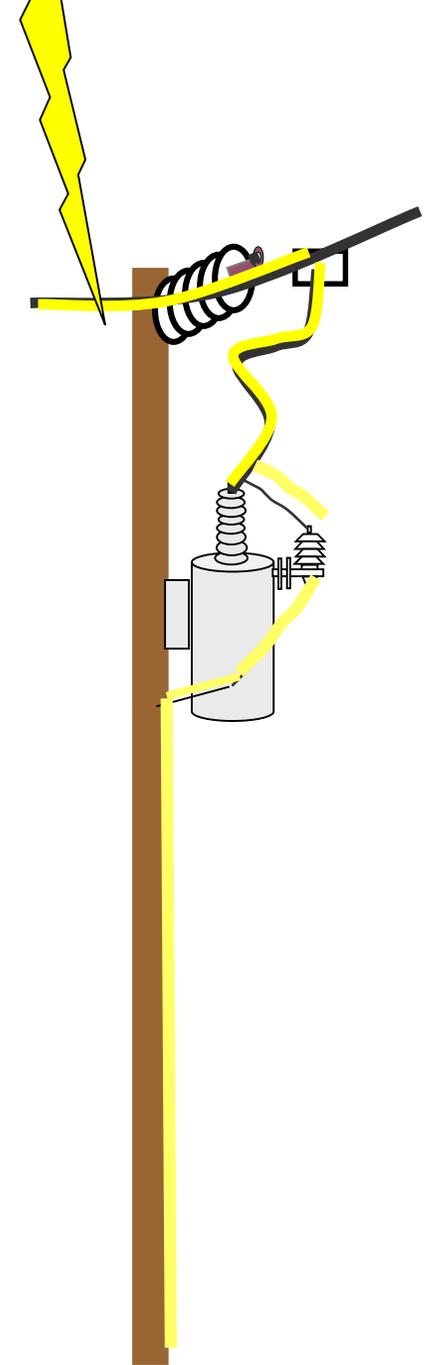
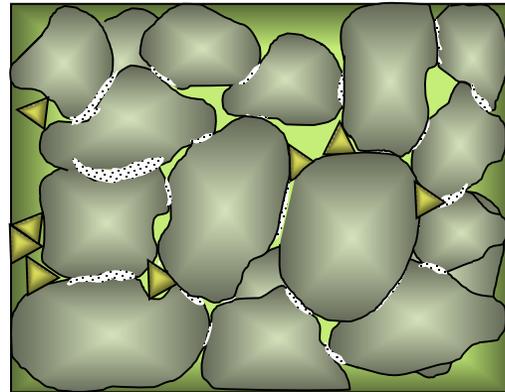
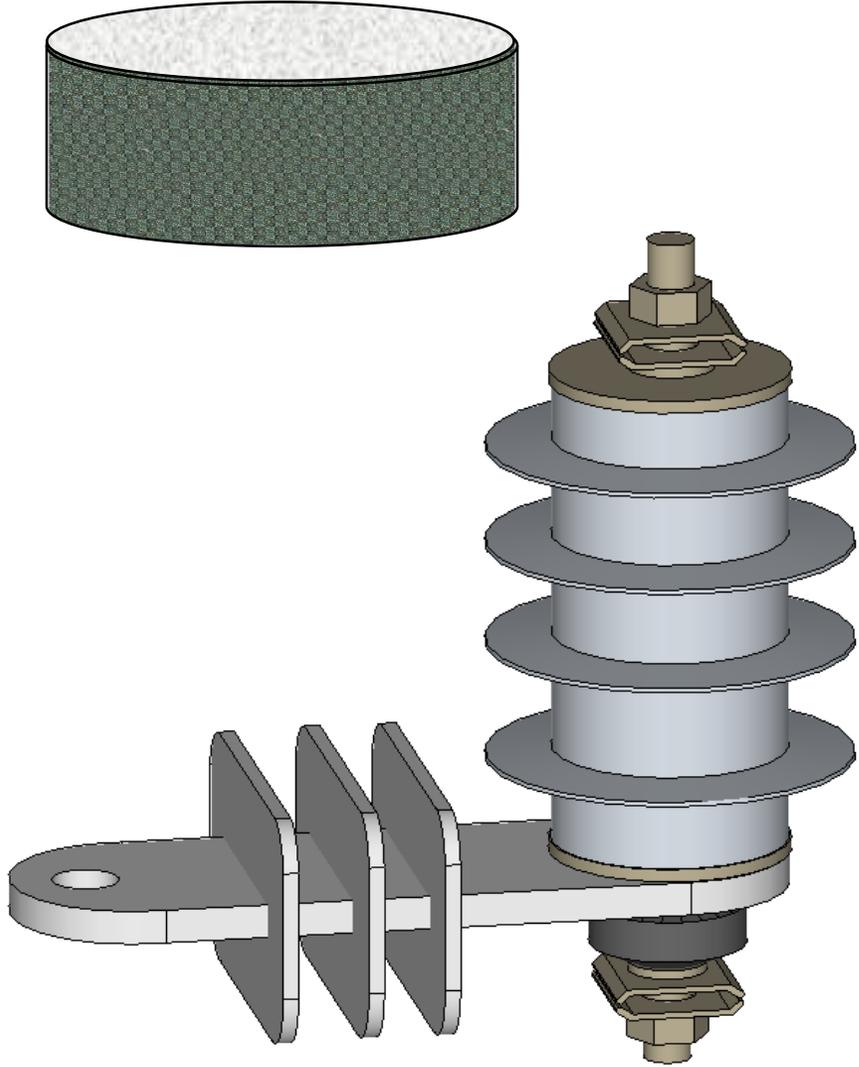
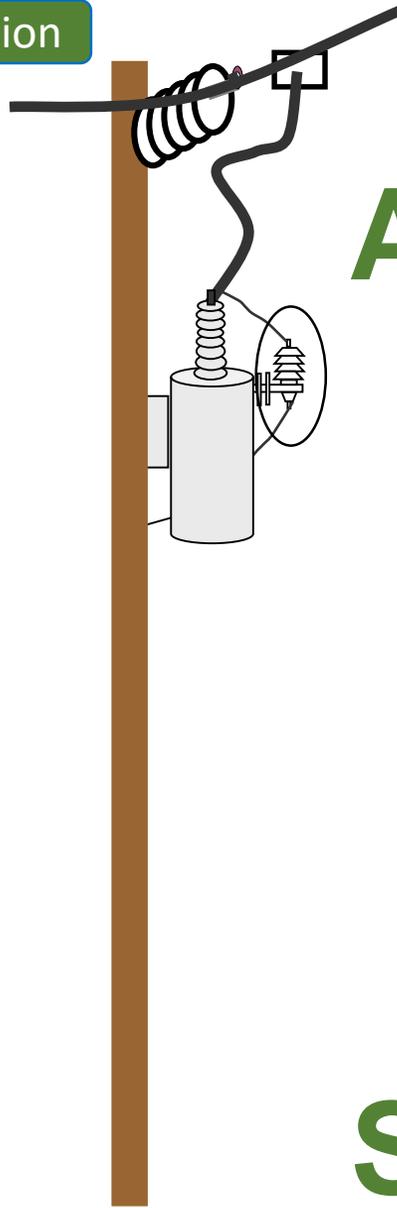


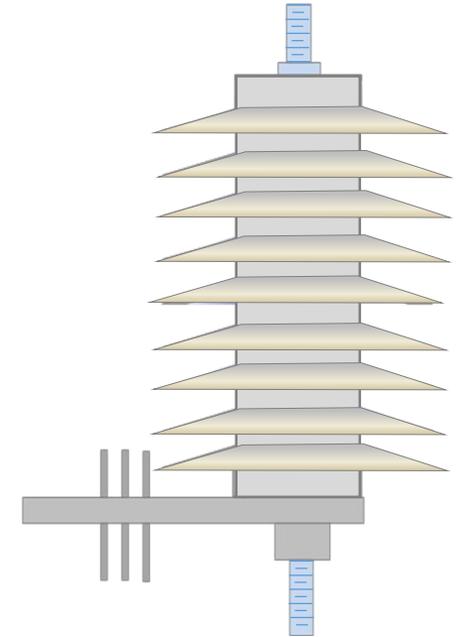
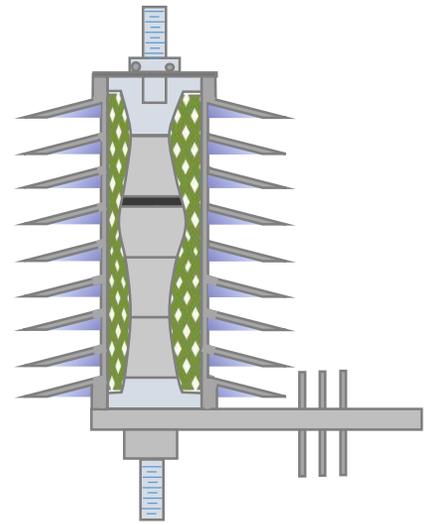
What is a Lightning Arrester?



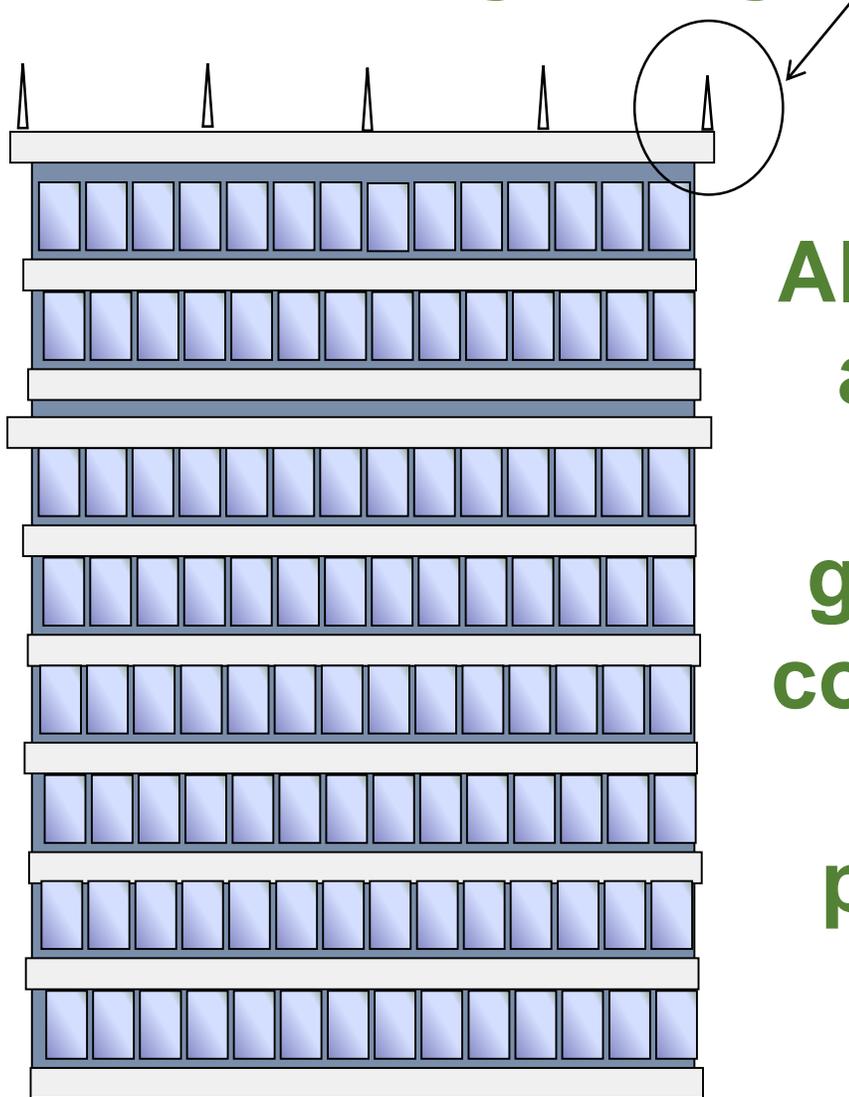
**According to
most definitions,
a Lightning
Arrester is....**



**A Device Used on
Power Systems
above 1000V to
Protect other
Equipment from
Lightning and
Switching Surges**



It is not a Lightning Rod.



Although Lightning Rods are devices that divert lightning surges to ground, they are simple conductive terminals that are always at ground potential and are never energized.

Other Devices Similar to Lightning Arresters



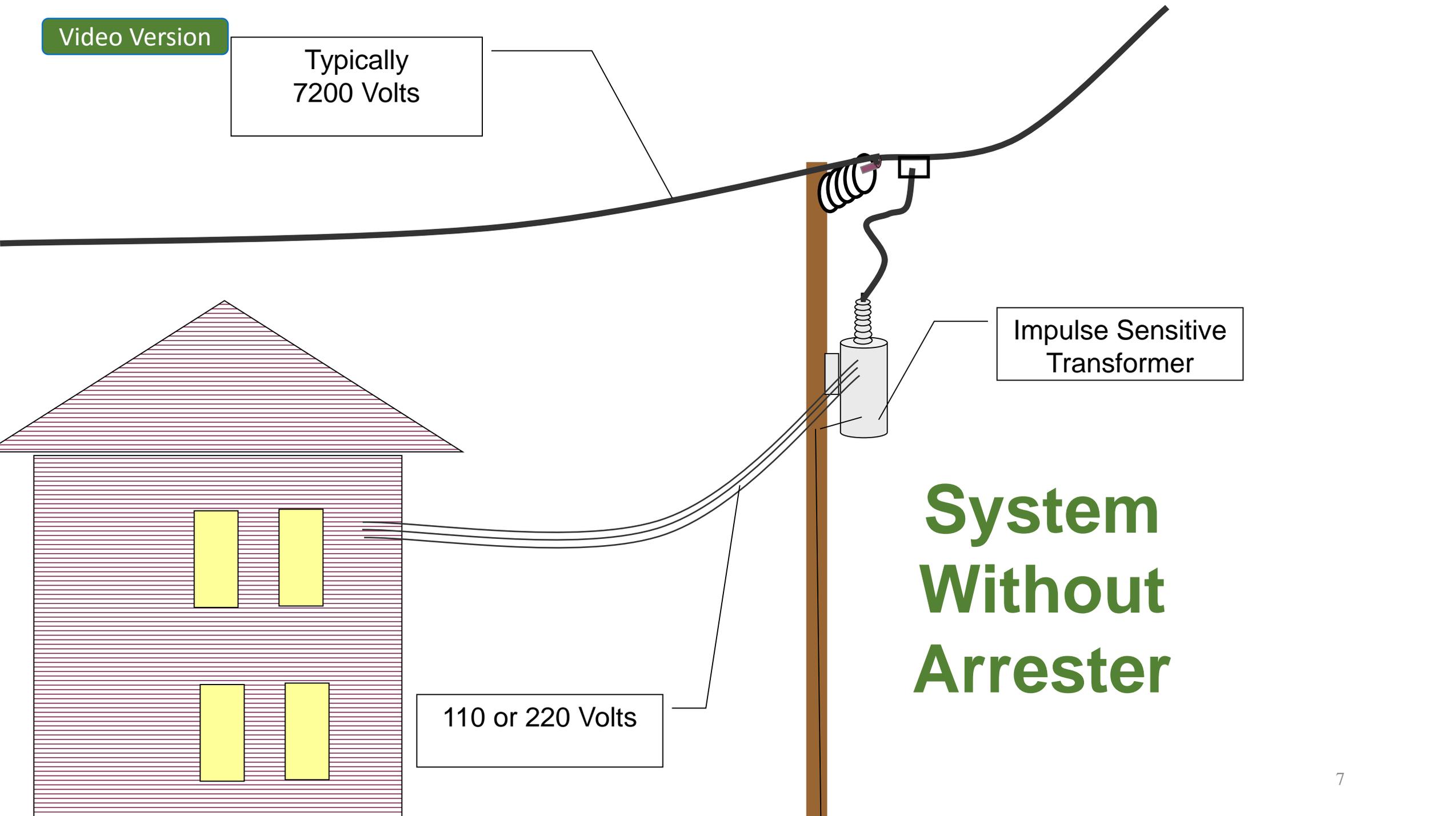
SPD (Surge Protective Device) This is also a surge diverter, but generally for voltages well below 1000 volts.

TVSS (Transient Voltage Surge Suppressor)
Again this is also a surge diverter, but generally for voltages well below 1000 volts.

How do Lightning Arresters Protect Power Systems?

Video Version

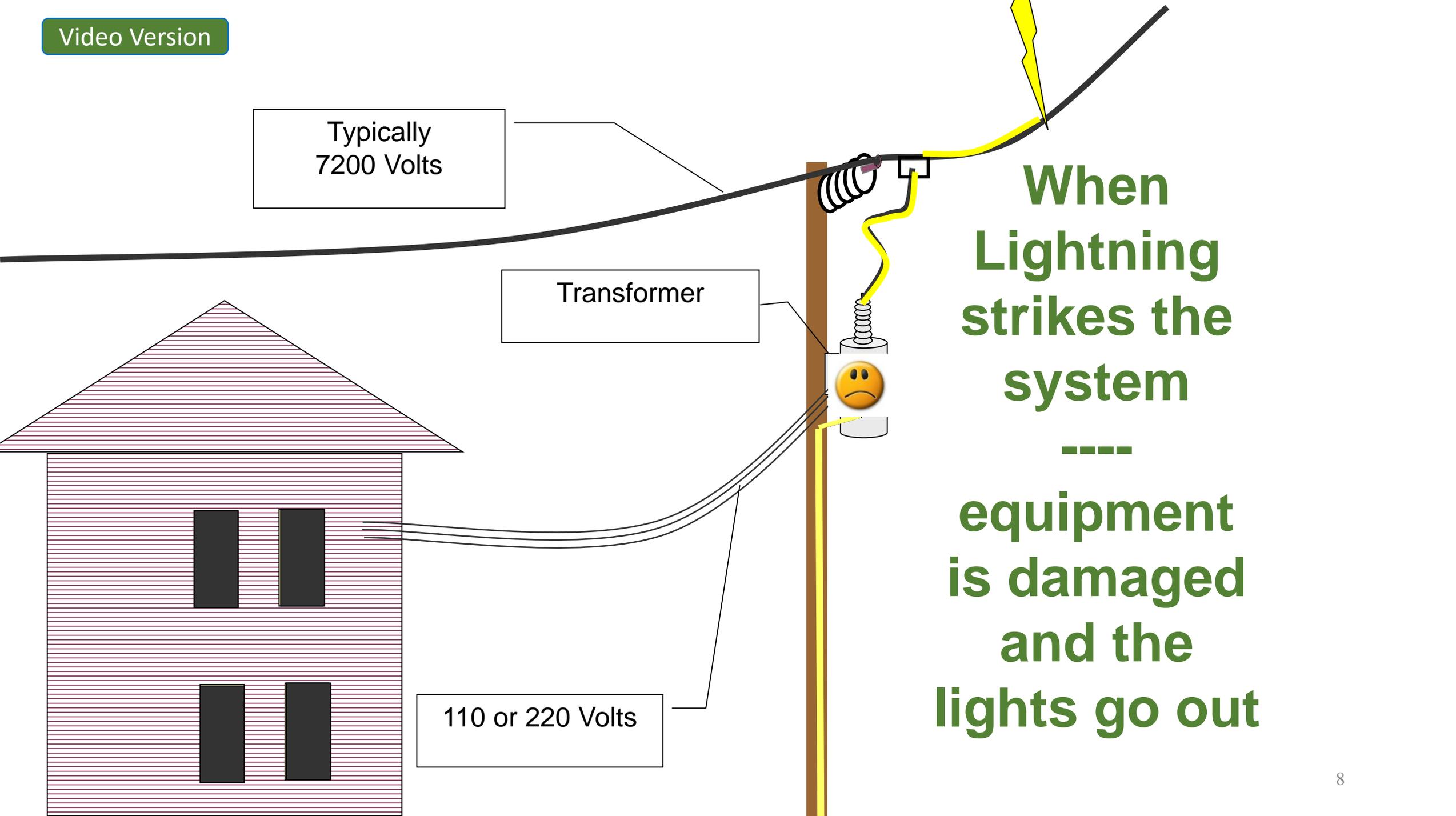
Typically
7200 Volts



Impulse Sensitive
Transformer

**System
Without
Arrester**

110 or 220 Volts



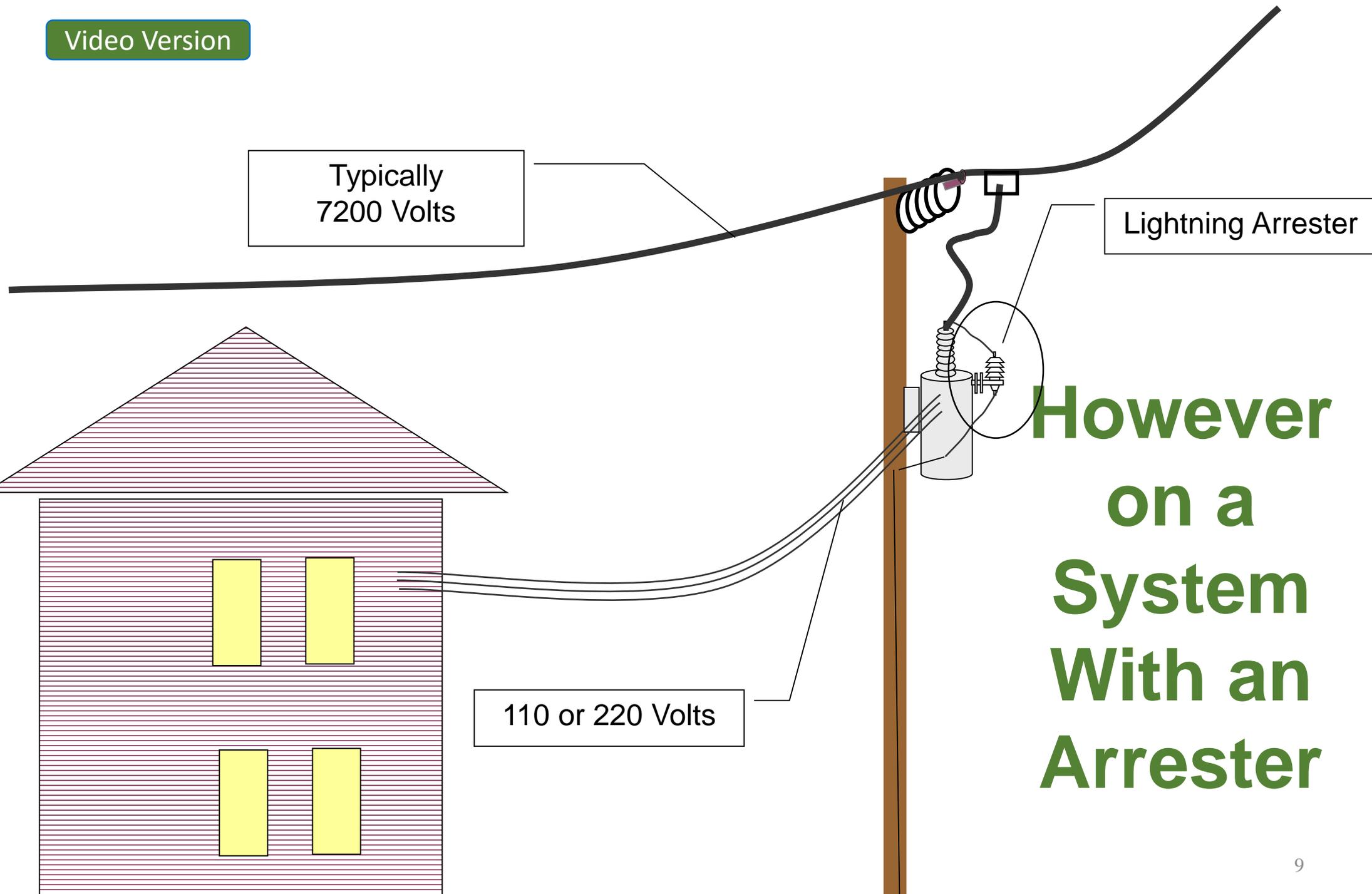
Typically
7200 Volts

Transformer

110 or 220 Volts

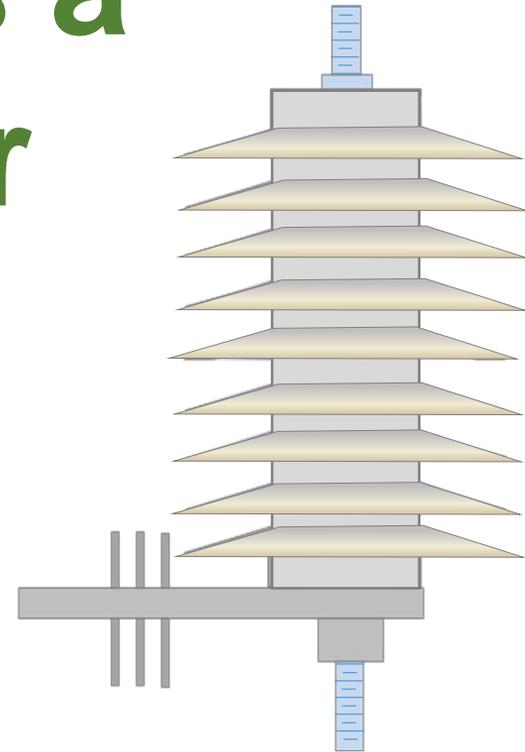
**When
Lightning
strikes the
system

equipment
is damaged
and the
lights go out**

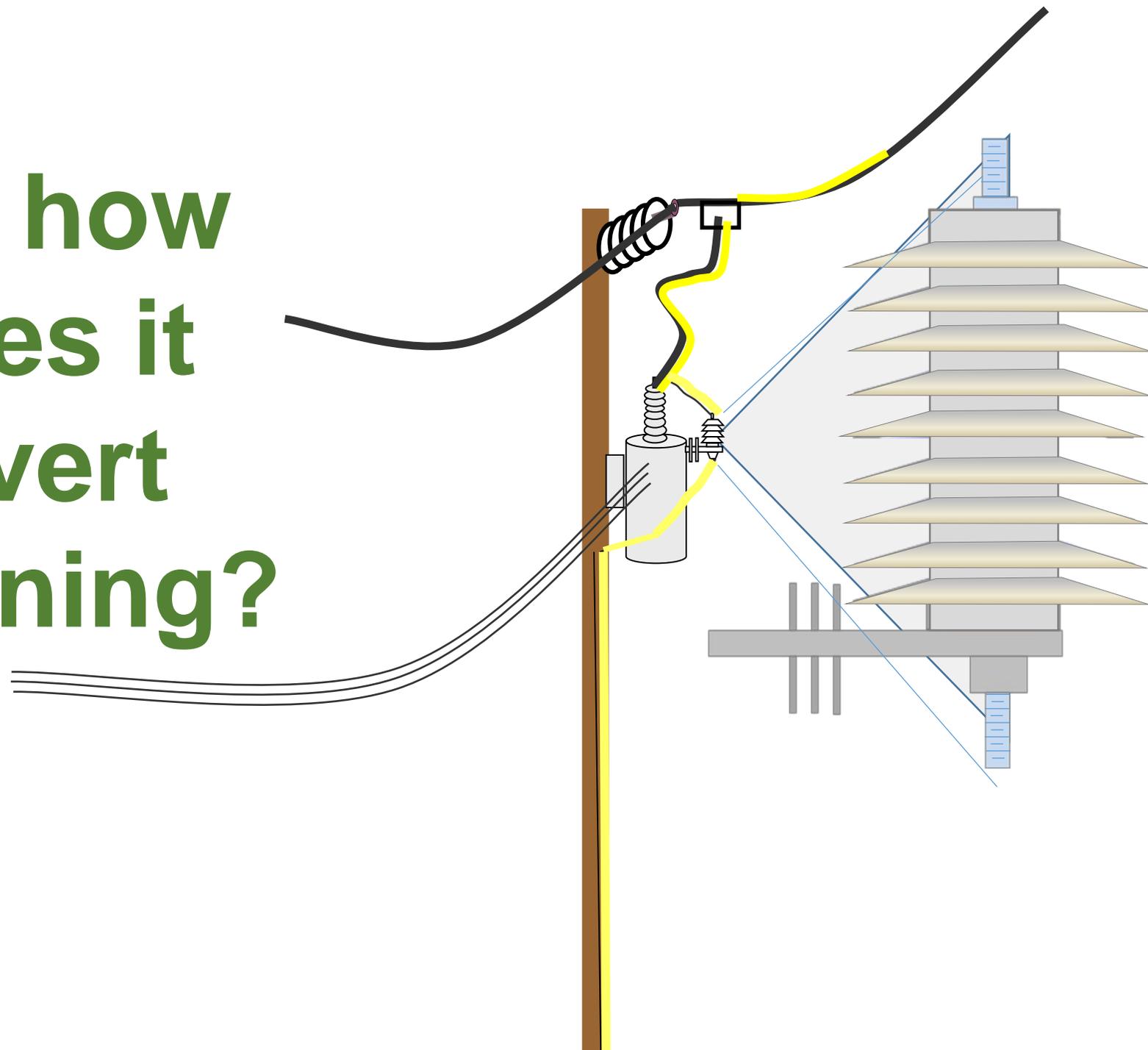


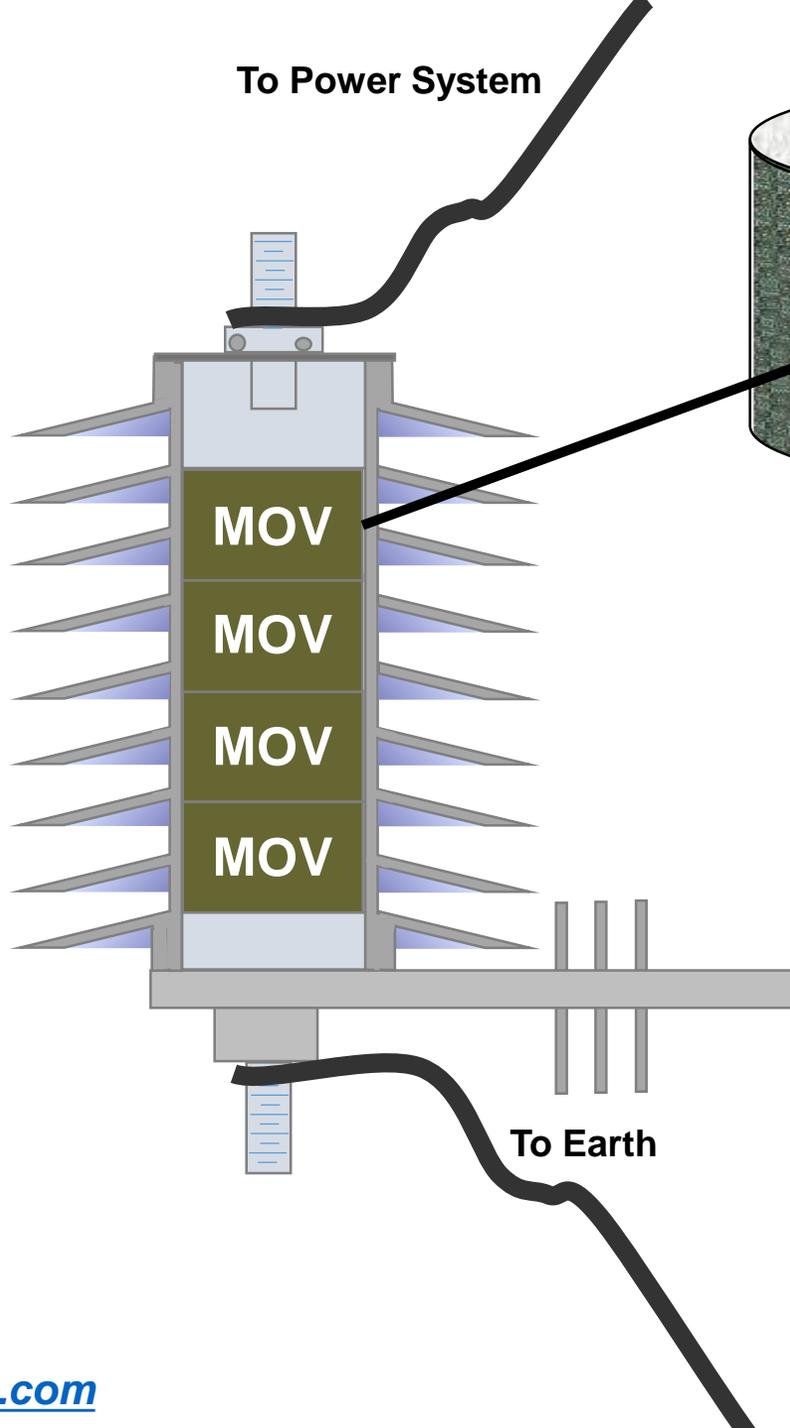
What exactly does a lightning arrester do?

- It Does not Absorb the Lightning
- It Does not Stop the Lightning
- It Does Divert the Lightning to Ground
- It Does Clamp (limit) the Voltage produced by the Lightning
- It Only protects equipment electrically in parallel with it.



Ok, how
does it
divert
lightning?

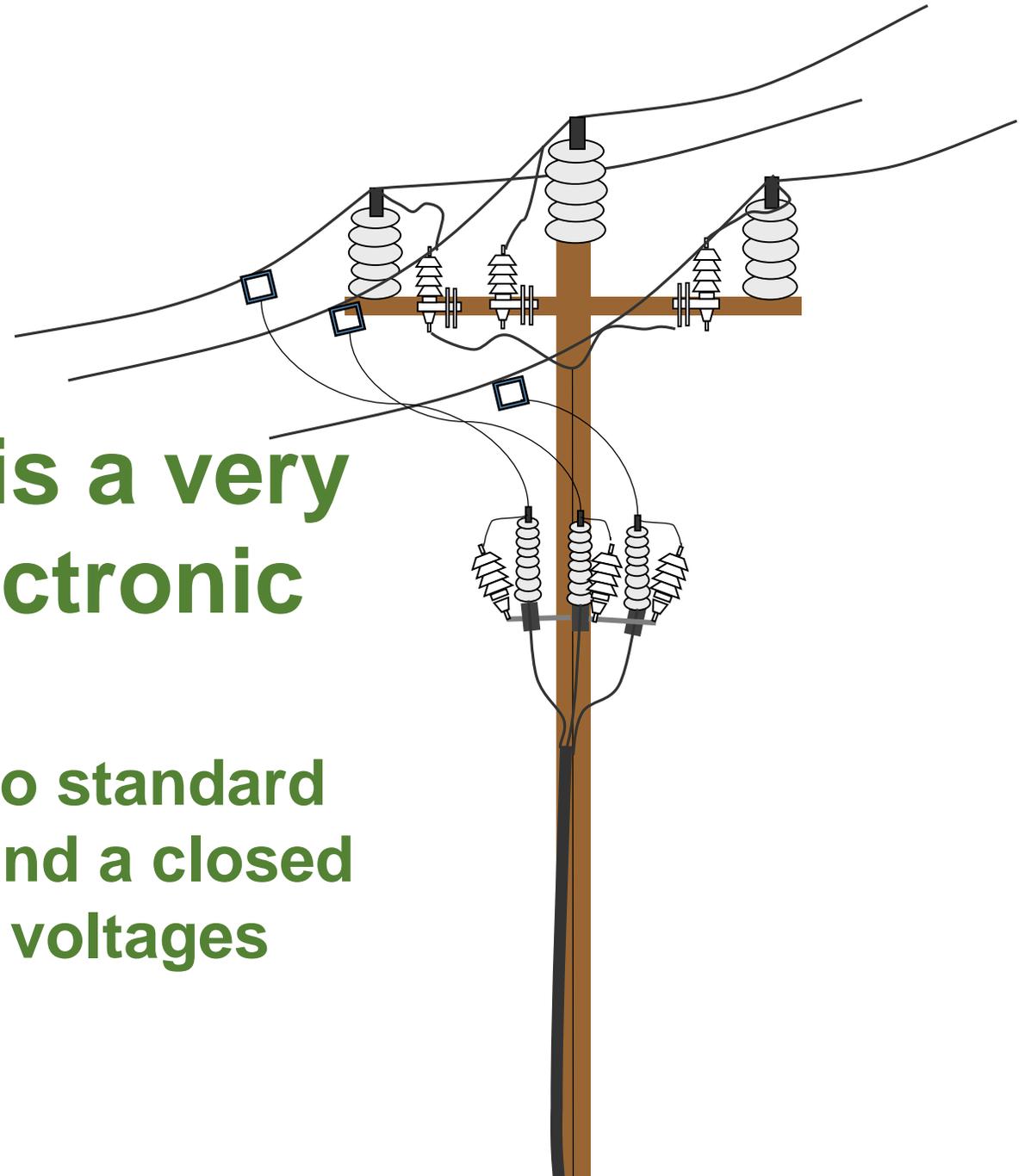
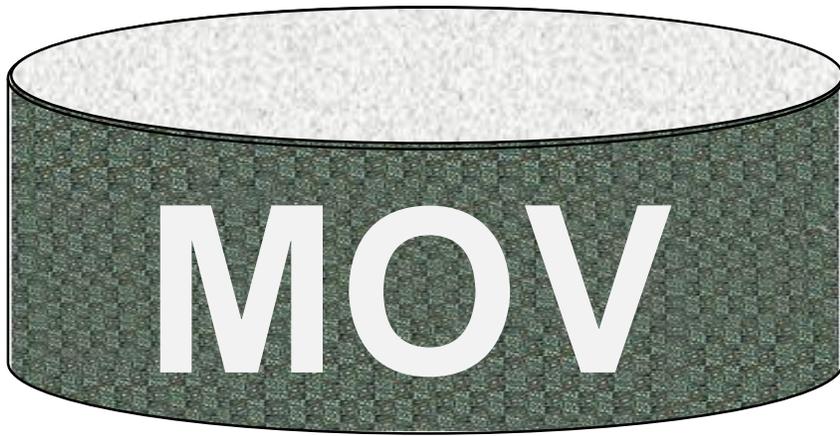




At the Heart of All Arresters is the Metal Oxide Varistor (MOV)

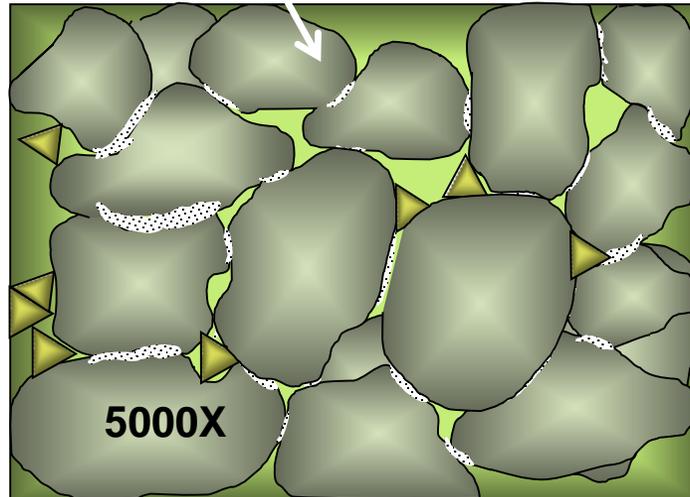
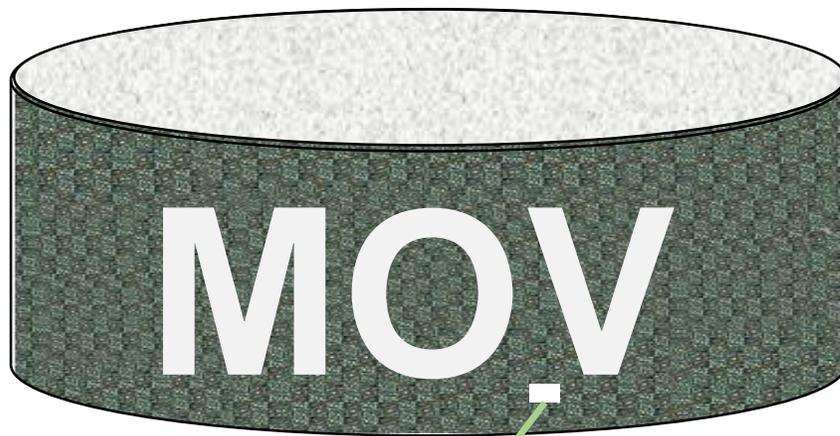
The MOV Disk is a Semiconductor that is sensitive to Voltage.

At normal Voltages the MOV disk is an insulator and will not conduct current. But at higher voltages caused by lightning it becomes a conductor



The MOV Disk is a very fast acting electronic switch

It is an open switch to standard system AC voltages and a closed switch to lightning voltages



By magnifying the MOV material 5000 times, Metal Oxide Grains and Dopants in the material can be discerned

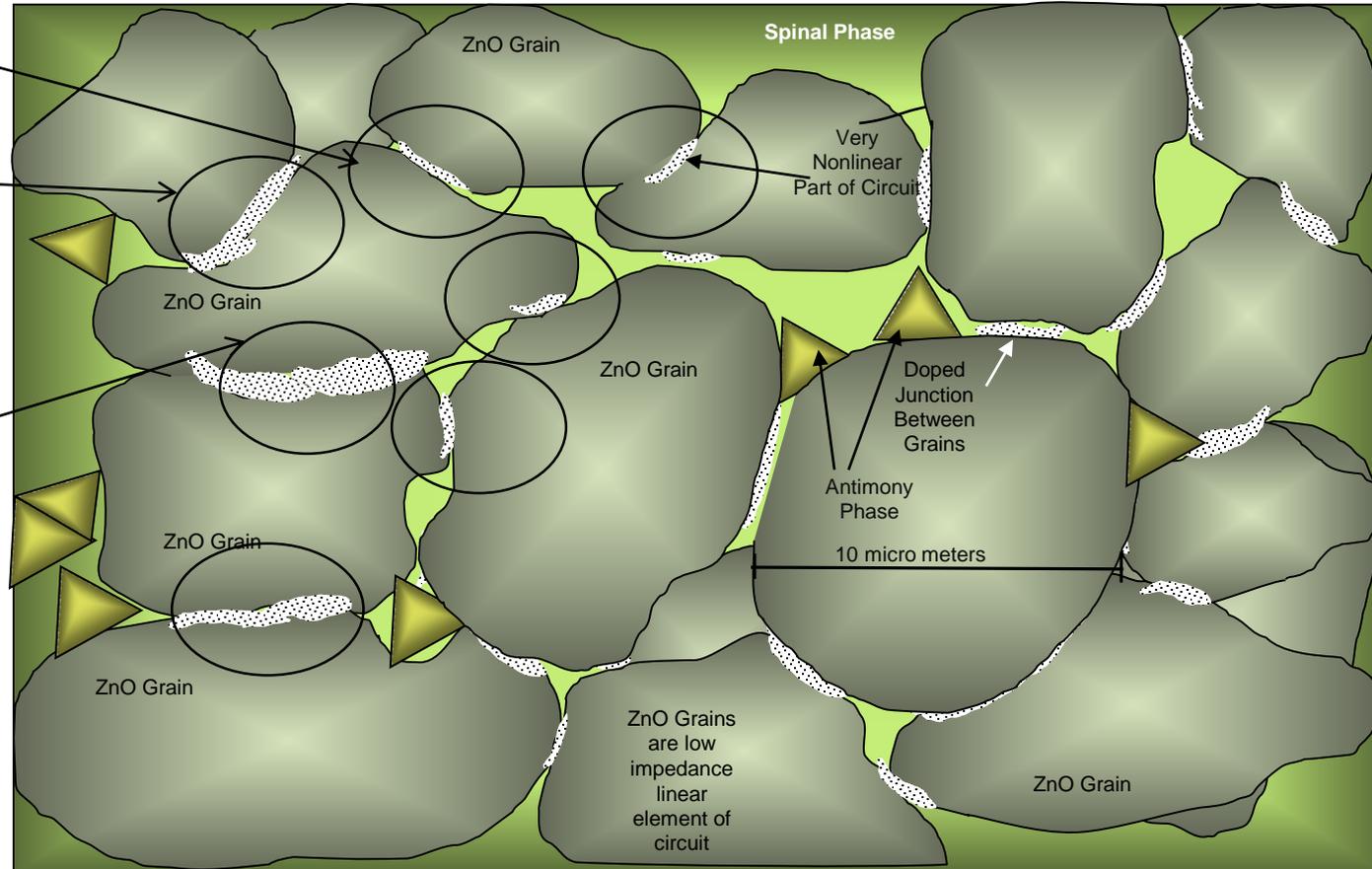
Each MOV Disk with a 35mm diameter and a 35mm height contains about 28 Billion MOV Grains

The MOV Grains and their Junctions are the Electronic Switches that turn on and off in unison to divert the lightning around the equipment.

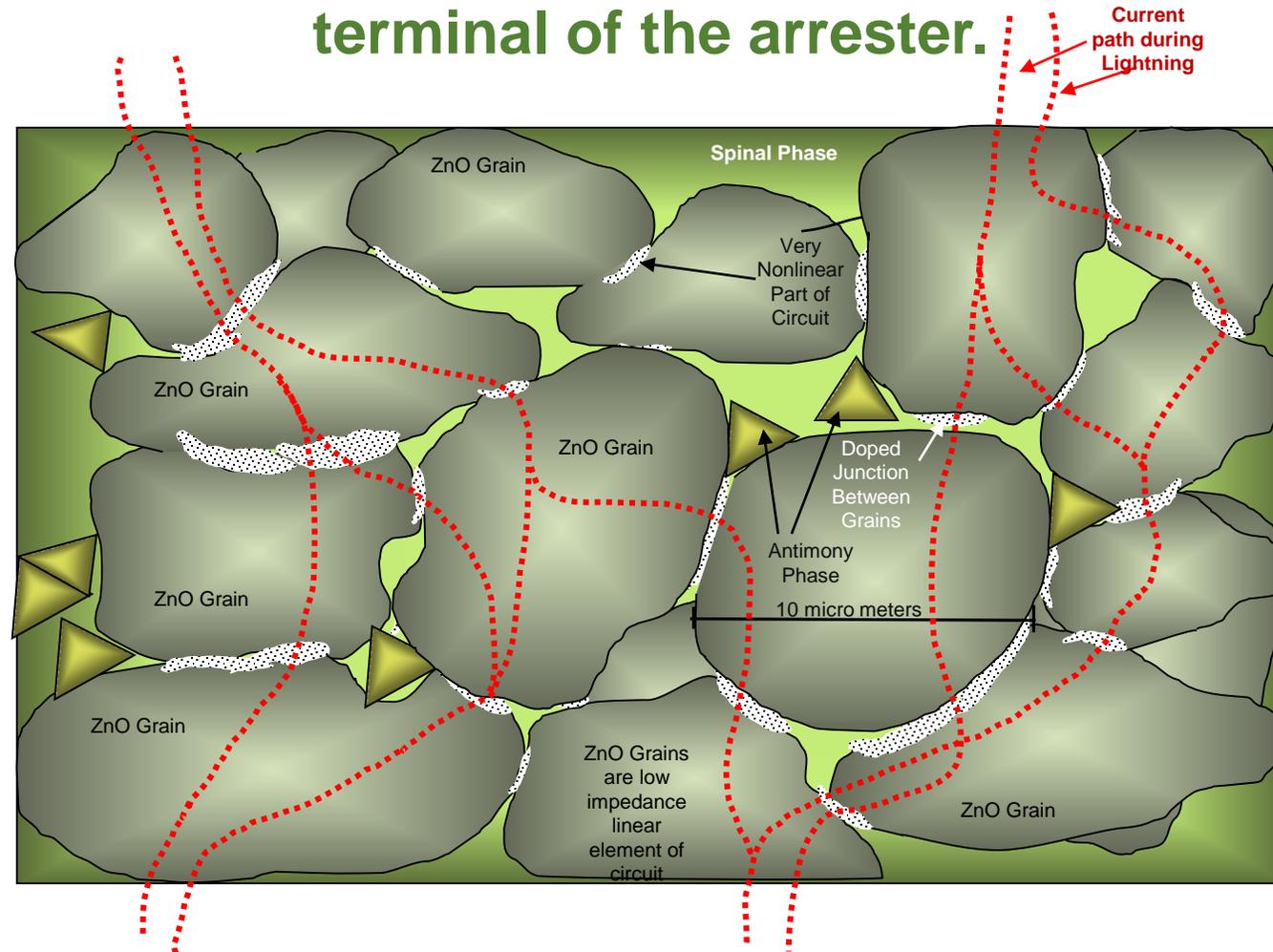
The Switches are at the junctions between the grains

These are voltage sensitive switches that switch on at about 3 volts

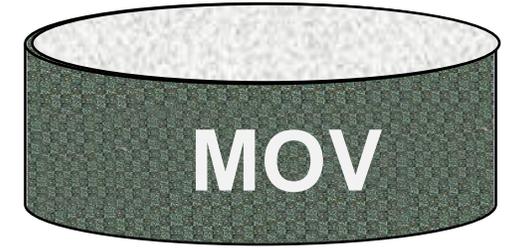
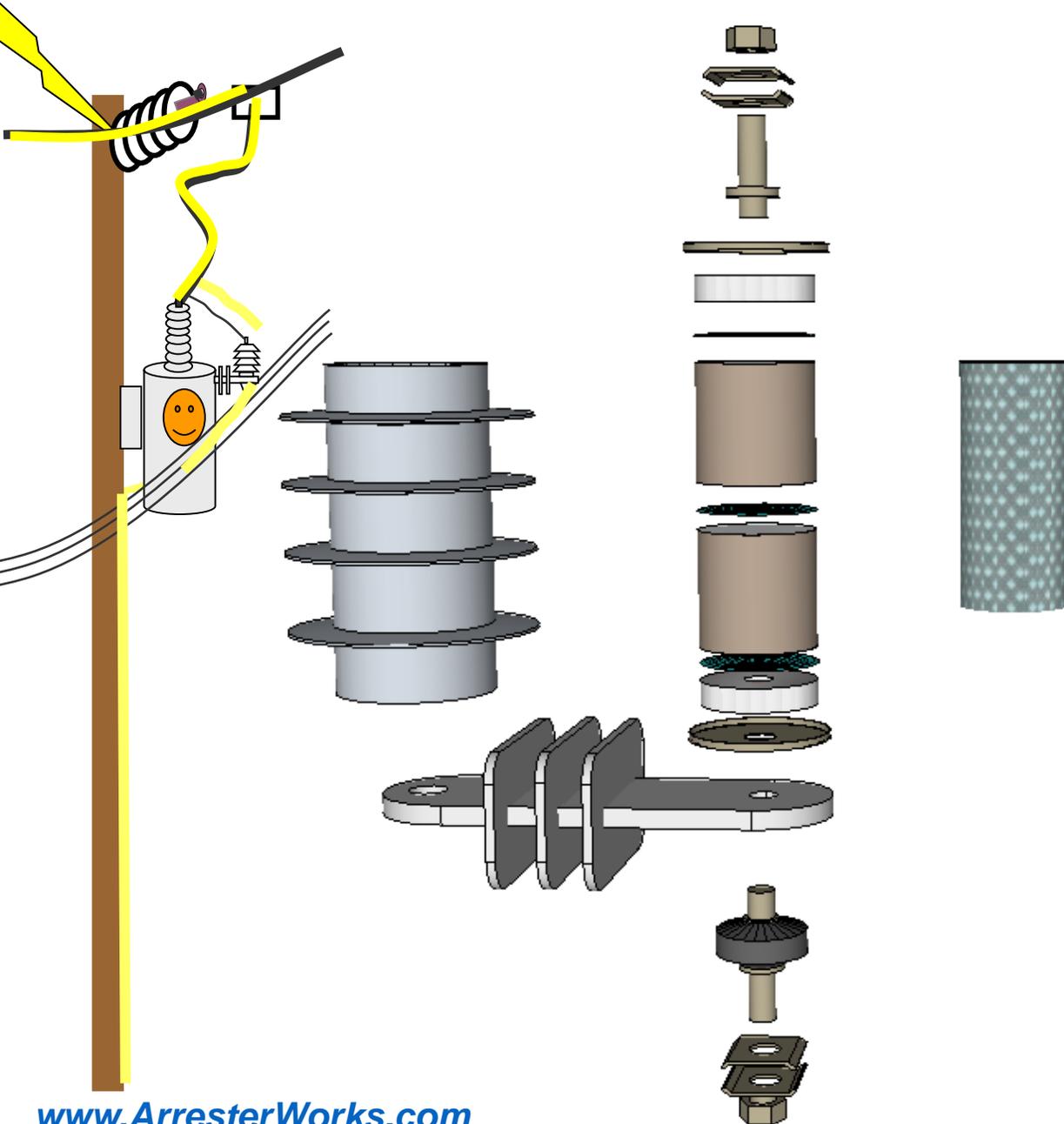
If there are 1000 junctions from top to bottom of a disk, it will have a total turn on voltage of about 3000 volts



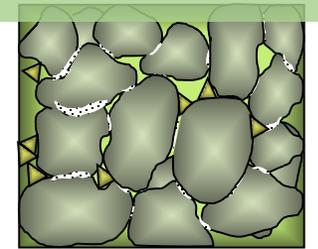
A lightning arrester is essentially a collection of billions of microscopic junctions of Metal Oxide Grains that turn on and off in microseconds to form a current path from the top terminal to the ground terminal of the arrester.



Video Version



So there you have it.
A Lightning Arrester is a device,
used on power systems, that
contains billions of electronic
switches that divert lightning
currents around sensitive
equipment and saves them from
damage.



For More about Lightning Arresters go to
www.ArresterWorks.com

This ArresterFacts is just one of many that make up the ArresterFacts Tutorial Series on Arresters.

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