

Protecting Electronic Equipment from High Voltage Spikes and EMI Noise

Most electronic equipment and switchmode power supplies include EMI (electromagnetic interference) protection circuits that are designed to protect the equipment from externally generated electrical interference including high voltage spikes/transients. In addition, these EMI filtering circuits are designed to keep any internally generated noise within the electronic equipment from affecting adjacent equipment via the shared AC power lines.

Destructive incoming electrical noise can be in the form of spikes or bursts of electrical energy on the AC power lines. This noise may be generated by natural causes such as lightning strikes or man-made by the on/off cycling of electric motors, actuators and solenoids. In these cases, an external EMI filter with a “high voltage pulse attenuation” specification may be required to supplement the internal EMI filters and reduce these potentially harmful spikes from reaching the electronic equipment. These protective filters will also have some outgoing noise attenuation. A good example of EMI filters that can protect electronic equipment from harmful AC input line conditions (high voltage spikes, etc.) would be Lambda’s MZ series of EMI filters.



Regarding the containment of internally generated electrical noise, although most electronic equipment including power supplies meet the governmental regulations for EMI, electrical noise is additive and if there are multiple electronic devices, power supplies, or high speed processor boards, it can result in higher than normal EMI noise levels. Under these circumstances, and in order for the end user to comply with the strict governmental EMC regulations, an external EMI Filter may need to be installed in series with the AC power lines.

EMC an abbreviation for **ElectroMagnetic Compliance** and refers to the ability of a device or system to function reliably in the presence of EMI and to limit its internally generated EMI to avoid affecting other equipment. Among the most frequently cited EMC standards are, EN55022 for Information Technology Equipment (ITE), EN55011 for Industrial Equipment and, in the USA, FCC Class A for Commercial or Industrial

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Equipment or FCC Class B for Residential Equipment. The FCC Class B is tougher and more restrictive than Class A.

If the electrical noise is only slightly out of specification, then a low cost, single stage EMI filter may suffice. If the noise is considerably out of specification then a higher performance two stage filter will be required. Examples of these would be Lambda's MA (single stage) and MX or MXB (two stage) filters. Look for the terms "wideband" or "low frequency attenuation" in the filter's specifications.



For more information about EMI filters, including datasheets, please see the selection guide at:

http://www.lambdapower.com/products/product_index.htm#filter

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About Lambda

Lambda Americas is a unit of TDK Corporation (NYSE: TDK), a leading global electronics company headquartered in Tokyo www.tdk.com. Lambda has been a major provider of power solutions for over 60 years. The company designs and manufactures a wide range of AC-DC and DC-DC power products and external EMI Filters for Industrial, Medical, Telecom, Datacom, and Test & Measurement applications worldwide. Additional information is available at 800-LAMBDA-4 (toll free) or 619-575-4400.