

**Part 1        General**

**1.1            SECTION INCLUDES**

- .1        Materials for moulded-case circuit breakers and ground-fault circuit-interrupters.

**1.2            RELATED SECTIONS**

- .1        Section 01 11 00 - General Requirements.
- .2        Section 26 05 00 - Common Work Results for Electrical.

**1.3            REFERENCES**

- .1        Canadian Standards Association (CSA International).
  - .1        CSA-C22.2 No. 5-02(R2007), Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

**1.4            SUBMITTALS**

- .1        Submit product data in accordance with Section 01 00 01 - General Requirements.

**1.5            PRODUCT DATA**

- .1        Provide manufacturer's product data for all devices.
  - .1        Provide following information:
  - .2        Time current characteristic curves on full size (280 mm x 432 mm) log-log time/current graph paper.
  - .3        Fault interrupting capability of each device in symmetrical amperes at applied voltage.
  - .4        Time current curves for all circuit breaker overload, overcurrent and ground current tripping devices.
  - .5        Relay current transformer ratios, accuracy class and current sensor tap ranges.
  - .6        Motor control overcurrent protective device characteristics and curves.
  - .7        Current limiting let-through information for HRC fuses in graph form.
  - .8        Minimum melting and maximum clearing time/current curves for HRC fuses.

## 1.6 COORDINATION STUDY

- .1 Provide a coordination/protective study and short circuit study of all new equipment specified herein and submit for review. The study shall be completed by the panel manufacturer prior to shop drawing stage. Settings on breakers to be set according to the coordination study.
- .2 Include the following:
  - .1 Cable thermal damage curves
  - .2 600V, 208V molded case circuit breaker overcurrent, overload, and ground fault devices.
  - .3 347/600V, 120/208V panel boards, MCC's, emergency generator and switchgear, connecting feeder cables and UPS.
  - .4 Transformer damage curves, magnetizing currents for all transformers 150 kVA and larger.
  - .5 Locked rotor currents, acceleration times and damage curves for motors 75 kW and larger.
  - .6 Generator overcurrent device, generator short circuit curves.
  - .7 Any additional data necessary for successful completion of the coordination and short circuit study.
- .3 Data shall clearly state the operating time in cycles of each breaker and indicate whether the time current curves for relays are inclusive of breaker trippings time or otherwise.
- .4 Prepare a summation chart showing all ratings and settings with easy reference to the appropriate curve.
- .5 Symmetrical and asymmetrical fault current calculations shall be submitted to verify the correct choice of the protective elements of the system.
- .6 Prepare a systems single line diagram on which the resultant short circuit values, device numbers and equipment ratings are shown.
- .7 Include a list of recommended settings for each relay.

## Part 2 Products

### 2.1 BREAKERS GENERAL

- .1 Moulded-case circuit breakers and Ground-fault circuit-interrupters: to CSA C22.2 No. 5

- .2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
  - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers with interchangeable trips as indicated.
- .6 Circuit breakers to have minimum 10kA symmetrical rms interrupting capacity rating, and higher than the fault currents in the feeder.

## 2.2 THERMAL MAGNETIC BREAKERS [DESIGN A]

- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

## 2.3 FUSES

- .1 Plug and Cartridge Standard (STD) Fuses: to CSA-C22.2 No. 59.1-M1987 and as follows:
  - .1 Standard fuse interrupting ratings: 10 kA symmetrical.
  - .2 HRC fuses: to CAN/CSA-C22.2 No. 106-M92 and as follows:
    - .1 HRC fuse interrupting ratings: 200 kA symmetrical.
    - .2 HRC fuse types:
      - .1 HRCI-J non-time delay.
      - .2 HRCI-J time delay.
      - .3 HRCI-R non-time delay.
      - .4 HRCI-R time delay.
      - .5 HRCII-C (motor protection only).
      - .6 HRC-L non-time delay.
      - .7 HRC-L time delay.
  - .3 Voltage: as indicated in schedules.
  - .4 Ampacity: as indicated in schedules.
  - .5 Fuse Types: as indicated by equipment manufacturer.

## 2.4 OPTIONAL FEATURES

- .1 Include:

- .1 Shunt trip.
- .2 Auxiliary switch.
- .3 Motor-operated mechanism c/w time delay unit.
- .4 Under-voltage release.
- .5 On-off locking device.
- .6 Handle mechanism.

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## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install overcurrent protective devices as indicated, in accordance with manufacturer's written instructions.
- .2 Fasten overcurrent protective devices without causing mechanical stresses, twisting or misalignment of equipment in final position.
- .3 Set field-adjustable trip settings as indicated subsequent to installation.
- .4 Overcurrent protective device sizes and identification as specified in respective equipment schedules.

**END OF SECTION**