Tempest and EMP Filters On Show At Electronica Show

MPE Ltd (published 05/11/2010)

MPE is attending the Electronica event in Munich this year with the company's catalogue of Tempest and EMP installation filters on show

On Electronica Stand B5.515 in Munich, the major UK EMC filter and capacitor manufacturer MPE is showcasing its new catalogue ranges of high-performance TEMPEST and EMP installation filters for fixed and mobile applications. Fixed means housed in a permanent, brick-built structure, whereas mobile signifies that which is transportable and deliverable.

MPE TEMPEST filters prevent covert interrogation of conducted lines

TEMPEST (an acronym for Transient Electromagnetic Pulse Emanation Standard) is both a specification for filter performance and a term used to describe the process for preventing compromising emanations. In the latter sense, signals radiated off a computer may be picked up by a nearby telephone line, power cable or aerial. The fact that electronic equipment such as computers and peripherals give off electromagnetic emanations has long been a concern of governments and commerce. Unless prevented by the distancing of perimeter fencing, an attacker close by can monitor and retrieve classified or sensitive information as it is being processed, pulling signals off conducted cables without the user being aware that a loss is occurring.

Accordingly MPE is launching a new range of high-performance TEMPEST EMI filters for single-phase AC mains lines. So, meeting the TEMPEST standards of 60dB performance in the frequency range 100kHz to 1GHz, these filters are of compact size for easy, flexible, bulkhead or chassis mounting into rack systems and stand-alone computer equipment, especially where low earth leakage is critical. A 3.5 milliamp (mA) maximum leakage current at 250V AC / 50Hz is seldom available in filters of such high performance.

All MPE feedthrough capacitor designs such as these incorporate self-healing, metallised plastic film capacitor material and utilise a solderless capacitor assembly technique to avoid heat damage to the plastic dielectric material, which would reduce its life and excellent conductivity, whilst the potting is in heat-dissipating epoxy resin rated to burn specification UL 94V-0 and compliant with RoHS (Restriction of Hazardous Substances) regulations.

MPE's EMP & HEMP filters protect electrical infrastructures

On its Electronica Stand, MPE is also featuring power line, data line, telephone line and control line filters to provide high-performance Electromagnetic Pulse (EMP) protection for vulnerable fixed or

mobile, digital or analogue, equipment of all types. Fundamentally MPE products are designed to earth conducted electrical interference and, whilst the vast majority of applications are for continuous wave filtering, they also deal with pulses. Localised power surges have many causes such as lightning, microwaves, unforeseen incidents or other transient energy bursts. A microwave generator in a suitcase can be carried into a high street bank to bring down its computer systems at a stroke. Hence, in all cases, the electrical cabling that serves as an EMP antenna must be effectively filtered.

The performance of MPE's EMP filters is 100dB in a frequency range from 14kHz to 10GHz. All lines in these multi-line systems feature high-energy varistor transient suppressors at the input end. The purpose of the primary protector is to shunt the bulk of the incoming pulse energy to earth. Secondary protection is provided by a transient suppressed filter to clean up and reduce the remaining pulse voltage to a safe level. To provide delay to the incoming pulse, the filter is either mounted at a distance from the primary protector or separated by a discrete inductor.

A very specific area of EMP is High-altitude Electromagnetic Pulse or HEMP. In recent years the danger of a HEMP attack in the atmosphere – to knock out all electricity grids, computers, satellites, communications networks and transport infrastructure – from Al-Qaeda terrorists, jihadists and rogue states such as North Korea and Iran has increased while the nuclear menace of the former Communist bloc has dissipated.

For example, a nuclear blast 300 miles up would knock out a nation's power supply network and all equipment systems containing microchips in under a billionth of a second (sources: the book "Physics for Future Presidents" by Richard Muller and the TV programme 'Electronic Armageddon' broadcast on the National Geographic Channel on 15.6.10). A solar flare could have the same devastating effects. The most recent UK information on these threats is available from the first Electric Infrastructure Security Summit, held on 20th September 2010 at Westminster Hall and hosted by the Electric Infrastructure Security Council.

Aside from missile defence, the High-altitude Electromagnetic Pulse (HEMP) threat can be effectively neutralised by the incorporation of MPE filters into vulnerable equipment to stop the pulse. Designed to meet Military Standard (MIL-STD) 188-125 Parts 1 and 2, this exceptionally versatile new range of filters from MPE, with a current rating per line of 6A to 400A at 50 degC, are smaller, lighter, lower in cost and have a better residual current performance than any previous solutions offered by the market. Performance ranges from 20dB at 10kHz to 80dB in the frequency range 10MHz to over 1GHz.

The design of these HEMP filters is unique because MPE has developed them to satisfy the pulse current injection (PCI) requirements of the specification rather than the usual insertion loss specification. Other filter manufacturers generally adapt traditional installation filter designs in an attempt to comply with the stringent PCI requirements, but such a compromise results in unnecessarily large filters with front-end circuitry and some uncertainty as to whether they will meet the complete specification.

MPE filter solutions for military vehicles & mobile tactical shelters

Above and beyond installation filters and feedthrough capacitors, MPE is one of the world's major providers of EMC filter solutions for shielding equipment on military vehicles and mobile tactical shelters. Equipment on military vehicles includes alternators, HVAC, power supplies and power management systems, generators, motors for windscreen wipers, washers and blowers, oil cooler fans and communications systems, as well as specialist NBC / CBRN threat detection and protection technologies, minesweeping ploughs and IED detectors.

MPE's TEMPEST-grade EMP equipment filters frequently go into mobile tactical shelters and similar battlefield enclosures. Normal applications on these units requiring MPE solutions are telecommunications and radar, IT systems, power supplies and a wide variety of portable electronic equipment. So you will find MPE's EMP equipment filters offering a TEMPEST level of performance located typically on the inside or outside wall of a mobile tactical shelter protecting the incoming mains supply to equipment, as well as further MPE EMC filters installed on racks inside.

From its 40,000 sq ft dedicated engineering facility at Knowsley, Liverpool, MPE has developed over 85 years a portfolio of over 20,000 catalogue and custom EMC filter and capacitor solutions for specific

RFI, EMC, EMP and TEMPEST applications in the commercial and military arenas. With 50 employees and a £4m turnover of which over half is exported, the company offers a comprehensive system design service with rapid prototyping, in-house or on-site testing, a dual chamber screened room and full engineering support.

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