

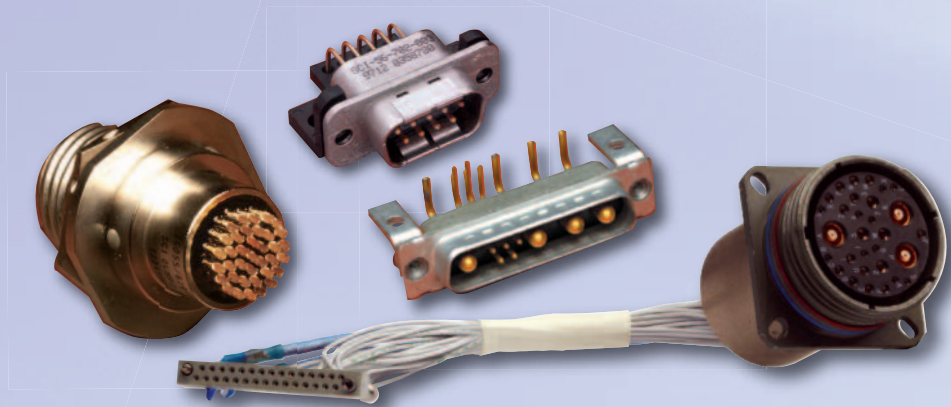
commercial/industrial/military

connectors & custom cable

assemblies



api 
technologies corp.
Spectrum Control



Circular & D-Sub Connectors

API Technologies has been a leader in providing application specific EMI filtered connector solutions since its founding in 1968. Our Spectrum Control brand offers the industry's most extensive line of circular and D-Sub connectors that are designed for high reliability or demanding environmental applications such as commercial aviation and avionics, off-highway and agricultural vehicles, high reliability power supplies, as well as all airborne, ship or ground-based military applications.

At API, we know it is rare to find an off-the-shelf connector that completely satisfies the environmental, mechanical and electrical requirements of demanding, high reliability applications. Our engineering team is ready to modify one of these existing designs or start with a "clean sheet" to ensure our connector satisfies all of your requirements.

Custom Cables & Harnessing

To assist our customers in meeting their high reliability requirements, API has developed extensive capabilities to provide custom cables and connector harnessing. Utilizing our dedicated manufacturing facility that is AS9100 Rev C/ISO 9001:2008 certified, this line of products includes signal and discrete cables, RF cables, power cables, connector harness assemblies and complete system integration.

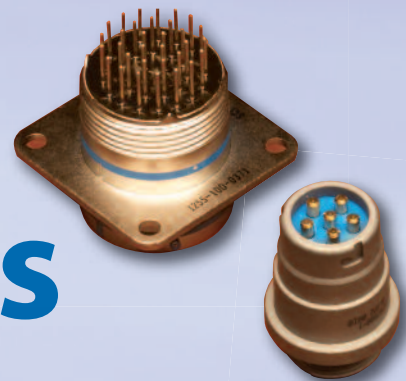
Vertical Integration

As a fully vertically integrated company, API's Spectrum Control brand is truly unique among connector suppliers. We design and manufacture all components for our circular filtered and unfiltered connectors. From shells and shields to seals and grommets, each component of your custom connector undergoes our extensive assembly and testing process, ensuring API is able to deliver extremely reliable, high performance connectors to fit both your economic and mechanical needs.

Our complete in-house production capability allows us to maintain tighter quality control, in turn enabling us to provide our customers with high quality parts at very competitive prices. In addition, our vertical integration facilitates the industry's shortest lead-times of 8 to 10 weeks, standard.

commercial/industrial/military

circular connectors



In response to market demand, we have developed a line of standard circular connectors for commercial, industrial and military applications that are completely intermateable with **MIL-DTL-38999 Series III** compact shell connectors. To meet this need, we reviewed our extensive library of proven API Technologies' Spectrum Control brand connector designs to create a line of EMI filtered or unfiltered circular connectors that are highly reliable, durable and fully customizable. Our standard circular connectors are available in wall mount, jam nut or straight plug shell options, 9 different shell sizes, 5 contact/termination styles and 18 insert configurations.

EMI Filtered or Specialty Unfiltered Connectors

API Technologies offers custom circular connectors in EMI filtered or unfiltered styles, including **MIL-DTL-55116, -83723, -24308, -26482 and -5015**. Our filtered compact shell connectors provide an effective filtering device that reduces the amount of real estate required within a product enclosure. Using our expertise in EMI filter design and manufacturing, we offer planar-style filtered arrays, available in C and Pi circuits. Other filter circuits including transient protection are available.

In addition, we can accommodate your quick-turn schedule for prototyping by adding either planar or tubular capacitor filtering to the rear of a standard connector.

Unfiltered circular connectors also can be designed to meet various environmental and mechanical specifications. As with our filtered connectors, API offers multiple termination styles, various material and finishing options and a variety of shell styles and sizes. Integral strain relief, as well as power, signal and coax line features are also available.



Composite Shell Connectors

For even greater design flexibility, API offers composite shell circular connectors. These composite connectors feature shells fabricated from high grade thermoplastic and are designed to replace traditional metal connector shells for substantial weight reduction. The composite shell maintains the form, fit and function of the original connector shell, making it ideal for applications where weight is a critical factor. A composite shell version of any API's circular connector designs are available.

Custom Mechanical Packages

Our vertical integration includes a unique material process and extensive machining capabilities, allowing us to easily modify the mechanical package of any connector, ensuring fast and affordable custom designs. Other connector manufacturers mold their composite shells, making custom designs expensive. At API, custom mechanical variations are machined allowing for unique packages without traditional tooling charges.



Hermetically Sealed Connectors

API also has a family of hermetically sealed circular connectors that protect against changes in atmospheric pressure and exposure to humidity, grime, and chemicals, making them ideal for aerospace engine control, hydraulic, and caustic environments where harsh conditions could exist. The hermetically sealed connector's receptacle has a seal of 10^{-7}cm^3 and comes in filtered and unfiltered versions.

Mini-MIL Connectors

API's Mini-MIL circular connectors are small and lightweight offering space and weight savings while providing equivalent performance to standard MIL-DTL-38999 connectors. These connectors are available filtered with C, Pi or mixed capacitance, or unfiltered, with a range of engagement, termination and receptacle types. Mini-MIL connectors can be customized to satisfy various mechanical and electrical requirements and are ideal for military, industrial and medical applications where space restrictions do not allow for larger 38999 connectors.

circular connectors

API Technologies offers a premium line of circular filtered connectors completely intermateable with MIL-DTL-38999 Series III. These custom high reliability, circular connectors have a proven reputation for superior quality and performance. Several types of EMI filtering are available (see figures at right).

Electrical Specifications

Operating

Temperature -55°C - 125°C

Capacitance See table

Capacitance Tolerance . . . ±25%, +100%

Voltage Rating 200VDC

Dielectric

Withstanding Voltage 500VDC

Dissipation Factor < 3.5%

Insulation Resistance 1000 MΩ, μF or 10KMΩ

The electrical properties listed above are typical, and can be exceeded based on customer requirements and mechanical configuration. Since many variables affect the design, it is best to contact us directly for a detailed assessment of your connector needs.

Circuits

Figure A (1)

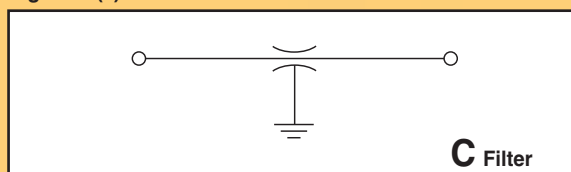
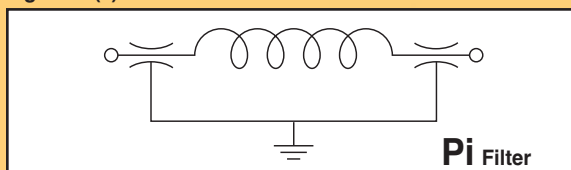


Figure B (2)

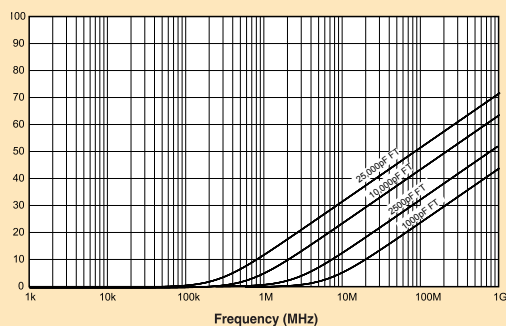


Capacitance

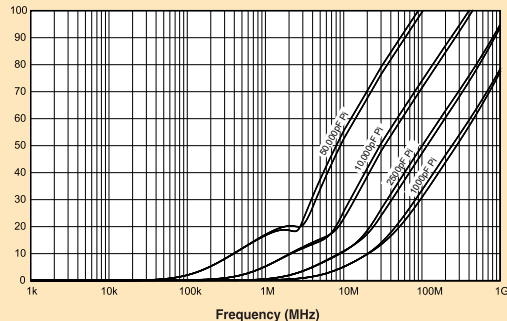
Cap Code	Cap Value	Circuit Availability
251	250pF	1
501	500pF	1, 2
102	1,000pF	2
122	1,250pF	1
252	2,500pF	1, 2
502	5,000pF	1, 2
103	10,000pF	1, 2
203	20,000pF	2
253	25,000pF	1
503	50,000pF	2

Note: Custom capacitance values and tolerances available.

**Insertion Loss (db) Per MIL-STD-220
C Filter**



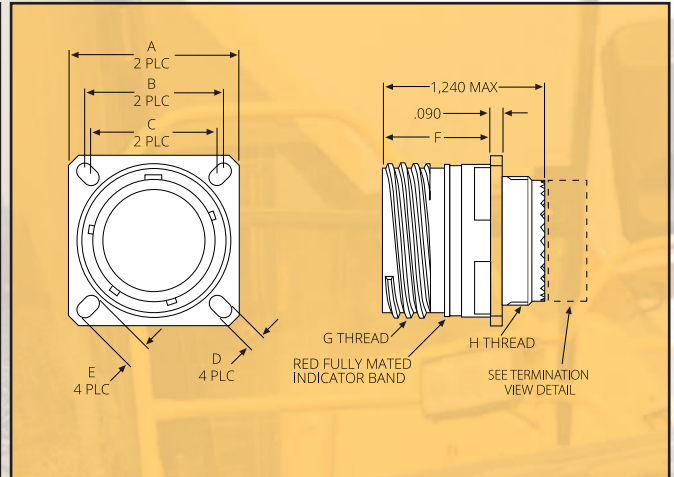
**Insertion Loss (db) Per MIL-STD-220
Pi Filter**



connector styles

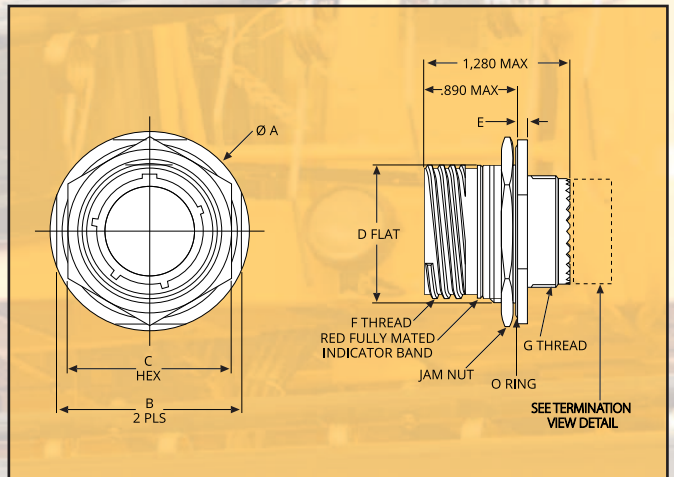
Wall Mount

Shell Size	A	B	C	D	E	F	G Thread	H Thread
A(9)	.937	.719	.594	.128	.216	.820	.6250-0.1P-0.3L-TS	M12x1.0-6g 0.100R
B(11)	1.031	.812	.719	.128	.194	.820	.7500-0.1P-0.3L-TS	M15x1.0-6g 0.100R
C(13)	1.126	.906	.812	.128	.173	.820	.8750-0.1P-0.3L-TS	M18x1.0-6g 0.100R
D(15)	1.220	.969	.906	.128	.194	.820	1.0000-0.1P-0.3L-TS	M22x1.0-6g 0.100R
E(17)	1.311	1.062	.969	.128	.194	.820	1.1875-0.1P-0.3L-TS	M25x1.0-6g 0.100R
F(19)	1.437	1.156	1.062	.128	.194	.820	1.2500-0.1P-0.3L-TS	M28x1.0-6g 0.100R
G(21)	1.563	1.250	1.156	.128	.194	.790	1.3750-0.1P-0.3L-TS	M31x1.0-6g 0.100R
H(23)	1.689	1.375	1.250	.154	.242	.790	1.5000-0.1P-0.3L-TS	M34x1.0-6g 0.100R
J(25)	1.811	1.500	1.375	.154	.242	.2790	1.6250-0.1P-0.3L-TS	M37x1.0-6g 0.100R



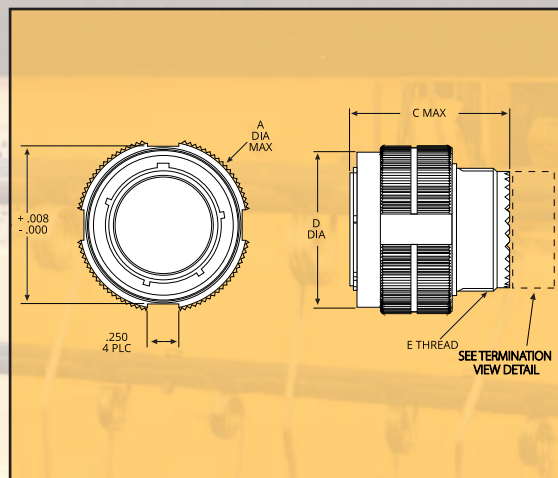
Jam Nut

Shell Size	A	B	C HEX	D	E	F Thread	G Thread
A(9)	1.189	1.063	.9375	.649	.102	.6250-0.1P-0.3L-TS	M12x1.0-6g 0.100R
B(11)	1.374	1.252	1.0625	.749	.102	.7500-0.1P-0.3L-TS	M15x1.0-6g 0.100R
C(13)	1.500	1.374	1.250	.936	.102	.8750-0.1P-0.3L-TS	M18x1.0-6g 0.100R
D(15)	1.626	1.500	1.375	1.060	.102	1.0000-0.1P-0.3L-TS	M22x1.0-6g 0.100R
E(17)	1.752	1.626	1.4375	1.185	.102	1.1875-0.1P-0.3L-TS	M25x1.0-6g 0.100R
F(19)	1.937	1.811	1.5625	1.310	.134	1.2500-0.1P-0.3L-TS	M28x1.0-6g 0.100R
G(21)	2.063	1.937	1.750	1.435	.134	1.3750-0.1P-0.3L-TS	M31x1.0-6g 0.100R
H(23)	2.189	2.063	1.8125	1.560	.134	1.5000-0.1P-0.3L-TS	M34x1.0-6g 0.100R
J(25)	2.311	2.189	2.000	1.685	.134	1.6250-0.1P-0.3L-TS	M37x1.0-6g 0.100R

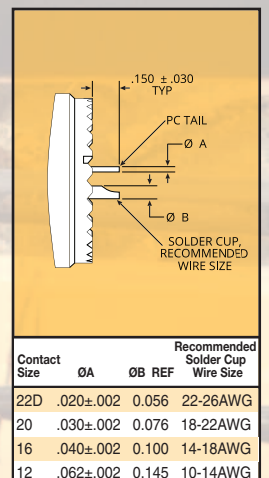


Straight Plug

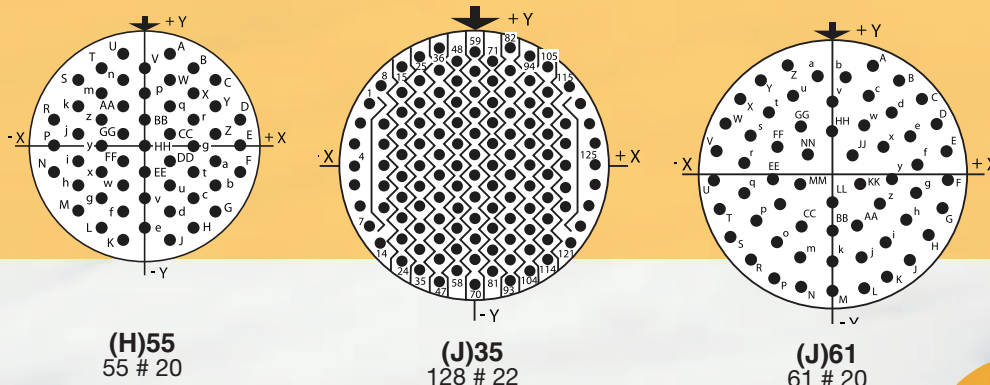
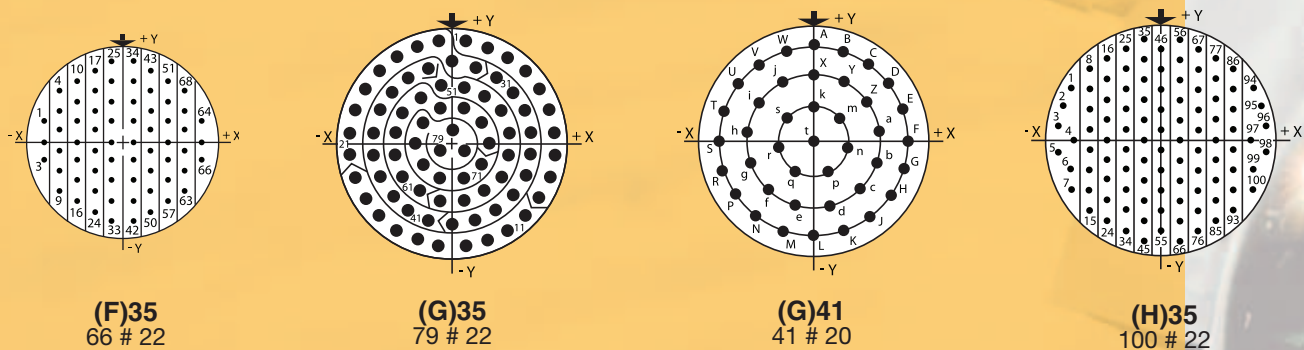
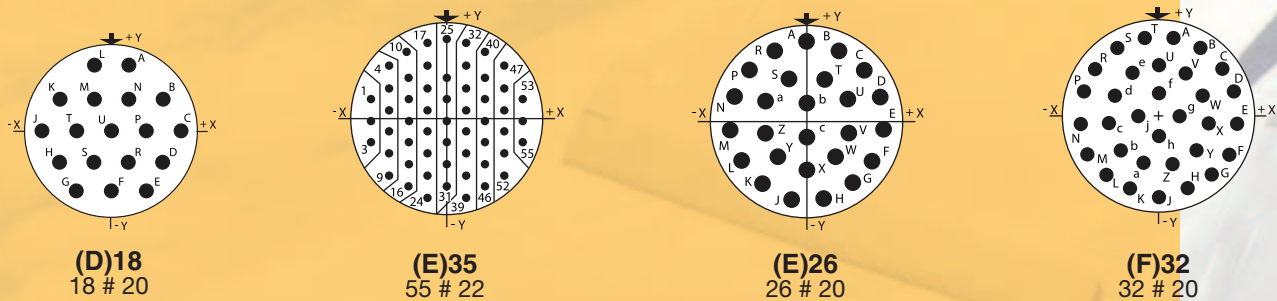
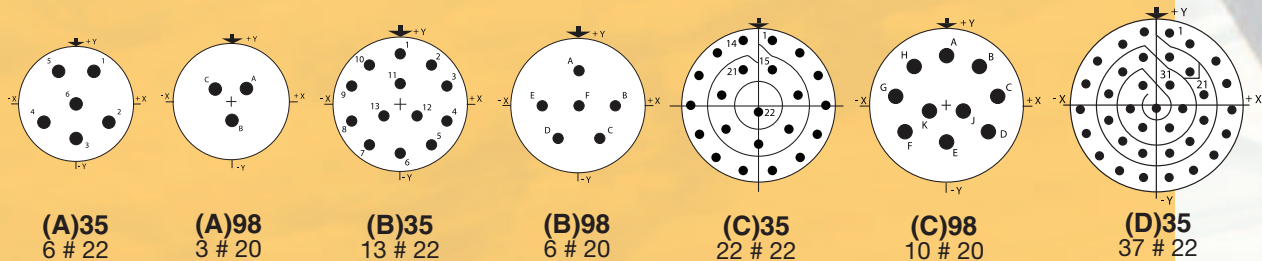
Shell Size	A	B	C	D	E Thread
A(9)	.858	.748	1.220	.724	M12x1.0-6g 0.100R
B(11)	.984	.862	1.220	.830	M15x1.0-6g 0.100R
C(13)	1.157	1.027	1.220	1.000	M18x1.0-6g 0.100R
D(15)	1.279	1.153	1.220	1.129	M22x1.0-6g 0.100R
E(17)	1.405	1.291	1.220	1.267	M25x1.0-6g 0.100R
F(19)	1.515	1.397	1.220	1.374	M28x1.0-6g 0.100R
G(21)	1.641	1.523	1.220	1.500	M31x1.0-6g 0.100R
H(23)	1.787	2.641	1.220	1.618	M34x1.0-6g 0.100R
J(25)	1.889	2.767	1.220	1.744	M37x1.0-6g 0.100R



Termination View



insert configurations



specialty circular connector

ordering information

FC	-	O	A	A	35	PP	N	1	102
Series	RoHS	Shell Style	Shell Size	Shell Size	Insert Configurations	Contact Termination Style	Polarization	Filter Circuit	EIA Capacitance Code
	-- Standard F - RoHS Compliant	0 - Wall Mount Receptacle 1 - Jam Mount Receptacle 2 - Straight Plug Self-Locking	A: 9 B: 11 C: 13 D: 15 E: 17 F: 19 G: 21 H: 23 J: 25 (See page 5)		(See page 6)	PP - Pin to PCB PS - Pin to Solder cup SP - Socket to PCB SS - Socket to Solder cup CR - Crimp Removable (Plug Only, Unfiltered)	N - Normal A, B, C, D E	1 - Feed Thru Cap 4 - Pi Filter *Note: Leave blank for unfiltered	Example: 1000pF = 102 (See page 4) *Note: Leave blank for unfiltered
			Material Finish A - AL/Electroless Ni B - AL/ Olive Drab Cad (Not available RoHS) C - SS/ Electroless Ni D - SS/ Electro Deposited Ni E - SS/ Passivated F - Composite/Electroless Ni G - Composite/Olive Drab Cad (Not Available RoHS) H - Alum Nickel PTFE (Teflon) I - Ni Alum Bronze						

custom

cable & harnessing

To help you simplify the installation of our connectors into your system and lower your costs, we provide custom cabling and harnessing services. Our capabilities include a wide range of cable harnessing, flat ribbon cable and ribbon cable processing, lead wire preparation, component, wire, and assembly marking, electro-mechanical assembly and more. All of our custom connector assemblies are 100% tested for integrity and effective performance.

- Built in accordance with IPC-A-610 and J-Std-001
- Cable harnessing
- Wide range of interconnects
- Flat ribbon cable
- High voltage
- Electro-mechanical assembly



Manufacturing Capabilities

- Lead wire preparation
- Soldering & tinning
- Strip & removal of insulation
- Wire, component & assembly marking
- Ribbon cable processing
- Over-molding connector backshells
- 100% testing includes full functional and environmental testing to product specific requirements
- Fully automated testing includes Hi pot, continuity, insertion Loss, TDR, and VSWR up to 40GHz

custom cable assemblies



API Technologies has a range of capabilities to produce custom cable assemblies designed to deliver dependable operation and cost savings in high reliability/high value applications. We can integrate any of API's extensive family of EMI connectors and components, RF filters and subsystems and power management systems or use industry standard components. As a vertically integrated manufacturer, we utilize our dedicated facility that is AS9100 Rev C/ISO 9001:2008 certified to produce the highest quality custom cable assemblies in the industry's shortest lead times.

- **Aerospace/Military/High End Commercial/Medical**
- **In house design and Build to Print**
- **In-house low pressure over-molding and specialty potting**

Signal & Discrete Cables

- Point-to-point, multi-conductor, branched harness, flex, semi-rigid, and rigid circuit card assembly
- EMI filtered and custom non-filtered connectors and EMI filters

RF Cables

- Frequency up to 50 GHz
- Phase matching
- Custom RF cable builder tool
- Rigid/semi-rigid cable

Power Cables

- Current ratings up to 750 amps
- Cooper "Roughneck" 4/00 + power distribution cable fabrication
- API supplied power management solutions

Systems Integration

- In-house machining capabilities
- In-house EMI/RF filters, connectors, PDU's, turn key
- Vertically integrated manufacturing approach
- Basic box builds through complex systems

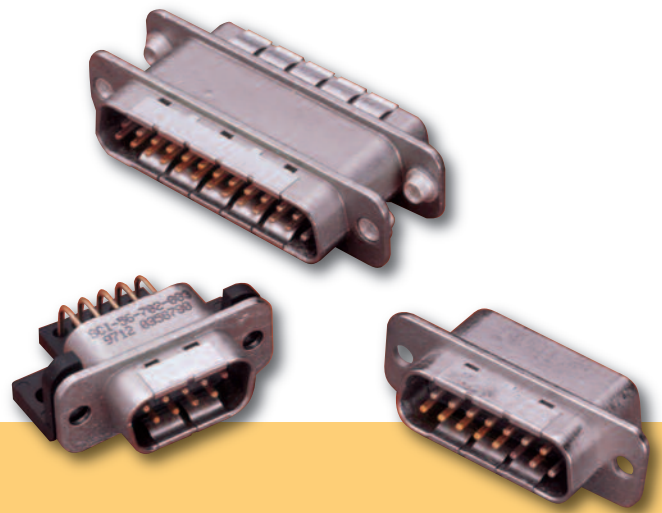
Overmolded Connector Backshells

API offers an alternative to the traditional connector backshell that improves performance while providing significant cost savings. Our overmolded connector backshells are completely weather sealed and EMI shielded and cost a fraction of a typical connector backshell. We machine our own overmolded backshells and then seal the attached wires and shielding with an extremely durable mold material. The result is a more attractive connector that is far more resistant to environmental conditions and costs 10 to 20 times less than traditional backshells.

- API's overmold backshells available for almost any connector configuration
- Overmolding provides better strain relief than heat shrink or metal backshells
- Total encapsulation of mold material protects against weather and environmental degradation
- Overmolded connector is 10 to 20 times less expensive than traditional backshells
- More attractive final assembly, custom mold imprinting available

emi filtered

d-sub connectors



For more than 45 years, API's Spectrum Control brand has been a leader in designing and manufacturing EMI filtered D-Sub connectors for high reliability applications. Our wide range of connector options will help you improve performance, save board space and reduce costs by managing EMI at the signal and power I/O. API's filtered connector advantages include:

- **Low ground impedance** - Full ground plate and metallic shell provide minimal impedance and superior performance
- **Eliminate re-radiation** - Filtered connector at interface leaves no path for bypassing the filter
- **Ground plane shielding** - Filtered connector ground planes shield the box even at the connector port
- **Efficient space utilization** - Filters located in the connectors provide 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** - 100% testing of filters, on-board filters are usually spot tested

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

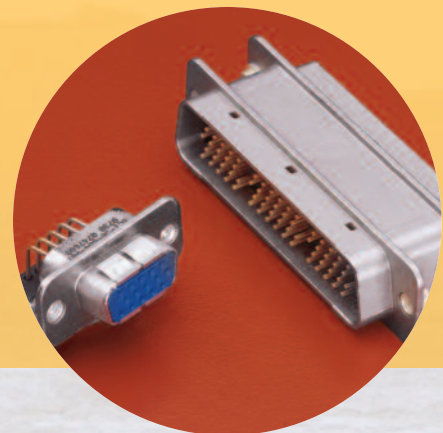
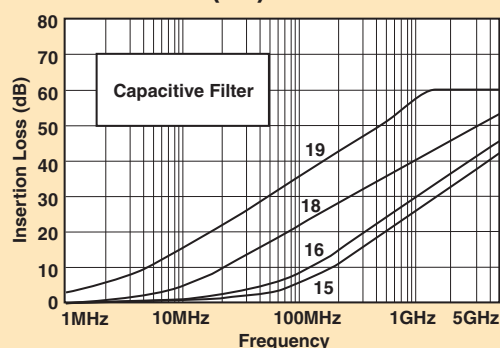
Features

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

High-Density Filtered Adapter for Telecommunications

In response to the unique requirements of the telecommunication industry, API has developed a High-Density EMI filtered adapter.

Insertion Loss (db) Per MIL-STD-220



d-sub connectors



Series 700 High Performance

API's 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
- One-piece die cast housing design
- Available in both feed-through capacitive and PI configurations
- Selective line filtering is available
- Tubular capacitor filtering provides effective performance through 10 GHz
- RoHS compliant versions available

Series 600 High-Density

API's Series 600 connectors incorporate the high performance and reliable filtering of their standard d-subminiature connectors in the high-density format.

Features

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

Series 500 Low Profile

The Series 500 Low Profile D-Subminiature Connectors are cost effective, highly reliable EMI filtered D-Sub connectors that feature a .318" footprint for 90° PCB Connectors and a low profile housing on straight PCB connectors.

Features

- Drop-in replacements for unfiltered D-Subminiature Connectors
- Compact-design, featuring .318" footprint
- Full interchangeability; based on MIL-C-24308
- 9, 15 and 25 shell sizes
- Available with board lock feature & 4-40 mounting threads
- Selective filtering available

Series F Ferrite Connectors

The Series F filtered D-subminiature connectors incorporate a solid slab of ferrite material as the filtering element, making it rugged and interchangeable with standard D-subminiature connectors.

Features

- Optimum filtering performance in the 10 to 300 MHz range
- No distortion of wave forms
- Replaces individual ferrite bead filters, saving cost & space (.318" footprint)
- Provides both pin to ground & pin to pin filtering
- 4-40 UNC locking insert eliminates loose hardware
- RoHS compliant versions available

Filtered Micro-D Connectors

For designs that require even smaller connector packages, the Micro-D offers a range of reliable filtering options, including capacitive, ESD versions, and several sizes and termination options to satisfy your smallest space constraints.

Features

- Light weight
- Compact size
- Environmentally sealed contact area when mated
- Corrosion resistant
- Durable (500 cycles min.)
- Superior electrical performance
- RoHS compliant



d-sub connectors

ordering information

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

This part number 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.

56	-	5	1	3	-	0	12	-	TI
<p>Product Series</p> <p>4 = Series F Ferrite</p> <p>5 = Series 500 Low Profile</p> <p>6 = Series 600 High Density</p> <p>7 = Series 700 High Performance</p>									
<p>Shell Size</p> <p>Series 400, Series 500</p> <p>0 = 9 Contacts</p> <p>1 = 15 Contacts</p> <p>2 = 25 Contacts</p>									
<p>Series 600 High Density</p> <p>0 = 15 Contacts</p> <p>1 = 26 Contacts</p> <p>2 = 44 Contacts</p> <p>3 = 62 Contacts</p> <p>4 = 78 Contacts</p>									
<p>Series 700</p> <p>0 = 9 Contacts</p> <p>1 = 15 Contacts</p> <p>2 = 25 Contacts</p> <p>3 = 37 Contacts</p> <p>4 = 50 Contacts</p>									
<p>Line Filtering</p> <p>0 = All positions same</p> <p>9 = Special loading (Series 600 only)</p>									
<p>Capacitance Value</p> <p>Series 400</p> <p>01 = Always</p> <p>Series 500</p> <p>10 = 120 pF</p> <p>11 = 440 pF</p> <p>12 = 840 pF</p> <p>13 = 1000 pF</p> <p>14 = 1500 pF</p> <p>Series 600</p> <p>15 = 85 pF FT</p> <p>16 = 180 pF FT</p> <p>18 = 1000 pF FT</p> <p>19 = 4000 pF FT</p> <p>20 = Insulated contact</p> <p>Series 700</p> <p>See filter specification chart online.</p>									
<p>Options</p> <p>Series F</p> <p>HD = High Density (15 socket only)</p> <p>Series 500</p> <p>TI = 4-40 threads on mounting flange (.125" hole if not selected)</p> <p>GBL = Grounded board lock includes 4-40 threads (available only on 90° PCB)</p> <p>GBLF = Grounded board lock and ferrite slab provides enhanced LC performance (available only on 90° PCB)</p> <p>Series 600 High Density</p> <p>LI = 4-40 UNC inserts</p> <p>S = Solder dipped tails</p> <p>50G = 50 μ (1.27 μm) gold</p> <p>GBL = Grounded board lock</p> <p>Series 700</p> <p>LI = 4-40 UNC inserts</p> <p>LIM = Metric M3.0 self-locking threads</p> <p>GB = Metal bracket provides ground connection, includes 4-40 self-locking threads (for right angle mount only)</p> <p>GBL = Grounded board lock (right angle)</p> <p>GBL6 = For .062" boards (straight PCB mount) (1.57mm)</p> <p>GBL9 = For .093" boards (straight PCB mount) (2.36mm)</p> <p>50G = 50 μ (1.27 μm) gold plating</p> <p>S = Solder dipped tails</p> <p>JS = Jack screw mounting</p> <p>For option combinations, consult factory.</p>									
<p>Filtered D-Subminiature Connectors</p> <p>56 - Standard connector</p> <p>F - RoHS compliant version</p>									
<p>Contact Type/Termination</p> <p>1 = Pin to solder cup</p> <p>2 = Pin to 90° PCB mount</p> <p>3 = Socket to straight PCB mount</p> <p>4 = Socket to 90° PCB mount</p> <p>5 = Pin-socket adapter</p> <p>6 = Socket to solder cup</p> <p>7 = Pin to straight PCB mount</p>									
<p>Styles available for:</p> <p>Series 400 only 2, 3, 4 & 7</p> <p>Series 500 only 2, 3, 4 & 7</p> <p>Series 600 only 1, 2, 3, 4 & 5</p> <p>Series 700 1 thru 7</p> <p>Note: 1 can be Pin to solder cup or Pin to PCB for Series 700.</p>									

Note: For Micro-D ordering information, please visit eis.apitech.com/micro

Filtered Combo D-Subminiature Connectors

API's Spectrum Control line of filtered combo D-sub provide high insertion loss with capacitive filtering. These connectors are available with 20 Amp power contacts or 40 Amp power 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 intermateability with unfiltered connectors. High strength epoxy potting protects ceramic elements.

Capacitive filtering is available ranging from 50 pF to 47 nF. 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

Models

- 3W3 in plug-solder cup and plug-right angle
- 5W5 in plug-vertical
- 9W4 in socket-solder cup, socket-vertical and plug-right angle
- 24W7 in socket-solder cup



commercial/industrial/military

connectors & custom cable assemblies

api
technologies corp.
Spectrum Control

eis.apitech.com

- EMI Filters
- Filtered Interconnects
- Ceramic Capacitors
- Specialty Connectors
- Power Filters
- Film Capacitors
- Magnetics

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ISO 9001:2008

AS 9100

RoHS
COMPLIANT



About API Technologies

API Technologies Corp. is a trusted provider of RF/microwave, microelectronics, and security solutions for critical and high-reliability applications. The company designs, develops and manufactures electronic components, modules, systems and products for technically demanding defense, commercial/industrial and aerospace applications. API Technologies' customers include many leading Fortune 500 companies, as well as a majority of NATO governments. While API was founded in 1981, our heritage brands have served the demanding, hi-rel marketplace for more than 60 years.

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