



Applications-Information 02/08



Battery Terminal Filters

The selection of the optimum EMI (electromagnetic interference) suppression filter for a specific application depends not only on electrical filtering performance, but also on physical and mechanical parameters. When stringent design constraints dictate that standard devices require unacceptable trade-offs, a custom-designed solution can be a viable option.

1. THE APPLICATION

Low power wireless technology is widely deployed in the security sector, for domestic, industrial and military applications. An intruder system designed to detect the movement of people or vehicles across installation perimeter boundaries or at border crossings, for example, comprises a battery operated detector unit which is buried underground and a handheld wireless unit used to interrogate the detector for data.

2. THE PROBLEM

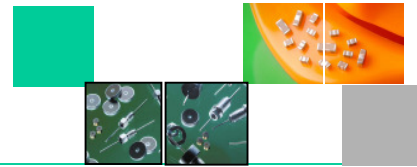
This is a battery powered system. The battery compartment is plastic, and therefore offers no obvious protection from radiated EMI. The danger is that any radiated EMI passing through the battery casing can then easily reach the connection between the battery and the detector itself, such that conducted interference becomes a serious risk to the electronic circuitry. Thus this device is now considered to be highly susceptible to both radiated and conducted EMI.

3. THE SOLUTION

One obvious and effective solution is to install feedthrough EMI filters which are highly effective at removing conducted interference. They could, in theory, be mounted at the interface between the battery and the connection to the rest of the internal circuitry. This option raises two specific challenges.

Challenge 1: Panel mountable feedthrough filters are typically constructed with a pin at each end. This is not an ideal means of connecting to the battery or battery spring. It is important that any alternative interconnect solution is highly compact, as space is at a premium.

Challenge 2: In this application, it is critical that the filter assembly is fully sealed to prevent moisture ingress or particles from penetrating and damaging the internal circuitry. The question is how to provide such a seal between the filter and the panel on which it is mounted.



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4. SYFER'S CUSTOM SOLUTION

Syfer Technology is able to offer a custom design solution to meet all these design criteria. Not only does it provide excellent EMI filtering performance, but it also meets the physical and mechanical requirements by being compact, easy to connect to the battery, and fully sealed to the panel.

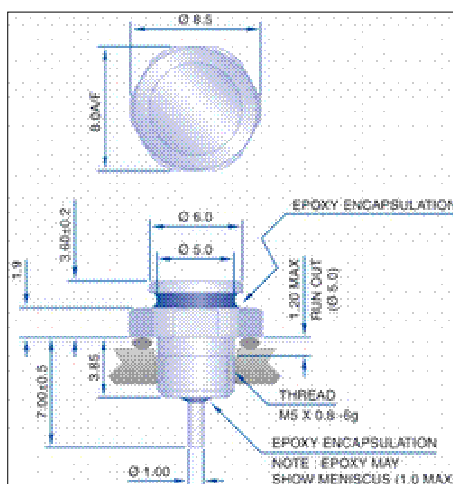
The customer found that two versions of the filter design were required and both were drawn up and manufactured by Syfer's engineering team based at its Norwich, UK facility. In this application, the SFDNC has been designed for the hand held unit and a smaller variant, the SFEMC has proved ideal for the buried device.

The special battery connection has been achieved by using an innovative circular end to the feedthrough pin to replace the standard long straight wire (See figure A). This allowed a spring to be fitted between the battery and the filter, to create a conventional battery connection.

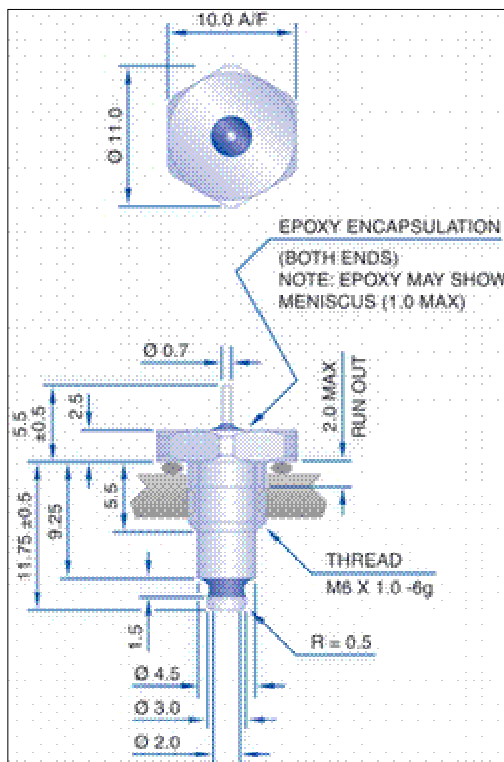
To meet the sealing constraint, a large flat area is provided on the body of the filter, at the top of the thread and under the head (See figure B). In this way a conductive 'O' ring or similar seal can be used to seal the filter against the mounting panel. The result is that a good electrical connection, essential to filtering performance, is maintained, while at the same time preventing moisture and anything else from entering the sensitive area of the electronic circuitry.

5. TECHNICAL DETAIL

The SFDNC and SFEMC custom designed, panel mounted feedthrough EMI filters have a capacitance of 10nF and operating voltage of 200V dc. Current rating is 10A. Insertion loss is 4dB at 1MHz, 22dB at 10MHz, 41dB at 100MHz and 60dB at 1GHz. Operating temperature range is -55 to 125°C. Manufactured from silver plated brass, the filters are fully RoHS compliant.



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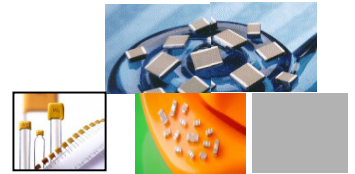


Customised battery connection for EMI filter. Providing an effective sealing option for a customised EMI filter.



6. SYFER FILTER RANGE

Syfer offers a wide range of standard threaded and solder-in panel mount EMI filters as well as surface mount types. Both ultra-stable C0G and stable X7R dielectric types are available with capacitance values from 10nF up to 2.2µF and working voltages from 50V dc up to 3kV dc and current ratings up to 15A. Custom designs and modifications to standard parts are offered to meet a range of specialised mechanical and electrical requirements. These include multiway assemblies using soldered or threaded filters, and planar capacitor arrays for designs requiring closer pin pitching.



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Syfer – The EMI Filter Specialist

In dieser Filterbroschüre finden Sie alle Daten und Fakten zu folgenden Produktgruppen:

- Surface mount EMI Filters
- Panel mount EMI Filters
- Special filters and assemblies
- Filters for Hi-Rel applications



Auf unserer Web-Seite: www.wts-electronic.de finden Sie unter Meldungen die EMI Filterbroschüre als PDF-Dokument.

Bitte fordern Sie die EMI Filterbroschüre, Muster und weitere Informationen gern bei uns an: Nadine.Ossenkopp@wts-electronic.de, Marketing, 05130 / 58 45 - 19

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