

**PART 1 - GENERAL**

- 1.1 An extremely low zero sequence impedance zig-zag reactor designed specifically to reduce loading of neutral conductors, reduce neutral-to-ground voltage and lower harmonic distortion in 3-phase, 4-wire systems.**
- .1 The unit must remove the 3<sup>rd</sup>, 9<sup>th</sup>, & 15<sup>th</sup> harmonics and other zero sequence currents by providing them with an alternate, low zero sequence impedance path. Removal of these currents by trapping them in a primary delta winding is NOT acceptable.
  - .2 Connected in parallel in a 3-phase, 4-wire system usually at the electrical distribution panel.
  - .3 Available Field Adjustable Impedance (FAI) option to allow for manual adjustment of the zero sequence impedance.
  - .4 Available Capacitive Reactance Compensation (CRC) option to provide inductive reactive current of up to 10% of NCE phase current rating.
  - .5 Harmonic mitigation shall be by electromagnetic means only. No capacitors or electronics shall be used.
  - .6 Evidence of relevant application experience must be available upon request.
- 1.2 Device Configuration:**
- .1 System Frequency: 60 [50][other] Hertz
  - .2 System Voltage: [120/208][277/480][347/600][other] Volts
  - .3 Neutral current ampacity: [60][75][100][150][175][225][250][300][350][400][500][600][other] Amps

**PART 2 - PRODUCT**

- 2.1 Key Requirements:**
- .1 Zero sequence impedance/reactance at 60Hz: Less than 0.95% and 0.3% respectively
  - .2 Load compatibility: K factor up to 20, Crest factor up to 4.5
  - .3 Neutral ampacity shall be three times the phase ampacity
  - .4 Ammeter complete with CT shall be supplied to display the neutral current being removed from the system by the unit. It shall be flush-mounted on the unit [supplied separately for remote mounting].
  - .5 Overcurrent protection for the filter shall not exceed 125% of the rated phase current.
- 2.2 Basic Requirements:**
- .1 Three-phase, common core construction. Convection air cooled
  - .2 Copper Windings
  - .3 Insulation Class: 220°C system
  - .4 Temperature rise: 130°C [80°C][115°C][other]
  - .5 Full load Efficiency at 170°C: 97% minimum
  - .6 Sound level: max. 45dB at 5 feet
  - .7 Enclosure: NEMA-3R ventilated sprinkler proof [Outdoor NEMA 3R enhanced][other]
  - .8 Finish: Grey [other]
  - .9 Anti-vibration pads shall be used between the core and the enclosure
  - .10 UL listed and CSA approved
  - .11 Built to NEMA ST-20 and in accordance with all applicable UL, CSA and ANSI/IEEE standards
  - .12 Warranty: 10 year pro-rated, with standard limited liability clauses
- 2.3 Options:**
- .1 Field Adjustable Impedance (FAI): Provides the opportunity to select a higher zero sequence impedance in situations where neutral current draw-off is unexpectedly high. Protects against overloading of the unit should load conditions or system configurations change.
  - .2 Over-Temperature switch wired to internal terminal strip. Temperatures specified for use with class 220°C insulation systems. Standard configuration is N.C. opening on high temperature. Optional configuration is N.O. closing on high temperature. Installation options: [one switch: 170°C or 200°C on center coil][two switches: 170°C and 200°C on center coil][six switches: one 170°C and one 200°C on each of the 3 coils]
  - .3 Device off-line alarm: Alarm to indicate when the unit has tripped off-line due to overloading or other operational problem. Includes a set of dry contacts for connection to customer's remote annunciator. This option is mandatory for installations that must meet the Canadian Electrical (CE) code if double ampacity neutrals are not included in the feeder circuit. (See section 26-266 in CE code book). The overcurrent protection required by CSA CE code rule 26-266 subrule (5) shall be equipped with an integral device arranged to activate a warning signal or alarm when operation of the overcurrent protection occurs.
  - .4 Capacitive Reactance Compensation (CRC): Provide inductive reactive current of up to 10% of NCE phase current rating to compensate for a leading power factor (PF) introduced by newer generation PF corrected power supplies.
- 2.4 Acceptable Product & Manufacturer:**  
NEUTRAL CURRENT ELIMINATOR™ (NCE™), by MIRUS International Inc.

**PART 3 - EXECUTION**

- 3.1 Installation**
- .1 The harmonic mitigation equipment shall be handled, stored and installed in accordance with the manufacturer's recommended installation practices as found in the installation, operation, and maintenance manual. Installation shall comply with all applicable codes.
- 3.2 Acceptance**
- .1 Harmonic compliance shall be verified with onsite field measurements of both the voltage and current harmonic distortion at the input terminals of the harmonic mitigating equipment with and without the equipment operating. A recording type Fluke 41 or equivalent harmonics analyzer displaying individual and total harmonic currents and voltages must be utilized.