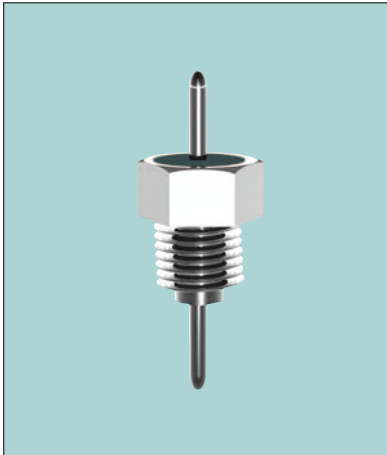


# Bolt Style EMI Filters

## SA Series – 4-40 Thread - Epoxy Sealed – Circuits Available – C & L



### APPLICATIONS

The SA series provides effective filtering in the RF and MICROWAVE frequency spectrums from 10 MHz through 26 GHz. Designed for mounting in a tapped bulkhead or with the standard nut and lockwasher provided, it is ideal for high impedance circuits where large capacitance values are not practical. In the “L” section version an internal ferrite bead

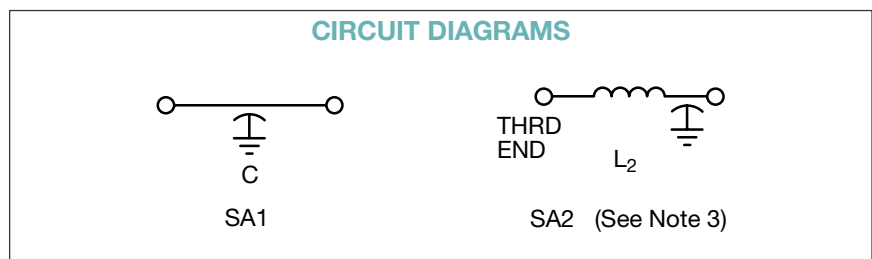
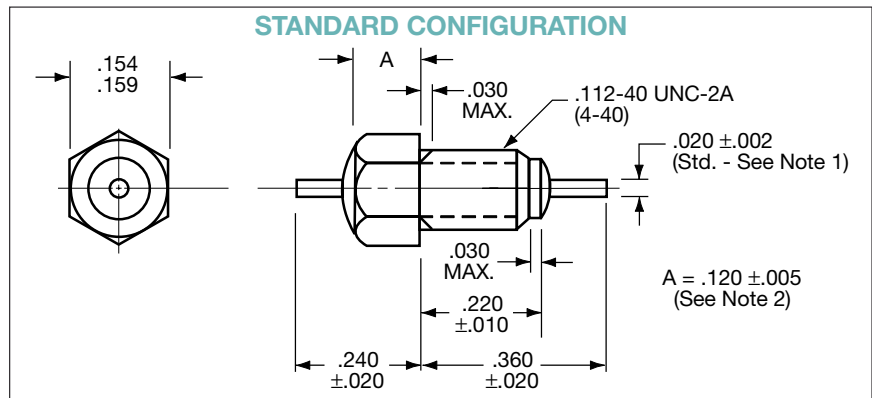
element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance. The SA series comes with a standard .020 diameter beryllium copper lead. Alternate lead lengths, diameters of .016 or .026 and alternate materials in steel or half-hard copper are available.

### CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/6. See QPL listings.
- Smallest screwbody filter available.
- Features rugged monolithic discoidal capacitor construction.
- Epoxy seal on both ends.

### SPECIFICATIONS

1. Plating: Silver standard – Electro-tin or gold available
2. Material:
  - Case: Cold rolled steel
  - Leads: Beryllium copper (steel or half/hard copper leads available)
3. Operating Temperature Range: -55°C to +125°C
4. Insulation Resistance:
  - At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
  - At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
  - R-level designs: 2.0 times rated DC voltage
  - Class B, Class S designs: 2.5 times rated DC voltage
6. DC Resistance (DCR): .02 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Recommended Mounting Torque: 32 oz-in. ± 4 oz-in.
10. Supplied with mounting nut and lockwasher - See Filter Design Guide Screw and Locking Washer Table
11. Insertion Loss for the “C” and “L” sections are equivalent due to the saturation characteristic of the ferrite bead element at rated current. At lower currents the “L” becomes much more effective.



millimeters (inches)	
0.05 (.002)	3.05 (.120)
0.13 (.005)	3.68 (.145)
0.25 (.010)	3.91 (.154)
0.41 (.016)	4.04 (.159)
0.51 (.020)	5.59 (.220)
0.66 (.026)	6.10 (.240)
0.76 (.030)	9.14 (.360)
2.84 (.112)	— —

(See Note 4)

#### Notes:

1. Standard catalog designs have .020" dia. lead. MIL-F-28861/6 calls for .026" dia. .026" dia. will not be supplied unless specified.
2. "A" dimension of .120 ± .005 will satisfy M28861/6-003 requirement for .145 ± .030. All "SA" series are supplied A = .120 ± .005.
3. All SA2 L-Section Filters have inductor (bead) at threaded end.
4. Metric equivalent dimensions given for information only.

# Bolt Style EMI Filters

## SA Series – 4-40 Thread - Epoxy Sealed – Circuits Available – C & L



### SPECIFICATIONS

AVX P/N	CKT	CAP <sup>1</sup>	DC Voltage	DCR	Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C					
					1 MHz	10 MHz	100 MHz	200 MHz	1 GHz	10 GHz
SA1C1-102	C	1000	50	.02	–	4	20	25	25	55
SA1C1-502	C	5000	50	.02	–	15	34	41	42	55
SA1C1-103	C	.01	50	.02	4	21	35	42	50	70
SA1C1-273	C	.027	50	.02	10	30	39	43	65	70
SA1C1-503	C	.05	50	.02	15	35	42	45	70	70
SA2C1-102	L2	1000	50	.02	–	4	20	27	30	60
SA2C1-502	L2	5000	50	.02	–	15	35	41	45	60
SA2C1-103	L2	.01	50	.02	4	21	35	44	50	70
SA2C1-273	L2	.027	50	.02	10	30	50	45	65	70
SA2C1-503	L2	.05	50	.02	15	37	45	45	70	70
SA1A1-102	C	1000	100	.02	–	4	20	25	25	55
SA1A1-502	C	5000	100	.02	–	15	35	41	42	55
SA1A1-103	C	.01	100	.02	4	21	35	42	50	70
SA1A1-273	C	.027	100	.02	10	30	39	43	65	70
SA1A1-453	C	.045	100	.02	14	35	42	45	70	70
SA2A1-102	L2	1000	100	.02	–	4	20	27	30	60
SA2A1-502	L2	5000	100	.02	–	15	35	41	45	60
SA2A1-103	L2	.01	100	.02	4	21	35	44	50	70
SA2A1-273	L2	.027	100	.02	10	30	50	45	70	70
SA2A1-453	L2	.045	100	.02	14	37	45	45	70	70
SA1B1-102	C	1000	200	.02	–	4	20	25	25	55
SA1B1-502	C	5000	200	.02	–	15	34	41	42	55
SA1B1-103	C	.01	200	.02	4	21	35	42	50	70
SA2B1-102	L2	1000	200	.02	–	4	20	27	30	60
SA2B1-502	L2	5000	200	.02	–	15	35	41	45	60
SA2B1-103	L2	.01	200	.02	4	21	35	44	50	70

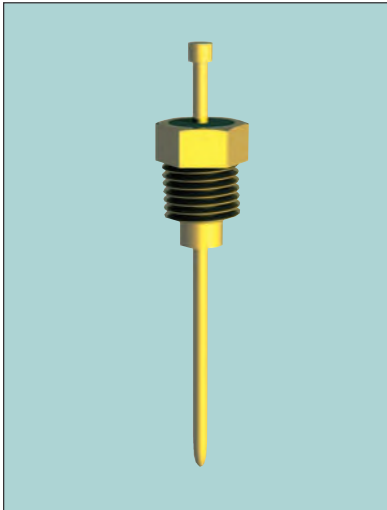
<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor  
resonances and other design constraints.

# Bolt Style EMI Filters

## SB Series – 8-32 Thread - Epoxy Sealed –

### Circuits Available – C, L, $\pi$



### APPLICATIONS

The SB series provides improved filtering in the HF through MICROWAVE frequency spectrums from 1 MHz through 10 GHz. Also designed for mounting in a tapped bulkhead or with the standard nut and lockwasher provided, it is ideal for medium to high impedance circuits where large

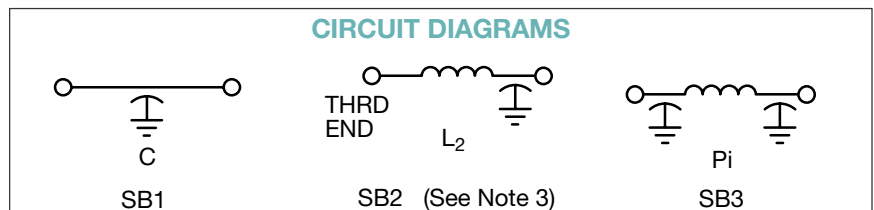
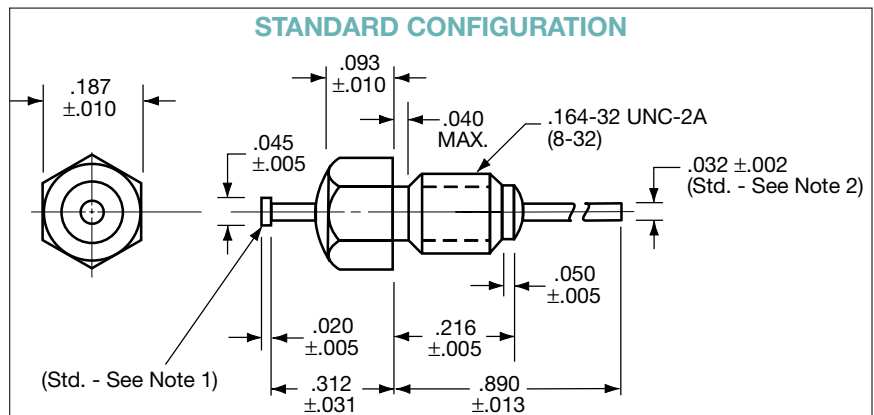
capacitance values are not practical. In the “L” and “ $\pi$ ” section versions an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves the insertion loss rolloff to 40 dB and 60 dB per decade respectively.

### CHARACTERISTICS

- Designed to meet or exceed the applicable portions of MIL-F-28861/7. See QPL listings.
- $\pi$  design offers steeper insertion loss rolloff.
- Features rugged monolithic discoidal capacitor construction.
- Epoxy seal on both ends.

### SPECIFICATIONS

1. Plating: Silver standard – Electro-tin or gold available
2. Material:
  - Case: Cold rolled steel
  - Leads: Half/hard copper
3. Operating Temperature Range: -55°C to +125°C
4. Insulation Resistance:
  - At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
  - At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
  - R-level designs: 2.0 times rated DC voltage
  - Class B, Class S designs: 2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 10 Amps, maximum
9. Recommended Mounting Torque: 64 oz-in.  $\pm$  4 oz-in.
10. Supplied with mounting nut and lockwasher - See Filter Design Guide Screw and Locking Washer Table
11. Insertion Loss for the “C”, “L” and “ $\pi$ ” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” and “ $\pi$ ” become much more effective.



millimeters (inches)	
0.05 (.002)	1.14 (.045)
0.13 (.005)	1.27 (.050)
0.18 (.007)	1.85 (.073)
0.25 (.010)	2.36 (.093)
0.33 (.013)	4.17 (.164)
0.38 (.015)	4.75 (.187)
0.51 (.020)	5.49 (.216)
0.64 (.025)	6.35 (.250)
0.76 (.030)	7.11 (.280)
0.79 (.031)	7.92 (.312)
0.81 (.032)	22.61 (.890)
1.02 (.040)	— —

(See Note 4)

#### Notes:

1. Nailhead standard, straight lead available.
2. Lead diameters other than .032" available.
3. All SB2 L-Section Filters have inductor (bead) at threaded end.
4. Metric equivalent dimensions given for information only.

# Bolt Style EMI Filters

## SB Series – 8-32 Thread - Epoxy Sealed – Circuits Available – C, L, $\pi$



### SPECIFICATIONS

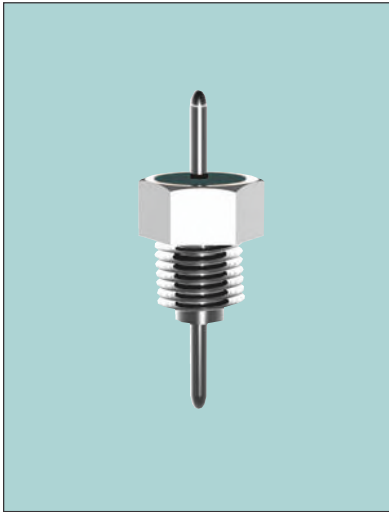
AVX P/N	CKT	CAP <sup>1</sup>	DC Voltage	DCR	Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C					
					1 MHz	10 MHz	100 MHz	200 MHz	1 GHz	10 GHz
SB1C1-102	C	1000	50	.01	–	4	20	25	40	50
SB1C1-502	C	5000	50	.01	–	15	34	41	50	55
SB1C1-103	C	.01	50	.01	4	21	35	40	55	60
SB1C1-273	C	.027	50	.01	10	30	39	45	65	70
SB1C1-503	C	.05	50	.01	15	35	42	50	70	70
SB2C1-273	L2	.027	50	.01	10	30	50	54	65	70
SB2C1-503	L2	.05	50	.01	15	36	54	60	70	70
SB3C1-323	$\pi$	.032	50	.01	12	30	60	70	70	70
SB1A1-102	C	1000	100	.01	–	4	20	25	40	50
SB1A1-502	C	5000	100	.01	–	15	34	41	50	55
SB1A1-103	C	.01	100	.01	4	21	35	40	55	60
SB1A1-273	C	.027	100	.01	10	30	39	45	65	70
SB1A1-503	C	.05	100	.01	15	35	42	50	70	70
SB2A1-103	L2	.01	100	.01	4	21	35	38	65	70
SB2A1-273	L2	.027	100	.01	10	30	50	54	70	70
SB3A1-152	$\pi$	1500	100	.01	–	8	20	45	70	70
SB3A1-123	$\pi$	.012	100	.01	–	12	60	70	70	70
SB3A1-153	$\pi$	.015	100	.01	–	17	37	43	70	70
SB1B1-102	C	1000	200	.01	–	4	20	25	40	50
SB1B1-502	C	5000	200	.01	–	15	34	41	50	55
SB2B1-102	L2	1000	200	.01	–	4	20	27	45	70
SB2B1-502	L2	5000	200	.01	–	15	35	41	55	70
SB3B1-202	$\pi$	2000	200	.01	–	8	42	58	70	70

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

# Bolt Style EMI Filters

## SH Series – 10-32 Thread - Epoxy Sealed – Circuits Available – C, L, $\pi$



### APPLICATIONS

The SH series provides intermediate filtering in the RF through MICROWAVE frequency spectrums from 100 KHz through 10 GHz. The larger hex size means that much higher values of capacitance are available in the feedthru style circuits and that a 125 VAC/400 Hz rating is available in certain values. Also designed for mounting in a tapped bulk-head or with the standard nut and lock-washer provided, it is optimum in medium

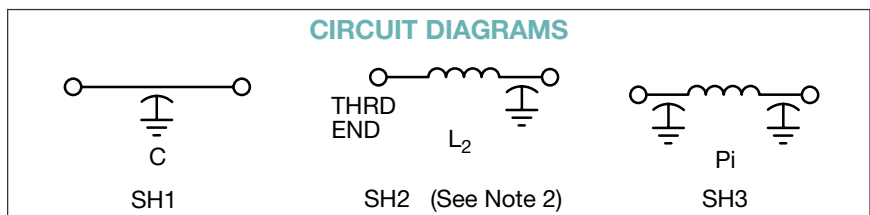
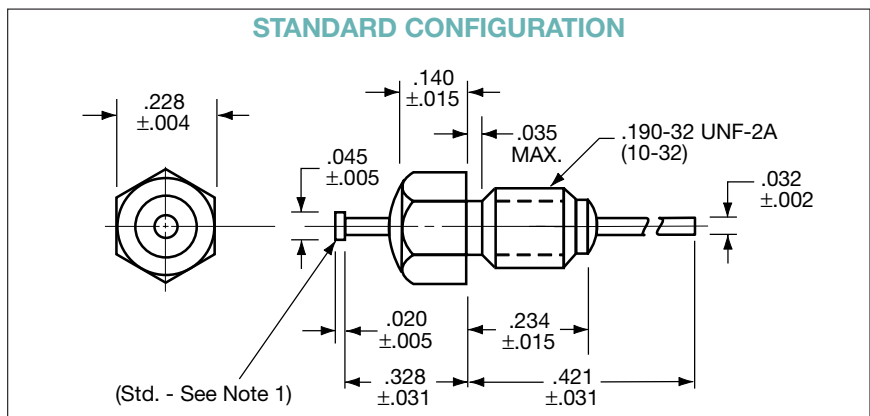
to low impedance circuits where significant amounts of capacitance to ground can be tolerated. In the “L” and “ $\pi$ ” section versions an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves the insertion loss rolloff to 40 dB and 60 dB per decade respectively. Alternate lead diameters or lengths are available, both with and without a nailhead.

### CHARACTERISTICS

- Equivalent to SB series  $\pi$  circuits and to SP series feedthru or “L” circuits.
- Conservatively rated for 125 VAC/400 Hz in certain values.
- $\pi$  design offers steeper insertion loss rolloff.
- Features rugged monolithic discoidal capacitor construction.
- Epoxy seal on both ends.

### SPECIFICATIONS

1. Plating: Silver standard – Electro-tin or gold available
2. Material:
  - Case: Cold rolled steel standard, brass available
  - Leads: Half/hard copper
3. Operating Temperature Range: -55°C to +125°C
4. Insulation Resistance:
  - At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
  - At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
  - R-level designs: 2.0 times rated DC voltage
  - Class B, Class S designs: 2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 10 Amps, maximum
9. Recommended Mounting Torque: 64 oz-in.  $\pm$  4 oz-in.
10. Supplied with mounting nut and lock-washer - See Filter Design Guide Screw and Locking Washer Table
11. Insertion Loss for the “C”, “L” and “ $\pi$ ” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” and “ $\pi$ ” become much more effective.



**millimeters (inches)**

0.05 (.002)	3.56 (.140)
0.10 (.004)	4.83 (.190)
0.13 (.005)	5.79 (.228)
0.38 (.015)	5.94 (.234)
0.51 (.020)	8.33 (.328)
0.79 (.031)	10.69 (.421)
0.81 (.032)	— —

(See Note 3)

**Notes:**

1. Nailhead standard, straight lead available.
2. All SH2 L-Section Filters have inductor (bead) at threaded end.
3. Metric equivalent dimensions given for information only.

# Bolt Style EMI Filters

## SH Series – 10-32 Thread - Epoxy Sealed – Circuits Available – C, L, $\pi$



### SPECIFICATIONS

AVX P/N	CKT	CAP <sup>1</sup>	DC Voltage	DCR	Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C					
					1 MHz	10 MHz	100 MHz	200 MHz	1 GHz	10 GHz
SH1C1-124	C	.12	50	.01	21	38	49	60	70	70
SH1C1-204	C	.2	50	.01	28	39	52	60	70	70
SH2C1-124	L2	.12	50	.01	21	38	52	70	70	70
SH2C1-204	L2	.2	50	.01	28	39	54	70	70	70
SH3C1-303	$\pi$	.03	50	.01	10	28	58	70	70	70
SH1A1-503	C	.05	100	.01	15	35	42	50	70	70
SH1A1-104	C	.1	100	.01	20	38	48	53	70	70
SH2A1-503	L2	.05	100	.01	15	36	50	60	70	70
SH2A1-104	L2	.1	100	.01	20	39	52	65	70	70
SH3A1-123	$\pi$	.012	100	.01	–	12	60	70	70	70
SH1L1-102	C	1000	200*	.01	–	4	20	25	40	50
SH1L1-502	C	5000	200*	.01	–	15	34	41	45	55
SH1L1-103	C	.01	200*	.01	4	21	35	38	60	65
SH1L1-253	C	.025	200*	.01	8	28	36	44	64	70
SH2L1-102	L2	1000	200*	.01	–	4	20	27	45	55
SH2L1-502	L2	5000	200*	.01	–	15	35	41	55	65
SH2L1-103	L2	.01	200*	.01	4	21	36	40	60	65
SH3B1-202	$\pi$	2000	200	.01	–	8	42	58	70	70

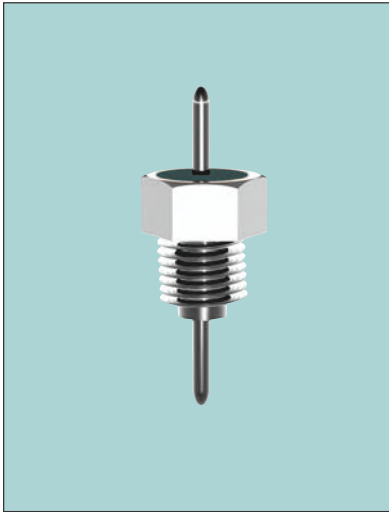
\* Rated 200 VDC or 125 VAC/400 Hz

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

# Bolt Style EMI Filters

## SP Series – 12-32 Thread - Epoxy Sealed – Circuits Available – C, L, $\pi$



### APPLICATIONS

The SP series provides increased filtering in the HF through MICROWAVE frequency spectrums from 100 KHz through 10 GHz. The larger hex size means that much higher values of capacitance are available and that a 125 VAC/400 Hz rating is available in certain values. Also designed for mounting in a tapped bulk-head or with the standard nut and lock-washer provided, it is optimum in medium

to low impedance circuits where significant amounts of capacitance to ground can be tolerated. In the “L” and “ $\pi$ ” section versions an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves the insertion loss rolloff to 40 dB and 60 dB per decade respectively.

Alternate lead diameters or lengths are available both with and without a nailhead.

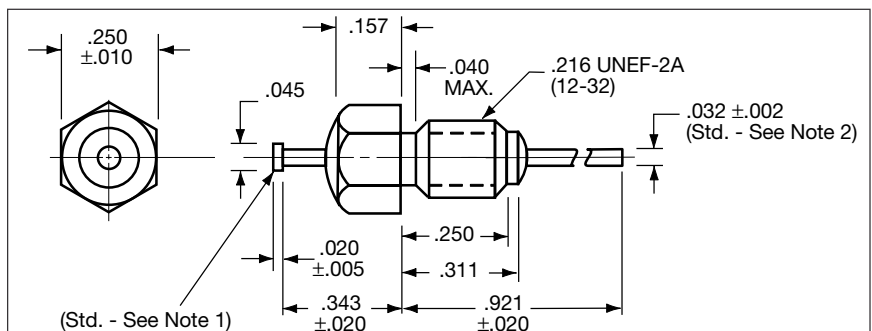
### CHARACTERISTICS

- Designed to meet or exceed the applicable portions of MIL-F-28861/9. See QPL listing.
- Conservatively rated for 125 VAC/400 Hz in certain values.
- $\pi$  design offers steeper insertion loss rolloff.
- Features rugged monolithic discoidal capacitor construction.
- Epoxy seal on both ends.

### SPECIFICATIONS

1. Plating: Silver standard – Electro-tin or gold available
2. Material:
  - Case: Cold rolled steel standard, brass available
  - Leads: Half/hard copper
3. Operating Temperature Range: -55°C to +125°C
4. Insulation Resistance:
  - At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
  - At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
  - R-level designs: 2.0 times rated DC voltage
  - Class B, Class S designs: 2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 10 Amps, maximum
9. Recommended Mounting Torque: 64 oz-in.  $\pm$  4 oz-in.
10. Supplied with mounting nut and lock-washer - See Filter Design Guide Screw and Locking Washer Table
11. Insertion Loss for the “C”, “L” and “ $\pi$ ” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” and “ $\pi$ ” become much more effective.

### STANDARD CONFIGURATION

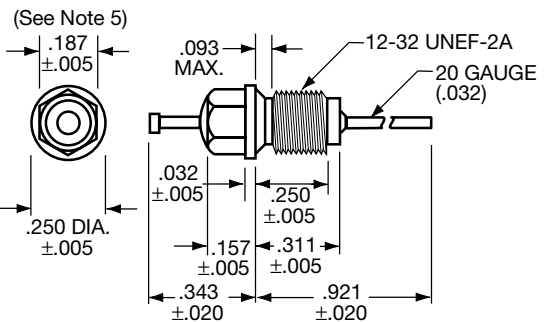


### ALTERNATE CONFIGURATION (SC SERIES)

millimeters (inches)

0.05 (.002)	2.36 (.093)
0.13 (.005)	3.99 (.157)
0.18 (.007)	4.75 (.187)
0.25 (.010)	5.49 (.216)
0.51 (.020)	6.12 (.241)
0.58 (.023)	6.35 (.250)
0.79 (.031)	7.90 (.311)
0.81 (.032)	8.71 (.343)
1.02 (.040)	9.45 (.372)
1.14 (.045)	9.73 (.383)
1.60 (.063)	23.39 (.921)
1.85 (.073)	—

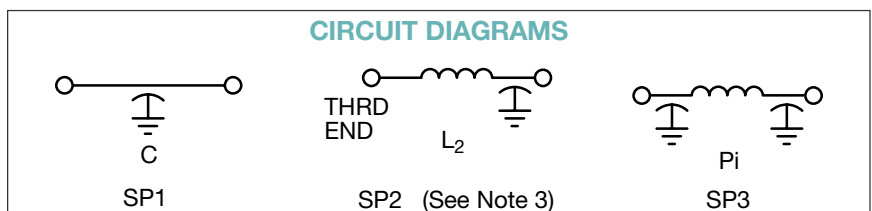
(See Note 4)



#### Notes:

1. Nailhead standard, straight lead available.
2. Lead diameters other than .032" available.
3. SP2 L-Section Filters have inductor (bead) at threaded end.
4. Metric equivalent dimensions given for information only.
5. Small-hex version may be specified for selected capacitance/voltage ratings. Contact AVX Filters Engineering for availability.

### CIRCUIT DIAGRAMS



# Bolt Style EMI Filters

## SP Series – 12-32 Thread - Epoxy Sealed – Circuits Available – C, L, $\pi$



### SPECIFICATIONS

AVX P/N	CKT	CAP <sup>1</sup>	DC Voltage	DCR	Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C					
					1 MHz	10 MHz	100 MHz	200 MHz	1 GHz	10 GHz
SP1C1-204	C	.20	50	.01	26	39	52	60	70	70
SP2C1-204	L2	.20	50	.01	26	38	65	70	70	70
SP3C1-124	$\pi$	.12	50	.01	20	38	70	70	70	70
SP1A1-503	C	.05	100	.01	15	35	38	50	70	70
SP1A1-104	C	.10	100	.01	20	38	48	53	70	70
SP2A1-503	L2	.05	100	.01	15	36	54	60	70	70
SP3A1-753	$\pi$	.075	100	.01	18	38	70	70	70	70
SP1L1-102	C	1000	200*	.01	–	4	20	25	40	50
SP1L1-502	C	5000	200*	.01	–	15	34	41	50	55
SP1L1-103	C	.01	200*	.01	4	21	35	40	55	60
SP1L1-253	C	.025	200*	.01	8	28	36	44	64	70
SP2L1-102	L2	1000	200*	.01	–	4	20	27	45	70
SP2L1-502	L2	5000	200*	.01	–	15	35	41	55	70
SP2L1-103	L2	.01	200*	.01	4	21	35	38	65	70
SP3B1-152	$\pi$	1500	200	.01	–	8	20	45	70	70
SP3B1-123	$\pi$	.012	200	.01	–	12	60	70	70	70

\* Rated 200 VDC or 125 VAC/400 Hz

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor  
resonances and other design constraints.