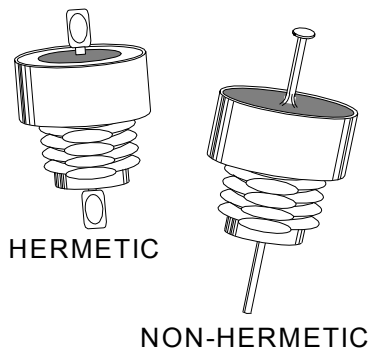


1/4-28 Filters

1/4-28 style filters provide exceptional EMI filtering performance from 10 Khz and up. They are a practical solution where high current and or operating voltages are present. A larger capacitor allows thicker dielectric layers, making them especially suited for AC applications. For more regarding filters and AC voltages, see our catalog page "[AC - 400Hz Heating of Ceramic Capacitors](#)." The larger capacitor also enables higher capacitance and attenuation performance over smaller filters. Below is a short discussion of the different types with links to specific products:



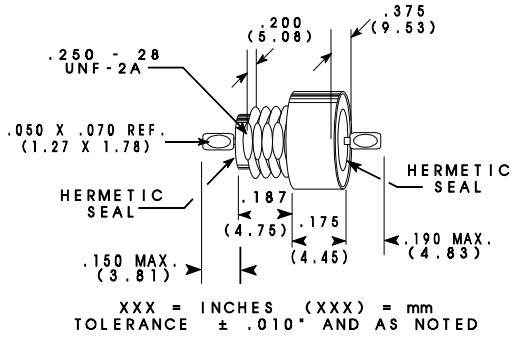
1/4-28 STYLE	"C"	"L"
Hermetic	KHC	KHL
Non-Hermetic	KRC	KRL

"Hermetic"; Have leak rates less than or equal to 1×10^{-7} atm cc/sec. The threaded end is permanently sealed by glass fusion. The cylindrical end is sealed with a glass to metal seal soldered in place. Prevents the transmission of air, moisture vapor or other gasses through the filter.

"Non-Hermetic"; Designed to pass gross leak testing. Epoxy sealed on both ends. This style is less expensive than hermetic types.

KH SERIES HERMETIC 1/4-28“C”FILTER

SHORT THREAD 1/4-28 CASE



Cap /Tolerance:

0.01 μ F - .25 μ F +100/-0%
Other tolerances available.

Dissipation Factor:

3.5% Maximum

Insulation Resistance:

10,000 MEGOHM or 1,000 Megohm- μ F
whichever is less @ 25°C, WVDC.

Dielectric Strength (DWV):

250% of Rated Voltage for 5 sec @ 25°C.

Max Mounting Torque:

7.0 in*lbs

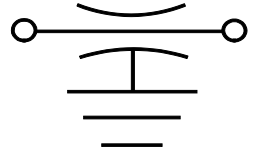
Operating Temp:

-55°C to +125°C

Installation Temp:

N/A. Internal construction with high temp. Sn10 solder.

1/4-28
“C” CIRCUIT



Material and Finish:

Steel case with tin-lead plating. Solderable tabs. Variations available.

Marking:

Color dots on head end standard. Custom marking available.

EMI PART NUMBER	CAP	MAX WVDC	DC AMPS	COLOR DOTS	TYP. FULL LOAD INSERTION LOSS (dB) @ 25°C PER MIL-STD-220							
					30 KH Z	100 KH Z	150 KH Z	300 KH Z	1 MHz	10 MHz	100 MHz	1 GHz
KHC103J	.01 μ F	400	15	2 WHITE	-	-	-	-	6	21	35	50
KHC503J	.05 μ F	400	15	2 YELLOW	-	-	-	3	15	34	45	60
KHC753J	.075 μ F	400	15	3 RED	-	-	-	8	18	37	46	65
KHC104J	.10 μ F	400	15	3 WHITE	-	5	8	13	25	38	50	70
KHC154J	.15 μ F	400	15	3 WHITE	-	6	10	14	25	38	50	70
KHC254F	.25 μ F	300	15	2 GREEN	-	10	14	20	30	40	55	70

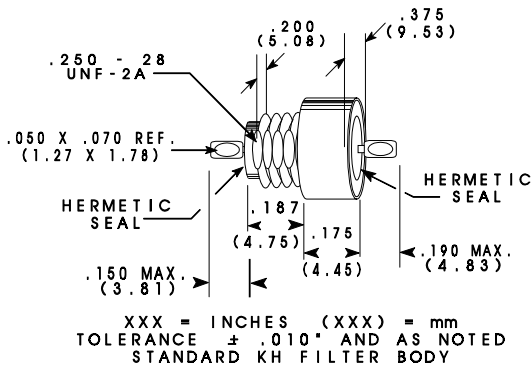
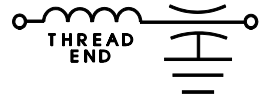
MOUNTING HARDWARE SUPPLIED

	<p>EMI FILTER COMPANY 12750 59th Way North Clearwater, FL 33760 727-585-7990 Fax: 727-586-5138 Toll Free: 1-800-323-7990 email: sales@emifiltercompany.com</p>
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KH SERIES HERMETIC 1/4-28“L”FILTER

SHORT THREAD 1/4-28 CASE

1/4-28
“L” CIRCUIT



Cap /Tolerance:

0.01 μ F - .25 μ F +100/-0%
Other tolerances available.

Dissipation Factor:

3.5% Maximum

Insulation Resistance:

10,000 Megohm or 1,000 Megohm- μ F
whichever is less @ 25°C, WVDC.

Dielectric Strength (DWV):

250% of Rated Voltage for 5 sec @ 25°C.

Max Mounting Torque:

7.0 in*lbs

Operating Temp:

-55°C to +125°C

Installation Temp:

N/A. Internal construction with high temp. Sn10 solder.

Material and Finish:

Steel case with tin-lead plating. Solderable tabs. Variations available.

Marking:

Color dots on head end standard. Custom marking available.

EMI PART NUMBER	CAP "L" CKT	MAX WVDC	DC AMPS	COLOR DOTS	TYP. FULL LOAD INSERTION LOSS (dB) @ 25°C PER MIL-STD-220							
					30 KH Z	100 KH Z	150 KH Z	300 KH Z	1 MHz	10 MHz	100 MHz	1 GHz
KHL103J	.01 μ F	400	15	2 WHITE	-	-	-	-	4	20	35	53
KHL203J	.02 μ F	400	15	1 RED + 1 WHITE	-	-	-	-	7	25	35	60
KHL253J	.025 μ F	400	15	2 RED	-	-	-	-	10	30	45	60
KHL753J	.075 μ F	400	15	3 RED	-	-	-	8	18	36	50	70
KHL154J	.15 μ F	400	15	3 WHITE	-	6	9	14	26	40	53	70
KHL204F	.20 μ F	300	15	2 GREEN	-	8	12	18	28	40	55	70
KHL254F	.25 μ F	300	15	2 GREEN	-	10	14	20	31	41	56	70

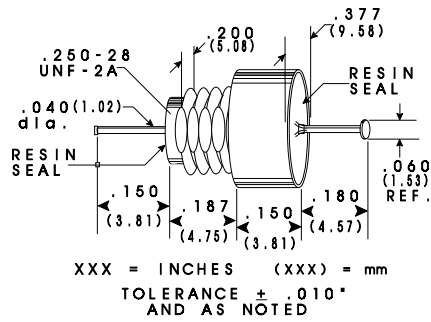
MOUNTING HARDWARE SUPPLIED

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Clearwater, FL 33760
727-585-7990 Fax: 727-586-5138
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email: sales@emifiltercompany.com

KR SERIES 1/4-28 "C" FILTER

RESIN SEALED, SHORT THREAD 1/4-28 CASE

1/4-28
"C" CIRCUIT



Cap /Tolerance:

0.01 μ F - .25 μ F +100/-0%
Other tolerances available.

Dissipation Factor:

3.5% Maximum

Insulation Resistance:

10,000 Megohm or 1,000 Megohm- μ F
whichever is less @ 25°C, WVDC.

Dielectric Strength (DWV):

250% of Rated Voltage for 5 sec @ 25°C.

Max Mounting Torque:

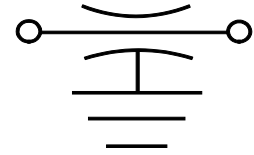
7.0 in*lbs

Operating Temp:

-55°C to +125°C

Installation Temp:

N/A. Internal construction with high temp.
Sn10 solder.



Material and Finish:

Steel case with tin-lead plating. Solderable leads. Variations available.

Marking:

Color dots on head end standard. Custom marking available

EMI PART NUMBER	CAP "C" CKT	MAX WVDC	DC AMP S	COLOR DOTS	TYP. FULL LOAD INSERTION LOSS (dB) @ 25°C PER MIL-STD-220							
					30 KH Z	100 KH Z	150 KH Z	300 KH Z	1 MHz	10 MHz	100 MHz	1 GHz
KRC103J	.01 μ F	400	15	2 WHITE	-	-	-	-	6	21	35	50
KRC503J	.05 μ F	400	15	2 YELLOW	-	-	-	3	15	34	45	60
KRC753J	.075 μ F	400	15	3 RED	-	-	-	8	18	37	46	65
KRC104J	.10 μ F	400	15	3 WHITE	-	5	8	13	25	38	50	70
KRC154J	.15 μ F	400	15	3 WHITE	-	6	10	14	25	38	50	70
KRC254F	.25 μ F	300	15	2 GREEN	-	10	14	20	30	40	55	70

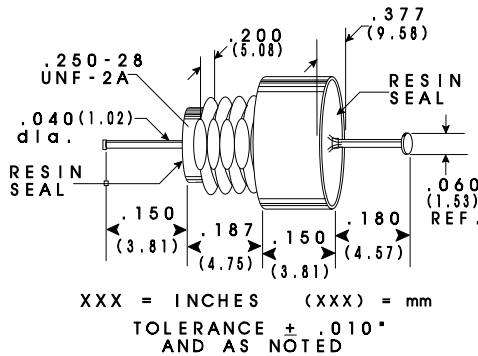
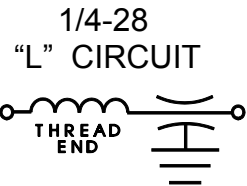
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KR SERIES 1/4-28 "L" FILTER

RESIN SEALED, SHORT THREAD 1/4-28 CASE



Cap /Tolerance:

0.01 μ F - .25 μ F +100/-0%
Other tolerances available.

Dissipation Factor:

3.5% Maximum

Insulation Resistance:

10,000 Megohm or 1,000 Megohm- μ F
whichever is less @ 25°C, WVDC.

Dielectric Strength (DWV):

250% of Rated Voltage for 5 sec @ 25°C.

Max Mounting Torque:

7.0 in*lbs

Operating Temp:

-55°C to +125°C

Installation Temp:

N/A. Internal construction with high temp. Sn10 solder.

Material and Finish:

Steel case with tin-lead plating. Solderable tabs. Variations available.

Marking:

Color dots on head end standard. Custom marking available.

EMI PART NUMBER	CAP "L" CKT	MAX WVDC	DC AMP S	COLOR DOT	TYP. FULL LOAD INSERTION LOSS (dB) @ 25°C PER MIL-STD-220							
					30 KH Z	100 KH Z	150 KH Z	300 KH Z	1 MHz	10 MHz	100 MHz	1 GHz
KRL103J	.01 μ F	400	15	2 WHITE	-	-	-	-	4	20	35	53
KRL203J	.02 μ F	400	15	1 RED + 1 WHITE	-	-	-	-	7	25	35	60
KRL253J	.025 μ F	400	15	2 RED	-	-	-	-	10	30	45	60
KRL753J	.075 μ F	400	15	3 RED	-	-	-	8	18	36	50	70
KRL154J	.15 μ F	400	15	3 WHITE	-	6	9	14	26	40	53	70
KRL204F	.20 μ F	300	15	2 GREEN	-	8	12	18	28	40	55	70
KRL254F	.25 μ F	300	15	2 GREEN	-	10	14	20	31	41	56	70

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AC - 400 Hz HEATING of CERAMIC CAPACITORS

Ceramics exhibit a sensitivity to changes in ac volt/mil levels. At 400 Hz the capacitance can almost double while the DF can increase by 10% or more. This change in capacitance and DF results in a significant increase in the internal reactive current of the capacitor, resulting in too much power (heat) being dissipated by the capacitive element of the filter, leading to catastrophic failures.

The problems associated with 400 Hz signals appeared in the late 1960's early 1970's when military airborne systems started requiring more filtering. The 400 Hz signals have many advantages at the system level, but created challenges for the filtering elements. The major problem was excessive heating of the filter.

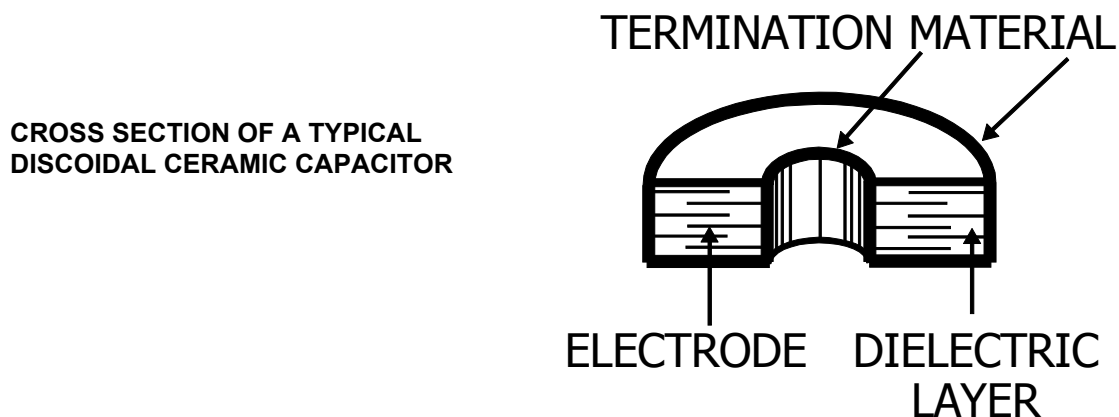
When compared to Polycarbonate, Polypropylene, and other dielectric materials, Ceramic dielectric capacitors will behave much differently in AC applications. Further, 400 Hz is 6.67 times worse, considering heating than 60 Hz. The capacitance of the capacitor, can almost double, and the dissipation factor (power factor) can increase up to 6 times the 1.0 volt rms value, increasing the reactive current in the capacitor.

In a perfect capacitor-one with no losses, the current leads the voltage by 90° when an AC voltage is applied. Dielectrics, however, have losses from various sources that are combined and are represented as being in series with the capacitor. These losses combine increasing the reactive current and generating more heat that needs to be dissipated by the capacitor.

By designing capacitors with thicker dielectric layers, lowering the volts/mil rating, and decreasing the overall capacitance of the filter, a unit can be designed to withstand a 400 Hz signal, and dissipate the lower power generated, and still offer the attenuation that is required.

Most studies on this phenomenon have been on capacitors > 0.3 " in diameter, although smaller capacitors will react the same way. The benefit of the smaller capacitor is that they have lower capacitance ratings, resulting in lower reactive current, and less power to dissipate.

Wire wound inductors can also add to these problems. EMI Filter Company uses only ferrite beads for the inductive elements of its' filters. The ferrites do contribute some but not nearly to the extent of the wire wound units and therefore are not discussed here.



To reduce costs, many ceramic capacitor manufacturers, design the capacitors with thinner dielectric layers to reduce the number of precious metal electrodes used. This thinner design will be more susceptible to the problems that have been discussed. EMI Filter Company, as a rule, designs all of its capacitors with a more conservative, thicker dielectric layer. This helps to minimize the reactive current of the capacitor, as well as making the capacitor more robust, without a significant increase in the cost.

