

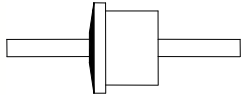

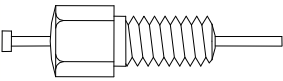
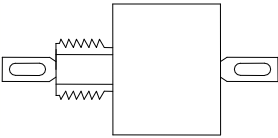
EMI FILTER DESIGN GUIDE

Selecting an appropriate filter style and type is often a complex task involving many considerations and trade-offs. Some of the factors that have a major impact on designer's selections are:

1. Real Estate limitations (size, weight, mounting type).
2. Environmental conditions (moisture resistance, shock, vibration).
3. Electrical characteristics (voltage, current, capacitance, insertion loss).

1.) This catalog has been organized to provide the designer with a variety of military equivalent and industry standard EMI filter sizes and mounting types. To facilitate location of a particular filter type, the parts have been listed by size starting with miniature solder-in eyelet types and ending with relatively large screw-in broadband types. Table 1, below, is a handy guide referencing appropriate catalog pages in respect to the filter type, reading from left to right and with respect to the filter circuit style, reading from right to left.

TABLE 1




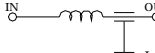



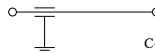
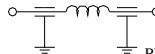
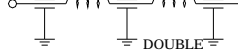
F I L T E R S T Y L E	DRAWINGS	INSTALLATION METHOD	BODY OUTSIDE DIA.	THREAD SIZE	TYPICAL LENGTH	TYPE OF SEAL	PAGE		F I L T E R S T Y L E
		SOLDER-IN	.086	N/A	.500	EPOXY	2-3	C-L	
			.128	N/A	.625	EPOXY	9	C-L	
			.165	N/A	.650	EPOXY	10	C-L	
			.250	N/A	.650	EPOXY	11	C-L	
.400			N/A	.700	EPOXY	12	C-L		
	SOLDER-IN	.122	N/A	1.350	EPOXY	15	π		
		.138	N/A	1.360	EPOXY	15			
		.187	N/A	1.480	EPOXY	15			
		.240	N/A	1.500	EPOXY	15			
	SCREW-IN	.070-.072	0-80 UNF	.25	EPOXY	4	C		
		.095-.105	2-56 UNC	.500	EPOXY	5-6	C-L-π		
		N/A	4-40 UNC	.600	EPOXY	18	C-L		
		N/A	8-32 UNC	1.200	EPOXY OR	19	C-L-π		
		N/A	12-32 UNEF	1.260	HERMETIC	20-21	C-L-π		
		N/A	5/16-24 UNF	1.310	ALL SIZES	22	C-L-π		
	SCREW-IN	.240	8-32 UNC	.840	HERMETIC	25	C-L		
		.375	¼-28 UNF	1.080	HERMETIC	26	C-L-π-T		
		.400	¼-28 UNF	1.130	HERMETIC	thru	C-L-π		
		.680	5/16-24 UNF	1.600	HERMETIC	45	C-L-π-T		

2.) Every filter in this catalog has been ruggedized and completely encapsulated resulting in an environmentally resistant unit intended for Hi-Rel military and aerospace applications. All parts, either epoxy resin or hermetically sealed devices, meet or exceed the applicable requirements of MIL-F-15733 and MIL-F-28861 specifications. Individual test parameters per MIL-STD-202 for each family of parts can be found in the General Specifications Table at the beginning of every catalog section.

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3.) Ensuring Electromagnetic Compatibility (EMC) between a variety of electric and electronic equipment and systems in a modern world of sophisticated and intricate electronics has become increasingly important in order to provide successful operation of different subsystems in the same electromagnetic environment. Electromagnetic Interference (EMI) being either narrowband (unwanted disturbances present over a narrow range of frequencies) or broadband (undesirable noise present over a wide range of frequencies) can be radiated, conducted or propagated by any combination of these two propagation modes. Common suppressing techniques involve grounding, shielding, and filtering. To determine electrical properties of a filter it is necessary to define quantitative limits for conducted and radiated interference and establish susceptibility levels for equipment that comprise a system.

To achieve adequate suppression of the spurious noise, filter style or circuit schematic should be first chosen following the rule of thumb of having the capacitor end of a filter facing the high impedance and the inductor end facing the low impedance. Table 2 below illustrates the above circuit selection criteria.

		LOAD IMPEDANCE (Z_i)	
		LOW	HIGH
SOURCE IMPEDANCE (Z_s)	LOW	 <p>INDUCTOR 20dB/DECADE</p>  <p>T-STYLE 60dB/DECADE</p>  <p>DOUBLE T-STYLE 100dB/DECADE</p>	 <p>L-STYLE 40dB/DECADE</p>  <p>DOUBLE L-STYLE 80dB/DECADE</p>
	HIGH	 <p>L-STYLE 40dB/DECADE</p>  <p>DOUBLE L-STYLE 80dB/DECADE</p>	 <p>C-STYLE 20dB/DECADE</p>  <p>PI-STYLE 60dB/DECADE</p>  <p>DOUBLE PI-STYLE 100dB/DECADE</p>

The next step will require determination of the working voltage, rated current, maximum DC resistance, cut-off frequency and insertion loss.

When specifying working voltage and rated current, any derating requirements should be taken into consideration. Maximum allowable voltage drop will usually govern maximum DCR of a filter. The cut-off frequency is often selected one decade above the frequency of a signal.

The insertion loss data throughout the catalog is based on MIL-STD-220 and provide means of comparison and testing only. IL performance of any given filter could be quite different for systems having actual source and load impedances other than 50 Ohms.

To help the user get acquainted with this catalog, every effort has been made to organize the data sheets and list the parts in a logical order. Every table starts at the top with lowest voltage/current and consequently highest capacitance/insertion loss characteristics parts. These are followed by higher voltage and naturally lower capacitance and insertion loss performance devices.

This catalog provides you with the most comprehensive and widely used selection of EMI filters. However, it represents only a cross-section of capabilities. Whether your application requires unique electrical characteristics or customized mechanical configuration, there is a high probability that we will be able to satisfy your specific needs without compromise.