SECTION 26 22 13 - LOW VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL
1.1 RELATED DOCUMENTS
A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.
1.2 SUMMARY
A. THIS SECTION INCLUDES THE FURNISHING AND INSTALLATION OF ALL TRANSFORMERS.
1.3 REFERENCES
A. EXCEPT AS HEREIN SPECIFIED, OR AS INDICATED ON THE DRAWINGS, THE WORK OF THIS SECTION SHALL COMPLY WITH THE FOLLOWING:
1. NEMA (NATIONAL ELECTRICAL MANUFACTURING ASSOCIATION) STANDARDS:
a. ANSI/NEMA ST20 - DRY-TYPE TRANSFORMERS FOR GENERAL APPLICATIONS.
b. ANSI/NEMA TP1 - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL DRY-TYPE TRANSFORMERS.
1.4 SYSTEM DESCRIPTION
A. GENERAL: TRANSFORMERS AS DEFINED FOR THIS SECTION INCLUDE ALL AIR-COOLED, DRY-TYPE EQUIPMENT:
1. 600 VOLT AND BELOW.
2. SINGLE-PHASE AND 3-PHASE.
B. DESIGN AND PERFORMANCE REQUIREMENTS:
1. SOUND LEVELS:
a. NOT TO EXCEED NEMA STANDARDS.
b. MANUFACTURER CERTIFIED FOR ALL UNITS FURNISHED.
1.5 SUBMITTALS
A. SHOP DRAWINGS: FOR TRANSFORMERS:
1. NAME OF MANUFACTURER.
2. MODEL NUMBER.
3. DETAILS OF CONSTRUCTION AND INSTALLATION.
4. ASSEMBLY DRAWINGS, INCLUDING ELEVATIONS, PLANS, SECTIONS, DIMENSIONS, WEIGHT, AND CONDUIT ENTRY LOCATIONS.
5. MOUNTING CONFIGURATION.
6. ELECTRICAL RATINGS:
a. KVA.
b. PRIMARY AND SECONDARY VOLTAGES.
c. IMPEDANCE.
d. TEMPERATURE RISE.
7. OPTIONS AND ACCESSORIES.
8. COLOR AND FINISH.
B. INSTALLATION INSTRUCTIONS FOR TRANSFORMERS.
1.6 QUALITY ASSURANCE
A. FABRICATION AND INSTALLATION PERSONNEL QUALIFICATIONS:
1. TRAINED AND EXPERIENCED IN THE FABRICATION AND INSTALLATION OF THE MATERIALS AND EQUIPMENT.
2. KNOWLEDGEABLE OF THE DESIGN AND THE REVIEWED SUBMITTALS.
B. REGULATORY AGENCIES REQUIREMENTS:
1. ALL TRANSFORMERS SHALL CARRY THE UNDERWRITERS' LABORATORY LABEL.
2. SINGLE PHASE TRANSFORMERS, 167 KVA AND SMALLER, AND 3 PHASE ENGINEERING DATA, AND WIRING DIAGRAMS.
1.7 DELIVERY, STORAGE AND HANDLING
A. DELIVER MATERIALS IN ORIGINAL, UNBROKEN, BRAND MARKED CONTAINERS OR WRAPPING AS APPLICABLE.
B. HANDLE AND STORE MATERIALS IN A MANNER WHICH WILL PREVENT DETERIORATION OR DAMAGE, CONTAMINATION WITH FOREIGN MATTER, DAMAGE BY WEATHER OR ELEMENTS, AND IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS.
C. STORE MATERIALS INDOORS IN A CONTROLLED ENVIRONMENT WITH LOW MOISTURE CONTENT. DO NOT STORE OUTDOORS.
D. REJECT DAMAGED, DETERIORATED, OR CONTAMINATED MATERIALS AND IMMEDIATELY REMOVE FROM THE SITE. REPLACE REJECTED MATERIALS WITH NEW MATERIALS AT NO ADDITIONAL COST TO OWNER.
1.8 PROJECT CONDITIONS
A. PROVIDE TEMPORARY TEMPERATURE/HUMIDITY CONTROL:
1. FOR ALL INSTALLED, NONENERGIZED TRANSFORMERS.
2. IN A MANNER WHICH WILL MAINTAIN ATMOSPHERIC MOISTURE CONTENT INSIDE THE TRANSFORMERS AT AN ACCEPTABLE MINIMUM.
1.9 WARRANTY
A. MANUFACTURER SHALL FURNISH FOR ALL TRANSFORMERS: 2-YEAR UNCONDITIONAL WARRANTY.
1. BEGINNING ON DATE OF DELIVERY TO CONTRACTOR.
2. CONTINGENT ON MANUFACTURER APPROVED INSTALLATION.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. PROVIDE PRODUCTS PRODUCED BY ONE OF THE FOLLOWING MANUFACTURERS; OR EQUAL:
1. SQUARE D COMPANY.
2. CUTLER HAMMER.
3. GENERAL ELECTRIC.
4. SIEMENS ENERGY & AUTOMATION.
2.2 TRANSFORMERS
A. VOLTAGE PHASE AS INDICATED ON THE DRAWINGS.
B. VOLTAGE TAPS:
1. SINGLE PHASE: FOUR 2-1/2% FOR.
2. THREE PHASE: TWO 2-1/2% FCAN AND FOUR 2-1/2% FOBN.
C. INSULATION:
1. AN UL RECOGNIZED 220 DEGREES C INSULATING SYSTEM, OPERATING AT 60 DEGREES C RISE OVER AN AMBIENT OF 40 DEGREES C.
2. TRANSFORMERS SHALL HAVE THE ABILITY TO CARRY A 33% OVERLOAD AT RATED VOLTAGE WITHOUT EXCEEDING THIS RATING.
D. VIBRATION: COMPLETELY ISOLATE THE CORE AND COIL UNIT FROM THE ENCLOSURE BY MEANS OF VIBRATION ABSORBING MOUNTS.
E. GROUND LUGS: SUPPLY TRANSFORMERS WITH EXTERNAL GROUND LUGS INTERNALLY CONNECTED TO TRANSFORMER NEUTRAL.
F. CORES:
1. CONSTRUCT CORES OF NONAGING, HIGH-PERMEABILITY, GRAIN-ORIENTED, COLD-ROLLED SILICON STEEL.
2. MINIMUM ACCEPTABLE STEEL GRADE: ELECTRICAL STEEL GRADED M-6.
3. KEEP MAGNETIC FLUX DENSITIES WELL BELOW THE SATURATION POINT, AND IN NO CASE SHALL THESE EXCEED A DESIGN LEVEL OF 14.6 KILOGAUSS, FOR UNITS RATED.
4. THE CORE SHALL NOT SATURATE EVEN WHEN THE TRANSFORMER IS SUBJECTED TO 102% OF NAMEPLATE VOLTAGE.
5. CLAMP CORE WITH STRUCTURAL ANGLE AND BOLT TO THE ENCLOSURE TO PREVENT DAMAGE DURING SHIPMENT.
G. COILS: WOUND OF CONTINUOUS ALUMINUM OR COPPER CONDUCTORS WITH-OUT SPLICES.
H. IMPREGNATION:
1. THOROUGHLY DRY CORE AND COIL WITH CORE BRACKETS.
2. IMPREGNATE WITH A MINIMUM OF TWO COMPLETE CYCLES OF A SILICONE VARNISH.
3. COMPLETE WITH 1 FINISHING COAT OF A HIGH TEMPERATURE SEALER VARNISH
I. ENCLOSURE:
1. DEGREASE, CLEAN, PHOSPHATIZE, AND PRIME ENTIRE TRANSFORMER ENCLOSURE.
2. FINISH WITH BAKED ENAMEL.
3. AIR DRY FINISH WILL NOT BE ACCEPTED AS BEING EQUAL.
J. TERMINAL COMPARTMENTS:
1. READILY ACCESSIBLE WITH CLAMP TYPE TERMINALS STURDILY MOUNTED.
2. SIZE ALL WIRING COMPARTMENT COVERS SO THAT WHEN REMOVED THE ENTIRE WIRING COMPARTMENT AREA IS EXPOSED.
K. CORE MOUNTING: MOUNT CORE AND COIL OF ALL CABINET TYPE TRANSFORMERS ABOVE THE BASE IN ORDER TO PROVIDE SPACE AT THE BOTTOM OF THE TRANSFORMER ENCLOSURE SO THAT WIRING IS NEVER EXPOSED TO TEMPERATURES HIGHER THAN THE AMBIENT TEMPERATURE.
L. GROUNDING: GROUND CORE AND COIL ASSEMBLY TO THE ENCLOSURE WITH FLEXIBLE COPPER STRAP.
M. NAMEPLATES: PERMANENTLY ATTACH METAL NAMEPLATES, MARKED IN ACCORDANCE WITH NEMA SPECIFICATIONS, TO THE TRANSFORMER IN A READILY ACCESSIBLE POSITION.
N. CASE TEMPERATURE: THE MAXIMUM TOP OR CASE TEMPERATURE AT FULL LOAD SHALL NOT EXCEED 35 DEGREES C ABOVE AMBIENT.

PART 3 - EXECUTION
3.1 INSTALLATION
A. MOUNTING: MOUNT ALL TRANSFORMERS AS INDICATED ON THE DRAWINGS.
B. EQUIPMENT GROUNDING: PROVIDE TRANSFORMER ENCLOSURE EQUIPMENT GROUNDING IN ACCORDANCE WITH THE LATEST APPLICABLE EDITION OF THE NATIONAL ELECTRICAL CODE.
C. NEUTRAL CONDUCTOR GROUNDING:
1. PROVIDE A THAT INSULATED GROUNDING CONDUCTOR FROM THE NEUTRAL OF A WYE CONNECTED SECONDARY 3 PHASE TRANSFORMER OR THE SECONDARY CENTER TAP OF A SINGLE PHASE TRANSFORMER TO THE NEAREST ACCEPTABLE GROUNDING ELECTRODE.
2. THIS WORK SHALL BE IN ACCORDANCE WITH THE LATEST APPLICABLE EDITION OF THE NATIONAL ELECTRICAL CODE.
D. INSTALL TRANSFORMERS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
E. TECHNICAL LITERATURE: TURN OVER ALL TECHNICAL LITERATURE AND MANUFACTURER'S GUARANTEE TO OWNER AND OBTAIN A SIGNED RECEIPT.
3.2 ADJUSTING
A. ADJUST THE FULL CAPACITY TAPS UNDER NO LOAD SO THAT THE AVERAGE SECONDARY PHASE TO NEUTRAL VOLTAGE FOR THE 3 PHASES IS AS CLOSE AS POSSIBLE TO 120 VOLTS.
3.3 CLEANING
A. SHIPPING PROTECTION: REMOVE ALL SHIPPING AND PACKING PROTECTION, INCLUDE CORE CLAMPS.
B. CLEANING: CLEAN INTERIOR AND EXTERIOR OF TRANSFORMERS AND LEAVE THEM FREE OF DUST AND PARTICLES THAT ACCUMULATE DURING CONSTRUCTION PRIOR TO TURNING SYSTEM OVER TO OWNER.

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL
1.1 RELATED DOCUMENTS
A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS APPLY TO THIS SECTION.
1.2 SUMMARY
A. THIS SECTION INCLUDES THE FURNISHING AND INSTALLATION OF ALL PANELBOARDS.
B. DIVISION OF WORK:
1. IN ACCORDANCE WITH THE GENERAL CONDITIONS, CONTRACTOR IS RESPONSIBLE FOR DIVIDING THE WORK AMONG THE SUBCONTRACTORS AND SUPPLIERS AND FOR DELINEATING THE WORK TO BE PERFORMED BY SPECIFIC TRADES.
2. THE FOLLOWING ARE SUGGESTIONS AS TO HOW THE WORK MAY BE DIVIDED. THIS IS NOT A COMPLETE LIST OF ALL THE WORK:
a. GENERAL CONTRACTOR:
1) INSTALL CONCRETE PADS:
a) AS SPECIFIED HEREIN.
b) AS DIRECTED BY ELECTRICAL SUBCONTRACTOR.
b. ELECTRICAL SUBCONTRACTOR:
1) ARRANGE AND PAY FOR ALL CONCRETE PADS.
2) COORDINATE PAD LOCATION WITH GENERAL CONTRACTOR.
1.3 SUBMITTALS
A. SHOP DRAWINGS: FOR PANELBOARDS:
1. NAME OF MANUFACTURER.
2. MODEL NUMBER.
3. DETAILS OF CONSTRUCTION AND INSTALLATION.
4. ASSEMBLY DRAWINGS, INCLUDING ELEVATIONS, PLANS, SECTIONS, DIMENSIONS, WEIGHT, AND CONDUIT ENTRY LOCATIONS.
5. ELECTRICAL RATINGS:
a. VOLTAGE.
b. AMPERAGE.
c. INTERRUPT RATING.
d. ENCLOSURE TYPE.
6. COLOR AND FINISH.
7. PROJECT SPECIFIC ONE LINE DIAGRAM.
8. OPTIONS AND ACCESSORIES.
B. INSTALLATION INSTRUCTIONS: FOR PANELBOARDS.
C. OPERATION AND MAINTENANCE MANUALS: FOR PANELBOARDS.
1. EQUIPMENT FUNCTION, NORMAL OPERATING CHARACTERISTICS, AND LIMITING CONDITIONS.
2. ASSEMBLY, INSTALLATION, ALIGNMENT, ADJUSTMENT, AND CHECKING INSTRUCTIONS.
3. OPERATING INSTRUCTIONS FOR START-UP, ROUTINE AND NORMAL OPERATING, REGULATION AND CONTROL, SHUTDOWN, AND EMERGENCY CONDITIONS.
4. MAINTENANCE INSTRUCTIONS.
5. GUIDE TO "TROUBLESHOOTING."
6. PARTS LIST AND PREDICTED LIFE OF PARTS SUBJECT TO WEAR.
7. PROJECT SPECIFIC OUTLINE AND CROSS SECTIONS, ASSEMBLY DRAWINGS, ENGINEERING DATA, AND WIRING DIAGRAMS.
8. TEST DATA AND PERFORMANCE CURVES.
1.4 QUALITY ASSURANCE
A. FABRICATION AND INSTALLATION PERSONNEL QUALIFICATIONS:
1. TRAINED AND EXPERIENCED IN THE FABRICATION AND INSTALLATION OF THE MATERIALS AND EQUIPMENT.
2. KNOWLEDGEABLE OF THE DESIGN AND THE REVIEWED SUBMITTALS.
B. ALL PANELBOARDS AND ACCESSORIES SHALL BEAR THE UL LABEL.
1.5 DELIVERY, STORAGE AND HANDLING
A. DELIVER ALL MATERIALS IN ORIGINAL, UNBROKEN, BRAND MARKED CONTAINERS OR WRAPPING AS APPLICABLE.
B. HANDLE AND STORE MATERIALS IN A MANNER WHICH WILL PREVENT DETERIORATION OR DAMAGE, CONTAMINATION WITH FOREIGN MATTER, DAMAGE BY WEATHER OR ELEMENTS, AND IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS.
C. STORE MATERIALS INDOORS IN A CONTROLLED ENVIRONMENT WITH LOW MOISTURE CONTENT. DO NOT STORE OUTDOORS.
D. REJECT DAMAGED, DETERIORATED, OR CONTAMINATED MATERIALS AND IMMEDIATELY REMOVE FROM THE SITE. REPLACE REJECTED MATERIALS WITH NEW MATERIALS AT NO ADDITIONAL COST TO OWNER.
1.6 PROJECT CONDITIONS
A. PROVIDE TEMPORARY TEMPERATURE/HUMIDITY CONTROL:
1. FOR ALL INSTALLED, NONENERGIZED TRANSFORMERS.
2. IN A MANNER WHICH WILL MAINTAIN ATMOSPHERIC MOISTURE CONTENT INSIDE THE TRANSFORMERS AT AN ACCEPTABLE MINIMUM.
1.7 WARRANTY
A. MANUFACTURER SHALL FURNISH FOR ALL TRANSFORMERS: 2-YEAR UNCONDITIONAL WARRANTY.
1. BEGINNING ON DATE OF DELIVERY TO CONTRACTOR.
2. CONTINGENT ON MANUFACTURER APPROVED INSTALLATION.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. 240/120 V AC MAXIMUM:
1. SQUARE D COMPANY: NQOD.
2. CUTLER HAMMER: POW-R-LINE 1.
3. GENERAL ELECTRIC: AQ.
4. SIEMENS ENERGY AND AUTOMATION: SENTRON S1.
B. 480Y/277V AC MAXIMUM:
1. SQUARE D COMPANY: NF.
2. CUTLER HAMMER: POW-R-LINE 2.
3. GENERAL ELECTRIC: AE.
4. SIEMENS ENERGY AND AUTOMATION: SENTRON S2.
C. 480V AC MAXIMUM:
1. SQUARE D COMPANY: I-LINE.
2. CUTLER HAMMER: POW-R-LINE 3, POW-R-LINE 4.
3. GENERAL ELECTRIC: SPECTRA SERIES.
4. SIEMENS ENERGY AND AUTOMATION: SENTRON S3, S4, S5.
D. ALL PANELBOARDS SHALL BE PRODUCTS OF THE SAME MANUFACTURER.
2.2 MATERIALS
A. GENERAL:
1. ALL PANELBOARDS SHALL HAVE PLATED COPPER BUS BARS AND FULL-SIZED NEUTRAL BAR.
2. BUSSING SHALL MEET UL STANDARD 67 FOR MAXIMUM HEAT RISE.
3. BUSSING TYPE: DISTRIBUTED PHASE.
B. CIRCUIT BREAKER PANELS:
1. AUTOMATIC CIRCUIT BREAKER TYPE WITH INDIVIDUAL BREAKER UNIT FOR EACH CIRCUIT, INTERCHANGEABLE, AND REMOVABLE WITHOUT DISTURBING ADJACENT UNITS.
2. COMPLETE FRONT TRIM WITH DOOR AND FLUSH LOCK, WITH 2 KEYS.
3. CABINETS AND FRONTS SHALL MEET UL STANDARDS FOR GUTTER SPACE AND MATERIAL GAGE.
4. ALL PANELBOARDS SHALL HAVE COMMON KEYING.
5. ALL PANELS SHALL HAVE A CIRCUIT DIRECTORY FRAME WITH PLASTIC COVER AND CARD MOUNTED INSIDE COVER.
6. FLUSH MOUNTED DOUBLE TUB PANELS IN FINISHED AREAS SHALL HAVE A COMMON FRONT COVER.
7. PANEL SHALL HAVE ELECTRICAL RATING AS INDICATED ON THE DRAWINGS.
8. FLUSH MOUNTED PANELBOARDS SHALL HAVE COVER FLANGE TO OVERLAP CABINET.
9. FINISH PANELS IN GRAY ENAMEL OVER RUST INHIBITOR PRIMER.
10. LOAD CENTERS NOT ALLOWED UNLESS NOTED OTHERWISE.
C. FUSIBLE PANELS
1. FUSIBLE SWITCH TYPE, COMPLETE WITH FUSIBLE BRANCH SWITCHES WITH PROVISIONS FOR DUAL ELEMENT FUSES.
2. FUSIBLE BRANCH SWITCHES SHALL BE QUICK-MAKE, QUICK-BREAK, VISIBLE BLADE, HORSEPOWER RATED WITH COVER INTERLOCK.
3. PROVIDE A MEANS TO ALLOW AUTHORIZED PERSONNEL TO RELEASE THE INTERLOCK FOR INSPECTION PURPOSES.
4. MOUNT CONVENTIONAL NAME PLATES PROVIDING CIRCUIT IDENTIFICATION ON EACH DISCONNECT SWITCH.
5. SWITCH TYPES:
a. RATED 200 AMPERES AND LESS: PLUG-IN TYPE.
b. RATED 400 AMPERES AND MORE: BOLTED ON TYPE.
6. EACH FUSIBLE SWITCH SHALL HAVE AN INDIVIDUAL DOOR AND THE SWITCH HANDLE SHALL BE CAPABLE OF BEING LOCKED IN THE OFF POSITION.
7. FINISH PANEL IN GRAY ENAMEL OVER RUST INHIBITOR PRIMER.
D. SHORT-CIRCUIT RATING: PROVIDE A SINGLE INTEGRATED RATING OF EACH PANELBOARD CERTIFYING CAPABILITY OF WITHSTANDING FAULT STRESSES EQUAL TO THE LOWEST INTERRUPTING RATING OF ANY OVERCURRENT PROTECTIVE DEVICE CONTAINED IN THE PANELBOARD.

PART 3 - EXECUTION
3.1 EXAMINATION
A. EXAMINE THE AREAS AND CONDITIONS UNDER WHICH PANELBOARDS AND ENCLOSURES ARE TO BE INSTALLED AND NOTIFY ENGINEER IN WRITING OF CONDITIONS DETRIMENTAL TO THE OPERATION OR THE PROMPT AND TIMELY COMPLETION OF THE WORK.
3.2 INSTALLATION
A. ANCHORING:
1. ANCHOR ENCLOSURES RIGIDLY TO WALLS AND STRUCTURAL SURFACES, ENSURING THAT THEY ARE PERMANENTLY AND MECHANICALLY SECURE.
2. LOCATE TOP OF ENCLOSURE APPROXIMATELY 6'-0" ABOVE FINISH FLOOR, UNLESS MOUNTED HIGHER IF APPLICABLE.
3. MOUNT PANELBOARDS CONTAINING OVERCURRENT PANELS 6'-6-INCHES ABOVE FINISHED FLOOR.
B. IDENTIFICATION OF OVERCURRENT PROTECTIVE DEVICES:
1. PROVIDE ALL PANELBOARDS AND SWITCHBOARDS WITH ENGRAVED PLASTIC NAMEPLATES TO IDENTIFY EACH OVERCURRENT PROTECTIVE DEVICE.
2. LABEL EACH PANELBOARD WITH VOLTAGE AND PHASE RATINGS.
3. PROVIDE TYPEWRITTEN DIRECTORY CARD UNDER PLASTIC COVER IN EACH PANELBOARD CABINET.
a. DIRECTORY SHALL BE FILLED IN TO DESCRIBE FINAL AND BRANCH CIRCUIT PANELS.
b. HANDWRITTEN.
c. HANDLETTERING WILL NOT BE ACCEPTABLE.
C. PANEL IDENTIFICATION: IN ACCORDANCE WITH DIVISION 26 SECTION "IDENTIFICATION FOR ELECTRICAL SYSTEMS."

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL
1.1 RELATED DOCUMENTS
A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS APPLY TO THIS SECTION.
1.2 SUMMARY
A. THIS SECTION INCLUDES THE FURNISHING AND INSTALLATION OF ALL WIRING DEVICES AND THE MAJOR ITEMS LISTED BELOW:
1. RECEPTACLES.
2. SWITCHES.
3. WALL PLATES.
4. CONNECTOR BODY AND PLUGS.
5. BOX COVERS.
1.3 REFERENCES
A. EXCEPT AS HEREIN SPECIFIED OR AS INDICATED ON THE DRAWINGS, THE WORK OF THIS SECTION SHALL COMPLY WITH THE FOLLOWING:
1. NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION - STANDARDS FOR GENERAL AND SPECIFIC PURPOSE WIRING DEVICES WD-1, WD-5.
2. FEDERAL SPECIFICATIONS W-C-596 AND WS-896.
3. UNDERWRITERS LABORATORIES (UL) STANDARD 498.
1.4 SUBMITTALS
A. SHOP DRAWINGS: FOR WIRING DEVICES.
1. NAME OF MANUFACTURER.
2. MODEL NUMBER.
3. DETAILS OF CONSTRUCTION AND INSTALLATION.
4. ELECTRICAL SPECIFICATIONS AND RATINGS.
5. DIMENSIONAL DATA.
6. COLOR AND FINISH.
1.5 QUALITY ASSURANCE
A. REGULATORY AGENCIES REQUIREMENTS:
1. NEC - NATIONAL ELECTRICAL CODE (NFPA 70) AS APPLICABLE TO CONSTRUCTION AND INSTALLATION OF ELECTRICAL WIRING DEVICES.
2. UL LABELS: PROVIDE WIRING DEVICES WHICH HAVE BEEN TESTED AND ARE LISTED AND LABELED BY UNDERWRITERS' LABORATORIES.
1.6 DELIVERY, STORAGE AND HANDLING
A. DELIVER ALL MATERIALS IN ORIGINAL, UNBROKEN, BRAND MARKED CONTAINERS OR WRAPPING AS APPLICABLE.
B. HANDLE AND STORE MATERIALS IN A MANNER WHICH WILL PREVENT DETERIORATION OR DAMAGE, CONTAMINATION WITH FOREIGN MATTER, DAMAGE BY WEATHER OR ELEMENTS, AND IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS.
C. STORE MATERIALS INDOORS AND PROTECT FROM WEATHER. WHEN NECESSARY TO STORE OUTDOORS, ELEVATE MATERIALS ABOVE GRADE AND ENCLOSE WITH DURABLE, WATERTIGHT WRAPPING.
D. REJECT DAMAGED, DETERIORATED, OR CONTAMINATED MATERIALS AND IMMEDIATELY REMOVE FROM THE SITE. REPLACE REJECTED MATERIALS WITH NEW MATERIALS AT NO ADDITIONAL COST TO OWNER.

PART 2 - PRODUCTS
2.1 WIRING DEVICES
A. GENERAL:
1. PROVIDE FACTORY-FABRICATED WIRING DEVICES IN TYPE, COLOR, AND ELECTRICAL RATING AS INDICATED ON THE SYMBOL LEGEND.
2. WHERE TYPE AND GRADE ARE NOT INDICATED, PROPER SELECTION SHALL BE DETERMINED BY INSTALLER TO FULFILL THE WIRING REQUIREMENTS AND TO COMPLY WITH NEC AND NEMA STANDARDS FOR WIRING DEVICES.
B. MANUFACTURERS: PROVIDE DEVICES OF ONE OF THE FOLLOWING MANUFACTURERS FOR SWITCHES AND RECEPTACLES SPECIFIED:
1. COOPER WIRING DEVICES
2. LEVITON.
3. HUBBELL, INC.
4. PASS AND SEYMOUR, INC.
5. BRYANT ELECTRIC, INC.
C. SWITCHES:
1. SWITCH RATING: 20 AMP, 120/277V, SPECIFICATION GRADE, QUIET OPERATING.
2. SWITCH PROVISIONS: BACK AND SIDE WIRING.
D. CONVENIENCE RECEPTACLES:
1. RATINGS: 20 AMP, 125V, SPECIFICATION GRADE.
2. PROVISIONS: BACK AND SIDE WIRING, GROUNDING SCREW.
E. GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES:
1. RATINGS: 20 AMP, 125V, SPECIFICATION GRADE.
2. PROVISIONS: FEED THROUGH PROTECTION.
F. WALL PLATES:
1. NUMBER: PROVIDE A SINGLE (SWITCH OR DUPLEX OUTLET) WALL PLATE FOR WIRING DEVICE GROUPING AT EACH LOCATION.
2. ATTACHMENT: PROVIDE METAL SCREWS FOR SECURING PLATES TO DEVICES; HIDDEN HEADS COVERED TO MATCH FINISH OF PLATE.
3. CONSTRUCTION:
a. STAINLESS STEEL: 0.04-INCH THICK, TYPE 302 SATIN FINISHED STAINLESS STEEL, ACCURATELY DIE CUT, PROTECTED WITH RELEASE PAPER.
b. CAST METAL: DIE CAST ZINC ALLOY, RIBBED FOR STRENGTH, FLASH REMOVED, PAINTED WITH GRAY ENAMEL, FURNISHED COMPLETE WITH 4 MOUNTING SCREWS WITH GASKETS.
c. STEEL: HOT DIPPED GALVANIZED, 1.25 OUNCE PER SQUARE FOOT MINIMUM.
4. PLATE APPLICATION:
a. FLUSH MOUNTED DEVICES: BEVELED TYPE WITH SMOOTH EDGE:
1) FINISHED AREAS: STAINLESS STEEL.
2) UNFINISHED AREAS: GALVANIZED STEEL, STAINLESS STEEL.
b. SURFACE MOUNTED DEVICES IN UNFINISHED PROCESS SPACES: GALVANIZED STEEL, STAINLESS STEEL.
c. WEATHERPROOF OUTLET COVERS AND FACE-PLATES:
1) CAST ALUMINUM NEMA 3R, WEATHERPROOF WHILE-IN-USE OUTLET COVER WITH FACEPLATE, FACEPLATE GASKET AND CORROSION PROOF FASTENERS.
2) MANUFACTURERS: HUBBELL, LEVITON.

PART 3 - EXECUTION
3.1 INSTALLATION
A. GENERAL:
1. INSTALL WIRING DEVICES IN ACCORDANCE WITH:
a. THE DRAWINGS.
b. MANUFACTURER'S WRITTEN INSTRUCTIONS.
c. APPLICABLE REQUIREMENTS OF NEC AND NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION'S "STANDARD OF INSTALLATION."
d. RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS SERVE THE INTENDED FUNCTION.
2. DELAY INSTALLATION OF DEVICES UNTIL WIRING IS COMPLETED.
3. ENSURE THAT RECEPTACLES AND SWITCHES ONLY IN ELECTRICAL BOXES WHICH ARE CLEAN AND FREE FROM EXCESS BUILDING MATERIALS AND DEBRIS.
B. SWITCHES:
1. INSTALL AS INDICATED ON THE DRAWINGS TO CONTROL LIGHTS AS INDICATED.
2. WHERE MORE THAN ONE WALL SWITCH IS INSTALLED IN SAME LOCATION, SET UNDER 1 COVER PLATE.
C. RECEPTACLES:
1. LOCATE APPROXIMATELY AS INDICATED ON THE DRAWINGS, LONG DIMENSION VERTICAL, WITH GROUNDING POLE AT TOP.
2. CENTERLINE GENERALLY 18 INCHES ABOVE FLOOR ON A TILE OR BLOCK JOINT WHERE POSSIBLE, AND 6 INCHES ABOVE COUNTER WHEN MOUNTING HEIGHT EXCEED 27 INCHES ABOVE FLOOR. MOUNT HORIZONTALLY WITH GROUNDING POLE AT LEFT.
3. REFER TO ELEVATION DRAWINGS FOR SPECIFIC LOCATION REQUIREMENTS FOR ARCHITECTURAL FEATURES OFTEN LOCATED ABOVE COUNTERS AND BACKSPLASHES. COORDINATE EXACT LOCATION OF FIXTURES TO MEET ARCHITECTURAL CONDITIONS.
4. REFER TO MECHANICAL DRAWINGS FOR COORDINATION WITH MECHANICAL EQUIPMENT, RADIATION, FIN TUBE, GRILLES, AND DIFFUSERS.
D. PROVIDE BONDING JUMPER FROM OUTLET TO BOX.
E. WALL PLATES:
1. INSTALL COVERPLATES ON ALL FINISHED WALLS.
2. PLATE SHALL COVER OPENING ONLY.
3. QUALITY CONTROL
a. TESTING: TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY OF GROUNDING CONNECTIONS, AND TEST AFTER ENERGIZING CIRCUITRY, TO VERIFY SYSTEMS COMPLIANCE WITH REQUIREMENTS.
b. PROTECTION OF WALL PLATES AND RECEPTACLES
UPON INSTALLATION OF WALL PLATES AND RECEPTACLES, ADVISE SUBCONTRACTORS REGARDING PROPER AND CAUTIOUS USE OF CONVENIENCE OUTLETS, AT TIME OF SUBSTANTIAL COMPLETION, REPLACE THOSE ITEMS WHICH HAVE BEEN DAMAGED, INCLUDING THOSE BURNED AND SOIRED BY FAULTY PLUGS.

SECTION 26 28 00 - LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES

PART 1 - GENERAL
1.1 RELATED DOCUMENTS
A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS APPLY TO THIS SECTION.
1.2 SUMMARY
A. THIS SECTION INCLUDES THE FURNISHING AND INSTALLATION OF ALL LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES:
1. THE TYPES OF LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES REQUIRED FOR THE PROJECT ARE AS SPECIFIED IN THIS SECTION INCLUDE THE FOLLOWING:
a. FUSES.
b. CIRCUIT BREAKERS.
1.3 REFERENCES
A. EXCEPT AS HEREIN SPECIFIED OR AS INDICATED ON THE DRAWINGS, THE WORK OF THIS SECTION SHALL COMPLY WITH THE FOLLOWING:
1. UL 489 - MOLDED-CASE CIRCUIT BREAKERS.
2. NEMA AB1 - MOLDED CASE CIRCUIT BREAKERS.
3. NEMA 250 - ENCLOSURES FOR ELECTRICAL EQUIPMENT.
4. NFPA 70 - NATIONAL ELECTRICAL CODE.
1.4 SUBMITTALS
A. MANUFACTURER'S LITERATURE FOR EACH TYPE OF LOW VOLTAGE CIRCUIT PROTECTIVE DEVICE FURNISHED TO INCLUDE:
1. NAME OF MANUFACTURER.
2. MODEL.
3. TIME-CURRENT CURVES.
4. INTERRUPT RATINGS.
5. NSC CLASS.
6. DETAILS OF CONSTRUCTION AND INSTALLATION.
7. OPTIONS AND ACCESSORIES.
B. INSTALLATION INSTRUCTIONS: FOR LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES.
C. OPERATION AND MAINTENANCE MANUALS: FOR LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES.
1. EQUIPMENT FUNCTION, NORMAL OPERATING CHARACTERISTICS, AND LIMITING CONDITIONS.
2. ASSEMBLY, INSTALLATION, ALIGNMENT, ADJUSTMENT, AND CHECKING INSTRUCTIONS.
3. OPERATING INSTRUCTIONS FOR START-UP, ROUTINE AND NORMAL OPERATING, REGULATION AND CONTROL, SHUTDOWN, AND EMERGENCY CONDITIONS.
4. MAINTENANCE INSTRUCTIONS.
5. GUIDE TO "TROUBLESHOOTING."
6. PARTS LIST AND PREDICTED LIFE OF PARTS SUBJECT TO WEAR.
7. PROJECT SPECIFIC OUTLINE AND CROSS SECTIONS, ASSEMBLY DRAWINGS, ENGINEERING DATA, AND WIRING DIAGRAMS.
8. TEST DATA AND PERFORMANCE CURVES.
1.5 QUALITY ASSURANCE
A. FABRICATION AND INSTALLATION PERSONNEL QUALIFICATIONS:
1. TRAINED AND EXPERIENCED IN THE FABRICATION AND INSTALLATION OF THE MATERIALS AND EQUIPMENT.
2. KNOWLEDGEABLE OF THE DESIGN AND THE REVIEWED SUBMITTALS.
B. REGULATORY AGENCIES REQUIREMENTS:
1. PROVIDE REQUIRED CIRCUIT BREAKERS FOR INSTALLATION IN PANELBOARDS, SWITCHBOARDS, INCLOSURES. OR MOTOR CONTROL CENTERS IN STRICT INSTALLATION OF ELECTRICAL WIRING DEVICES.
2. UL LABELS: PROVIDE WIRING DEVICES WHICH HAVE BEEN TESTED AND ARE LISTED AND LABELED BY UNDERWRITERS' LABORATORIES.
1.6 DELIVERY, STORAGE AND HANDLING
A. DELIVER ALL MATERIALS IN ORIGINAL, UNBROKEN, BRAND MARKED CONTAINERS, OR WRAPPING AS APPLICABLE.
B. HANDLE AND STORE MATERIALS IN A MANNER WHICH WILL PREVENT DETERIORATION OR DAMAGE, CONTAMINATION WITH FOREIGN MATTER, DAMAGE BY WEATHER OR ELEMENTS, AND IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS.
C. STORE MATERIALS INDOORS AND PROTECT FROM WEATHER. WHEN NECESSARY TO STORE OUTDOORS, ELEVATE MATERIALS ABOVE GRADE AND ENCLOSE WITH DURABLE, WATERTIGHT WRAPPING.
D. REJECT DAMAGED, DETERIORATED, OR CONTAMINATED MATERIALS AND IMMEDIATELY REMOVE FROM THE SITE. REPLACE REJECTED MATERIALS WITH NEW MATERIALS AT NO ADDITIONAL COST TO OWNER.

PART 2 - PRODUCTS
2.1 FABRICATED SWITCHES
A. MANUFACTURERS: PROVIDE PRODUCTS PRODUCED BY ONE OF THE FOLLOWING MANUFACTURERS (FOR EACH