

READ THIS FIRST

Notice to the Design Engineer, this document is part of Facilities and Infrastructure standards for Electrical Systems. Designers are advised to NOT use this template (*.doc) document as part of any project contract documents. Designers shall use the Port of Seattle MasterSpec specifications from the following link:

<https://www.portseattle.org/page/guide-specifications>.

Designers shall edit the corresponding Port's MasterSpec specification to meet the F&I Electrical Standard outlined in this specification. Note that Port's MasterSpec specifications contain specifications and languages for both Aviation and Maritime Divisions. F&I Standards are strictly for Aviation Division, and any Maritime related specs or languages should be removed from the project specifications.

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 AND NOTES TO DESIGNER

- A. Section Includes:
 - 1. Distribution panelboards 800A through 1200A.
 - 2. Lighting and appliance branch-circuit panelboards 100A through 600A.
 - 3. Load centers.
- B. All new panels shall be labeled with Arc Flash Hazard, as calculated by engineer of record. Refer to Standard Section 260573 for detailed information on Power System Studies requirements.
- C. When the design includes circuiting to panelboards that are old and in poor condition, panel shall be replaced as part of the design with a new 54 circuit panelboard with main circuit breaker.
- D. New panelboards shall have minimum 54 circuits, with the exception of 208/120V panels in elevator machine rooms serving only elevator loads.
- E. Designers shall use Port STIA standard panel schedule in excel format. Schedules for specific panels may be available from F&I. Panel schedule template is available on the Port Internet site.
 - 1. Designer shall submit electronic version of panel schedules to F&I at 60 & 100% Design.
- F. Designer shall include standard panelboard door-in-door detail in project drawings.

1. Detail shall include complete text in compliance with Port STIA standard for all phenolic labels.
- G. Main Circuit Breaker is required for all panelboards that are not located in the same room as the source panel or that are serving a specific tenant or user group.
- H. Panelboards shall have individual feeds. Multiple section panels with feed-through lugs are allowed only with F&I approval.
- I. Fully rated panelboards are standard. No series rated panelboards are allowed.
- J. Circuit breakers are the standard protective device for mains and branch circuits unless fuses are required for interrupting high fault currents.
- K. 200% neutral bus is required for panels serving predominantly computer loads, sensitive electronic loads, lighting with electronic ballasts variable frequency drives and other non-linear loads.
- L. Surge Protective Devices is required for panels serving predominantly computer loads and sensitive electronic loads.
- M. Panelboard shall have a minimum of 25% spare breaker capacity and 30% spare load capacity. 50% spare breaker capacity is preferred.
- N. For new distribution panelboards, a metering section or separate metering cabinet must be included, with capacity to hold a minimum of 6 meters. Refer to Section 262713 – Electrical Power Metering for meter cabinet requirements.
 1. In the beginning of a project, Designers shall coordinate with F&I and Utility Department on the desire for new panelboard/distribution board to have integrated multi-point metering.
 - a. On the drawing and/or within this specification, Designer shall specify the correct CTs sizes for each circuit in the new panelboard.
- O. When the design includes (new or modified) metered circuits in existing panelboard(s), Designer shall replace the existing CTs if the CTs do not meet the requirement of the new or modified circuits.
- P. When calculated available fault current is within 10% of standard panel AIC rating, panel shall be specified with the next higher AIC rating.
 1. Example: if panelboard comes in standard ratings of 14kAIC and 22kAIC, and calculated AIC is 12.6kA or greater, panel shall be specified with 22kAIC rating.

1.3 DEFINITIONS

- A. SPD: Surge Protective Device

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Include evidence of NRTL listing for series rating of installed devices.
 - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 7. Include wiring diagrams for power, signal, and control wiring.
 - 8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Section 260548 "Seismic Controls for Electrical and Communication Work." Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field Quality-Control Reports:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- D. Panelboard Schedules:
 - 1. Panelboard schedules shall utilize the POS standard panel schedule in Microsoft Excel format which has provision for totaling all loads and performing demand calculations by load category.

2. Electronic copies of schedules are available from the Facilities and Infrastructure department. The STIA standard template is available on the Port of Seattle internet site, included with the STIA Electrical Standards.
<https://www.portseattle.org/page/design-standards>
3. This schedule shall be updated with as-built information upon the completion of the project. The contractor shall post a hard copy of the revised panel schedule in any panel modified and submit an electronic copy of the panel schedule in Port standard excel format showing accurate as-built information to F&I.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.
- B. Panelboard Schedules: Provide panel schedules accurately representing as-built conditions.
 1. Provide hard copies for installation in panelboards. Submit final versions after load balancing.
 2. Provide electronic copies in Port standard Excel format to F&I upon project completion.
 3. Panel schedules must include the date of panel or circuit installation.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Keys: Two spares for each type of panelboard cabinet lock.
 2. Touch-up Paint: One pint container of paint matching enclosure finish packaged with protective covering for storage and identified with labels.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

- C. Product Selection for Restricted Space: Verify that product submitted will fit in space shown on drawings and meet NEC working clearance requirements.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Comply with UL 67, UL 50 and NEMA PB 1.
- F. Comply with NFPA 70.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation if required by storage conditions.
- B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding 23 deg F to 104 deg F.
 - b. Altitude: Not exceeding 1000 feet.

1.11 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Section 260548 "Seismic Controls for Electrical and Communication Work."
- B. Main Circuit Breaker: Required for all panelboards that are not located in the same room as the source panel, or that are serving a specific tenant or user group.
- C. Enclosures: Flush- and surface-mounted cabinets.
 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R or 4.
 - c. Corrosive Locations: NEMA 4X.
 - d. Hazardous Locations: NEMA 7.
 - e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.
 2. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Except NEMA 3R enclosures. Two locks required. Full size door allowing access to interior of panel shall have maintenance master keyed lock. Smaller door allowing access to circuit breaker handles shall also have a lock keyed for access by maintenance. Depending on the use group and area, this door may remain unlocked for user group access to the circuit breakers or maintenance may optionally keep this door locked. Special locks from Maintenance shall be added to the panel.
 3. Panel doors shall have a continuous piano hinge for 110 degree opening minimum.
 4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
 5. Finishes:
 - a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Same finish as panels and trim.
 6. Extend front of panelboards to include a door for panelboards located outside of dedicated electrical room. Door shall be lockable and shall shield breakers from operation by unauthorized personnel.
 7. Directory Card: Inside panelboard door, mounted in welded metal frame with transparent protective cover. Card shall contain the computer printed copy of the panel schedule using the F&I standard panelboard schedule.
- D. Phase, Neutral, and Ground Buses:
 1. Material: Hard-drawn copper, 98 percent conductivity, silver plated.
 2. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box. Provide where required by sensitive loads.

3. Neutral Bus: 100% rated.
 4. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus for panelboards with predominantly computer loads, sensitive electronic loads, lighting with electronic ballasts variable frequency drives and other non-linear loads.
- E. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity, tin or silver plated copper
 2. Main and Neutral Lugs: Mechanical type.
 3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
 4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 6. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
- F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.
- G. Future Devices: Provide approximately 25% spare breakers of the size most used in the panel and 30% space for future load growth.
- H. Panelboards shall be fully rated. Manufacturer documentation shall be permanently affixed to the surface of the panelboard indicating circuit breaker types.
- I. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assure that panelboard interrupting ratings exceed present and expected future available fault currents. No series rated breakers allowed.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
- B. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2.

2.3 DISTRIBUTION PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: ;

1. EATON
2. General Electric Company
3. Square D

- B. Panelboards: NEMA PB 1, power and feeder distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
 - 1. For doors more than 36 inches high, provide two latches, keyed alike.
- D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. EATON
 - 2. General Electric Company.
 - 3. Square D.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
- E. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.
- F. Provide minimum 54 breaker spaces in branch circuit panels.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Provide products by panelboard manufacturer.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 225 A and larger. Main and branch circuit breaker above 225A to be 100% rated.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time time adjustments.
 - c. Ground-fault pickup level, time delay, and I^2t response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip) where required.
6. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip) where required.
7. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - c. Ground-Fault Protection: Integrally mounted or remote-mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator, where required by engineering considerations
 - d. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage, where required by engineering considerations.
 - e. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay as required by engineer of record.
 - f. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts. Provide for conveyor motor loads, panelboard mains and as required by contract drawings.
 - g. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function with other upstream or downstream devices.
 - h. Multipole units enclosed in a single housing or factory assembled to operate as a single unit where required by engineer of record.
 - i. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

2.6 ACCESSORY COMPONENTS AND FEATURES

- A. Shunt trip breakers for load management purposes. 120-V trip coil energized from separate circuit.
- B. Transient Voltage Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2.
- C. Ground Fault Circuit Interrupter (GFCI) circuit breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- D. Feed-through lugs
- E. Double main lugs

- F. Adjustable trips where engineered coordination settings are provided.
- G. Current Transformers:
 - 1. Round, 2.5" diameter, rated for 600VAC, 50-400 Hz, flexible leads.
 - 2. Must be compatible with EATON PEM series meters. Instrument class meters with 5 amp secondaries.
 - 3. 125:5 CURRENT TRANSFORMERS WILL NOT BE ALLOWED.
 - 4. Approved manufacturers: ITI 2DARL (for 250A and smaller, ITI 5DARL (for larger than 250 amps), or F&I approved equal.

PART 3 - INSTALLATION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PANELBOARD INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Flush mounted panelboard fronts shall be oversized by approximately $\frac{3}{4}$ " to cover rough opening for recessed panelboards.
- C. Surface mounted panelboard fronts shall have same dimensions as enclosure.
- D. Wall Mounted Panelboards: Top of trim shall be 72" above finished floor for Lighting and Appliance Panelboards.
- E. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- F. Highest operating handle for Distribution panelboards shall be 78" or less.
- G. Floor Mounted Panels: Install panelboards on concrete bases, 3-1/2 inch nominal thickness. Concrete shall be rated for minimum 3000 psi.
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of base.

2. For panelboards, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 4. Install anchor bolts to elevations required for proper attachment to panelboards.
 5. Attach panelboard to the vertical finished or structural surface behind the panelboard.
- H. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- I. Comply with mounting and anchoring requirements specified in Section 260548 "Seismic Controls for Electrical and Communication Work."
- J. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- K. Install overcurrent protective devices and controllers not already factory installed.
1. Set field-adjustable, circuit-breaker trip ranges.
- L. Where flush mounted panelboards are below accessible ceilings, provide six 1-inch empty conduits from top of panelboard into accessible ceiling space for future branch circuit conductors. (This may not apply if there is little or no possibility of additional load on panels).
- M. Torque main lugs per manufacturer's recommendations. When manufacturer recommendations are unavailable, use UL 486A and UL 486B for torque values. Place a spot of red paint on lugs after torquing such that paint will be visibly disturbed if lugs are disturbed.
- N. Current Transformers: Securely support CTs so that transformer leads are not bearing weight and are not under pressure.
- O. Comply with NECA 1.
- P. Areas accessible to non-electrical staff in non-finished areas shall have the code required working clearance areas painted in front of the panel on the concrete floor.

3.3 **IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; describe branch circuits as to the type of load and location using room numbers, column lines or other easily recognizable descriptions. Obtain approval from maintenance department before installing. Use a computer to create directory; handwritten directories are not acceptable. Include date of last changes made and name of individual and firm making changes.

- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- E. Provide the following placard at each panelboard:
 - 1. "NOTIFY AV MAINTENANCE IMMEDIATELY IF ANY CIRCUIT BREAKER TRIPS OR CIRCUIT LOADS NEED TO BE ALTERED".
- F. Provide Arc Flash Hazard label on panelboard. Label shall include the following information: Date of study, Engineer of Record, Arc Flash Level and Port of Seattle Representative initial.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Acceptance Testing Preparation:
 - 1. Megger test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Verify continuity and tightness of ground connections.
 - 3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 4. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: The Port shall have the option of performing its own infrared inspection.
 - c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- D. Panelboards will be considered defective if they do not pass tests and inspections.

- E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action. Submit test and inspection reports to F&I.

3.5 **ADJUSTING**

- A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573 "Power system Studies."
- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
 - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - 4. Tolerance: Difference exceeding 10 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

END OF SECTION 262416

Except as noted below:

Panel Schedule Tutorial

Single Phase and Three Phase Panel Schedules

Panel Trim Door in Door Type Drawing (262416e)

Panel Trim Panel Schedule Holder (262416f)