



# High Altitude Electro Magnetic Pulse (HEMP) Surge Protection Products to MIL-STD-188-125-1 and above

## Technology / Capability Overview



- Quick acting EMP surge protection that switches in less than 1 billionth of a second.
- High current shunting capability above 250KAmps.
- Exceeds Military Standards: MIL-STD-188-125-1, MIL-STD-461, MIL-STD-464, CS115, CS116, CS117
- Units are designed to protect power, data, communications, and radio antenna input

## Model Variants



1. Models available for all Single Phase & 3-Phase Power configurations.
2. Models available for all DC Voltages.
3. Models available for Data, Ethernet, RS-485, RS-422, RS-232, Etc.
4. Models available for RF Communications, Antennas, coax, Etc.
5. Models available for Low Voltage Controls systems. Relevant to protecting Power, Communications, Data, and Controls Systems.

## Performance of Technology

The initial EMP Shield model was tested and passed testing by a DoD Certified Testing Lab, (Keystone Compliance) without any degradation or failures after (42) hits.

Military test results were consistent between 7ns-9nS, with the required response time of <20nS.

The latest EMP Shield models begin shunting over-voltage in less than < 1nS.

## Scalability / Production

### Scalability:

Electrically scale-able from 3 volts to thousands of volts. From 1 kAmp to thousands of kAmps.

### Production Capabilities:

- Mass production above 20,000 units per month can be achieved
- The company is currently shipping 40 models of the EMP Shield to most States in the US and 12 other countries.



# High Altitude Electro Magnetic Pulse (HEMP) Surge Protection Products for Data and Communication Systems

## Technology / Capability Overview



- Quick acting EMP surge protection that switches in less than 1 billionth of a second.
- Current shunting capability above up to 50KAmps.
- Exceeds Military Standards: MIL-STD-188-125-1, MIL-STD-461, MIL-STD-464, CS115, CS116, CS117.
- Units are designed to protect data and communications from EMP, EMI, and static discharges.
- Quick installation and easy maintenance.

## Model Variants

1. Models available for all Single Phase & 3-Phase Power configurations.
2. Models available for all DC Voltages.
3. Models available for Data, Ethernet, RS-485, RS-422, RS-232, Etc.
4. Models available for RF Communications, Antennas, coax, Etc.
5. Models available for Low Voltage Controls systems. Relevant to protecting Power, Communications, Data, and Controls Systems.

## Performance of Technology

- For Data and Communication Systems.
- For single buildings to large multi-story campuses.
- For Command and Control circuitry.
- For Data, Ethernet, RS-485, RS-422, RS-232, Etc.
- For RF Communications, Antennas, coax, Etc.

## Scalability / Production

### Scalability:

Electrically scale-able from 3 volts to thousands of volts. From 1 kAmp to thousands of kAmps.

### Production Capabilities:

- Mass production above 20,000 units per month can be achieved.
- TRL - Level 9.



# High Altitude Electro Magnetic Pulse (HEMP) Surge Protection Products for Vehicles

## Technology / Capability Overview



- Quick acting EMP surge protection that switches in less than 1 billionth of a second.
- Current shunting capability above up to 250KAmps.
- Exceeds Military Standards: MIL-STD-188-125-1, MIL-STD-461, MIL-STD-464, CS115, CS116, CS117.
- Units are designed to protect power, data, communications and radio antenna input.
- Quick installation and easy maintenance.

## Model Variants

1. Models available for all Single Phase & 3-Phase Power configurations.
2. Models available for all DC Voltages.
3. Models available for Data, Ethernet, RS-485, RS-422, RS-232, Etc.
4. Models available for RF Communications, Antennas, coax, Etc.
5. Models available for Low Voltage Controls systems. Relevant to protecting Power, Communications, Data, and Controls Systems.

## Performance of Technology

- Vehicles may require multiple EMP Shields to protect all of the installed systems.
- For vehicle power supply and onboard electronics.
- For Data, Ethernet, RS-485, RS-422, RS-232, Etc.
- For RF Communications, Antennas, coax, Etc.

## Scalability / Production

### Scalability:

Electrically scale-able from 3 volts to thousands of volts. From 1 kAmp to thousands of kAmps.

### Production Capabilities:

- Mass production above 20,000 units per month can be achieved.
- TRL - Level 9.



# How Does EMP Shield Work?

**The EMP Shield can see and protect all the electronics and equipment connected to your electrical system.**

This is accomplished by shunting (shorting) the over voltage coming in from the Grid and the voltage surges that are collected within your home.

Whether the electrons are collected within your home or are attempting to come into your electrical system from outside the home (the grid), the EMP Shield will see the surge and protect your electrical system. The EMP Shield reacts in less than 1 billionth of a second. Since the shunting is completed incredibly fast, the over voltage is drained away from the equipment before the voltage can rise high enough to damage any equipment. We call this new technology SightSpeed™



**SightSpeed**™  
Technologies



# What is EMP Shield?

EMP Shield™ is the worlds only tested and approved EMP protection technology for an entire electrical system.

The EMP Shield is a very robust electrical surge arrestor, designed to exceed the requirements of MIL-STD-188-125-1 for shunting over-voltage spikes (conductor to conductor, conductor to ground, conductor to neutral, and ground to neutral) very quickly.

Built to exceed military standards, EMP Shield is also one of the worlds fastest whole home surge protectors operating in less than 1 billionth of a second.

EMP Shield is designed to protect an entire home from Lightning, CME (coronal mass ejection, power surges, and an EMP (electromagnetic pulse). Proven and tested at Keystone Compliance, a Federally approved Department of Defense (DOD) testing facility, Our EMP Shield was struck with over 40x EMP strikes with no impact to the device.

MIL-STD-188-125-1 requires that the over-voltage spike from the E1 spike begin shunting 5,000 Amps within 20 nanoseconds. All EMP Shield models start shunting over voltage in less than 10 nanoseconds, while some models are able to begin shunting over voltage in less than 1 nanosecond. The EMP Shields are also designed to continue protecting through the expected durations of the E2 and E3 spikes produced in a HEMP strike.

Military Certified For:

- MIL-STD-188-125-1
- MIL-STD-461G
- MIL-STD-464C
- CS115 (EMI / EMP)
- CS116 (EMI / EMP)
- CS117 (Lighting)

**See next slide for military testing details**



# What Tests Has EMP Shield Completed?

EMP Shield is a family of incredibly robust EMP, solar flare, and lightning defense technologies.

They have been designed to exceed the US Military requirements for protection against a high-altitude nuclear detonation that results in an electromagnetic pulse. This family of products has been tested at Keystone Compliance, a DOD Certified Testing Laboratory, to verify compliance with the following Military Standards:

MIL-STD-188-125-1 - High Altitude EMP;

MIL-STD-461G - Control of Electromagnetic Interference;

MIL-STD-461-CS-115 - The purpose of CS115 is to test an electronic or electrical system to withstand signals coupled onto the test unit's associated cabling. The test unit will be subjected to rise and fall times, pulse width, and amplitude as specified on Figure CS115-1 at a 30 Hz rate for one minute;

MIL-STD-461-CS116 applies to 10 kHz to 100 MHz for all interconnecting cables, including power cables, and individual high side power leads;

MIL-STD-461-CS117 - applies to all safety-critical equipment interconnecting cables and non-safety critical equipment with interconnecting cables/electrical interfaces that are part of or connected to equipment performing safety critical functions. The goal is to ensure an test unit's ability to withstand lightning transients coupled onto the test unit's associated cables and power leads;

MIL-STD-461-RS105 - Transient electromagnetic pulse of up to 50 kV/m, double exponential wave with a rise time in the nanosecond range, that is applied to the equipment under test (EUT) at least 5 times and;

MIL-STD-464C - Electromagnetic Environmental Effects Requirements for Systems.

Our test results show that we begin shunting the overvoltage condition in less than 1 nanosecond, and our units are designed to shunt over 100,000 Amps per phase. Our devices are scalable to any size.



# Why Do I Need An EMP Shield?

Our Most Common Question is:

## **If the Grid is Down and I Have No Electricity, Why Do I Need an EMP Shield?**

- 1.** You will save thousands of dollars and potentially years of time. Electrical surges will destroy electrical equipment if not protected. In most cases, EMP Shield is cheaper than most home deductables.
- 2.** Power may go out for a day or a year. However, when the power is restored, your home electrical system and electronics will still be operational. You will be able to assume your previous lifestyle.
- 3.** If you have a backup power system, you will still be able to use your electrical system and electronics normally. Common backup power systems can include generators, solar power systems, and wind turbine systems.
- 4.** Reduce your chances of fire. As seen in the Carrington event in 1859, many people were injured from electrical surge and fires produced from this CME (coronal mass ejection). The EMP Shield removes this excess electricity from your home and reduces your risk of fire.
- 5.** EMP Shield can also protect your backup power systems.
- 6.** EMP Shield protects against more than just EMP (Electromagnetic Pulse). Our technology also protects against CME (Coronal Mass Ejection / Solar Flares), Lightning, and Power Surges. We offer the worlds most robust, durable and proven EMP Protection systems. 2x locations in 2018 were struck with lightning with the EMP Shield Installed. Each home had ZERO damage and witnessed ZERO fire.
- 7.** We offer 40 types of EMP Shield that can be used for homes, vehicles, backup power systems, industrial facilities, and DOD/DHS applications. If you need to protect an electrical system, EMP Shield has or will develop a device for you.
- 8.** The EMP Shield Home Models can assist in preventing smart meter fires.