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## **APPLICATIONS NOTES**

### **USE OF MPE HIGH PERFORMANCE POWER LINE FILTERS WITH ISOLATION TRANSFORMERS**

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**Approved to ISO9001**

# **APPLICATIONS NOTES**

## **USE OF MPE HIGH PERFORMANCE POWER LINE FILTERS WITH ISOLATION TRANSFORMERS**

Where an isolation transformer is used ahead of a power line filter, special considerations are required.

### **Single Phase Supplies**

Because isolation transformers remove the reference to neutral, on a 240V supply the filter will be presented with a floating +/- 120V rather than 240V and 0V normally encountered.

Many high performance power line filters now incorporate a modern filter design utilising current compensated inductors to achieve maximum performance within a small enclosure size. This type of filter will normally be designed to run on single phase plus neutral supplies. The filter circuit is not symmetrical but is configured so that filter capacitor leakage currents on the 240V live line do not saturate the inductor core. If used on a floating supply such as provided by an isolation transformer, some inductor core saturation may occur causing some loss in filter performance.

For use with isolation transformers, MPE would recommend the use a "two phase" filter as shown on pages 28 - 29 of MPE's power line filter catalogue ref MPE104 9/94. These filters are specially designed for use on this type of supply, and offer 100dB performances starting at 50kHz.

If an even better low frequency performance is needed then two single line filters should be used, one on each line. A suitable range is shown on page 18 - 19 of MPE's power line filter catalogue. These filters offer a performance of 100dB from 10kHz to 10GHz.

In the unusual event that neutral is joined from input to output of the isolation transformer, then a standard single phase power line filter will be suitable.

### **Three Phase Supplies**

Because capacitor leakage currents largely cancel in three phase filters, standard three phase filters are suitable for use with three phase isolating transformers, whether or not a neutral is present. If no neutral is present then the filter neutral terminals should be left unconnected.