

# Amphenol Filtered Connectors

Filtered ARINC Connectors Filtered MIL-C-24308 Connectors Discrete Filters Filter Plates Filter Terminal Blocks



Amphenol Canada Corp. an ISO 9001 company

### About The Company

Amphenol Canada, a subsidiary of Amphenol Corporation, is an international leader in the manufacture of filter connectors and has been pioneering EMI and EMP technologies for more than 40 years.

Located in Toronto, Canada, our modern 60,000 sq. ft. facility employs approximately 250 people, and is dedicated to the manufacture of filter connectors. We design, develop and manufacture EMI and EMP filter connectors which are used world-wide in Military, Aerospace, Communication and Commercial applications. Our products are unique, offering stress-isolated, solderless technology in tubular, planar, and chip capacitor designs.

Amphenol Canada is vertically integrated and, with the exception of diodes, has the capability of manufacturing all elements of our filter connectors. We also have the support of other Amphenol divisions in an integrated working relationship as one of the largest connector manufacturing companies in the world.

Our expertise in understanding and supporting our customers' filter interconnect needs has earned us a reputation of quality and excellence among the world's leading users of electronic components.



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### Advantages of Filter Connectors

The integration of the filter elements into the connector, rather than a board level solution, results in many advantages to the user:

- reduction in space and weight
- reduction in inspection and assembly labour

### **Filter Connector Design**

Filter connectors have been used for over thirty years to provide cost and space effective solutions to EMI problems in a wide range of military and commercial applications including avionics systems, satellites, missiles, communications, control systems and tempest equipment. A low pass filter connector incorporates capacitors and ferrite inductors into the connector body. The two capacitor types commonly used in filter connectors for military or

#### **Planar Array**

Amphenol Canada's planar design consists of planar ceramic capacitor arrays and discrete ferrite inductors assembled concentrically over the contacts and into the connector shell. The planars are compressed between rubber gaskets and have contact springs in each position which form a stress isolated connection with the contact body. The planars are grounded to the shell via a ground spring.

#### **Tubular Capacitor**

Amphenol Canada's tubular design consists of a ferrite bead and ceramic tubular capacitor assembled onto a machined contact. The filter tube is connected to the contact with conductive rubber washers to provide a stress-isolated contact assembly. Grounding is achieved via a ground plate.

- improved high frequency EMI performance by elimination of parasitic effects associated with board level filters
- superior shielding effectiveness

avionics applications are planar arrays and tubular capacitors. Each of these capacitor types is an efficient filter at high frequencies (>I GHz) and has been proven to be extremely reliable when suitably assembled into a connector. Both planar and tubular designs feature Amphenol's unique solderless construction which reduces stress on the ceramic elements and results in superior physical and thermal shock capabilities.





### **Filter Connector Selection**

Selection of a particular filter circuit will depend on the required insertion loss characteristics and the system source and load impedances. By arranging the capacitive and inductive elements in a variety of combinations a number of equivalent circuits may be attained. These filter types are available in a wide range of capacitance and voltage values and may be selected in virtually any combination within the connector insert. In addition to filter contacts, insulated contacts, ground contacts and sealing plugs are available.

	Filter Circuit	Best Filtering Application
PI		Unknown or medium source and load impedance
LRC	← ←	Low source and high load impedance
CLR	← ● = ● ■ ● ● ■ ● ■ ■ ■ ● ■ ■ ■ ■ ■ ■ ■ = = ■ ■ ■ ■ = ■ = = = ■ ■ ■ ■ =	High source and low load impedance
С	• <u> </u>	High source and high load impedance
т	• <del> </del>	Low source and low load impedance

High source or load impedance >100ohms

Low source or load impedance <10ohms

The following factors may affect the filter performance, and should be considered when selecting a filter connector:

#### **Operating Voltage**

As a DC voltage is applied across a capacitor, the dielectric constant decreases resulting in a capacitance decrease and a reduction in filter performance. The magnitude of the change is dependant upon the type of ceramic material used, the dielectric thickness and the magnitude of the voltage applied.

#### **Operating Currents**

Operating currents cause magnetic saturation of inductive elements (ferrites). Therefore filters with ferrite inductors (Pi, CLR, LRC and T) will perform much like C filters as the ferrite approaches saturation.

#### **Operating Temperature Range**

Capacitance and insertion loss performance are shown at 25°C. Depending on the type of ceramic material being used, capacitance can drop by up to 80% at temperature extremes. However, commonly used dielectrics have temperature coefficients of +/-15% from  $-55^{\circ}$ C to  $+125^{\circ}$ C.

#### **Transient Voltage Requirements**

Some transient voltage requirements may necessitate the addition of diodes or MOV's to the PCB or in the connector.

### **485 Series Introduction and Design Features**

The Amphenol 485 series is a range of filtered ARINC 404 and 600 rack and panel connectors designed to provide space and cost-effective solutions to EMC compliance issues in avionics products. Amphenol's filtered ARINC connectors are used extensively on Boeing, McDonnell Douglas and Airbus avionics equipment and a wide range of other military and commercial applications. The majority of the Amphenol filtered ARINC connector designs incorporate planar capacitor array technology in a solderless, stress-isolated configuration. This results in superior thermal and physical shock performance and unparalleled long term reliability. These products have been extensively qualified to the requirements of ARINC 600-9 and MIL-C-81659 and there are numerous qualification test reports available for review.

### Front Removable Socket Contact Stability

One significant feature of the Amphenol filtered ARINC connector is the ability to remove the front socket contact. This is an important design feature as the size 22D socket contacts in ARINC 404 and 600 connectors are exposed and therefore susceptible to damage. This is one of the most common in-service problems of standard ARINC connectors. A front removable socket contact avoids the potential cost and inconvenience of removing the connector from the avionics box and results in long term improvements in maintainability and reduction in life cycle costs. It is important that the front removable socket be designed such that the contact is mechanically stable and properly positioned to meet the connector interface and mating specifications. The Amphenol design provides for excellent true position location and contact stability by virtue of the solderless design. The Amphenol contact is stabilized at the front by a plastic stabilization insert, through the length of the connector and at the rear engagement area. This approach provides for the best possible contact location and stability and is further augmented by the use of an environmental seal at the connector mating interface.



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### **ARINC Filter Connector Construction and Material Specifications**



### **Electrical Characteristics**

Filter Circuit	PI					С,	C,CLR,LRC,T				
Filter Type		PA4	P02	P04	P08	CA2	C01	<b>C02</b>	<b>C04</b>	C22	C50
Capacitance (pF)		400 to	1800 to	4000 to	8000 to	200 to	900 to	1800 to	4000 to	22000 to	50000 to
(@ 25°C, 1kHz & 1.0 VRMS)		800	3600	8000	16000	400	1800	3600	8000	40000	100000
Insertion Loss* (dB min.)	.I MHz	_	_	-	_	-	-	-	-	-	3
(per MIL-STD-220	I MHz	-	-	2	5	-	-	-	-	10	15
at 25°C & no load)	10 MHz	2	10	15	18	-	4	8	13	26	35
	100 MHz	20	38	50	55	10	20	25	33	45	50
	1000 MHz	58	60	60	63	25	35	40	50	50	52
Working Voltage (VDC)		200 100									
(@ 25°C & sea level)		200 100									
Dielectric Withstanding Voltage (@ 25°C & 50 mA max. charg	(VDC) ing current)	500 300									
Insulation Resistance (Gohms) (@ 25°C & working voltage)		10									
Current Rating by Contact Size		#22 =	5 Amps				#16 = 13	Amps			
(continuous max., DC ampere		#20 =	7.5 Amps				#12 = 23	Amps			
Filter RF Current Rating (ampe (max. @ any frequency)	eres)				3						

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Note: Other capacitance values, mixed capacitance arrangements, ground and insulated contacts are available.

Consult the factory for your particular application.

\* Acceptance testing performed to 500MHz maximum

### **Typical Insertion Loss Performance**





### ARINC 600 Style Filter Connectors Receptacle Shell Size 1



#### **Receptacle Shell Size 2**



\* This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details.

**Note:** Size 22D contacts are supplied installed and are removable with Amphenol insertion/removal tool 485-905. Cavity C and F power contacts are packaged separately. Coax and triax contacts may be ordered separately.

<sup>†</sup> Cavity C dimension is shown unfiltered

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### ARINC 600 Style Filter Connectors Receptacle Shell Size 3



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### MIL-C-83527 Style Filter Connectors Receptacle Shell Size 3





\* This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details.

**Note:** Size 22D contacts are supplied installed and are removable with Amphenol insertion/removal tool 485-905. Cavity C and F power contacts are packaged separately. Coax and triax contacts may be ordered separately.

 $^\dagger$  ARINC 600 Cavity C and F and MIL-C-83527 Cavity B and D dimensions are shown unfiltered.

### **ARINC 600 Insert Arrangements**

#### Shell Size 2 or 3, Cavity A, B, D or E





 $\bigcirc^{10}$ °  $O^{ii}$ 12 0 Insert I3C2 Contacts Contacts Contacts Coax Contacts ୕ୄୄୖ୶ଡ଼ୄୖଡ଼ୄଡ଼ୄଡ଼ୄଡ଼ୄଡ଼ୄ 00000000000 0000000000 00000000000

Insert 85 80 #22 Contacts 4#20 Contacts I#I6 Contact

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Note: Consult the factory for other insert patterns.

### ARINC 404 and MIL-C-81659 Filtered Connectors Receptacle Shell Size 1



**Receptacle Shell Size 2** 



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\*This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details.

**Note:** Size 22D contacts are supplied installed and are removable with Amphenol insertion/removal tool 485-905. Pin contacts are not removable. Coax and triax contacts may be ordered separately.

### ARINC 404 and MIL-C-81659 Filtered Connectors Receptacle Shell Size 3



#### **Receptacle Shell Size 4**



\*This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details. **Note:** Size 22D contacts are supplied installed and are removable with Amphenol insertion/removal tool 485-905. Pin contacts are not removable. Coax and triax contacts may be ordered separately.

### ARINC 404 and MIL-C-81659 Insert Arrangements



### **ARINC 404 and 600 Termination Styles**



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### Transient Suppression for Lightning and EMP Applications

#### **Designing for Lightning Induced Transient Susceptibility**

In addition to designing for control of steady state electromagnetic interference (EMI/EMC), modern avionics engineers must also design for the recent advent of much stricter requirements for immunity to lightning induced transient susceptibility. These requirements vary by equipment type and environmental area and are defined by a variety of military and commercial specifications including RTCA/DO-160 C Section 22. The nature of the transient events ranges from very low level disturbances requiring little or no protection, to high frequency and high energy events that can be disruptive or destructive to the avionics equipment.

#### **Filter Connectors with Transient Supressors**

While conventional EMI filter connectors have been shown to be effective in providing protection against low energy transients, they offer little protection from high voltage/high energy transients that may result from lightning, load switching, electrostatic discharge (ESD) or electromagnetic pulse (EMP). For those applications requiring protection of sensitive circuitry from such overvoltage events, Zener suppression diodes or MOV's can be incorporated into the connector body in combination with EMI filtering or alone. Combining the transient suppression device into the connector

#### **Amphenol Diode Protected Connectors**

The approach employed by Amphenol to incorporate diode protection into the connector body is to install a custom diode/contact assembly into an insert with a ground plate. This design provides for a 600 W device to be installed on each contact in the connector while minimizing the package size and In general, practices which are good for control of EMI/EMC will also serve to mitigate the effects of lightning induced transients but further measures must often be taken to ensure proper system operation and survivability. One of the more effective methods available is the inclusion of circuit protective devices in the circuit at the input of the LRU. The most common types of devices employed are Zener suppression diodes and metal oxide varistors (MOV's). These non-linear V-I devices conduct very little current at low voltage levels, but once above the breakdown voltage, the voltage across the device remains fairly constant.

provides several advantages:

- saves space and weight versus placing discrete components onto a PCB
- reduces system design time
- reduces number of components
- improves voltage clamping performance by eliminating parasitic lead resistance and inductance of board level components
- allows for retrofit of existing equipment requiring lightning or EMP hardening
- improves system repairability and maintenance logistics

weight. In the ARINC connector products this design still allows for easy removal and replacement of the front socket contacts. In addition, each diode is individually replaceable at the factory in the event that repair is necessary.

### **Diode Contact Characteristics**

Diode Contact Designation	Breakdown Voltage <sup>+</sup> V <sub>(BR)</sub> Min. Nom. Max.		Test Current I <sub>T</sub>	Rated Stand-off Voltage Vwm	Maximum Reverse Leakage Current I <sub>D</sub> @ V <sub>WM</sub>	Maximum* Peak Reverse Clamping Voltage V <sub>c</sub> Max. @ I <sub>pp</sub>	Maximum Peak Pulse Current Ipp	Power Capability @1 msec Pulse	
	V <sub>DC</sub>	V <sub>DC</sub>	V <sub>DC</sub>	mADC	V	μADC	V	А	W
485-D0068	6.4	6.8	7.2	10	5.8	1000	10.5	57.0	600
485-D0100	9.5	10.0	10.5	1	8.5	10	14.5	41.0	600
485-D0150	14.3	15.0	15.8	1	12.8	5	21.2	28.0	600
485-D0220	20.9	22.0	23.1	1	18.8	5	30.6	20.0	600
485-D0330	31.4	33.0	34.7	1	28.2	5	45.7	13.2	600
485-D0470	44.7	47.0	49.4	1	40.2	5	64.8	9.3	600
485-D0680	64.6	68.0	71.4	1	58.1	5	92.0	6.5	600
485-D1000	95.0	100.0	105.0	1	85.5	5	137.0	4.4	600
485-D1500	143.0	150.0	158.0	1	128.0	5	207.0	2.9	600
485-D2000	190.0	200.0	210.0	1	171.0	5	274.0	2.2	600

Note: Other diode contacts having different voltage and power capabilities are available. Consult the factory for additional information.

\* 10 x 1000 µsec pulse

+ Available in undirectional and bidirectional devices

		Maxim	um Rating	s (125°C	C)	Characteristics (25°C)								
MOV	Continuous Trans		Trans	ient Maximum										
Contact Designation	RMS Voltage	DC Voltage	Energy (10/1000µs)	Peak Current (8/20µs)	Leakage Current at 90% V <sub>T (DC)</sub>	Vari @ Te	stor Vol 1m AD st Curre	tage C ent	Maxi Clarr Voltage Current	imum ping V <sub>c</sub> @Test (8/20µs)	Capac (p f=1	citance F) MHz	Leak Current V <sub>T</sub>	age at 90%
	V <sub>M(AC)</sub> Volts	V <sub>M(DC)</sub> Volts	W <sub>™</sub> Joules	I <sub>™</sub> Amperes	Ι <mark>, Max</mark> μΑ	Min. Volts	V <sub>N(DC)</sub> Volts	Max. Volts	V <sub>c</sub> Volts	I <sub>P</sub> Amps	Min.	Max.	l <sub>ι</sub> Max μA	V <sub>T (DC)</sub> Volts
485-M-0160	6.0	8.0	1.5	250	50	12.5	16.0	19.5	34.0	10	1600	2750	5.0	8
485-M-0220	10.0	14.0	1.5	250	50	18.5	22.0	25.5	42.0	10	1600	2750	5.0	14
485-M-0390	25.0	31.0	1.5	250	50	35.0	39.0	43.0	85.0	5	450	1350	5.0	28
485-M-0470	30.0	38.0	1.5	250	50	42.0	47.0	52.0	100.0	5	450	1250	5.0	36
485-M-2000	130.0	130.0	2.4	300	100	184.0	200.0	228.0	375.0	5	150	350	5.0	130
485-M-2400	150.0	150.0	2.4	300	100	212.0	240.0	268.0	430.0	5	100	350	5.0	150

### **MOV Contact Characteristics**

Note: Values are for size 22 contacts. Other MOV contacts are available. Consult the factory for additional information.

### Filter/Diode Connector Transient Response





PCB mounted Diode or MOV



**Contact/Connector Diode or MOV** 

#### **Termination Module**

A termination module is a removable extension of the connector which is recommended for use with ARINC connectors which have transient suppression devices. The engagement side of the termination module is designed to mate to the rear of the connector and the termination end is designed to attach to the PCB or wire harness (PC tails, solder-cups, wire-wrap or crimp). Proper engagement of the connector and termination module is guaranteed by guide posts in the connector and front or rear activated jack screws. Sealing is accomplished with a rubber interfacial gasket.

Connectors designed to engage to a termination module are designed with one-piece front removable socket contacts to minimize the number of interconnects.

The use of a termination module provides several advantages:

- simplifies the assembly process by soldering to the lighter weight termination module rather than to the connector itself
- facilitates repair and rework procedures due to easy installation and removal from the motherboard





### **ARINC Accessories**

ARINC replacement contacts can be ordered separately if required. Additional accessories such as EMI backshells and fibre optic contacts are also available. Contact the factory for details.



#### **ARINC 600**

Contact Size	Contact P/N	Insertion/Removal tool	Crimp tool	Positioner
#22 socket	485-1034*	485-905	N/A	N/A
#22 crimp termination	485-6222	M81969/1-01	M22520/2-01 or	M22520/2-06 or
			M22520/7-01	M22520/7-06
#20 pin+	485-120	M81969/1-02 or M81969/14-10	M22520/2-01	M22520/2-08
#16 pin+	485-116	M81969/1-03 or M81969/14-03	M22520/1-01	M22520/1-02
#12 pin+	485-112	M81969/14-04	M22520/1-01	M22520/1-11

#### **ARINC 404**

Contact Size	Contact P/N	Insertion/Removal tool	Crimp tool	Positioner
#22 socket	485-1236*	485-905	N/A	N/A
#22 crimp termination	485-4222	M81969/1-01	M22520/2-01 or M22520/7-01	M22520/2-06 or M22520/7-06

\* Some connectors have custom socket contacts. Consult the factory for details.

+ Cavity C or F contacts

### **485 Series Part Numbering Information**



### MIL-C-24308 Style (D-Sub) Filter Connectors

Amphenol offers a variety of filtered D–Sub connectors to address aerospace and commercial EMI requirements. There are two products in particular which are designed for aerospace applications where high reliability and superior environmental and electrical performance are required. The 481 series of filtered D–Sub connectors has been in production for over 20 years using tubular capacitor filter technology. In the late 1980's, Amphenol developed a planar filter

#### 308 Series – Planar Capacitor Technology

- superior pin-pin cross talk isolation
- cost effective for small quantities
- can accommodate a wider range of capacitance values than planar designs

#### **Quality Conformance Inspection**

The 308 series connectors have been extensively qualified per the requirements of MIL–C–24308. All products shipped receive the following inspection tests:

- 100% visual and mechanical inspection
- 100% capacitance, dielectric withstanding voltage, insulation resistance and dissipation factor testing
- sample insertion loss testing (AQL 1.0%)



capacitor version of the same connector, the 308 series. As a result, Amphenol has the widest product offering in the industry and can provide either technology as the application and production requirements dictate.

- fully tooled in medium density pin and selected socket and high density arrangements
- short production leadtimes
- solderless stress-isolated construction (see page 23 for details)

For high reliability applications, the following inspection tests or certifications are also available:

- thermal shock
- elevated temperature voltage conditioning
- elevated temperature insulation resistance and capacitance
- outgassing per JSC-SPR-0022 for space borne applications
- · baseline and single lot date code manufacturing
- other tests as required (consult the factory)

#### **308 Special**



Filtered D-Sub programmable



EMI Grounded Special



Zinc Nickel Plating Environmentally friendly, conductive and able to withstand up to 2000 hours of salt spray per ASTM-B117

Please consult factory for any custom arrangements

### Planar D-Sub Filter Connector Construction and Material Specifications



### **308 Series Electrical Characteristics**

Filter Circuit	PI					C,CLR,LRC,T						
Filter Type		<b>PA</b> 4	P02	P04	P08	<b>PI6</b>	CA2	C01	<b>C</b> 02	<b>C04</b>	<b>C22</b> <sup>†</sup>	<b>C50</b> <sup>†</sup>
Capacitance (pF) (@ 25°C, IkHz & LOVRMS)		400 to 800	1800 to 3600	4000 to 8000	8000 to 16000	16000 to 32000	200 to 400	900 to 1800	1800 to 3600	4000 to 8000	22000 to 40000	50000 to 100000
Insertion Loss (dB min.)	.I MHz	-	-	_	_	_	_	-	-	_	_	3
(per MIL-STD-220	I MHz	-	_	2	5	8	-	-	-	-	10	15
at 25°C & no load)	10 MHz	2	10	15	18	28	-	4	8	13	26	35
	100 MHz	20	38	50	55	62	10	20	25	33	45	50
	1000 MHz	58	60	60	63	68	25	35	40	50	50	52
Working Voltage (VDC) (@ 25°C & sea level)		200 100									00	
Dielectric Withstanding Volta (@ 25°C & 50 mA max. cha	age (VDC) arging current)	500 300								00		
Insulation Resistance (Gohm (@ 25°C & working voltage	s) )	10										
Contact Current Rating (continuous max., DC amperes)						5						
Filter RF Current Rating (am (max. @ any frequency)	iperes)					3						

Note: Other capacitance values, mixed capacitance arrangements, ground and insulated contacts are available.

Consult the factory for your particular application. † Not available in high density arrangements

### **Typical Insertion Loss Performance**



#### C, CLR, LRC and T Filters



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### **308 Series Plug Dimensions**



**Front View** 

Side View

**Rear View** 

		Dimension													
	Number of	Α		B Max		С		D Max		E Max		F		G	
Shell Size	Contacts	±.005"	±,13mm	inches	mm	± .015"	±,38 mm	inches	mm	inches	mm	± .005"	±,13mm	± .005"	±,13mm
E	9 or 15	0.984	24,99	0.685	17,34	1.213	30,81	0.534	13,56	0.434	11,02	0.329	8,36	0.666	16,92
Α	15 or 26	1.312	33,32	1.009	25,63	1.541	39,14	0.534	13,56	0.434	11,02	0.329	8,36	0.994	25,25
В	25 or 44	1.852	47,04	1.557	39,55	2.088	53,04	0.534	13,56	0.434	11,02	0.329	8,36	1.534	38,96
С	37 or 62	2.500	63,50	2.205	56,01	2.729	69,32	0.534	13,56	0.434	11,02	0.329	8,36	2.182	55,42
D	50 or 78	2.406	61,11	2.110	53,59	2.635	66,93	0.641	16,28	0.541	13,74	0.441	11,20	2.079	52,81
6	104	2.500	63,50	2.255	57,28	2.729	69,32	0.680	17,27	0.640	16,26	0.503	12,77	2.212	56,18

\* For Dimension P, see page 21

### **308 Series Receptacle Dimensions**



**Front View** 

Side View

**Rear View** 

		Dimension													
	Number of	Α		B Max		С		D Max		E Max		F		G	
Shell Size	Contacts	±.005"	±,13mm	inches	mm	± .015"	±,38 mm	inches	mm	inches	mm	± .005"	±,13mm	± .005"	±,13mm
E	9 or 15	0.984	24,99	0.685	17,34	1.213	30,81	0.534	13,56	0.434	11,02	0.311	7,90	0.643	16,33
Α	15 or 26	1.312	33,32	1.009	25,63	1.541	39,14	0.534	13,56	0.434	11,02	0.311	7,90	0.971	24,66
В	25 or 44	1.852	47,04	1.557	39,55	2.088	53,04	0.534	13,56	0.434	11,02	0.311	7,90	1.511	38,38
С	37 or 62	2.500	63,50	2.205	56,01	2.729	69,32	0.534	13,56	0.434	11,02	0.311	7,90	2.159	54,84
D	50 or 78	2.406	61,11	2.110	53,59	2.635	66,93	0.641	16,28	0.541	13,74	0.423	10,74	2.064	52,43
6	104	2.500	63,50	2.255	57,28	2.729	69,32	0.680	17,27	0.640	16,26	0.485	12,32	2.189	55,60

 $^{\ast}$  For Dimension P, see page 21

### **308 Series Termination Styles**



† This dimension is 0.078" (1,98) for high density arrangements

	Termination Style and Shell Length (P Max dimension)													
Filter	I and 2		3		4		6		7		8		9	
Circuit	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm
PI,LRC,CLR,T	0.575	14,61	0.695	17,65	0.575	14,61	0.575	14,61	N/A	N/A	0.470	11,94	0.695	17,65
с	0.450	11,43	0.570	14,48	0.450	11,43	0.450	11,43	0.400	10,16	0.370	9,40	0.570	14,48

### **308 Series Mounting Styles**







Mounting Style 2





Mounting Style 3 (two row)

Mounting Style 3 (three row)

		Dimension											
	Number of	Α		B Max		с		D		E		F Max	
Shell Size	Contacts	±.004"	±,IImm	inches	mm	±.015"	±,39mm	± .008"	±,21mm	±.020"	±,51mm	inches	mm
Е	9 or 15	0.331	8,41	0.250	6,35	0.647	16,43	0.270	6,86	0.149	3,79	0.855	21,72
Α	15 or 26	0.331	8,41	0.250	6,35	0.647	16,43	0.270	6,86	0.149	3,79	0.855	21,72
В	25 or 44	0.331	8,41	0.250	6,35	0.647	16,43	0.270	6,86	0.149	3,79	0.855	21,72
С	37 or 62	0.331	8,41	0.250	6,35	0.647	16,43	0.270	6,86	0.149	3,79	0.855	21,72
D	50 or 78	0.387	9,83	0.250	6,35	0.703	17,86	0.324	8,23	0.149	3,79	0.910	23,12

### 308 Series Part Numbering Information



### 308 Series Insert Arrangements Pin Engaging Face Shown



**Note:** Consult the factory for other insert patterns.

104 #22 Contacts

# Recommended Panel Cutout

### Front and Rear Mounting



	Dimension											
	A	min		В	C min							
Shell Size	inches	mm	±.005"	±,13mm	inches	mm						
I (E)	0.801	20,35	0.984	24,99	0.449	11,40						
2 (A)	1.129	28,68	1.312	33,32	0.449	11,40						
3 (B)	1.669	42,39	1.852	47,04	0.449	11,40						
4 (C)	2.321	58,95	2.500	63,50	0.449	11,40						
5 (D)*	2.213	56,21	2.406	61,11	0.555	14,09						
5 (D) <sup>+</sup>	2.250	57,15	2.406	61,11	0.585	14,86						
6 *	2.360	59,94	2.500	63,50	0.630	16,00						

\* Rear mounting dimensions + Front mounting dimensions

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Amphenol Filtered Connectors <

### **FX Series**

Filter Terminal Blocks, Discrete Filters and Specials

#### DESCRIPTION



Amphenol's FX series of Discrete Feed-thru Filters offer excellent, low cost filter solutions for telecom, industrial, military and aerospace electronics applications, especially where small size and high performance are important.

Manufactured to meet the requirements of Mil-F-15733, the FX filters are available in threaded bushing and solder-mount styles with capacitance ranges from 10pF to 600nF.

Due to Amphenol's unique manufacturing process, higher capacitance values and greater voltage withstand capabilities are achieved with the same industry standard package sizes.

Consult factory for custom filter and/or filter plate requirements.

#### MATERIALS

Terminals: Copper Alloy, silver plated (filter pins shown are gold plated) Eyelets/Bushings: Brass, silver plated





# For EMI/EMP Protection, Look to the Leader -

## **Amphenol Aerospace**



Each circuit of the filter connector is individually filtered and internally housed in the connector, eliminating the need for costly and bulky exterior discrete protection devices. Amphenol Filter connectors are intermateable and intermount-able with MIL-C-38999, MIL-C-27599, MIL-C-83723, MIL-C-26482, MIL-C-24308, MIL-C-5015.

Amphenol offers a broad range of cost saving filter options with versatility in sizes, styles and arrangements.



EMI Programmable Connectors An alternative to non-removable filter contacts. Crimp style EMI contacts are insertable and removable from the rear of the connector. Allows the user to run diagnostic EMI evaluations of systems before going into production, easily modifying circuitry and pinouts at the test bench level. Available in a wide range of capacitance values in both Pi and C type filters, crimp and PC termination styles.



EMI/EMP Adapters Provide cost effective solutions to problems on existing applications. Designed to be installed between the existing cable plug and unit receptacle. Circuit protection at MF, HF, VHF, and UHF levels is available in contact sizes 22 to 12 with all the popular Mil-specs.



**Header Assemblies** 

For time and cost savings. Can be vapor phase or wave soldered to flex or printed circuit boards prior to the receipt of an EMI/EMP connector. Expensive connector assemblies can be easily removed from and reattached to the header assembly as the manufacturing process dictates. Available to fit all major cylindrical Milspec connectors.

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