

Use case Eaton Bussmann series MOVTPs



Eaton MOVs provide integrated circuit protection in smart meters

Energy consumption around the globe has been on a sustained rise over the last few decades due to rapid growth in the residential, commercial, and industrial sectors. According to reports, energy usage by industries will grow by up to 30% between 2018 and 2050¹ due to strong economic growth and an increasing consumption of goods. Smart meters aid remote and accurate tracking of energy consumption globally.

What are smart meters and why do we need them?

Smart meters are electronic devices that monitor and record information concerning energy consumption, current and voltage levels, power factor (PF), etc., and relay the information to utility companies. When customers understand their energy usage patterns, they can take active measures to lower their annual

energy costs and avoid waste. Remotely and accurately capturing customers' energy consumption is essential in utility companies for billing, troubleshooting technical issues in the power supply, and promoting transparency. Similarly, gas and water meters measure water and gas (e.g., natural gas) volumes supplied to residential, industrial, and commercial customers.

Today's smart meters have become increasingly complex due to an array of functions. Nonetheless, rapid advances in IC technology assure a high degree of sensitivity and accuracy, and compact design footprints. Smart meters, however, incorporate sensitive electronics prone to damage from overvoltages and overcurrent. For example, since electricity meters connect to the grid, they may face power quality issues due to lightning strikes and inductive load

switching. Thus, adequate circuit protection is required to avoid unexpected device failures and costly downtime.

Ensuring robust circuit protection in smart meter applications

The most common circuit protection elements include surface-mounted (SMD) and PPTC fuses, transient voltage suppression (TVS) diodes, and Metal Oxide Varistors (MOVs). MOVs are ideal for suppressing transient overvoltages that often affect power supply circuits connected to mains. The element works by varying its internal resistance during a surge event and clamping it to a safe level. A new requirement from some smart meter designers is the protection of the MOV from end-of-life failures by automatically disconnecting itself from the circuit to avoid catastrophic damage due to

short-circuiting.

Eaton Bussmann series solutions

Eaton's Bussmann series MOVTPs are ideal for overvoltage and over-temperature protection in many types of smart meters. These radial-leaded MOVs feature a thermal element designed to open when the device overheats due to prolonged or abnormal overvoltages. Eaton MOVTPs come in small-footprint 14 mm and 20 mm disc sizes with voltage ratings from 130 Vac to 465 Vac, compliant with the most common distribution voltages. These products are rated up to 10 kA of surge current and offer an optional third lead for indication purposes. The extra lead indicates the device's end of life, unlike a standard MOV that would reach end of life as a short.

1: [Energy Live News](#)

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