall be considered exposed.

## Electrical conduits shall not be hung on hangers with any other service foreign to the electrical systems, nor shall they be attached to other foreign services.

## The lighting and power branch circuit conductors shall be installed in separate raceway systems unless specifically shown or noted otherwise.

## Equipment Bases. Provide concrete equipment bases for all floor mounted equipment furnished under the contract. Concrete bases shall be 3-1/2" high unless noted otherwise and shall extend 3-inches on all sides of the unit. Trowel all edges at a 45 degree angle. This work shall be done under Division 3 of the specifications. Bases shall be provided for switchboards, motor control centers, transformers and all other floor mounted equipment.

## Outlet Box Locations. Outlet boxes shall be located so they are not placed back-to-back in the same wall in order to limit sound transmission from room to room.

## PROTECTION FROM WEATHER

### Raceway stub ups shall be capped or otherwise protected from moisture and debris until such time that the conductors are pulled. Conductors shall not be installed in raceways until the building is protected from the weather, all concrete and plastering is completed and raceways in which moisture has collected have been swabbed or blown out.

## ELECTRICAL ROOM COORDINATION

### Where a number of electrical panels and/or related electrical items are shown, the Electrical Contractor shall coordinate the physical sizes with his equipment suppliers to ensure that there is adequate space for the items shown to be installed in those areas and that all Code required clearances are maintained.

### The Contractor shall rearrange the equipment layout to achieve full use of the available space prior to installing conduit stub ups. Where a conflict or rearrangement exists, the Contractor shall submit a proposed revised layout of the area to the Architect.

## LIGHTING SYSTEM SWITCHING

### The lighting design for this project has included multi-level lighting in some areas. Where 3 lamp fixtures are shown in a room, the outer 2 lamps will be switched from one switch and the center lamp will be switched from the other switch by means of dual ballasts. Where 4 lamp fixtures are shown in a room, the outer 2 lamps will be switched from one switch and the center 2 lamps will be switched from the other switch by means of dual ballasts. The intent is to provide manual 50% lumen output reduction through switching means as an energy saving measure. When available and cost effective, provide step dimming ballast in lieu of dual ballast to provide the specified lumen reduction requirements. When available and cost effective, provide full dimming ballast and/or drivers where dimmer switches are shown. A similar multi-level lighting arrangement will be provided where 4-3 way switches are shown.

## WIRING - NUMBER OF WIRES REQUIRED

### The number of wires for lighting and receptacle branch circuits is not shown on the drawings. The number of wires in any circuit shall be determined in accordance with the National Electrical Code, and wiring shall be provided to perform all functions of the devices being installed. Additionally, wires shall be provided as required by the contract documents, i.e. equipment grounds, etc. Provide the number of wires required for a complete and workable system.

## PAINTING, FINISHING

### Painting of electrical work exposed in occupied spaces, except mechanical and electrical machine rooms and maintenance/service spaces; and work exposed on the exterior is specified and performed under other divisions of these specifications.

### Factory finishes, shop priming, and special protective coatings are specified in the individual equipment specification sections.

### Where factory finishes are provided on equipment and no additional field painting is specified, all marred or damaged surfaces shall be touched up or refinished so as to leave a smooth, uniform finish at the time of final inspection.

## SLEEVES

### Sleeves shall be used to accommodate conduit or tubing where conduit or tubing passes through concrete slabs.

### All sleeves through floors shall be black iron pipe, flush with walls or finished floors; and of sizes to accommodate the raceways shown. Sleeves through outside walls above grade shall be caulked with approved caulking compound. Sleeves shall not be required through on grade slabs. Sleeves through floors shall extend above floor to an elevation that would prevent flooding of lower floors.

### Install manufactured floor and thruwall seals, similar to Type "FSK" as manufactured by O.Z. Electric Manufacturing Company.

## CABLE AND CONDUIT SEALS

### Seals shall be provided around conduits and cables which penetrate smoke walls, fire walls, and floors. Nelson Flameseal or approved equal system shall be used to seal penetrations of electrical cables and conduits.

### Materials used shall be as follows:

#### Flameseal putty.

#### Ceramic fiber insulation.

#### Ceramic fiber board shall be required to provide rigid support on large oversized openings. Board shall be rigid and able to withstand temperatures in excess of 2000 degrees F.

#### Accessory hardware shall be required on oversized openings.

### Follow manufacturer's instructions in selecting the type of seals and accessories. Also follow the manufacturer’s instructions on installation of the cable and conduit seals.

### Equal quality equipment by OZ Gedney and 3M shall be acceptable.

## ACCESS PANELS

### Furnish and install panels for access to junction boxes and similar items where no other means of access, such as a readily removable, sectional ceiling is shown or specified.

### Panels shall not be less than 12-inches by 16-inches in size. Larger panels shall be furnished where required. Panels in tile or other similar patterned ceilings shall have dimensions corresponding to the tile or pattern module.

### Access panels shall be flush type and of all steel construction, with No. 16 gauge wall or ceiling frame for masonry or plaster and a No. 14 gauge panel door. Doors shall be secured with concealed hinges and flush locks of either the cylinder type or approved, positive acting, screwdriver operated type. Doors for wall panels may be secured with suitable clips and countersunk screws. Panels shall be painted with a rust-inhibitive primer at the factory. Access panels in rated walls or ceilings shall be provided with rating of the same type.

# WORK IN EXISTING BUILDING

## Where drawings indicate work to be done in the existing building, the Contractor shall carefully examine such areas to determine the nature and extent of work involved before submitting his bid. The Contractor shall be responsible for all damage to existing items and utilities due to the progress of his work, and shall repair all such items or replace same to an approved condition at his own expense.

# REMOVAL WORK

## All existing devices shown with cross-hatching and/or so noted shall be removed, relocated, remain or shall be abandoned as noted on the drawings.

### Devices shall be completely removed from walls that are also shown to be removed. Devices shown to be removed on drywall or plaster type walls that are to remain shall have the wall surface patched to match the existing. Flush type devices shown to be removed on concrete or brick type walls that are to remain shall have the device removed and shall be provided with a blank cover plate.

### Conduits shall be completely removed from walls that are also shown to be removed. Conduits may be abandoned in walls that are to remain. All conduits and boxes that are surface mounted and no longer require active circuits shall be removed.

### The conductors for the devices shown to be removed shall be disconnected and removed back to the panel or back to the next device shown to remain as required by the actual existing circuiting. Continuity of circuiting shall be maintained for the existing devices shown to remain. Circuiting shall be extended from new or existing circuits as shown or as required.

### See the Architectural Drawings for wall removal and types.

# EXISTING MATERIAL

## Refer to the Supplementary Conditions Section of this specification for the disposition of all salvageable material.

# ELECTRICAL-MECHANICAL EXTENT OF WORK

## The responsibility of work specified under Division 23 and 26 is clarified under Section 23 05 13, Electrical Requirements for Mechanical Equipment. Division 23 Contractor is to coordinate all electrical requirements prior to ordering powered mechanical equipment. Said Section 23 05 13 is incorporated herein by reference.

# CUTTING AND PATCHING

## The Contractor shall be responsible for all cutting and patching of holes in the building which are required for the electrical work. Cutting, patching and painting shall conform to the requirements of the General Conditions of this specification.

## Cutting of structural framing, walls, floors, decks and other members intended to withstand stress is not permitted.

## All patching shall be finished and painted to match existing.

# COORDINATION

## Coordinate the locations and purchasing of equipment between other trades to ensure proper interfacement and placement of equipment requiring electrical power.

## Coordinate other work of the different trades so that:

### Interference’s between mechanical, electrical, architectural, and structural work, including existing services, is avoided.

### Within the limits indicated on the drawings, the maximum practicable space for operation, repair, removal and testing of electrical, and other equipment will be provided.

### Pipe, conduits, ducts, and similar items, shall be kept as close as possible to ceilings, walls, columns, to take up a minimum amount of space. Pipes, conduits, ducts, and similar items shall be located so that they will not interfere with the intended use of other equipment.

# ELECTRICAL SERVICE

## The Contractor shall provide all material and pay all fees required by the local utility company for the connection of the new electrical service as shown on the plans. The Contractor shall also meet all equipment requirements of the local utility company. The Contractor shall provide all necessary materials for construction of the temporary electrical service and shall coordinate all details with the local utility company.

## METERING

### Contractor shall furnish all material and labor as required by the local utility company.

## EXISTING UTILITIES

### Existing utilities within the contract limits shall be rerouted and/or abandoned as shown on the drawings. The Contractor shall verify the location of all existing utilities with the Owner and Utility Companies prior to commencing excavation work. All new or rerouted work must be in place before removal of existing work. All service outages must be scheduled with the Owner and be approved by the Owner. The drawings and survey data of the contract documents indicate the available information on the existing power and communication services, and on new services to be provided to the project by local utility companies. Accuracy of this information is not assured.

# EXCAVATION AND BACKFILLING

## Contractor shall perform all excavation and backfilling necessary to install the required electrical work. Coordinate the work with other excavating and backfilling and other work in the same area. Except as indicated otherwise, comply with the applicable sections in these Specifications, excavation filling and backfilling (for structures) to 5' outside the building line, and exterior utilities sections for beyond 5' from the building line.

## Landscape work, pavement, flooring and similar exposed finish work that is disturbed or damaged by excavation shall be repaired and restored to their original condition by the Contractor.

# OUTLET BOXES, PULL BOXES AND CONDUIT FITTINGS

## Furnish and install outlet boxes, pull boxes, and conduit fittings as described below. Catalog numbers shown are Appleton Electric Company. Equal materials by Steel City, O.Z., and Raco, are acceptable.

## OUTLET BOXES

### Lighting Boxes (concealed) - No. 40-3/4

### Lighting Boxes (concrete) - OCR Series

### Lighting Boxes (exposed) - 4S-3/4 or 40-3/4

### Flush Switches, Receptacles - No. 4S-3/4 (with box covers or No. Telephone and Flush Junction Boxes 225) where extension or plaster ring cannot be used. (Provide Extension Ring or Plaster Ring as required)

### Weatherproof type Switch, - FS Series w/FS cover and

 Receptacle and Telephone Boxes neoprene gasket.

 (exposed)

### Switch, Receptacle and Telephone- 4S-3/4 with 8360 or 8370 Series

 Boxes (exposed) raised surface cover.

### Per NEC 2017 Art. 406.9(B), all receptacles in wet locations shall be in outlet boxes listed as ‘extra duty’.

## Where space is limited, No. 4CS-3/4 handy boxes may be used for switch, receptacle and telephone outlets with specific approval only.

## Extension and plaster rings shall be installed as required by the NEC.

## Outlet boxes shall comply with the National Electrical Code in regard to the allowable fill.

## PULL BOXES

### Pull boxes shall be fabricated of code gauge galvanized sheet metal and shall be sized in accordance with National Electrical Code requirements, or as shown on the drawings. Provide removable cover on the largest access side of the box. In-line conduit pull boxes may be O.Z., Type PBW, or equal.

# RACEWAYS AND FITTINGS

## Steel Conduit. Rigid steel conduit, intermediate conduit and electric metallic tubing shall be hot dipped, galvanized as manufactured by Youngston Sheet and Tube Company, National Electric or equal.

## Rigid heavy wall (Schedule 40) PVC conduit may be used only for direct burial in earth and embedding in concrete. PVC conduit shall be installed as recommended by manufacturer.

## Raceways shall be installed concealed. Wiremold shall be used only after Owner's approval. Wiremold shall be painted to match walls, or in accordance with the Architects' direction.

## Joints. All threaded joints shall be made up wrench-tight and rain-tight. Compression joints shall be made up mechanically secure and snug so as to take continuous current-carrying electrical contacts.

## Provide marking of conduit and junction boxes to indicate which distribution system they are serving. Concealed junction boxes shall be legibly marked with a magic marker to indicate the panel and circuit number that junction box serves.

## Minimum conduit size to be 3/4”

## All connectors and couplings shall be steel, compression or set screw type is acceptable, wet locations to be compression.

# CONDUCTORS

## All conductors shall be 600 volt and shall be copper with THW or THHN insulation. No wire branch circuit shall be smaller than No. 12.

## All wires shall be installed in conduit.

## Conductors shall be continuous from outlet to outlet and no splices shall be made except within outlet or junction boxes. Junction boxes may be used where required.

# GROUNDING

## Green ground conductor shall be installed in each conduit.

## Grounding and bonding of electrical circuit and equipment shall be accomplished as set forth in the NEC.

## Ground HVAC ductwork and equipment to the C.O. equipment ground. (Not C.O. ground window). Use No. 6 insulated conductor.

# POWER PANELS

## Power panels shall be Square D I-Line circuit breaker type panels as indicated on the drawings or engineer approved equal. Panelboards shall have distributed phase copper bussing throughout. Circuit breakers shall be as specified for lighting panels unless indicated otherwise. Lighting and Power panels shall have combination card holder and nameplate and shall be equipped with typewritten directories that identify all loads served and all spare circuits. Provide a copper ground bus in all power panels. Power panels shall be Underwriters Laboratory approved and shall bear the UL label. The size of the panelboard main protective device or main lugs, the size, type and the number of branch circuits and the type of mounting shall be as shown on the drawings.

# LIGHTING PANELS

## Lighting panelboards shall be Westinghouse Pow-R-Line C Type for 277/480 volt or 120/208 volt panels. Provide Square D type NF or NQOB type panels in accordance with requirements listed on the Drawings. All branch circuit breakers are to be quick-make, quick-break, trip indicating and common trip on all multipole breakers, and shall be bolt-on type. Trip indication shall be clearly shown by breaker handle taking position between "ON" and "OFF" positions. Panelboards shall have distributed phase copper bussing throughout. Lighting panels shall have combination card holder and nameplate and shall be equipped with typewritten directories that identify all loads served and all spare circuits. All panels shall be provided with a copper ground bus and shall be Underwriters' Laboratory approved and shall bear the UL label. The size of the panelboard main protective device or main lugs, the size, type and the number of branch circuits and the type of mounting shall be as shown on the drawings.

# SAFETY SWITCHES

## Furnish and install heavy duty type safety switches having the electrical characteristics, ratings and modifications shown on the drawings. All switches shall have:

### NEMA 1 general purpose (indoor) enclosures unless otherwise noted;

### Handle that is padlockable in "OFF" position;

### Non-teasible, positive quick-make, quick-break mechanism;

### UL approved and shall bear the UL label;

### All fusible switches shall have Class R fuse rejection clips.

# MOTOR STARTERS

## Provide magnetic starters or VFD’s for three phase motors. Motor starters for equipment rated less than 50 H.P. shall be full voltage non-reversing across the line magnetic type rated in accordance with NEMA standard sizes and horsepower ratings. Minimum size magnetic starter shall not be less than NEMA size one.

## Motors for equipment rated with 50 H.P. or larger shall be operated by reduced voltage starters or VFD’s. Reduced voltage starters shall be of the star delta type with closed transition.

## Motor starters shall be furnished with the following options:

### Hand-Off-Auto selector switch unless otherwise noted. An On-Off selector switch or push button station shall be provided where required.

### Contacts: 2 normally open. 2 normally closed.

### Control transformer; primary and secondary fuses.

### Red running light with push to test.

### On delay relay; adjustable 0-30 seconds.

# LOCK-OUT PUSH BUTTONS

## Lock-out push buttons where shown on the drawings, or wherever required, for remote lock-out of motors shall be Westinghouse Catalog No. 1033-321 (surface mounted) 1033-410 (flush mounted) push button with enclosure and Catalog No. 1032907 padlock type rotary latch or approved equal. At the Contractor's option where, lock-out push buttons are shown, the contractor may provide non-fusible disconnect switches for the motor circuit if space is adequate.

# MANUFACTURERS

## Panelboards, safety switches, motor controllers, and lock-out pushbuttons manufactured by Westinghouse, Square D, ITE, Gould, or General Electric are acceptable. All major components shall be of the same manufacturer.

# FUSES

## Fuses shall be furnished and installed in each fused switch, and shall have ratings as shown on the drawings.

## All cartridge fuses shall be dual element Bussman Fusetron Class R Type unless otherwise noted. Three spare fuses shall be furnished for each size used. Each fused switch shall be provided with a mastic backed label clearly identifying the type and size of fuse required. Bussman HICAP Class R fuses shall be provided for fuses larger than 600 amps.

# LIGHT FIXTURES

## Furnish and install all light fixtures as shown on the drawings.

## All lighting fixtures and their electrical components shall bear the UL label.

## FLUORESCENT BALLASTS

### Ballasts for fluorescent lamps shall be of the high frequency electronic type, operating lamps at a frequency of 20 KHZ or higher with no detectable flicker. All ballasts shall be UL listed and CSA certified. Ballasts shall be designed to operate (T8) or (T12) fluorescent lamps, and shall have a sound rating of "A”. Ballasts shall be manufactured in the United States. Ballasts shall be manufactured by Magnetek or Advance.

### Ballasts shall consistently start and operate lamps from a supply line voltage of plus or minus (±) 10 percent of the design voltage (120 or 277 volts). Ballasts shall provide installed light levels equivalent to C.B.M. certified electromagnetic ballasts. Light output shall not vary by more than 12 percent over a plus or minus (±) 10 percent variation in supply voltage. Ballasts shall be capable of operating remaining lamps if one or more companion lamps fail or are removed. Ballasts shall have a sequenced start progression which first heats the cathode filaments, and then ignites the lamps.

### Ballasts shall have an input current total harmonic distortion content of less than 15 percent (based on the full light output current level). The lamp current crest factor for any ballast shall not exceed 1.6. Ballasts shall have a power factor of 95 percent or greater, and shall contain no PCB’s.

### Ballasts shall comply with all applicable State, Federal and industry performance and safety standards. Ballasts shall comply with FCC requirements governing electromagnetic and radio frequency interference. Ballasts shall comply with IEEE standards for line voltage transient protection, and shall meet or exceed ANSI and IEEE standards for harmonic distortion. Ballasts shall carry a five (5) year warranty, minimum, including all parts and labor.

## Fluorescent lamps shall be T8 type.

## Outdoor lighting fixtures shall be LED, or Metal Halide Type, unless otherwise shown or noted.

## Ballasts for high intensity discharge lamps shall be single lamp, protected type, high power factor, CWA type ballasts unless indicated otherwise. Ballasts shall be suitable for 150 degrees F for interior applications and -20 degrees F for exterior applications. Ballasts shall be manufactured by Advance, General Electric, Jefferson, Universal, or equal. Metal halide fixtures shall be so designed as to provide complete protection as recommended by Sylvania Lamp Company.

## Standard plaster frames shall be provided for all recessed lighting fixtures installed in plaster or drywall finished walls or ceilings. Coordinate with architectural drawings.

## All recessed fluorescent fixture lenses shall be prismatic panel clear acrylic KSH-12 for 2' x 4' fixtures; minimum 1/8" thick.

## All recessed incandescent and H.I.D. light fixtures shall be provided with thermal protection per N.E.C.

## Undercabinet and undercounter light fixtures shall be installed with 3/8" deep x 2" x 4" wood spacers painted black to provide an air space between fixture and top of millwork.

# WIRING DEVICES

## All wiring devices shall be suitable for intended purpose and shall be UL listed.

### All outlets shall be located as shown on the drawings except that where practicable, outlets shall be located in center of panels or trim or otherwise symmetrically located to conform with existing structural layout. Outlets incorrectly installed shall be corrected. Damaged items or damaged finishes shall be repaired or replaced at no expense to the Owner.

### Outlets shall be set plumb or horizontal and shall extend to the finished surface of the walls, ceiling or floor, as the case may be, without projecting beyond same.

### Receptacles, switches, etc., shown on wood trim, cases or other fixtures shall be installed symmetrically; and, where necessary, shall be set with the long dimensions of the plate horizontal, or ganged in tandem.

### Where dimmer switches are shown adjacent to standard switches, both shall be installed in separate back boxes with adequate space between so that neither coverplate requires cutting.

### Where devices are shown near wall openings, coordinate location if corner guards are to be installed so that coverplates do not require cutting.

### Where shown on the drawings furnish and install wiring devices indicted by the symbols. Wiring devices shall be products of Pass & Seymour, or equal. Catalog numbers shown below are Pass & Seymour hard use specification grade. Equal devices manufactured by Hubbell, Leviton, or General Electric shall be acceptable.

 **NOTE TO SPECIFIER: SWITCHES ARE SPECIFICATION GRADE, TUMBLER TYPE-CHANGE COLOR AS DESIRED. FOR ROCKER TYPE SWITCHES USE 26021, 26022, 26023, AND 26024.**

### Switches. Branch circuit switches shall be flush tumbler (rocker) type as follows:

 Single Pole 20AC1 Series - Gray

 Two Pole 20AC2 Series - Gray

 Three-Way 20AC3 Series - Gray

 Four-Way 20AC4 Series - Gray

 Single Pole SW With Pilot 20-AC1-RPL Series - Gray

#### Switches for emergency systems shall be as shown above, but red in color.

### Dimmer Switches: Provide dimmer switches according to the following (all catalog numbers are Lutron Nova T series, unless otherwise noted). At minimum, all dimmer switches shall be rated to accommodate the load shown to be switched on the Drawings.

Incandescent Dimmers Catalog No.

120 Volt, 600 Watt, Single Pole NT-600

120 Volt, 1000 Watt, Single Pole NT-1000

120 Volt, 1500 Watt, Single Pole NT-1500

120 Volt, 2000 Watt, Single Pole NT-2000

Incandescent Low Voltage Dimmers

(for transformer supplied low voltage lamps)

120 Volt, 600 VA (500W), Single Pole NTLV-600

120 Volt, 1000 VA (800W), Single Pole NTLV-1000

120 Volt, 1500 VA (1200W), Single Pole NTLV-1500

Fluorescent Dimmers (for 30 & 40W

rapid start lamps with magnetic

dimming type ballasts)

120 Volt, 1 to 10 Lamps, Single Pole NF-10

120 Volt, 6 to 20 Lamps, Single Pole NF-20

120 Volt, 14 to 30 Lamps, Single Pole NF-30

277 Volt, 1 to 12 Lamps, Single Pole NF-10-277

277 Volt, 6 to 24 Lamps, Single Pole NF-20-277

 **NOTE TO SPECIFIER: RECEPTACLES ARE RECTANGULAR TYPE FOR FIGURE 8 TYPE USE 5252. CHANGE COLOR AS DESIRED.**

### Receptacles. All receptacles shall be side and back wired, self-grounding of the type indicated as follows:

 Duplex Convenience Receptacles 26352 Series - Gray

 20A-125V (Grounding Type)

 Weatherproof Duplex Receptacles 26352 Series - Gray with

 15A-125V (Grounding Type) Weatherproof F.S. Plate

 Weatherproof Duplex GFI 2091-F with 4511 (horizontal) or 4512 Receptacle 20A-125 Volt (vertical) weatherproof wall plate

 Clock Hanger Outlet 2123 Gray

 Hospital Grade Receptacle 26362 Gray for Normal Power and

 20A-125 Volt (Grounding Type) 26362HG Red for Emergency Power

 Safety Receptacle (15A) Hubbell SG-62H

 Emergency Duplex Receptacle 26362 Red

 20A-125V (Grounding Type)

### Hospital grade receptacles shall be installed in all anesthetizing locations including all operating rooms, delivery, cysto, fracture, special procedure rooms and ICU and CCU rooms. Receptacles on emergency power shall be red in color. Cover plates for emergency outlets in these areas shall be engraved with panel and circuit no. designation per NEC. Engraving shall be 1/8" high, block style letters, with red filler on front side of cover plates.

### Plates. Furnish and install wall plates for all wiring devices. Plates for flush devices shall be Sierra Smooth 430S/S line satin finished stainless steel (**or** Pass and Seymour “RP” Series high impact thermoplastic, and shall be gray in color). Oversize plates are not acceptable. Weatherproof switch plates shall be Crouse-Hinds DS185 type. Where switches and/or receptacles are shown adjacent to each other, provide a common cover plate for each group of devices.

# MOUNTING HEIGHTS

## Mounting heights to center of box and above finished floor for the below-named items shall be as follows, unless otherwise shown. All other device mounting heights shall be as shown on the drawings.

### Flush tumbler switches 48"

### Switches in concrete block 46"

### Switches over wainscot 6" above 48" wainscot

### Convenience outlets 18" mounted vertically with ground prong

slot at bottom

### Safety switches 48"

### Motor controllers 48"

### Panelboards to top 72"

### TeleComm/Data outlets 18"

### Alarms, Annunciator Controls (Centerline) 48”

### Key Pad, Push Pad, Prox/Reader 48”

### Bracket lights (120 volt) 84"

### Bracket lights (277 volt) 96"

### Exit Sign, Em. battery Light - Wall 87”

### Occupancy Sensor-Switch Type 48”

### Occupancy Sensor Wall Directional 10’-0”

### Occupancy Sensor – 360 Degree Ceiling

### Clock outlets 8' ceiling 90"

 9' ceiling 96"

### Receptacles above counters 6" above counters mounted

(horizontally)-(vertically)

### Convenience outlets in mechanical, 48"

electrical, janitor, and elevator

machine rooms

### TeleComm/Data panels 72" to top

### Control Panel-FA, Gen. Intrcm. 48”

### Exterior W.P. convenience outlets 24" above grade mounted (horizontally)-

(vertically)

### Capacitors furnished by Mechanical 36" minimum

### Lock-out push button 36" minimum

### Intercom push button, Volume Control 48”

### Speakers, PA, Sound System 90” or ceiling mounted

### Fire alarm pull station 48"

### Fire alarm horn, bell, chime or light 80" or ceiling mounted

## Contractor shall check all equipment layouts and verify exact mounting heights.

# TELEPHONE SERVICE

## Refer to TeleComm/Data Sections

## Local telephone company shall pull all the wires. Contractor to provide pull wires in all empty conduits.

# EMERGENCY POWER

## Connect to and utilize generators whenever available and when project budget allows.

## Battery operated light fixtures shall be installed in the Corridor area. Exit lights shall be battery operated to meet the code.

# NAMEPLATES

## Nameplates shall be provided for all items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards and motor control centers, control devices and other significant equipment.

### Nameplates shall be 1" x 2-1/2" laminated black phenolic resin with a white core with engraved lettering, a minimum of 3/16-inch high. Manufacturers factory installed nameplates shall be acceptable provided all information is furnished.

### Nameplates shall identify the equipment item that the device is serving and also from where the device is being fed from.

# PROTECTION

## Protection of existing equipment and facilities shall be provided and coordinated with the Owner.

# OUTAGES

## All outages shall be scheduled and approved by the Owner, 72 hour minimum, refer to front end specifications for additional information. Contractor shall submit in writing a document indicating the times of day and duration of all electrical outages.

 **NOTE TO SPECIFIER: EDIT FIRE ALARM SYSTEM TO SUIT REQUIREMENTS.**

# FIRE ALARM

## Provide a fire alarm control panel for the facility in accordance with items shown on the Drawings. Panel shall be an expandable four zone, Class B system. Fire Alarm shall have a combination annunciator/control panel with a 1-1/2 hour nickel cadmium battery backup.

## All necessary equipment for a complete and workable system shall be provided, including battery charger, supervised trouble, alarm, zone indicators, reset switch and four normally open and two normally closed auxiliary contacts. (3 open for fire alarm, 1 open for fire alarm trouble; open contacts for connection to building automation system.) Provide all wiring in conduit, 1/2" minimum.

## Operation shall include automatic shutdown of air-handlers and closing of smoke dampers. Existing operations at existing areas shall remain.

## Additional Devices:

### Combination horn/visual devices

### Manual pull stations

### Photoelectric detectors

### Photoelectric duct detectors in air handler duct. Furnished and wired by electrical, installed by mechanical. Provide with remote reset and indicators near mechanical room door.

### Provide wiring and accessories for closing smoke dampers furnished and installed by mechanical.

# ASBESTOS

## If asbestos is encountered or suspected during the course of work, stop all work and notify the UNL Project Manager immediately.

# AS-BUILT DRAWINGS

## Contractor shall provide the Owner as-built drawings for all systems including electrical and special systems described in specifications. This shall consist of all drawings, wiring schematics, and diagrams for the fire alarm, telephone and data systems, as well as, any change to the systems shown on the drawings.

END OF SECTION 260000