

PART 1 GENERAL

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1.2 GENERAL

- A. The party performing the work under this Section hereinafter referred to as the Contractor, shall furnish all labor, material, tools, equipment, services, and related accessories for a complete installation of all electrical work as indicated in the Drawings and Specifications. Items omitted from either the Specifications or the Drawings, but shown or described in the other, and all items necessary to make the electrical system complete and workable shall form a part of the work.
- B. Raceway, wiring, cabling, pull boxes, junction boxes, etc. shown in the Contract Documents are diagrammatic in nature to show intent only. As the result of differences between various manufacturers requirements, all raceway, wiring, and cabling may not be shown on the Drawings. It is the responsibility of the Contractor to include in his/her Bid any additional raceways, wiring, and cabling required for the proper installation and operation of the systems being proposed for use on this Project.
- C. Any discrepancies within Drawings and Specifications shall be promptly brought to the attention of the A/E for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the A/E during the bidding period or of any error on the Contractor's part.
- D. The Contractor shall check all existing field conditions (or Civil, Structural, Architectural trades work) for possible interference caused by conditions in the field before bid is made. No allowance shall subsequently be made to the Contractor by reason of his failure to have made such examinations or of any error on his part.
- E. The Contractor shall be held to have examined the premises and site so as to compare them with the Contract Documents and to have satisfied himself as to the conditions of the premises, the site, any obstructions, the actual level, access points, and all other existing conditions. The Contractor shall verify all dimensions in the field, shall check location of and connection to existing facilities, and shall assume all responsibility for same.
- F. Should any changes in the Drawings and Specifications be required to conform to the above regulations, the Contractor shall notify the Owner or his representative at the time of submitting his bid. After entering into the Owner-Contractor Agreement, the Contractor shall be responsible for the expense to meet these requirements without additional expense to the Owner.
- G. The Contractor shall receive, store, uncrate, protect, and install Owner furnished equipment with all precautions required to place the equipment in operation, ready for use. The Contractor shall be responsible for the equipment when received, as if he had purchased the equipment himself.
- H. The Contractor shall secure and pay for all permits and inspections required for the work.
- I. The Contractor shall not allow or cause any of the work to be covered up or enclosed until it has been inspected. Any work that is enclosed or covered up before such inspection and test shall be uncovered at the Contractor's expense; after it has been inspected, the Contractor shall restore the work to its original condition at his own expense.
- J. All work shall be done in accordance with the Contract Documents, in a neat and workmanlike manner consistent with recognized good practice, and shall be subject to the approval of the Owner or his representative.
- K. If the Contractor fails to do any required patching or repair, any damage resulting from the installation of the electrical work, such patching or repair shall be done by the Owner and the cost shall be paid by the Contractor.
- L. All equipment furnished with finished surfaces from manufacturer are not to be defaced in any way and shall be cleaned to original finish at time of completion of work except where otherwise noted.
- M. The Contractor shall conduct such tests and adjustments of equipment as required to verify equipment performance. Such tests shall be conducted in the presence of the Owner or his representative.
- N. The Contractor shall remove all debris resulting from the work, as well as all tools, equipment, etc., from the site upon completion of this contract. All equipment, including lighting fixtures shall be clean and free from dirt, grease, finger marks, etc., before final acceptance.
- O. Locations of conduits, disconnects, panels, lights, etc., shown on Drawings are approximate. The Contractor shall use good judgment in placing the preceding to eliminate all interference with other structures, piping, etc.

1.3 CODES AND STANDARDS

- A. All work, material, and equipment shall comply with all requirements of the latest editions and interim amendments of the National Electrical Code (NEC), National Electrical Safety Code, National Fire Protection Association, OSHA, Americans with Disabilities Act (ADA), and all applicable federal, state, and local laws and ordinances. All electrical equipment provided under this Contract shall be new (except where otherwise noted) and shall comply with the requirements of the Underwriters' Laboratories (UL) and bear the UL label.

1.4 SUBMITTALS

- A. The Contractor shall turn over all certificates of approval for inspections of electrical work to the Owner promptly when received. These certificates must be received before payment will be made for the work involved.
- B. Provide Shop Drawings for all materials listed in this Specification.
- C. The Owner or his representative reserves the right to reject any equipment or materials which are not in compliance with these Specifications, or the approved Shop Drawings, either before or after installation at no expense to the Owner, and equipment shall be replaced with approved equipment by the Contractor at no cost to the Owner.

GENERAL NOTES

1. UNLESS OTHERWISE INDICATED, ALL MOUNTING ELEVATIONS ARE CENTERLINE ELEVATIONS.
2. CONTRACTOR SHALL NOT BE PERMITTED TO CONSOLIDATE INDIVIDUAL CIRCUIT HOME RUNS EXCEPT AS FOLLOWS:
 - a. WHEN SHOWN ON DRAWINGS
 - b. WITH PRIOR WRITTEN APPROVAL BY THE ENGINEER
 - c. FOR MULTIPLE 20 AMPERE BRANCH CIRCUIT HOME RUNS PROVIDE 3/4" x 3/4" NEUTRALS AND 1/2" GROUND IN 3/4" MIN. CONDUIT. A HOME RUN SHALL CONSIST OF A MAX. OF 3 SEPARATE PHASE CONDUCTORS
3. CONDUIT HOME RUNS NOT OTHERWISE MARKED SHALL BE CONSIDERED #4/10 AND #10 GROUND IN 3/4" MIN. CONDUIT.
4. THIS CONTRACTOR SHALL FURNISH, INSTALL, AND SIZE ALL SLEEVES, HOLES, CORES, PATCHING, SLOTS, ANCHORS, BRACKETS, SUPPORTS, JUNCTION BOXES, PULL BOXES, AND OTHER APPURTENANCES NECESSARY TO EXECUTE THE CONTRACT DOCUMENTS COMPLETE. SOME OF THESE ITEMS MAY BE SHOWN ON THE DRAWINGS FOR CLARITY OR DESIGN PREFERENCE. HOWEVER, NOT ALL OF THE ITEMS NECESSARY FOR COMPLETE EXECUTION AND INSTALLATION, ARE SHOWN.

1.5 RECORD DRAWINGS

- A. The Contractor shall keep on-up-to-date record of all deviations from the Contract Documents. At completion of this Project, the Contractor shall deliver a set of As-Built Drawings and Specifications showing these deviations to the Owner.

1.6 EXISTING CONDITIONS

- A. Certain areas require the Contractor to remove, add to, or relocate portions of existing work. It shall be the Contractor's responsibility to remove portions of walls, etc., in a manner so that he may install new work. The Contractor shall then patch, repair and/or replace walls, etc., to match existing conditions.
- B. During building operations some existing installation may be exposed that will have to be changed, altered, re-routed, removed, and/or abandoned. Any such work which in the trade comes under the jurisdiction of the Electrical Contractor shall be done by this Contractor without extra cost to the Owner, as through fully detailed and/or described on Plans and in Specifications.

1.7 GUARANTEE

- A. All equipment furnished and work performed under the Contract Documents shall be guaranteed against defects in materials or workmanship for a period of one (1) year from the date of final acceptance. Any failure of equipment or work due to defects in materials or workmanship shall be corrected by the Contractor at no cost to the Owner.

PART 2 BASIC MATERIALS

2.1 CONDUIT

- A. All conduit shall be rigid metal conduit, except where otherwise noted.
- B. All conduit shall be 3/4" minimum except where otherwise noted. All conduits in finished spaces shall be concealed.
- C. The same type of conduit shall be used for all power and lighting.
- D. All conduits and fittings shall be run in straight lines parallel with or at right angles to building walls, partitions, floors and ceilings. When the location on the Plans interferes with other work in place or subsequently to be placed, the Contractor shall work out a satisfactory location, free from interferences.
- E. Individual conduits shall be rigidly supported and clamped with one-hole conduit clamps, conduit beam clamps, conduit hangers, or wall brackets, as required for the type of construction and/or as indicated on the Drawings. The use of perforated flat steel straps for supporting conduits will not be permitted. Conduits shall be secured so that they cannot be moved without the use of tools.
- F. Where a group of conduits run together, support the conduits on hangers fabricated from light steel framing unless otherwise shown on the Drawings.
- G. Use liquid tight flexible metal conduit for final connections to transformers, motors, limit switches, and similar devices subject to movement and vibration.
- H. Provide pull boxes, junction boxes, splice boxes and fittings where shown and at other locations as necessary and required by the National Electrical Code.
- I. All spare (empty) conduits shall be capped at each end and shall include a pull wire.

2.2 WIRE

- A. All single conductor power wire shall be 600 volt, type THWN, or THHN with copper conductors, except where otherwise noted.
- B. Minimum wire size shall be No. 10 AWG, except where otherwise noted. Wire size No. 8 AWG and larger shall be stranded, and all smaller wires shall be solid, except where otherwise noted.
- C. Conductors for power and lighting feeders and branch circuits shall have Conductor Identification. Conductor identification shall be as called for in the National Electric Code. A separate color shall be used for each phase conductor of each voltage system. Color coding shall be consistent throughout.
- D. Conductors for control, signal, and communications wiring shall be identified by terminal and splice points with permanent self-adhesive wire identification labels. Labels shall be placed on both ends of each conductor. Labels shall be made of cloth, vinyl plastic, or other permanent materials. Wire markers made of paper tape shall not be used.

2.3 SUPPORTING DEVICES

- A. Provide all angle iron, channels, rods, supports, or hangers required to install any electrical equipment called for by the Contract Documents.

PART 3 POWER DISTRIBUTION

3.1 PANELBOARDS

- A. Panelboards shall be circuit breaker type and shall have voltage rating, current rating, number of phases, and number of wires as shown on the drawings. All panels shall have a solid neutral bar and a ground bar. Panels shall be dead front type construction with a gasketed code gauge sheet metal cabinet without knockouts. Panels shall be a minimum of 20" wide except where otherwise noted. Panels shall be complete with door and lock. Panels shall be suitable for surface or flush mounting as noted. Enclosure shall be rated minimum NEMA 3F unless otherwise noted. Panels shall have copper main terminal bus. Circuit breakers shall be built-in type.
- B. Panels shall have an integrated short circuit rating. (In RMS symmetrical amperes) of not less than the interrupting rating of the lowest rated circuit breaker in the panel. Panels shall have the number and size of circuit breakers as shown on the drawings. Where spaces are called for, panel bus shall be extended behind the spaces.
- C. Non-latching type circuit breaker handle-locking devices shall be provided where shown on the Drawings.
- D. Each panel shall have a typewritten directory on the inside of the door designating the use and location of each circuit.
- E. All panels shall be of the same manufacturer. Panelboards shall be manufactured by Eaton, General Electric, Square D or approved equal.

3.2 DISCONNECT SWITCHES

- A. Disconnect switch shall be general duty, 240 V, service entrance labeled, fusible. Disconnect switches shall be quick-make, quick-break type. Fusible disconnect switches shall have fuse clips for UL listed NEMA class fuses. Fuse clips for RK-1 or J fuses shall be spring-reinforced. Fuses shall have a minimum integrated interrupting rating of 50,000 RMS symmetrical at 240 V AC. Enclosure shall be NEMA 3F for outdoor installations.

3.3 CIRCUIT BREAKERS

- A. All circuit breakers shall be quick-make, quick-break, with thermal-magnetic trips and a minimum interrupting rating of 10,000 amperes at 240 volt and 22,000 amperes at 277 volts. RMS symmetrical. Provide ground fault interrupter type circuit breakers where noted.
- B. Enclosed circuit breakers shall have NEMA 1 enclosures for indoor installations and NEMA 3F for outdoor installations.

3.4 FUSES

- A. Provide a complete set of fuses for all fusible equipment on the job. All fuses shall be of the same manufacturer and shall have an interrupting rating of 200,000 A RMS symmetrical, except otherwise noted. All fuses shall bear a UL label and NEMA class designation. Fuse identification labels showing size and type of fuse installed shall be placed inside the cover of each switch or piece of equipment.
- B. Fuses rated 600A and less shall be time delay, dual-element, current limiting type; UL listed NEMA Class RK-1, except where otherwise noted.
- C. Fuses shall be manufactured by Bussmann, Littelfuse or approved equal.

3.5 IDENTIFICATION

- A. Provide on each panelboard, disconnected switch, etc. a 1" x 3" laminated phenolic nameplate to identify the equipment. Nameplates shall be engraved to show block letters on a white background. Nameplates shall be fastened to the door with two self-tapping metal screws and shall be removable.
- B. The owner may assign various security levels to schedulers by function and/or fields. This full scheduling capabilities for all fields to only having privileges such as full scheduling capabilities by phone. Scheduling tool shall be capable of setting curfew limits.

ELECTRICAL ABBREVIATIONS

A	AMPERE
AFG	ABOVE FINISHED GRADE
BR	BREAKER
CON	CONDUIT
CCT	CIRCUIT
CT	CURRENT TRANSFORMER
EX	EXISTING
G/RO/UND	GROUND
KVA	KILOVOLT AMPERE
KW	KILOWATT
LIG	LIGHTING OR LIGHT
MTD	MOUNTED
NIS	NOT TO SCALE
P	POLE
PAN	PANEL OR PANELBOARD
PRM	PRIMARY
SEC	SECONDARY
SID	SHIELD
THD	THREE PHASE
UNO	UNLESS NOTED OTHERWISE
V	VOLT
W	WAIT
WR	WEATHERPROOF
XTR	TRANSFORMER
PH	PHASE

PLAN SYMBOLS

HH	HANDHOLE
BB	PANEL BOARD
MM	UTILITY METER
NP	NEW POLE
EP	EXISTING POLE
DD	HEAVY-DUTY FUSIBLE DISCONNECT
AS	CONDUIT HOME RUN, AS INDICATES DESTINATION, PANELBOARD A, CIRCUIT 5
EX	EXPOSED CONDUIT(S) WITH APPROPRIATE CONDUCTOR QUANTITIES. SEE GENERAL NOTES
CON	CONCEALED CONDUIT(S) BELOW GRADE FLOOR IN SLAB IN WALL OR ABOVE CEILING WITH APPROPRIATE CONDUCTOR QUANTITIES. SEE GENERAL NOTES.
EL	OVERHEAD LINE, X INDICATES TYPE: E = ELECTRIC, L = LIGHTING
LD	LIGHTING
UD	UNDERGROUND DUCT/BANK
EL	X INDICATES TYPE: E = ELECTRIC, L = LIGHTING
G	G = GROUNDING CONDUCTOR

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ISSUED FOR BIDDING

DATE	BY

ADDENDUM REVISIONS

ADDENDUM NO	ADDENDUM DATE	BY

ISSUED FOR CONSTRUCTION

DATE	BY

REVISIONS

NO	DESCRIPTION

RECORD DRAWINGS

DATE	BY

DRAWN

KAP	DATE	10/21/14
CHECKED	KAP	JOB NO 14578385
SCALE	AS SHOWN	

ELECTRICAL SYMBOLS LEGEND AND SPECIFICATIONS

**CITY OF HILLIARD, OHIO
ALT FIELD LIGHTING REPLACEMENT
CIP LB-5**

