

160MXT- Family

Surge Suppression Device

For Installation in the Service Entrance Power Distribution Panel

1.0 GENERAL

1.1 DESCRIPTION

These specifications describe the electrical and mechanical requirements for a high-energy transient voltage surge suppressor. The specified surge protective device shall provide effective high-energy surge diversion for application in ANSI/IEEE C62.41-2002 Location Category C3 environments. Testing per ANSI/IEEE C62.45-2002 using ANSI/IEEE C62.41-2002 Category C3 waveforms and amplitudes. UL1449 second edition listed, including the requirements of February 9, 2007. The specified surge protective device shall provide:

- 160,000 amps, per phase, of surge protection.
- Peak surge current ratings must be independently tested & verified.
- All mode protection, L-N, L-G, L-L, N-G.
- Each MOV protected from over-current, thermal overload and monitored individually.
- Green, power present LED, red, protection reduced LED on front panel. Internal red LED's to pinpoint problem areas.
- Audible fault alarm with silence switch.
- Event counter with reset and automatic memory backup.
- Remote alarm relay contacts (surge protected), Form C.
- 200 kAIC fusing.
- Micro-Z low impedance installation cable.
- Twenty year warranty on entire system
- LIFETIME "NO NONSENSE" WARRANTY ON FIELD REPLACEABLE INTERNALLY FUSED PROTECTION MODULES. Replacement fused modules are sent from factory stock, located in Deer Park, Long Island, New York, USA.

1.2 STANDARDS

The specified suppressor shall be designed, manufactured, tested and installed in compliance with:

- American National Standards Institute and Institute of Electrical and Electronic Engineers (ANSI/IEEE C62.11, C62.41, and C62.45)
- Federal Information Processing Standards Publication 94 (FIPS PUB 94)
- National Electrical Manufacturer Association (NEMA LS-1)
- National Fire Protection Association (NFPA 20, 70, 75 and 78)
- Underwriters Laboratories (UL 1449, second edition) listed, including the requirements of February 9, 2007
- CAN/C22.2 No. 8-M1986; CSA Electrical Certification Notice No. 516

The system individual units shall be UL listed under UL1449 Second Edition Standard for Transient Voltage Surge Suppressors (TVSS), including 2/9/2007 requirements and the surge ratings shall be permanently affixed to the TVSS.

1.3 ENTRANCE PANEL EQUIPMENT ELECTRICAL REQUIREMENTS

1.3.1 Environmental Requirements

A. Operating Requirements:

1. Operating temperature range shall be -40 to +70 degrees C (-40 to +160 degrees F).
2. Storage temperature range shall be -40 to +85 degrees C.
3. Operation shall be reliable in an environment with 0% to 95% non-condensing relative humidity.
4. The system shall be capable of operation up to an altitude of 13,000 feet above sea level.
5. Maximum continuous operating voltage shall be no less than 125% of the nominal rated line voltage.
6. The power frequency range shall be at 47 to 440 Hertz.

1.3.2 Electrical Requirements

A. Electrical Requirements:

1. Preferred method of connection via #10 AWG Micro-Z cable.
2. The rated single pulse current capacity for each mode of protection shall be no less than L-N 80 kA, L-G 80 kA, L-L 160 kA, N-G 120 kA (Delta: L-L 160 kA, L-G 160 kA) as per NEMA LS-1-1992.
3. The maximum listed surge rating of the specified protection modes shall not exceed the following in any mode as per UL1449 Second Edition Suppression Voltage Rating 6kV, 500A (8/20 μ s waveform), as per ANSI/IEEE C62.41 Category C3 waveform 20kV, 10kA (8/20 μ s waveform) and supported by independent third party testing documentation.

Service Voltage	6kV, 500A <u>Line-Neutral</u>	20kV, 10kA <u>Line-Neutral*</u>
120/240 VAC	500V	550V
120/208 VAC	500V	550V
220/380 VAC	900V	1040V
240/415 VAC	900V	1040V
240 VAC	900V	1040V
240/120/120 VAC	900/500V	1040/550V
277/480 VAC	1000V	1040V
347/600 VAC	1000V	1052V
480 VAC	1500V	2000V
600 VAC	1800V	2030V

Delta Models: Measurement made from Line – Ground.

4. The life expectancy of the device shall be measured by a minimum joules rating (8/20 μ s waveform):

Service Voltage	Joules Total
120/240 VAC	11,000j
120/208 VAC	11,000j
220/380 VAC	33,600j
240/415 VAC	33,600j
240 VAC	26,900j
240/120/120 VAC	21,570j
277/480 VAC	33,600j
347/600 VAC	38,640j
480 VAC	37,440j
600 VAC	43,200j

5. The maximum surge current capacity per phase of the specified system, based on the standard IEEE 8/20 microsecond waveform, shall be at least: 1 Event at 160 kA. The surge life (8/20 μ s) shall be at least 10,000 occurrences @ 6 kA. The transient suppression capability shall be bi-directional and suppress both positive and negative impulses.
6. The suppressor shall be capable of interrupting a 100 kA, short circuit current delivered from the AC power line. The interrupt capability must be confirmed and documented by a recognized independent testing laboratory.
7. The suppressor shall be designed so as to minimize the internal surge path impedance. Direct point-to-point internal wiring is inherently inductive and not acceptable. Connection to the power service shall be constructed as shown in the installation notes for best performance.
8. Equipment shall be as manufactured by MCG Surge Protection; Model: 160MXT Family or engineering department approved equal with supporting test data.

2.0 ENTRANCE PANEL PROTECTION SYSTEM COMPONENTS

- A. Protection Modules:** The suppressor shall be constructed using field replaceable protection modules. The suppressor shall have multiple surge paths per phase. Each surge path shall be individually over current fused, thermal sensed cut-off and monitored 40mm Metal Oxide Varistors (MOVs), including neutral to ground protection mode. Each module will provide multiple redundant protection, with one module per each phase and each MOV individually fused. The status of each module shall be locally monitored with an internal red LED to indicate specific module fault condition. The transient I_{peak} rating of the fuse shall be coordinated with the I_{peak} handling capability of the MOV so that the surge path capability is not limited by the series fusing. In addition, each MOV shall incorporate a thermal disconnect means to remove a shorted MOV safely from the protection system.
- B. Self-Diagnostics:** Red and green solid-state LED indicators shall be provided on the hinged front cover to indicate protection status. An illuminated green LED indicates power and protection is present at each phase, an illuminated red LED shall indicate protection reduced and/or when protection is lost. In addition to front panel LEDs a required internal status indication of phase and the neutral to ground module to provide power and fault indications in the event of even the loss of a single fuse or MOV. Also provided, on the hinged front cover is an event counter to record number of suppression events. Relay operation shall be in a fail-safe operating mode i.e., continuously energized so that power failure, reduced protection, or a break in the remote monitoring line will cause a fault indication at the remote monitor. Neon indicators are not permitted.

- C. **Remote Alarm Capability:** Relay alarm contacts shall be provided for remote alarm monitoring capability of unit status. Form C normally open and normally closed contacts shall be provided with voltage and current limiting protection.
- D. **Audible Alarm:** The specified system shall be equipped with an audible alarm, which shall be activated when any one or more of the modules has a reduced protection condition. A mute option shall be provided for the audible alarm.
- E. **NEMA 4 Enclosure:** 14 gauge steel.
- F. **Dimensions:** 12" X 15" X 5.5" (305mm X 381mm X 140mm)
- G. **Weight:** 35 lbs. (16,0 kg)

3.0 INSTALLATION AND MAINTENANCE

- A. The unit shall be installed in accordance with the manufacturer's printed instruction to maintain warranty. All local and national codes must be observed.
- B. Units shall be installed as close as possible to the panel board to which it is connected, using low impedance Micro Z cabling provided
- H. Detailed installation/maintenance instructions shall be provided to insure safety of maintenance personnel.
- I. Replaceable fused protection modules are required for simple maintenance. Internal construction should facilitate rapid repair. Repair time should not exceed 5 minutes.

4.0 20 YEAR WARRANTY

Manufacturer to provide 20-year warranty to cover repair or replacement with a new device. Manufacturer to provide no cost replacement of fused protection modules for the life of the suppressor.