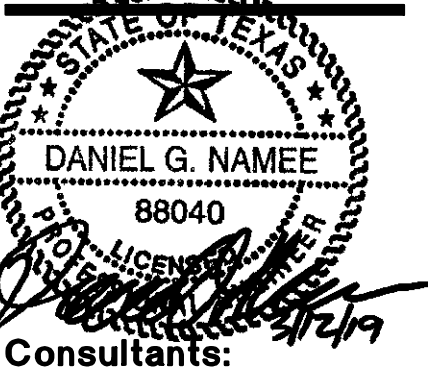


Project Information:



Section 1650
ELECTRICAL SPECIFICATIONS

PART 1:

GENERAL - ELECTRICAL

1-1 DESCRIPTION:

1-2 WARRANTY:

The undertaking of the work described in this Division shall be considered equivalent to the issuance, as part of this work, of a specific guarantee extending one year beyond the date of completion of work and acceptance by Owner, against defects in materials and workmanship. Materials, appliances and labor necessary to affect repairs and replacement, so as to maintain said work in good functioning order shall be provided as required. Reprovisions necessitated by normal wear in use or by Owner's abuse are not included under this guarantee.

1-3 PROJECT CONDITIONS:

Visit the site of the proposed construction in order to fully understand the facilities, difficulties and restriction attending the execution of the work. No additional compensation will be allowed this Contractor for work or items omitted from his original Proposal due to his failure to inform himself regarding such matters affecting the performance of the work in this Contract or necessary for the installation and completion of the work indicated herein.

1-4 PERMITS AND FEES:

The contractor shall arrange and pay for all permits, fees, tests, and all inspections as required by governmental authorities.

1-5 COORDINATION WITH FIELD CONDITIONS:

Contractor shall review all pertinent Drawings and adjust his work to all conditions shown there on. Discrepancies between Plans, Specifications, and actual field conditions shall be brought to the prompt attention of the Architect.

Approximate location of transformers, feeders, branch circuits, lighting and power outlets, panels, outlets for special systems, etc., are indicated on the Drawings. However, the Drawings do not show complete and accurate detailed locations of such outlets, conduit runs, etc., and exact locations must be determined by actual field measurement. Such locations will, at all times, be subject to the approval of the Architect.

Communicate with the Architect and secure his approval of any outlet (light fixture, receptacle, switch, etc.) location about which there may be the least question. Outlets obviously placed in a location not suitable to the finished room without specific approval, shall be removed and relocated when so directed by the Architect. Location of light fixtures shall be coordinated with reflected ceiling plans.

1-6 SUBMITTALS:

Contractor shall submit six sets of submittals, shop drawings, descriptive literature, physical data and a specification criteria for the following items:

Lighting and Appliance Panels/boards
Heavy Duty Disconnect Switches Lighting Fixtures and Lamps Lighting Contactors Time Clocks Wiring Devices and Plates Conduit and Fittings Wire Dry Type Transformers

Any deviations from the specified items shall be listed on the cover sheet and clearly identified for all divisions. The contractor shall provide two copies of owner's manuals to the architect upon completion of the work.

1-7 SUBSTITUTIONS:

A. The names, manufacturers, and model numbers have been used in the Contract documents to establish type of equipment and standards of quality. Where more than one manufacturer is named for a specific item of equipment, only one of the specified manufacturers will be considered for approval. Where only one manufacturer is mentioned with the phrase "or approved equal," Contractor may submit an alternate manufacturer for consideration, provided the following conditions are met:

1. Submit alternate equipment with complete descriptive data in shop drawing form. Provide samples of equipment upon request by architect. Samples will be returned if requested in writing.
2. Alternate equipment must be equal to the standard of materials, construction and performance.
3. Alternate equipment must be presented to the Engineer architect ten (10) days prior to bid date for approval.

B. The Architect and Engineer shall be the sole judge of quality and equivalence of equipment, materials and methods.

1-8 QUALITY ASSURANCE:

All work shall be performed in accordance with all state, local & federal codes and all authorities having jurisdiction, including but not limited to:
National Electrical Code (NEC)
American Society for Testing and Materials (ASTM) Underwriter's Laboratories, Inc. (UL)
Insulated Power Cable Engineer's Association (IPCEA), National Electrical Manufacturer's Association (NEMA), Institute of Electrical and Electronics Association (IEEE), American National Standards Institute (ANSI), National Fire Protection Association (NFPA)

1-9 SLEEVES, CUTTING AND PATCHING:

This Section shall be responsible for the placing of sleeves for all conduit passing through walls, partitions, beams, floors, roof, etc. sleeves through below-grade walls shall be as specified and detailed on the plans.
All cutting and patching will be done under another Division, but this Section will be responsible for timely performance of this work and layout of holes and setting sleeves.

1-10 EXCAVATION AND BACKFILL:

Trenching and backfilling and other earthwork operations required to install the facilities specified herein shall conform to the applicable requirements of Division 2 (BES of maximum standard density). Where trenching or excavation is required in improved areas, the backfill shall be compacted to a condition equal to that of adjacent undisturbed earth and the surface of the area restored to the condition existing prior to trenching or excavating operations. The plans indicate information pertaining to surface and sub-surface obstructions; however, this information is not guaranteed. Should obstructions be encountered whether or not shown, the Contractor shall alert routing of new work, remove existing lines, remove obstructions where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of new work and leave existing surfaces and structures in a satisfactory and serviceable condition.

1-11 CLEANING:

Clean lighting fixtures and equipment.
Touch-up and refinish scratches and marred surfaces on panels, switches, starters, and transformers.
1-12 TESTS AND INSPECTIONS
Tests and inspection requirements shall be coordinated Architect.
Data for field acceptance test shall be sufficiently in advance of completion date of contract to permit alterations or adjustments necessary to achieve proper functioning of equipment prior to contract completion date.

Conduct re-tests as directed by Architect on portions of work or equipment altered or adjusted as determined to be necessary by field acceptance test. No retest delay or consumption of time as a result of such necessary re-test beyond contract completion date shall relieve Contractor of his responsibility under contract.
Put circuits and equipment into service under normal conditions, collectively and separately, as may be required to determine satisfactory operation. Demeritistic equipment to operate in accordance with requirements of these specifications. Perform tests in the presence of Architect. Furnish instruments and personnel required for tests.
At the time designated by the Architect, the entire system shall be inspected by the Architect and Engineer. The contractor or his representative shall be present at this inspection.
Panels/boards, switches, fixtures, etc., shall be cleaned and in operating condition. Certificates and documents required hereinafter shall be in order and presented to the Architect prior to inspection.
Panel covers, junction box covers, etc., shall be removed for visual inspection of the wire, bus bars, etc.
After the inspection, any items that are noted as needing to be changed or corrected in order to comply with these specifications and the drawings shall be accomplished without delay.

PART 2: PRODUCTS - ELECTRICAL

2-1 ALL PRODUCTS:

All products shall be listed by Underwriter's Laboratories and have the UL label affixed.

2-2 RACEWAYS AND FITTINGS:

Except as noted or otherwise specified, all wiring shall be installed in galvanized rigid steel conduit or electrical steel tube (EMT) of proper size to contain the number of conductors required in accordance with the latest edition of the N.E.C. Where conduit sizes are shown on the drawings, those shall take preference.
Provide EMT to sizes up to 4 inches when concealed or not exposed to damage. Rigid steel, galvanized for underground use, where exposed to damage, or in exterior applications; Rigid galvanized steel when embedded in concrete or masonry construction.
Minimum size shall be 3/4 inch except for fixtures which not exceeding 6"-0 inch long, branch circuits run underground shall be run in Corbin Schedule 40 PVC conduit. Install ground wire in accordance with NEC Table 250-35. Electrical metallic tubing systems shall utilize wet-die rigid compression type fittings where exposed to moisture and set screw type fittings elsewhere.

Conduit shall be run concealed in finished areas. Conduit may be exposed in mechanical rooms and where otherwise indicated.
Concealed conduit shall be run in an direct manner with as long bends as possible. Exposed conduit shall be run parallel with, or at right angles to the lines of the building; and all bends shall be made with standard conduit elbows or conduit bent to not less than same radius. Not more than equivalent of four quarter bends shall be used in any run between terminals and cabinet, of between outlet or junction boxes. Approved conduits shall be used in lieu of conduit size where size of installation and appearance warrants their use. Conduit joints shall be made with approved couplings and unions.
Provide #30 nylon pulling line in all conduits in which permanent wiring is not installed.
Branch circuit conduits installed in concrete slabs on fill or grade shall be positioned in a manner to ensure complete concrete cover. In no case shall such conduits be exposed below or above the slab surfaces, or penetrate the waterproof membrane.
At locations where feeder, or other large conduits, must pass through slabs on fill or grade, the conduit shall be PVC coated rigid galvanized steel, extended 6 inches into the earth, and 2 inches above exposed surface of slab.

All conduit shall be securely fastened and supported using hot galvanized malleable iron one-half inch slots, clamps, hangers or other means approved by the engineer. Supports shall be as required by NEC Table 344-12. In wire shall not be used as support or securing means. Supports shall be installed independently of ceiling hanger wire.

2-3 GULLET AND JUNCTION BOXES:

Provide an approved galvanized outlet box with adequate volume for number of conductors connected.
Provide standard galvanized switch boxes of the required number of gangs. Switch boxes for exposed wiring shall be handy boxes or approved equal.
Outlet boxes for receptacles shall be similar to Universal 52515 with suitable raised cover. Receptacle boxes on exposed wiring shall be handy boxes or approved equal.
Weatherproof boxes where necessary shall be FS or FD.
Outdoor boxes shall be NEMA 3R with conduit connections made by Myers Hubs.

See notes and details on Drawings for special box requirements.

Provide Junction boxes required to facilitate the installation of the various conduit systems. Provide support boxes required for risers, each complete with approved cable supports as described elsewhere in this Division. Acceptable manufacturers are General Electric Company, Square D Company or Siemens.
Outlet boxes for drywall shall be standard galvanized switch boxes.
Provide cover plates for O/J outlet boxes.
Provide Junction boxes and conduit system for all electrical systems (i.e. electrical, sound, data, and home cable systems).

2-4 RACEWAYS:

Full boxes shall be provided for conduit systems as required and shall be constructed of galvanized steel of not less than gauge and size specified by National Electrical Code.
Where two or more feeders pass through a common pull box, they shall be tagged to indicate clearly their electrical characteristics, circuit number, and panel designation.
2-5 WIRE AND CABLE:
All wire shall be new and continuous without weld, splice, or joints throughout its length. It must be uniform in cross-section, free from flaws, scales and other imperfections.
Wire shall be soft draw, annealed, B&S pure copper, with the coating. Aluminum wiring is not acceptable.
Acceptable manufacturers for 600 volt wire and cable shall be Southern, Triangle PVC, Case, and Home Cable Company.
Acceptable manufacturers for 300 volt wire and cable shall be Westing, Belden, and Alpha.
Acceptable manufacturers for conductors shall be AMP, Bundy, Ideal, JM, O.Z. Geedey, and Thomas & Betts.

A. TYPES:

1. Provide cable gauge type -THHN- or -TH- insulation.
2. All wire No.8 and larger shall be stranded. All wire No. 10 and smaller shall be solid. Minimum wire shall be No. 12, unless otherwise shown on Drawings.
3. Provide type -RHBS or other 90 degree C insulation wiring for branch circuit wiring installed through continuous runs of fluorescent fixture bodies.
4. The stem device wiring shall be 300 volt, PVC jacket UL -listed when routed in a raceway. The jacket shall be UL listed for use in air plenums when a raceway is not used. 5. Control wiring shall be No. 14 AWG copper conductor unless otherwise shown; 600 volt rated insulation.
5. Open low voltage wiring in return air plenums shall be plenum rated or run in conduit.
6. All wiring in mechanical rooms, electrical rooms and other areas subject to physical damage shall be run in conduit.

B. COLOR CODING: Conductors shall be color coded in accordance with the governing authority requirements or as follows:

120/208V	277/480V	120/240V
1. NEUTRAL: White	1. Neutral: Grey	1. Neutral: white
2. PHASE A: Black	2. Phase A: Brown	2. Phase A: Black
3. PHASE B: Red	3. Phase B: Purple	3. Phase B: Orange
4. PHASE C: Blue	4. Phase C: Yellow	4. Phase C: Blue
5. GROUND: Green	5. Ground: Green	5. Ground: Green

C. SPLICES:

Splices, where required, shall be fully made up in outlet boxes with compression crimp-on type splice connectors and at least 12 inches topped and set for the future hanger. Where load requirements specify certain codes for phases and neutral, etc., these shall become the standard for this project.
Joints and splices will not be permitted in main or feeder. Joints in branch circuits will be permitted where branch circuits divide, and then shall consist of one through-circuit to which the branch shall be spliced. Joints shall not be left for the future hanger to make FN joints and splices with Bushman Series -2007 solderless connectors complete with insulating caps or properly sized wire nuts.

2-6 -RNG DEVICES:

Provide electrical service, equipment and wiring device grounding as shown, scheduled and as specified.
Acceptable manufacturers are Hubbell, or Pass & Seymour.
A. SWITCHES
Furnish and install generally where indicated on the Drawings. Coordinate final color and exact locations with architect.
Wall switches shall be 20 amp, 120-277 volt and shall be Hubbell Style Line Series 21 or equal as follows:
1. SINGLE POLE SWITCHES: 2121-W, White.
2. DOUBLE POLE SWITCHES: 2122-W, White.
3. TRIZ-WAY SWITCHES: 2123-W, White.
4. FOUR-WAY SWITCHES: 2124-W, White.
B. DIMMERS:
Provide Leviton specification grade IllumiTouch series Incandescent/great slide dimmer, Color as required, #P106-1L, 600W with power extender DPSPF-112 for load capacity to 2000W for each dimming circuit.

C. RECEPTACLES:

Furnish and install generally where indicated on the Drawings. Coordinate final color and exact location with architect.
Receptacles shall be Hubbell or equal as follows:

1. Duplex 20A-125V self grounding: 2162-W (White, Nema configuration 5-20R).
2. Duplex 20A-125V Self Grounding: 2161-W (White, Nema configuration 5-20R).
3. Isolated grounding: 20A-125V: I0-2162 (Orange, Nema configuration 5-20R).
4. Clock hanger receptacle 20A-125V: S261-01 (Brown with stain finished stainless steel plate with hanger, Nema configuration 5-20R).
5. Ground fault circuit interrupter (GFI) receptacle 20A-125V: GF-3262-W (White with indicator light Nema Configuration 5-20R, with -feed through- connectors capable of protecting connected downstream receptacles on a single circuit, and of being installed in a 2-1/4"- deep outlet box without outlet).
6. Equipment receptacles shall be coordinated with owner/manufacturer requirements and the correct and appropriate receptacle and cover plate then installed.

D. PLATES:

1. Furnish and install plates on all outlet boxes.
2. Plates in offices and similar finished areas shall be Hubbell smooth thermo-plastic.
3. Wet locations: Provide Tynroc or Corbin Nemo 3R, impact resistant polycarbonate enclosures. Enclosures shall be suitable for wet locations when in use.
4. Provide Hubbell stainless steel type 302/304 coverplates installed in kitchens.
5. Isolated Grounded Receptacle Systems: Stamped steel metal, shall to match box without overlapping sharp edges.

F. Floor boxes shall be cast iron as manufactured by Hubbell and as indicated below. (Note: If floors are wood, provide a Hubbell cast iron floor box and flush cover designed for this application).
1. Slab at grade (and level, fully adjustable type 1).
a. Single gang: #B-2438 w/FSB-3063 carpet flange.
b. Two gang: #B-4233 w/FSB-3063 carpet flange.
c. Three gang: #B-4333 w/FSB-3063 carpet flange.
2. Slab above grade (isolator, semi-adjustable, type 1).
a. Single gang: #B-2414 w/FSB-3063 carpet flange.
b. Two gang: #B-4214 w/FSB-3063 carpet flange.
c. Three gang: #B-4314 w/FSB-3063 carpet flange.
3. Cover plates shall show brass finish as follows:
a. Single gang: #B-2414 w/FSB-3063 carpet flange.
b. 15-2425 for data/communications.
c. Provide appropriate coverplate for special purpose receptacles.

Unless noted to the contrary on plans, or directed otherwise during the progress of the work, wiring devices shall be set as follows:
1. Switches 42 inches above finished floor.
2. Duplex and single receptacles 15 inches above finish floor except where located above counters or countertops with shelving or as required by local codes.
3. Wall telephone outlets, except where counters or shelving interferes 15 inches above finished floor.
4. All locations above counters, set devices 1 foot-0 inches above counter tops, verify exact mounting height with the architect.
2-7 DRY-TYPE TRANSFORMERS:

Provide dry type, two-winding transformers with primary and secondary voltages and kVA ratings as shown in plans. Transformers shall operate at 60 Hertz. All transformers shall be manufactured with standard materials and components. When noted in the drawings, provide hermetic refrigerating transformer. Acceptable manufacturers are General Electric Company, Square D Company or Siemens.
All cores shall be constructed of high grade, non-oiling silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point. The core laminations shall be stamped together with structural steel angles. The completed core and coil shall be isolated from the base by means of rubber, vibration-dampening mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure. The vibration isolating system shall be designed to provide a permanent fastening of the core and coil to the enclosure. Sound isolating system requiring the complete removal of all fastening devices will not be accepted. Windings shall be copper or electrical grade aluminum terminated on tin plated or copper bars. Full windings are not acceptable.

The transformer core shall be visibly grounded to the enclosure by means of a flexible grounding conductor installed in accordance with NEMA, IEEE and ANSI standards.
Transformer coil shall be of continuous-equal type construction and shall be impregnated with non-hygroscopic, thermal-stable resin.
Transformers shall be enclosed in drip-proof, metallic enclosures designed to provide for air cooling and prevent accidental contact with live conductors. Wiring compartment shall be located below the core and coil and cooled by air circulation or induction from the core and coil by means of a suitable thermal insulation barrier. Transformer exposed to weather or installed in a splashed area shall have rain shields on all openings. Entire transformer enclosure shall be cleaned, phosphatized, primed and painted with a Grey, baked enamel.
Transformers shall operate at 100% nameplate kVA rating continuously while in a 40 degree C ambient without exceeding the rated average winding temperature rise of the ANSI insulation system as described below.

Temperature rating shall be as follows:
RATING PHASE INSULATION - TEMP. RISE
0.025 through 3 kVA Single Type B - 80 C
3 through 25 kVA Single Type F - 115 C
3. Provide type -RHBS or other 90 degree C insulation wiring for branch circuit wiring installed through continuous runs of fluorescent fixture bodies.
37-1/2 kVA and larger Single Type H - 150 C
30 kVA and larger Three Type H - 150 C

Transformers shall have minimum full rated taps in high voltage winding as follows:
3 through 25 kVA 2 - 5% FEEN
15 through 300 kVA 6 - 2-1/2% TAPS, 2 above and 4 below normal
Maximum sound ratings shall be as follows:
kVA 0 - 9 06 40
10 - 50 50
600W /480V 30,000 AC
15 300 50

Provide a nominal 3-1/2" thick, 2500 PSI (28 Day) concrete reinforced pad with number 6 welded wire mesh. The pad shall conform to the shape of the transformer and extend at least 3 inches beyond the length and width of the transformer. All corners of the pad shall be rounded.
Install four mounted transformers on properly sized rubber-in-shear vibration isolators. Top-mounted transformers shall use rubber-in-shear hangers. Wall-mounted transformers shall not be mounted directly to the wall without vibration isolation.
Racks containing in a minimum of 2 feet of flexible steel conduit to transformer enclosures. Provide grounding conductor sized per NEC, connected to the building grounding electrode system.

2-8 GROUNDING:
Provide electrical service, equipment and wiring device grounding as shown, scheduled and as specified.
The types of grounding include, but are not limited to, the grounding bonding of all equipment devices, building steel piping, and as required by the National Electrical Code, Local Inspection Department and Power Company. A grounding conductor is required for all feeders and circuits.
Provide grounding products manufactured by Coppsweld and Cowled.
Ground rods shall be 3/4" inch diameter by 10 feet long construction with copper jacket and a steel core. Ground drains shall be copper except for steel or iron pipes in which the drains shall be galvanized iron. Conductors shall be connected by means of an approved pressure connector or clamp.
Perform a ground resistance test using a bridge megger. The system resistance shall not exceed 5 OHMS. Provide additional electrodes as required (refer to 250-94 of the NEC). Test shall not be conducted following wet weather. Provide personnel and instruments to conduct these tests and submit certified test for review.

A. BUILDING STEEL AND PIPING SYSTEMS: Install a bonding jumper between building steel and metallic piping systems to bond them to the electrical grounding system.
B. NEUTRAL: The neutral shall be grounded only at the service entrance and other separately derived systems. The neutral shall be kept separate from the grounding system and shall not be used as a ground.
C. GROUNDING SEPARATELY DERIVED ALTERNATING CURRENT SYSTEM
TRANSFORMERS: The center point (neutral) of each wye connected transformer shall be bonded to the case and a grounding electrode conductor. The grounding electrode conductor shall be connected to building steel, a ground rod or the building grounding system, if building steel or ground rod are not available.
D. GROUNDING CONDUCTOR: A grounding conductor and metallic conduit system shall bond all equipment served by the electrical system. Provide a flexible bonding jumper for isolated metallic piping and ductwork and ground expansion fittings and joints.
E. CONDUIT GROUNDING FINISHING:
Conduit terminating in equipment that has a ground bus such as switchboards, panels/boards, etc., shall have grounding bushings installed. Ground each conduit by means of a grounding bushing and to the ground bus in the equipment.
F. MOTORS: The frame of all motors shall be grounded.
G. SPECIAL GROUNDING: Provide a 16 AWG copper grounding conductor for each telephone board, telecontrol system, etc. Terminate the grounding conductor on ground bus and to the building electrical grounding system. Refer to 800-40(d) and 820-40(d) of the NEC.
H. REMOTE PANELBOARDS: Provide a grounding electrode conductor at remote panels as required by the NEC.
I. LIGHTING FIXTURES: All light fixtures shall be grounded flexible fixture wires longer than six feet is not considered to be grounded.
J. RECEPTACLES: Receptacles shall use an approved grounding yoke. All receptacles shall be grounded.
2-9 PANELBOARDS:
Furnish and install power distribution, lighting and appliance panels/boards as indicated in the panelboard schedule and as shown on the plans. Power distribution panelboards shall be equipped with fusible switches or circuit breakers as shown on the schedule. Panelboards shall be equipped with thermal-magnetic, molded case circuit breakers of frame and trip ratings as shown on the schedule. Acceptable manufacturers are General Electric Company, Square D Company or Siemens.
Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on the panelboard schedule and shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 50C, rise above 40C ambient. Heat rise test shall be conducted in accordance with Underwriters Laboratories Standard UL 87. The maximum temperature shall not exceed 100C. The maximum temperature shall be the maximum of actual heat tests. All current carrying parts of the bus shall be tin plated copper.
Bus structure shall be insulated. Bus bar connections to the branch circuit breakers shall be made in accordance with the bus sequence type and shall accept bolt-on circuit breakers for lighting and appliance panelboards.
Provide a bare non-insulated and/or insulated ground bus and full or double size neutral bus as required and indicated in each panelboard schedule.
Each panelboard shall have an engraved label/nomenclature. Nomenclatures shall be white with black letters and show panel designation. Nomenclatures shall be attached with stainless steel screws.
Place a name, complete typewritten directory card identifying the load served by each branch circuit in the frame on the panel door, under a clear plastic cover. Spaces and spaces shall be written with a suitable pen or pencil in a uniform position. Legend indicating what where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturers, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state "Caution - Series Rated System." (NEC 110-22). Nomenclature shall identify replacement components.
A. Circuit Breakers
Where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturers, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state "Caution - Series Rated System." (NEC 110-22).
1. Distribution Panelboards:
Circuit breakers shall be equipped with individually insulated, broced and protected connections. The front faces of all circuit breakers shall be flush with each other, large, permanent, individual circuit numbers shall be affixed to each breaker in a uniform position. Breakers shall be clearly shown by the breaker handle taking a position between "ON" and "OFF". Provisions for additional breakers shall be such that no additional connectors will be required to add breakers. Circuit breakers shall be of the frame size, trip setting and interrupting capacity as indicated on the drawings.
Current limiting circuit breakers shall be equal to Square O Company "I-Limit" - Series.
Circuit breakers shall be conventional interrupting capacity but in no case be less than the following symmetrical ampere RMS:
FRAME SIZE/ VOLTAGE INTERRUPTING CAPACITY HIGH CURRENT INTERRUPTING CAPACITY
1000W /240V 10,000 AC 65,000 AC 200,000 AC
225W /240V 10,000 AC 65,000 AC 200,000 AC
400W /240V 42,000 AC 65,000 AC 200,000 AC
600W /240V 42,000 AC 65,000 AC 200,000 AC
800W /240V 42,000 AC 65,000 AC 200,000 AC
1000W /240V 42,000 AC 65,000 AC 200,000 AC
1200W /240V 42,000 AC 65,000 AC 200,000 AC
100W /480V 14,000 AC 25,000 AC 200,000 AC
225W /480V 22,000 AC 65,000 AC 200,000 AC
400W /480V 30,000 AC 65,000 AC 200,000 AC
600W /480V 30,000 AC 65,000 AC 200,000 AC
800W /480V 30,000 AC 65,000 AC 200,000 AC
1000W /480V 30,000 AC 65,000 AC 200,000 AC
1200W /480V 50,000 AC 65,000 AC 200,000 AC
All main circuit breakers shall be vertically mounted and shall not be installed in branch breaker spaces. Circuit breakers shall be bolt-on thermal-magnetic, molded case circuit breakers. Breakers shall be 1, 2, or 3 pole with an integral operator to ensure simultaneous opening of all poles in multiple circuit breakers. Breakers shall have an over-center, tri-free, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication. Handles shall have "ON", "OFF" and "TRIP" positions. Circuit breakers shall be UL listed in accordance with UL Standard 489 and shall be rated 277 volts ac (single pole, 15-30 ampere) or 480/277 volts ac (2 and 3 pole) with continuous current ratings as noted on the plans. Interrupting ratings shall be 14,000 rms symmetrical ampere of 277 volts ac (single pole) or 480/277 volts ac (2 and 3 pole). Single pole, 15 and 20 ampere circuit breakers intended to switch fluorescent lighting loads on a regular basis shall carry the SMD marking. The lugs for terminating conductors shall be rated at 75°C.
3. 240 Volt lighting and Appliance Panels/boards:
All main circuit breakers shall be vertically mounted and shall not be installed in branch breaker spaces. Circuit breakers shall be bolt-on thermal-magnetic, molded case circuit breakers. Breakers shall be 1, 2, or 3 pole with an integral operator to ensure simultaneous opening of all poles in multiple circuit breakers. Breakers shall have an over-center, tri-free, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication. Handles shall have "ON", "OFF" and "TRIP" positions.
Circuit breakers shall be UL listed in accordance with UL standard 489 and shall be rated 240 volts ac maximum with continuous current rating as noted on the plans. The lugs for terminating conductors shall be rated at 75°C.
Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" at 120V ac and carry the SMD marking.
UL Class A ground fault circuit protection shall be provided on all receptacle circuits serving wet areas and on all 120V ac branch circuits as specified on the plans or panelboard schedule. This protection shall be on integral part of the branch circuit breaker, which also provides overload, and short circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole circuit breaker with integral ground fault circuit interruption shall require no more panelboard ground circuit space than a conventional circuit breaker. Circuit breakers shall be rated 10,000 AC at 240V unless otherwise noted on plans.