

SECTION 16412
CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes molded-case and insulated-case circuit breakers

B. Related Sections:

1. Section 16441 – Switchboards
2. Section 16442 - Panelboards

1.2 REFERENCES

A. NEMC (National Electrical Contractors Association) – Standard of Installation

B. NEMA AB 1 – (National Electrical Manufacturers Association) – Molded Case Circuit Breakers

C. NETA ATS (International Electrical Testing Association) – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS:

- A. Project Record Documents: Record actual locations and continuous current ratings of circuit breakers.
- B. Product Data: Submit catalog sheets showing ratings, trip units, time current curves, dimensions, and enclosure details.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations and continuous current ratings of circuit breakers.
- B. Section 01700 – Closeout and Turnover Procedures

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years motor control center manufacturing experience.

PART 2 - PRODUCTS

2.1 MOTOR CASE CIRCUIT BREAKER

- A. Products Description: molded-case circuit breaker conforming to NEMA AB 1, suitable for use as service entrance equipment where so applied.
- B. Non Field-Adjustable Trip Circuit Breaker: Circuit breakers with frame size below 200 amperes U.O.N. Cutler-Hammer type FD or equal
- C. Field-Changeable Field-Adjustable Ampere Rating Circuit Breaker: Circuit breakers with frame size above 200 amperes, U.O.N. Cutler-Hammer type KD or equal.
- D. Current Limiting Circuit Breaker: Circuit breaker indicated as current-limiting has automatically-resetting current limiting elements in each pole. Let-through Current and Energy: Less than permitted for same size Class RK-5 fuse.
- E. Solid-State Circuit Breaker: Electronic sensing, timing, and tripping circuits for adjustable current settings; ground fault trip with integral ground fault sensing (if required); instantaneous trip; and adjustable short time trip. Circuit breakers with frames size 400 amperes and above. Cutler-Hammer type LD-310 or equal
- F. Current Limiter: Designed for application with molded case circuit breaker.
 - 1. Coordinate limiter size with trip rating of circuit breaker to prevent nuisance tripping and to achieve interrupting current rating specified for circuit breakers.
 - 2. Interlocks trip circuit breaker and prevent closing circuit breaker when limiter compartment cover is removed or when one or more limiter is not in place or has operated.
- G. Accessories: As scheduled to meet project requirements. Confirm to NEMA AB 1
 - 1. Shunt Trip Device: As specified by project, 120 VAC U.O.N.
 - 2. Under Voltage Trip Device: As specified by project, 120 VAC U.O.N.
 - 3. Auxiliary Switch: As specified by project. 2A, 2B U.O.N.
 - 4. Alarm Switch: As specified by project. 1A/1B U.O.N.
 - 5. Electrical Operator: As specified by project 120 VAC U.O.N.
 - 6. Handle lock: Provisions for padlocking.

7. Ground Lug: In each enclosure

H. Applications

1. Molded case circuit breakers may be installed as individually mounted enclosed breakers or in switchboards, distribution panelboards or on busway systems as main or distribution devices.
- I. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Provide solid neutral assembly and ground bar.

2.2 INSULATED CASE CIRCUIT BREAKER

- A. Product Description: Enclosed, insulated-case circuit breaker conforming to NEMA AB 1, suitable for use as service entrance equipment where so applied.
- B. Trip Unit: Electronic sensing, timing, and tripping circuits for adjustable current settings; ground fault trip with integral ground fault sensing, if required; instantaneous trip; and adjustable short time trip.
- C. Accessories: As scheduled to meet project requirements. Conform to:
 1. NEMA AB 1
 - a. Shunt Trip Device: As specified by project
 - b. Undervoltage Trip Device: As specified by project
 - c. Auxiliary Switch: As specified by project
 - d. Alarm Switch: As specified by project
 - e. Electrical Operator: As specified by project
 - f. Handle Lock: Provisions for padlocking
 - g. Grounding Lug: In each enclosure
 - h. Applications:
 - Insulated case circuit breakers may be installed as individually mounted enclosed breakers or, in switchboards, distribution panelboards or on busway systems as main or distribution devices.
- D. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Provide solid neutral assembly and equipment ground bar.

2.3 ENCLOSURE

- A. NEMA AB 1 as required to meet conditions for molded case or insulated case breakers. Fabricate enclosure from steel finished with manufacturer's standard gray finish.
 - 1. Interior Dry Locations: Type 1
 - 2. Exterior Locations: Type 3R
 - 3. Industrial Locations: Type as specified

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation."
- B. Install enclosed circuit breakers plumb. Provide supports in accordance with Section 16050.
- C. Height: 5 feet to operating handle
- D. Locate and install engraved plastic nameplates under the provisions of Section 16050.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.6.1.1.

3.3 ADJUSTING

- A. Adjust trip settings so that circuit breakers coordinate with other overcurrent protective devices in circuit as indicated in the project coordination study.
- B. Adjust trip settings to provide adequate protection from overcurrent and fault currents

3.4 EXISTING WORK

- A. Disconnect and remove circuit breakers
- B. Ensure access to existing enclosed circuit breakers and other installations which remain active and which require access. Modify installation provide access panel as appropriate.

- C. Clean and repair existing enclosed circuit breakers, which remain or are to be reinstalled.

END OF SECTION