

SECTION 16010 GENERAL CONDITIONS ELECTRICAL

THE CONTRACTOR SHALL BE GOVERNED BY THE PRESENT SPECIFICATIONS TOGETHER WITH THE CURRENT RECOMMENDATIONS AND REGULATIONS OF THE LOCAL AUTHORITIES HAVING JURISDICTION AND UL STANDARDS. OBTAIN ALL PERMITS AND INSPECTIONS REQUIRED FOR THE WORK AND PAY ALL FEES AND COSTS THEREOF. THE OWNER RESERVES THE RIGHT TO RELOCATE ANY EQUIPMENT UP TO 10 FEET IN ANY DIRECTION PRIOR TO ROUGH-IN.

WIRING FOR MECHANICAL EQUIPMENT:

- 1. ALL POWER WIRING FOR ITEMS FURNISHED UNDER DIVISION 15 SHALL BE FURNISHED AND INSTALLED UNDER THE OVERCURRENT PROTECTION AND INSTALLED UNDER THE OVERCURRENT PROTECTION AND INSTALLED BY DIVISION 16.
2. ALL DISCONNECT SWITCHES SHALL BE FURNISHED AND INSTALLED BY DIVISION 16.
3. TOGGLE SWITCHES FOR 1/2 HP MOTORS AND LESS SHALL BE FURNISHED AND INSTALLED BY DIVISION 16.
4. WIRING AND CONDUIT FOR SOLENOID VALVES, AND CONTROL TRANSFORMERS INCLUDING THE TRANSFORMERS SHALL BE FURNISHED AND INSTALLED BY DIVISION 15.
5. DIVISION 16 SHALL INSTALL ALL STARTERS, TOGGLE SWITCHES, DISCONNECTS, AND ALL WIRING TO THE RESPECTIVE MOTOR OR DEVICE. WIRING AND CONDUIT FROM STARTER TO A CONTROLLER SHALL BE BY DIVISION 15.
6. DEFINITIONS:
A. POWER WIRING: LINE VOLTAGE CIRCUITRY ROUGH-IN INCLUDING CONDUIT, BOXES, CONDUCTORS, ETC. BETWEEN THE OVERCURRENT PROTECTION AND THE EQUIPMENT INCLUDING THE CONNECTION OF THE STARTERS BY DIVISION 16.
B. CONTROL WIRING: ANY VOLTAGE CIRCUITRY ROUGH-IN INCLUDING CONDUIT, BOXES, CONDUCTORS, ETC. BETWEEN CONTROL ACTIVATOR AND THE CONTROLLER OR STARTER BY DIVISION 15.
7. CONDUIT: ALL POWER WIRING AND 120V CONTROL WIRING SHALL BE IN CONDUIT.
8. SMOKE DETECTORS AND FIRESTATS:
A. SMOKE DETECTORS SHALL BE FURNISHED BY DIVISION 16. UPON ACTIVATION OF THE FIRE ALARM SYSTEM THE FIRE ALARM CONTROL PANEL SHALL SEND A SIGNAL TO THE HVAC UNIT CONTROLS TO CAUSE IMMEDIATE SHUTDOWN. FURNISH ALL REQUIRED FIRE ALARM CONTROL MODULES, COORDINATE HVAC UNIT SHUTDOWN WITH MECHANICAL CONTRACTOR. WIRING FROM THE DETECTOR TO FIRE ALARM SYSTEM SHALL BE FURNISHED BY DIVISION 16.
B. ALL FIRESTATS SHALL BE FURNISHED, INSTALLED, AND WREDED BY DIVISION 15.

CONNECT ALL MOTORS WITH SHORT LENGTH OF LIQUIDTIGHT FLEXIBLE METAL CONDUIT. USE PROPER TYPE CONNECTOR WITH THIS TYPE CONDUIT.

FURNISH SIX (6) COPIES OF SHOP DRAWINGS FOR ALL PRINCIPAL DEVICES AND PIECES OF EQUIPMENT FOR REVIEW BY THE ENGINEER, OWNER AND ARCHITECT.

- 1. PANELBOARDS.
2. SURGE SUPPRESSION DEVICES.
3. LIGHTING FIXTURES.
4. WIRING DEVICES AND PLATES.
5. FIRE ALARM SYSTEM.
6. DISCONNECT SWITCHES.

SITE VISIT: BEFORE SUBMITTING BID, CONTRACTOR SHALL VISIT THE JOB SITE FOR THE PURPOSE OF EXAMINING THE SITE AND CONDITIONS UNDER WHICH THE WORK MUST BE PERFORMED. NO EXTRA CHARGES WILL BE ALLOWED FOR SITUATIONS ARISING FROM FAILURE OF CONTRACTOR TO THOROUGHLY FAMILIARIZE HIMSELF WITH SITE AND EXISTING BUILDING CONDITIONS, INCLUDING CHARGES AND REQUIREMENTS TO UTILITIES AS SHOWN FOR THE PROJECT. CONTRACTOR SHALL VERIFY THAT CONNECTIONS TO EXISTING EQUIPMENT ARE AS INDICATED ON DRAWINGS AND SPECIFICATIONS. ANY DEVIATIONS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. ANY DEVIATIONS SHALL BE REPORTED PRIOR TO BIDDING.

SECTION 16020 POWER SERVICE AND GROUNDING

ELECTRICAL POWER SERVICE SHALL BE ARRANGED WITH THE LOCAL ELECTRIC POWER DISTRIBUTOR. BID PRICE SHALL INCLUDE ALL CHARGES BY THE POWER COMPANY FOR INSTALLATION OF SERVICES TO THE BUILDING.

PROVIDE GROUNDING IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND AS SHOWN ON THE DRAWINGS.

THE POWER SERVICE SHALL BE 120/208 VOLTS, 3 PHASE, 4 WIRE, WYE. PROVIDE METERING AS REQUIRED BY THE POWER COMPANY.

GROUNDING ELECTRODE CONDUCTORS SHALL BE COPPER AND OF THE SAME SIZE CONDUCTOR USED TO INTERCONNECT THE GROUND RODS, AND TO THE WATER PIPING SYSTEM AS REQUIRED BY NEC ARTICLE 250.

GROUND RODS SHALL BE 3/4" DIAMETER BY 10 FEET LONG AND OF COPPERCLAD CONSTRUCTION. UNLESS OTHERWISE CALLED FOR, ALL GROUNDING AND GROUND ROD CONNECTIONS SHALL BE BY BURNDY HYDRONUD PROCESS.

CONFIRM WITH THE POWER COMPANY THE POWER SERVICE ARRANGEMENTS. INCLUDE IN THE BID PRICE ALL COSTS RELATIVE TO THE POWER SERVICE WITH THE TYPE OF SERVICE PLANNED.

SERVICE ENTRANCE GROUNDING SHALL BE MADE BY GROUND RODS DRIVEN VERTICALLY INTO THE GROUND WHERE THE TOP OF THE ROD IS APPROXIMATELY 12" BELOW GRADE. THERE SHALL BE 3 DRIVEN GROUND RODS WITH THE RODS SPACED A MINIMUM OF 20 FEET APART IN A TRIANGULAR FORM AND INTERCONNECTED. FROM THE RODS THERE SHALL BE A GROUNDING ELECTRODE CONDUCTOR EXTENDED TO THE MAIN SERVICE ENTRANCE AND CONNECT AS DIRECTED BY THE CODE. EXTEND THE GROUNDING ELECTRODE CONDUCTOR TO THE NEAREST AVAILABLE METAL COLD WATER PIPE OF SIZE NOT LESS THAN 1" AND THE BUILDING STEEL AND MAKE CONNECTION THERE TO.

PAD MOUNT TRANSFORMERS SHALL HAVE GROUND RODS PLACED AS DIRECTED BY THE UTILITY COMPANY. EXTEND GROUNDING CONDUIT INTO THE TRANSFORMER ENCLOSURE FOR THE TERMINATION TO THE NEUTRAL CONDUCTOR AND TO THE SERVICE ENTRANCE TRIAD. GROUNDING CONDUCTORS SHALL BE OF THE SAME SIZE AS THE GROUNDING ELECTRODE CONDUCTOR.

FURNISH AND INSTALL A GROUNDING JUMPER ON ALL WATER METER OR UNDER IN THE COLD WATER PIPING.

MINIMUM SIZE GROUNDING ELECTRODE CONDUCTOR SHALL BE A.W.G. NO. 2 FOR SERVICES LESS THAN 400 AMPERE; NO. 2/0 FOR SERVICES 400 TO 500 AMPERE AND NO. 4/0 FOR SERVICES 1000 AMPERE AND GREATER.

ALL GROUNDING ELECTRODE CONDUCTORS SHALL BE STRANDED BARE COPPER BURIED A MINIMUM OF 30" BELOW FINISHED GRADE.

SECTION 16030 BASIC MATERIALS

CONDUCTORS THE MINIMUM SIZE CONDUCTOR FOR ALL SERVICES AND METERING SHALL BE NO. 12 AWG. SOLID FOR SIZES NO. 14 AWG AND SMALLER. STRANDED FOR NO. 8 AWG AND LARGER.

CONDUCTORS SHALL BE 98% CONDUCTIVITY COPPER AND MEET OR EXCEED UL STANDARDS. FEEDER SPECIFICATION IS C-30A AND NATIONAL ELECTRICAL CODE.

CONDUCTORS NO. 8 AWG AND SMALLER SHALL BE INSULATED WITH TYPE THHN/THWN. ALL OTHER INSULATION: ALL CONDUCTORS LARGER THAN NO. 8 AWG SHALL BE TYPE THWN/THHN DUAL RATED OR "THW" INSULATION. CURRENT CARRYING CAPACITY OF ALL CONDUCTORS IS TO BE BASED ON 60° C FOR THHN AND LESS ALL OTHERS SHALL BE BASED ON 75° C, REGARDLESS OF THE CONDUCTOR INSULATION TYPE.

ALL CONDUITS SHALL CONTAIN A CODE SIZED EQUIPMENT GROUNDING CONDUCTOR WHICH MAY NOT BE ILLUSTRATED ON THE PLANS.

NO LUBRICANT OTHER THAN POWDERED SOAPSTONE OR APPROVED PULLING COMPOUND MAY BE USED TO PULL CONDUCTORS.

CONDUCTORS SHALL NOT BE NICKED DURING INSULATION REMOVAL OR BENT AT SHARP ANGLES DURING DEVICE INSTALLATION OR PANELBOARD MAKE-UP.

CONDUCTORS NO. 8 AWG AND SMALLER FOR LIGHTING AND POWER BRANCH CIRCUITS SHALL BE SPLICED WITH SPRING TYPE WIRE CONNECTORS. THE CONNECTOR SHALL BE A UL LISTED PRESSURE-TYPE CONNECTOR RATED AT 800V AND 105° C. IN-LINE SPLICING OF NO. 8 AWG AND LARGER CONDUCTORS SHALL BE WITH COMPRESSION TYPE SLEEVES. WHERE CONDUCTORS ARE TAPPED OFF FEEDER CONDUCTORS NO. 6 AWG AND LARGER THE CONNECTION SHALL BE MADE AT POWER DISTRIBUTION BLOCKS SECURELY MOUNTED IN AN ENCLOSURE. THE POWER DISTRIBUTION BLOCK SHALL BE RATED AT 600V, 75° C AND UL RECOGNIZED. THE POWER DISTRIBUTION BLOCK SHALL BE GOLD-SHANNUT, ILSCO OR APPROVED SUBSTITUTE.

WHERE GROUNDING CONDUCTORS ARE TERMINATED IN JUNCTION OR OUTLET BOXES AN APPROVED GROUNDING SCREW OR CLIP SHALL BE USED. COVER SCREW IS NOT AN ACCEPTABLE MEANS OF TERMINATION. SURFACES SHALL BE FREE OF PAINT, RUST, AND GREASE OR OTHER FOREIGN MATERIAL.

CONDUCTORS SHALL BE INSTALLED IN ACCORDANCE WITH NEC ARTICLE 310.

CONDUIT

USE GALVANIZED RIGID STEEL CONDUIT OR INTERMEDIATE METAL CONDUIT UNDERGROUND, IN CONCRETE, OR WHERE MECHANICAL STRENGTH OR EXPOSURE TO PHYSICAL DAMAGE IS REQUIRED. SCHEDULE 40 RIGID NONMETALLIC CONDUIT MAY ALSO BE USED UNDERGROUND OR IN CONCRETE. ELECTRICAL METALLIC TUBING SHALL BE USED ELSEWHERE, UNLESS NOTED OTHERWISE. ALL CONDUCTORS SHALL BE INSTALLED IN CONDUIT.

CONDUIT SHALL MEET: GALVANIZED RIGID STEEL - UL 6 AND ANSI C80.1; "IMC" - UL 1242 AND ANSI C80.5; "EMT" - UL 797 AND ANSI C80.3; "RMC" - UL 651 POLYVINYL CHLORIDE.

POWER, TELEPHONE, AND OTHER UNDERGROUND SERVICE ENTRANCE CONDUITS AND PANELBOARD FEEDER CONDUITS WHERE UNDERGROUND OR CONCRETE ENCASED MAY BE SCHEDULE 40 PVC, TRANSITION TO (SCHEDULE 80 PVC) BEFORE EMERGING ABOVE GRADE OR SLAB WHERE EXPOSED TO PHYSICAL DAMAGE. CHECK LOCAL CODES AND UTILITY REQUIREMENTS. PVC CONDUIT SHALL MEET FEDERAL SPECIFICATIONS WC-1094A, NEMA TC2 AND UL 651.

EACH LENGTH OF CONDUIT SHALL BE STAMPED WITH NAME AND TRADE MARK OF MANUFACTURER AND APPROVAL OF NATIONAL BOARD OF FIRE UNDERWRITERS.

PROTECT THREADS OF GALVANIZED RIGID STEEL CONDUIT AND IMC DURING STORAGE.

STACK CONDUIT ON BLOCKING OFF GROUND TO PREVENT THE ENTRY OF FOREIGN MATERIAL.

TAKE EVERY PRECAUTION TO PREVENT ENTRY OF WATER AND FOREIGN MATTER IN CONDUIT DURING CONSTRUCTION. INSTALL FACTORY CONDUIT CAPS ON STUB-UPS DURING CONSTRUCTION. SWAB TRAPPED RUNS PRIOR TO PULLING CONDUCTORS.

GALVANIZED RIGID STEEL CONDUIT OR "IMC" SHALL BE TERMINATED IN THREADED HUBS OR WITH DOUBLE LOCKNUTS (BONDNUIT TYPE) DRAWN TIGHT AND CONDUIT BUSHING.

FIELD CUT CONDUIT SHALL BE CUT SQUARE, REAMED SMOOTH AND THREADED PROPERLY AND FULL. PAINT FIELD CUT MALE THREADS WITH CONDUCTIVE AND RUST PREVENTIVE COMPOUND. CUTTING OIL AND DEBRIS SHALL BE REMOVED PRIOR TO INSTALLATION.

PVC CONDUIT SHALL BE TERMINATED WITH APPROVED CONNECTORS AND FITTINGS. PVC CONDUIT SHALL BE HEATED AND BENT WITH MANUFACTURER APPROVED EQUIPMENT AND METHODS. OPEN FLAME OR TORCH IS NOT AN ACCEPTABLE MEANS OF HEATING. FIELD CUTS SHALL BE SQUARE AND REAMED SMOOTH.

"EMT" CONDUIT SHALL BE TERMINATED WITH STEEL SET-SCREW TYPE COUPLINGS, CONNECTORS AND FITTINGS. FIELD-CUT CONDUIT SHALL BE SQUARE AND REAMED SMOOTH. ALL CONDUIT 1-1/4" AND LARGER SHALL HAVE INSULATED GROUNDING BUSHINGS INSTALLED.

CONDUIT SHALL BE INSTALLED AND SUPPORTED PER NATIONAL ELECTRICAL CODE ARTICLE 342 (INTERMEDIATE METAL CONDUIT), ARTICLE 344 (RIGID METAL CONDUIT), ARTICLE 352 (RIGID POLYVINYL CHLORIDE CONDUIT), ARTICLE 358 (ELECTRICAL METALLIC TUBING) AND ARTICLE 110 (REQUIREMENTS FOR ELECTRICAL INSTALLATIONS).

WHERE EXPOSED:
1. ORGANIZE THE RUNS INTO GROUPS AND COORDINATE WITH OTHER TRADES TO AVOID INTERFERENCE.
2. ARRANGEMENT SHALL BE NEAT AND ORDERLY WITH RUNS PARALLEL TO STRUCTURAL ELEMENTS. NO DIAGONAL RUNS WILL BE ALLOWED.
3. SUPPORTS SHALL BE "UNISTRUT" WITH SUITABLE CLAMPS THE UNISTRUT SHALL BE SUPPORTED FROM BUILDING STRUCTURES. PAINT CUT ENDS OF UNISTRUT WITH RUST PROHIBITOR.

PRIMARY CONDUITS SHALL BE LOCATED A MINIMUM OF 42" BELOW FINISHED GRADE. LOCATE A MARKER TAPE 12" BELOW GRADE DIRECTLY ABOVE THE PRIMARY CONDUIT.

SECONDARY CONDUITS FROM THE TRANSFORMER TO THE SERVICE ENTRANCE SHALL BE A MINIMUM OF 24" BELOW GRADE.

ALL CONDUITS ARE TO CONTAIN A CODE SIZED EQUIPMENT GROUNDING CONDUCTOR WHICH MAY NOT BE ILLUSTRATED.

ALL CONDUIT SHALL BE IDENTIFIED BY A COLOR CODED BAND EVERY 10 FEET. BAND SHALL BE PAINTED OR COLOR CODE TAPE (DO NOT USE FITTINGS IN PAINT).

- 1. 120/208 VOLT NONE
2. TELEPHONE GREEN
3. FIRE ALARM RED
4. COMPUTER YELLOW

ALL JUNCTION BOXES SHALL BE PAINTED CORRESPONDING TO ABOVE COLOR CODES. CIRCUIT NUMBER SHALL BE CONTAINED IN A LOCATION SHALL BE MARKED ON INSIDE AND OUTSIDE OF JUNCTION BOX COVER WITH PERMANENT MARKING.

METAL CLAD TABLE

METAL-CLAD SHALL NOT BE UTILIZED OR PERMITTED, WHERE FLEXIBLE WIRING METHOD IS REQUIRED. PROVIDE FLEXIBLE CONDUIT WITH INDIVIDUAL CONDUCTORS.

WIRE BOXES

FLUSH SURFACE RECEPTACLE BOXES: IN STUD AND PLASTERED MASONRY USE MINIMUM BOX SIZE OF 4" SQUARE X 1-1/2" DEEP WITH DEVICE EXTENSION RING AS REQUIRED. WHERE SET WITH WALL, IN EXPOSED MASONRY AND CONCRETE WALLS USE RACEWAY OR 2-1/2" DEEP "MASONRY" TYPE BOXES.

PROPERLY SECURE AND ATTACH ALL BOXES DIRECTLY TO THE BUILDING CONSTRUCTION, SUPPORT BY CONDUIT IS NOT ACCEPTABLE.

ALL BOXES INSTALLED ON OPPOSITE SIDES OF ONE-HOUR AND TWO-HOUR WALLS MUST BE SEPARATED BY A HORIZONTAL DISTANCE OF 24 INCHES.

BOXES INSTALLED ON OPPOSITE SIDES OF A NON-RATED WALL SHALL NOT BE INSTALLED BACK TO BACK.

WIRING DEVICES

ALL DEVICES SHALL BE SPECIFICATION GRADE.

- LIGHT SWITCH, SPECIFICATION GRADE, 20A.
SINGLE POLE, HUBBELL NO. 1221.
3-WAY, HUBBELL NO. 1223.
4-WAY, HUBBELL NO. 1224.
PILOT LIGHT, HUBBELL NO. HBL1221PL.

- RECEPTACLES, SPECIFICATION GRADE, 20A.
DUPLEX, HUBBELL NO. 5362
TAMPER RESISTANT DUPLEX, HUBBELL NO. 5362TR
GROUND FAULT DUPLEX, HUBBELL NO. GFRST20
GROUND FAULT DUPLEX, WEATHER RESISTANT, HUBBELL NO. GFRST20G
GROUND FAULT DUPLEX, TAMPER RESISTANT, HUBBELL NO. GFRST20G
TVSS DUPLEX, HUBBELL NO. HBL5362SA
ISOLATED GROUND TVSS DUPLEX, HUBBELL NO. IG5362SA
ISOLATED GROUND DUPLEX, HUBBELL NO. IG5352

- 20A, 250V 3 WIRE RECEPTACLE, HUBBELL NO. HBL5461
30A, 250V 4 WIRE DRYER RECEPTACLE, HUBBELL NO. HBL9430A
30A, 250V 4 WIRE RANGE RECEPTACLE, HUBBELL NO. HBL9450A

SPECIAL COLORS MAY BE REQUIRED BY THE OWNER'S REPRESENTATIVE. THE CONTRACTOR SHALL VERIFY DEVICE AND TRIMPLATE COLOR WITH THE ARCHITECT.

FOR FLUSH MOUNTED DEVICES IN DRY LOCATIONS, THERMOPLASTIC (NYLON) COVERPLATES SHALL BE USED EXCEPT WHERE SPECIFICALLY REQUESTED BY THE ARCHITECT OR NOTED ON THE DRAWINGS TO BE METAL. FOR SURFACE MOUNTED DEVICES IN DRY LOCATIONS, GALVANIZED STEEL COVERPLATES SHALL BE USED.

WHERE "WP" IS INDICATED ON DRAWINGS, DEVICE SHALL BE LISTED AND LABELED AS WEATHER RESISTANT (OR WR). COVERPLATE SHALL POWDERCOATED METAL WEATHER-PROOF IN-USE HOOD TYPE AND SHALL BE LISTED TO UL 5140 EXTRA-DUTY THERMOPLASTIC HOODS ARE NOT ACCEPTABLE. THOMAS & BETTS "RED DOT" SERIES CK OR EQUAL. FOR SURFACE MOUNTED DEVICES IN DAMP OR WET LOCATIONS, JUNCTION BOX SHALL BE DIE CAST ALUMINUM TYPE "FD".

POWER EQUIPMENT

PANELBOARDS

BRANCH CIRCUIT PANELBOARDS SHALL BE OF THE CIRCUIT BREAKER, DEAD-FRONT SAFETY TYPE, DOUBLE-HINGED DOOR-IN-DOOR CONSTRUCTION, EQUAL TO CUTLER-HAMMER WITH BOLT-ON DEVICES, WITH CONTENTS AS INDICATED ON PANEL SCHEDULE. SHALL BEAR LISTING DEVICE LABEL OF UL, AND SHALL MEET ALL APPLICABLE REQUIREMENTS OF NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION.

BALANCE ALL CIRCUITS IN A PANEL TO ACHIEVE NOT MORE THAN 10 PERCENT UNBALANCED NEUTRAL CURRENT IN PANEL FEEDER.

PROVIDE TYPED DIRECTORY CARDS UNDER PLASTIC ON DOORS.

MINIMUM SHORT CIRCUIT INTERRUPTING CAPACITY SHALL BE AS INDICATED ON PANEL SCHEDULES. ALL PANELS SHALL BE FULLY RATED. SERIES RATINGS SHALL NOT BE APPLIED OR UTILIZED.

EACH UNGROUNDED SYSTEM CONDUCTOR SHALL BE IDENTIFIED BY PHASE AND SYSTEM, AND PERMANENTLY POSTED AT EACH BRANCH-CIRCUIT PANELBOARD. CONDUCTORS SHALL BE MARKED AT ALL LOCATIONS WHERE ACCESSIBLE. REFER TO NEC-210.4(D).

SECURE SURFACE MOUNTED PANELBOARDS TO WALL USING 1/4" TOGGLE BOLTS, BOLTED TO MASONRY WALL WHERE HOLLOW BLOCK WALLS DO NOT OCCUR. SUITABLE EXPANSION SHIELDS AND ANCHOR BOLTS SHALL BE UTILIZED.

PRIOR TO PROJECT COMPLETION, PROVIDE A NEW TYPED DIRECTORY CARD UNDER PLASTIC AFFIXED TO THE INTERIOR OF EACH PANELBOARD DOOR FOR IDENTIFICATION OF THE PANELBOARD AND ALL CIRCUITS CONTAINED WITHIN. THIS NEW TYPED DIRECTORY SHALL AT A MINIMUM PROVIDE THE FOLLOWING INFORMATION:

- 1. PANELBOARD IDENTIFICATION MARK NUMBER.
2. PANELBOARD VOLTAGE AND PHASE.
3. PANELBOARD AMPERAGE.
4. INSTALLING CONTRACTOR'S COMPANY NAME, SERVICE DEPARTMENT CONTACT INFORMATION, AND THE CONTRACTOR'S PROJECT IDENTIFYING NUMBER

5. CIRCUIT BREAKERS: FOR EACH CIRCUIT BREAKER, PROVIDE THE FOLLOWING INFORMATION: BREAKER AMPERAGE AND NUMBER OF POLES. IDENTIFY EQUIPMENT SERVED.

FOR LIGHTING AND RECEPTACLE CIRCUITS, IDENTIFY ROOM OR ROOMS (BY ROOM NAME, OR ROOM NUMBER AS DESIGNATED ON THE PROJECT DRAWINGS) SERVED BY INDIVIDUAL CIRCUITS.

FOR EQUIPMENT SERVED BY CIRCUIT BREAKERS, PROVIDE DRAWING MARK NUMBER OF THE EQUIPMENT SERVED.

SAFETY SWITCHES

SWITCHES SHALL BE HEAVY-DUTY, HORSEPOWER RATED, QUICK-MAKE, QUICK-BREAK FUSED WITH ARC SHIELDS WITH ENCLOSED CONSTRUCTION.

ALL SAFETY SWITCHES SHALL BE MECHANICALLY INTERLOCKED TO PREVENT OPENING WHILE ENERGIZED. SCREWS FROM DOOR TO CAN ARE NOT ACCEPTABLE.

LIGHTING

LIGHTING FIXTURES

BALLAST: FLUORESCENT BALLAST SHALL BE CLASS "P" BEARING THE ETL AND CBM LABELS. HIGH INTENSITY DISCHARGE BALLASTS SHALL BE CONSTANT WATTAGE HIGH POWER FACTOR. ALL OUTLET BALLASTS SHALL BE RATED FOR THE WATTAGE OF THE LAMP(S) SERVED.

LIGHTING FIXTURES: SPECIFIED LIGHTING QUALITY, CONSTRUCTION AND PERFORMANCE REQUIRED. ALTERNATES SHALL BE ACCEPTED UPON REVIEW OF COMPLETE AND ADEQUATE INFORMATION TO ALLOW EVALUATION AND DETERMINATION REGARDING APPROVAL.

CONNECT RECEPTACLE FIXTURES USING "GREEN" WIRE AND #12 AWG WIRE. FACTORY ACCEPTABLE FIXTURES OR FIXTURES OF A DIFFERENT MAKE AND CONDUCTOR ARE ACCEPTABLE. CONTRACTOR INSTALLED WHIPS SHALL BE #12 AWG. DIRECT CONNECTION OF CONDUIT TO FIXTURE IS NOT ACCEPTABLE. INSTALL A #12 AWG GREEN INSULATED GROUNDING CONDUCTOR TO EACH RECEPTACLE FIELD FOR GROUNDING CONDUIT. MECHANICALLY CONNECT GROUNDING CONDUCTOR IN A PERMANENT AND PROTECTIVE MANNER. CONDUIT SYSTEM SHALL BE ELECTRICALLY CONTINUED.

THE MOUNTING OF LIGHTING FIXTURES SHALL BE CAREFULLY AND SECURELY MADE. ATTACHMENT SHALL BE MADE TO THE BUILDING STRUCTURAL SYSTEM.

LAY-IN FIXTURES SHALL BE SUPPORTED IN THE CEILING T FRAMING SYSTEM. FIXTURE SUPPORT SHALL MEET THE INTENT OF NEC 410.16 (C) AND OTHER BUILDING CODES. CONTRACTOR SHALL COORDINATE WITH CEILING INSTALLATION MADE SO AS TO PROVIDE REQUIRED SUPPORT. IF THE CEILING SUSPENSION SYSTEM DOES NOT MEET THE NEC OR OTHER BUILDING CODES, REQUIREMENTS FOR SUPPORTING FIXTURES IT WILL BE THE RESPONSIBILITY OF THIS (ELECTRICAL) CONTRACTOR TO SUPPLY HANGER WIRE SUPPORT EQUAL TO THE CEILING SUSPENSION SUPPORT WIRE AT EACH CORNER OF THE FIXTURE.

FIXTURES WHICH ARE SURFACE MOUNTED SHALL BE ATTACHED TO THE CEILING TRUSS, EITHER BY BRACING THE FRAMING AND THE USE OF THREADED BOLTS, OR BY SUITABLE CLAMPS ATTACHED TO THE FRAME. ATTACHMENT TO STEEL FRAMING SHALL BE BOLTED CONNECTORS MANUFACTURED ESPECIALLY FOR THE PURPOSE. EXPANSION ANCHORS MAY BE USED PROVIDED THEY HAVE A METAL SHEATH. PLASTIC SHEATH EXPANSION ANCHORS OR SIMILAR DEVICES ARE NOT ACCEPTABLE.

LAMPS AS MANUFACTURED BY SYLVANIA, PHILIPS, GENERAL ELECTRIC OR ENGINEER APPROVED SUBSTITUTE.

LIGHTING FIXTURES AS SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE, OR ENGINEER APPROVED SUBSTITUTE. FIXTURE NUMBERS GIVEN INDICATE MINIMUM STANDARDS FOR FIXTURE PHYSICAL DEPTH, DIAMETER AND CONSTRUCTION MATERIALS, EVEN WHEN SUCH DETAILS ARE NOT SPECIFICALLY MENTIONED IN THE LIGHTING FIXTURE SCHEDULE. FIXTURES WHICH DO NOT MEET THESE MINIMUM REQUIREMENTS WILL BE REJECTED.

POINT BY POINT COMPUTER PHOTOMETRIC AND LIGHTING POWER DENSITY CALCULATION PRINTOUTS ARE REQUIRED AS NOTED ON THE DRAWINGS. DRAWING MATERIALS WILL NOT BE APPROVED WITHOUT THE REQUIRED CALCULATIONS.

EXIT SIGNS

INSTALLATIONS FOR CEILING UNITS IN LAY-IN THE AREAS SHALL BE INDEPENDENT OF THE TILE. ATTACH HANGERS TO T BAR CONCEALED AND PROPERLY SUPPORTED TO PREVENT SAGGING OF THE CEILING SYSTEM.

FLUORESCENT LIGHT EMERGENCY BATTERY PACK

EMERGENCY LIGHTING SHALL BE PROVIDED BY THE INSTALLATION OF BATTERY UNITS LOCATED IN CERTAIN FLUORESCENT FIXTURES. THE BATTERY PACK WILL SERVE TWO LAMPS, AND BE WIRED SUCH THAT FAILURE OF ONE LAMP WILL NOT PLACE THE ENTIRE FIXTURE IN COMPLETE DARKNESS. WHERE SPECIFICALLY INDICATED SPECIAL WIRING CONNECTION IS REQUIRED IN ORDER TO ALLOW THE LIGHTING FIXTURE TO BE SWITCHED OFF AS THE ROOM NEEDS REQUIRE, BUT ALSO COME ON AUTOMATICALLY WHEN NORMAL POWER IS INTERRUPTED.

BATTERY UNITS SHALL HAVE A NICKEL CADMIUM BATTERY WHICH WILL SUPPLY 90 MINUTES OF 1100 TO 1400 LUMENS OF ILLUMINATION. THE UNIT SHALL BE SINGLE POLE BOJINE NO. B50 OR APPROVED SUBSTITUTE.

THE BATTERY PACK SHALL HAVE A SEPARATE FULLTIME ENERGIZED LINE BROUGHT TO IT SO THE UNIT MONITORS POWER AVAILABLE AT THE PANELBOARD. THIS SHALL BE IN ADDITION TO THE SWITCH LINE. SO LONG AS THE MONITOR LINE TO THE PANELBOARD IS ENERGIZED, THE BATTERY UNIT WILL NOT OPERATE. THE MONITOR LINE SHALL BE OF THE SAME POWER PHASE AS THE SWITCH LINE.

EXTERIOR LIGHT CONTROL

THE CONTACTORS SHALL BE MULTIPLE POLE, RATED 25 AMPERES, THEY SHALL BE MAGNETICALLY HELD. USE MECHANICALLY HELD, WHERE SPECIFICALLY CALLED FOR.

PHOTOCELL SHALL BE AS MANUFACTURED BY THE TORK COMPANY. IT SHALL BE CATALOG NO. 2101 FOR 120 VOLTS AND 2104 FOR 208 AND 277 VOLTS AND BE RATED SINGLE POLE, SINGLE THROW, 2000 WATTS.

THE TIME SWITCH SHALL BE AS MANUFACTURED BY THE TORK COMPANY. IT SHALL BE CATALOG NO. 7200L FOR 120 VOLTS AND 7202L FOR 208 AND 277 VOLTS AND BE RATED DOUBLE POLE, SINGLE THROW, 40 AMPERES WITH RESERVE POWER.

COMMUNICATIONS

COMMUNICATIONS ROUGH-IN

PROVIDE TELEPHONE, INTERCOM, SOUND AND TELEVISION RACEWAY, OUTLET BOXES, TERMINAL CABINETS, TERMINAL SPACES, ETC. AS CALLED FOR ON THE DRAWINGS AND SPECIFIED HEREINAFTER. THE RACEWAY SYSTEM SHALL BE ARRANGED TO ACCOMMODATE THE INSTALLATION OF CABLE AND EQUIPMENT BY OTHERS IN THE FUTURE.

VERIFY THE SERVICE ARRANGEMENT AND POINT OF SERVICE ENTRANCE WITH THE INSTALLING COMPANY. COORDINATE ALL ROUGH-IN WORK WITH THE INSTALLING COMPANY.

THE CONDUIT AND BOXES SHALL BE AS CALLED FOR UNDER THE BASIC MATERIALS SECTION OF THESE SPECIFICATIONS.

"TERMINAL SPACE" SHALL CONSIST OF PLYWOOD ATTACHED TO A WALL FOR THE USE AND MOUNTING OF CABLE AND TERMINAL EQUIPMENT. THE PLYWOOD SHALL BE 3/4" THICKNESS, WITH THE TOP OF THE PLYWOOD 6 FEET ABOVE FLOOR. THE WIDTH SHALL BE AS SHOWN ON THE DRAWINGS, BUT NOT LESS THAN 24".

ALL EMPTY CONDUIT SHALL HAVE A NYLON PULL STRING INSTALLED AND TIED OFF AT EACH END.

TRANSIENT VOLTAGE SURGE PROTECTIVE DEVICE

A PANELBOARD LEVEL TRANSIENT VOLTAGE SURGE PROTECTIVE DEVICE (SPD) SHALL CONNECTED TO EACH PANELBOARD INDICATED ON THE ONE-LINE DIAGRAM. THE DEVICE SHALL BE UL LISTED AND COMPLY WITH UL 1449, THIRD EDITION.

WHERE THE ASSOCIATED PANELBOARD IS SURFACE MOUNTED INDOORS AND IS OF NEMA 1 CONSTRUCTION, THE SPD MAY BE SURFACE MOUNTED ADJACENT TO THE PANELBOARD OR INTEGRAL TO THE PANELBOARD, WHERE THE ASSOCIATED PANELBOARD IS RECESSED IN A WALL OR IS OF ANY OTHER TYPE THAN NEMA 1, THE SPD SHALL BE INTEGRAL TO THE PANELBOARD.

PROVIDE AN APPROPRIATE PANELBOARD CIRCUIT BREAKER FOR CONNECTION OF THE SPD TO THE PANEL PHASE BUSES. THE SPD SHALL NOT BE DIRECTLY CONNECTED TO THE PANEL BUS. VERIFY THE BREAKER AMP RATING WITH THE SPD MANUFACTURER. BREAKER SHALL BE MULTI-POLE, ONE POLE PER PHASE, WITH A COMMON TRIP HANDLE.

SUPPRESSOR RATINGS:

- SPD CONNECTED TO SERVICE ENTRANCE EQUIPMENT: TYPE 2 SPD
1. PEAK SURGE CURRENT:
A. 200KA FOR CONNECTED SERVICE EQUIPMENT RATED 1600A AND LARGER.
B. 120KA FOR CONNECTED SERVICE EQUIPMENT LESS THAN 1600A
2. SCORE: NOT LESS THAN 100KA.
3. I-NOMINAL: NOT LESS THAN 20KA.
4. PROTECTION MODES:
A. 208Y120V, 3-PHASE, 4-WIRE: 700V L-N; 1200V L-G; 1000V L-L
B. 120V L-L
C. 240-120V, 1-PHASE, 3-WIRE: 700V L-N; 700V L-G; 700V N-G; 1000V L-L

SPD CONNECTED TO NON-SERVICE ENTRANCE EQUIPMENT: TYPE 2 SPD
1. PEAK SURGE CURRENT: 100KA
2. SCORE: NOT LESS THAN 100KA.
3. I-NOMINAL: NOT LESS THAN 20KA.

- 4. PROTECTION MODES:
A. 208Y120V, 3-PHASE, 4-WIRE: 700V L-N; 700V L-G; 700V N-G; 700V L-L
B. 120V L-L
C. 240-120V, 1-PHASE, 3-WIRE: 700V L-N; 700V L-G; 700V N-G; 1200V L-L

WIRING BETWEEN THE SPD AND THE BREAKER SHALL BE AS SHORT AND STRAIGHT AS POSSIBLE. THE WIRE LEADS PROVIDED WITH THE SPD SHALL NOT BE SPLICED OR EXTENDED UNLESS SPECIFICALLY ALLOWED BY THE SPD INSTALLATION INSTRUCTIONS. ANY ALLOWED SPLICES OR EXTENSIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SHALL NOT EXCEED THE MANUFACTURER'S STATED MAXIMUM LEAD LENGTH.

DO NOT ENERGIZE THE SPD UNTIL THE ELECTRICAL POWER SYSTEM HAS BEEN FULLY TESTED, INSPECTED, ENERGIZED, AND STABILIZED. PERFORM NO CONDUCTOR INSULATION RESISTANCE TESTS WHILE THE SPD IS CONNECTED.

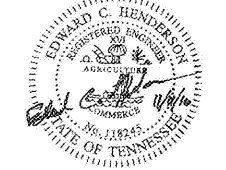
PROTECTIVE DEVICES SHALL BE WARRANTED FOR 10 YEARS FROM THE DATE OF SUBSTANTIAL COMPLETION.



BARRY BYRD ARCHITECTURE

P.O. Box 5482
Knoxville, TN 37928
(865) 687-6500

Seal:



THIS DRAWING IS THE PROPERTY OF BARRY BYRD ARCHITECTURE. ANY USE OR PRODUCTION IN PART OR IN WHOLE IS PROHIBITED WITHOUT THE EXPRESSED WRITTEN CONSENT OF BARRY BYRD ARCHITECTURE.

Project Name: GERMANTOWN2

Drawn By: MWE

Revisions:

Table with columns: No., DATE, DESCRIPTION

Project Title:

RETAIL SPACE

Poplar Avenue & Exeter Road

Location: Germantown, TN

Sheet Contents: Electrical Specifications

Date: November 11, 2016

Sheet Number: E-215

Order Plans @