SECTION 26 28 16

**ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**BASED ON DFD MASTER ELECTRICAL SPEC DATED 03/01/21**

This section has been written to provide an outline for specialty situations that you may encounter regarding circuit breakers. Depending on the requirements of your specific project, you will need to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.

This section applies to standalone, separately-enclosed circuit breakers.

**PART 1 - GENERAL**

**SCOPE**

The work under this section includes enclosed circuit breakers. Included are the following topics:

PART 1 - GENERAL

 Scope

 Related Work

 References

 Submittals

Operation and Maintenance Data

 Regulatory Requirements

 Delivery, Storage, and Handling

PART 2 - PRODUCTS

 Circuit Breakers

 Ratings

 Enclosure

 Accessories

PART 3 - EXECUTION

 Installation

 Adjusting

 Field Quality Control

 Construction Verification Items

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Section 26 08 00 - Commissioning of Electrical.

Section 01 91 01 or 01 91 02 – Commissioning Process

**REFERENCES**

NEMA AB 1 ‑ Molded Case Circuit Breakers

NEMA KS 1 ‑ Enclosed Switches

**SUBMITTALS**

Include circuit breaker ratings, withstand ratings, frame size, time-current and let‑through current curves, outline dimensions, and terminal lug sizes.

Documentation shall be provided for Arc Energy Reduction where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200A or higher.

# OPERATION AND MAINTENANCE DATA

All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

**REGULATORY REQUIREMENTS**

Circuit breakers listed by Underwriter's Laboratories, Inc., and suitable for specific application.

**DELIVERY, STORAGE, AND HANDLING**

Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

**PART 2 - PRODUCTS**

**CIRCUIT BREAKERS**

Molded Case Circuit Breakers: Inverse time with integral thermal and instantaneous magnetic trip elements in each pole.

***The consultant shall identify electronic trip circuit breakers and circuit breakers with ground fault protection on the drawings.***

Electronic Trip Circuit Breaker: As scheduled on the drawings, electronic circuit breakers shall have, at a minimum, adjustments for long time trip, short time trip and instantaneous trip.

Provide integral ground fault sensing with adjustable ground fault trip where indicated on the drawings.

Provided for Arc Energy Reduction where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200A or higher.

**RATINGS:**

Ratings as shown on the Drawings.

**ENCLOSURE**

Enclosure:

Indoor: NEMA Type -1 code gauge steel with rust inhibiting primer and baked gray enamel finish.

Outdoor: NEMA 3R code gauge zinc coated steel with baked gray enamel finish [NEMA 4X stainless steel with brushed finish].

Corrosive Areas, Kitchen/Food service areas, Therapeutic/Pool spaces and Damp/Wet locations: NEMA type 4X, 304 stainless steel with brushed finish.

***Consultant shall delete all accessories not needed on this project.***

**ACCESSORIES**

Provide accessories as scheduled, to NEMA AB 1.

Shunt Trip Device: [120] [\_\_\_\_\_] volts, AC. Electrically operated solenoid for remote opening of circuit breaker main contacts.

Auxiliary Switch: 120 volts, [ 5 ] [ ] amps. One set of normally open and one set of normally closed contacts. Contacts signal the status of CB main contacts independent of the method used to open or close CB.

Alarm Switch: 120 volts, [ 5 ] [ ] amps. One set of normally open and one set of normally closed contacts. Contact activation upon any trip function of the CB or external trip device.

Electric Operator: 120 volts, [ 5 ] [ ] amps.

Handle Lock: Include provisions for padlocking.

**PART 3 - EXECUTION**

**INSTALLATION**

Install enclosed circuit breakers where shown on Drawings, in accordance with manufacturer's instructions.

Install free standing enclosed circuit breakers on a 3.5 inch high concrete equipment pad.

Install 90 degree C insulated conductors based on ampacity of 75 degree C conductors when utilizing 100% rated OCPD’s. Consult manufacturer’s requirements for specific devices.

**ADJUSTING**

Adjust all operating mechanisms for free mechanical movement.

Adjust trip and time delay settings to values as recommended in coordination study or as instructed by the A/E. Include a copy of the coordination study and recommended circuit breaker set points in the O&M manual

**FIELD QUALITY CONTROL**

Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.

Check tightness of accessible bolted bus joints using a calibrated torque wrench. Tightness shall be in accordance with manufacturer's recommended values.

Touch up scratched or marred surfaces to match original finish.

Inspect visually and perform several mechanical ON-OFF operations on each device.

**CONSTRUCTION VERIFICATION**

Contractor is responsible for utilizing the construction verification checklists supplied under specification Section 26 08 00 in accordance with the procedures defined for construction verification in Section 01 91 01 or 01 91 02.

END OF SECTION