

1. What is an MOV (Metal Oxide Varristor)? How does it work?

An MOV is a sintered ceramic component with suspended metal oxides. An MOV acts much like a solid state switch, creating a low impedance path to ground. It is voltage dependent and begins to conduct when voltage on one surface exceeds a given threshold. This threshold is determined by the thickness of the component.

2. What is device response time?

MEASURED in nanoseconds, the METER-TREATER[®] device has an extremely fast response time of 15 - 50 nanoseconds due to the very short lengths leading up to and away from the MOV. Aside from lead lengths, all MOVs have similar response times, therefore response time is not a key evaluation criterion and is often used to mislead consumers. MOV based protectors are fast enough for most protection scenarios except for high speed communication applications. Currently, there is no accurate or economical way to measure component response times. *NOTE:* Response time is not recognized as a viable SPD selection criteria by NEMA, IEEE/ANSI or the IEC.

3. What is the clamping voltage?

The initial voltage point at which the MOV begins to conduct at any given amperage. Manufacturers of MOVs rate their components at 1 milliamp, an accepted industry standard. Clamping voltage is non-linear because it rises as amperage increases. MOVs have published clamping graphs that show their clamping voltage at any given amperage. The clamping voltage for the meter-based device at 1 milliamp is 240v. The lowest possible clamping voltage device for 120-volt residential service is around 200 volts (1 milliamp rating). Devices at this level fall under UL Standard 1449 2nd Edition and a clamp voltage of 330 volts would be determined with an 8/20 μ s waveform at 6kV/500Amps.

4. Will it save me electricity?

ABSOLUTELY No! If someone tries to sell you a surge protection device as an energy saver, he or she will most likely end up on 60 minutes! Hopefully, this practice is becoming a thing of the past.

5. Will it protect me from something as severe as a direct lightning strike?

No!- nothing is a complete guarantee from a direct lightning strike. Lightning has been measured well in excess of 250,000 amps. No SPD device currently available can effectively handle such high surge energy.

6. What happens when it fails? Will it cut off power to my house?

MOVs self sacrifice in a "dead short" mode. When this happens on a METER-TREATER[®] the MOV ruptures and goes off line. The METER-TREATER[®] meter based device will not cut off power to your house. Only the MOV surge circuit becomes inactive.

7. Will it catch fire or explode?

The METER-TREATER[®] device cannot catch fire or explode because of its custom fuse elements. However, other similar products on the market may have this problem if not properly fused. In addition, MOV elements too small for a given application may rupture violently under heavy surge activity. Also, hermetically sealed devices have been known to rupture violently, if not properly fused. The best way to ensure that a service entrance meter-based device (for use at Category C locations) does not have a fire problem is to subject it to what is known as the “End-of-Life” test.

8. Where does it install and how long does it take?

It goes between the electric meter and the meter box on the outside of the house and takes between 2 and 10 minutes to install. A simple pigtail ground wire is attached and the device is snapped into place. The cover and meter are repositioned and sealed.

9. I have three phase service on my home, will it work?

No, three-phase service requires a completely different configuration and protection approach.

10. How long will it last?

The MTBF (mean time between failure) is approximately 17 - 20 years.. The number, duration, and intensity of surges that the component sees over its lifetime determines the life of any MOV based product. MOV manufacturers publish curves called life curves, which shows the survivability of any given component at a given amperage and time duration. In general the more MOV mass the more durable the product. A single large diameter MOV tends to be more durable than groups of smaller MOVs (see #7).

11. How will I know if it is still working?

The lights will be on, or in the case of window units, the window will be clear. If the window is blackened or the lights are out, the unit needs to be replaced. Because it takes such a high-energy pulse for the METER-TREATER[®] to fail, chances are the homeowner will have other indications that a significant surge event has taken place.

12. What if I have a bad ground?

A bad ground does not effect the performance of MOVs, however, it may alter the effectiveness of any surge protective device. MOVs create a low impedance path to ground. The less attractive that path is, the higher the probability that the ‘surge pulse’ will seek an alternate path. If an alternative path is not available then the voltage level at which the MOV conducts may rise. In summary, a poor ground at a customer’s service entrance would make a less attractive path for surge current seeking ground at the location.

13. What are Joules, why is the rating on this device so high?

JOULES are the measures of energy absorbing capacity for these devices. The METER-TREATER[®] rating is high due to the very large MOV component used. Unfortunately, some manufacturers abuse joule ratings by using misleading calculations and

assumptions. In theory, (not taking into consideration current sharing issues) the more MOV mass the more joules the device can absorb.

14. Will it keep my clocks from blinking?

No! It is not a source of energy; it has no affect on the normal flow of electricity into your house.

15. What doesn't it protect me from?

Any electric activity that does not come in through the power line (such as a surge on the phone line), surges beyond its capability (such as direct lightning strike) or sustained/continuous overvoltage.

16. Will it remove "Noise"?

No! There are no RFI or EFI components incorporated in the METER-TREATER[®] units.

17. Can I buy one direct and put it on myself?

No! It is only to be installed by qualified utility personnel. Meter-Treater, Inc. never sells a meter-based device to a homeowner without prior approval of the utility.

18. I keep having problems and losing electronic equipment. Will this guarantee me of no more problems?

No! If you experience repetitive losses, you may have additional problems or conditions contributing to the situation such as a loose neutral. Even other equipment, such as copy machines, on the same plug can cause problems. We recommend checking your wiring and using additional outlet protectors for sensitive electronic equipment. Quality TVSS devices enhance the survivability of sensitive electronic systems and equipment.

19. What kind of guarantee is there?

The product comes with a standard 10-year product guarantee. An optional 10-year extended consequential damage warranty is available.

20. Can I get a discount on my homeowners insurance?

Maybe, check with your insurance carrier.

21. I want a lower clamping voltage, something closer to the 120 volts of my system.

MOVs are rated in multiple ways, we have already discussed clamping voltage and amperage. A more critical specification is the MCOV (maximum continuous operating voltage) that the component can withstand. This is more commonly referred to as RMS (Route Mean Square) which for standard residential service is 120 volts. The MOV used in the METER-TREATER[®] is rated for 150 volts RMS (remember this component has a clamp voltage rating of 240 volts). In order to achieve 120 volts clamping, an MOV with a 95 volt RMS rating would be required. Placement of such a device on a system with 120 volts RMS would cause violent and immediate component destruction. The 150-volt MOV in the METER-TREATER[®] is the lowest possible clamping component safe for use at the harsh, category C, service entrance location.

22. Why do I need outlet protectors in addition to the residential surge protective device? What is the "Two Stage Approach"?

Because of the non-linear clamping characteristics of MOVs and the potential overshoot inherent in all MOV devices, there exists the possibility of a certain portion of an incoming surge to continue downstream. The higher the magnitude of the incoming surge, the higher the 'overshoot' or 'let-through'. In addition, surges can be generated internally or can enter through Cable TV, Telephone lines etc. Outlet protectors are particularly important for highly sensitive electronics such as computers, stereos, VCRs, etc. The two-stage approach is insurance that surge energy levels stay well below the upset or destruction levels of the equipment being protected.

23. Will it cause the voltage to rise in my house or will it create EMF?

No! Again it is not a source of energy. The device is passive and surge components are in parallel with the lines, not series.

24. Will these devices work on my older two wire service; my outlets don't have the third grounding prong? What are 'modes of protection'?

Yes it will work on the older two wire service; however, the most effective surge suppression provides a low resistance path to ground. Since this system has no ground at the outlet, surges must travel back through the neutral wire, which subjects all equipment and appliances to the surge. By placing a meter-based surge arrester on a two wire home surges will be intercepted before they enter the house, all the more reason to put one on a two-wire house. We do recommend that highly sensitive electronics in such a house be provided with a three prong, grounded outlet, tied back to a proper ground point at the building's electrical service entrance. Please note, such a residence may not meet current code. Modes of protection are the electrical connections of the MOVs between hot and neutral, hot and ground, and neutral and ground. We recommend using outlet protectors that provide all mode protection.

25. Does it limit the voltage in my house to no more than 240 volts?

No! As previously explained, the characteristics of MOVs allow a non-linear let through of voltage. There is a misconception by consumers, created by misleading manufacturer information, that surge protectors are crow bar devices (a crowbar device would limit the amount of voltage). Such a device would be considerably more complicated in design and very expensive.

26. Will it protect me against continuous high voltage by high line drops, open neutrals or other system problems?

No! MOVs are not designed to handle sustained, continuous overvoltage (remember MCOV). It would require a very large mechanism to divert the high voltage and high amperage associated with these conditions. MOVs are designed for very rapid, short duration surge activity. We have had incidents where the METER-TREATER[®] device was able to sustain the shunting activity during continuous high voltage conditions for approximately one to two cycles. In several of these cases, no damage was experienced in the residence, however the METER-TREATER[®] self sacrificed. In some instances, the METER-TREATER[®] was able to shunt the overvoltage just long enough for the

system to clear or the event to stop, however, there is no guarantee that the outcome will always be favorable.

27. Will it protect my car?

Never consider a customer's question "dumb". Your customer may have a valid reason for such a question. Before breaking out in uncontrollable laughter, pause and ask yourself what the person may be getting at. Do they have an electric car, an electric golf cart, or do they plug a motor home into the AC plug in their garage. If you answered yes to any of these questions, then the answer to the initial question would be yes. However, sensitive electronics within the vehicle would still require secondary protection.

28. Why do I need protection for simple appliances?

We know that over time the internal working of simple appliances (motor windings) can break down. Since the quality of some appliances have diminished and others have incorporated more sophisticated circuitry, the need for surge protection is even greater. The cost to repair even a simple appliance in many cases exceeds the cost to completely replace it.

29. Will it protect me if lightning hits my chimney?

No! The secondary outlet will provide some protection in cases like this. The meter-based device will however, protect the power company from the surge since it is bi-directional. It will shunt the surge to ground if it exits the house and travels back up the power line.

30. Why don't my circuit breakers protect me?

They aren't fast enough. Circuit breakers are current limiting (amperage) devices; the METER-TREATER[®] is voltage dependent.

31. What makes it better than other devices I can buy? What is current sharing?

It is better because of its unique patented design, which incorporates heavy duty 40mm blocks (not small circuit board components). In addition, our custom balanced fuses eliminate thermal runaway and fire commonly associated with smaller circuit board mounted MOVs. Other features are a UL listed container and our in-field experience since 1987. One large MOV is superior to many paralleled smaller MOVs because smaller MOVs do not share current evenly. There is a 10% clamping deviation potential from one MOV to the next. METER-TREATER[®] device eliminates the current sharing issue since there is only one large MOV per phase.

32. Why do I need it now and not years ago?

- ♣ **PROLIFERATION** of electronics in home.
- ♣ **A** reduction in quality in many appliances.
- ♣ **THE** cost of repair.
- ♣ **PEACE** of mind.

33. Why do I need such a high-energy device? What is Pulse Life/Maximum Spike Current?

Although the larger damaging surges are rare, when they occur they tend to be very destructive. A high-energy device can help minimize the impact, but more importantly, a high-energy device can survive many lower level surges without degrading. This is called the pulse life durability. And as we mentioned earlier, the pulse life is a function of the total mass of the MOV material combined with design of the device (keep in mind, multiple parallel MOVs are not as desirable as one homogenous mass).

34. What is the difference between this device and other devices I have seen such as lightning rods?

Other, non MOV, devices typically have a much higher clamping voltage. Some devices even require ‘arc over’ prior to the actual shunting activity. Devices such as lightning rods do nothing more than divert lightning to ground. The bottom line is that a meter-base MOV protector such as the METER-TREATER[®] creates a low impedance, low voltage threshold path to ground before entering the house.

35. They tell me that because I am at the end of a run there is nothing I can do to get better quality power. Is that true?

No! In some instances running the line another block or so down the road and terminating it helps eliminate surges. The reason is, high energy pulses don’t like sharp turns, therefore, a high energy pulse seeking a very easy path to ground, may shoot past a customers transformer and continue to the end of the pole and possibly to ground. Due to the cost we recommend this only as a last resort and only in a situation where a repetitive problem exists.

36. I had an open neutral/transformer failure/line drop last week that destroyed many of my appliances? Would these devices have saved them?

As we discussed earlier in question 27, the METER-TREATER[®] meter-based surge protector is not designed to mask or protect against system flaws. The standard answer to this question is No, however, there have been instances where the METER-TREATER[®] has been effective under these conditions.