

SECTION 16010  
GENERAL REQUIREMENTS – ELECTRICAL

PART 1 GENERAL

1.1 DESCRIPTION

A. Work Included

1. All items of labor, materials, and equipment, not specified in detail or shown on drawings but necessary for complete installation and proper operation of work described or implied, shall be furnished and installed.
2. Test all electrical conductors, after completion of installation of wiring and apparatus, to ensure continuity, proper splicing, freedom from grounds, except "made grounds" and those required for protection and insulation resistance. Use testing instruments, i.e. megger. Activation of each circuit will be required as final test. Testing shall be done at no additional expense to the Owner.
3. Drawings are indicative of work to be installed but do not indicate all bends, fittings, boxes, etc. that will be required in this Contract. The structural and finished conditions of the project shall be investigated prior to construction.
4. Coordinate work with other trades to avoid interference between piping, ducts, equipment, architectural or structural features. In case of interference, the Engineer decides which work is to be relocated, regardless of which is first installed.
5. Visit the site to determine actual conditions. No extra compensation will be allowed by failure to determine existing conditions.

B. Products Installed But Not Furnished Under This Section

1. The Owner will furnish the Well House Control Panel.
2. The Contractor shall receive, unload, store, install, mount, and secure the control panel at the location indicated on the Drawings. The Contractor shall furnish and install all raceways, conductors, grounding, power wiring, control wiring, and network cabling shown on the Drawings and required for a complete installation, unless specifically noted otherwise.
3. The Contractor shall terminate all field-installed wiring within the control panel in accordance with the panel shop drawings, wiring diagrams, and instructions provided by the Owner.
4. The Contractor shall coordinate all installation requirements, conduit routing, cable requirements, termination points, and startup requirements with the Owner.
5. During startup and commissioning, the Contractor shall provide qualified personnel to assist the Owner as required. Assistance shall include verification of power and control wiring, continuity testing, point-to-point checkout, correction of wiring deficiencies, troubleshooting of circuits and field devices, and re-termination or repair of wiring installed under this Contract as necessary to achieve a fully operational system.

6. The Contractor shall cooperate with and provide reasonable support to the Owner's SI during system startup, testing, and commissioning activities until all installed equipment and control functions operate as specified."

## 1.2 QUALITY ASSURANCE

- A. Regulations, Standards and Publications
  1. ANSI American National Standards Institute, Inc.
  2. ASTM American Society for Testing and Materials
  3. BOCA Building Officials and Code Administrators
  4. IEEE Institute of Electrical and Electronic Engineers
  5. IPCEA Insulated Power Cable Engineers Association
  6. ISA International Society of Automation
  7. NEC National Electrical Code of National Fire Protection Association
  8. NEMA National Electrical Manufacturers Association
  9. NESC National Electrical Safety Code
  10. NFPA 70E Standard for Electrical Safety in the Workplace
  11. UL Underwriters' Laboratories
- B. Electrical Requirements
  1. The installation shall comply with all Federal and State, municipal or other authority's laws, rules and/or regulations.
  2. Inspections by the required authorities shall be made. Original final wiring certificates with two copies shall be submitted to the Owner.
  3. The electrical inspections shall be made by the County.
  4. All electrical equipment and its components and materials shall meet all applicable UL criteria and bear the appropriate label of the Underwriters' Laboratory.
  5. All electrical equipment or apparatus of any one system shall be of the same quality as produced by one or more manufacturers, suitable for use in a unified system. The term "manufacturer" shall be understood as applying to a reputable firm who assumes full responsibility for its products.

## 1.3 SUBMITTALS

- A. Shop Drawings
  1. All shop drawings shall be submitted to the Engineer for review. All shop drawing submittals shall clearly indicate, using arrows and/or highlighting on all copies, which item(s) are being submitted and that each item being submitted is in compliance with all requirements on the drawings and in these specifications. All pertinent specification and drawing requirements shall be indicated on the shop drawings. If incorrect, they shall be resubmitted in quantity according to Contract conditions until satisfactory. Work shown on shop drawings shall not be executed until such drawings are approved. Electrical items shall not be installed until final approval of the shop drawings has been given by the Engineer.
  2. See specific sections for a breakdown of shop drawing items.

3. Submit certification that all equipment is UL listed.
  4. Shop drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices.
  5. The Engineer reserves the right to request additional shop drawings.
- B. Installation, Operation and Maintenance Manuals
1. Submit required number of installation, operation and maintenance manuals for all equipment being provided for the electrical system. These manuals shall be submitted in 3-ring loose-leaf binders and shall be complete, neat, orderly and indexed.
  2. The installation, operation and maintenance manuals shall include a copy of the approved shop drawings for all electrical items installed on the project.

#### 1.4 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Product Handling
1. Deliver all materials in good condition. Store in dry place, off ground, and keep dry at all times.
- B. Protection of Installation
1. All unfinished installations, construction materials and equipment shall be protected during construction.

### PART 2 PRODUCTS

#### 2.1 SEE SPECIFIC SECTIONS FOR PRODUCTS

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Protection of Installation
1. All equipment shall be protected during construction. All damaged equipment caused by noncompliance with this requirement shall be repaired at no expense to the Owner.
- B. Openings and Chases
1. Determine locations of chases and openings prior to construction so that same may be provided where required. If openings or chases are made after building construction is accomplished, such cutting and repairing of the building shall be made by this Contractor in complete coordination with other trades on the job site to match original conditions in quality, color and type of materials used, and at no additional expense to the Owner.
- C. Position of Outlets

1. The Engineer shall determine the position of all relocated outlets and equipment if the required location differs from that indicated on the drawings.
- D. Moving Outlets
1. The Owner reserves the right to move any outlet a distance of ten feet before roughing in, at no additional expense.
- E. Methods and Materials
1. All work shall be installed in a first-class, neat and workmanlike manner by skilled mechanics. All materials shall be new. Firmly support all materials and equipment.
- F. Cutting, Repairing and Finishing
1. All cutting, repairing, finishing and painting required for the installation of work under this Contract shall be performed under this Contract.
  2. All disturbed surfaces shall be repaired and finished to match adjacent surfaces by skilled mechanics working in their respective fields.
- G. Excavation and Backfilling
1. Excavation and backfilling shall be in accordance with the requirement of Division 2 and as required to complete the work according to details on drawings.
- H. Concrete
1. Concrete work shall be in accordance with the requirements of Division 3 and as required to complete the work according to details on drawings.
- I. Cutting and Patching of Concrete Areas
1. Openings in concrete required for Electrical construction shall be made by taking extreme precautions to prevent excessive damage to existing facilities. Prior to completion, all disturbed areas shall be closed, restored to normal and finished to match surrounding areas.
- J. Access
1. Install all conduit, wire, cable, wiring devices and equipment to preserve access to all equipment installed under this Contract.
- K. Layout of Wiring
1. The layout of wiring as shown on the drawings shall not be considered as absolute. It shall be subject to changes where necessary to overcome obstacles in construction. Where a major deviation from the plans is indicated by practical consideration, shop drawings shall be submitted showing all deviations in detail to clearly indicate the necessity or desirability for the change.

L. Miscellaneous Supports

1. Furnish and install all necessary angles, beams, channels, hanger rods or other supports for equipment and piping furnished under this Contract requiring support or suspension from building structure.

M. Continuity of Service

1. Uninterrupted electrical service shall be maintained during the entire time required for complete installation of the work proposed in the Drawings and in the specifications.
2. Temporary equipment, cable, and whatever else is necessary shall be provided as required to maintain electrical service to all facilities. Temporary service facilities, if required at any time, shall not be disconnected or removed until new services are placed in proper operation.
3. If any service or system must be interrupted, the Contractor shall request permission in writing stating the date and time the service will be interrupted, and the areas affected. This request shall be made in sufficient time for proper arrangements to be made. Written permission shall be obtained from the Owner before interrupting electrical service to any facility.

N. Clean Up

1. Upon completion of all work under the electrical specifications, furnish labor, materials, and incidentals to accomplish the following: remove all dirt, foreign materials, stains, fingerprints, etc. from all lighting fixtures, glassware, panelboards, wall plates, system equipment, floors, walls and ceilings adjacent to the above equipment and leave the electrical work in such a condition that no cleaning will be required by the Owner. The complete system shall be subject to inspection and approval by the Owner.

END OF SECTION

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