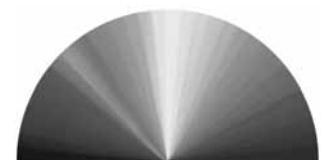


EMI Filtered Connectors



ISO 9001
CERTIFIED



SPECTRUM CONTROL INC.
A Control Products and Systems Company
Signal and Power Integrity Group

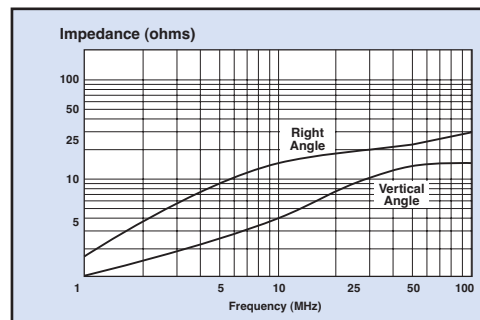
Filtered Connector Product Positioning Guide

Series F Ferrite Filtered Connectors

- Filtering of high frequency interference
- Short, space saving .318" footprint
- Replaces individual ferrite leads, saving cost and space
- Effective in meeting FCC, VDE, EN55022 and Japan's VCCI requirements

The Series F ferrite filtered connector is designed as a low cost EMI solution for high frequency interference. The space saving .318" footprint makes this product interchangeable with standard D-subminiature connectors.

Series F Connectors 132-136

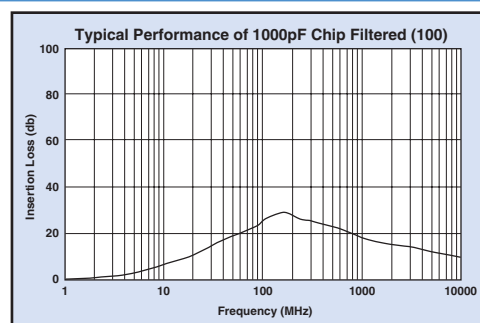


Series 100 Chip-Cap Filtered Connectors

- Lowest cost capacitive filtered connectors
- Available in 9, 15, 25 and 37 shell sizes
- 0.318", 0.405" and 0.590" footprints available
- Selective line filtering is available

The Series 100 connectors provide an excellent combination of low cost and good performance. Styles are available as "drop-in" replacements for unfiltered connectors and as adapters for non-standard applications.

Series 100 Connectors 137-140

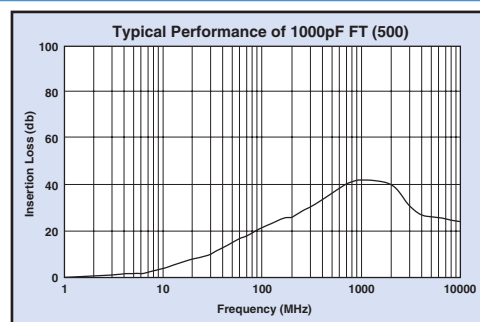


Series 500 Low Profile Feed-thru Connectors

- Low Cost, High Performance connectors
- Available in 9, 15 and 25 shell sizes
- Compact design with a 0.318" footprint
- Solid ground plane design provides EMI shielding

The Series 500 filtered D-subminiature connectors feature a compact design for 90° PCB connectors and straight PCB connectors utilizing tubular capacitors. These filtered D-Subs are "drop-in" replacements for standard unfiltered connectors.

Series 500 Connectors 141-144

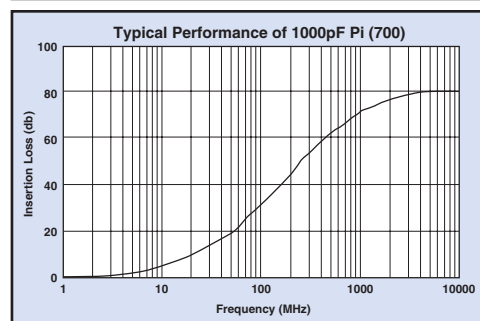
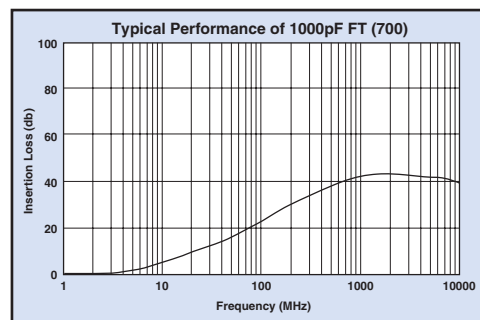


Series 700 High Performance Filtered Connectors

- Available in 9, 15, 25, 37 and 50 shell sizes
- One piece die cast housing design
- Available in both feed-thru capacitive and PI configurations
- Selective line filtering is available
- Tubular capacitor filtering provides effective performance through 10 GHz

These connectors are a highly effective method of filtering at the I/O interface. The ability to selectively filter lines allows signals of various rates to pass without degrading signal integrity. Series 700 connectors feature a .590" footprint on right angle connectors. Styles are available with pin or socket contacts or as pin/socket adapters.

*Series 700 Connectors
Filter Selection
and Specifications 149-150
Shell Size 9 Connectors 151-154
Shell Size 15 Connectors 155-158
Shell Size 25 Connectors 159-162
Shell Size 37 Connectors 163-166
Shell Size 50 Connectors 167-170*



Filtered Connector Selection Guide

Other Key

Pages	Pages
Part Numbers & Options	171-172
Adapter Test Kit	197
Waved Metal Gaskets	198
Hooded Strain Reliefs	199
Custom Engineered Solutions	200
Performance Testing	201
Board & Panel Cutouts	202-203

Series 600 Hi-Density Filtered Connectors

- Available in 15, 26, 44, 62 and 78 shell sizes
 - Compact design using one piece die cast housing
 - Available in feed-thru capacitive configurations
 - Selective line filtering is available
- This line of connectors incorporates the high performance and reliable filtering of Spectrum's standard D-sub's in a Hi-Density format. These connectors are also available in a pin/socket adapter.

Series 600	
Hi-Density Connector	145-146
Series 600 Hi-Density Telecommunications Adapter	147-148

Filtered Combo D-Subminiature Connectors

- Excellent filtering of signal, power and coaxial contacts with high performing feed-thru capacitors
 - Ground plane design provides superior EMI shielding
 - Available in a wide variety of mixed versions
- Spectrum's line of filtered combo D-sub's provide high insertion loss with tubular or chip capacitive filtering. These connectors are available with 20 Amp power contacts, 40 Amp power contacts, 50 ohm coaxial contacts or 75 ohm coaxial contacts. High strength epoxy potting protects ceramic elements.

Filtered Combo D-Subminiature Connectors	173-180
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Series E (ESD/EFT) Transient Protected Connectors

- Fail safe design guards equipment in case of severe surge
 - Connects directly between the serial or parallel port of your hardware and cable
 - Available in 9, 15, 25, and 37 line protection
- Surge suppressors provide protection against data loss and damage due to transient over-voltages from a variety of sources including lighting, factory equipment, motors and AC power lines. Protects printers, personal computers, LANS, WANS, RS-232 and RS-422/485 equipment.

Series E Connectors	181-184
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Datacom Connectors

- Modular jack connectors available filtered with ferrite or capacitive film
 - Modular jack connectors available in single or multiport styles
 - Filtered USB connectors available in a variety of configurations
 - Miniature ribbon connectors and adapters available in 50 line configurations
- Filtered datacom connectors are available for a wide variety of applications including original telephone manufacturing, operating telephone companies, cable reclamation, cable manufacturing and bay connectorization, LANs, WANs, network cards, broadband transmissions, workstations, peripherals, fax/modems, copy machines and multiplexing.

Filtered Miniature Ribbon Connectors and Adapters	185-188
Filtered Modular Jack Connectors	189-191
Filtered Mini-DIN Connectors	192
Filtered USB Connectors	193-196

Custom Filtered Connectors

- Available in C, Pi, LC and T configurations
 - Able to filter most connector interface types including circular, rack and panel, ARINC, etc.
 - Value added options such as wire harnessing, flex circuits and hermeticity are available
 - Selective line filtering available
 - Use either tubular capacitors or planar arrays
- This series of filtered connectors includes custom products ranging from MIL-C-38999, ARINC military connectors to filtered industrial connectors. These connectors are available with capacitor values up to 500,000 pF per line making it ideal for most applications. Common markets for custom filtered connectors are military, industrial and medical equipment.

Compact Shell Filtered Connectors	205
MIL-C-38999	206-211
Extended Shell Filtered Connectors	212
MIL-C-38999	213-221
MIL-C-83723	222-225
MIL-C-26482	226-229
Custom Filtered Connectors	230-231
Quality Acceptance Test Specifications	232

Advantages of Spectrum Filtered Connectors

Spectrum offers the industry's most complete line of filtered D-subminiature connectors.

Features

- All shell sizes (9, 15, 25, 37 and 50)
- Many termination types (PC mount, wire wrap, solder cup and 90° PCB)
- In house ceramic tube design for high performance filtering
- Filtering options:
 - Pi Filter Configuration (*Provides 45-60 dB per decade slope to insertion loss curve*)
 - Capacitive only C Filters (*Provides cost-effective EMI attenuation*)
 - Ferrite Filtered Series F Connectors (*Provides filtering in situations that do not tolerate capacitive loading of circuit*)
 - Series 500 Connectors (*Short .318" PCB footprint*)
 - Chip-Cap Series 100 Connectors (*Short .318" PCB footprint*)
- Construction (Series 600 & 700)
 - One piece zinc diecast shell, nickel plated
 - Complete 360° grounding with ground plate
 - Patented coaxial springs ensure ground continuity

Factors to be considered when evaluating EMI filtering through filtered connector or on-board filter:

- EMI effectiveness
- Cost of components
- Hidden costs of extra components
- Design of board
- Reliability

Advantages of a Filtered Connector

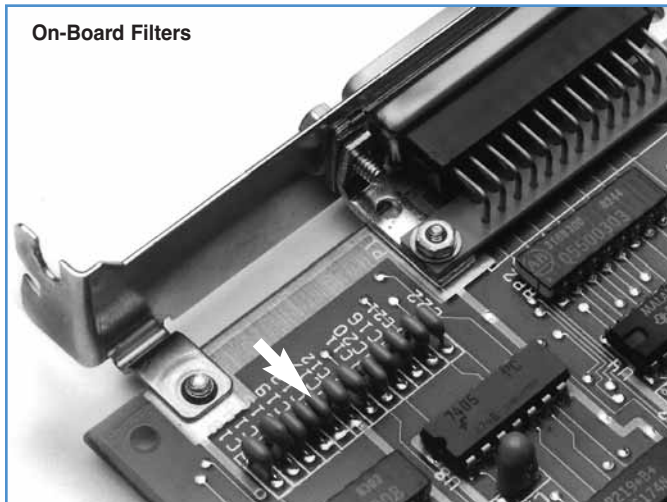
- **Low ground impedance** – Full ground plate and metallic shell provide minimal impedance and superior performance compared to on-board filter with high impedance
- **Eliminate re-radiation** – Filtered connector at interface leaves no path for bypassing the filter
- **Ground plane shielding** – Spectrum Control filtered connector ground planes shield the box even at the connector port
- **Efficient space utilization** – Filters located in connector provides additional space on PCB board
- **Consistent performance** – Filtered connectors provide more consistent pin to pin performance
- **Fewer components** – Filtered connectors reduce component count creating cost savings
- **Reliability** – Spectrum Control tests 100% of filters, on-board filters are usually spot tested



D-Subminiature Connectors



On-Board Filters



Series F Ferrite Filtered Connectors

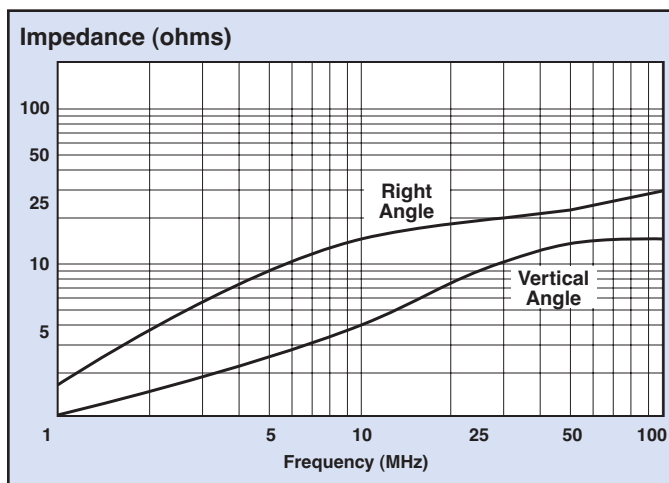
The Series F filtered D-subminiature connectors incorporate a solid slab of ferrite material as the filtering element. This rugged one piece design provides a compact connector that is a drop-in replacement for standard connectors. The ferrite material has been chosen for optimum filtering performance in the 10 to 300 MHz. range.

Series F Applications

- Personal computers, microcomputer-applied products and peripheral/terminal equipment
- Eliminates common-mode noise along data lines in data communication terminals and digital equipment

Features

- Low cost, high performance ferrite filter
- No distortion of wave forms
- Replaces individual ferrite bead filters, saving cost and space
- Provides both pin to ground and pin to pin filtering
- Effective in helping meet requirements of FCC, VDE, EN55022 and Japan's VCCI
- Short, space saving .318" footprint
- Interchangeable with standard D-subminiature connectors
- Can be installed directly over PCB trace pattern with no shorting
- 4-40 UNC locking insert eliminates loose hardware
- Metal shielding front shell
- Gold plated contacts
- RoHS compliant versions available (replace 56- with 56F)



Mechanical Specifications

Front Shell Steel (Tin Plated)
Housing UL 94V-0 Rated thermoplastic, black
Contacts Phosphor Bronze (sockets)
or Brass (pins)
Contact
Plating Gold Flash (<10µ in.) over Nickel
Operating
Temperature -40°C to +105°C

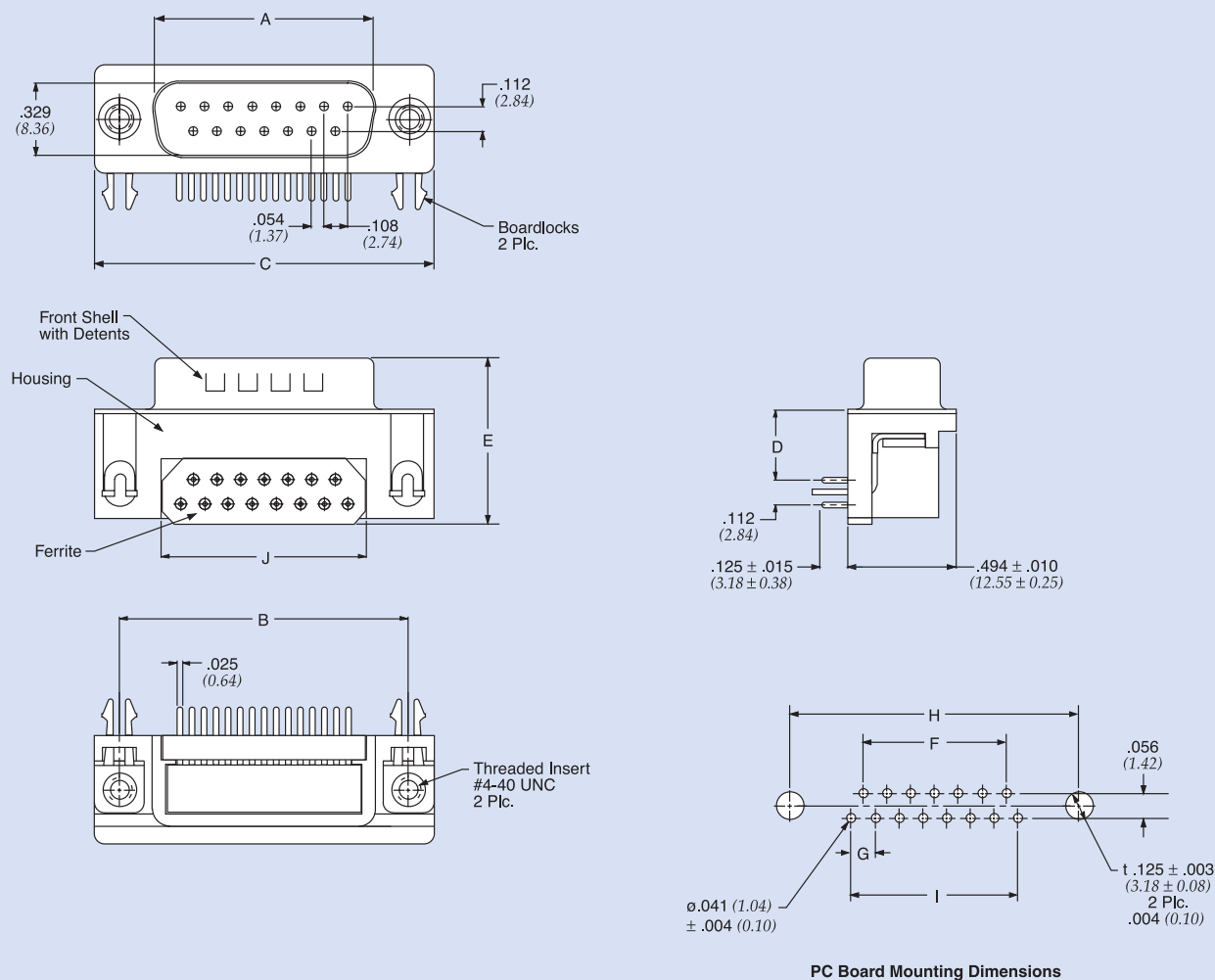
Electrical Specifications

Frequency (MHz)	Impedance (Ohms)	
	Right Angle	Vertical
1	2	1
10	15	6
30	20	10
50	23	12
100	27	15

Frequency
Range 10 – 300 MHz
Current
Rating 5 Amps
Dielectric
Withstand Voltage . . 1000 VAC for one minute
Insulation
Resistance 1000 megohms Min. @ 500VDC

Series F Ferrite Filtered Connectors

Pin Contact – Right Angle Mount



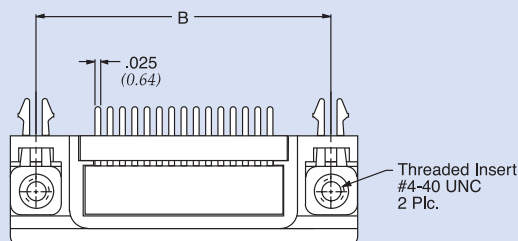
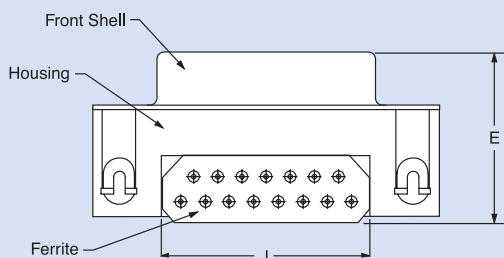
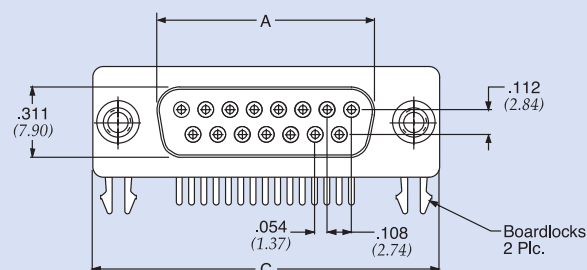
Part Number	Description	Typ. Impedance (Ohms)		Frequency Range	A +/- 0.010 (0.25)	B +/- 0.005 (0.13)	C +/- 0.015 (0.38)	D +/- 0.010 (0.25)	E +/- 0.015 (0.38)	F +/- 0.005 (0.13)	G +/- 0.004 (0.10)	H +/- 0.005 (0.13)	I +/- 0.005 (0.13)	J +/- 0.005 (0.13)
		30 MHz	100 MHz											
€ 56-402-001	D-Sub 9 pin	20	27	10 MHz to 300 MHz	0.666 (16.92)	0.984 (25.00)	1.213 (30.81)	0.318 (8.08)	0.751 (19.10)	0.324 (8.22)	0.108 (2.74)	0.984 (25.00)	0.432 (10.98)	0.606 (15.40)
€ 56-412-001	D-Sub 15 pin				0.994 (25.25)	1.312 (33.32)	1.541 (39.14)	0.318 (8.08)	0.751 (19.10)	0.648 (16.46)	0.108 (2.74)	1.312 (33.32)	0.756 (19.20)	0.929 (23.60)
€ 56-422-001	D-Sub 25 pin				1.534 (38.96)	1.852 (47.04)	2.088 (53.04)	0.318 (8.08)	0.751 (19.10)	1.196 (30.36)	0.110 (2.76)	1.852 (47.04)	1.304 (31.12)	1.476 (37.50)

€ Also available through Spectrum Control's authorized European distributors/agents.

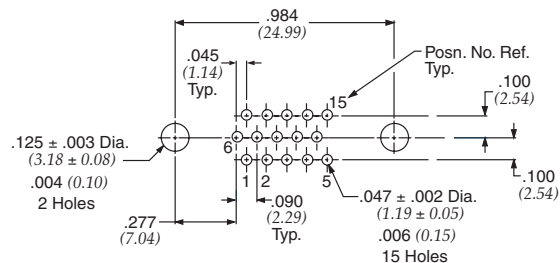
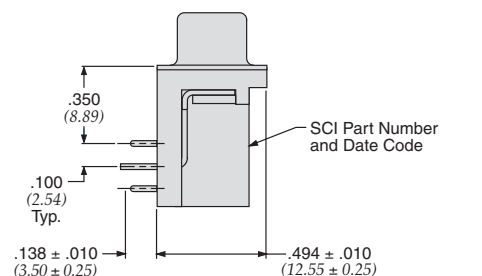
Dimensions in inches (mm)

Series F Ferrite Filtered Connectors

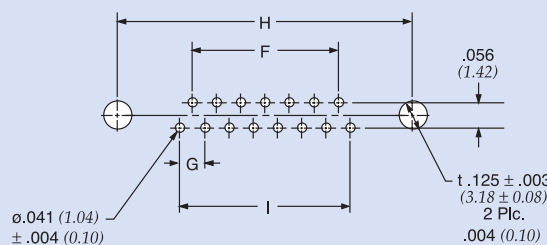
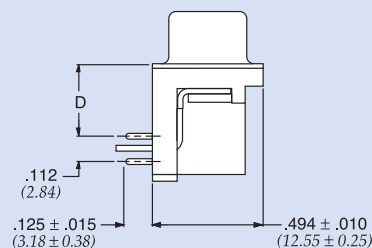
Socket Contact – Right Angle Mount



*Hi-Density



PC Board Mounting Dimensions



PC Board Mounting Dimensions

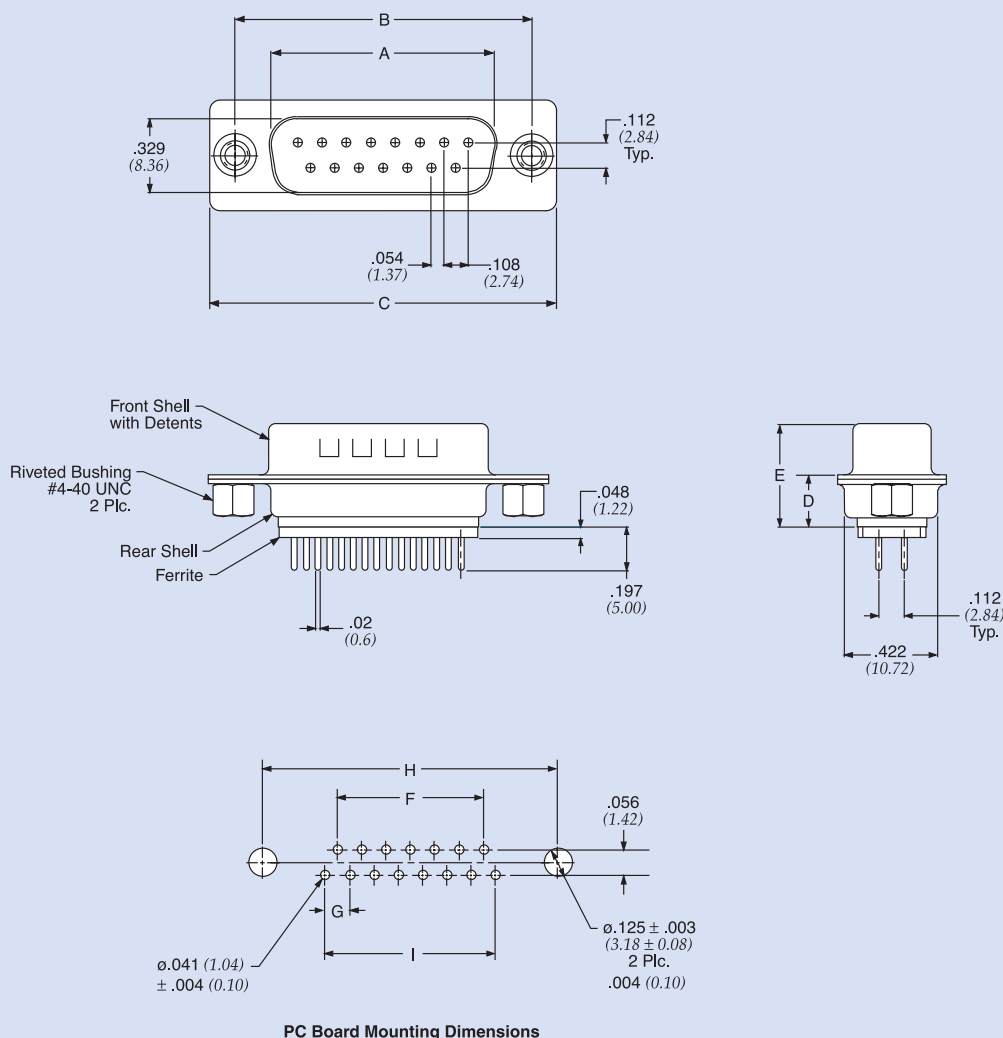
Part Number	Description	Typ. Impedance (Ohms)		Frequency Range	A +/-	B +/-	C +/-	D +/-	E +/-	F +/-	G +/-	H +/-	I +/-	J +/-
		30 MHz	100 MHz		0.010 (0.25)	0.005 (0.13)	0.015 (0.38)	0.010 (0.25)	0.015 (0.38)	0.005 (0.13)	0.004 (0.10)	0.005 (0.13)	0.005 (0.13)	0.005 (0.13)
€ 56-404-001	D-Sub 9 socket	20	27	10 MHz to 300 MHz	0.643 (16.33)	0.984 (25.00)	1.213 (30.81)	0.318 (8.08)	0.755 (19.20)	0.324 (8.22)	0.108 (2.74)	0.984 (25.00)	0.432 (10.98)	0.606 (15.40)
€ 56-414-001	D-Sub 15 socket				0.971 (24.66)	1.312 (33.32)	1.541 (39.14)	0.318 (8.08)	0.755 (19.20)	0.648 (16.46)	0.108 (2.74)	1.312 (33.32)	0.756 (19.20)	0.929 (23.60)
€ 56-424-001	D-Sub 25 socket				1.511 (38.38)	1.852 (47.04)	2.088 (53.04)	0.318 (8.08)	0.755 (19.20)	1.196 (30.36)	0.110 (2.76)	1.852 (47.04)	1.304 (31.12)	1.476 (37.50)
€ 56-414-001-HD	Hi-Density 15 socket	16	26		0.643 (16.33)	0.984 (25.00)	1.213 (30.81)	* See inset drawing						

€ Also available through Spectrum Control's authorized European distributors/agents.

Dimensions in inches (mm)

Series F Ferrite Filtered Connectors

Pin Contact – Vertical Mount

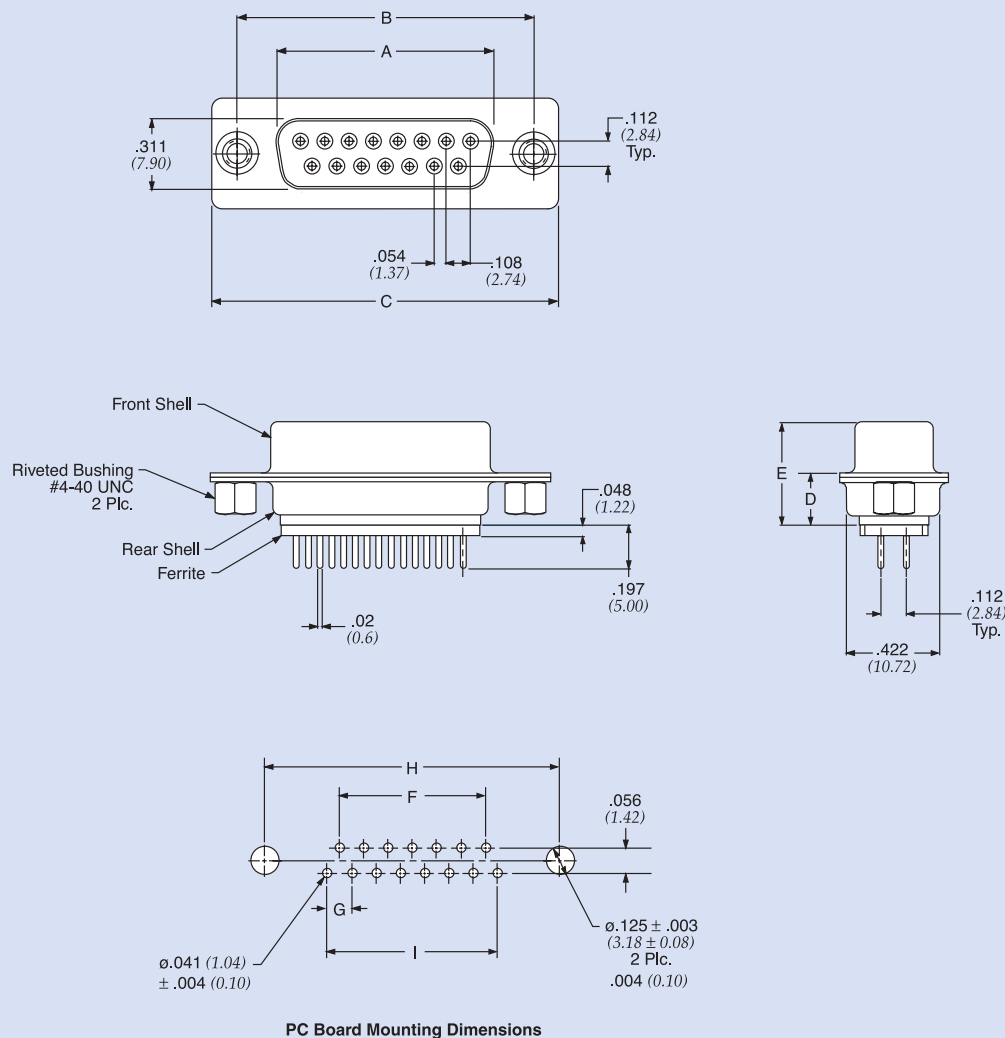


Part Number	Description	Typ. Impedance (Ohms)		Frequency Range	A +/-	B +/-	C +/-	D +/-	E +/-	F +/-	G +/-	H +/-	I +/-
		30 MHz	100 MHz		0.010 (0.25)	0.005 (0.13)	0.015 (0.38)	0.010 (0.25)	0.015 (0.38)	0.005 (0.13)	0.004 (0.10)	0.005 (0.13)	0.005 (0.13)
56-407-001	D-Sub 9 pin	10	15	10 MHz to 300 MHz	0.666 (16.92)	0.984 (25.00)	1.213 (30.81)	0.236 (5.99)	0.468 (11.88)	0.324 (8.22)	0.108 (2.74)	0.984 (25.00)	0.432 (10.98)
56-417-001	D-Sub 15 pin				.994 (25.25)	1.312 (33.32)	1.541 (39.14)	0.236 (5.99)	0.468 (11.88)	0.648 (16.46)	0.108 (2.74)	1.312 (33.32)	0.756 (19.20)
56-427-001	D-Sub 25 pin				1.534 (38.96)	1.852 (47.04)	2.088 (53.04)	0.236 (5.99)	0.468 (11.88)	1.196 (30.36)	0.110 (2.76)	1.852 (47.04)	1.304 (31.12)

Dimensions in inches (mm)

Series F Ferrite Filtered Connectors

Socket Contact – Vertical Mount



Part Number	Description	Typ. Impedance (Ohms)		Frequency Range	A +/-	B +/-	C +/-	D +/-	E +/-	F +/-	G +/-	H +/-	I +/-
		30 MHz	100 MHz		0.010 (0.25)	0.005 (0.13)	0.015 (0.38)	0.010 (0.25)	0.015 (0.38)	0.005 (0.13)	0.004 (0.10)	0.005 (0.13)	0.005 (0.13)
56-403-001	D-Sub 9 socket	10	15	10 MHz to 300 MHz	0.643 (16.33)	0.984 (25.00)	1.213 (30.81)	0.236 (5.99)	0.472 (11.98)	0.324 (8.22)	0.108 (2.74)	0.984 (25.00)	0.432 (10.98)
56-413-001	D-Sub 15 socket				.971 (24.66)	1.312 (33.32)	1.541 (39.14)	0.236 (5.99)	0.472 (11.98)	0.648 (16.46)	0.108 (2.74)	1.312 (33.32)	0.756 (19.20)
56-423-001	D-Sub 25 socket				1.511 (38.38)	1.852 (47.04)	2.088 (53.04)	0.236 (5.99)	0.472 (11.98)	1.196 (30.36)	0.110 (2.76)	1.852 (47.04)	1.304 (31.12)

Dimensions in inches (mm)

Series 100 Chip-Cap Filtered Connectors

These versatile and widely used PCB connectors are an inexpensive filtering method that eliminates the problem of conducted electromagnetic interference (EMI).

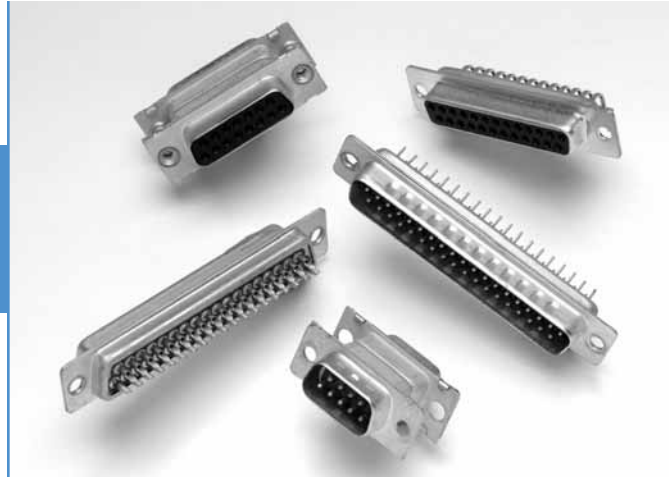
Chip-cap plug and receptacles are available in 9, 15, 25 and 37 positions. These connectors are "drop-in" replacements for non-filtered D-subminiature connectors with matched PCB footprints. Housings are made of UL 94V-0 rated thermoplastic material. Low cost front metal shells are compatible with full metal-shell threaded insert mating hardware. Integral boardlocks secure posted connectors to the PC board, prior to soldering.

Features

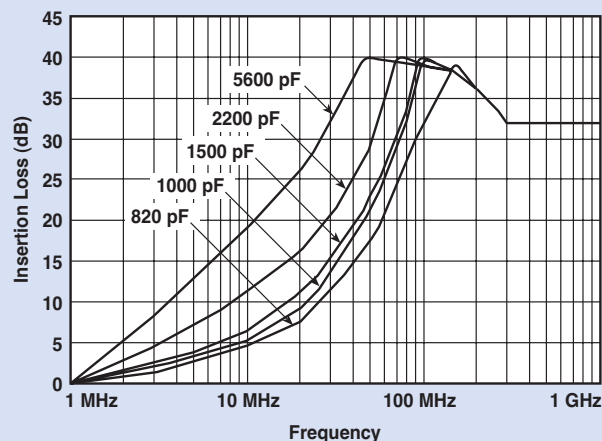
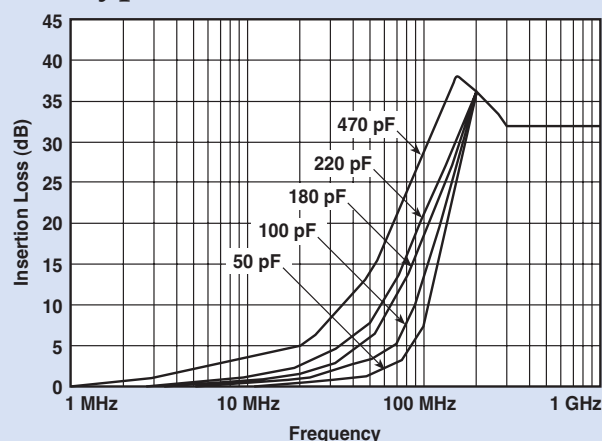
- Offer economical, high performance EMI/RFI protection
- Matched .318", .405" and .590" PCB footprints mean "Drop-in" replacement for non-filtered connectors
- Low cost chip capacitors
- Connectors have industry standard interface
- Connector insulators made of UL 94V-0 rated high temperature, thermoplastic
- Connector body is recognized under the Component Program of Underwriters Laboratories, Inc. (E149046)
- Connector body is certified by the Canadian Standards Association

Mechanical Specifications

<i>Shells</i>	Steel, tin plated
<i>Insulators</i>	94V-0 rated thermoplastic, black
<i>Eyelets</i>	Brass, tin plated
<i>Threaded Inserts</i>	Zinc
<i>Boardlocks</i>	Copper alloy, tin plated
<i>Pin Contacts</i>	Brass
<i>Socket Contacts</i>	Phosphor Bronze
<i>Contact Plating</i>	Duplex plated as follows: 15uin (.38um) gold on mating end, with entire contact 50uin (1.27um) min. nickel underplated and flash gold finish



Typical Insertion Loss



Performance Specifications

<i>Current Rating</i>	5 Amps
<i>Contact Resistance</i>	8 Milliohms max.
<i>Capacitance</i>	50, 100, 180, 220, 470, 820 1,000, 1,500, 2,200, 5,600 pF and 47 nF $\pm$ 20% (custom valves and selective loading available)
<i>Dielectric Withstanding Voltage</i>	700 VDC min. for 5 sec.
<i>Insulator Resistance</i>	500 Megohms min. @ 100 VDC
<i>Working Voltage</i>	200 VDC (100 VDC for 47 nF)
<i>Operating Temperature</i>	-55°C/+85°C

Series 100 Chip-Cap Filtered Connectors

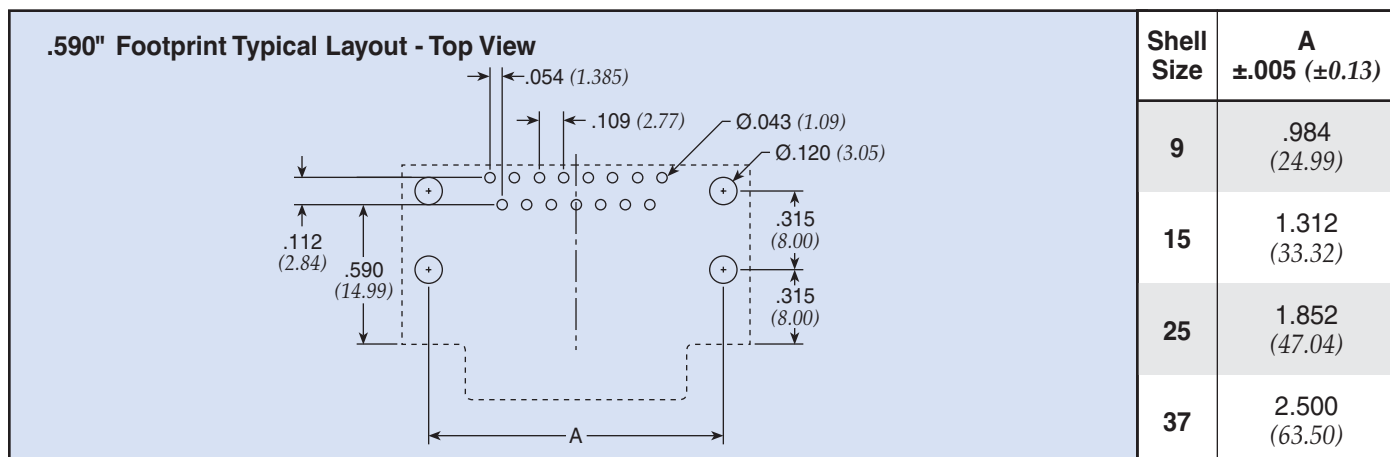
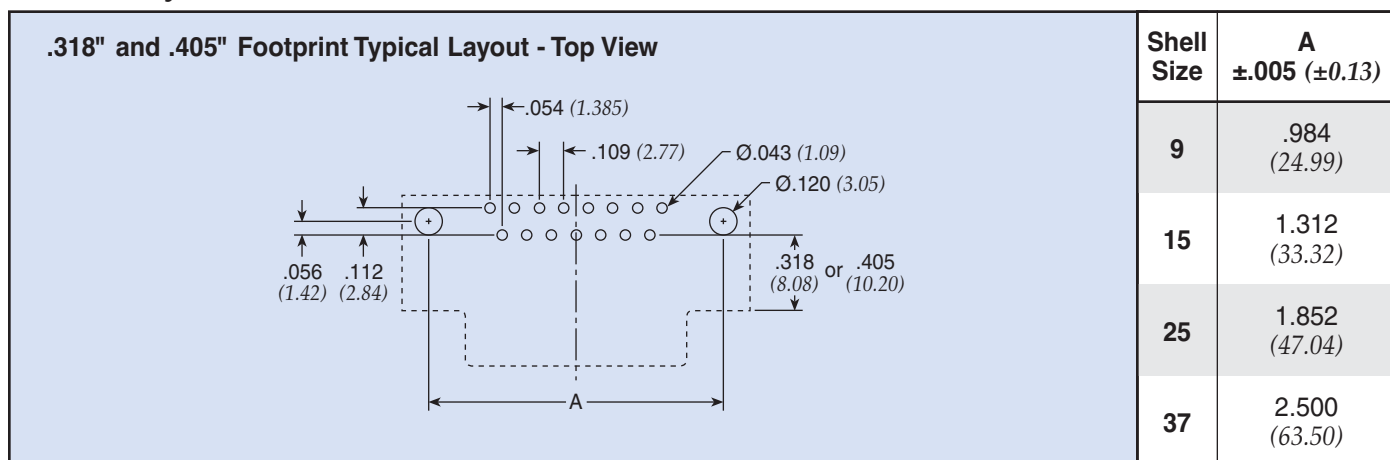
Ordering Information

Example: **56-104-004-5-T**

This part number represents a Series 100 connector with a shell size of 9 and a socket to right angle configuration. The capacitance value is 470 pF and the connector has a .590" footprint with 4-40 threads.

56	1	0	4	-	004	-	5	-	T
Filtered D-sub Connectors	Series 100 Connectors		Shell Size/ Number of Contacts	Contact Type/Termination	Capacitance Value	Footprint (right angle connectors only)	Mounting or Hardware Options		
			0 - 9 size 1 - 15 size 2 - 25 size 3 - 37 size	1 - Pin to solder cup 2 - Pin to right angle 3 - Socket to straight PCB 4 - Socket to right angle 5 - Adapter (pin to socket) 6 - Socket to solder cup 7 - Pin to straight PCB	002 - 100 pF 003 - 220 pF 004 - 470 pF 005 - 820 pF 006 - 1500 pF 007 - 5600 pF 008 - 50 pF 009 - 180 pF 010 - 1000 pF 011 - 2200 pF 012 - 47 nF	3 - .318" 4 - .405" 5 - .590"	SC and Straight PCBs TIB - 4-40 thread on rear of flange TIF - 4-40 thread on front of flange MIB - M3 thread on rear of flange GBL6 - For .062" boards JS - Jack screws Right Angles and Adapters - No GBL attached GL - Includes grounding board lock and 4-40 threads T - 4-40 threads GB - No board locks (includes 4-40 threads) J - Jack screws M - M3 thread GJ - GL and jack screws		
- - Standard connector F - RoHS compliant version									

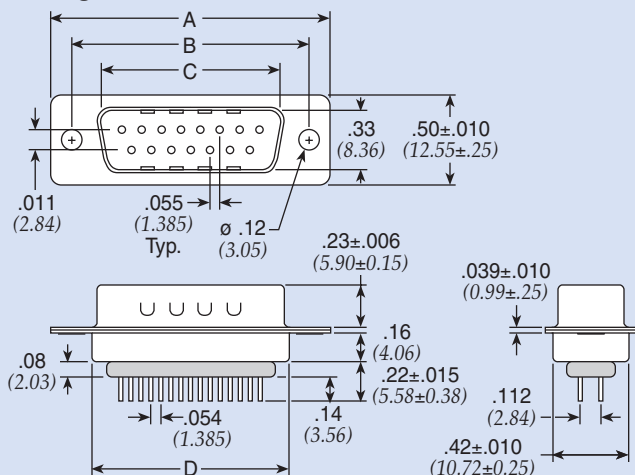
Board Layouts



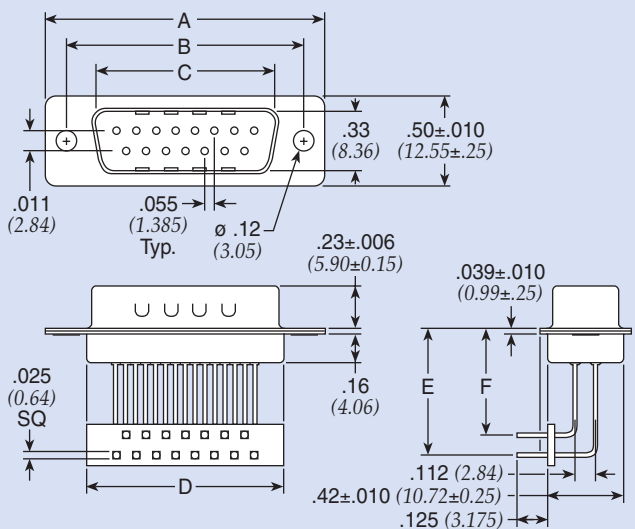
Dimensions in inches (mm)

Series 100 Chip-Cap Filtered Connectors

Pin Contact (plug) Straight PC Mount



90° PC Mount

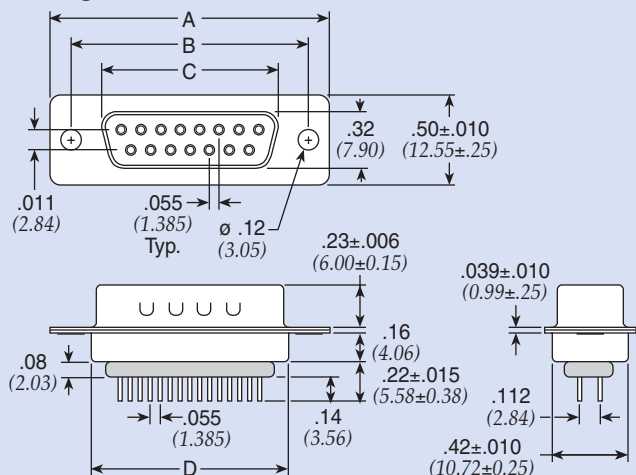


Size	A	B	C	D
9	1.213±.015 (30.81±0.38)	.984±.005 (24.99±0.13)	.667±.010 (16.92±0.25)	.755 (19.18)
15	1.541±.015 (39.14±0.38)	1.312±.005 (33.32±0.13)	.994±.010 (25.25±0.25)	1.083 (27.51)
25	2.088±.015 (53.04±0.38)	1.852±.005 (47.04±0.13)	1.534±.010 (38.96±0.25)	1.614 (41.00)
37	2.73±.015 (69.32±0.38)	2.50±.005 (63.50±0.13)	2.18±.010 (55.42±0.25)	2.27 (57.71)

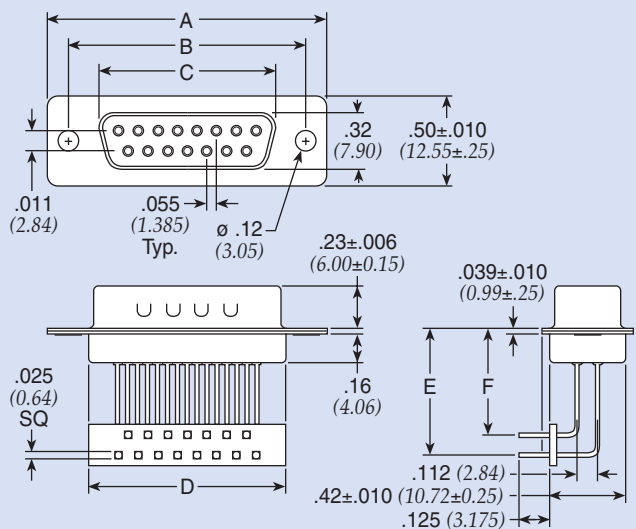
Footprint	E	F
.318	.430 (10.92)	.318 (8.08)
.405	.517 (13.13)	.405 (10.29)
.590	.700 (17.83)	.590 (14.99)

Dimensions in inches (mm)

Socket Contact (receptacle) Straight PC Mount



90° PC Mount



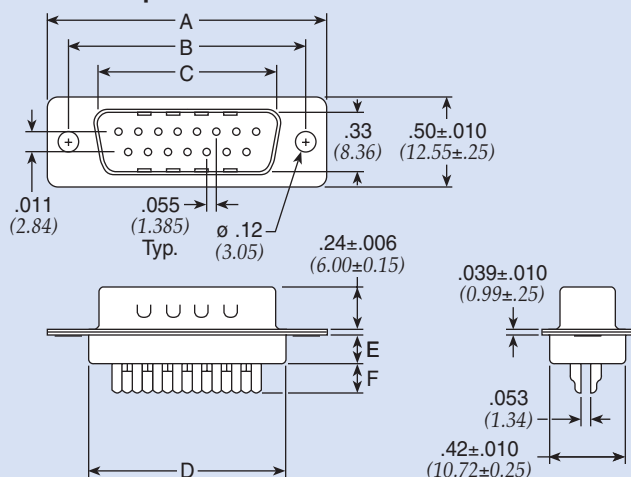
Size	A	B	C	D
9	1.213±.015 (30.81±0.38)	.984±.005 (24.99±0.13)	.643±.010 (16.33±0.25)	.755 (19.18)
15	1.541±.015 (39.14±0.38)	1.312±.005 (33.32±0.13)	.971±.010 (24.66±0.25)	1.083 (27.51)
25	2.088±.015 (53.04±0.38)	1.852±.005 (47.04±0.13)	1.511±.010 (38.38±0.25)	1.614 (41.00)
37	2.73±.015 (69.32±0.38)	2.50±.005 (63.50±0.13)	2.16±.010 (54.84±0.25)	2.27 (57.71)

Footprint	E	F
.318	.430 (10.92)	.318 (8.08)
.405	.517 (13.13)	.405 (10.29)
.590	.700 (17.83)	.590 (14.99)

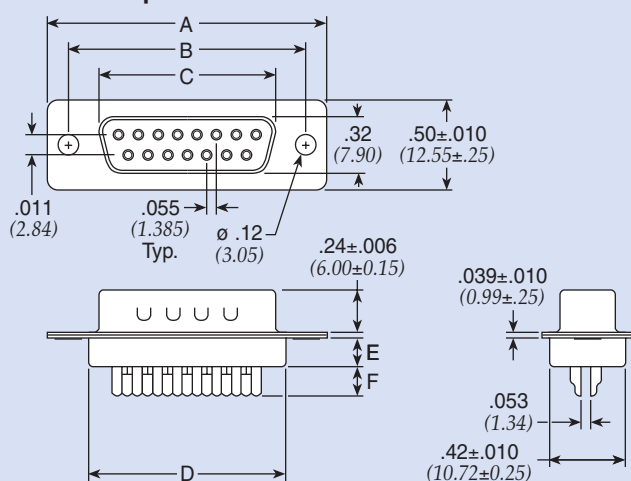
Dimensions in inches (mm)

Series 100 Chip-Cap Filtered Connectors

Pin Contact (plug) Solder Cup Termination



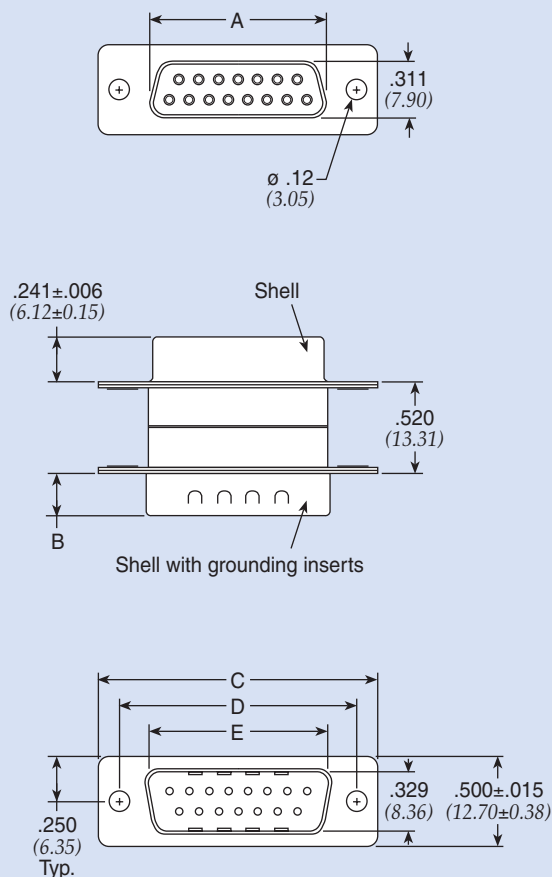
Socket Contact (receptacle) Solder Cup Termination



Size	A	B	C	D	E	F
9	1.213±.015 (30.81±0.38)	.984±.005 (24.99±0.13)	.643±.010 (16.33±0.25)	.755 (19.18)	.16 (4.06)	.16 (4.06)
15	1.541±.015 (39.14±0.38)	1.312±.005 (33.32±0.13)	.971±.010 (24.66±0.25)	1.083 (27.51)	.16 (4.06)	.16 (4.06)
25	2.089±.015 (53.04±0.38)	1.852±.005 (47.04±0.13)	1.511±.010 (38.38±0.25)	1.615 (41.00)	.16 (4.06)	.16 (4.06)
37	2.73±.015 (69.32±0.38)	2.50±.005 (63.50±0.13)	2.16±.010 (54.84±0.25)	2.27 (57.71)	.16 (4.06)	.16 (4.06)

Dimensions in inches (mm)

Pin - Socket Adapter



Size	A	B	C	D	E
9	.642 (16.31)	.233±.006 (5.92±.15)	1.213±.015 (30.81±.38)	.984 (24.99)	.667 (16.94)
15	.970 (24.64)	.233±.006 (5.92±.15)	1.541±.015 (39.14±.38)	1.312 (33.33)	.995 (25.27)
25	1.511 (38.38)	.228±.006 (5.80±.15)	2.088±.015 (53.04±.38)	1.852 (47.05)	1.532 (38.92)
37	2.158 (54.82)	.228±.006 (5.80±.15)	2.729±.015 (69.32±.38)	2.500 (63.50)	2.183 (55.45)

Dimensions in inches (mm)

Series 500 Low Profile Filtered Connectors

Spectrum Control's Series 500 are cost effective, highly reliable EMI filtered D-subminiature connectors that feature a .318" footprint for 90 degree PCB connectors and a low profile housing on straight PCB connectors. Series 500 filtered D-sub are "drop-in" replacements for standard unfiltered D-sub connectors.

The ability of these connectors to achieve EMI filtering within the smaller footprint is the result of technical advances in ceramic capacitors. Series 500 connectors use tubular capacitors for high performance EMI filtering. Quality features for these connectors include board lock mounting, metal front shells and gold plated contacts.

Series 500 capacitive filtered D-sub connectors are an ideal solution to FCC/EC/VCCI emissions problems. These connectors are designed to protect equipment from external EMI noise and eliminate system glitches.

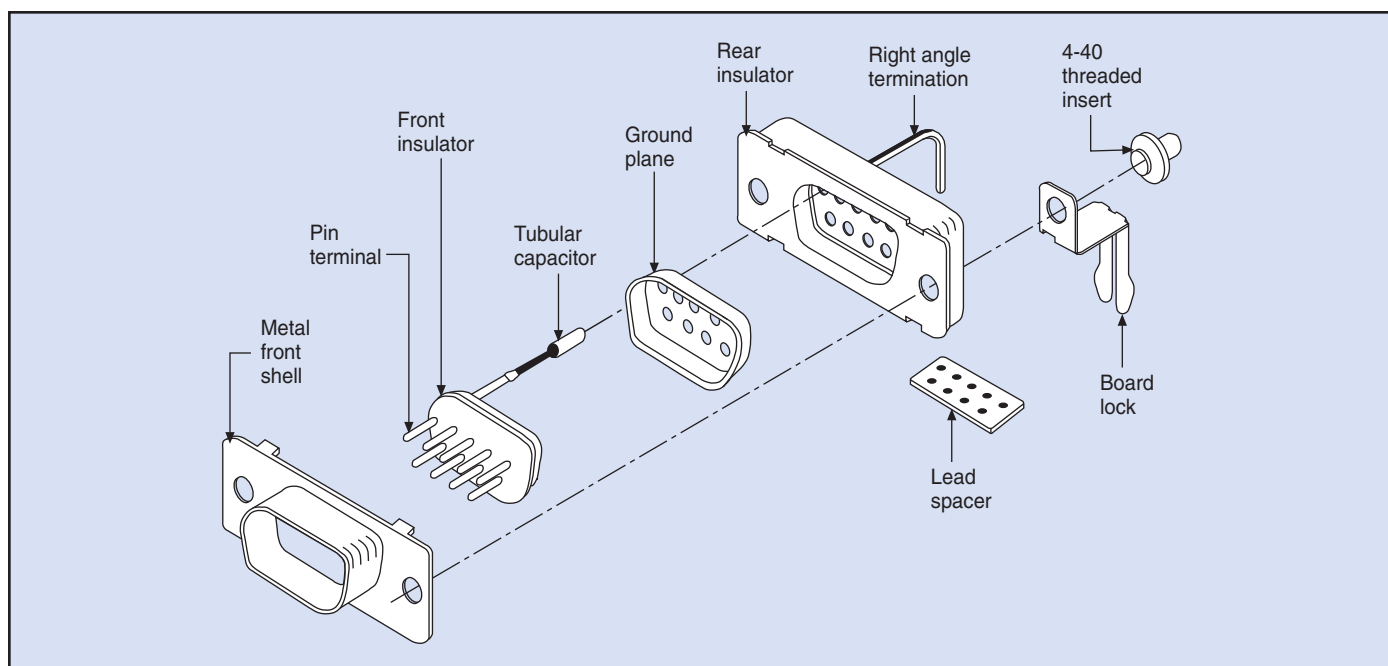
Series 500 Applications

- Personal computers
- Industrial process equipment
- Graphics workstations
- PBX telecommunications equipment
- Cellular base stations and medical electronics



Features

- "Drop-in" replacements for unfiltered D-subminiatures
- Compact design, featuring .318" footprint
- Tubular feed-thru capacitors provide filtering superior to on-board components
- Ground plane design provides EMI shielding
- Full interchangeability; based on MIL-C-24308
- Each connector position is tested 100% for critical electrical parameters to ensure consistent performance
- Insulators are UL recognized UL94-V0 flammability rated
- 9, 15 and 25 shell sizes
- Available with board lock feature and 4-40 mounting threads
- Selective filtering available
- UL/CSA approved
- Greater than 40 dB filtering up through 1 GHz without resonances
- Bi-Directional control of EMI at the I/O ports



Series 500 Low Profile Filtered Connectors

Mechanical Specifications

Shell Steel, tin plated

Insulators Glass-filled polyester, flammability UL94V-O

Pin Contacts Copper alloy CA725, 15 microinch (0.38 μm) gold plated* over nickel

Socket Contacts Copper alloy CA725, 30 microinch (0.76 μm) gold plated* over nickel

*Heavier gold plating available upon request.

Ground Plane Phosphor bronze, nickel plated

Operating Temperature -40°C to +125°C

Capacitors Proprietary barium titanate ceramic formulations

Other environmental tests such as shock, vibration, humidity, etc. are performed as detailed in our filtered connector performance specifications on page 203.

Electrical Specifications

Current Rating 5 Amps

RF Current Rating 0.3 Amps

Contact Resistance 10 milliohms maximum

Capacitance 120, 440, 840, 1000, 1500 pF $\pm 30\%$

Working Voltage 100 VDC

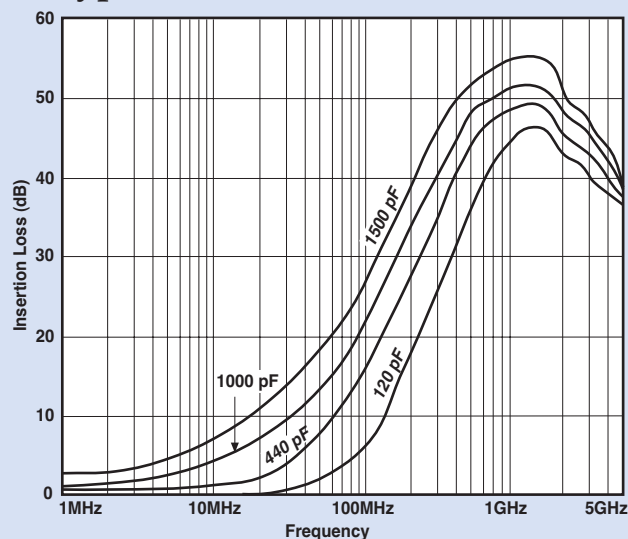
Dielectric Withstanding Voltage 300 VDC

Insulation Resistance 1 Gohm minimum

UL Recognized Under category of communication circuit accessories, File #E149046



Typical Insertion Loss



Above curves represent application of proper grounding fundamentals. For assistance consult Spectrum Control.

840 pF is typically within 2 dB of 1000 pF curve.

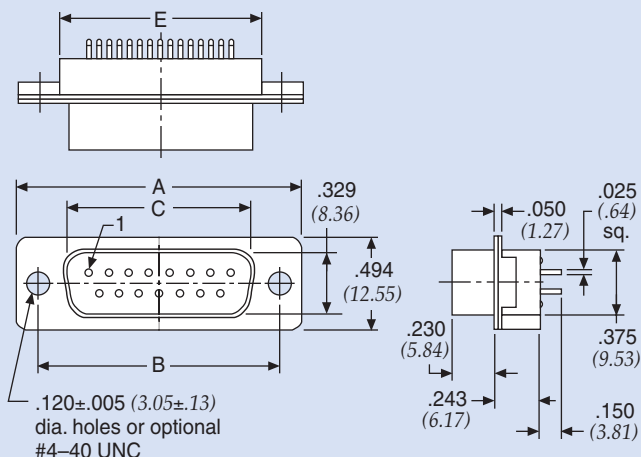
Filter Performance

Cap. (pF) Value $\pm 30\%$	3 dB Cut-off Freq. (MHz)	Insertion Loss (dB)					
		20 MHz	100 MHz	500 MHz	1 GHz	2 GHz	5 GHz
120	40	—	4	21	26	26	20
440	11	3	15	27	33	32	25
840	6	6	19	32	38	37	25
1000	3	8	21	35	41	38	25
1500	2	10	25	40	47	42	25

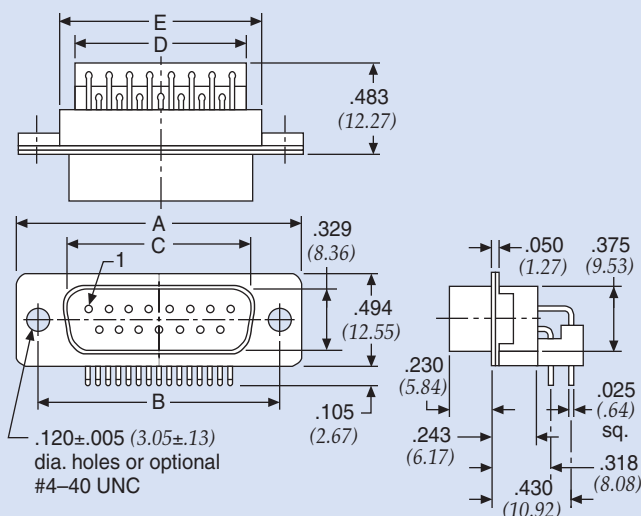
Insertion loss measured per MIL-STD-220, no load, 50 ohm source and load. Above data represents guaranteed minimum.

Series 500 Low Profile Filtered Connectors

Pin Contact (*plug*) Straight PC Mount



90° PC Mount

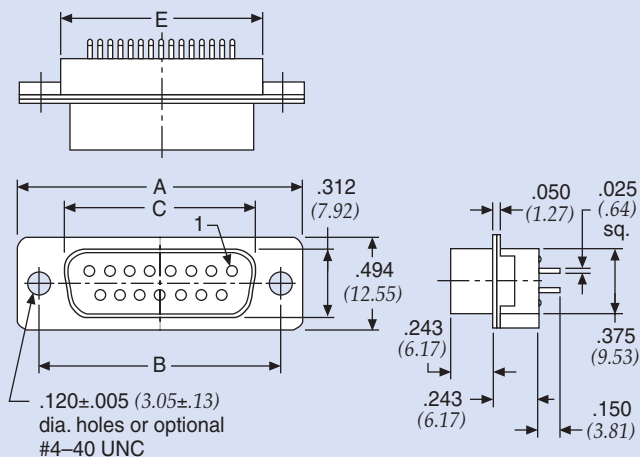


Size	A	B	C	D	E
9	1.213 (30.81)	0.984 (24.99)	0.666 (16.92)	0.540 (13.72)	0.748 (19.00)
15	1.541 (39.14)	1.312 (33.32)	0.994 (25.25)	0.867 (22.02)	1.076 (27.33)
25	2.088 (53.04)	1.852 (47.04)	1.534 (38.96)	1.412 (35.86)	1.616 (41.05)

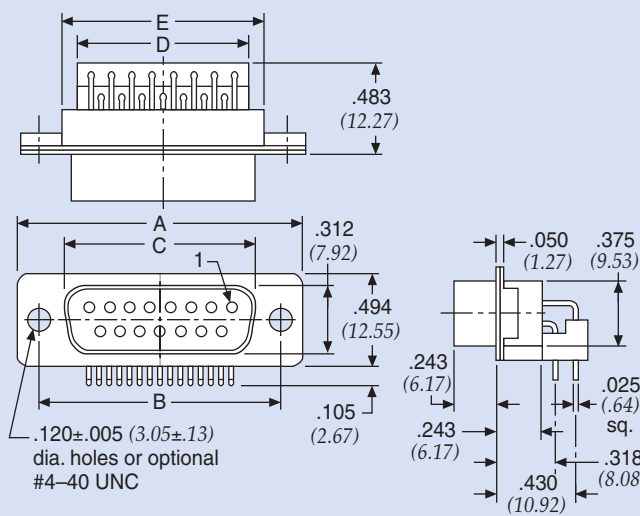
Standard Tolerance = ±.015 (0.38)

Dimensions in inches (mm)

Socket Contact (*receptacle*) Straight PC Mount



90° PC Mount



Size	A	B	C	D	E
9	1.213 (30.81)	0.984 (24.99)	0.642 (16.31)	0.540 (13.72)	0.748 (19.00)
15	1.541 (39.14)	1.312 (33.32)	0.970 (24.64)	0.867 (22.02)	1.076 (27.33)
25	2.088 (53.04)	1.852 (47.04)	1.510 (38.35)	1.412 (35.86)	1.616 (41.05)

Standard Tolerance = ±.015 (0.38)

Dimensions in inches (mm)

Series 500 Low Profile Filtered Connectors

Ordering Information

Example: **56-524-013-GBL**



56
Filtered D-sub Connectors

5
Series 500 Connectors

2
Shell Size/Number of Contacts

0 - 9 size
1 - 15 size
2 - 25 size

4
Contact Type/Termination

2 - Pin to 90° PCB mount
3 - Socket to straight PCB mount
4 - Socket to 90° PCB mount
7 - Pin to straight PCB mount

013
Capacitance Value

010 - 120 pF
011 - 440 pF
012 - 840 pF
013 - 1000 pF
014 - 1500 pF

GBL
Mounting or Hardware Options

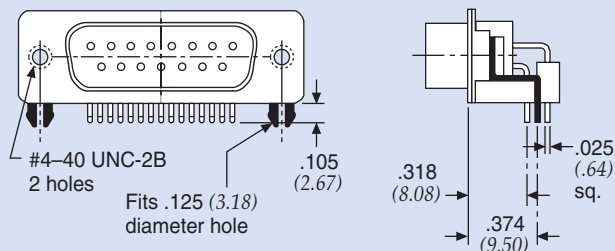
TI - 4-40 threads on mounting flange (.120" (3.05mm) hole if not selected)
GBL - Grounded board lock, includes 4-40 threads (available only on 90° PCB)
GBLF - Grounded board lock and ferrite slab, provides the enhanced performance of an (LC) filter (available only on 90° PCB)

- - Standard connector
F - RoHS compliant version

This part number represents a Series 500 filtered D-sub connector with 25 contacts, socket to 90° PCB mount configuration. The filter has a capacitance value of 1000 pF and the connector includes a grounded board lock.

For special needs or combinations of features, contact Spectrum Control engineering.

GBL Option



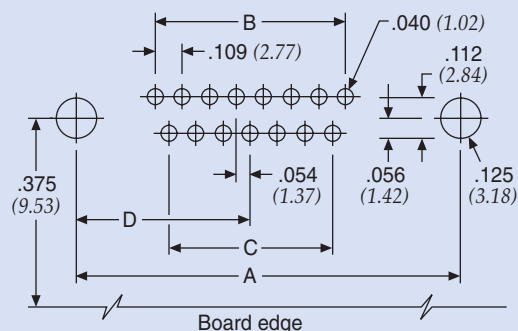
Features

- Snap-in retention to PC board, requires no hardware
- Ensures low ground impedance for superior filtering
- 4-40 threads on mounting flange eliminate loose hardware

Board Layout

Dimensions in inches (mm)

Typical Layout for .318" (8.08) Footprint



Shell Size	A	B	C	D
9	.984 (24.99)	.436 = 4 x .109 (11.07 = 4 x 2.77)	.327 = 3 x .109 (8.31 = 3 x 2.77)	.492 (12.50)
15	1.312 (33.32)	.763 = 7 x .109 (19.38 = 7 x 2.77)	.654 = 6 x .109 (16.61 = 6 x 2.77)	.656 (16.66)
25	1.852 (47.04)	1.308 = 12 x .109 (33.22 = 12 x 2.77)	1.199 = 11 x .109 (30.45 = 11 x 2.77)	.926 (23.52)

Dimensions in inches (mm)

Series 600 Hi-Density Filtered Connectors

The miniaturization of electronic systems and sub-systems is pushing designers to increase circuit densities within smaller packages. To address this growing need, Spectrum Control has developed a line of filtered Hi-Density D-subminiature connectors. This new line of connectors incorporates the high performance and reliable filtering of Spectrum's standard D-sub in the Hi-Density format.

Features

- Connectors designed to MIL-C-24308
- Capacitance values from 85 pF to 4000 pF
- Filter type feed-thru C
- Selectively specify and filter each contact position
- Available in feed-thru capacitive configurations

Mechanical Specifications:

Same as Series 700 connectors, page 150.

Electrical Specifications: Hi-Density Connectors

Filter Designations	Filter Circuits	Capacitance		3 dB Cut-off Frequency Max. (MHz)	Dielectric With-standing Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB)									
		Value	Tol.				5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz	2 GHz	5 GHz
15	C	85 pF	±25%	60	300V	100V	—	—	—	—	1	6	16	21	22	20
16		180 pF	±25%	28	300V	100V	—	—	—	1	8	10	18	25	26	24
18		1000 pF	±25%	5.1	300V	100V	—	3	8	14	20	25	32	35	41	39
19		4000 pF	±25%	1.3	300V	100V	8	13	19	26	31	37	45	48	52	47

Filter designation "G" for grounded contacts, "I" for insulated (not filtered) contacts. Filter designation "O" for omitted contact and no hole in ground plane.

Above data represents guaranteed minimum.

Ordering Information

Example: **56-605-015-LI**

56 - **6** **0** **5** - **0** **15** - **LI**

D-Sub Connector
Hi-Density

Shell Size**
0 = 15
1 = 26
2 = 44
3 = 62
4 = 78

Contact/Termination
1 - Pin to solder cup
2 - Pin to 90° PCB mount*
3 - Socket to PCB mount
4 - Socket to 90° PCB* mount
5 - Pin-socket adapter
7 - Pin to PCB mount

Special
0 = All positions same
9 = Special loading

Filter Designation
15 - 85 pF FT
16 - 180 pF FT
18 - 1,000 pF FT
19 - 4,000 pF FT
20 - Insulated contact

Options
LI = 4-40 inserts
S = Solder dip tails
50G = μ gold
GBL = Grounding board lock

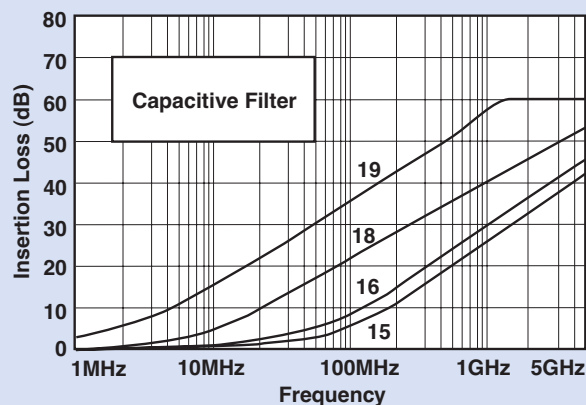
- Standard connector
F - RoHS compliant version

** Some shell sizes require minimum order quantity. Consult Spectrum Control for details.

Note: VGA adapters also available. Consult factory

This part number represents a Series 600 Hi-Density filtered D-Sub connector with 15 contacts, pin-socket adapter configuration. The FT filters have a capacitance value of 85 pF and the connector includes 4-40 locking inserts.

Typical Insertion Loss



Above curves represent application of proper grounding fundamentals, for assistance consult with Spectrum Control.

Insertion loss measured per MIL-STD-220, no load, 50 ohm source and load.

Electrical Specifications

Current Rating . . . 3 Amps

RF Current Rating . . 0.3 Amps

Contact Resistance . . 15 milliohms maximum

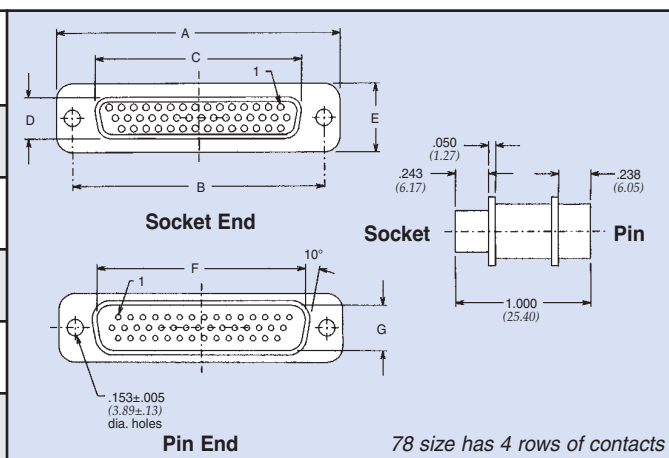
UL Recognized Under category of communication circuit accessories, File #E149046

Series 600 Hi-Density Filtered Connectors



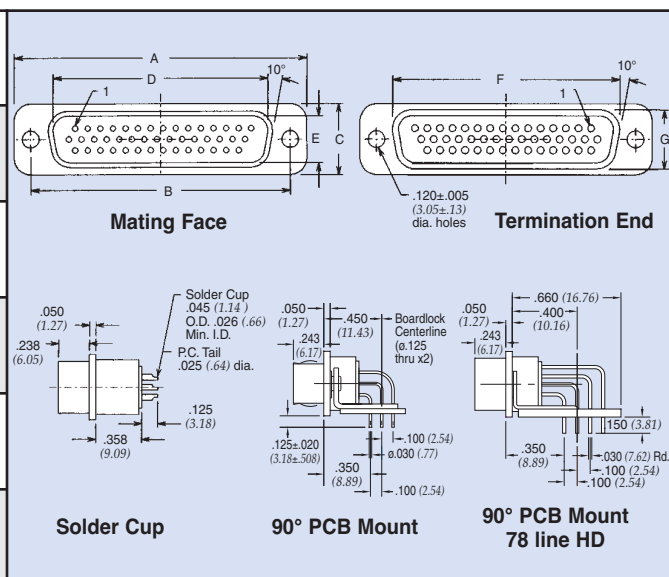
Pin/Socket Adapter

Size	A	B	C	D	E	F	G
15	1.213 (30.81)	.984 (24.99)	.640 (16.26)	.304 (7.72)	.505 (12.83)	.666 (16.92)	.333 (8.46)
26	1.541 (39.14)	1.312 (33.32)	.968 (24.59)	.304 (7.72)	.505 (12.83)	.994 (25.25)	.333 (8.46)
44	2.088 (53.04)	1.852 (47.04)	1.508 (38.30)	.304 (7.72)	.505 (12.83)	1.534 (38.96)	.333 (8.46)
62	2.729 (69.32)	2.500 (63.50)	2.156 (54.76)	.304 (7.72)	.505 (12.83)	2.182 (55.42)	.333 (8.46)
78	2.635 (66.93)	2.406 (61.11)	2.062 (52.37)	.416 (10.57)	.615 (15.62)	2.079 (52.81)	.420 (11.18)



Pin or Socket to Solder Cup, PCB Mount and 90° PCB Mount

Size	A	B	C	D	E	F	G
15	1.213 (30.81)	.984 (24.99)	.505 (12.83)	.666 (16.92)	.333 (8.46)	.757 (19.23)	.420 (10.67)
26	1.541 (39.14)	1.312 (33.32)	.505 (12.83)	.994 (25.25)	.333 (8.46)	1.085 (27.56)	.420 (10.67)
44	2.088 (53.04)	1.852 (47.04)	.505 (12.83)	1.534 (38.96)	.333 (8.46)	1.625 (41.28)	.420 (10.67)
62	2.729 (69.32)	2.500 (63.50)	.505 (12.83)	2.182 (55.42)	.333 (8.46)	2.273 (57.73)	.420 (10.67)
78	2.635 (66.93)	2.406 (61.11)	.615 (15.62)	2.079 (52.81)	.440 (11.18)	2.170 (55.12)	.527 (13.39)



Dimensions in inches (mm)

Hi-Density Filtered Adapter for Telecommunications

Within the telecommunications industry, it has been standard practice to use an adapter (male/female) type of EMI filtered connector as the interface between the switching system electronics and the premise wiring. These filtered adapters provide effective containment of EMI compared to either D-subminiature or 50-position "ribbon" contact type connectors.

The following several factors have mandated the development of a new generation of filtered adapters.

Special Requirements

- Higher density wiring
- The need for more contacts, usually a multiple of 16
- Higher reliability contact geometries
- Bellcore TR-NWT-001089 requirements
 - 1000 volts AC withstand for one minute
 - 2500 volts spike surge testing
- Improved flammable resistant plastic insulators

Spectrum Control, in response to these unique requirements of the telecommunication industry, has developed a new Hi-Density filtered adapter.

Features

- New ceramic technology and filter element construction to accept higher voltages
- Improved reliability compared to "ribbon" type connectors
- Integral ground plane and one-piece diecast housing for the highest level of EMI integrity
- More contacts/wires per square inch of panel space through Hi-Density arrangements
- 64 contact positions standard, with 78 positions available by request in any filter combination



Mechanical Specifications

<i>Shell</i>	Zinc diecast, nickel plated 150 μ inches (3.81 μ m) min.
<i>Insulators</i>	Thermoplastic, UL94V-0
<i>Contacts</i>	One-piece, screw machined Copper alloy, contact area plated 50 μ inches (1.27 μ m) gold over 50 μ inches (1.27 μ m) nickel
<i>Ground Plane</i>	Brass, solder plated
<i>Grounding Springs</i>	Beryllium copper, tin plated per MIL-T-10727
<i>Operating Temperature</i>	-55°C to +125°C
<i>Capacitor</i>	High performance ceramic feed-thru utilizing ultra low ESR design

Electrical Specifications

<i>Rated Voltage</i>	100 VDC
<i>Current Rating</i>	3 Amps
<i>DC Resistance</i>	15 milliohm max.
<i>Dielectric Withstanding Voltage</i>	1000 VRMS (FCC Part 68 test)
<i>Capacitance</i>	1000 pF, $\pm$ 25%
<i>Voltage Surge</i>	meets 2500 volts surge (10/1000) (See Wave form figure on next page)

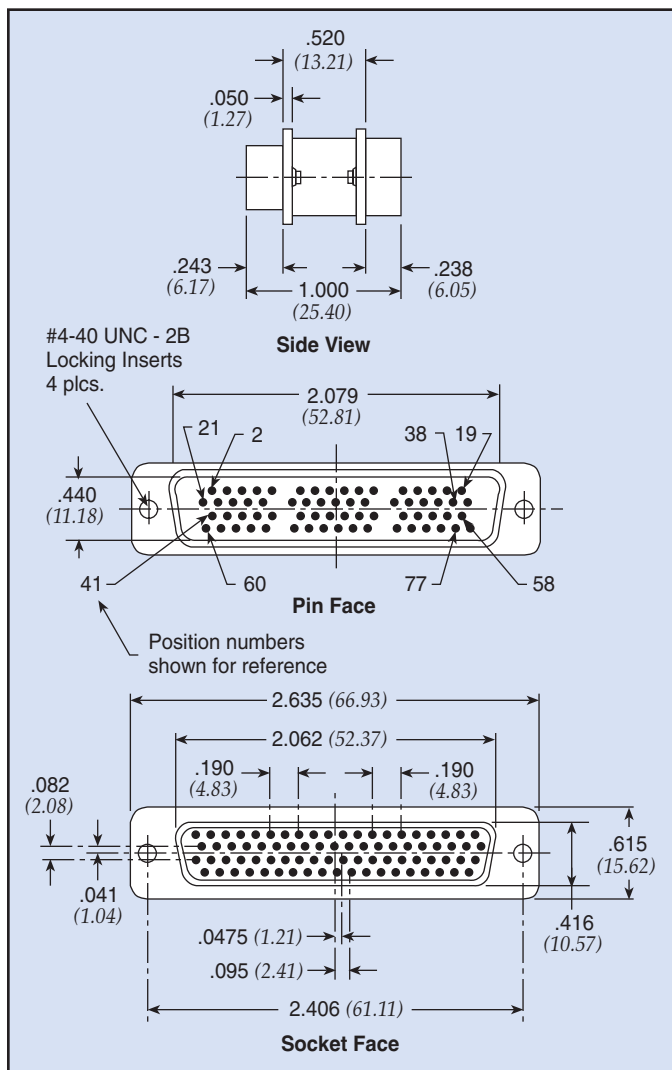
Hi-Density Filtered Adapter for Telecommunications

Filter Performance

Minimum Insertion Loss	
20 MHz	7 dB
50 MHz	14 dB
100 MHz	20 dB
500 MHz	32 dB
1 GHz	35 dB
2 GHz	41 dB
5 GHz	39 dB

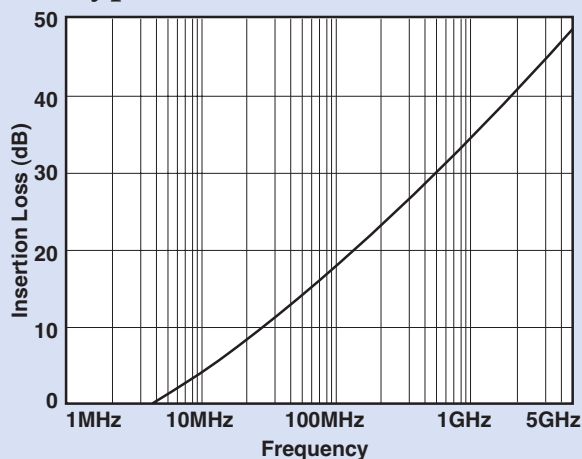
Insertion loss measured per MIL-STD-220, no load, 50 ohm source and load. Above data represents guaranteed minimum.

Part Number for Ordering: #56-645-002



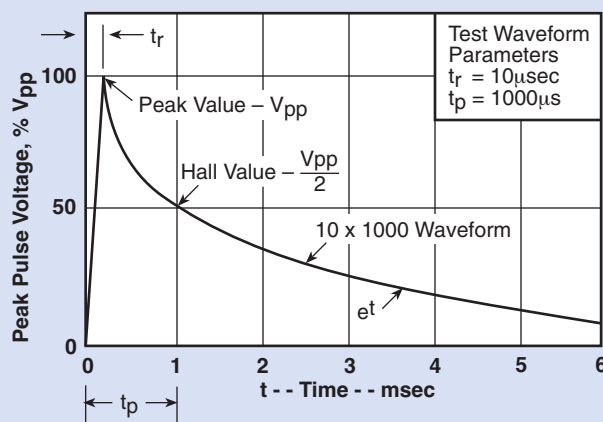
Dimensions in inches (mm)

Typical Insertion Loss



Above curves represent application of proper grounding fundamentals, for assistance consult with Spectrum Control.

Pulse Wave Form* (10 x 1000)



* Reference Bellcore TR-NWT-1089, $V_{pp} = 1000\text{V}$

Series 700 High Performance Filtered Connectors

Filter Selection

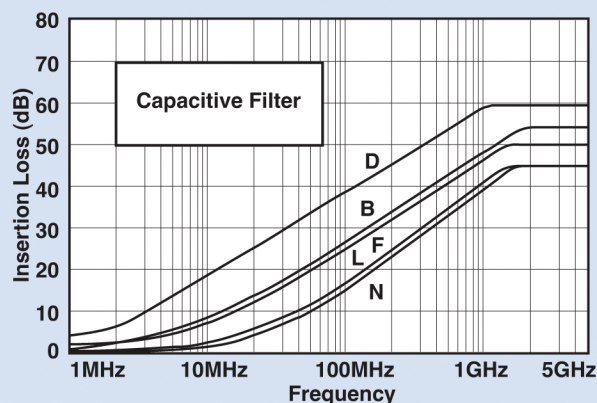
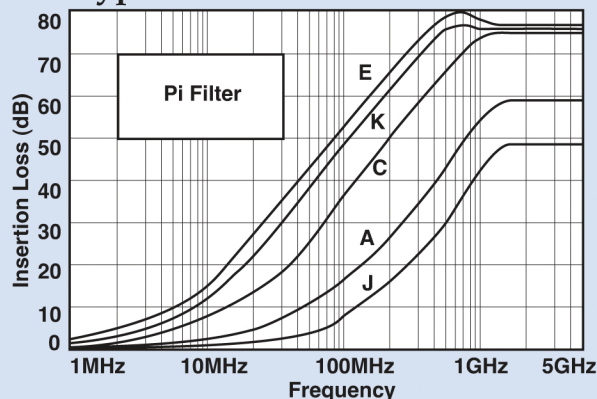
Spectrum Control Series 700 connectors offer the highest performance filtering for all types of professional applications.

Features

- Available in 9, 15, 25, 37 and 50 shell sizes
- Variety of termination configurations including right angle and straight PCB for both pin and socket contact and as an adapter
- Capacitive and Pi type filters in a full range of capacitance values

The catalog data for this series is presented in order of shell size, and grouped by pin and socket contacts. Part numbers must be selected from the tables within the series section.

Typical Insertion Loss



Above curves represent application of proper grounding fundamentals, for assistance consult with Spectrum Control.

Insertion loss measured per MIL-STD-220, no load, 50ohm source and load.

Electrical Specifications: High Performance Connectors

Filter Designations	Filter Circuits	Capacitance		3 dB Cut-off Frequency Max. (MHz)	Dielectric With-standing Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB)									
		Value	Tol.				5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz	2 GHz	5 GHz
J	Pi	100 pF	+100 -0%	32	300V	100V	—	—	—	2	6	11	27	40	43	40
A		310 pF	±20%	17	300V	100V	—	—	3	7	13	21	36	43	50	45
C		1000 pF	+150 -0%	3.2	300V	100V	—	5	9	19	30	43	62	70	68	63
K		2500 pF	+100 -0%	1.3	150V	50V	8	13	18	33	45	58	73	78	70	65
E		4000 pF	+100 -0%	0.8	150V	50V	8	13	20	35	48	61	76	80	70	65
N	C	375 pF	±20%	14	600V	200V	—	—	2	7	13	20	29	35	30	29
L		500 pF	±20%	10.6	600V	200V	—	—	3	10	15	22	31	37	33	31
F		830 pF	±20%	6.4	600V	200V	—	4	9	16	22	28	35	39	38	36
B		1000 pF	+100 -0%	3.2	600V	200V	—	5	10	17	23	30	37	43	44	42
D		5000 pF	+100 -0%	0.64	300V	100V	10	16	22	30	35	41	50	52	52	50

Filter designation "G" for grounded contacts, "I" for insulated (not filtered) contacts.
Filter designation "O" for omitted contact and no hole in ground plane.

Above data represents guaranteed minimum.

Series 700

Specifications and Connector Ordering

Mechanical Specifications

Shell	Zinc diecast, nickel plated 150 μ inches (3.81 μ m) min.
Insulators	Glass-filled polyester, flammability UL94V-0
Pin Contacts	Copper alloy, 15 μ inches (0.38 μ m) gold plated * over nickel
Socket Contacts	Copper alloy, 30 μ inches (0.76 μ m) gold plated * over nickel * Heavier gold plating available upon request. See pg. 169: Connector Options
Terminations	Gold flash for PCB mount and solder cups. Solder dipped also available.
Ground Plane	Brass, solder plated
Grounding Springs	Beryllium copper, tin plated per MIL-T-10727
Operating Temperature	-55°C to +125°C
Capacitors	Proprietary barium titanate ceramic formulations

Electrical Specifications

Current Rating	5 Amps
R.F. Current Rating	0.3 Amps
Contact Resistance	10 milliohms maximum
UL Recognized	Under category of communication circuit accessories, File #E149046
Inductance on PI Filters	~ 860 nH between 100 kHz and 1 MHz
Solder cups accept up to a 20 gauge wire	

Note:

For additional mechanical, electrical, and environmental specifications, refer to page 201.

Ordering Your Connector

STEP 1: SELECTING THE FILTER

- Using the insert loss graphs on page 149 determine which filters provide the required attenuation at the troublesome frequency, while not affecting the signal frequency by more than 3 to 6 dB.
- Choose the filter type, either feed-thru capacitor or Pi. The Pi is generally considered better due to its superior high frequency performance and steeper curve. The feed-thru capacitor is lower cost.
- Select capacitance value.
- Note the Spectrum letter designation for the filter chosen from the table on page 149.

STEP 2: SELECTING THE CONNECTOR

- Turn to the appropriate size section.
(9, 15, 25, 37, 50)
- Choose either pin contacts (plug) or socket contacts (receptacle).
- Choose the required termination type.
- From the table on the appropriate connector page, using the filter letter designation chosen in step 1 above, select the part number.

STEP 3: SPECIFYING OPTIONS

- Refer to page 172 for special options including heavy gold plating, 4-40 mounting threads, grounding brackets, hardware, and others.
- Most options are available within the standard lead times.
- Some options require a part number suffix, while other combinations may require factory assistance for part number assignment. If a suffix is shown, add it to your selected part number. If more than one option is needed, consult with factory for part number assignment.

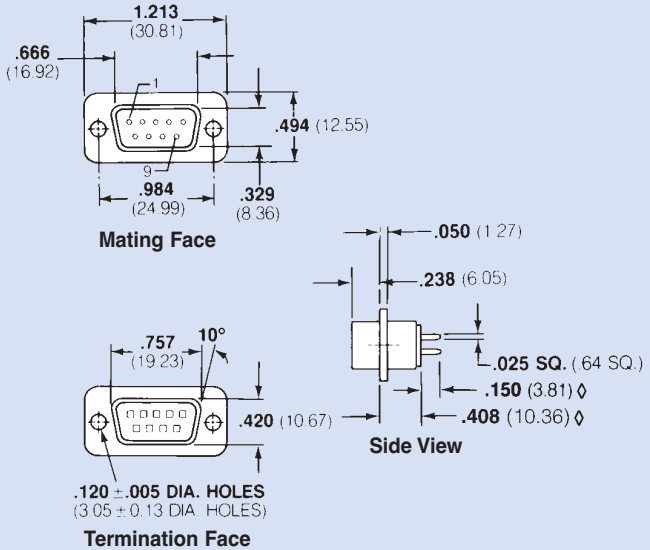
9 Series 700 Pin Contact

Shell Size



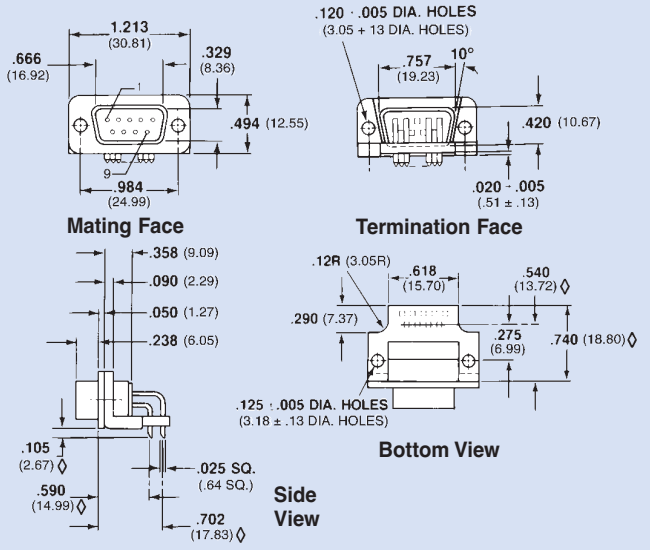
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-701-001	A	310 pF Pi
56-701-002	B	1000 pF C
56-701-003	C	1000 pF Pi
56-701-004	D	5000 pF C
56-701-005	E	4000 pF Pi
56-701-028	F	830 pF C
56-701-029	J	100 pF Pi
56-701-030	K	2500 pF Pi
56-701-047	N	375 pF C
56-701-086	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-702-001	A	310 pF Pi
56-702-002	B	1000 pF C
* 56-702-003	C	1000 pF Pi
56-702-004	D	5000 pF C
* 56-702-005	E	4000 pF Pi
56-702-007	F	830 pF C
56-702-008	J	100 pF Pi
56-702-009	K	2500 pF Pi
56-702-013	N	375 pF C
* 56-702-033	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

Dimensions in inches (mm)

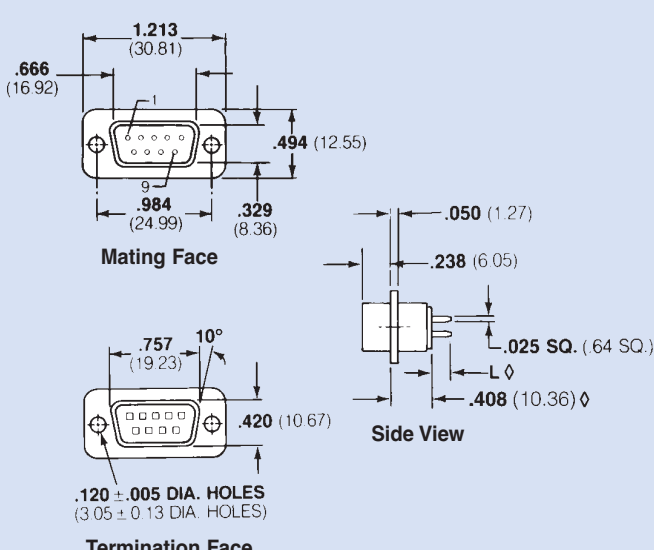
9 Series 700 Pin Contact

Shell Size



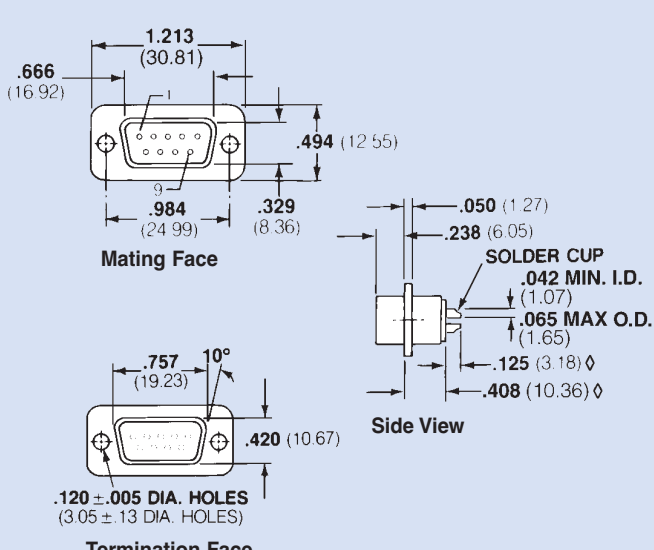
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-701 -006 -022 -017				A	310 pF Pi
56-701 -007 -023 -018				B	1000 pF C
56-701 -008 -024 -019				C	1000 pF Pi
56-701 -009 -025 -020				D	5000 pF C
56-701 -010 -026 -021				E	4000 pF Pi
56-701 -037 -034 -031				F	830 pF C
56-701 -038 -035 -032				J	100 pF Pi
56-701 -039 -036 -033				K	2500 pF Pi
56-701 -050 -049 -048				N	375 pF C



Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-701-011	A	310 pF Pi
* 56-701-012	B	1000 pF C
* 56-701-013	C	1000 pF Pi
* 56-701-014	D	5000 pF C
* 56-701-015	E	4000 pF Pi
* 56-701-040	F	830 pF C
56-701-041	J	100 pF Pi
56-701-042	K	2500 pF Pi
56-701-081	N	375 pF C
56-701-087	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

Dimensions in inches (mm)

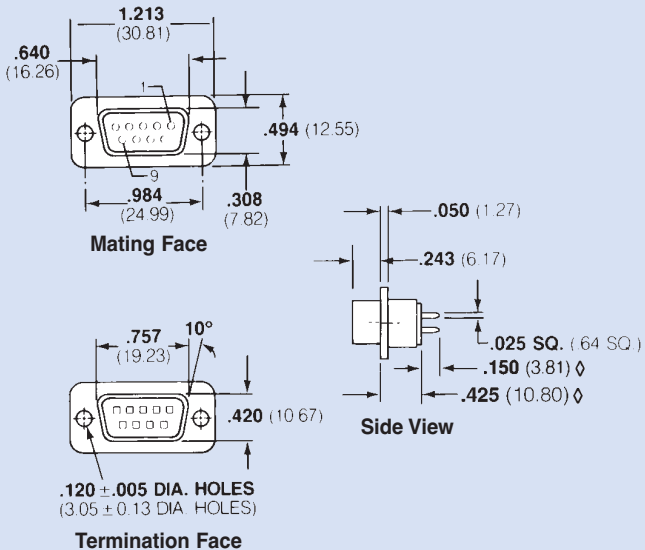
9 Series 700 Socket Contact

Shell Size



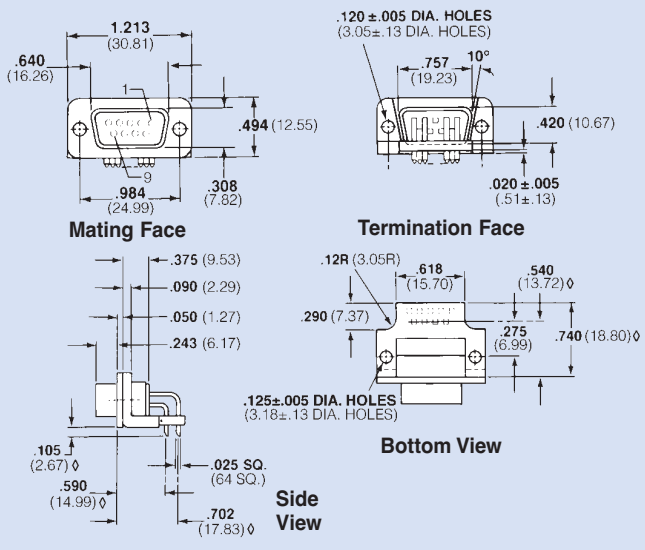
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-703-001	A	310 pF Pi
56-703-002	B	1000 pF C
56-703-003	C	1000 pF Pi
56-703-004	D	5000 pF C
56-703-005	E	4000 pF Pi
56-703-022	F	830 pF C
56-703-023	J	100 pF Pi
56-703-024	K	2500 pF Pi
56-703-036	N	375 pF C
56-703-047	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-704-001	A	310 pF Pi
56-704-002	B	1000 pF C
* 56-704-003	C	1000 pF Pi
56-704-004	D	5000 pF C
* 56-704-005	E	4000 pF Pi
56-704-007	F	830 pF C
56-704-008	J	100 pF Pi
56-704-009	K	2500 pF Pi
56-704-018	N	375 pF C
56-704-035	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

Dimensions in inches (mm)

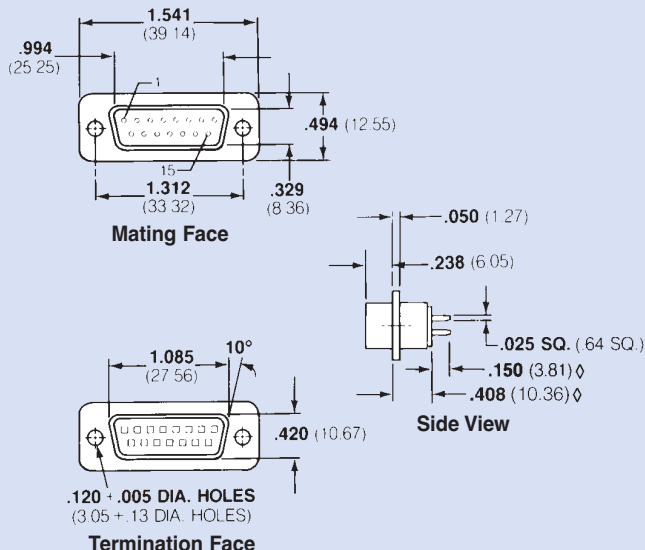
15 Series 700 Pin Contact

Shell Size



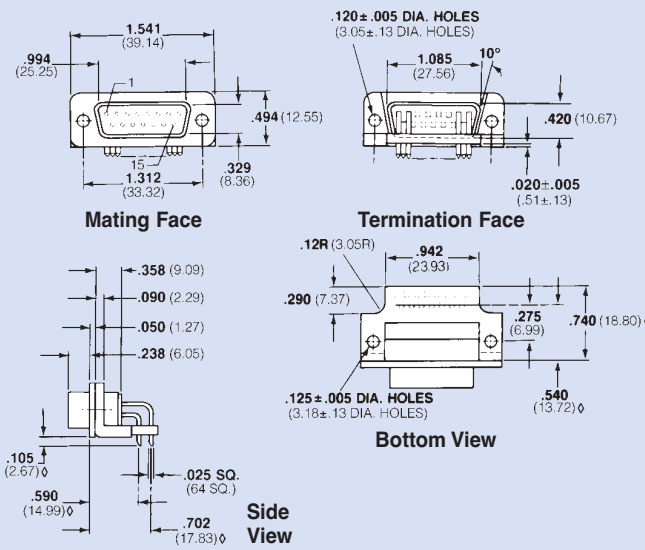
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-711-001	A	310 pF Pi
56-711-002	B	1000 pF C
56-711-003	C	1000 pF Pi
56-711-004	D	5000 pF C
56-711-005	E	4000 pF Pi
56-711-028	F	830 pF C
56-711-029	J	100 pF Pi
56-711-030	K	2500 pF Pi
56-711-048	N	375 pF C
56-711-088	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-712-001	A	310 pF Pi
56-712-002	B	1000 pF C
* 56-712-003	C	1000 pF Pi
56-712-004	D	5000 pF C
* 56-712-005	E	4000 pF Pi
* 56-712-007	F	830 pF C
56-712-008	J	100 pF Pi
56-712-009	K	2500 pF Pi
56-712-017	N	375 pF C
56-712-039	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\phi = \pm .015$

Dimensions in inches (mm)

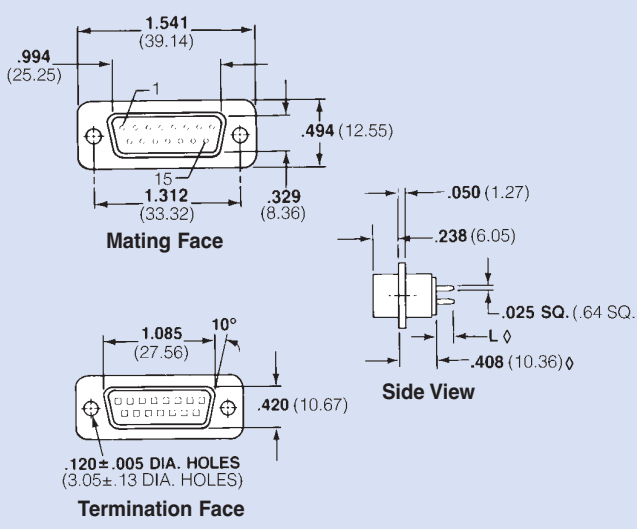
15 Series 700 Pin Contact

Shell Size



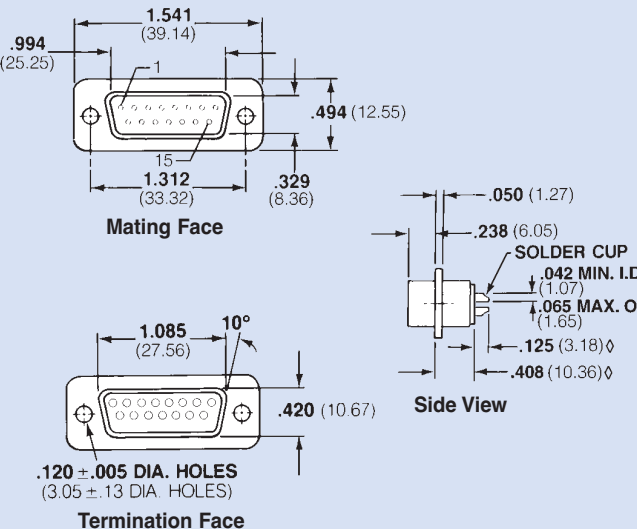
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-711 -006 -023 -018				A	310 pF Pi
56-711 -007 -024 -019				B	1000 pF C
56-711 -008 -025 -020				C	1000 pF Pi
56-711 -009 -026 -021				D	5000 pF C
56-711 -010 -027 -022				E	4000 pF Pi
56-711 -037 -034 -031				F	830 pF C
56-711 -038 -035 -032				J	100 pF Pi
56-711 -039 -036 -033				K	2500 pF Pi
56-711 -051 -050 -049				N	375 pF C



Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-711-011	A	310 pF Pi
56-711-012	B	1000 pF C
* 56-711-013	C	1000 pF Pi
56-711-014	D	5000 pF C
* 56-711-015	E	4000 pF Pi
* 56-711-040	F	830 pF C
56-711-041	J	100 pF Pi
56-711-042	K	2500 pF Pi
56-711-085	N	375 pF C
56-711-086	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = ± 0.005 except where noted, $\phi = \pm 0.015$

Dimensions in inches (mm)

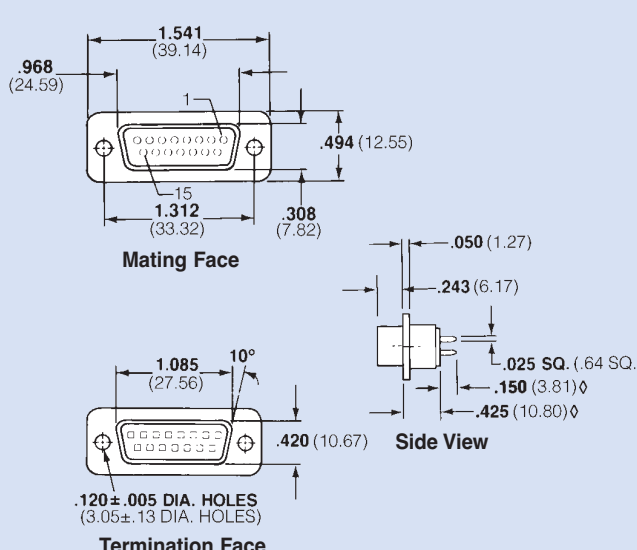
15 Series 700 Socket Contact

Shell Size



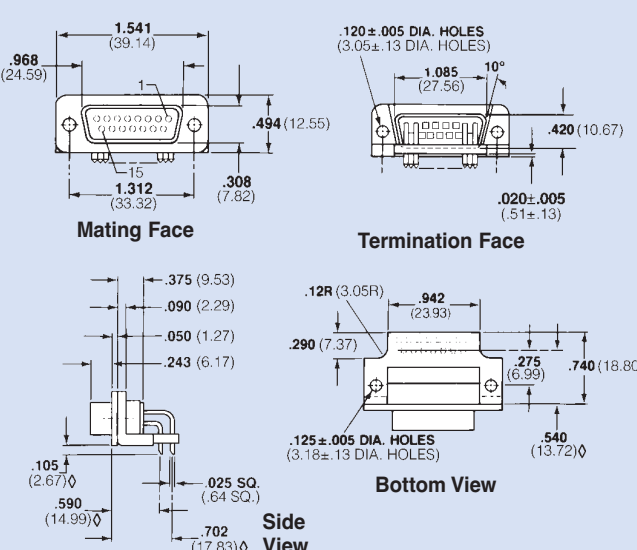
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-713-001	A	310 pF Pi
56-713-002	B	1000 pF C
56-713-003	C	1000 pF Pi
56-713-004	D	5000 pF C
56-713-005	E	4000 pF Pi
56-713-021	F	830 pF C
56-713-022	J	100 pF Pi
56-713-023	K	2500 pF Pi
56-713-037	N	375 pF C
56-713-045	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-714-001	A	310 pF Pi
56-714-002	B	1000 pF C
* 56-714-003	C	1000 pF Pi
56-714-004	D	5000 pF C
* 56-714-005	E	4000 pF Pi
* 56-714-006	F	830 pF C
56-714-007	J	100 pF Pi
56-714-008	K	2500 pF Pi
56-714-017	N	375 pF C
56-714-031	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

Dimensions in inches (mm)

15 Series 700

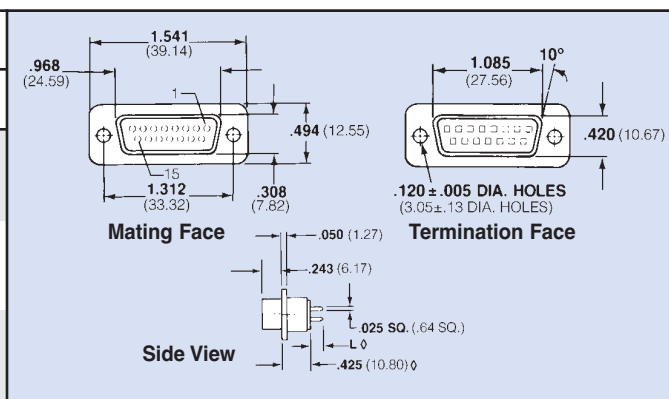
Socket Contact & Pin/Socket Adapter

Shell Size



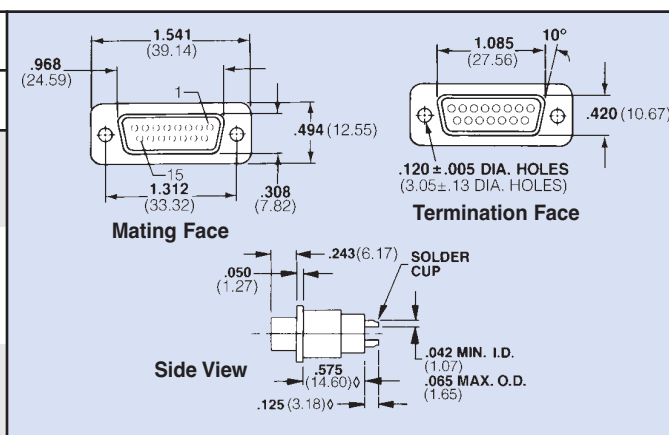
Solderless Wire Wrap

Spectrum Part Number				EMI Filter	
	Select one				
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-713	-006	-016	-011	A	310 pF Pi
56-713	-007	-017	-012	B	1000 pF C
56-713	-008	-018	-013	C	1000 pF Pi
56-713	-009	-019	-014	D	5000 pF C
56-713	-010	-020	-015	E	4000 pF Pi
56-713	-030	-027	-024	F	830 pF C
56-713	-031	-028	-025	J	100 pF Pi
56-713	-032	-029	-026	K	2500 pF Pi
56-713	-040	-039	-038	N	375 pF C



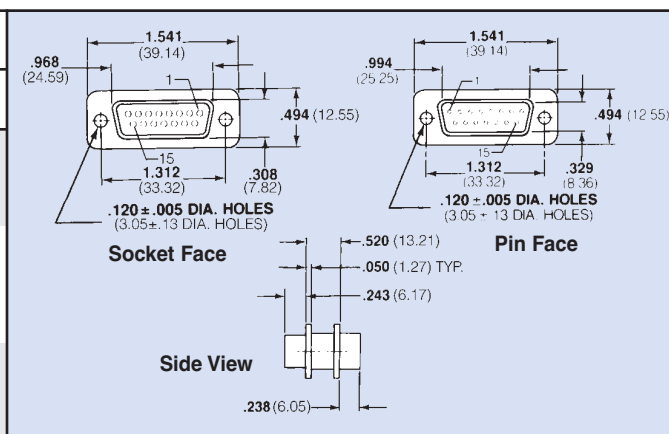
Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-716-001	A	310 pF Pi
56-716-002	B	1000 pF C
* 56-716-003	C	1000 pF Pi
56-716-004	D	5000 pF C
* 56-716-005	E	4000 pF Pi
56-716-006	F	830 pF C
56-716-007	J	100 pF Pi
* 56-716-008	K	2500 pF Pi
56-716-009	N	375 pF C
56-716-013	L	500 pF C



Pin/Socket Adapter

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-715-001	A	310 pF Pi
56-715-002	B	1000 pF C
* 56-715-003 €	C	1000 pF Pi
56-715-004	D	5000 pF C
* 56-715-005 €	E	4000 pF Pi
56-715-007	F	830 pF C
56-715-008	J	100 pF Pi
56-715-009	K	2500 pF Pi
56-715-015	N	375 pF C
56-715-040	L	500 pF C



€ Also available through Spectrum Control's authorized European distributors/agents.

* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = ±.005 except where noted, Ø = ±.015

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Dimensions in inches (mm)



Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-721-001	A	310 pF Pi
56-721-002	B	1000 pF C
56-721-003	C	1000 pF Pi
56-721-004	D	5000 pF C
56-721-005	E	4000 pF Pi
56-721-033	F	830 pF C
56-721-034	J	100 pF Pi
56-721-035	K	2500 pF Pi
56-721-063	N	375 pF C
56-721-111	L	500 pF C

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-722-001	A	310 pF Pi
56-722-002	B	1000 pF C
* 56-722-003	C	1000 pF Pi
56-722-004	D	5000 pF C
* 56-722-005	E	4000 pF Pi
* 56-722-008	F	830 pF C
56-722-009	J	100 pF Pi
56-722-010	K	2500 pF Pi
56-722-027	N	375 pF C
56-722-060	L	500 pF C

Mating Face

Termination Face

Bottom View

Side View

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

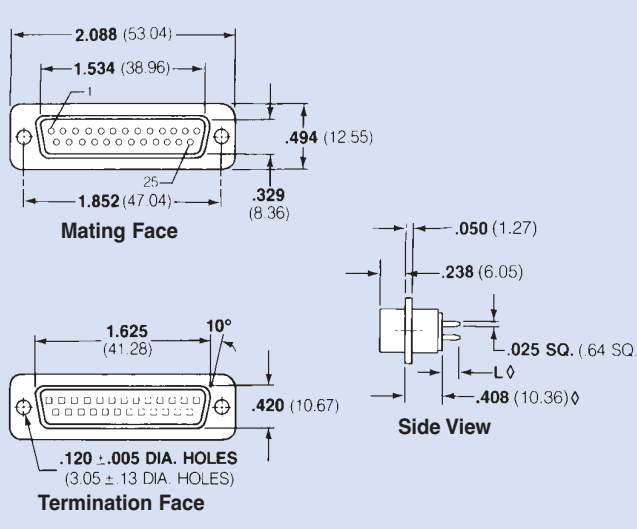
25 Series 700 Pin Contact

Shell Size



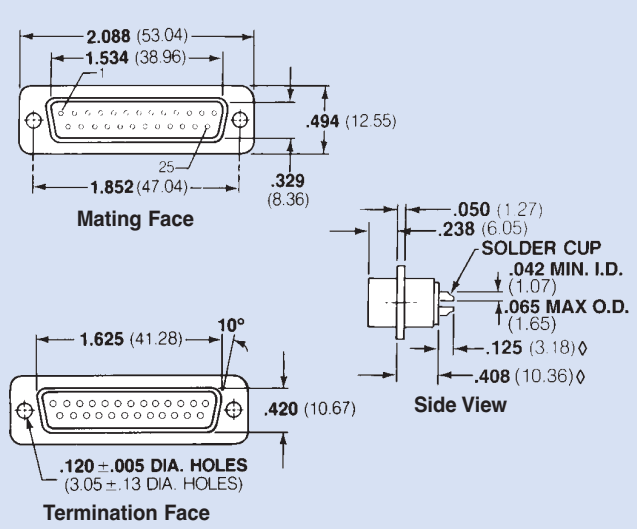
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-721 -006 -028 -024				A	310 pF Pi
56-721 -007 -029 -025				B	1000 pF C
56-721 -008 -030 -026				C	1000 pF Pi
56-721 -009 -031 -022				D	5000 pF C
56-721 -010 -032 -027				E	4000 pF Pi
56-721 -042 -039 -036				F	830 pF C
56-721 -043 -040 -037				J	100 pF Pi
56-721 -044 -041 -038				K	2500 pF Pi
56-721 -066 -065 -064				N	375 pF C



Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-721-011	A	310 pF Pi
* 56-721-012	B	1000 pF C
* 56-721-013	C	1000 pF Pi
56-721-014	D	5000 pF C
* 56-721-015	E	4000 pF Pi
* 56-721-045	F	830 pF C
56-721-046	J	100 pF Pi
56-721-047	K	2500 pF Pi
56-721-070	N	375 pF C
56-721-112	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

Dimensions in inches (mm)

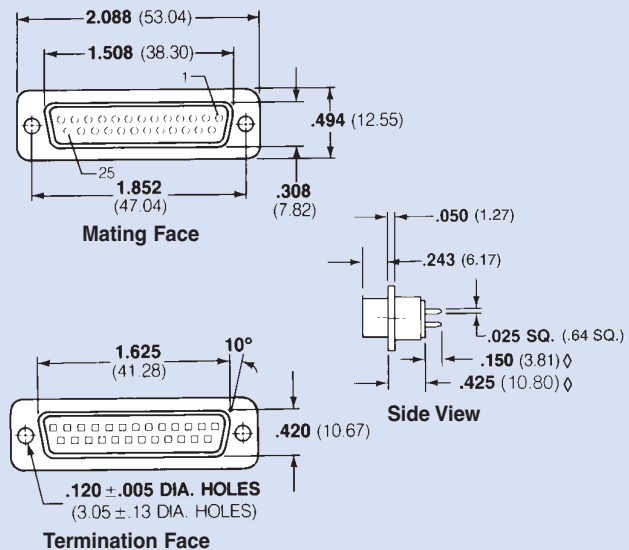
25 Series 700 Socket Contact

Shell Size



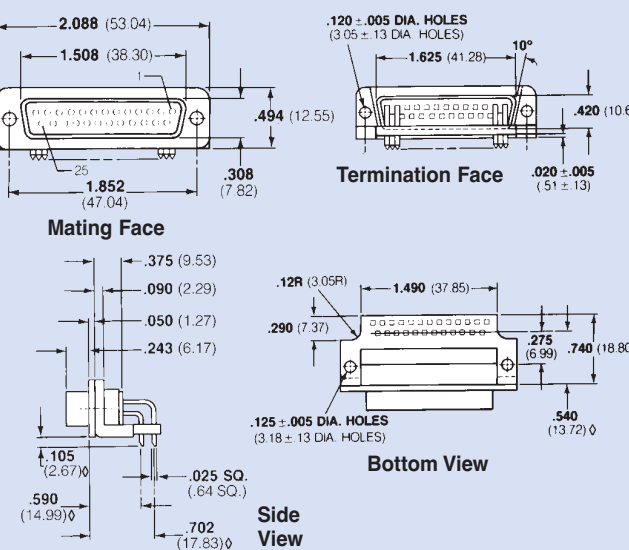
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-723-001	A	310 pF Pi
56-723-002	B	1000 pF C
56-723-003	C	1000 pF Pi
56-723-004	D	5000 pF C
56-723-005	E	4000 pF Pi
56-723-023	F	830 pF C
56-723-024	J	100 pF Pi
56-723-025	K	2500 pF Pi
56-723-045	N	375 pF C
56-723-069	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-724-001	A	310 pF Pi
56-724-002	B	1000 pF C
* 56-724-003	C	1000 pF Pi
56-724-004	D	5000 pF C
* 56-724-005	E	4000 pF Pi
* 56-724-008	F	830 pF C
56-724-009	J	100 pF Pi
56-724-010	K	2500 pF Pi
56-724-021	N	375 pF C
56-724-046	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

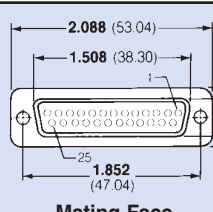
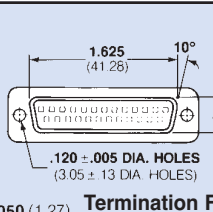
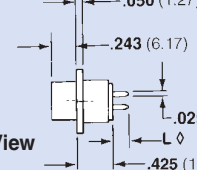
Dimensions in inches (mm)

25 Series 700 Shell Size Socket Contact & Pin/Socket Adapter



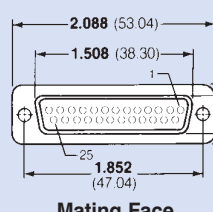
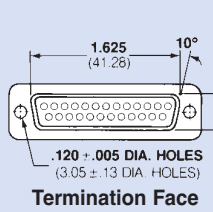
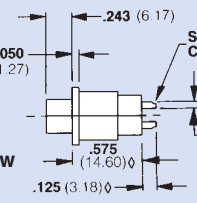
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>				EMI Filter	
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
* 56-723	-006	-017	* -012	A	310 pF Pi
56-723	-007	-018	-013	B	1000 pF C
* 56-723	-008	-019	* -014	C	1000 pF Pi
56-723	-009	-020	-015	D	5000 pF C
* 56-723	-010	-021	* -016	E	4000 pF Pi
* 56-723	-032	-029	* -026	F	830 pF C
56-723	-033	-030	-027	J	100 pF Pi
56-723	-034	-031	-028	K	2500 pF Pi
56-723	-048	-047	-046	N	375 pF C

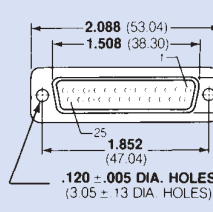
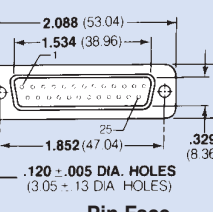
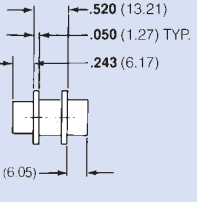
Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-726-001	A	310 pF Pi
56-726-002	B	1000 pF C
* 56-726-003	C	1000 pF Pi
56-726-004	D	5000 pF C
* 56-726-005	E	4000 pF Pi
56-726-006	F	830 pF C
56-726-007	J	100 pF Pi
* 56-726-008	K	2500 pF Pi
56-726-009	N	375 pF C
56-726-021	L	500 pF C

Pin/Socket Adapter

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-725-001	A	310 pF Pi
56-725-002	B	1000 pF C
* 56-725-003 €	C	1000 pF Pi
56-725-004	D	5000 pF C
* 56-725-005 €	E	4000 pF Pi
* 56-725-019	F	830 pF C
56-725-020	J	100 pF Pi
* 56-725-021	K	2500 pF Pi
56-725-064	N	375 pF C
56-725-073	L	500 pF C

€ Also available through Spectrum Control's authorized European distributors/agents.

* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = ±.005 except where noted, $\phi = \pm .015$

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Dimensions in inches (mm)

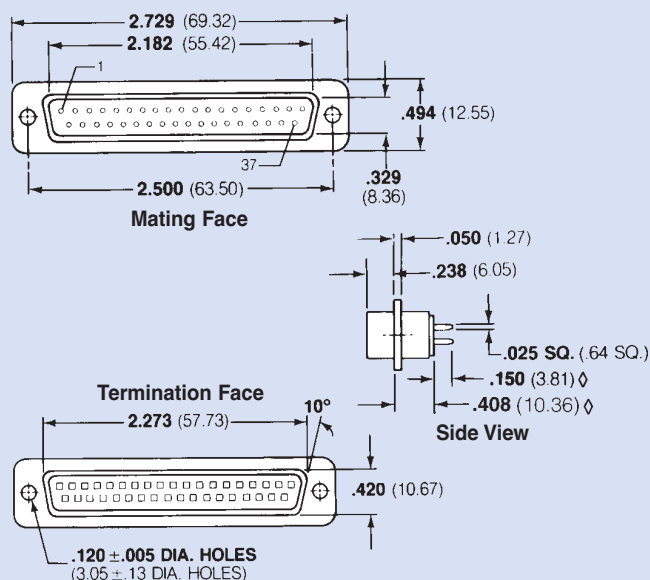
37 Series 700 Pin Contact

Shell Size



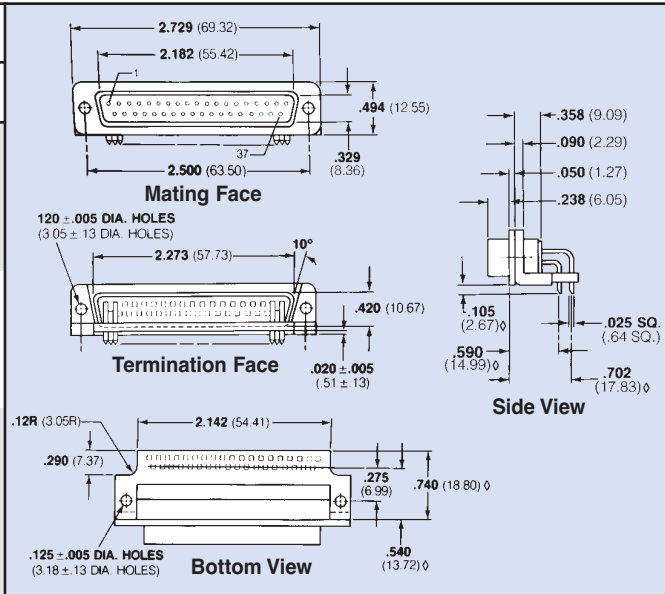
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-731-001	A	310 pF Pi
56-731-002	B	1000 pF C
56-731-003	C	1000 pF Pi
56-731-004	D	5000 pF C
56-731-005	E	4000 pF Pi
56-731-028	F	830 pF C
56-731-029	J	100 pF Pi
56-731-030	K	2500 pF Pi
56-731-048	N	375 pF C
56-731-076	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-732-001	A	310 pF Pi
56-732-002	B	1000 pF C
* 56-732-003	C	1000 pF Pi
56-732-004	D	5000 pF C
* 56-732-005	E	4000 pF Pi
56-732-006	F	830 pF C
56-732-007	J	100 pF Pi
56-732-008	K	2500 pF Pi
56-732-009	N	375 pF C
56-732-023	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\diamond = \pm .015$

Dimensions in inches (mm)

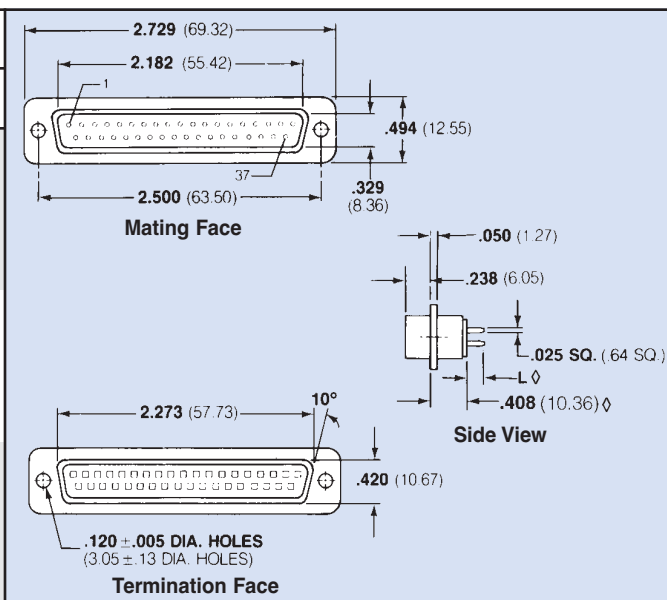
37 Series 700 Pin Contact

Shell Size



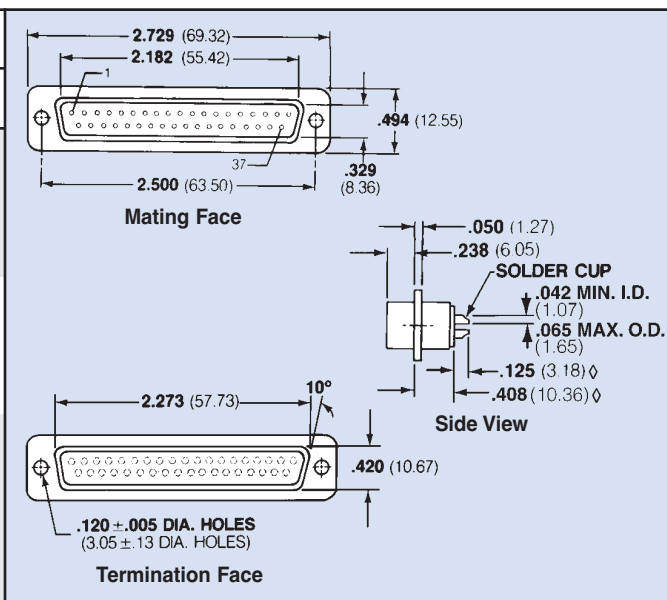
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-731 -006 -023 -018				A	310 pF Pi
56-731 -007 -024 -019				B	1000 pF C
56-731 -008 -025 -020				C	1000 pF Pi
56-731 -009 -026 -021				D	5000 pF C
56-731 -010 -027 -022				E	4000 pF Pi
56-731 -037 -034 -031				F	830 pF C
56-731 -038 -035 -032				J	100 pF Pi
56-731 -039 -036 -033				K	2500 pF Pi
56-731 -051 -050 -049				N	375 pF C



Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-731-011	A	310 pF Pi
56-731-012	B	1000 pF C
* 56-731-013	C	1000 pF Pi
56-731-014	D	5000 pF C
* 56-731-015	E	4000 pF Pi
* 56-731-040	F	830 pF C
56-731-041	J	100 pF Pi
56-731-042	K	2500 pF Pi
56-731-060	N	375 pF C
56-731-077	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm$.005 except where noted, ϕ = $\pm$.015

Dimensions in inches (mm)

37 Series 700

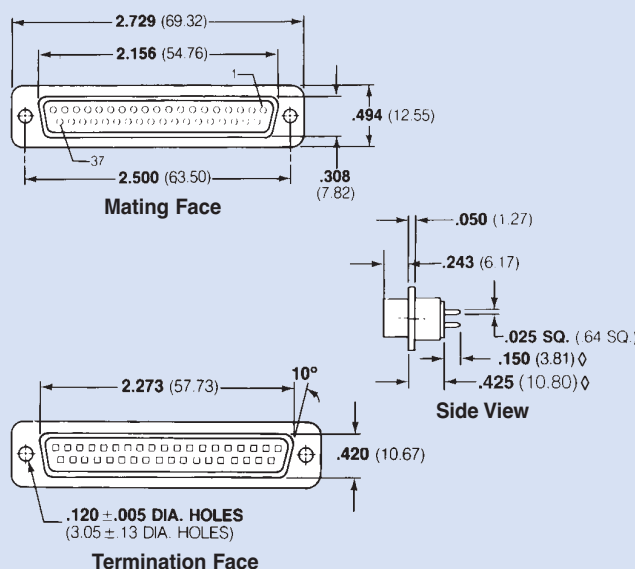
Socket Contact

Shell Size



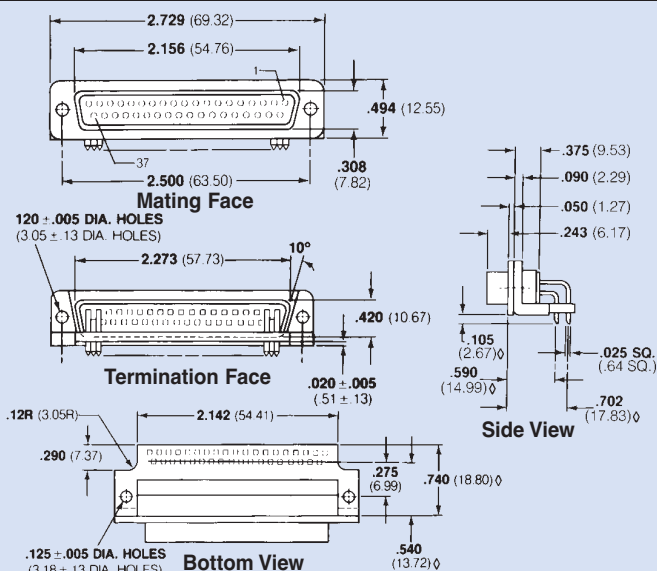
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-733-001	A	310 pF Pi
56-733-002	B	1000 pF C
56-733-003	C	1000 pF Pi
56-733-004	D	5000 pF C
56-733-005	E	4000 pF Pi
56-733-021	F	830 pF C
56-733-022	J	100 pF Pi
56-733-023	K	2500 pF Pi
56-733-035	N	375 pF C
56-733-046	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-734-001	A	310 pF Pi
56-734-002	B	1000 pF C
56-734-003	C	1000 pF Pi
56-734-004	D	5000 pF C
56-734-005	E	4000 pF Pi
56-734-006	F	830 pF C
56-734-007	J	100 pF Pi
56-734-008	K	2500 pF Pi
56-734-012	N	375 pF C
56-734-021	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\phi = \pm .015$

Dimensions in inches (mm)

37 Series 700

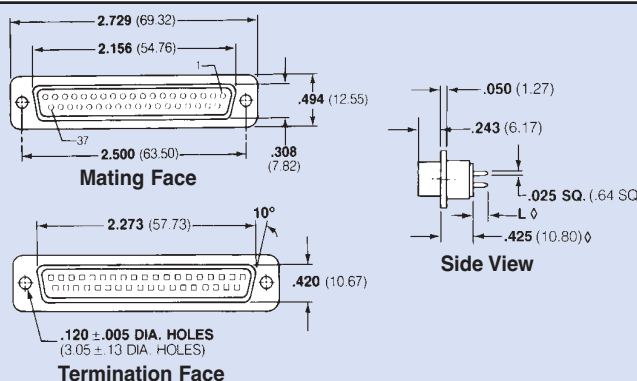
Socket Contact & Pin/Socket Adapter

Shell Size



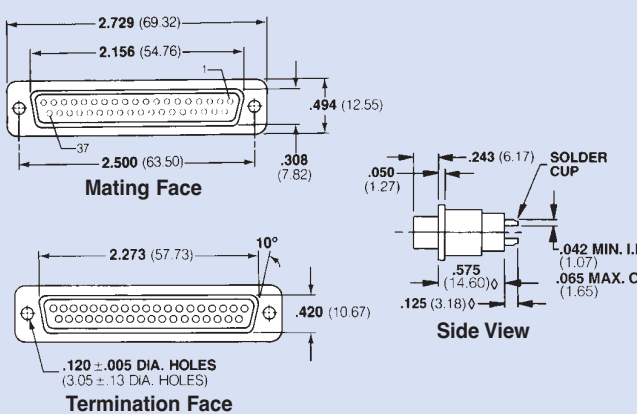
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>				EMI Filter	
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
* 56-733-006	-006	-016	* -011	A	310 pF Pi
56-733-007	-007	-017	-012	B	1000 pF C
56-733-008	-008	-018	-013	C	1000 pF Pi
56-733-009	-009	-019	-014	D	5000 pF C
56-733-010	-010	-020	-015	E	4000 pF Pi
56-733-030	-030	-027	-024	F	830 pF C
56-733-031	-031	-028	-025	J	100 pF Pi
56-733-032	-032	-029	-026	K	2500 pF Pi
56-733-038	-038	-037	-036	N	375 pF C



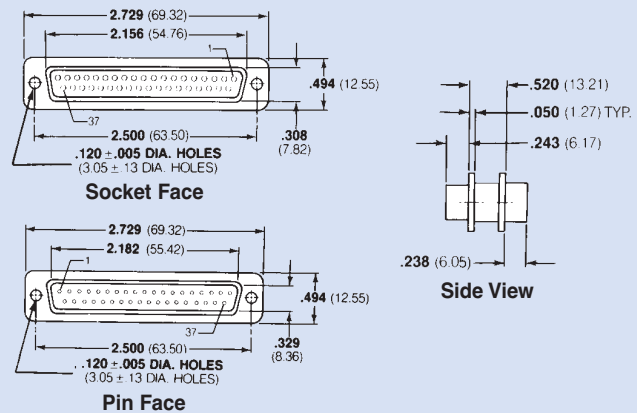
Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-736-001	A	310 pF Pi
56-736-002	B	1000 pF C
* 56-736-003	C	1000 pF Pi
56-736-004	D	5000 pF C
* 56-736-005	E	4000 pF Pi
56-736-006	F	830 pF C
56-736-007	J	100 pF Pi
* 56-736-008	K	2500 pF Pi
56-736-009	N	375 pF C
56-736-015	L	500 pF C



Pin/Socket Adapter

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-735-001	A	310 pF Pi
56-735-002	B	1000 pF C
* 56-735-003 €	C	1000 pF Pi
56-735-004	D	5000 pF C
* 56-735-005 €	E	4000 pF Pi
* 56-735-008	F	830 pF C
56-735-009	J	100 pF Pi
56-735-010	K	2500 pF Pi
56-735-025	N	375 pF C
56-735-034	L	500 pF C



€ Also available through Spectrum Control's authorized European distributors/agents.

* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = ± 0.005 except where noted, $\phi = \pm 0.015$

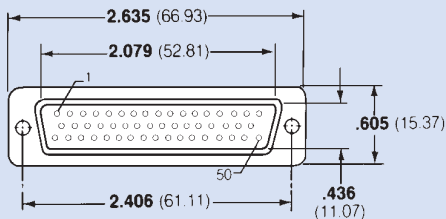
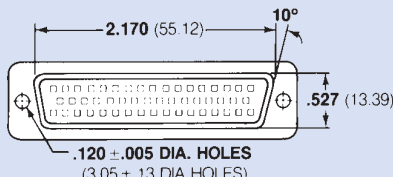
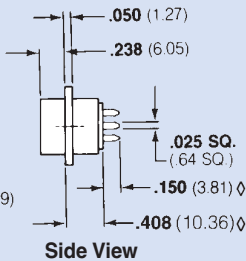
SPECTRUM CONTROL INC. • 8031 Avonia Rd. • Fairview, PA 16415 • Phone: 814-474-2207 • Fax: 814-474-2208 • Web site: www.spectrumcontrol.com
 SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

Dimensions in inches (mm)

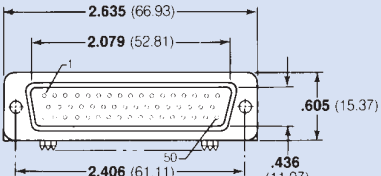
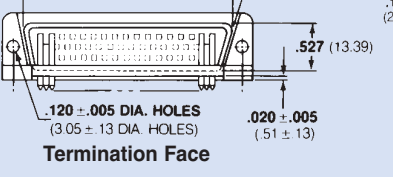
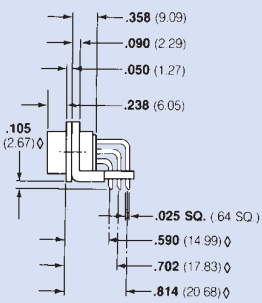
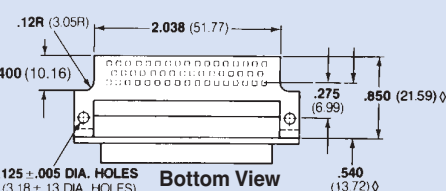
50 Series 700 Pin Contact Shell Size



Printed Circuit Board Mount

Spectrum Part Number	EMI Filter		Mating Face	Termination Face	Side View
	Filter Designation**	Cap. Value			
56-741-001	A	310 pF Pi			
56-741-002	B	1000 pF C			
56-741-003	C	1000 pF Pi			
56-741-004	D	5000 pF C			
56-741-005	E	4000 pF Pi			
56-741-027	F	830 pF C			
56-741-028	J	100 pF Pi			
56-741-029	K	2500 pF Pi			
56-741-042	N	375 pF C			
56-741-066	L	500 pF C			

Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter		Mating Face	Termination Face	Side View	Bottom View
	Filter Designation**	Cap. Value				
56-742-001	A	310 pF Pi				
56-742-002	B	1000 pF C				
56-742-003	C	1000 pF Pi				
56-742-004	D	5000 pF C				
56-742-005	E	4000 pF Pi				
56-742-006	F	830 pF C				
56-742-007	J	100 pF Pi				
56-742-008	K	2500 pF Pi				
56-742-009	N	375 pF C				
56-742-022	L	500 pF C				

* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = $\pm .005$ except where noted, $\phi = \pm .015$

Dimensions in inches (mm)

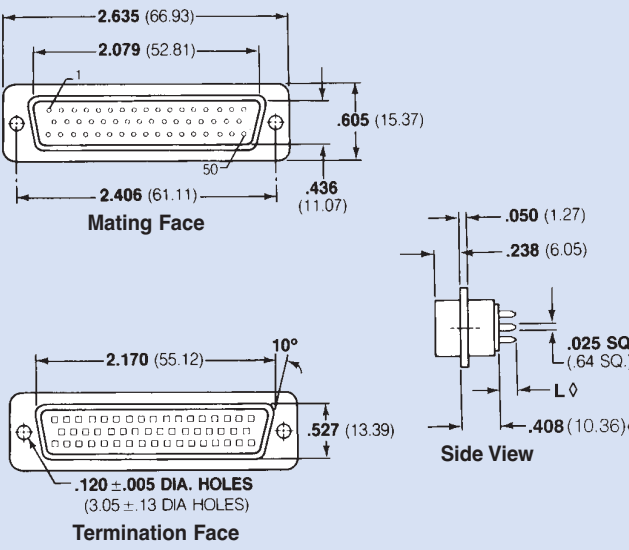
50 Series 700 Pin Contact

Shell Size



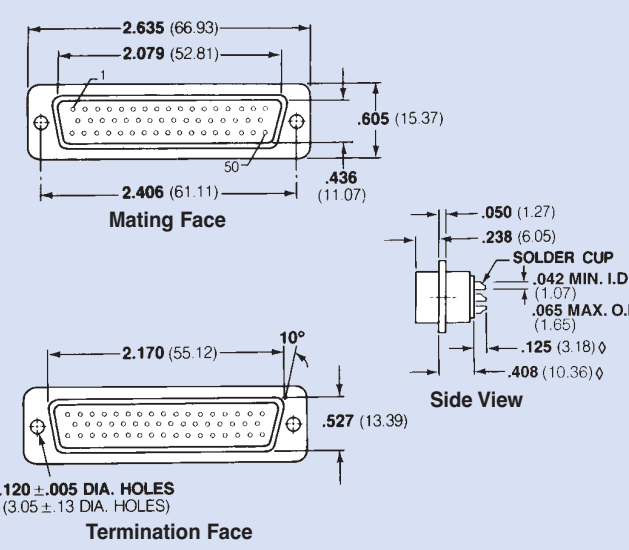
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-741 -006 -022 -017				A	310 pF Pi
56-741 -007 -023 -018				B	1000 pF C
56-741 -008 -024 -019				C	1000 pF Pi
56-741 -009 -025 -020				D	5000 pF C
56-741 -010 -026 -021				E	4000 pF Pi
56-741 -036 -033 -030				F	830 pF C
56-741 -037 -034 -031				J	100 pF Pi
56-741 -038 -035 -032				K	2500 pF Pi
56-741 -045 -044 -043				N	375 pF C



Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-741-011	A	310 pF Pi
* 56-741-012	B	1000 pF C
* 56-741-013	C	1000 pF Pi
* 56-741-014	D	5000 pF C
* 56-741-015	E	4000 pF Pi
56-741-039	F	830 pF C
56-741-040	J	100 pF Pi
56-741-041	K	2500 pF Pi
56-741-063	N	375 pF C
56-741-067	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = ± 0.005 except where noted, $\diamond = \pm 0.015$

Dimensions in inches (mm)

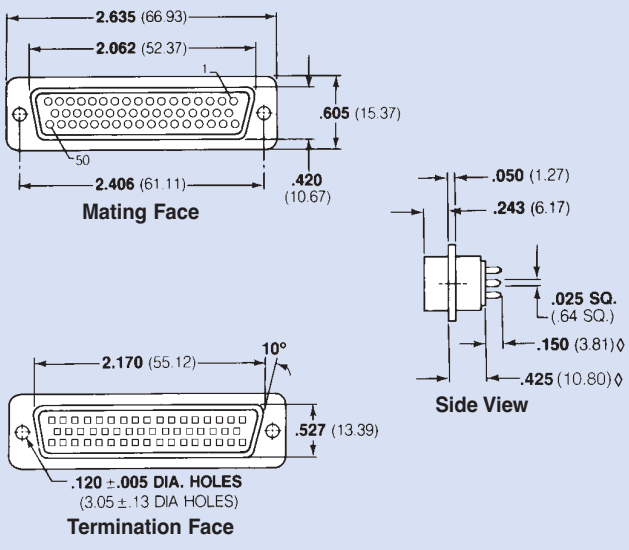
50 Series 700 Socket Contact

Shell Size



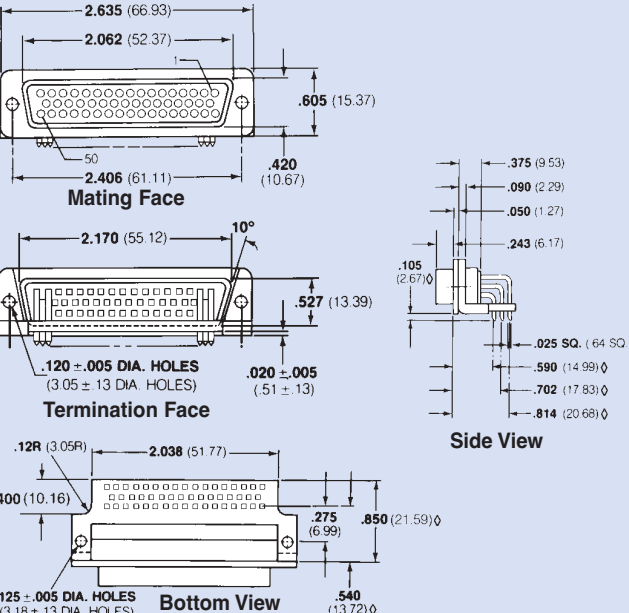
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-743-001	A	310 pF Pi
56-743-002	B	1000 pF C
56-743-003	C	1000 pF Pi
56-743-004	D	5000 pF C
56-743-005	E	4000 pF Pi
56-743-021	F	830 pF C
56-743-022	J	100 pF Pi
56-743-023	K	2500 pF Pi
56-743-033	N	375 pF C
56-743-043	L	500 pF C



Printed Circuit Board Right Angle Mount

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-744-001	A	310 pF Pi
56-744-002	B	1000 pF C
56-744-003	C	1000 pF Pi
56-744-004	D	5000 pF C
56-744-005	E	4000 pF Pi
56-744-006	F	830 pF C
56-744-007	J	100 pF Pi
56-744-008	K	2500 pF Pi
56-744-009	N	375 pF C
56-744-012	L	500 pF C



* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = ± 0.005 except where noted, $\diamond = \pm 0.015$

Dimensions in inches (mm)

50 Series 700

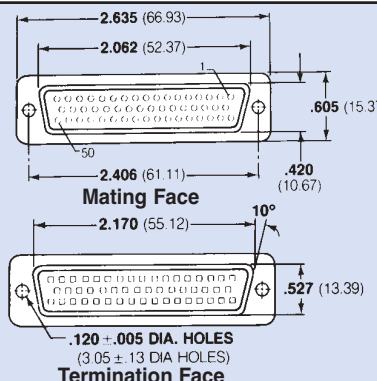
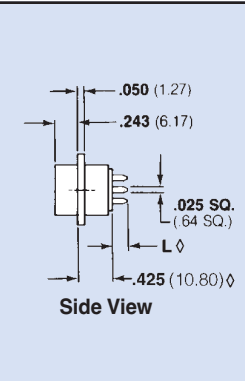
Socket Contact & Pin/Socket Adapter

Shell Size



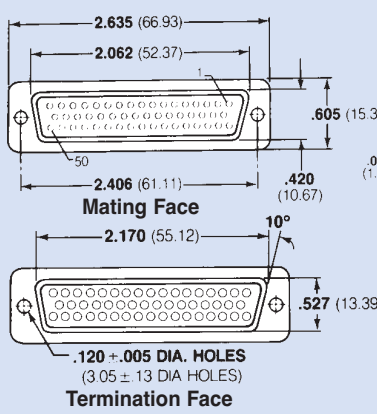
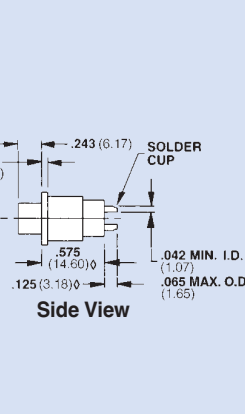
Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>				EMI Filter	
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-743	-006	-016	-011	A	310 pF Pi
56-743	-007	-017	-012	B	1000 pF C
56-743	-008	-018	-013	C	1000 pF Pi
56-743	-009	-019	-014	D	5000 pF C
56-743	-010	-020	-015	E	4000 pF Pi
56-743	-030	-027	-024	F	830 pF C
56-743	-031	-028	-025	J	100 pF Pi
56-743	-032	-029	-026	K	2500 pF Pi
56-743	-036	-035	-034	N	375 pF C

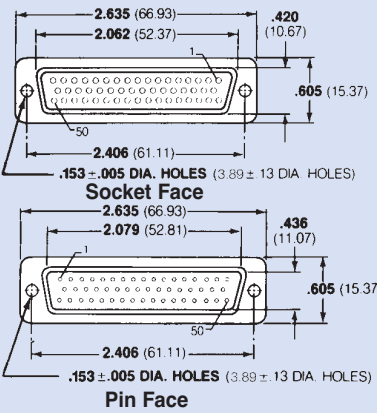
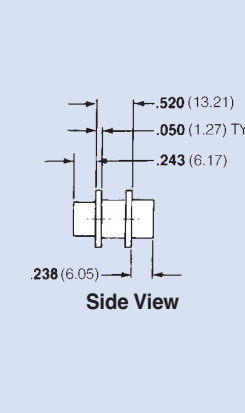
Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-746-001	A	310 pF Pi
56-746-002	B	1000 pF C
56-746-003	C	1000 pF Pi
56-746-004	D	5000 pF C
56-746-005	E	4000 pF Pi
56-746-006	F	830 pF C
56-746-007	J	100 pF Pi
56-746-008	K	2500 pF Pi
56-746-009	N	375 pF C
56-746-018	L	500 pF C

Pin/Socket Adapter

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-745-001	A	310 pF Pi
56-745-002	B	1000 pF C
* 56-745-003	C	1000 pF Pi
56-745-004	D	5000 pF C
* 56-745-005	E	4000 pF Pi
56-745-006	F	830 pF C
56-745-007	J	100 pF Pi
56-745-008	K	2500 pF Pi
56-745-019	N	375 pF C
56-745-027	L	500 pF C

* May be available from distributor stock.

** See page 149 for filter performance.

Standard Tolerance = ± 0.005 except where noted, $\phi = \pm 0.015$

Dimensions in inches (mm)

D-Subminiature Part Numbering System

Ordering Information

Example: **56-513-012-TI**



Product Series 1 = Series 100 C.O.B. 4 = Series F Ferrite 5 = Series 500 Low Profile 6 = Series 600 Hi-Density 7 = Series 700 High Performance Filtered D-Subminiature Connectors - Standard connector F - RoHS compliant version	Shell Size Series 400, Series 100 & 500 0 = 9 Contacts 1 = 15 Contacts 2 = 25 Contacts 3 = 37 Contacts Series 600 Hi-Density 0 = 15 Contacts 1 = 26 Contacts 2 = 44 Contacts 3 = 62 Contacts 4 = 78 Contacts Series 700 0 = 9 Contacts 1 = 15 Contacts 2 = 25 Contacts 3 = 37 Contacts 4 = 50 Contacts	Line Filtering 0 = All positions same 9 = Special loading (Series 600 only)	Capacitance Value Series 400 01 = Always Series 100 02 = 100 pF 03 = 220 pF 04 = 470 pF 05 = 820 pF 06 = 1500 pF 07 = 5600 pF 08 = 50 pF 09 = 180 pF 10 = 1000 pF 11 = 2200 pF 12 = 47 nF Series 500 10 = 120 pF 11 = 440 pF 12 = 840 pF 13 = 1000 pF 14 = 1500 pF Series 600 15 = 85 pF FT 16 = 180 pF FT 18 = 1000 pF FT 19 = 4000 pF FT 20 = Insulated contact Series 700 See filter specification chart on page 149 and select part numbers from Series 700 charts pages 151-170.	Series 100 - .120 thru-hole and 15µ" gold (.38um) 3G - 30µ" gold (.76um) 5G - 50µ" gold (1.27um) SC and Straight PCBs TIB - 4-40 thread on rear of flange TIF - 4-40 thread on front of flange MIB - M3 thread on rear of flange GBL6 - for .062" boards (1.57mm) JS - Jack screws Right Angles and Adapters - No GBL attached GL - includes grounding board lock and 4-40 threads T - 4-40 threads GB - no board locks J - jack screws M - M3 thread GF - GL and jack screws Series F HD =Hi-Density (15 socket only) Series 500 TI = 4-40 threads on mounting flange (.125" hole if not selected) GBL = Grounded board lock includes 4-40 threads (available only on 90° PCB) GBLF = Grounded board lock and ferrite slab provides enhanced LC performance. (Available only on 90° PCB) Series 600 Hi-Density LI = 4-40 UNC inserts S = Solder dipped tails 50G = 50 µ (1.27 µm) gold GBL = Ground board lock Series 700 LI = 4-40 UNC inserts LIM = Metric M3.0 self-locking threads GB = Metal bracket provides ground connection, includes 4-40 self-locking threads (for right angle mount only) GBL = Grounded board lock (right angle) GBL6 = for .062" boards (straight
		Contact Type/Termination 1 = Pin to solder cup 2 = Pin to 90° PCB mount 3 = Socket to straight PCB mount 4 = Socket to 90° PCB mount 5 = Pin-socket adapter 6 = Socket to solder cup 7 = Pin to straight PCB mount Styles available for: Series 400 only 2, 3, 4, 7 Series 100 1 thru 7 Series 500 only 2, 3, 4 & 7 Series 600 only 1, 2, 3, 4, 5 Series 700 1 thru 6 Note: 1 can be Pin to solder cup or Pin to PCB for Series 700. See charts pages 151-170.		

To assist your efforts in selecting the correct Filtered Connector to meet your needs, we have developed a part numbering system. All of the standard products are shown in their respective catalog pages.

Part number **56-513-012-TI** represents a Series 500 connector with 15 contacts in a socket to straight PCB mount configuration. All connector positions have a capacitance value of 840 pF and there are 4-40 threads on mounting flange.

D-Subminiature Connector Options

Threaded Inserts

Available on Series 500, 600 & 700

- #4-40 UNC or metric M3.0 threaded inserts in mounting flanges
- Allows ease of panel-assembly
- Plated steel inserts with last thread upset for torque

Grounding Bracket

For right angle mount PCB connectors, available on Series 700

- Metal bracket in place of plastic
- Provides ground connection direct from circuit board
- Allows shell grounding to board
- Includes 4-40 threads

Stand-off with Board Lock Feature

For straight PCB connectors, available on Series 700

- Allows shell grounding to board
- Eliminates stress on filter terminations
- Tin plated brass stand-off with snap-in feature
- Available for .062" (1.57mm) or .093" (2.36mm) thick boards

Grounding Bracket with Board Lock

For right angle mount PCB connectors, available on Series 500 & 700

- Metal bracket provides grounding
- Snap-in, no hardware needed, 4-40 threads included
- For use on .062" (1.57mm) thick boards

Gold Plating

Available on Series 600 & 700

- High reliability applications, 50µ" (1.27 µm) gold over 50µ" (1.27 µm) nickel

Solder Dipped Tails

Available on Series 600 & 700 connectors

- Solder dipped tails added to standard gold flash

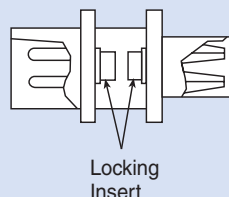
Water Block

Consult Spectrum Control engineers for specifics.

- Internally sealed in accordance with NEMA Standard Rain Test section 6.4 (also UL50 part 28 ram test for submersion, section 6.10.1)

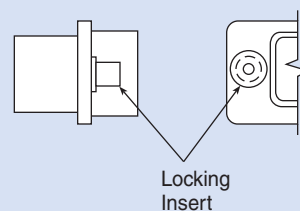
Threaded Inserts

Adapter



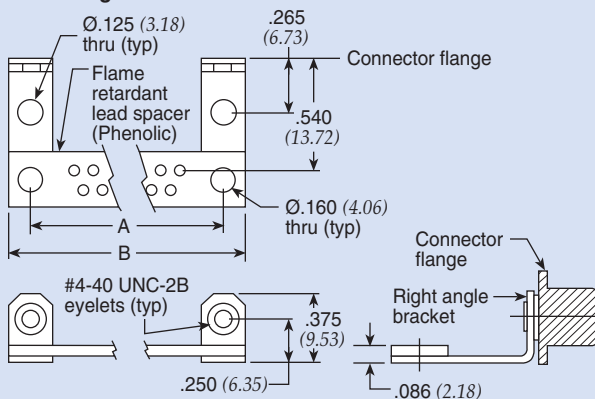
4 Places

Connector



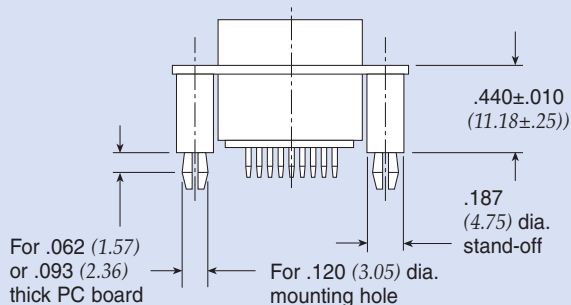
2 Places

Grounding Brackets

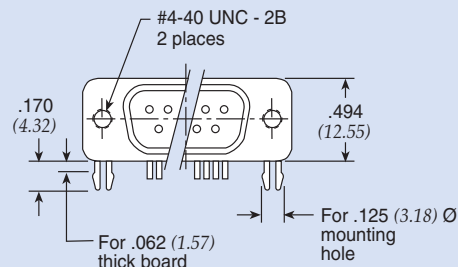


Size	A	B
9	.984 (24.99)	1.214 (30.84)
15	1.312 (33.32)	1.542 (39.17)
25	1.852 (47.04)	2.088 (53.04)
37	2.500 (63.50)	2.730 (69.34)

Stand-off with Board Lock



Grounding Bracket with Board Lock (see above for grounding bracket details)



Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors

Spectrum's line of filtered combo D-subminiatures provide high insertion loss with tubular capacitive filtering. These connectors are available with 20 Amp power contacts, 40 Amp power contacts, 50 ohm coaxial contacts or 75 ohm coaxial contacts. Configurations include male and female versions with straight PC terminals, right angle PC terminals or solder cup terminals. Standard D-sub shell sizes provide interchangeability with unfiltered connectors. High strength epoxy potting protects ceramic elements.

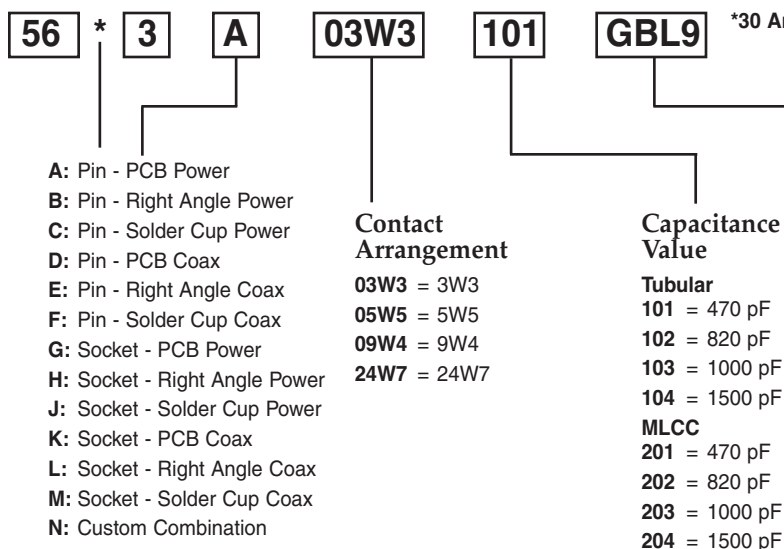
Capacitive filtering is available in 470, 820, 1000 and 1500 pF. Additional capacitance ranges and configurations can be provided upon request. Please consult factory for more information.

Applications

- Telecommunications base station equipment
- Switching and transmission equipment
- Power supplies
- Industrial equipment
- Computer work stations

Ordering Information

Example: **563A03W3101GBL9**



* Insert "F" for RoHS compliant



Mechanical Specifications

Shell	Steel, tin plated
Power Contacts	Brass, gold plated .000030 in. (0.762 μ m) minimum
Signal Contacts	Pin: brass, gold plated .000015 in. (0.762 μ m) min. Socket: copper alloy, gold plated .000030 in. (0.762 μ m) min.
Insulator	Glass-filled polyester, flammability UL94V-0
Operating Temperature	-55°C to +125°C
Capacitors	Proprietary barium titanate ceramic formulations or high voltage MLCC

Electrical Specifications

Operating Voltage	200 VDC
Current Rating*	40 Amp power/ 5 Amp signal
Insulation Resistance	1 Gohm at 100 VDC
Capacitance	470, 820, 1000, 1500, or 4000 pF (FT only) $\pm$ 20% (10 - 5000 pF available for signal pins, consult factory for part number on values above 1500 pF and below 470 pF)

Dielectric Withstanding Voltage	600 VDC
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*30 Amp available. Consult factory.

Options

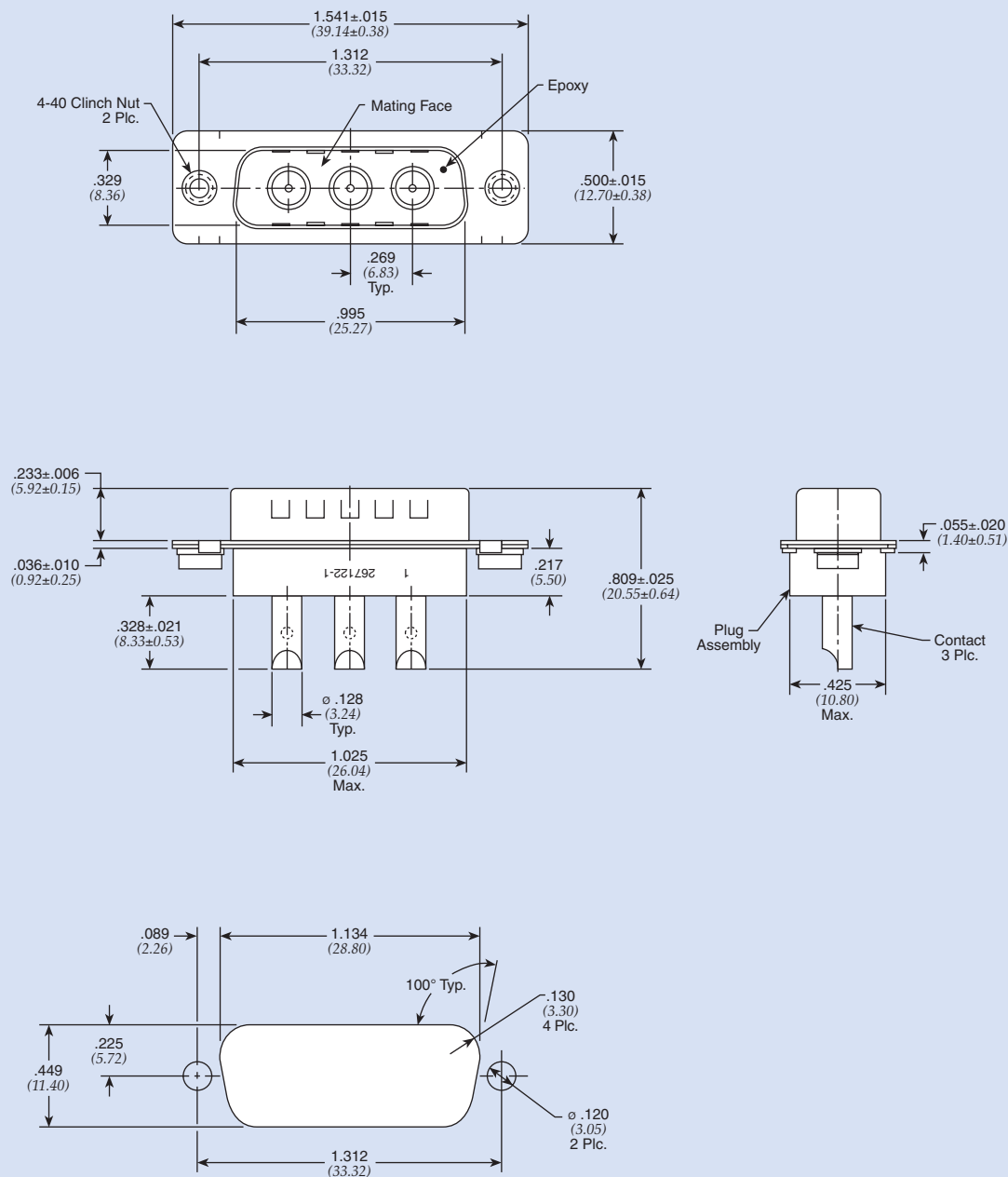
See options descriptions on page 172 add suffix ending

- LI** = 4-40 UNC inserts
- LIM** = Metric M3.0 self-locking threads
- GB** = Metal bracket provides ground connection, includes 4-40 self-locking threads (for right angle mount only)
- GBL** = Grounded board lock (right angle)
- GBL6** = for .062" boards (straight PCB mount)
- GBL9** = for .093" boards (straight PCB mount)
- 50G** = 50 μ (1.27 μ m) gold plating
- S** = Solder dipped tails
- JS** = Jackscrew mounting

For option combinations, consult factory.

Filtered Combo D-Subminiature Connectors 3W3

Plug - Solder Cup

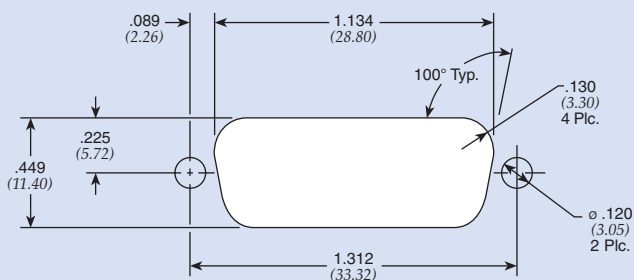
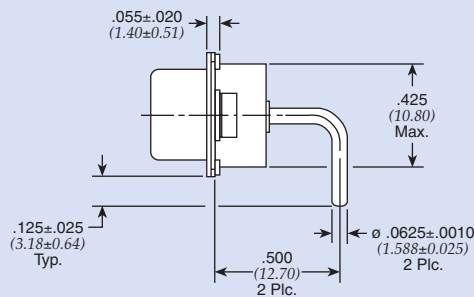
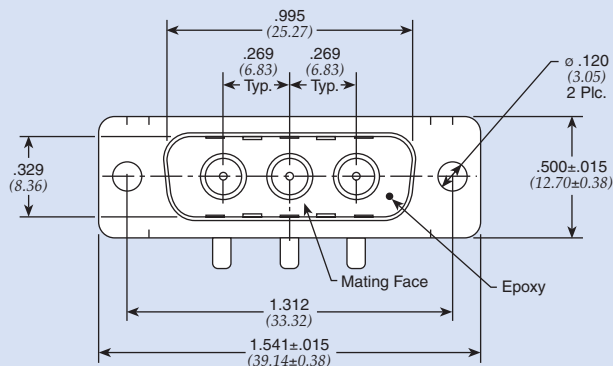
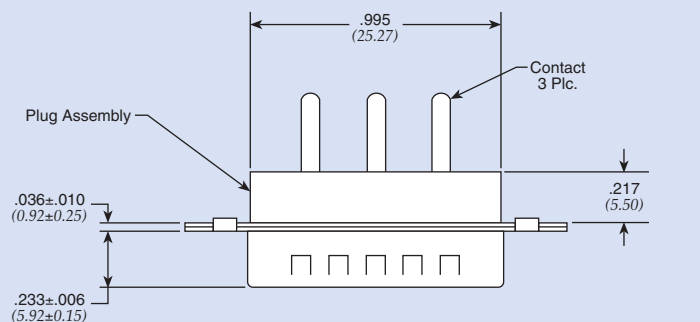


Only represents a few of our available configurations. Consult factory for more information.

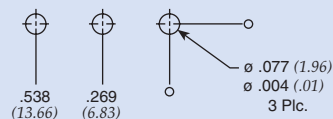
Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors 3W3

Plug - Right Angle



Recommended Panel Cutout

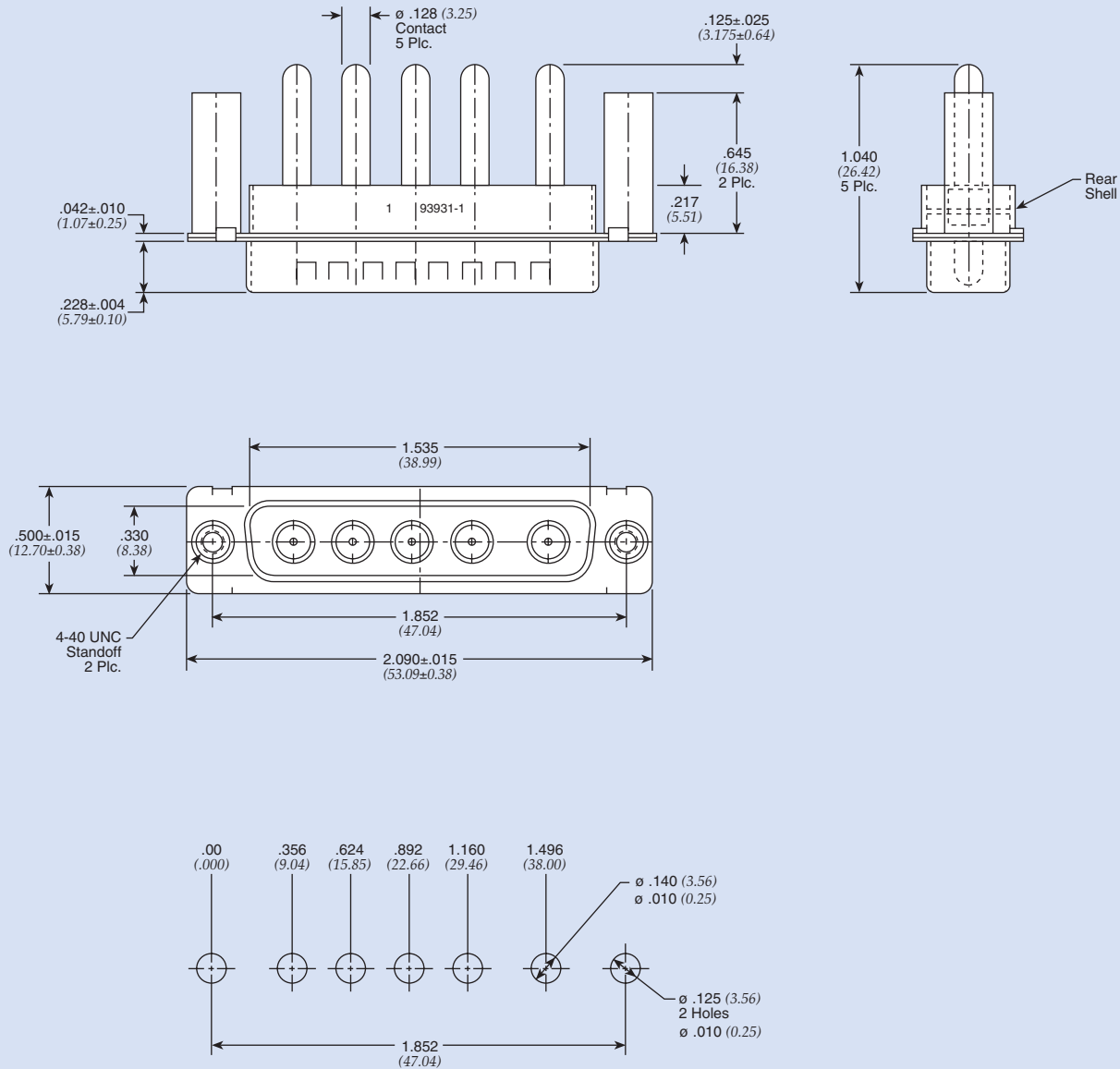


Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors 5W5

Plug - Vertical



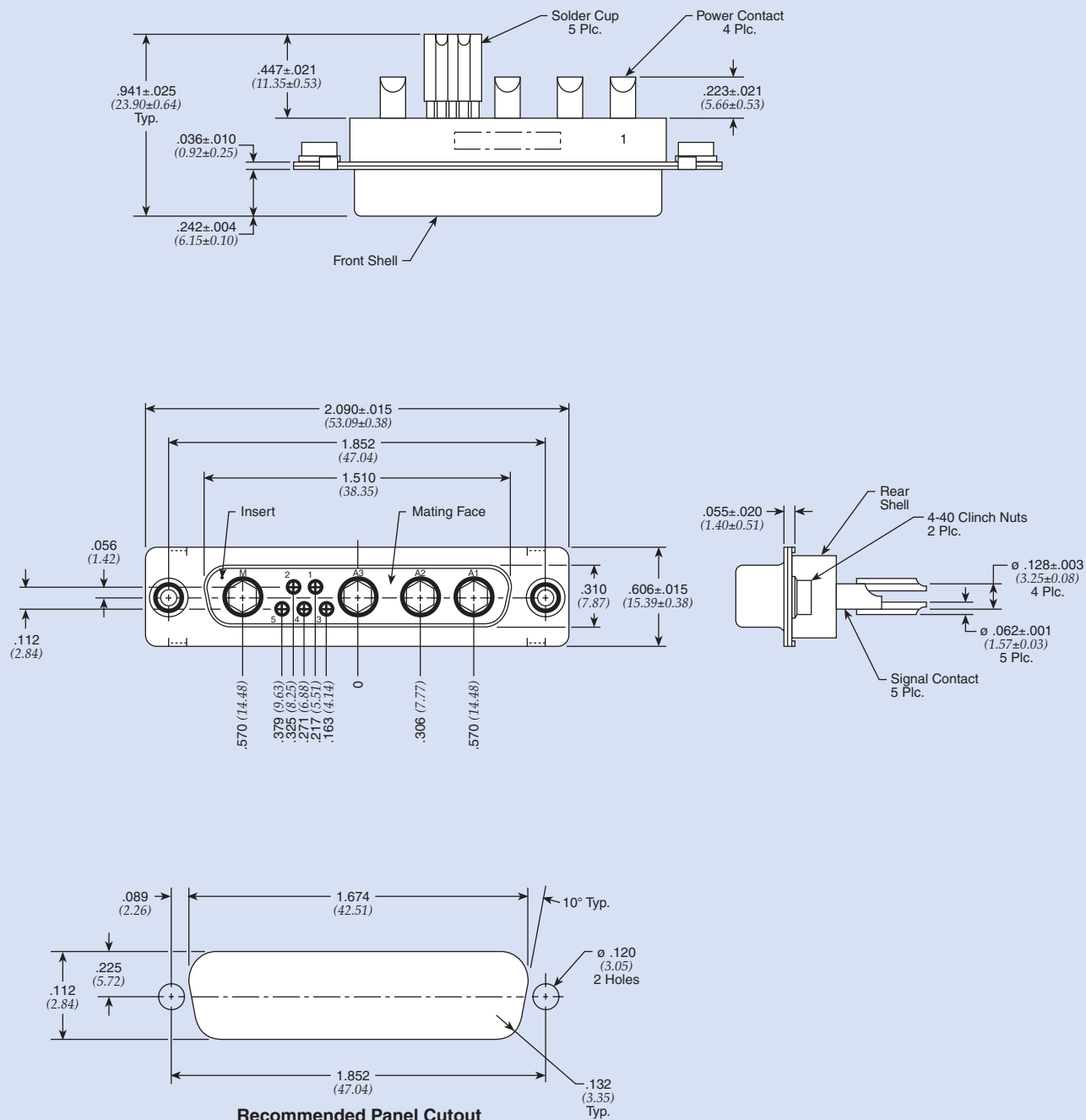
Recommended PCB Layout

Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors 9W4

Socket - Solder Cup



Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (mm)



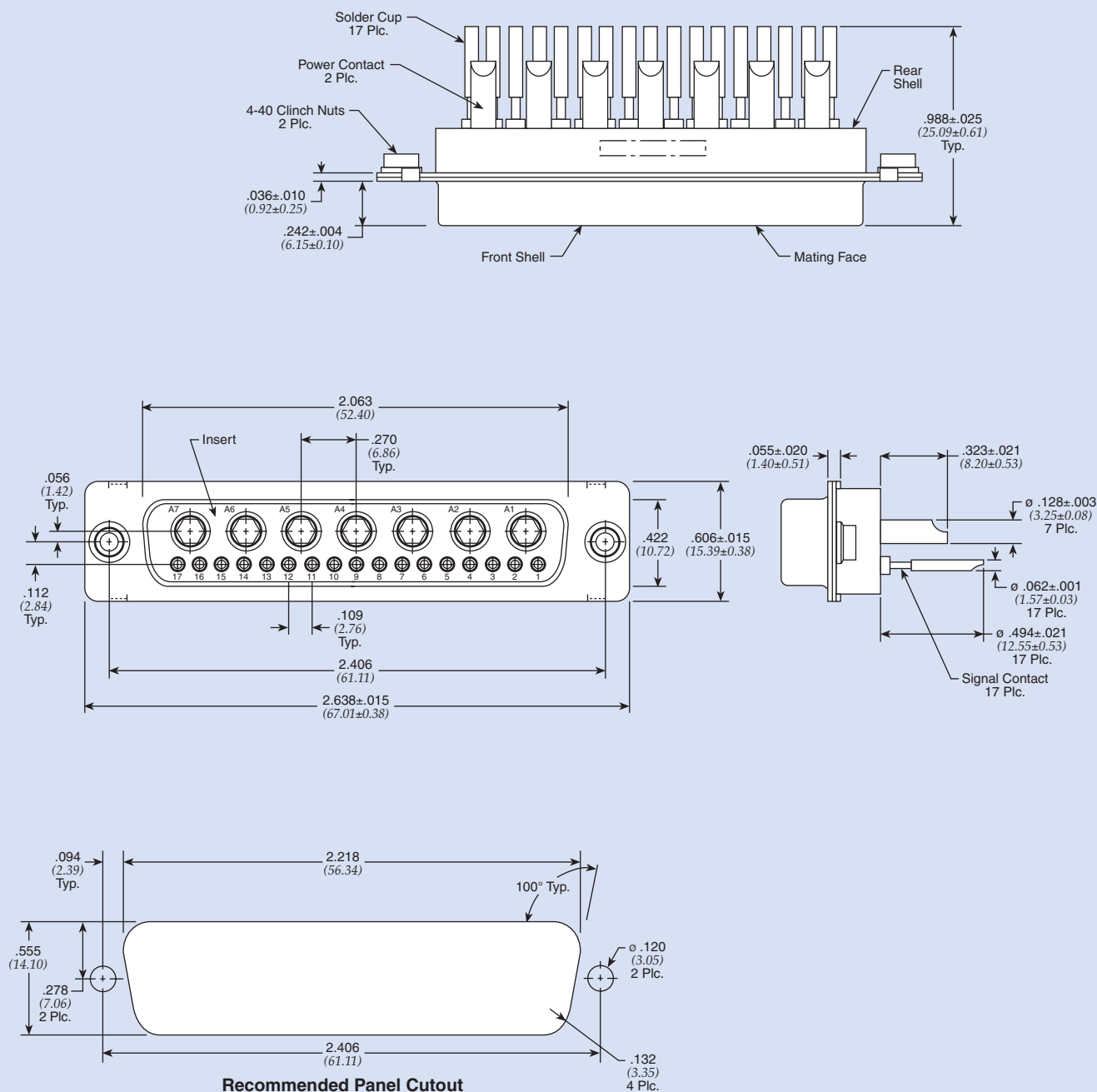
Filtered Connectors



Dimensions in inches (*mm*)

Filtered Combo D-Subminiature Connectors 24W7

Socket - Solder Cup



Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (mm)

Series E (ESD/EFT) Transient Protected Connectors

These fully integrated connectors and adapters provide protection from Electro Static Discharge (ESD) and Electronically Fast Transients (EFT) that can damage or even destroy your equipment. The connectors are designed to meet various IEC 61000-4-21, EN 61000-4-2 and IEC 61000-4 standards, and are offered in a wide range of clamping voltages to fit your specific application. The connectors have integrated ESD transient voltage suppressors from Littelfuse®, are available in industry standard sizes and are “drop in” replacements for unprotected connectors.

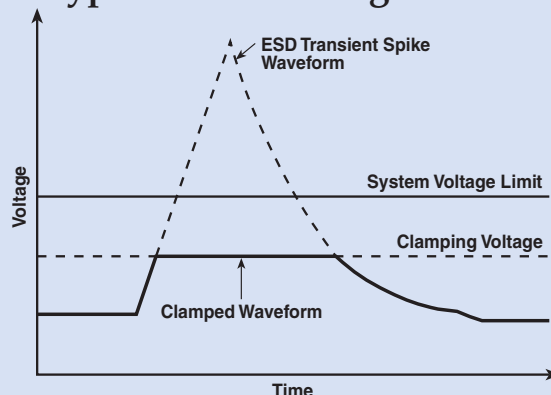
They are available with various capacitance levels to condition your signals to handle EMI issues at the same time or with as little as a 0.05 pF to protect the integrity of your signal in high speed or digital applications.

Features

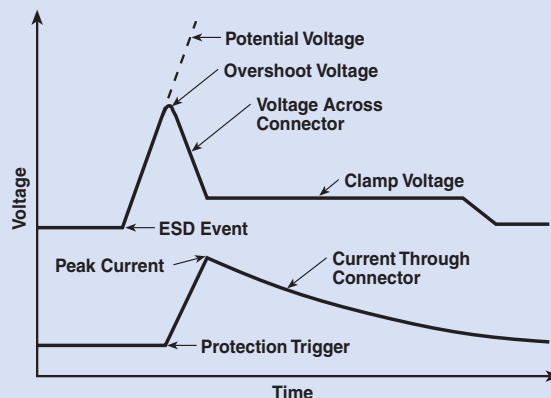
- **ESD/EFT protection at the I/O ports** – Prevents the transients from entering the system before they can cause harm or create EMI problems.
- **Low ground impedance** – The metallic shell provides minimal impedance to direct the damaging transient spikes to ground, which is essential for proper protection.
- **Removal of ground traces from the board** – This eliminates potential line-to-line noise problems and spark-overs between ground and signal lines.
- **Complete protection** – All lines, including ground lines, have bi-directional protection.
- **Efficient space utilization** – Standard footprints save valuable board space in terms of not only components, but also extra ground traces.
- **Fewer components** – Reduces total number of components purchased, stocked, placed and tested; yielding the savings of all the hidden costs involved in these activities, while reducing your supplier base.
- **Available capacitance** – Available with various capacitance values to supply low pass properties along with the transient protection, thus supplying ESD/EFT and EMI protection all in one complete package. The metal shell also provides EMI shielding of system. Parts are available with capacitance values less than 50 pF for digital and very high speed signal lines.



Typical Time-Voltage Curves



Typical Time-Voltage Curve of Transient Spike on Integrated Protected Connector with Capacitance (Parts with Working Voltage Code starting with 0)



Typical Time-Voltage Curve of Low Capacitance Integrated Protection (Parts with Working Voltage Code starting with P)

Mechanical Specifications

Front Shell	Steel, tin plated
Housing	94V-0 rated thermoplastic, black
Eyelets	Brass, tin plated
Threaded Inserts	Zinc
Boardlocks	Copper alloy, tin-lead plated
Pin Contacts	Brass
Socket Contacts	Phosphor Bronze
Contact Plating	Duplex plated as follows: 15uin (.38um) gold on mating end, with entire contact 50uin (1.27um) min. nickel underplated and flash gold finish.
Current Rating	5 Amp per pin
Operating Temp	-55°C to +125°C

Series E (ESD/EFT) Transient Protected Connectors

Ordering Information

Example: **56-E04-005-5-T**

This part number represents a Series E connector with a shell size of 9 and a socket to right angle configuration. The maximum working voltage is 5.5 VDC and the connector has a .590" footprint with 4-40 threads.

56	-	E	0	4	-	005	-	5	-	T	
		Series E (ESD/EFT) Connectors									
Integrated D-sub Connectors		Shell Size/ Number of Contacts		Contact Type/Termination		Working Voltage Code		Footprint (right angle connectors only)		Mounting or Hardware Options	
		0 - 9 size 1 - 15 size 2 - 25 size 3 - 37 size		1 - Pin to solder cup 2 - Pin to right angle 3 - Socket to straight PCB 4 - Socket to right angle 5 - Adapter (pin to socket) 6 - Socket to solder cup 7 - Pin to straight PCB		See table below. (Use 3-digit code that matches your electrical requirements)		3 - .318" 4 - .405" 5 - .590"		- .120 thru-hole and 15μ" gold 3G - 30μ" gold 5G - 50μ" gold SC and Straight PCBs (only) TIB - 4-40 thread on rear of flange TIF - 4-40 thread on front of flange MIB - M3 thread on rear of flange GBL6 - for .062" boards JS - Jack screws Right Angles and Adapters (only) - No GBL attached GL - Includes grounding board lock T - 4-40 threads GB - No board locks J - Jack screws M - M3 thread GJ - GL and jack screws	

Transient Voltage Protection with Capacitance

Immunity to IEC 61000-4-2 (ESD) up to level 4 and IEC 61000-4-4 (EFT) air and contact discharge specifications.

Working Voltage Code	Max. Working Voltage VDC	Max. Working Voltage VAC	Clamp Voltage 8 x 20 μs	Peak Current 8 x 20 μs	V breakdown 1 ma	Energy (J) 10 x 100 μs	Typical Cap. pF at 1 MHz
003	3.5	2.5	10.0@5A	120	5 (3.7-7.0)	0.3	2200
005	5.5	4.0	15.5@5A	120	8 (7.1-9.3)	0.3	1600
009	9.0	6.5	20.0@2A	40	12 (11-14)	0.1	450
012	12.0	9.0	25.0@2A	40	16 (14-18.5)	0.1	350
014	14.0	10.0	30.0@5A	120	18 (15.9-20.3)	0.3	480
018	18.0	14.0	40.0@5A	120	25 (22-28)	0.3	450
026	26.0	20.0	58.0@5A	100	34 (29.5-38.5)	0.3	190
030	30.0	25.0	65.0@2A	30	42 (37-46)	0.1	80
	>30.0	>25.0	Please consult factory for availability				

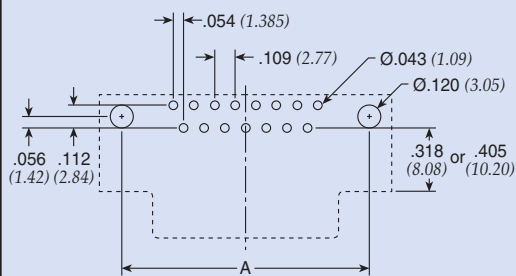
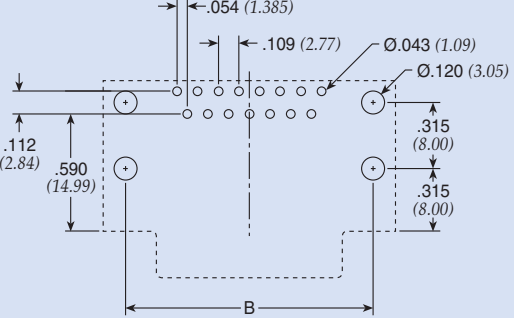
Notes: Consult factory for custom capacitance values. Typical leakage at 25°C is <25 μA
Maximum leakage 50 μA at V_{m(DC)}

Transient Voltage Protection without Significant Capacitance

Immunity to IEC 61000-4-2 (ESD) up to Level 4 air and contact discharge. Excellent for digital, high speed and high frequency signals.

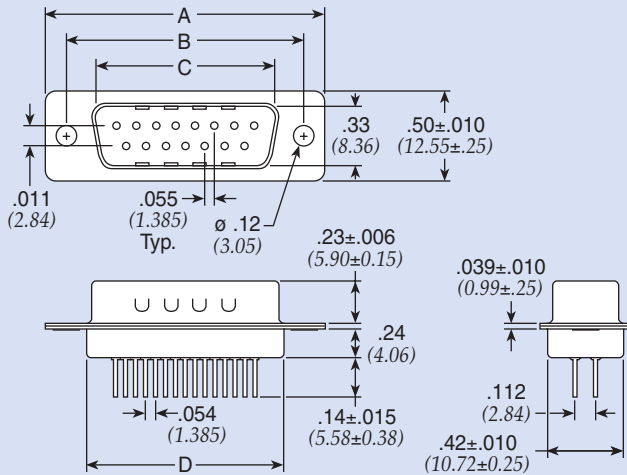
Working Voltage Code	Max. Working Voltage (V) DC	Clamp Voltage Typical	Clamp Voltage Maximum	Trigger Voltage	Leakage (A) Current	Typical Cap. at 1 MHz
P24	24.0	150.0	80.0	1000	<1.0 nA	0.05 pF

Board Layouts

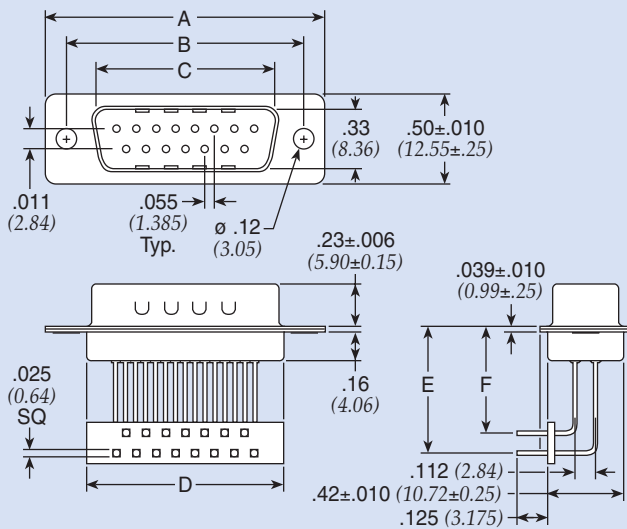
.318" and .405" Footprint Typical Layout - Top View		Shell Size	A ±.005 (±0.13)	.590" Footprint Typical Layout - Top View		Shell Size	B ±.005 (±0.13)
		9	.984 (24.99)			9	.984 (24.99)
		15	1.312 (33.32)			15	1.312 (33.32)
		25	1.852 (47.04)			25	1.852 (47.04)
		37	2.500 (63.50)			37	2.500 (63.50)
Dimensions in inches (mm)				Dimensions in inches (mm)			

Series E (ESD/EFT) Transient Protected Connectors

Pin Contact (plug) Straight PC Mount



90° PC Mount

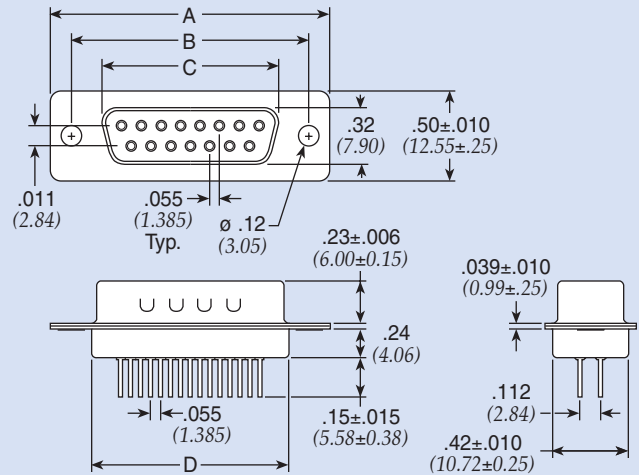


Size	A	B	C	D
9	1.213±.015 (30.81±0.38)	.984±.005 (24.99±0.13)	.667±.010 (16.92±0.25)	.755 (19.18)
15	1.541±.015 (39.14±0.38)	1.312±.005 (33.32±0.13)	.994±.010 (25.25±0.25)	1.083 (27.51)
25	2.088±.015 (53.04±0.38)	1.852±.005 (47.04±0.13)	1.534±.010 (38.96±0.25)	1.614 (41.00)
37	2.73±.015 (69.32±0.38)	2.50±.005 (63.50±0.13)	2.18±.010 (55.42±0.25)	2.27 (57.71)

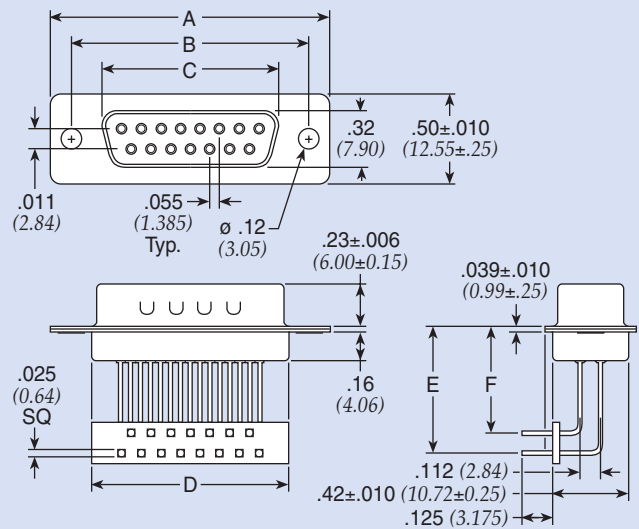
Footprint	E	F
.318	.430 (10.92)	.318 (8.08)
.405	.517 (13.13)	.405 (10.29)
.590	.700 (17.83)	.590 (14.99)

Dimensions in inches (mm)

Socket Contact (receptacle) Straight PC Mount



90° PC Mount



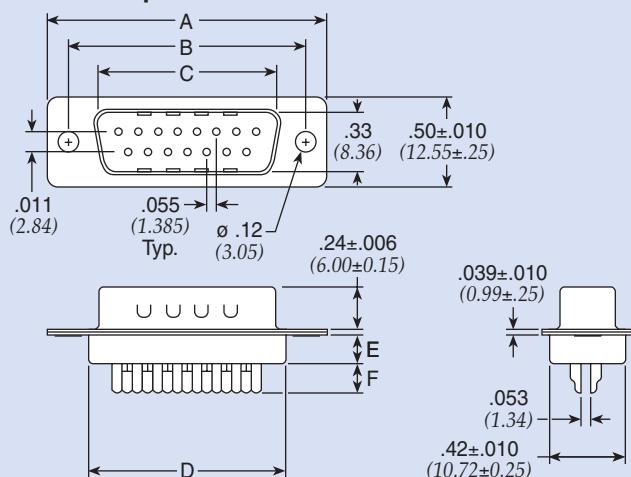
Size	A	B	C	D
9	1.213±.015 (30.81±0.38)	.984±.005 (24.99±0.13)	.643±.010 (16.33±0.25)	.755 (19.18)
15	1.541±.015 (39.14±0.38)	1.312±.005 (33.32±0.13)	.971±.010 (24.66±0.25)	1.083 (27.51)
25	2.088±.015 (53.04±0.38)	1.852±.005 (47.04±0.13)	1.511±.010 (38.38±0.25)	1.614 (41.00)
37	2.73±.015 (69.32±0.38)	2.50±.005 (63.50±0.13)	2.16±.010 (54.84±0.25)	2.27 (57.71)

Footprint	E	F
.318	.430 (10.92)	.318 (8.08)
.405	.517 (13.13)	.405 (10.29)
.590	.700 (17.83)	.590 (14.99)

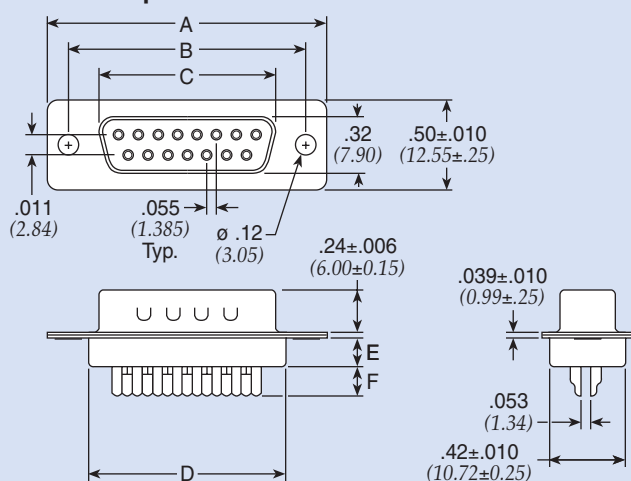
Dimensions in inches (mm)

Series E (ESD/EFT) Transient Protected Connectors

Pin Contact (plug) Solder Cup Termination



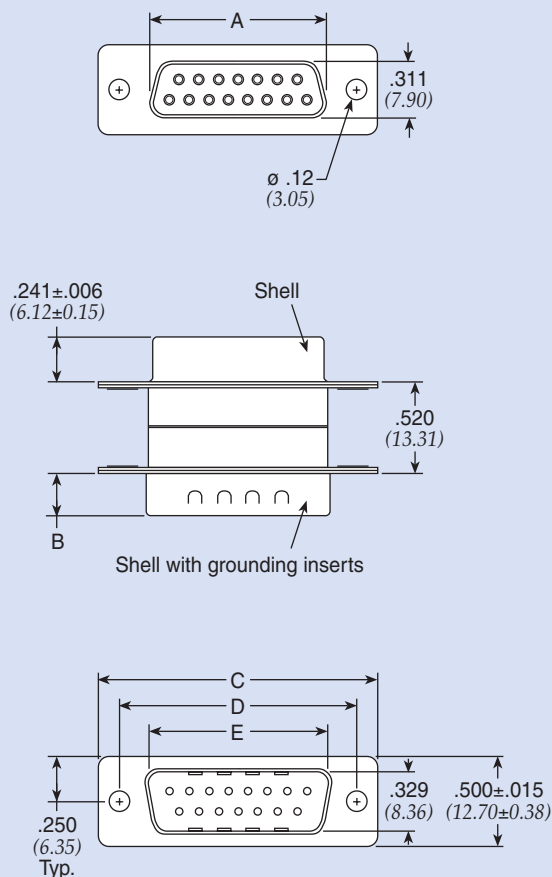
Socket Contact (receptacle) Solder Cup Termination



Size	A	B	C	D	E	F
9	1.213 $\pm$.015 (30.81 $\pm$ 0.38)	.984 $\pm$.005 (24.99 $\pm$ 0.13)	.643 $\pm$.010 (16.33 $\pm$ 0.25)	.755 (19.18)	.16 (4.06)	.16 (4.06)
15	1.541 $\pm$.015 (39.14 $\pm$ 0.38)	1.312 $\pm$.005 (33.32 $\pm$ 0.13)	.971 $\pm$.010 (24.66 $\pm$ 0.25)	1.083 (27.51)	.16 (4.06)	.16 (4.06)
25	2.089 $\pm$.015 (53.04 $\pm$ 0.38)	1.852 $\pm$.005 (47.04 $\pm$ 0.13)	1.511 $\pm$.010 (38.38 $\pm$ 0.25)	1.615 (41.00)	.16 (4.06)	.16 (4.06)
37	2.73 $\pm$.015 (69.32 $\pm$ 0.38)	2.50 $\pm$.005 (63.50 $\pm$ 0.13)	2.16 $\pm$.010 (54.84 $\pm$ 0.25)	2.27 (57.71)	.16 (4.06)	.16 (4.06)

Dimensions in inches (mm)

Pin - Socket Adapter



Size	A	B	C	D	E
9	.642 (16.31)	.233 $\pm$.006 (5.92 $\pm$.15)	1.213 $\pm$.015 (30.81 $\pm$.38)	.984 (24.99)	.667 (16.94)
15	.970 (24.64)	.233 $\pm$.006 (5.92 $\pm$.15)	1.541 $\pm$.015 (39.14 $\pm$.38)	1.312 (33.33)	.995 (25.27)
25	1.511 (38.38)	.228 $\pm$.006 (5.80 $\pm$.15)	2.088 $\pm$.015 (53.04 $\pm$.38)	1.852 (47.05)	1.532 (38.92)
37	2.158 (54.82)	.228 $\pm$.006 (5.80 $\pm$.15)	2.729 $\pm$.015 (69.32 $\pm$.38)	2.500 (63.50)	2.183 (55.45)

Dimensions in inches (mm)



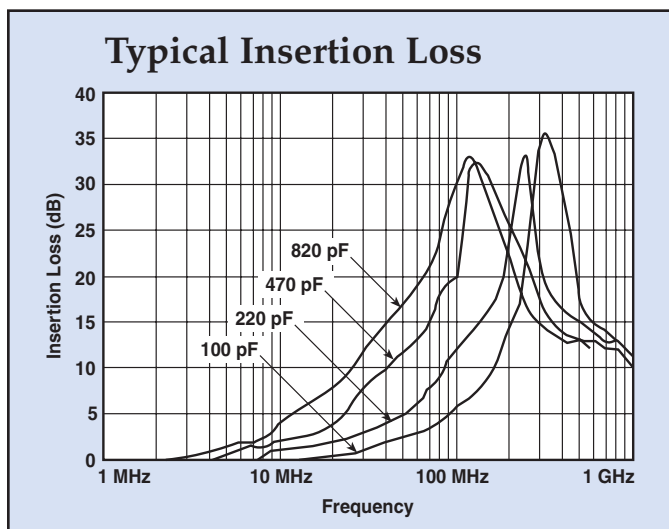
Filtered Miniature Ribbon Connectors

Filtered miniature ribbon connectors are fully intermateable and interchangeable with existing standard product. Rugged design construction and predictable capacitive filter performance is available in right-angle and male/female adapter versions.

Applications for this type of connector are widely diversified and include all phases of the telecommunications industry including original telephone manufacturing, operating telephone companies, cable reclamation, cable manufacturing and bay connectorization. The filtered miniature ribbon connector line is also ideally suited for use in printers, computer terminals, test equipment, business and copying machines, telemetering, and various equipment used in the security industry.

Features

- Lower installed cost
- Assists with FCC Part 15; available for Part 68 requirements
- Applicable for VDE specifications 0871, 0875-0878, Vfg Federal Regulations and VCCI noise requirements
- Drop-in replacement, matched footprint
- All circuit lines filtered
- Connector body is recognized under the Component Recognition Program of Underwriters Laboratories, Inc.
- Plastic components are UL94V-0 rated
- Connector body is certified by Canadian Standard Association



Electrical Specifications

Operating Temperature	-55°C - 105°C
Dielectric Withstanding Voltage	1000 VAC min per (FCC Part 68 test)
Capacitance	100 pF, 220 pF, 470 pF, 820 pF, ±15% (adapter), ±20% (connector)
Dissipation Factor	2.5% max (adapter) 5% max (connector)

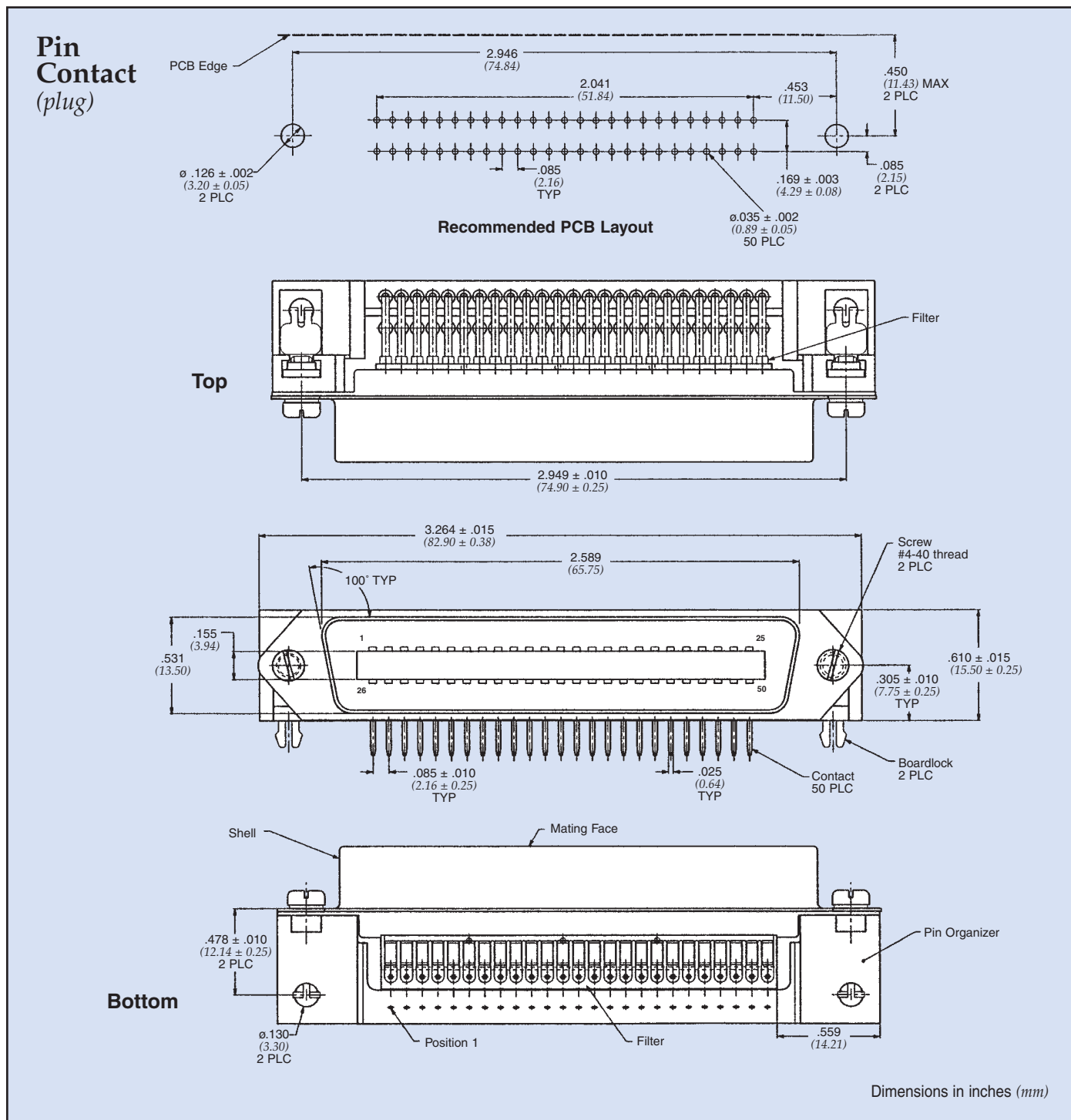
Mechanical Specifications - Adapter

Shell	Zinc
Thermoplastic	
Insert.	Black, high strength
Contacts	Copper alloy
Contact Plating	30uin (.76um) (min.) gold over nickel

Mechanical Specifications - Connector

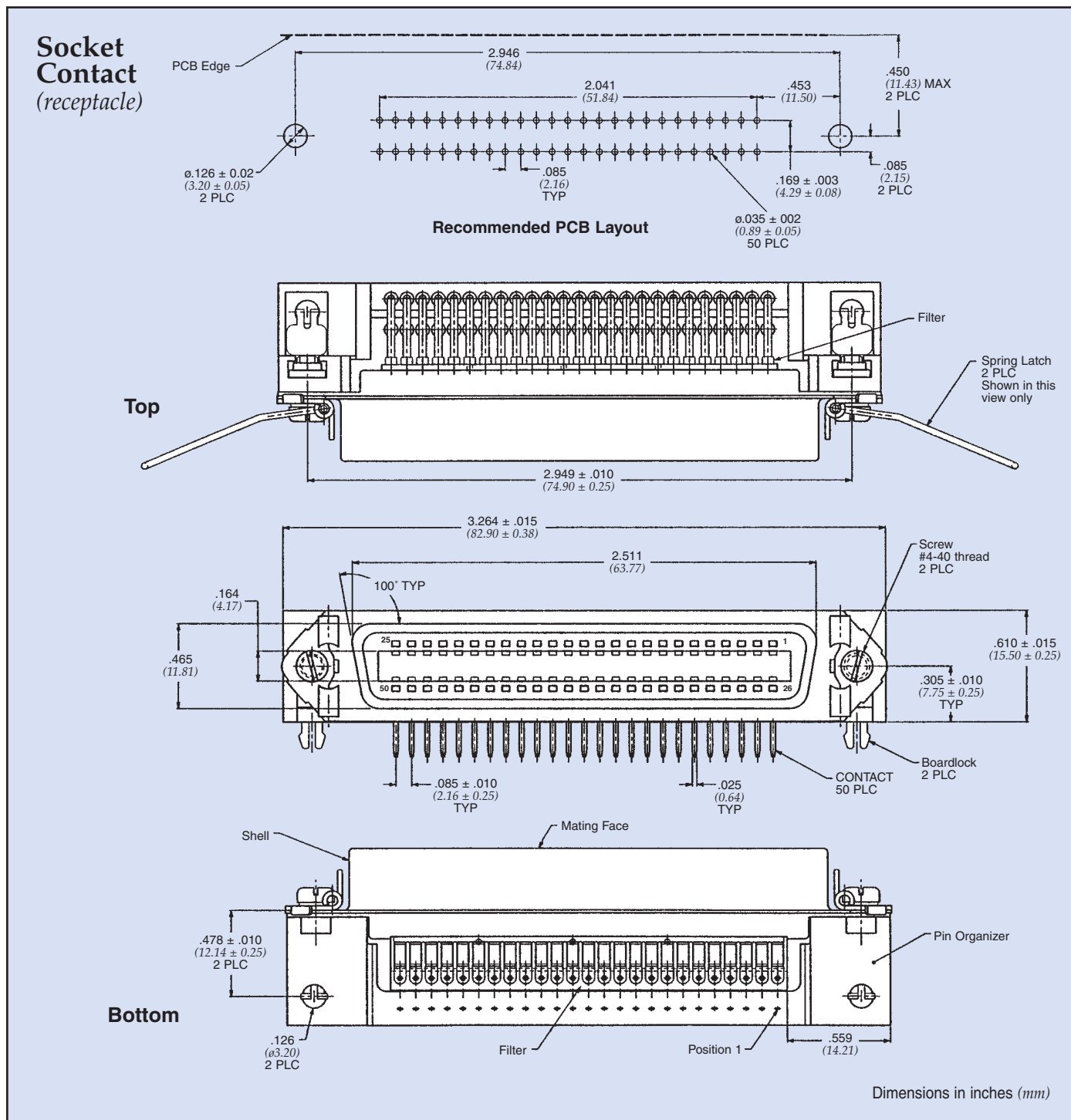
Shell	Steel, tin plated
Thermoplastic	
Insert	Blue, 30% glass filled
Contacts	Phosphor bronze
Contact Plating	Gold flash (<10 μ in) over nickel

Filtered Miniature Ribbon Connectors 50 Position



Part Number	Capacitance Value
56-882-002	100 pF, $\pm$ 20%
56-882-003	220 pF, $\pm$ 20%
56-882-004	470 pF, $\pm$ 20%
56-882-005	820 pF, $\pm$ 20%

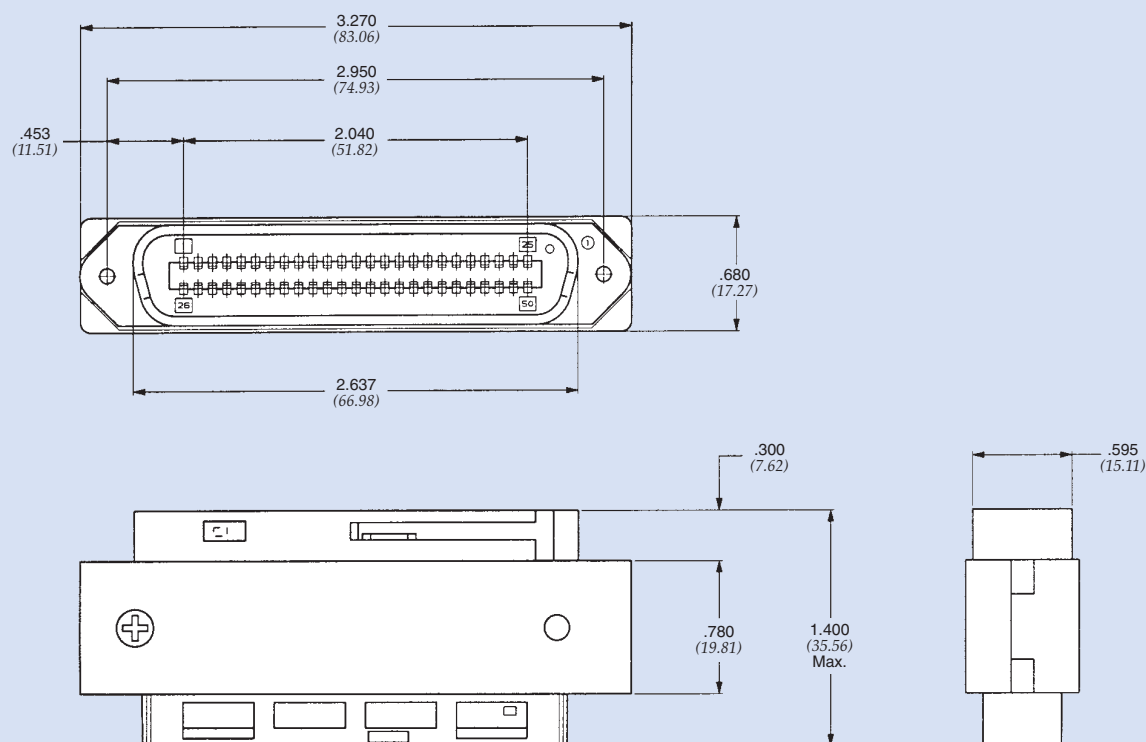
Filtered Miniature Ribbon Connectors 50 Position



Part Number	Capacitance Value
56-886-002	100 pF, $\pm 20\%$
56-886-003	220 pF, $\pm 20\%$
56-886-004	470 pF, $\pm 20\%$
56-886-005	820 pF, $\pm 20\%$

Filtered Miniature Ribbon Connectors 50 Position

Adapter



Dimensions in inches (mm)

Part Number	Capacitance Value
56-889-002	100 pF ±15%
56-889-003	220 pF ±15%
56-889-004	470 pF ±15%
56-889-005	820 pF ±15%

Hardware options also available. Consult factory for more information.

Filtered Modular Jack Connectors

Protecting signals from electromagnetic interference (EMI) is now more important than ever. Spectrum Control gives you more choices in keeping your signals clean and free of EMI. Whatever the level of protection your application requires, we offer signal conditioning products that meet any level of price and performance.

These compact, low-cost, filtered printed circuit board RJ45 modular jack connectors from Spectrum Control offer an inexpensive way to protect equipment from conducted and radiated electromagnetic interference (EMI), while meeting all appropriate performance requirements. Offering compact size and high reliability, these new connectors are fully interchangeable and interchangeable with existing standard product. The low profile and narrow width of the multi-port style allows more ports to be packed into less space.

Ferrite filtered versions can be supplied in fully shielded, partially shielded or unshielded versions. Redundant shielding tabs ensure that a low impedance ground path is maintained across the interface; tabs are available in board-ground or panel-ground versions, with panel-ground jacks also incorporating board-ground legs. These flame retardant polyester thermoplastic connectors are compatible with wave solder environments, and employ duplex plated contacts with solder tails.

Modular jack connectors assist with FCC Part 15 A & B; and CISPR 22 compliance.

Applications for this type of connector are widely diversified and include: LANs, WANs, network cards, broadband transmission equipment, workstations, peripherals, fax/modems, copy machines and multiplexing.

Features

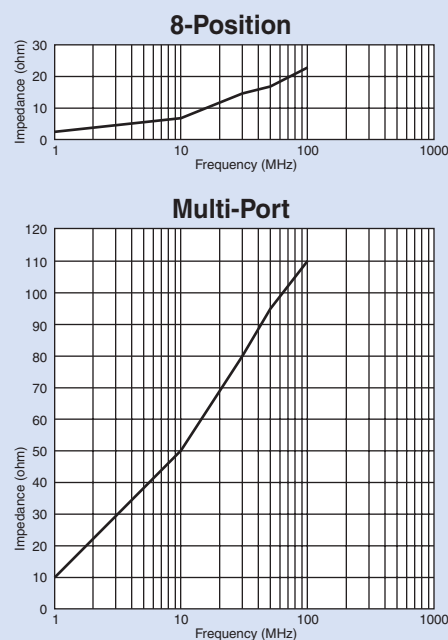
- Lower installed cost
- Assists with FCC Part 15 A & B; and CISPR 22 compliance
- Drop-in replacement, matched footprint
- All circuit lines protected
- Inductor or capacitor versions
- Available with two grounding options – PCB or parallel
- Unshielded, partial or fully shielded versions
- Certified by Canadian Standards Association File No. LR 7189
- Certified by Underwriters Laboratories, Inc., File Number E81956



Equivalent Circuit (Ferrite Version)



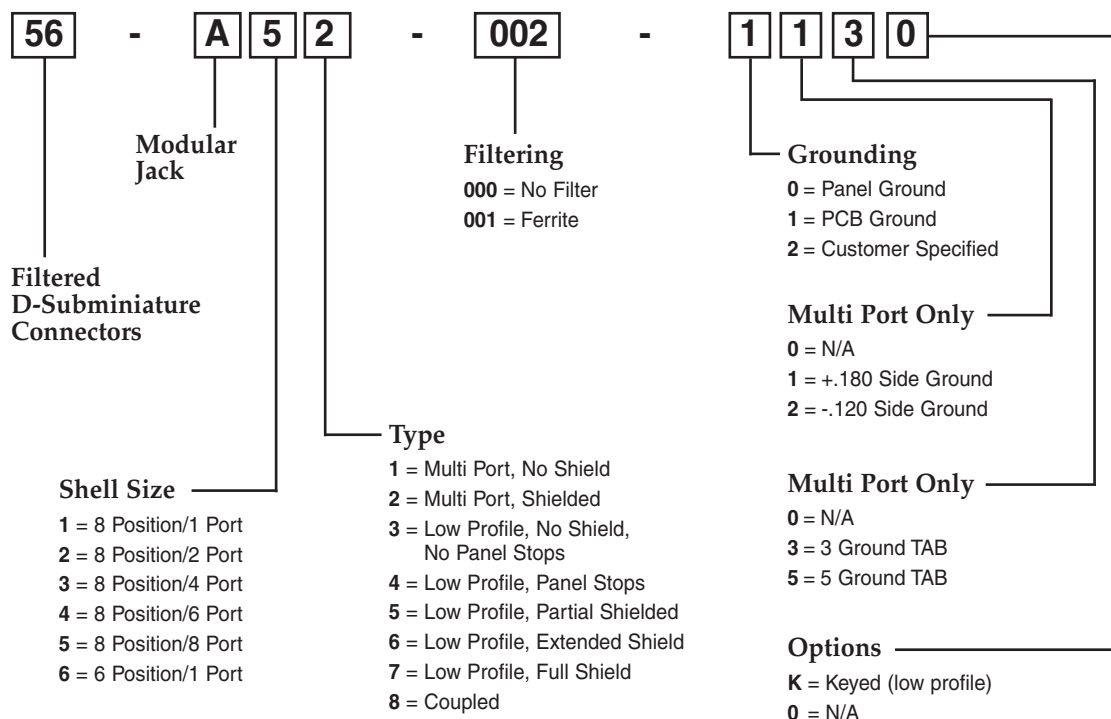
Typical Impedance vs. Frequency (Ferrite Version)



Filtered Modular Jack Connectors

Ordering Information

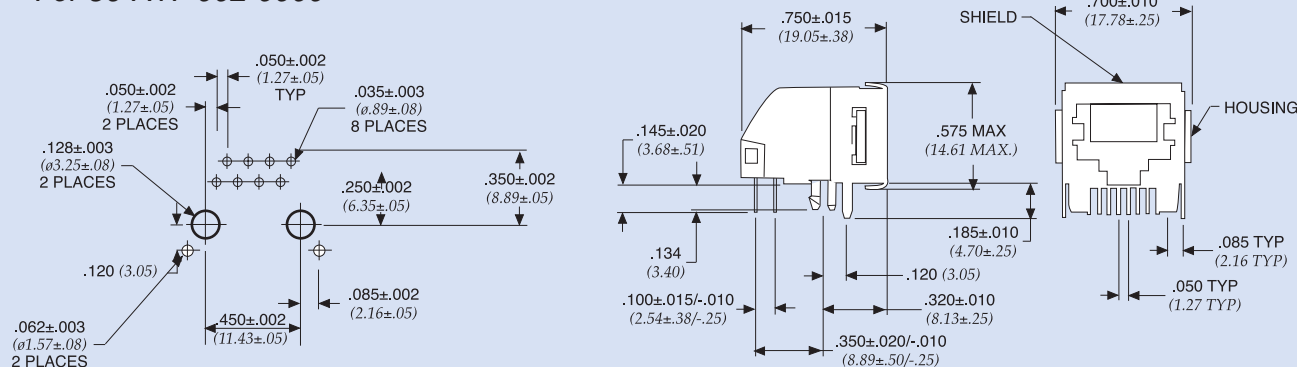
Example: **56-A52-002-1130**



Note: Not all configurations available for every size, consult factory for availability

Typical Dimensions

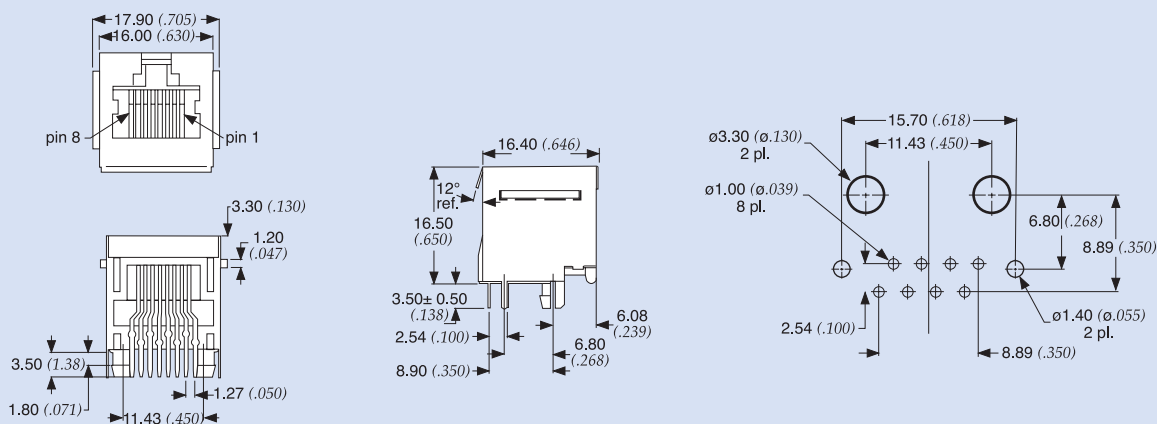
For 56-A17-002-0000



Dimensions in inches (mm)

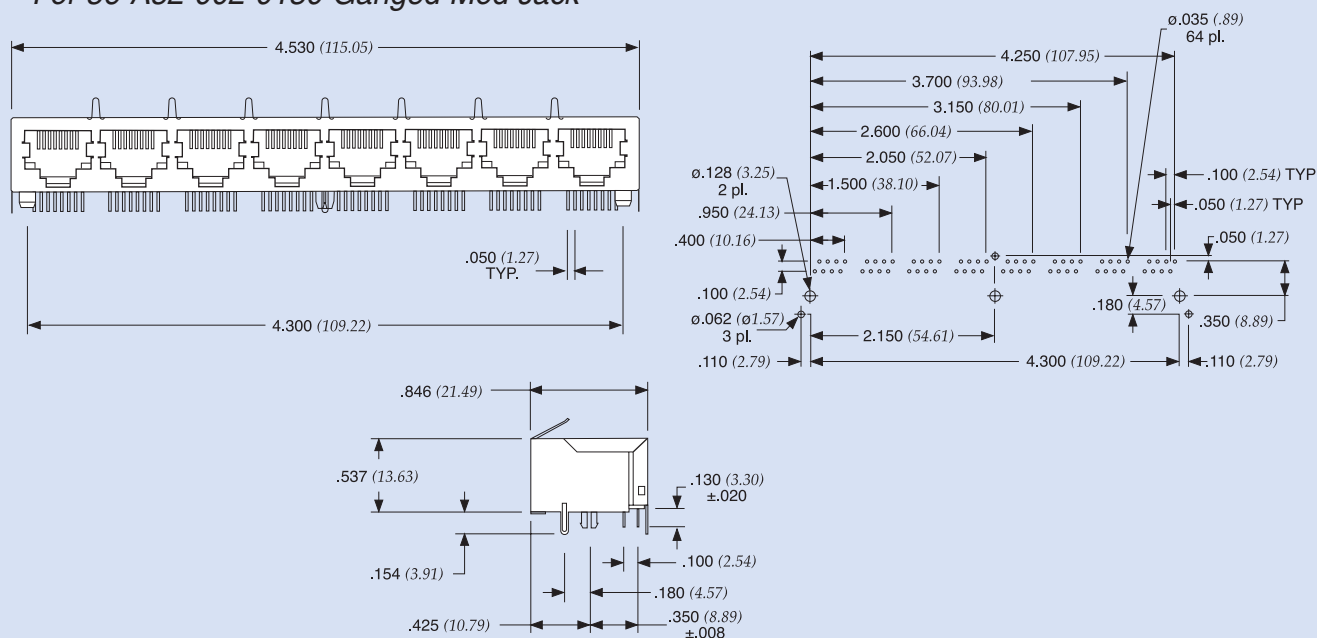


For 56-A18-005-1000 Vertical Mod Jack



Dimensions in inches (*mm*)

For 56-A52-002-0130 Ganged Mod Jack



Dimensions in inches (*mm*)

Filtered Mini-DIN Connectors

Filtered mini-DIN connectors are available in several configurations and sizes. These are "drop-in" replacements for standard unfiltered connectors with matched footprints. Housings are made of high temperature UL94V-0 rated thermoplastic material. Connectors are available with full metal shields and kinked or straight ground tabs. Each size can be shielded or filtered with ferrites.

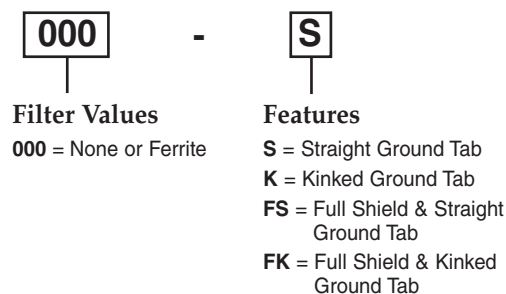
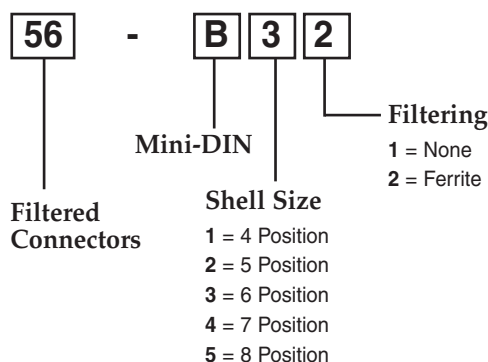
Primary applications are in computer keyboard and mouse connections.

Features

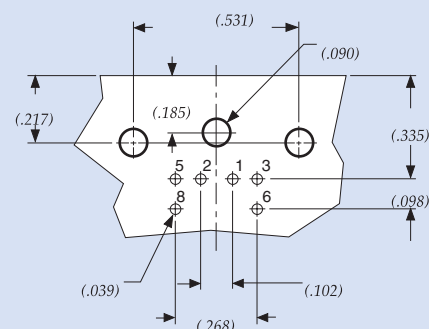
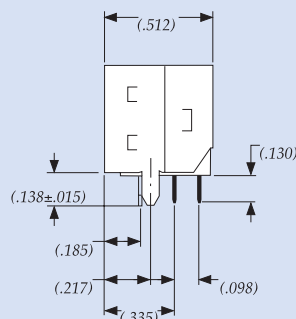
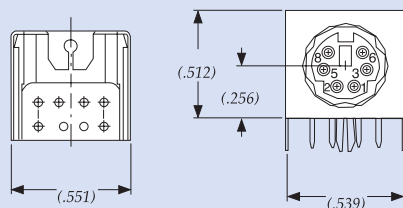
- Audio, video and computer equipment
- Drop-in replacement for unfiltered connectors
- Shielded, ferrite or capacitive filtering

Ordering Information

Example: **56-B32-000-S**



Typical Dimensions For 56-B32-000-S



RECOMMENDED PC BOARD LAYOUT

Dimensions in inches (mm)

Specifications

<i>Contacts</i>	Copper alloy, gold over nickel plating
<i>Shield</i>	Brass, tin plated
<i>Housing</i>	94V-0 rated thermoplastic, black
<i>Current rating</i>	1A @ 12 VDC
<i>DWV</i>	500 VDC
<i>Insulation Resistance</i>	500MOhms min
<i>Operating Temp</i>	-25°C to +70°C
<i>Typical Ferrite Impedance</i>	20-22 Ohm @ 100 MHz
<i>Typical insertion loss</i>	32 db @ 200 MHz

EMI & ESD Protection @ the USB Connector



The industry wide adoption of connector standards for computer peripherals has helped facilitate the explosion of consumer electronics technology. The resulting Universal Serial Bus (USB) connector allows for high-speed, easy connection of an ever-increasing range of peripherals to a PC and to each other.

Today, there are several standards governing USB connectors. The original USB 1.0 has been supplemented by USB 2.0, which passed in 2000. USB 2.0 allows for significantly higher data transfer rates, 480 megabits per second (MPS) vs. only 12 MPS under USB 1.0. Additionally, in 2002 USB On-The-Go (OTG) was introduced to further extend these connectors to dual-role devices that can act as a host or peripheral. All of these standards have yielded devices that are much easier to install and can be freely connected and disconnected without rebooting the computer system.

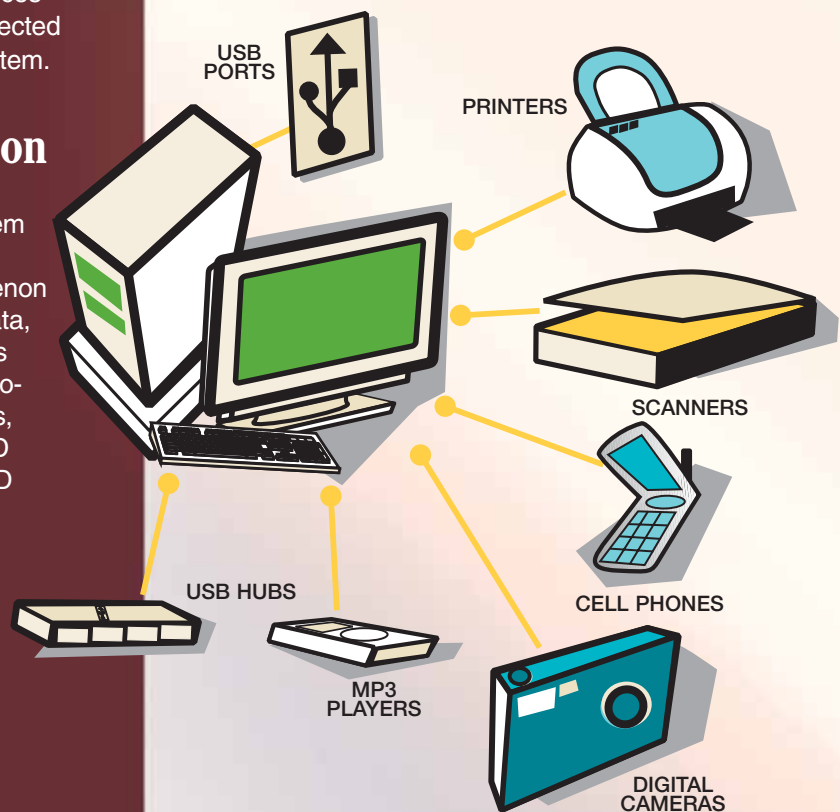
The Need for EMI & ESD Protection

Inherent in the development of more plug-and-play devices with hot-plug capability is greater risk of system exposure to electromagnetic interference (EMI) and electrostatic discharge (ESD). Both of these phenomenon can cause transmission signal degradation, loss of data, system lock-up, and permanent hardware damage. As system circuitry has gotten more complex to accommodate faster transfer speeds and smaller package sizes, greater potential exists for damage from EMI and ESD occurrences. The USB 2.0 spec calls for EMI and ESD protection according to industry specifications. This protection has become more of a challenge as less space is available for components and smaller IC chips are more susceptible to low level damage.

A Better Solution... Filtering at the Connector

Spectrum Control has developed a series of USB connectors that incorporates EMI and ESD filters into an industry standard USB package. By moving the EMI filtering or ESD protection to the USB connector, designers can free-up valuable PC board space for other components and provide better protection for the entire device. These connectors are drop-in replacements for unfiltered connectors making them ideal solutions for the ongoing miniaturization of peripheral devices. Spectrum's EMI filtered and ESD protected USB connectors also can eliminate the need to redesign PC boards in the event of noncompliance during either EMC or ESD testing. Various models of these connectors meet the requirements of USB 1.1 or USB 2.0 specifications and all are RoHS compliant.

Plug-and-Play Devices put your computer at RISK!



Applications

- EMI/RFI Sensitive Electronics
- Test and Measurement Equipment
- Notebook Computers & Peripherals
- Home Entertainment & Multimedia
- Industrial Controls
- Data Acquisition

EMI Filtered USB Connectors Series USB-F

Electrical Specifications

Operating Temperature -55°C to +125°C

Working Voltage 5 VDC

Current Rating 1 Amp max.

Contact Resistance 30 mΩ max.

Temperature Range -40°C to +71°C

Capacitive Filtered

Capacitance 100pF

Dielectric withstand voltage 125VDC

Inductive Filtered

Common mode impedance 90Ω ±25%

@ 100MHz

IR 10 MΩ min.

DC Resistance 0.30 Ω max.

Material

Shell: Brass, nickel plated

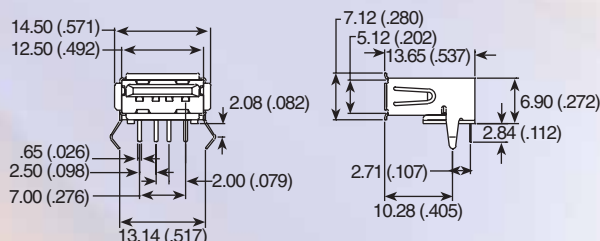
Insulator: Thermoplastic, UL94V-0, reflow compatible

Contacts: Phosphor bronze, gold flash over nickel

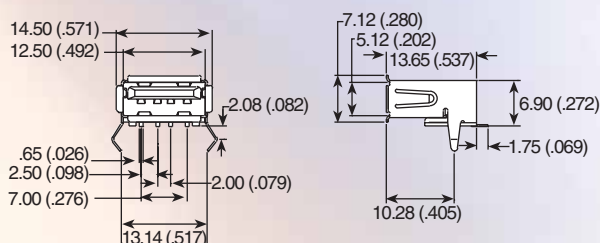


Capacitive Filters for USB 1.1

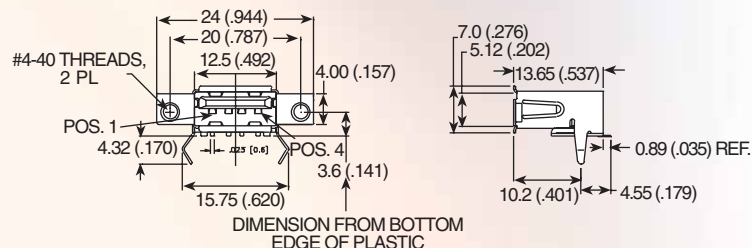
56FU04-004 - socket right angle through hole connector



56FU04-004SM - socket-right angle surface mount connector



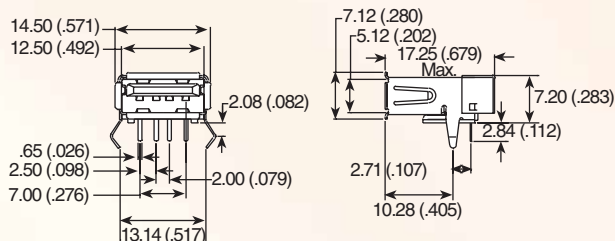
56FU04-004TPM - socket right angle through hole connector with panel mount tabs



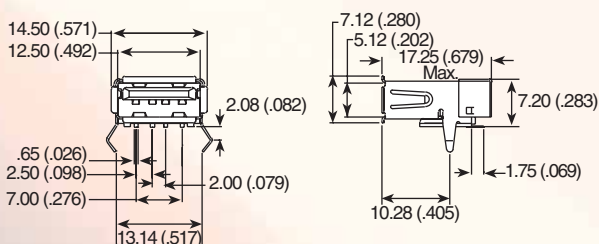
Note: Additional capacitor values available. Consult factory.

Inductive Filters for USB 2.0

56FU04-020 - socket right angle through hole connector



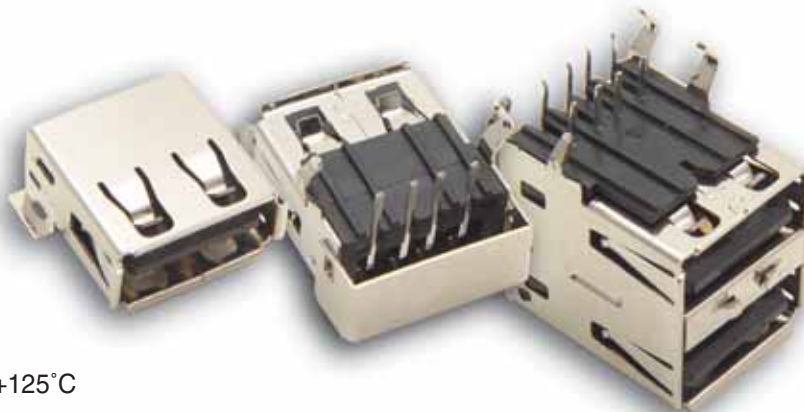
56FU04-020SM - socket-right angle surface mount connector



Note: ESD protection can be added to the 2.0 versions as an option

Custom styles and configurations available. Consult factory.

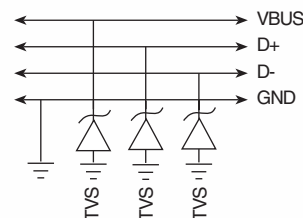
ESD Protected USB Connectors Series USB-E



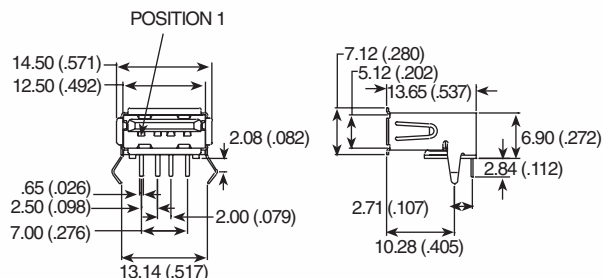
Electrical Specifications

Operating Temperature -55°C to +125°C
Working Voltage 5 VDC
Current Rating 1 Amp max.
Contact Resistance 30 mΩ max.
Temperature Range -40°C to +71°C
Reverse standoff voltage 5 Volts
Reverse breakdown voltage 6 Volts
Clamping voltage $I_{pp}=1A$, $t_p=8/20\mu s$, 9.8 Volts
 (15 Volts for 56FU24-E01)
Junction capacitance, I/O to GND .. 10pF max.
 (3pF max. for 56FU24-E01)

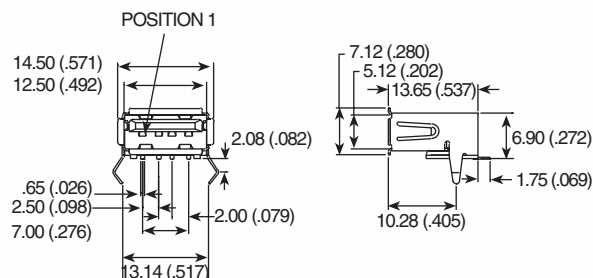
Protection Schematic



56FU04-E01 - socket-right angle through hole connector with TVS diodes



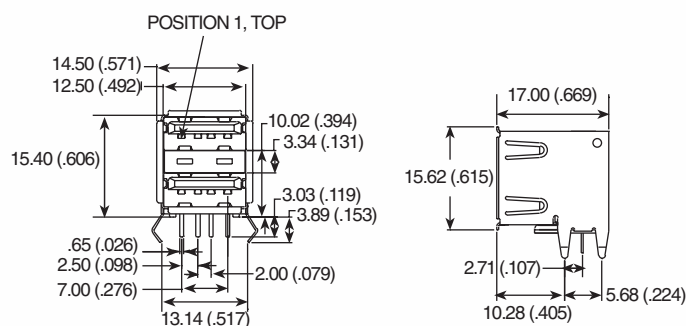
56FU04-E01SM - socket right angle surface mount connector with TVS diodes



Material

Shell: Brass, nickel plated
Insulator: Thermoplastic, UL94V-0, reflow compatible
Contacts: Phosphor bronze, gold flash over nickel

56FU24-E01 - stacked socket-right angle through hole connector with TVS diodes



Custom styles and configurations available. Consult factory.

D-Subminiature Adapter Test Kit & Hardware

Adapter Test Kit

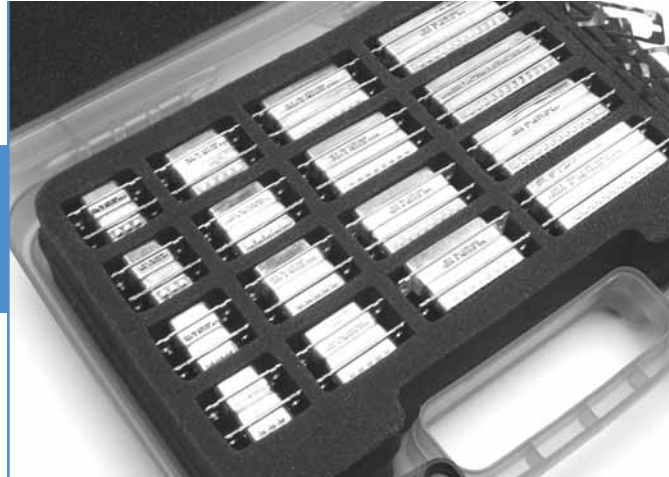
Specially designed for EMI evaluation process

- Male/female adapter part
- Easily plugged into equipment under testing conditions
- Ideal for new products and retrofitting
- Each adapter test kit includes:
 - 20 filtered adapters
 - Four shell sizes 9, 15, 25 and 37
 - Four filter ranges:

Series 700	Series 100
- 310 pF Pi	- 100 pF
- 830 pF FT	- 470 pF
- 1000 pF Pi	- 1000 pF
- 4000 pF Pi	- 5600 pF

Ordering Information

Description	Spectrum Part Number
Adapter test kit	56-700-002
Adapter test kit with Jackscrew <i>Includes 40 pcs. 56-201-006</i>	56-700-002-JS
Hexagonal Spacer	56-201-001 (1 per)
Jackscrew Mounting Hardware <i>For .312" (7.92 mm) length</i>	56-201-004 (1 per)
Jackscrew Mounting Hardware <i>For .688" (17.47 mm) length</i>	56-201-006 (2 per)
Series 100 adapter test kit	56-100-002
Tubular Spacer	56-201-003 (1 per)



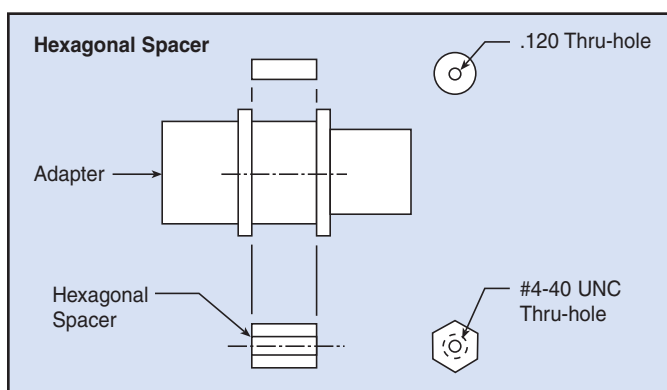
Adapter Test Kit

Hardware

Designed to provide simple and effective mounting

Hexagonal Spacer

- Tapped spacer fits between flanges
- Provide retrofit of 4-40" threads
- Two spacers per adapter required, packaged in bulk



Jackscrew Mounting Hardware

- Male/female jackscrews
- Standard 4-40 threads for compatibility
- Two male thread lengths available
- Two screws per adapter required
- Lockwasher included, packaged in bulk

Waved Metal Gaskets

Proper mounting of an EMI filter is critical to achieving optimum filtering performance. For applications requiring very high attenuation, it is necessary to fill the gaps at the mounting surface-to-connector interface. The length of any gap must be short, relative to the wavelength of the signal to be attenuated. Spectrum Control supplies a line of "waved" gaskets. This design ensures the maximum "gap length" will not exceed the wave pitch, .200" (5.08mm), even on surfaces with poor flatness. This ensures maximum filter performance to 1GHz and beyond.

Specifications

Material Beryllium Copper, CA 172
(per QQ-C-533)

Finish -70 Electro tin plate, 100 micro
inches (per MIL-T-10727)
NI nickel plated, AU gold plated

Material

Thickness005" (.13mm) compressed

Wave

Height030"+.020/-0.015
(.76+.51/-0.38mm)

Length increase
when flattened 0.008" (.20mm) per inch

Ordering Information *Select part number by filling in "xxx": 572019-00xxx-70*

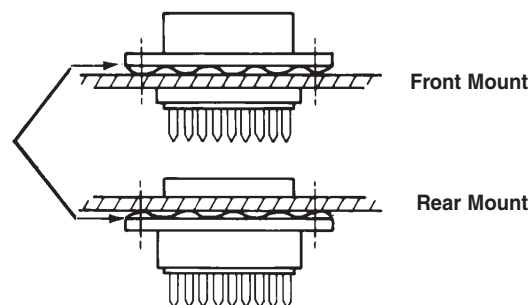
Mounting: Front mounted pin or socket connector, rear mounted pin connector.						
Shell Size	A ±.020 (0.51)	B ±.020 (0.51)	C ±.020 (0.51)	D ±.020 (0.51)	E ±.005 (0.13)	“XXX”
9	1.213 (30.81)	.984 (24.99)	.777 (19.74)	.600 (15.24)	.440 (11.18)	100
15	1.541 (39.14)	1.312 (33.32)	1.105 (28.07)	.600 (15.24)	.440 (11.18)	101
25	2.088 (53.04)	1.852 (47.04)	1.645 (41.78)	.600 (15.24)	.440 (11.18)	102
37	2.729 (69.32)	2.500 (63.50)	2.293 (58.24)	.600 (15.24)	.440 (11.18)	103
50	2.635 (66.93)	2.406 (61.11)	2.190 (55.63)	.710 (18.03)	.550 (13.97)	104

Mounting: Rear mounted socket connectors only.								
Shell Size	A ±.020 (0.51)	B ±.020 (0.51)	C ±.020 (0.51)	D ±.020 (0.51)	E ±.005 (0.13)	F ±.005 (0.13)	G ±.020 (0.51)	“XXX”
9	1.213 (30.81)	.984 (24.99)	.450 (11.43)	.660 (16.76)	.324 (8.23)	.360 (9.14)	.600 (15.24)	105
15	1.541 (39.14)	1.312 (33.32)	.670 (17.02)	.988 (25.10)	.324 (8.23)	.360 (9.14)	.600 (15.24)	106
25	2.088 (53.04)	1.852 (47.04)	1.110 (28.19)	1.528 (38.81)	.324 (8.23)	.360 (9.14)	.600 (15.24)	107
37	2.729 (69.32)	2.500 (63.50)	1.550 (39.37)	2.176 (55.27)	.324 (8.23)	.360 (9.14)	.600 (15.24)	108
50	2.635 (66.93)	2.406 (61.11)	1.550 (39.37)	2.082 (52.88)	.436 (11.07)	.470 (11.94)	.710 (18.03)	109

Dimensions in inches (mm)



Waved Metal
Grounding/Shielding
Gasket
(shown in free state)



Wave Height



Hooded Strain Reliefs

Hooded strain reliefs are used whenever a connector is used on a cable assembly which will be exposed to users and subject to multiple disconnects. Hoods are designed to protect users from shock hazard by exposed solder joints, as well as provide a strain relief for the wires and protection against accidental short circuits.

Since most filter connectors are larger than standard connectors, there had been a problem fitting most commercially available hoods. Spectrum Control solves this problem. Our hoods are molded of thin wall plastic, providing extra internal space to accommodate larger filter connectors. The hood is constructed of extremely durable polycarbonate and meets the flammability requirements for UL94V-0.

In addition, hoods are ideal for use on applications which require the use of extra components such as resistors or varistors on the wires. The nonconductive hood conveniently houses the connector, components, and protects any joints.

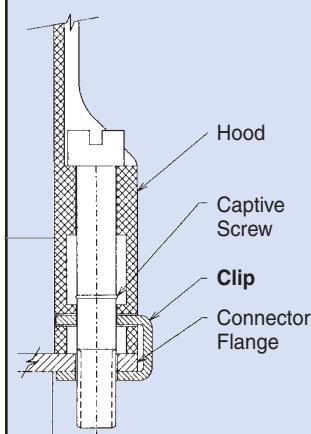
- **2560-9000-XX** is supplied with metal retention clips to hold the connector within the hood assembly. This item is recommended for use with Spectrum Filtered D-sub's, most other filtered D-sub's, and most standard D-sub's.
- **2560-9001-XX** is meant to be used with a connector which has a special eyelet on the mounting flange. This feature is available as an option on the Spectrum Filtered D-sub. Contact factory for additional information.



#2560-9000-XX

Retention Clip Version

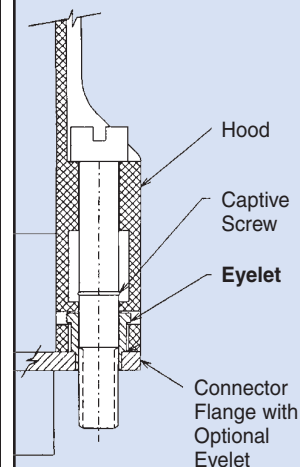
(For use with most connectors)



#2560-9001-XX

"Eyelet"

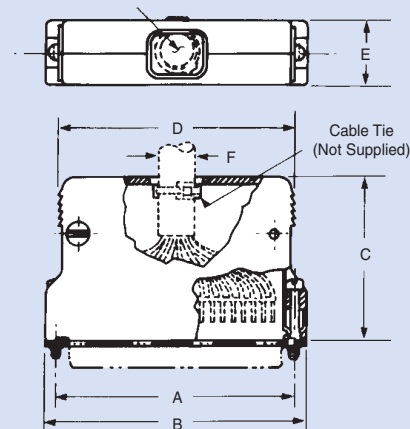
(For use with "Eyelet" connectors)



Ordering Information and Dimensions

Part Number	Connector Size	A ±.005	B Max	C Max	D Max	E Max	F Max
2560-9000-01 2560-9001-01	9	0.984 (24.99)	1.228 (31.19)	1.710 (43.43)	0.985 (25.02)	.685 (17.40)	.240 (6.07)
2560-9000-02 2560-9001-02	15	1.312 (33.33)	1.556 (39.52)	1.710 (43.43)	1.310 (26.71)	.685 (17.40)	.300 (7.62)
2560-9000-03 2560-9001-03	25	1.852 (47.04)	2.103 (53.42)	1.710 (43.43)	1.850 (46.99)	.685 (17.40)	.400 (10.16)
2560-9000-04 2560-9001-04	37	2.500 (63.50)	2.744 (69.70)	1.710 (43.43)	2.500 (63.50)	.685 (17.40)	.400 (10.16)

Dimensions in inches (mm)



Custom Engineered Solutions

Despite the breadth of our filtered connector product line, there exist certain applications which demand a custom EMC solution. Our engineering staff will work with your design team to provide a custom filtered connector which meets your individual requirements. Examples of custom projects are shown below.

Special Mounting Flanges

- Housings can be designed to be integrated into the customer's equipment. The housings are constructed of machined materials, or precision diecast zinc.

Value-added Assemblies

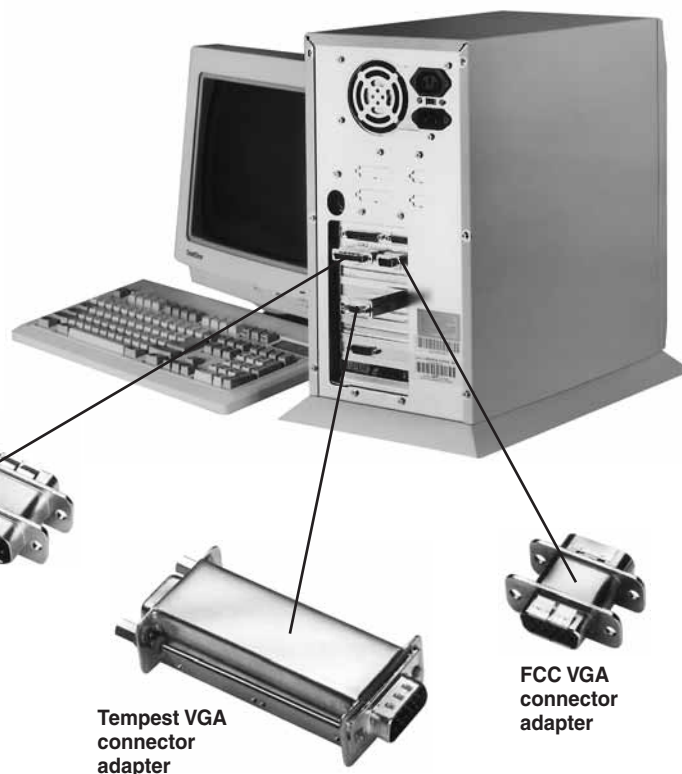
- Spectrum's capabilities extend beyond just supplying filter connectors. Additional operations such as sourcing and assembling flexible circuits, adding flying leads, or making connector to connector assemblies, all can be provided in conjunction with the filter connector.

Custom Filter Arrangements

- Complex filters involving unbalanced Pi types, LC types with large inductive components, special pin-in to pin-out translations, and overvoltage protective devices such as diodes and varistors can be packaged within the connector.

Other Connector Formats

- Manufacturer specific connectors also can be filtered. Our involvement ranges from complete design to implementing minor modifications to include the addition of the filter components. Medical equipment and hand-held devices are examples of excellent applications for these connectors.



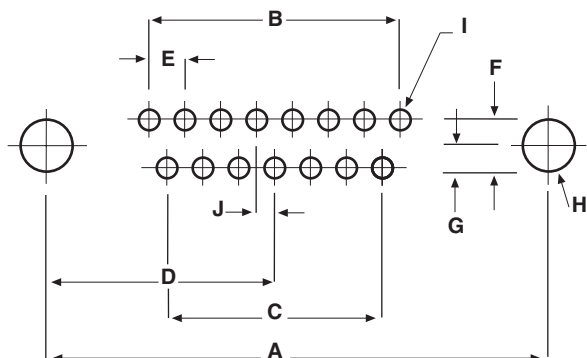
Filtered Connector Performance Specifications

The filtered D-subminiature connectors shown in this catalog have been designed and tested to the following test plan.

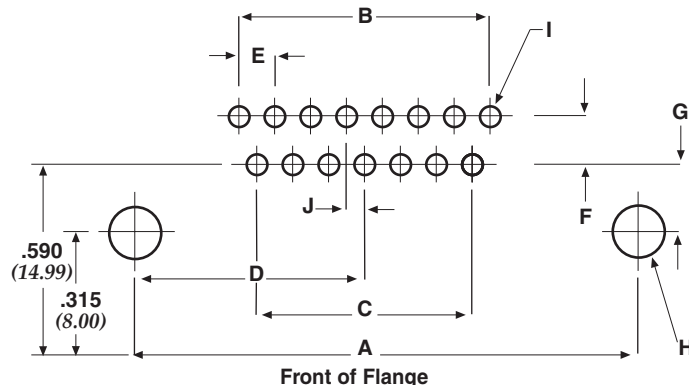
The information shown can be used as a basis for your filtered connector specifications. (Contact Spectrum Control for additional details.)

Test Group	Order of Test	Examination of Test	Test Method	Post Test Requirements
I	1	Visual and Mechanical Examination		In accordance with applicable requirements.
	2	Materials, Designs Construction and Workmanship		
	3	Physical Dimensions and Marking		
	4	Capacitance	MIL-STD-202 Method 305 1 KHz, 1VRMS max. 25°C	Within specified tolerance.
	5	Dielectric Withstanding Voltage	MIL-STD-202 Method 301	No breakdown or damage.
	6	Insulation Resistance	MIL-STD-202 Method 302, test condition at rated voltage	5000 megohm minimum.
	7	Insertion Loss	MIL-STD-220 No load	In accordance with applicable requirements.
II	1	Contact Engagement and Separation	MIL-C-24308, Para. 3.5.10	Maximum engagement force 18.0 oz., minimum separation force 0.7 oz.
	2	Mating and Unmating Force	MIL-C-24308, Para. 3.5.4	MIL-C-24308, Para. 3.5.4 Table II Limits: Shell size 1-5, class G only.
	3	Durability	MIL-C-24308, Para. 3.5.16, 4.7.18, except 100 cycles	MIL-C-24308, Para. 3.5.9 Contact resistance at 1 amp. 20 milliohms max.
	4	Thermal Shock	MIL-STD-202 Method 107, Test condition B, -55°C to +125°C	No evidence of damage. Insulation resistance not less than 2500 megohms.
	5	Solderability	MIL-STD-202; Method 208, RMA-Flux	Terminals shall meet solderability requirements.
	6	Moisture Resistance	MIL-STD-202 Method 106, less step seven	Insulation resistance not less than 500 megohms. Meet dielectric withstanding voltage requirements.
	7	Resistance to Soldering Heat	MIL-STD-202 Method 210, Test condition D	Insulation resistance not less than 500 megohms. Meet dielectric withstanding voltage requirements.
III	1	Vibration	MIL-STD-202 Method 204, Test condition D, 100 mA, current	No interruption of current flow longer than 1 microsecond. Insulation resistance greater than 5000 megohms.
	2	Shock	MIL-STD-202 Method 213. Test Condition G, 100 mA, current	No interruptions of current flow longer than 1 microsecond.
				Contact resistance at 1 amp. 15 milliohms max.
				Capacitance within specified limits.
				Insulation resistance greater than 2500 megohms.
	3	Mounting Inserts a. Prevailing torque (locking) b. Installation torque (locking) c. Push-out Force	IFI-100	a. 3 inch-pounds max. b. 6 inch-pounds without damage c. 10 pounds axial force without loosening insert
IV	1	Life	MIL-STD-202 Method 108, Test condition D, within 125% of rated voltage at the maximum operating temperature.	Filter shall meet all initial requirements except insulation resistance shall not be less than 500 megohms.

Board & Panel Cutouts



Printed Circuit
Vertical Board Mount (standard density)

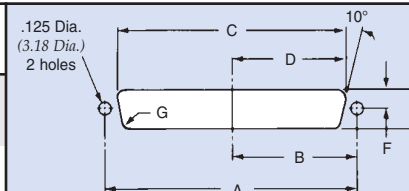


Printed Circuit
Right Angle Mount (standard density)

Board Layout (Pin and Socket Contact) for Standard D-Sub Connectors

Shell Size	A	B	C	D	E	F	G	H	I (Dia.)	J
9 (0)	.984 (25.00)	.436 = 4 x .109 (11.07) (2.77)	.327 = 3 x .109 (8.31) (2.77)	.492 (12.50)			PCB Mount .056 (1.42)			
15 (1)	1.312 (33.32)	.763 = 7 x .109 (19.38) (2.77)	.654 = 6 x .109 (16.61) (2.77)	.656 (16.66)			PCB Mount Rt Angle .275 (6.99)	.125 (3.18)	.045 (1.14)	.054 (1.37)
25 (2)	1.852 (47.04)	1.308 = 12 x .109 (33.22) (2.77)	1.199 = 11 x .109 (30.45) (2.77)	.926 (23.52)	.109 (2.77)	.112 (2.84)	0.112 2 rows			
37 (3)	2.500 (63.50)	1.962 = 18 x .109 (49.83) (2.77)	1.853 = 17 x .109 (47.07) (2.77)	1.250 (31.75)			0.00 1 row			
50 (4)	2.406 (61.11)	1.744 = 16 x .109 (44.30) (2.77)	1.635 = 15 x .109 (41.35) (2.77)	1.203 (30.56)						

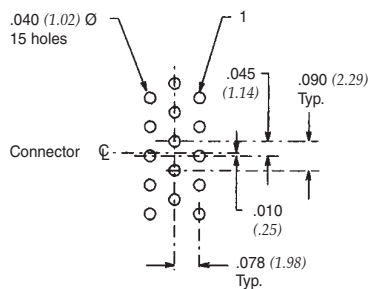
Panel Cutouts (Front or Rear Mounting) for Standard and Hi-Density D-Sub Connectors

Shell Size	A ±.015 (.38)	B ±.015 (.38)	C ±.015 (.38)	D ±.015 (.38)	E ±.003 (.08)	F ±.005 (.13)	G ±.002 (.05)	
9 (0)	.984 (24.99)	.492 (12.49)	.777 (19.74)	.388 (9.87)	.440 (11.18)	.220 (5.59)	.150 (3.81)	
15 (1)	1.312 (33.32)	.656 (16.66)	1.105 (28.07)	.552 (14.03)	.440 (11.18)	.220 (5.59)	.150 (3.81)	
25 (2)	1.852 (47.04)	.926 (23.52)	1.645 (41.78)	.822 (20.89)	.440 (11.18)	.220 (5.59)	.150 (3.81)	
37 (3)	2.500 (63.50)	1.250 (31.75)	2.293 (58.24)	1.146 (29.12)	.440 (11.18)	.220 (5.59)	.150 (3.81)	
50 (4)	2.406 (61.11)	1.203 (30.55)	2.190 (55.63)	1.095 (27.81)	.550 (13.97)	.275 (6.98)	.150 (3.81)	

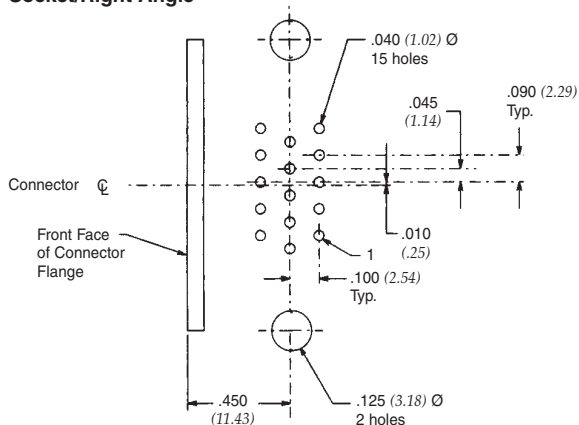
Dimensions in inches (mm)

Board & Panel Cutouts

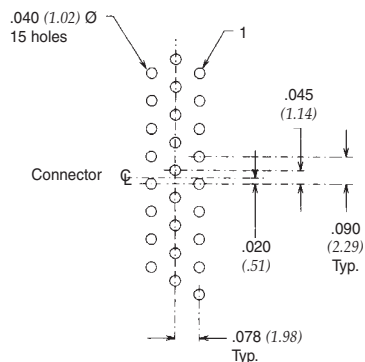
**15 Hi-Density
Pin/PCB**



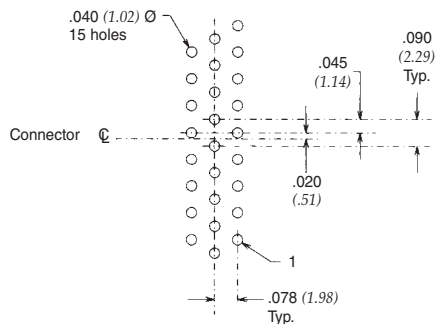
**15 Hi-Density
Socket/Right Angle**



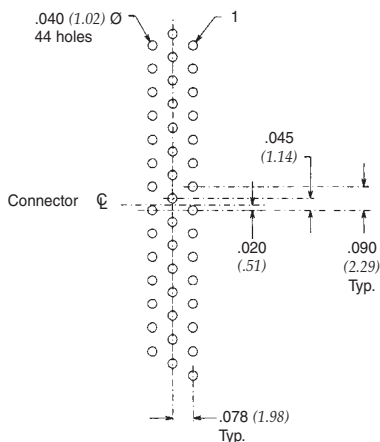
**26 Hi-Density
Pin/PCB**



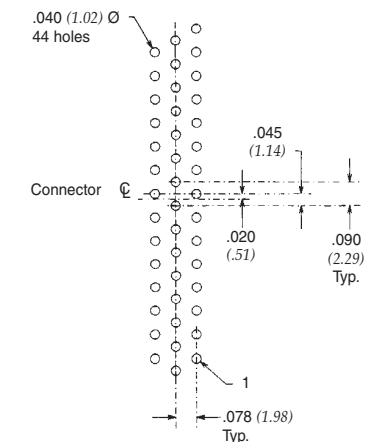
**26 Hi-Density
Socket/PCB**



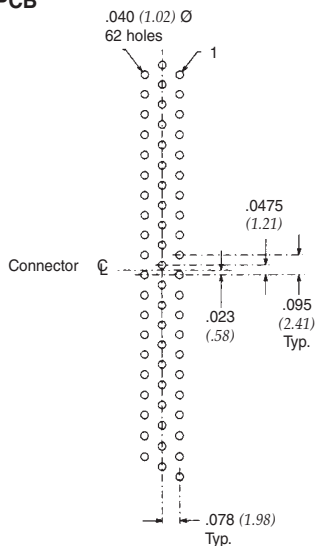
**44 Hi-Density
Pin/PCB**



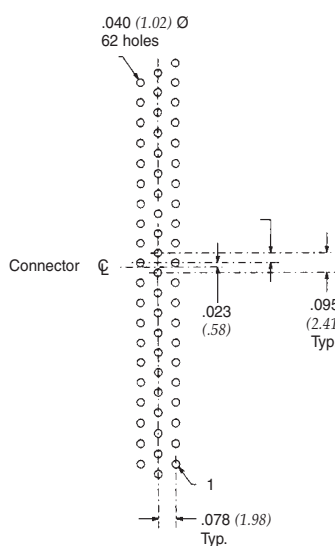
**44 Hi-Density
Socket/PCB**



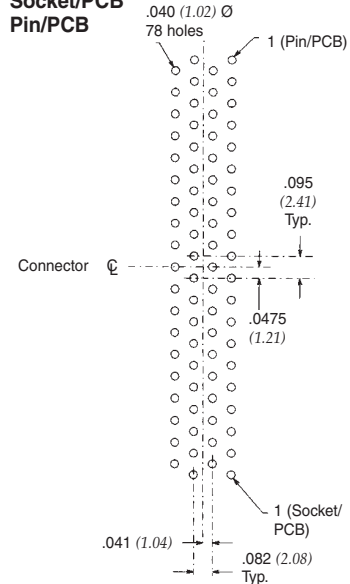
**62 Hi-Density
Pin/PCB**



**62 Hi-Density
Socket/PCB**



**78 Hi-Density
Socket/PCB
Pin/PCB**



Dimensions in inches (mm)

Custom Filtered Connectors MIL and High Reliability

Spectrum Control offers a premium line of custom and specialty filtered connectors. These custom high reliability, circular, rack and panel and ARINC connectors have a reputation for superior quality and performance. Several types of filtering are available (See figure at right).

EMI Filter Performance

The performance indicated in this table are examples for design guidelines. Insertion values are per MIL-STD-220 (No Load).

Resistance

Insulation Resistance. 5 Gigohm min.
D.C. Resistance 30 Milliohm max.

Figure A (1)

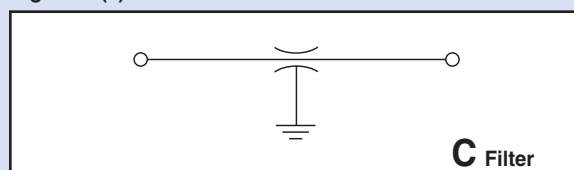


Figure B (2)

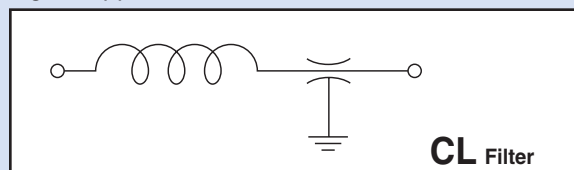


Figure C (3)

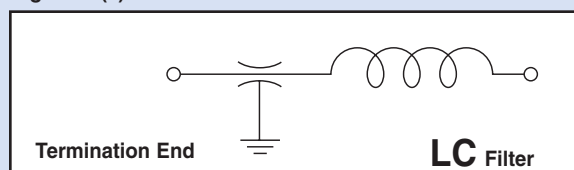
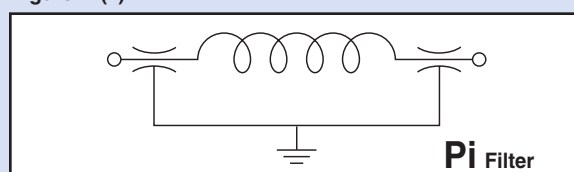


Figure D (4)



Electrical Characteristics

Capacitance (pF, GMV)	Working Voltage		DWV (VOC)	Minimum Insertion Loss (dB)																	
				Figure A						Figure B & C					Figure D						
	Cut-Off Freq. (MHz)	1 MHz		10 MHz	100 MHz	500 MHz	1000 MHz	Cut-Off Freq. (MHz)	1 MHz	10 MHz	100 MHz	500 MHz	1000 MHz	Cut-Off Freq. (MHz)	1 MHz	10 MHz	100 MHz	500 MHz	1000 MHz		
1,000	200	115	500	5	—	4	21	34	39	5	—	5	23	36	42	5	—	4	28	54	65
2,000	200	115	500	1	—	9	26	39	44	1	—	10	29	42	47	1	—	8	39	65	70
3,000	200	115	500	1	—	12	30	43	48	1	—	13	36	45	51	1	—	11	47	70	70
5,000	200	115	500	1	1	16	34	46	52	1	1	17	37	49	54	1	1	14	54	70	70
7,000	200	115	500	1	3	19	37	49	55	1	3	20	39	52	57	1	3	18	60	70	70
10,000	200	115	500	1	4	21	39	52	57	1	4	22	41	54	60	1	4	22	64	70	70
20,000	100	—	250	.50	9	26	44	57	62	.50	9	28	47	60	65	.50	9	33	70	70	70

Consult Spectrum Control for availability of alternative capacitance values.

Compact Shell Filtered Connectors

MIL-C-38999 Filtered Connector, Compact Shell

This design is for the MIL-C-38999 connector series I, II, and III. The shell is constructed out of a single piece of metal and contains planar capacitors. **The dimensions are the same as the unfiltered MIL qualified connector.**

The compact shell filtered connectors offer designers an effective filtering device that reduces the amount of real estate required within a product enclosure. These connectors are available with mixed capacitance filtered lines within the connector as well as insulated and/or grounded lines. Some capacitance levels may not be available in all connector sizes. Please consult factory for specific applications.

Compact shell filtered connectors provide a simple and space-efficient solution to a complex EMI problem. More detailed information on compact shell connectors is located on pages 206-211.



Advantages of Spectrum's Compact Shell Design

■ Easy retrofit or upgrade

Our compact shell connector is the only MIL filtered connector which is the same size as an unfiltered connector . . . allowing for easy retrofit or upgrade without concerns for space availability.

■ Weight and space savings

Smaller physical size is ideal for many applications, especially airborne.

■ Reduced cost and lead times

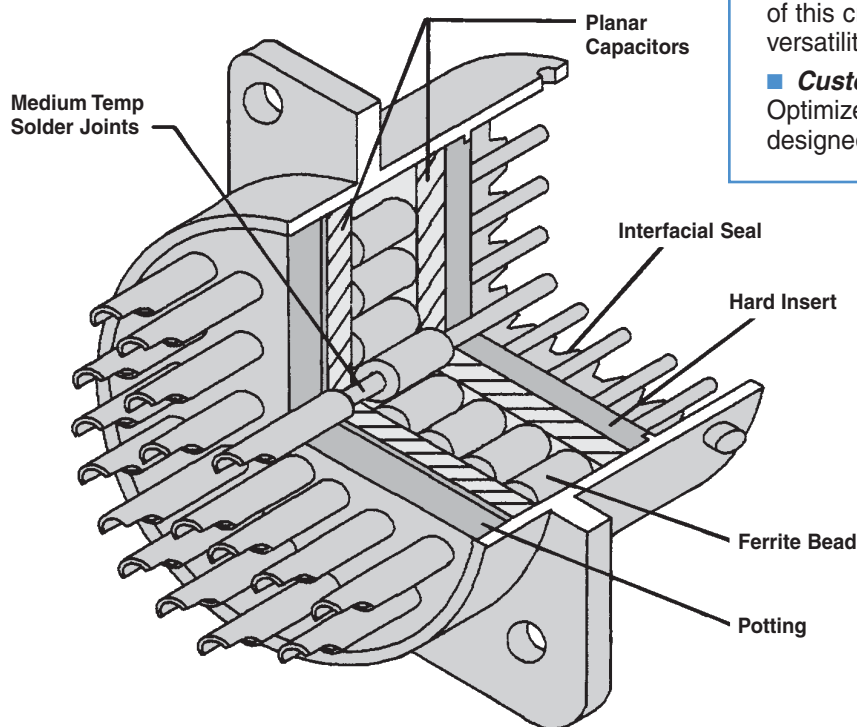
Standardized design for most contact arrangements minimizes tooling required (often none) . . . reducing procurement costs and facilitating small order quantities or prototypes.

■ Design flexibility and quality assurance

We are vertically integrated for ceramic filter capacitors, enabling us to offer a broad selection of this critical component and ensuring design versatility and manufacturing control.

■ Custom designs

Optimize your system performance with a custom designed filtered connector.



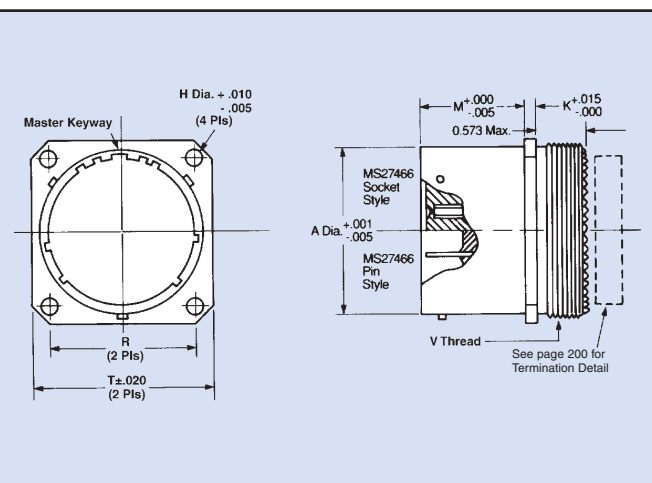
For extended shell tubular design, see page 212.

MIL-C-38999, Compact Shell Series I



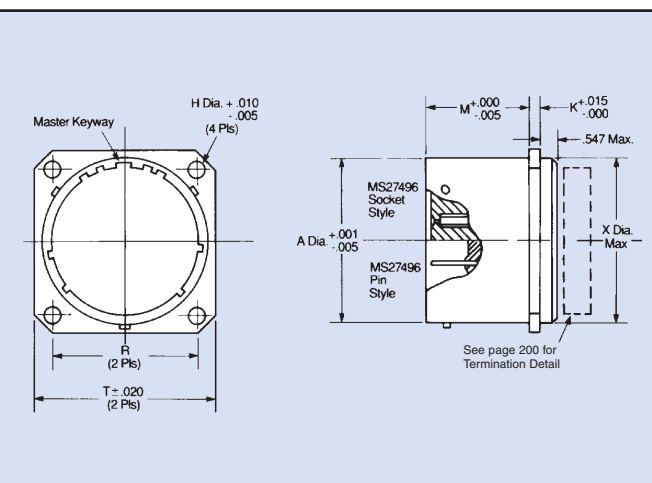
MS27466 Wall Mount, Front Panel Mounting

Shell Size	A Dia.	M	H Dia.	K	R	T	V Thread UNEF-2A
9	.572 (14.55)	.632 (16.07)	.128 (3.26)	.085 (2.16)	.719 (18.28)	.938 (23.85)	.4375-18
11	.700 (17.80)	.632 (16.07)	.128 (3.26)	.085 (2.16)	.812 (20.65)	1.031 (26.22)	.5625-24
13	.850 (21.62)	.632 (16.07)	.128 (3.26)	.085 (2.16)	.906 (23.04)	1.125 (28.61)	.6875-24
15	.975 (24.79)	.632 (16.07)	.128 (3.26)	.085 (2.16)	.969 (24.64)	1.219 (31.00)	.8125-20
17	1.100 (27.97)	.632 (16.07)	.128 (3.26)	.085 (2.16)	1.062 (27.01)	1.312 (33.36)	.9375-20
19	1.207 (30.69)	.632 (16.07)	.128 (3.26)	.085 (2.16)	1.156 (29.40)	1.438 (36.51)	1.0625-18
21	1.332 (33.87)	.602 (15.31)	.128 (3.26)	.115 (2.92)	1.250 (31.79)	1.562 (39.72)	1.1875-18
23	1.475 (37.61)	.602 (15.31)	.147 (3.74)	.115 (2.92)	1.375 (34.97)	1.688 (42.93)	1.3125-18
25	1.582 (40.23)	.602 (15.31)	.147 (3.74)	.115 (2.92)	1.500 (38.15)	1.812 (46.08)	1.4375-18



MS27496 Box Mount, Front Panel Mounting

Shell Size	A Dia.	M	K	X Dia.	H Dia.	R	T
9	.572 (14.55)	.632 (16.07)	.085 (2.16)	.469 (11.93)	.128 (3.26)	.719 (18.28)	.938 (23.85)
11	.700 (17.80)	.632 (16.07)	.085 (2.16)	.594 (15.11)	.128 (3.26)	.812 (20.65)	1.031 (26.22)
13	.850 (21.62)	.632 (16.07)	.085 (2.16)	.719 (18.28)	.128 (3.26)	.906 (23.04)	1.125 (28.61)
15	.975 (24.79)	.632 (16.07)	.085 (2.16)	.844 (21.46)	.128 (3.26)	.969 (24.64)	1.219 (31.00)
17	1.100 (27.97)	.632 (16.07)	.085 (2.16)	.969 (24.64)	.128 (3.26)	1.062 (27.01)	1.312 (33.36)
19	1.207 (30.69)	.632 (16.07)	.085 (2.16)	1.078 (27.41)	.128 (3.26)	1.156 (29.40)	1.438 (36.57)
21	1.332 (33.87)	.602 (15.31)	.115 (2.92)	1.203 (30.59)	.128 (3.26)	1.250 (31.79)	1.562 (39.72)
23	1.457 (36.91)	.602 (15.31)	.115 (2.92)	1.328 (33.77)	.147 (3.74)	1.375 (34.97)	1.688 (42.93)
25	1.582 (40.23)	.602 (15.31)	.115 (2.92)	1.453 (36.95)	.147 (3.74)	1.500 (38.15)	1.812 (46.08)

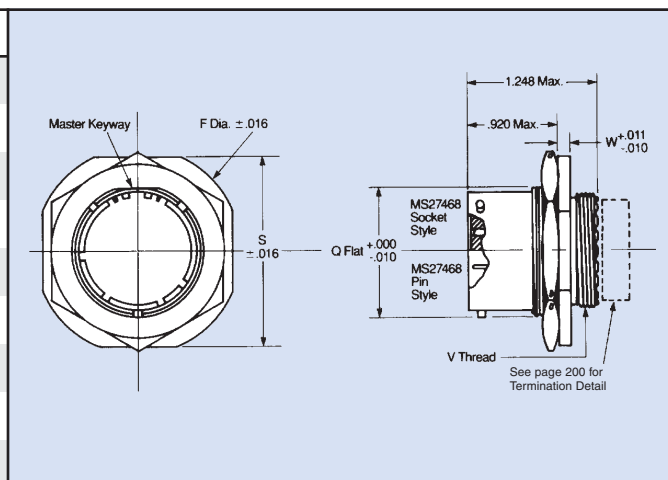


Dimensions in inches (mm)

MIL-C-38999, Compact Shell Series I

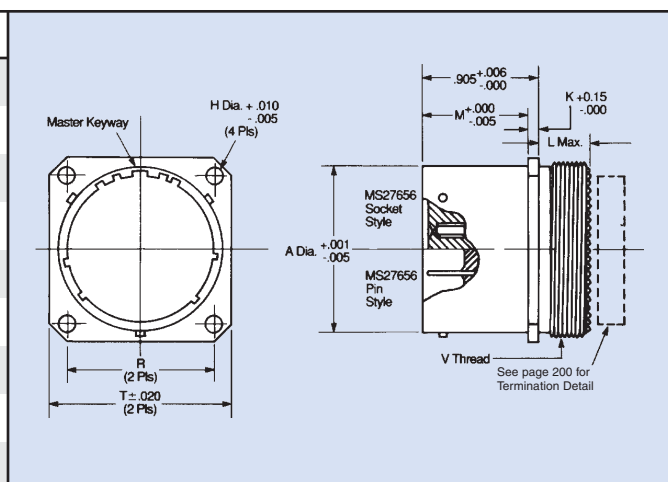
MS27468 Jam Nut

Shell Size	V Thread UNEF-2A	F Dia.	S	Q Dia.	W
9	.4375-28	1.188 (30.21)	1.062 (27.01)	.655 (16.66)	.109 (2.77)
11	.5625-24	1.375 (34.97)	1.250 (31.79)	.755 (19.20)	.109 (2.77)
13	.6875-24	1.500 (38.15)	1.375 (34.97)	.942 (23.96)	.109 (2.77)
15	.8125-20	1.625 (41.32)	1.500 (38.15)	1.066 (27.11)	.109 (2.77)
17	.9375-20	1.750 (44.50)	1.625 (41.32)	1.191 (30.29)	.109 (2.77)
19	1.0625-18	1.938 (49.28)	1.812 (46.08)	1.316 (33.47)	.140 (3.56)
21	1.1875-18	2.062 (52.44)	1.938 (49.28)	1.441 (36.64)	.140 (3.56)
23	1.3125-18	2.188 (55.64)	2.062 (52.44)	1.566 (39.82)	.140 (3.56)
25	1.4375-18	2.312 (58.79)	2.188 (55.64)	1.691 (43.00)	.140 (3.56)



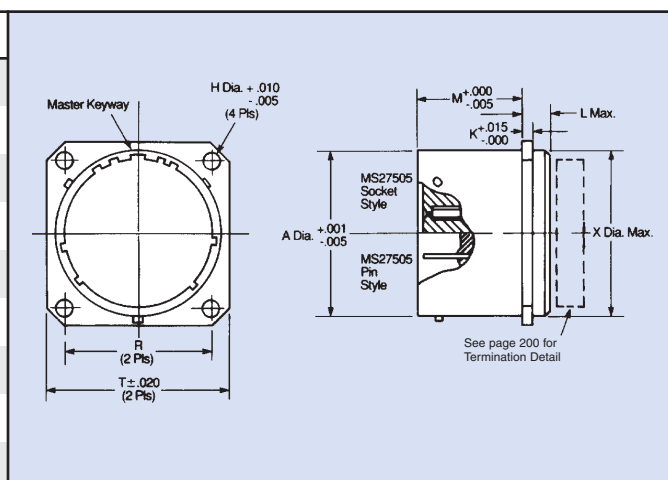
MS27656 Wall Mount, Back Panel Mounting

Shell Size	A Dia.	M	K	L	H Dia.	R	T	V Thread UNEF-2A
9	.572 (14.55)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.128 (3.25)	.719 (18.25)	.938 (23.85)	.4375-28
11	.700 (17.80)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.128 (3.25)	.812 (20.65)	1.031 (26.22)	.5625-24
13	.850 (21.62)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.128 (3.25)	.906 (23.04)	1.125 (28.61)	.6875-24
15	.975 (24.79)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.128 (3.25)	.969 (24.64)	1.219 (31.00)	.8125-20
17	1.100 (27.97)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.128 (3.25)	1.062 (27.01)	1.312 (33.36)	.9375-20
19	1.207 (30.69)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.128 (3.25)	1.156 (29.40)	1.438 (36.57)	1.0625-18
21	1.332 (33.87)	.790 (20.09)	.115 (2.92)	.500 (12.72)	.128 (3.25)	1.250 (31.79)	1.562 (39.72)	1.1875-18
23	1.457 (37.05)	.790 (20.09)	.115 (2.92)	.500 (12.72)	.147 (3.74)	1.375 (34.97)	1.688 (42.93)	1.3125-18
25	1.582 (40.23)	.790 (20.09)	.115 (2.92)	.500 (12.72)	.147 (3.74)	1.500 (38.15)	1.812 (46.08)	1.4375-18



MS27505 Box Mount, Back Panel Mounting

Shell Size	A Dia.	M	K	L	X Dia.	H Dia.	R	T
9	.572 (14.55)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.547 (13.91)	.128 (3.25)	.719 (18.28)	.938 (23.85)
11	.700 (17.80)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.656 (16.68)	.128 (3.25)	.812 (20.65)	1.031 (26.22)
13	.850 (21.62)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.828 (21.06)	.128 (3.25)	.906 (23.04)	1.125 (28.61)
15	.975 (24.79)	.820 (20.85)	.085 (2.16)	.469 (11.93)	.953 (24.23)	.128 (3.25)	.969 (24.64)	1.219 (31.00)
17	1.100 (27.97)	.820 (20.85)	.085 (2.16)	.469 (11.93)	1.078 (27.41)	.128 (3.25)	1.062 (27.01)	1.312 (33.36)
19	1.207 (30.69)	.820 (20.85)	.085 (2.16)	.469 (11.93)	1.203 (30.59)	.128 (3.25)	1.156 (29.40)	1.438 (36.57)
21	1.332 (33.87)	.790 (20.09)	.115 (2.92)	.500 (12.72)	1.328 (33.77)	.128 (3.25)	1.250 (31.79)	1.562 (39.72)
23	1.457 (37.05)	.790 (20.09)	.115 (2.92)	.500 (12.72)	1.453 (36.95)	.147 (3.74)	1.375 (34.97)	1.688 (42.93)
25	1.582 (40.23)	.790 (20.09)	.115 (2.92)	.500 (12.72)	1.578 (40.13)	.147 (3.74)	1.500 (38.15)	1.812 (46.08)



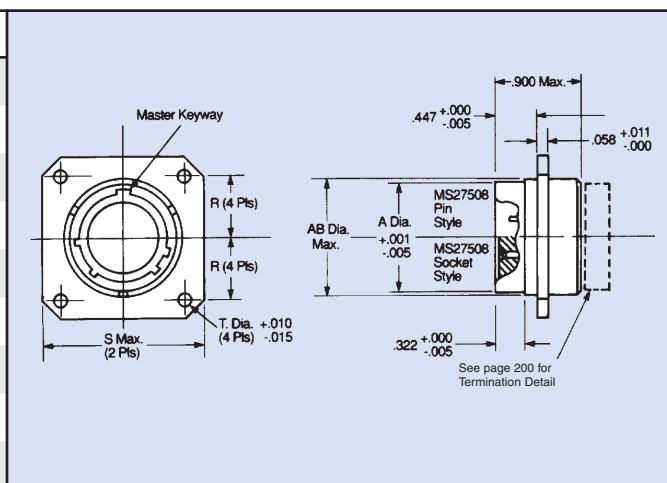
Dimensions in inches (mm)

MIL-C-38999, Compact Shell Series II



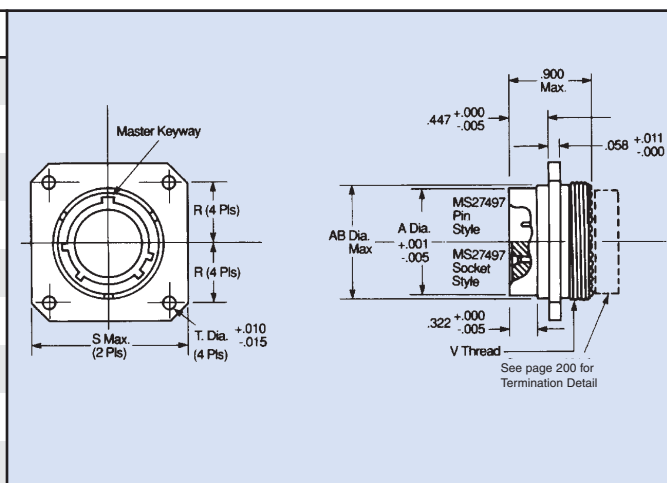
MS27508 Box Mount, Back Panel Mounting

Shell Size	A Dia.	AB Dia.	R BSC	T Dia.	S
8	.473 (12.03)	.547 (13.91)	.297 (7.55)	.120 (3.05)	.828 (21.06)
10	.590 (15.00)	.672 (17.09)	.3595 (9.14)	.120 (3.05)	.954 (24.26)
12	.750 (19.07)	.844 (21.46)	.406 (10.32)	.120 (3.05)	1.047 (26.63)
14	.875 (22.25)	.969 (24.64)	.453 (11.52)	.120 (3.05)	1.141 (29.02)
16	1.000 (25.43)	1.094 (27.82)	.4845 (12.32)	.120 (3.05)	1.234 (31.38)
18	1.125 (28.61)	1.219 (31.00)	.531 (13.50)	.120 (3.05)	1.328 (33.77)
20	1.250 (31.79)	1.344 (34.18)	.578 (14.70)	.120 (3.05)	1.453 (36.95)
22	1.375 (34.97)	1.469 (37.36)	.625 (15.89)	.120 (3.05)	1.578 (40.13)
24	1.500 (38.15)	1.594 (40.54)	.6875 (17.48)	.147 (3.74)	1.703 (43.31)



MS27497 Wall Mount, Back Panel Mounting

Shell Size	A Dia.	AB Dia.	R BSC	T Dia.	S	V Thread UNEF-2A
8	.473 (12.03)	.547 (13.91)	.297 (7.55)	.120 (3.05)	.828 (21.06)	.4375-28
10	.590 (15.00)	.672 (17.09)	.3595 (9.14)	.120 (3.05)	.954 (24.26)	.5625-24
12	.750 (19.07)	.844 (21.46)	.406 (10.32)	.120 (3.05)	1.047 (26.63)	.6875-24
14	.875 (22.25)	.969 (24.64)	.453 (11.52)	.120 (3.05)	1.141 (29.02)	.8125-20
16	1.000 (25.43)	1.094 (27.82)	.4845 (12.32)	.120 (3.05)	1.234 (33.77)	.9375-20
18	1.125 (28.61)	1.219 (31.00)	.531 (13.50)	.120 (3.05)	1.328 (36.95)	1.0625-18
20	1.250 (31.79)	1.344 (34.18)	.578 (14.70)	.120 (3.05)	1.453 (36.95)	1.1875-18
22	1.375 (34.97)	1.469 (37.36)	.625 (15.89)	.120 (3.05)	1.578 (40.13)	1.3125-18
24	1.500 (38.15)	1.594 (40.54)	.6875 (17.48)	.147 (3.74)	1.703 (43.31)	1.4375-18

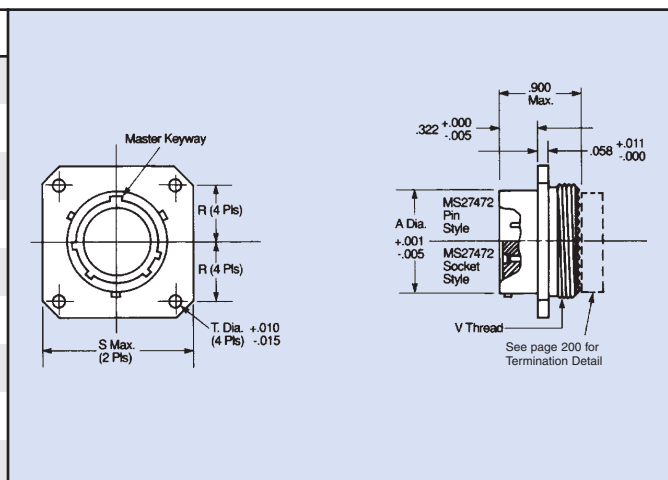


Dimensions in inches (mm)

MIL-C-38999, Compact Shell Series II

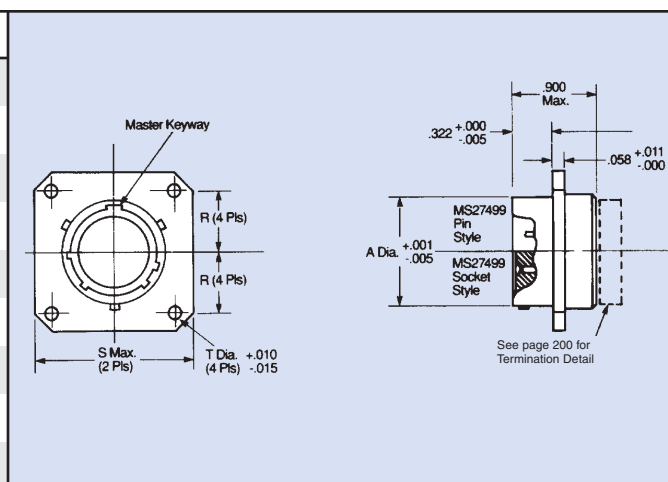
MS27472 Wall Mount, Front Panel Mounting

Shell Size	A Dia.	R BSC	T Dia.	S	V Thread UNEF-2A
8	.473 (12.03)	.297 (7.55)	.120 (3.05)	.828 (21.06)	.4375-28
10	.590 (15.00)	.3595 (9.14)	.120 (3.05)	.954 (24.26)	.5625-24
12	.750 (19.07)	.406 (10.32)	.120 (3.05)	1.047 (26.63)	.6875-24
14	.875 (22.25)	.453 (11.52)	.120 (3.05)	1.141 (29.02)	.8125-20
16	1.000 (25.43)	.4845 (12.32)	.120 (3.05)	1.234 (31.38)	.9375-20
18	1.125 (28.61)	.531 (13.50)	.120 (3.05)	1.328 (33.77)	1.0625-18
20	1.250 (31.79)	.578 (14.70)	.120 (3.05)	1.453 (36.95)	1.3125-18
22	1.375 (34.97)	.625 (15.98)	.120 (3.05)	1.578 (40.13)	1.3125-18
24	1.500 (38.15)	.6875 (17.48)	.147 (3.74)	1.703 (43.31)	1.4375-18



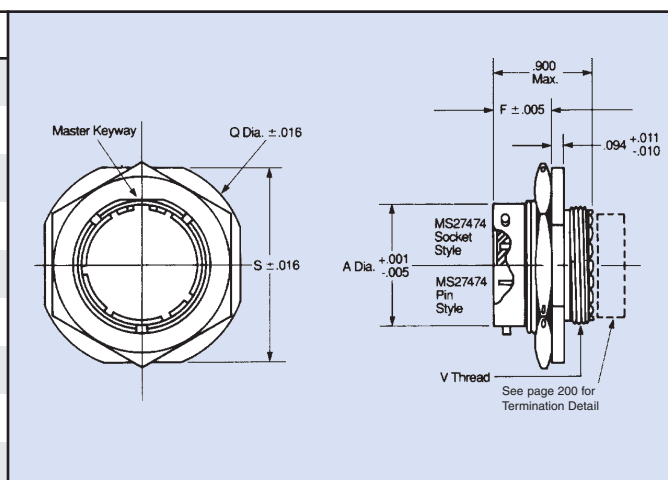
MS27499 Box Mount, Front Panel Mounting

Shell Size	A Dia.	R BSC	T Dia.	S
8	.473 (12.03)	.297 (7.55)	.120 (3.05)	.828 (21.06)
10	.590 (15.00)	.3595 (9.14)	.120 (3.05)	.954 (24.26)
12	.750 (19.07)	.406 (10.32)	.120 (3.05)	1.047 (26.63)
14	.875 (22.25)	.453 (11.52)	.120 (3.05)	1.141 (29.02)
16	1.000 (25.43)	.4845 (12.32)	.120 (3.05)	1.234 (31.38)
18	1.125 (28.61)	.531 (13.50)	.120 (3.05)	1.328 (33.77)
20	1.250 (31.79)	.578 (14.70)	.120 (3.05)	1.453 (36.95)
22	1.375 (34.97)	.625 (15.89)	.120 (3.05)	1.578 (40.13)
24	1.500 (38.15)	.6875 (17.48)	.147 (3.74)	1.703 (43.31)



MS27474 Jam Nut

Shell Size	V Thread Size	UNEF-2A Mod (Plated) Major Dia. Mod	A Dia.	F	Q Dia.	S
8	.4375-28	.421- .417	.473 (12.03)	.438 (11.14)	1.375 (34.97)	1.250 (31.79)
10	.5625-24	.542- .538	.590 (15.00)	.438 (11.14)	1.500 (38.15)	1.375 (34.97)
12	.6875-24	.667- .663	.750 (19.07)	.438 (11.14)	1.625 (41.35)	1.500 (38.15)
14	.8125-20	.791- .787	.875 (22.25)	.438 (11.14)	1.750 (44.50)	1.625 (41.35)
16	.9375-20	.916- .912	1.000 (25.43)	.438 (11.14)	1.938 (49.28)	1.781 (45.29)
18	1.0625-18	1.034-1.030	1.125 (28.61)	.438 (11.14)	2.016 (51.27)	1.890 (48.06)
20	1.1875-18	1.158-1.154	1.250 (31.79)	.464 (11.80)	2.141 (54.45)	2.016 (51.27)
22	1.3125-18	1.283-1.279	1.375 (34.97)	.464 (11.80)	2.265 (57.60)	2.140 (54.42)
24	1.4375-18	1.408-1.404	1.500 (38.15)	.464 (11.80)	2.390 (60.78)	2.265 (57.60)



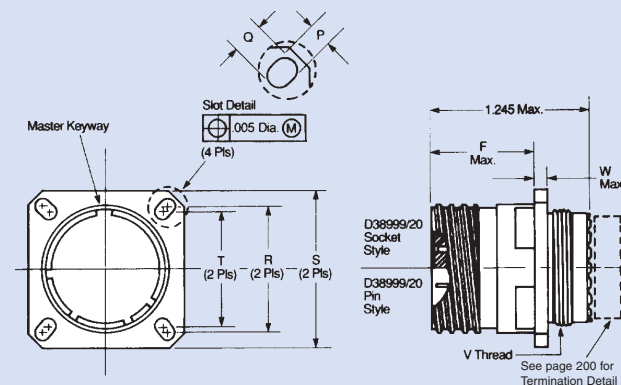
Dimensions in inches (mm)

MIL-C-38999, Compact Shell Series III



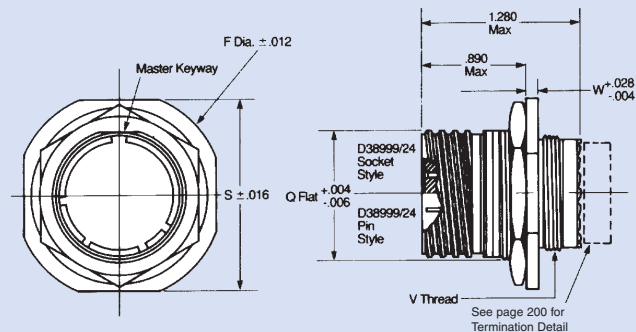
D38999/20 Wall Mount

Shell Size	V Thread	F	R	T	S	P	Q	W
9	M12 x 1.0-6g-0.100R	.823 (20.93)	.719 (18.28)	.594 (15.11)	.937 (23.83)	.128 (3.25)	.216 (5.49)	.098 (2.49)
11	M15 x 1.0-6g-0.100R	.823 (20.93)	.812 (20.15)	.719 (18.28)	1.031 (26.22)	.128 (3.25)	.194 (4.93)	.098 (2.49)
13	M18 x 1.0-6g-0.100R	.823 (20.93)	.906 (23.04)	.812 (20.65)	1.126 (28.63)	.128 (3.25)	.194 (4.93)	.098 (2.49)
15	M22 x 1.0-6g-0.100R	.823 (20.93)	.969 (24.64)	.906 (23.04)	1.220 (31.02)	.128 (3.25)	.173 (4.40)	.098 (2.49)
17	M25 x 1.0-6g-0.100R	.823 (20.93)	1.062 (27.01)	.969 (24.64)	1.311 (33.34)	.128 (3.25)	.194 (4.93)	.098 (2.49)
19	M28 x 1.0-6g-0.100R	.823 (20.93)	1.156 (29.40)	1.062 (27.01)	1.437 (36.54)	.128 (3.25)	.194 (4.93)	.098 (2.49)
21	M31 x 1.0-6g-0.100R	.791 (20.12)	1.250 (31.79)	1.156 (29.40)	1.563 (39.75)	.128 (3.25)	.194 (4.93)	.126 (3.20)
23	M34 x 1.0-6g-0.100R	.791 (20.12)	1.375 (34.97)	1.250 (31.79)	1.689 (42.95)	.154 (3.92)	.242 (6.15)	.126 (3.20)
25	M37 x 1.0-6g-0.100R	.791 (20.12)	1.500 (38.15)	1.375 (34.97)	1.811 (46.05)	.154 (3.92)	.242 (6.15)	.126 (3.20)



D38999/24 Jam Nut

Shell Size	V Thread	F Dia.	S	Q	W
9	M12 X 1.0-6g-0.100R	1.189 (30.24)	1.063 (27.03)	.651 (16.55)	.087 (2.21)
11	M15 X 1.0-6g-0.100R	1.375 (34.97)	1.252 (31.84)	.751 (19.10)	.087 (2.21)
13	M18 X 1.0-6g-0.100R	1.500 (38.15)	1.374 (34.94)	.938 (23.85)	.087 (2.21)
15	M22 X 1.0-6g-0.100R	1.626 (41.35)	1.500 (38.15)	1.062 (27.01)	.087 (2.21)
17	M25 X 1.0-6g-0.100R	1.752 (44.55)	1.626 (41.35)	1.187 (30.19)	.087 (2.21)
19	M28 X 1.0-6g-0.100R	1.937 (49.26)	1.811 (46.05)	1.312 (33.36)	.118 (3.00)
21	M31 X 1.0-6g-0.100R	2.063 (52.46)	1.937 (49.26)	1.437 (36.54)	.118 (3.00)
23	M34 X 1.0-6g-0.100R	2.189 (55.67)	2.063 (52.46)	1.562 (39.72)	.118 (3.00)
25	M37 X 1.0-6g-0.100R	2.311 (58.77)	2.189 (55.67)	1.687 (42.90)	.118 (3.00)



Dimensions in inches (mm)

Extended Shell Filtered Connectors

This extended shell design is used in all MIL series connectors including 38999, 24308, 83723, and 26482. This connector is constructed by adding filters to the rear of a standard connector. The method of filtering can be either planars or tubular capacitors.

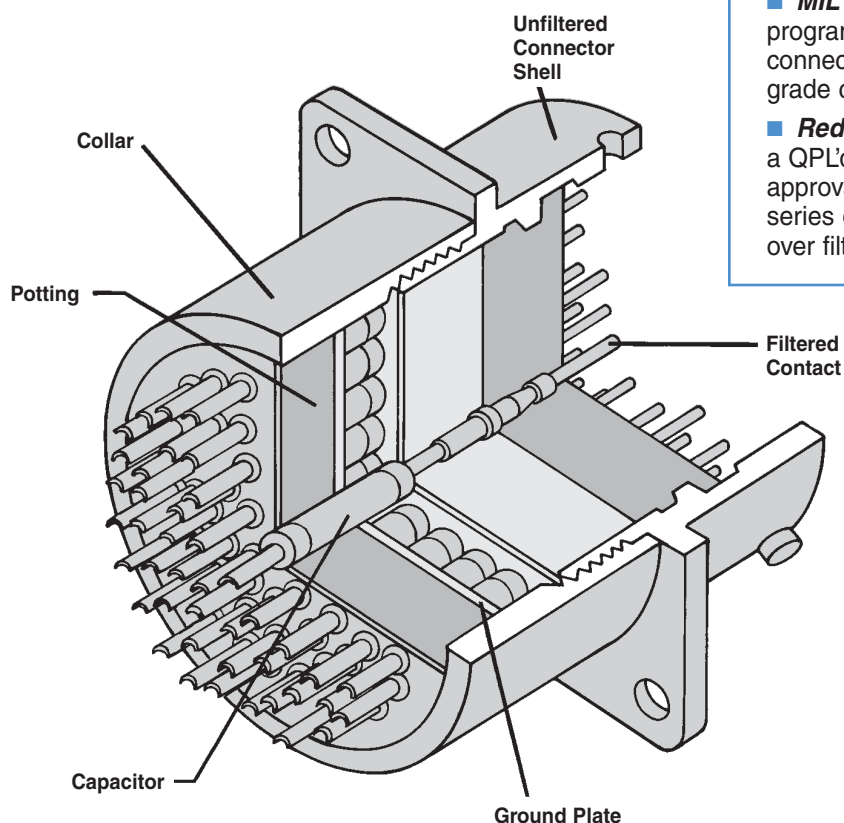
Extended shell connectors are ideal where quick turnaround is required for prototype devices. The range of filtering within the connector can be expanded due to the availability of either tubular or planar capacitors. In addition, custom schematics (such as double **Pi**, double **L**, or **T** sections) and transient voltage protection devices can be included in the connector.

For more information on extended shell connectors, refer to pages 213-229.



Spectrum's Control Advantages

- **Retrofit existing connectors** - We can add filters to customer supplied connectors, saving time during prototype phase and expediting system evaluation.
- **Design flexibility and quality assurance** - We are vertically integrated with ceramic capacitors, enabling us to offer a broad selection of this critical component and ensuring design versatility and manufacturing control.
- **Prototypes** - Our EMI filtering expertise and large capacitor inventory allow us to quickly provide a working sample of your filtered connector.
- **Economy and turnaround** - Most components we utilize are standards, minimizing our tooling requirements and providing cost savings and a shorter lead time.
- **MIL and commercial applications** - Reduce program costs by utilizing our extended shell connectors for both MIL spec and commercial grade connectors.
- **Reduce testing and qualification** - Use of a QPL'd connector interface can expedite your approval process. In addition, we can filter any series of connectors . . . eliminating concerns over filter connector availability.



For 38999 compact shell design, see page 205.

MIL-C-38999, Extended Shell

Ordering Information

Available connector styles and shell sizes for this MIL series are shown on the following pages. Refer to these pages and the information below to develop your connector part number.

Custom Designs

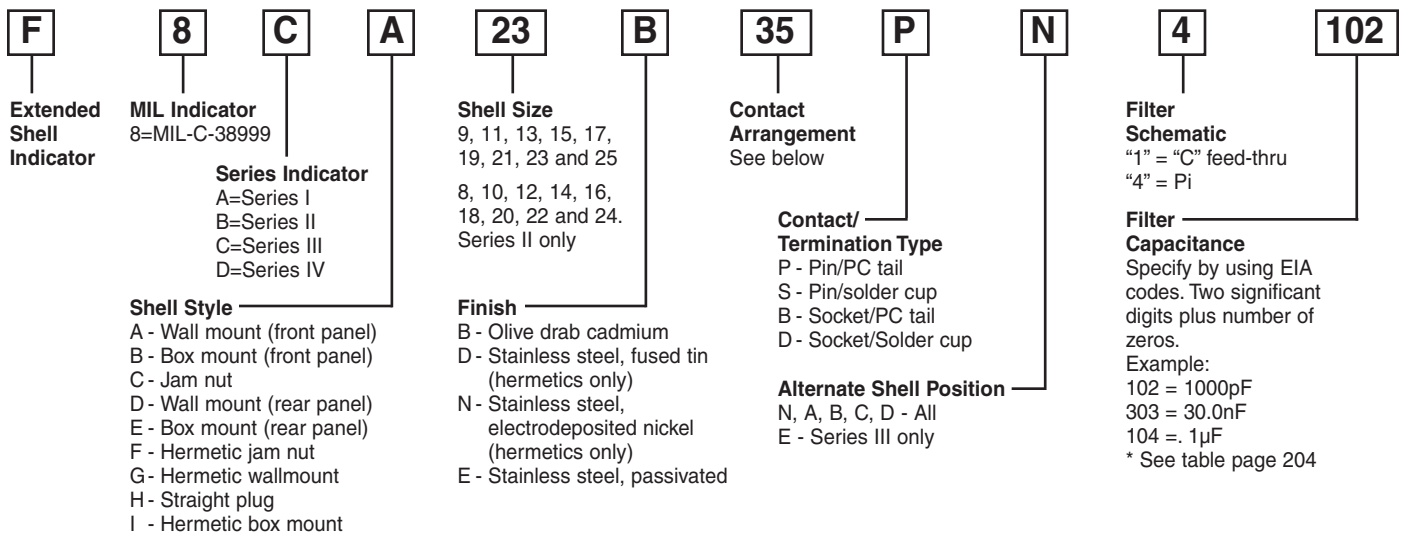
Due to the versatility provided with this product design, custom requirements can be readily accommodated. Consult Spectrum Control for your specific needs.



Materials and Finishes

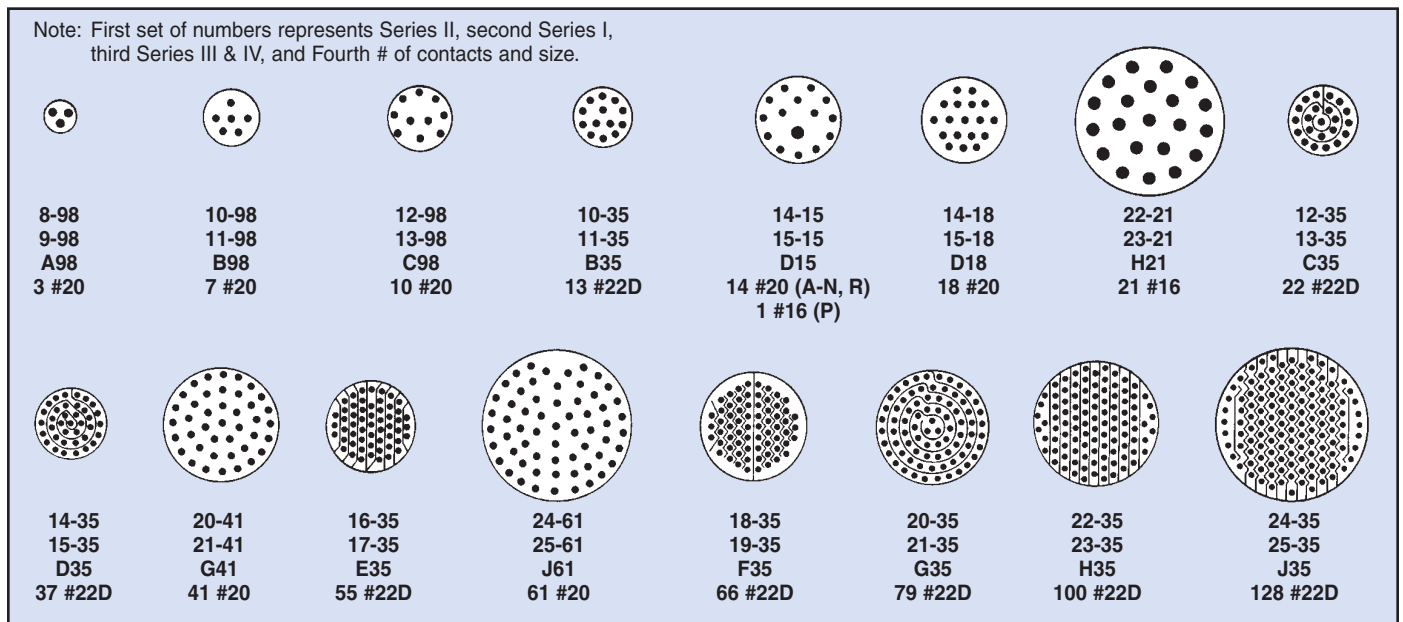
Shell. As noted in Ordering Information
Backshell. Copper Alloy, Nickel Plate
Contacts. Copper alloy, gold plate per MIL-G-45204

(For electrical specifications, see page 204.)



Contact Arrangements (First two digits shell size, second two contact arrangement)

Note: First set of numbers represents Series II, second Series I, third Series III & IV, and Fourth # of contacts and size.

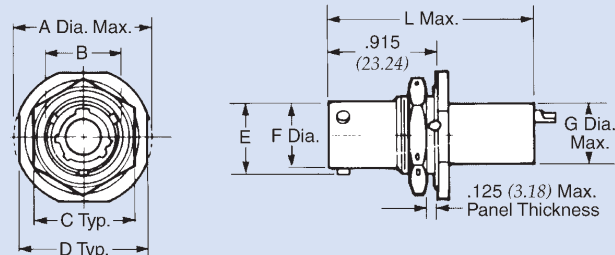


Note: For availability of filtered connectors with custom requirements, such as mixed capacitance, insulated lines, ground lines or other contact arrangements, consult factory for specific part number.

MIL-C-38999, Extended Shell Series I

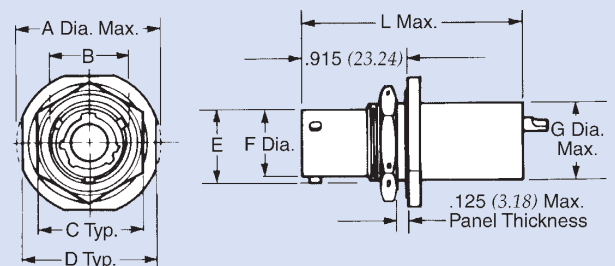
MS27468 Jam Nut Receptacle

Shell Size	A	B	C	D	E	F	G	L
9	1.199 (30.45)	.697 (17.70)	.875 (22.23)	1.062 (26.97)	.669 (16.99)	.572 (14.53)	.515 (13.08)	1.715 (43.56)
11	1.386 (35.20)	.822 (20.88)	1.000 (25.40)	1.250 (31.75)	.769 (19.53)	.700 (17.78)	.640 (16.26)	1.715 (43.56)
13	1.511 (38.38)	1.007 (25.58)	1.188 (30.18)	1.375 (34.93)	.955 (24.26)	.850 (21.59)	.765 (19.43)	1.715 (43.56)
15	1.636 (41.55)	1.134 (28.80)	1.312 (33.32)	1.500 (38.10)	1.084 (27.53)	.975 (24.77)	.890 (22.61)	1.715 (43.56)
17	1.761 (44.73)	1.259 (31.98)	1.438 (36.53)	1.625 (41.28)	1.208 (30.68)	1.100 (27.94)	1.015 (25.78)	1.715 (43.56)
19	1.949 (49.50)	1.384 (35.15)	1.562 (39.67)	1.812 (46.02)	1.333 (33.86)	1.207 (30.66)	1.140 (28.96)	1.715 (43.56)
21	2.073 (52.65)	1.507 (38.28)	1.688 (42.88)	1.938 (49.23)	1.459 (37.06)	1.332 (33.83)	1.265 (32.13)	1.745 (44.32)
23	2.199 (55.85)	1.634 (41.50)	1.812 (46.02)	2.062 (52.37)	1.575 (40.01)	1.457 (37.01)	1.390 (35.31)	1.745 (44.32)
25	2.323 (59.00)	1.759 (44.68)	2.000 (50.80)	2.188 (55.58)	1.709 (43.41)	1.582 (40.18)	1.515 (38.48)	1.745 (44.32)



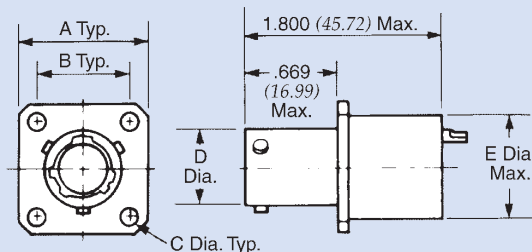
MS27470 Hermetic Seal Jam Nut Receptacle

Shell Size	A	B	C	D	E	F	G	L
9	1.199 (30.45)	.697 (17.70)	.875 (22.23)	1.062 (26.97)	.669 (16.99)	.572 (14.53)	.730 (18.54)	1.860 (47.24)
11	1.386 (35.20)	.822 (20.88)	1.000 (25.40)	1.250 (31.75)	.769 (19.53)	.700 (17.78)	.855 (21.72)	1.860 (47.24)
13	1.511 (38.38)	1.007 (25.58)	1.188 (30.18)	1.375 (34.93)	.955 (24.26)	.850 (21.59)	.980 (24.89)	1.860 (47.24)
15	1.636 (41.55)	1.134 (28.80)	1.312 (33.32)	1.500 (38.10)	1.084 (27.53)	.975 (24.77)	1.105 (28.07)	1.860 (47.24)
17	1.761 (44.73)	1.259 (31.98)	1.438 (36.53)	1.625 (41.28)	1.208 (30.68)	1.100 (27.94)	1.230 (31.24)	1.860 (47.24)
19	1.949 (49.50)	1.384 (35.15)	1.562 (39.67)	1.812 (46.02)	1.333 (33.86)	1.207 (30.66)	1.355 (34.42)	1.885 (47.88)
21	2.073 (52.65)	1.507 (38.28)	1.688 (42.88)	1.938 (49.23)	1.459 (37.06)	1.332 (33.83)	1.405 (35.69)	1.885 (47.88)
23	2.199 (55.85)	1.634 (41.50)	1.812 (46.02)	2.062 (52.37)	1.575 (40.01)	1.457 (37.01)	1.605 (40.77)	1.885 (47.88)
25	2.323 (59.00)	1.759 (44.68)	2.000 (50.80)	2.188 (55.58)	1.709 (43.41)	1.582 (40.18)	1.730 (43.94)	1.885 (47.88)



MS27469 Hermetic Seal Wall Mount Receptacle

Shell Size	A	B	C	D	E
9	.938 (23.83)	.719 (18.26)	.128 (3.25)	.572 (14.53)	.765 (19.43)
11	1.031 (26.19)	.812 (20.62)	.128 (3.25)	.700 (17.78)	.890 (22.61)
13	1.125 (28.58)	.906 (23.01)	.128 (3.25)	.850 (21.59)	1.015 (25.78)
15	1.219 (30.96)	.969 (24.61)	.128 (3.25)	.975 (24.77)	1.140 (28.96)
17	1.312 (33.32)	1.062 (26.97)	.128 (3.25)	1.100 (27.94)	1.265 (28.96)
19	1.438 (36.53)	1.156 (29.36)	.128 (3.25)	1.207 (30.66)	1.390 (35.31)
21	1.562 (39.67)	1.250 (31.75)	.128 (3.25)	1.332 (33.83)	1.515 (38.48)
23	1.688 (42.88)	1.375 (34.93)	.147 (3.73)	1.457 (37.01)	1.640 (41.66)
25	1.812 (46.02)	1.500 (38.10)	.147 (3.73)	1.582 (40.18)	1.765 (44.83)

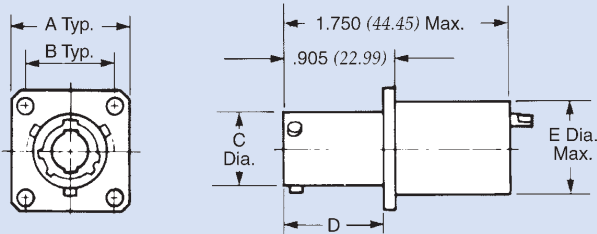


Dimensions in inches (mm)

MIL-C-38999, Extended Shell Series I

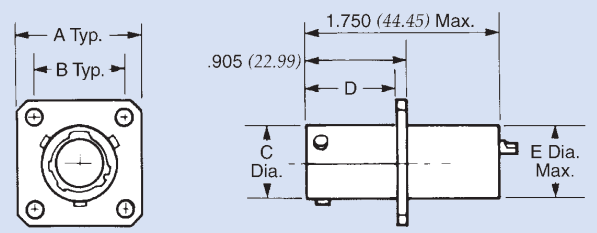
MS27496 Box Mount Receptacle, Front Panel Mounting

Shell Size	A	B	C	D	E
9	.938 (23.83)	.719 (18.26)	.572 (14.53)	.632 (16.05)	.495 (12.57)
11	1.031 (26.19)	.812 (20.62)	.700 (17.78)	.632 (16.05)	.620 (15.75)
13	1.125 (28.58)	.906 (23.01)	.850 (21.59)	.632 (16.05)	.745 (18.92)
15	1.219 (30.96)	.969 (24.61)	.975 (24.77)	.632 (16.05)	.870 (22.10)
17	1.312 (33.32)	1.062 (27.10)	1.100 (27.94)	.632 (16.05)	.995 (25.27)
19	1.438 (36.53)	1.156 (29.36)	1.207 (30.66)	.632 (16.05)	1.115 (28.32)
21	1.562 (39.67)	1.250 (31.75)	1.332 (33.83)	.602 (15.29)	1.235 (31.37)
23	1.688 (42.88)	1.375 (34.93)	1.457 (37.05)	.602 (15.29)	1.360 (34.54)
25	1.812 (46.02)	1.500 (38.10)	1.582 (40.18)	.602 (15.29)	1.485 (37.72)



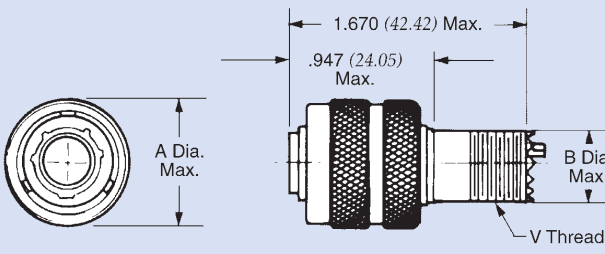
MS27505 Box Mount Receptacle, Back Panel Mounting

Shell Size	A	B	C	D	E
9	.938 (23.83)	.719 (18.26)	.572 (14.53)	.820 (20.83)	.495 (12.57)
11	1.031 (26.19)	.812 (20.62)	.700 (17.78)	.820 (20.83)	.620 (15.75)
13	1.125 (28.58)	.906 (23.01)	.850 (21.59)	.820 (20.83)	.745 (18.92)
15	1.219 (30.96)	.969 (24.61)	.975 (24.77)	.820 (20.83)	.870 (22.10)
17	1.312 (33.32)	1.062 (27.10)	1.100 (27.94)	.820 (20.83)	.995 (25.27)
19	1.438 (36.53)	1.156 (29.36)	1.207 (30.66)	.820 (20.83)	1.115 (28.32)
21	1.562 (39.67)	1.250 (31.75)	1.332 (33.83)	.790 (20.07)	1.235 (31.37)
23	1.688 (42.88)	1.375 (34.93)	1.457 (37.01)	.790 (20.07)	1.360 (34.54)
25	1.812 (46.02)	1.500 (38.10)	1.582 (40.18)	.790 (20.07)	1.485 (37.72)



MS27467 Straight Plug

Shell Size	A	B	V
9	.844 (21.44)	.540 (13.72)	.4375-28 UNEF-2A
11	.969 (24.61)	.660 (16.76)	.5625-24 UNEF-2A
13	1.141 (28.98)	.785 (19.94)	.6875-24 UNEF-2A
15	1.266 (32.16)	.915 (23.24)	.8125-20 UNEF-2A
17	1.391 (35.33)	1.025 (26.04)	.9375-20 UNEF-2A
19	1.500 (38.10)	1.145 (29.08)	1.0625-18 UNEF-2A
21	1.625 (41.28)	1.270 (32.26)	1.1875-18 UNEF-2A
23	1.750 (44.45)	1.395 (35.43)	1.3125-18 UNEF-2A
25	1.875 (47.63)	1.520 (38.61)	1.4375-18 UNEF-2A

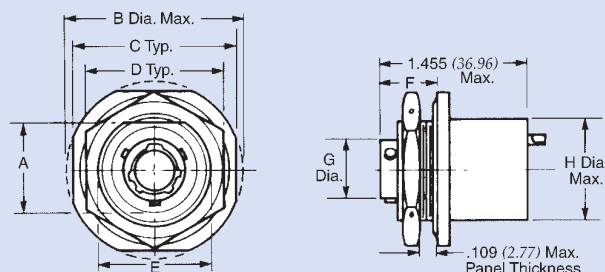


Dimensions in inches (mm)

MIL-C-38999, Extended Shell Series II

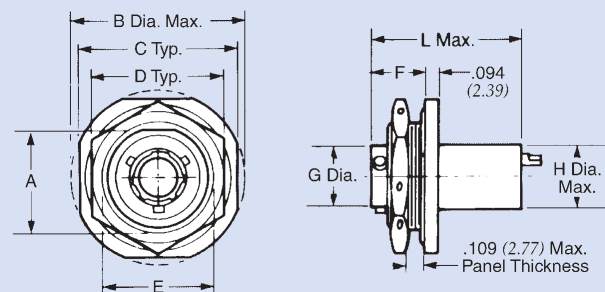
MS27477 Hermetic Jam Nut Receptacle

Shell Size	A	B	C	D	E	F	G	H
8	.830 (21.08)	1.390 (35.31)	1.250 (31.75)	1.062 (26.97)	.884 (22.45)	.438 (11.13)	.473 (12.01)	.435 (11.05)
10	.955 (24.26)	1.515 (38.48)	1.375 (34.93)	1.188 (30.18)	1.007 (25.58)	.438 (11.13)	.590 (14.99)	.525 (13.34)
12	1.084 (27.53)	1.640 (41.66)	1.500 (38.10)	1.312 (33.32)	1.134 (28.80)	.438 (11.13)	.750 (19.05)	.665 (16.89)
14	1.208 (30.68)	1.765 (44.83)	1.625 (41.28)	1.438 (36.53)	1.259 (31.98)	.438 (11.13)	.875 (22.23)	.785 (19.94)
16	1.333 (33.86)	1.953 (49.61)	1.781 (45.24)	1.562 (39.67)	1.384 (35.15)	.438 (11.13)	1.000 (25.40)	.915 (23.24)
18	1.459 (37.06)	2.031 (51.59)	1.890 (48.01)	1.688 (42.88)	1.507 (38.28)	.438 (11.13)	1.125 (28.50)	.985 (25.02)
20	1.576 (40.03)	2.156 (54.76)	2.016 (51.21)	1.812 (46.02)	1.634 (41.50)	.464 (11.79)	1.250 (31.75)	1.135 (28.83)
22	1.701 (43.21)	2.280 (57.91)	2.140 (54.31)	2.000 (50.80)	1.759 (44.68)	.464 (11.79)	1.375 (34.93)	1.255 (31.88)
24	1.826 (46.38)	2.405 (61.09)	2.265 (57.53)	2.125 (53.98)	1.884 (47.85)	.464 (11.79)	1.500 (38.10)	1.385 (35.18)



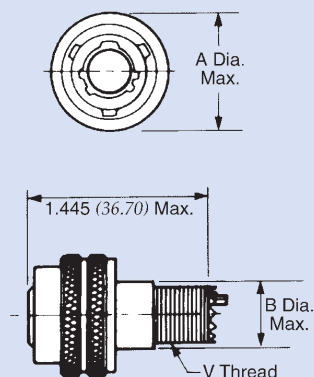
MS27474 Jam Nut Receptacle

Shell Size	A	B	C	D	E	F	G	H	L
8	.830 (21.08)	1.390 (35.31)	1.250 (31.75)	1.062 (26.97)	.884 (22.45)	.438 (11.13)	.473 (12.01)	.515 (13.08)	1.370 (34.80)
10	.955 (24.26)	1.515 (38.48)	1.375 (34.93)	1.188 (30.18)	1.007 (25.58)	.438 (11.13)	.590 (14.99)	.640 (16.26)	1.370 (34.80)
12	1.084 (27.53)	1.640 (41.66)	1.500 (38.10)	1.312 (33.32)	1.134 (28.80)	.438 (11.13)	.750 (19.05)	.765 (19.43)	1.370 (34.80)
14	1.208 (30.68)	1.765 (44.83)	1.625 (41.28)	1.438 (36.53)	1.259 (31.98)	.438 (11.13)	.875 (22.23)	.890 (22.61)	1.370 (34.80)
16	1.333 (33.86)	1.953 (49.61)	1.781 (45.24)	1.562 (39.67)	1.384 (35.15)	.438 (11.13)	1.000 (25.40)	1.015 (25.78)	1.370 (34.80)
18	1.459 (37.06)	2.031 (51.59)	1.890 (48.01)	1.688 (42.88)	1.507 (38.28)	.438 (11.13)	1.125 (28.50)	1.140 (28.96)	1.370 (34.80)
20	1.576 (40.03)	2.156 (54.76)	2.016 (51.21)	1.812 (46.02)	1.634 (41.50)	.464 (11.79)	1.250 (31.75)	1.265 (32.13)	1.395 (35.43)
22	1.701 (43.21)	2.280 (57.91)	2.140 (54.36)	2.000 (50.80)	1.759 (44.68)	.464 (11.79)	1.375 (34.93)	1.390 (35.31)	1.395 (35.43)
24	1.826 (46.38)	2.405 (61.09)	2.265 (57.53)	2.125 (53.98)	1.884 (47.85)	.464 (11.79)	1.500 (38.10)	1.515 (38.48)	1.395 (35.43)



MS27484 Straight Plug

Shell Size	A	B	V Thread Modified Class 2-A	Modified Major Dia.
8	.734 (18.64)	.540 (13.72)	.4375-28 UNEF	.421-.417
10	.844 (21.44)	.660 (16.76)	.5625-24 UNEF	.542-.538
12	1.016 (25.81)	.785 (19.94)	.6875-24 UNEF	.667-.663
14	1.141 (28.98)	.915 (23.24)	.8125-20 UNEF	.791-.787
16	1.265 (32.13)	1.025 (26.04)	.9375-20 UNEF	.916-.912
18	1.391 (35.33)	1.145 (29.08)	1.0625-18 UNEF	1.034-1.030
20	1.500 (38.10)	1.270 (32.26)	1.875-18 UNEF	1.158-1.154
22	1.625 (41.28)	1.395 (35.43)	1.3125-18 UNEF	1.283-1.279
24	1.750 (44.45)	1.520 (38.61)	1.4375-18 UNEF	1.408-1.404

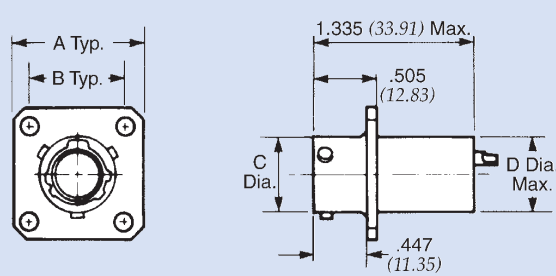


Dimensions in inches (mm)

MIL-C-38999, Extended Shell Series II

MS27508 Box Mount Receptacle, Back Panel Mounting

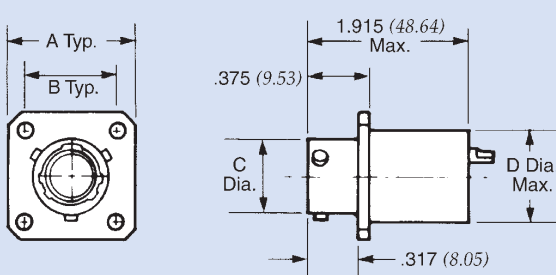
Shell Size	A	B	C	D
8	.812 (20.62)	.594 (15.09)	.473 (12.01)	.495 (12.57)
10	.938 (23.83)	.719 (18.26)	.590 (14.99)	.620 (15.75)
12	1.031 (26.19)	.812 (20.62)	.750 (19.05)	.745 (18.92)
14	1.125 (28.58)	.906 (23.01)	.875 (22.23)	.870 (22.10)
16	1.219 (30.96)	.969 (24.61)	1.000 (25.40)	.995 (25.27)
18	1.312 (33.32)	1.062 (27.10)	1.125 (28.58)	1.115 (28.32)
20	1.438 (36.53)	1.156 (29.36)	1.250 (31.75)	1.235 (31.37)
22	1.562 (39.67)	1.250 (31.75)	1.375 (34.93)	1.360 (34.54)
24	1.688 (42.88)	1.375 (34.93)	1.500 (38.10)	1.485 (37.72)



Technical drawing of MS27508 Box Mount Receptacle showing front and side views with dimensions. Front view shows dimensions A Typ. and B Typ. Side view shows dimensions 1.335 (33.91) Max., .505 (12.83), .447 (11.35), C Dia., and D Dia. Max.

MS27476 Hermetic Seal, Box Mount Receptacle

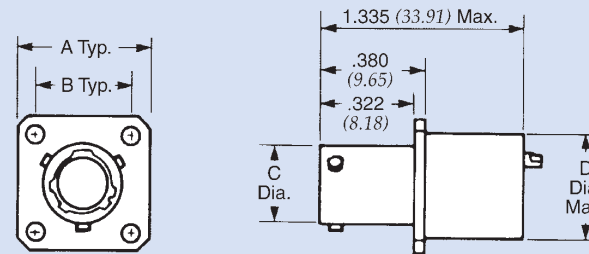
Shell Size	A	B	C	D
10	.938 (23.83)	.719 (18.26)	.590 (14.99)	.750 (19.05)
12	1.031 (26.19)	.812 (20.62)	.750 (19.05)	.860 (21.84)
14	1.125 (28.58)	.906 (23.01)	.875 (22.23)	.985 (25.02)
16	1.219 (30.96)	.969 (24.61)	1.000 (25.40)	1.110 (28.19)
18	1.312 (33.32)	1.062 (26.97)	1.125 (28.58)	1.235 (31.37)
20	1.438 (36.53)	1.156 (29.36)	1.250 (31.75)	1.330 (33.78)
22	1.562 (39.67)	1.250 (31.75)	1.375 (34.93)	1.455 (36.96)
24	1.688 (42.88)	1.375 (34.93)	1.500 (38.10)	1.580 (40.13)



Technical drawing of MS27476 Hermetic Seal, Box Mount Receptacle showing front and side views with dimensions. Front view shows dimensions A Typ. and B Typ. Side view shows dimensions 1.915 (48.64) Max., .375 (9.53), .317 (8.05), C Dia., and D Dia. Max.

MS27499 Box Mount Receptacle, Front Panel Mounting

Shell Size	A	B	C	D
8	.812 (20.62)	.594 (15.09)	.473 (12.01)	.495 (12.57)
10	.938 (23.83)	.719 (18.26)	.590 (14.99)	.620 (15.75)
12	1.031 (26.19)	.812 (20.62)	.750 (19.05)	.745 (18.92)
14	1.125 (28.58)	.906 (23.01)	.875 (22.23)	.870 (22.10)
16	1.219 (30.96)	.969 (24.61)	1.000 (25.40)	.995 (25.27)
18	1.312 (33.32)	1.062 (26.97)	1.125 (28.58)	1.115 (28.32)
20	1.438 (36.53)	1.156 (29.36)	1.250 (31.75)	1.235 (31.37)
22	1.562 (39.67)	1.250 (31.75)	1.375 (34.93)	1.360 (34.54)
24	1.688 (42.88)	1.375 (34.93)	1.500 (38.10)	1.485 (37.72)



Technical drawing of MS27499 Box Mount Receptacle showing front and side views with dimensions. Front view shows dimensions A Typ. and B Typ. Side view shows dimensions 1.335 (33.91) Max., .380 (9.65), .322 (8.18), C Dia., and D Dia. Max.

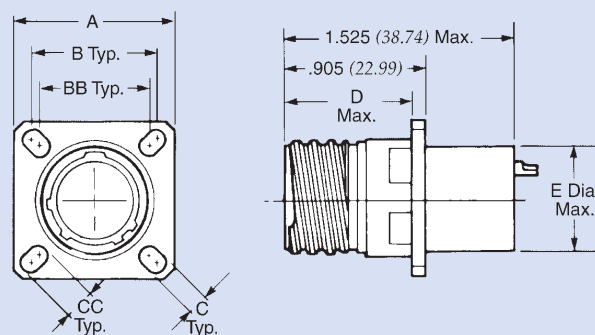
Dimensions in inches (mm)

MIL-C-38999, Extended Shell Series III



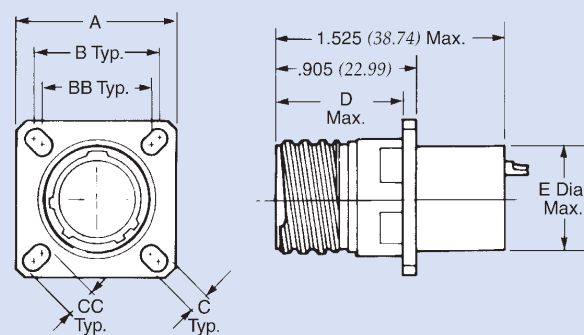
D38999/20 Wall Mount Receptacle

Shell Size	MS Shell Size Code	A	B	BB	C	CC	D	E
9	A	.938 (23.83)	.719 (18.26)	.594 (15.09)	.128 (3.25)	.216 (5.49)	.820 (20.83)	.550 (13.97)
11	B	1.031 (26.19)	.812 (20.62)	.719 (18.26)	.128 (3.25)	.194 (4.93)	.820 (20.83)	.670 (17.02)
13	C	1.125 (28.58)	.906 (23.01)	.812 (20.62)	.128 (3.25)	.194 (4.93)	.820 (20.83)	.785 (19.94)
15	D	1.219 (30.96)	.969 (24.61)	.906 (23.01)	.128 (3.25)	.173 (4.39)	.820 (20.83)	.945 (24.00)
17	E	1.312 (33.32)	1.062 (26.97)	.969 (24.61)	.128 (3.25)	.194 (4.93)	.820 (20.83)	1.060 (26.92)
19	F	1.438 (36.53)	1.156 (29.36)	1.062 (26.97)	.128 (3.25)	.194 (4.93)	.820 (20.83)	1.180 (29.97)
21	G	1.562 (39.67)	1.250 (31.75)	1.156 (29.36)	.128 (3.25)	.194 (4.93)	.790 (20.07)	1.295 (32.89)
23	H	1.688 (42.88)	1.375 (34.93)	1.250 (31.75)	.154 (3.91)	.242 (6.15)	.790 (20.07)	1.415 (35.94)
25	J	1.812 (46.02)	1.500 (38.10)	1.375 (34.93)	.154 (3.91)	.242 (6.15)	.790 (20.07)	1.535 (38.99)



D38999/21 Hermetic Seal Box Mount Receptacle

Shell Size	MS Shell Size Code	A	B	BB	C	CC	D	E
9	A	.937 (23.80)	.719 (18.26)	.594 (15.09)	.128 (3.25)	.216 (5.49)	.843 (21.41)	.380 (9.65)
11	B	1.031 (26.20)	.812 (20.62)	.719 (18.26)	.128 (3.25)	.194 (4.93)	.843 (21.41)	.500 (12.70)
13	C	1.126 (28.60)	.906 (23.01)	.812 (20.62)	.128 (3.25)	.194 (4.93)	.843 (21.41)	.620 (15.75)
15	D	1.220 (31.00)	.969 (24.61)	.906 (23.01)	.128 (3.25)	.194 (4.93)	.843 (21.41)	.775 (19.68)
17	E	1.311 (33.30)	1.062 (26.97)	.969 (24.61)	.128 (3.25)	.194 (4.93)	.843 (21.41)	.895 (22.73)
19	F	1.437 (36.50)	1.156 (29.36)	1.062 (26.97)	.128 (3.25)	.194 (4.93)	.843 (21.41)	1.010 (25.65)
21	G	1.563 (39.70)	1.250 (31.75)	1.156 (29.36)	.128 (3.25)	.194 (4.93)	.843 (21.41)	1.130 (28.70)
23	H	1.689 (42.90)	1.375 (34.93)	1.250 (31.75)	.154 (3.91)	.242 (6.15)	.843 (21.41)	1.250 (31.75)
25	J	1.811 (46.00)	1.500 (38.10)	1.375 (34.93)	.154 (3.91)	.242 (6.15)	.843 (21.41)	1.365 (34.67)

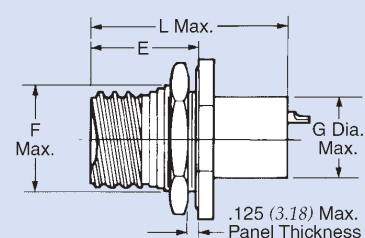
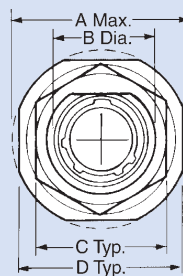


Dimensions in inches (mm)

MIL-C-38999, Extended Shell Series III

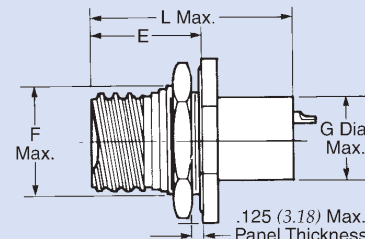
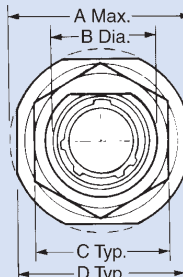
D38999/24 Jam Nut Receptacle

Shell Size	MS Shell Size Code	A	B	C	D	E	F	G	L
9	A	1.199 (30.45)	.697 (17.70)	.875 (22.23)	1.062 (26.97)	.871 (22.12)	.669 (16.99)	.550 (13.97)	1.595 (40.51)
11	B	1.386 (35.20)	.822 (20.88)	1.000 (25.40)	1.250 (31.75)	.871 (22.12)	.769 (19.53)	.670 (17.02)	1.595 (40.51)
13	C	1.511 (38.38)	1.007 (25.58)	1.188 (30.18)	1.375 (34.93)	.878 (22.30)	.955 (24.26)	.785 (19.94)	1.595 (40.51)
15	D	1.636 (41.55)	1.134 (28.80)	1.312 (33.32)	1.500 (38.10)	.878 (22.30)	1.084 (27.53)	.945 (24.00)	1.595 (40.51)
17	E	1.761 (44.73)	1.259 (31.98)	1.438 (36.53)	1.625 (41.28)	.878 (22.30)	1.208 (30.68)	1.060 (26.92)	1.595 (40.51)
19	F	1.949 (49.50)	1.384 (35.15)	1.562 (39.67)	1.812 (46.02)	.878 (22.30)	1.333 (33.86)	1.180 (29.97)	1.630 (41.40)
21	G	2.073 (52.65)	1.507 (38.28)	1.688 (42.88)	1.938 (49.23)	.878 (22.30)	1.459 (37.06)	1.295 (32.89)	1.630 (41.40)
23	H	2.199 (55.85)	1.634 (41.50)	1.812 (46.02)	2.062 (52.37)	.878 (22.30)	1.575 (40.01)	1.415 (35.94)	1.630 (41.40)
25	J	2.323 (59.00)	1.759 (44.68)	2.000 (50.80)	2.188 (55.58)	.878 (22.30)	1.709 (43.41)	1.535 (38.99)	1.630 (41.40)



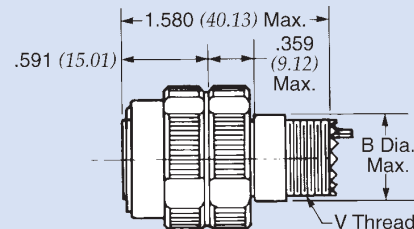
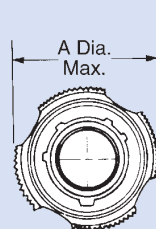
D38999/23 Hermetic Seal Jam Nut Receptacle

Shell Size	MS Shell Size Code	A	B	C	D	E	F	G	L
9	A	1.199 (30.45)	.697 (17.70)	.875 (22.23)	1.062 (26.97)	.871 (22.12)	.669 (16.99)	.730 (18.54)	1.955 (49.66)
11	B	1.386 (35.20)	.822 (20.88)	1.000 (25.40)	1.250 (31.75)	.871 (22.12)	.769 (19.53)	.845 (21.46)	1.955 (49.66)
13	C	1.511 (38.38)	1.007 (25.58)	1.188 (30.18)	1.375 (34.93)	.878 (22.30)	.955 (24.26)	.970 (24.64)	1.955 (49.66)
15	D	1.636 (41.55)	1.134 (28.80)	1.312 (33.32)	1.500 (38.10)	.878 (22.30)	1.084 (27.53)	1.095 (27.81)	1.955 (49.66)
17	E	1.761 (44.73)	1.259 (31.98)	1.438 (36.53)	1.625 (41.28)	.878 (22.30)	1.208 (30.68)	1.220 (30.99)	1.955 (49.66)
19	F	1.949 (49.50)	1.384 (35.15)	1.562 (39.67)	1.812 (46.02)	.878 (22.30)	1.333 (33.86)	1.345 (34.16)	1.985 (50.42)
21	G	2.073 (52.65)	1.507 (38.28)	1.688 (42.88)	1.938 (49.23)	.878 (22.30)	1.459 (37.06)	1.470 (37.34)	1.985 (50.42)
23	H	2.199 (55.85)	1.634 (41.50)	1.812 (46.02)	2.062 (52.37)	.878 (22.30)	1.575 (40.01)	1.595 (40.51)	1.985 (50.42)
25	J	2.323 (59.00)	1.759 (44.68)	2.000 (50.80)	2.188 (55.58)	.878 (22.30)	1.709 (43.41)	1.720 (43.69)	1.985 (50.42)



D38999/26 Straight Plug

Shell Size	MS Shell Size Code	A	B	V Thread
9	A	.859 (21.82)	.580 (14.73)	M12 X1.0-6g-0.1R
11	B	.969 (24.61)	.695 (17.65)	M15X1.0-6g-0.1R
13	C	1.141 (28.98)	.810 (20.57)	M18X1.0-6g-0.1R
15	D	1.266 (32.16)	.965 (24.51)	M22X1.0-6g-0.1R
17	E	1.391 (35.33)	1.080 (27.43)	M25X1.0-6g-0.1R
19	F	1.500 (38.10)	1.195 (30.35)	M28X1.0-6g-0.1R
21	G	1.625 (41.28)	1.310 (33.27)	M31X1.0-6g-0.1R
23	H	1.750 (44.45)	1.425 (36.20)	M34X1.0-6g-0.1R
25	J	1.875 (47.63)	1.540 (39.12)	M37X1.0-6g-0.1R



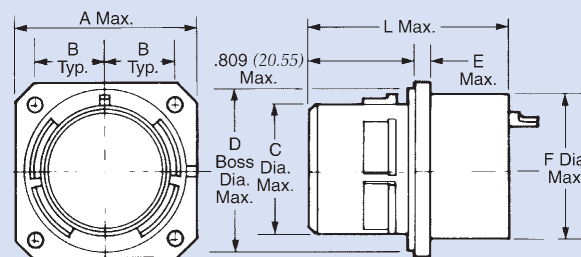
Dimensions in inches (mm)

MIL-C-38999, Extended Shell Series IV



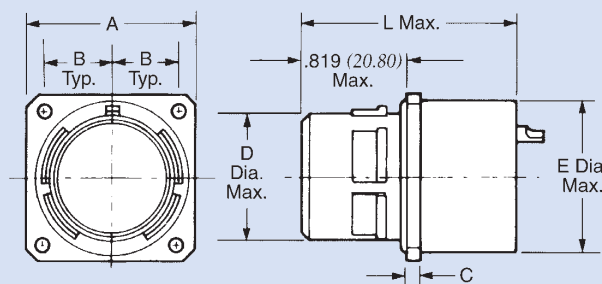
D38999/40 Wall Mount Receptacle

Shell Size	MS Size Code	A	B	C	D	E	F	L
11	B	1.051 (26.70)	.406 (10.31)	.509 (12.93)	.793 (20.14)	.102 (2.59)	.670 (17.02)	1.785 (45.34)
13	C	1.145 (29.08)	.453 (11.51)	.634 (16.10)	.919 (23.34)	.102 (2.59)	.785 (19.94)	1.785 (45.34)
15	D	1.240 (31.50)	.4845 (12.31)	.759 (19.28)	1.044 (26.52)	.102 (2.59)	.945 (24.00)	1.785 (45.34)
17	E	1.334 (33.88)	.531 (13.49)	.885 (22.48)	1.170 (29.72)	.102 (2.59)	1.060 (26.92)	1.785 (45.34)
19	F	1.480 (37.06)	.578 (14.68)	1.009 (25.63)	1.294 (32.87)	.102 (2.59)	1.180 (29.97)	1.785 (45.34)
21	G	1.582 (40.18)	.625 (15.88)	1.134 (28.80)	1.419 (36.04)	.133 (3.38)	1.295 (32.89)	1.815 (46.10)
23	H	1.708 (43.38)	.6875 (17.46)	1.259 (31.98)	1.544 (39.22)	.133 (3.38)	1.415 (35.94)	1.815 (46.10)
25	J	1.834 (46.58)	.750 (19.05)	1.384 (35.15)	1.669 (42.39)	.133 (3.38)	1.535 (38.99)	1.815 (46.10)



D38999/41 Hermetic Seal Box Mount Receptacle

Shell Size	MS Size Code	A	B	C	D	E	L
11	B	1.051 (26.70)	.406 (10.31)	.093 (2.36)	.509 (12.93)	.500 (12.70)	1.785 (45.34)
13	C	1.145 (29.08)	.453 (11.51)	.093 (2.36)	.634 (16.10)	.620 (15.75)	1.785 (45.34)
15	D	1.240 (31.50)	.4845 (12.31)	.093 (2.36)	.759 (19.28)	.775 (19.68)	1.785 (45.34)
17	E	1.334 (33.88)	.531 (13.49)	.093 (2.36)	.885 (22.48)	.895 (22.73)	1.785 (45.34)
19	F	1.480 (37.06)	.578 (14.68)	.093 (2.36)	1.009 (25.68)	1.010 (25.65)	1.785 (45.34)
21	G	1.582 (40.18)	.625 (15.88)	.093 (2.36)	1.134 (28.80)	1.130 (28.70)	1.815 (46.10)
23	H	1.708 (43.38)	.6875 (17.46)	.093 (2.36)	1.259 (31.90)	1.250 (31.75)	1.815 (46.10)
25	J	1.834 (46.58)	.750 (19.05)	.093 (2.36)	1.384 (35.15)	1.365 (34.67)	1.815 (46.10)

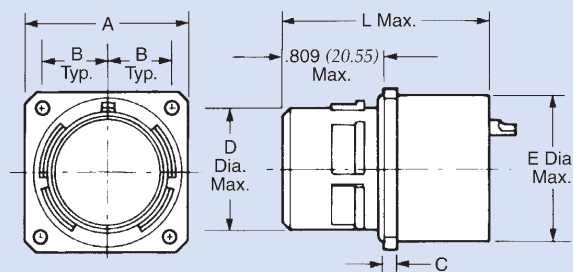


Dimensions in inches (mm)

MIL-C-38999, Extended Shell Series IV

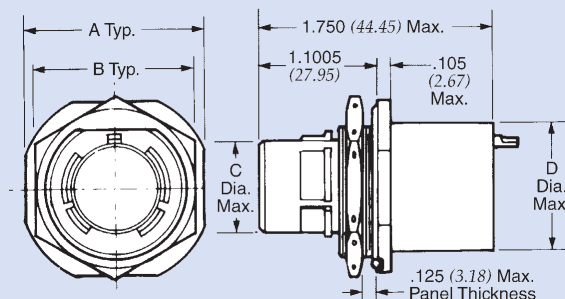
D38999/42 Box Mount Receptacle

Shell Size	Shell Size Code	A	B	C	D	E	L
11	B	1.051 (26.70)	.406 (10.31)	.102 (2.59)	.509 (12.93)	.655 (16.64)	1.785 (45.34)
13	C	1.145 (29.08)	.453 (11.51)	.102 (2.59)	.634 (16.10)	.770 (19.56)	1.785 (45.34)
15	D	1.240 (31.50)	.4845 (12.31)	.102 (2.59)	.759 (19.28)	.895 (22.73)	1.785 (45.34)
17	E	1.334 (33.88)	.531 (13.49)	.102 (2.59)	.885 (22.48)	1.020 (25.91)	1.785 (45.34)
19	F	1.460 (37.08)	.578 (14.68)	.102 (2.59)	1.009 (25.63)	1.130 (28.70)	1.785 (45.34)
21	G	1.582 (40.18)	.626 (15.90)	.133 (3.38)	1.134 (28.80)	1.250 (31.75)	1.815 (46.10)
23	H	1.708 (43.38)	.6875 (17.46)	.133 (3.38)	1.259 (31.98)	1.375 (34.93)	1.815 (46.10)
25	J	1.834 (46.58)	.750 (19.05)	.133 (3.38)	1.384 (35.15)	1.500 (38.10)	1.815 (46.10)



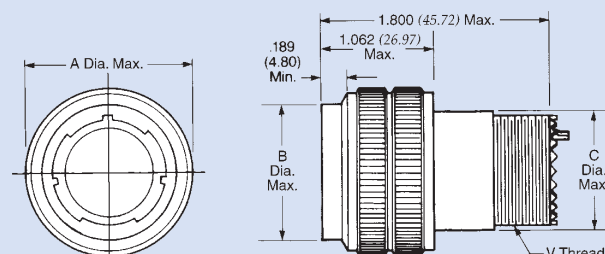
D38999/44 Jam Nut Receptacle

Shell Size	MS Shell Size Code	A	B	C	D
11	B	1.394 (35.41)	1.260 (32.00)	.509 (12.93)	.670 (17.02)
13	C	1.520 (38.61)	1.417 (36.00)	.634 (16.10)	.785 (19.94)
15	D	1.642 (41.71)	1.614 (41.00)	.759 (19.28)	.945 (24.00)
17	E	1.799 (45.69)	1.614 (41.00)	.885 (22.48)	1.060 (26.92)
19	F	1.909 (48.49)	1.811 (46.00)	1.009 (25.63)	1.180 (29.97)
21	G	2.035 (51.69)	1.968 (50.00)	1.134 (28.80)	1.295 (32.89)
23	H	2.157 (54.79)	1.968 (50.00)	1.259 (31.98)	1.415 (35.94)
25	J	2.283 (57.99)	2.165 (55.00)	1.384 (35.15)	1.535 (38.99)



D38999/46 Straight Plug

Shell Size	MS Shell Size Code	A	B	C	V
11	B	1.054 (26.77)	.775 (19.69)	.695 (17.65)	M15x1.0-6g-0.1R
13	C	1.226 (31.14)	.901 (22.89)	.810 (20.57)	M18x1.0-6g-0.1R
15	D	1.351 (34.32)	1.039 (26.39)	.965 (24.51)	M22x1.0-6g-0.1R
17	E	1.476 (37.49)	1.149 (29.18)	1.080 (27.43)	M25x1.0-6g-0.1R
19	F	1.586 (40.28)	1.275 (32.39)	1.195 (30.35)	M28x1.0-6g-0.1R
21	G	1.711 (43.46)	1.401 (35.59)	1.310 (33.27)	M31x1.0-6g-0.1R
23	H	1.836 (46.63)	1.527 (38.79)	1.425 (36.20)	M34x1.0-6g-0.1R
25	J	1.964 (49.89)	1.649 (41.88)	1.540 (39.12)	M37x1.0-6g-0.1R



Dimensions in inches (mm)

MIL-C-83723, Extended Shell Series III

All extended shell connectors are manufactured by adding filters to a standard MIL qualified connector. The filtering is achieved by extending the connector with the use of a backshell and placing either planar or tubular capacitors in the backshell. Spectrum will always keep the extension to a minimum.

These miniature circular filtered connectors are designed to meet the applicable portions of MIL-C-83723 and are interchangeable with that specification.

Custom Designs

Due to the versatility provided with this product design, custom requirements can be readily accommodated. Consult Spectrum Control for your specific needs.

Materials and Finishes

Shell. As noted in Ordering Information
Backshell. Copper Alloy, Nickel Plate
Contacts. Copper alloy, gold plate per MIL-G-45204

(For electrical specifications, see page 204.)

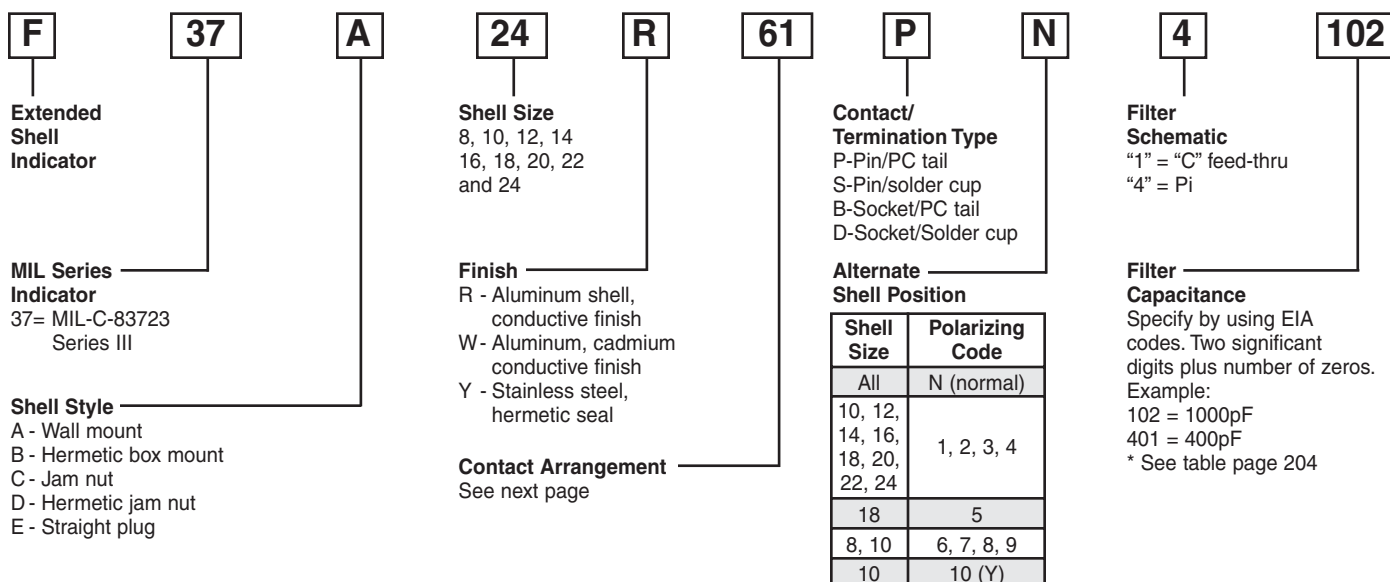
Ordering Information

Available connector styles and shell sizes for this MIL series are shown on the following pages. Refer to these pages and the information below to develop your connector part number.



Spectrum's Control Advantages

- **Retrofit existing connectors** - We can add filters to customer supplied connectors, saving time during prototype phase and expediting system evaluation.
- **Design flexibility and quality assurance** - We are vertically integrated with ceramic capacitors, enabling us to offer a broad selection of this critical component and ensuring design versatility and manufacturing control.
- **Prototypes** - Our EMI filtering expertise and large capacitor inventory allow us to quickly provide a working sample of your filtered connector.
- **Economy and turnaround** - Most components we utilize are standards, minimizing our tooling requirements and providing cost savings and a shorter lead time.
- **MIL and commercial applications** - Reduce program costs by utilizing our extended shell connectors for both MIL spec and commercial grade connectors.
- **Reduce testing and qualification** - Use of a QPL'd connector interface can expedite your approval process. In addition, we can filter any series of connectors . . . eliminating concerns over filter connector availability.



MIL-C-83723, Extended Shell Series III

Contact Arrangements (First two digits shell size, second two contact arrangement)



8-2
2 #20



10-2
2 #20



10-20
2 #16



8-3
3 #20



8-98
3 #20



12-3
3 #16



12-4
4 #16



10-5
5 #20



10-6
6 #20



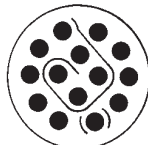
14-7
7 #16



10-16
10 #16



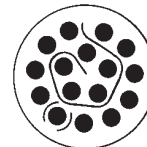
12-12
12 #20



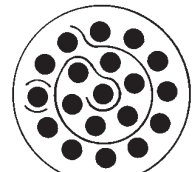
18-14
14 #16



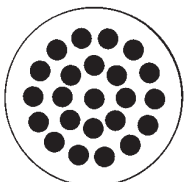
14-15
15 #20



20-16
16 #16



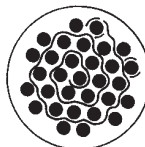
22-19
19 #16



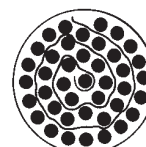
22-23
23 #16



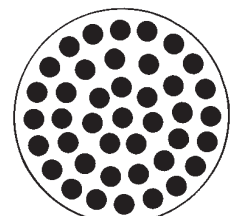
16-24
24 #20



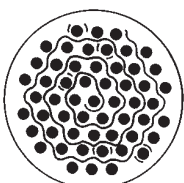
18-31
31 #20



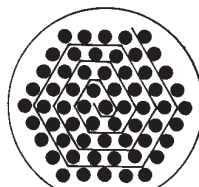
20-41
41 #20



28-41
41 #16



22-55
55 #20



24-61
61 #20

Note:

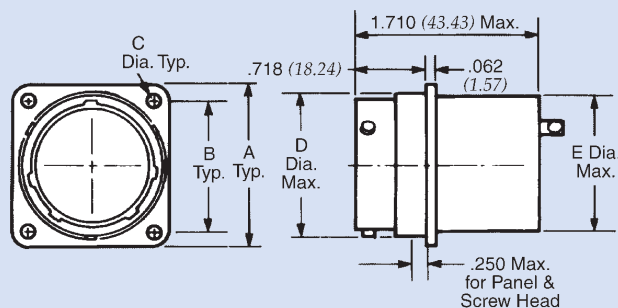
For availability of filtered connectors with custom requirements, such as mixed capacitance, insulated lines, ground lines or other contact arrangements, consult factory for specific part number.

MIL-C-83723, Extended Shell Series III



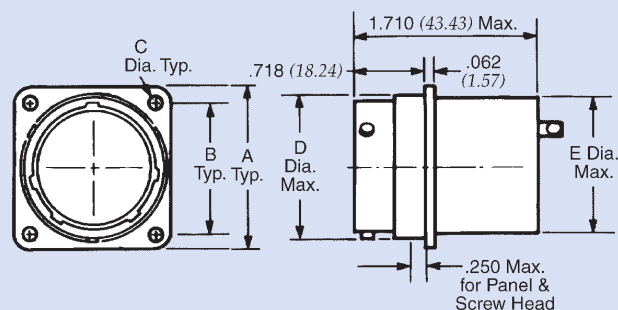
M83723/71/72 Bayonet Coupling Wall Mount Receptacle

Shell Size	A	B	C	D	E
8	.812 (20.62)	.594 (15.09)	.120 (3.05)	.562 (14.27)	.575 (14.61)
10	.937 (23.80)	.719 (18.26)	.120 (3.05)	.696 (17.68)	.700 (17.78)
12	1.031 (26.19)	.812 (20.62)	.120 (3.05)	.875 (22.23)	.825 (20.96)
14	1.125 (28.58)	.906 (23.01)	.120 (3.05)	.935 (23.75)	.950 (24.13)
16	1.250 (31.75)	.969 (24.61)	.120 (3.05)	1.062 (26.97)	1.075 (27.31)
18	1.343 (34.11)	1.062 (26.97)	.120 (3.05)	1.187 (30.15)	1.140 (28.96)
20	1.473 (37.41)	1.156 (29.36)	.120 (3.05)	1.312 (33.32)	1.265 (32.13)
22	1.562 (39.67)	1.250 (31.75)	.120 (3.05)	1.437 (36.50)	1.340 (34.04)
24	1.703 (43.26)	1.375 (34.93)	.149 (3.78)	1.562 (39.67)	1.515 (38.48)



M83723/79 Bayonet Coupling Hermetic Box Receptacle

Shell Size	A	B	C	D	E
8	.812 (20.62)	.594 (15.09)	.120 (3.05)	.562 (14.27)	.580 (14.73)
10	.937 (23.80)	.719 (18.26)	.120 (3.05)	.696 (17.68)	.645 (16.38)
12	1.031 (26.19)	.812 (20.62)	.120 (3.05)	.875 (22.23)	.830 (21.08)
14	1.125 (28.58)	.906 (23.01)	.120 (3.05)	.935 (23.75)	.895 (22.73)
16	1.250 (31.75)	.969 (24.61)	.120 (3.05)	1.062 (26.97)	1.020 (25.91)
18	1.343 (34.11)	1.062 (26.97)	.120 (3.05)	1.187 (30.15)	1.145 (29.08)
20	1.473 (37.41)	1.156 (29.36)	.120 (3.05)	1.312 (33.32)	1.270 (32.26)
22	1.562 (39.67)	1.250 (31.75)	.120 (3.05)	1.437 (36.50)	1.395 (35.43)
24	1.703 (43.26)	1.375 (34.93)	.149 (3.78)	1.562 (39.67)	1.520 (38.61)

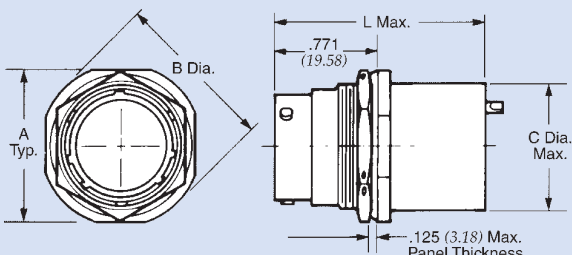


Dimensions in inches (mm)

MIL-C-83723, Extended Shell Series III

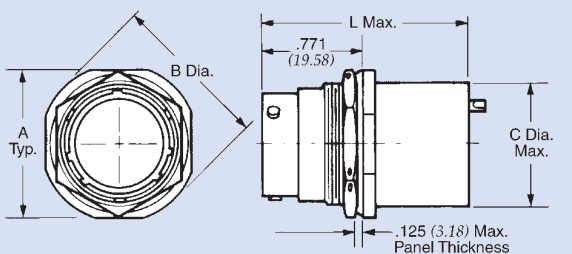
M83723/73/74 Bayonet Coupling Jam Nut Receptacle

Shell Size	A	B	C	L
8	.979 (24.87)	1.068 (27.13)	.575 (14.61)	1.830 (46.48)
10	1.104 (28.04)	1.192 (30.28)	.700 (17.78)	1.830 (46.48)
12	1.291 (32.79)	1.380 (35.05)	.825 (20.96)	1.830 (46.48)
14	1.391 (35.33)	1.505 (38.23)	.950 (24.13)	1.830 (46.48)
16	1.516 (38.51)	1.630 (41.40)	1.075 (27.31)	1.830 (46.48)
18	1.641 (41.68)	1.756 (44.60)	1.140 (28.96)	1.830 (46.48)
20	1.766 (44.86)	1.860 (47.24)	1.265 (32.13)	1.830 (46.48)
22	1.954 (49.63)	2.068 (52.53)	1.340 (34.04)	1.860 (47.24)
24	2.079 (52.81)	2.160 (54.86)	1.515 (38.48)	1.860 (47.24)



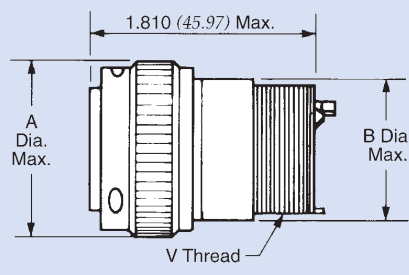
M83723/81 Bayonet Coupling Hermetic Jam Nut Receptacle

Shell Size	A	B	C	L
8	.979 (24.87)	1.068 (27.13)	.490 (12.45)	1.670 (42.42)
10	1.104 (28.04)	1.192 (30.28)	.550 (13.97)	1.670 (42.42)
12	1.291 (32.79)	1.380 (35.05)	.740 (18.80)	1.670 (42.42)
14	1.391 (35.33)	1.505 (38.23)	.800 (20.32)	1.670 (42.42)
16	1.516 (38.51)	1.630 (41.40)	.925 (23.50)	1.670 (42.42)
18	1.641 (41.68)	1.756 (47.24)	1.050 (26.67)	1.670 (42.42)
20	1.766 (44.86)	1.860 (47.24)	1.240 (31.50)	1.670 (42.42)
22	1.954 (49.63)	2.068 (52.53)	1.300 (33.02)	1.670 (42.42)
24	2.079 (52.81)	2.160 (54.86)	1.490 (37.85)	1.670 (42.42)



M83723/77/78 Bayonet Coupling Straight Plug

Shell Size	A	B	V
8	.766 (19.46)	.590 (14.99)	1/2-20 UNEF-2A
10	.906 (23.01)	.720 (18.29)	5/8-24 UNEF-2A
12	1.078 (27.38)	.840 (21.34)	3/4-20 UNEF-2A
14	1.141 (28.98)	.965 (24.51)	7/8-20 UNEF-2A
16	1.266 (32.16)	1.090 (27.69)	1-20 UNEF-2A
18	1.375 (34.93)	1.14 (29.08)	1 1/16-18 UNEF-2A
20	1.510 (38.35)	1.270 (32.26)	1 3/16-18 UNEF-2A
22	1.625 (41.28)	1.395 (35.43)	1 5/16-18 UNEF-2A
24	1.760 (44.70)	1.520 (38.61)	1 7/16-18 UNEF-2A



Dimensions in inches (mm)

MIL-C-26482, Extended Shell



All extended shell connectors are manufactured by adding filters to a standard MIL qualified connector. The filtering is achieved by extending the connector with the use of a backshell and placing either planar or tubular capacitors in the backshell. Spectrum will always keep the extension to a minimum.

These miniature circular filtered connectors are designed to meet the applicable portions of MIL-C-83723 and are interchangeable with that specification.

Custom Designs

Due to the versatility provided with this product design, custom requirements can be readily accommodated. Consult Spectrum Control for your specific needs.

Materials and Finishes

Shell. As noted in Ordering Information
Backshell. Copper Alloy, Nickel Plate
Contacts. Copper alloy, gold plate per MIL-G-45204

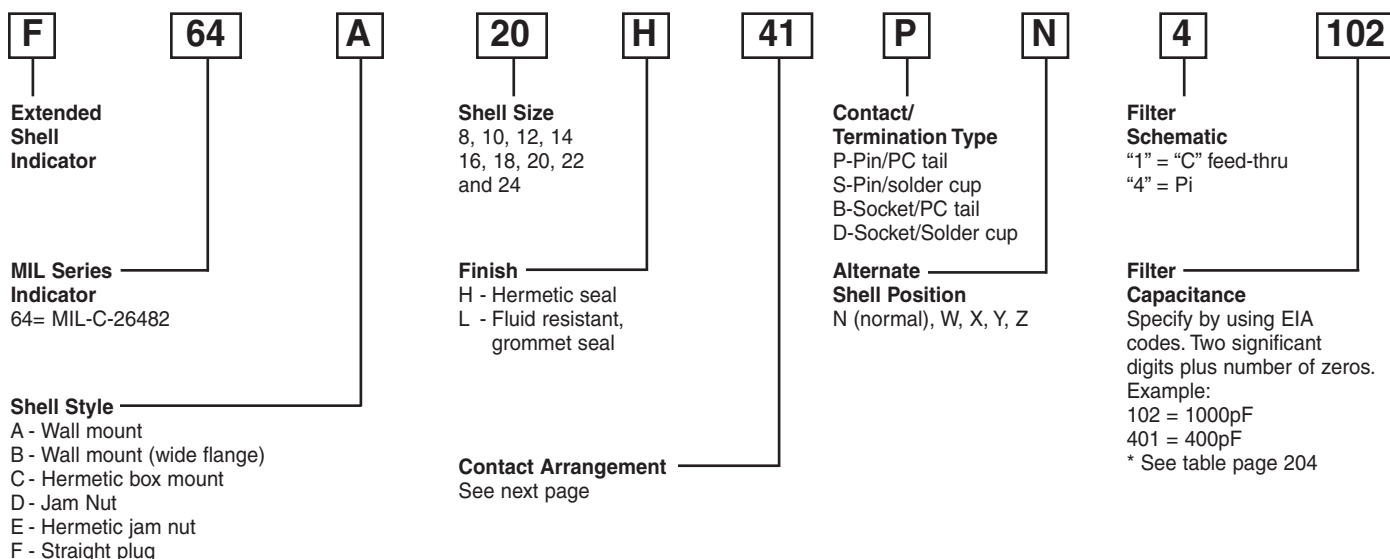
(For electrical specifications, see page 204.)

Ordering Information

Available connector styles and shell sizes for this MIL series are shown on the following pages. Refer to these pages and the information below to develop your connector part number.

Spectrum's Control Advantages

- **Retrofit existing connectors** - We can add filters to customer supplied connectors, saving time during prototype phase and expediting system evaluation.
- **Design flexibility and quality assurance** - We are vertically integrated with ceramic capacitors, enabling us to offer a broad selection of this critical component and ensuring design versatility and manufacturing control.
- **Prototypes** - Our EMI filtering expertise and large capacitor inventory allow us to quickly provide a working sample of your filtered connector.
- **Economy and turnaround** - Most components we utilize are standards, minimizing our tooling requirements and providing cost savings and a shorter lead time.
- **MIL and commercial applications** - Reduce program costs by utilizing our extended shell connectors for both MIL spec and commercial grade connectors.
- **Reduce testing and qualification** - Use of a QPL'd connector interface can expedite your approval process. In addition, we can filter any series of connectors . . . eliminating concerns over filter connector availability.

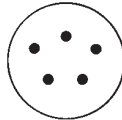


MIL-C-26482, Extended Shell

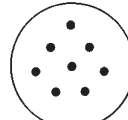
Contact Arrangements (First two digits shell size, second two contact arrangement)



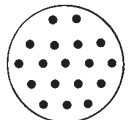
8-98
3 #20



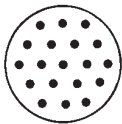
14-5
5 #16



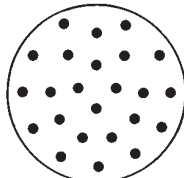
16-8
8 #16



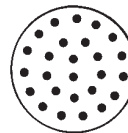
14-18
18 #20



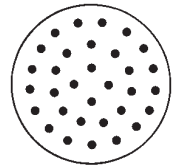
14-19
19 #20



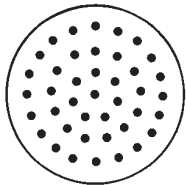
20-24
24 #20



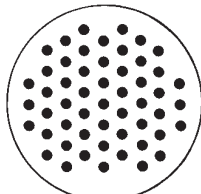
16-26
26 #20



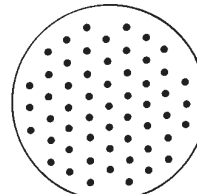
18-32
18 #20



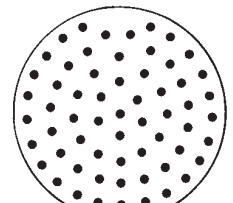
20-41
41 #20



22-53
53 #20



22-55
55 #20



24-61
61 #20

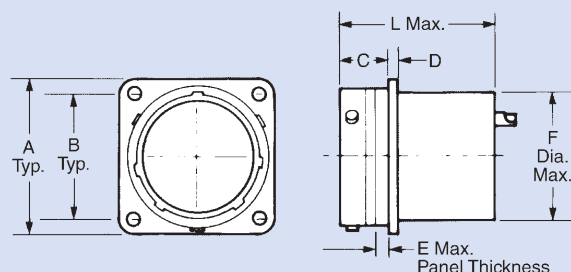
Note:

For availability of filtered connectors with custom requirements, such as mixed capacitance, insulated lines, ground lines or other contact arrangements, consult factory for specific part number.

MIL-C-26482, Extended Shell

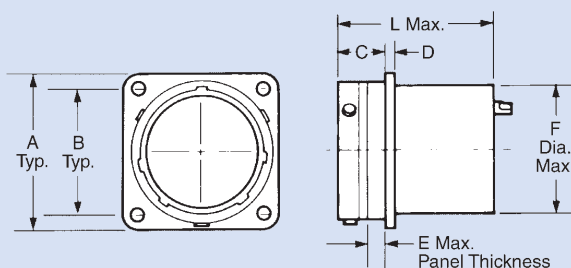
MS3470 Wall Mount Receptacle

Shell Size	A	B	C	D	E	F	L
8	.828 (21.03)	.594 (15.09)	.446 (11.33)	.062 (1.57)	.087 (2.21)	.575 (14.61)	1.575 (40.01)
10	.954 (24.23)	.719 (18.26)	.446 (11.33)	.062 (1.57)	.087 (2.21)	.700 (17.78)	1.575 (40.01)
12	1.047 (26.59)	.812 (20.62)	.446 (11.33)	.062 (1.57)	.087 (2.21)	.825 (20.96)	1.575 (40.01)
14	1.141 (28.98)	.906 (23.01)	.446 (11.33)	.062 (1.57)	.087 (2.21)	.950 (24.13)	1.575 (40.01)
16	1.234 (31.34)	.969 (24.61)	.446 (11.33)	.062 (1.57)	.087 (2.21)	1.075 (27.31)	1.575 (40.01)
18	1.328 (33.73)	1.062 (26.97)	.446 (11.33)	.062 (1.57)	.087 (2.21)	1.140 (28.96)	1.575 (40.01)
20	1.453 (36.91)	1.156 (29.36)	.572 (14.53)	.094 (2.39)	.212 (5.38)	1.265 (32.13)	1.735 (44.07)
22	1.578 (40.08)	1.250 (31.75)	.572 (14.53)	.094 (2.39)	.212 (5.38)	1.340 (34.04)	1.735 (44.07)
24	1.703 (43.26)	1.375 (34.93)	.604 (15.34)	.094 (2.39)	.212 (5.38)	1.515 (38.48)	1.765 (44.83)



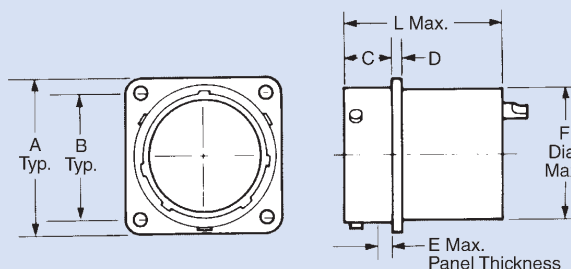
MS3472 Wide Flange Wall Mount Receptacle

Shell Size	A	B	C	D	E	F	L
8	1.065 (27.05)	.734 (18.64)	.477 (12.12)	.062 (1.57)	.118 (3.00)	.575 (14.61)	1.605 (40.77)
10	1.141 (28.98)	.812 (20.62)	.477 (12.12)	.062 (1.57)	.118 (3.00)	.700 (17.78)	1.605 (40.77)
12	1.266 (32.16)	.938 (23.83)	.477 (12.12)	.062 (1.57)	.118 (3.00)	.825 (20.96)	1.605 (40.77)
14	1.360 (34.54)	1.031 (26.19)	.477 (12.12)	.062 (1.57)	.118 (3.00)	.950 (24.13)	1.605 (40.77)
16	1.453 (36.91)	1.125 (28.58)	.477 (12.12)	.062 (1.57)	.118 (3.00)	1.075 (27.31)	1.605 (40.77)
18	1.532 (38.91)	1.203 (30.56)	.477 (12.12)	.062 (1.57)	.118 (3.00)	1.140 (28.96)	1.605 (40.77)
20	1.688 (42.88)	1.297 (32.94)	.571 (14.50)	.094 (2.39)	.212 (5.38)	1.265 (32.13)	1.735 (44.07)
22	1.766 (44.86)	1.375 (34.93)	.571 (14.50)	.094 (2.39)	.212 (5.38)	1.340 (34.04)	1.735 (44.07)
24	1.891 (48.03)	1.500 (38.10)	.604 (15.34)	.094 (2.39)	.212 (5.38)	1.515 (38.48)	1.765 (44.83)



MS3440 Hermetic Seal Box Mount Receptacle

Shell Size	A	B	C	D	E	F	L
10	.954 (24.23)	.719 (18.26)	.588 (14.94)	.062 (1.57)	.087 (2.21)	.750 (19.05)	1.750 (44.45)
12	1.047 (26.59)	.812 (20.62)	.588 (14.94)	.062 (1.57)	.087 (2.21)	.860 (21.84)	1.750 (44.45)
14	1.141 (28.98)	.906 (23.01)	.588 (14.94)	.062 (1.57)	.087 (2.21)	.990 (25.15)	1.750 (44.45)
16	1.234 (31.34)	.969 (24.61)	.588 (14.94)	.062 (1.57)	.087 (2.21)	1.110 (28.19)	1.750 (44.45)
18	1.328 (33.73)	1.062 (26.97)	.588 (14.94)	.062 (1.57)	.087 (2.21)	1.235 (31.37)	1.750 (44.45)
20	1.453 (36.91)	1.156 (29.36)	.650 (16.51)	.094 (2.39)	.212 (5.38)	1.330 (33.78)	1.850 (46.99)
22	1.578 (40.08)	1.250 (31.75)	.650 (16.51)	.094 (2.39)	.212 (5.38)	1.455 (36.96)	1.850 (46.99)
24	1.703 (43.26)	1.375 (34.93)	.650 (16.51)	.094 (2.39)	.212 (5.38)	1.580 (40.13)	1.750 (44.45)

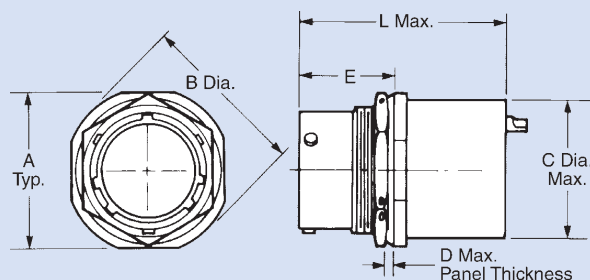


Dimensions in inches (mm)

MIL-C-26482, Extended Shell

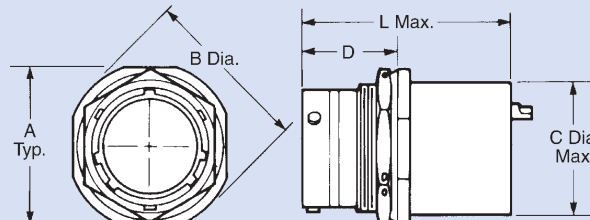
MS3474 Jam Nut Receptacle

Shell Size	A	B	C	D	E	L
8	.938 (23.83)	1.063 (27.00)	.575 (14.61)	.187 (4.75)	.683 (17.35)	1.870 (47.50)
10	1.063 (27.00)	1.187 (30.15)	.700 (17.78)	.187 (4.75)	.683 (17.35)	1.870 (47.50)
12	1.250 (31.75)	1.346 (34.19)	.825 (20.96)	.187 (4.75)	.683 (17.35)	1.870 (47.50)
14	1.346 (34.19)	1.500 (38.10)	.950 (24.13)	.187 (4.75)	.683 (17.35)	1.870 (47.50)
16	1.500 (38.10)	1.625 (41.28)	1.075 (27.31)	.187 (4.75)	.683 (17.35)	1.870 (47.50)
18	1.625 (41.28)	1.750 (44.45)	1.140 (28.96)	.187 (4.75)	.683 (17.35)	1.870 (47.50)
20	1.812 (46.02)	1.938 (49.23)	1.265 (32.13)	.250 (6.35)	.746 (18.95)	1.970 (50.04)
22	1.938 (49.23)	2.063 (52.40)	1.340 (34.04)	.250 (6.35)	.746 (18.95)	1.970 (50.04)
24	2.063 (52.40)	2.187 (55.55)	1.515 (38.48)	.219 (5.56)	.746 (18.95)	1.970 (50.04)



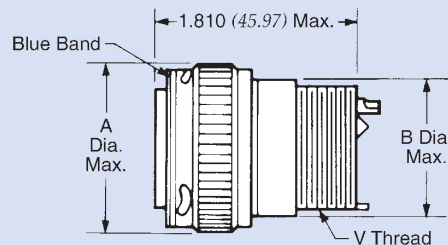
MS3449 Hermetic Seal Jam Nut Receptacle

Shell Size	A	B	C	D	L
8	.938 (23.83)	1.063 (27.00)	.410 (10.41)	.699 (17.75)	1.750 (44.45)
10	1.063 (27.00)	1.187 (30.15)	.520 (13.21)	.699 (17.75)	1.750 (44.45)
12	1.250 (31.75)	1.346 (34.19)	.630 (16.00)	.699 (17.75)	1.750 (44.45)
14	1.346 (34.19)	1.500 (38.10)	.760 (19.30)	.699 (17.75)	1.750 (44.45)
16	1.500 (38.10)	1.625 (41.28)	.880 (22.35)	.699 (17.75)	1.750 (44.45)
18	1.625 (41.28)	1.750 (44.45)	.980 (24.89)	.699 (17.75)	1.750 (44.45)
20	1.812 (46.02)	1.938 (49.23)	1.110 (28.19)	.762 (19.35)	1.850 (46.99)
22	1.938 (49.23)	2.063 (52.40)	1.230 (31.24)	.762 (19.35)	1.850 (46.99)
24	2.063 (52.40)	2.187 (55.55)	1.390 (35.31)	.762 (19.35)	1.880 (47.75)



MS3475 Straight Plug

Shell Size	A	B	V Thread
8	.782 (19.86)	.590 (14.99)	1/2-20 UNEF-2A
10	.926 (23.52)	.720 (18.29)	5/8-24 UNEF-2A
12	1.043 (26.49)	.840 (21.34)	3/4-20 UNEF-2A
14	1.183 (30.05)	.965 (24.51)	7/8-20 UNEF-2A
16	1.305 (33.15)	1.090 (27.69)	1-20 UNEF-2A
18	1.391 (35.33)	1.145 (29.08)	1 1/16-18 UNEF-2A
20	1.531 (38.89)	1.270 (32.26)	1 3/16-18 UNEF-2A
22	1.656 (42.06)	1.395 (35.43)	1 5/16-18 UNEF-2A
24	1.777 (45.14)	1.520 (38.61)	1 7/16-18 UNEF-2A



Dimensions in inches (mm)

Custom Filtered Connectors

Wire Harnesses

Spectrum Control will add wires to the filtered connector to allow the customer to easily install the connector into the system at a lower cost. These value-added services include adding wires terminated or unterminated to all lines or only select lines, twisted pairs and labeling of wires for easy placement in your system. We can also encapsulate the wires inside the connector providing strength to the total harness.

By contracting Spectrum Control to add the harness assembly, customers are assured the performance of the filtered connector has not been adversely affected. **All of our custom connectors are 100% tested for integrity and effective performance.**

Spectrum's connector manufacturing operators are all certified to MIL-STD-2000 solder specification. We have invested in this certification to provide you with confidence that the quality of our custom construction meets the highest standards in the industry.

Wire Harnesses



Sole Sourced Military Connectors

Many systems being designed today have made use of connectors that are sole sourced items. Examples of these include MIL-C-81511, MIL-C-81703, Airborn and Lemo connectors. We will design and manufacture a custom filtered connector that specifically addresses the requirements of unique applications such as oil and gas drilling/exploration and power generation.

Filtering these unique connectors is accomplished in one of two ways at Spectrum Control. We can add the required filtering to the back of the existing connector and thereby extend the length, or manufacture a new shell and then filter within that shell. This method can be utilized when the cost of the unfiltered connector is prohibitive due to the sole sourced situation in a particular connector series.



Custom Filtered Connectors

Connectors with Complex Schematics

Spectrum Control has the capability to offer filtered connectors with complex schematics such as double L (CLCL), double Pi (CLCLC), double T (LCLCL) filters, or transient voltage suppression devices. These products may be required when the system impedances are mismatched or when an extremely fast rise in insertion loss is needed.

Spectrum Control is experienced in the manufacture of these complex schematics in all of our filter products. Spectrum's engineering facility can use computer models to select the best filter type for the application.

Plastic Commercial Connectors

Many manufacturers in the medical and high reliability commercial markets utilize plastic connectors that subsequently require filtering. Spectrum Control will filter plastic shell connectors.

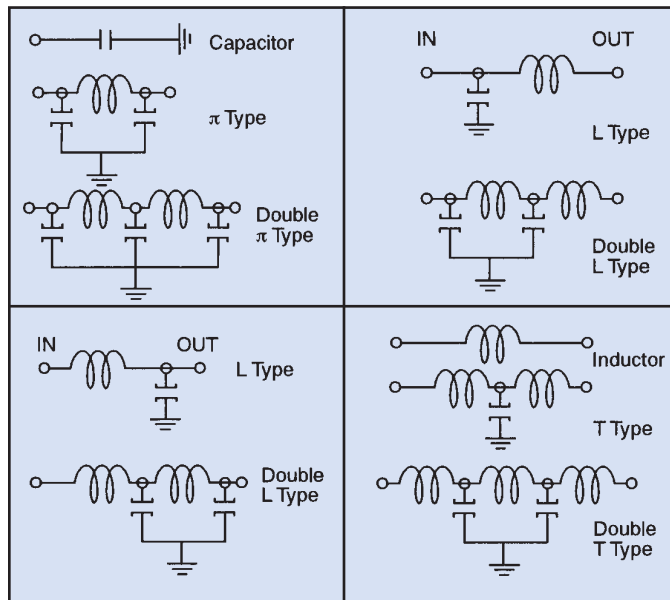
This product requires special manufacturing techniques. The ground path for filtering is achieved either by using one of the connector pins or by adding an external ground strap to the metal collar.

Through the use of lower cost commercial components such as formed terminals, **Spectrum Control will minimize the cost of filtering this type connector.**

Value-added Filtered Connectors

We are often approached by customers who have procured a large quantity of unfiltered connectors for a program and subsequently determined that some need to be filtered. **Instead of scrapping or returning these connectors at a large expense, appropriate EMI filters can be added by Spectrum Control.**

The addition of filters to an existing stock of connectors can provide significant cost savings. In many cases, standard unfiltered connectors are purchased in large volumes at a discounted price. By filtering a small quantity of these standard connectors, customers typically realize total cost savings and a reduced overall lead time.



Plastic Commercial Connectors

