

## 560LS - 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 C62.41-1991 Location Category C3 environments. Testing per ANSI/IEEE C62.45-1992 using ANSI/IEEE C62.41-1991 Category C3 waveforms and amplitudes. UL1449 second edition listed. The specified surge protective device shall provide:

- 560,000 amps, per phase, of surge protection.
- Fourteen times redundancy per phase.
- All mode protection, L-N, L-G, L-L, N-G.
- Each MOV protected from thermal overload by integral thermal disconnect that is monitored.
- Each MOV protected from over-current by 200kAIC rated fuses that are monitored.
- Front panel status LEDs indicate status of protection circuits. Internal LEDs indicate module status.
- NEMA 4 style enclosure – painted steel.
- Filtering standard (except for -600D). Models without filtering available upon request.
- Options available: 1. Upgraded front panel (includes event counter, remote alarm relay contacts Form C (surge protected), audible fault alarm with mute switch). 2. Internal disconnect switch. 3. Micro-Z connection cable, 4. NEMA 4X enclosure.
- Ten year warranty on entire system.
- LIFETIME "NO NONSENSE" WARRANTY ON FIELD REPLACEABLE 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
- CAN/C22.2 No. 8-M1986; CSA Electrical Certification Notice No. 516

The system individual units shall be UL listed under UL 1449 Second Edition Standard for Transient Voltage Surge Suppressions (TVSS) 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 320 kA/Ph, L-G 240 kA/Ph, L-L 560 kA, N-G 240 kA ( Delta L-L 560 kA, L-G 560 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 $\mu$ s waveform), as per ANSI/IEEE C62.41 Category C3 waveform 20kV, 10kA (8/20 $\mu$ 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 VAC	500V	590V
120/240 VAC	500V	590V
120/208 VAC	500V	590V
220/380 VAC	1000V	1098V
240/415 VAC	1000V	1098V
240 VAC	1000V	1098V
240/120/120 VAC	1000/500V	1098/590V
277/480 VAC	1000V	1098V
347/600 VAC	1200V	1368V
480 VAC	1500V	1678V
600 VAC	1800V	1910V

\* Delta Models – Measurement is made from Line – Ground.

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

Service Voltage	Joules Total
120 VAC	35,328
120/240 VAC	35,328
120/208 VAC	35,328
220/380 VAC	107,520
240/415 VAC	107,520
240 VAC	94,080
240/120/120 VAC	65,408
277/480 VAC	107,520
347/600 VAC	123,648
480 VAC	131,040
600 VAC	151,200

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 560 kA. The surge life (8/20 $\mu$ s) shall be at least 10,000 occurrences @25 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 kAIC, short circuit current delivered from the AC power line.
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: 560LS - 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 and thermally fused and monitored. 34mm Metal Oxide Varistors (MOVs) with integral thermal disconnect shall be used, including neutral to ground protection mode. Each module will provide seven times (7X) redundant protection, with two modules per each phase and seven fuses per module. The transient I<sub>peak</sub> rating of the fuse shall be coordinated with the I<sub>peak</sub> handling capability of the MOV so that the surge path capability is not limited by the series fusing.
- 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 present, an illuminated red LED shall indicate protection reduced and/or when protection is lost. Internal Bicolor LEDs (green/red) shall indicate module status (green – full protection, red – reduced protection). Relay operation, where equipped, 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.

- D. Remote Alarm Capability:** Optional relay alarm contacts, where required, shall be provided for remote alarm monitoring capability of unit status. Form C (normally open and normally closed contacts) shall be provided. Contacts shall be surge protected.
- E. Audible Alarm:** Optional audible alarm, where required, shall be provided, 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.
- F. NEMA 4 Enclosure:** 14 gauge steel.
- G. Dimensions:** 17"H X 15"W X 6"D (432mm X 381mm X 153mm)
- H. Mounting:** 17.75" X 13"/0.313" ID - 4 holes (451 X 330mm/7.9mm ID – 4 holes)
- I. Weight:** 47 lbs. (21.4 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. Detailed installation/maintenance instructions shall be provided to insure safety of maintenance personnel.
- C.** Replaceable fused protection modules are required for simple maintenance. Internal construction should facilitate rapid repair. Repair time should not exceed 10 minutes.

### 4.0 10 YEAR WARRANTY

Manufacturer to provide 10-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.