



IN OUR WORLD,
SOME THINGS ARE
FORBIDDEN





THE PROBLEM

TRANSIENT ENVIRONMENT

It is critical to invest in protection systems in order to mitigate the damages caused by transients. The investment in SineTamer® products will cut annual maintenance electrical and/or electronic costs and provide the benefit of return on investment that typically ranges from 3-18 months. Remember that these damages can occur at any time and in various ways; during a thunderstorm, a failure in the electrical system, in a blackout or even by a curious squirrel stumbling into an electrical transformer.

What is a Transient?

A transient is a brief but powerful high-voltage and high-current event that can last up to 100 microseconds (As defined by the ANSI/IEEE C62.41). It can climb as high as 100,000 volts during extreme events such as lightning, as high as 10,000 volts due to utility substation operations/grid switching events (external sources), as high as 6,000 volts for switching inductive loads (electric motors), and as small yet disruptive as 2,000 volts created internally. These internal causes can account for more than a million events per hour in heavy industrial environments.

Critical System, always in danger

Electronic control systems can be found at: water treatment facilities, traffic control systems, point of sales (POS) terminals, automated industrial process plants, air traffic control systems, data processing centers, communication systems, radio base stations of cellular phone companies, clinics and hospitals, laboratories, financial centers. UPSs, and all manner of military defense systems. The consequences resulting from failures in these delicate circuits can, in many cases, be devastating.

Energy Control Systems is proud to offer the industry's most complete and capable line of high quality Surge Protective Devices (SPDs) for Industrial, Commercial and Department of Defense applications. Our high quality, ISO 9001 manufactured devices cover the full range of applications for AC/DC power, data, current loop, and telecommunications applications from 5V DC to 7200V AC.

Our twenty five years of hands on, real world field experience can be seen in the simplicity, functionality and user friendly design of all our products. Simply stated, these are the finest, highest quality, best performing surge suppression products available anywhere in the world today. We not only set the standard, we are the standard.

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Number One in Power Quality Problems

Transients, spikes, surges... these disturbances are the most destructive, costly and common power quality events in industry today. In the United States, these events represent billions of dollars a month in maintenance and production costs due to opportunity costs. Over the years as virtually all equipment has become increasingly microprocessor based, such failures are more recurrent and more costly. Other events such as fluctuations, blackouts and harmonics cause significant problems that are without a doubt disruptive,

however as compared to transients, are much lower in actual damages. Transients are able to stop equipment and plants for extended periods of time, causing disruptions in the processes, delays in deliveries and loss of credibility to clientele. Often, the repair costs are minimal compared to the cost of lost profits or deferred production. Equipment downtime prevent delivery of product demand and services that customers require.

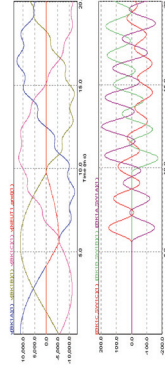


External Reasons - 20%

Dramatic and catastrophic lightning or electrical system failures represent 20% of the transient problems.

Internal Sources - 80%

Switching of internal loads can produce up to 1,000,000 non-catastrophic yet disruptive transients per hour in very active industrial environments. This constant bombardment causes severe cumulative damage (electronic rust) and eventually serious failures.



THE SOLUTION

CASCADE PROTECTION NETWORK

The Optimal SineTamer® Protection Network consists of installing various types of protection units, strategically located at specific points where the critical equipment is located. These are known as levels 1 and 2, where an equipment failure can be lethal! The type, number and location of the specific SineTamer® units are determined by an on-site-survey by our trained distributor. This should be done on all of the panels, conducting a requirements analysis based on the critical nature of the connected loads. This cascade system will best cover all paths where transients are deemed to occur, reducing and eliminating the destructive effects of both types of transients. Even in the most severe conditions your system will survive and your equipment will continue operating...

In addition to the protection system installed in the main panel listed in category C, it is strongly recommended that you also install suppressors in categories B and/or A, as per standard specification C62-72-2007, to be applied downstream of the electrical system.



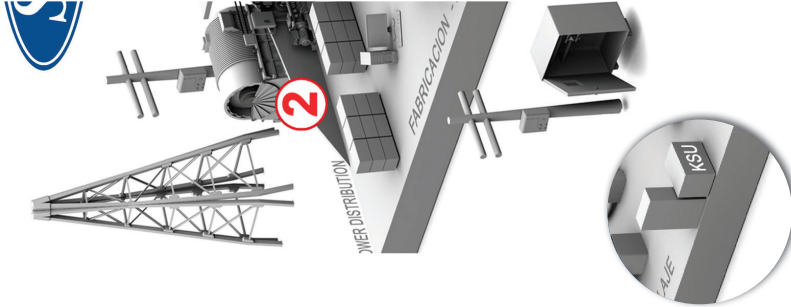
1. Main Distribution Panel

The first line of defense is in the main distribution board. At this position, the extremely high external surges begin to be attenuated and the high transient energy is reduced to levels that suppressors located downstream will eventually eliminate.



2. Distribution Panel

The second line of defense aims to further reduce the residual missed by the first line, after receiving lightning or failures at the substation. Also to reduce transients generated in other boards.



3. Telecom and Data Circuits

Control circuits and voice, data and signal transmission are also exposed to transients. These are very vulnerable, even minimal levels of transients voltage can damage communication ports and integrated circuits. Therefore, they should be protected throughout the facility and/or select the most critical or high risk spots.

SineTamer
ST-CT/ST-TRJ/
ST-CXF/ST-CXBNC

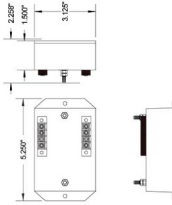
**Telecom
Units/Data**

SineTamer® has a wide range of data and telecommunications suppressors at your disposal. Designs that provide protection to all forms of telephone lines, including ISDN, E1 and T1. Models ranging from single, with screw-type terminals, in two blocks of connecting multiple pairs capable of protecting up to 25 pairs of lines.

The data lines of all types need to have an efficient lightning and surge protection. SineTamer® has models available for 4/20mA, for load cell and flow meter applications, as well as 2, 10 and 100 Mbits and a single pair up to four pairs and are listed to UL497. SineTamer® is aware that security cameras are of great importance to the protection and safety of personnel and property. We have a complete line of coaxial protection units available - from a single port-dual port - and up to 12 rack mounting panels in ports.

ST Telecom/Data

These devices are designed to protect phone lines with standard voice quality. They are also intended for installation at the telephone demarcation point as well as to allow a common earth point. This device is available for a variety of line connections (1, 2, 3, 4, or 6 pairs) performed by using terminal strips and making installation very simple. An earth terminal is always provided on the face of the unit to ensure low ground impedance discharge path.



The unique design of these devices has turned them into the most versatile TVSS devices on the market, with superior performance specifications and an unrivaled guarantee.

TABLE OF MAXIMUM SUGGESTED OPERATING LIMITS, DATA RATE & ADDITIONAL DEVICE RESISTANCE

Nominal System Operating Voltage (Vnom)	CLP#AxB Operating Voltage Model Number	Maximum Continuous Operating Voltage (MCOV)		Maximum Continuous Operating Current (MCOG)	Maximum Digital/Analog Data Rates vs Additional Series Resistance
		Voltage (L-L)	Voltage (L-G)		
15 = Vnom < 32	ST-CLP24AxB	+36 Vpk	+36 Vpk	500mA	2 Mbps / 20 MHz 5 Ohms per line (10 Ohms per pair/loop)

Let-Through Voltages Using ANSI/IEEE C82.45 & C82.41 Test Environment:
Static, positive polarity. All voltages are peak (+/-10%)

Model	Test Mode	Cat. B Impulse Wave 6kV, 3kA
ST-CLP24AxB	L-G L-L	< 40 < 40

ANSI/IEEE C 62.36-2000, C82.41.2-2002, C82.45-2002 Unpowered, Positive Polarity. All voltages are peak (+/-10%)	
Test Mode	Let-Through-Voltage Test Test Category: B3/C1 Impulse Wave 6 kV 3kA < 420V < 420V
T-R T/R-G	

SineTamer

ST-SP,ST-SPT, FSPT FAMILY

Control Power Units

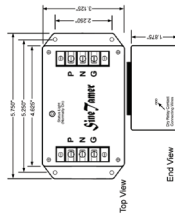
Controlling transients that disrupt the software of modern equipment is essential in proactive maintenance. Systems managed with microprocessors are extremely sensitive in single phase systems which is why they require the most effective protection.

The Family, including ST-SP, ST-SPT and FSPT units, is designed precisely for this purpose. Compact units to be installed in front of the power supplies and/or individual computers such as PLC's, servers, UPS's, laboratory equipment and many others find solution in this family for the most demanding requirements. Their design, through the use of high conductivity integrated circuits, with thermal fused varistors, fixed threshold circuits, frequency attenuation and/or both, allow SineTamer® units with all protection modes, to deliver the lowest residual voltage ensuring the safe and secure operation of hardware and software.



ST-SPT Series

The ST-SPT SineTamer® devices provide the best protection available for such units. These devices are designed for use in 120, 240 and 480 VAC and DC powered equipment in sensitive and critical equipment. They are extremely effective in limiting transients generated inside buildings, industrial plants, and medical centers. These areas often have significant ring wave generated events that attack microprocessors. All of the 15/30amp units provide 60ka of total energy dissipation.

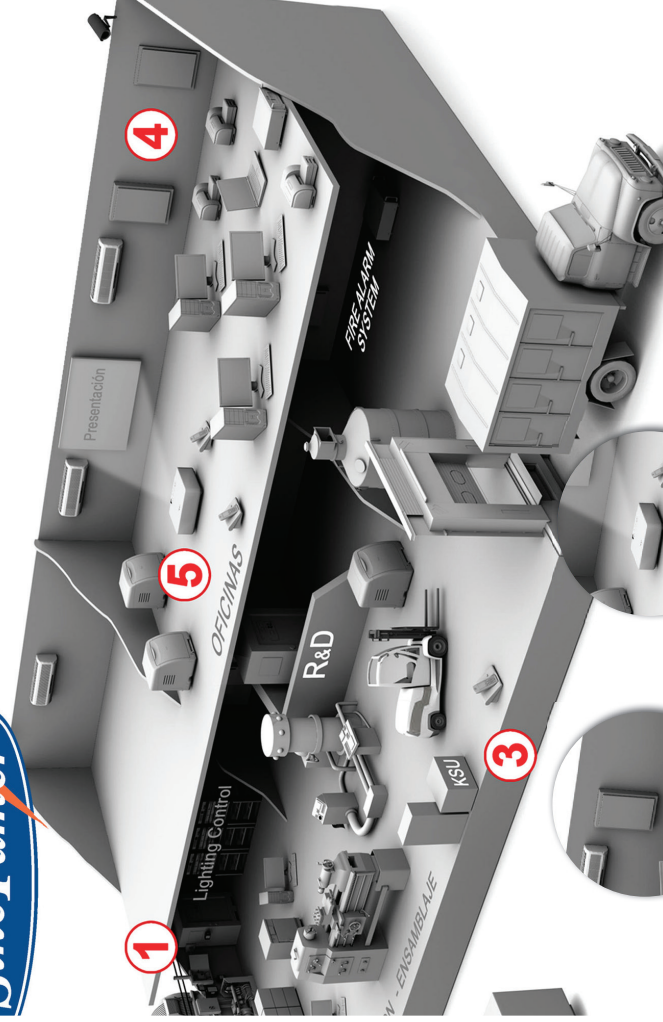


MEASURED LIMITING VOLTAGE PERFORMANCE AND ELECTRICAL SPECIFICATIONS

Model	High Voltage Continuous operation	Modes	ANSI/IEEE C62.41 - 1991 Through Voltage Testing		
			A1 2kV, 67A 100kHz Ring Wave 180° Phase Angle	A3 6kV, 200A 100kHz onda 90° Phase Angle	B3/C1 6kV, 3kA Impulse Wave 90° Phase Angle
ST-SPT24-15	30 L-N	L-N	20V (D)	66V (D)	197V (D)
	30 L-G	L-G	43V (D)	133V (D)	252V (D)
	30 N-G	N-G	23V (S)	66V (S)	385V (S)
ST-SPT120-15	150 L-N	L-N	28V (D)	94V (D)	290V (D)
	150 L-G	L-G	62V (D)	190V (D)	380V (D)
	150 N-G	N-G	41V (S)	94V (S)	550V (S)
ST-SPT240-15	300 L-N	L-N	38V (D)	121V (D)	610V (D)
	300 L-G	L-G	70V (D)	220V (D)	605V (D)
	390 N-G	N-G	51V (S)	121V (S)	605V (S)

U.S. NAVY Analysis of Pre/Post Installation of TVSS Systems on 23 Surface Ships

Annual Pre Install Maint. Cost	Annual Post Install Maint. Costs	TVSS Cost	Annual Savings	Payback Period (yrs.)
\$ 7,814,718	\$ 2,865,107	\$ 2,679,350	\$ 4,949,611	0.54



4. Sub Distribution Boards

Sub distribution boards are located to feed several areas for specific purposes, especially for critical loads and high value systems. These circuits, due to their value, must be protected.

5. Delicate Systems

It is very common to see extremely delicate control systems such as robotic controls, communications, security control centers, specialized machines and/or surgical. These systems need isolation from the transient generating sources to give them proper operational integrity. Making it extremely important to apply a good protection to mitigate the effects of transients.

"The Ultimate Guarantee of the Industry"

Up to a Twenty Five year guarantee against all failures by any electrical anomaly, including lightning. No fine print. We have many independent analysis and performance assessments of the SineTamer® system available.



Why BUY

SineTamer® is backed by a company of professionals in the design, development and implementation of high quality and internationally recognized surge protection systems. Our purpose is to provide our customers with individual attention thanks to the work of our engineers and of hundreds of professionals around the world who provide advisory services to technicians and engineers from many companies. As a result, they have acquired the ability to recommend and select the best alternatives for protection based on the experience, honesty and integrity of all those who form part of the SineTamer® family.

Leadership in the high efficiency design

The best product in a "Real World". SineTamer® is one of the best performing commercially available suppressor on the market today. We offer features such as "Discrete All Mode Protection" in other words: "True suppression with protection element in all modes". Compact design, capable of being applied into panel boards, with a high frequency conducting integrated circuit, encapsulated in a heat dissipating resin, with a true Frequency Attenuation system. All features that are now being copied but not equalled. As always our residual voltage remains the central focus of the design. We will never sacrifice its performance for a better commercial presence as other designs do.

The tool you need to make your buying decision

Real performance tests, transparent and complete specification sheets, efficiency tests with real-world applications -- no hidden evidence and false results, without specifications that are far from reality, no partial test nor incomplete specifications. We want you to have real information at hand to make wise decisions.



Power Units

units are highly efficient suppressors with durability and stability carefully engineered in their circuit board and selected components.

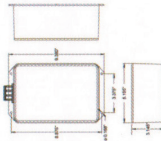
We have units from 40kA to 600kA per phase, from 120VAC to 6900 VAC and up to 900VDC. Each are available with various options that are available on all models. Units are designed with fixed threshold clamping or frequency attenuation circuit. Units are also available in various modes of protection—up to 10 discrete modes on three phase WYE systems. The units are complete with heat dissipation resin covering all components to insure long term consistent performance, compact design insuring short internal component lead length and standard thermal and current fusing.

All units are tested with the IEEE standards C62.41 and C62.45 for use in categories C, B, and A. Various families are also tested to IEC61643-1 Class 2, 3. Below is an example of that information.



These models are designed to be installed at main panels, automatic transfer switches and distribution boards, and in main breakers of machines, also for individual equipment such as variable frequency drivers or CNC machine or other similar equipment.

The units are designed with the latest advances in circuit board design and computer modeling. All panel



LA-ST Model

LA-ST devices provide the best protection available in units of their kind, units designed up for use in circuits up to 480VAC with capacities up to 300kA per phase, with all models of protection, 10 in WYE, 6 in Delta, 6 in Split phase, and 3 in single phase circuits, with fixed threshold and frequency attenuation clamping, thermal fuse protected varistors, phase current fusing, and an absolute replacement guarantee for 20 years.

MEASURED LIMITING VOLTAGE PERFORMANCE AND ELECTRICAL SPECIFICATIONS						
Model	Circuit Type	MCOV	Peak Surge Current (Amps) Per Mode	ANSI/IEEE C62.41 & C62.45 Lat-Through Voltage Test Results		
				A1 2kV, 67A 100KHz Ring Wave 270° Phase Angle	ANSI/UL 1449-2006 (Third Edition) Voltage Protection Rating (VPR)	C3 20kV, 10kA Impulse Wave 90° Phase Angle
LA-ST1201P1	120V, Single Ø (2 wire + ground)	150 L-N 150 L-G 150 N-G	40,000 L-N	45	500	914
			40,000 L-G	60	500	1025
			40,000 N-G	55	500	1176
			120,000 Total			
LA-ST1201S1	120/240V Split Ø (3 wire + ground)	300 L-L 150 L-N 150 L-G 150 N-G	40,000 L-L	75	1000	1119
			40,000 L-N	45	500	914
			40,000 L-G	60	500	1025
			40,000 N-G	55	500	1176
						240,000 Total