

SECTION 16010 - ELECTRICAL GENERAL

1.0 GENERAL

1.1 THE ELECTRICAL CONTRACTOR WILL BE REQUIRED TO CARRY AN "EC" LICENSE CLASSIFICATION

1.2 THE WORK COVERED BY THIS DIVISION CONSISTS OF PROVIDING ALL LABOR, EQUIPMENT AND MATERIALS AND PERFORMING ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF THE ELECTRICAL WORK AS HEREIN CALLED FOR AND SHOWN ON THE DRAWINGS. THE WORK SHALL INCLUDE BUT SHALL NOT BE LIMITED TO THE FOLLOWING:

PROVIDE ALL POWER, LIGHTING, FIRE ALARM, INTERCOM, TELEPHONE, COMMUNICATIONS, AND OTHER ELECTRICAL SYSTEMS FOR THE PROJECT.

1.3 RELATED DOCUMENTS:

1.3.1 DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION.

1.3.2 PROVISIONS OF THIS SECTION APPLY TO WORK OF ALL DIVISION 16 SECTIONS.

1.3.3 REVIEW ALL PROJECT DRAWINGS TO BE AWARE OF CONDITIONS AFFECTING WORK HEREIN.

1.3.4 DEFINITIONS:

1. PROVIDE: FURNISH, INSTALL, AND TEST, COMPLETE AND READY FOR INTENDED USE.
2. FURNISH: SUPPLY AND DELIVER TO PROJECT SITE, READY FOR SUBSEQUENT REQUIREMENTS.
3. INSTALL: OPERATIONS AT PROJECT SITE, INCLUDING UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR REQUIREMENTS.

1.4 PERMITS AND FEES: CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, METERS, AND INSPECTIONS REQUIRED FOR HIS WORK AND PAY ALL FEES AND CHARGES INCIDENTAL THERETO.

1.5 VERIFICATION OF OWNER'S SURVEY DATA: PRIOR TO COMMENCING ANY EXCAVATION OR GRADING THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE ACCURACY OF ALL SURVEY DATA INDICATED ON THE DRAWINGS AND/OR PROVIDED BY THE OWNER. SHOULD THE CONTRACTOR DISCOVER ANY INACCURACIES, ERRORS, OR OMISSIONS IN THE SURVEY DATA, HE SHALL IMMEDIATELY NOTIFY THE ENGINEER. COMMENCEMENT BY THE CONTRACTOR OF ANY EXCAVATION OR UPGRADING SHALL BE HELD AS AN ACCEPTANCE OF THE SURVEY DATA BY HIM AFTER WHICH TIME THE CONTRACTOR HAS NO CLAIM AGAINST THE OWNER RESULTING FROM ALLEGED ERRORS, OMISSIONS OR INACCURACIES OF THE SAID SURVEY DATA.

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- 1.6 DELIVERY AND STORAGE OF MATERIALS: MATERIALS DELIVERED TO SITE SHALL BE INSPECTED FOR DAMAGE, UNLOADED, AND STORED WITH A MINIMUM OF HANDLING. ALL MATERIAL SHALL BE STORED TO PROVIDE PROTECTION FROM THE WEATHER AND ACCIDENTAL DAMAGE.
- 1.7 EXTENT OF WORK IS INDICATED IN THE DRAWINGS, SCHEDULES, AND SPECIFICATION. SINGULAR REFERENCES SHALL NOT BE CONSTRUED AS REQUIRING ONLY ONE DEVICE IF MULTIPLE DEVICES ARE SHOWN ON THE DRAWINGS OR ARE REQUIRED FOR PROPER SYSTEM OPERATION.
- 1.8 FIELD MEASUREMENTS AND COORDINATION:
- 1.8.1 THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO OBTAIN A COMPLETE AND SATISFACTORY INSTALLATION. SEPARATE DIVISIONAL DRAWINGS AND SPECIFICATIONS SHALL NOT RELIEVE THE CONTRACTOR OR SUBCONTRACTORS FROM FULL COMPLIANCE OF WORK OF HIS TRADE INDICATED ON ANY OF THE DRAWINGS OR IN ANY SECTION OF THE SPECIFICATIONS. REPORT CONFLICTS PRIOR TO START OF WORK.
- 1.8.2 VERIFY ALL FIELD DIMENSIONS AND LOCATIONS OF EQUIPMENT TO INSURE CLOSE, NEAT FIT WITH OTHER TRADES' WORK. MAKE USE OF ALL CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS TO VERIFY EXACT DIMENSION AND LOCATIONS. DO NOT SCALE ELECTRICAL DRAWINGS, RELY ON DIMENSIONS SHOWN ON ARCHITECTURAL OR STRUCTURAL DRAWINGS.
- 1.8.3 COORDINATE WORK IN THIS DIVISION WITH ALL OTHER TRADES IN PROPER SEQUENCE TO INSURE THAT THE TOTAL WORK IS COMPLETED WITHIN CONTRACT TIME SCHEDULE AND WITH MINIMUM CUTTING AND PATCHING.
- 1.8.4 LOCATE ALL EQUIPMENT, MATERIALS, AND APPARATUS SYMMETRICAL WITH ARCHITECTURAL ELEMENTS. INSTALL TO EXACT HEIGHT AND LOCATIONS WHEN SHOWN ON ARCHITECTURAL DRAWINGS. WHEN LOCATIONS ARE SHOWN ONLY ON MECHANICAL DRAWINGS, BE GUIDED BY ARCHITECTURAL DETAILS AND CONDITIONS EXISTING AT JOB AND CORRELATE THIS WORK WITH THAT OF OTHERS.
- 1.8.5 INSTALL WORK AS REQUIRED TO FIT STRUCTURE, AVOID OBSTRUCTIONS, AND RETAIN CLEARANCE, HEADROOM, OPENINGS AND PASSAGEWAYS. CUT NO STRUCTURAL MEMBERS WITHOUT WRITTEN APPROVAL FROM ENGINEER OR ARCHITECT.
- 1.8.6 CAREFULLY EXAMINE ANY EXISTING CONDITIONS, PIPING, AND PREMISES. COMPARE DRAWINGS WITH EXISTING CONDITIONS. REPORT ANY OBSERVED DISCREPANCIES. WRITTEN INSTRUCTIONS WILL BE ISSUED BY THE ENGINEER TO RESOLVE DISCREPANCIES.
- 1.8.7 BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS AND FITTINGS OR TO LOCATE EVERY ACCESSORY. DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC. STUDY CAREFULLY THE SIZES AND LOCATIONS OF STRUCTURAL MEMBERS, WALL AND PARTITION LOCATIONS, TRUSSES, AND ROOM DIMENSIONS AND TAKE ACTUAL MEASUREMENTS ON THE JOB. LOCATE MATERIAL, EQUIPMENT AND ACCESSORIES WITH SUFFICIENT SPACE FOR INSTALLING AND SERVICING. CONTRACTOR IS RESPONSIBLE FOR ACCURACY OF HIS MEASUREMENTS AND SHALL NOT ORDER MATERIALS OR PERFORM WORK WITHOUT VERIFICATION. NO EXTRA COMPENSATION WILL BE ALLOWED BECAUSE FIELD MEASUREMENTS VARY FROM THE DIMENSIONS ON THE DRAWINGS. IF FIELD MEASUREMENTS SHOW THAT EQUIPMENT OR MATERIAL CANNOT BE FITTED, THE ENGINEER SHALL BE CONSULTED.

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REMOVE AND RELOCATE, WITHOUT ADDITIONAL COMPENSATION, ANY ITEM THAT IS INSTALLED AND IS LATER FOUND TO ENCROACH ON SPACE ASSIGNED TO ANOTHER USE.

1.9 **GUARANTEE AND SERVICE:**

1.9.1 THE CONTRACTOR SHALL GUARANTEE LABOR, MATERIALS AND EQUIPMENT FOR A PERIOD OF ONE (1) YEAR FROM SUBSTANTIAL COMPLETION, OR FROM OWNER'S OCCUPANCY, WHICHEVER IS EARLIER. CONTRACTOR SHALL MAKE GOOD ANY DEFECTS AND SHALL INCLUDE ALL NECESSARY ADJUSTMENTS TO AND REPLACEMENT OF DEFECTIVE ITEMS WITHOUT EXPENSE TO THE OWNER.

1.9.2 IN ADDITION TO THE MANUFACTURER'S GUARANTEE OF EACH ITEM, CONTRACTOR SHALL PROVIDE HIS STANDARD GUARANTEE AFTER FINAL ACCEPTANCE AND MAKE GOOD ANY DEFECTS OF MATERIALS OR WORKMANSHIP OCCURRING DURING THIS PERIOD WITHOUT EXPENSE TO THE OWNER.

1.9.2 OWNER RESERVES THE RIGHT TO MAKE EMERGENCY REPAIRS AS REQUIRED TO KEEP EQUIPMENT IN OPERATION WITHOUT VOIDING CONTRACTOR'S GUARANTEE BOND NOR RELIEVING CONTRACTOR OF HIS RESPONSIBILITIES DURING GUARANTEE PERIOD.

1.10 **SHOP DRAWINGS:**

1.10.1 BEFORE ORDERING ANY MATERIALS OR EQUIPMENT, AND **WITHIN 30 DAYS AFTER THE AWARD OF CONTRACT THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER ONE COMPLETE SCHEDULE** SHOWING THE MAKE, TYPE, MANUFACTURER'S NAME AND TRADE DESIGNATION OF ALL EQUIPMENT.

1. THIS SCHEDULE SHALL BE ACCOMPANIED BY SIX (6) COPIES OF THE MANUFACTURER'S PRINTED SPECIFICATIONS AND SHOP DRAWINGS FOR EACH PIECE OF EQUIPMENT OR SPECIALTY AND SHALL GIVE DIMENSIONS, DIAGRAMS, DESCRIPTIVE LITERATURE, CAPACITY OR RATING, KIND OF MATERIAL, FINISH, GUARANTEE, ETC., AND SUCH OTHER DETAILED INFORMATION AS THE ENGINEER MAY REQUIRE.

2. WHEN APPROVED, SUCH SCHEDULE SHALL BE AN ADDITION TO THESE SPECIFICATIONS, AND SHALL BE OF EQUAL FORCE IN THAT NO DEVIATION WILL BE PERMITTED EXCEPT WITH THE APPROVAL OF THE ENGINEER.

1.10.2 IF SHOP DRAWINGS SHOW VARIATION FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL MAKE SPECIFIC MENTION OF SUCH VARIATION IN HIS LETTER OF TRANSMITTAL. IF ACCEPTABLE, CONTRACTOR WILL NOT BE RELIEVED OF THE RESPONSIBILITY FOR EXECUTING THE WORK IN ACCORDANCE WITH THE CONTRACT.

1.10.3 REVIEW OF SHOP DRAWINGS, DESCRIPTIVE LITERATURE, CATALOG DATA, OR SCHEDULES BY THE ENGINEER SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS FROM CONTRACT DRAWINGS OR SPECIFICATIONS, UNLESS HE HAS IN WRITING CALLED TO THE ATTENTION OF THE ENGINEER SUCH DEVIATION AT THE TIME OF SUBMISSION, NOR SHALL IT RELIEVE HIM FROM RESPONSIBILITY FOR ERRORS OF ANY SORT IN SHOP DRAWINGS, DESCRIPTIVE LITERATURE, CATALOG DATA, OR SCHEDULES.

1.10.4 SUBMIT SHOP DRAWINGS AND ANY OTHER DRAWINGS SPECIFICALLY CALLED FOR IN OTHER SECTIONS. SHOP DRAWINGS SHALL CONSIST OF PLANS, SECTIONS,

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ELEVATIONS AND DETAILS TO SCALE (NOT SMALLER THAN 1/4" PER FOOT), WITH DIMENSIONS CLEARLY SHOWING THE INSTALLATION. DIRECT COPIES OF SMALL SCALE PROJECT DRAWINGS ISSUED TO THE CONTRACTOR ARE NOT ACCEPTABLE. DRAWINGS SHALL TAKE INTO ACCOUNT EQUIPMENT FURNISHED UNDER OTHER SECTIONS AND SHALL SHOW SPACE ALLOTTED FOR IT. INCLUDE CONSTRUCTION DETAILS AND MATERIALS.

- 1.10.5 SUBMIT PRODUCT DATA AFTER AWARD OF THE CONTRACT AND BEFORE ANY EQUIPMENT OR MATERIALS ARE PURCHASED. PRODUCT DATA ARE DEFINED AS MANUFACTURER'S PRINTED LITERATURE SPECIFICALLY MARKED TO INDICATE SIZE AND MODEL AND ACCOMPANIED BY RATING SHEETS LISTING VALUES SHOWING THAT EQUIPMENT MEETS SCHEDULED OR SPECIFIED VALUES. PROPERLY CODED STAMP FROM THE ENGINEER ON RETURNED SUBMITTAL IS REQUIRED BEFORE ORDERING EQUIPMENT.
- 1.10.6 SHOP DRAWINGS SHALL BE SUBDIVIDED INTO THE SPECIFICATION SECTION WHICH THEY WERE SPECIFIED. EACH SECTION SHALL BE LABELED WITH THE SPECIFICATION SECTION NUMBER.
- 1.10.7 WHERE POSSIBLE, SUPPLY ALL SHOP DRAWINGS WITHIN ONE SUBMITTAL PACKAGE. FOLLOW THE FORMAT INDICATED IN 1.9.6.
- 1.11 ELECTRICAL ROOM DRAWINGS: A DETAILED, 1/4"=1'-0" SCALED PLAN VIEW DRAWING SHALL BE SUBMITTED FOR EACH ELECTRICAL ROOM TO ENSURE THAT THE EQUIPMENT BEING SUPPLIED WILL FIT PROPERLY. THIS DRAWING SHALL MAKE SPECIFIC MENTION OF ANY NEC VIOLATION. ALL EQUIPMENT WITHIN THE ELECTRICAL ROOM SHALL BE LABELED AND ACTUAL DIMENSIONS SHOWN. THE DRAWINGS SHALL BE SUBMITTED WITH THE SHOP DRAWINGS AND MANUFACTURER'S PRODUCT SHEETS. FAILURE TO SUPPLY SCALED DRAWINGS SHALL BE THE BASIS OF REJECTING THE ENTIRE SUBMITTAL PACKAGE. IN AREAS THAT THE ELECTRICAL EQUIPMENT IS LOCATED IN MECHANICAL ROOMS, INDICATE MECHANICAL EQUIPMENT AND DUCT WORK ON DRAWINGS TO COORDINATE CLEARANCE MANDATED BY THE NEC.
- 2.0 PRODUCTS
- 2.1 ALL MATERIALS SHALL BE NEW AND UNUSED, OWNER-SUPPLIED, OR REUSED AS SHOWN ON THE DRAWINGS, THE BEST OF THEIR RESPECTIVE KINDS, SUITABLE FOR THE CONDITIONS AND DUTIES IMPOSED ON THEM. THE DESCRIPTION, CHARACTERISTICS, AND REQUIREMENTS OF MATERIALS TO BE USED SHALL BE IN ACCORDANCE WITH QUALIFYING CONDITIONS ESTABLISHED IN THE FOLLOWING SECTIONS.
- 2.2 EQUIPMENT AND MATERIALS
- 2.2.1 EQUIPMENT AND MATERIALS FURNISHED UNDER THIS DIVISION SHALL BE THE PRODUCT OF A MANUFACTURER REGULARLY ENGAGED IN THE MANUFACTURE OF SUCH ITEMS FOR A PERIOD OF THREE YEARS. WHERE PRACTICAL, ALL OF THE COMPONENTS SHALL BE PRODUCTS OF A SINGLE MANUFACTURER IN ORDER TO PROVIDE PROPER COORDINATION AND RESPONSIBILITY. WHERE REQUIRED, CONTRACTOR SHALL FURNISH PROOF OF INSTALLATION OF SIMILAR EQUIPMENT OR MATERIALS.
- 2.2.2 EACH ITEM OF EQUIPMENT SHALL BEAR A NAME PLATE SHOWING THE MANUFACTURER'S NAME, TRADE NAME, MODEL NUMBER, SERIAL NUMBER, RATINGS

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AND OTHER INFORMATION NECESSARY TO FULLY IDENTIFY IT. THIS PLATE SHALL BE PERMANENTLY MOUNTED IN A PROMINENT LOCATION AND SHALL NOT BE CONCEALED, INSULATED OR PAINTED.

- 2.2.3 THE LABEL OF THE APPROVING AGENCY, SUCH AS UL OR NEMA, BY WHICH A STANDARD HAS BEEN ESTABLISHED FOR THE PARTICULAR ITEM SHALL BE IN FULL VIEW. MATERIALS SHALL BE UL-LISTED FOR THE APPLICATION SPECIFIED OR INDICATED ON THE DRAWINGS OR SPECIFICATIONS.
- 2.2.4 MATERIALS AND EQUIPMENT ARE SPECIFIED HEREIN BY A SINGLE OR BY MULTIPLE MANUFACTURERS TO INDICATE QUALITY, MATERIAL AND TYPE OF CONSTRUCTION DESIRED. MANUFACTURER'S PRODUCTS SHOWN ON THE DRAWINGS HAVE BEEN USED AS BASIS FOR DESIGN; IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN THAT ALTERNATE MANUFACTURER'S PRODUCTS MEET DETAILED SPECIFICATIONS AND THAT SIZE AND ARRANGEMENT OF EQUIPMENT ARE SUITABLE FOR INSTALLATION.
- 2.2.5 MODEL NUMBERS: CATALOG NUMBERS AND MODEL NUMBERS INDICATED IN THE DRAWINGS AND SPECIFICATIONS ARE USED AS A GUIDE IN THE SELECTION OF THE EQUIPMENT AND ARE ONLY LISTED FOR THE CONTRACTOR'S CONVENIENCE. THE CONTRACTOR SHALL DETERMINE THE ACTUAL MODEL NUMBERS FOR ORDERING EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE WRITTEN DESCRIPTION OF EACH ITEM AND WITH THE INTENT OF THE DRAWINGS AND SPECIFICATIONS.
- 2.3 REQUESTS FOR SUBSTITUTION:
- 2.3.1 WHERE A PARTICULAR SYSTEM, PRODUCT OR MATERIAL IS SPECIFIED BY NAME, CONSIDER IT AS STANDARD BASIS FOR BIDDING, AND BASE PROPOSAL ON THE PARTICULAR SYSTEM, PRODUCT OR MATERIAL SPECIFIED. OTHER SYSTEMS, PRODUCTS, EQUIPMENT OR MATERIALS MAY BE ACCEPTED ONLY IF IN THE OPINION OF THE ENGINEER, THEY ARE EQUIVALENT IN QUALITY AND WORKMANSHIP AND WILL PERFORM SATISFACTORILY ITS INTENDED PURPOSE. ALL SUCH SUBSTITUTIONS IN MATERIALS OR EQUIPMENT SHALL BE APPROVED IN WRITING BY THE ENGINEER.
- 2.3.2 IN MAKING REQUESTS FOR SUBSTITUTIONS, THE CONTRACTOR SHALL LIST THE PARTICULAR SYSTEM, PRODUCT, EQUIPMENT OR MATERIAL HE WISHES TO SUBSTITUTE AND AT BID TIME THE CONTRACTOR SHALL STATE THE AMOUNT HE WILL ADD OR DEDUCT FROM HIS BASE BID IF THE SUBSTITUTION IS APPROVED BY THE ENGINEER. IF NO DEDUCTION OR ADDITION TO THE BASE BID IS ALLOWED BY THE CONTRACTOR FOR SUCH SUBSTITUTION, IT SHALL BE SO STATED ON THE REQUEST.
- 2.3.3 REQUESTS BY CONTRACTOR FOR SUBSTITUTION WILL BE CONSIDERED ONLY WHEN REASONABLE, TIMELY, FULLY DOCUMENTED, AND QUALIFYING UNDER ONE OR MORE OF THE FOLLOWING CIRCUMSTANCES.
1. REQUIRED PRODUCT CANNOT BE SUPPLIED IN TIME FOR COMPLIANCE WITH CONTRACT TIME REQUIREMENTS.
 2. REQUIRED PRODUCT IS NOT ACCEPTABLE TO GOVERNING AUTHORITY, OR DETERMINED TO BE NON-COMPATIBLE, OR CANNOT BE PROPERLY COORDINATED, WARRANTED OR INSURED, OR HAS OTHER RECOGNIZED DISABILITY AS CERTIFIED BY CONTRACTOR.
 3. SUBSTANTIAL COST ADVANTAGE IS OFFERED OWNER AFTER DEDUCTING OFF-SETTING DISADVANTAGES INCLUDING DELAYS, ADDITIONAL COMPENSATION

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FOR REDESIGN, INVESTIGATION, EVALUATION AND OTHER NECESSARY SERVICES
AND SIMILAR CONSIDERATIONS.

- 2.3.4 ALL REQUESTS FOR SUBSTITUTION SHALL CONTAIN A "COMPARISON SCHEDULE" AND CLEARLY AND SPECIFICALLY INDICATE ANY AND ALL DIFFERENCES OR OMISSIONS BETWEEN THE PRODUCT SPECIFIED AS THE BASIS OF DESIGN AND THE PRODUCT PROPOSED FOR SUBSTITUTION. DIFFERENCES SHALL INCLUDE BUT SHALL NOT BE LIMITED TO DATA AS FOLLOWS FOR BOTH THE SPECIFIED AND SUBSTITUTED PRODUCTS:

1. PRINCIPLE OF OPERATION.
2. MATERIALS OF CONSTRUCTION OR FINISHES.
3. THICKNESS OF MATERIALS.
4. WEIGHT OF ITEM.
5. DELETED FEATURES OR ITEMS.
6. ADDED FEATURES OR ITEMS.
7. CHANGES IN OTHER WORK CAUSED BY THE SUBSTITUTION.
8. PERFORMANCE AND RATING DATA.

IF THE APPROVED SUBSTITUTION CONTAINS DIFFERENCES OR OMISSIONS NOT SPECIFICALLY CALLED TO THE ATTENTION OF THE ENGINEER, THE OWNER RESERVES THE RIGHT TO REQUIRE EQUAL OR SIMILAR FEATURES TO BE ADDED TO THE SUBSTITUTED PRODUCTS AT THE CONTRACTOR'S EXPENSE.

- 2.4 PRIOR APPROVAL: WHERE THE TERM "OR APPROVED EQUAL" IS USED IN THE DRAWINGS OR THE SPECIFICATIONS, SUBMIT ALL REQUESTS FOR APPROVAL OF THE ALTERNATE MANUFACTURER'S PRODUCTS TWO WEEKS PRIOR TO BID OPENING. APPROVAL WILL BE IN THE FORM OF AN ADDENDUM TO THE SPECIFICATIONS AND DRAWINGS. CLEARLY INDICATE ALL DIFFERENCES BETWEEN THE SPECIFIED AND PROPOSED PRODUCT FOLLOWING THE GUIDELINES FOR SUBSTITUTION HEREIN. AT THE ENGINEER'S OPTION, THE "PRIOR APPROVAL" MAY BE WAVED IF IN THE ENGINEER'S FEELS THE SUBSTITUTION IS IN THE BEST INTEREST OF THE OWNER.

3.0 EXECUTION

- 3.1 WORKMANSHIP: ALL MATERIALS, FIXTURES, AND EQUIPMENT SHALL BE INSTALLED AND COMPLETED IN A FIRST-CLASS WORKMANLIKE MANNER AND IN ACCORDANCE WITH THE BEST MODERN METHODS AND PRACTICE. ANY MATERIALS INSTALLED WHICH DO NOT PRESENT AN ORDERLY AND REASONABLY NEAT AND/OR WORKMANLIKE APPEARANCE, OR DO NOT ALLOW ADEQUATE SPACE FOR MAINTENANCE, SHALL BE REMOVED AND REPLACED WHEN SO DIRECTED BY THE ENGINEER.

3.2 COORDINATION

- 3.2.1 THE CONTRACTOR SHALL BE RESPONSIBLE FOR FULL COORDINATION OF THE ELECTRICAL SYSTEMS WITH SHOP DRAWINGS OF THE BUILDING CONSTRUCTION SO THE PROPER OPENINGS AND SLEEVES OR SUPPORTS ETC., ARE PROVIDED FOR CONDUIT, DEVICES, OR OTHER EQUIPMENT PASSING THROUGH SLABS OR WALLS. THE CONTRACTOR SHALL REVIEW ALL SEPARATE DIVISIONS AND INCORPORATE INTO PROJECT AS REQUIRED.
- 3.2.2 ANY ADDITIONAL STEEL SUPPORTS REQUIRED FOR THE INSTALLATION OF ANY ELECTRICAL EQUIPMENT, ETC., SHALL PROVIDED BY THE CONTRACTOR.

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- 3.2.3 IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL EQUIPMENT THAT MAY REQUIRE MAINTENANCE AND OPERATION ARE MADE EASILY ACCESSIBLE, REGARDLESS OF THE DIAGRAMMATIC LOCATION SHOWN ON THE DRAWINGS.
- 3.2.4 ALL CONNECTIONS TO FIXTURES AND EQUIPMENT SHOWN ON THE DRAWINGS SHALL BE CONSIDERED DIAGRAMMATIC UNLESS OTHERWISE INDICATED BY A SPECIFIC DETAIL ON THE DRAWINGS. THE ACTUAL CONNECTIONS SHALL BE MADE TO FULLY SUIT THE REQUIREMENTS OF EACH CASE AND ADEQUATELY PROVIDE FOR SERVICING.
- 3.2.5 THE CONTRACTOR SHALL PROTECT EQUIPMENT AND FIXTURES AT ALL TIMES DURING STORAGE AND CONSTRUCTION. HE SHALL REPLACE ALL EQUIPMENT AND FIXTURES WHICH ARE DAMAGED AS A RESULT OF INADEQUATE PROTECTION.
- 3.2.6 PRIOR TO STARTING AND DURING PROGRESS OF WORK, EXAMINE WORK AND MATERIALS INSTALLED BY OTHERS AS THEY APPLY TO WORK IN THIS DIVISION. REPORT CONDITIONS WHICH WILL PREVENT SATISFACTORY INSTALLATION.
- 3.2.7 START OF WORK WILL BE CONSTRUED AS ACCEPTANCE OF SUITABILITY OF WORK OF OTHERS.
- 3.3 UTILITIES COORDINATION: THE CONTRACTOR SHALL MEET WITH RESPECTIVE PERSONNEL OF THE TELEPHONE AND ELECTRIC UTILITIES AND REVIEW ALL DETAILS OF THE SERVICE AND DISTRIBUTION. ALL DETAILS SHOWN ON CONTRACT DOCUMENTS SHALL BE VERIFIED FOR ADEQUACY AND ACCURACY. THE CONTRACTOR SHALL INCORPORATE ANY REQUIRED REVISIONS WITHOUT ADDITIONAL COST TO THE OWNER.
- 3.4 CONSTRUCTION ELECTRICAL UTILITIES: PROVIDE ALL TEMPORARY WIRING FOR POWER AND LIGHT REQUIRED FOR CONSTRUCTION PURPOSES AND REMOVE SUCH TEMPORARY WIRING WHEN USE IS NO LONGER REQUIRED.
- 3.5 INTERRUPTION OF SERVICE: BEFORE ANY EQUIPMENT IS SHUT DOWN FOR DISCONNECTING OR TIE-INS, ARRANGEMENTS SHALL BE MADE WITH THE ENGINEER AND THIS WORK SHALL BE DONE AT THE TIME BEST SUITED TO THE OWNER. OUTAGES MUST BE SCHEDULED THROUGH THE ENGINEER. EXTENT, LENGTH, AND TIMING OF OUTAGES SHALL BE REVIEWED BY THE ENGINEER. SERVICES SHALL BE RESTORED THE SAME DAY. PROVIDE TEMPORARY POWER OR OTHER SERVICES AS REQUIRED DURING OUTAGES.
- 3.6 CUTTING AND PATCHING: CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING OF ALL HOLES, CHASES, SLEEVES, AND OTHER OPENINGS REQUIRED FOR INSTALLATION OF EQUIPMENT FURNISHED AND INSTALLED UNDER THESE SPECIFICATIONS. OBTAIN PERMISSION FROM ENGINEER BEFORE CUTTING ANY STRUCTURAL ITEMS.
- 3.7 EQUIPMENT SETTING: BOLT FLOOR MOUNTED EQUIPMENT DIRECTLY TO CONCRETE PADS USING HOT-DIPPED GALVANIZED ANCHOR BOLTS, NUTS AND WASHERS. LEVEL EQUIPMENT. ALL FLOOR MOUNTED EQUIPMENT SHALL BE PROVIDED WITH A RAISED 4" CONCRETE PAD.
- 3.8 PAINTING: TOUCH-UP FACTORY FINISHES ON EQUIPMENT LOCATED INSIDE AND OUTSIDE SHALL BE DONE UNDER DIVISION 16. OBTAIN MATCHED COLOR COATINGS FROM THE MANUFACTURER AND APPLY AS DIRECTED BY MANUFACTURER. IF CORROSION IS FOUND DURING INSPECTION ON THE SURFACE OF ANY EQUIPMENT, CLEAN, PRIME, AND PAINT, AS REQUIRED.

- 3.9 CLEAN-UP: THOROUGHLY CLEAN ALL EXPOSED PARTS OF APPARATUS AND EQUIPMENT OF CEMENT, PLASTER, AND OTHER MATERIALS AND REMOVE ALL OIL AND GREASE SPOTS. REPAINT OR TOUCH UP AS REQUIRED TO LOOK LIKE NEW. DURING PROGRESS OF WORK, CONTRACTOR IS TO CAREFULLY CLEAN AND LEAVE PREMISES FREE FROM DEBRIS AND IN A SAFE CONDITION.
- 3.10 START-UP AND OPERATIONAL TEST: START EACH ITEM OF EQUIPMENT IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS; OR WHERE NOTED UNDER EQUIPMENT SPECIFICATION, START-UP SHALL BE DONE BY A QUALIFIED REPRESENTATIVE OF THE MANUFACTURER. ALIGNMENT, LUBRICATION, SAFETY, AND OPERATING CONTROL SHALL BE INCLUDED IN START-UP CHECK.
- 3.11 RECORD DRAWINGS:
- 3.11.1 PRIOR TO REQUESTING ANY PAYMENT DURING THE PROGRESS OF THE WORK THE CONTRACTOR SHALL RECORD ON THEIR FIELD SET OF DRAWINGS THE CORRECTIONS, VARIATIONS, AND DEVIATIONS FOR SYSTEMS WHICH ARE NOT INSTALLED EXACTLY AS SHOWN ON THE CONTRACT DRAWINGS.
- 3.11.2 UPON COMPLETION OF THE WORK, RECORD DRAWINGS SHALL BE PREPARED AS DESCRIBED IN THE GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, AND DIVISION 1 SECTIONS.
- 3.12 ACCEPTANCE:
- 3.12.1 REQUEST INSPECTIONS AS REQUIRED UNDER THE SUPPLEMENTARY OR GENERAL CONDITIONS. CONCEAL NO WORK UNTIL INSPECTED.
- 3.12.2 PUNCH LIST: SUBMIT WRITTEN CONFIRMATION THAT ALL PUNCH LISTS HAVE BEEN CHECKED AND THE REQUIRED WORK COMPLETED.
- 3.12.3 INSTRUCTIONS: AT COMPLETION OF THE WORK, PROVIDE A COMPETENT AND EXPERIENCED PERSON WHO IS THOROUGHLY FAMILIAR WITH THE PROJECT, FOR A PERIOD DEEMED NECESSARY BY THE OWNER TO INSTRUCT PERMANENT OPERATING PERSONNEL IN THE OPERATION OF EQUIPMENT AND CONTROL SYSTEMS.
- 3.12.4 OPERATION AND MAINTENANCE MANUALS: FURNISH TWO COMPLETE MANUALS BOUND IN RING BINDERS AND ORGANIZED BY SYSTEM OR SECTION. MANUALS SHALL CONTAIN:
1. DETAILED OPERATING INSTRUCTIONS AND INSTRUCTIONS FOR MAKING MINOR ADJUSTMENTS.
 2. COMPLETE WIRING AND CONTROL DIAGRAMS.
 3. ROUTINE MAINTENANCE OPERATIONS.
 4. MANUFACTURER'S CATALOG DATA, SERVICE INSTRUCTIONS, AND PARTS LISTS FOR EACH PIECE OF OPERATING EQUIPMENT.
- 3.12.5 CONTROL DIAGRAMS: FRAME UNDER GLASS AND MOUNT ON EQUIPMENT ROOM WALL.
- 3.12.6 TEST TOGETHER AND SEPARATELY TO DETERMINE THAT:

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1. SYSTEM IS FREE FROM SHORT CIRCUITS AND OTHER FAULTS.
2. MOTOR STARTER OVERLOAD DEVICES ARE SIZED CORRECTLY.
3. MOTORS ROTATE CORRECTLY.
4. ALL EQUIPMENT OPERATES CORRECTLY AND AS SPECIFIED.

3.12.7 WARRANTIES: SUBMIT COPIES OF ALL MANUFACTURER'S WARRANTIES.

3.12.8 RECORD DRAWINGS: SUBMIT "RECORD DRAWINGS".

3.12.9 EQUIPMENT IDENTIFICATION:

INSTALL 1" X 2 1/2" ENGRAVED PHENOLIC BLACK OVER WHITE IDENTIFICATION NAMEPLATES ON CONTROLS, PANELS, SWITCHES, STARTERS, TIMERS, DISCONNECTS AND SIMILAR OPERABLE EQUIPMENT. DYMO TYPE LABELS ARE NOT ACCEPTABLE.

TAGS SHALL IDENTIFY PANEL NUMBER, TRANSFORMER NUMBER, EQUIPMENT ITEM BEING SERVED, ETC.

IDENTIFICATION SHALL CORRELATE WITH DRAWING NUMBERS

ATTACH TAGS TO VERTICAL SURFACES WITH NON FERROUS POP RIVETS

3.12.10 ACCEPTANCE WILL BE ON THE BASIS OF TESTS AND INSPECTIONS OF THE WORK. A REPRESENTATIVE OF THE FIRM WHICH PERFORMED THE TESTING SHALL BE IN ATTENDANCE TO ASSIST DURING INSPECTION. CONTRACTOR SHALL FURNISH NECESSARY ELECTRICIANS TO OPERATE SYSTEM, MAKE ANY NECESSARY ADJUSTMENTS AND ASSIST WITH FINAL INSPECTION.

END OF SECTION