

Insertion Loss Evaluation

Insertion loss is an important specification to consider in the selection of filter connectors. Insertion loss is a measure of the degradation experienced by a signal when a device, such as a connector, is inserted into the transmission path.

When a filter element performs its job of stripping signal noise from a transmission line, it may attenuate a portion of the desired signal as well. Measured in decibels (dB), insertion loss should be minimized in sensitive electronic systems which may operate at extremely low current levels. Typically, some amount of insertion loss is considered acceptable to accomplish the necessary signal selectivity, since the signal can always be re-amplified post-filtering. However, in many applications, too large a loss may ultimately result in the unacceptable degradation of system performance.

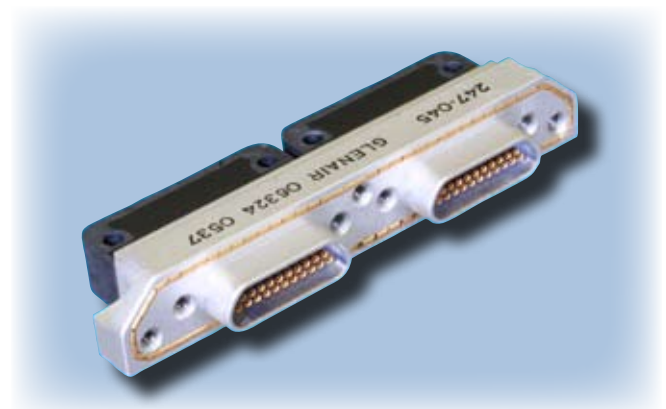
The evaluation of insertion loss is performed over a specific frequency range—i.e. a spectrum that extends from one limiting frequency to another. The intent being to measure signal degradation for each filter type across the actual operating frequencies of the equipment under consideration. Note that each filter type may yield different (theoretical and actual) insertion loss values depending on the specific capacitance and inductance [pF] ratings of the filter elements. Effective EMI/EMP filtering is, therefore, a balance between the purposeful attenuation of signal noise and the unfortunate degradation of signal strength—both conditions directly attributable to the insertion of the filter device into the system. Sensible EMC design should, as a consequence, always incorporate conventional grounding and shielding of interconnect cabling and equipment housings in anticipation of unexpected EMI problems. The tables on the opposite page explain predictable insertion loss [dB] for each filter type (C, L, and Pi), at the available capacitance ratings [pF] across a common frequency range [MHz].

Custom Options in Filtered Connectors

Glenair filter connector designs may be optimized for use in a wide range of application environments including avionic systems, down-hole drilling and logging devices, naval and marine platforms, network-centric ground warfare systems, and missile and satellite/space applications. Common electrical customizations include unique capacitance values on individual lines, electrostatic discharge designs, transient voltage suppression diodes, grounded holes and feed-throughs, as well as the incorporation of customer-specified filter architectures including Pi, C, L-C, C-L and T configurations.

Mechanical packaging options in EMI/EMP filter connectors include:

- Hybrid Fiber Optic/Electrical Contacts
- Hermetic Sealing
- Dual-Flange PCB Mount Designs
- Composite Thermoplastic Shell Materials
- Variable Length PCB Tails
- Piggy-Back Crimp Contacts
- EMI Grounding Fingers and Gaskets
- In-Line, Feed-Through, Plug and Other Shell Styles



Custom dual plan Micro-D filter connector with EMI gasket and right angle PCB mounting. Glenair can apply a broad range of custom shell configurations, filter values, TVS technologies—even hybrid fiber optic contacts—into any standard connector package.