

SF400M-Family

Surge Suppression Device

For Installation at the Service Entrance 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 Category C3 waveforms and amplitudes. UL 1449 second edition listed. The specified surge protective device shall provide:

- 400,000 transient amps, per phase, of surge protection.
- All mode protection, L-N, L-G, L-L, N-G.
- Integral disconnect deadfront.
- Self diagnostics with comprehensive LCD digital readout on front panel showing the exact % level of protection available.
- Audible fault alarm with silence switch.
- Event counter, indication of time & date of last event (battery backup for time & date).
- Fused shared surge current paths. This device contains 9 redundant (shared paths) protection power modules and 18 fuses.
- 200 kAIC fusing.
- Remote alarm relay contacts (surge protected), Form C.
- Micro-Z low impedance installation cable.
- Ten year warranty on entire system.
- LIFETIME "NO NONSENSE" WARRANTY ON FIELD REPLACEABLE PROTECTION POWER MODULES AND FUSES. Replacement protection modules and fuses 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 (FIP 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. **Magnetic Fields:** Connection shall be made using low impedance Micro Z cabling provided with the suppressor for maximum magnetic field cancellation.
- B. **Operating Temperature:** Operating temperature range shall be -40 to +71 degrees C (-40 to +160 degrees F).
- C. **Storage Temperature:** Storage temperature range shall be -40 to +85 degrees C.
- D. **Relative Humidity:** Operation shall be reliable in an environment with 0% to 95% non-condensing relative humidity.
- E. **Operating Altitude:** The system shall be capable of operation up to an altitude of 13,000 feet above sea level.
- F. **Operating Voltage:** Maximum continuous operating voltage shall be 115% of the nominal rated line voltage.
- G. **Power Frequency:** The power frequency range shall be at 47 to 440 Hertz.

1.3.2 Electrical Requirements:

- A. **Unit Operating Voltage:** The nominal unit operating voltage shall be indicated in **Table 1.0**.
- B. **Nominal System Operating Voltage shall be:**

_____ VAC, _____ Phase, _____ Wire Plus Ground, _____ Type

Table 1.0

Model	Voltage	Description	Joules Total	Clamp @1mA	Vpeak L-N 10kA (8/20us)	Vpeak L-N 3kA (8/20us)	UL1449 2 nd Edition SVR
SF400M-120T	120/240 VAC	1phase, 3W + gnd	24,248j	220V	464V	376V	400V
SF400M-120Y	120/208 VAC	3phase, 4W + gnd, wye	24,248	220V	464V	376V	400V
SF400M-220Y	220/380 VAC	3phase, 4W + gnd, wye	60,480	410V	792V	680V	700V
SF400M-240D	240 VAC	3phase, 3W + gnd, delta	60,480	430V	1064V	800V	700V
SF400M-240DCT	240/120/120*	3phase, 4W + gnd, hi-leg	35,112	430/220V	1064/464V	800/376V	700/400V
SF400M-240Y	240/415 VAC	3phase, 4W + gnd, wye	60,480	430V	792V	680V	700V
SF400M-277Y	277/480 VAC	3phase, 4W + gnd, wye	64,800	510V	944V	880V	800V
SF400M-480D	480 VAC	3phase, 3W + gnd, delta	108,000	865V	1800V	1420V	1500V

*High-leg delta center tapped

- C. Unit shall be installed in parallel with the protected equipment. No series connected protective elements shall be used.
- D. Protection per mode shall be: L-N 240 kA, L-G 160 kA, L-L 400 kA, N-G 240 kA.

- E. 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 400 kA. The surge life (8/20us) shall be at least 10,000 @15 kA occurrences. The transient suppression capability shall be bi-directional and suppress both positive and negative impulses.
- F. The suppressor shall be capable of interrupting a 200 kA, short circuit current delivered from the AC power line. The interrupt capability must be confirmed and documented by a recognized independent testing laboratory.
- G. 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.
- H. Equipment shall be as manufactured by MCG Surge Protection; Model: SF400M-Family or engineering department approved equal with supporting test data.

2.0 ENTRANCE PANEL PROTECTION SYSTEM COMPONENTS

- A. **Replaceable Modules:** The suppressor shall be constructed using field replaceable plug-in, pluck-out modules and fuses. Each module shall consist of multiple 40 mm metal oxide varistors. The status of each module shall be locally monitored with two red LEDs one of which will illuminate if module protection is reduced to the 50 percent level. Protector will provide five times (5X) redundant protection, per phase, with three modules per each phase with two replaceable fuses per module.
- B. **Self-Diagnostics:** Red, green and yellow solid state LED indicators shall be provided on the hinged front cover to indicate protection status. An illuminated green LED indicates power is present at the protector on all phases, and an illuminated red LED shall indicate that one or more of the modules have reduced protection. An illuminated yellow LED shall indicate a suppression event. Both front panel and internal LEDs are required to provide power and fault indications. 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. **Integral Disconnect:** Unit shall be provided with deadfront disconnect to remove power from protector for maintenance access.
- D. **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.
- E. **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.
- F. **Advanced Diagnostic LCD Display:** A microprocessor controlled LCD display indicates the exact percentage of protection present on any phase. Should a reduced protection condition occur the display will call out the exact module to be replaced.
- G. **Transient Counter:** Transient event counter provides a date/time stamp on the occurrence of the most recent transient. Internal panel reset button shall be provided for resetting the counter.

H. **NEMA 4 Enclosure:** 14 gauge steel, with stainless steel hardware.

I. **Dimensions:** 21" x 14" x 6.5" Shipping weight: 51lbs maximum.

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 panelboard to which it is connected - preferably within 2 feet of the panelboard and using low impedance Micro Z cabling.
- C. Detailed installation/maintenance instructions shall be provided to insure safety of maintenance personnel.
- D. Plug-in, pluck-out modules and field replaceable fuses are required for simple maintenance. Internal construction should facilitate rapid repair. Repair time should not exceed 5 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 protection modules with coordinated fuses for the life of the suppressor.