
Specifying Surge Protection

Surges in a residence are generated by internal and external sources. Internal sources such as appliances and other equipment can generate surges to other devices connected to the same wiring. Defective equipment and on/off switching can generate surges in the thousands of volts. Externally generated sources include power line surges and lightning. A typical lightning flash measures 30M Volts and 30 kA. The surge energy that reaches a device varies with distance from the source of the surge. Some documents suggest 10kA is the largest surge that will reach the service disconnect of a residence. **Surge Protective Devices** limits these surges to prevent damage to equipment.

The markings required on the Surge Protection Device label help determine where the device may be applied. The required markings are:

- a. **Operating Voltage and Phase** – The voltage, phase and frequency the Surge Protector is meant to be connected to.
- b. **Nationally Recognized Test Laboratory (NRTL) Marking** – Surge Protective Devices for the US market are required by the National Electrical Code NFPA 70 to be listed by a Nationally Recognized Test Laboratory. UL, CSA, ETL, etc.
- c. **Maximum Continuous Overvoltage (MCOV)** – The maximum RMS voltage that may be continuously applied to the Surge protection device
- d. **Nominal Discharge Current (In)** – The peak current the Surge Protection Device can handle 15x surges of and remain functional. The Nominal Discharge Current predicts how long the protector will last. A 3kA rated protector can handle a minimum of 15 surges at 3kA which is similar to 15 nearby lightning strikes.
- e. **Surge Protection Device Type (1,2,3)** – Specifies where the protector may be installed. Type 1 may be installed before the service disconnect. Type 2 may be installed directly after the service disconnect. Type 3 must have a minimum of 30 feet of conductor between the service disconnect and the protector.
- f. **Short Circuit Current Rating (SCCR)** – The maximum amount of short circuit current the AC power circuit can deliver should be equal to or less than this number
- g. **Voltage Protection Rating (VPR)** – The voltage a protector limits a 6kV 3kA surge to during test. This duration of this voltage is microseconds.

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The chart below shows the internal protection MCOV rating built in Goulds Water Technology Variable Frequency Drives and recommended MCOV for Surge Protective Devices.

Goulds VFD	MCOV Rating (Maximum Continuous Operating Voltage)		Surge Protective Device	
	Input (Vac RMS)	Output (Vac RMS)	Input Vac	Manufacturer and Part Number
1151AB2	150	NA	150	Square D: SDSA-1175 Ditek: D50-120/2401
1AB2	320	NA	300	
2AB2	320	NA	300	
3AB2	320	420	300	
5AB2	320	420	300	
1AS15	320	420	300	
3AS20	320	420	300	
3AS30	320	420	300	
3AS50	320	420	300	
SPD2XXXX 1 phase	300	300	300	
CPC2XXXX 1 phase	300 L-L, 380 L-G	NA	300	
AVB1-4XXX	625	NA	550	Square D: TVS5EMA10A
AVB5XXX	680	NA	650	
CPC2XXXX 3 phase	300 L-L, 380 L-G	NA	300	Square D: TVS3HWA10X
CPC4XXXX	600 L-L, 685 L-G	NA	550	Square D: TVS5EMA10A
CPC5XXXX	770 L-L, 770 L-G	NA	650	
HV 2.XXX	300 L-L, 300 L-G	NA	300	Square D: TVS3HWA10X
HV 4.XXX	600 L-L, 600 L-G	NA	550	Square D: TVS5EMA10A
SPD2XXXX 3 phase	300	300	300	Square D: TVS3HWA10X
SPD4XXXX	550	550	550	Square D: TVS5EMA10A
SPD5XXXXX				



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