Section 262816 - Enclosed Switches and Circuit Breakers

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
			2. SUBMITTALS
				1. Section Includes:

Non-fusible switches.

Enclosures.

Molded-case circuit breakers (MCCBs).

* + - 1. DEFINITIONS
				1. NC: Normally closed.
				2. NO: Normally open.
				3. SPDT: Single pole, double throw.
			2. PERFORMANCE REQUIREMENTS
				1. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

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.".

* + - 1. ACTION SUBMITTALS
				1. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

Enclosure types and details for types other than NEMA 250, Type 1.

Current and voltage ratings.

Short-circuit current ratings (interrupting and withstand, as appropriate).

Include evidence of NRTL listing for series rating of installed devices.

Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

* + - * 1. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

Wiring Diagrams: For power, signal, and control wiring.

* + - 1. INFORMATIONAL SUBMITTALS
				1. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

* + - 1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 01700 "Project Closeout" include the following:

Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

* + - 1. QUALITY ASSURANCE
				1. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source and single manufacturer.
				2. 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.
				3. Comply with NFPA 70.
			2. PROJECT CONDITIONS
				1. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.

Altitude: Not exceeding 6600-feet.

* + - 1. COORDINATION
				1. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
1. PRODUCTS
	* + 1. NONFUSIBLE SWITCHES
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

[Eaton](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5b89e87f35-19ca-4028-83ba-a4bc0097ad0a%5d%20Type%5bManufacturerUrl%5d&src=altarix).

[General Electric Company](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5bd8e04d81-a29f-4fa0-af20-a4bc0097ad0b%5d%20Type%5bManufacturerUrl%5d&src=altarix).

[Siemens Industry, Inc](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5bd7018077-4130-4d0e-ae28-a4bc0097ad0b%5d%20Type%5bManufacturerUrl%5d&src=altarix).

[Square D; by Schneider Electric](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5bd9267a28-c0e6-4daa-8488-a4bc0097ad0c%5d%20Type%5bManufacturerUrl%5d&src=altarix).

* + - * 1. Type HD, Heavy Duty, Single Throw, 240-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
				2. Accessories:

Equipment Ground Kit: Internally mounted and labeled for copper ground conductors.

Lugs: Mechanical type, suitable for number, size, and conductor material.

* + - 1. MOLDED-CASE CIRCUIT BREAKERS
				1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2155) Subject to compliance with requirements, provide products by one of the following:

[Eaton](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5b89e87f35-19ca-4028-83ba-a4bc0097ad0a%5d%20Type%5bManufacturerUrl%5d&src=altarix).

[General Electric Company](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5bd8e04d81-a29f-4fa0-af20-a4bc0097ad0b%5d%20Type%5bManufacturerUrl%5d&src=altarix).

[Siemens Industry, Inc](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5bd7018077-4130-4d0e-ae28-a4bc0097ad0b%5d%20Type%5bManufacturerUrl%5d&src=altarix).

[Square D; by Schneider Electric](http://www.specagent.com/LookUp/?Section=262816&SectionReleaseDate=&DocType=FL&ToolID=1&uid=Id%5bd9267a28-c0e6-4daa-8488-a4bc0097ad0c%5d%20Type%5bManufacturerUrl%5d&src=altarix).

* + - * 1. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
				2. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.
				3. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 100 percent rated.
				4. MCCBs shall be equipped with a device for locking in the isolated position.
				5. Lugs shall be suitable for 140 deg F rated wire on 125-A circuit breakers and below 167 deg F rated wire.
				6. Standards: Comply with UL 489 and NEMA AB 3, with interrupting capacity to comply with available fault currents.
				7. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

Instantaneous trip.

Long- and short-time pickup levels.

Long- and short-time time adjustments.

* + - * 1. Features and Accessories:

Standard frame sizes, trip ratings, and number of poles.

Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.

Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.

* + - 1. ENCLOSUREs
				1. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

Outdoor Locations: NEMA 250, Type 3R.

* + - * 1. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1) gray baked enamel paint, electrodeposited on cleaned, phosphatized galvannealed steel (NEMA 250 Types 3R, 12).
				2. Operating Mechanism: The circuit-breaker operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
				2. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS
				1. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.

Indoor, Dry and Clean Locations: NEMA 250, Type 1.

Outdoor Locations: NEMA 250, Type 3R.

* + - 1. INSTALLATIOn
				1. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
				2. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
				3. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
				4. Install fuses in fusible devices.
				5. Comply with NECA 1.
			2. IDENTIFICATIOn
				1. Comply with requirements in Section 260553 "Identification for Electrical Systems”

Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

Label each enclosure with engraved metal or laminated-plastic nameplate.

* + - 1. ADJUSTINg
				1. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.
				2. Set field-adjustable circuit-breaker trip ranges to values indicated on the shop drawing review comments.

END OF SECTION 262816