

# Amphenol Filtered Connectors

Filtered ARINC  
Connectors

Filtered MIL-C-24308  
Connectors

Discrete Filters

Filter Plates

Filter Terminal Blocks

## Amphenol

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.

A m p h e n o l C u s t o m P r o d u c t s



**Amphenol custom products.  
Helping to make design  
dreams reality.**

**Amphenol**  
Aerospace Products

C o n n e c t i n g S o l u t i o n s

# Table of Contents

## Introduction to Filter Connectors

Advantages of Filter Connectors .....	2
Filter Connector Design .....	2
Filter Connector Selection .....	3

## Filtered ARINC 600 and 404 connectors (485 series)

Introduction and Design Features .....	4
Cross-section and Material Specification .....	5
Electrical Characteristics .....	6
ARINC 600 Dimensions .....	7 and 8
ARINC 600 Insert Arrangements .....	9
ARINC 404 Dimensions .....	10 and 11
ARINC 404 Insert Arrangements .....	12
ARINC 404 and 600 Termination Styles .....	12
Transient Suppression for Lightning and EMP Applications .....	13
Diode/MOV Electrical Characteristics .....	14
Filter/Diode Connector Transient Response.....	15
Termination Module .....	15
ARINC Accessories .....	16
ARINC Part Numbering System .....	16

## Filtered D-Sub Connectors (308 Series)

Introduction .....	17
--------------------	----

## 308 Series (Planar design)

Cross-section and Material Specification .....	18
Electrical Characteristics .....	19
Dimensions .....	20
Termination Styles .....	21
Mounting Styles .....	21 and 22
Part Numbering System .....	22

Insert Arrangements .....	23
Panel Cutout .....	23

## FX Series

Filter Terminal Blocks, Discrete Filters and Specials .....	24
---	----



## 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

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

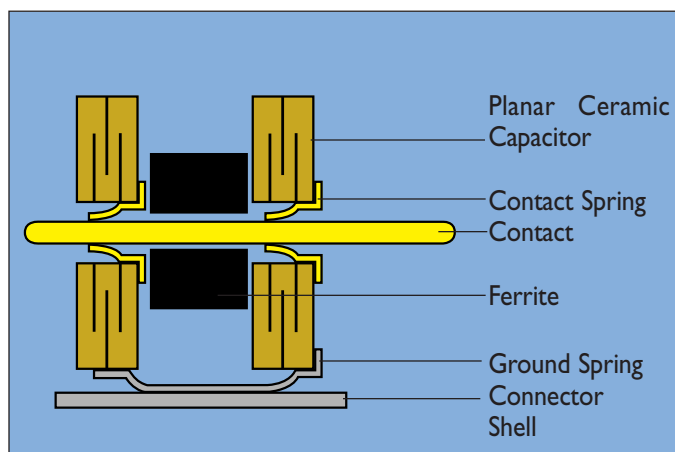
## Filter Connector Design

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

avionics applications are planar arrays and tubular capacitors. Each of these capacitor types is an efficient filter at high frequencies ( $>1$  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.

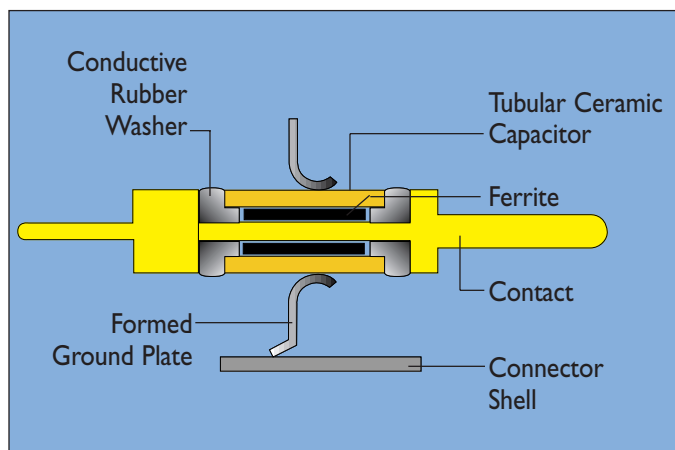
### Planar Array

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.




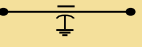
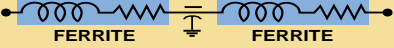




# Filter Connector Selection

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
C		High source and high load impedance
T		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°C to +125°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

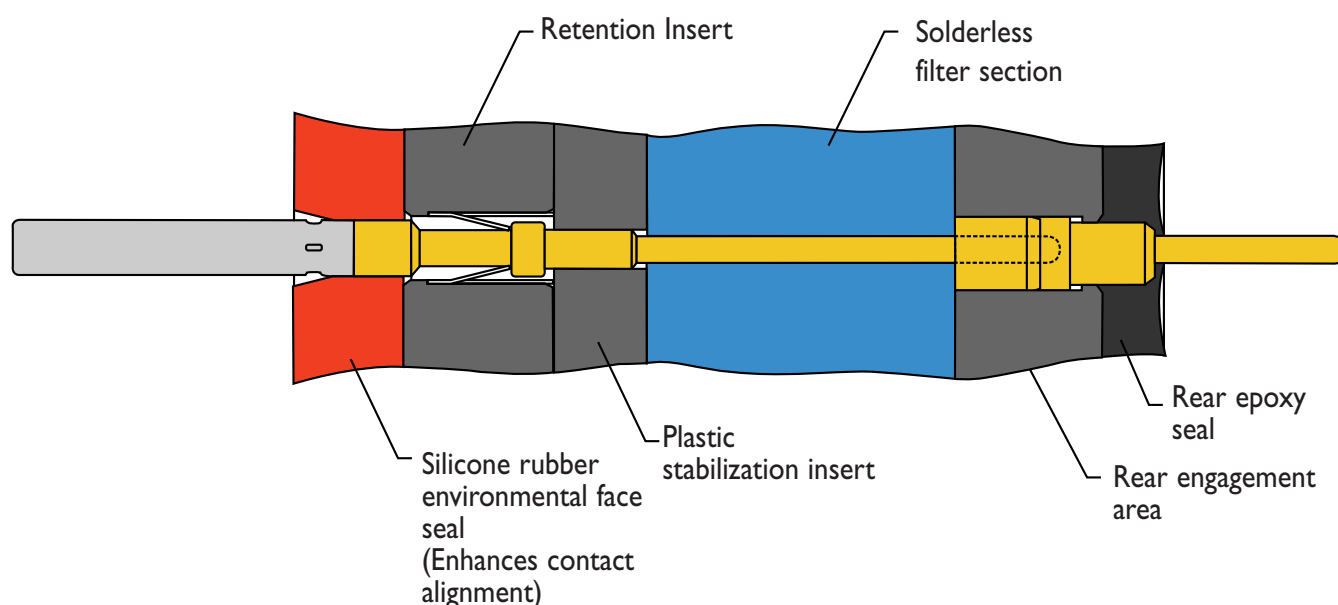
The Amphenol 485 series is a range of filtered ARINC 404 and 600 rack and panel connectors designed to provide space and cost-effective solutions to EMC compliance issues in avionics products. Amphenol's filtered ARINC connectors are used extensively on Boeing, McDonnell Douglas and Airbus avionics equipment 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.

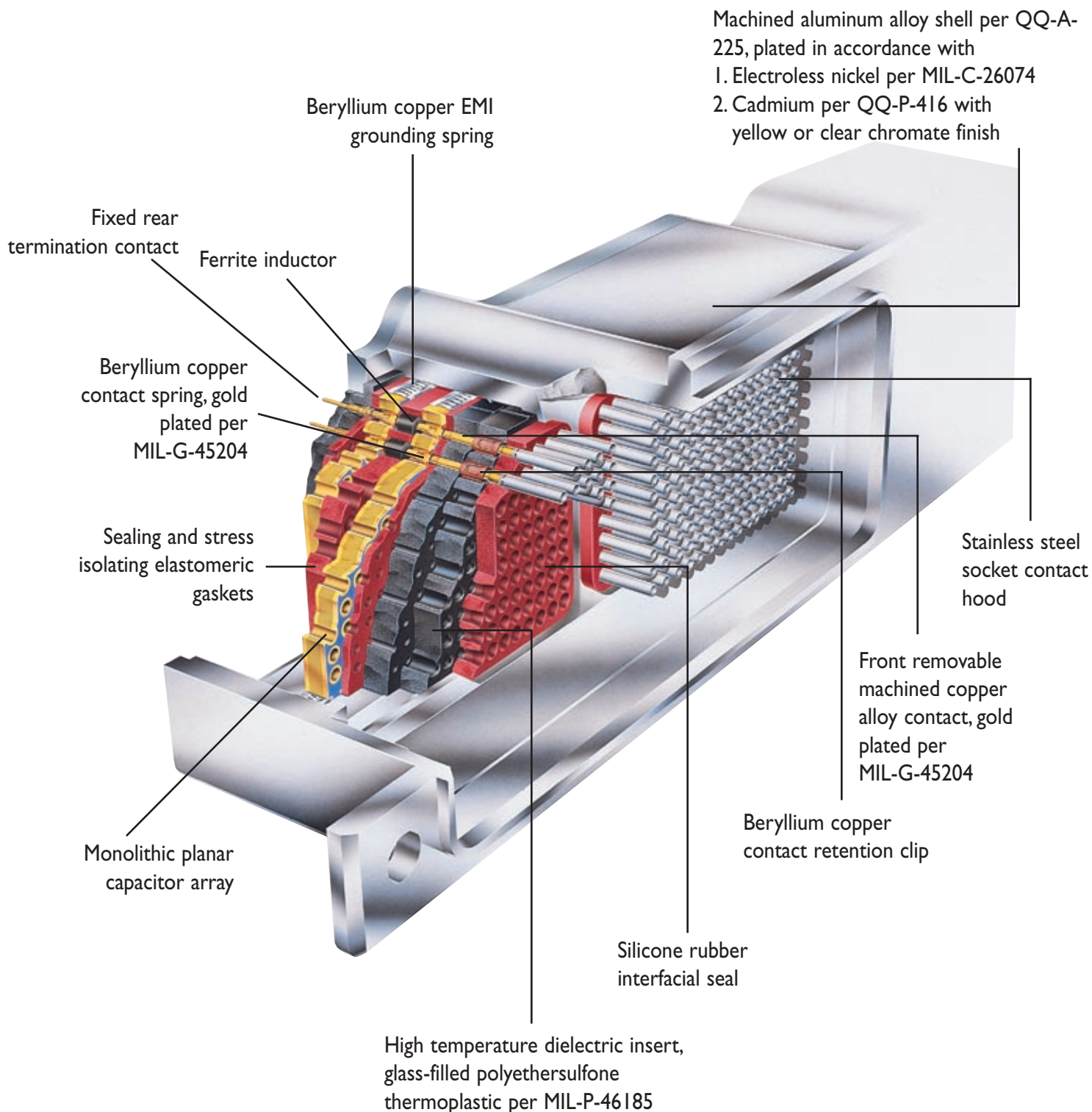
### Front Removable Socket Contact Stability

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.



## ARINC Filter Connector Construction and Material Specifications



## Electrical Characteristics

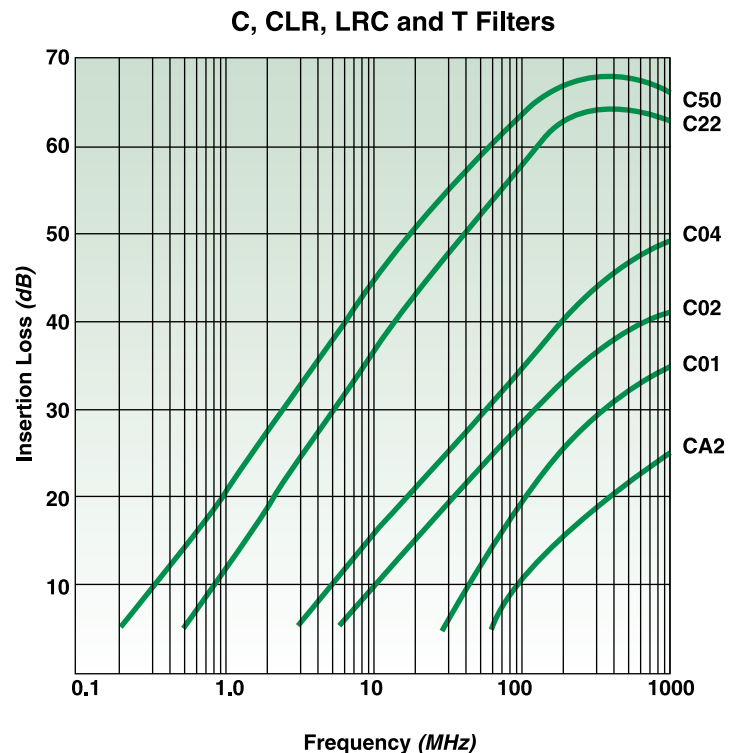
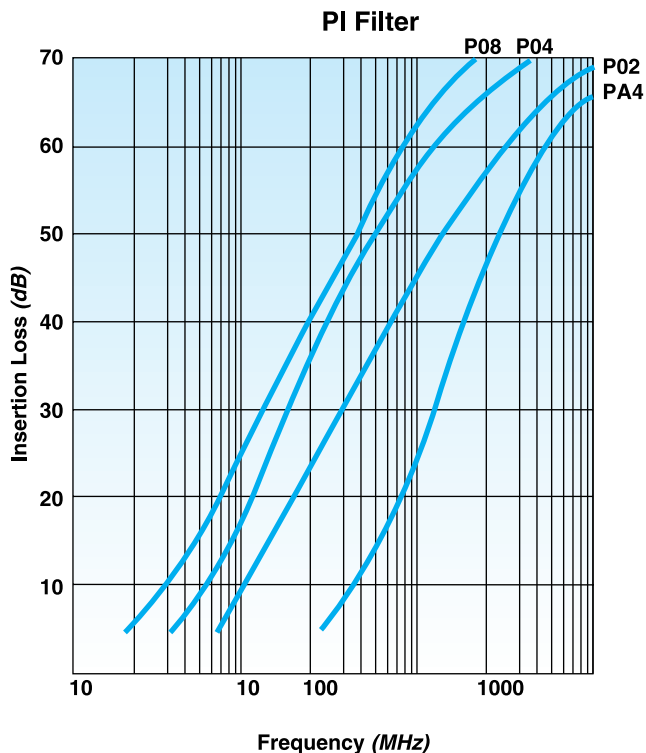
Filter Circuit	PI				C,CLR,LRC,T					
Filter Type	PA4	P02	P04	P08	CA2	C01	C02	C04	C22	C50
Capacitance (pF) (@ 25°C, 1kHz & 1.0 VRMS)	400 to 800	1800 to 3600	4000 to 8000	8000 to 16000	200 to 400	900 to 1800	1800 to 3600	4000 to 8000	22000 to 40000	50000 to 100000
Insertion Loss* (dB min.) (per MIL-STD-220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

**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

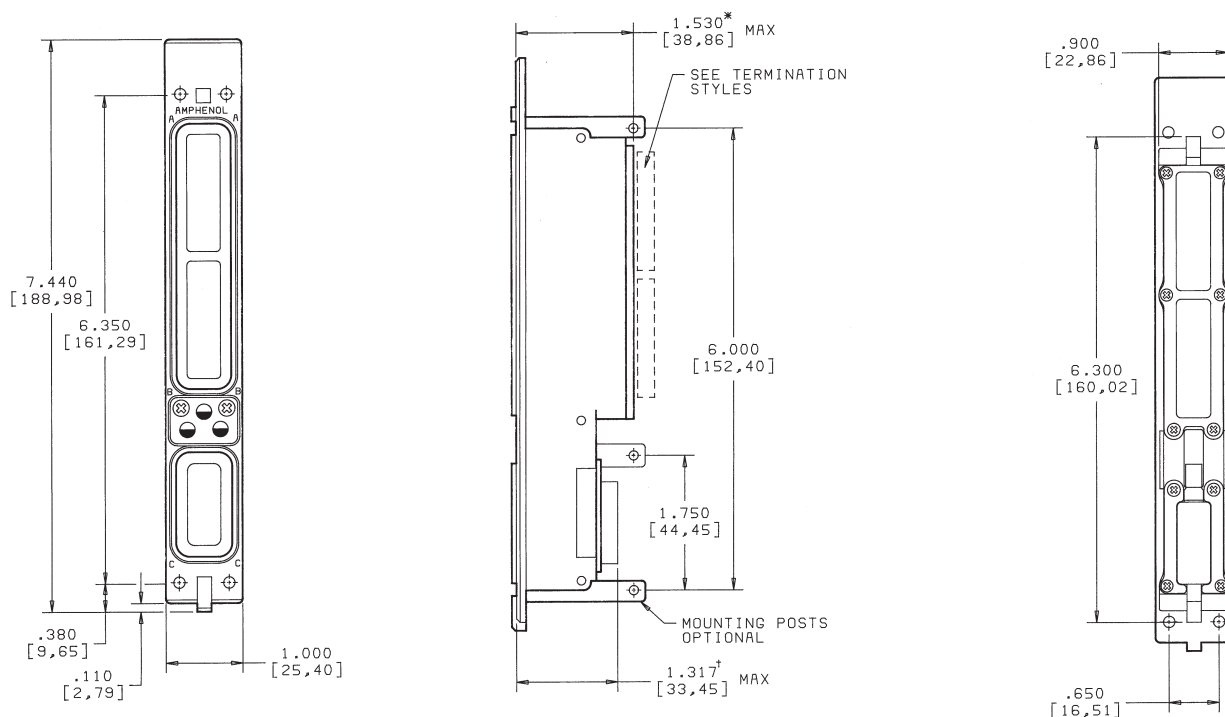
## Typical Insertion Loss Performance



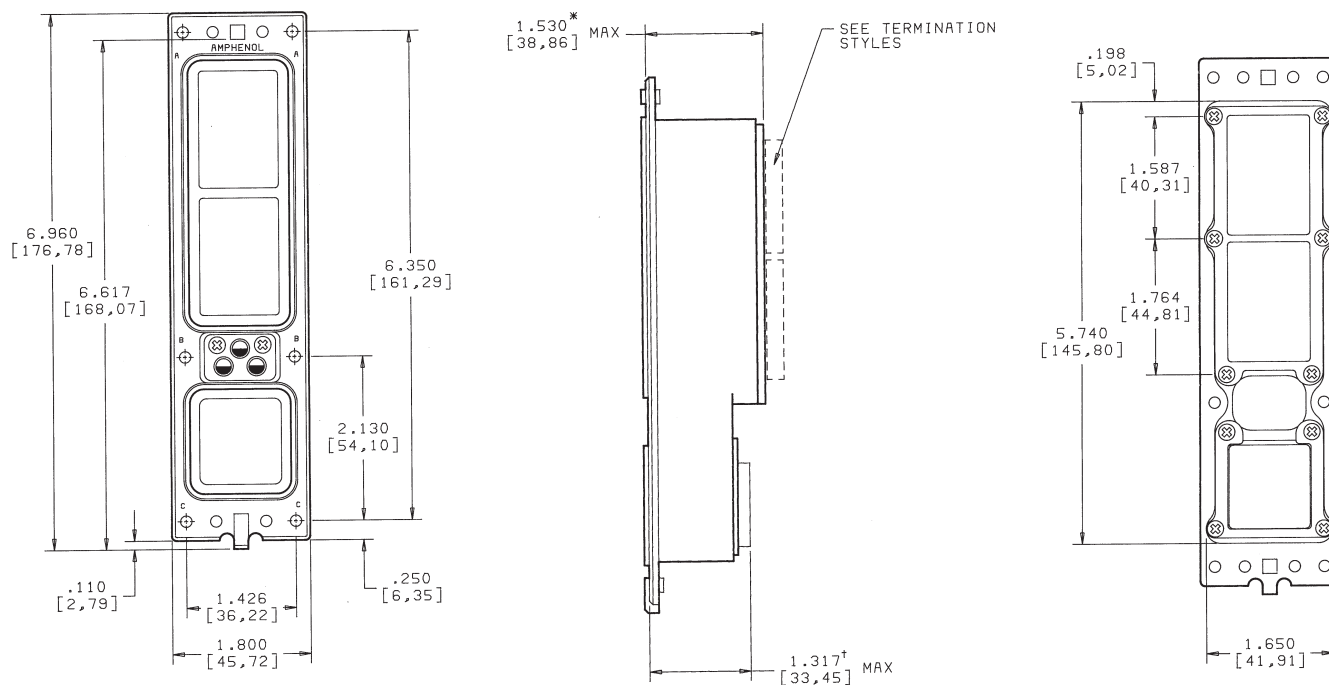


## ARINC 600 Style Filter Connectors

### Receptacle Shell Size 1



### Receptacle Shell Size 2

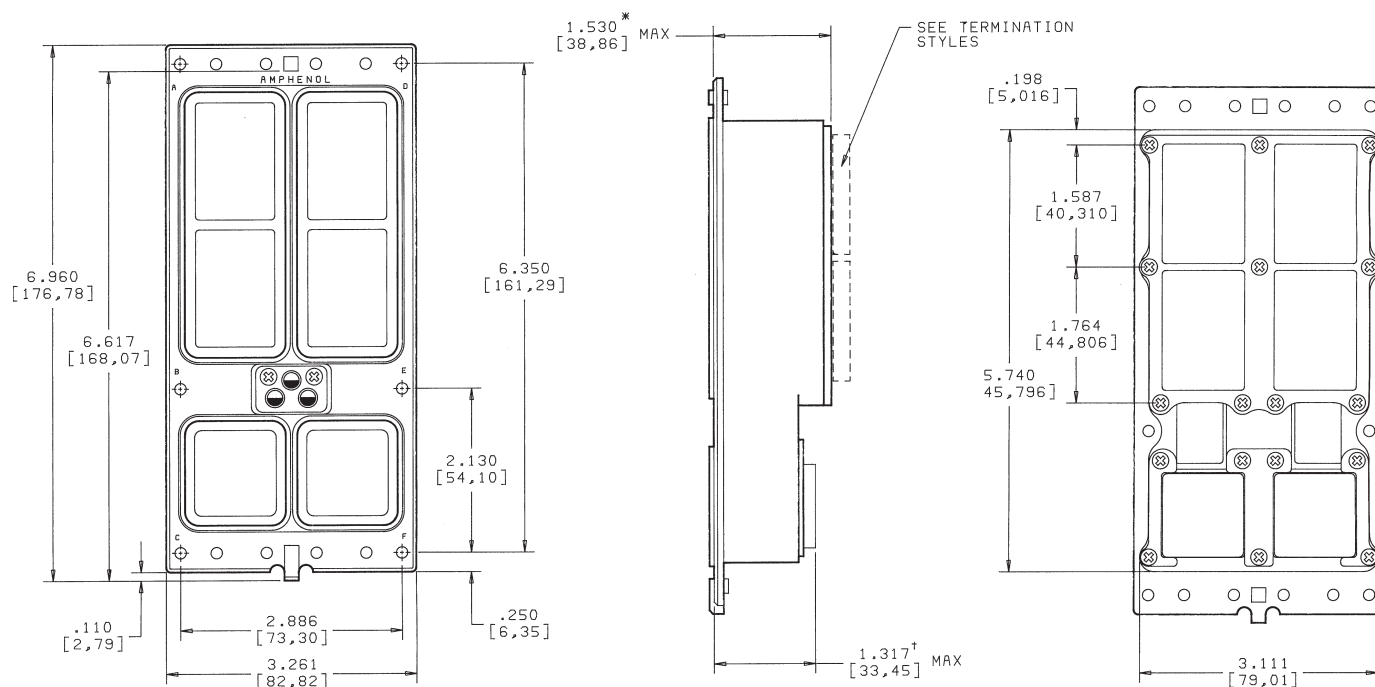


\*This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details.

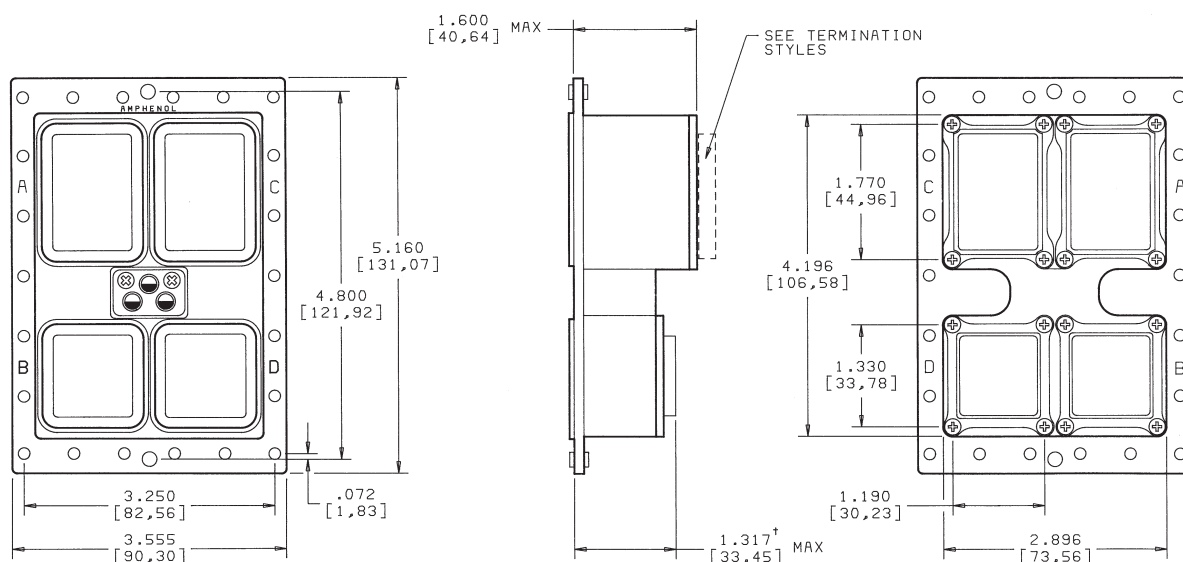
**Note:** Size 22D contacts are supplied installed and are removable with Amphenol insertion/removal tool 485-905. Cavity C and F power contacts are packaged separately. Coax and triax contacts may be ordered separately.

† Cavity C dimension is shown unfiltered

## ARINC 600 Style Filter Connectors Receptacle Shell Size 3



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



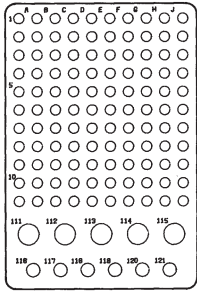
\*This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details.

**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.

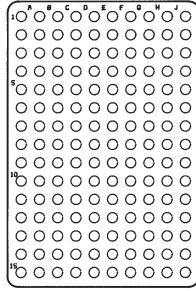
† ARINC 600 Cavity C and F and MIL-C-83527 Cavity B and D dimensions are shown unfiltered.

# ARINC 600 Insert Arrangements

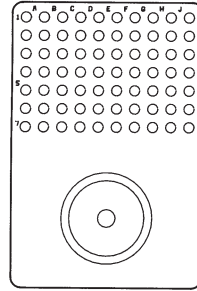
Shell Size 2 or 3, Cavity A, B, D or E



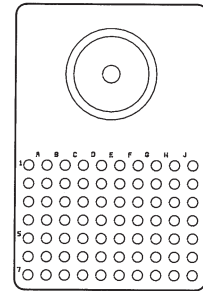
**Insert 121**  
110 #22 Contacts  
5 #16 Contacts  
6 #20 Contacts



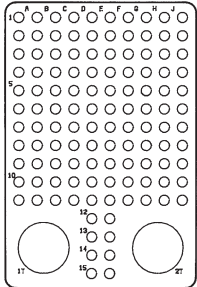
**Insert 150**  
150 #22 Contacts



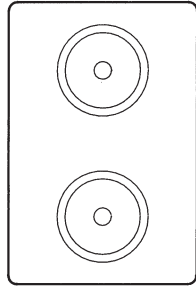
**Insert 71C1**  
70 #22 Contacts  
1 #1 Coax Contact



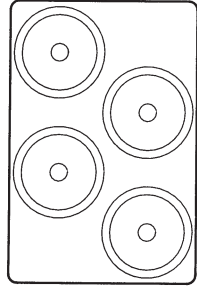
**Insert 71C1A**  
70 #22 Contacts  
1 #1 Coax Contact



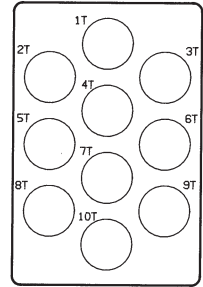
**Insert 120T2**  
118 #22 Contacts  
2 #8 Triax/Coax Contacts



**Insert C2**  
2 #1 Coax Contacts

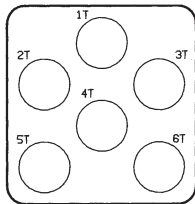


**Insert C4**  
4 #1 Coax Contacts

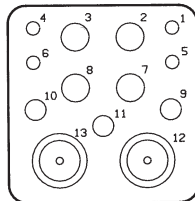


**Insert 10T10**  
10 #8 Triax/Coax Contacts

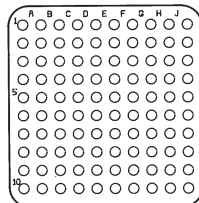
Shell Size 2 or 3, Cavity C or F



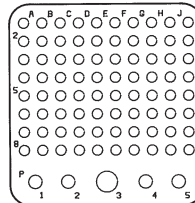
**Insert 6T6**  
6 #8 Twinax/Coax Contacts



**Insert 13C2**  
4 #12 Contacts  
3 #16 Contacts  
4 #20 Contacts  
2 #5 Coax Contacts



**Insert 100**  
100 #22 Contacts

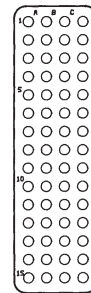


**Insert 85**  
80 #22 Contacts  
4 #20 Contacts  
1 #16 Contact

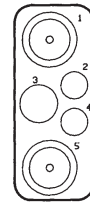
Shell Size 1

Cavity A or B

Cavity C



**Insert 60**  
60 #22 Contacts

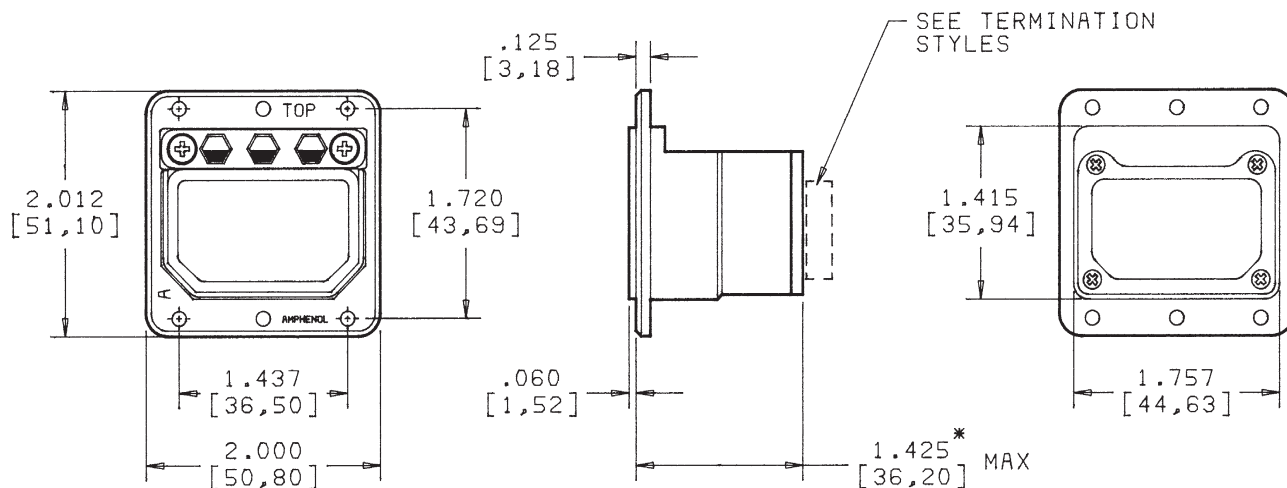


**Insert 5C2**  
1 #12 Contact  
2 #16 Contacts  
2 #5 Coax Contacts

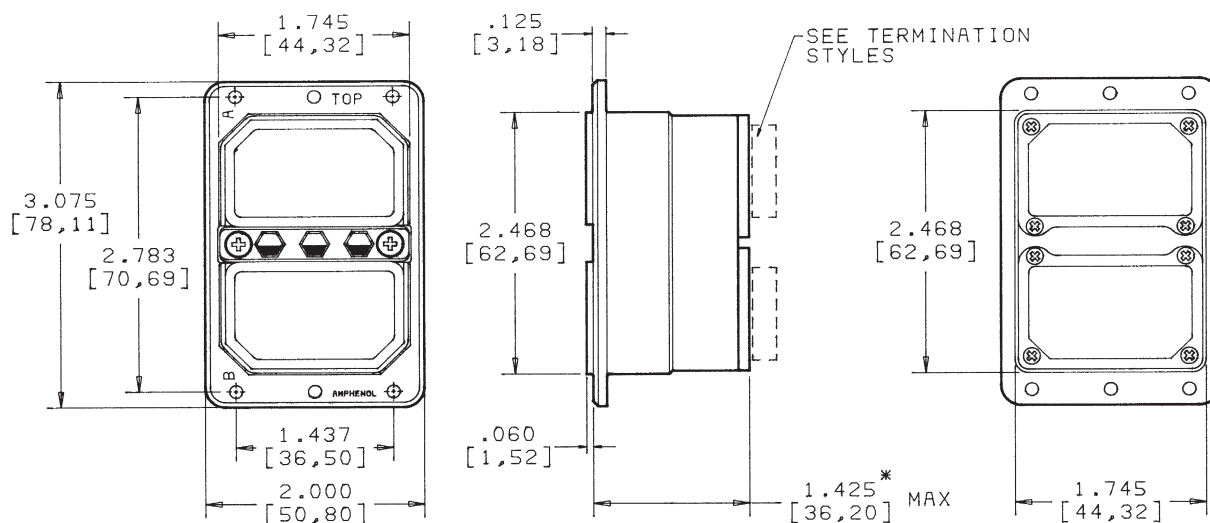
Note: Consult the factory for other insert patterns.

# ARINC 404 and MIL-C-81659 Filtered Connectors

## Receptacle Shell Size 1



## Receptacle Shell Size 2



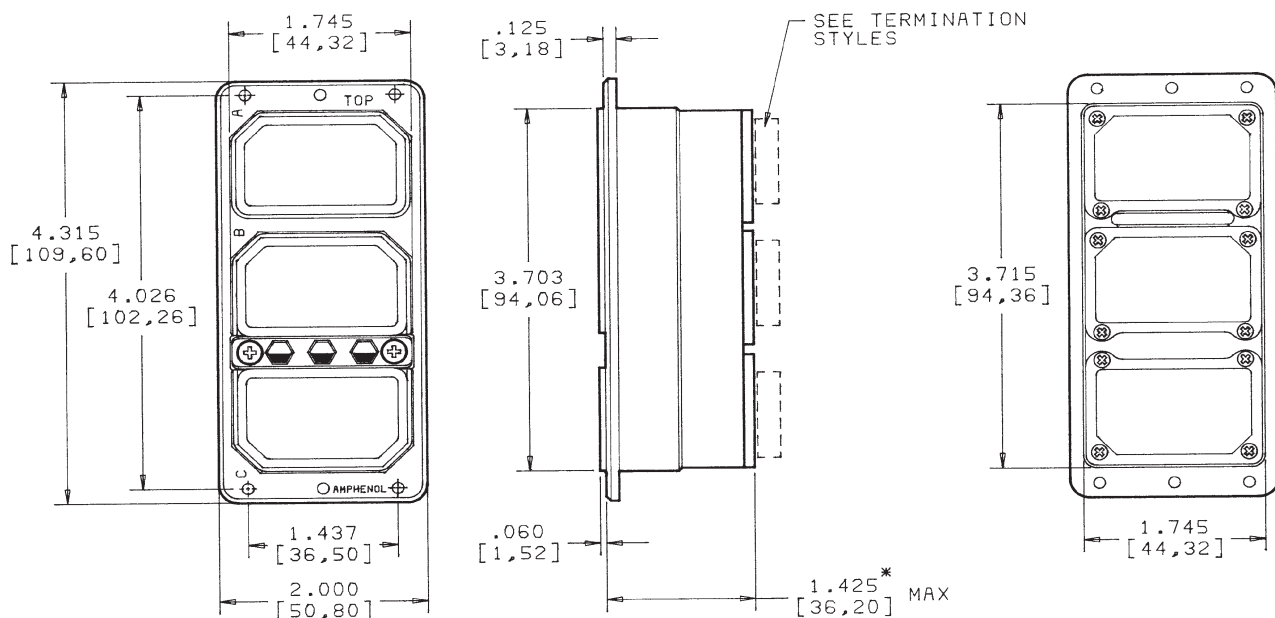
\*This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details.

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

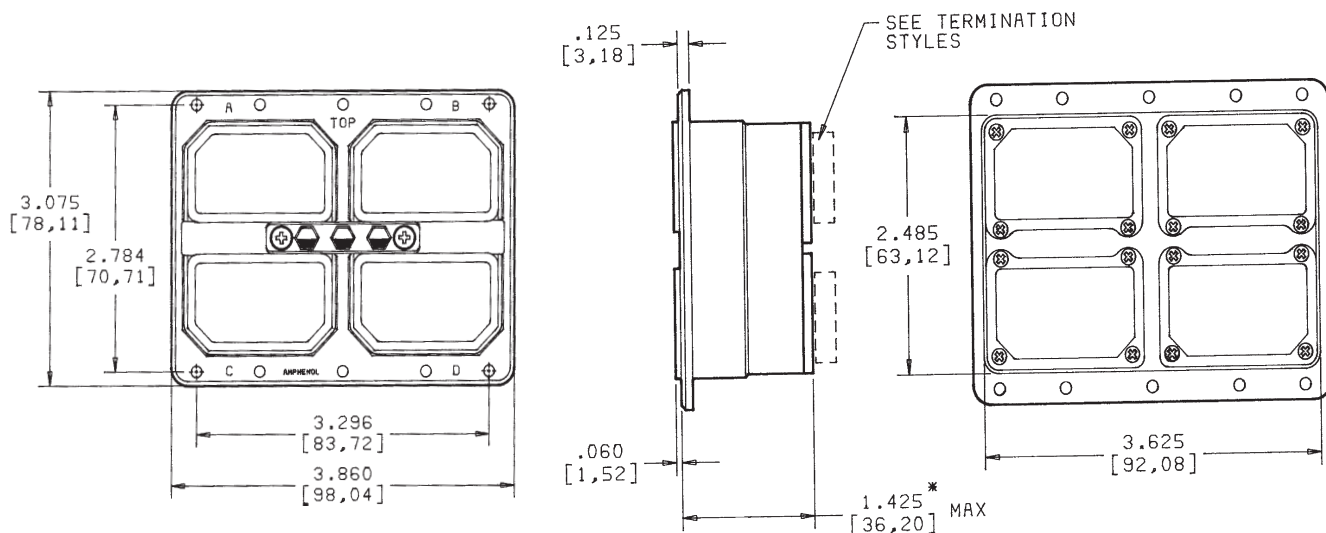


## ARINC 404 and MIL-C-81659 Filtered Connectors

### Receptacle Shell Size 3



### Receptacle Shell Size 4

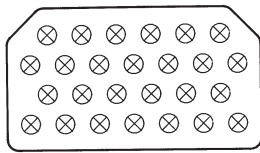


\*This dimension is for all filter styles with PCB, wire wrap or solder cup terminations. For environmental class connectors with rear release contacts, add .600" (15,24mm). Shorter length designs are available. Consult the factory for details.

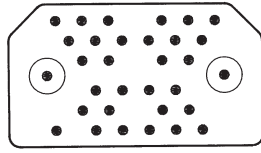
**Note:** Size 22D contacts are supplied installed and are removable with Amphenol insertion/removal tool 485-905. Pin contacts are not removable. Coax and triax contacts may be ordered separately.



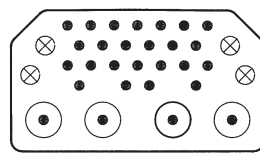
## ARINC 404 and MIL-C-81659 Insert Arrangements



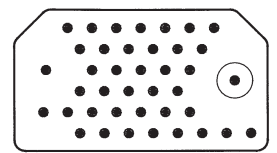
**Insert 26**  
26 #16 Contacts



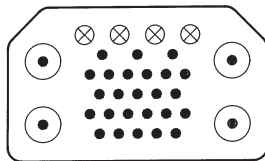
**Insert 32C2**  
30 #20 Contacts  
2 #5 Coax Contacts



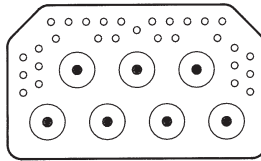
**Insert 32C4**  
24 #20 Contacts  
4 #16 Contacts  
4 #5 Coax Contacts



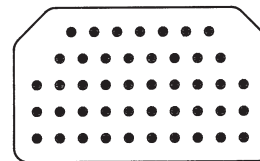
**Insert 40C1**  
39 #20 Contacts  
1 #5 Coax Contact



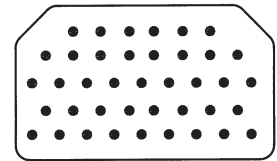
**Insert 33C4**  
25 #20 Contacts  
4 #16 Contacts  
4 #5 Coax Contacts



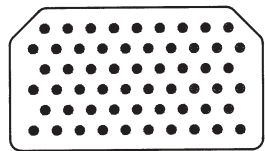
**Insert 36C7**  
29 #22 Contacts  
7 #5 Coax Contacts



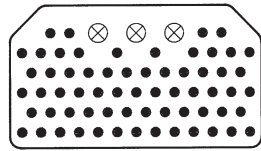
**Insert 45**  
45 #20 Contacts



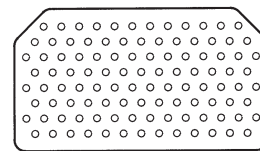
**Insert 40**  
40 #20 Contacts



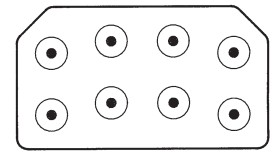
**Insert 57**  
57 #20 Contacts



**Insert 67**  
64 #20 Contacts  
3 #16 Contacts



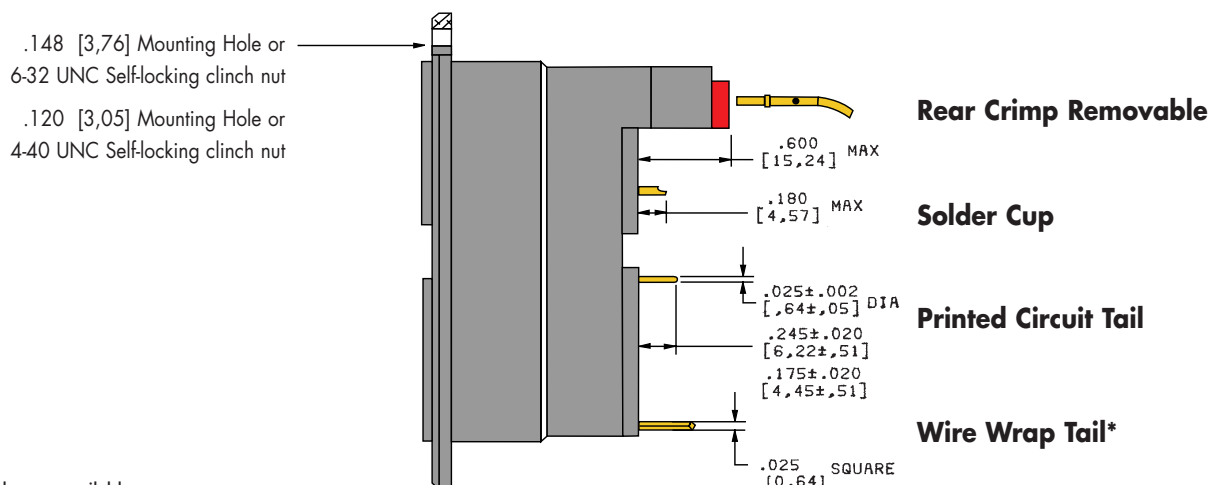
**Insert 106**  
106 #22 Contacts



**Insert C8**  
8 #9 Coax Contacts

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

## ARINC 404 and 600 Termination Styles



\*Various lengths are available.  
Consult the factory for details.

# 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.

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.

## Filter Connectors with Transient Suppressors

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 over-voltage 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

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 reparability and maintenance logistics

## 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

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* $V_{(BR)}$			Test Current $I_T$	Rated Stand-off Voltage $V_{WM}$	Maximum Reverse Leakage Current $I_D @ V_{WM}$	Maximum* Peak Reverse Clamping Voltage $V_C \text{ Max.} @ I_{PP}$	Maximum Peak Pulse Current $I_{PP}$	Power Capability @ 1 msec Pulse
	Min.	Nom.	Max.						
	$V_{DC}$	$V_{DC}$	$V_{DC}$	mADC	V	$\mu\text{ADC}$	V	A	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  $\mu\text{sec}$  pulse

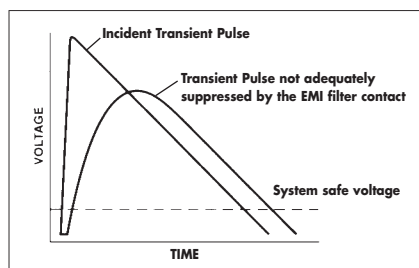
+ Available in unidirectional and bidirectional devices

## MOV Contact Characteristics

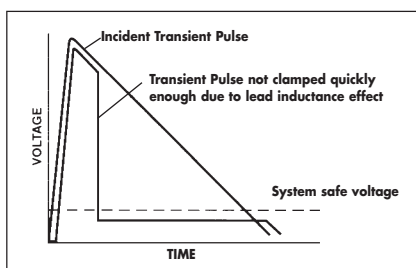
MOV Contact Designation	Maximum Ratings (125°C)					Characteristics (25°C)								
	Continuous		Transient		Maximum Leakage Current at 90% V <sub>T (DC)</sub>	Varistor Voltage @ 1m ADC Test Current			Maximum Clamping Voltage V <sub>C</sub> @ Test Current (8/20μs)		Capacitance (pF) f=1 MHz		Maximum Leakage Current at 90% V <sub>T (DC)</sub>	
	RMS Voltage	DC Voltage	Energy (10/1000μs)	Peak Current (8/20μs)										
	V <sub>M(AC)</sub> Volts	V <sub>M(DC)</sub> Volts	W <sub>TM</sub> Joules	I <sub>TM</sub> Amperes	I <sub>L</sub> Max μA	Min. Volts	V <sub>N(DC)</sub> Volts	Max. Volts	V <sub>C</sub> Volts	I <sub>p</sub> Amps	Min.	Max.	I <sub>L</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

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

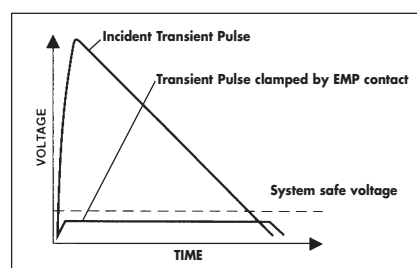
## Filter/Diode Connector Transient Response



EMI Filter



PCB mounted Diode or MOV



Contact/Connector Diode or MOV

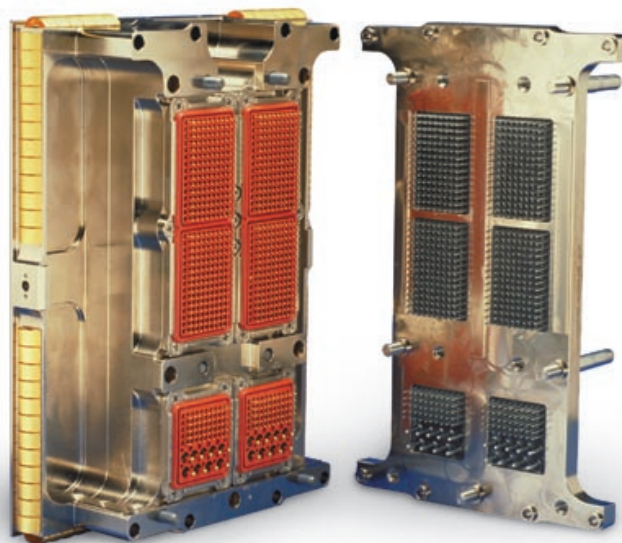
## Termination Module

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 M22520/7-01	M22520/2-06 or 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

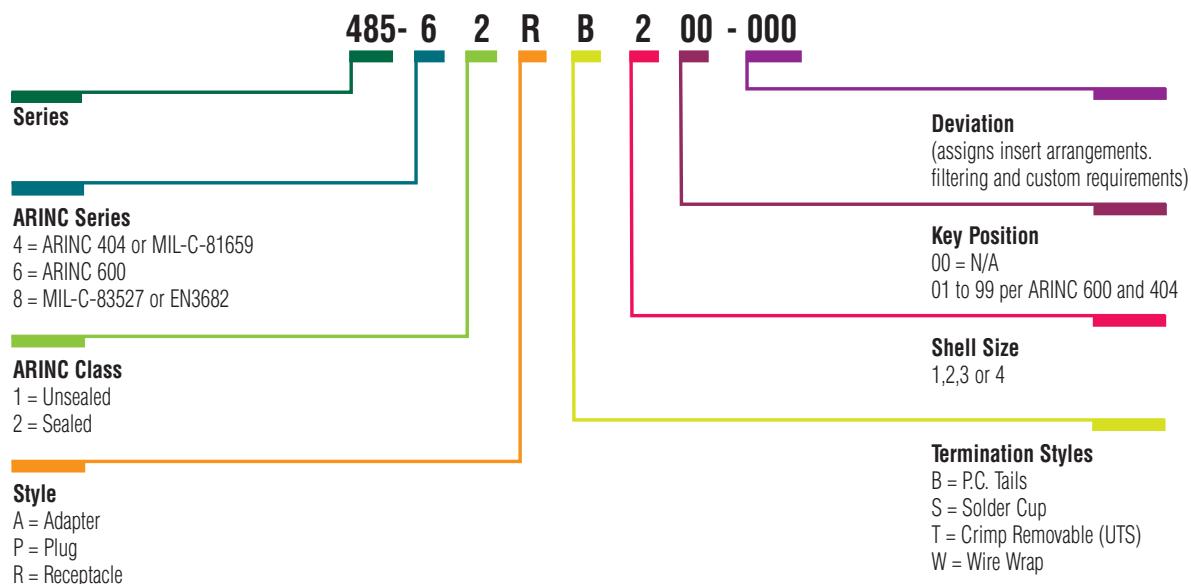
### ARINC 404

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



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.

### 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
- 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)

### 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%)

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

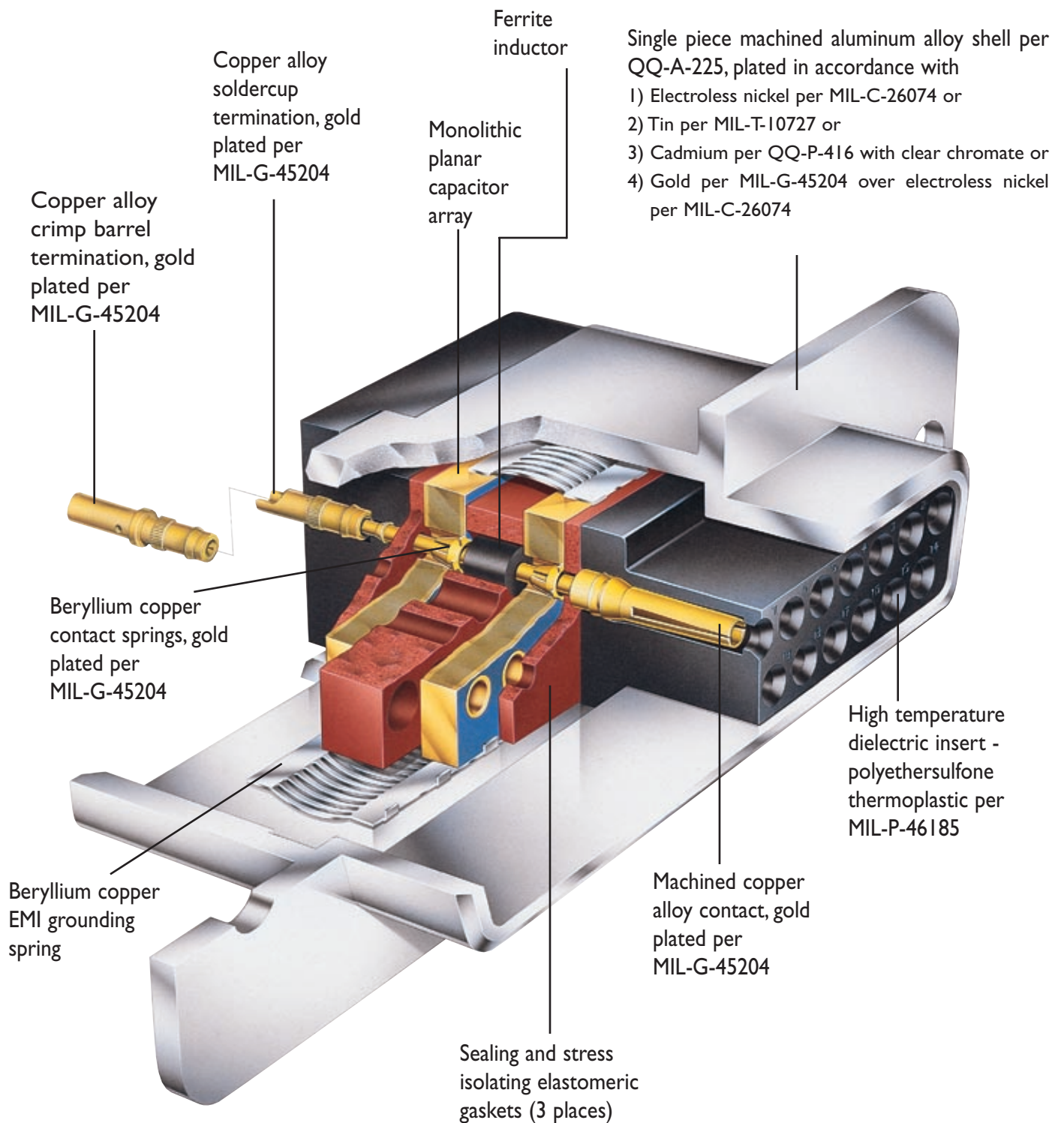


Zinc Nickel Plating

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



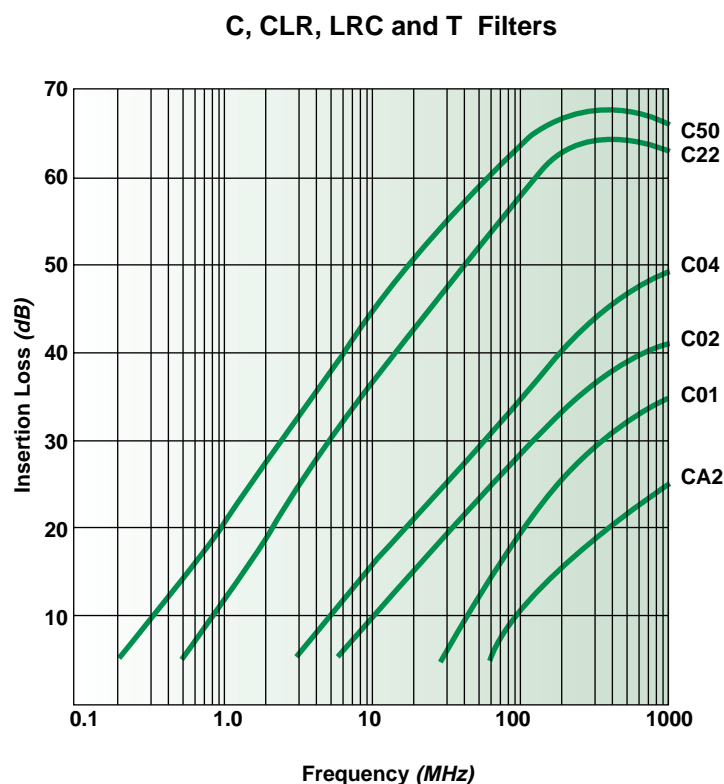
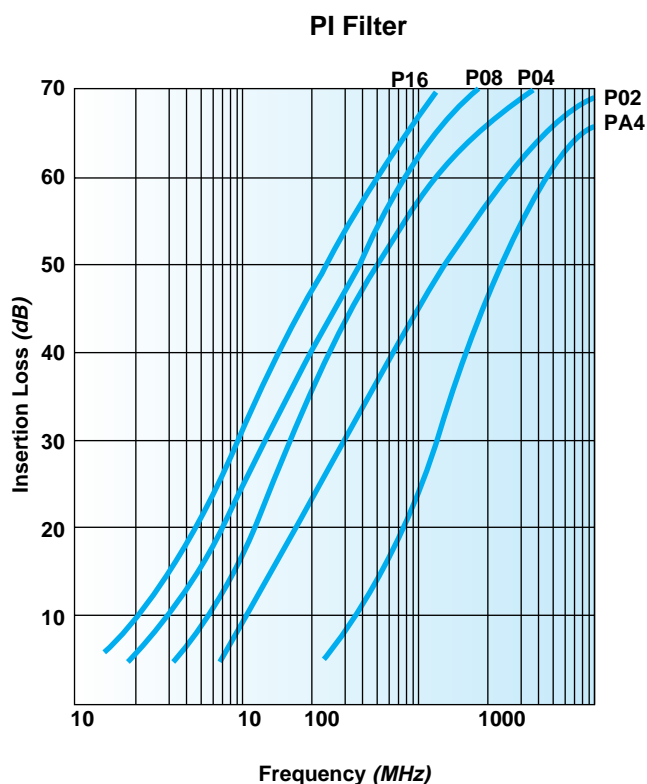
## 308 Series Electrical Characteristics

Filter Circuit	PI					C,CLR,LRC,T					
Filter Type	PA4	P02	P04	P08	P16	CA2	C01	C02	C04	C22†	C50†
Capacitance (pF) (@ 25°C, 1kHz & 1.0 VRMS)	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.) (per MIL-STD-220 at 25°C & no load)	.1 MHz	—	—	—	—	—	—	—	—	—	3
	1 MHz	—	—	2	5	8	—	—	—	10	15
	10 MHz	2	10	15	18	28	4	8	13	26	35
	100 MHz	20	38	50	55	62	10	20	25	33	45
	1000 MHz	58	60	60	63	68	25	35	40	50	52
Working Voltage (VDC) (@ 25°C & sea level)	200									100	
Dielectric Withstanding Voltage (VDC) (@ 25°C & 50 mA max. charging current)	500									300	
Insulation Resistance (Gohms) (@ 25°C & working voltage)	10										
Contact Current Rating (continuous max., DC amperes)	5										
Filter RF Current Rating (amperes) (max. @ any frequency)	3										

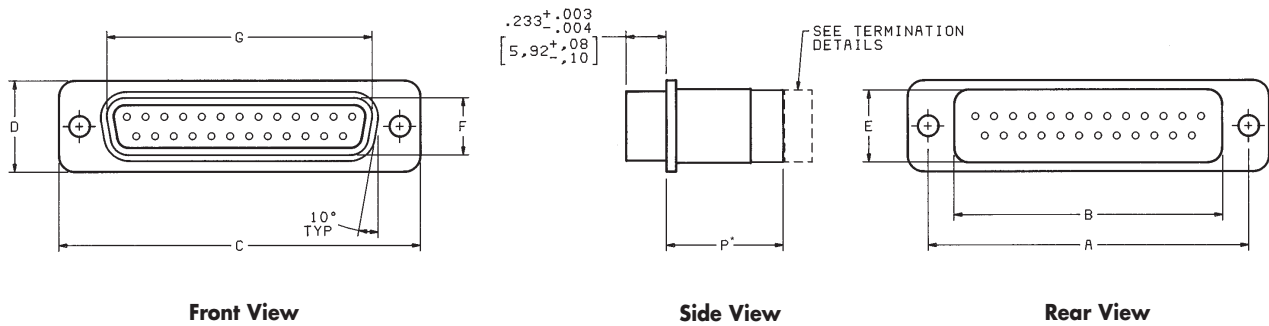
**Note:** Other capacitance values, mixed capacitance arrangements, ground and insulated contacts are available.  
Consult the factory for your particular application.

<sup>†</sup> Not available in high density arrangements

## Typical Insertion Loss Performance



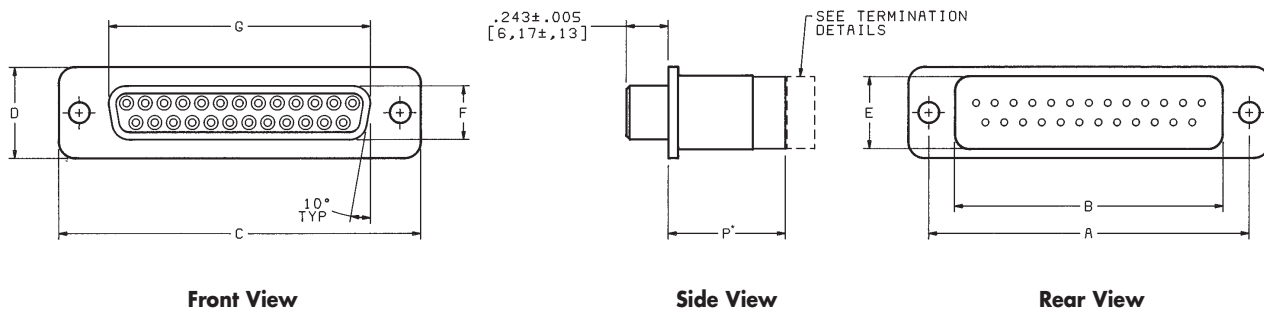
## 308 Series Plug Dimensions



Shell Size	Number of Contacts	Dimension													
		A		B Max		C		D Max		E Max		F		G	
		±.005"	±.13mm	inches	mm	±.015"	±.38mm	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
A	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
B	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
C	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

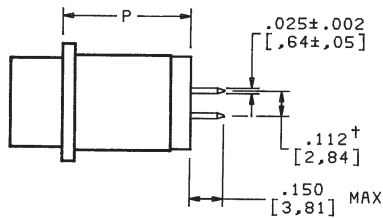
## 308 Series Receptacle Dimensions



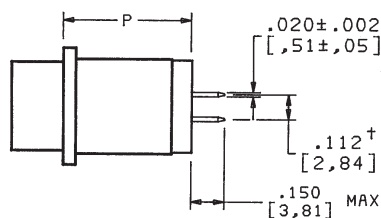
Shell Size	Number of Contacts	Dimension													
		A		B Max		C		D Max		E Max		F		G	
		±.005"	±.13mm	inches	mm	±.015"	±.38mm	inches	mm	inches	mm	±.005"	±.13mm	±.005"	±.13mm
E	9 or 15	0.984	24,99	0.685	17,34	1.213	30,81	0.534	13,56	0.434	11,02	0.311	7,90	0.643	16,33
A	15 or 26	1.312	33,32	1.009	25,63	1.541	39,14	0.534	13,56	0.434	11,02	0.311	7,90	0.971	24,66
B	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
C	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

\* For Dimension P, see page 21

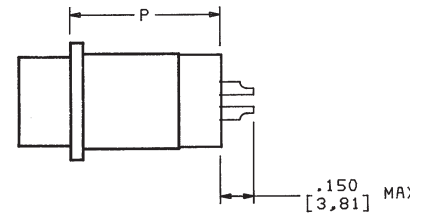
## 308 Series Termination Styles



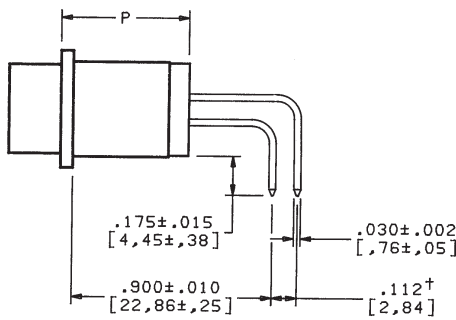
Termination Style 1



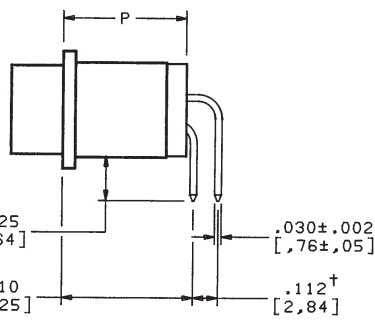
Termination Style 2



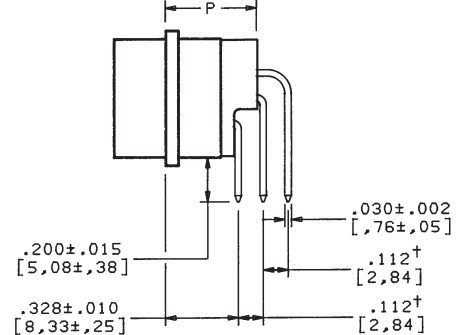
Termination Style 3



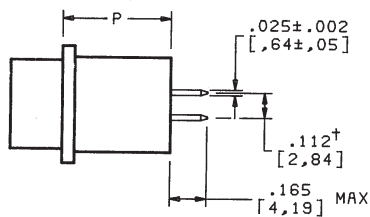
Termination Style 4



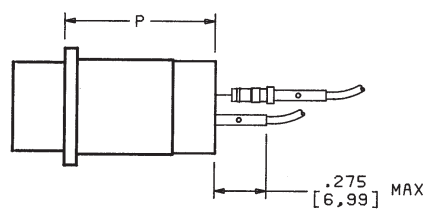
Termination Style 6



Termination Style 7



Termination Style 8

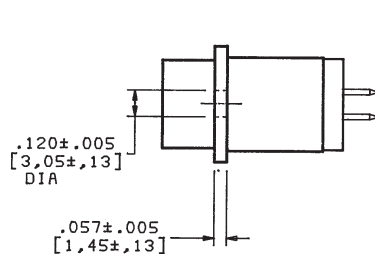


Termination Style 9

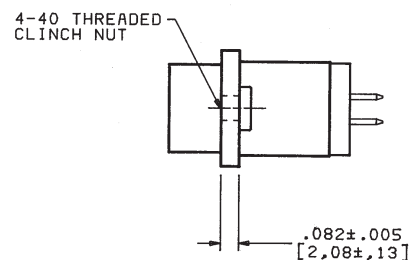
† This dimension is 0.078" (1.98) for high density arrangements

Filter Circuit	Termination Style and Shell Length (P Max dimension)													
	1 and 2		3		4		6		7		8		9	
	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
C	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

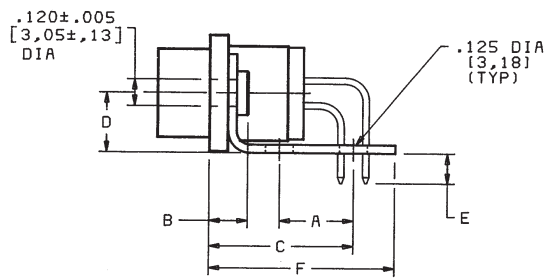


Mounting Style 1

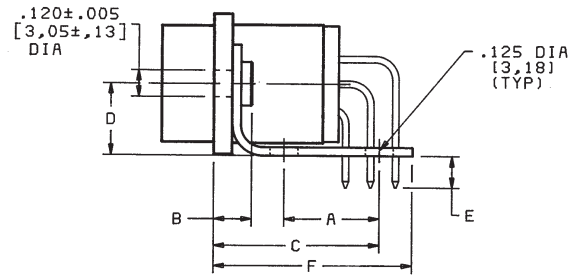


Mounting Style 2





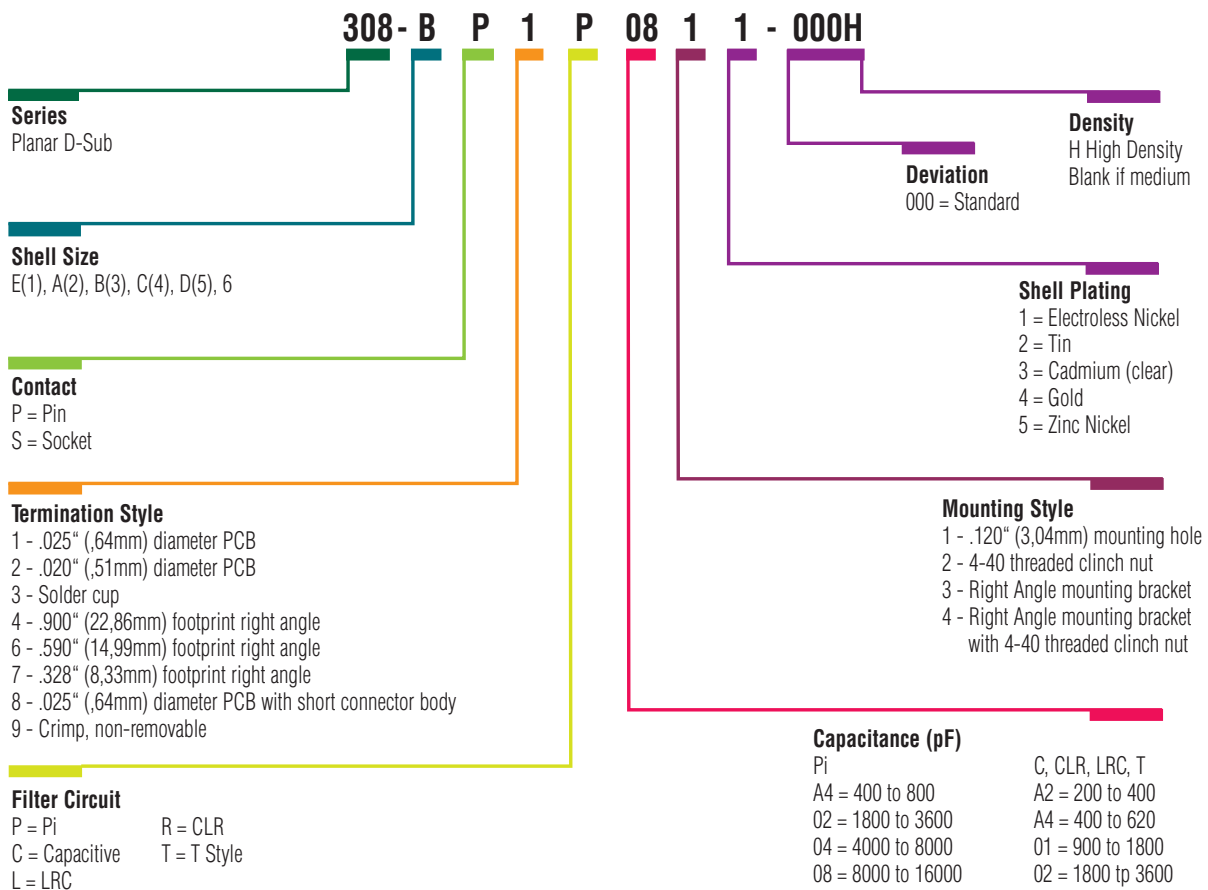
Mounting Style 3 (two row)



Mounting Style 3 (three row)

Shell Size	Number of Contacts	Dimension											
		A		B Max		C		D		E		F Max	
		±.004"	±.11mm	inches	mm	±.015"	±.39mm	±.008"	±.21mm	±.020"	±.51mm	inches	mm
E	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
A	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
B	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
C	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

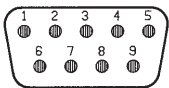
## 308 Series Part Numbering Information



# 308 Series Insert Arrangements

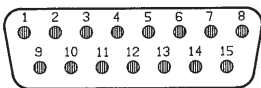
## Pin Engaging Face Shown

Shell Size 1 (E)



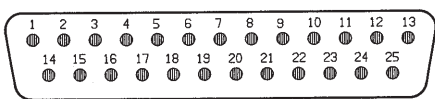
9 #20 Contacts

Shell Size 2 (A)

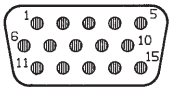


15 #20 Contacts

Shell Size 3 (B)



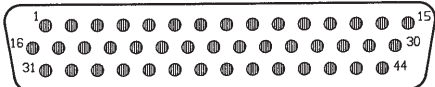
25 #20 Contacts



15 #22 Contacts

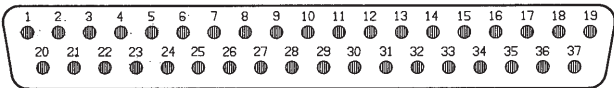


26 #22 Contacts



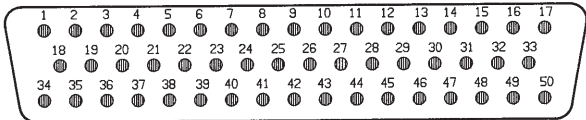
44 #22 Contacts

Shell Size 4 (C)

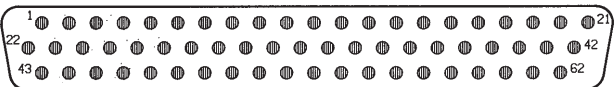


37 #20 Contacts

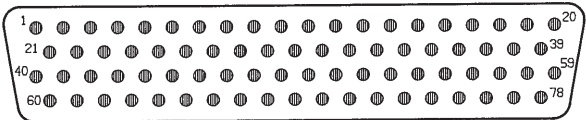
Shell Size 5 (D)



50 #20 Contacts

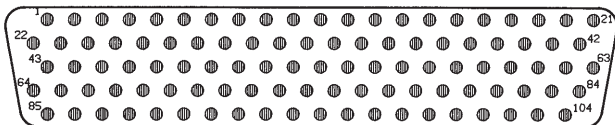


62 #22 Contacts



78 #22 Contacts

Shell Size 6

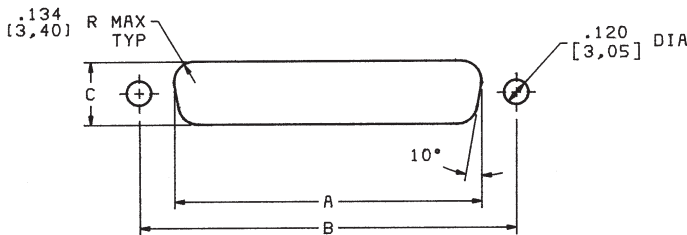


104 #22 Contacts

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

## Recommended Panel Cutout

### Front and Rear Mounting



Shell Size	Dimension					
	A min		B		C min	
	inches	mm	±.005"	±.13mm	inches	mm
1 (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

<sup>+</sup> Front mounting dimensions

## 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.

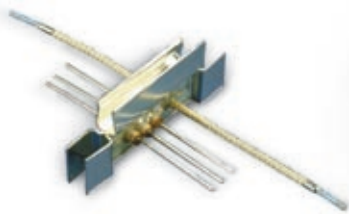
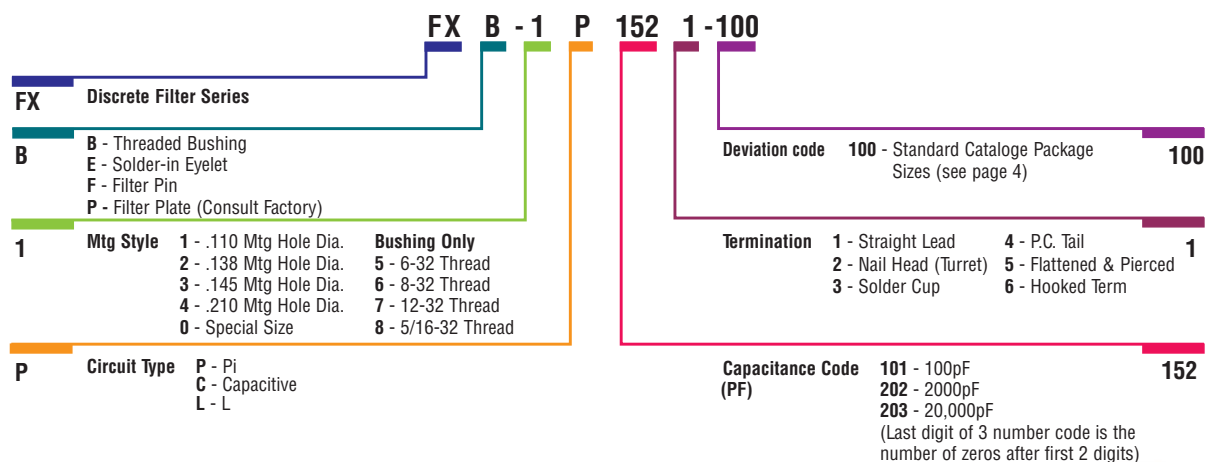
Consult factory for custom filter and/or filter plate requirements.

## MATERIALS

Terminals: Copper Alloy, silver plated (filter pins shown are gold plated)

Eyelets/Bushings: Brass, silver plated

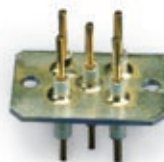
## ORDERING INFORMATION



## Coax Filter Plate Assembly



### Filtered Terminal Block



## Filter Plate Assembly



## Special Filter Plate Shell Assembly

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



**Amphenol Aerospace, the Interconnection Leader, offers advanced EMI/EMP Protection with high reliability. The proven performance of Amphenol® EMI Filter/Transient Protection Connectors means dependable protection for the costly and sensitive circuitry in sophisticated avionics.**

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 intermountable 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 Mil-spec connectors.

Contact us for your special application requirements: Amphenol Aerospace, 40-60 Delaware Ave., Sidney, NY 13838-1395  
Phone: 607-563-5011 Fax: 607-563-5157 Web Site: [www.Amphenol-Aerospace.com](http://www.Amphenol-Aerospace.com)



**Amphenol Canada**  
20 Melford Drive  
Scarborough, ON  
Canada M1B 2X6  
Phone: 416-291-4401  
Fax: 416-292-0647

Amphenol Aerospace  
40-60 Delaware Avenue  
Sidney, NY 138 38-1395  
Phone: (607) 563-5453  
Fax: (607) 563-5351

Amphenol Aerospace  
22952 Alcade Drive  
Suite 110  
Laguna Hills, CA 92653  
Phone: (949) 855-4454  
Fax: (949) 855-9115

Amphenol Aerospace  
57 E. Hattendorf Avenue  
Suite 150  
Roselle, IL 60172  
Phone: (630) 893-1713  
Fax: (603) 893-3958

Amphenol Aerospace  
7506 East Independence Blvd.  
Charlotte, NC 28227  
Phone: (704) 531-9053  
Fax: (704) 531-9054

Communication and Network  
Products Division  
One Kennedy Avenue  
Danbury, CT 06810  
Phone: (203) 743-9272

Fiber Optic Products  
1925A Ohio Street  
Lisle, IL 60532  
Phone: (630) 960-1010

Sine Systems \* Pyle Connectors  
Corporation  
25325 Joy Boulevard  
Mt. Clemens, MI 48046  
Phone: (810) 465-3131

Chicago Office  
650 W. Grand Avenue, Suite 304  
Elmhurst, IL 60126  
Phone: (630) 832-4600

Spectra Strip  
720 Sherman Avenue  
Hamden, CT 06514  
Phone: (203) 281-3200

Technical Products International  
2110 Notre Dame Avenue  
Winnipeg, MB, R3H 0K1 Canada  
Phone: (204) 697-2222

Times Fiber Communications, Inc.  
358 Hall Avenue  
Wallingford, CT 06492  
Phone: (203) 265-8500  
Amphenol Mexico  
Presidente Masaryk 61, Piso 2  
C.P. 11570 Mexico D.F.  
Mexico  
Phone: (52-5) 254-7283  
Fax: (52-5) 531-9659

Advanced Circuit Technology  
118 Northeastern Boulevard  
Nashua, NH 03062  
Phone: (603) 880-6000

Amphenol Scandinavia  
P.O. Box 2047  
Johannelundsvagen 2  
194 02 Upplands Vaesby  
Sweden  
Phone: 46-8-594-10440

Amphenol Socapex S.A.S.  
Promenade de l'Arve, BP 29  
74311 Thyez Cedex  
France  
Phone: 33-4-5089-2800

Amphenol-TFC (Changzhou)  
Communications Equipment Co., Ltd.  
96 Hehai Road, Changzhou New &  
HighTech & Industrial  
Development Zone  
Changzhou 213000, Jiangsu, PRC  
Phone: 86-519-510-6004

Amphenol Taiwan  
59, Lung-Shou Street, Sec. 1  
Lu-Chu-Hsiang, Taoyuan Hsien  
Taiwan  
Republic of China  
Phone: 886-3-379-5677

Amphenol-Tuchel Electronics GmbH  
August-Haeusser-Strasse 10  
74080 Heilbronn  
Germany  
Phone: 49-7131-929-0

Amphetronix Limited  
P.O. Box No. 1, Plot No. 105  
105 Bhosari Industrial Area  
Pune 411026, India  
Phone: 91-20-790363

Israel  
Bar-Tec Ltd.  
11 Barliam St., P.O. Box 279  
Kfar Saba 44102  
Israel  
Phone: (972-9) 974097  
Fax: (972-9) 974324

Amphenol Australia Limited  
2 Fiveways Blvd., Keysboroug  
Victoria 3173, Melbourne, Australia  
Phone: 61-3-8796-8888

Amphenol European Sales Operations  
Hoofdveste 19  
3992 DH  
The Netherlands  
Phone: 31-30-635-8001

Amphenol Dae Shin Limited  
#182-1 Dodan-Dong, Wonmi-ku  
Bucheon-City, Kyungki-Do  
Korea  
Phone: 82-32-680-3800

Amphenol do Brasil LTDA  
Morumbi Tower  
Avenida Roque Petroni Junior 999  
13th Floor CEP 04707-910  
Sao Paulo, Brazil  
Phone: 55-11-5185-2881

Amphenol East Asia Limited  
10/F Wah Luen Industrial Centre  
15-21 Wong Chuk Yeung Street  
Fotan, Hong Kong  
Phone: 852-2669-2663

Amphenol Espana  
Calle Cuba No. 6, 2-5  
28820 Coslada Madrid  
Spain  
Phone: 349-1-673-2235

Amphenol Gesellschaft mbH  
Johnstrasse 42  
2 Stoch, Top 3A  
Vienna, Austria  
Phone: 43-1-985-1511

Amphenol Interconnect  
Products Corporation  
20 Valley Street  
Endicott, NY 13760  
Phone: (607) 754-4444

Amphenol Italia, S.P.A.  
Galleria Gandhi, 2-27  
20017 - Mazzo di Rho (Milano)  
Italy  
Phone: (390-2) 939-04192  
Fax: (390-2) 935-03206  
Telex: 334623 AMPHIT I

Amphenol Japan, K.K.  
2-3-27, Kudan Minami  
Chiyoda-ku, Tokyo 102  
Japan  
Phone: 81-3-3263-5611

Amphenol Limited  
Thanet Way  
Whitstable, Kent  
England CT5 3JF  
Phone: 44-1227-773-200

Amphenol Ges mbH  
Tautenhayngasse 22  
A-1150 Wien (Vienna)  
Austria  
Phone: (43-1) 985-15-11  
Fax: (43-1) 982-61-01  
Telex: (847) 132661 AMPHWA

Amphenol East Asia, Ltd.  
80 Genting Lane  
09-04 Genting Block  
Ruby Industrial Complex  
Singapore 1334  
Phone: (65) 7433022  
Fax: (65) 7432466  
Telex: RS 23499 AMPHNL

**Amphenol**  
Amphenol Canada Corp.

20 Melford Drive, Scarborough, Ontario, Canada M1B 2X6  
Telephone (416) 291-4401 Fax (416) 292-0647

Notice: Specifications are subject to change without notice. Contact your nearest Amphenol sales office for the latest specifications. All statements, information and data given herein are believed to be accurate and reliable but are presented without guaranty, warranty, or responsibility of any kind, express or implied. Statements or suggestions concerning possible use of our products are made without representation or warranty that any such use is free of patent infringement, and are not recommended to infringe any patent. The user should not assume that all safety measures are indicated or that other measures may not be required. Amphenol is a registered trademark.