electromagnetic

integrated solutions

full line catalog

api technologies corp.

Spectrum Control

api technologies corp.

Spectrum Control

Electromagnetic Integrated Solutions

API Technologies has been the world's leading provider of custom application-specific EMI filter solutions since 1968. Through our Spectrum Control line we offer a wide range of standard products and we will develop a new or modified product or integrated assembly to help you address the mechanical, electrical and/or power requirements of your next design.

Our family of Electromagnetic Integrated Solutions includes not only the industry's most complete line of coaxial EMI components, power surface mount filters, filtered connectors, filtered arrays, power filters and EMC testing services, but also an expanded offering of ceramic capacitors, filtered and unfiltered interconnects, and magnetics.

Table of Contents:

Innovative Solutions from Components to Complex Assemblies

Understanding how and where potential EMI problems exist in an electronic system can be a daunting challenge. Uncovering the best way to address both conducted and radiated EMI by understanding all the mechanical, electrical and environmental concerns of your system can reduce costs and keep a project on budget and schedule. Our extensive library of standard components, which we frequently develop into custom assemblies, offers you a more complete, high performance solution… saving you time and money.

Industry's Broadest Line of Standard Products

We offer the flexibility to filter EMI at the power source, at the I/O connection, in a barrier wall or on the PCB. Our industry-leading line, including inductors, glass and resin sealed filters, SMT filters, filter plates, filtered connectors, power entry and power line filters, military/aerospace multisection filters, ceramics and magnetics, gives you a wide range of size, performance and packaging options, most available RoHS compliant. In addition, we have got over 800 standard MIL QPL products and DSCC part numbers.

Custom Application-Specific Solutions

This phrase serves as an excellent summary of what we produce for our customers, as well as defines what distinguishes our company from others in the electronics market. Rarely does a 100% off-the-shelf component completely satisfy the mechanical, electrical, and/or power requirements and constraints of a sophisticated OEM design. Whether modifying an existing component, working from a "clean sheet" approach, or integrating various technologies into a subassembly or system, the result will be a tailored API Technologies' Spectrum Control design for your exact application parameters, one that pushes the envelope of product performance.

As the world leader in EMI products and a market leader in microwave and power products, our customers rely on us to create and provide optimized solutions that improve their competitive advantage.

Product Families

Ceramic Capacitors

- Discoidal capacitors
- SMPS modular capacitors
- Planar capacitors
- Tubular capacitors

Coaxial Filters & Interconnects

- Resin and hermetically sealed filters
- Motor-line feed-through filters (MLFT)
- High current/high voltage filters
- Miniature hermetically sealed and surface mount filters
- Filter plates and terminal blocks
- D-sub and combo filtered connectors
- Ribbon and datacomm connectors
- Rugged USB connectors

Specialty Connectors & Custom Cable Assemblies

- Circular connectors
- Mini-MIL and Rapid Mate connectors
- Audio and glass sealed connectors
- Value-added terminations and harnesses
- Custom cable assemblies

EMI Power Filters

- Commercial power filters
- Military/aerospace power filters
- Power entry modules
- Power Line Filters

Magnetics

- Current transformers
- Power transformers
- Inductors, chokes and filters
- Switch mode power supply inductors
- Modem and module transformers
- Air coils

Vertical Integration

API's business teams coordinate and share extensive in-house resources to support many of the problem-solving designs and value-added programs we create. Internal capabilities range from formulating and producing the ceramics used in many of our products to complete metal fabrication, which facilitates the mechanical/packaging requirements of our customers' designs. Specific technologies are sourced from multiple locations using expertise found throughout our organization, often crossing business segments to find the ideal production method, including use of our MIL-STD-790 and TS16949 certified factories.

Low Cost Manufacturing Centers

ISO9001:2008 certified API Technologies adheres to world class manufacturing techniques ensuring each customer receives the Six Sigma reliability they demand. In response to the realities of the marketplace, we have established low cost manufacturing facilities in China and Mexico. These new plants complement our North American production capacity and flexible manufacturing systems, allowing us to ramp-up production to meet fast-track delivery requirements.

Global Reach

Today, more than ever, it is imperative suppliers be prepared to support their customers around the world. API Technologies has created a network of sales and design centers, manufacturing plants and distribution facilities to support the world's major markets. From field sales specialists to engineering and manufacturing to logistics, we have moved our key program development personnel closer to our customers regardless of their location. We are committed to being a player in the global economy and ideal partner for our worldwide OEM customers.

Engineering & Technology Leader

The heritage of our company, dating to its founding in 1968, is as an engineering driven, solutions provider. Through the years of expansion and acquisition, this basic premise remains a constant and driving force. Our teams of experienced application engineers use sophisticated simulation software to replicate real-world environments. Once product designs are complete, we conduct exhaustive in-house testing and verification to ensure function and compliance. API Technologies maintains a leadership position in many industries by applying the latest technology to design performance-enhancing products and systems.

R & D Commitment... Creating the Next Generation

The surest way to guarantee organic new product development is through investment in research personnel and equipment. API Technologies consistently commits the resources necessary to fund the innovation and creativity leading to technological advancements. We constantly are looking for ways to improve existing designs, as well as find entirely new approaches yielding unforeseen benefits. All of our business units have made significant new product introductions in recent years.

Optimized Designs

Defense

- Specialty Connectors
- QPL'd Coaxial Filters
- Military Custom Power Filters
- Ceramic Capacitors
- Magnetics

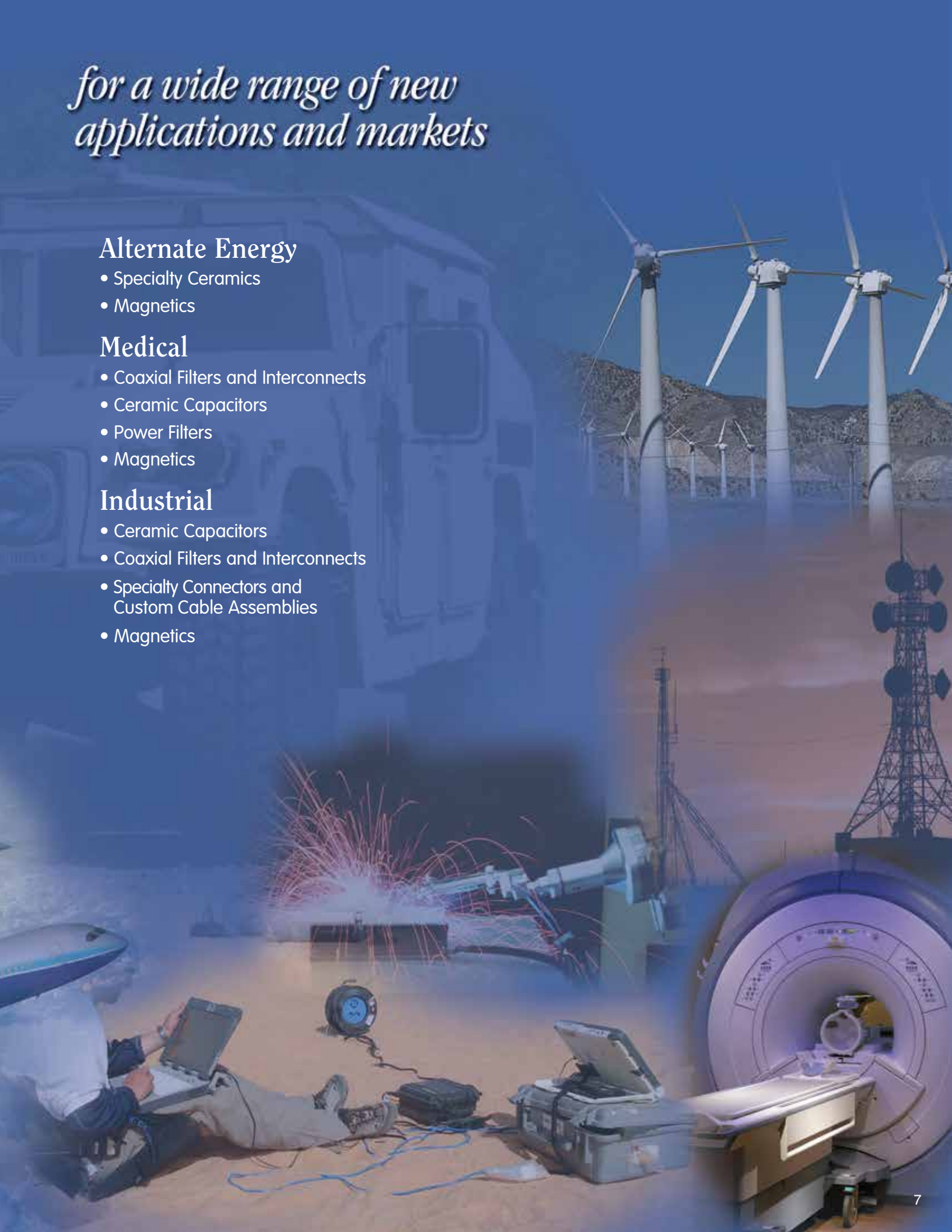
Communications

- Coaxial Interconnects
- Commercial Custom Power Filters
- Surface Mount Filters
- Magnetics

Avionics

- Specialty Connectors
- Coaxial Filters and Interconnects
- Custom Power Filters
- Magnetics

for a wide range of new applications and markets



Alternate Energy

- Specialty Ceramics
- Magnetics

Medical

- Coaxial Filters and Interconnects
- Ceramic Capacitors
- Power Filters
- Magnetics

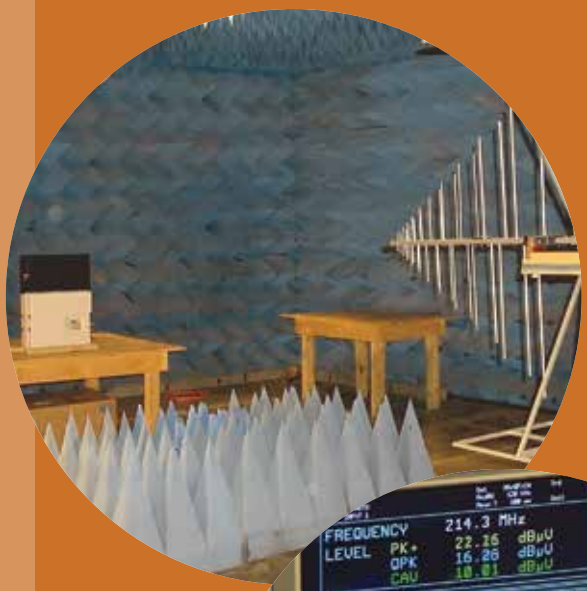
Industrial

- Ceramic Capacitors
- Coaxial Filters and Interconnects
- Specialty Connectors and Custom Cable Assemblies
- Magnetics

EMI Testing Services

API Technologies has the EMC expertise and in-house filter solutions you need to meet worldwide EMC standards.

Our EMC testing services offer you a flexible resource to assist in product development by identifying and correcting EMI susceptibility and/or emission problems. API has a fully equipped EMC testing laboratory and an experienced engineering staff ready to solve demanding EMC challenges. For a modest daily fee, we can test your equipment, determine state of compliance, and work with you in developing a viable solution. It is not uncommon for clients to leave our lab with a prototype in hand.



EMC Lab Highlights

- NARTE certified staff
- Semi-anechoic chamber
- Computer controlled instrumentation
- Graphical data presentation in multiple formats
- Fiber optic video monitoring system

Testing Capabilities

MILITARY

MIL-STD-461 A/B/C/D/E

MIL-STD-1399

AUTOMOTIVE

CISPR 25 Test Methods

COMMERCIAL

FCC-Part 15

RTCA/DO-160 A/B/C/D

GR-1089-CORE

INTERNATIONAL

EN55011/CISPR 11

EN55014/CISPR 14

EN55022/CISPR 22

EN61000-4-2 Electrostatic Discharge

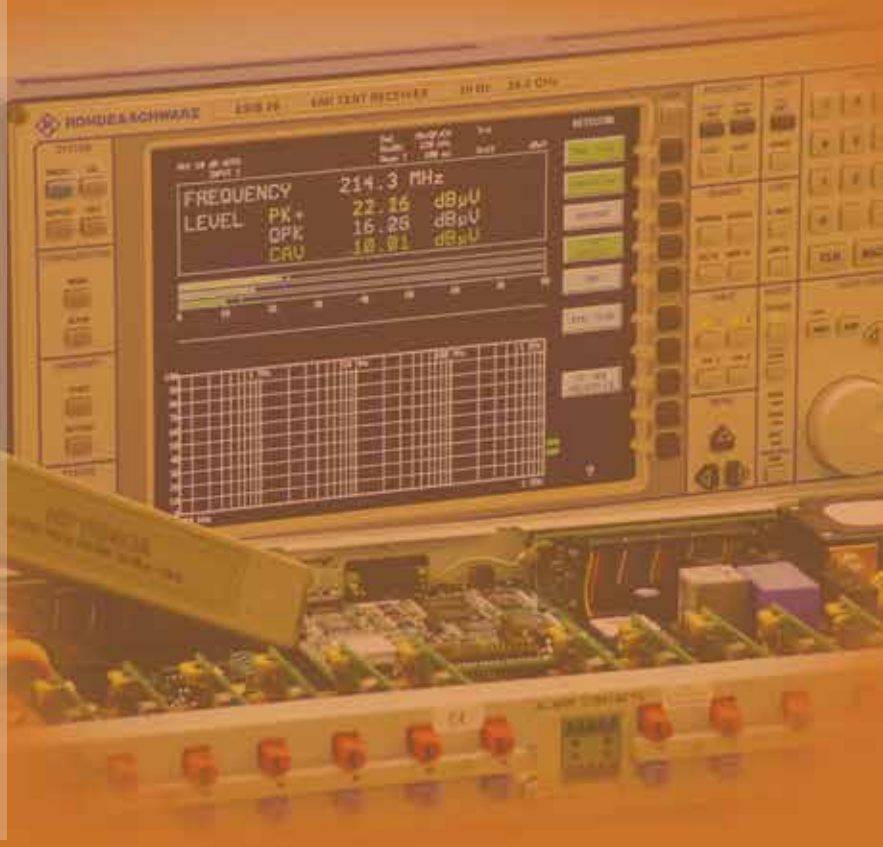
EN61000-4-3 Radiated RF Immunity

EN61000-4-4 Electrical Fast Transient

EN61000-4-5 Surge

EN61000-4-6 Conducted RF Immunity

EMI/RFI Filter and Capacitor Performance Testing



Reliability Levels

Class B

Class B is outlined in MIL-PRF-28861 and is prescribed for most military/aerospace requirements. It is more stringent than MIL-PRF-15733, requiring 100% screening that includes thermal shock, voltage conditioning and x-ray.

Periodic Group B testing is performed on units selected at random from production lots.

Class B MIL-PRF-28861 Test Sequence Summary

Inspection	Class B
Group I	
AC voltage drop (when applicable)	X
Voltage and temperature limits of capacitance	X
Insertion loss (at temperature)	X
Barometric pressure (reduced)	X
Temperature rise	X
Current overload	X
Terminal strength	X
Thermal shock and immersion	X
Group II	
Subgroup 1	
Life	X
Subgroup 2	
Resistance to soldering heat	X
Salt spray (corrosion)	X
Radiographic inspection	X
Subgroup 3	
Resistance to solvents	X
Group III	
Shock (specified pulse)	X
Vibration (high frequency)	X
Moisture resistance	X
Seal (when applicable)	X
Radiographic inspection	X

"R" level testing

"R" level screening is performed by API Technologies' Hi-Rel Laboratory as detailed below. Customers requiring special tests may order to their own specifications or simply order to level R and then note additions or deviations.

"R" level test sequence

(100% testing unless otherwise specified)

- Thermal Shock: 5 cycles from -55°C to +125°C in accordance with MIL-STD-202, Method 107D, Condition A.
- Burn-in: 100 hours at 1.4x rated DC voltage, 125°C.
- Seal Test: MIL-STD-202, Method 112, Test Condition A. Hermetic sealed parts only.
- Capacitance and Dissipation Factor: MIL-STD-202, Method 305, frequency 1kHz.
- Dielectric Withstanding Voltage: 2.5 times the rated DC voltage for 5 ±1 second at 25°C, with 50 mA maximum charging current.
- Insulation Resistance: MIL-STD-202, Method 302, 125°C at rated DC voltage and room temperature (25°C). The 125°C requirement shall be 10% of the specified catalog IR at 25°C.
- DC Resistance: MIL-STD-202, Method 303.
- Insertion Loss Test: Sample per MIL-PRF-15733. At full rated load in accordance with MIL-STD-220. The minimum insertion loss shall be defined in the filter catalog.
- Visual and Mechanical: In accordance with MIL-PRF-15733.
- Marking: All filters which have successfully completed the test sequence shall be marked with an "R" in the second part of the number. For example, a standard SCI-2130-004 becomes SCI-R2130-004 and 9051-100-0000 becomes 9051-R100-0000, and 51-719-011 becomes 51-R719-011 after completion of the Hi-Rel Level "R" Test Sequence.

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Electromagnetic Integrated Solutions Selection Guide

CERAMIC CAPACITORS

Specialty Ceramic Components

Applications

Medical implantable devices, EMI/RFI suppression filters, commercial and military applications, power supplies, converters

Features / Benefits

- **Discoidals**
  - Low inductance, non-polar
  - Filtering and decoupling of high frequency applications
  - Reliable, low profile, multi-layered designs
- **Tubular Capacitors**
  - Small, lightweight, reliable, high dielectric strength
  - Uniform insertion loss over a broad frequency range
- **Switch Mode Power Supplies**
  - Ideal for DC-DC power supply applications
  - Capacitor assemblies with low ESR/ESL
  - Leaded configuration safeguards the device against thermal and mechanical stresses
- **Fed/MIL approvals**
  - MIL-PRF-49470 approvals

Performance Characteristics

- **Discoidals**
  - .080 to 0.600 in. diameter
  - 50 to 500 Volt
  - NPO, X7R and Z5U ceramic available
- **Tubular Capacitors**
  - Feed-through and Pi circuit
  - 0.081 to 0.122 in. diameter
  - 50 to 200 Volt
- **Switch Mode Power Supplies**
  - BP, BX, BR or BQ ceramic available
  - Lead options: in, out or straight
  - 50 to 500 Volt

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eis.apitech.com/ceramic

Advanced Ceramics

Applications

Chemical and fluid handling systems, microwave hybrid applications, HF/RF power amplifiers, computer, medical and network products, multi line designs, circular and D-sub connectors

Features / Benefits

- **Structural Ceramics**
  - High wear and corrosion resistance
  - Temperature stability and strength
  - Superior thermal shock resistance
  - Custom solutions available
- **Capacitor Arrays**
  - Variable mounting style selection
  - Decreased assembly time – one placement
  - Reduced component stress
  - Parallel and series configurations of chip capacitors
- **Planars**
  - Custom geometry configurations available
  - Design flexibility with multiple capacitance values
  - Established circular, D-sub and mini connector designs available

Performance Characteristics

- **Structural Ceramics**
  - Materials: Steatite, Cordierite and Alumina
  - Finishing methods: glazing, tumbling, plating
- **Planar & Capacitor Arrays**
  - Capacitance values up to 40 µF depending on array
  - Voltage ratings up to 1500 VDC
  - Temperature rating -55°C to 125°C

eis.apitech.com/ceramic

COAXIAL FILTERS & INTERCONNECTORS

Three Terminal Chips, Power/ Square & Mini Surface Mount Filters

Applications

Cellular telephones and base stations, telecommunication equipment, computer and peripheral equipment, digital AV equipment such as TV, VCR and DVD, power amplifiers, power supplies, and temperature and motor controls

Features / Benefits

Three Terminal Chips

- Non-polar, surface mountable
- Superior filtering characteristics
- Available in 0603, 0805, 1205, and 1806 sizes

Power, Square & Mini Surface Mount Filters

- PSM: 2 – 20 Amps (FT)
  2 – 10 Amps (Pi)
- SSM & MSM: 10 Amps
- High temperature construction
- Small, square mechanical geometry enhances soldering to a PCB
- Tape and reel and bulk packaging
- Simple structure and high withstanding voltage

Performance Characteristics

Three Terminal

- **Voltage** Up to 100 VDC
- **Current** Up to 2 Amps
- **Capacitance** Up to 220,000 pF

PSM/SSM/MSM

- **Rated voltage** 50 – 200 VDC
- **Capacitance** 47 pF to .01 µF
- **Temp range** -55°C to +125°C

RoHS COMPLIANT

eis.apitech.com/smt

Miniature & Solder-in Filters

Applications

Ideal for microwave applications such as attenuators and oscillators. Perform well in high impedance circuits where large capacitance values are not practical

Features / Benefits

- **Small size options**
  Ideal for use when real estate is limited
  - Solder-in, Knurled press-in & 2-56 threaded Spanner
- **Design flexibility**
  Wide range of solder-in bushings with a variety of circuits: C, L, and Pi
  - Custom lead options available
- **Construction**
  High temperature construction
- **Plating**
  Suitable for gold bonding when specified
- **Coaxial**
  Feed-through filtering
- **FED/MIL approvals**
  Qualified to MIL-C-11015 and MIL-PRF-15733

Performance Characteristics

- **Insertion loss range**
  Effective filtering to 18 GHz in a shielded application
- **Capacitance**
  Up to 30,000 pF
- **Operating voltage**
  Up to 750 VDC
- **Temperature range**
  -55°C to +125°C

RoHS COMPLIANT

eis.apitech.com/lowpass

Hermetic/Resin Sealed Filters & MLFT Filters

Applications

Power supplies, signal lines, rocket ignitors, aerospace, DC motors, telecomm & military/secure communications, medical equipment, mining/oil drilling, transceivers, microwave filters, industrial control systems, multi-circuit filter assemblies

Features / Benefits

Hermetic/Resin Sealed

- **Cost-effective solutions**
  Low cost filters provide protection in hostile environments
- **Design flexibility**
  Wide range of bushing sizes, lead configuration options and circuit types including C, L, Pi, transient suppression Pi, T, & TT
- **Reliability**
  Built in accordance with MIL-PRF-15733 or MIL-PRF-28861
- **FED/MIL approvals**
  Qualified to MIL-PRF-15733, MIL-PRF-28861 and DSCC 84084
- **Safety**
  Some select filters U.L. 1459 recognized and CSAC22.2 certified

MLFT - Motor Line Feed-Through Filters

- **One component solution**
  Eliminates the need for multiple capacitors, inductive coils, leads and PCB assemblies
- **Easy installation**
  Provides a connector interface for a space saving EMI solution

Performance Characteristics

- **Insertion loss range**
  Effective filtering from 10 KHz to 18 GHz with proper installation
- **Capacitance and temperature characteristics**
  To 5.2 µF NPO, X7R, Y5V, Z5U
- **Temperature range**
  -55°C to +125°C
- **Voltage ratings (max.)**
  To 2500 VDC
  - 240 VAC @ 400 Hz
- **Current ratings (max.)**
  To 100 Amps

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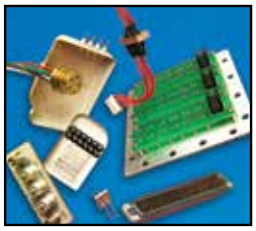
Electromagnetic Integrated Solutions Selection Guide

COAXIAL FILTERS & INTERCONNECTORS

Filter Plates & Shrouded Latch Plates & Assemblies



Telecommunications equipment, military, industrial, scientific, remote sensory and medical equipment

- **Total reduced costs** Economical method of meeting EMC requirements
- **Excellent filtering** Outperform surface mount filters at frequencies above 130 MHz; provide an EMI filtered signal line between electronic system modules
- **Reliability** Every filter plate is tested 100% for key parameters
- **Standard centers** 0.100" and 2 mm centers allow for easy termination
- **Easy Mate™ filter plate** Design provides for quick installation into predefined cutout
- **Microcircuit packages** Custom designs available with a variety of materials, filtering and connectors
- **Rugged construction** Shroud protects filter element from potential damage

- **Insertion loss range** Effective insertion loss from 1 MHz to 18 GHz with proper installation
- **Capacitance** Pi: 68 pF to 5000 pF

  Feed-through: 10 pF to 4000 pF
- **Temperature characteristics** NPO, X7R, Y5V, Z5U
- **Temperature range** -55°C to +125°C
- **Voltage ratings (max.)** To 250 VDC
- **Current ratings (max.)** To 5 Amps standard

RoHS COMPLIANT

eis.apitech.com/plate

Filtered Terminal Blocks

Telecommunications equipment, industrial controls, power supplies, uninterruptible power supplies, military, instrumentation and power distribution equipment

- **Rugged construction** Provides protection to filtering element; especially useful for repeated changes in field wiring
- **Design flexibility** 2 to 6 terminals available in "Barrier Strip" 2 to 12 terminals available in European variety
- **Performance** Filter elements provide high insertion loss for EMI filtering of AC and DC power and control lines
- **Reliability** Every terminal block is tested 100% for key parameters
- **FED/MIL approvals** Barrier strips are recognized to U.L. 1059 file E133076 and approved by CSA Std 22.2 No. 158-1987 and ECN584B, LR92537; 52-160 series 100 VDC UL/CSA 52-257 series 250 VAC UL/CSA

- **Insertion loss range** Effective insertion loss from 1 MHz to 18 GHz with proper installation
- **Capacitance** 2500 pF
- **Temperature range** -55°C to +105°C
- **Voltage ratings (max.)** Barrier: to 250 VAC
- **Current ratings (max.)** Barrier: 30 Amps

RoHS COMPLIANT

eis.apitech.com/block

Low Cost Ferrite Filtered D-Sub Connectors

Personal computers, microcomputers-applied products, peripheral/terminal equipment, industrial process equipment, cellular base stations, PBX telecommunications equipment, graphics workstations, and medical electronics

- **Cost-effective solutions** Low cost, high performance; replaces individual filters on PCB, saving cost and space
- **Design flexibility** Available in 9, 15 and 25 lines standard density
- **Compact design** Interchangeable with standard D-subminiature connectors
- **Performance** Gold plated contacts

  Superior filtering of high frequency interference; ground plane design provides superior EMI shielding
- **Reliability** Each connector position is tested 100% for critical electrical parameters to ensure consistent performance
- **FED/MIL approvals** UL 94V-0, UL/CSA recognized

- **Insertion loss range** 1 MHz to 5 GHz and beyond
- **Capacitance and temperature characteristics** To 120 pF – 1500 pF
- **Temperature range** -40°C to +125°C
- **Voltage ratings (max.)** 500 VDC
- **Current ratings (max.)** 5 Amps

RoHS COMPLIANT

eis.apitech.com/series100

High Performance Filtered D-Subminiature & Combo Connectors

Telecommunications equipment, cellular base stations, secure communications, medical electronics, industrial process equipment, microwave TX/RX, personal computers, graphics work-stations and aerospace applications

- **Excellent filtering** Filter types include Pi or feed-through capacitors; signal, power contacts; groundplane design provides superior EMI shielding.
- **Design flexibility** 9 through 50 line construction, standard, high density, mixed pin loading & selectively loaded lines
- **Reliability** Each connector position is tested 100% for critical electrical parameters to ensure consistent performance
- **Numerous options** Hardware, mounting, waved metal gaskets, hooded strain reliefs, combined filter types and plating
- **FED/MIL approvals** UL 94V-0, UL/CSA recognized

- **Insertion loss range** 1 MHz to 18 GHz and beyond
- **Capacitance and temperature characteristics** To 5600 pF

  NPO, X7R, Y5V, Z5U
- **Temperature range** -55°C to +125°C
- **Voltage ratings (max.)** 200 VDC
- **Current ratings (max.)** 5 Amps

RoHS COMPLIANT

eis.apitech.com/filcon

Filtered Datacom Connectors

Data networking equipment, personal and industrial computers and peripherals, workstations, fax/modems, copy machines, original telephone manufacturing, medical equipment, broadband transmission equipment, bay connectorization and multiplexing

- **Cost-effective solutions** Miniature ribbon connectors and adapters with chip capacitors

  Rugged USB connector
- **Design flexibility** Miniature ribbon connectors and adapters available in 50-line configurations with a variety of hardware options

- **Reliability** Each connector position is tested 100% for critical electrical parameters
- **Insertion loss/ inductance range** Effective insertion loss from 1 MHz to 18 GHz with proper installation
- **Capacitance** Up to 820 pF
- **Temperature range** -55°C to +125°C
- **Voltage ratings (max.)** 1000 VDC DWV (miniature ribbon connectors) 500 VAC DWV (rugged USB)
- **Current ratings (max.)** 1.5 Amps

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Electromagnetic Integrated Solutions Selection Guide

SPECIALTY CONNECTORS & CUSTOM CABLE ASSEMBLIES

POWER FILTERS & FILM MODULES

Specialty Connectors

Commercial and military avionics, satellites, telecommunications, power supplies, electronic warfare, ground/ air weapon systems and mining and oil drilling exploration

- **Excellent filtering**
  Tubular and planar filtered arrays using Pi, LC, T, and C circuits; TVS protection available
- **Design flexibility**
  Filtered MIL-DTL-38999, MIL-DTL-83723, MIL-DTL-26482, MIL-DTL-24308, MIL-DTL-55116 as well as custom filtered connectors
- **Reliability**
  Each connector position is tested 100% for critical electrical parameters
- **Specialty Unfiltered Connectors**
  Built to MIL specifications, custom shells to fit available space. Integral strain relief. Power, signal & coax line combinations

- **Insertion loss range**
  Effective insertion loss from 1 MHz to 18 GHz with proper installation
- **Capacitance and temperature characteristics**
  To 0.1 µF

  COG, X7R, Z5U
- **Temperature range**
  -55°C to +125°C
- **Voltage ratings (max.)**
  125 VAC @ 400 Hz
  up to 1000 VDC

eis.apitech.com/circular

Custom Cable & Harnessing

Commercial and military avionics, telecommunications, industrial equipment, mining & oil exploration, medical equipment

Signal & Discrete Cables
Point-to-point, multi-conductor, branched harness, flex, semi-rigid, rigid circuit card assembly

RF Cables
Phase matching, rigid/semi-rigid cable, custom RF cable builder tool

Power Cables
Cooper "Roughneck" 4/00 + power distribution cable fabrication

- **Interconnects**
  Harnesses can include a wide range of interconnects both unfiltered or API – Spectrum filtered products, sensors & potentiometers
- **Manufacturing expertise**
  Services include lead wire preparation, soldering & tinning, marking & ribbon cable processing

  Overmolding – rapid custom mold development (2 weeks typical)
- **100% tested**
  Continuity

  Isolation (1500VDC)

- **Standard assured**
  All cable assemblies & harnessing built in accordance with WHMA-IPC-620 & J-Std-001

  Printed circuit board assemblies built in accordance with IPC-A-610

  In house design & build
- **Wire processing range**
  28AWG to 350MCM
- **Temperature range**
  -55°C to +200°C
- **Current ratings (max.)**
  To 750 Amps
- **Frequency ratings**
  To 40 GHz

eis.apitech.com/harness

High Current Feed-Through Filters

Cellular base stations, telephone racks, high current switch mode power supplies, power amplifiers and servers, industrial equipment and laser welders

- **Easy installation**
  Bolt-in style, surface mount
- **Design flexibility**
  Available with single, dual, triple and quad configurations, different stud lengths, mounting brackets hardware and EMI gasketing available
- **Performance**
  Ideally suited to help meet NEBS, GR1089, and EN55022
- **Agency approvals**
  Designed to meet agency approvals, some selected filters UL 1950 recognized, CSA C22.2 certified and TüV approved
- **Custom options**
  Custom interfacing, contact pins, wire leads, multiple outputs
- **Environmental**
  Can be used in both indoor and outdoor applications

- **Current ratings (max)**
  To 500 Amps
- **Voltage ratings (max)**
  To 1000 VDC and to 240 VAC
- **Insertion loss range**
  AC: 1 MHz to 1 GHz

  DC: 150 KHz to 10 GHz

  High performance options available with IL up to 100 dB
- **Temperature range**
  -55°C to +125°C
- **Capacitance**
  4.7µF max

  Class Y2 and Y4 available

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eis.apitech.com/slfilter

Power Entry Modules

Digital equipment, personal computers and peripherals, measuring instruments, home appliances, monitor and display units

- **Rugged construction**
  Designed to perform in industrial environments
- **Design flexibility**
  Available in PCB mount, bolt-in, and snap-in configurations, fast-on tab, solder lug or flying leads, Fused and Switched and Fused options available
- **Performance**
  Ideally suited for products that must conform to FCC part 15 regulations

  Meets over voltage of IEC 664 category II and complies with IEC 950

  Metal case provides high performance
- **Agency approvals**
  UL recognized, CSA certified, TüV approved (tested and found to be in accordance with VDE 0565 Part 3)
- **Custom options**
  Value added connectors, wire leads, ring terminals

- **Current ratings (max)**
  Up to 15 Amps

  Switched/Fused 2, 4, and 6 Amps
- **Voltage ratings (max)**
  From DC to 250 VAC, 60 Hz
- **Insertion loss range**
  Effective filtering from 100 KHz to 30 MHz
- **Temperature range**
  -25°C to +85°C
- **Leakage current**
  0.35 mA to 0.50 mA max for general purpose filters

  0.005 mA to 0.10 mA max for medical filters

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Power Line Filters & 3 Phase Power Line Filters

Digital equipment, personal computers and peripherals, measuring instruments, medical, industrial, telecommunications equipment, factory automation, UPS, vending machines, elevators, and switch mode power supplies, welders, appliances, inverters and converters

- **Rugged construction**
  Designed to perform in industrial environments
- **Design flexibility**
  Available with fast-on or bolt-in terminals

  Single and dual stage

  Delta and Wye configurations
- **Performance**
  Ideally suited for products that must conform to FCC part 15 regulations

  Both metal and plastic cases provide high performance

  Excellent attenuation for high voltage impulse
- **Agency approvals**
  Several styles are UL recognized, CSA certified, TüV approved (tested and found to be in accordance with VDE 0565 Part 3)

- **Current ratings (max)**
  1 Amp to 100 Amps

  3 Amps to 200 Amps (3 Phase)
- **Voltage ratings (max)**
  From 48 VDC to 250 VAC, 60 Hz

  250 VAC to 440 VAC (3 Phase)
- **Insertion loss range**
  Effective filtering from 100 KHz to 30 MHz
- **Temperature range**
  -25°C to +85°C

  -40°C to +85°C (3 Phase)
- **Leakage current**
  0.35 mA to 3.0 mA max

eis.apitech.com/pline

api technologies corp.
Spectrum Control

Electromagnetic Integrated Solutions Selection Guide

POWER FILTERS & FILM MODULES

Military/Aerospace Multisection Filters & Custom Commercial Assemblies

Commercial and military avionics, satellites, secure communications, ruggedized computer, radar, electronic warfare and ground weapons systems, telecommunications, cellular base stations, medical equipment, telephone switching and traffic control systems

- **Rugged construction**
  Metal enclosures built to withstand MIL-STD environmental conditions, designed to perform in industrial or military environments
- **Design flexibility**
  Filters designed to meet customers' requirements
  Transient protection
  Circuit breakers
  Voltage cut-off
  Other options available
- **Performance**
  Provides quick and economical solutions to meet customers' specific requirements
  Increases speed-to-market and decreases development time
  Designs optimized through EMC verification
- **Military approvals**
  Available to meet MIL-PRF-15733 and MIL-STD-461
  Military testing IAW MIL-STD-202, MIL-STD-105
  Designed to meet NEBS and safety agency approvals
- **EMI design verification**
  Equipment verification can be accomplished through Spectrum Control's EMI test lab

- **Current ratings (max)**
  Up to 250 Amps
- **Voltage ratings (max)**
  400 VDC and 250 VAC standard; custom voltage ratings available
- **Insertion loss range**
  Effective filtering from 10 KHz to 10 GHz
- **Temperature range**
  -55°C to +125°C
- **Leakage current**
  Standard and low leakage designs available

RoHS COMPLIANT

eis.apitech.com/power

Film Capacitors & Modules

Renewable energy conversion equipment; electric vehicle inverter and charger equipment; laser pulse power and radar systems; industrial welders, elevators and medical defibrillators; high voltage and aircraft power supplies and motor drives

- **Design flexibility**
  Wide range of dielectrics: polypropylene, polyester (mylar), polyphenylene sulphide (PPS)
  Variety of terminations: radial or axial leads, machined, stamped, lugs, PCB mount, threaded, inserts
  Multiple enclosures: metal case, pre-molded plastic, wrap and fill
  Hermetic, non-hermetic
  Various geometries: cylindrical, flat, modular, oval-wound
  Encapsulation options: Dry or impregnated
  Multitude of sizes: less than an inch to several cubic feet
- **Performance**
  Deliver high DC current, high pulse capability, high stability, low self-inductance, and low ESR
- **Compact size**
- **Testing & Verification**
  Simulation software replicates real work environment
  In house testing and verification insures function and compliance

- **Voltage ratings**
  AC: Up to 750 VAC
  DC: Up to 20,000 VDC
- **Temperature range**
  -55°C to +150°C
- **DF**
  0.3% to 0.15% typical
- **IR**
  3 G min
- **Ripple currents**
  Up to 400 arms

RoHS COMPLIANT

eis.apitech.com/film

MAGNETICS

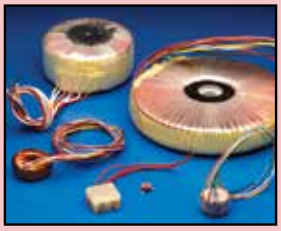
Current Transformers

Current Sensors
- Measures electrical current (AC & DC) and can transform current from high to low measurable values
- Wide primary current range of 3.5 Amps to 800 Amps

High Frequency Current Transformers
- 20 kHz-100 kHz operating frequency
- Available totally encapsulated, with or without wound primary turns and loading resistor
- Built to UL, MIL, VDE, CE specs, EMRL current transformers meet UL1244

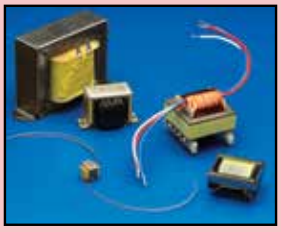
Load Detector Current Sensors
- Innovative Snap-On load detectors mount on pre-wired systems without disrupting existing connections
- Broad frequency response of 30Hz to 15 kHz
- Measure currents up to 40 Amps RMS continuous and 120 Amps intermittent

Toroidal Power Transformers



- 50/60HZ, 5-15,000V (Europe ER series)
- 60 Hz 120V (U.S. FR series)
- 400Hz 115-230V (Military DR series)
- Lower magnetic leakage, lower electrical noise and mechanical hum

Laminate Power Transformers



- Value ranges from 3 VA to 100,000 VA
- Transform line voltage to any other voltage

RoHS COMPLIANT

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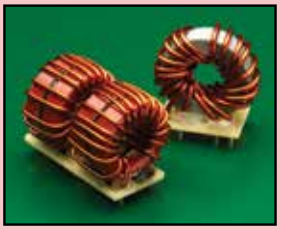
Switch Mode Power Supply Inductors

- Filter inductors, toroidal current sense transformers and high frequency inverter transformers
- Performance verified in 25kHz power supply
- 10 to 1,000 watts with low power losses

Power Inductors/ Chokes



- Precision wound heavy-duty toroidal inductors
- Up to 100 amps, standard
- Lighting dimmers – low wattage residential to higher wattage commercial, motor controls, SCR controls and line filters

Lighting Chokes & Inductor/Filters

- Precision wound heavy-duty toroidal inductors
- 120 volt models from 12.5 to 100 Amps
- 240 volt models from 8.3 to 60 Amps

Modem & Module Transformers

- Broadband and voiceband transformers used for datacom and telecom applications
- xDSL, T1/E1, T3/DS3/E3/STS-1, ISDN interface modules
- ADSL / POTS splitter modules
- Impedance and line matching transformers

Custom designs available for all magnetics

RoHS COMPLIANT

eis.apitech.com/magnetics

ceramic capacitors

api technologies corp.
Spectrum Control

Ceramic Capacitors

we offer performance and cost alternatives to meet varied voltage, capacitance, packaging and budgetary requirements

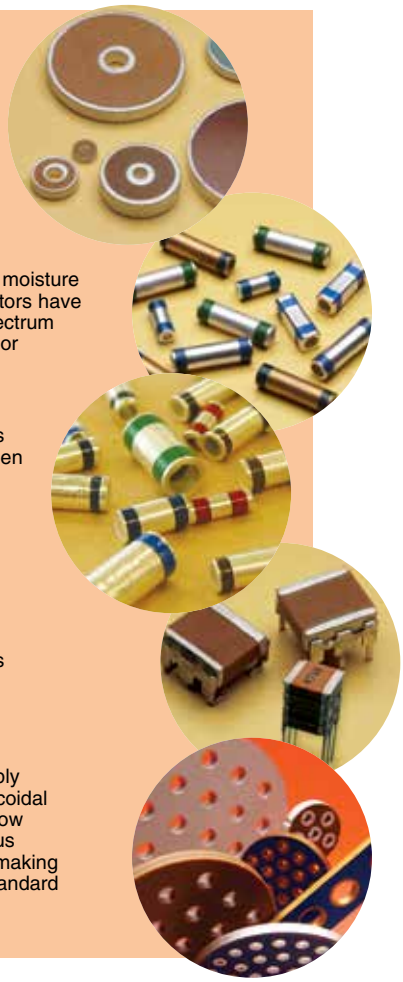
Discoidal Feed-Through Capacitors are ideal for by-pass and filtering applications with a low inductance construction suited for high frequency applications. Their low profile and rugged design is an excellent alternative to ceramic tubes… **CC3-CC7**

Tubular Feed-Through Capacitors are small and lightweight with high dielectric strength and are impervious to moisture and contamination. Feed-through capacitors have a uniform insertion loss over a broad spectrum range and are ideal for multi-pin connector applications… **CC8-CC9**

Tubular Pi Capacitors have similar characteristics to feed-through capacitors in addition to a narrower transition between the pass and stop bands, effectively stopping high frequency interference without affecting desired frequencies and providing filtering of noise content close to signal content … **CC10-CC11**

SMPS (Switch Mode Power Supply) Capacitors deliver lower equivalent series resistance, lower equivalent series inductance, lower ripple voltage and less self-heating when compared to other capacitive elements… **CC13-CC16**

Planar Capacitors offer a faster assembly time compared to stand-alone chips, discoidal or tubular capacitors. They also have a low profile and are capable of meeting various geometric and electrical configurations, making Spectrum's planar capacitors the new standard in EMI suppression applications… **CC17**



API Technologies' Expertise

Inside every EMI filter is a ceramic feed-through capacitor. The Spectrum Control line of ceramic capacitors is designed to provide solutions to a wide range of filtering applications. Our ceramic capacitors are ideal for EMI/RFI suppression filters, medical implantable devices, commercial and military applications, power supplies and converters.

Custom Ceramic Capacitors

We offer many variations of discoidal, tubular and planar capacitors to fit your custom application:

- Various OD, ID, thickness and length configurations
- Pressed discoidals with surface printed terminals
- Multi hole discoidal designs
- Miniature discoidals down to .080" OD
- Arrays
- Custom style capability
- High voltage designs available
- High temperature designs available
- Square tubes for surface mount applications
- Lapped feed-through capacitors

api technologies corp.
Spectrum Control

Discoidal Capacitors

Ceramic discoidal feed-through capacitors are the building blocks of the EMI filter industry. API's Spectrum Control discoidal capacitors provide great versatility in meeting varied voltage, capacitance and dimensional requirements. Our nonpolar, multilayer capacitors are small, reliable and high in dielectric strength. Operational temperatures of –55°C to +125°C are achieved with no voltage de-rating.

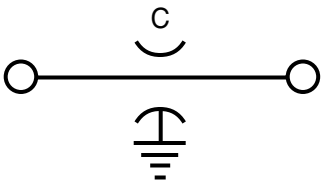
The versatile nature of our discoidals makes them ideally suited for by-pass and filtering applications. Due to their low inductance construction, these capacitors perform extremely well in high frequency applications. The circular geometry of a discoidal feed-through capacitor offers many paths to ground, resulting in lower impedance and better filtering performance.

The low profile and rugged design of our discoidal capacitors offer an excellent alternative to ceramic tubes.

Features

- Excellent high frequency performance
- Low profile design
- Rugged construction
- Low impedance, many paths to ground
- Low inductance, non-polar
- AC applications up to 240V
- DC applications up to 500V
- -55°C to +125°C operation

Feed-Through Circuit

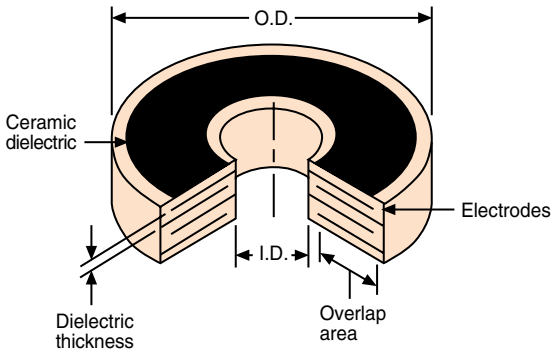


Specialty Ceramic Capacitors

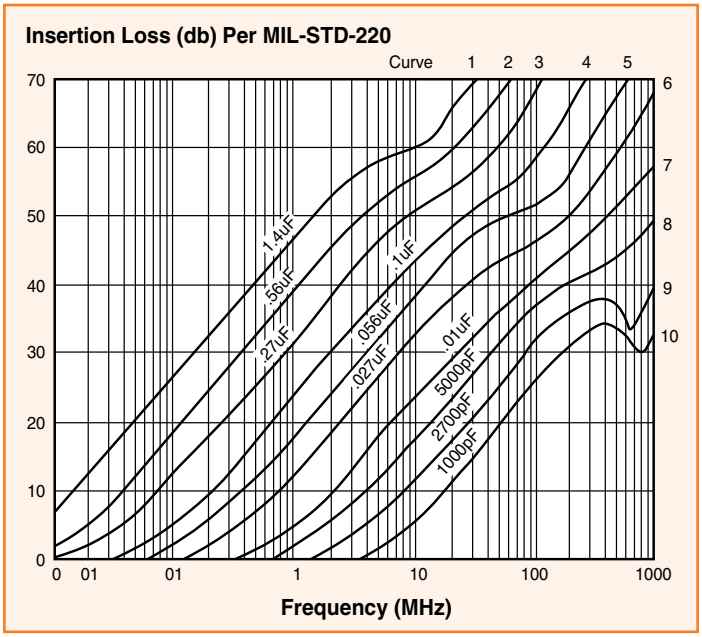
We offer many variations of discoidal and array capacitors to fit your custom application:

- Various OD, ID and thickness configurations
- Pressed discoidals with surface printed terminals
- Multi-hole discoidal designs
- Miniature discoidals down to .080" OD
- Arrays
- Custom style capability
- High voltage designs available
- High temperature designs available

Multilayer Discoidal



Insertion Loss



Metallization

Standard metallization is solderable silver.
Other metallizations are available upon request.

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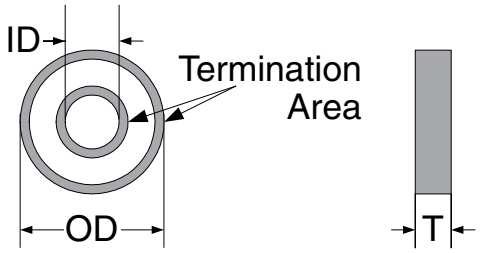
Spectrum Control

Discoidal NP0



OD	(in)	**0.080** ±0.005				**0.100** ±0.005				**0.135** ±0.005				**0.150** ±0.010				**0.195** ±0.010				**0.340** ±0.010				**0.595** ±0.010			
	(mm)	**2.03** ±0.13				**2.54** ±0.13				**3.43** ±0.13				**3.81** ±0.25				**4.95** ±0.25				**8.64** ±0.25				**15.11** ±0.25			
ID	(in)	**0.030** ±0.005				**0.040** ±0.005				**0.040** ±0.005				**0.045** ±0.005				**0.062** ±0.005				**0.055** ±0.005				**0.095** ±0.005			
	(mm)	**0.76** ±0.13				**1.02** ±0.13				**1.02** ±0.13				**1.14** ±0.13				**1.52** ±0.13				**1.40** ±0.13				**2.41** ±0.13			
T Max	(in)	0.045				0.060				0.060				0.110				0.120				0.120				0.125			
	(mm)	1.14				1.52				1.52				2.79				3.05				3.05				3.18			
Term BW	(in)	0.000 - 0.015				0.000 - 0.020				0.000 - 0.025				0.000 - 0.025				0.002 - 0.025				0.005 - 0.045				0.005 - 0.055			
	(mm)	0.00 - 0.38				0.00 - 0.51				0.00 - 0.64				0.00 - 0.64				0.05 - 0.64				0.13 - 1.14				0.13 - 1.40			
Cap(pF) \ WV(VDC)		500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50
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Note: AC voltage determined upon request

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

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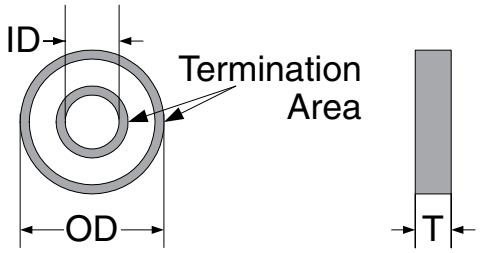
Discoidal X7R



OD	(in)	**0.080** ±0.005				**0.100** ±0.005				**0.135** ±0.005				**0.150** ±0.010				**0.195** ±0.010				**0.340** ±0.010				**0.595** ±0.010			
	(mm)	**2.03** ±0.13				**2.54** ±0.13				**3.43** ±0.13				**3.81** ±0.25				**4.95** ±0.25				**8.64** ±0.25				**15.11** ±0.25			
ID	(in)	**0.030** ±0.005				**0.040** ±0.005				**0.040** ±0.005				**0.045** ±0.005				**0.062** ±0.005				**0.055** ±0.005				**0.095** ±0.005			
	(mm)	**0.76** ±0.13				**1.02** ±0.13				**1.02** ±0.13				**1.14** ±0.13				**1.52** ±0.13				**1.40** ±0.13				**2.41** ±0.13			
T Max	(in)	0.045				0.060				0.060				0.110				0.120				0.120				0.125			
	(mm)	1.14				1.52				1.52				2.79				3.05				3.05				3.18			
Term BW	(in)	0.000 - 0.015				0.000 - 0.020				0.000 - 0.025				0.000 - 0.025				0.002 - 0.025				0.005 - 0.045				0.005 - 0.055			
	(mm)	0.00 - 0.38				0.00 - 0.51				0.00 - 0.64				0.00 - 0.64				0.05 - 0.64				0.13 - 1.14				0.13 - 1.40			
WV(VDC) / Cap(pF)		500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50
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Note: AC voltage determined upon request

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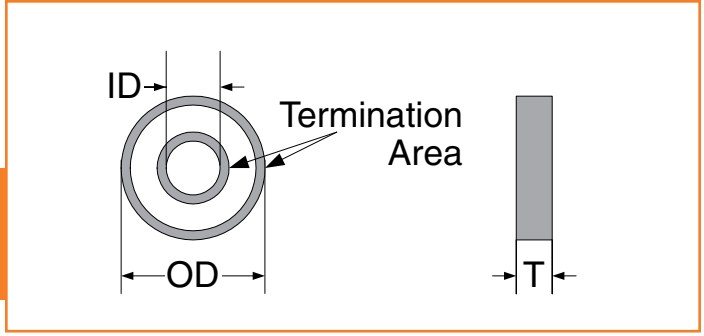
Spectrum Control

Discoidal Z5U



OD	(in)	**0.080** ±0.005				**0.100** ±0.005				**0.135** ±0.005				**0.150** ±0.010				**0.195** ±0.010				**0.340** ±0.010				**0.595** ±0.010			
	(mm)	**2.03** ±0.13				**2.54** ±0.13				**3.43** ±0.13				**3.81** ±0.25				**4.95** ±0.25				**8.64** ±0.25				**15.11** ±0.25			
ID	(in)	**0.030** ±0.005				**0.040** ±0.005				**0.040** ±0.005				**0.045** ±0.005				**0.062** ±0.005				**0.055** ±0.005				**0.095** ±0.005			
	(mm)	**0.76** ±0.13				**1.02** ±0.13				**1.02** ±0.13				**1.14** ±0.13				**1.52** ±0.13				**1.40** ±0.13				**2.41** ±0.13			
T Max	(in)	0.045				0.060				0.060				0.110				0.120				0.120				0.125			
	(mm)	1.14				1.52				1.52				2.79				3.05				3.05				3.18			
Term BW	(in)	0.000 - 0.015				0.000 - 0.020				0.000 - 0.025				0.000 - 0.025				0.002 - 0.025				0.005 - 0.045				0.005 - 0.055			
	(mm)	0.00 - 0.38				0.00 - 0.51				0.00 - 0.64				0.00 - 0.64				0.05 - 0.64				0.13 - 1.14				0.13 - 1.40			
WV(VDC) / Cap(pF)		500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50
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Note: AC voltage determined upon request

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Discoidal Electrical Testing

Electrical Parameter	Test Method	Temperature Coefficient NP0	X7R	Z5U
Temperature Coefficient	EIA 198	±30 ppm/ °C, - 55 to +125°C	±15%, -55 to +125°C	+22, -56%, +10 to +85°C
Capacitance Tolerance	EIA Tolerance Code	K, M, P	K, M, P	M, P, Z
Capacitance Test@ 25°C	MIL-STD-202, Method 305	Cap ≤ 100 pF: 1 MHz, 1 Vrms Cap > 100 pF: 1 KHz,1 Vrms	1 KHz, 1 Vrms	1 KHz, 0.5 Vrms
Dissipation Factor @ 25°C	MIL-STD-202, Method 305	0.15% Max	3.5% Max	3.5% Max
Aging Rate (Per Decade)		0%	<2.0%	<3.5%
Insulation Resistance @ 25°C	MIL-STD-202, Method 302	1000 M · µF or 100 KM , whichever is less	1000 M · µF or 100 KM , whichever is less	1000 M · µF or 100 KM , whichever is less
Insulation Resistance @ 125°C	MIL-STD-202, Method 302	100 M · µF or 10 KM , whichever is less	100 M · µF or 10 KM , whichever is less	100 M · µF or 10 KM , whichever is less
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	250% of Rated Voltage, 5 second hold, 30-50 mA	250% of Rated Voltage, 5 second hold, 30-50 mA	250% of Rated Voltage, 5 second hold, 30-50 mA

Discoidal Part Numbering System

After determining the capacitor properties required for a given application, use information from pages AC4-7 and the part numbering system below to place the order. If there are any questions, do not hesitate to contact API's customer service.

Example: **340055AX145P6B0**

The part number shown represents a discoidal with an outer diameter of 0.340" and inner diameter of 0.055". The voltage rating for this part is 50 VDC. The ceramic type will be X7R. The capacitance value is 1,400,000 pF with a tolerance of +100, -0%. The termination will be silver and the parts will receive bulk packaging. Since the last identifier in the part number is "0", there are no special requirements.

340	055	A	X	145	P	6	B	0
Outer Diameter Example: 0.340" = 340	**Inner Diameter** Example: 0.055" = 055	**Voltage Rating** A: 50 VDC B: 100 VDC C: 200 VDC E: 500 VDC	**Ceramic Code** N: NP0 X: X7R Z: Z5U	**EIA Cap Code** Example: 1,400,000 pF = 145	**EIA Cap Tolerance** K: ±10% M: ±20% P: +100 -0% Z: +80 -20%	**Termination** 6: Silver	**Packaging** B: Bulk	**Special Requirements** 0: None D: Class B G: Custom

api technologies corp.
Spectrum Control

Tubular FT Capacitors

API Technologies' Spectrum Control brand manufactures a wide variety of tubular feed-through (FT) ceramic capacitors, which are small in size, lightweight, nonpolar and offer high dielectric strength. Operating temperatures of –55°C to +125°C are achieved with no voltage de-rating. All capacitors are fired to produce true monolithic structures, which are impervious to moisture and contamination. Outer terminations feature a nickel barrier and a final metal layer, typically silver.

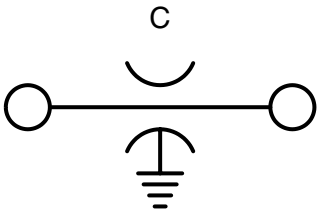
Feed-through tubular capacitors are ideally suited for by-pass and filtering applications. Due to the cylindrical design, the capacitors will have uniform insertion loss over a broad frequency range. This structure yields a low inductance when compared to conventional wound capacitors.

Solid FT capacitors have no internal electrodes and find their primary usage in low cost applications. Multilayered FT capacitors have a higher capacitance to volume ratio and are ideally suited for greater filtering at lower frequencies. Multilayered FT capacitors are also designed for applications where source impedances are high and sharp attenuation rise is critical.

Features

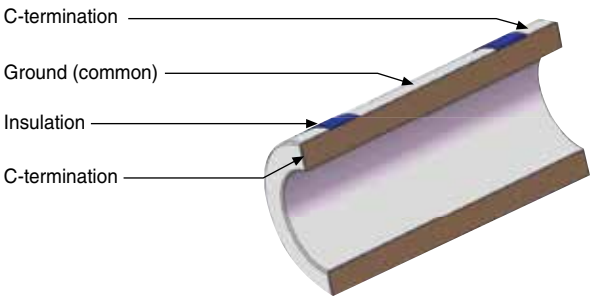
- Low cost solution for general purpose filtering
- Ideal for multi-pin connector applications
- High ratio of capacitance to volume
- Low inductance, non-polar
- Impervious to moisture and contamination
- -55°C to +125°C operation

Feed-Through Circuit

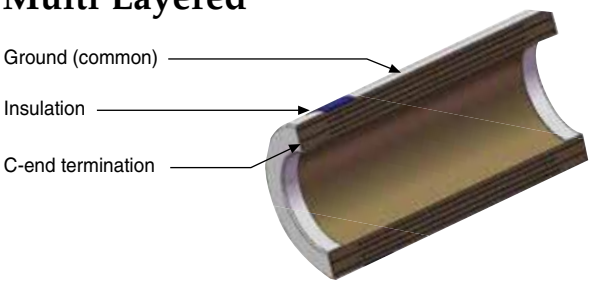


Feed-Through Construction

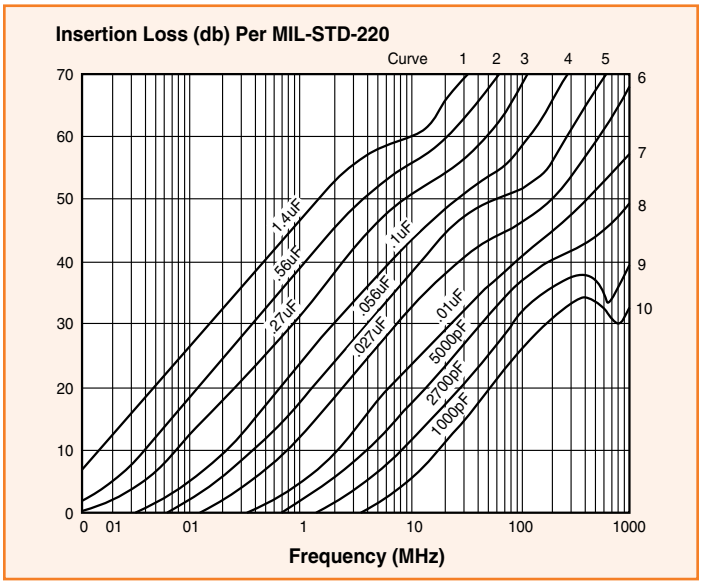
Solid



Multi Layered



Insertion Loss



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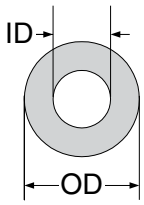
Tubular FT Specifications



Banding Dimensions

Center Dimension, min.	0.065”	1.651 mm
Tip Dimension, min.	0.002”	0.051 mm
Bandwidth, 200 VDC min.	0.025”	0.635 mm
Bandwidth, 100 VDC min.	0.020”	0.508 mm
Bandwidth, 50 VDC min.	0.015”	0.381 mm

TCC																								
	OD	(in)	**0.081** ±0.002						**0.090** ±0.003													**0.122** ±0.004		
		(mm)	**2.06** ±0.05						**2.29** ±0.08													**3.10** ±0.10		
	ID	(in)	**0.050** ±0.002						**0.060** ±0.003													**0.082** ±0.004		
		(mm)	**1.27** ±0.05						**1.52** ±0.08													**2.08** ±0.10		
	Length	(in)	**0.173** ±0.010			**0.235** ±0.010			**0.173** ±0.010			**0.235** ±0.010			**0.300** ±0.010			**0.315** ±0.010			**0.250** ±0.010		
		(mm)	**4.39** ±0.25			**5.97** ±0.25			**4.39** ±0.25			**5.97** ±0.25			**7.62** ±0.25			**8.00** ±0.25			**6.35** ±0.25		
	WV(VDC) / Cap(pF)		200	100	50	200	100	50	200	100	50	200	100	50	200	100	50	200	100	50	200	100	50	
NP0	10 Max																							
	12																							
	27																							
	33																							
	39																							
	47																							
	56																							
	68																							
	82																							
	100																							
	120																							
	150																							
	180																							
	220																							
	270																							
	330																							
	390																							
	470																							
X7R	330																							
	390																							
	470																							
	560																							
	680																							
	820																							
	1,000																							
	1,200																							
	1,500																							
	1,800																							
	2,200																							
	2,700																							
	3,300																							
	3,900																							
	4,700																							
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	6,800																							
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	12,000																							
	15,000																							
	18,000																							
	22,000																							
	27,000																							
Y5V	3,300																							
	3,900																							
	4,700																							
	5,600																							
	6,800																							
	8,200																							
	10,000																							
	12,000																							
	15,000																							
	18,000																							
	22,000																							
	27,000																							

KEY: Solid Multi-layered

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Tubular Pi Capacitors

As with the feed-through tubular capacitors, the Pi (π) tubular capacitors offered by API's Spectrum Control brand are small in size, lightweight, nonpolar and offer high dielectric strength. Operating temperatures of -55°C to +125°C are achieved with no voltage de-rating. All capacitors are fired to produce true monolithic structures, which are impervious to moisture and contamination. Outer terminations feature a nickel barrier and a final metal layer, typically silver.

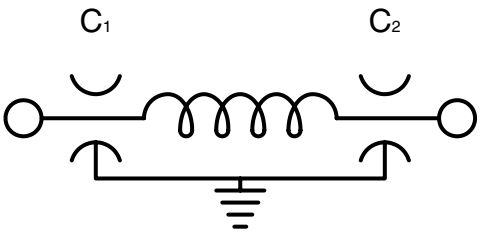
Compared to feed-through tubular capacitors, Pi tubular capacitors have a much narrower transition between the pass and stop bands. Pi capacitors are effective in stopping high frequency interference without affecting necessary frequencies immediately below the stop band.

Similar to feed-through tubular capacitors, Pi tubular capacitors can be designed with a solid or multilayered configuration. Solid Pi tubular capacitors are more cost effective, but limited in capacitance values. Multilayered Pi tubular capacitors can cover a wider range of capacitance, while still maintaining the mechanical strength of a solid Pi tubular capacitor in a similar case size.

Features

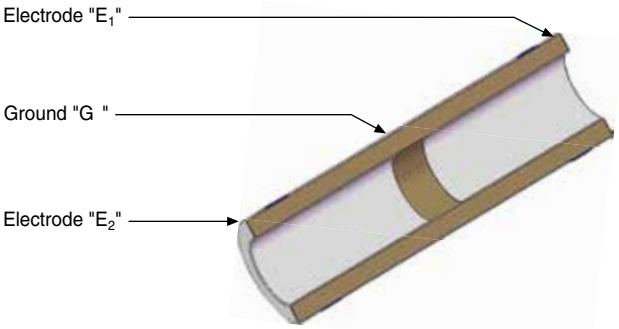
- Provide filtering of noise content close to signal content
- Ideal for multi-pin connector applications
- High ratio of capacitance to volume
- Low inductance, nonpolar
- Impervious to moisture and contamination
- -55°C to +125°C operation

Pi Circuit

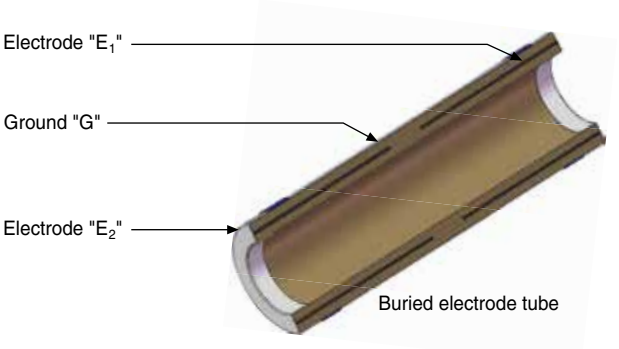


$C_1 + C_2 = C_{Total}$
Inductive Element not included.

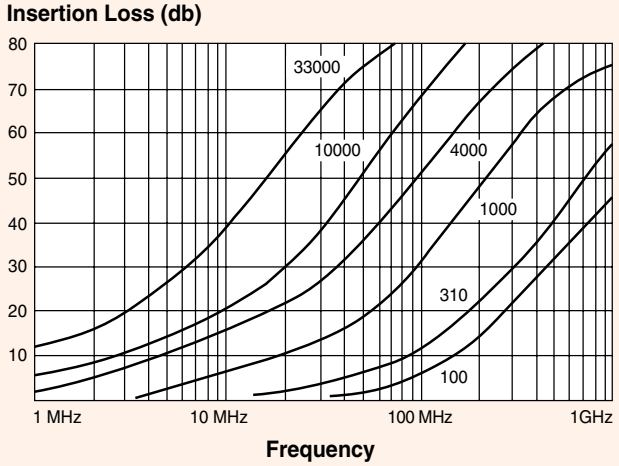
Solid



Multi-layered Tube



Insertion Loss



API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

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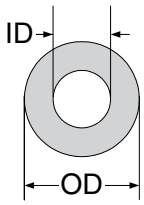
Tubular Pi Specifications



Banding Dimensions

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Tip Dimension, min.	0.002”	0.051 mm
Bandwidth, 200 VDC min.	0.025”	0.635 mm
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TCC																							
	OD	(in)	**0.081** ±0.002						**0.090** ±0.003												**0.122** ±0.004		
		(mm)	**2.06** ±0.05						**2.29** ±0.08												**3.10** ±0.10		
	ID	(in)	**0.050** ±0.002						**0.060** ±0.003												**0.082** ±0.004		
		(mm)	**1.27** ±0.05						**1.52** ±0.08												**2.08** ±0.10		
	Length	(in)	**0.173** ±0.010			**0.235** ±0.010			**0.173** ±0.010			**0.235** ±0.010			**0.300** ±0.010			**0.315** ±0.010			**0.250** ±0.010		
		(mm)	**4.39** ±0.25			**5.97** ±0.25			**4.39** ±0.25			**5.97** ±0.25			**7.62** ±0.25			**8.00** ±0.25			**6.35** ±0.25		
	WV(VDC) / Cap(pF)		200	100	50	200	100	50	200	100	50	200	100	50	200	100	50	200	100	50	200	100	50
NP0	10 Max																						
	12																						
	27																						
	33																						
	39																						
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	15,000																						
	18,000																						
	22,000																						
	27,000																						

KEY: Solid Multi-Layered

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Spectrum Control

General Tubular Capacitor Information

Specialty Tubular Products

We offer many variations of tubular capacitors to fit your custom application:

- Various OD, ID and length configurations
- Square tubes for surface mount applications
- Lapped feed-through capacitors
- Custom style capability

Tubular Electrical Testing

Electrical Parameter	*Test Method*	*Temperature Coefficient* NP0	X7R	Y5V
Temperature Coefficient	EIA 198	±30 ppm/ °C, - 55 to +125°C	±15%, -55 to +125°C	+22, –82%, -30 to +85°C
Capacitance Tolerance	EIA Tolerance Code	M, P	N, P, Z	N, P, Z
Capacitance Test @ 25°C	MIL-STD-202, Method 305	Cap ≤ 100 pF: 1 MHz, 1 Vrms Cap > 100 pF: 1 KHz, 1 Vrms	1 KHz, 1 Vrms	1 KHz, 1.0 Vms
Dissipation Factor @ 25°C	MIL-STD-202, Method 305	0.15% Max	3.5% Max	3.5% Max
Aging Rate (Per Decade)		No Aging	<2.0%	<2.5%
Insulation Resistance @ 25°C	MIL-STD-202, Method 302	50 K Megohm or 500 Ohm-Farad, whichever is lower	50 K Megohm or 500 Ohm-Farad, whichever is lower	50 K Megohm or 500 Ohm-Farad, whichever is lower
Insulation Resistance @ 125°C	MIL-STD-202, Method 302	5 K Megohm or 50 Ohm-Farad, whichever is lower	5 K Megohm or 50 Ohm-Farad, whichever is lower	5 K Megohm or 50 Ohm-Farad, whichever is lower
Dielectric Withstanding Voltage	MIL-STD-202, Method 301	250% of Rated Voltage, 5 second hold, 30-50 mA	250% of Rated Voltage, 5 second hold, 30-50 mA	250% of Rated Voltage, 5 second hold, 30-50 mA

Tubular Part Numbering System

After determining the capacitor properties required for a given application, use information from pages AC9-12 and the part numbering system below to place the order. If there are any questions, do not hesitate to contact API's customer service.

Example: **I8150173X7R471M**

The part number shown represents a Pi tubular capacitor with an outer diameter of 0.081" and inner diameter of 0.050". The voltage rating for this part is 200 VDC. The ceramic type will be X7R. The capacitance value is 470 pF with a tolerance of ±20%. The termination will be silver and the parts will receive bulk packaging.

I	81	50	173	X7R	471	M
Voltage Rating	**Outer Diameter**	**Inner Diameter**	**Length**	**Ceramic Code**	**EIA Cap Code**	**EIA Cap Tolerance**
A: FT, 50 VDC	Example:	Example:	Example:	NP0	Example:	M: ±20%
C: FT, 100 VDC	0.081" = 81	0.050" = 50	0.173" = 173	X7R	470 pF = 471	N: ±30%
E: FT, 200 VDC				Y5V		P: +100 -0%
G: Pi, 50 VDC						Z: +80 -20%
H: Pi, 100 VDC						
I: Pi, 200 VDC						

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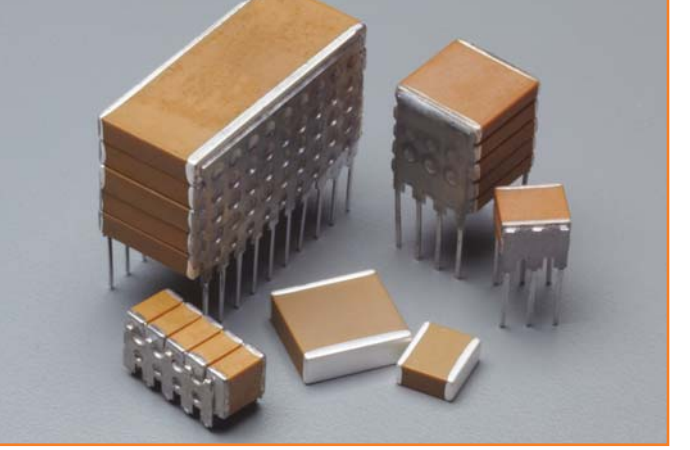
Mil Qualified & DSCC Certified
SMPS Capacitor Assemblies



API Technologies' Spectrum Control line of MIL-PRF-49470 qualified and DSCC 87106 certified Switch Mode Power Supply capacitors are designed to provide superior performance in high frequency switching applications. These capacitors are ideal for high energy density products found in both military and commercial markets.

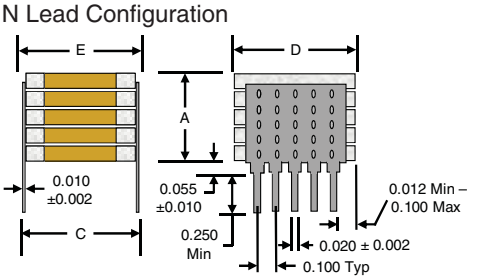
- Capacitance values 0.01µF to 47µF
- Leaded parts safeguard against thermal and mechanical stresses

API's High-speed SMPS capacitors have the following characteristics when compared to other capacitive elements:

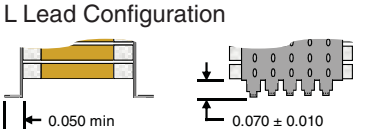
- Lower Equivalent Series Resistance (ESR)
- Lower Equivalent Series Inductance (ESL)
- Lower ripple voltage and less self heating

Style/Size		Dimensions A max	B max	C ±0.025"	D ±0.025"	E max	Leads/ Side
SMP-3	(in)	0.650	0.715	0.450	1.050	0.500	10
	(mm)	16.50	18.16	11.42	26.65	12.69	
SMP-4	(in)	0.650	0.715	0.400	0.400	0.440	4
	(mm)	16.50	18.16	10.15	10.15	11.17	
SMP-5	(in)	0.650	0.715	0.250	0.250	0.300	3
	(mm)	16.50	18.16	6.35	6.35	7.62	

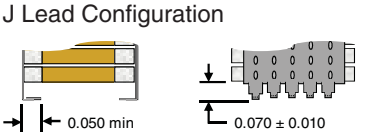
N Lead Configuration



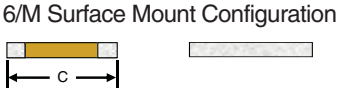
L Lead Configuration



J Lead Configuration



6/M Surface Mount Configuration



Dielectric Characteristics

API offers SMPS capacitors in two basic dielectric classes, with individual designs tailored to meet specific performance characteristics.

Dielectric Type	Stability Class	Description
BP (NPO/COG)	Ultra Stable Class I	Effects on electrical properties are minimal with variations in operating temperature, voltage, frequency or time. Used in applications which require stable performance.
BQ, BR and BX	Stable Class II	Class II dielectrics will exhibit a predictable shift in performance characteristics when exposed to variations in temperature, voltage, frequency or time. Selected for applications where blocking, coupling, by-passing and frequency discriminating elements are used. Offers higher capacitance than Class I (COG).

SMPS Part Numbering System

Example: **SMP3X124KENMB00**

The part number shown represents a size 3 SMPS capacitor. The ceramic type will be BX, capacitance value is 120,000 pF, with a tolerance of ±10%. The voltage rating is 500 VDC, termination will be "N" style leads and the parts will receive marking/ bulk packaging.

SMP3	X	124	K	E	N	M	B	00
Case Size	**Ceramic Code**	**EIA Cap Code**	**EIA Cap Tolerance**	**Voltage Rating**	**Termination**	**Marking**	**Packaging**	**Special Requirements**
SMP3 SMP4 SMP5	P: BP Q: BQ R: BR X: BX	Example: 120,000 pF	J: ±5% K: ±10% M: ±20%	Z: 25 VDC A: 50 VDC B: 100 VDC C: 200 VDC E: 500 VDC	J: Leads in L: Leads out N: Leads straight	M: Marked U: Unmarked	T: Tape & Reel F: Foam carrier/ boxed W: Waffle B: Bulk	GA:87106 Group A HR:Hi-Rel*

* HR: Hi-Rel designation reflects MIL-PRF-49470, level B, QPL approval

For complete specs and drawings, visit eis.apitech.com/smps

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Spectrum Control

Military/Hi-Rel & Commercial/Industrial Grade
SMPS Capacitor Assemblies

API Technologies' Spectrum Control brand offers high reliability/military grade and commercial/industrial grade capacitors designed to provide superior performance in high frequency switch mode power supply applications. These capacitors are ideal for bulk capacitance and pulsing applications and are available in a range of different footprints and mounting configurations. The high reliability/military grade is based on the design principals and test requirements defined by MIL-PRF-49470.

- Leaded options safeguard against thermal and mechanical stresses in larger package sizes
- Capacitance values 0.01 µF to 150 µF
- Stable Class II, BX, BR, BQ and X7R dielectric materials offer reliable operation and predictable performance characteristics related to temperature, frequency and voltage

API's line of Spectrum Control high-speed Switch Mode Power Supply capacitors have the following characteristics when compared to other capacitor technologies:

- Lower Equivalent Series Resistance (ESR)
- Lower Equivalent Series Inductance (ESL)
- Lower ripple voltage and less self heating

Electrical Characteristics

VTC	WVDC	Maximum Capacitance Value									
		2225	2425	3530	3640	3940	4540	5550	6560	7565	44105
X7R	50	156	156	276	396	476	566	826	127	157	157
X7R	100	685	685	126	186	206	256	396	566	686	586
X7R	200	475	475	685	825	106	126	156	256	336	276
X7R	500	155	155	275	395	395	475	685	825	126	126
BX	50	475	565	106	126	156	185	276	396	576	476
BX	100	215	335	475	575	825	825	125	186	226	276
BR	200	125	155	255	395	395	475	685	106	126	126
BQ	500	564	684	125	155	185	185	275	475	565	565

Dimensions (Refer to drawings on page 14)

Dimensions in (mm)	Case Size									
	2225	2425	3530	3640	3940	4540	5550	6560	7565	44A5
C ±0.025 (0.635)	0.235 (5.97)	0.250 (6.35)	0.360 (9.14)	0.370 (9.40)	0.400 (10.16)	0.460 (11.68)	0.560 (14.22)	0.660 (16.76)	0.760 (19.30)	0.450 (11.42)
D Min - Max	0.224–0.275 (5.69–6.99)	0.224–0.275 (5.69–6.99)	0.275–0.325 (6.99–8.26)	0.350–0.425 (8.89–10.80)	0.350–0.425 (8.89–10.80)	0.350–0.425 (8.89–10.80)	0.450–5.25 (11.43–13.34)	0.550–0.625 (13.97–15.88)	0.600–0.675 (15.24–17.15)	0.950–1.075 (24.13–27.31)
E Max	0.300 (7.62)	0.300 (7.62)	0.420 (4.67)	0.430 (10.92)	0.440 (11.17)	0.530 (13.46)	0.630 (16.00)	0.730 (18.54)	0.830 (21.08)	0.500 (12.70)
A Max	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)
# Leads/Side	3	3	3	4	4	4	5	6	6	10

Note: C dimension for non-leaded chip capacitors equals dimension specified less the thickness of the leads or 0.020" total

SMPS Part Numbering System

Example: **2225X824KAJMBHR**

The part number shown represents a 2225 size SMPS capacitor. The ceramic type is X7R / BX, capacitance value is 0.82 µF, with a tolerance of ±10%. The voltage rating is 50 VDC, termination is "J" style leads, Group A testing is M49470 Group A, Subgroups 1 & 2 and the parts will receive marking / bulk packaging.

2225	X	824	K	A	J	M	B	HR

Case Size (Ref Dimensions Table)
A: 1.0, B: 1.1, C: 1.2, D: 1.3, E: 1.4, F: 1.5, G: 1.6, H: 1.7, J: 1.8, K: 1.9, L: 2.0
For dimensions ≥1.000" Substitute letters above eg. 44A5 = 44105 chip size

Ceramic Code
B: X7R
Q: BQ
R: BR
X: BX

EIA Cap Code
824= 820,000 pF= 0.82 µF
125= 1,200,000 pF= 1.2 µF
156= 15,000,000 pF= 15 µF

EIA Cap Tolerance
K: ±10%
M: ±20%

Working Voltage
A: 50 VDC
B: 100 VDC
C: 200 VDC
E: 500 VDC

Lead Configurations
J: Leads in
L: Leads out
N: Leads straight
6: Ag termination
M: PdAg termination

Marking
M: Marked
U: Unmarked (Std)

Packaging
B: Bulk
F: Foam carrier/ boxed
S: Special
T: Tape & Reel - 7 in
W: Waffle

Special Requirements*
00: Standard
HR: M49470
XX: Custom

* 00 Designation reflects sample visual / mechanical inspection, plus 100% Capacitance, DF, DWV & IR testing @ +25°C
HR designation reflects Group A, Subgroups 1 & 2 inspection per MIL-PRF-49470

Additional package sizes, capacitance values and higher voltage ratings available, please contact factory.

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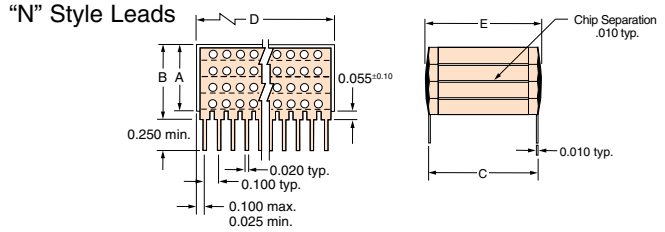
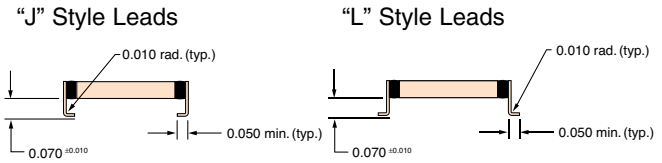
SMPS Specifications





	BP				BX				BR				BQ			
	Working Volts DC				Working Volts DC				Working Volts DC				Working Volts DC			
Cap Value (µF)	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50
0.01																
0.012																
0.015																
0.018																
0.022																
0.027																
0.033																
0.039																
0.047																
0.056																
0.068																
0.082																
0.10																
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1																
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39																
47																

KEY: SMP-3 SMP-4 SMP-5

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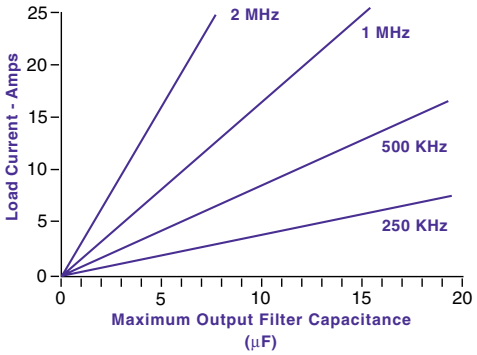
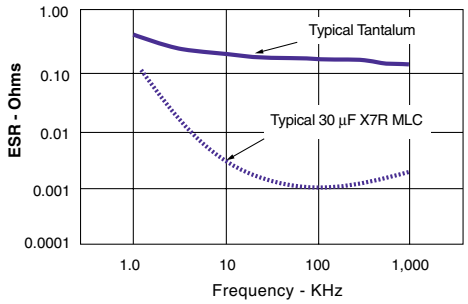
SMPS Capacitor Electrical Testing

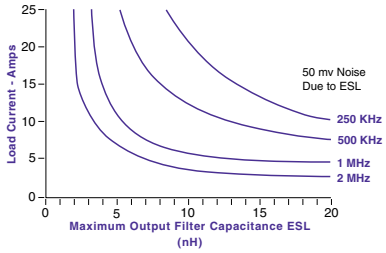
Absolute Maximum Output Capacitance
Assuming no ESL and no ESR



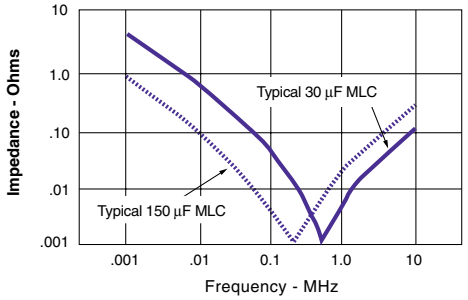
ESR vs. Frequency



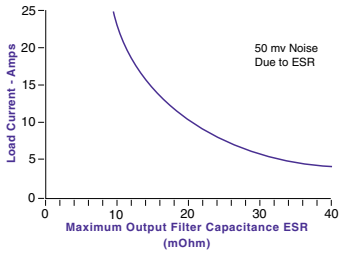
Absolute Maximum Capacitance ESL
Assuming no ESR - Capacitive Induced Ripple



Impedance vs. Frequency



Absolute Maximum Capacitance ESR
Assuming no ESL - Capacitive Induced Ripple



Test Group	*Test Order*	*Test*	*Test Method*	*Post Test Requirements*	*Sampling Procedure*
Group A	1	Visual and Mechanical			13 samples 0 failures
	2	Materials, Designs, Construction and Workmanship			
	3	Physical Dimensions and Marking			
	4	Capacitance and Dissipation Factor	MIL-STD-202 Method 305		100%
	5	Dielectric Withstanding Voltage	MIL-STD-202 Method 301, 2.5x DCWV except 500V @ 1.5x		
	6	Insulation Resistance	MIL-STD-202 Method 302 @ DCWV, 25 C	>100,000 megohms or 1,000 megohm-uF, whichever is less	
Group B Sub Grp I	1	Voltage and Temperature Limits			12 samples 1 failure
	2	Resistance to Solvents	MIL-STD-202 Method 215		
	3	Immersion	MIL-STD-202 Method 104 test condition B	No mechanical damage. Dielectric strength, capacitance, df and 25 C IR to original limits	
	4	Terminal Strength	MIL-STD-202 Method 211 test condition A. Case codes 1-4, 6-5 lbs case code 5-4 lbs	No evidence of loosening or rupturing of terminals	
Group B Sub Grp II	1	Resistance to Soldering Heat	MIL-STD-202 Method 210 N lead style test condition B, J and L styles test condition I	No mechanical damage. Dielectric strength, capacitance, df and 25 C IR to original limits	12 samples 1 failure
	2	Moisture Resistance	MIL-STD-202 Method 106, 20 cycles	No mechanical damage. Dielectric strength, capacitance, df and 25 C IR to original limits	
Group B Sub Grp III	1	Life	MIL-STD-202 Method 108, 1000 hrs. 2x DCWV except 1.2x 500 DCWV	No mechanical damage. Dielectric strength, capacitance, df, 125 C IR and 25 C IR to original limits	12 samples 1 failure
Optional		Solderabililty Group A			
		Thermal Shock and Voltage Conditioning			

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Planar Capacitors

API Technologies' Spectrum Control brand designs and manufactures a wide range of planar capacitor arrays. Using over 25 years expertise in multilayer ceramic capacitor manufacturing, planar capacitors offer many advantages over stand-alone chip, discoidal or tubular capacitors: low profile, compact, quick assembly time. Various custom and industry standard geometries are available and our designs can incorporate multiple capacitance values, feed-through holes and ground holes. With a combination of versatility and function, API's planar capacitors are quickly becoming the new standard in filtered connectors used in EMI suppression applications.

Features

- Unparalleled electrical performance and reliability
- Fast prototyping and short lead times
- 100% electrical and dimensional testing of critical parameters
- Custom packaging to suit end user needs
- Custom and standard designs available

Mechanical Specifications

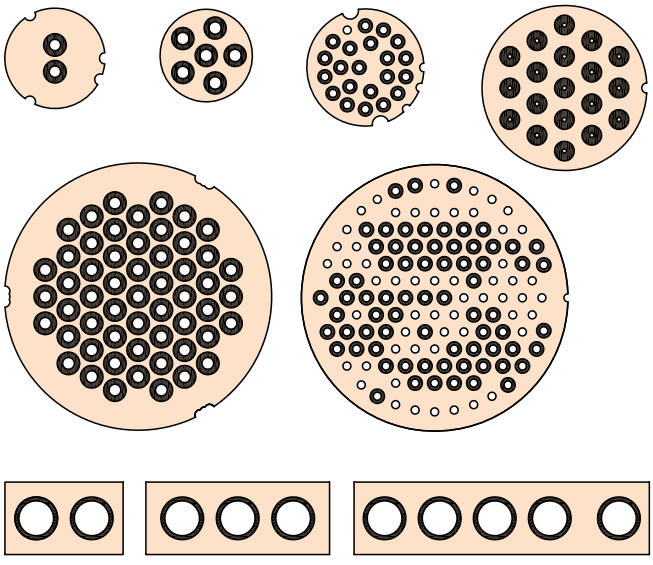
Dielectrics:	EIA Codes: NP0 (COG), X7R, Z5U
Termination:	Fired-on: silver, solderable silver plating: gold, silver or copper over nickel barrier
Surface:	Lapped, termination bandwidth and insulative coating options
Geometry:	Military circulars, D-Sub, ARINC, Micro-D, custom configurations
Thickness:	Up to .150"

Electrical Specifications

Operating Temperature	-55°C - 125°C
Capacitance	Up to 1µF
Capacitance Tolerance	±10%, ±20%, +100%
Capacitance Rating	Up to 1500VDC
Dielectric Withstanding Voltage	Up to 3000VDC
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 planar capacitor needs.

Typical Design Layouts



API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

Dielectric Characteristics

Capacitor Selection

Multilayer capacitors (MLC) and single layer capacitors are categorized by performance with temperature. Component selection is typically determined by dielectric performance, electrical environment and temperature stability.
In determining the proper component for a specific application, the following information should be considered.

Dielectric Type

There are three basic dielectric classes (characteristics) available:

DIELECTRIC PROPERTIES

Dielectric Type	Stability Class	Description
BP (NPO and COG)	Ultra Stable Class I	Effects on electrical properties are minimal with temperature, frequency or time. Used in applications which require stable performance.
BQ, BR, BX and X7R	Stable Class II	Effects on electrical properties predictably change with temperature, voltage, frequency and time. Selected for applications where blocking, coupling, by-passing and frequency discriminating elements are used. Offers higher capacitance than Class I (COG).
Z5U and Y5V	General Purpose Class II	Exhibits a greater variation of properties with temperature. Dielectric constant is higher than Class I and Class II dielectrics. Extremely high capacitance per unit volume and used in general performance applications.

Dielectric Characteristics

NPO (COG)

Operating Temperature Range ..... -55°C to 125°C
Temperature Coefficient ..... 0 ± 30 ppm/°C
Dissipation Factor ..... .001 (0.1%) max. @ 25°C
Insulation Resistance: 25°C ..... 10^6 Megohms
125°C ..... 10^5 Megohms
Dielectric Withstanding Voltage ..... 50 to 200V, 2.5 x VDCW
201 to 500V, 1.5 x VDCW, or 500V*,
>500V, 1.2 VDCW, or 750V*
Aging Rate ..... 0% per decade hour
Test Parameters ..... 1 KHz, 1.0 ± 0.2 VRMS, 25°C
1 MHz for capacitance ≤1,000 pF

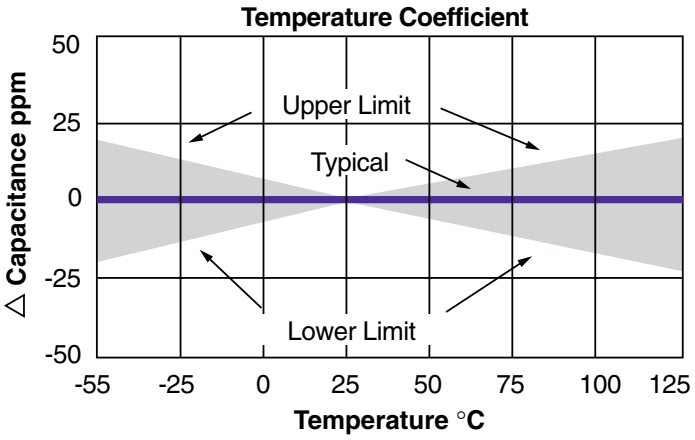
** Whichever is greater*

Capacitor Size

The capacitor body size impacts its utility to the design requirements in respect to capacitance value and voltage rating. Typically smaller units are less expensive and provide for greater space savings. Because mass affects the thermal response of the chips, size should be considered when selecting the attachment method to the circuit.

TERMINATION MATERIAL

Material Type	Recommended Usage
Silver Palladium	Nonmagnetic application requirements. Recommended for conductive epoxy and leaded attachment methods. For soldering applications, use solder reflow below 230°C.
Silver	Most ductile of the available termination methods. Used in applications which will be leaded, to minimize thermal stresses.

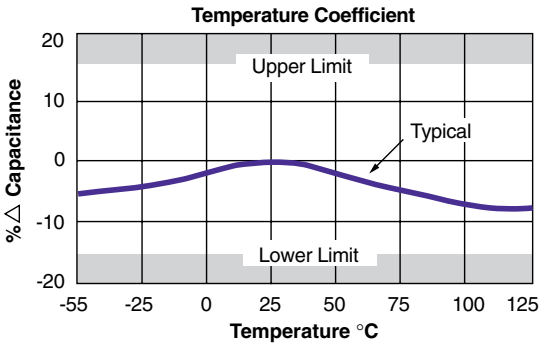


Dielectric Characteristics

Dielectric Characteristics Continued

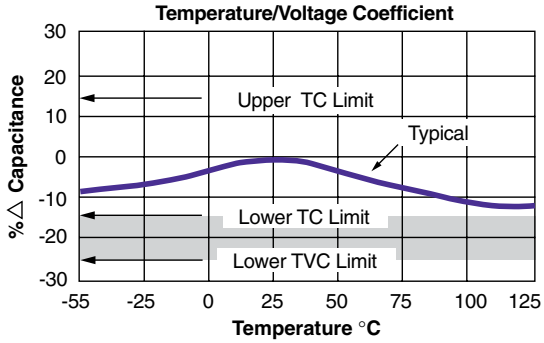
X7R

Operating Temperature Range	-55°C to 125°C
Temperature Coefficient	± 15% △C max.
Dissipation Factor	.025 (2.5%) max. @ 25°C
Insulation Resistance: 25°C	10^6 Megohms
125°C	10^5 Megohms
Dielectric Withstanding Voltage	50 to 200V, 2.5 x VDCW 201 to 500V, 1.5 x VDCW, or 500V*, >500V, 1.2 VDCW, or 750V*
Aging Rate	<2.0% per decade hour
Test Parameters	1 KHz, 1.0 VRMS ± 0.2 VRMS, 25°C



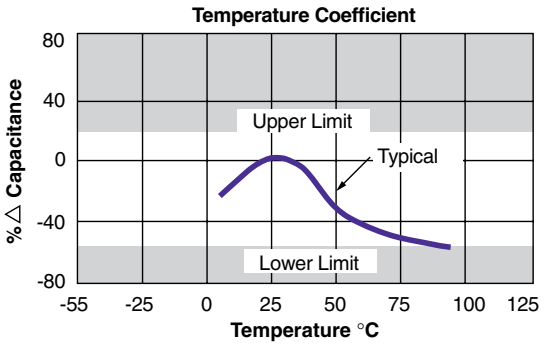
BX

Operating Temperature Range	-55°C to 125°C
Temperature Coefficient	± 15% △C max.
Temperature Voltage Coefficient	+ 15% - 25% △C max.
Dissipation Factor	.025 (2.5%) max. @ 25°C
Insulation Resistance: 25°C	10^6 Megohms
125°C	10^5 Megohms
Dielectric Withstanding Voltage	50 to 200V, 2.5 x VDCW 201 to 500V, 1.5 x VDCW, or 500V*, >500V, 1.2 VDCW, or 750V*
Aging Rate	2.0% per decade hour
Test Parameters	1 KHz, 1.0 VRMS ± 0.2 VRMS, 25°C



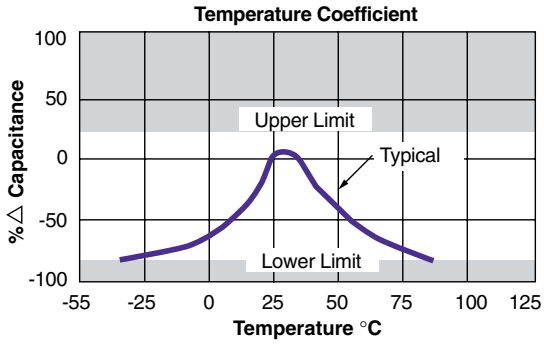
Z5U

Operating Temperature Range	+10°C to 85°C
Temperature Coefficient	+ 22% - 56% △C max.
Dissipation Factor	.030 (3.0%) max. @ 25°C
Insulation Resistance: 25°C	10^5 Megohms
Dielectric Withstanding Voltage	50 to 200V, 2.5 x VDCW 250V, 1.5 x VDCW
Aging Rate	-2.0% per decade hour
Test Parameters	1 KHz, 0.5 VRMS ± 0.1 VRMS, 25°C



Y5V

Operating Temperature Range	-30°C to 85°C
Temperature Coefficient	+ 22% - 82% △C max.
Dissipation Factor	.050 (5.0%) max. @ 25°C
Insulation Resistance: 25°C	10^5 Megohms
Dielectric Withstanding Voltage	50 to 200V, 2.5 x VDCW 250V, 1.5 x VDCW
Aging Rate	-2.0% per decade hour
Test Parameters	1 KHz, 1.0 VRMS ± 0.2 VRMS, 25°C



** Whichever is greater*

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Processing & Soldering Notes

General Soldering Recommendations for Leadless Ceramic Capacitors

Soldering Ceramic Capacitors with High Temperature Process

SN10 solder
Ramp rate, heating and cooling . approximately 30°C/min
Peak temperature . . . . . approximately 320°C
Dwell at peak. . . . . < 30 seconds

An RMA flux may be needed.

Soldering Ceramic Capacitors with Medium Temperature Process

SN96 solder
Ramp rate, heating and cooling ... approximately 30°C/min
Peak temperature ..... approximately 250°C
Dwell at peak ..... < 30 seconds

Soldering Ceramic Capacitors with Low Temperature Process

SN62 solder
Ramp rate, heating and cooling ... approximately 30°C/min
Peak temperature ..... approximately 220°C
Dwell at peak ..... < 30 seconds

Notes

Care must be taken to minimize the time silver terminations are exposed to molten solder to avoid leaching (amalgamation of the silver into molten solder). API recommends the use of a silver (Ag) bearing solder when terminating directly to ceramic capacitors to reduce the potential for leeching. Gradual heating and cooling of the components are essential to prevent thermal stresses to the ceramic.

Application Note: Soldering Recommendations for Switch Mode Power Supply Capacitors

- SMPS capacitors are highly durable structures designed to provide long service per lifetime, however they require attention to basic considerations during assembly. Like all ceramic components, SMPS capacitors are subject to thermal stresses. For this reason, preheating of the capacitor assemblies is recommended. Preheat components using hot plate to 120 to 150°C, or within 50 to 60°C of the soldering temperature being applied. Avoid over-exposure to high temperatures during assembly and allow for gradual, post-assembly cooling.
- For hand iron soldering, recommended soldering iron tip temperature is 330 to 350°C. Contact the pad adjacent to the pre-tinned lead should be made from below the PCB (opposite of the component side), and the dwell time on the solder joint should be less than five seconds. An aluminum heat sink plate may be placed adjacent to the SMPS lead frame to protect the ceramic body during assembly. Avoid direct contact between soldering iron and ceramic during assembly process. Soldering time is dependant upon heat sinking provided by the chassis and board material, so a longer preheat cycle may be required.
- Standard solders (Sn60, Sn63, Sn60/38/2) may be used. Please consult the factory for use with RoHS compliant solders.
- Use a controlled temperature profile ramp not exceeding 4°C per second as measured by an attached low mass thermocouple.
- Soldering time and temperatures can vary with component size, board material and layout. Please consult the factory for assistance.

coaxial filters & interconnects

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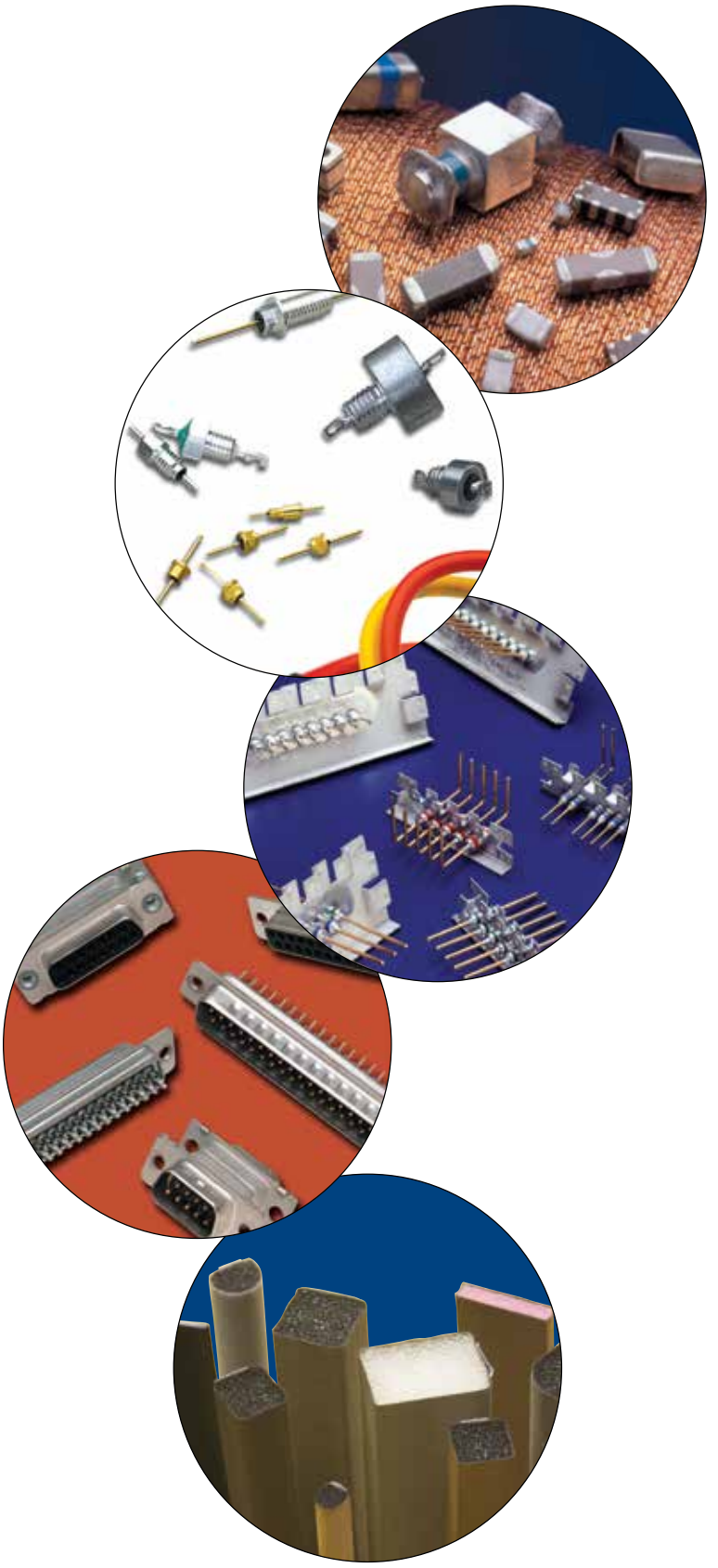
Coaxial Filters & Interconnects



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Application Guidelines

Sources of EMI

Electromagnetic interference occurs naturally from terrestrial sources such as lightning discharges, precipitation, and sand and dust storms, in addition to cosmic noise emanating from sources within and outside our solar system. Man-made sources include power lines, rotating machinery, ignition systems, television and radio receivers, fluorescent lights, power amplifiers, computing devices and transmitters of all types.

Interference Suppression

Filter networks suppress electromagnetic interference in two basic ways. The capacitor elements shunt the interference to ground, and the series inductor elements raise the impedance of the line making the shunt capacitor elements even more effective.

Capacitor Elements

The types of capacitors used in API's line of Spectrum Control filters are often referred to as feed-through capacitors due to their physical geometry.

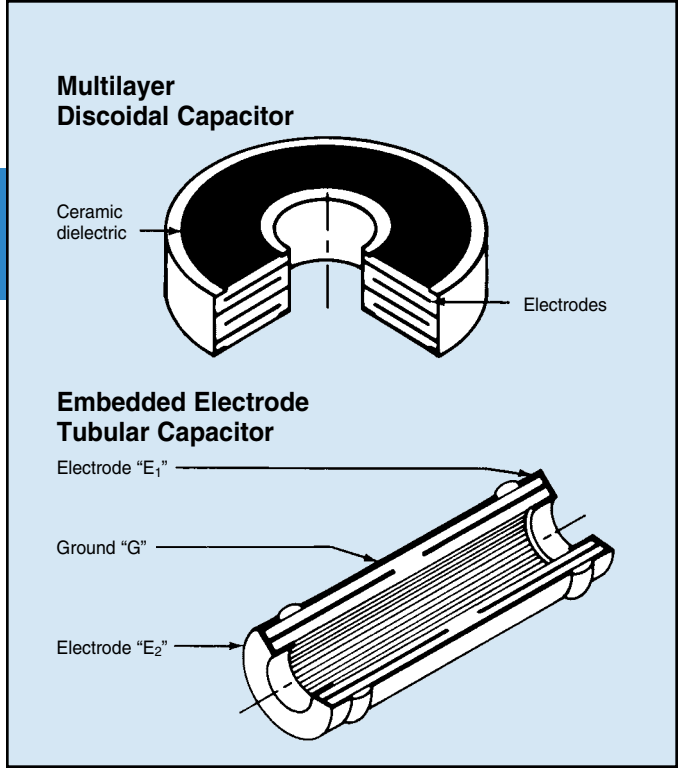
The feed-through design results in greatly reduced self-inductance compared to standard leaded capacitors. Also, this design effectively prevents radiation from the input coupling directly with the output of the capacitor, unlike leaded or chip capacitors. The combination of low inductance and high input/output isolation provides excellent shunting of EMI for frequencies up to and beyond 1 GHz.

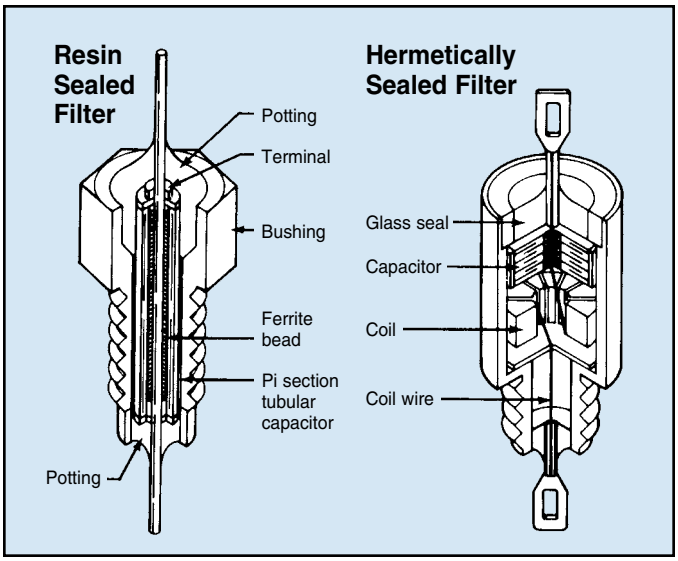
The simplest feed-through type is a ceramic tube that may have buried electrodes and can be constructed as a single capacitor or as two capacitors, as used in a Pi section filter. This type of device can have capacitance values from 10 pF to 0.1 µF and typical working voltage ratings up to 2500 VDC. Due to the simple construction, these capacitors are very efficient at frequencies up to 10 GHz and exhibit no pronounced resonances.

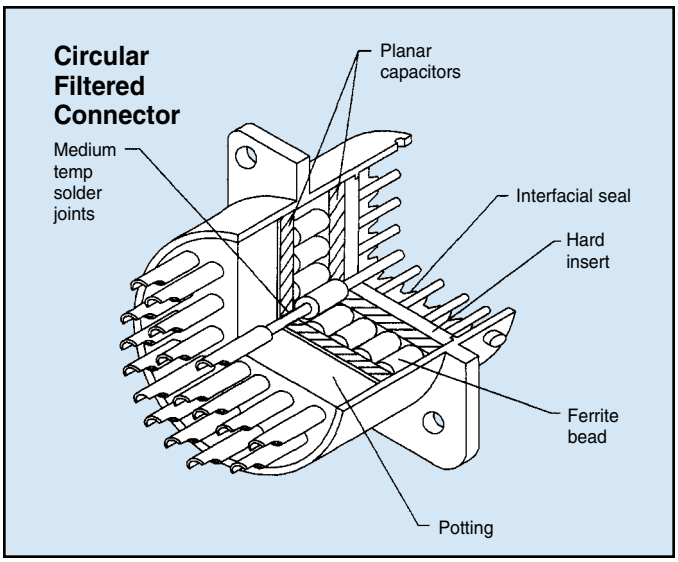
Multilayer monolithic discoidal capacitors are used for very high capacitance parts in standard sizes or for smaller filters where the required capacitance cannot be achieved by a ceramic tube. This type of capacitor consists of alternate layers of opposite polarity electrodes separated by a ceramic dielectric. Typical capacitance values from 100 pF to 10 µF are available with working voltages up to 400 VDC.

Inductive Elements

Ferrite sleeves are used with tubular capacitors since they can be conveniently accommodated inside the tube to provide a very compact filter. They are also used with discoidal capacitors in some applications. Wound inductors are used with discoidal capacitors to provide very high performance filters.







Application Guidelines

Low Pass EMI filters are available in the following circuit configurations:

C Filter

The C filter is a three terminal feed-through capacitor. It is used to attenuate high frequency signals.

L Filter

An L filter consists of one inductive element and one capacitive element. This type of filter can offer high impedance or low impedance input depending upon its orientation in the circuit. It is most commonly used in applications where one has a high impedance load and a low impedance source (see LT), or where one has a high impedance source and a low impedance load (see LB).

Pi Filter

The Pi filter contains two capacitive elements and one inductive element. It presents a low impedance to both the source and the load. Because of the additional element, it provides better high frequency performance than the C or L configurations. Due to the possibility of 'ringing', Pi filters are not recommended for switching applications.

Transient Suppression Pi Filter

The transient suppression Pi filter consists of a Pi filter with a transient suppressor at the input to the filter. The filter supplies the high frequency performance of the Pi filter with the added protection of the transient suppressor to protect the circuit from voltage spikes on the line.

T Filter

The T filter consists of two inductive elements and one capacitive element. This circuit configuration presents a high impedance input from either end. It has similar filter performance to the Pi circuit configurations. It does not have the ringing characteristic of the Pi filter and can be used in switching applications.

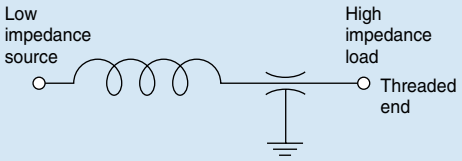
Multisection Filter (Double T)

API's multielement filters are designed for optimum insertion loss in circuits with a relatively low source and load impedance. These filters are also recommended in any application where a high degree of filtering is required. The unit utilizes an inductor input for the best compatibility with a MIL-STD-461 test setup (10 µF feed-through capacitor).

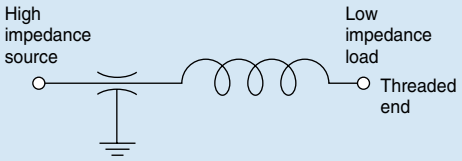
Schematics

C Filter

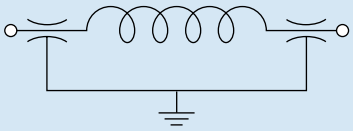
L-C Filter LT



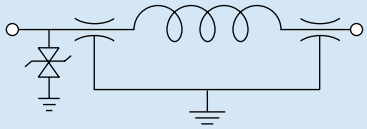
L-C Filter LB



Pi Filter

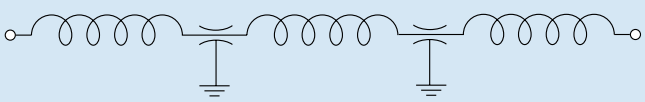


Transient Suppression Pi Filter



T Filter

Multi-section Filter (Double T)



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Application Guidelines

Insertion Loss Measurement

Insertion loss (IL) is a measure of the effectiveness of a filter. It is defined as the ratio of the voltage (E1) across the circuit load without the filter and the voltage (E2) across the load with the filter. Since insertion loss is dependent on the source and load impedance in which the filter is to be used, IL measurements are defined for a matched 50 ohm system. The insertion loss is measured in decibels (dB) and defined as follows:

$$IL\ (dB) = 20 \log \left[\frac{E1}{E2} \right]$$

Circuit Impedance vs. Insertion Loss

In practical circuit applications the source and load impedances may be quite different from 50 ohms. If these impedances are known, API engineering can provide information on the expected insertion loss or an estimate can be made using the following formula:

$$IL\ (dB) = 20 \log \left[1 + \frac{Zs\ Zl}{Zt\ (Zs + Zl)} \right]$$

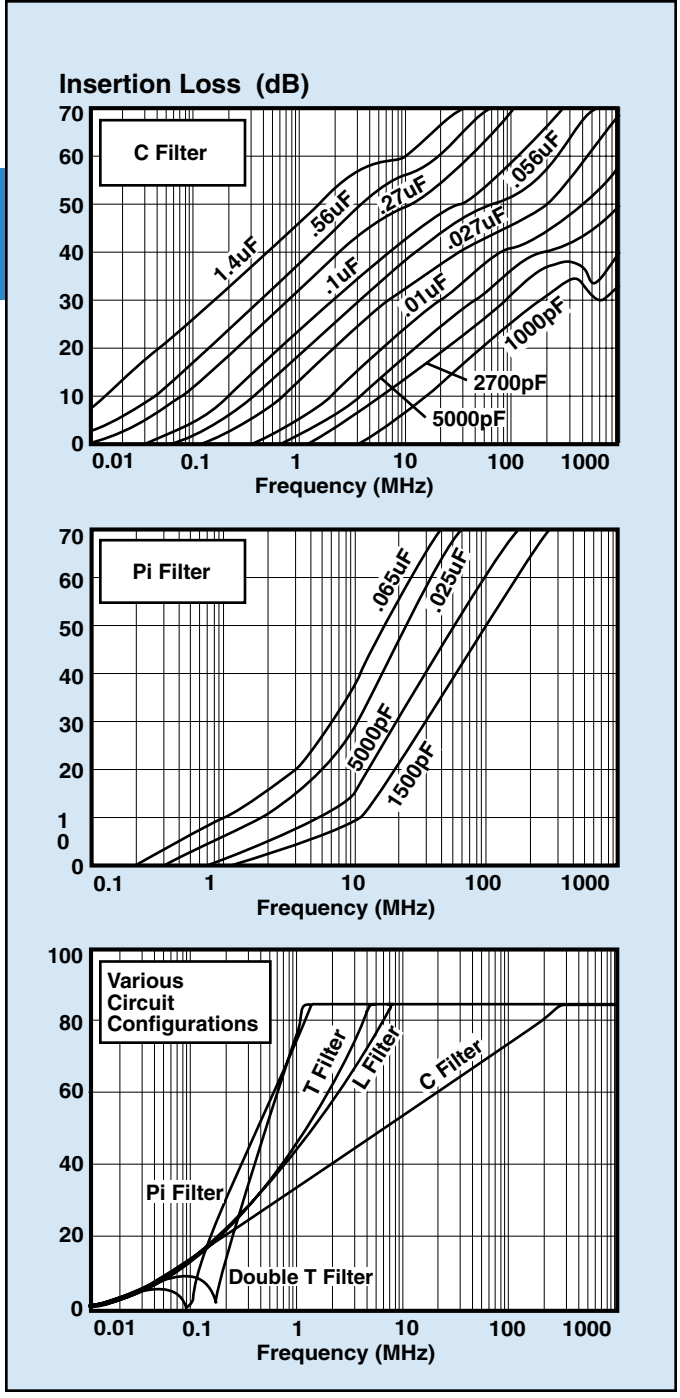
Where Zs = Source impedance in ohms
Zl = Load impedance in ohms
Zt = Transfer impedance in 50 ohm system

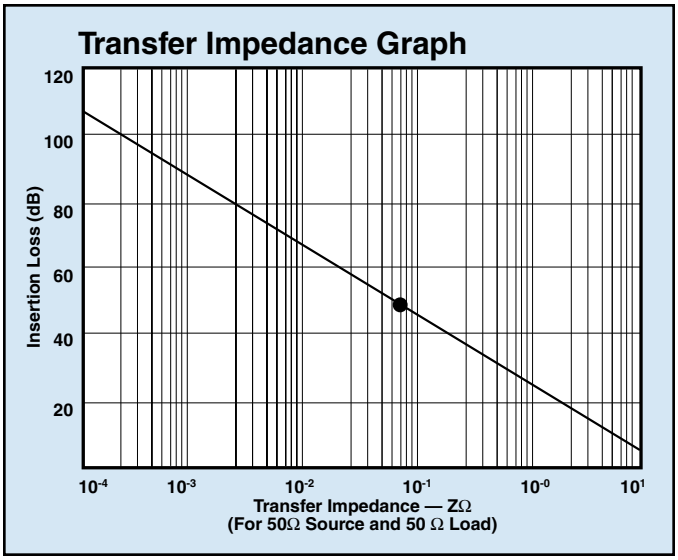
Example:

1. System source and load impedances are 100 ohms and 600 ohms respectively.
2. Selected filter has insertion loss of 50 dB at 100 MHz in a 50 ohm system.
3. From the IL vs Transfer Impedance curve (right) the transfer impedance is 0.08 ohms.
4. $IL = 20 \log \left[1 + \frac{100 \times 600}{0.08\ (100+600)} \right]$

   $= 20 \log 1072$

   $= 61$ dB





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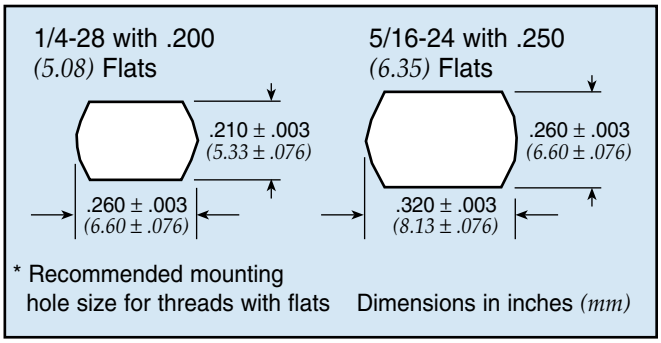
Filter Installation

Threaded Style Filters

Filter Thread Size	Maximum Mounting Torque		Mounting Hole Dia.		Drill Size	
	in-lbs	Nm	(in)	(mm)	English	Metric (mm)
4-40	1.5	0.170	0.120	3.05	# 31	3.10
6-40	3	0.339	0.147	3.73	# 26	3.75
6-32	3	0.339	0.147	3.73	# 26	3.75
8-32	4	0.452	0.173	4.39	# 17	4.40
10-32	4	0.452	0.190	4.83	# 8	5.10
12-28	6	0.678	0.228	5.79	# 1	5.80
12-32	6	0.678	0.228	5.79	# 1	5.80
1/4-28 *	7	0.791	0.261	6.63	# G	6.70
5/16-24 *	7	0.791	0.323	8.20	# P	8.25
5/16-32	7	0.791	0.323	8.20	# P	8.25
3/8-32	9	1.017	0.386	9.80	# W	9.90

Note: For 5/8-24 and 7/16-28 please refer to the specific instruction noted on part drawings or see page LP22 of the catalog.

- Exceeding recommended mounting torque may result in damage to the capacitor within the filter due to possible twisting or elongation of the case.
- For product without hex surfaces do not hold the filter with pliers or other gripping tools. Pressure exerted on the filter case may crack the ceramic capacitor element.
- Proper use of filters requires that the filter case be adequately grounded to form an effective path for the interference.



* Recommended mounting hole size for threads with flats

Dimensions in inches *(mm)*

Solder-in Style Filters

- A controlled temperature profile not exceeding 6°F (3°C) per second is recommended when soldering filters.
- When soldering to terminals of a filter, a heat sink should always be used adjacent to the body of the filter.
- 60-40 solder is recommended for installation of the filter into the chassis as well as soldering to the terminals. If a filter style without an eyelet is being soldered into a chassis, iron processes should be avoided and the recommended solder alloy is 60-38-2.
- Installation hole size for a solder-in filter should be 0.003-0.005" over the maximum tolerance of the minor diameter of the mounting portion of the eyelet with a ±0.002" tolerance.
- Machine/oven soldering 385-415°F (195-210°C) using a dwell and cycle time fast enough to reflow the solder and ramped to maintain less than 6°F/sec rate of change.
- For iron soldering to filter body, preheat components at 250-300°F (120-150°C), solder iron is recommended to be set at 500-550°F (260-290°C). The dwell on the solder joint should be less than 5 seconds.The time is dependent on the heat sinking provided by the chassis so a longer preheat may be required.

Soldering to Filter Terminals

- Use a temperature controlled soldering iron with tip temperature of 525 ± 10°F (275 ± 5°C).
- Use an SN 63 RMA flux core solder.
- Make mechanical wire connection.
- Use heat sink next to filter body where possible.
- Clean soldering iron tip.
- Clip end of solder (remove 0.5") to expose flux for soldering.
- Apply soldering iron to wire/flag junction at wetted solder tip region of iron (Wetted Bridge Method). Immediately apply solder. Dwell time for soldering iron tip on product should be 3-5 seconds maximum.

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EMI/RFI Filter and Capacitor Performance Testing

The resin sealed and hermetically sealed filters shown in this section have been designed to meet the requirements of this test plan as applicable. Group I tests are typically performed on most product. Groups II, III and IV tests are performed per specification requirements.

The information shown can be used as a basis for filter specifications. (Contact factory for additional details if necessary.)

Test Group	Order of Test	Examination or 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	Seal	Method 112†, Condition A	No leaks. Not applicable to resin sealed or solder-in products.
	*5	Capacitance	Method 305†, 1KHz. 2.5 VRMS Max. 25°C	Within specified tolerance.
	*6	Dielectric Withstanding Voltage	Method 301†, 2.5 times, DCWV, 5 seconds, 50 Ma max. charging current	No evidence of damage or breakdown.
	*7	Insulation Resistance	Method 302† at DCWV, at 2 minutes 50 ma charging current	Greater than 1000 megohms or 100 ohm farads, whichever is less.
	*8	Voltage Drop	MIL-F-15733, Paragraph 4.6.8	Per applicable requirements.
	*9	Insertion Loss	MIL-STD-220, 3pc, sample only	Per applicable requirements.
II	1	Temperature Rise	MIL-F-15733, Paragraph 4.6.4	Per applicable requirements.
	2	Overload	MIL-F-15733, Paragraph 4.6.10	Per applicable requirements.
	3	Barometric Pressure	Method 105†, Test Condition B hi-pot, (per method 301†) at 1.25 times DCWV	No evidence of damage or breakdown.
	4	Shock	Method 213†, Test Condition I	No mechanical damage, Insulation resistance greater than 500 ohm farads, whichever is less.
	5	Vibration	Method 204†, Test Condition B for Glass Seal, Condition D for Resin	No mechanical damage, Insulation resistance greater than 500 megohms or 50 ohm farads, whichever is less.
	6	Moisture Resistance	Method 106†	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
III	1	Terminal Strength	Method 211†, Test Condition A, 5 lbs.	No evidence of loosening or rupturing of terminal.
	2	Resistance to Soldering Heat	Method 210†, Test Condition B, Depth of immersion 1/16 plus or minus 1/32	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
	3	Thermal Shock	Method 107† Test Condition A -55°C to +125°C	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
	4	Immersion Cycling	Method 104† Test Condition A	Insulation resistance greater than 500 megohms or 50 ohm farads whichever is less.
IV	1	Solderability (5pcs only)	Method 208†	Per applicable requirements.
	2	Life	Method 108†, Test Condition D with 125% rated voltage at maximum operating temperature	Filters shall meet all initial requirements except insulation resistance shall not be less than 50% of initial guaranteed value.

* Acceptance tests typically performed on most products.
† Methods are from MIL-STD-202

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EMI/RFI Filter and Capacitor Performance Testing

Reliability Levels

Class B

Class B is outlined in MIL-F-28861 and is prescribed for most military/aerospace requirements. It is more stringent than MIL-F-15733 requiring 100% screening that includes thermal shock, voltage conditioning and x-ray.

Periodic Group B testing is performed on units selected at random from production lots.

Class B Test Sequence Summary

Inspection	Class B
Group I	
AC voltage drop (when applicable)	X
Voltage and temperature limits of capacitance	X
Insertion loss (at temperature)	X
Barometric pressure (reduced)	X
Temperature rise	X
Current overload	X
Terminal strength	X
Thermal shock and immersion	X
Group II	
Subgroup 1	
Life	X
Subgroup 2	
Resistance to soldering heat	X
Salt spray (corrosion)	X
Radiographic inspection	X
Subgroup 3	
Resistance to solvents	X
Group III	
Shock (specified pulse)	X
Vibration (high frequency)	X
Moisture resistance	X
Seal (when applicable)	X
Radiographic inspection	X

"R" level testing

"R" level screening is performed by Spectrum Control's Hi-Rel Laboratory as detailed below. Customers requiring special tests may order to their own specifications or simply order to level R and then note additions or deviations.

"R" level test sequence

(100% testing unless otherwise specified)

- Thermal Shock: 5 cycles from -55°C to +125°C in accordance with MIL-STD-202, Method 107D, Condition A.
- Burn-in: 100 hours at 1.4x rated DC voltage, 125°C.
- Seal Test: MIL-STD-202, Method 112, Test Condition A. Hermetic seal parts only.
- Capacitance and Dissipation Factor: MIL-STD-202, Method 305, frequency 1kHz.
- Dielectric Withstanding Voltage: 2.5 times the rated DC voltage for 5 ± 1 second at 25°C, with 50 mA maximum charging current.
- Insulation Resistance: MIL-STD-202, Method 302, 125°C at rated DC voltage and room temperature (25°C). The 125°C requirement shall be 10% of the specified catalog IR at 25°C.
- DC Resistance: MIL-STD-202, Method 303.
- Insertion Loss Test — Sample per MIL-F-15733. At full rated load in accordance with MIL-STD-220. The minimum insertion loss shall be defined in the filter catalog.
- Visual and Mechanical: in accordance with MIL-F-15733.
- Marking: All filters which have successfully completed the test sequence shall be marked with an "R" in the second part of the number. For example, a standard SCI-2130-004 becomes SCI-R2130-004 and 9051-100-0000 becomes 9051-R100-0000, and 51-719-011 becomes 51-R719-011 after completion of the Hi-Rel Level "R" Test Sequence.

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Military Cross Reference Qualified Components

MIL-F-15733

Military Designation MIL-F-15733	API Part Number
/23-0001	51-390-001
/23-0002	51-390-002
/23-0003	51-390-003
/23-0004	51-390-004
/23-0005	51-390-301
/23-0006	51-390-302
/23-0007	51-390-005
/23-0008	51-390-006
/23-0009	51-390-007
/23-0010	51-390-008
/23-0011	51-390-303
/23-0012	51-390-304
/23-0013	51-390-009
/23-0014	51-390-010
/23-0015	51-390-011
/23-0016	51-390-012
/23-0017	51-390-305
/23-0018	51-390-306
/23-0019	51-390-013
/23-0020	51-390-014
/23-0021	51-390-015
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/23-0042	51-390-314
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/23-0058	51-390-040

Military Designation MIL-F-15733	API Part Number
/23-0059	51-390-319
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/24-0001	51-353-064
/24-0002	51-353-065
/24-0003	51-444-049
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Military Designation MIL-F-15733	API Part Number
/26-0009	51-311-313
/26-0010	51-353-081
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/34-0002	51-322-017
/34-0003	51-311-327
/34-0004	51-321-328
/34-0005	51-321-329
/34-0006	51-321-330
/34-0007	51-353-207
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/34-0010	51-311-007
/34-0011	51-320-058
/34-0013	51-320-060

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Military Cross Reference Qualified Components

MIL-F-15733 (cont'd)

Military Designation MIL-F-15733	API Part Number
/34-0014	51-311-340
/34-0015	51-444-005
/34-0016	51-444-105
/34-0017	51-444-016
/34-0018	51-444-106
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/34-0036	54-370-033
/34-0037	54-310-039
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/39-0017	51-311-347
/39-0018	51-311-348
/40-0001	51-704-002
/43-0001	51-719-023
/43-0002	51-712-055
/44-0001	51-744-003
/44-0002	51-762-005
/44-0003	51-762-006
/46-0001	51-709-004
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Military Designation MIL-F-15733	API Part Number
/54-0001	51-311-404
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/54-0017	51-321-670
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/67-0012	51-321-403

MIL-F-28861

Military Designation MIL-F-28861	API Part Number
/1-001	51-359-081
/1-002	54-367-049
/1-003	51-359-082
/1-004	54-367-050
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/1-022	54-367-085
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/1-024	54-367-086
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/1-035	51-359-127
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/2-018	51-311-370
/2-019	51-311-022
/2-020	51-311-023
/2-021	51-311-371
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/2-024	51-311-372
/3-001	51-390-044
/3-002	51-390-045

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Military Cross Reference Qualified Components

MIL-F-28861 (cont'd)

Military Designation MIL-F-28861	API Part Number
/3-003	51-390-321
/3-004	51-390-046
/3-005	51-390-047
/3-006	51-390-322
/3-007	51-390-048
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DSCC 84084 Product

DSCC Designation	API Part Number
84084-001	54-310-042
84084-004	51-320-162
84084-005	51-320-163
84084-006	51-320-164
84084-007	51-320-165
84084-008	51-320-166
84084-009	51-320-167
84084-010	51-320-168
84084-011	51-320-169
84084-013	51-321-398
84084-014	51-321-399
84084-015	51-321-400
84084-016	51-321-401

MIL-C-11015

/32 CK#	API Part Number
CK99BW502M	SCI-9900-502AP
CK99BW272M	SCI-9910-272AQ
CK99BW101M	SCI-9920-101T
CK99BW501M	SCI-9920-501K
CK99BW122M	SCI-9920-122J

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API Technologies/AMP Part Number Cross Reference

AMP Part Number	API Part Number
1124033-1	56-407-001
1124034-1	56-403-001
1124082-1	56-614-001
1124174-1	56-413-001
1124175-1	56-423-001
1-842900-3	56-702-001-LI
1-842900-0	56-702-005-LI
1-842900-1	56-702-008-LI
1-842900-2	56-702-008-LI
1-842900-4	56-702-XXX-LI**
1-842901-3	56-712-001-LI
1-842901-0	56-712-005-LI
1-842901-1	56-712-008-LI
1-842901-2	56-712-008-LI
1-842901-4	56-712-XXX-LI**
1-842902-3	56-722-001-LI
1-842902-0	56-722-005-LI
1-842902-1	56-722-009-LI
1-842902-2	56-722-009-LI
1-842902-4	56-722-XXX-LI**
1-842903-3	56-732-001-LI
1-842903-0	56-732-005-LI
1-842903-1	56-732-007-LI
1-842903-2	56-732-007-LI
1-842903-4	56-732-XXX-LI**
1-842904-3	56-742-001-LI
1-842904-0	56-742-005-LI
1-842904-1	56-742-007-LI
1-842904-2	56-742-007-LI
1-842904-4	56-742-XXX-LI**
1-842905-3	56-704-001-LI
1-842905-0	56-704-005-LI
1-842905-1	56-704-008-LI
1-842905-2	56-704-008-LI
1-842905-7	56-704-XXX**
1-842905-4	56-704-XXX-LI**
1-842906-3	56-714-001-LI
1-842906-0	56-714-005-LI
1-842906-1	56-714-007-LI
1-842906-2	56-714-007-LI
1-842906-4	56-714-XXX-LI**
1-842907-3	56-724-001-LI
1-842907-0	56-724-005-LI
1-842907-1	56-724-009-LI
1-842907-2	56-724-009-LI
1-842907-4	56-724-XXX-LI**
1-842908-3	56-734-001-LI
1-842908-0	56-734-005-LI
1-842908-1	56-734-007-LI
1-842908-2	56-734-007-LI
1-842908-4	56-734-XXX-LI**
1-842909-3	56-744-001-LI
1-842909-0	56-744-005-LI
1-842909-1	56-744-007-LI
1-842909-2	56-744-007-LI
1-842909-4	56-744-XXX-LI**
1-842910-3	56-701-001-LI
1-842910-0	56-701-005-LI
1-842910-1	56-701-029-LI
1-842910-2	56-701-029-LI
1-842910-4	56-701-XXX-LI**
1-842911-3	56-711-001-LI
1-842911-0	56-711-005-LI
1-842911-1	56-711-029-LI
1-842911-2	56-711-029-LI
1-842911-4	56-711-XXX-LI**
1-842912-3	56-721-001-LI
1-842912-0	56-721-005-LI
1-842912-1	56-721-034-LI
1-842912-2	56-721-034-LI
1-842912-4	56-721-XXX-LI**
1-842913-3	56-731-001-LI
1-842913-0	56-731-005-LI
1-842913-1	56-731-029-LI
1-842913-2	56-731-029-LI
1-842913-4	56-731-XXX-LI**
1-842914-3	56-741-001-LI
1-842914-0	56-741-005-LI
1-842914-1	56-741-028-LI
1-842914-2	56-741-028-LI
1-842914-4	56-741-XXX-LI**
1-842915-3	56-703-001-LI
1-842915-0	56-703-005-LI
1-842915-1	56-703-023-LI
1-842915-2	56-703-023-LI
1-842915-4	56-703-XXX-LI**
1-842916-3	56-713-001-LI
1-842916-0	56-713-005-LI
1-842916-1	56-713-022-LI
1-842916-2	56-713-022-LI
1-842916-4	56-713-XXX-LI**
1-842917-3	56-723-001-LI
1-842917-0	56-723-005-LI
1-842917-1	56-723-024-LI
1-842917-2	56-723-024-LI
1-842917-4	56-723-XXX-LI**
1-842918-3	56-733-001-LI
1-842918-0	56-733-005-LI
1-842918-1	56-733-022-LI
1-842918-2	56-733-022-LI
1-842918-4	56-733-XXX-LI**
1-842919-3	56-743-001-LI
1-842919-0	56-743-005-LI
1-842919-1	56-743-022-LI
1-842919-2	56-743-022-LI
1-842919-4	56-743-XXX-LI**
1-842920-3	56-701-011-LI
1-842920-0	56-701-015-LI
1-842920-1	56-701-041-LI
1-842920-2	56-701-041-LI
1-842920-4	56-701-XXX-LI**
1-842921-3	56-711-011-LI
1-842921-0	56-711-015-LI
1-842921-1	56-711-041-LI
1-842921-2	56-711-041-LI
1-842921-4	56-711-XXX-LI**
1-842922-3	56-721-011-LI
1-842922-0	56-721-015-LI
1-842922-1	56-721-046-LI
1-842922-2	56-721-046-LI
1-842922-4	56-721-XXX-LI**
1-842923-3	56-731-011-LI
1-842923-0	56-731-015-LI
1-842923-1	56-731-041-LI
1-842923-2	56-731-041-LI
1-842923-4	56-731-XXX-LI**
1-842924-3	56-741-011-LI
1-842924-0	56-741-015-LI
1-842924-1	56-741-040-LI
1-842924-2	56-741-040-LI
1-842924-4	56-741-XXX-LI**
1-842925-3	56-706-001-LI
1-842925-0	56-706-005-LI
1-842925-1	56-706-007-LI
1-842925-2	56-706-007-LI
1-842925-8	56-706-XXX**
1-842925-4	56-706-XXX-LI**
1-842926-3	56-716-001-LI
1-842926-0	56-716-005-LI
1-842926-1	56-716-007-LI
1-842926-2	56-716-007-LI
1-842926-4	56-716-XXX-LI**
1-842927-3	56-726-001-LI
1-842927-0	56-726-005-LI
1-842927-1	56-726-007-LI
1-842927-2	56-726-007-LI
1-842927-4	56-726-XXX-LI**
1-842928-3	56-736-001-LI
1-842928-0	56-736-005-LI
1-842928-1	56-736-007-LI
1-842928-2	56-736-007-LI
1-842928-6	56-736-XXX**
1-842928-7	56-736-XXX**
1-842928-4	56-736-XXX-LI**
1-842929-3	56-746-001-LI
1-842929-0	56-746-005-LI
1-842929-1	56-746-007-LI
1-842929-2	56-746-007-LI
1-842929-4	56-746-XXX-LI**
1-842930-3	56-705-001-LI
1-842930-0	56-705-005-LI
1-842930-1	56-705-009-LI
1-842930-2	56-705-009-LI
1-842930-4	56-705-XXX-LI**
1-842931-3	56-715-001-LI
1-842931-0	56-715-005-LI
1-842931-1	56-715-008-LI
1-842931-2	56-715-008-LI
1-842931-4	56-715-XXX-LI**
1-842932-3	56-725-001-LI
1-842932-0	56-725-005-LI
1-842932-1	56-725-020-LI
1-842932-2	56-725-020-LI
1-842932-4	56-725-XXX-LI**
1-842933-3	56-735-001-LI
1-842933-0	56-735-005-LI
1-842933-1	56-735-009-LI
1-842933-2	56-735-009-LI
1-842933-4	56-735-XXX-LI**
1-842934-3	56-745-001-LI
1-842934-0	56-745-005-LI
1-842934-1	56-745-007-LI
1-842934-2	56-745-007-LI

*** There may be mechanical and/or electrical differences between the Amp and Spectrum part. Please consult factory.**
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API Technologies/AMP
Part Number Cross Reference

AMP Part Number	API Part Number
1-842934-4	56-745-XXX-LI**
1-93768-0	56-701-081-LI
1-93769-0	56-711-085-LI
1-93770-0	56-721-070-LI
1-93771-0	56-731-060-LI
1-93772-0	56-706-009-LI
1-93773-0	56-716-009-LI
1-93774-0	56-726-009-LI
1-93775-0	56-736-009-LI
267028-1	56-B12-000-K
267100-1	56-C31-001
267116-1	56-407-001
267161-2	56-423-001
267290-1	56-724-008-GBL
267292-1	56-624-XXX**
267397-1	56-413-001
267533-1	56-B22-000-S
267534-1	56-B42-000-S
267534-2	56-B42-000-K
267809-1	56-703-022
267810-1	56-713-021
267811-1	56-723-022
2-842919-6	56-743-003-LI
2-842920-2	56-701-042
2-842927-2	56-726-XXX**
3-842917-1	56-723-045-LI
3-842917-2	56-723-XXX**
3-842917-3	56-723-XXX**
842582-3	56-701-047
842582-4	56-701-047-LI
842583-3	56-711-048
842583-4	56-711-048-LI
842584-3	56-721-063
842584-4	56-721-063-LI
842585-3	56-731-048
842585-4	56-731-048-LI
842586-3	56-703-036
842586-4	56-703-036-LI
842587-3	56-713-037
842587-4	56-713-037-LI
842588-3	56-723-045
842588-4	56-723-045-LI
842589-3	56-733-035
842589-4	56-733-035-LI
842590-3	56-702-013
842590-4	56-702-013-LI
842591-3	56-712-017
842591-4	56-712-017-LI
842592-3	56-722-027
842592-4	56-722-027-LI
842593-3	56-732-009
842593-4	56-732-009-LI
842594-3	56-704-018
842594-4	56-704-018-LI
842595-3	56-714-017
842595-4	56-714-017-LI
842596-3	56-724-021
842596-4	56-724-021-LI
842597-3	56-734-012
842597-4	56-734-012-LI
842610-3	56-701-086

AMP Part Number	API Part Number
842610-4	56-701-086-LI
842611-3	56-711-088
842611-4	56-711-088-LI
842612-3	56-721-111
842612-4	56-721-111-LI
842613-3	56-731-076
842613-4	56-731-076-LI
842614-3	56-703-047
842614-4	56-703-047-LI
842615-3	56-713-045
842615-4	56-713-045-LI
842616-3	56-723-069
842616-4	56-723-069-LI
842617-3	56-733-046
842617-4	56-733-046-LI
842618-3	56-702-033
842618-4	56-702-033-LI
842619-3	56-712-039
842619-4	56-712-039-LI
842620-3	56-722-060
842620-4	56-722-060-LI
842621-3	56-732-023-LI
842621-4	56-732-023-LI
842622-3	56-704-035
842622-4	56-704-035-LI
842623-3	56-714-031
842623-4	56-714-031-LI
842624-3	56-724-046
842624-4	56-724-046-LI
842625-3	56-734-021
842625-4	56-734-021-LI
842638-3	56-701-028
842638-4	56-701-028-LI
842639-3	56-711-028
842639-4	56-711-028-LI
842640-3	56-721-033
842640-4	56-721-033-LI
842641-3	56-731-028
842641-4	56-731-028-LI
842642-3	56-703-022
842642-4	56-703-022-LI
842643-3	56-713-021
842643-4	56-713-021-LI
842644-3	56-723-023
842644-4	56-723-023-LI
842645-3	56-733-021
842645-4	56-733-021-LI
842646-3	56-702-007
842646-4	56-702-007-LI
842647-3	56-712-007
842647-4	56-712-007-LI
842648-3	56-722-008
842648-4	56-722-008-LI
842649-3	56-732-006
842649-4	56-732-006-LI
842650-3	56-704-007
842650-4	56-704-007-LI
842651-3	56-714-006
842651-4	56-714-006-LI
842652-3	56-724-008

AMP Part Number	API Part Number
842652-4	56-724-008-LI
842653-3	56-734-006
842653-4	56-734-006-LI
842666-3	56-701-002
842666-4	56-701-002-LI
842667-3	56-711-002
842667-4	56-711-002-LI
842668-3	56-721-002
842668-4	56-721-002-LI
842669-3	56-731-002
842669-4	56-731-002-LI
842670-3	56-703-002
842670-4	56-703-002-LI
842671-3	56-713-002
842671-4	56-713-002-LI
842672-3	56-723-002
842672-4	56-723-002-LI
842673-3	56-733-002
842673-4	56-733-002-LI
842674-3	56-702-002
842674-4	56-702-002-LI
842675-3	56-712-002
842675-4	56-712-002-LI
842675-5	56-712-002-LIM
842676-3	56-722-002
842676-4	56-722-002-LI
842677-3	56-732-002
842677-4	56-732-002-LI
842678-3	56-704-002
842678-4	56-704-002-LI
842679-3	56-714-002
842679-4	56-714-002-LI
842680-3	56-724-002
842680-4	56-724-002-LI
842681-3	56-734-002
842681-4	56-734-002-LI
842697-3	56-705-008
842697-4	56-705-008-LI
842697-5	56-705-026-LI
842697-5	56-705-XXX**
842698-3	56-715-007
842698-4	56-715-007-LI
842699-3	56-725-019
842699-4	56-725-019-LI
842699-4	56-725-019-LI
842700-3	56-735-008
842700-4	56-735-008-LI
842737-3	56-705-002
842737-4	56-705-002-LI
842738-3	56-705-026
842738-4	56-705-026-LI
842738-5	56-705-026-HV
842739-3	56-705-049
842739-4	56-705-049-LI
842740-3	56-715-002
842740-4	56-715-002-LI
842741-3	56-715-015
842741-4	56-715-015-LI
842742-3	56-715-040
842742-4	56-715-040-LI
842743-3	56-725-002

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API Technologies/AMP Part Number Cross Reference

AMP Part Number	API Part Number
842743-4	56-725-002-LI
842744-3	56-725-064
842744-4	56-725-064-LI
842744-5	56-725-XXX**
842745-3	56-725-073
842745-4	56-725-073-LI
842746-3	56-735-002
842746-4	56-735-002-LI
842747-3	56-735-025
842747-4	56-735-025-LI
842748-3	56-735-034
842748-4	56-735-034-LI
842796-2	56-725-064-HV
842797-2	56-735-025-HV
842830-3	56-706-006
842900-1	56-702-003
842900-2	56-702-009
842900-3	56-702-005
842900-4	56-702-008
842900-5	56-702-008
842900-6	56-702-001
842900-7	56-702-XXX**
842900-8	56-702-003-LI
842900-9	56-702-009-LI
842901-1	56-712-003
842901-2	56-712-009
842901-3	56-712-005
842901-4	56-712-008
842901-5	56-712-008
842901-6	56-712-001
842901-7	56-712-XXX**
842901-8	56-712-003-LI
842901-9	56-712-009-LI
842902-1	56-722-003
842902-2	56-722-010
842902-3	56-722-005
842902-4	56-722-009
842902-5	56-722-009
842902-6	56-722-001
842902-7	56-722-XXX**
842902-8	56-722-003-LI
842902-9	56-722-010-LI
842903-1	56-732-003
842903-2	56-732-008
842903-3	56-732-005
842903-4	56-732-007
842903-5	56-732-007
842903-6	56-732-001
842903-7	56-732-XXX**
842903-8	56-732-003-LI
842903-9	56-732-008-LI
842904-1	56-742-003
842904-2	56-742-008
842904-3	56-742-005
842904-4	56-742-007
842904-5	56-742-007
842904-6	56-742-001
842904-7	56-742-XXX**
842904-8	56-742-003-LI
842904-9	56-742-008-LI
842905-1	56-704-003
842905-2	56-704-009
842905-3	56-704-005
842905-4	56-704-008
842905-5	56-704-008
842905-6	56-704-001
842905-7	56-704-XXX**
842905-8	56-704-003-LI
842905-9	56-704-009-LI
842906-1	56-714-003
842906-2	56-714-008
842906-3	56-714-005
842906-4	56-714-007
842906-5	56-714-007
842906-6	56-714-001
842906-7	56-714-XXX**
842906-8	56-714-003-LI
842906-9	56-714-008-LI
842907-1	56-724-003
842907-2	56-724-010
842907-3	56-724-005
842907-4	56-724-009
842907-5	56-724-009
842907-6	56-724-001
842907-7	56-724-XXX**
842907-8	56-724-003-LI
842907-9	56-724-010-LI
842908-1	56-734-003
842908-2	56-734-008
842908-3	56-734-005
842908-4	56-734-007
842908-5	56-734-007
842908-6	56-734-001
842908-7	56-734-XXX**
842908-8	56-734-003-LI
842908-9	56-734-008-LI
842909-1	56-744-003
842909-2	56-744-008
842909-3	56-744-005
842909-4	56-744-007
842909-5	56-744-007
842909-6	56-744-001
842909-7	56-744-XXX**
842909-8	56-744-003-LI
842909-9	56-744-008-LI
842910-1	56-701-003
842910-2	56-701-030
842910-3	56-701-005
842910-4	56-701-029
842910-5	56-701-029
842910-6	56-701-001
842910-7	56-701-XXX**
842910-8	56-701-003-LI
842910-9	56-701-030-LI
842911-1	56-711-003
842911-2	56-711-030
842911-3	56-711-005
842911-4	56-711-029
842911-5	56-711-029
842911-6	56-711-001
842911-7	56-711-XXX**
842911-8	56-711-003-LI
842911-9	56-711-030-LI
842912-1	56-721-003
842912-2	56-721-035
842912-3	56-721-005
842912-4	56-721-034
842912-5	56-721-034
842912-6	56-721-001
842912-7	56-721-XXX**
842912-8	56-721-003-LI
842912-9	56-721-035-LI
842913-1	56-731-003
842913-2	56-731-030
842913-3	56-731-005
842913-4	56-731-029
842913-5	56-731-029
842913-6	56-731-001
842913-7	56-731-XXX**
842913-8	56-731-003-LI
842913-9	56-731-030-LI
842914-1	56-741-003
842914-2	56-741-029
842914-3	56-741-005
842914-4	56-741-028
842914-5	56-741-028
842914-6	56-741-001
842914-7	56-741-XXX**
842914-8	56-741-003-LI
842914-9	56-741-029-LI
842915-1	56-703-003
842915-2	56-703-024
842915-3	56-703-005
842915-4	56-703-023
842915-5	56-703-023
842915-6	56-703-001
842915-7	56-703-XXX**
842915-8	56-703-003-LI
842915-9	56-703-024-LI
842916-1	56-713-003
842916-2	56-713-023
842916-3	56-713-005
842916-4	56-713-022
842916-5	56-713-022
842916-6	56-713-001
842916-7	56-713-XXX**
842916-8	56-713-003-LI
842916-9	56-713-023-LI
842917-1	56-723-003
842917-2	56-723-025
842917-3	56-723-005
842917-4	56-723-024
842917-5	56-723-024
842917-6	56-723-001
842917-7	56-723-XXX**
842917-8	56-723-003-LI
842917-9	56-723-025-LI
842918-1	56-733-003
842918-2	56-733-023
842918-3	56-733-005

*** There may be mechanical and/or electrical differences between the Amp and Spectrum part. Please consult factory.**
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api technologies corp.
Spectrum Control

API Technologies/AMP Part Number Cross Reference

AMP Part Number	API Part Number
842918-4	56-733-022
842918-5	56-733-022
842918-6	56-733-001
842918-7	56-733-XXX**
842918-8	56-733-003-LI
842918-9	56-733-023-LI
842919-1	56-743-003
842919-2	56-743-023
842919-3	56-743-005
842919-4	56-743-022
842919-5	56-743-022
842919-6	56-743-001
842919-7	56-743-XXX**
842919-8	56-743-003-LI
842919-9	56-743-023-LI
842920-1	56-701-013
842920-2	56-701-042
842920-3	56-701-015
842920-4	56-701-041
842920-5	56-701-041
842920-6	56-701-011
842920-7	56-701-XXX**
842920-8	56-701-013-LI
842920-9	56-701-042-LI
842921-1	56-711-013
842921-2	56-711-042
842921-3	56-711-015
842921-4	56-711-041
842921-5	56-711-041
842921-6	56-711-011
842921-7	56-711-XXX**
842921-8	56-711-013-LI
842921-9	56-711-042-LI
842922-1	56-721-013
842922-2	56-721-047
842922-3	56-721-015
842922-4	56-721-046
842922-5	56-721-046
842922-6	56-721-011
842922-7	56-721-XXX**
842922-8	56-721-013-LI
842922-9	56-721-047-LI
842923-1	56-731-013
842923-2	56-731-042
842923-3	56-731-015
842923-4	56-731-041
842923-5	56-731-041
842923-6	56-731-011
842923-7	56-731-XXX**
842923-8	56-731-013-LI
842923-9	56-731-042-LI
842924-1	56-741-013
842924-2	56-741-041
842924-3	56-741-015
842924-4	56-741-040
842924-5	56-741-040
842924-6	56-741-011
842924-7	56-741-XXX**
842924-8	56-741-013-LI
842924-9	56-741-041-LI
842925-1	56-706-003
842925-2	56-706-008
842925-3	56-706-005
842925-4	56-706-007
842925-5	56-706-007
842925-6	56-706-001
842925-7	56-706-XXX**
842925-8	56-706-003-LI
842925-9	56-706-005-LI
842926-1	56-716-003
842926-2	56-716-008
842926-3	56-716-005
842926-4	56-716-007
842926-5	56-716-007
842926-6	56-716-001
842926-7	56-716-XXX**
842926-8	56-716-003-LI
842926-9	56-716-008-LI
842927-1	56-726-003
842927-2	56-726-008
842927-3	56-726-005
842927-4	56-726-007
842927-5	56-726-007
842927-6	56-726-001
842927-7	56-726-XXX**
842927-8	56-726-003-LI
842927-9	56-726-008-LI
842928-1	56-736-003
842928-2	56-736-008
842928-3	56-736-005
842928-4	56-736-007
842928-5	56-736-007
842928-6	56-736-001
842928-7	56-736-XXX**
842928-8	56-736-003-LI
842928-9	56-736-008-LI
842929-1	56-746-003
842929-2	56-746-008
842929-3	56-746-005
842929-4	56-746-007
842929-5	56-746-007
842929-6	56-746-001
842929-7	56-746-XXX**
842929-8	56-746-003-LI
842929-9	56-746-008-LI
842930-1	56-705-003
842930-2	56-705-010
842930-3	56-705-005
842930-4	56-705-009
842930-5	56-705-009
842930-6	56-705-001
842930-7	56-705-XXX**
842930-8	56-705-003-LI
842930-9	56-705-010-LI
842931-1	56-715-003
842931-2	56-715-009
842931-3	56-715-005
842931-4	56-715-008
842931-5	56-715-008
842931-6	56-715-001
842931-7	56-715-XXX**
842931-8	56-715-003-LI
842931-9	56-715-009-LI
842932-1	56-725-003
842932-2	56-725-021
842932-3	56-725-005
842932-4	56-725-020
842932-5	56-725-020
842932-6	56-725-001
842932-7	56-725-XXX**
842932-8	56-725-003-LI
842932-9	56-725-021-LI
842933-1	56-735-003
842933-2	56-735-010
842933-3	56-735-005
842933-4	56-735-009
842933-5	56-735-009
842933-6	56-735-001
842933-7	56-735-XXX**
842933-8	56-735-003-LI
842933-9	56-735-010-LI
842934-1	56-745-003
842934-2	56-745-008
842934-3	56-745-005
842934-4	56-745-007
842934-5	56-745-007
842934-6	56-745-001
842934-7	56-745-XXX**
842934-8	56-745-003-LI
842934-9	56-745-008-LI
842938-1	56-701-004
842938-2	56-701-004-LI
842939-1	56-711-004
842939-2	56-711-004-LI
842940-1	56-721-004
842940-2	56-721-004-LI
842941-1	56-731-004
842941-2	56-731-004-LI
842942-1	56-703-004
842942-2	56-703-004-LI
842943-1	56-713-004
842943-2	56-713-004-LI
842944-1	56-723-004
842944-2	56-723-004-LI
842945-1	56-733-004
842945-2	56-733-004-LI
842946-1	56-702-004
842946-2	56-702-004-LI
842947-1	56-712-004
842947-2	56-712-004-LI
842948-1	56-722-004
842948-2	56-722-004-LI
842949-1	56-732-004
842949-2	56-732-004-LI
842950-1	56-704-004
842950-2	56-704-004-LI
842951-1	56-714-004
842951-2	56-714-004-LI
842952-1	56-724-004
842952-2	56-724-004-LI

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Spectrum Control

API Technologies/AMP Part Number Cross Reference

AMP Part Number	API Part Number
842953-1	56-734-004
842953-2	56-734-004-LI
842954-1	56-705-004
842954-2	56-705-004-LI
842955-1	56-715-004
842955-2	56-715-004-LI
842956-1	56-725-004
842956-2	56-725-004-LI
842956-3	56-725-004-LI
842957-1	56-735-004
842957-2	56-735-004-LI
842957-3	56-735-004-LI
859762-1	56-726-003
869202-1	56-715-004
869214-1	56-701-003-LIM
869248-1	56-711-003-LIM
869408-1	56-715-XXX**
869427-2	56-414-001-HD
869436-2	56-402-001
869442-2	56-422-001
869454-1	56-704-007-LI
869504-1 & 2	56-B32-000-S
869505-1	56-B52-000-S
869508-1 & 2	56-B32-000-K
869509-1	56-B52-000-K
869520-2	56-404-001
869521-2	56-424-001
93725-1	56-C33-001
93768-1	56-701-014
93768-2	56-701-012
93768-3	56-701-040
93768-4	56-701-087
93768-5	56-701-081
93768-6	56-701-014-LI
93768-7	56-701-012-LI
93768-8	56-701-040-LI
93768-9	56-701-087-LI
93769-1	56-711-014
93769-2	56-711-012
93769-3	56-711-040
93769-4	56-711-086
93769-5	56-711-085
93769-6	56-711-014-LI
93769-7	56-711-012-LI
93769-8	56-711-040-LI
93769-9	56-711-086-LI
93770-1	56-721-014
93770-2	56-721-012
93770-3	56-721-045
93770-4	56-721-112
93770-5	56-721-070
93770-6	56-721-014-LI
93770-7	56-721-012-LI
93770-8	56-721-045-LI
93770-9	56-721-112-LI
93771-1	56-731-014
93771-2	56-731-012
93771-3	56-731-040-LI
93771-4	56-731-077
93771-5	56-731-060
93771-6	56-731-014-LI
93771-7	56-731-012-LI
93771-8	56-731-040-LI
93771-9	56-731-077-LI
93772-1	56-706-004
93772-2	56-706-002
93772-3	56-706-006
93772-4	56-706-017
93772-5	56-706-009
93772-6	56-706-004-LI
93772-7	56-706-002-LI
93772-8	56-706-006-LI
93772-9	56-706-017-LI
93773-1	56-716-004
93773-2	56-716-002
93773-3	56-716-006
93773-4	56-716-013
93773-5	56-716-009
93773-6	56-716-004-LI
93773-7	56-716-002-LI
93773-8	56-716-006-LI
93773-9	56-716-013-LI
93774-1	56-726-004
93774-2	56-726-002
93774-3	56-726-006
93774-4	56-726-021
93774-5	56-726-009
93774-6	56-726-004-LI
93774-7	56-726-002-LI
93774-8	56-726-006-LI
93774-9	56-726-021-LI
93775-1	56-736-004
93775-2	56-736-002
93775-3	56-736-006
93775-4	56-736-015
93775-5	56-736-009
93775-6	56-736-004-LI
93775-7	56-736-002-LI
93775-8	56-736-006-LI
93775-9	56-736-015-LI

*** There may be mechanical and/or electrical differences between the Amp and Spectrum part. Please consult factory.**
**** A standard part number does not currently exist but will be assigned upon ordering.**

Surface Mount EMI Filters

our family of surface mount filters is designed to provide a range of high performance EMI filtering options with a minimal PCB footprint

Advantages of a Surface Mount Filter

With many years of experience in the design and manufacture of filters, API Technologies has a unique perspective on EMI and how to control it. We provide an integrated approach to EMC problems with services such as customer consulting, diagnostic testing, design and manufacturing. By offering a variety of custom assemblies, we are able to unite your specific requirements with our high performance filters.

API's Spectrum Control line of surface mount EMI filters are ideal for a wide range of PCB applications, including: automotive electronics, digital A/V equipment, computers, peripherals, telecommunications, switching power supplies and high current buss lines.

Three Terminal Chips offer superior ability to withstand transient voltages and surges, and deliver excellent filtering performance in high current applications while providing exceptional solderability and resistance to solder heat… **SM2-SM7**

SA Series Arrays incorporate four lines in one compact footprint. These arrays are nonpolar and designed to minimize residual inductance, thereby ensuring large insertion loss in a wide band and better cross talk control… **SM8-SM9**

MSM Mini-Surface Mount offers a multilayer electrode structure, high temperature construction and 10 Amps current ratings. The filter chips provide extreme elimination of residual inductance and the self-resonant frequency extends the microwave band… **SM11**

SSM Square Surface Mount square mechanical geometry enhances SMT soldering in applications up to 10 Amps. These filters come in a Pi circuit configuration and are designed to address EMI/RFI on crowded printed circuit boards… **SM12-SM13**

PSM Power Surface Mount are the first high temperature surface mount filter designed to effectively filter EMI/RFI at currents up to 20 Amps. These filters come in either a Feed-through or Pi circuit configuration and offer superior high frequency noise suppression… **SM14-SM15**

MSP Mini Surface Mount Power Filters offers a multilayer electrode structure, high temperature construction and 10 Amps current ratings. The filter chips provide extreme elimination of residual inductance and the self-resonant frequency extends to the microwave band… **SM16**

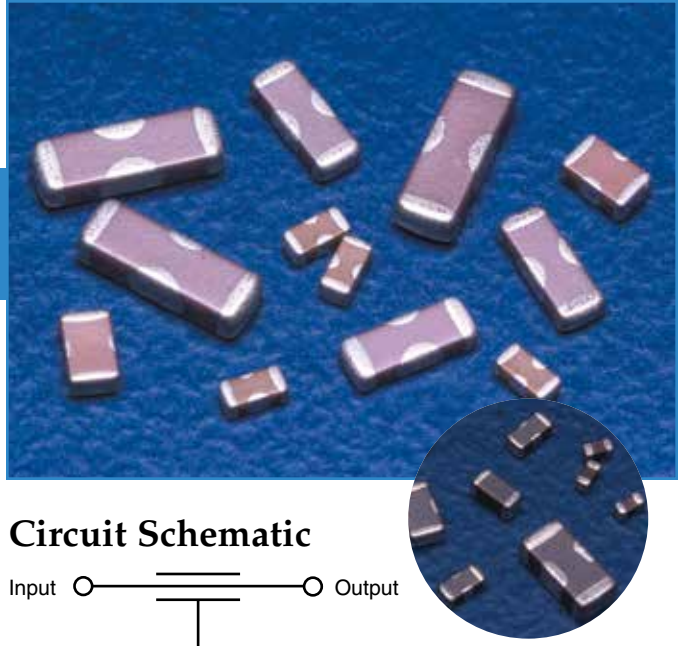
MPC Series Miniature PCB Power Filters are designed to fit a wide range of environments. These filters are ideal for personal computers and peripherals, home appliances, measuring instruments and medical equipment, and are all available lead free… **SM17-SM20**

High Frequency PCB Filters provide EMI filtering to protect low power digital circuits. With mounting directly on the printed circuit board, filtering begins at the source of the problem… **SM21**

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

api technologies corp.
Spectrum Control

Surface Mount EMI Filters
Three Terminal Chips



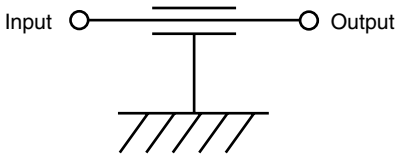
Features

- Excellent performance in high current applications
- Non-polar, surface mountable
- Superior filtering characteristics
- Superb ability to withstand transient voltages and surge
- Offers exceptional solderability and resistance to solder heat
- Available in 0603, 0805, 1205 and 1806 body size
- Two amp current rating available
- Available lead free/RoHS Compliant

Applications

- Cellular telephones and base stations
- Telecommunication equipment
- Industrial electronic interface or programmable controllers
- Electronic automotive equipment
- Computer and peripheral equipment

Circuit Schematic



Typical Electrical Characteristics

Capacitance Range	COG (NPO)	22 pF to 470 pF
	X7R	470 pF to 47,000 pF
	YV5	100,000 pF and 220,000 pF
Capacitance Tolerance	COG (NPO)	+50/-20%
	X7R	+50/-20%
	Y5V	+80/-20%
Temperature Coefficient	COG (NPO)	0 ±/30 ppm/°C, -55 to +125°C
	X7R	+/-15%, -55 to +125°C
	Y5V	-25 to +85˚C
Insulation Resistance	up to 22,000 pF	10000 Megohms
	47,000 pF	5000 Megohms
DC Resistance	0.4 Amp or less	0.3 ohm max.
	1 Amp	0.08 ohm max.
	2 Amp	0.04 ohm max.
Rated Voltage	up to 100 VDC	
Rated Current	up to 2 Amps	

api technologies corp.
Spectrum Control

Surface Mount EMI Filters

Three Terminal Chips

Selection Guide

Part Number	Body Size	Capacitance (in picofarad)	Capacitance Tolerance	Temp. Charact.	Rated Voltage (Volts DC)	Rated Current (Amps DC)	IR (Megohms Min.)	DC Resistance (ohm Max.)	Operating Temp.
SF0603C220SBNB-*	0603	22	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603C470SBNB-*	0603	47	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603C101SBNB-*	0603	100	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603C221SBNB-*	0603	220	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF0603X471SBNB-*	0603	470	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF0603X102SBNB-*	0603	1,000	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF0603X222SBNB-*	0603	2,200	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF0603X223SANC-*	0603	22,000	+50/-20%	X7R	25	0.5	10,000	0.15	-55/+125°C
SF0603Y104MAND-*	**0603**	**100,000**	**±20%**	**Y5V†**	**25**	**1**	**1,000**	**0.08**	**-25/+85°C**
SF0805C220SBNC-*	0805	22	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0805C470SBNC-*	0805	47	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0805C101SBNC-*	0805	100	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0805C221SBNC-*	0805	220	+50/-20%	COG	50	0.4	10,000	0.3	-55/+125°C
SF0805X471SBNC-*	0805	470	+50/-20%	X7R	50	0.4	10,000	0.3	-55/+125°C
SF0805X102SBNC-*	0805	1,000	+50/-20%	X7R	50	0.4	10,000	0.3	-55/+125°C
SF0805X222SBNC-*	0805	2,200	+50/-20%	X7R	50	0.4	10,000	0.3	-55/+125°C
SF0805X223SBND-*	**0805**	**22,000**	**+50/-20%**	**X7R**	**50**	**1.0**	**10,000**	**0.08**	**-55/+125°C**
SF1205C220SBNB-*	1205	22	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205C470SBNB-*	1205	47	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205C101SBNB-*	1205	100	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205C221SBNB-*	1205	220	+50/-20%	COG	50	0.3	10,000	0.3	-55/+125°C
SF1205X471SBNB-*	1205	470	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X102SBNB-*	1205	1,000	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X222SBNB-*	1205	2,200	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X223SBNB-*	1205	22,000	+50/-20%	X7R	50	0.3	10,000	0.3	-55/+125°C
SF1205X473SBND-*	**1205**	**47,000**	**+50/-20%**	**X7R**	**50**	**1.0**	**5,000**	**0.08**	**-55/+125°C**
SF1806C220SDNB-*	1806	22	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C470SDNB-*	1806	47	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C101SDNB-*	1806	100	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C221SDNB-*	1806	220	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806C471SDNB-*	1806	470	+50/-20%	COG	100	0.3	10,000	0.3	-55/+125°C
SF1806X102SDNB-*	1806	1,000	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
SF1806X222SDNB-*	1806	2,200	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
SF1806X103SDNB-*	1806	10,000	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
SF1806X223SDNB-*	1806	22,000	+50/-20%	X7R	100	0.3	10,000	0.3	-55/+125°C
2 AMP FILTER SF1806Y224ZBNE-*	**1806**	**220,000**	**+80/-20%**	**Y5V†**	**50**	**2.0**	**1,000**	**0.04**	**-25/+85°C**

Bold Letter = High Current Applications
† = Temperature Characteristic is +30/-80%

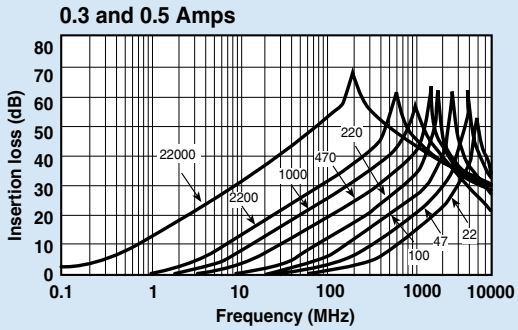
-* = Denotes Packaging Style. Replace with T for Tape and Reel or B for Bulk

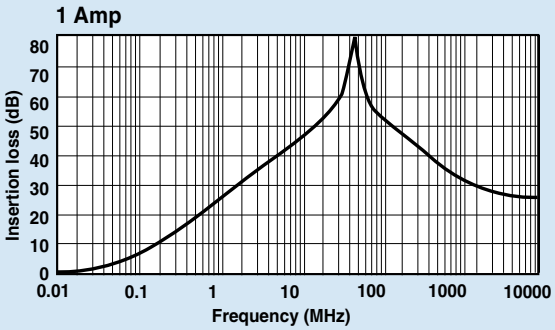
Surface Mount EMI Filters

Three Terminal Chips

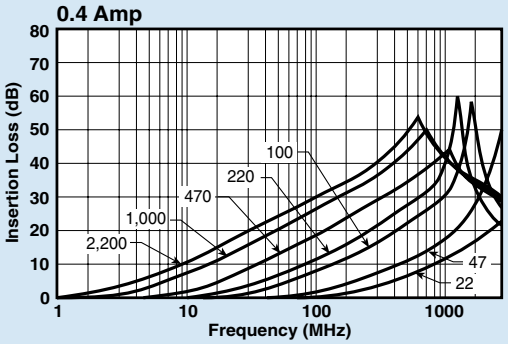
Insertion Loss (Per MIL-STD-220)

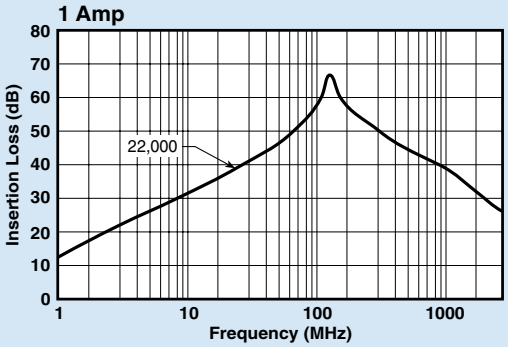
SF0603 Series



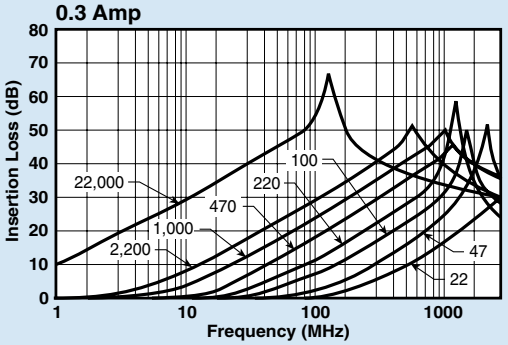


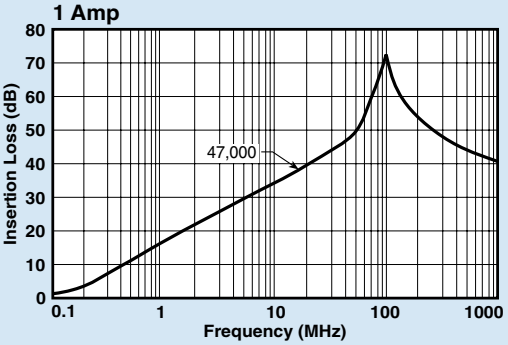
SF0805 Series



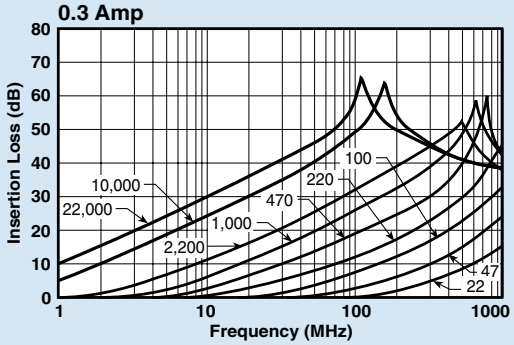


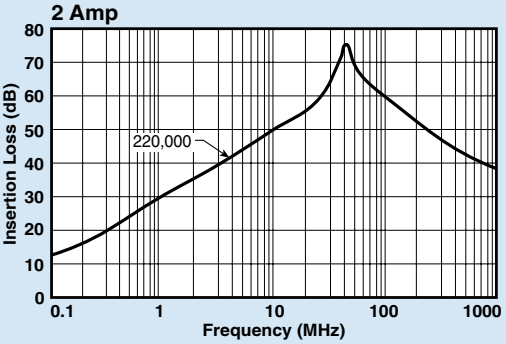
SF1205 Series





SF1806 Series





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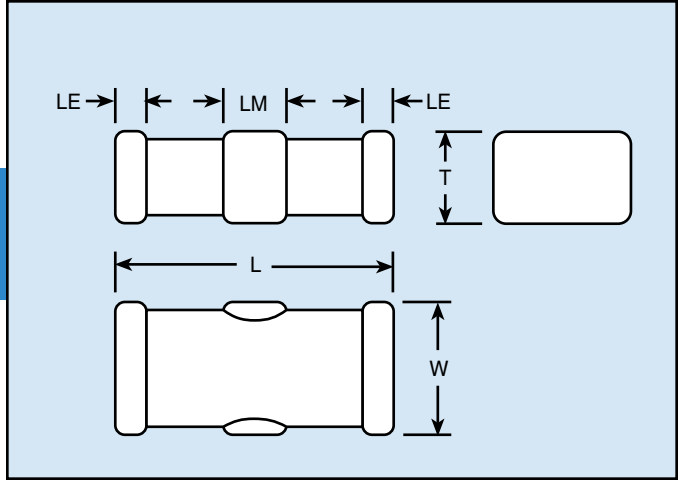
Surface Mount EMI Filters

Three Terminal Chips



Mechanical Dimensions

Dimensions in inches *(mm)*

Body Style/Size	Body Length (L)	Body Width (W)	Body Thickness (T)	End Terminal Length (LE)	Middle Terminal Length (LM)
SF0603	0.063 +/-0.006 *(1.60 +/-0.15)*	0.031 +/-0.006 *(0.80+/-0.15)*	0.023 +/-0.006 *(0.6+/-0.15)*	0.008 +/-0.006 *(0.2 +/-0.15)*	0.020 +/-0.006 *(0.5 +/-0.15)*
SF0805	0.079 +/-0.008 *(2.0 +/-0.2)*	0.049 +/-0.008 *(1.25 +/-0.2)*	0.032 +/-0.008 *(0.8 +/-0.2)*	0.012 +/-0.008 *(0.3 +/-0.2)*	0.024 +/-0.008 *(0.6 +/-0.2)*
SF1205	0.126 +/-0.008 *(3.2 +/-0.2)*	0.049 +/-0.008 *(1.25 +/-0.2)*	0.028 +/-0.008 *(0.7 +/-0.2)*	0.016 +/-0.012 *(0.4 +/-0.3)*	0.043 +/-0.012 *(1.1 +/-0.3)*
SF1806	0.177 +/-0.012 *(4.5 +/-0.3)*	0.063 +/-0.012 *(1.6 +/-0.3)*	0.039 +/-0.012 *(1.0 +/-0.3)*	0.020 +/-0.012 *(0.5 +/-0.3)*	0.055 +/-0.012 *(1.4 +/-0.3)*

Ordering Information

Example: SF0805C221SBNCT

This part number represents a three terminal chip with a body size of 0805 with a COG (NPO) dielectric. The capacitance is 220 pF with a capacitance tolerance of +50%/-20%. Voltage rating is 50 Volts DC. It has nickel barrier, solder plated terminations and a current rating of 0.4 Amp, (400 milliamps). The parts are taped and reeled.

SF	0805	C	221	S	B	N	C	T
Style	**Size**	**Ceramic**	**Capacitance Code**	**Capacitance Tolerance**	**Rated Voltage (Vdc)**	**Termination**	**Current Rating**	**Packaging**
SF	**0603** **0805** **1205** **1806**	**C -** COG **X -** X7R **Y -** Y5V	First two numbers are significant, the third number refers to number of zeroes	**S -** +50%/-20% **Z -** +80%/-20%	**A -** 25 **B -** 50 **D -** 100	**N -** Ni Barrier, Solder Plated	**B -** 0.3 A **C -** 0.4 A **D -** 1 A **E -** 2 A **F -** 3 A **G -** 4 A **H -** 5 A **I -** 6 A	**T -** Tape & Reel **B -** Bulk

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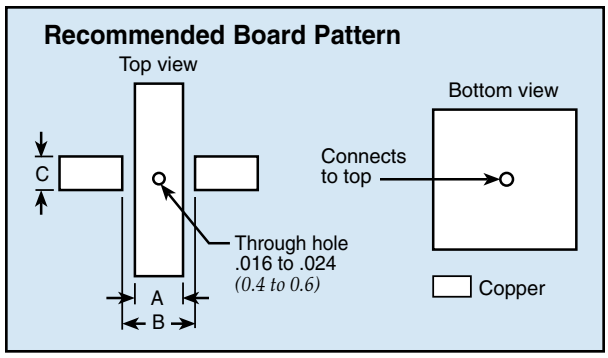
Surface Mount EMI Filters
Three Terminal Chips
Soldering Specifications

Soldering Instructions

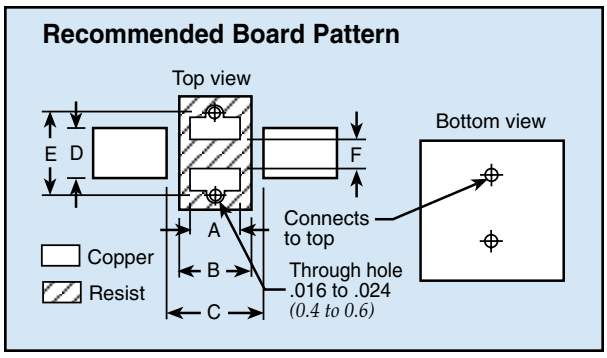
Reflow Soldering



Board Pattern Dimensions in inches *(mm)*

Body Style/Size	Dimension		
	A	B	C
SF0603	0.020 *(0.5)*	0.047 *(1.2)*	0.031 *(0.8)*
SF0805	0.024 *(0.6)*	0.059 *(1.5)*	0.039 *(1.0)*
SF1205	0.051 *(1.3)*	0.091 *(2.3)*	0.047 *(1.2)*
SF1806	0.079 *(2.0)*	0.138 *(3.5)*	0.051 *(1.3)*

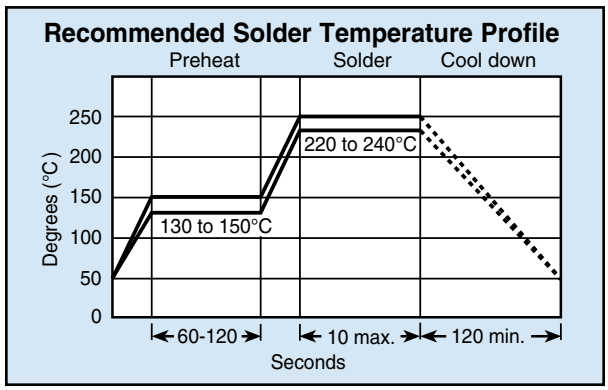
Flow Soldering



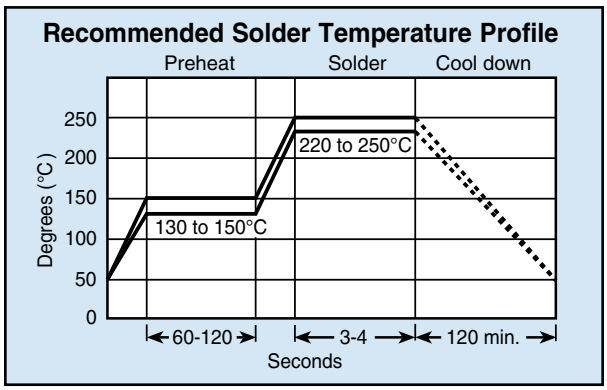
Board Pattern Dimensions in inches *(mm)*

Body Style/Size	Dimension					
	A	B	C	D	E	F
SF0603	0.020 *(0.5)*	0.031 *(0.8)*	0.047 *(1.2)*	0.031 *(0.8)*	0.071 *(1.8)*	0.016 *(0.4)*
SF0805	0.024 *(0.6)*	0.031 *(0.8)*	0.059 *(1.5)*	0.039 *(1.0)*	0.087 *(2.2)*	0.024 *(0.6)*
SF1205	0.051 *(1.3)*	0.059 *(1.5)*	0.091 *(2.3)*	0.047 *(1.2)*	0.118 *(3.0)*	0.024 *(0.6)*
SF1806	0.059 *(1.5)*	0.079 *(1.5)*	0.138 *(3.5)*	0.051 *(1.3)*	0.118 *(3.0)*	0.024 *(0.6)*

Reflow Soldering



Flow Soldering



General Soldering Notes

1. High soldering temperatures and long soldering times can cause leaching of the termination and adversely affect adhesion. These conditions can also decrease capacitance value. Use the above recommended solder temperature cycle.
2. Due to the mechanical characteristic of ceramic composition, aggressive thermal shock will degrade performance. Preheat the assembly before soldering using the above solder temperature profile as a guide.
3. Use mild flux (less than 0.2% by weight of Chlorine), preferable rosin based. If water soluble, wash thoroughly to assure all residue is removed from the underside of components.
4. Ultrasonic Cleaning
   When using an ultrasonic cleaning method, the following range is recommended:

   Frequency: Not to exceed 28kHz
   Output Power: Not to exceed 20W/liter
   Cleaning Time: 5 minutes max

Surface Mount EMI Filters

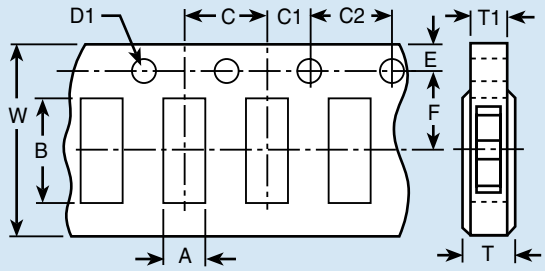
Three Terminal Chips Soldering Specifications

Package Quantities

Body Style/Size	Tape and Reel
SF0603	4,000 units/reel
SF0805	4,000 units/reel
SF1205	4,000 units/reel
SF1806	2,000 units/reel

Package Information

Paper Tape Dimensions
SF0805 and SF1205 Bodies



Dimensions in inches *(mm)*

Body Style/ Size	Chip Cavity		Tape			Holes			Hole Diameter	Thickness	
	Length A	Width B	Width W	Center to End F	Indexing to End E	Center to Center C	Indexing to Center C1	Indexing to Indexing C2	Indexing D1	Overall T (Max.)	Carrier Tape T1 (Max.)
SF0603	0.039 +/-0.00? *(1.0 +/-0.?)*	0.075 +/-0.00? *(1.9+/-0.?)*	0.315 +/-0.012 *(8.0 +/-0.3)*	0.138 +/-0.002 *(3.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 +0.004/-0 *(1.5 +0.1/-0)*	0.043 *(1.1)*	0.039 *(1.0)*
SF0805	0.064 +/-0.008 *(1.62 +/-0.2)*	0.091 +/-0.008 *(2.3 +/-0.2)*	0.315 +/-0.012 *(8.0 +/-0.3)*	0.138 +/-0.002 *(3.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 +0.004/-0 *(1.5 +0.1/-0)*	0.043 *(1.1)*	0.039 *(1.0)*
SF1205	0.067 +/-0.008 *(1.70 +/-0.2)*	0.138 +/-0.008 *(3.5 +/-0.2)*	0.315 +/-0.012 *(8.0 +/-0.3)*	0.138 +/-0.002 *(3.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 +0.004/-0 *(1.5 +0.1/-0)*	0.043 *(1.1)*	0.039 *(1.0)*

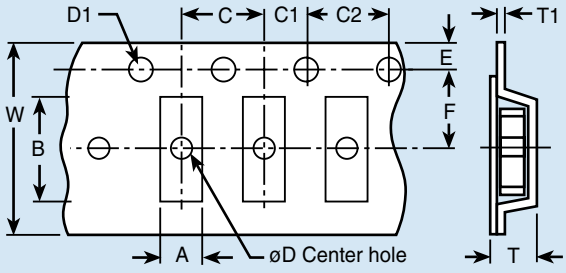
Plastic Reel Dimensions

Dimensions in inches *(mm)*

Body Style/Size	Diameter (Max.)	Width (Max.)
SF0603	7.00 *(180)*	0.46 *(11.5)*
SF0805	7.00 *(180)*	0.46 *(11.5)*
SF1205	7.00 *(180)*	0.46 *(11.5)*
SF1806	7.00 *(180)*	0.61 *(11.5)*

Package Information

Tape and Reel Specification
Plastic Carrier Tape Dimensions
SF1806 Body



Dimensions in inches *(mm)*

Body Style/ Size	Chip Cavity		Tape			Holes			Hole Diameter		Thickness	
	Length A	Width B	Width W	Center to End F	Indexing to End E	Center to Center C	Indexing to Center C1	Indexing to Indexing C2	Center D (Min.)	Indexing D1	Overall T (Max.)	Tape T1 (Max.)
SF1806	0.071 +/-0.008 *(1.80 +/-0.2)*	0.185 +/-0.008 *(4.70 +/-0.2)*	0.472 +/-0.008 *(12.0 +/-0.2)*	0.217 +/-0.002 *(5.5 +/-0.05)*	0.069 +/-0.004 *(1.75 +/-0.1)*	0.157 +/-0.004 *(4.0 +/-0.1)*	0.079 +/-0.004 *(2.0 +/-0.1)*	0.157 +/-0.008 *(4.0 +/-0.1)*	0.059 *(1.5)*	0.059 +0.004/-0 *(1.5 +0.1/-0)*	0.098 *(2.5)*	0.024 *(0.6)*

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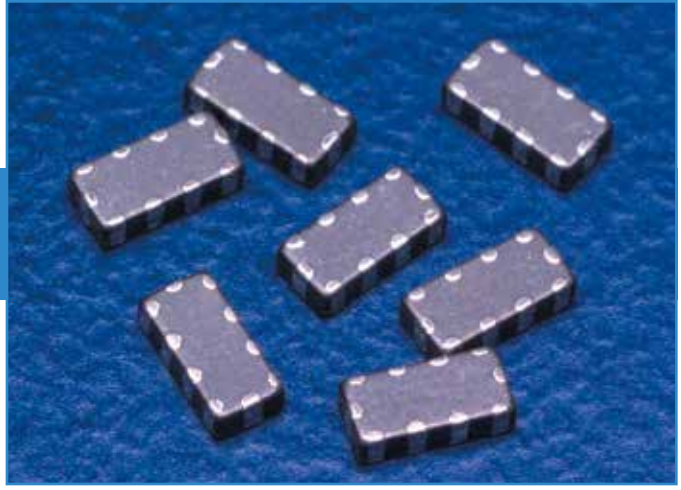
Surface Mount Filter Arrays
SA Series



Features

- The filter's structure minimizes residual inductance with a high self resonant frequency, ensuring large insertion loss in a wide band.
- The common ground electrode built into the chip ensures complete grounding of all lines at the ground on both ends. The filter is designed to control cross talk.
- An optimum constant can be selected from the capacity range of 22-22,000 pF to best suit the frequency.
- Solder plated nickel barrier terminations offer good solderability and resistance to soldering heat.
- Available lead free/RoHs compliant

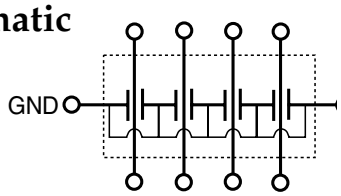
Applications

- Noise reduction for DC lines on computers
- Computer peripheral equipment
- Audio Visual Equipment
- Cellular telephones & base stations
- Telecommunications Equipment

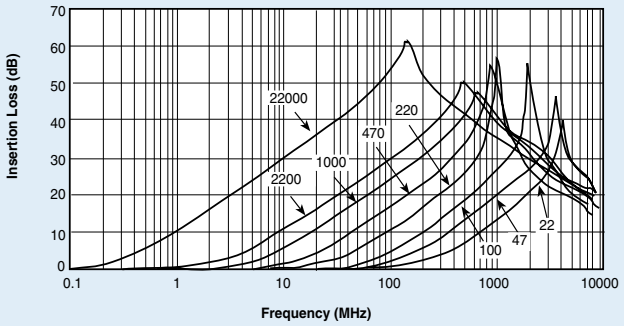
Typical Electrical Characteristics

Rated Voltage . . . . . 25 VDC to 50 VDC
Rated Current . . . . . 0.3 Amps
IR . . . . . 10,000 MΩ Min.
DC Resistance . . . . . 0.3 Ω Max.
Temperature Range . . . . . -55˚C to +125˚C
Capacitance Range . . . . . 22 pF to 22,000 pF
Capacitance Tolerance . . . . . ±20%

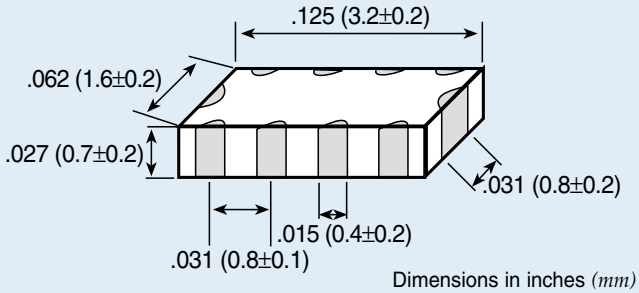
Circuit Schematic



Insertion Loss



Dimensions



Dimensions in inches *(mm)*

Specifications

Part Number	Rated Voltage (@ 50/60Hz)	Rated Current	Temperature Characteristic	IR	DC Resistance	Operating Temp	Capacitance (pF)
SA1206C220	50 VDC	0.3A DC	C	10,000 MΩ min.	0.3Ω max.	-55/+125˚C	22
SA1206C470			C				47
SA1206C101			C				100
SA1206C221			C				220
SA1206R471			U				470
SA1206R102			R				1,000
SA1206R222			R				2,200
SA1206R223	25 VDC		R				22,000

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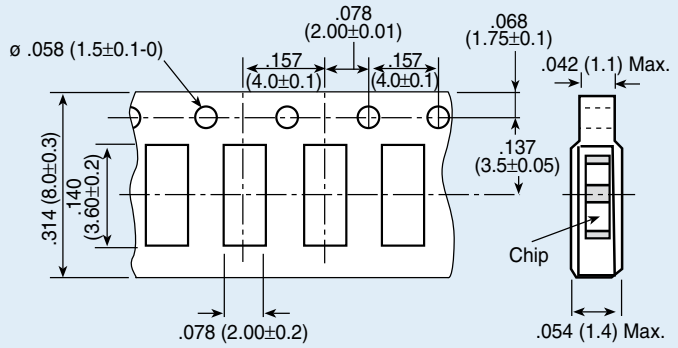
Surface Mount Filter Arrays
SA Series

Ordering Information

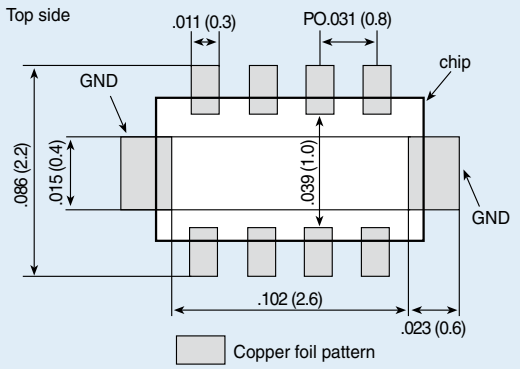
SA	1206	C	220	M	B	N	B
Style	**Size**	**Temperature Characteristics**	**Capacitance**	**Capacitance tolerance**	**Rated Voltage (Vdc)**	**Termination**	**Packaging**
SA Series	1206	**C** +/- 30 ppm/°C **R** +/- 15% **U** -750 +/- 120 ppm/°C	22 pF 47 pF 100 pF 220 pF 470 pF 1,000 pF 2,200 pF 22,000 pF	**M** = ± 20%	**A** = 25 **B** = 50	**N** = Ni Barrier Solder Plated	**T** - Tape and reel 4,000 pc/reel **B** - Bulk pack 1,000 pcs/bag

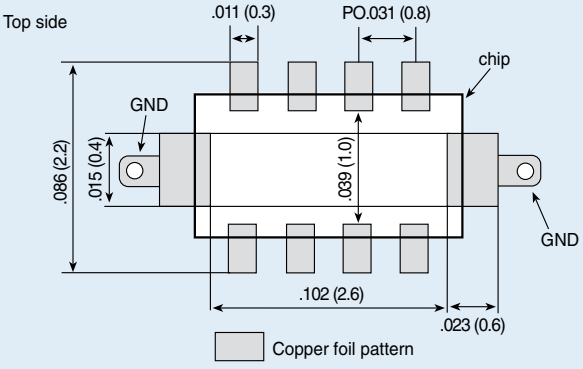
SA Tape and Reel Packaging

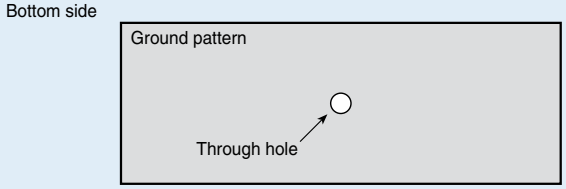


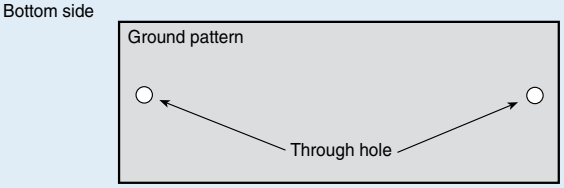
Dimensions in inches *(mm)*

Recommended Board Pattern









Dimensions in inches *(mm)*

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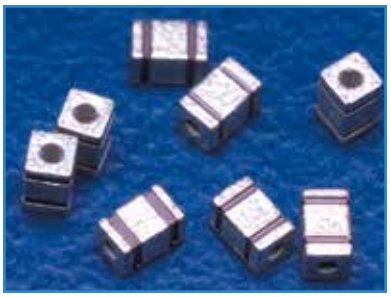
Surface Mount Low Pass Filters

MSM, SSM, RSM & PSM Series

MSM - Miniature Surface Mount Chip Capacitors



The MSM series filters feature high temperature construction and have current ratings up to 10 Amps. The filter chips will hardly allow residual inductance and the self-resonant frequency extends to the microwave band. Applications include telecommunication equipment, computer and peripheral equipment and digital AV equipment, medical equipment, DC power supply lines.

- Miniature footprint help in dense circuit configuration
- Rated at 10 Amps
- Packaged in tape and reel or bulk form
- Operating temperature ranges of -25˚C to +85˚C and -55˚C to +125˚C
- Available lead free/RoHs compliant

SSM - Square Surface Mount Filters

The SSM series filters feature high temperature construction and have current ratings up to 10 Amps. This filter chip series is nonpolar and surface mountable with excellent performance characteristics and comes in a Pi circuit configuration. Applications include telecommunication equipment, computer and peripheral equipment, digital AV equipment, power amplifiers, power supplies and high current buss lines.

- Square mechanical geometry enhances SMT soldering
- Rated to 10 Amps
- Packaged in tape and reel or bulk form
- Operating temperature range of –55˚C to +125˚C
- Available lead free/RoHs compliant

RSM - Round Surface Mount Filters

The RSM series filters feature high temperature construction and have current ratings up to 10 Amps. This filter chip series is nonpolar and surface mountable with excellent performance characteristics and comes in a Pi circuit configuration. Applications include telecommunication equipment, computer and peripheral equipment, digital AV equipment, power amplifiers, power supplies and high current buss lines.

- Round mechanical geometry enhances SMT soldering
- Rated to 10 Amps
- Packaged in tape and reel or bulk form
- Operating temperature range of –55˚C to +125˚C
- Available lead free/RoHs compliant

PSM - Power Surface Mount Filters

The PSM series filters feature high temperature construction and have current ratings up to 20 Amps. This filter series is nonpolar and surface mountable with excellent performance characteristics and comes in either a Feed-through or Pi circuit configuration. Applications include telecommunication equipment, computer and peripheral equipment, digital AV equipment, power amplifiers, power supplies and high current buss lines.

- Provides time and costs saving compared to through-hole filters
- Rated to 20 Amps
- Packaged in tape and reel or bulk form
- Operating temperature range of –55˚C to +125˚C
- Available lead free/RoHs compliant

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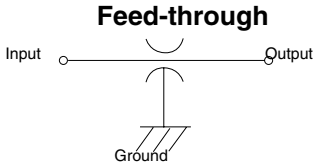
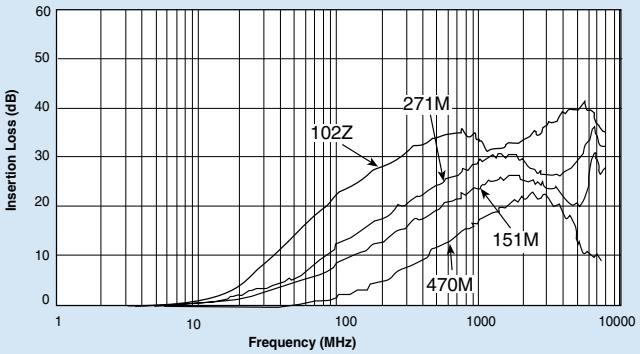
Surface Mount Low Pass Filters
MSM Series

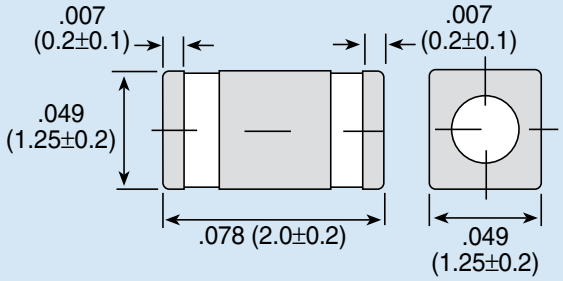
MSM



Working Voltage . . . . . 50 VDC
Test Voltage . . . . . 150 VDC
Current Rating . . . . . 10 Amps max.
Insulation Resistance . . . . . 1.0 MΩ
Terminations . . . . . Ni-Barrier
Soldering Conditions . . . . . Max. 250˚C-5 sec.

Insertion Loss





MSM

Dimensions in inches (mm)

MSM Ordering Information

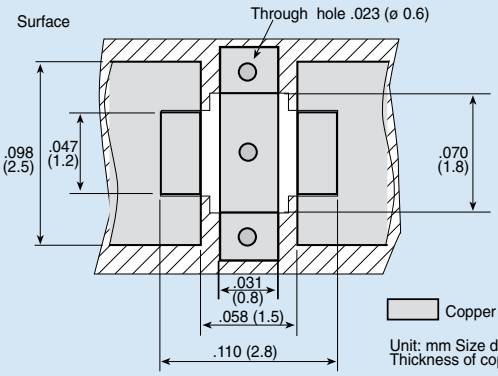
MSM	4	T	470M	10	T
Style	**Circuit Configuration**	**Temperature Characteristic**	**Capacitance**	**Current Rating**	**Packaging**
MSM (Miniature)	**4 -** Feed-Through	**R -** +/-15% **T -** +22/-33% **V -** +22/-82%		10 Amps	**T -** Tape and Reel 2,000 pcs/reel **B -** Bulk pack 1,000pcs/reel

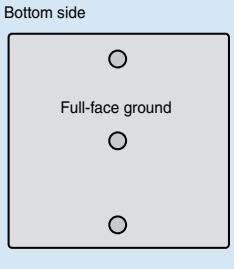
Value	Tolerance
47 pF	+50/- 20%

Specifications

Part Number	Temperature Characteristics	Capacitance	Capacitance Tolerance	Current Rating	Rated Rating Rating	Temperature Range
MSM4T470M10	T	47pF	+50/-20%	10A	50VDC	-55/+125˚C
MSM4R151M10	R	150pF				-55/+125˚C
MSM4R271M10	R	270pF				-55/+125˚C
MSM4V102M10	V	1000pF				-25/+85˚C

MSM Recommended Board Pattern



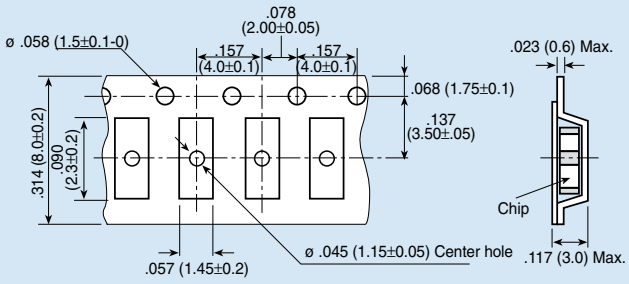


Copper foil pattern Resist

Unit: mm Size difference: ±0.1
Thickness of copper foil: 35µm

Note: Exclusively for reflow soldering

MSM Tape and Reel Packaging



Dimensions in inches (mm)

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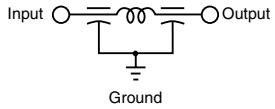
Spectrum Control

Surface Mount Low Pass Filters
SSM & RSM Series

SSM

Pi



Working Voltage. . . . . 100 VDC
Test Voltage . . . . . 250 VDC
Current . . . . . Max. 10 Amps
Insulation Resistance . . . . . Min. 10^4 MΩ
Terminations . . . . . Silver Ni-Tin plated
Soldering Conditions . . . . . Max. 250°C -5 sec.
Marking. . . . . None
Packaging. . . . . Bulk or tape and reel

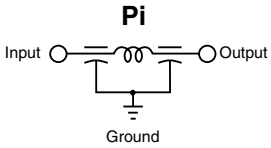
Note: Insertion loss shown for the following SSM values* only:

101Z
501P
202P

*Additional IL charts available by request.

RSM

Pi



Working Voltage. . . . . 100 VDC
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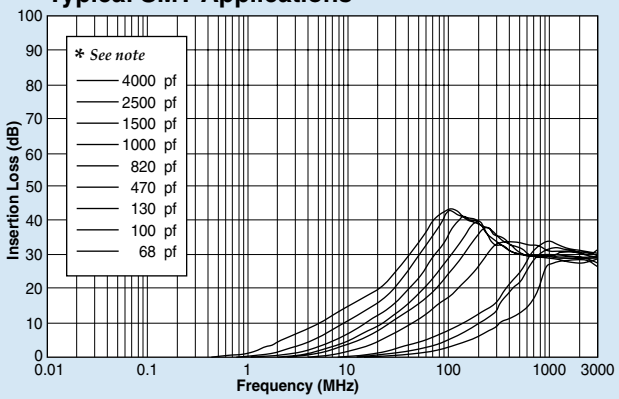
Current . . . . . Max. 10 Amps
Insulation Resistance . . . . . Min. 10^4 MΩ
Terminations . . . . . Silver Ni-Tin plated
Soldering Conditions . . . . . Max. 250°C -5 sec.
Marking. . . . . None
Packaging. . . . . Bulk or tape and reel

Note: Insertion loss shown for the following RSM values only:

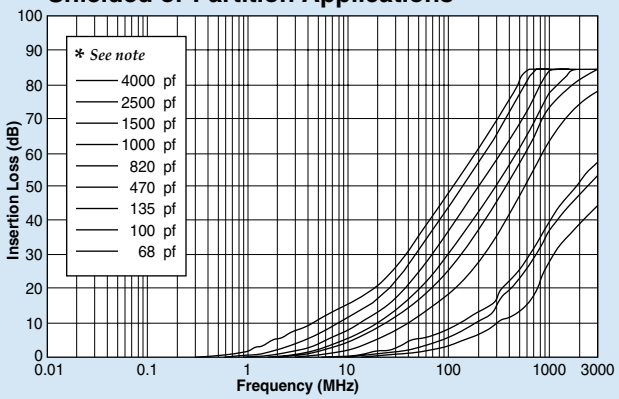
152P
402Z

Pi Insertion Loss

Typical SMT Applications

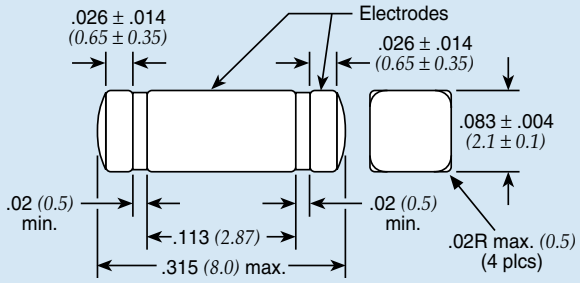


Shielded or Partition Applications

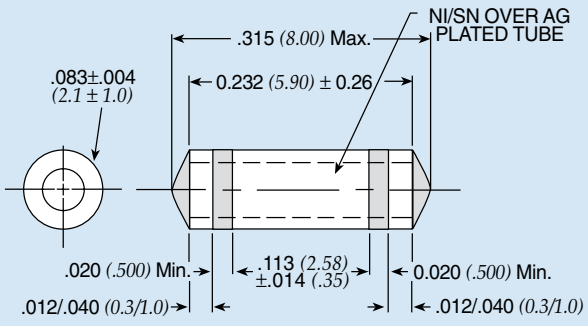


** Capacitance values for insertion loss curves are displayed left to right in the order shown.*

SSM



RSM



Dimensions in inches *(mm)*

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Surface Mount Low Pass Filters

SSM & RSM Series

SSM & RSM Ordering Information

Example: **SSM1-101Z-05T**

SSM	1 *	-	101Z	-	05	T	1
Style	Circuit Configuration		Capacitance		Current Rating	Packaging	Tape and Reel

Style
SSM (Square)
RSM (Round)

Circuit Configuration
1 - Pi

† Also available through API's authorized distributors.

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

† SSM1-152P-05-T1 €

Capacitance

Code	Value	Tolerance
101Z	100 pF	+80/-20%
501P	500 pF	+100/-0%
152P	1500 pF	+100/-0%
202P	2000 pF	+100/-0%
402E	4000 pF	±25
402Z	4000 pF	+80/-20%

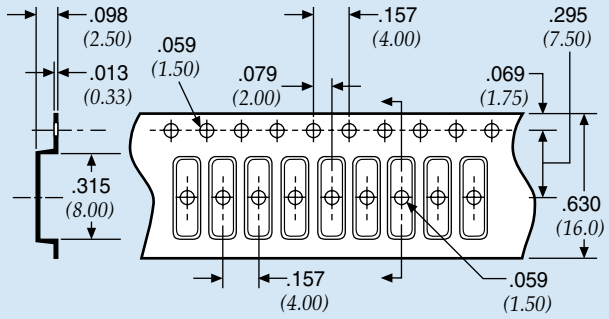
Current Rating
05 - 5 Amps
10 - 10 Amps

Packaging
T - Tape and reel packaging
B - Bulk packaging

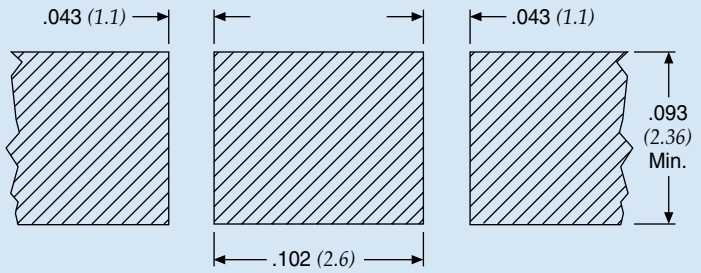
Tape and Reel
1 - 1,000 pieces
6 - 6,000 pieces
Note: Tape and reel packaging - 1,000 pieces (7") and 6,000 pieces (13")

***** *Add "F" before "-" for RoHS compliant version*

SSM/RSM Tape and Reel Packaging



SSM Recommended Board Pattern



Dimensions in inches *(mm)*

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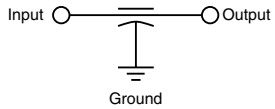
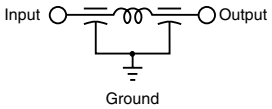
Surface Mount Low Pass Filters
PSM Series

PSM

Feed-Through



Pi

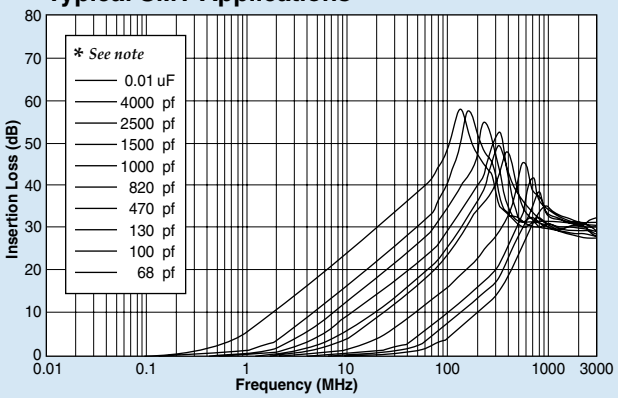


Voltage Rating DC . . . . . 200 VDC @ -55°C to +125°C
DWV . . . . . 700 VDC
Current Rating . . . . . 20 Amps (Feed-through) max.
10 Amps (Pi) max.
Insulation Resistance . . . . . 1.0 GΩ @ 25°C
Dissipation Factor . . . . . 4.0% maximum
D.C.R. . . . . . Max. .0005Ω, typ. .0002Ω

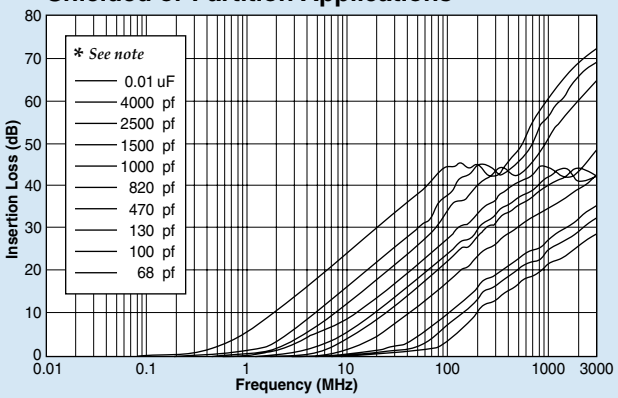
* AC rated parts available. Please consult factory.

Feed-Through Insertion Loss

Typical SMT Applications

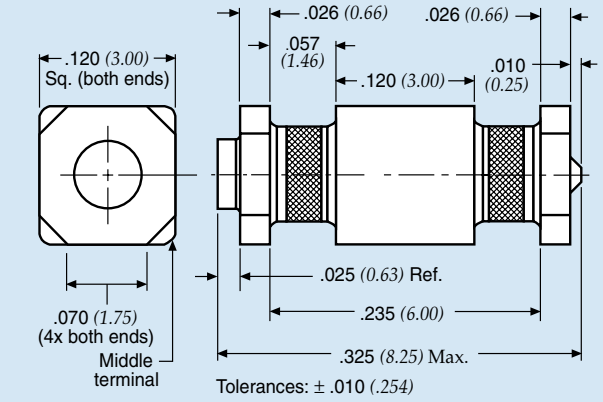


Shielded or Partition Applications



** Capacitance values for insertion loss curves are displayed left to right in the order shown.*

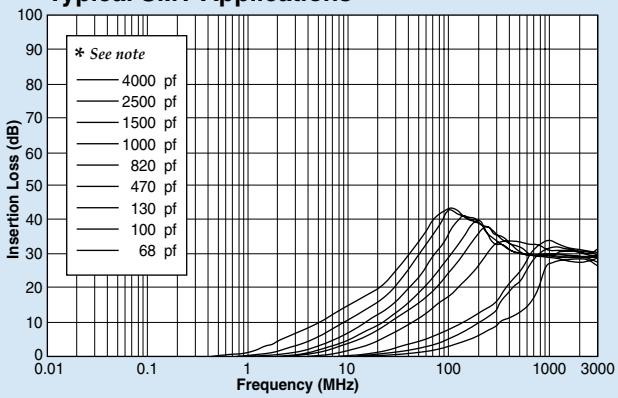
PSM



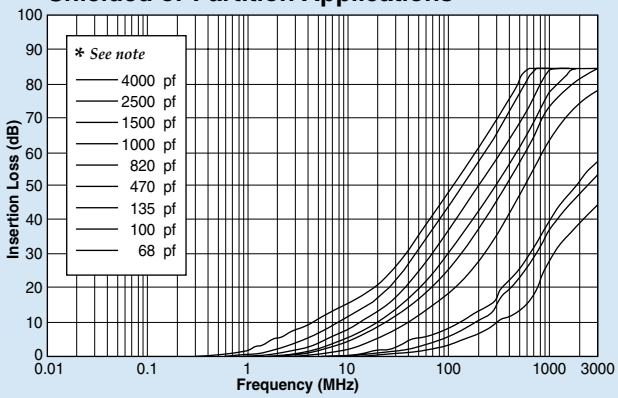
Dimensions in inches *(mm)*

Pi Insertion Loss

Typical SMT Applications



Shielded or Partition Applications



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Surface Mount Low Pass Filters
PSM Series

PSM Ordering Information
Example: **PSM4-402Z-20T0**

PSM - **4** - **402Z** - **20** - **T** - **0**

Style
PSM (Power)

Circuit Configuration
1 - Pi
4 - Feed-through

† Also available through API's authorized distributors.

Capacitance

Code	Value*	Tolerance
680M	68 pF	±20%
101M	100 pF	±20%
131P	130 pF	+100/-0%
471P	470 pF	+100/-0%
821M	820 pF	±20%
102M	1000 pF	±20%
152M	1500 pF	±20%
252P	2500 pF	+100/-0%
402Z	4000 pF	+80/20%
103Z**	.01 µF	+80/-20%

Current Rating
10 - 10 Amps (Pi)
20 - 20 Amps (Feed-through)

Packaging
T - Tape and reel packaging
B - Bulk packaging

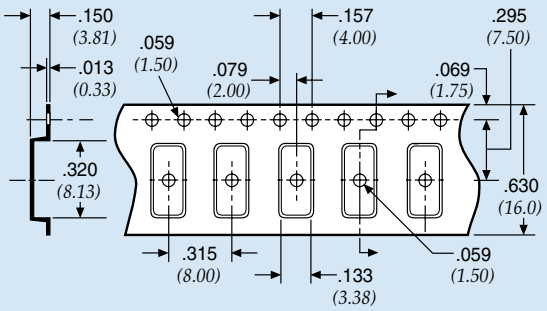
Tape and Reel
0 - 500 pieces
2 - 2,000 pieces
Note: Tape and reel packaging - 500 pieces (7") and 2,000 pieces (13")

* *Other capacitance values available as special order.*

** *Available in Feed-through circuit only.*

Technical Notes
- Soldering recommendations supplied upon request
- Reflow temperature limit is 250°C
- Unit weight is approximately 0.4 grams
- Tape and reel packaging available for automated assembly

PSM Tape and Reel Packaging



Dimensions in inches *(mm)*

PSM Recommended Board Pattern

Solder paste pattern

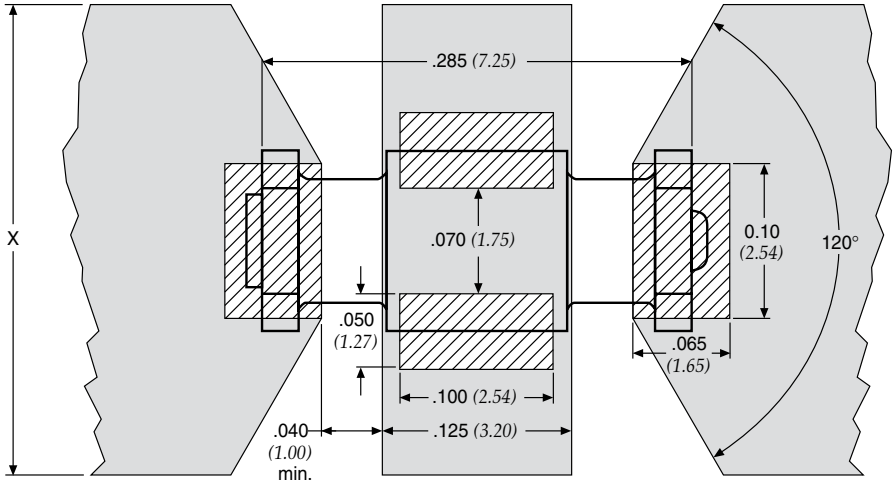
Recommended pad, must be able to support continuous signal current

X = 0.350" minimum for 1 oz. copper (0.036 mm thickness)

X = 0.200" minimum for 2 oz. copper (0.071 mm thickness)

For low current (10 Amp or less)
X = 0.130" minimum for 1 oz. copper (0.036 mm thickness for 10 Amp and 0.5 oz. copper - 0.018 mm thickness for 5 Amp or less)

Dimensions in inches *(mm)*



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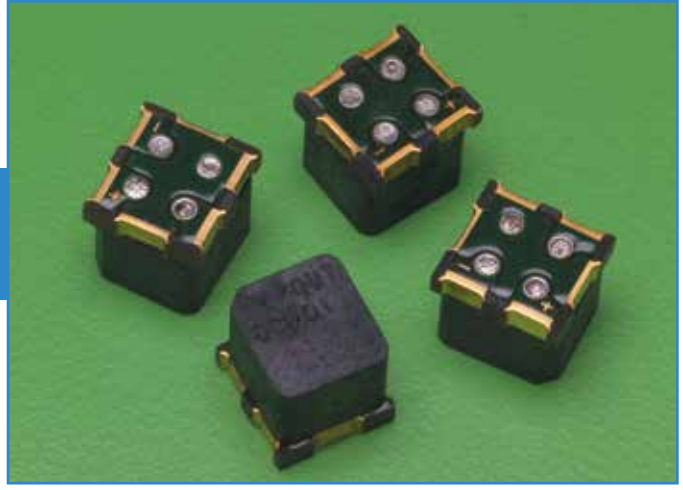
Spectrum Control

Mini Surface Mount Power Filters
MSP Series



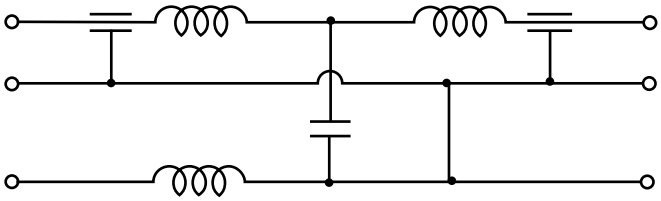
Features

- Designed for 10A DC power lines
- Offers high insertion loss in a wide frequency band by combining feed-through capacitors, multilayer ceramic capacitors and ferrite bead inductors with high self resonance frequency.
- Compact EMI package with plus and minus lines

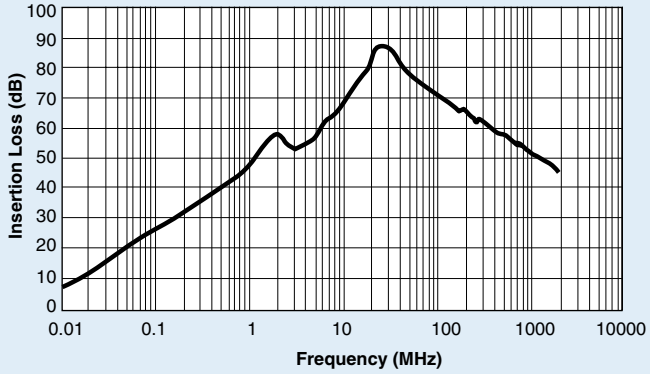
Applications

- Electronic measuring instruments
- Industrial equipment
- Automotive electronics
- Switching power supplies
- DC-DC converters

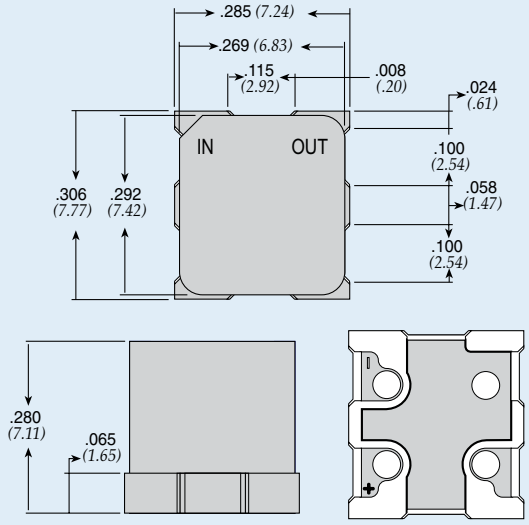
Circuit Schematic



Insertion Loss



Dimensions



Dimensions in inches *(mm)*

Specifications

Model	Rated Voltage	Rated Current	Max. DCR	Temperature Range
MSP-007-050	50VDC	10A	5 M	-25˚C ~ +105˚C

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Spectrum Control

Miniature PCB Power Filters
MPC Series

Tested and found to be
IAW VDE 0565 Part 3

61-MPC Series

Rugged construction design enables parts to perform in industrial environments. The 61-MPC series is ideally suited for products that must conform to FCC part 15 regulations. Agency approvals: UL recognized, CSA certified, TUV approved (tested and found to be in accordance with VDE 0565 Part 30. Applications include:

- Personal computers and peripherals
- Measuring instruments
- Home appliances and vacuum cleaners
- Monitor and display units
- Switching power supplies
- Available lead free/RoHs compliant

11-MPC Series

Power filters are available in PCB mount, bolt-in, fast-on tab or solder lug. The 11-MPC series is ideally suited for products that have been limited board space and require a low cost alternative. Available in both metal and plastic cases. Applications include:

- Personal computers and peripherals
- Digital equipment
- Measuring instruments and medical equipment
- TV & VCR monitors and display units
- Available lead free/RoHs compliant

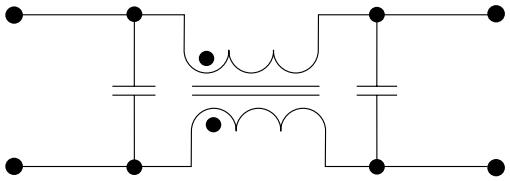
MPC-010/-015 Series

The compact design of the MPC-010 and -015 series power filters integrates a feed-through capacitor, multilayer ceramic capacitor and ferrite bead inductors. This series is ideally suited for dense PCB's and where both positive and negative lines have reduced EMI in one housing. Applications include:

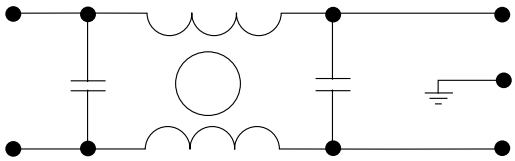
- DC power lines on industrial equipment
- Measuring instruments
- Home appliances and vacuum cleaners
- Monitor and display units
- Switching power supplies
- Available lead free/RoHs compliant

Circuit Diagrams

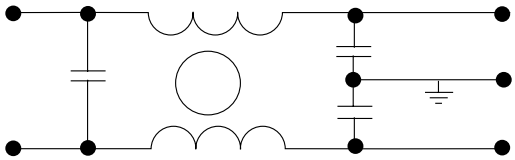
Circuit 1



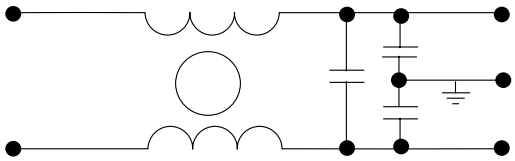
Circuit 2



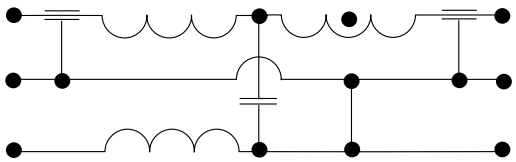
Circuit 3



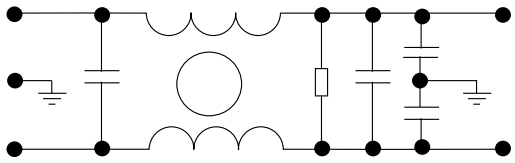
Circuit 4



Circuit 5



Circuit 6



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Spectrum Control

Miniature PCB Power Filters
MPC Series

Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Inductance (L_1)	Temperature Rise (Max.)	Circuit Diagram	Figure
61-MPC-010-1-11	250VAC	1A	0.1mA	11mH	40˚C	1	A
61-MPC-016-1-11		1.6A		6.0mH			
61-MPC-025-1-11		2.5A		2.4mH			
61-MPC-036-1-11		3.6A		1.2mH			
11-MPC-001-2-B	120/250VAC	1A	5uA	———	30°C	2	B1
11-MPC-001-5-A			0.50mA			3	B
11-MPC-001-5-B							B1
11-MPC-002-5-B		2A				4	E
11-MPC-002-5-D							F
11-MPC-003-5-E		3A				3	B1
11-MPC-006-5-B		6A					D
11-MPC-006-5-C						6	C
11-MPC-016-5-B		16A	0.2mA				
MPC-010-050	50 VDC	10A	———	———	———	5	G
MPC-010-250	250 VDC						
MPC-015-050	50VDC	15A					

Note: Test voltage: 1500VAC one minute, line to ground. Insulation resistance: 300 M min. at 500VDC. Voltage drop: 1V max. at rated current. Weight: 17.5g

Figure A

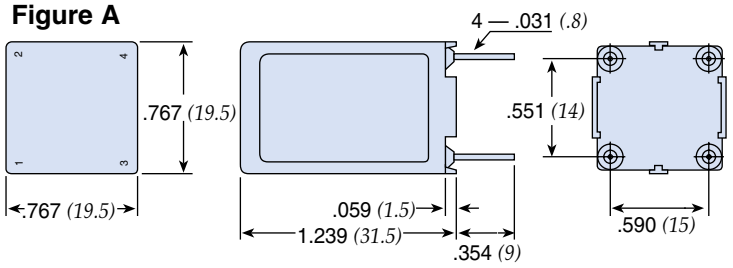


Figure B

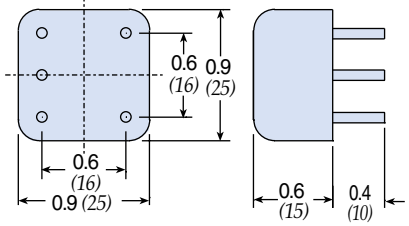


Figure B1

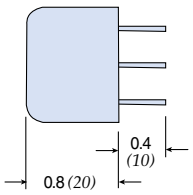


Figure C

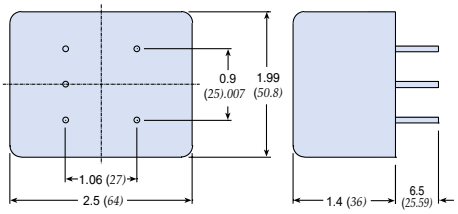


Figure D

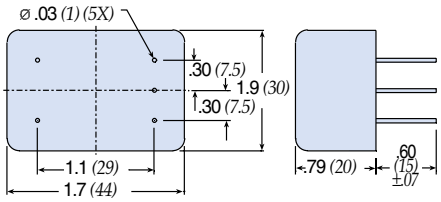


Figure E

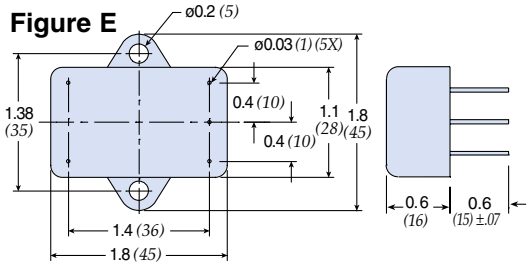


Figure F

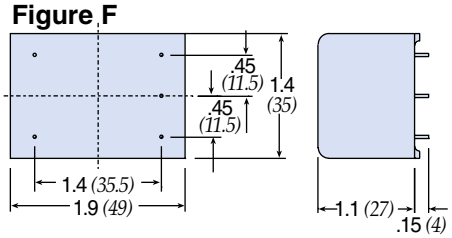
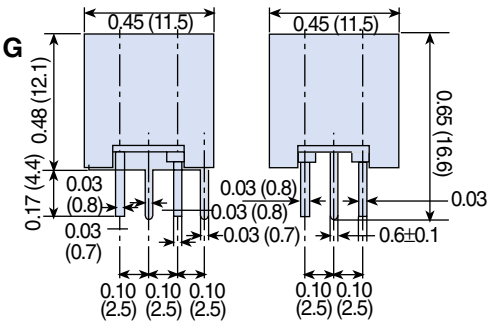


Figure G



Dimensions in inches *(mm)*

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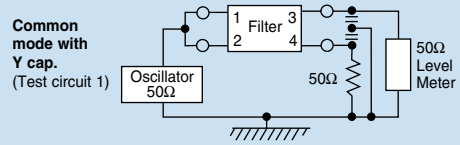
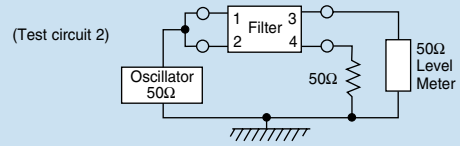
Miniature PCB Power Filters

MPC Series

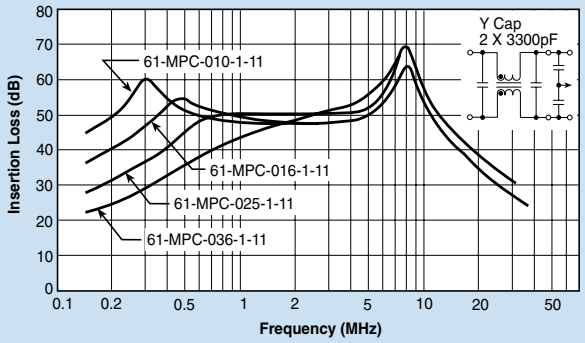
61-MPC Series

Common Mode





61-MPC



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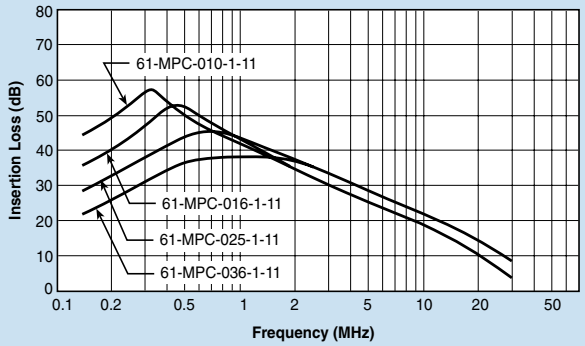
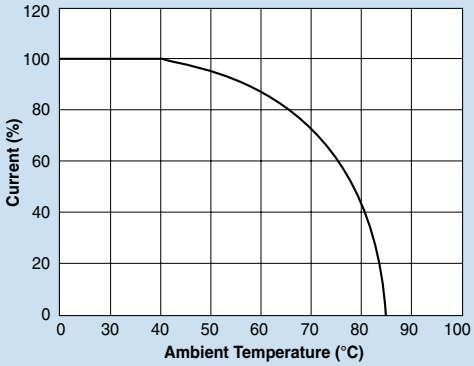
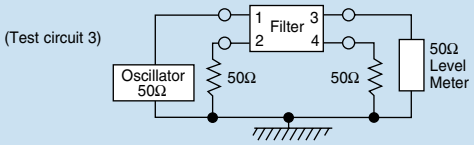


Temperature Characteristics



Normal Mode



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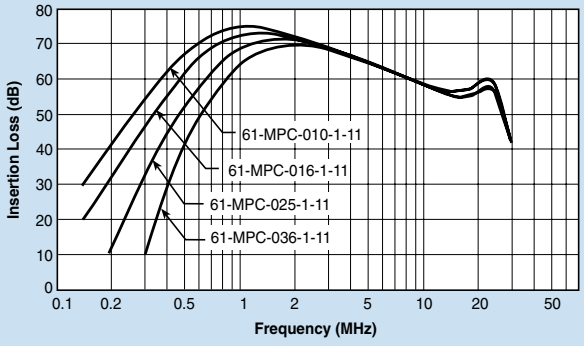
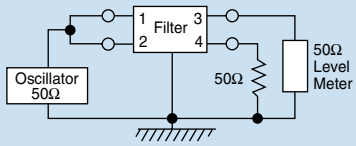


api technologies corp.
Spectrum Control

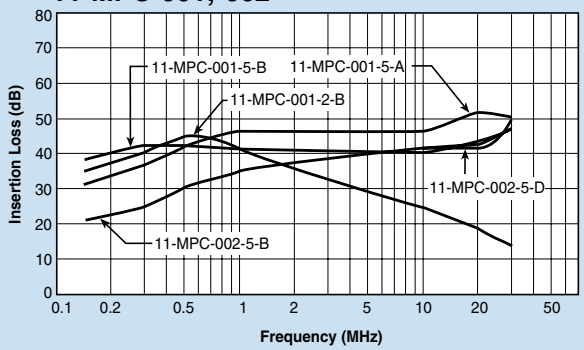
Miniature PCB Power Filters
MPC Series

11-MPC Series

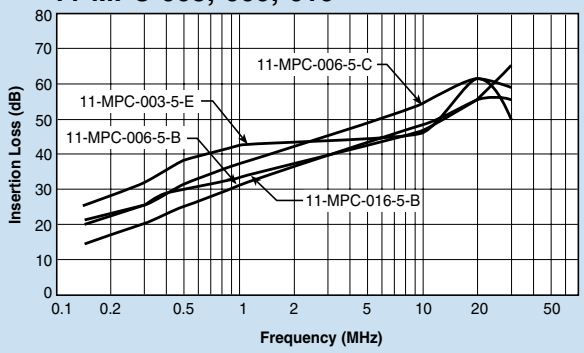
Common Mode



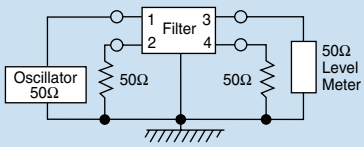
11-MPC-001;-002



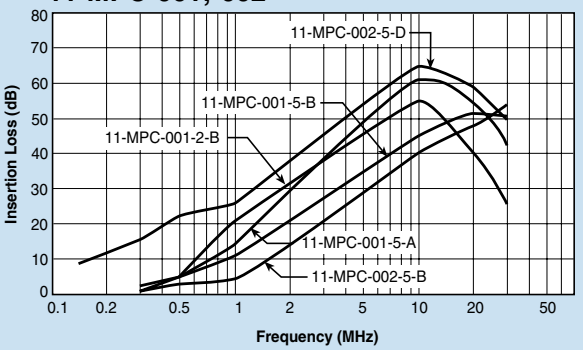
11-MPC-003;-006;-016



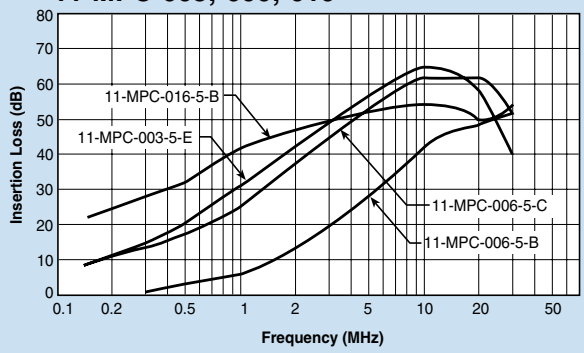
Normal Mode



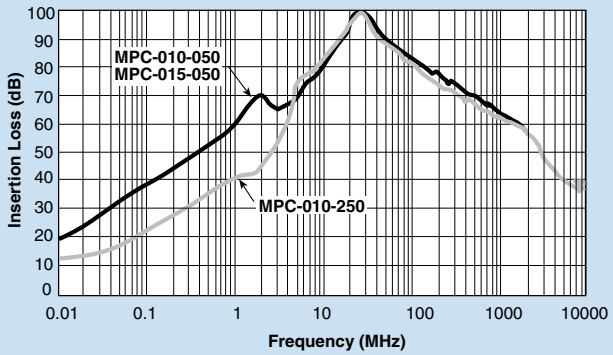
11-MPC-001;-002



11-MPC-003;-006;-016



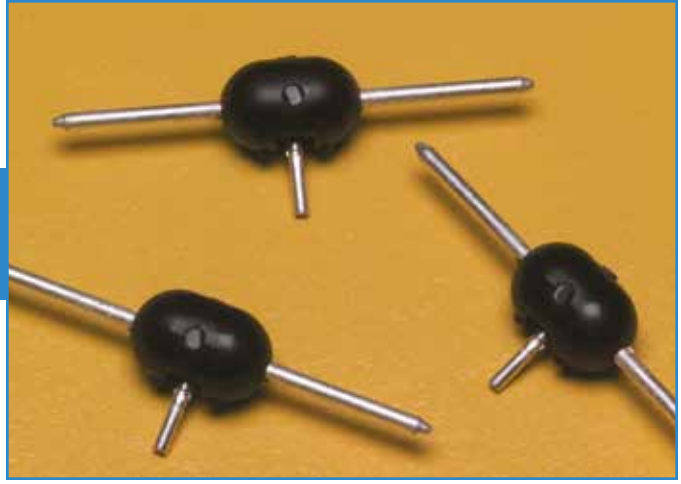
MPC-010 & 015 Series



api technologies corp.
Spectrum Control

Through-hole Filters

High Frequency PCB Filters



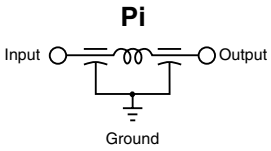
API Technologies' Spectrum Control line of high frequency PCB filter provides EMI filtering to protect low power digital circuits, while meeting most government and industrial specifications for EMI control. With low assembly and installation costs, the PCB filter helps keep your project on budget. By mounting the PCB filter at the source of the problem, we eliminate the need for additional filtering at other points in the circuit. The filter mounts directly to a printed circuit board with no mounting bracket or plate needed, providing you with a lower total installed cost. In addition, the PCB filter can be flow-soldered with other components.

API's PCB filter has built-in standoffs, which allow for cleaning or coating beneath the filter, and the filter is encapsulated for environmental protection.

Features

- Provides EMI filtering to protect low power digital circuits - helps equipment meet FCC and VDE specifications
- Mounts directly to printed circuit board with no bracket or plate for lower applied costs - can be flow soldered with other components
- Encapsulated for environmental protection
- Mounts on PCB to begin filtering at the source of the problem
- Built-in standoffs permit cleaning or coating under the filter

Circuit Schematic

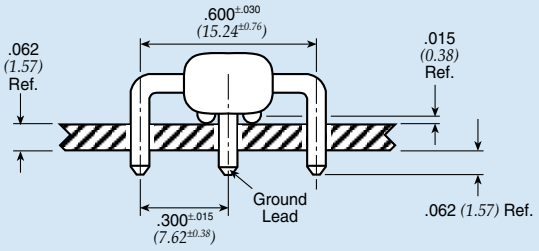


Typical Electrical Characteristics

Current	Max. 10A DC; 0.3A RF
Operating Voltage	Max. 50 VDC, -25°C to +85°C
Capacitance	800 pF min.
Dissipation Factor	0.1 Max.
Dielectric Withstanding Voltage	125 VDC for 5 seconds
Insulation Resistance	Min. 100 MegOhms at 100 VDC for 2 minutes and 25°C
Direct Current Resistance	0.002 ohms Max.
Minimum No-Load Insertion Loss	Per MIL-STD-220 at 25°C; PCB mounted, 50 ohm strip line 3dB @ 8 MHz 10dB @ 25 MHz 15dB @ 50 MHZ 20dB @ 100 MHz-1GHz

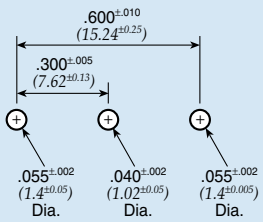
Preformed to Recommended Mounting Configuration
Part Number 842448-2

Recommended Mounting Configuration



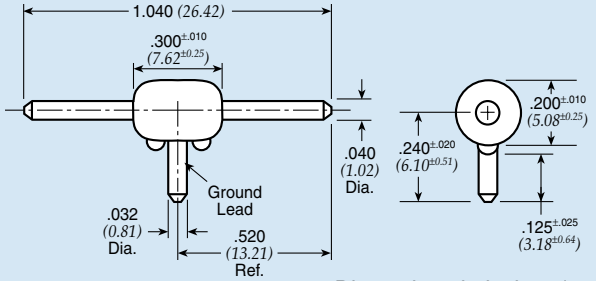
Dimensions in inches *(mm)*

Recommended PCB Hole Layout



Dimensions in inches *(mm)*

Standard Configuration **Part Number 842448-1**



Dimensions in inches *(mm)*

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

Low Pass EMI Filters

the industry's most complete line of EMI filters gives you more style, size, IL performance and cost alternatives

Motor Line Feed-Through (MLFT) Filters are high capacitance filters specifically designed for DC motor and other lower voltage applications. This one-component solution addresses EMI noise issues and eliminates the need for multiple components and electrical connections… **LP2**

Solder-In Filters offer an ideal solution for applications in critical areas where space does not allow for use of mounting tools or hardware. Available in C, Pi and standard L circuit configurations and primarily used in filtering signal/data lines and AC power lines… **LP3-LP7**

9900 Series Filters have a knurled design allowing them to be pressed into place creating a reliable mechanical bond making them an excellent choice for applications where soldering is undesirable… **LP8-LP11**

Spec Spin Filters are an excellent choice for applications that require many lines to be filtered in close proximity to each other due to their space saving #2-56 threaded miniature EMI spanner design. These filters are designed without a hex and do not require soldering for installation… **LP12**

Resin Sealed Filters provide excellent environmental protection in a rugged case that is resin sealed at both ends and easily mounted with a tapped hole or through hole. These filters are provided in C, L and Pi configurations with metric threading available… **LP13-LP24**

High Current Resin Sealed Filters are ideal for use in high current 5 volt logic buss, as well as ±48 VDC telephone rack buss, high current switch mode power supplies and DC charging systems. These filters feature rugged bolt-in style for easy installation… **LP25-LP26**

Hermetically Sealed Filters feature hermetic glass seals and high EMI filtering performance making them highly reliable in the toughest environmental conditions. These filters are available with C, L, Pi, T and double T configurations with MIL-F-15733 and MIL-F-28861 QPL filters available… **LP27-LP42**

Value Added Assemblies offer flexible solutions by allowing you to add connectors, modify terminations or add wire harnesses, thereby lowering your cost of acquisition and assembly, reducing your production time/costs and inventory, all while giving you a filter assembly that meets your unique design challenges… **LP43**

Low Pass EMI Advantages

API Technologies' Spectrum Control brand was founded in 1968 as a designer and manufacturer of Electromagnetic Interference (EMI) filters. Today, API continues that work, combining knowledge with excellence. These many years of experience have yielded an engineering-driven team that understands how and where potential EMI problems exist in an electronic system and how to best eliminate them. With an extensive library of standard products and a willingness to develop an application-specific custom solution, our customers count on us to help them satisfy global EMC standards while meeting demanding design parameters.

- Wide range of package sizes, mounting options and circuit configurations offering maximum design flexibility
- Develop custom application-specific solutions addressing your mechanical and electrical requirements
- High reliability construction… built in accordance to MIL-PRF-15733 or MIL-PRF-28861
- Over 800 standard QPL products and DSCC part numbers
- Effective filtering up to 18 GHz
- Reliability testing available for customer specific requirements

For complete specs and drawings, visit eis.apitech.com/low_pass_filters.asp

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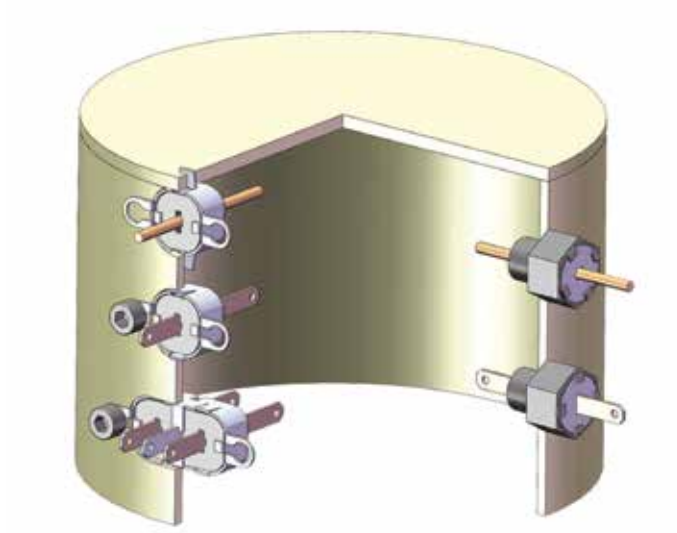
api technologies corp.
Spectrum Control

Motor Line Feed-Through (MLFT) Filters

As the world leader in EMC, API Technologies' Spectrum Control brand has developed a family of high capacitance filters specifically designed for DC motor and other lower voltage applications. The Motor Line Feed-Through (MLFT) filter is a one-component solution that eliminates the need for multiple capacitors, inductive coils, leads and PCB assemblies requiring numerous electrical connections and large amounts of space. MLFT filters are engineered to provide the required EMI filtering and mechanical interface at a reduced cost.

MLFT filters offer significant insertion loss to pass global conductive and radiated EMC tests, such as CISPR 25. Our standard line of filters can be designed into mechanical packages for easy retrofit into existing designs or as custom assemblies to simplify installation during production. These filters are available in stamped or threaded housings, with single or dual lines, and round leads or Faston terminals for applications to 100 volts.



Benefits

- Easy installation, provides a connector interface
- Excellent EMI filtering through GHz range
- Competitive cost
- Space saving EMI solution
- Fewer electrical connections
- Failsafe DC open circuit for safety concerns
- Standard and custom filtering and mechanical packages
- Transient voltage and surge protection available

Ordering Information

Example: **MLFT2-001-TFCAC**

The part number shown represents a single line, threaded MLFT Filter with Faston Terminals, a capacitance rating of 0.20 µF and a voltage rating of 100V.

MLFT2	-	001	-	T	F	CA	C
Motor Line Feed-Through Filter				**Style** **T** = Single line threaded **S** = Single line stamped **D** = Dual line stamped	**Terminal** **F** = .110 Faston **R** = .062 round lead	**Capacitance** **CA** = .20 µF **CC** = 2000 pF **CD** = 20 pF	**Voltage Rating** **C** = 100V

api technologies corp.
Spectrum Control

Solder-in Filters

Solder-in filters are ideal for use in critical areas where space does not allow use of mounting tools or hardware. The solder-in feature also allows installation in unison with other board mounted components. Primarily used in filtering signal/data lines and DC power lines.

Features

- Small size to allow effective use of space
- Voltage ratings to 750 VDC
- Multiple circuit configurations: C, L & Pi available
- High temperature construction to prevent reflow during installation
- MIL-F-15733 QPL versions available

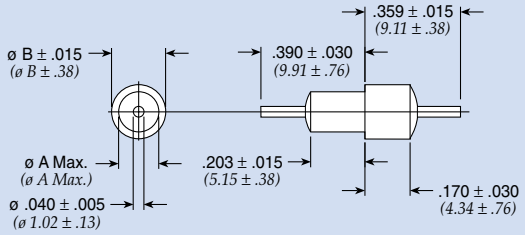


Figure 1

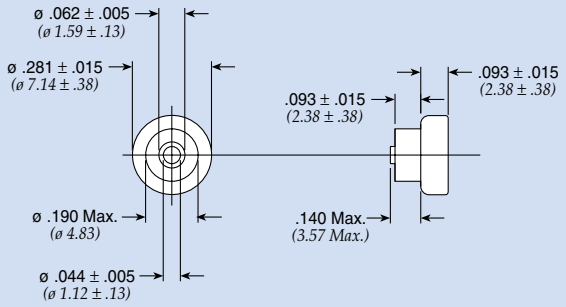


Figure 2

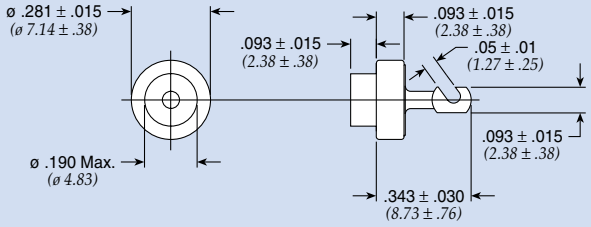


Figure 3

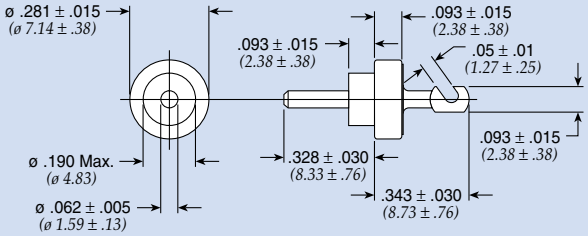


Figure 4

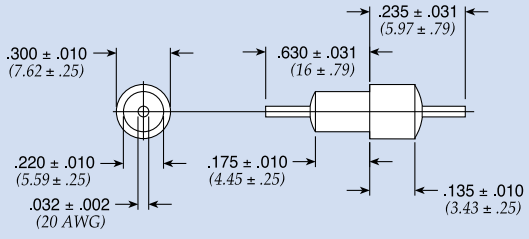


Figure 5

Dimensions in inches *(mm)*

Solder-in Filters

Solder-in C Circuit

Part Number	See Pg. LP3 for Fig.	A In	A (mm)	B In	B (mm)	Rated Voltage 125°C DC	I Amp	Cap*	Minimum Insertion Loss (dB) 1 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
54-786-003	1	0.156	*(3.96)*	0.203	*(5.16)*	50	10	0.30 µF	32	47	54	60	66	70	70
54-785-002	1	0.125	*(3.18)*	0.184	*(4.67)*	100	10	0.05 µF (min)	16	33	41	45	48	50	50
54794002X5R101M	4	—	—	—	—	250	25	100 pF ± 20%	—	—	—	—	10	20	20
54803004X5R101M	3	—	—	—	—	250	25	100 pF ± 20%	—	—	—	—	10	20	20
54802002X5R101M	2	—	—	—	—	250	25	100 pF ± 20%	—	—	—	—	10	20	20
†**54794002X5R471M**	4	—	—	—	—	250	25	470 pF ± 20%	—	—	—	12	22	25	25
†**54803004X5R471M**	3	—	—	—	—	250	25	470 pF ± 20%	—	—	—	12	22	25	25
54802002X5R471M	2	—	—	—	—	250	25	470 pF ± 20%	—	—	—	12	22	25	25
†**54802002X5V102P**	2	—	—	—	—	250	25	1000 pF	—	—	—	15	25	35	40
†**54803004X5V102P**	3	—	—	—	—	250	25	1000 pF	—	—	—	15	25	35	40
†**54794002X5V102P**	4	—	—	—	—	250	25	1000 pF	—	—	—	15	25	35	40
†**54-786-077**	5	—	—	—	—	750	10	1000pF	—	4	—	20	25	35	40

† Also available through API's authorized distributors.

* Tolerances are +100/-0% unless noted.

Solder-in Filters

Solder-in Pi Circuit

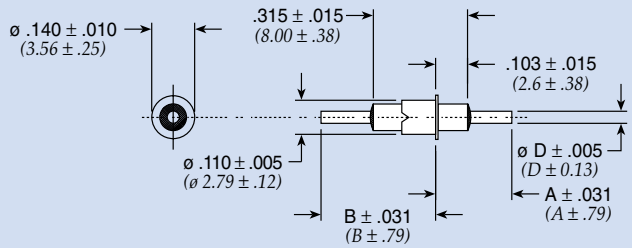


Figure 1

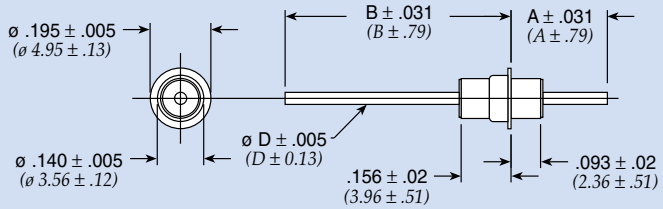


Figure 2

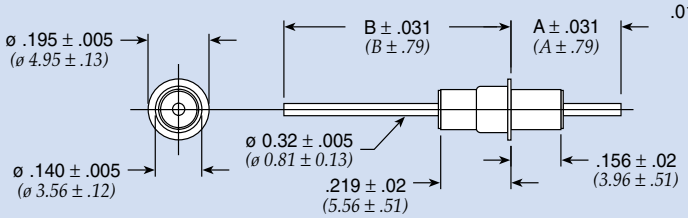


Figure 3

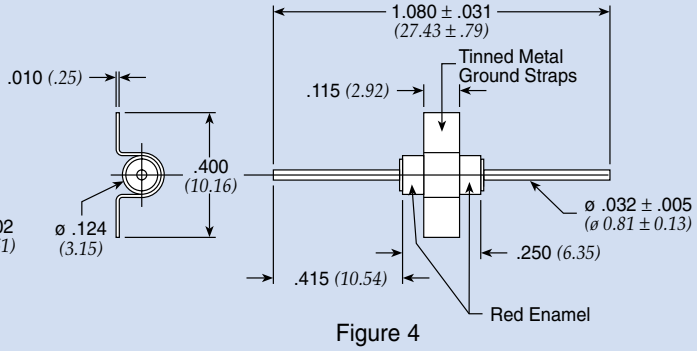


Figure 4

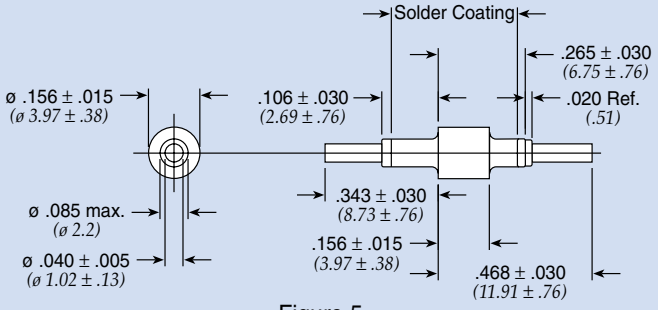


Figure 5

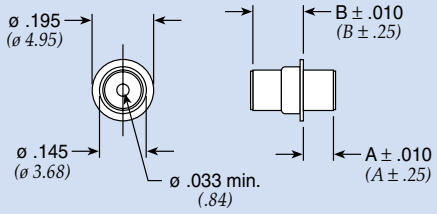


Figure 6

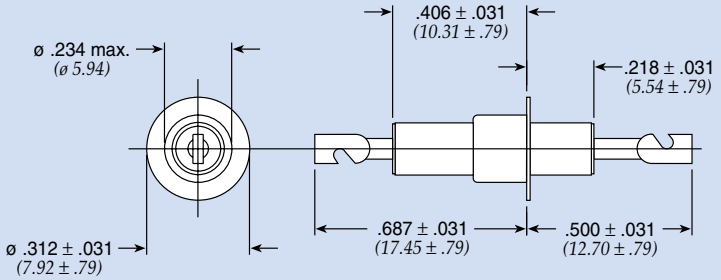


Figure 7

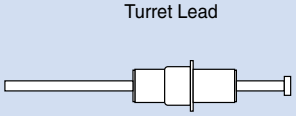


Figure 8

Dimensions in inches *(mm)*

Solder-in Filters

Solder-in Pi Circuit

Part Number	M15733 MIL Number	See Pg. LP5 for Fig.	A		B		D		Rated Voltage 125°C		I	Min	Minimum Insertion Loss (dB)						
			In	(mm)	In	(mm)	In	(mm)	DC	AC	Amp	Cap	1 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
51-703-013*	/62-0003	3	0.312	(7.92)	0.469	(11.91)	0.032	(0.81)	70	—	10	1500 pF	—	5	12	50	50	65	65
51-750-309*	/62-0004	2	0.268	(6.81)	0.780	(19.81)	0.032	(0.81)	70	—	10	0.012 µF	5	22	50	70	70	65	65
†**1234-000*** €	—	2	0.257	(6.53)	0.780	(19.81)	0.032	(0.81)	70	—	10	0.012 µF	5	25	50	70	70	70	70
51-749-304	—	4	—	—	—	—	—	—	70	—	10	0.012 µF	5	25	50	70	70	65	65
1234-001	—	4	—	—	—	—	—	—	70	—	10	0.012 µF	5	25	50	70	70	65	65
†**51-750-301***	—	2	0.250	(6.35)	0.780	(19.81)	0.032	(0.81)	70	—	10	0.012 µF	5	25	50	70	70	70	70
†**1233-000*** €	—	3	0.312	(7.92)	0.780	(19.81)	0.032	(0.81)	70	—	10	0.022 µF	7	35	60	70	70	70	70
†**51-750-302***	—	3	0.312	(7.92)	0.780	(19.81)	0.032	(0.81)	70	—	10	0.022 µF	7	25	60	70	70	70	70
51-750-313	/51-0002	3	0.312	(7.92)	0.780	(19.81)	0.032	(0.81)	70	—	10	0.022 µF	7	25	60	70	70	70	70
†**51-723-303**	—	5	—	—	—	—	—	—	200	—	10	1300 pF	—	5	15	30	45	55	55
51-713-010	/62-0002	1	1.140	(28.96)	1.277	(32.44)	0.032	(0.81)	200	—	10	1500 pF	—	5	12	45	50	70	70
†**1251-001** €	—	1	1.109	(28.17)	1.206	(30.63)	0.032	(0.81)	200	—	10	1500 pF	—	5	15	40	50	70	70
51-703-001*	—	3	0.312	(7.92)	0.406	(10.31)	0.032	(0.81)	200	—	10	1500 pF	—	8	17	45	65	70	70
†**1203-050** €	—	3	0.312	(7.92)	0.406	(10.31)	0.032	(0.81)	200	—	10	1500 pF	—	5	15	45	50	70	70
51-703-012*	/62-0001	3	0.312	(7.92)	0.406	(10.31)	0.032	(0.81)	200	140	10	1500 pF	—	3	15	45	50	70	70
51-713-002	—	1	1.103	(28.01)	1.212	(30.78)	0.032	(0.81)	200	—	10	1500 pF	—	5	12	40	70	70	70
1214-029	—	2	0.288	(7.31)	0.780	(19.81)	0.032	(0.81)	200	—	10	1750 pF	—	5	15	50	60	60	70
†**1214-007** €	—	6	0.093	(2.36)	0.157	(3.99)	—	—	200	—	10	1750 pF	—	5	15	35	50	60	60
51-707-002*	—	2	0.288	(7.31)	0.780	(19.81)	0.032	(0.81)	200	—	10	1750 pF	—	8	17	50	65	70	70
†**1214-001***	—	2	0.288	(7.31)	0.780	(19.81)	0.032	(0.81)	200	—	10	1750 pF	—	5	15	50	50	60	60
†**51-707-006***	/33-0001	2	0.288	(7.31)	0.780	(19.81)	0.032	(0.81)	200	90	10	1750 pF	—	5	15	50	50	60	60
51-707-007	/33-0002	2	0.288	(7.31)	0.780	(19.81)	0.032	(0.81)	200	90	10	1750 pF	—	5	15	50	50	60	60
51-707-026	/66-0001	6	0.288	(7.31)	0.157	(3.99)	—	—	200	—	10	1750 pF	—	5	15	35	50	50	50
†**51-750-322**	—	2	1.123	(28.52)	1.347	(34.21)	0.040	(1.02)	200	—	10	3000 pF	—	7	25	50	65	65	65
51-703-007*	/51-0001	3	0.312	(7.92)	0.406	(10.31)	0.032	(0.81)	200	200	10	5500 pF	—	15	30	55	65	70	70
1223-012	—	1	0.240	(6.10)	0.360	(9.14)	0.040	(1.02)	200	—	15	3000 pF	—	7	25	50	65	65	65
†**1204-050** €	—	7	0.210	(5.34)	—	—	—	—	500	—	25	3000 pF	—	8	25	50	65	70	70
51-704-002	/40-0001	7	0.234	(5.94)	—	—	—	—	500	350	25	3000 pF	—	7	25	55	65	70	70

* Denotes parts with turret on one end per Figure 8.
† Also available through API's authorized distributors.
€ Also available through API's authorized European distributors/agents.

api technologies corp.
Spectrum Control

Large Diameter Solder-in High Temp Filters

Features

- .400” diameter mounting vs .128” diameter mounting
- High temperature construction withstands 300°C installation temperatures
- Increased capacitance values than standard 9900 series - up to 1.2uF
- EMI filtering from 500KHz up to 10GHz
- 15 Amp current rating
- Ideal for low to medium impedance circuits where large amounts of capacitance to ground can be tolerated (feed-thru “C” circuit)
- Glass seal one end provides protection from hostile environments and maintain hermeticity
- Rugged monolithic discoidal capacitor construction
- Gold plated suited for gold bonding
- Designed to be soldered into a package, bracket or bulkhead
- Reverse seal available
- Special lead length and end terminations available

Large Diameter Solder-in High Temp Filters

Part Number	Circuit	AMP	DC Voltage	Min Cap (µf)	Minimum Insertion Loss (dB)					
					500 KHz	1 MHz	10 MHz	100 MHz	1 GHz	10 GHz
SCI-9945-125H	C	15	50	1.2	33	37	52	70	70	70
SCI-9945-504H	C	15	100	.50	26	34	42	58	70	70
SCI-9945-754H	C	15	100	.75	31	37	43	62	70	70
SCI-9945-105H	C	15	100	1.0	31	40	48	64	70	70
SCI-9945-503HAC	C	15	200*	.050	7	15	34	42	70	70
SCI-9945-154HAC	C	15	200*	.15	17	24	38	50	70	70
SCI-9945-103H	C	15	400	.010	—	4	20	34	50	60
SCI-9945-503H	C	15	400	.050	7	15	34	44	70	70

* Rated 200VDC or 125VAC/400Hz

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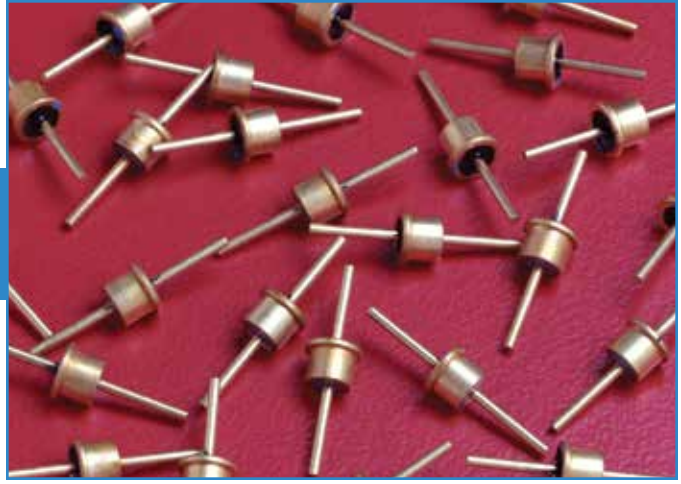
Miniature Solder-in Filters
9900 Series



These filters are ideal for microwave applications such as attenuators and oscillators, and perform well in high impedance circuits where large capacitance values are not practical.

Features

- Miniature size to allow effective use of space
- Standard capacitance values from 5pF to .033µF
- Voltage ratings to 200 VDC/115 VAC 0–400 Hz
- Hermetically sealed on one end allows for through-hole sealing between compartments
- High temperature construction meets MIL-F-28861 solderability and resistance to soldering heat requirements
- Available in MIL-C-11015 versions — see page CF10
- Gold plating compatible with gold bonding techniques

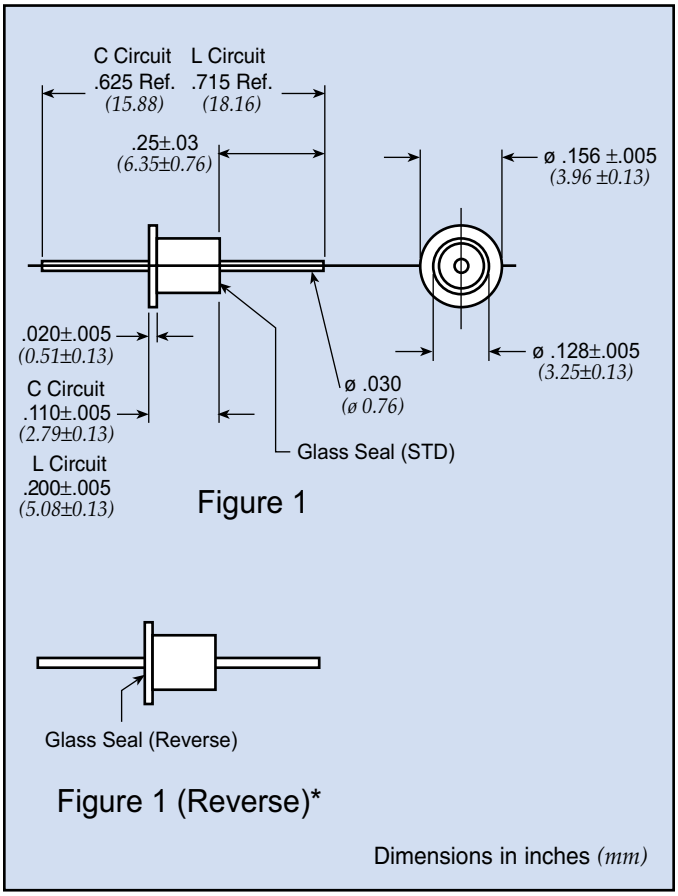


Figure 1

Figure 1 (Reverse)*

Dimensions in inches *(mm)*

Marking C Circuit

Color dot standard as follows:

- 101 Green – 100pF
- 501 Brown – 500pF
- 102 Purple – 1000pF
- 122 White – 1200pF
- 272 Red – 2700pF
- 502 Blue – 5000pF
- 153 Pink – 15000pF
- 000 None – 10pF max

Marking L Circuit

Color dot standard as follows:

- 100 Violet – 10pF
- 250 Blue – 25pF
- 102 White – 1000pF
- 152 White – 1500pF
- 502 Yellow – 5000pF
- 103 2White – .01µF
- 153 2White – .015µF
- 273 2Red – 27000pF
- 333 2Red – .033µF

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Miniature Solder-in Filters
9900 Series

Miniature Solder-in C Circuit

Part Number*	Figure	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	Min Cap	Minimum Insertion Loss (dB) 1 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
SCI-9900-153	1	50		5	0.015 µF	7	25	30	40	40	60	60
SCI-9900-303	1	50		5	0.030 µF	10	30	35	45	50	55	55
†**SCI-9910-272**	1	100		5	2700 pF	—	10	18	25	33	40	50
†**SCI-9910-502**	1	100		5	5000 pF	—	15	20	30	35	45	55
SCI-9900-000	1	200		5	4 pF max.	—	—	—	—	—	10	10
†**SCI-9920-101**	1	200	115	5	100 pF	—	—	—	3	10	20	28
†**SCI-9920-501**	1	200	115	5	500 pF	—	—	—	15	22	35	40
†**SCI-9920-122**	1	200	115	5	1200 pF	—	5	10	20	28	35	45

* For reverse glass seal add an “R” to the end of the part number (SCI-9900-153R).
† Also available through API’s authorized distributors.
Parts are RoHS Compliant

Miniature Solder-in L Circuit

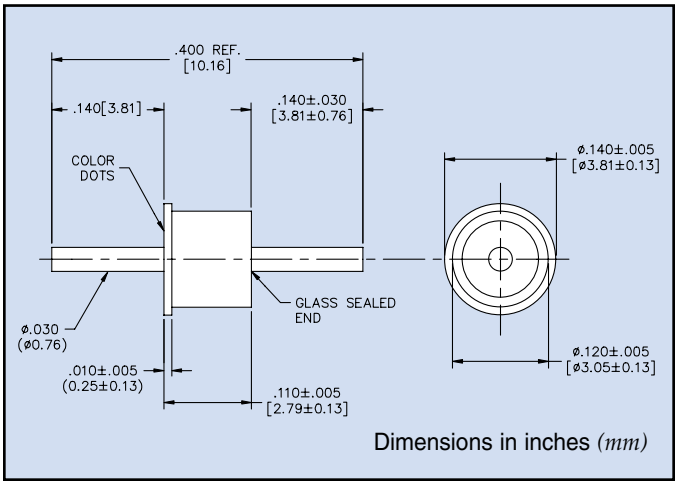
Part Number*	Figure	Rated Voltage 125°C DC	I Amp	Min Cap	Minimum Insertion Loss (dB) 1 MHz	10 MHz	100 MHz	1 GHz	10 GHz
SCI-9980-100	1	200	10	10 pF	—	—	—	7	20
SCI-9980-101	1	200	10	100 pF	—	—	5	22	35
SCI-9980-102	1	200	10	1000 pF	—	8	25	40	42
SCI-9980-103	1	200	10	.01 uF	8	27	48	65	65
SCI-9980-122	1	200	10	1200 pF	—	8	28	42	50
SCI-9980-152	1	200	10	1500 pF	—	10	28	43	53
SCI-9980-153	1	200	10	.015 uF	10	28	50	65	65
SCI-9980-250	1	200	10	25 pF	—	—	—	13	25
SCI-9980-272	1	200	10	2700 pF	8	13	32	45	55
SCI-9980-273	1	50	10	27,000 pF	13	33	53	75	75
SCI-9980-333	1	200	10	.033 uF	13	35	55	75	75
SCI-9980-501	1	200	10	500 pF	—	—	18	37	38
SCI-9980-502	1	200	10	5000 pF	8	17	35	47	55

* Reverse seal available. Add R at the end of the part number. (SCI-9980-102R).
Note: Hi-rel versions available. Add R after the first dash. (SCI-R9980-102).
Lt circuit part number series SCI-9981-XXX.
Parts are RoHS Compliant

api technologies corp.
Spectrum Control

Spec Mini Solder-in Feed-Thru Filters

API Technologies miniature solder-in filters are hermetically sealed on one end for thru-hole sealing between compartments allowing it to be soldered into a package, bracket, or bulkhead while maintaining hermetically. These mini EMI filters are ideal for a variety of products intended for use in the microwave frequency spectrum including oscillators, attenuators, and synthesizers. The high temperature construction meets military requirements for solderability and resistance to soldering heat and its high-purity gold plating provides excellent compatibility with gold bonding techniques.



Dimensions in inches *(mm)*

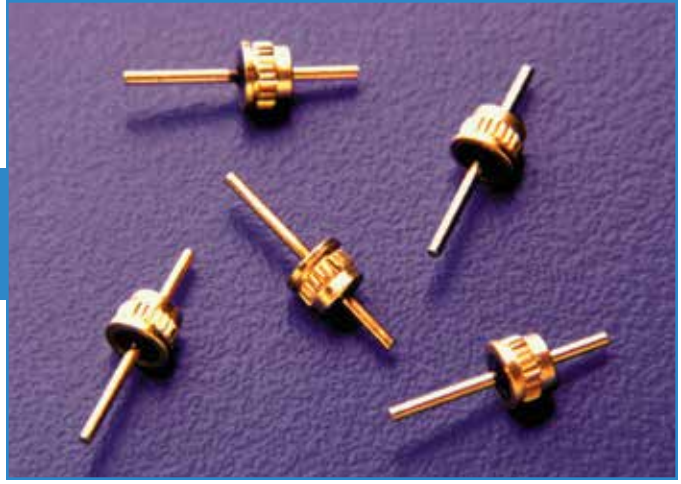
Features

- .120" diameter mounting
- Capacitance values from 5pF to .027µF
- RoHS compliant
- Reverse seal available
- High temperature construction

Part Number	DC Amps	Working Voltage	Cap (µf)	Minimum Insertion Loss (dB)					
				500 KHz	1 MHz	10 MHz	100 MHz	1 GHz	10 GHz
SCI-9909-008	5	200	5	—	—	—	—	—	5
SCI-9909-009	5	200	10	—	—	—	—	5	20
SCI-9909-010	5	200	25	—	—	—	—	10	25
SCI-9909-011	5	200	50	—	—	—	—	10	25
SCI-9909-012	5	200	100	—	—	—	3	20	28
SCI-9909-013	5	200	250	—	—	—	5	22	30
SCI-9909-014	5	200	500	—	—	—	15	35	40
SCI-9909-015	5	200	1000	—	—	5	20	35	45
SCI-9909-016	5	200	1500	—	—	5	22	35	45
SCI-9909-017	5	100	2700	—	—	10	25	40	50
SCI-9909-018	5	100	5000	—	—	15	30	45	55
SCI-9909-019	5	50	10,000	—	4	21	35	50	60
SCI-9909-020	5	50	27,000	—	10	28	42	55	65

api technologies corp.
Spectrum Control

Spec Mini-Press 9925 Series



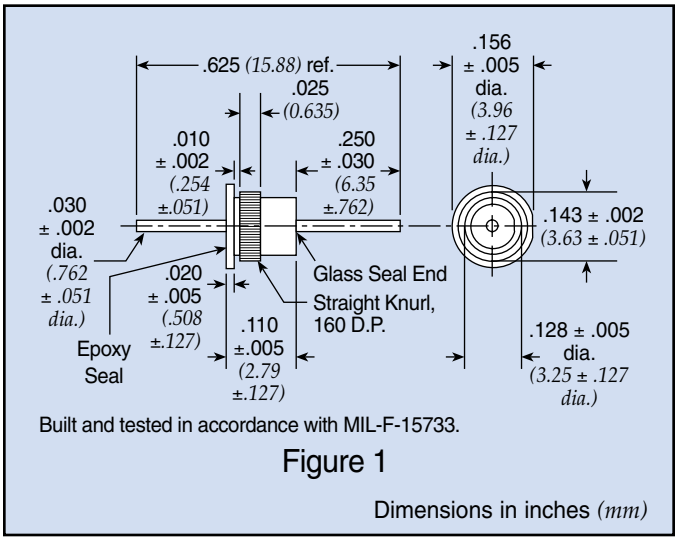
This new knurled filter is designed to be pressed into place and create a reliable mechanical bond. This feature makes it an excellent selection for applications where soldering is undesirable. Suitable plating is available that allows gold bonding to the terminals.

Applications

These filters are ideal for microwave and RF applications such as attenuators, synthesizers, and oscillators. They perform well in high impedance circuits where large capacitance values are not practical.

Installation

- .136" to .137" (3.45-3.48mm) diameter hole
- Hole must be free of all insulating materials.
- Installation tool must have a hole of sufficient depth and diameter to accept the terminal of the filter.
- Installation force must be applied gradually and smoothly until the flange of the filter is seated against the receiving part (request installation instructions).



Built and tested in accordance with MIL-F-15733.

Figure 1

Dimensions in inches *(mm)*

Mechanical Specifications

Installation . . . . . Press-in

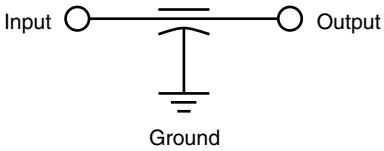
Plating . . . . . Gold

Seal . . . . . Glass sealed on one end, resin sealed on the other end

Termination Options . . . . . Plating suitable for gold bonding

Operating Temperature . . . . -55°C to +125°C

Circuit Schematic



Insertion Tool

Part Number: SCI-9925-200

Part Number	Figure	Rated Voltage 125°C DC	I Amp	Cap	Minimum Insertion Loss (dB) 1 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
†SCI-9925-153	1	50	5	0.015 µF +100%/-0%	7	25	30	40	40	60	60
†SCI-9925-303	1	50	5	0.030 µF +100%/-0%	10	30	35	45	50	55	55
†SCI-9925-502	1	100	5	5000 pF +100%/-0%	—	15	20	30	35	45	55
†SCI-9925-000	1	200	5	10 pF max.	—	—	—	—	—	10	10
†SCI-9925-101	1	200	5	100 pF +100%/-0%	—	—	—	3	10	20	28
†SCI-9925-501	1	200	5	500 pF +100%/-0%	—	—	—	15	22	35	40
†SCI-9925-122	1	200	5	1200 pF +100%/-0%	—	5	10	20	28	35	45
SCI-9925-272	1	200	5	2700 pF +100%/-0%	—	10	18	25	33	40	50

† Also available through API's authorized distributors.
Note: Parts are RoHS Compliant

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

api technologies corp.
Spectrum Control

Spec Spin Filters

API Technologies' Spectrum Control brand introduces the new space saving #2-56 threaded miniature EMI spanner filter. This new threaded filter is designed without a hex and does not require soldering for installation. These features make it an excellent selection for applications that require many lines to be filtered in close proximity. The easy swap out also allows for flexibility in filter replacement and capacitance substitution. Easy filter substitution also allows for flexibility in filter placement. Custom design queries are always welcome.

Applications

API's Spectrum Control brand spanner filter offers superior insertion loss over a broad frequency range when compared to surface mount components. The filter is available in capacitance values up to 10,000 pF, and is featured in a microcircuit package used in microwave applications such as frequency synthesizers, power amplifiers, MMW radio, and is ideal for commercial and high-reliability applications.

Electrical Specifications

Operating Temperature . . . . -55°C to +125°C

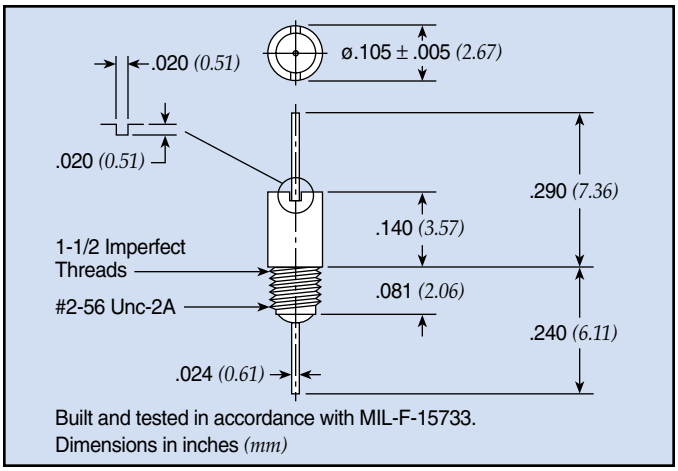
Voltage Rating . . . . . 50 VDC

Current Rating . . . . . 5 A

Effective Filtering From . . . . 1 MHz to 10 GHz

Capacitance . . . . . to 10,000 pF

Dielectric Withstanding Voltage . . . . . 125 VDC



Built and tested in accordance with MIL-F-15733.
Dimensions in inches *(mm)*

Mechanical Specifications

Center Spacing . . . . . .0.110"

Lead Finish . . . . . Gold

Bushing Finish . . . . . Gold

Tightening Torque . . . . . 14 oz-in (± 2) (0.11Nm)

Insertion Tool

Part Number: 54-874-020

Part Number*	Cap (pF)	Max. Tolerance	Circuit	Current	Voltage	DWV	I.R.	Temperature Range
54-874-010	10	+0%/-20%	C	5 A	50 VDC	125 VDC	1,000 M	-55°C to +125°C
54-874-011	39	+50%/-20%						
54-874-012	100							
54-874-013	390							
54-874-014	1,000							
54-874-015	2,000							
54-874-016	3,300	+100%/-0%						
54-874-017	4,700							
54-874-018	10,000	+80%/-20%						

Note: Parts are RoHS Compliant

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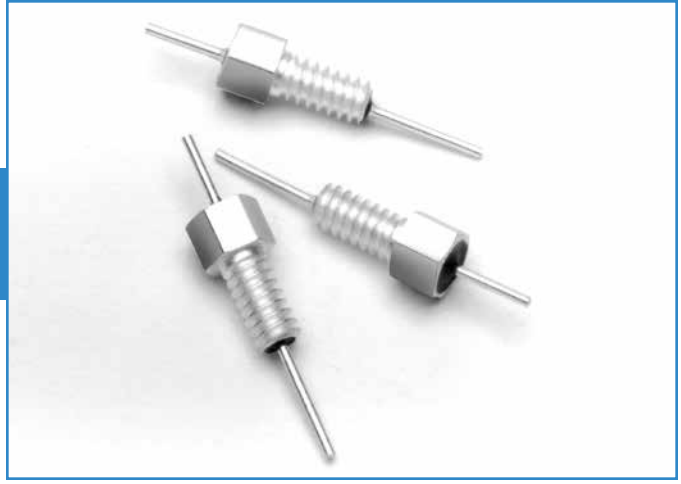
Spectrum Control

Resin Sealed Bolt-in Filters



These filters are easily mounted in a tapped hole or through-hole with supplied nut and lock-washer. The rugged case with resin seals at both ends provides excellent environmental protection. Primarily used in filtering signal/data lines and DC power lines.

Features

- Wide range of sizes: 4-40 thread through 5/16-24 thread
- Voltage ratings to 500 VDC/220 VAC (400 Hz)
- MIL-F-15733 QPL filters available
- Multiple circuit configurations: C, L and Pi
- Metric threaded filters available, consult factory

4-40 C Circuit

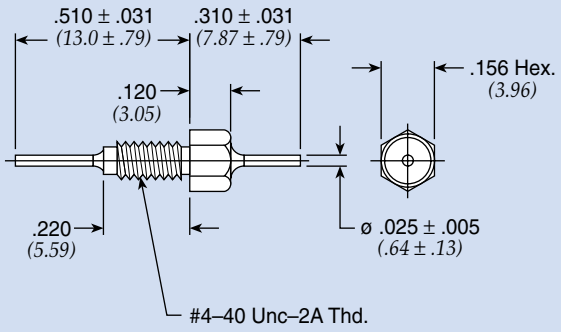


Figure 1

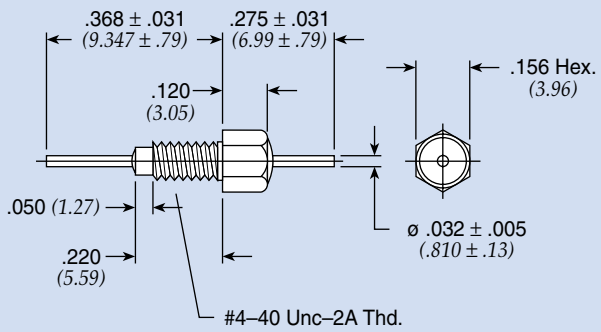


Figure 2

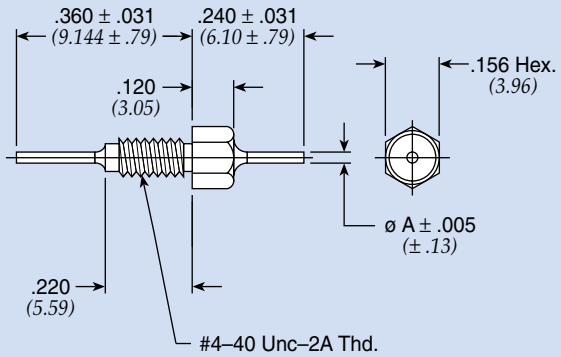


Figure 3

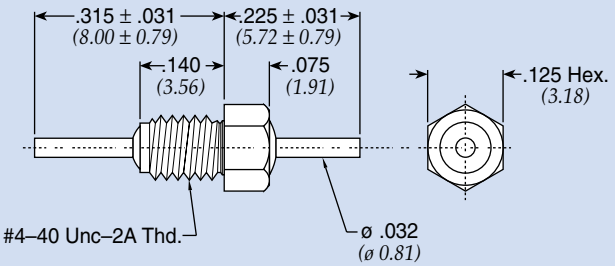


Figure 4

Dimensions in inches *(mm)*

Resin Sealed Bolt-in Filters

4-40 C Circuit

Part Number	See Pg. LP12 for Fig.	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	Min Cap	A In	A (mm)	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
†SCI-9110-100	3	50	—	10	10 pF	0.032	(0.81)	—	—	—	—	—	—	10	10
†9900-381-6004	2	50	—	10	5000 pF	—	—	—	—	15	22	30	35	45	55
9900-381-6026	2	50	—	10	0.031 µF	—	—	12	20	25	35	40	45	55	60
†9900-381-6006	2	50	—	10	0.045 µF	—	—	14	22	30	40	45	50	55	60
†54-790-023	1	100	—	10	0.050 µF	—	—	15	24	34	41	45	50	60	60
†54790001X5F101M	1	100	—	10	100 pF ± 20%	—	—	—	—	—	—	—	10	20	25
54-790-019	1	100	—	10	2700 pF	—	—	—	—	9	18	27	33	35	35
9900-381-6013	2	100	—	10	2700 pF	—	—	—	—	10	18	25	33	40	50
54-790-020	1	100	—	10	5600 pF	—	—	—	—	15	24	33	37	40	40
SCI-9112-273	3	100	—	3	0.027 µF	0.016	(0.41)*	10	20	30	37	45	45	55	60
SCI-9110-273	3	100	—	10	0.027 µF	0.020	(0.51)	10	20	30	37	45	45	55	60
54-790-022	1	100	—	10	0.027 µF	—	—	10	20	30	37	45	50	55	60
†SCI-9112-503	3	100	—	3	0.05 µF	0.016	(0.41)*	15	24	35	41	45	50	60	60
SCI-9110-503	3	100	—	10	0.05 µF	0.020	(0.51)	15	24	35	41	45	50	60	60
54-862-001	4	200	—	10	10 pF	—	—	—	—	—	—	—	—	10	10
54-862-002	4	200	—	10	100 pF	—	—	—	—	—	—	3	10	20	28
54-862-003	4	200	—	10	1000 pF	—	—	—	—	—	—	15	25	35	40
†9900-381-6020	2	200	—	10	100 pF	—	—	—	—	—	—	3	10	20	28
SCI-9122-101	3	200	115	3	100 pF	0.016	(0.41)*	—	—	—	—	—	10	20	20
SCI-9120-101	3	200	115	10	100 pF	0.020	(0.51)	—	—	—	—	—	10	20	20
9900-381-6021	2	200	—	10	500 pF	—	—	—	—	—	—	15	20	35	40
SCI-9122-102	3	200	115	3	1000 pF	0.016	(0.41)*	—	—	—	11	20	28	28	40
SCI-9120-102	3	200	115	10	1000 pF	0.020	(0.51)	—	—	—	11	20	28	28	40
†9900-381-6022	2	200	—	10	1200 pF	—	—	—	—	5	9	20	28	35	45
SCI-9122-502	3	200	115	3	5000 pF	0.016	(0.41)*	—	—	15	24	33	37	40	50
SCI-9120-502	3	200	115	10	5000 pF	0.020	(0.51)	—	—	15	24	33	37	40	50
SCI-9122-103	3	200	115	3	0.01 µF	0.016	(0.41)*	—	12	20	29	38	45	50	55
SCI-9120-103	3	200	115	10	0.01 µF	0.020	(0.51)	—	12	20	29	38	45	50	55
9900-381-6005	2	200	—	10	0.015 µF	—	—	7	9	20	29	35	45	50	60
†54-790-018	1	300	—	10	1000 pF	—	—	—	—	—	9	20	28	28	40
†54-790-021	1	300	—	10	0.01 µF	—	—	—	9	20	29	38	45	50	50

* Tinned, steel leads.

† Also available through API's authorized distributors.

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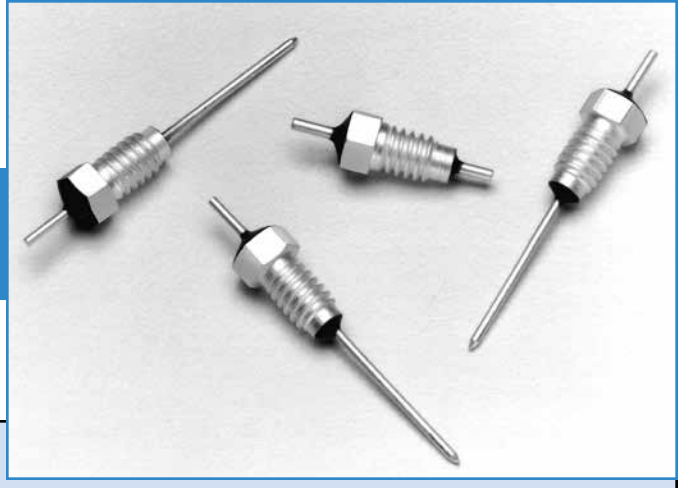
Resin Sealed Bolt-in Filters



4-40 L and Pi Circuit

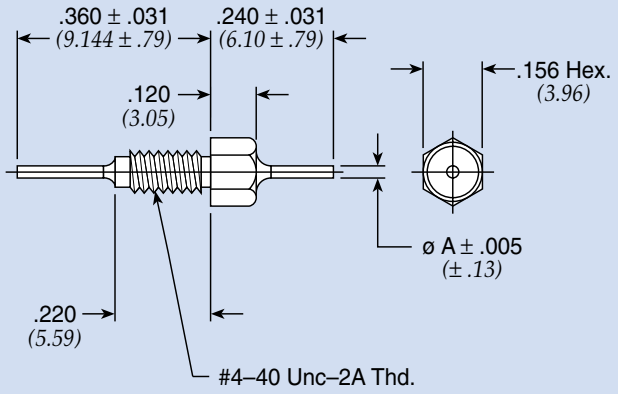


Figure 1

Dimensions in inches *(mm)*

Part Number	Figure	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	CKT	Min Cap	A In	A (mm)	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
†51-729-305	1	50	—	3	Pi	5500 pF	0.018	(0.46)	—	7	14	40	60	70	70	70
†51-729-312	1	50	—	3	Pi	7000 pF	0.018	(0.46)	—	8	15	40	65	70	70	70
SCI-3102-002	1	50	—	3	LB	0.075 µF	0.016	(0.41)*	18	25	37	42	52	55	70	70
SCI-3102-000	1	50	—	5	LB	0.075 µF	0.016	(0.41)	18	25	37	42	52	55	70	70
SCI-3102-007	1	50	—	10	LB	0.075 µF	0.025	(0.64)	18	25	37	42	52	55	70	70
†51-729-304	1	100	—	3	LB	0.022 µF	0.018	(0.46)	7	17	27	34	43	47	55	55
†SCI-3112-002	1	100	—	5	LB	0.027 µF	0.016	(0.41)*	10	20	30	38	45	45	65	70
†SCI-3112-000	1	100	—	5	LB	0.027 µF	0.016	(0.41)	10	20	30	38	45	45	65	70
SCI-3112-007	1	100	—	10	LB	0.027 µF	0.025	(0.64)	10	20	30	38	45	45	65	70
SCI-3112-102	1	100	—	3	LB	0.05 µF	0.016	(0.41)*	15	24	35	42	54	56	70	70
SCI-3112-100	1	100	—	5	LB	0.05 µF	0.016	(0.41)	15	24	35	42	54	56	70	70
SCI-3112-107	1	100	—	10	LB	0.05 µF	0.025	(0.64)	15	24	35	42	54	56	70	70
†51-729-303	1	200	—	3	Pi	1500 pF	0.018	(0.46)	—	—	5	15	42	65	70	70
SCI-3122-002	1	200	115	3	LB	0.01 µF	0.016	(0.41)*	—	12	21	30	41	45	70	70
SCI-3122-000	1	200	115	5	LB	0.01 µF	0.016	(0.41)	—	12	21	30	41	45	70	70
SCI-3122-007	1	200	115	10	LB	0.01 µF	0.025	(0.64)	—	12	21	30	41	45	70	70

* Tinned, steel leads.

† Also available through API's authorized distributors.

Resin Sealed Bolt-in Filters

6-32 C, L, Pi/6-40 Pi

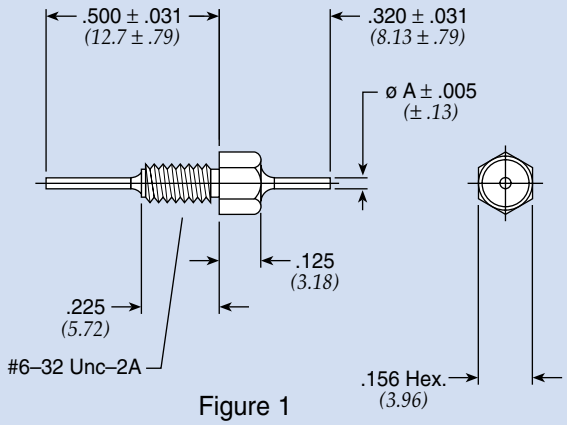


Figure 1

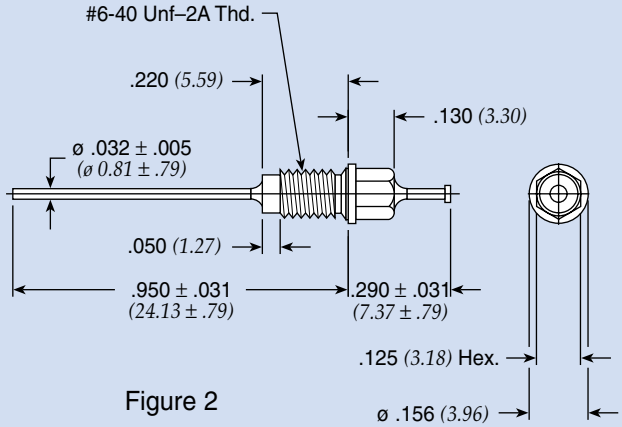


Figure 2

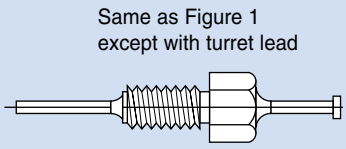


Figure 3

Dimensions in inches *(mm)*

Part Number	Figure	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	CKT	Min Cap	A In	A (mm)	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
†51-726-008	1	50	—	3	Pi	5500 pF	0.018	(0.46)	—	7	14	30	55	70	70	70
51-726-017	1	50	—	3	Pi	9000 pF	0.018	(0.46)	—	8	18	45	65	70	70	70
54-779-019	1	50	—	10	C	0.10 µF	0.032	(0.81)	22	31	40	44	47	55	65	65
†54779001X5F100M	1	100	—	10	C	10 pF ± 20%	0.032	(0.81)	—	—	—	—	—	—	10	10
†54779001X5U102P €	1	100	—	10	C	1000 pF	0.032	(0.81)	—	—	—	10	21	28	28	28
54-779-014	1	100	—	10	C	2700 pF	0.032	(0.81)	—	—	9	18	27	33	35	35
54-779-016	1	100	—	10	C	0.01 µF	0.032	(0.81)	—	9	20	29	38	45	50	50
†51-726-002	3	100	—	10	LB	0.022 µF	0.032	(0.81)	7	17	27	34	43	50	60	60
54-779-017	1	100	—	10	C	0.027 µF	0.032	(0.81)	10	20	30	37	45	50	55	60
54-779-018	1	100	—	10	C	0.050 µF	0.032	(0.81)	15	24	34	41	45	50	60	60
†51-726-001	1	200	—	3	Pi	1500 pF	0.018	(0.46)	—	—	5	15	42	65	70	70
†1289-001	2	200	—	10	Pi	1500 pF	0.032	(0.81)	—	—	5	15	40	60	60	60
†1289-004	2	200	—	10	Pi	3000 pF	0.032	(0.81)	—	—	8	15	50	65	70	70
54-779-015	1	200	—	10	C	5600 pF	0.032	(0.81)	—	—	15	24	33	37	40	40

† Also available through API's authorized distributors.
€ Also available through API's authorized European distributors/agents.

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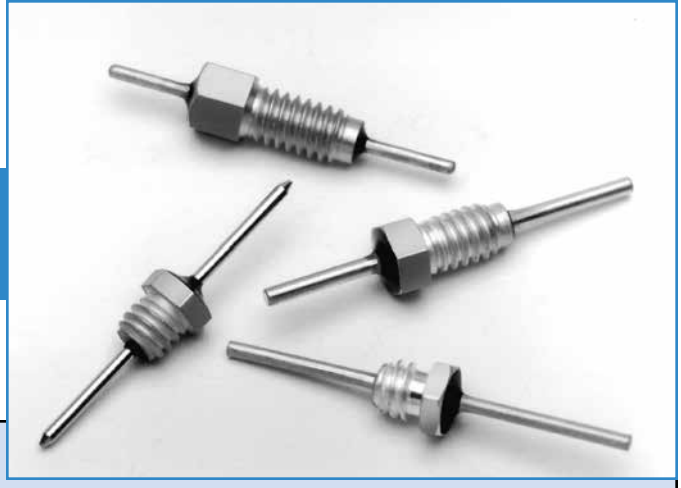

8-32 C Circuit

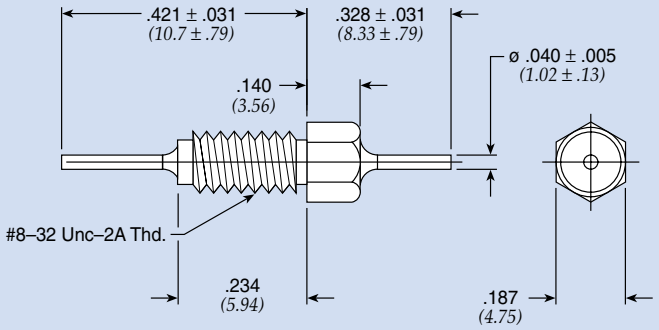

Figure 1

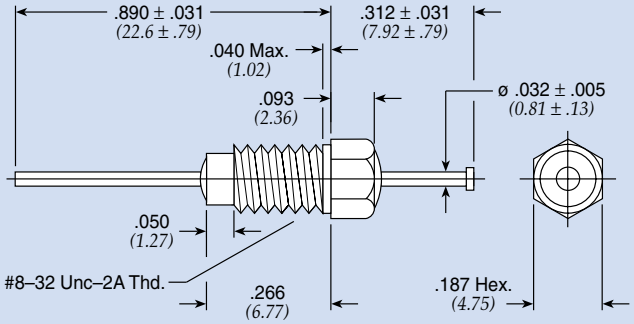

Figure 2

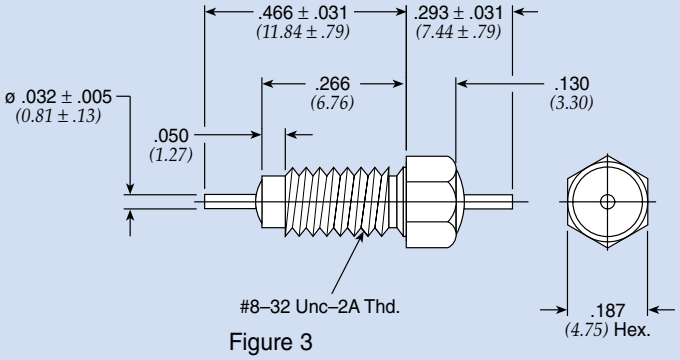

Figure 3

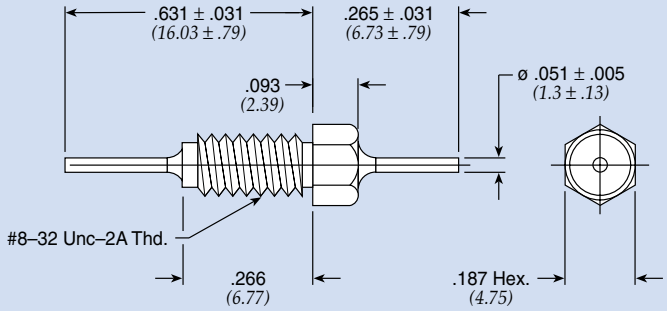

Figure 4

Dimensions in inches *(mm)*

Part Number	Figure	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	Min Cap	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
SCI-9200-503	2	50	—	10	0.05 µF	15	24	35	41	45	50	60	60
9950-381-6009	3	50	—	10	0.12 µF	20	30	43	45	55	55	55	55
54-785-017	1	50	—	10	0.21 µF	28	37	45	50	55	60	70	70
9950-381-6008	3	70	—	10	0.08 µF	15	24	37	41	51	51	55	55
†54713001X5F101M	4	100	—	10	80 pF	—	—	—	—	—	10	20	20
†54713001X5U102P	4	100	—	10	1000 pF	—	—	—	11	20	28	28	28
54-785-013	1	100	—	10	0.01 µF	—	9	20	29	38	45	50	55
SCI-9210-103	2	100	—	10	0.01 µF	—	12	20	29	38	45	50	50
SCI-9210-273	2	100	—	10	0.027 µF	10	20	30	36	45	50	55	60
†54-785-005	1	100	—	10	0.05 µF	15	24	34	41	45	50	60	60
54-785-016	1	100	—	10	0.1 µF	20	29	38	44	47	55	65	65
54-785-011	1	150	—	10	2000 pF	—	—	8	17	26	32	34	35
54-785-012	1	150	—	10	5000 pF	—	6	15	24	33	37	40	40
SCI-9220-101	2	200	115	10	100 pF	—	—	—	—	—	10	20	25
SCI-9220-102	2	200	115	10	1000 pF	—	—	—	11	20	28	28	28
SCI-9220-502	2	200	115	10	5000 pF	—	6	15	24	33	37	40	40

† Also available through API's authorized distributors.

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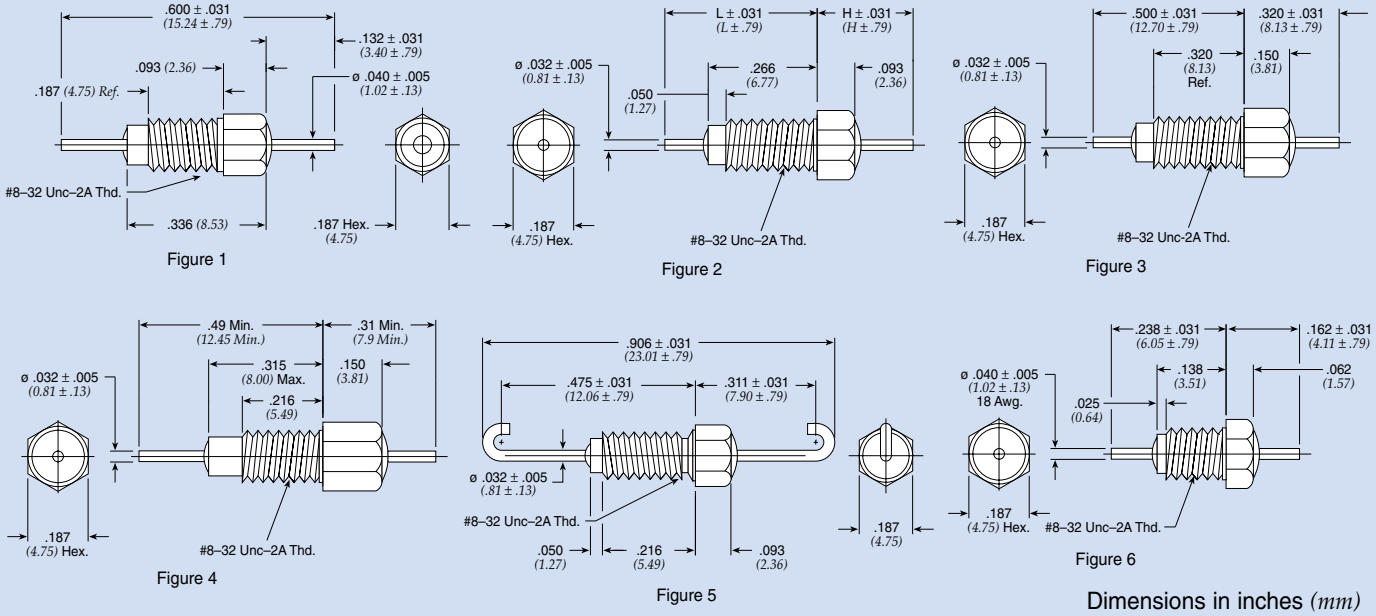
Resin Sealed Bolt-in Filters

8-32 L & Pi Circuit



Part Number	M15733 MIL Number	Fig.	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	CKT	Min Cap	H In	H (mm)	L In	L (mm)	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
51-712-069 €	—	2	50	—	10	Pi	0.012 µF	0.265	(6.73)	0.413	(10.49)	5	9	18	45	65	70	70	70
†**51-712-065**	/61-0014	4	50	—	20	Pi	0.012 µF	0.310	(7.87)	0.490	(12.45)	—	10	20	30	65	70	70	70
†**1250-054**	—	2	70	—	10	Pi	5000 pF	0.312	(7.92)	0.500	(12.70)	—	—	20	30	65	65	70	70
†**1293-001**	—	3	70	—	10	Pi	0.028 µF	—	—	—	—	10	14	38	65	75	75	75	75
51-712-055	/43-0002	2	100	70	10	Pi	3000 pF	0.312	(7.92)	0.578	(14.68)	—	—	5	15	45	50	50	50
†**51-712-014**	/28-0001	2	100	70	10	Pi	3000 pF	0.312	(7.92)	0.890	(22.61)	—	—	5	15	45	60	60	60
51-712-028	/28-0002	5	100	70	10	Pi	3000 pF	—	—	—	—	—	—	5	15	45	60	60	60
†**51-712-063***	/61-0008	2	100	70	10	Pi	5500 pF	0.312	(7.92)	0.500	(12.70)	—	—	15	35	65	70	70	70
†**51-712-003** ◊	—	2	100	—	10	LB	0.022 µF	0.280	(7.11)	0.850	(21.59)	7	17	27	34	43	50	60	60
51-712-060 ◊	/28-0004	2	100	70	10	LB	0.022 µF	0.312	(7.92)	0.890	(22.61)	10	17	28	34	41	50	60	60
†**51-712-067**	/61-0013	2	100	—	10	LB	0.031 µF	0.280	(7.11)	0.890	(22.61)	10	20	30	38	42	52	60	60
51-762-006	/44-0003	6	125	85	15	Pi	65 pF	—	—	—	—	—	—	—	—	—	—	16	42
†**1250-059**	—	6	125	—	15	Pi	1500 pF	—	—	—	—	—	—	5	15	35	45	60	60
†**51-762-005**	/44-0002	6	125	85	15	Pi	1500 pF	—	—	—	—	—	—	5	15	25	35	50	50
1250-062	—	1	125	—	15	Pi	3000 pF	—	—	—	—	—	—	5	15	45	45	70	70
†**51-744-003***	/44-0001	1	125	85	15	Pi	3000 pF	—	—	—	—	—	—	10	15	30	40	65	65
†**SCI-3223-000**	—	2	200	115	10	Pi	2000 pF	0.312	(7.92)	0.890	(22.61)	—	—	8	10	48	50	70	70
†**1250-003** €	—	2	200	—	10	Pi	3000 pF	0.312	(7.92)	0.890	(22.61)	—	—	5	15	45	65	70	70
†**51-712-001***	—	2	200	—	10	Pi	3000 pF	0.312	(7.92)	0.890	(22.61)	—	—	5	15	45	65	70	70
1250-049	—	2	200	—	10	Pi	3000 pF	0.312	(7.92)	0.578	(14.68)	—	—	5	15	45	65	65	60
†**51-744-002** ◊	—	2	200	—	10	Pi	5500 pF	0.265	(6.73)	0.413	(10.49)	—	7	14	30	55	70	70	70
†**1293-000**	—	3	200	—	10	Pi	0.012 µF	—	—	—	—	5	10	28	40	65	70	70	70

† Also available through API's authorized distributors.
€ Also available through API's authorized European distributors/agents.
* Denotes parts with turret lead.
◊ Supplied with .040" (1.02mm) diameter lead.

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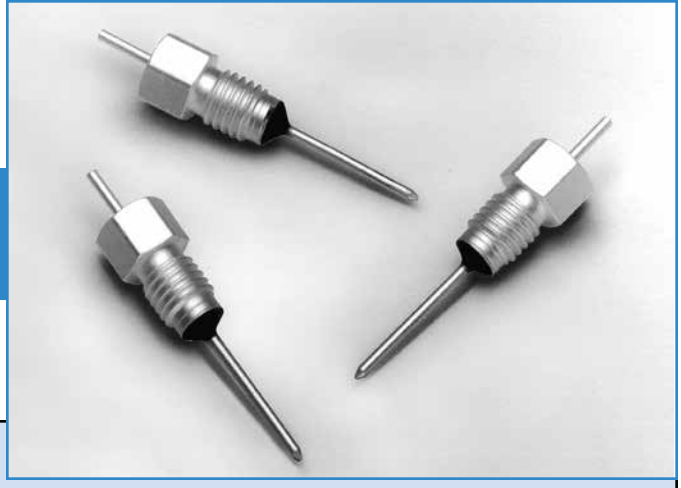
Resin Sealed Bolt-in Filters



10-32 C & Pi Circuit

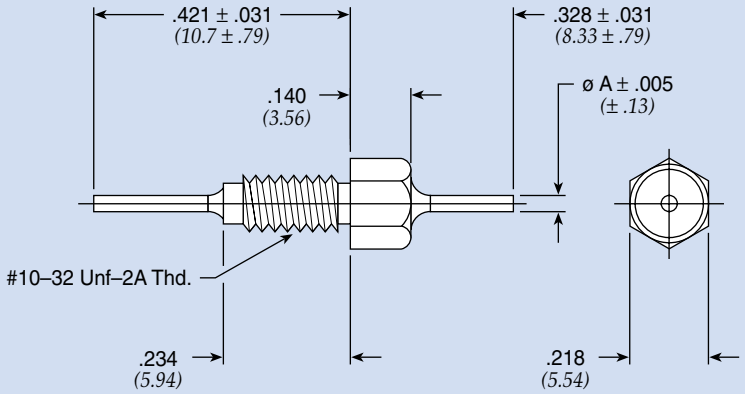


Figure 1

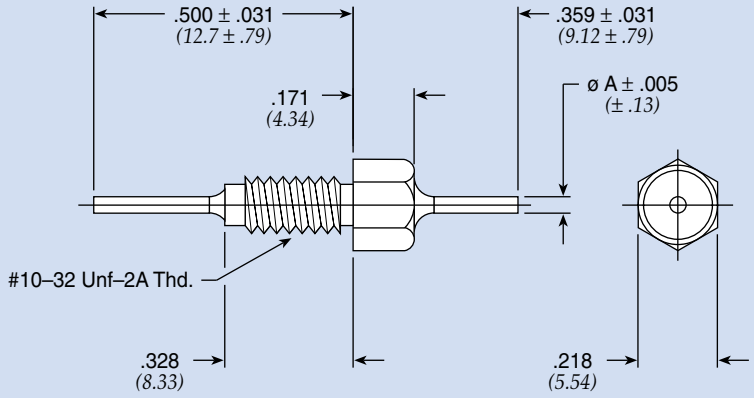


Figure 2

Dimensions in inches *(mm)*

Part Number	Figure	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	CKT	Min Cap	A In	A (mm)	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
51-761-002	1	50	—	10	Pi	0.018 µF	0.032	*(0.81)*	7	14	30	55	70	70	70	70
†**54-786-013**	1	50	—	10	C	0.3 µF	0.040	*(1.02)*	30	38	47	50	55	60	70	70
54-786-028	1	50	—	10	C	0.56 µF	0.040	*(1.02)*	35	43	50	52	60	65	70	70
†**54-786-014**	2	50	—	10	C	0.8 µF	0.040	*(1.02)*	40	46	52	54	70	70	70	70
51-761-001	1	100	—	10	Pi	0.01 µF	0.032	*(0.81)*	—	10	20	45	65	70	70	70
54-786-027	1	200	—	10	C	0.1 µF	0.040	*(1.02)*	20	29	38	44	47	55	65	65

† Also available through API's authorized distributors.

Resin Sealed Bolt-in Filters

12-28 C /12-32 C Circuit

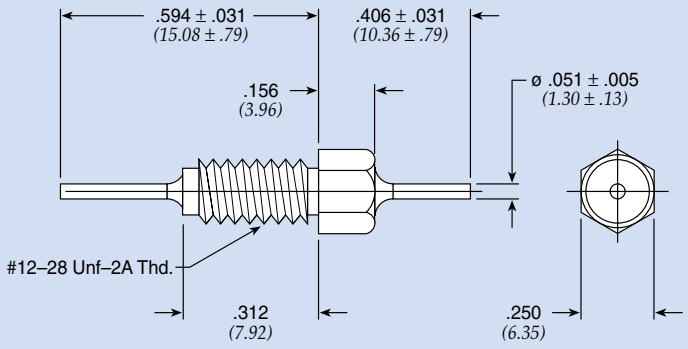


Figure 1

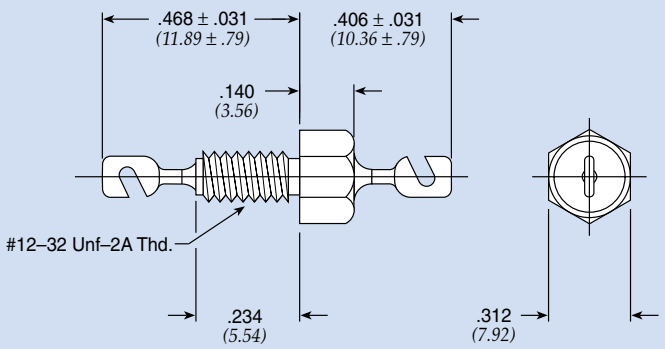


Figure 2

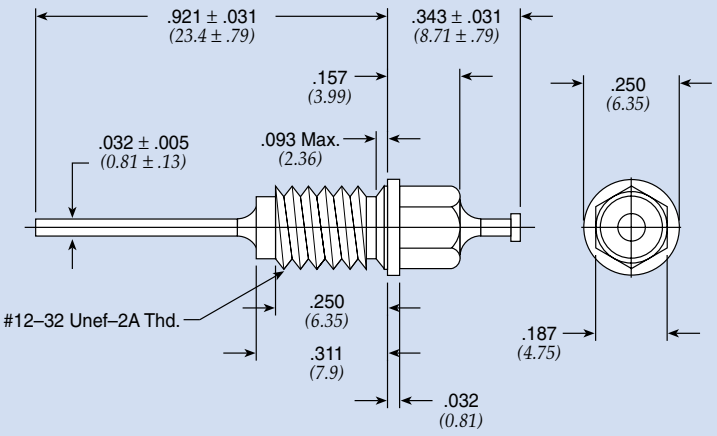


Figure 3

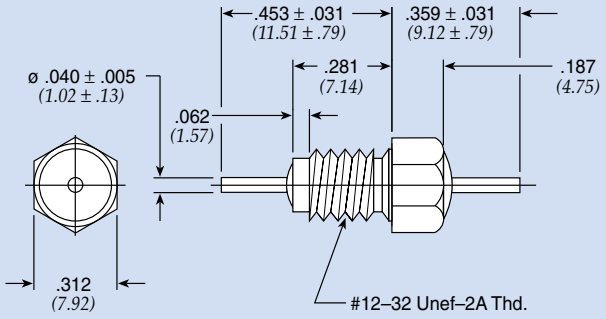


Figure 4

Dimensions in inches *(mm)*

Part Number	Figure	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	CKT	Min Cap	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
9910-381-6004	4	35	—	15	C	1 µF	38	40	52	52	70	70	78	80
9910-381-6003	4	50	—	15	C	0.75 µF	35	37	51	51	61	61	65	70
SCI-9310-273	3	100	—	10	C	0.027 µF	10	20	30	37	45	50	55	60
9910-381-6002	4	100	—	15	C	0.30 µF	28	30	45	50	55	55	60	65
54804002X5R101M	2	250	—	10	C	100 pF ± 20%	—	—	—	—	—	10	20	25
† **54804002X5R471M**	2	250	—	10	C	470 pF ± 20%	—	—	—	—	12	22	25	28
† **54804002X5V102P**	2	250	—	10	C	1000 pF	—	—	—	10	21	28	28	28
54743001X5U102Z	1	250	—	15	C	1000 pF	—	—	—	—	20	28	28	28

† Also available through API's authorized distributors.

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Resin Sealed Bolt-in Filters

12-28 & 12-32 Pi Circuit

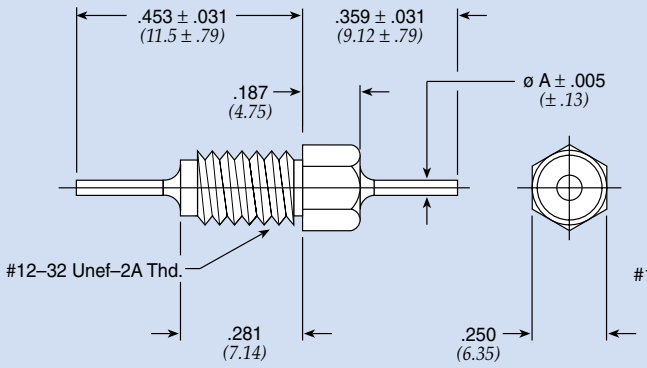


Figure 1

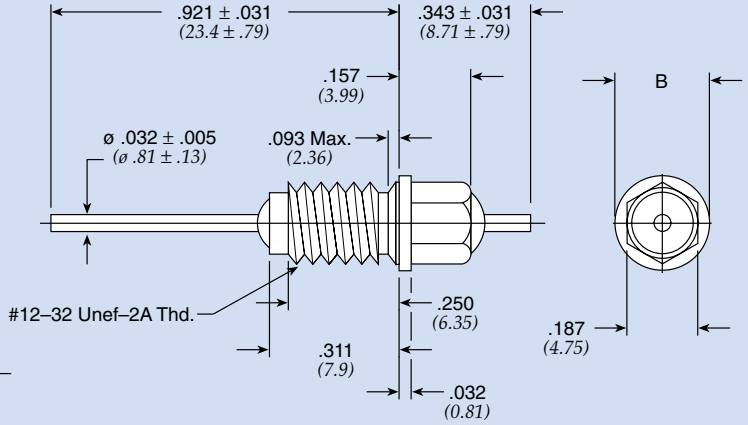


Figure 2

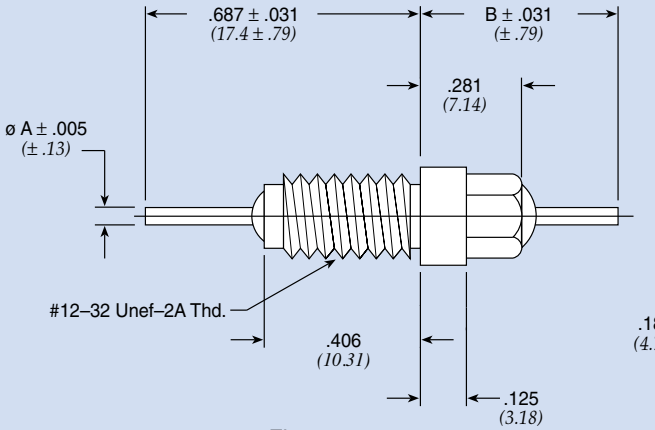
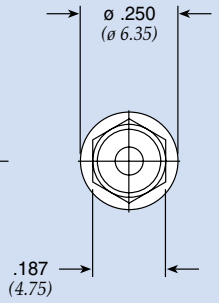


Figure 3



Same as Figure 3
Except as Shown.

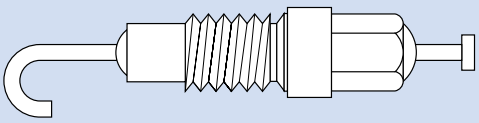


Figure 4

Same as Figure 1
Except as Shown.

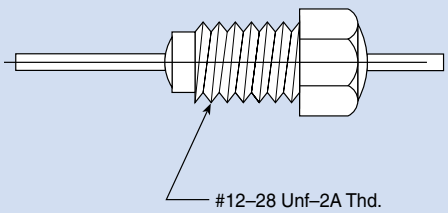


Figure 5

Same as Figure 2
Except as Shown.

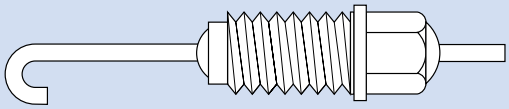


Figure 6

Turret Lead

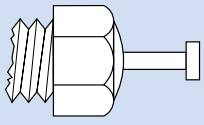


Figure 7

Dimensions in inches *(mm)*

Resin Sealed Bolt-in Filters

12-28 & 12-32 Pi Circuit

Part Number	M15733 MIL Number	See Pg. LP20 for Fig.	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	Min Cap	A In	A (mm)	B In	B (mm)	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
51-709-013	—	3	50	—	10	0.1 µF	0.040	*(1.02)*	0.437	*(11.10)*	10	40	52	70	70	70	70	70
SCI-3303-000*	—	2	50	—	10	0.15 µF	0.032	*(0.81)*	0.250	*(6.35)*	12	43	68	70	70	70	70	70
51-709-015	/61-0009	3	70	—	10	0.012 µF	0.032	*(0.81)*	0.470	*(11.94)*	—	—	—	—	65	65	65	65
†**1216-001**	—	3	70	—	10	0.050 µF	0.032	*(0.81)*	0.468	*(11.89)*	15	20	60	65	75	75	75	75
†**1270-016***	—	2	100	—	10	5500 pF	0.032	*(0.81)*	0.250	*(6.35)*	—	7	20	35	65	70	70	70
†**1270-025**	—	2	100	—	10	5500 pF	0.032	*(0.81)*	0.235	*(5.97)*	—	7	20	35	65	70	70	70
†**1201-066**	—	1	100	—	10	5500 pF	0.032	*(0.81)*	—	—	—	7	20	40	68	70	70	70
51-714-055*	/61-0011	2	100	—	10	5500 pF	0.032	*(0.81)*	0.235	*(5.97)*	—	7	20	—	65	70	70	70
51-714-054*	/61-0010	2	100	—	10	5500 pF	0.032	*(0.81)*	0.250	*(6.35)*	—	7	20	—	65	70	70	70
51-714-053*	/61-0007	2	100	70	10	5500 pF	0.032	*(0.81)*	0.250	*(6.35)*	—	7	—	—	65	70	70	70
51-714-058*	—	2	100	—	10	0.025 µF	0.032	*(0.81)*	0.250	*(6.35)*	10	15	40	60	70	70	70	70
51-714-056	/61-0012	6	100	—	10	0.025 µF	0.032	*(0.81)*	0.235	*(5.97)*	—	—	—	—	65	65	65	65
†**SCI-3313-000***	—	2	100	—	10	0.10 µF	0.032	*(0.81)*	0.250	*(6.35)*	10	40	65	70	70	70	70	70
51-719-022	—	1	200	—	10	1300 pF	0.040	*(1.02)*	—	—	—	—	5	10	35	60	70	70
†**1201-052**	—	5	200	—	10	3000 pF	0.032	*(0.81)*	—	—	—	—	5	15	45	45	70	70
†**1201-054**	—	1	200	—	10	3000 pF	0.032	*(0.81)*	—	—	—	—	5	15	45	45	70	70
51-714-001*	—	2	200	—	10	3000 pF	0.032	*(0.81)*	0.250	*(6.35)*	—	—	5	15	43	60	70	70
†**1270-024**	—	2	200	—	10	3000 pF	0.032	*(0.81)*	0.235	*(5.97)*	—	—	5	15	45	45	70	70
51-714-003*	—	2	200	—	10	3000 pF	0.032	*(0.81)*	0.235	*(5.97)*	—	—	5	15	43	60	70	70
†**1270-009**	—	2	200	—	10	3000 pF	0.032	*(0.81)*	0.250	*(6.35)*	—	—	5	15	45	45	70	70
51-719-053**	/61-0001	5	200	140	10	3000 pF	0.032	*(0.81)*	—	—	—	—	—	—	45	—	70	70
51-719-054*	/61-0002	1	200	140	10	1500 pF	0.032	*(0.81)*	—	—	—	—	—	—	45	45	70	70
51-714-051*	/61-0005	2	200	140	10	1500 pF	0.032	*(0.81)*	0.250	*(6.35)*	—	—	—	—	45	45	70	70
51-719-023*	/43-0001	5	200	140	10	3000 pF	0.032	*(0.81)*	—	—	—	—	—	—	—	45	45	45
51-714-052*	/61-0006	2	200	140	10	3000 pF	0.032	*(0.81)*	0.235	*(5.97)*	—	—	—	—	45	45	70	70
51-714-004*	—	2	200	—	10	5500 pF	0.032	*(0.81)*	0.235	*(5.97)*	—	7	14	35	60	70	70	70
†**51-719-021**	—	1	200	—	10	5500 pF	0.040	*(1.02)*	—	—	—	7	14	30	50	65	65	65
€**51-714-002***	—	2	200	—	10	5500 pF	0.032	*(0.81)*	0.250	*(6.35)*	—	7	14	35	60	70	70	70
†**SCI-3323-000***	—	2	200	115	10	0.012 µF	0.032	*(0.81)*	0.250	*(6.35)*	—	—	27	30	70	70	70	70
†**1221-001**	—	4	300	—	10	5500 pF	0.032	*(0.81)*	0.437	*(11.10)*	—	—	15	30	65	70	70	70
†**51-709-004**	/46-0001	4	300	—	10	5500 pF	0.032	*(0.81)*	0.437	*(11.10)*	—	—	—	—	65	70	70	70
1201-086	—	1	350	—	10	2500 pF	0.040	*(1.02)*	—	—	—	—	5	10	50	50	65	65
†**51-719-011** €	—	1	500	—	10	3000 pF	0.040	*(1.02)*	—	—	—	—	12	20	45	60	60	60

† Also available through API's authorized distributors.
€ Also available through API's authorized European distributors/agents.
* Denotes parts supplied with lead as shown in Figure 7.
** Bushing housing will have 1 1/2 imperfect threads at hex to thread interface.

Resin Sealed Bolt-in Filters

5/16-24 & 5/16-32 C & Pi Circuit

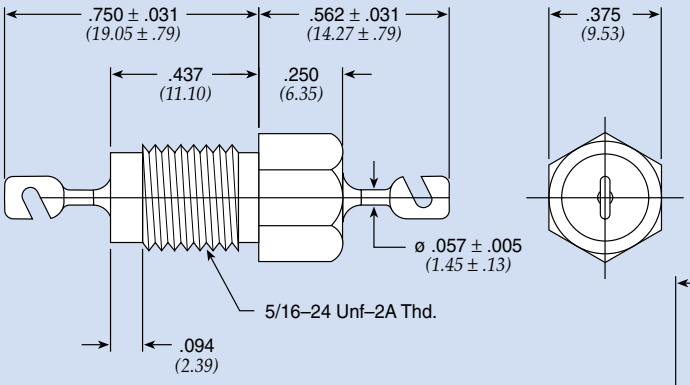


Figure 1

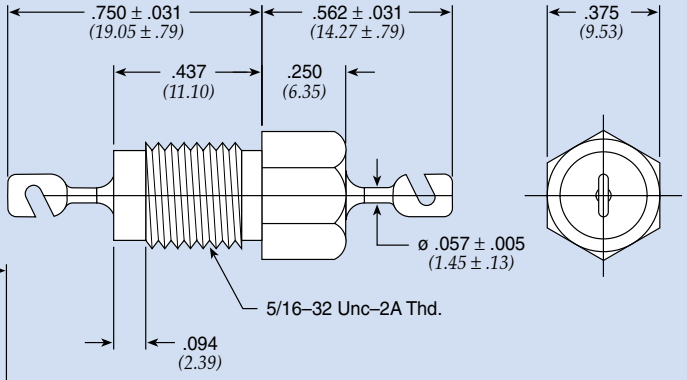


Figure 2

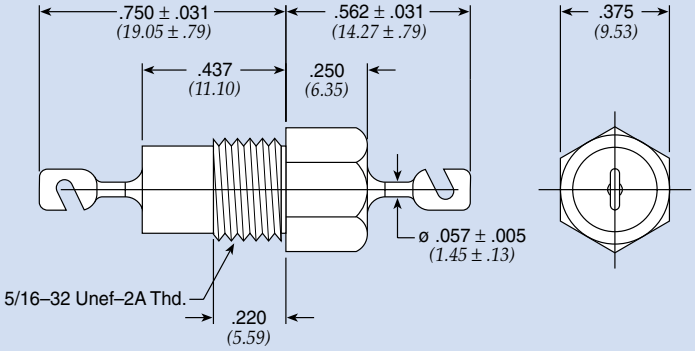


Figure 3

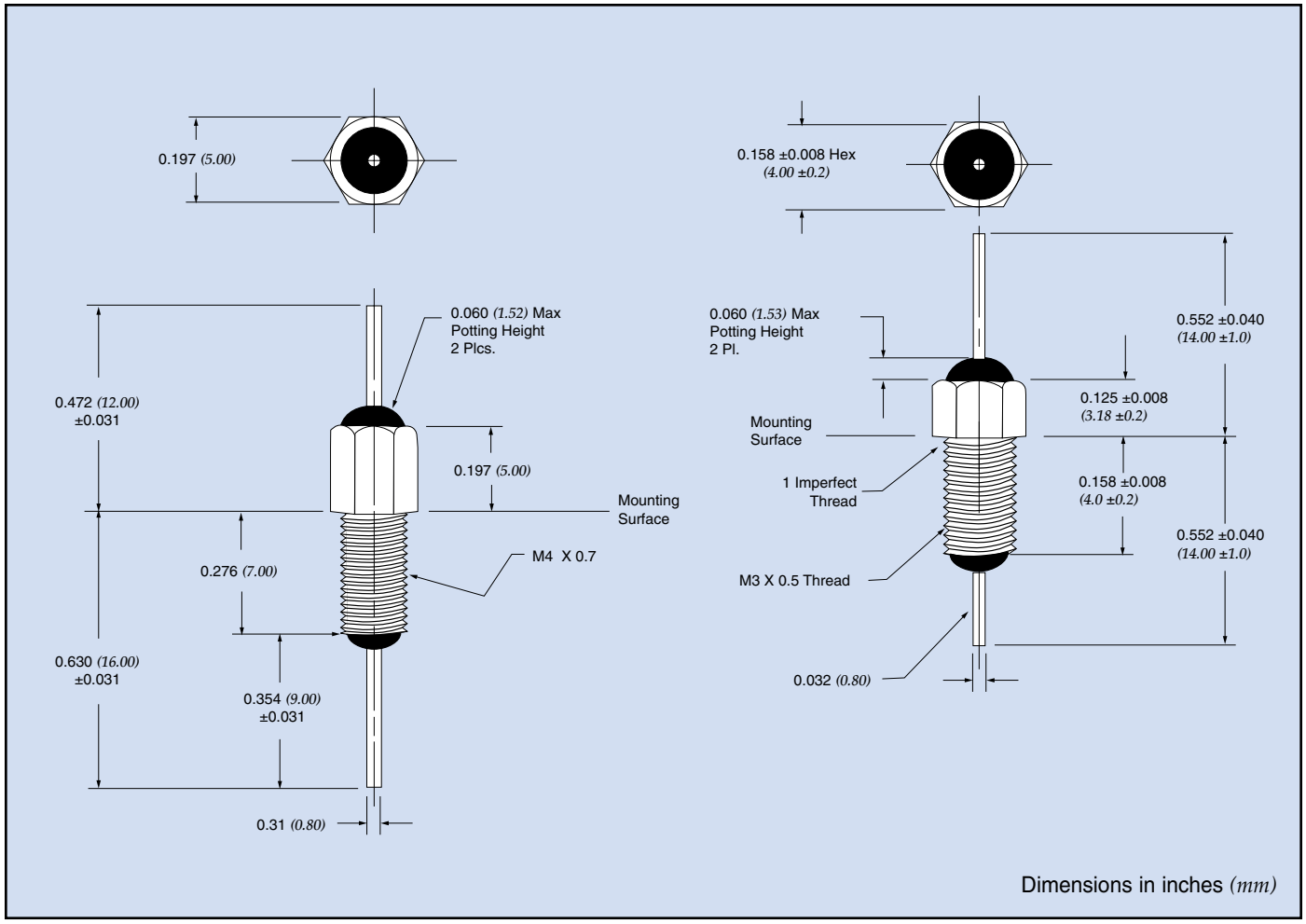
Dimensions in inches *(mm)*

Part Number	M15733 MIL Number	Fig.	Rated Voltage 125°C DC	Rated Voltage 125°C AC	I Amp	CKT	Min Cap	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
SCI-9510-503	—	1	100	—	25	C	0.05 µF	15	24	35	41	45	60	60	60
SCI-3513-000	—	1	100	—	25	Pi	0.1 µF	10	18	28	37	70	70	70	70
SCI-3523-000	—	1	200	115	25	Pi	0.02 µF	—	—	25	50	66	66	70	70
SCI-3543-000	—	1	400	220	25	Pi	6000 pF	—	—	15	35	54	65	70	70
SCI-9550-102	—	1	500	115	25	C	1000 pF	—	—	—	11	20	28	28	28
† **1202-052**	—	1	500	—	25	Pi	3000 pF	—	—	10	35	55	55	70	70
† **1202-054**	—	2	500	—	25	Pi	3000 pF	—	—	10	35	55	55	70	70
51-702-020*	/61-0003	3	500	350	25	Pi	3000 pF	—	—	—	35	55	55	70	70
51-702-021	/61-0004	3	500	350	25	Pi	3000 pF	—	—	10	35	55	55	70	70
SCI-9550-332	—	1	500	115	25	C	3300 pF	—	—	12	20	30	33	40	40
SCI-3553-000	—	1	500	220	25	Pi	0.012 µF	—	—	18	28	52	52	70	70
† **1202-005**	—	2	700	—	25	Pi	2000 pF	—	—	5	20	50	55	70	70

† Also available through API's authorized distributors.
* Denotes parts with 5/16-24 Threads

Metric Resin Sealed Bolt-in Filters

M3 Pi Circuit & M4 C Circuit



Dimensions in inches *(mm)*

Part Number	Figure	Rated Voltage 125°C DC	I Amp	CKT	Min Cap	Temperature Range
51-831-004	1	100	3	Pi	1000 pF	-55°C to +125°C
51-831-011	1	100	10	Pi	100 pF	-55°C to +125°C
51-831-012	1	100	10	Pi	1500 pF	-55°C to +125°C
51-831-013	1	100	10	Pi	3000 pF	-55°C to +125°C
51-831-014	1	70	10	Pi	5500 pF	-55°C to +125°C
51-831-015	1	100	10	Pi	12000 pF	-55°C to +125°C
54-863-004	2	100	10	C	10000 pF	-55°C to +125°C
54-863-005	2	100	10	C	100 pF	-55°C to +125°C
54-863-007	2	100	10	C	1000 pF	-55°C to +125°C
54-863-008	2	100	10	C	2000 pF	-55°C to +125°C
54-863-010	2	100	10	C	4700 pF	-55°C to +125°C

RoHS available.

api technologies corp.
Spectrum Control

High Current/High Voltage Resin Sealed Filters

High current filters are ideal for use in high current 5 volt logic buss, but also can be used for ±48 VDC telephone rack buss, high current switch mode power supplies and DC charging systems. High voltage filters find use in high voltage power supplies and applications requiring U.L. Hi-Pot.

Features

- Current ratings up to 100 Amps
- Continuous voltage ratings up to 1250 VDC/240 VAC (400Hz)
- U.L. 1459 recognized and CSA C22.2 approved versions available
- Rugged bolt-in style for easy installation

Installation Notes

for Figure 1 & 2 — see below (Figure 3 see page CF6)

1. Mounting installation torque
   Method A: Mounting in full threaded through-hole
   Maximum torque: 96 in-lbs

   Method B: Mounting w/hardware
   Maximum torque: 84 in-lbs

2. Terminal installation torque
   Maximum torque: 20 in-lbs

   Note: Use two-wrench method to install terminal hardware

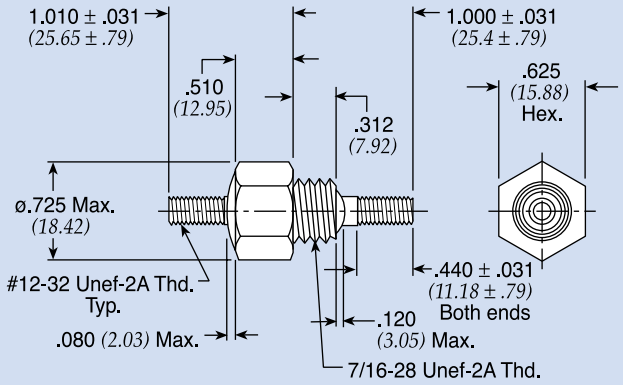


Figure 1

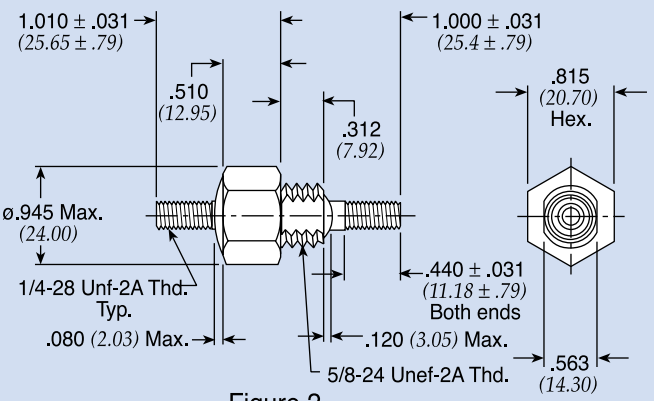


Figure 2

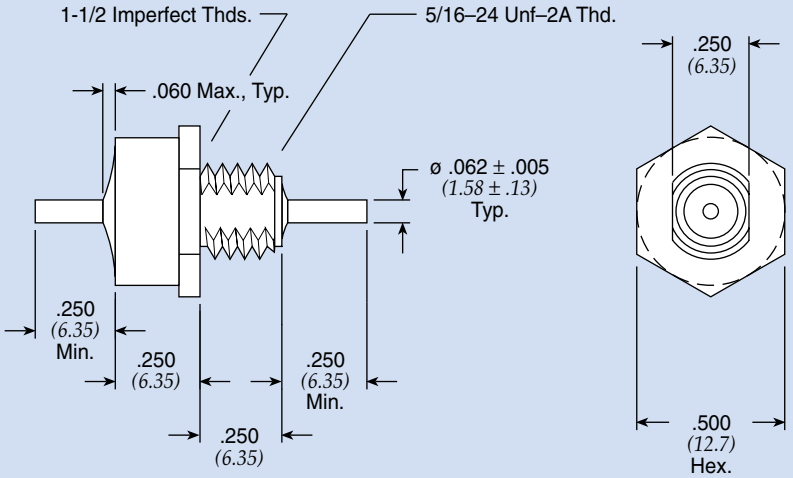


Figure 3

Dimensions in inches *(mm)*

High Current/High Voltage Resin Sealed Filters

High Current High Voltage Feed-through

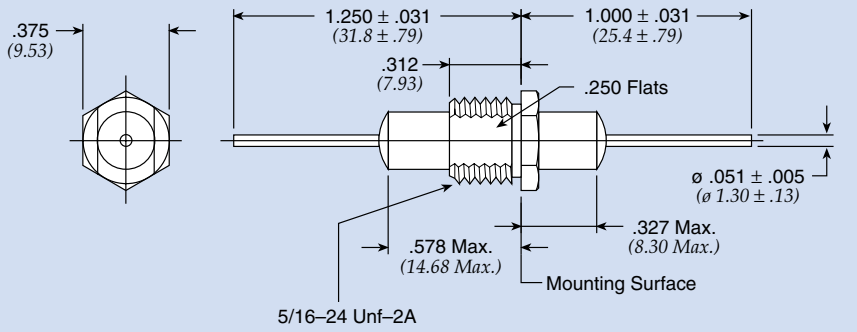


Figure 4

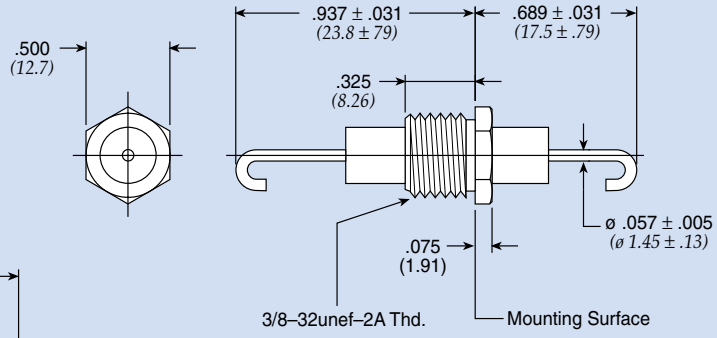


Figure 5

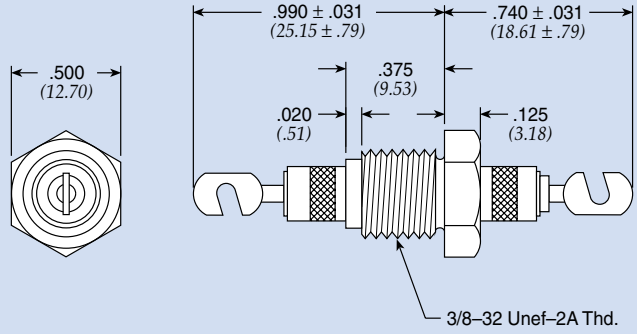


Figure 6

Dimensions in inches *(mm)*

Part Number	Figure	Rated Voltage 125°C DC	Rated Voltage 125°C AC***	I Amp	CKT	Min Cap	Minimum Insertion Loss (dB) 1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
54-848-005*	1	60	—	50	C	0.22 µF	20	30	40	50	50	50	50	50
54-853-001*	2	60	—	50	C	0.22 µF	20	30	40	50	50	50	50	50
54-853-004 €	2	200	140	100	C	0.22 µF	20	30	40	50	50	50	50	50
54-848-008	1	200	140	100	C	0.22 µF	20	30	40	50	50	50	50	50
54-844-001**	3	600	240	25	C	4700 pF ± 20%	—	—	12	20	30	33	50	50
54-844-002**	3	600	240	25	C	0.01 µF ± 20%	3	7	20	25	35	40	57	57
54-763-008	4	750	—	25	C	1000 pF	—	—	—	10	20	28	28	28
54-763-009	4	750	—	25	C	4000 pF	—	—	10	22	32	35	35	40
54-789-003	5	1250	—	25	C	4000 pF	—	—	6	20	30	35	35	35
†**1280-060** €	6	2500	—	25	Pi	1500 pF	—	—	5	15	50	50	50	50

† Also available through API's authorized distributors.
€ Also available through API's authorized European distributors/agents.
* Denotes parts that are UL recognized to UL 60950 and certified to CSA C22.2
** Denotes parts that meet 1500 VAC Dielectric Withstanding Voltage per UL 1283 and CSA C22.2
*** AC Voltage to be 400Hz

api technologies corp.
Spectrum Control

Hermetically Sealed Threaded Case Filters

This series of filters features hermetic glass seals and high EMI filtering performance. They are excellent for critical applications that demand high reliability in the toughest environmental conditions and provide broad-band high performance EMI filtering from 10 KHz to over 10 GHz.

Features

- MIL-F-15733 and MIL-F-28861, DSCC 84084 QPL filters available
- Popular .375", .410" and .690" case diameters
- Voltage ratings from 50 V to 400 VDC/240 AC, 400 Hz
- Impervious to high moisture environments, solvents and severe environmental conditions
- High temperature terminal construction
- D-slotted bushings
- High reliability testing available

Thread length: A - 0.187 (4.76) B - 0.312 (7.92)

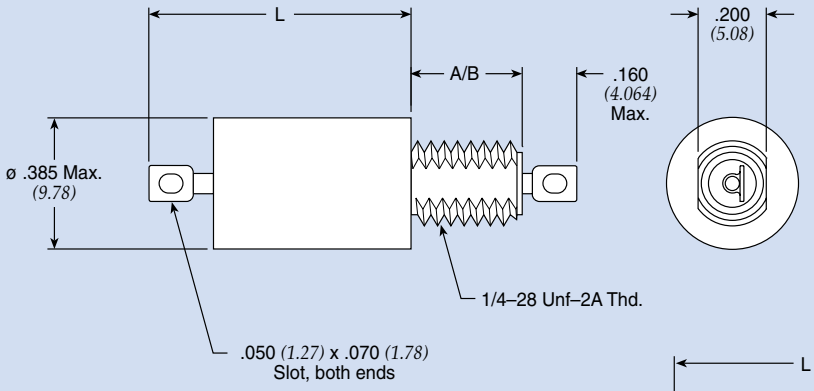
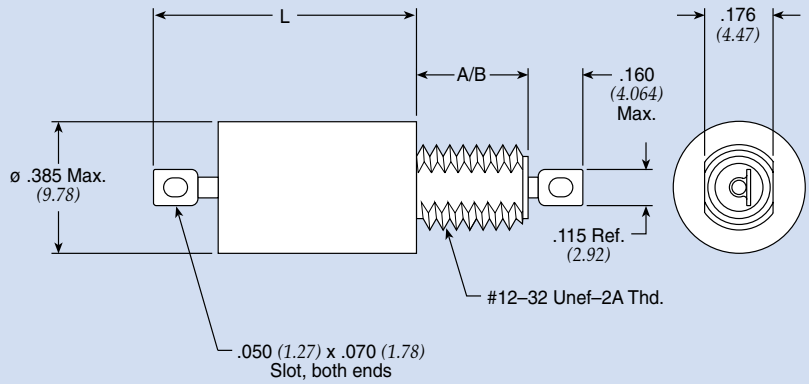


Figure 1



Note: ø .410 Max. for M28861 parts

Figure 2

Dimensions in inches *(mm)*

Hermetically Sealed Threaded Case Filters

.375 ø C Circuit Standard

Part Number	MIL No	See Pg. LP26 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
†54-367-008	—	1	80	—	50	—	15	1.400	0.005	0.387	(9.830)	A	15	28	33	44	60	70	70
54-370-007	—	1	80	—	50	—	15	2.800	0.005	0.576	(14.630)	A	20	34	39	50	60	70	70
54-371-001	—	1	80	—	50	—	15	4.000	0.005	0.688	(17.475)	A	26	40	46	55	60	70	70
54-367-005	—	1	150	—	100	—	15	0.450	0.005	0.387	(9.830)	A	6	19	25	36	55	70	70
†9920-100-6002	—	1	200	—	150	125	15	0.150	0.005	0.387	(9.830)	A	—	6	15	26	42	55	70
54-367-007	—	1	250	—	200	125	15	0.015	0.005	0.387	(9.830)	A	—	—	—	6	25	45	50
†54-367-006	—	1	250	—	200	125	15	0.250	0.005	0.387	(9.830)	A	—	14	19	30	50	65	70
54-370-006	—	1	250	—	200	125	15	0.500	0.005	0.630	(16.002)	A	7	20	28	39	55	70	70
9923-100-6004	—	1	400	—	400	240	15	0.060	0.005	0.415	(10.541)	A	—	5	10	18	38	55	70

.375 ø C Circuit MIL Qualified

(See MIL index on pages CF9-11 for complete MIL part number listing)

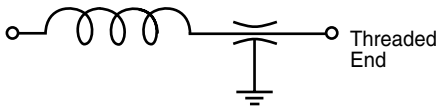
Part Number	M15733 M28861◊ MIL No	See Pg. LP26 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
54-367-054	1-012◊	1	—	—	50	—	15	1.200	0.008	0.410	(10.414)	B	15	28	33	40	40	70	70
54-367-049	1-002◊	1	—	—	50	—	15	1.200	0.008	0.410	(10.414)	A	15	28	33	40	40	70	70
54-370-032	49-0008	1	—	—	50	—	15	2.100	0.010	0.576	(14.630)	A	20	33	40	50	65	70	70
54-367-055	1-014◊	1	—	—	70	—	15	0.700	0.008	0.410	(10.414)	B	10	24	30	40	40	64	70
54-370-030	34-0035	2	—	—	100	—	10	0.300	0.004	0.474	(12.040)	A	7	19	25	35	55	70	70
54-367-051	1-006◊	1	—	—	100	—	15	0.450	0.008	0.410	(10.414)	A	6	19	25	36	40	60	70
54-367-056	1-016◊	1	—	—	100	—	15	0.450	0.008	0.410	(10.414)	B	6	19	25	36	40	60	70
54-367-057	1-018◊	1	—	—	150	—	15	0.250	0.008	0.410	(10.414)	B	—	14	20	31	40	56	70
54-367-053	1-010◊	1	—	—	200	125	15	0.150	0.008	0.410	(10.414)	A	—	10	16	26	40	52	70
54-367-058	1-020◊	1	—	—	200	125	15	0.150	0.008	0.410	(10.414)	B	—	10	16	26	40	52	70
54-370-034	49-0010	1	—	—	330	—	15	0.062	0.004	0.680	(17.272)	A	—	2	7	17	37	55	70

† Also available through API's authorized distributors.

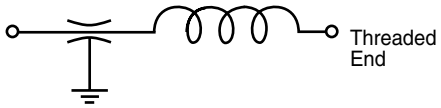
api technologies corp.
Spectrum Control

Hermetically Sealed Threaded Case Filters

L-C Filter LT



L-C Filter LB



.375 ø L Circuit

Thread length: A - 0.187 (4.76) B - 0.312 (7.92)

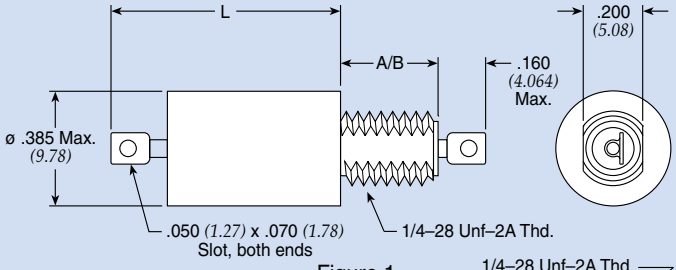


Figure 1

Note: ø .410 Max. for M28861 parts

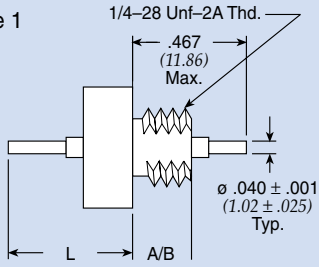


Figure 3

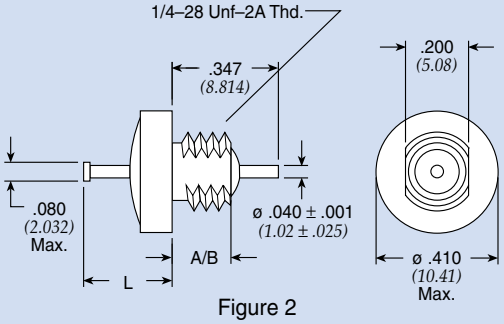
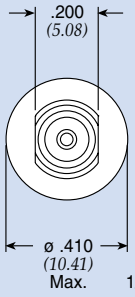


Figure 2
Resin Sealed
Not Hermetically Sealed



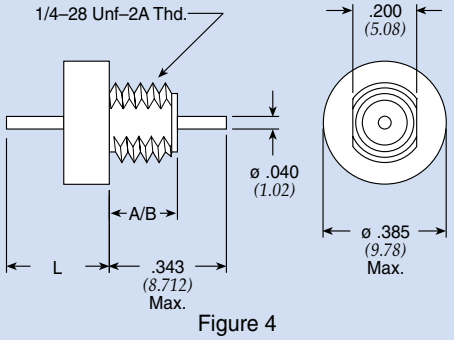


Figure 4

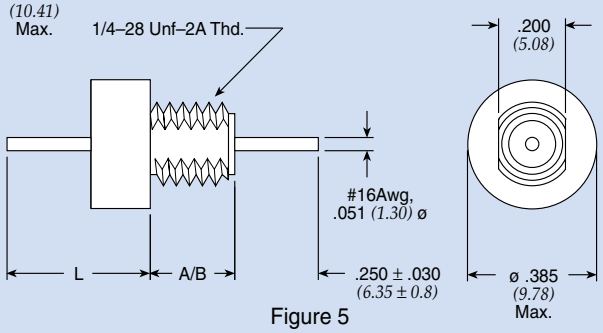


Figure 5

Dimensions in inches *(mm)*

.375 ø L Standard Low Profile

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
†9051-100-0000	—	1	80	—	50	—	15	1.200	0.005	LB	0.370	(9.398)	A	15	25	34	44	60	70	70
†51-359-001 €	—	1	80	—	50	—	15	1.400	0.005	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
SCI-1021-000	—	2*	80	—	50	—	15	1.400	0.003	LB	0.280	(7.112)	A	15	28	33	44	60	70	70
†9053-100-0001	—	1	80	—	50	—	15	1.400	0.005	LB	0.370	(9.398)	A	15	25	34	44	60	70	70
†51-717-001 €	—	2*	80	—	50	—	15	1.400	0.005	LB	0.325	(8.255)	A	15	28	33	44	60	70	70
51-344-006	—	4	80	—	50	—	15	1.400	0.005	LB	0.330	(8.382)	A	15	28	33	44	60	70	70
†SCI-1020-000	—	1	80	—	50	—	15	1.400	0.003	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
SCI-1021-020	—	2◊*	80	—	50	—	15	1.400	0.003	LB	0.280	(7.112)	B	15	28	33	44	60	70	70
†SCI-1020-020	—	1	80	—	50	—	15	1.400	0.003	LB	0.370	(9.398)	B	15	28	33	44	60	70	70
SCI-1150-001	—	1	80	—	50	—	15	2.800	0.003	LB	0.450	(11.430)	B	20	34	40	49	60	70	70
9051-101-0018	—	5	80	—	50	—	25	1.400	0.001	LB	0.450	(11.430)	A	15	25	34	44	60	70	70
†9053-100-0008	—	1	100	—	70	—	15	0.700	0.005	LB	0.370	(9.398)	A	9	20	29	39	52	70	70

* Part is resin sealed, this is not a hermetic part.
† Also available through API's authorized distributors.
€ Also available through API's authorized European distributors/agents.
◊ Note: 0.462" (11.73mm) length from mounting surface to end of lead — not 0.347" (8.8mm).

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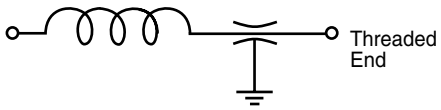
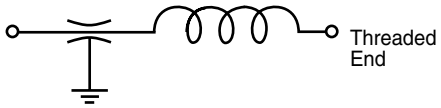
Spectrum Control

Hermetically Sealed Threaded Case Filters

L-C Filter LT



L-C Filter LB



.375 ø L Standard Low Profile *continued*

Part Number	MIL No	See Pg. LP28 for Fig	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
†9050-100-0008	—	2*	100	—	70	—	15	0.750	0.005	LB	0.325	(8.255)	A	9	20	29	39	52	70	70
†9053-100-0002	—	1	150	—	100	—	15	0.500	0.005	LB	0.370	(9.398)	A	4	12	21	31	48	70	70
SCI-1250-001	—	1	150	—	100	—	15	0.500	0.003	LB	0.450	(11.430)	B	8	20	25	34	50	64	70
€SCI-2150-000	—	1	150	—	100	—	15	1.000	0.003	LB	0.450	(11.430)	A	10	25	30	41	56	70	70
SCI-2150-001	—	1	150	—	100	—	15	1.000	0.003	LB	0.450	(11.430)	B	10	25	30	41	56	70	70
†51-717-007	—	2*	250	125	200	125	15	0.015	0.005	LB	0.325	(8.255)	A	—	—	—	6	25	38	45
†51-359-007	—	1	250	125	200	125	15	0.012	0.005	LB	0.370	(9.398)	A	—	—	—	6	25	38	50
9050-100-0011	—	2	350	125	300	125	15	0.150	0.008	LB	0.325	(8.255)	A	—	10	15	25	40	52	60
€SCI-2350-000	—	1	300	125	300	125	15	0.250	0.003	LB	0.450	(11.430)	A	4	15	21	31	50	70	70
SCI-2350-001	—	1	300	125	300	125	15	0.250	0.003	LB	0.450	(11.430)	B	4	15	21	31	50	70	70

* Part is resin sealed, this is not a hermetic part.

.375 ø L Circuit MIL Qualified Low Profile

(See MIL index on pages CF9-11 for complete MIL part number listing)

Part Number	M15733 M28861◊ MIL No	See Pg. LP28 for Fig	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
†51-359-021	38-0004	1		—	50	—	10	1.400	0.008	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
†51-359-024	38-0005	1	80	—	50	—	10	1.400	0.008	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
†51-359-051	58-0001	1	80	—	50	—	10	1.400	0.008	LB	0.545	(13.843)	A	15	28	33	44	60	70	70
51-359-105	58-0004	1	80	—	50	—	10	1.400	0.008	LT	0.545	(13.843)	B	15	28	33	44	60	70	70
†51-359-044	49-0006	1	100	—	50	—	15	1.200	0.010	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
†51-359-055	49-0007	3	100	—	50	—	15	1.200	0.010	LB	0.450	(11.43)	A	15	28	33	44	60	70	70
51-359-081	1-001◊	1	—	—	50	—	15	1.400	0.008	LB	0.410	(10.414)	A	15	28	33	40	40	70	70
51-359-086	1-011◊	1	—	—	50	—	15	1.400	0.008	LB	0.410	(10.414)	B	15	28	33	40	40	70	70
†51-359-053	49-0001	4	100	—	50	—	15	0.680	0.010	LB	0.319	(8.103)	A	8	20	28	38	55	70	70
51-359-082	1-003◊	1	—	—	70	—	15	0.700	0.008	LB	0.410	(10.414)	A	10	24	30	40	40	64	70
51-359-083	1-005◊	1	—	—	100	—	15	0.450	0.008	LB	0.410	(10.414)	A	6	19	25	36	40	60	70
51-359-088	1-015◊	1	—	—	100	—	15	0.450	0.008	LB	0.410	(10.414)	B	6	19	25	36	40	60	70
51-359-084	1-007◊	1	—	—	150	—	15	0.250	0.008	LB	0.410	(10.414)	A	—	14	20	31	40	56	70
51-359-050	38-0008	1	—	—	200	125	15	0.150	0.008	LB	0.370	(9.398)	A	—	—	—	6	25	42	60
51-359-085	1-009◊	1	—	—	200	125	15	0.150	0.008	LB	0.410	(10.414)	A	—	10	16	26	40	52	70
51-359-090	1-019◊	1	—	—	200	125	15	0.150	0.008	LB	0.410	(10.414)	B	—	10	16	26	40	52	70

† Also available through API's authorized distributors.
€ Also available through API's authorized European distributors/agents.

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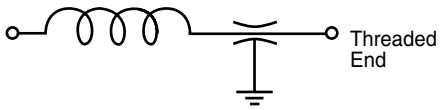
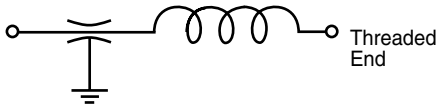
Hermetically Sealed Threaded Case Filters

L-C Filter LT



L-C Filter LB



.375 ø L Circuit

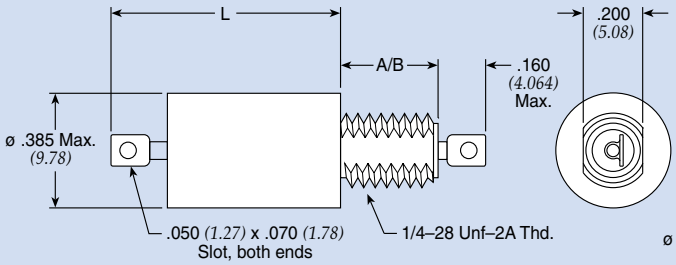
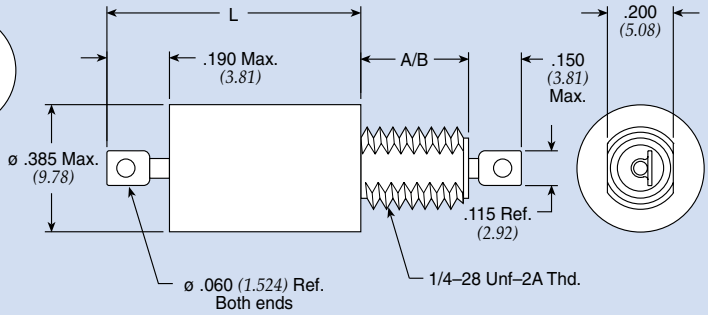


Figure 1

Thread length:
A - 0.187 (4.76)
B - 0.312 (7.92)

Note: ø .410 Max. for M28861 parts



Dimensions in inches *(mm)*

.375 ø L Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-353-007	—	1	80	—	50	—	0.06	1.400	70.000	LB	0.770	*(19.558)*	A	44	70	70	70	70	70	70
51-353-095	—	1	80	—	50	—	0.15	1.400	12.000	LT	0.960	*(24.384)*	A	21	52	64	70	70	70	70
51-353-003	—	1	80	—	50	—	0.45	1.400	1.200	LB	0.770	*(19.558)*	A	16	31	37	55	70	70	70
51-353-099	—	1	80	—	50	—	1.00	1.400	0.250	LT	0.770	*(19.558)*	A	16	33	44	70	70	70	70
51-353-100	—	1	80	—	50	—	5.00	1.400	0.015	LT	0.770	*(19.558)*	A	15	28	33	46	70	70	70
†**9200-300-0025**	—	1	80	—	50	—	10.00	1.200	0.010	LB	0.450	*(11.430)*	A	15	28	33	44	60	70	70

† Also available through API's authorized distributors.

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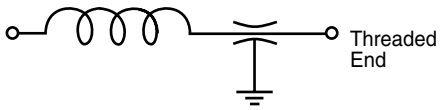
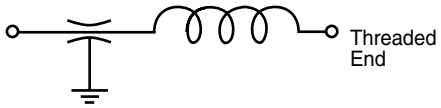
Hermetically Sealed Threaded Case Filters

L-C Filter LT



L-C Filter LB



.375 ø L Circuit Standard Product *continued*

Part Number	MIL No	See Pg. LP30 for Fig	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
†9200-303-0095	—	1	80	—	50	—	10.00	1.200	0.010	LB	0.450	(11.430)	B	15	28	33	44	60	70	70
51-353-101	—	1	80	—	50	—	10.00	1.400	0.010	LT	0.450	(11.430)	A	14	28	33	44	60	70	70
51-353-109	—	1	80	—	50	—	10.00	1.400	0.010	LT	0.450	(11.430)	B	15	28	33	44	60	70	70
51-353-120	—	1	150	—	100	—	1.00	0.750	0.250	LB	0.758	(19.253)	A	9	27	36	57	70	70	70
9000-103-0019	—	1	150	—	100	—	5.00	0.450	0.015	LT	0.758	(19.253)	B	6	20	26	37	68	70	70
SCI-2120-014	—	1	150	—	100	—	10.00	1.000	0.003	LB	0.450	(11.430)	B	14	28	34	44	52	70	70
51-353-110	—	1	250	—	200	125	1.00	0.250	0.250	LT	0.758	(19.253)	A	—	17	29	50	70	70	70
†51-353-111	—	1	250	—	200	125	1.00	0.250	0.250	LB	0.758	(19.253)	A	—	17	29	50	70	70	70
51-353-112	—	1	250	—	200	125	3.00	0.250	0.050	LT	0.758	(19.253)	A	—	13	20	35	70	70	70
†51-353-113	—	1	250	—	200	125	3.00	0.250	0.050	LB	0.758	(19.253)	A	—	13	20	35	70	70	70
51-353-114	—	1	250	—	200	125	5.00	0.250	0.015	LT	0.758	(19.253)	A	—	12	20	30	62	70	70
51-353-116	—	1	250	—	200	125	10.00	0.250	0.010	LT	0.450	(11.430)	A	—	15	20	30	50	70	70
SCI-2320-010	—	1	300	—	300	125	0.50	0.150	1.000	LB	0.758	(19.253)	B	—	23	35	56	70	70	70
SCI-2320-004	—	1	300	—	300	125	1.00	0.150	0.250	LB	0.758	(19.253)	A	—	10	21	41	70	70	70
SCI-2320-005	—	1	300	—	300	125	2.00	0.150	0.063	LB	0.758	(19.253)	A	—	8	14	30	70	70	70
SCI-2320-006	—	1	300	—	300	125	3.00	0.150	0.027	LB	0.758	(19.253)	A	—	8	14	26	64	70	70
SCI-2320-007	—	1	300	—	300	125	10.00	0.150	0.003	LB	0.450	(11.430)	A	—	8	14	25	45	52	70
SCI-2320-014	—	1	300	—	300	125	10.00	0.150	0.003	LB	0.450	(11.430)	B	—	8	14	25	45	52	70

.375 ø L Circuit MIL Qualified Profile

(See MIL index on pages CF9-11 for complete MIL part number listing)

Part Number	M15733 MIL No	See Pg. LP30 for Fig	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-390-018	23-0026	1	—	—	50	—	0.50	1.400	0.360	LB	0.630	(16.002)	A	12	36	48	69	70	70	70
51-390-026	23-0038	1	—	—	50	—	1.00	1.400	0.140	LB	0.630	(16.002)	A	11	26	36	55	70	70	70
51-390-034	23-0050	1	—	—	50	—	2.00	1.400	0.070	LB	0.630	(16.002)	A	10	24	32	48	70	70	70
†51-353-067	24-0006	1	80	—	50	—	10.00	1.400	0.010	LB	0.760	(19.304)	B	15	28	31	42	56	70	70
51-353-207	34-0007	1	—	—	50	—	10.00	1.400	0.010	LB	0.760	(19.304)	A	15	28	31	42	56	70	70
51-444-072	58-0002	1	80	—	50	—	10.00	1.400	0.008	LT	0.545	(13.843)	A	15	28	33	44	60	70	70
†51-353-066	24-0005	1	80	—	50	—	10.00	1.400	0.010	LB	0.760	(19.304)	A	15	28	31	42	56	70	70
51-353-287	39-0014	1	—	—	50	—	10.00	1.400	0.003	LT	0.760	(19.304)	B	14	28	34	44	52	70	70
†51-444-060	24-0008	1	80	—	50	—	10.00	1.400	0.010	LT	0.740	(18.796)	B	15	28	31	42	56	70	70
†51-343-028	38-0002	1	—	—	50	—	15.00	1.400	0.008	LB	0.481	(12.217)	A	15	28	33	44	64	70	70
†51-343-034	38-0006	1	—	—	50	—	15.00	1.400	0.008	LB	0.481	(12.217)	B	15	28	33	44	64	70	70
51-353-053	25-0003	1	—	—	100	—	1.00	0.450	0.250	LB	0.738	(18.745)	A	6	23	34	55	70	70	70
†51-353-054	25-0005	1	—	—	100	—	5.00	0.450	0.015	LT	0.758	(19.253)	A	6	17	23	35	69	70	70
†51-353-055	25-0008	1	—	—	100	—	5.00	0.450	0.015	LB	0.738	(18.745)	A	6	17	23	35	69	70	70
51-353-155	39-0008	1	—	—	100	—	5.00	0.450	0.015	LB	0.760	(19.304)	A	6	20	26	35	60	60	70
51-444-039	25-0017	1	—	—	100	—	5.00	0.450	0.015	LT	0.758	(19.253)	B	6	17	23	35	69	70	70

† Also available through API's authorized distributors.

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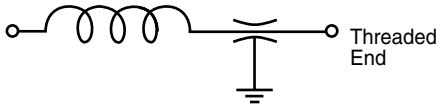
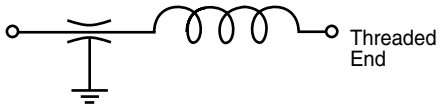
Spectrum Control

Hermetically Sealed Threaded Case Filters

L-C Filter LT



L-C Filter LB



.375 ø L Circuit MIL Qualified Profile *continued*

(See MIL index on pages CF9-11 for complete MIL part number listing)

Part Number	M15733 MIL No	See Pg. LP30 for Fig	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-444-040	25-0020	1	—	—	100		5.00	0.450	0.015	LB	0.738	*(18.745)*	B	6	17	23	35	69	70	70
51-353-156	39-0009	1	—	—	100		10.00	0.450	0.003	LT	0.760	*(19.304)*	A	6	20	26	35	56	60	70
51-353-157	39-0010	1	—	—	100		10.00	0.450	0.003	LB	0.760	*(19.304)*	A	6	20	26	35	56	60	70
†**51-353-076**	26-0001	1	—	—	150	125	1.00	0.250	0.250	LT	0.758	*(19.253)*	A	—	13	24	45	80	70	70
†**51-353-077**	26-0003	1	—	—	150	125	1.00	0.250	0.250	LB	0.738	*(18.745)*	A	—	13	24	45	80	70	70
51-444-043	26-0013	1	—	—	150	125	1.00	0.250	0.250	LT	0.758	*(19.253)*	B	—	13	24	45	80	70	70
51-444-044	26-0015	1	—	—	150	125	1.00	0.250	0.250	LB	0.738	*(18.745)*	B	—	13	24	45	80	70	70
51-390-040	23-0058	1	—	—	150		2.00	0.250	0.070	LT	0.630	*(16.002)*	A	3	15	23	38	60	70	60
51-390-039	23-0057	1	—	—	150		2.00	0.250	0.070	LT	0.630	*(16.002)*	B	3	15	23	38	60	70	60
51-444-005	34-0015	1	—	—	150	125	3.00	0.150	0.050	LT	0.758	*(19.253)*	B	—	8	15	30	68	70	70
†**51-353-078**	26-0004	1	—	—	150	125	3.00	0.250	0.050	LT	0.758	*(19.253)*	A	—	8	15	30	68	70	70
†**51-353-079**	26-0006	1	—	—	150	125	3.00	0.250	0.050	LB	0.738	*(18.745)*	A	—	8	15	30	68	70	70
†**51-444-046**	26-0018	1	—	—	150	125	3.00	0.250	0.050	LB	0.738	*(18.745)*	B	—	8	15	30	68	70	70
51-444-047	26-0019	1	—	—	150	125	5.00	0.250	0.015	LT	0.758	*(19.253)*	B	—	8	14	25	58	70	70
†**51-353-080**	26-0007	1	—	—	150	125	5.00	0.250	0.015	LT	0.758	*(19.253)*	A	—	8	14	25	58	70	70
51-353-081	26-0010	1	—	—	150	125	5.00	0.250	0.015	LB	0.738	*(18.745)*	A	—	8	14	25	58	70	70
51-444-027	34-0030	1	—	—	200	125	5.00	0.250	0.150	LB	0.900	*(22.860)*	A	2	15	21	32	60	70	70
51-444-117	54-0018	2	—	—	300	125	1.00	0.150	0.250	LB	0.740	*(18.796)*	A	—	10	21	41	70	70	70

† Also available through API's authorized distributors.

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Hermetically Sealed Threaded Case Filters

.375 ø Pi Circuit

Thread length: A - 0.187 (4.76) B - 0.312 (7.92)

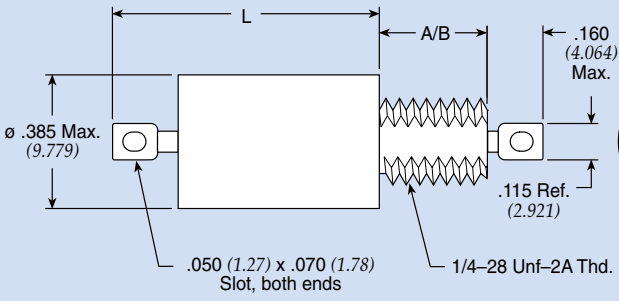

Figure 1

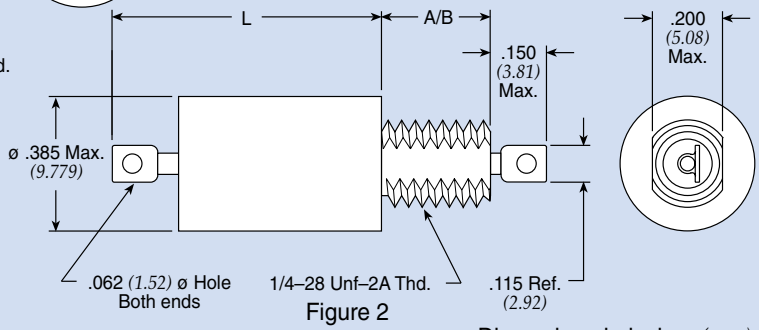

Figure 2

Dimensions in inches *(mm)*

.375 ø Pi Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
SCI-2030-010	—	2	80	—	50	—	0.50	1.500	1.000	0.758	(19.253)	B	24	66	70	70	70	70	70
SCI-2030-004	—	2	80	—	50	—	1.00	1.500	0.250	0.758	(19.253)	A	15	54	70	70	70	70	70
SCI-2030-005	—	2	80	—	50	—	2.00	1.500	0.063	0.758	(19.253)	A	—	45	62	70	70	70	70
SCI-2030-006	—	2	80	—	50	—	3.00	1.500	0.027	0.758	(19.253)	A	—	35	55	70	70	70	70
SCI-2030-013	—	2	80	—	50	—	3.00	1.500	0.027	0.758	(19.253)	B	—	35	55	70	70	70	70
†9001-100-1080	—	1	80	—	50	—	5.00	2.800	0.015	0.758	(19.253)	A	—	18	60	70	70	70	70
†9001-100-1081	—	1	80	—	50	—	10.0	2.800	0.005	0.758	(19.253)	A	21	32	40	35	68	70	70
SCI-2130-009	—	1	150	—	100	—	0.25	1.000	4.000	0.758	(19.253)	B	28	70	70	70	70	70	70
51-311-319	—	1	150	—	100	—	0.50	1.000	0.600	0.758	(19.253)	A	—	51	69	70	70	70	70
†9001-100-1010	—	1	150	—	100	—	0.50	1.000	0.600	0.758	(19.253)	A	6	39	68	70	70	70	70
51-311-320	—	1	150	—	100	—	1.00	1.000	0.250	0.758	(19.253)	A	—	41	60	70	70	70	70
†9001-100-1013	—	1	150	—	100	—	1.00	1.000	0.250	0.758	(19.253)	A	—	28	59	70	70	70	70
51-311-321	—	1	150	—	100	—	3.00	1.000	0.060	0.758	(19.253)	A	—	16	41	70	70	70	70
†51-311-322	—	1	150	—	100	—	5.00	1.000	0.015	0.758	(19.253)	A	—	—	28	65	70	70	70
SCI-2130-007	—	1	150	—	100	—	10.0	1.000	0.003	0.758	(19.253)	A	9	24	29	40	70	70	70
SCI-2130-014	—	1	150	—	100	—	10.0	1.000	0.005	0.758	(19.253)	B	9	24	29	40	70	70	70
51-311-316	—	1	250	125	200	125	1.00	0.300	0.250	0.758	(19.253)	A	—	20	40	70	70	70	70
51-311-317	—	1	250	125	200	125	3.00	0.300	0.050	0.758	(19.253)	A	—	—	20	55	70	70	70
†9001-100-1025	—	1	250	125	200	125	5.00	0.300	0.015	0.758	(19.253)	A	—	—	12	50	70	70	80
SCI-2330-009	—	1	300	125	300	125	0.25	0.300	4.000	0.758	(19.253)	B	8	50	66	70	70	70	70
SCI-2330-010	—	1	300	125	300	125	0.50	0.300	1.000	0.758	(19.253)	B	—	40	56	70	70	70	70
SCI-2330-012	—	1	300	125	300	125	2.00	0.300	0.063	0.758	(19.253)	B	—	18	33	63	70	70	70
SCI-2330-007	—	1	300	125	300	125	10.0	0.300	0.003	0.758	(19.253)	A	—	14	20	30	70	70	70

† Also available through API's authorized distributors.

Hermetically Sealed Threaded Case Filters

.375 ø Pi Circuit MIL Qualified Product

(See MIL index on pages CF9-11 for complete MIL part number listing)

Part Number	M15733 MIL No	See Pg. LP33 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-390-305	23-0017	1	—	—	50	—	0.30	2.800	0.770	0.730	(18.542)	B	29	73	80	80	80	80	80
51-390-314	23-0042	1	—	—	50	—	1.00	2.800	0.140	0.730	(18.542)	A	8	52	71	80	80	80	80
†51-390-318	23-0054	1	—	—	50	—	2.00	1.500	0.070	0.730	(18.542)	A	—	46	65	80	80	80	80
†51-390-317	23-0053	1	—	—	50	—	2.00	1.500	0.070	0.730	(18.542)	B	—	46	65	80	80	80	80
51-311-311	25-0010	1	—	—	100	—	0.25	0.900	1.500	0.793	(20.142)	A	—	48	66	80	80	80	70
†51-311-308	25-0002	1	—	—	100	—	1.00	0.500	0.250	0.793	(20.142)	A	—	33	52	80	80	80	70
†51-311-309	25-0004	1	—	—	100	—	3.00	0.660	0.050	0.793	(20.142)	A	—	17	34	68	80	80	70
†51-311-310	25-0006	1	—	—	100	—	5.00	0.900	0.015	0.793	(20.142)	A	—	—	17	57	80	80	70
51-353-344	39-0011	1	—	—	100	—	10.0	0.990	0.003	0.760	(19.304)	A	9	24	29	40	70	70	70
51-353-345	39-0012	1	—	—	100	—	10.0	0.990	0.003	0.760	(19.304)	A	9	24	29	40	70	70	70
†51-311-314	26-0011	1	—	—	150	125	0.25	0.300	1.500	0.793	(20.142)	A	—	29	47	70	80	80	70
51-390-312	23-0036	1	—	—	150	—	0.50	0.500	0.360	0.730	(18.542)	A	—	48	66	70	70	70	70
51-390-311	23-0035	1	—	—	150	—	0.50	0.500	0.360	0.730	(18.542)	B	—	48	66	70	70	70	70
†51-353-336	26-0002	1	—	—	150	125	1.00	0.300	0.250	0.793	(20.142)	A	—	11	32	63	80	80	70
51-390-315	23-0047	1	—	—	150	—	1.00	0.500	0.140	0.730	(18.542)	B	—	32	51	70	70	70	70
51-311-312	26-0005	1	—	—	150	125	3.00	0.300	0.050	0.793	(20.142)	A	—	5	6	47	80	80	70
51-311-408	54-0005	2	—	—	300	115	1.00	0.300	0.250	0.761	(19.329)	A	—	23	43	70	70	70	70

† Also available through API's authorized distributors.

Transient Suppression Pi Filters

Part Number	See Pg. LP33 for Fig.	Rated Volt. VDC	I Amp	Min Cap µF	DCR Min Mohms	Max RDC Ohms	Transient Suppressor* VR* (VDC)	BV* (VDC)	IT* (MA)	IPP* (A)	Length In	Length (mm)	Max Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-570-300	1	5	0.50	1.400	0.500	0.600	6.5	7.22/7.98	10	44.7	1.179	(29.947)	A	23	57	70	70	70	70
51-570-301	1	5	1.00	1.400	0.500	0.350	6.5	7.22/7.98	10	44.7	1.179	(29.947)	A	3	47	70	70	70	70
51-570-302	1	5	3.00	1.400	0.500	0.060	6.5	7.22/7.98	10	44.7	1.179	(29.947)	A	—	23	58	70	70	70
51-570-303	1	5	5.00	1.400	0.500	0.015	6.5	7.22/7.98	10	44.7	1.179	(29.947)	A	—	17	48	70	70	70
51-570-304	1	5	10.00	1.400	0.500	0.005	6.5	7.22/7.98	10	44.7	1.179	(29.947)	A	16	26	35	40	60	70
51-570-310	1	28	0.50	1.400	30.000	0.600	33.0	36.7/40.6	1	9.4	1.179	(29.947)	A	23	57	70	70	70	70
51-570-311	1	28	1.00	1.400	30.000	0.350	33.0	36.7/40.6	1	9.4	1.179	(29.947)	A	3	47	70	70	70	70
51-570-312	1	28	3.00	1.400	30.000	0.060	33.0	36.7/40.6	1	9.4	1.179	(29.947)	A	—	23	58	70	70	70
51-570-313	1	28	5.00	1.400	30.000	0.015	33.0	36.7/40.6	1	9.4	1.179	(29.947)	A	—	17	48	70	70	70
51-570-314	1	28	10.00	1.400	30.000	0.005	33.0	36.7/40.6	1	9.4	1.179	(29.947)	A	16	26	35	40	60	70
51-570-320	1	50	0.50	1.400	50.000	0.600	58.0	64.4/71.2	1	5.3	1.179	(29.947)	A	23	57	70	70	70	70
51-570-321	1	50	1.00	1.400	50.000	0.350	58.0	64.4/71.2	1	5.3	1.179	(29.947)	A	3	47	70	70	70	70
51-570-322	1	50	3.00	1.400	50.000	0.060	58.0	64.4/71.2	1	5.3	1.179	(29.947)	A	—	23	58	70	70	70
51-570-323	1	50	5.00	1.400	50.000	0.015	58.0	64.4/71.2	1	5.3	1.179	(29.947)	A	—	17	48	70	70	70
51-570-324	1	50	10.00	1.400	50.000	0.005	58.0	64.4/71.2	1	5.3	1.179	(29.947)	A	16	26	35	40	60	70

* Transient Suppression definitions and ratings

VR = Reverse standoff voltage
BV = Breakdown voltage
IPP = Max. peak pulse current
IT = Test current

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Hermetically Sealed Threaded Case Filters

.375 ø T Circuit

Thread length: A - 0.187 (4.76) B - 0.312 (7.92)

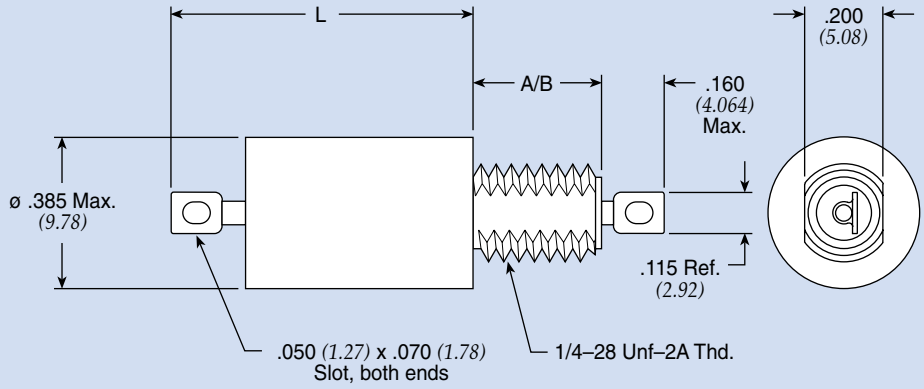

Figure 1

Note: Max. O.D. is ø .416" for Military QPL Filters.

Dimensions in inches *(mm)*

.375 ø T Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
SCI-2040-012	—	1	80	—	50	—	2.00	1.400	0.126	1.071	(27.203)	B	8	22	30	55	70	70	70
SCI-2040-013	—	1	80	—	50	—	3.00	1.400	0.054	1.071	(27.203)	B	8	22	28	43	70	70	70
†9004-100-2017	—	1	80	—	50	—	15.0	1.400	0.005	1.179	(29.947)	A	17	27	34	44	60	70	70
SCI-2140-004	—	1	150	—	100	—	1.00	0.500	0.500	1.070	(27.178)	A	4	25	40	70	70	70	70
SCI-2140-006	—	1	150	—	100	—	3.00	0.500	0.054	1.071	(27.203)	A	4	19	24	39	70	70	70
SCI-2140-007	—	1	150	—	100	—	10.0	0.500	0.010	1.071	(27.203)	A	4	19	24	34	57	70	70
SCI-2340-009	—	1	300	—	300	125	0.25	0.150	8.000	1.071	(27.203)	B	11	57	70	70	70	70	70
SCI-2340-004	—	1	300	—	300	125	1.00	0.150	0.500	1.071	(27.203)	A	—	13	29	59	70	70	70
SCI-2340-013	—	1	300	—	300	125	3.00	0.150	0.054	1.071	(27.203)	B	—	8	14	29	70	70	70
SCI-2340-014	—	1	300	—	300	125	10.0	0.150	0.010	1.071	(27.203)	B	—	8	14	24	47	70	70

† Also available through API's authorized distributors.

.375 ø T Circuit MIL Qualified Product

(See MIL index on pages CF9-11 for complete MIL part number listing)

Part Number	M15733 MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-382-609	25-0024	1	—	—	100	—	2.00	0.750	0.100	1.179	(29.947)	B	10	22	31	55	80	70	70
51-382-603	25-0007	1	—	—	100	—	4.00	0.750	0.063	1.345	(34.163)	A	10	22	28	43	80	70	70
†51-351-604	26-0012	1	—	—	150	125	2.00	0.250	0.100	1.179	(29.947)	A	—	13	21	43	80	70	70
51-351-603	26-0008	1	—	—	150	125	4.00	0.250	0.063	1.345	(34.163)	A	—	11	18	33	80	70	70

† Also available through API's authorized distributors.

Hermetically Sealed Threaded Case Filters

.375 ø TT Circuit Standard Product

Part Number	MIL No	See Pg. LP35 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
SCI-2060-009	—	1	—	—	50	—	0.25	1.500	12.000	1.241	(31.521)	B	70	70	70	70	70	70	70
SCI-2060-013	—	1	—	—	50	—	3.00	1.500	0.081	1.241	(31.521)	B	—	33	54	70	70	70	70
SCI-2060-007	—	1	—	—	50	—	10.0	1.500	0.006	1.241	(31.521)	A	15	29	35	42	55	70	70
SCI-2060-014	—	1	—	—	50	—	10.0	1.500	0.006	1.241	(31.521)	B	15	29	35	42	55	70	70
SCI-2160-011	—	1	—	—	100	—	1.00	1.500	0.750	1.241	(31.521)	B	12	52	70	70	70	70	70
SCI-2160-012	—	1	—	—	100	—	2.00	1.500	0.189	1.241	(31.521)	B	—	33	56	70	70	70	70
SCI-2160-013	—	1	—	—	100	—	3.00	1.500	0.081	1.241	(31.521)	B	—	24	54	70	70	70	70
SCI-2160-014	—	1	—	—	100	—	10.0	1.400	0.006	1.241	(31.521)	B	12	25	32	42	55	70	70
SCI-2360-011	—	1	—	—	300	125	1.00	0.500	0.750	1.241	(31.521)	B	—	48	70	70	70	70	70
SCI-2360-006	—	1	—	—	300	125	3.00	0.500	0.080	1.241	(31.521)	A	—	12	38	70	70	70	70
SCI-2360-007	—	1	—	—	300	125	10.0	0.500	0.006	1.241	(31.521)	A	5	18	24	34	55	70	70
SCI-2360-014	—	1	—	—	300	125	10.0	0.500	0.006	1.241	(31.521)	B	5	18	24	34	55	70	70

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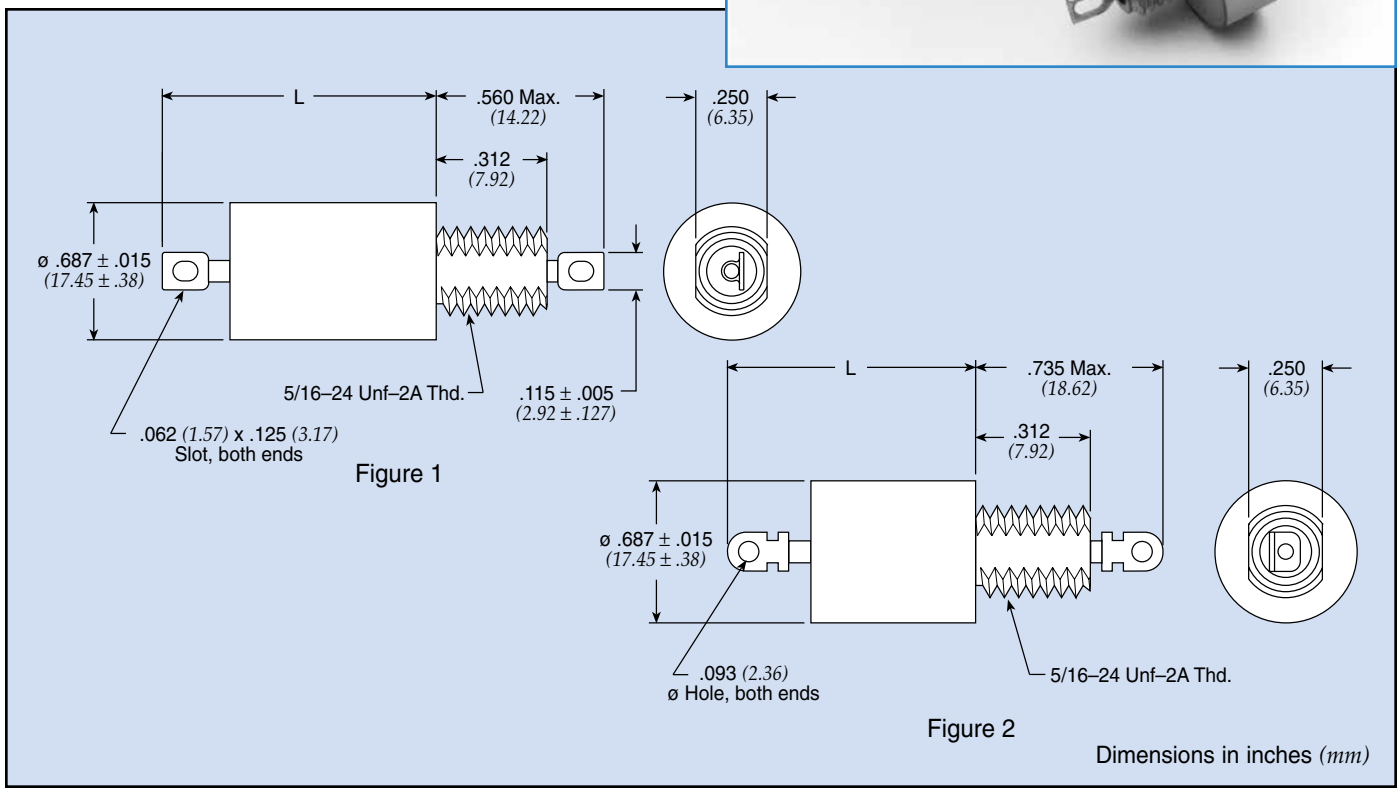
Spectrum Control

Hermetically Sealed Threaded Case Filters

.690 ø C Circuit



.690 ø C Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
†9932-100-6004	—	1	200	—	150		15	2.600	0.005	0.702	(17.831)	10	29	39	50	60	70	70
54-310-001	—	1	300	—	300	125	15	0.500	0.005	0.560	(14.224)	6	19	25	36	50	70	70
54-310-005	—	2	250	—	200	125	25	0.500	0.005	0.750	(19.050)	6	19	25	36	50	70	70
54-310-009	—	1	450	240	400	240	15	0.250	0.005	0.560	(14.224)	—	14	19	30	45	60	70
†9932-100-6005	—	1	450	240	400	240	15	0.250	0.005	0.560	(14.224)	—	14	19	30	50	70	70

.690 ø C Circuit MIL Qualified Product

Part Number	M15733 MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
54-310-039	34-0037	1	—	—	275	125	15	0.200	0.005	0.575	(14.605)	5	15	21	31	51	70	70

.690 ø C Circuit DSCC 84084 Product

Part Number	84084 No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
54-310-042	-001	1	—	—	400	230	15	0.150	0.005	0.700	(17.780)	—	10	16	26	40	52	70

† Also available through API's authorized distributors.

api technologies corp.
Spectrum Control

Hermetically Sealed Threaded Case Filters

.690 ø L Circuit

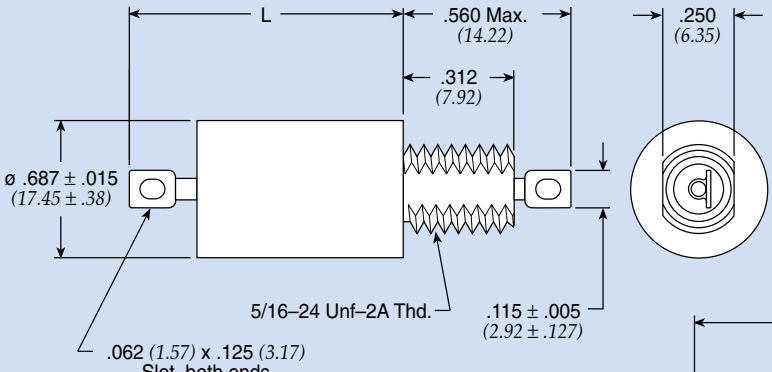


Figure 1

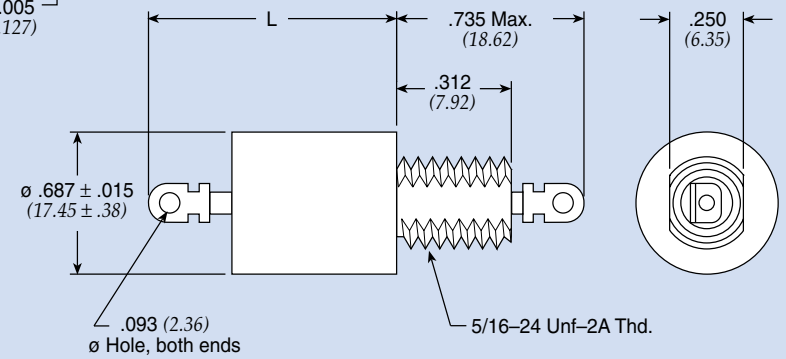


Figure 2

Dimensions in inches *(mm)*

.690 ø L Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
9010-100-0049	—	1	150	—	100	—	10.0	1.400	0.005	LT	0.905	(22.987)	16	24	34	44	60	70	70
SCI-6120-008	—	1	150	—	100	—	10.0	2.600	0.006	LB	0.959	(24.359)	18	32	39	49	70	70	70
SCI-6120-009	—	1	150	—	100	—	20.0	2.600	0.001	LB	0.905	(22.987)	18	32	39	49	60	70	70
51-320-041	—	1	250	—	200	125	10.0	0.500	0.008	LT	0.905	(22.987)	5	19	25	35	50	70	70
51-320-024	—	1	450	240	400	240	1.00	0.360	0.210	LT	0.905	(22.987)	5	30	38	60	70	70	70
51-320-100	—	1	450	240	400	240	1.00	0.250	0.210	LT	0.905	(22.987)	—	21	33	55	70	70	70
†51-320-026	—	1	450	240	400	240	3.00	0.360	0.030	LT	0.905	(22.987)	5	19	25	45	70	70	70
51-320-103	—	1	450	240	400	240	5.00	0.360	0.010	LB	0.905	(22.987)	—	12	18	30	60	70	70
51-322-007	—	1	450	240	400	240	15.0	0.360	0.007	LB	0.650	(16.510)	5	19	25	35	48	62	70
51-322-015	—	2	450	240	400	240	25.0	0.360	0.007	LT	0.750	(19.050)	5	17	23	34	48	62	70
51-322-036	—	2	450	240	400	240	25.0	0.250	0.007	LB	0.750	(19.050)	—	10	16	29	45	60	70
9010-100-0054	—	1	450	240	300	240	1.00	0.150	0.250	LT	0.905	(22.987)	—	14	32	52	70	70	70
SCI-6320-004	—	1	300	—	300	125	1.00	0.400	0.300	LB	0.959	(24.359)	6	24	35	56	70	70	70

† Also available through API's authorized distributors.

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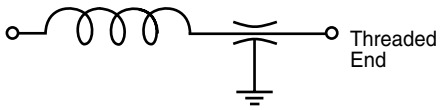
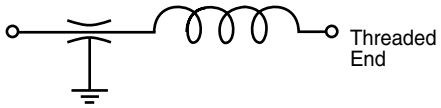
Spectrum Control

Hermetically Sealed Threaded Case Filters

L-C Filter LT



L-C Filter LB



.690 ø L Circuit MIL Qualified Product

(See MIL index on pages CF9-11 for complete MIL part number listing)

Part Number	M15733 MIL No	See Pg. LP38 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
†51-320-015	27-0005	1	—	—	200	125	3.00	0.250	0.033	LT	0.900	(22.860)	—	14	21	39	80	70	70
51-320-017	27-0008	1	—	—	200	125	5.00	0.250	0.016	LT	0.900	(22.860)	—	13	19	32	69	70	70
51-320-018	27-0009	1	—	—	200	125	5.00	0.250	0.016	LB	0.900	(22.860)	—	13	19	32	69	70	70
51-323-003	27-0011	1	—	—	200	125	10.0	0.250	0.005	LT	1.031	(26.187)	—	13	19	30	61	70	70
51-323-004	27-0012	1	—	—	200	125	10.0	0.250	0.005	LB	1.031	(26.187)	—	13	19	30	61	70	70
†51-322-009	27-0014	2	—	—	200	125	15.0	0.250	0.007	LT	1.763	(44.780)	—	19	25	36	60	70	70
51-322-017	34-0002	2	—	—	200	125	20.0	0.360	0.050	LB	1.763	(44.780)	—	19	25	35	57	70	70

.690 ø L Circuit DSCC 84084 Product

Part Number	84084 No	See Pg. LP38 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-320-162	-004	1	—	—	400	230	1.00	0.150	0.150	LT	0.905	(22.987)	—	19	30	46	60	70	70
51-320-163	-005	1	—	—	400	230	1.00	0.150	0.150	LB	0.905	(22.987)	—	19	30	46	60	70	70
51-320-164	-006	1	—	—	400	230	3.00	0.150	0.026	LT	0.905	(22.987)	—	11	19	36	60	70	70
51-320-165	-007	1	—	—	400	230	3.00	0.150	0.026	LB	0.905	(22.987)	—	11	19	36	60	70	70
51-320-166	-008	1	—	—	400	230	5.00	0.150	0.013	LT	0.905	(22.987)	—	10	16	28	54	70	70
51-320-167	-009	1	—	—	400	230	5.00	0.150	0.013	LB	0.905	(22.987)	—	10	16	28	54	70	70
51-320-168	-010	1	—	—	400	230	10.0	0.150	0.008	LT	0.905	(22.987)	—	10	16	25	48	70	70
51-320-169	-011	1	—	—	400	230	10.0	0.150	0.008	LB	0.905	(22.987)	—	10	16	25	48	70	70

† Also available through API's authorized distributors.

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Hermetically Sealed Threaded Case Filters

.690 ø Pi Circuit

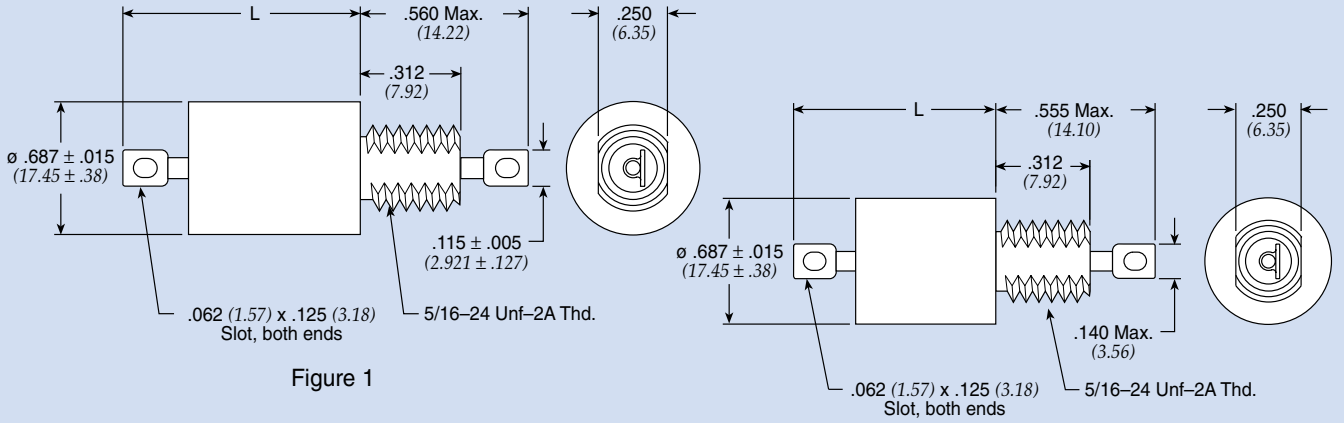

Figure 1

Figure 2

Dimensions in inches *(mm)*

.690 ø Pi Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-321-322	—	1	150	—	100	—	1.00	2.800	0.210	1.195	(30.353)	35	69	70	70	70	70	70
SCI-6130-009	—	1	150	—	100	—	20.0	5.200	0.001	1.195	(30.353)	23	31	35	35	70	70	70
51-321-317	—	1	450	240	400	*240	1.00	0.720	0.400	1.195	(30.353)	—	53	70	70	70	70	70
†51-321-318	—	1	450	240	400	*240	3.00	0.720	0.030	1.195	(30.353)	—	31	51	70	70	70	70
†51-321-319	—	1	450	240	400	*240	5.00	0.720	0.020	1.195	(30.353)	—	11	30	65	70	70	70

* 0-60 Hz

.690 ø Pi Circuit MIL Qualified Product

(See MIL index on pages CF8-10 for complete MIL part number listing)

Part Number	M15733 MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-321-312	27-0004	1	—	—	200	125	1.00	0.500	0.250	1.195	(30.353)	—	47	65	80	80	70	70
51-323-313	27-0003	1	—	—	200	125	1.00	0.500	0.270	1.031	(26.187)	—	43	61	80	80	70	70
51-321-313	27-0010	1	—	—	200	125	5.00	0.500	0.024	1.195	(30.353)	—	10	28	64	80	70	70
†51-321-314	27-0013	1	—	—	200	125	10.0	0.500	0.008	1.195	(30.353)	—	16	18	48	80	70	70
51-321-329	34-0005	1	—	—	200	125	10.0	0.500	0.075	1.195	(30.353)	—	16	18	48	80	70	70

.690 ø Pi Circuit DSCC 84084 Product

Part Number	84084 No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-321-398	-013	2	—	—	400	230	1.00	0.200	0.150	1.200	(30.480)	—	27	46	74	80	80	80
51-321-399	-014	2	—	—	400	230	3.00	0.200	0.026	1.200	(30.480)	—	—	30	60	80	80	80
51-321-400	-015	2	—	—	400	230	5.00	0.200	0.013	1.200	(30.480)	—	—	12	50	80	80	80
51-321-401	-016	2	—	—	400	230	10.0	0.200	0.008	1.200	(30.480)	—	—	—	30	80	80	80

† Also available through API's authorized distributors.

Hermetically Sealed Threaded Case Filters

.690 ø T Circuit

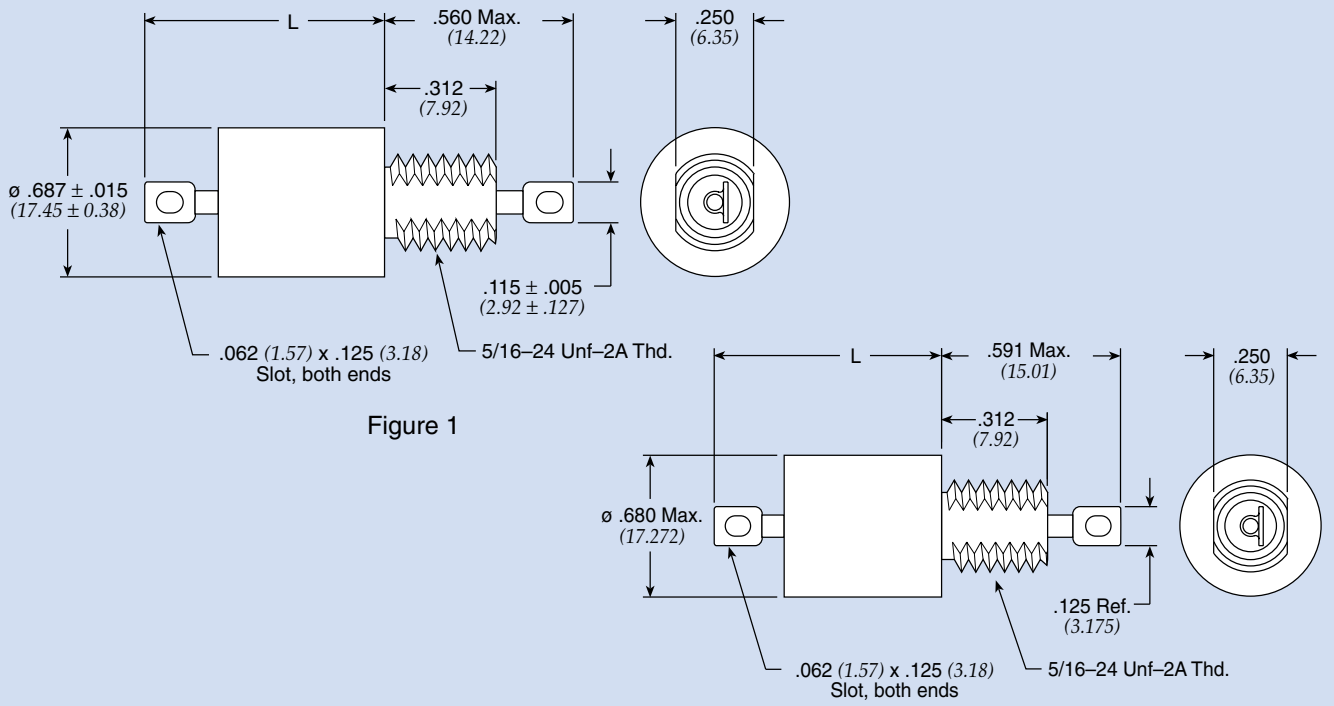

Figure 1

Figure 2

Dimensions in inches *(mm)*

.690 ø T Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
SCI-6140-004	—	1	150	—	100	—	1.00	2.600	0.600	1.195	(30.353)	23	54	70	70	70	70	70
SCI-6140-006	—	1	150	—	100	—	3.00	2.600	0.100	1.195	(30.353)	21	35	46	70	70	70	70
SCI-6140-007	—	1	150	—	100	—	5.00	2.600	0.060	1.195	(30.353)	21	34	41	58	70	70	70
SCI-6140-009	—	1	150	—	100	—	20.0	2.600	0.002	1.195	(30.353)	21	35	41	50	60	70	70
51-321-649	—	1	250	125	200	125	2.00	0.360	0.090	1.195	(30.353)	—	24	38	65	70	70	70
†51-321-610	—	1	450	240	400	240	1.00	0.360	0.600	1.195	(30.353)	7	43	60	70	70	70	70

.690 ø T Circuit MIL Qualified Product

(See MIL index on pages CF8-10 for complete MIL part number listing)

Part Number	M15733 MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-321-607	27-0017	1	—	—	200	125	1.50	0.250	0.133	1.195	(30.353)	—	19	32	62	70	70	70
51-321-608	27-0018	1	—	—	200	125	4.00	0.250	0.025	1.195	(30.353)	—	14	21	36	70	70	70
51-321-670	54-0017	2	—	—	300	115	10.0	0.500	0.006	1.177	(29.896)	5	20	23	35	60	70	60

† Also available through API's authorized distributors.

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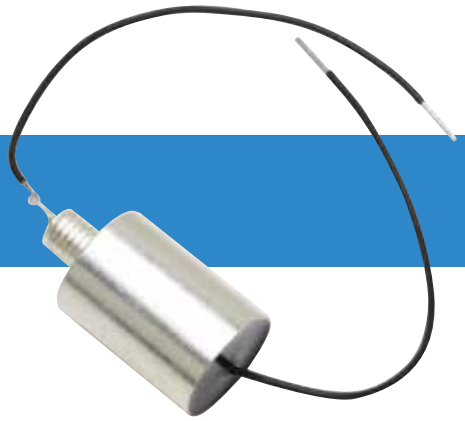
Value-Added Low Pass Filter Assemblies



API Technologies' Spectrum Control line of value-added low pass filters provide flexible solutions to meet your unique design challenges. Our manufacturing process allows you to add connectors, modify terminations or add wire harnesses without adding much cost or drastically increasing lead times.

For custom requirements and exceptional needs, contact our design/manufacturing team.

Incorporate specific terminations, connectors or wire harnesses to accommodate your application.

Lower the cost of acquisition and assembly.

Reduce production operations and lead times.

Our value-added services:

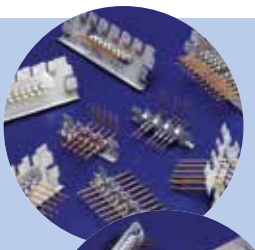
- Allow you to stream-line your bill of materials.
- Reduce inventory/production costs.
- Offer custom application-specific low pass filter assemblies.

Build-to-order low pass filters.

EMI Filtered Arrays

our filter plates and terminal blocks provide exceptional EMI protection of signal and power lines at a lower total installed cost

Easy Mate® Filter Plates reduce installation time and overall cost with its patented snap-in design to maximize real estate on PCBs. The Easy Mate® Jr. offers a lower profile for installation of feed-through filters into small hardware applications…**FA3-FA8**

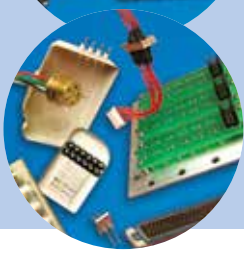


Bolt-In Filter Plates provide EMI filtering for signal and power lines and an excellent method for electronic system interface. These plates eliminate the need to mount filters into bulkheads and are ideal for the isolation of electronic compartments to suppress EMI… **FA9-FA12**

Shrouded Latch Filter Plates combine a bolt-in filter plate with the latching feature of a ribbon cable header providing an easy to install and highly effective method for an electronic interface and EMI solution in one package… **FA13-FA14**

Barrier Strip Filtered Terminal Blocks are available in 2 to 6 terminal versions and our filter elements provide high insertion loss for EMI/RFI filtering of AC and DC power and control lines… **FA19-FA20**

Custom Filtered Arrays help meet your design or manufacturing parameters through special mechanical and electrical specifications or by adding varying cable lengths and terminations for a complete turnkey assembly. Custom high reliability assemblies available…**FA22**



Advantages of a Filtered Array

- Provide an EMI filtered signal or power line between electronic system modules
- Reduce cost . . . economical method to meet EMC requirements
- Reduce labor . . . eliminate need to assemble filters into a bulkhead
- Outperform surface mount EMI filters at frequencies above 50 MHz
- Reduce risk of damage to filter elements due to thermal shock and installation
- Improve reliability . . . every filter plate is 100% tested for key parameters
- Maximize real estate on PCB
- Mixed schematics in a single filter plate package

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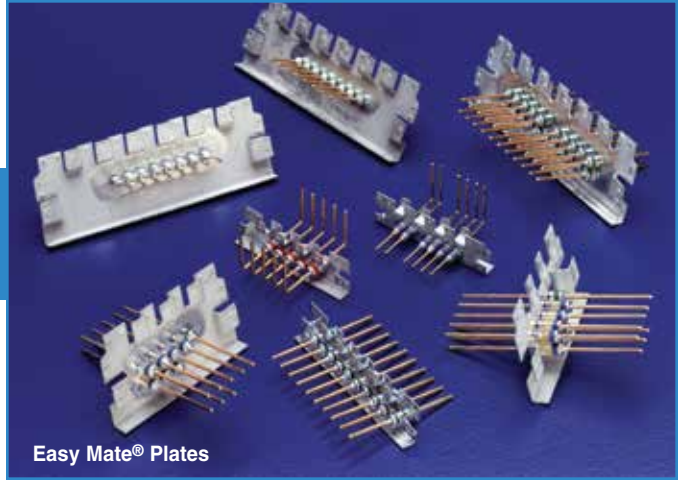
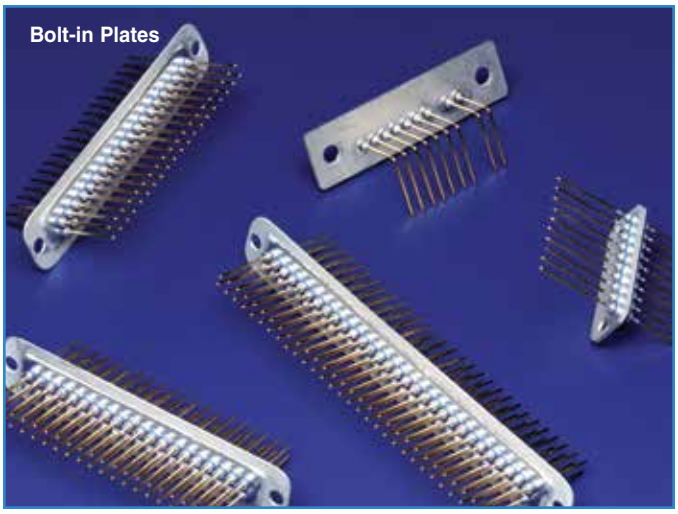
Filter Plates


Easy Mate® Plates


Bolt-in Plates


Custom Plate Solutions

Eliminating EMI/RFI interference has become a stringently enforced matter and needs to be considered at the early stages of design for all electronic systems. Both internal and external interference sources have a major impact on the successful EMC performance of a new system.

Shielding alone is unsatisfactory in shunting unwanted harmonics, conducted or radiated, on power/control lines that run through compartments of an electronic enclosure. This is particularly applicable in systems operating at frequencies above 50 MHz. Isolation and the incorporation of feed-through filters (Filter Plates) to facilitate entering or leaving sensitive compartments in an assembly are excellent methods to bring electronic interdependent functions/systems into compliance.

Filter plates allow a means of interfacing voltage and/or data (controlling instructions) to distant areas of a system without compromising its performance. Filter plates provide excellent isolation from 5 MHz to 18 GHz and beyond, reduce the labor involved for installation, and reduce the risk of damaging filter elements during installation. Connecting to these filter plates is easily accomplished through several methods, including ribbon style connectors, harnesses, hard wiring or directly soldering leads at a 90° angle to the printed circuit board.

The drawings on pages FA4, FA10 and FA14 illustrate how filter plates are incorporated into an electronic system.

Filter Plate Advantages

- Provide an EMI filtered signal line between electronic system modules
- Reduce cost . . . economical method to meet EMC requirements
- Reduce labor . . . eliminate need to assemble filters into a bulkhead
- Outperform surface mount EMI filters at frequencies above 50 MHz
- Reduce risk of damage to filter elements due to thermal shock and installation
- Improve reliability . . . every filter plate is 100% tested for key parameters
- Maximize real estate on PCB
- Mixed schematics in a single filter plate package

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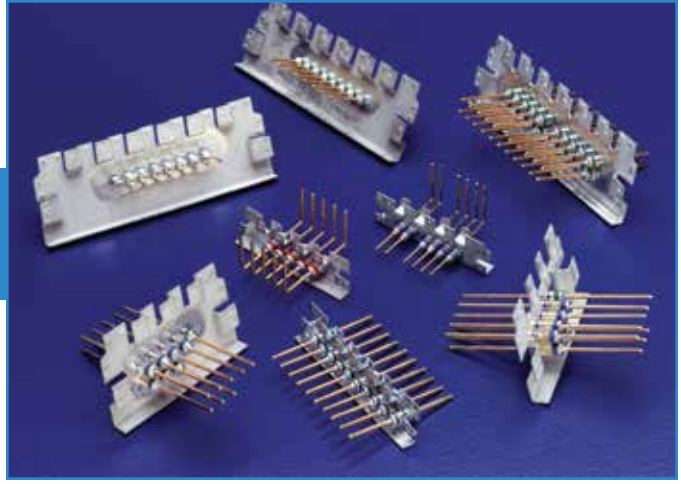
Easy Mate® Filter Plates



API's Spectrum Control brand developed an EMI/RFI filter plate, Easy Mate®, which simplifies installation and eliminates the need for mounting hardware. The Easy Mate®, **patented**, is designed to "snap" into the chassis of electronic systems, reducing the labor required to complete a plate installation. The drawing on page FA4 shows the Easy Mate® design.

These plates are available in two lengths and in both standard density centers (.100") and high-densitycenters (2mm). Standard density Easy Mate® plates offer up to 26 lines per plate in a double row configuration, while high-density plates offer up to 32 lines. Custom sizes for Easy Mate® plates are available.

Easy Mate® Advantages

- Reduces installation time and overall cost
- Eliminates mounting hardware and prepwork
- Flexibility for 1 or 2 rows and standard density centers (.100") or high density centers (2mm)
- Improves overall quality and reliability
- Multiple dimpled finger ground contacts provides excellent long term EMI filtering from 5 MHz to 18 GHz
- Outperforms surface mount devices
- Maximize real estate on PCB
- Mixed capacitance values and schematics
- Ideal for isolation of electronic compartments
- Available in RoHS compliant versions

Ordering Information

Example: **52-898-206-BA2**

The part number shown represents an Easy Mate® filter plate with 2 rows, 6 filters per row. Filters are C style with a capacitance value of 100pF. The plate length is 1.092", and the leads are bent 90° to the right side.

52	**	898	-	2	06	-	B	A	2
Filter Plates		**898** Easy Mate® Standard Density **960** Easy Mate® Hi-density *		**No. of Rows** **1** = 1 row **2** = 2 rows	**No. of Filters** **Number of Lines per Row** If less than 10, use a 0 (zero) first.		**Filter Designation** A - T from table on page 118. ***	**Plate Length** **A** - 1.092 (27.74mm) **B** - 1.812 (46.02mm)	**Lead Configuration** **0** - Straight **1** - 90° (left) **2** - 90° (right) **3** - 90° (both)

* *Maximum capacitance up to 4000pF C style filter*

** *Replace "–" with "F" for RoHS compliant version*

*** *To request selective line filtering, a mechanical configuration or material specification not shown in this catalog, please complete and forward the design inquiry form on page FA18. We will review your request and provide you with a part number.*

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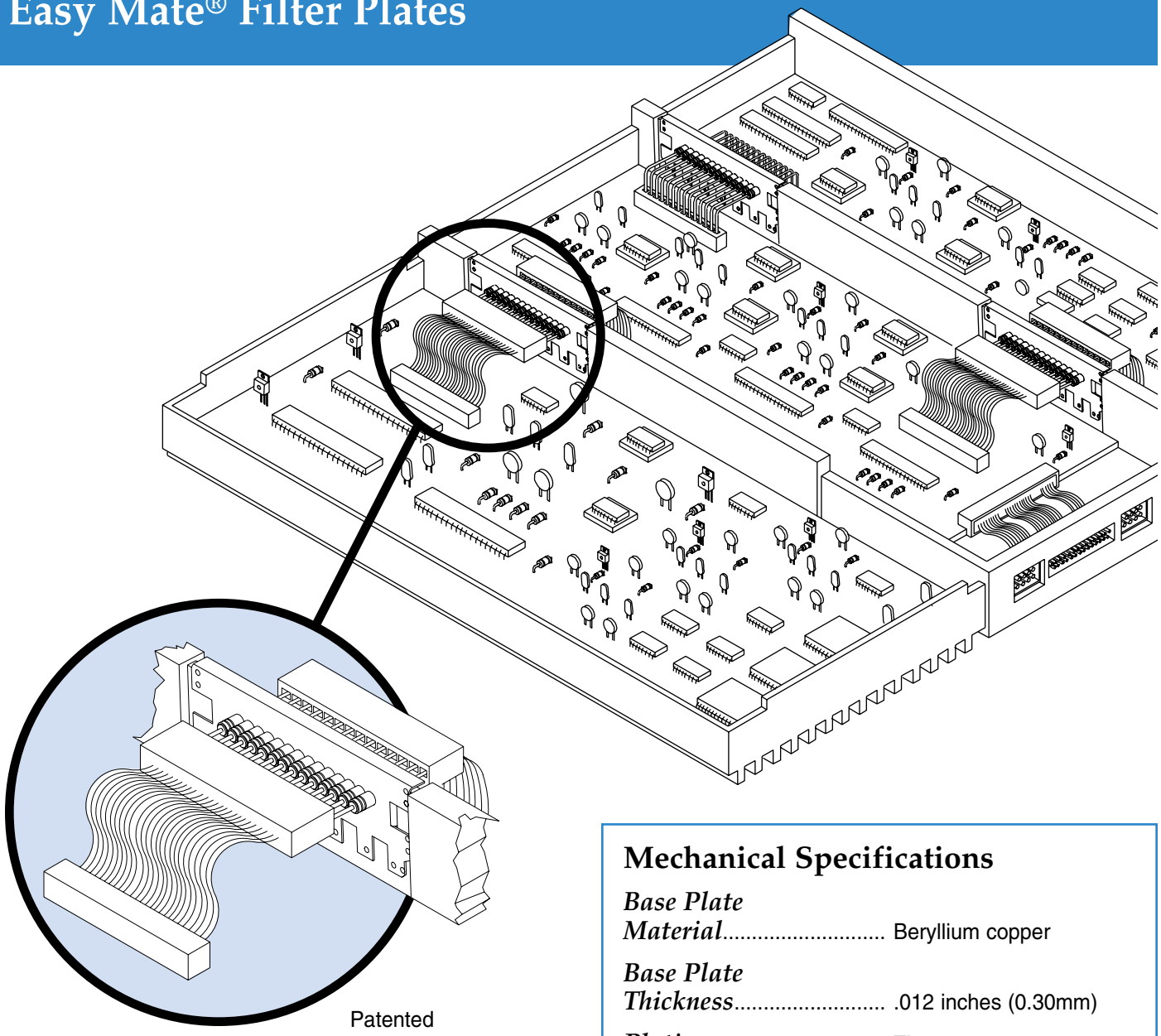
Easy Mate® Filter Plates



Patented

Soldering to Filter Terminals

- Use a temperature controlled soldering iron with tip temperature of 525 ± 10° F (275 ± 5° C).
- Use an SN 63 RMA flux core solder.
- Make mechanical wire connection.
- Use heat sink next to filter body where possible.
- Clean soldering iron tip.
- Clip end of solder—remove 0.5" (12.7mm) to expose flux for soldering.
- Apply soldering iron to wire/flag junction at wetted solder tip region of iron (Wetted Bridge Method). Immediately apply solder. Dwell time for soldering iron tip on product should be 3-5 seconds maximum. (For non-RoHS versions only)

Mechanical Specifications

Base Plate Material	Beryllium copper
Base Plate Thickness	.012 inches (0.30mm)
Plating	Tin, RoHS version will be silver
Lead Material	Copper alloy
Lead Plating	Gold plate
Lead Diameter	ø .025" (.64mm) for 0.100" centers (2.54mm) ø .020 (.51mm) for 0.079" centers (2.00mm)
Current Rating	5 Amps for .025" ø (.64mm) 3 Amps for .020" ø (.51mm)

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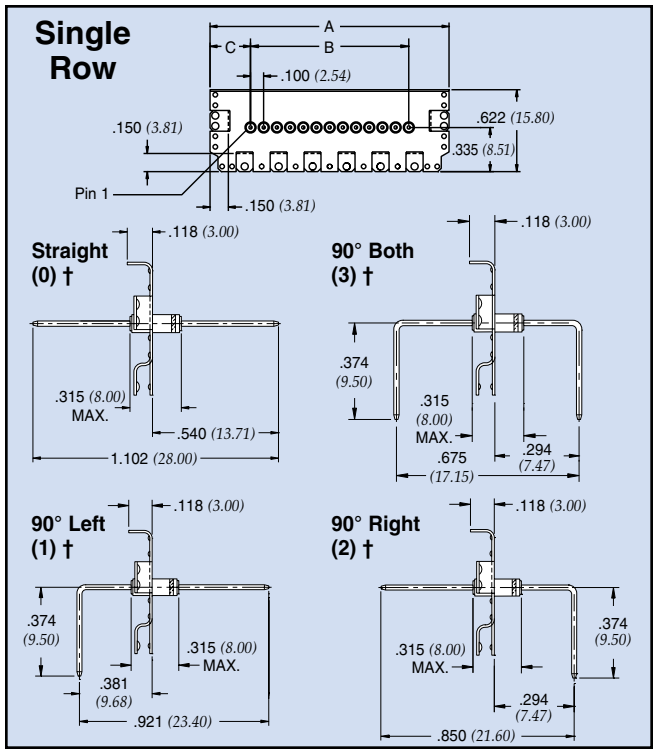
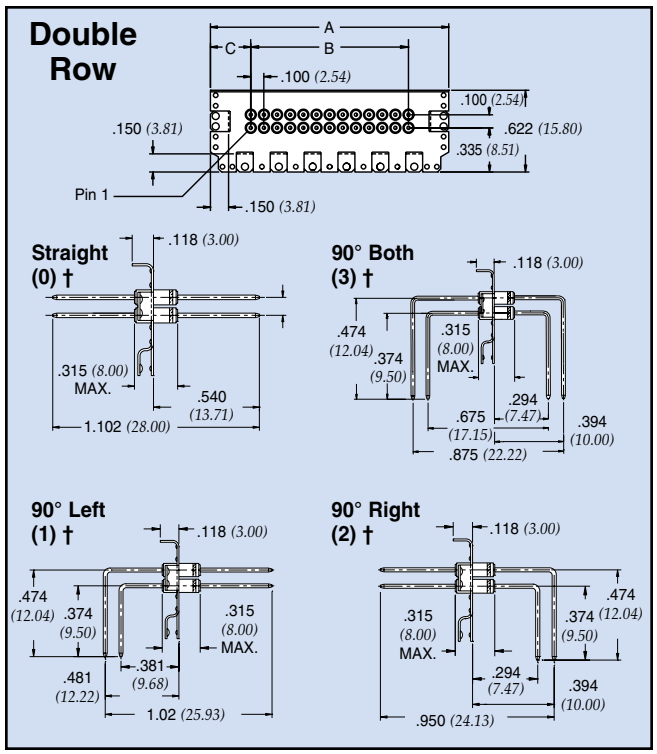
Easy Mate® Filter Plates
Standard Density Centers .100"

Dimensions: inches and *(mm)*
Lead Spacing: .100" *(2.54 mm)*



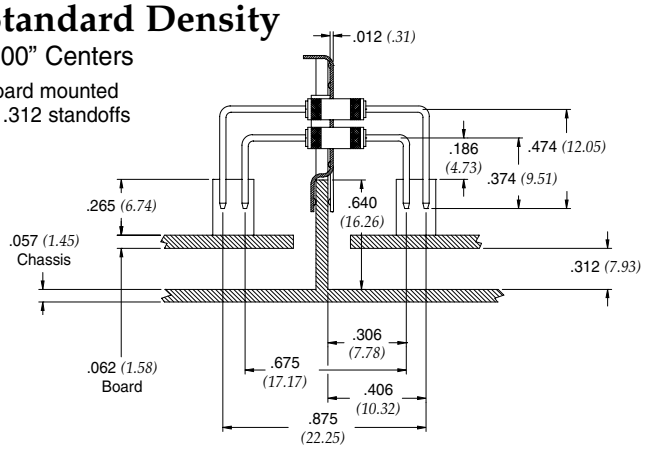


Patented
† Refers to lead configuration for part number/ordering information

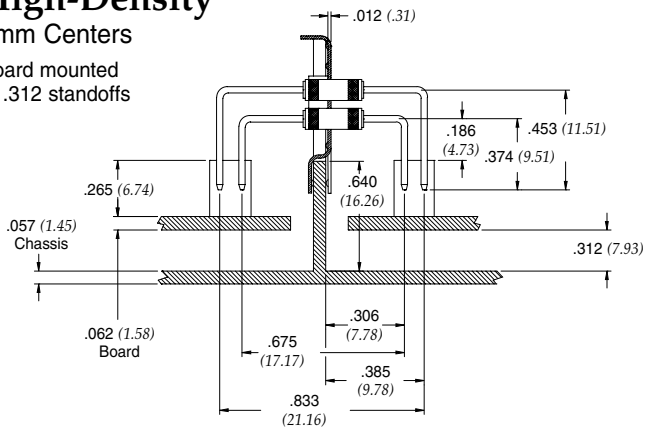
Plate length (A)	No. of filtered lines per row	52-898-XXX-XXX B		C	
1.092 *(27.74)*	1	0	*(0.00)*	0.496	*(12.60)*
	2	0.1	*(2.54)*	0.496	*(12.60)*
	3	0.2	*(5.08)*	0.396	*(10.06)*
	4	0.3	*(7.62)*	0.396	*(10.06)*
	5	0.4	*(10.16)*	0.296	*(7.52)*
	6	0.5	*(12.70)*	0.296	*(7.52)*
1.812 *(46.02)*	1	0	*(0.00)*	0.906	*(23.01)*
	2	0.1	*(2.54)*	0.806	*(20.47)*
	3	0.2	*(5.08)*	0.806	*(20.47)*
	4	0.3	*(7.62)*	0.706	*(17.93)*
	5	0.4	*(10.16)*	0.706	*(17.93)*
	6	0.5	*(12.70)*	0.606	*(15.39)*
	7	0.6	*(15.24)*	0.606	*(15.39)*
	8	0.7	*(17.78)*	0.506	*(12.85)*
	9	0.8	*(20.32)*	0.506	*(12.85)*
	10	0.9	*(22.86)*	0.406	*(10.31)*
	11	1.0	*(25.40)*	0.406	*(10.31)*
	12	1.1	*(27.94)*	0.306	*(7.77)*
	13	1.2	*(30.48)*	0.306	*(7.77)*

Typical Mounting Applications

Standard Density
.100" Centers
Board mounted to .312 standoffs



High-Density
2mm Centers
Board mounted to .312 standoffs



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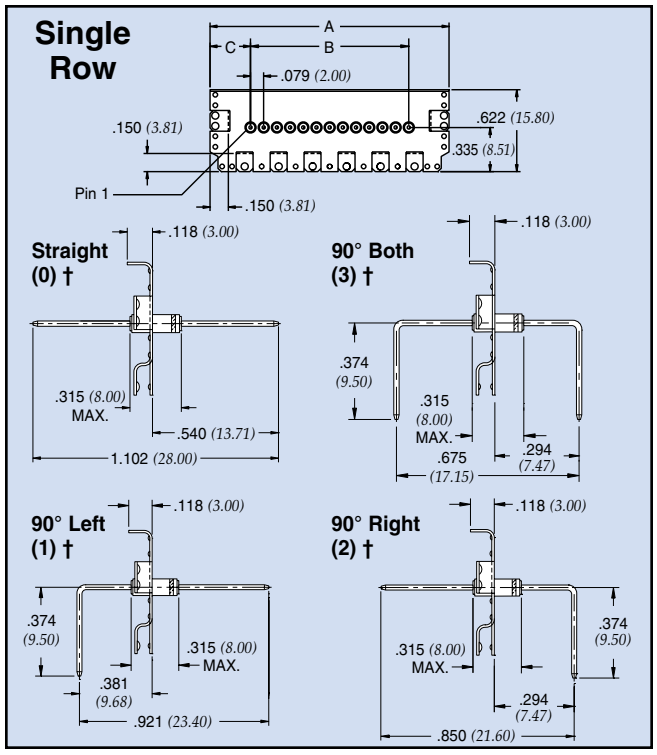
Easy Mate® Filter Plates
Hi-Density Centers 2mm

Dimensions: inches and *(mm)*
Lead Spacing: .079" *(2.00 mm)*



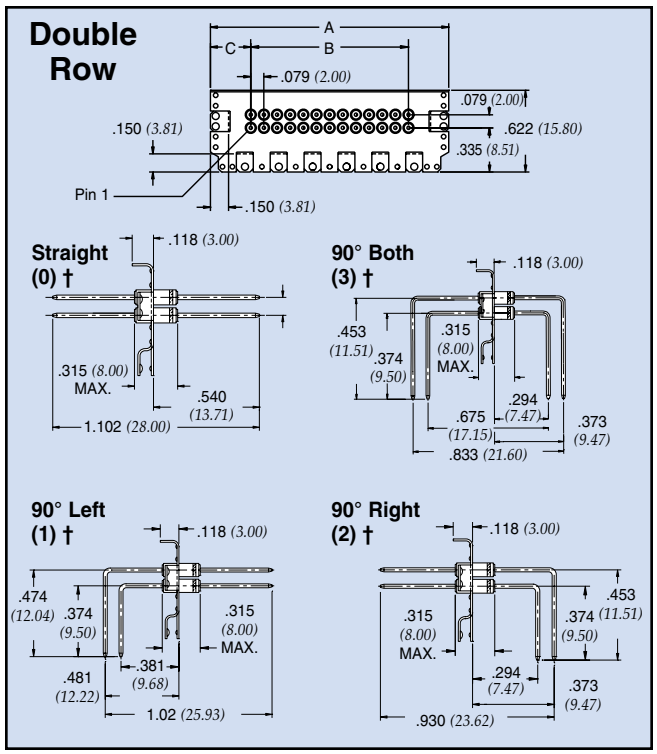
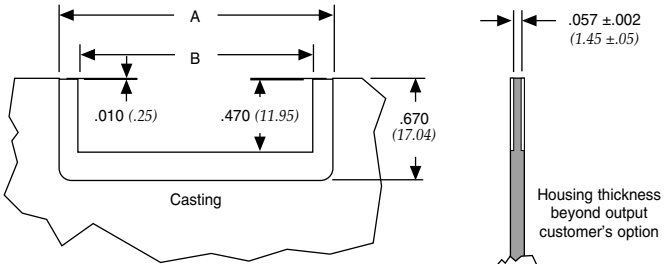


Plate length (A)	No. of filtered lines per row	52-960-XXX-XXX B	52-960-XXX-XXX C
1.092 *(27.74)*	2	0.079 *(2.00)*	0.463 *(11.77)*
	3	0.157 *(4.00)*	0.463 *(11.77)*
	4	0.236 *(6.00)*	0.385 *(9.77)*
	5	0.315 *(8.00)*	0.385 *(9.77)*
	6	0.394 *(10.00)*	0.306 *(7.77)*
	7	0.472 *(12.00)*	0.306 *(7.77)*
1.812 *(46.02)*	2	0.079 *(2.00)*	0.866 *(22.00)*
	3	0.157 *(4.00)*	0.787 *(20.00)*
	4	0.236 *(6.00)*	0.787 *(20.00)*
	5	0.315 *(8.00)*	0.709 *(18.00)*
	6	0.394 *(10.00)*	0.709 *(18.00)*
	7	0.472 *(12.00)*	0.630 *(16.00)*
	8	0.551 *(14.00)*	0.630 *(16.00)*
	9	0.630 *(16.00)*	0.551 *(14.00)*
	10	0.709 *(18.00)*	0.551 *(14.00)*
	11	0.787 *(20.00)*	0.472 *(12.00)*
	12	0.866 *(22.00)*	0.472 *(12.00)*
	13	0.945 *(24.00)*	0.394 *(10.00)*
	14	1.024 *(26.00)*	0.394 *(10.00)*
	15	1.102 *(28.00)*	0.315 *(8.00)*
	16	1.181 *(30.00)*	0.315 *(8.00)*

Easy Mate® Chassis Cut-out Design



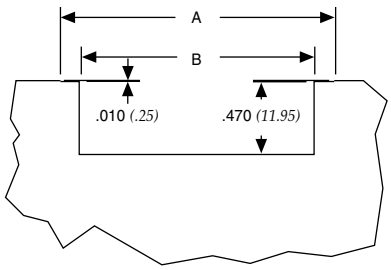


Plate Length	A	B
1.092 *(27.74)*	1.117 *(28.41)*	0.816 *(20.75)*
1.812 *(46.02)*	1.837 *(46.71)*	1.535 *(39.04)*

Patented
† Refers to lead configuration for part number/ordering information

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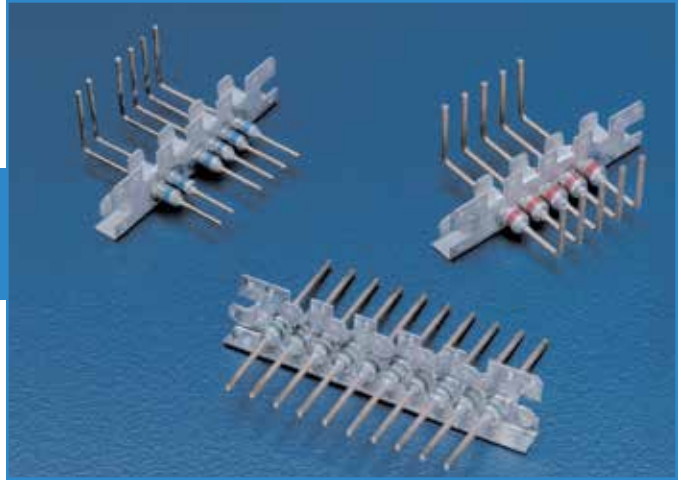
Easy Mate® Jr. Filter Plates



API's Spectrum Control brand has expanded its popular Easy Mate® family by adding two more package sizes. These new sizes are lower profile and facilitate installation of feed-through filters into small hardware applications such as PCS linear power amplifiers and RF transmitters. The Easy Mate® Jr. is available in two plate lengths, .990" and 1.240", and in standard (.100") and high density centers (2mm).

Easy Mate® Jr. Advantages

- Reduces installation time and overall cost
- Eliminates mounting hardware and prepwork
- Increase flexibility with standard density centers (.100") or high density centers (2mm)
- Improves overall quality and reliability
- Multiple finger ground contacts provide excellent EMI filtering from 5 MHz to 18 GHz
- Outperforms surface mount devices
- Maximize real estate on PCB
- Mixed capacitance values and schematics
- Ideal for isolation of electronic compartments
- Available in RoHS compliant versions

Mechanical Specifications

Base Plate Material	Beryllium copper
Base Plate Thickness	.010 inches (.25mm)
Plating	Tin, RoHS version will be silver
Lead Material	Copper alloy
Lead Plating	Gold plate
Lead Diameter	ø .025" (.64mm) for 0.100" centers (2.54mm) ø .020 (.51mm) for 0.079" centers (2.00mm)
Current Rating	5 Amps for .025" ø (.64mm) 3 Amps for .020" ø (.51mm)

Ordering Information

Example: **52-978-106-BA2**

The part number shown represents an Easy Mate® Jr. filter plate with 6 filters. Filters are C style with a capacitance value of 100pF. The plate length is .990", and the leads are bent 90° to the right side.

52 - ** **978** - **1** **06** - **B** **A** **2**

Filter Plates

978 Easy Mate® Jr. Standard Density

979 Easy Mate® Jr. High-density *

No. of Rows

1 = 1 row

No. of Filters

Number of Lines per Row

If less than 10, use a 0 (zero) first.

Filter Designation

A - T from table on page FA17. ***

Plate Length

A - .990 (25.15mm)
B - 1.240 (31.49mm)

Lead Configuration

0 - Straight
1 - 90° (left)
2 - 90° (right)
3 - 90° (both)

* *Maximum capacitance up to 4000pF C style filter*

** *Replace "–" with "F" for RoHS compliant version*

*** *To request selective line filtering, a mechanical configuration or material specification not shown in this catalog, please complete and forward the design inquiry form on page FA18. We will review your request and provide you with a part number.*

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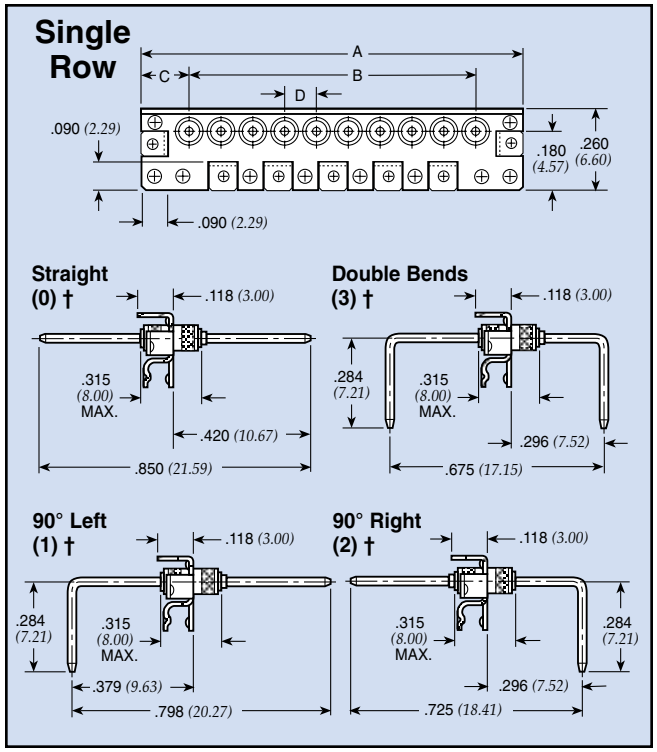
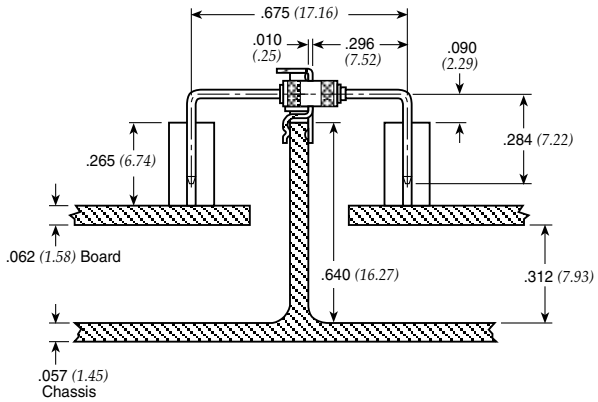
Easy Mate® Jr. Filter Plates

Dimensions: inches and *(mm)*



† Refers to lead configuration for part number/ordering information

Typical Mounting Application



Standard Density Centers .100" (D)

Plate length (A)	No. of filtered lines per row	52-978-XXX-XXX B	52-978-XXX-XXX C
.990 (25.15)	2	0.1 (2.54)	0.395 (10.03)
	3	0.2 (5.08)	0.395 (10.03)
	4	0.3 (7.62)	0.295 (7.49)
	5	0.4 (10.16)	0.295 (7.49)
	6	0.5 (12.70)	0.195 (4.95)
	7	0.6 (15.24)	0.195 (4.95)
1.24 (31.49)	2	0.1 (2.54)	0.570 (14.48)
	3	0.2 (5.08)	0.470 (11.94)
	4	0.3 (7.62)	0.470 (11.94)
	5	0.4 (10.16)	0.370 (9.40)
	6	0.5 (12.70)	0.370 (9.40)
	7	0.6 (15.24)	0.270 (6.86)
	8	0.7 (17.78)	0.270 (6.86)
	9	0.8 (20.32)	0.170 (4.32)
	10	0.9 (22.86)	0.170 (4.32)

High Density Centers 2mm (D)

Plate length (A)	No. of filtered lines per row	52-979-XXX-XXX B	52-979-XXX-XXX C
.990 (25.15)	2	0.079 (2.00)	0.417 (10.58)
	3	0.157 (4.00)	0.417 (10.58)
	4	0.236 (6.00)	0.338 (8.58)
	5	0.315 (8.00)	0.338 (8.58)
	6	0.394 (10.00)	0.259 (6.58)
	7	0.472 (12.00)	0.259 (6.58)
1.24 (31.49)	2	0.079 (2.00)	0.580 (14.75)
	3	0.157 (4.00)	0.502 (12.75)
	4	0.236 (6.00)	0.502 (12.75)
	5	0.315 (8.00)	0.423 (10.75)
	6	0.394 (10.00)	0.423 (10.75)
	7	0.472 (12.00)	0.344 (8.75)
	8	0.551 (14.00)	0.344 (8.75)
	9	0.630 (16.00)	0.266 (6.75)
	10	0.709 (18.00)	0.266 (6.75)

Easy Mate® Jr. Chassis Cut-out Design

Patented

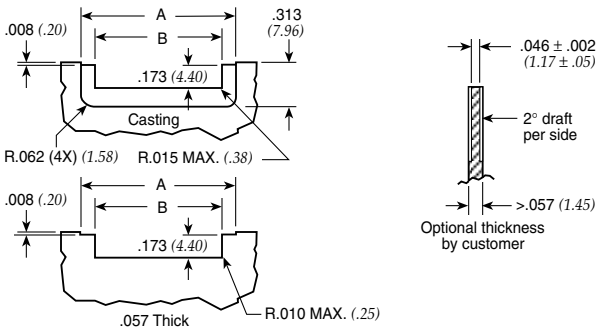


Plate Length	A	B
.990 (25.15)	1.015 (25.78)	0.834 (21.18)
1.24 (31.49)	1.265 (32.13)	1.084 (27.53)

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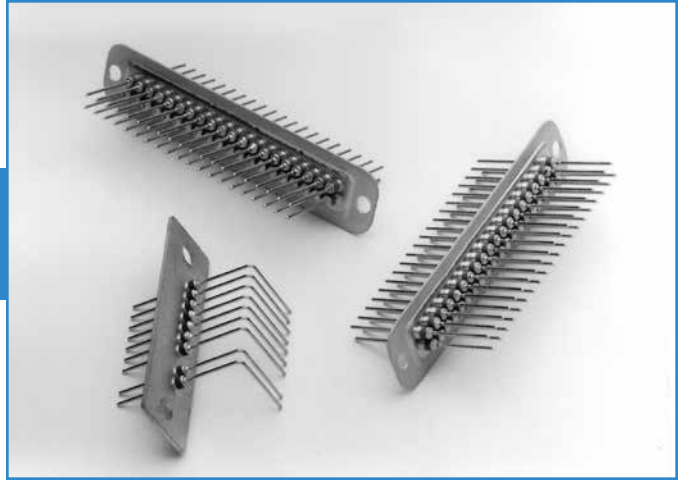
Bolt-in Style Filter Plates



The Bolt-in style plate provides an excellent method for electronic system interface and EMI filtering. Bolt-in filter plates are available in a variety of plate sizes and up to 74 lines per plate in high-density (2mm) and 60 pins per plate in standard density (.100”). On the larger plate sizes, API ensures structural integrity through a unique, coining process. The drawing on page FA10 shows an electronic system utilizing Bolt-in style filter plates.

Bolt-in Filter Plate Advantages

- Eliminates the need to assemble filters into a bulkhead
- Excellent filtering from 5 MHz to 1 GHz
- Total cost savings vs. customer installed discrete filter elements
- Ideal for isolation of electronic compartments to suppress EMI
- Outperforms surface mount filters over 50 MHz
- Improved reliability
- Mixed capacitance values and schematics
- Maximize real estate on PCB
- Available in RoHS compliant versions

Ordering Information

Example: **52-970-208-BB2**

The part number shown represents a Bolt-in style filter plate with 2 rows, 8 filters per row. Filters are C style with a capacitance value of 100pF. The plate length is 1.560”, and the leads are bent 90° to the right side.

52	**	970	-	2	08	-	B	B	2
Filter Plates		**970** Bolt-in Standard Density **971** Bolt-in High Density *		**No. of Rows** **1** = 1 row **2** = 2 rows	**No. of Filters** **Number of Lines per Row** If less than 10, use a 0 (zero) first.		**Filter Designation** A - T from table on page FA17. ***	**Plate Length** **A** - 1.060 (26.92mm) **B** - 1.560 (39.62mm) **C** - 2.560 (65.02mm) **D** - 3.560 (90.42mm)	**Lead Configuration** **0** - Straight **1** - 90° (left) **2** - 90° (right) **3** - 90° (both)

* *Maximum capacitance up to 4000pF C style filter*

** *Replace “–” with “F” for RoHS compliant version*

*** *To request selective line filtering, a mechanical configuration or material specification not shown in this catalog, please complete and forward the design inquiry form on page FA18. We will review your request and provide you with a part number.*

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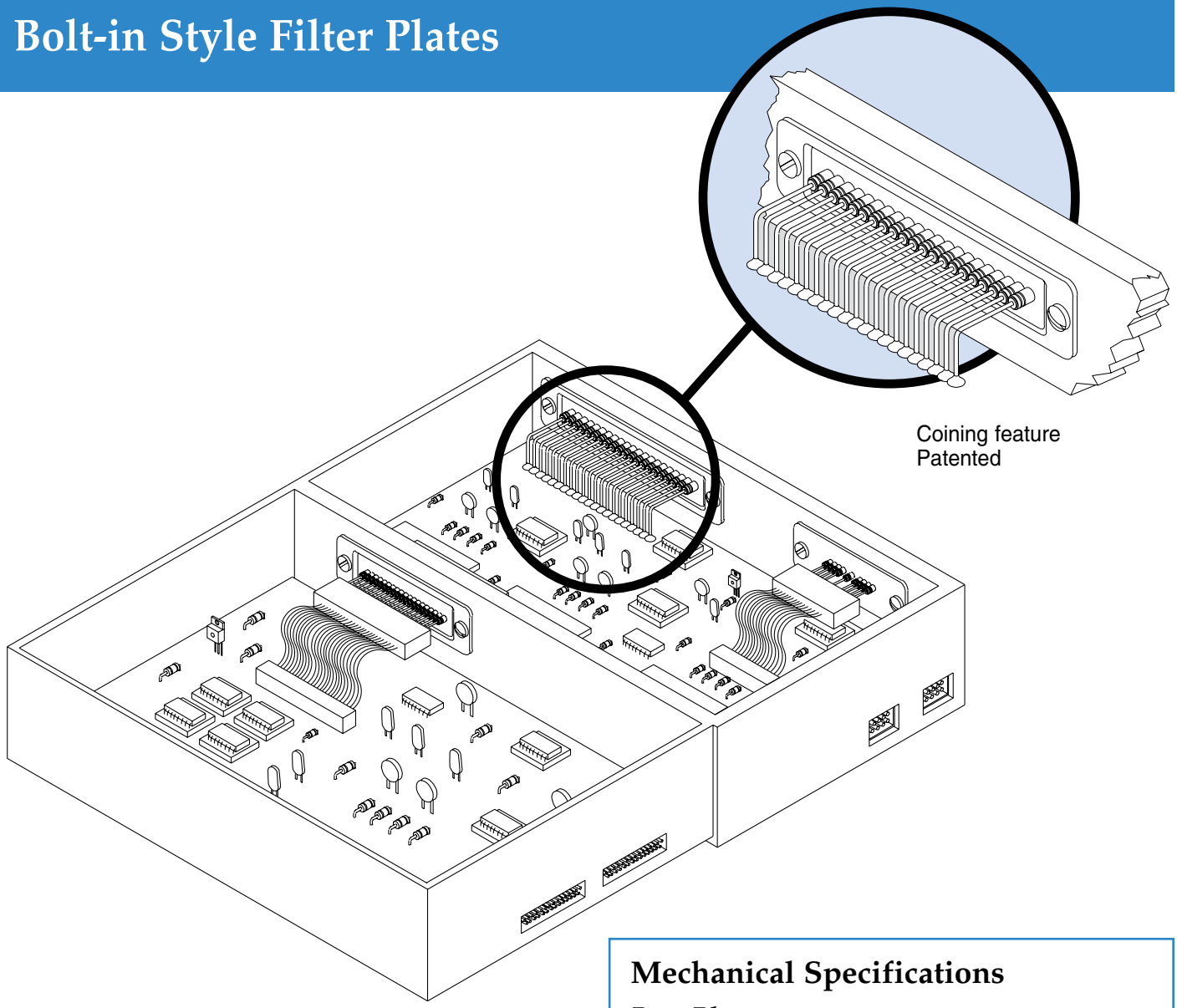
Bolt-in Style Filter Plates



Coining feature
Patented

Mechanical Specifications

Base Plate Material	Brass UNS C26000/C27000
Base Plate Thickness	.020 inches (.51mm)
Plating	Tin, RoHS version will be silver
Lead Material	Copper alloy
Lead Plating	Gold plate
Lead Diameter	ø .025" (.64mm) for 0.100" centers (2.54mm) ø .020 (.51mm) for 0.079" centers (2.00mm)
Current Rating	5 Amps for .025" (.64mm) ø 3 Amps for .020" (.51mm) ø

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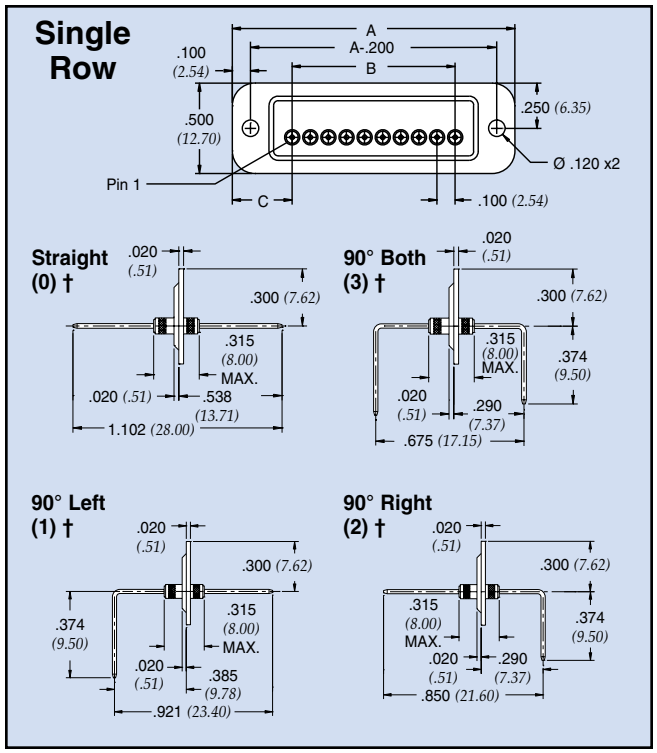
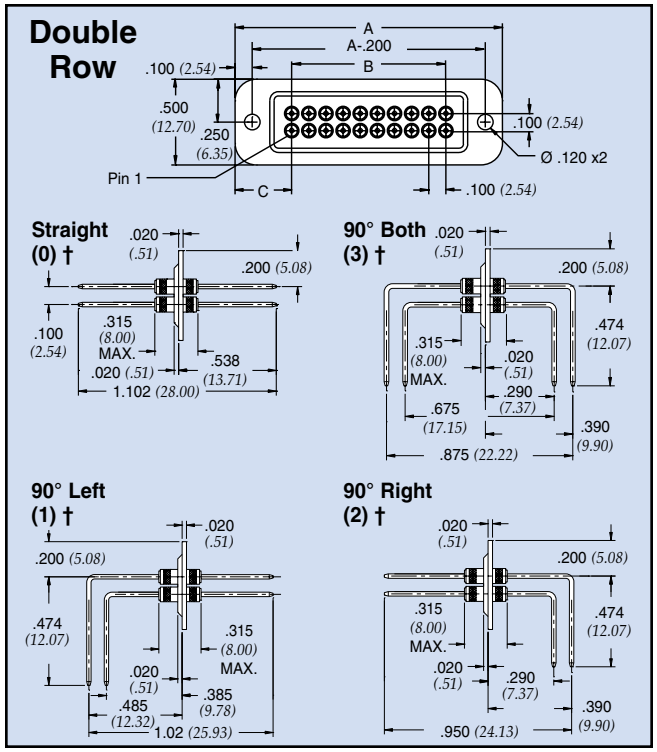
Bolt-in Style Filter Plates
Standard Density Centers .100"

Dimensions: inches and *(mm)*
Lead Spacing: .100" *(2.54 mm)*





Coining feature patented
† Refers to lead configuration for part number/ordering information

Plate length (A)	No. of filtered lines per row	52-970-XXX-XXX B		52-970-XXX-XXX C	
1.060 * (26.92)	1	0	(0.00)	0.53	(13.46)
	2	0.1	(2.54)	0.43	(10.92)
	3	0.2	(5.08)	0.43	(10.92)
	4	0.3	(7.62)	0.33	(8.38)
	5	0.4	(10.16)	0.33	(8.38)
1.560 * (39.62)	1	0.0	(0.00)	0.73	(18.54)
	2	0.1	(2.54)	0.73	(18.54)
	3	0.2	(5.08)	0.63	(16.00)
	4	0.3	(7.62)	0.63	(16.00)
	5	0.4	(10.16)	0.53	(13.46)
	6	0.5	(12.70)	0.53	(13.46)
	7	0.6	(15.24)	0.43	(10.92)
	8	0.7	(17.78)	0.43	(10.92)
	9	0.8	(20.32)	0.33	(8.38)
	10	0.9	(22.86)	0.33	(8.38)
2.560 (65.02)	5	0.4	(10.16)	1.03	(26.16)
	6	0.5	(12.70)	1.03	(26.16)
	7	0.6	(15.24)	0.93	(23.62)
	8	0.7	(17.78)	0.93	(23.62)
	9	0.8	(20.32)	0.83	(21.08)
	10	0.9	(22.86)	0.83	(21.08)
	11	1.0	(25.40)	0.73	(18.54)
	12	1.1	(27.94)	0.73	(18.54)
	13	1.2	(30.48)	0.63	(16.00)
	14	1.3	(33.02)	0.63	(16.00)
	15	1.4	(35.56)	0.53	(13.46)
	16	1.5	(38.10)	0.53	(13.46)
	17	1.6	(40.64)	0.43	(10.92)
	18	1.7	(43.18)	0.43	(10.92)
	19	1.8	(45.72)	0.33	(8.38)
	20	1.9	(48.26)	0.33	(8.38)
3.560 (90.42)	13	1.2	(30.48)	1.13	(27.70)
	14	1.3	(33.02)	1.13	(27.70)
	15	1.4	(35.56)	1.03	(26.16)
	16	1.5	(38.10)	1.03	(26.16)
	17	1.6	(40.64)	0.93	(23.62)
	18	1.7	(43.18)	0.93	(23.62)
	19	1.8	(45.72)	0.83	(21.08)
	20	1.9	(48.26)	0.83	(21.08)
	21	2.0	(50.80)	0.73	(18.54)
	22	2.1	(53.34)	0.73	(18.54)
	23	2.2	(55.88)	0.63	(16.00)
	24	2.3	(58.42)	0.63	(16.00)
	25	2.4	(60.96)	0.53	(13.46)
	26	2.5	(63.50)	0.53	(13.46)
	27	2.6	(66.04)	0.43	(10.92)
	28	2.7	(68.58)	0.43	(10.92)
	29	2.8	(71.12)	0.33	(8.38)
	30	2.9	(73.66)	0.33	(8.38)

*** For plate widths 1.060 and 1.560 there will be no coining. For these plates, increase dimensions to the right .020". Thus, any dimension on left will be reduced by .020.**

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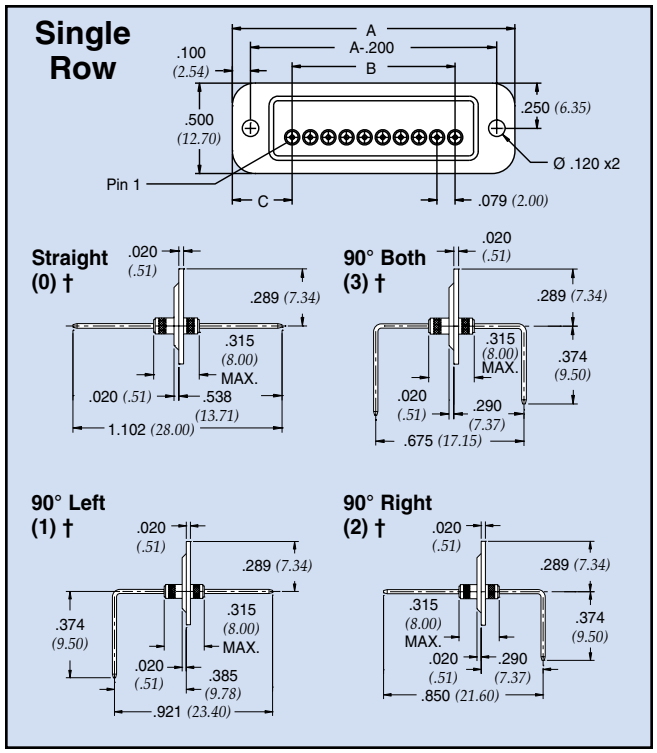
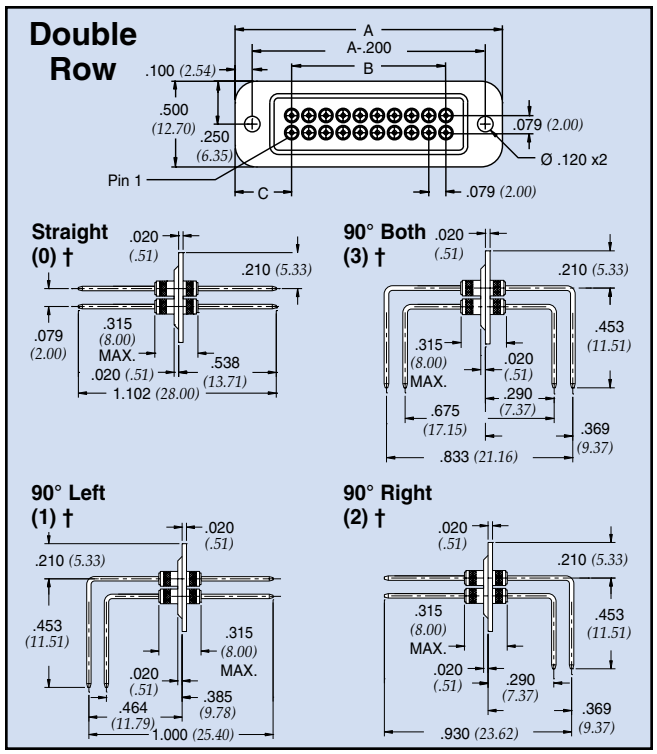
Bolt-in Style Filter Plates
High-Density Centers 2mm

Dimensions: inches and *(mm)*
Lead Spacing: .079" *(2.00 mm)*





Coining feature patented
† Refers to lead configuration for part number/ordering information

Plate length (A)	No. of filtered lines per row	52-971-XXX-XXX B	52-971-XXX-XXX C
1.060 * (26.92)	2	0.079 (2.00)	0.487 (12.38)
	3	0.157 (4.00)	0.409 (10.38)
	4	0.236 (6.00)	0.409 (10.38)
	5	0.315 (8.00)	0.330 (8.38)
	6	0.394 (10.00)	0.330 (8.38)
1.560 * (39.62)	3	0.157 (4.00)	0.662 (16.81)
	4	0.236 (6.00)	0.662 (16.81)
	5	0.315 (8.00)	0.583 (14.81)
	6	0.394 (10.00)	0.583 (14.81)
	7	0.472 (12.00)	0.504 (12.81)
	8	0.551 (14.00)	0.504 (12.81)
	9	0.630 (16.00)	0.426 (10.81)
	10	0.709 (18.00)	0.426 (10.81)
	11	0.787 (20.00)	0.347 (8.81)
	12	0.866 (22.00)	0.347 (8.81)
2.560 (65.02)	10	0.709 (18.00)	0.886 (22.51)
	11	0.787 (20.00)	0.886 (22.51)
	12	0.866 (22.00)	0.807 (20.51)
	13	0.945 (24.00)	0.807 (20.51)
	14	1.024 (26.00)	0.729 (18.51)
	15	1.102 (28.00)	0.729 (18.51)
	16	1.181 (30.00)	0.650 (16.51)
	17	1.260 (32.00)	0.650 (16.51)
	18	1.339 (34.00)	0.571 (14.51)
	19	1.417 (36.00)	0.571 (14.51)
	20	1.496 (38.00)	0.492 (12.51)
	21	1.575 (40.00)	0.492 (12.51)
	22	1.654 (42.00)	0.414 (10.51)
	23	1.732 (44.00)	0.414 (10.51)
	24	1.811 (46.00)	0.335 (8.51)
	25	1.890 (48.00)	0.335 (8.51)
3.560 (90.42)	20	1.496 (38.00)	0.993 (25.22)
	21	1.575 (40.00)	0.993 (25.22)
	22	1.654 (42.00)	0.914 (23.22)
	23	1.732 (44.00)	0.914 (23.22)
	24	1.811 (46.00)	0.835 (21.22)
	25	1.890 (48.00)	0.835 (21.22)
	26	1.969 (50.00)	0.757 (19.22)
	27	2.047 (52.00)	0.757 (19.22)
	28	2.126 (54.00)	0.678 (17.22)
	29	2.205 (56.00)	0.678 (17.22)
	30	2.283 (58.00)	0.599 (15.22)
	31	2.362 (60.00)	0.599 (15.22)
	32	2.441 (62.00)	0.520 (13.22)
	33	2.520 (64.00)	0.520 (13.22)
	34	2.598 (66.00)	0.442 (11.22)
	35	2.677 (68.00)	0.442 (11.22)
	36	2.756 (70.00)	0.363 (9.22)
	37	2.835 (72.00)	0.363 (9.22)

*** For plate widths 1.060 and 1.560 there will be no coining. For these plates, increase dimensions to the right .020". Thus, any dimension on left will be reduced by .020.**

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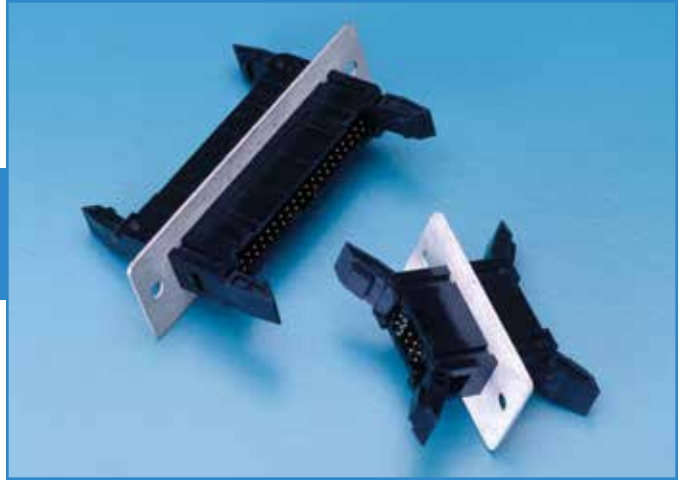
Spectrum Control

Shrouded Latch Filter Plates



Shrouded Latch Filter Plates are an effective method for combining an electronic interface and EMI solution in one package. The shrouded latch incorporates the bolt-in concept filter plate with the latching feature of popular ribbon cable headers. This product is available in pin counts of 10 through 64 positions. The latch is available in a variety of standard heights.

The shrouded latch filter plate is ideal for securing and protecting the filter element from exposure to mechanical shock and vibration which could loosen the cable interface.

Shrouded Latch Filter Plate Advantages

- Available in 10 to 64 positions
- Mates to most ribbon cable connectors
- Variety of latch ejector heights available
- Pins on .100" centers
- Reliable cable retention for high vibration applications
- Mixed capacitance values and schematics available
- Excellent filtering from 5 MHz to 1 GHz and beyond
- Shroud protects filter elements from potential damage
- Available in RoHS compliant versions

Mechanical Specifications

Base Plate Material	Brass UNS C26000/C27000
Base Plate Thickness	.040" (1.0mm)
Plating	Tin, RoHS version will be silver
Shrouded Material	Thermoplastic Polyester UL94V-0
Lead Material	Copper alloy
Lead Plating	Gold plate
Lead Diameter	ø .025" (0.6mm)
Current Rating	5 Amps

Ordering Information

Example: **53-038-014-BS1**

The part number shown represents a shrouded latch filter plate with 14 filtered lines. Filters are C style with a capacitance value of 100pF. The plate has a short latch height and double shroud configuration.

53	-	* 038	-	0 14	-	B	S	1

Shrouded Latch Filter Plate

Total Number of Filtered Lines- 2 rows

10	34
14	40
16	44
20	50
24	60
26	64
30	

Filter Designation
A - T from table on page FA17. **

Latch Height
S - Short .435" (11.0mm)
L - Long .575" (14.6mm)

Configuration
1 - Double Shroud
2 - Single Shroud
3 - Single Shroud w/90° bend opposite side

* *Replace "–" with "F" for RoHS compliant version*

** *To request selective line filtering, a mechanical configuration or material specification not shown in this catalog, please complete and forward the design inquiry form on page FA18. We will review your request and provide you with a part number.*

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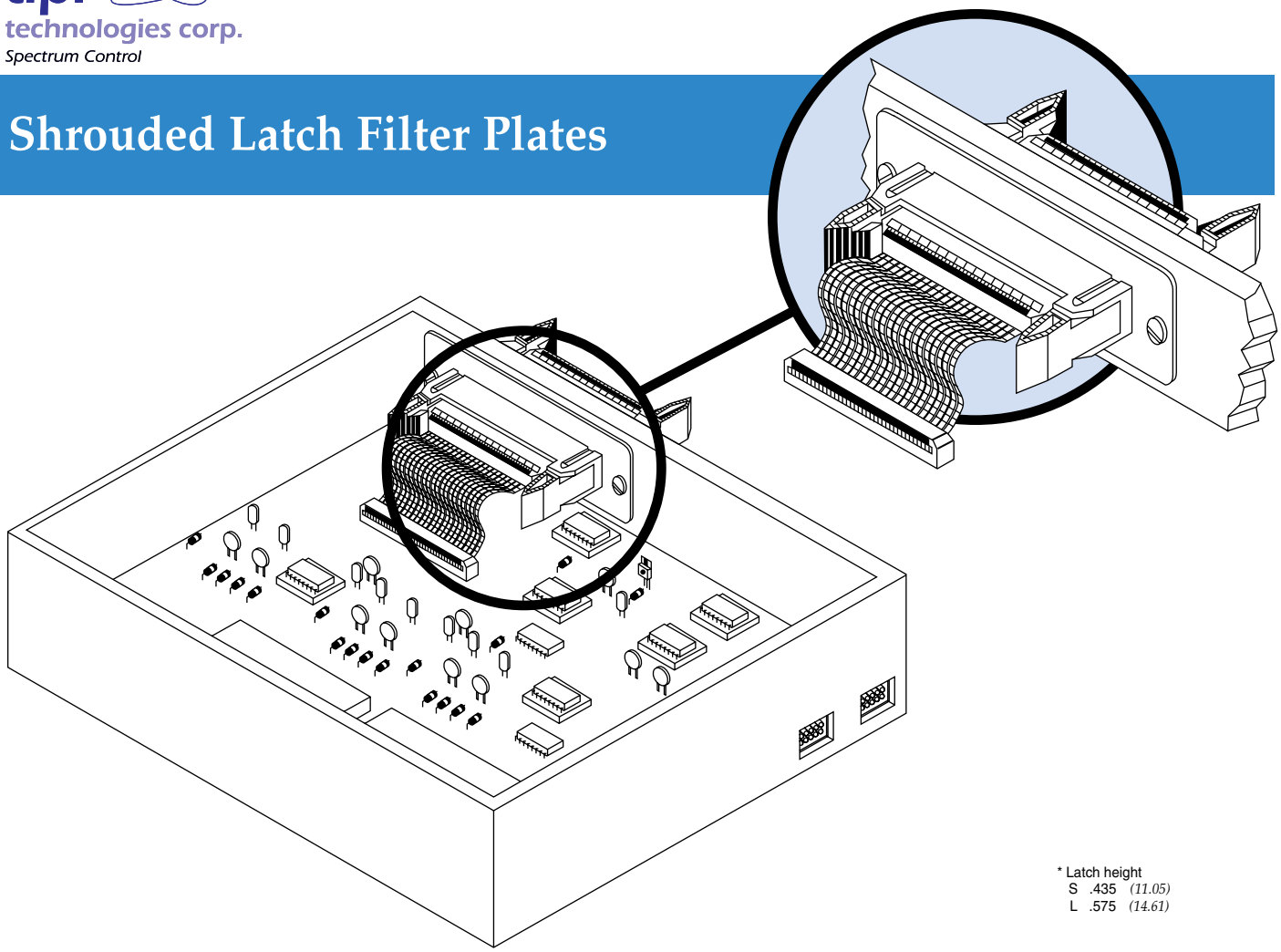
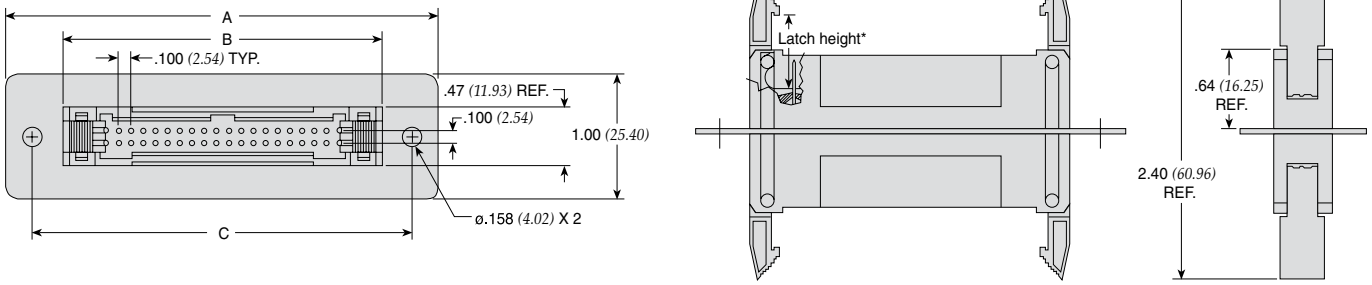
Spectrum Control

Shrouded Latch Filter Plates





* Latch height
S .435 *(11.05)*
L .575 *(14.61)*

Part Number	Number of Circuits	A		B		C	
		in	*(mm)*	in	*(mm)*	in	*(mm)*
53-038-010-XXX*	10	2.00	*(50.8)*	1.10	*(27.9)*	1.58	*(40.1)*
53-038-014-XXX	14	2.20	*(55.9)*	1.30	*(33.0)*	1.78	*(45.2)*
53-038-016-XXX*	16	2.30	*(58.4)*	1.40	*(35.6)*	1.88	*(47.8)*
53-038-020-XXX*	20	2.50	*(63.5)*	1.60	*(40.6)*	2.08	*(52.8)*
53-038-024-XXX	24	2.70	*(68.6)*	1.80	*(45.7)*	2.28	*(57.9)*
53-038-026-XXX	26	2.80	*(71.1)*	1.90	*(48.3)*	2.38	*(60.5)*
53-038-030-XXX	30	3.00	*(76.2)*	2.10	*(53.3)*	2.58	*(65.5)*
53-038-034-XXX	34	3.20	*(81.3)*	2.30	*(58.4)*	2.78	*(70.6)*
53-038-040-XXX*	40	3.50	*(88.9)*	2.60	*(66.0)*	3.08	*(78.2)*
53-038-044-XXX	44	3.70	*(94.0)*	2.80	*(71.1)*	3.28	*(83.3)*
53-038-050-XXX*	50	4.00	*(101.6)*	3.10	*(78.7)*	3.58	*(90.9)*
53-038-060-XXX	60	4.50	*(114.3)*	3.60	*(91.4)*	4.08	*(103.6)*
53-038-064-XXX*	64	4.70	*(119.4)*	3.80	*(96.5)*	4.28	*(108.7)*

* Indicates standard sizes

Dimensions in inches *(mm)*

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api technologies corp.
Spectrum Control

Custom Filter Plates

High Volume Industrial

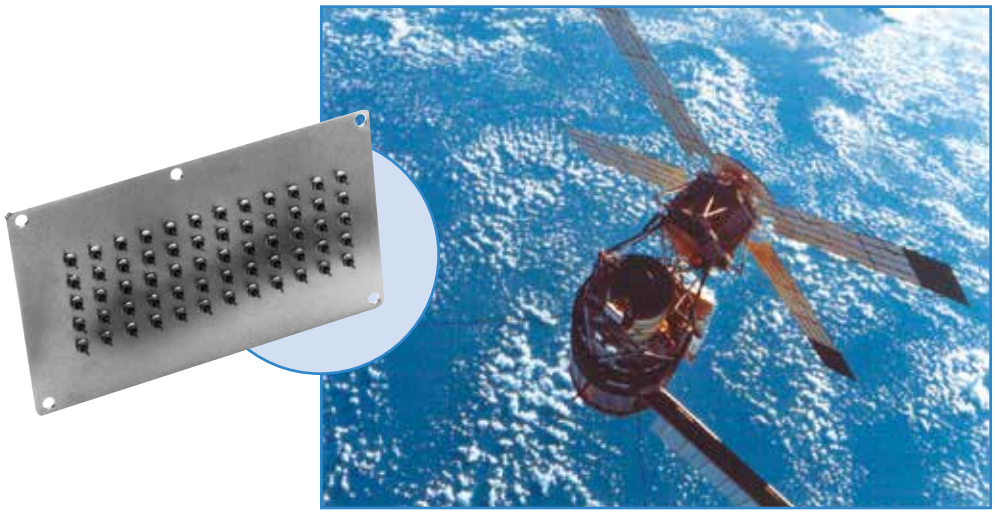
As a long-term producer of filter plates for industrial applications, API Technologies understands the cost requirements of this market. In turn, we have established a program to develop and manufacture custom designed filter plates for cost sensitive industrial applications.

We have engineered a variety of capacitive only filter elements that provide excellent RF isolation from 5 MHz to 1 GHz and beyond. To determine the available capacitance values, contact API. Our technical staff will work with you to develop a solution that meets your system and budget needs.

Military/High Reliability

Improving the electromagnetic compliance (EMC) of electronic systems is an area of intense focus within the defense and avionics industries. To achieve this goal, many companies are replacing discrete filter elements and surface mount filters with feed-through filter plate assemblies for higher frequency isolation.

API will custom design a filter plate that meets your size, material and filtering requirements. We are capable of providing stringent testing and analysis of our filter plate assemblies to MIL-F-15733 and MIL-F-28861.



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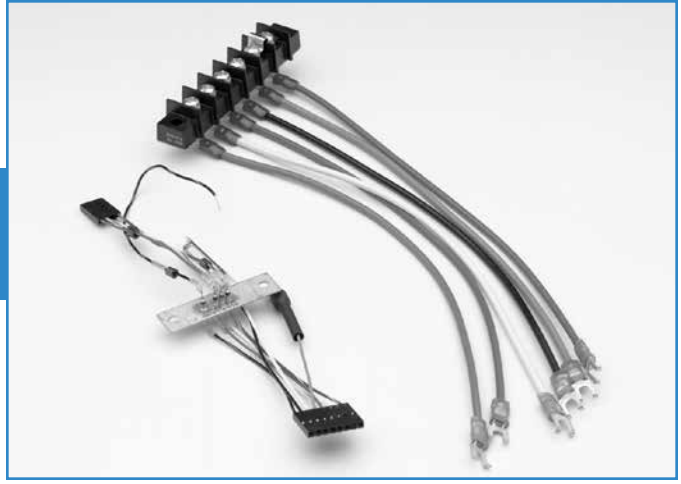
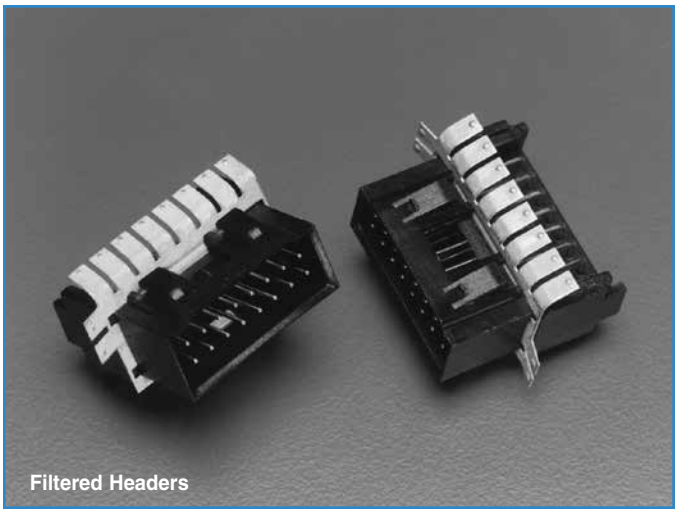
Custom Capabilities



In addition to our custom filter plates, API Technologies' Spectrum Control brand offers a number of value-added features designed to complement your manufacturing operation. Our marketing and engineering staff will evaluate your design or manufacturing parameters and develop a filter solution which provides increased filtering performance economically.

API Capabilities

- Custom assemblies with varying cable lengths and impedances for high clock speeds associated with digital electronics
- Integrate a filter solution with other components to ensure a completely functional device
- Perform EMC evaluations on your equipment, recommending proper placement of EMI/RFI filtering components



Filtered Headers

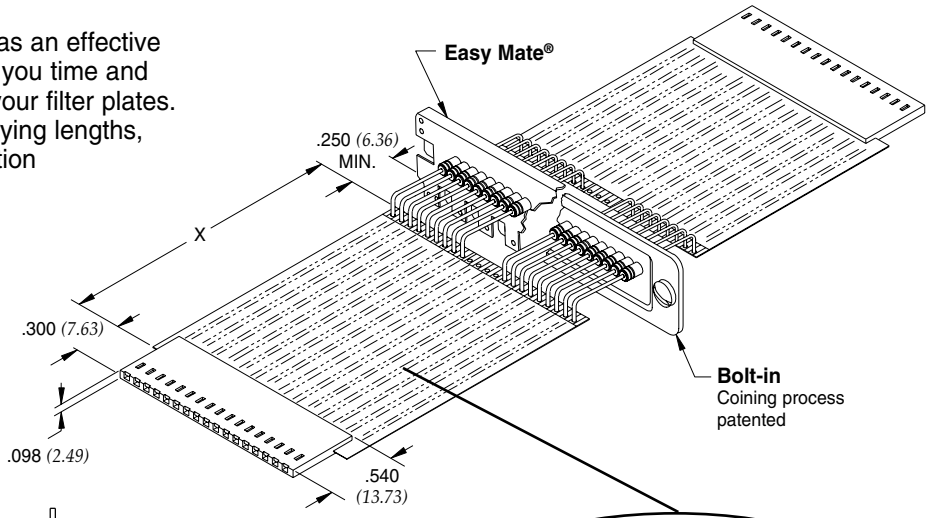
Replace the unfiltered connector on your PC board with API's low cost filtered header. This innovative new product allows you to meet EMC emissions and susceptibility standards with minimal or no board change.

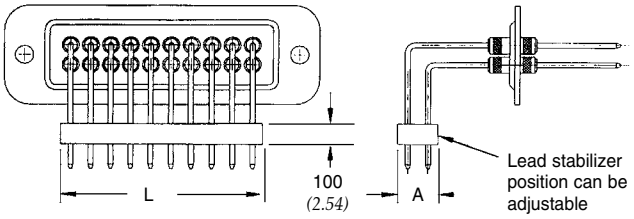
Flat Conductor Cables

Flat conductor cables are often selected as an effective method of interconnection. API can save you time and money by installing conductor cables to your filter plates. Flat conductor cables are available in varying lengths, conductor counts, and in several termination configurations.

Lead Stabilizer

API has developed a filter plate lead stabilizer bar to protect leads during installation and ensure proper alignment to PCB.





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Spectrum Control

Filter Selection

EMI Filter Performance

The electrical characteristics table and insertion loss graphs indicate the performance of feed-through capacitors and Pi type filters. Utilize this information to specify the EMI filtering components included in your filter plate.

Custom Filtering

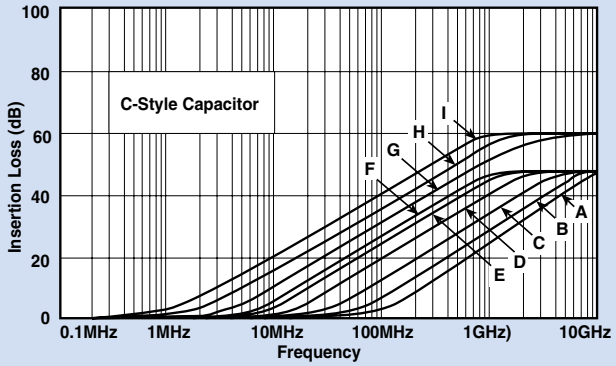
API Technologies' Spectrum Control line of filter plates are engineered to accommodate selective line filtering. Several different types of filters may be specified in a single, easy to install filter plate, allowing you to facilitate a wide range of filtering requirements.

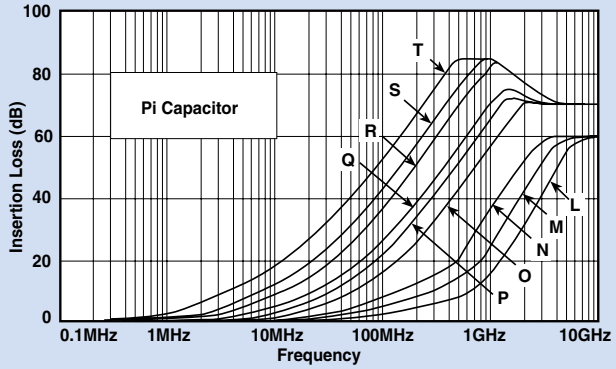
For selective line filtering, provide a sketch indicating the filters and positions required. The example below represents a 10 pin, 2 row plate with six 1000 pF feed-through capacitors and four 1700 pF Pi type filters.

Part Number Based on front view of plate

10	F	F	F	R	R	6
1	F	F	F	R	R	5

Typical Insertion Loss





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

Filter Designation	Filter** Circuits	Capacitance Value	Capacitance Tolerance	3 dB Max Cut-off Frequency (MHz)*	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB) 50 ohm system per MIL-STD-220 (no load) 5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz
A		68 pF	±20%	77	100V	—	—	—	—	—	3	10	16
B		100 pF	±20%	53	100V	—	—	—	—	1	6	14	19
C		135 pF	+100/-0%	23	100V	—	—	—	1	5	10	16	20
D	C	470 pF	±20%	11	100V	—	—	2	7	13	19	25	27
E		820 pF	±20%	6	100V	—	2	6	12	18	24	30	33
F		1000 pF	±20%	5	100V	—	3	7	14	20	26	32	35
G		1500 pF	±20%	3.5	100V	1	4	10	16	22	29	36	37
H		2500 pF	+100/-0%	1.3	100V	5	11	17	23	29	35	38	40
I		4000 pF	+100/-0%	.8	100V	9	15	21	27	34	38	42	46
J	Insulated	10 pF	Max.	635	100V	—	—	—	—	—	—	—	—
K	Grounded Insert					—	—	—	—	—	—	—	—
L		68 pF	±20%	65	100V	—	—	—	—	1	6	17	23
M		100 pF	±20%	46	100V	—	—	—	—	2	9	22	28
N		135 pF	+100/-0%	25	100V	—	—	—	1	6	17	26	34
O		470 pF	±20%	11	100V	—	—	—	9	18	22	36	43
P	Pi	820 pF	±20%	6	100V	—	—	4	13	23	31	45	52
Q		1000 pF	±20%	5	100V	—	2	7	16	24	36	51	59
R		1700 pF	+100/-0%	1.9	100V	1	6	14	28	35	49	64	69
S		2500 pF	+100/-0%	1.3	50V	4	9	16	28	41	54	70	70
T		5000 pF	+100/-0%	.7	100V	9	15	28	41	53	66	70	70

*** 3 dB cut-off frequency calculated at the maximum capacitance.**
**** For Hi-Density centers (2 mm) only C style filters are available, to a maximum of 4000pF.**

All high density capacitors are 50 volts @ 125°C.

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Custom Filter Plates
Filter Plate Design Inquiry Form

General Information

Customer: _____ Location: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact: _____ Title: _____

Phone: _____ Fax: _____

Project Information

Project name: _____ Annual usage: _____ Target price: _____

Intended application: _____ Quote quantity: _____

Function of circuit filter is used in: _____ Target cost: _____

Functional Detail NOTE: Bold lettering represents standard, readily available material (Circle the appropriate parameters needed)

Lead Diameter	**Total Lead Length**	**Lead Material**	**Lead Plating**
0.020" **0.025"** 0.032" 0.040"	0.700" 1.00" **1.102"**	**Phosphor Bronze** Copper	**Gold** Tin Silver

Base Plate Material

Brass UNS C26000/C27000 Cold Rolled Steel (CRS) UNS G10080/G10180 Aluminum UNS A93003/A96061 Beryllium Copper*

* For Beryllium Copper, ask about our new **"Easy Mate®"** Plate

Plate Thickness (± 0.002")	**Plating of Base Plate**
(0.010" for **Easy Mate®Jr.)** **(0.012"** for **Easy Mate®)** **(0.020"** for **Bolt-in)** 0.026" 0.033" 0.041"	**Tin** Silver 90/10 Solder Nickel

Center-to-Center Spacing			
(Not all capacitances available on all centers)	Standard (inch):	0.079	**0.100**
	Metric (mm):	2	**2.54**

Detailed Sketch and Comments Area

Include Mounting Detail

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Barrier Strip Filtered Terminal Blocks

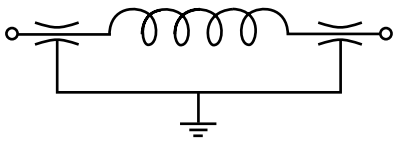
The barrier strip filtered terminal block is designed to provide excellent EMI/RFI filtering of AC and DC power lines and control lines. This terminal block is available in various sizes, with terminals for soldering or spade lugs. Application examples include filtering power supplies in telecommunications equipment, metering, industrial controls, instrumentation and EDP equipment.

Features

- UL recognized and CSA approved for DC voltages
- E133076, UL 1059
- LR92537, CSA STD 22.2 N°158-1987 and ECN584B
- Filter element provides high insertion loss for EMI/RFI filtering of AC and DC power and control lines
- Rugged construction provides protection to filtering element; especially useful for repeated changes in wiring or field connections
- 2 to 6 terminals available (combine if larger number of terminals needed)
- Cost-effective solution for industrial interconnection EMI filtering problems
- Termination options available: straight lead, male or female disconnects, pigtail (12 AWG = 0.081" (2.05mm); 22 AWG = 0.025" (0.64mm)
- Available in RoHS compliant versions

Circuit Schematic

Pi Filter



Ordering Information

Example: **52-160-006-A AOO**

The part number shown represents a barrier strip terminal block with six terminals and rated for 20 Amps. Male disconnects (.250") are the method of termination.

52 – * **160** – **006** – **A**

Barrier Strip Terminal Block
160 - Front panel mount
188 - Rear panel mount

Number of Terminals
002 - 2 terminals through **006** - 6 terminals

Current Rating
A - 20 Amps

For instructions on soldering to filter terminals, please refer to page FA4 in filter plate section.

* *Replace "–" with "F" for RoHS compliant version*

Mechanical Specifications

Center Spacing . . . . . .438" (11.1 mm)
Wire Size . . . . . AWG #12 max for 20A
Screw Size . . . . . 20A - #6-32, zinc-plated philslot screws
Molded Material . . . . . Black, UL rated 94VO thermoplastic
Tightening Torque . . . . . 9 in.-lbs. max.
Terminal . . . . . Brass, tin-plated

Electrical Specifications

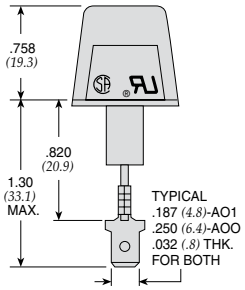
Operating Temperature . . -55° C to 105° C
Working Voltage 100VDC
Capacitance . . . . . 2,500 pF to 5,200 pF
Dielectric Withstanding Voltage . . . 1700VDC
Current Rating 20A
D.C. Resistance . . . . . .01 ohms max.

Typical Loss (dB) In 50 Ohm Circuit

Frequency	Insertion Loss (dB)
30 MHz	22
50 MHz	32
100 MHz	48
300 MHz	70
500 MHz	75
1000 MHz	75

AOO

Dimensions in inches *(mm)*



Special Terminations Code
Note: Leave blank if ordering standard product.
Male quick disconnects directly on terminal block.

AO1 . . . . . .187 (4.8)
AOO 250 (6.4)

For custom designs see page FA18 and consult with factory.

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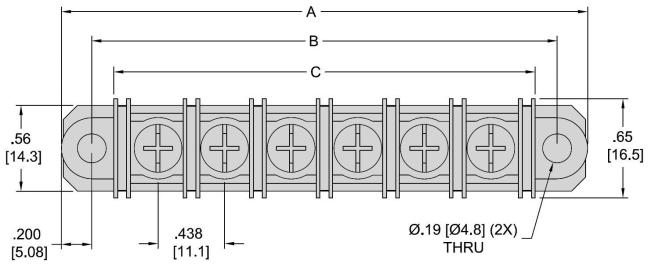
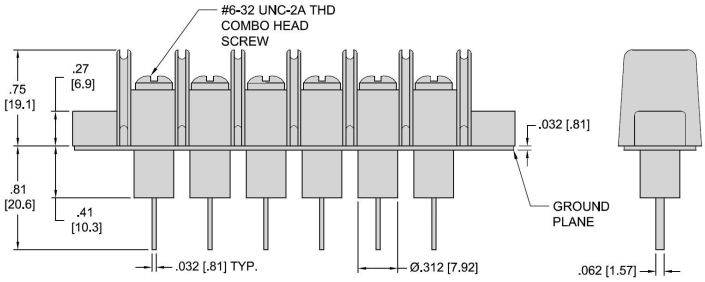
Barrier Strip
Filtered Terminal Blocks

Front panel mount





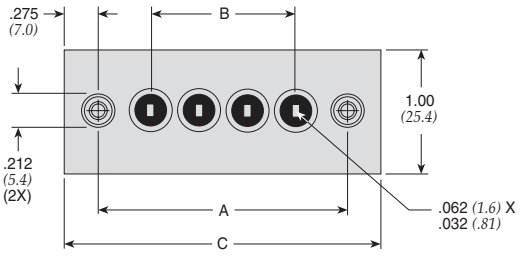
20 Amps

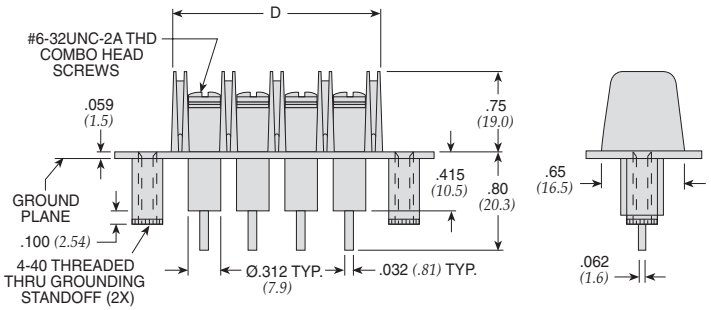
Dimensions in inches *(mm)*

Part Number	Number of Circuits	A in.	A *(mm)*	B in.	B *(mm)*	C in.	C *(mm)*
€ 52-160-002-A	2	1.71	*(43.4)*	1.31	*(33.3)*	1.02	*(25.9)*
52-160-003-A	3	2.15	*(54.6)*	1.75	*(44.5)*	1.46	*(37.1)*
52-160-004-A	4	2.59	*(65.8)*	2.19	*(55.6)*	1.90	*(48.3)*
52-160-005-A	5	3.02	*(76.7)*	2.62	*(66.5)*	2.32	*(58.9)*
52-160-006-A	6	3.46	*(87.9)*	3.06	*(77.7)*	2.77	*(70.4)*

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

Rear panel mount





20 Amps

Dimensions in inches *(mm)*

Part Number	Number of Circuits	A in.	A *(mm)*	B in.	B *(mm)*	C in.	C *(mm)*	D in.	D *(mm)*
52-188-002-A	2	1.31	*(33.3)*	.438	*(11.1)*	1.86	*(47.3)*	1.02	*(25.9)*
52-188-003-A	3	1.75	*(44.4)*	.875	*(22.2)*	2.30	*(58.4)*	1.46	*(37.1)*
52-188-004-A	4	2.19	*(55.6)*	1.313	*(33.3)*	2.74	*(69.5)*	1.90	*(48.3)*
52-188-005-A	5	2.62	*(66.6)*	1.750	*(44.4)*	3.17	*(80.6)*	2.32	*(58.9)*
52-188-006-A	6	3.06	*(77.7)*	2.188	*(55.6)*	3.61	*(91.7)*	2.77	*(70.4)*

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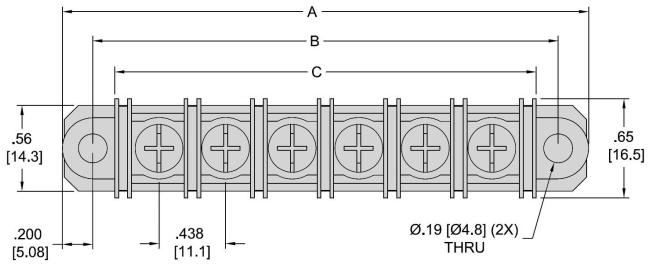
Spectrum Control

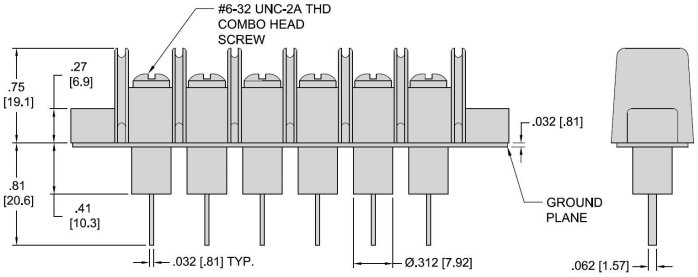
250 Volt AC Rated Filtered Terminal Blocks

API Technologies' Spectrum Control line of filtered terminal block provides superior EMI/RFI filtering of AC power and control lines. This terminal block is available in various sizes, with terminals for soldering, spade lugs, or wire pigtails. Termination options available: straight lead male or female disconnects, or wire pigtails in lengths to your specification.

Features

- UL recognized and CSA approved for AC voltages.
- E133076, UL 1059.
- LR92537, CSA STD 22.2 N°158-1987 and ECN584B.
- Termination options available: straight lead, male or female disconnects, pigtail (12 AWG-22 AWG).





Applications

- Metering equipment
- Programmable controllers
- Industrial process control
- Heavy equipment controls
- Power supplies
- Regulators
- Surge sensing equipment
- Power factor correction
- Telecommunications power management, ATM, Sonet, etc.
- Medical equipment

Specifications

ELECTRICAL

Operating Temperature:	-55° C to +105° C
Voltage Rating:	250VAC
Current Rating:	20 Amps
Wire Range:	12-22AWG
Torque:	9 lb-in.
Capacitance:	2000pF to 5200pF
Dielectric Withstanding Voltage:	1500VAC @ 25° C

MECHANICAL

Center Spacing:	.438" (11.1 mm)
Wire Size:	AWG #12 max. for 20 Amp
Screw Size:	20A - #6-32, zinc plated philslot
Molded Material:	UL rated 94VO polyamide
Tightening Torque:	9 in.-lbs. max.
Terminal Options:	straight lead, male or female disconnects, pigtail

Part Number	Number of Circuits	A in.	A (mm)	B in.	B (mm)	C in.	C (mm)
52-257-002	2	1.71	(43.4)	1.31	(33.3)	1.02	(25.9)
52-257-003	3	2.15	(54.6)	1.75	(44.5)	1.46	(37.1)
52-257-004	4	2.59	(65.8)	2.19	(55.6)	1.90	(48.3)
52-257-005	5	3.02	(76.7)	2.62	(66.5)	2.32	(58.9)
52-257-006	6	3.46	(87.9)	3.06	(77.7)	2.77	(70.4)

Dimensions in inches *(mm)*

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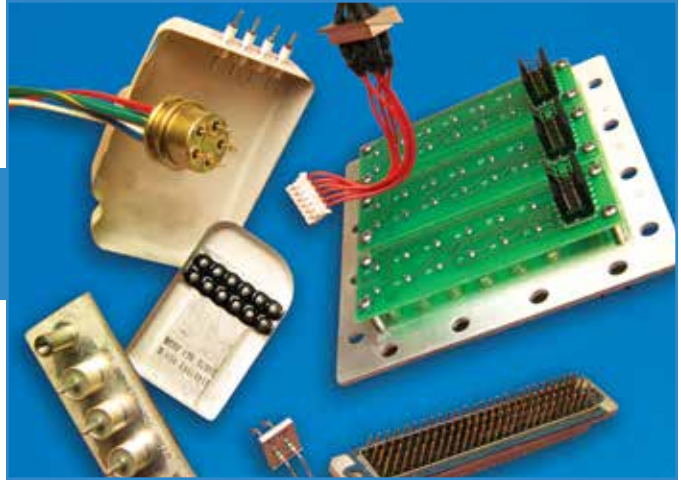
Custom Filtered Arrays



API Technologies' Spectrum Control brand will custom design a filter plate or terminal block that meets your size, material and filtering requirements. We have engineered a variety of capacitive only filter elements that provide excellent RF isolation from 5 MHz to 1 GHz and beyond. In addition, we are capable of providing stringent testing and analysis of our filter plate or terminal block assemblies to MIL-F-15733 and MIL-F-28861.

In addition to our standard and custom filter plates and terminal blocks, we offer a number of value-added features designed to complement your manufacturing operation. Our marketing and engineering staff will evaluate your design or manufacturing parameters and develop a filter solution which provides increased filtering performance economically.

API Capabilities

- Custom assemblies with varying cable lengths and terminations
- Integrate a filter solution with other components to ensure a completely functional device
- Perform EMC evaluations on your equipment, recommending proper placement of EMI/RFI filtering components
- Custom high reliability assemblies

Filtered Headers

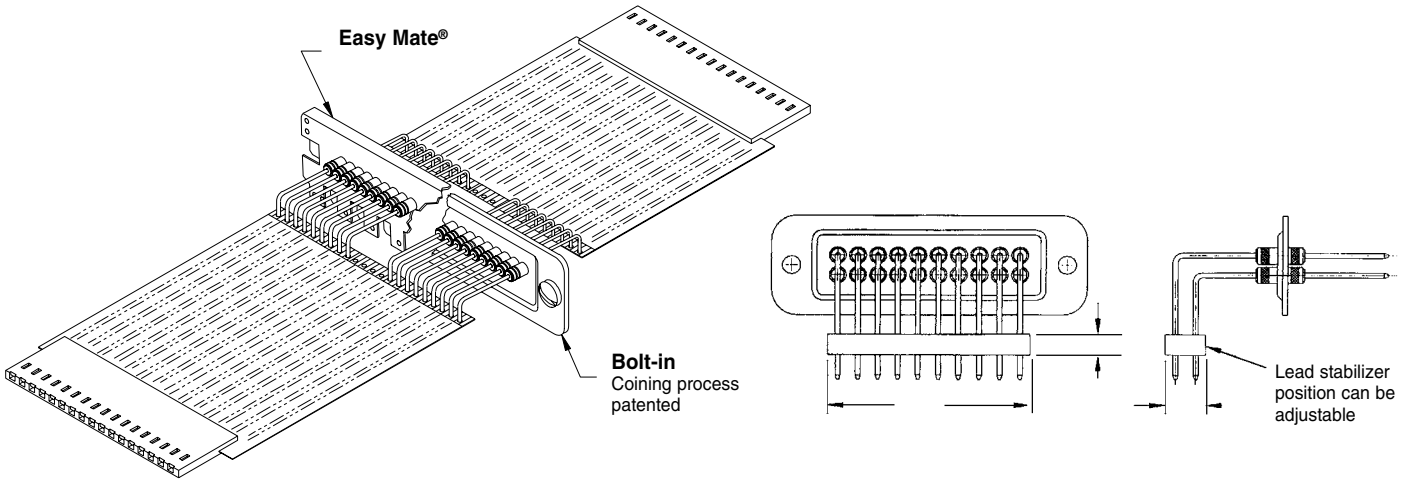
Replace the unfiltered connector on your PC board with API's low cost filtered header. This innovative new product allows you to meet EMC emissions and susceptibility standards with minimal or no board change.

Flat Conductor Cables

Flat conductor cables are often selected as an effective method of interconnection. API can save you time and money by installing conductor cables to your filter plates. Flat conductor cables are available in varying lengths, conductor counts and in several termination configurations.

Lead Stabilizer

API Technologies' Spectrum Control brand has developed a filter plate lead stabilizer bar to protect leads during installation and ensure proper alignment to PCB.



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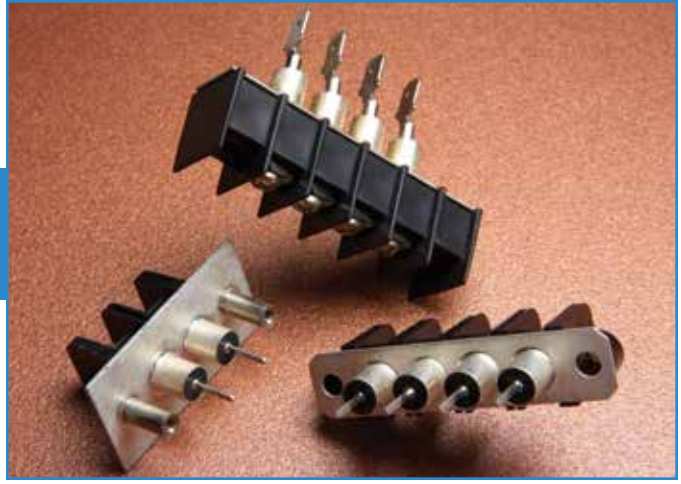
Custom Filtered Terminal Blocks

Terminal Block Design Inquiry Form



API Technologies' Spectrum Control brand can incorporate EMI filters into a variety of terminal block designs. We offer product variations from several terminal block manufacturers. In addition to developing a filtering solution, we will add custom wiring and terminations to meet your requirements. API offers:

- Unique package integration for customer specific needs
- Wide range of designs from numerous terminal block manufacturers
- Custom assemblies with varying cable lengths and terminations

Terminal Block Design Inquiry Form

General Information

Customer: _____ Location: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact: _____ Title: _____

Phone: _____ Fax: _____

Project Information

Project name: _____ Annual usage: _____ Target price: _____

Intended application: _____ Quote quantity: _____

Function of circuit filter is used in: _____ Target cost: _____

Detailed Sketch and Comments Area

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EMI Filtered Connectors

from performance to board space, to cost, we offer many reasons and options for managing EMI at the signal & power I/O

Series F Ferrite Filtered Connectors offer a low cost, space saving solution for high frequency interference… **FC3-FC7**

Series 500 Low-Profile Feed-Through Connectors deliver reliable EMI filtering in 90° PCB and straight PCB connectors… **FC8-FC11**

Series 600 High-Density Filtered Connectors meet the growing need for increased circuit densities in smaller packages… **FC12-FC13**

Series 700 High Performance Connectors feature feed-through capacitive and Pi filters for the most effective filtering… **FC16-FC37**

Filtered Combo D-Sub Connectors use tubular capacitors for high insertion loss in signal, power and coaxial contacts… **FC38-FC48**

Micro D Series Connectors allow designers to incorporate EMI filtering into even smaller packages… **FC49-FC53**

Datacom Connectors including modular jack, miniature ribbon and mini-DIN protect critical datacom lines… **FC54-FC57**

Hooded Strain Reliefs for shock protection from exposed wires and short circuits… **FC60**

Performance Specifications & Board/ Panel Cutouts… **FC62-FC64**

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 –** API's 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 –** API tests 100% of filters, on-board filters are usually spot tested

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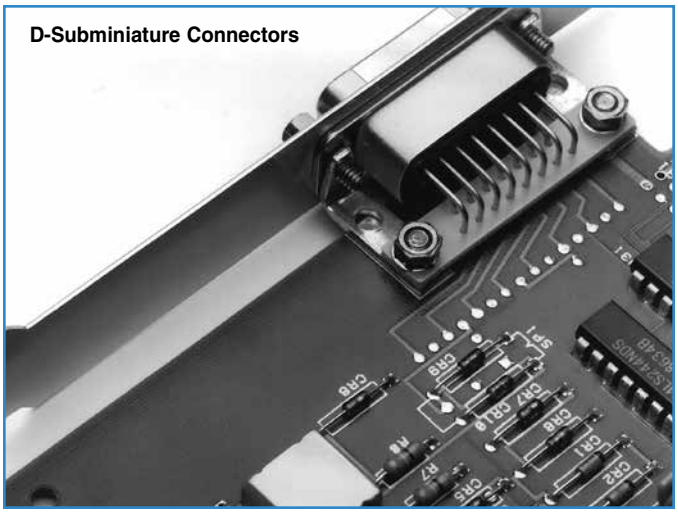
Advantages of API Filtered Connectors

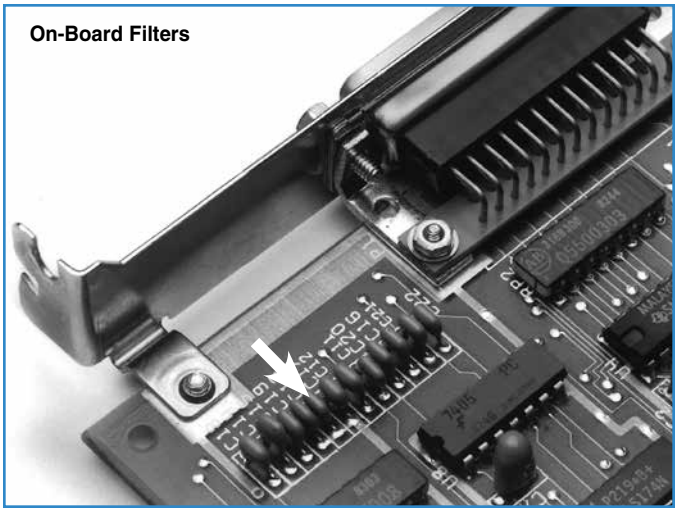
API Technologies' Spectrum Control brand offers the industry's most complete line of filtered D-subminiature connectors. Our connectors are available in shell sizes from 9 to 50, and come in many termination types, such as PC mount, wire wrap, solder cup and 90° PCB. In addition, API offers a wide range of filtering options, allowing you to find the right balance between performance and economy.

EMI filter options include our Pi filter configuration, which provides 45-60 dB per decade slope to insertion loss curve, our capacitive-only C filters that provide cost-effective EMI attenuation, ferrite filtered series F connectors (designed for filtering in situations that do not tolerate capacitive loading of circuit), as well as our series 500 connectors, with small .318" footprints.

The construction of our high performance Series 600 and 700 connectors features a one-piece zinc diecast shell, which is subsequently nickel-plated. Each filter is constructed with 360° grounding with ground plate, and our patented coaxial springs ensure ground continuity. And with API's advanced in-house ceramic tube design, you'll get a reliable, high performance filter from start to finish.



D-Subminiature Connectors



On-Board Filters

Advantages of an API 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 –** API 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 –** API tests 100% of filters, on-board filters are usually spot tested

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Series F Ferrite Filtered Connectors

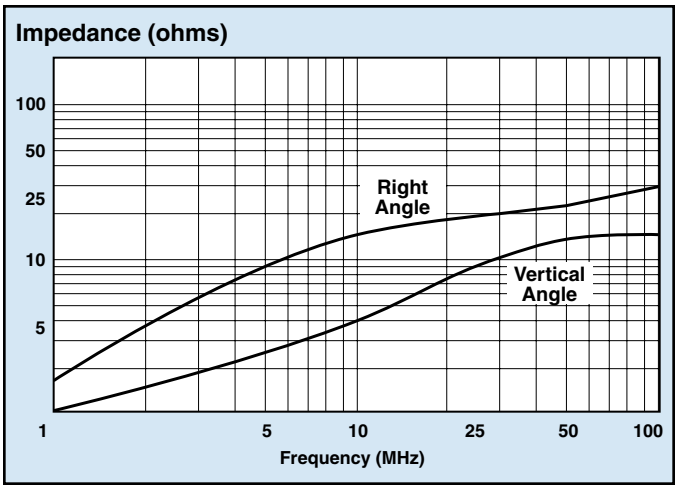
The Series F filtered D-subminiature connectors incorporate a solid slab of ferrite material as the filtering element. This rugged one-piece design provides a com-pact connector that is a drop-in replacement for standard connectors. The ferrite material has been chosen for optimum filtering performance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

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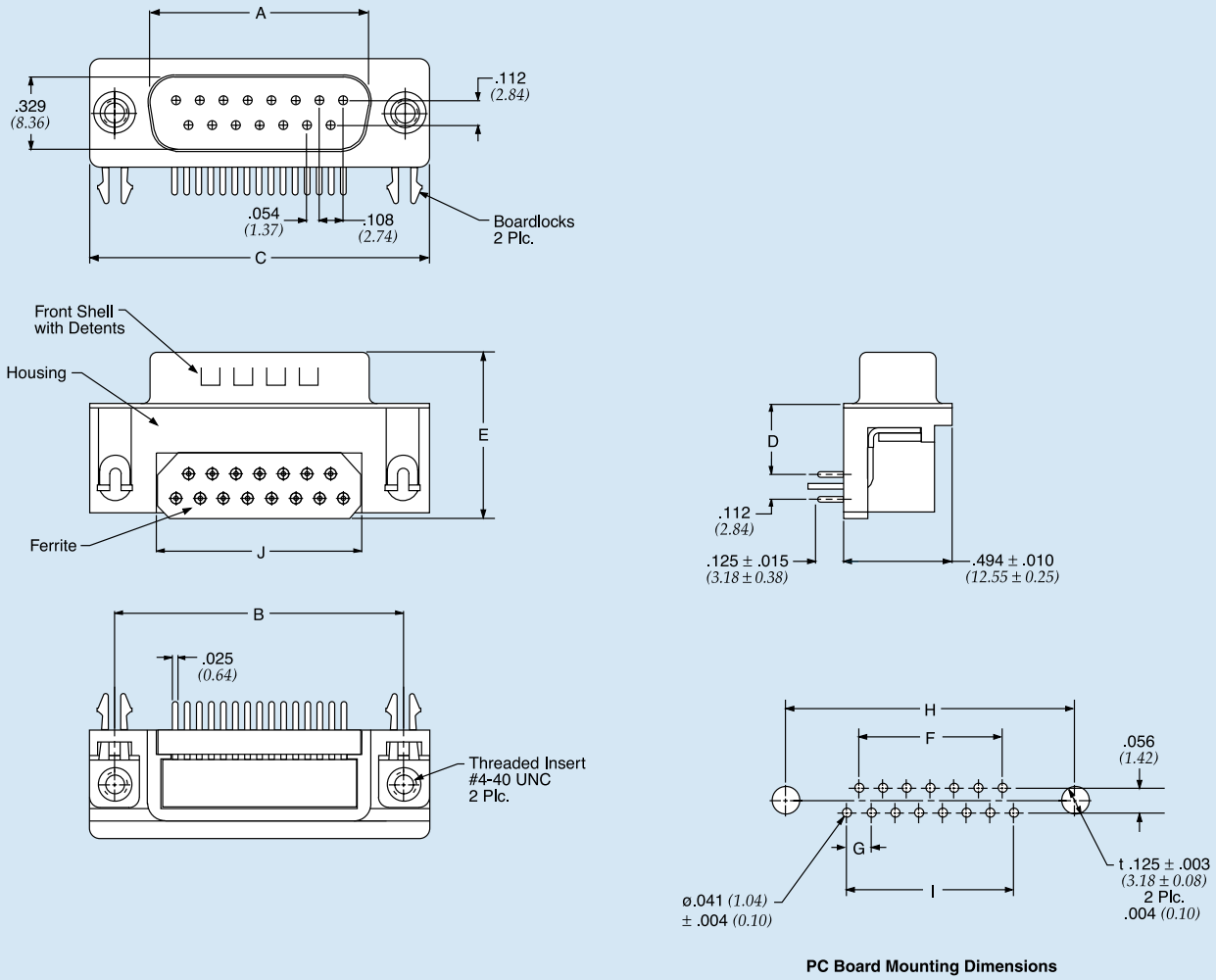
Series F Ferrite Filtered Connectors

Pin Contact – Right Angle Mount



PC Board Mounting Dimensions

Part Number	Description	Typ. Impedance (Ohms) 30 MHz	Typ. Impedance (Ohms) 100 MHz	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)
€ 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 API's authorized European distributors/agents.

Dimensions in inches *(mm)*

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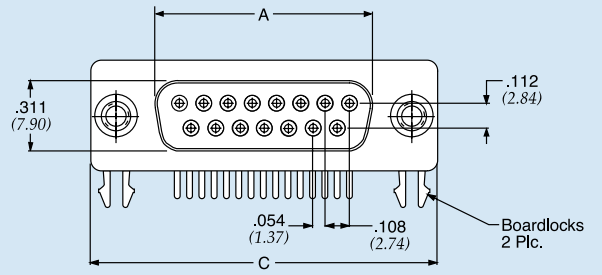
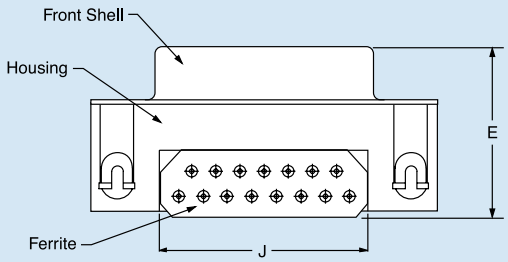
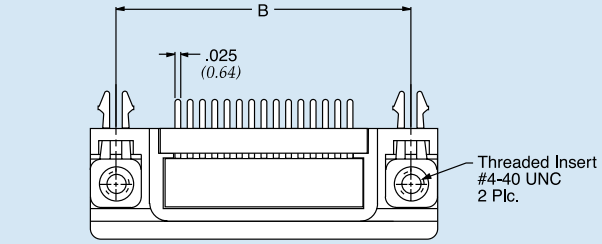
Series F Ferrite Filtered Connectors

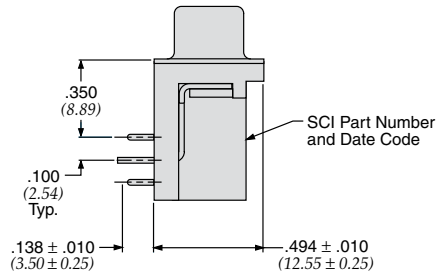
Socket Contact – Right Angle Mount

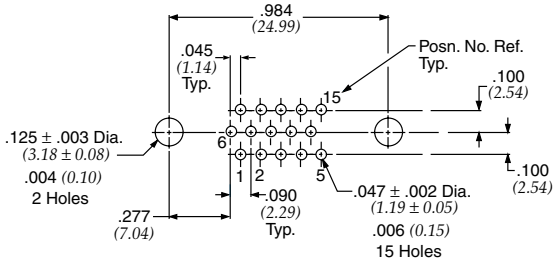




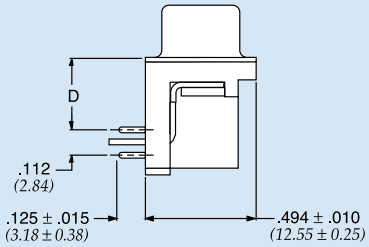


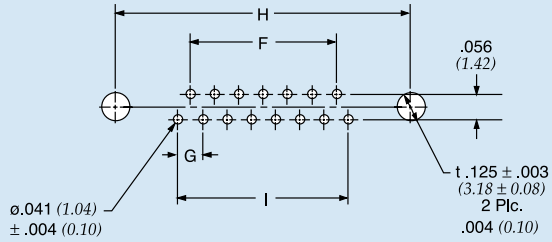
*High-Density





PC Board Mounting Dimensions





PC Board Mounting Dimensions

Part Number	Description	Typ. Impedance (Ohms) 30 MHz	Typ. Impedance (Ohms) 100 MHz	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)
€ 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 API's authorized European distributors/agents.

Dimensions in inches *(mm)*

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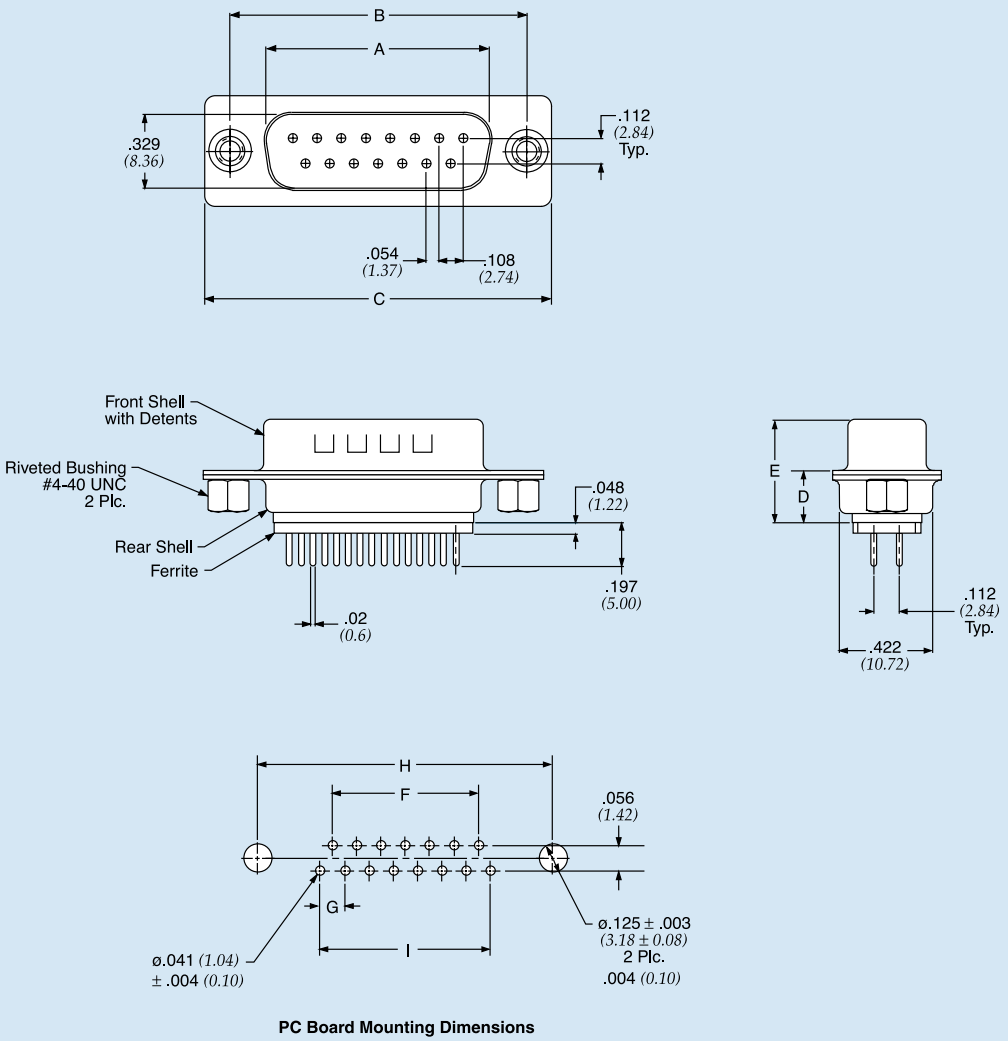
Series F Ferrite Filtered Connectors

Pin Contact – Vertical Mount



PC Board Mounting Dimensions

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)
		30 MHz	100 MHz										
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)*

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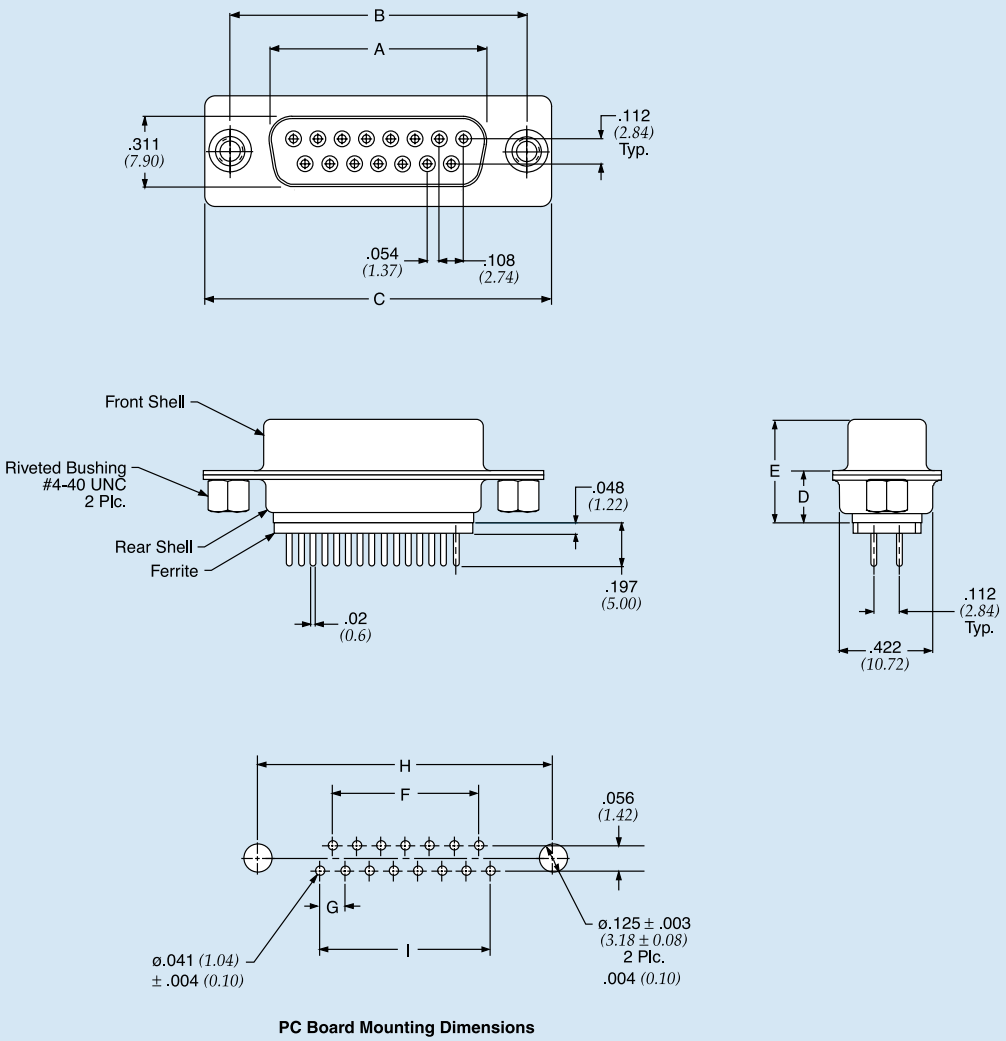
Series F Ferrite Filtered Connectors

Socket Contact – Vertical Mount



PC Board Mounting Dimensions

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)
		30 MHz	100 MHz										
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)*

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Series 500 Low Profile Filtered Connectors

API's Spectrum Control brand of 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-subs 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.

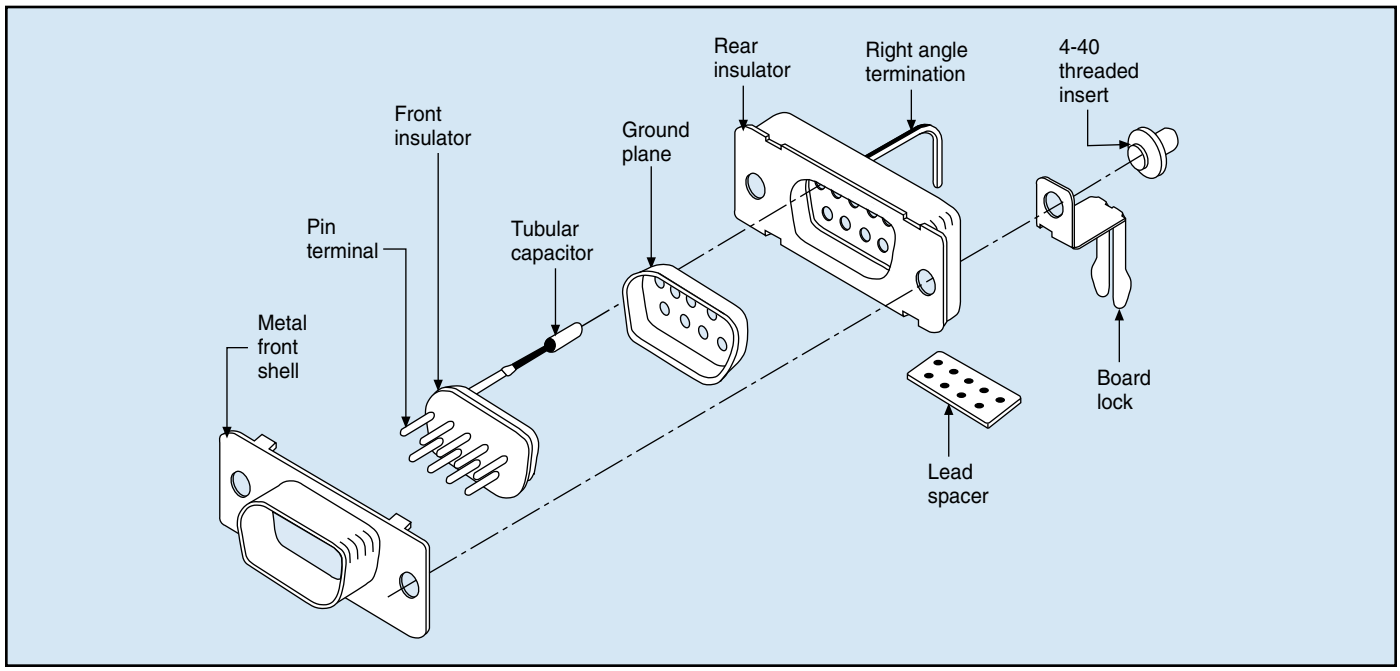
Series 500 capacitive filtered D-sub connectors are an ideal solution to FCC/EC/VCCI emissions problems. These connectors are designed to protect equipment from external EMI noise and eliminate system glitches.

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-through 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



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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 FC81.

Electrical Specifications

Current Rating . . . . . 5 Amps

RF Current Rating . . . . . 0.3 Amps

Contact Resistance . . . . . 10 milliohms maximum

Capacitance . . . . . 120, 440, 840, 1000, 1500 pF ±30%

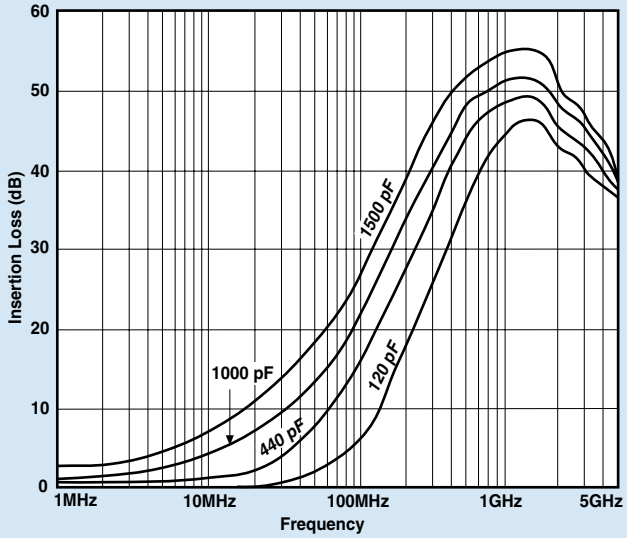
Working Voltage . . . . . 100 VDC

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 API.

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

Filter Performance

Cap. (pF) Value ±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

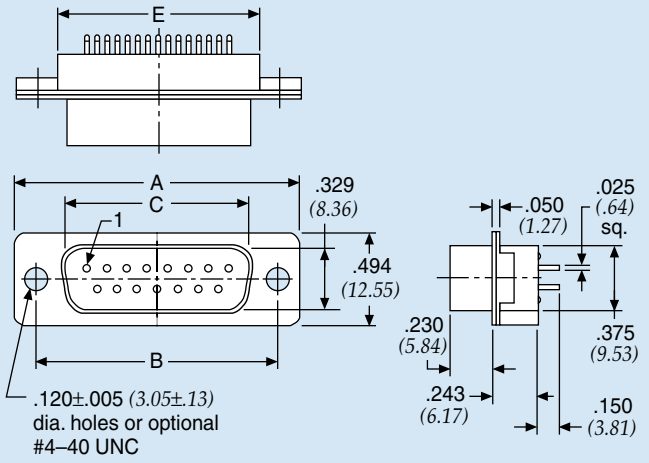
Insertion loss measured per MIL-STD-220, no load, 50 ohm source and load. Above data represents guaranteed minimum.

api technologies corp.
Spectrum Control

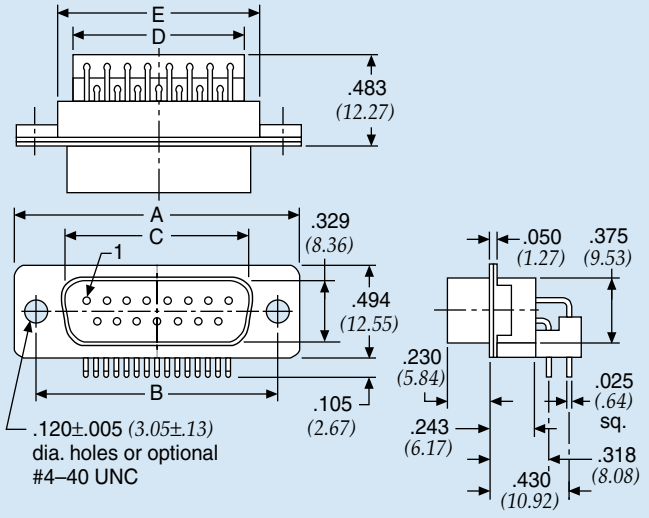
Series 500 Low Profile Filtered Connectors

Pin Contact *(plug)*

Straight PC Mount



90° PC Mount



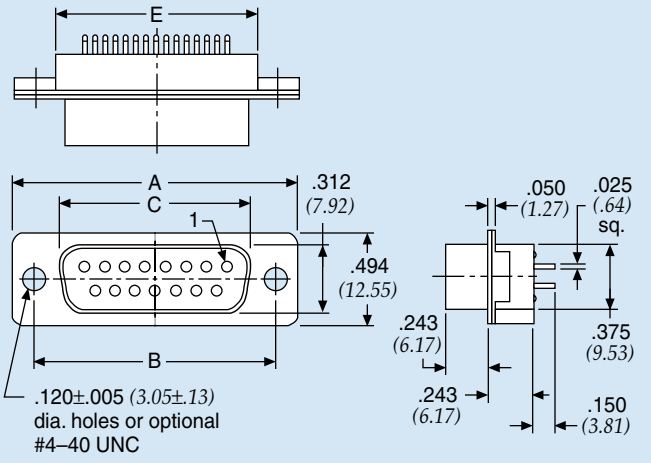
Size	A	B	C	D	E
9	1.213 *(30.81)*	0.984 *(24.99)*	0.666 *(16.92)*	0.540 *(13.72)*	0.748 *(19.00)*
15	1.541 *(39.14)*	1.312 *(33.32)*	0.994 *(25.25)*	0.867 *(22.02)*	1.076 *(27.33)*
25	2.088 *(53.04)*	1.852 *(47.04)*	1.534 *(38.96)*	1.412 *(35.86)*	1.616 *(41.05)*

Standard Tolerance = ±.015 *(0.38)*

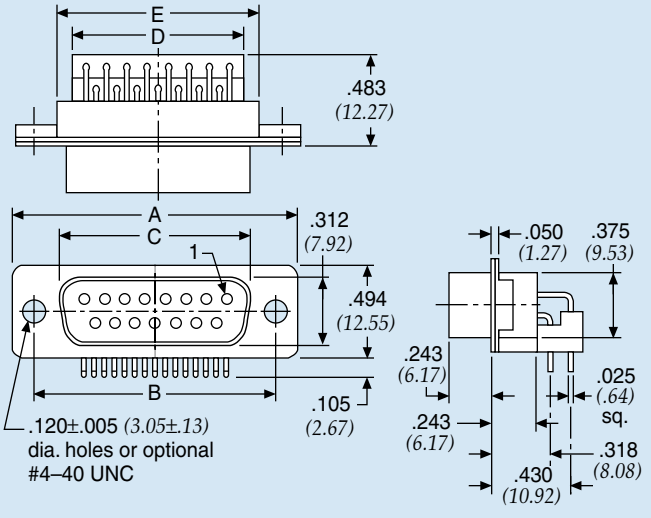
Dimensions in inches *(mm)*

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)*

api technologies corp.
Spectrum Control

Series 500 Low Profile Filtered Connectors

Ordering Information

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

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 API engineering.

[ ] - [ ][ ][ ] - 013 - [ ]

Filtered D-sub Connectors
– - Standard connector
F - RoHS compliant version

Series 500 Connectors

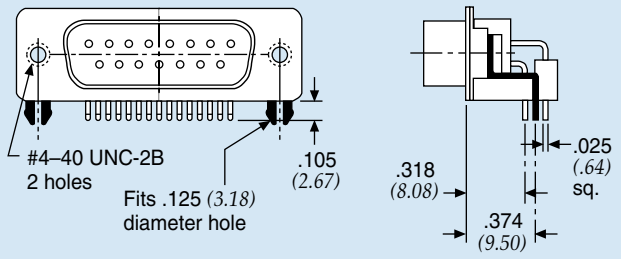
Shell Size/ Number of Contacts
0 - 9 size
1 - 15 size
2 - 25 size

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

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

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)

GBL Option

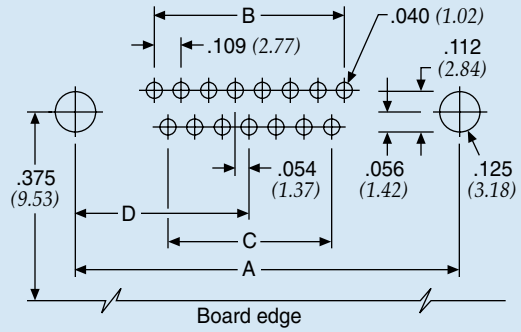


Features
- Snap-in retention to PC board, requires no hardware
- Ensures low ground impedance for superior filtering
- 4-40 threads on mounting flange eliminate loose hardware

Dimensions in inches *(mm)*

Board Layout

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)*

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Series 600 High-Density Filtered Connectors

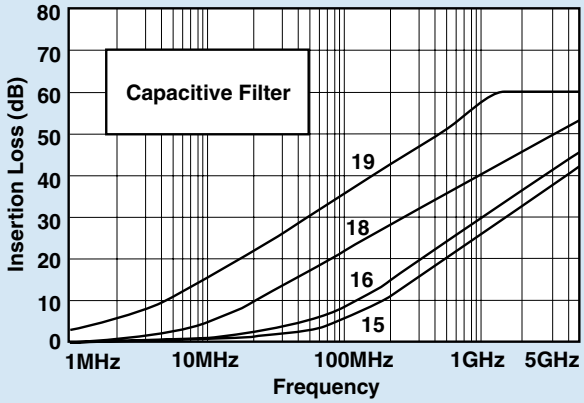
The miniaturization of electronic systems and sub-systems is pushing designers to increase circuit densities within smaller packages. To address this growing need, API Technologies' Spectrum Control brand has developed a line of filtered High-Density D-subminiature connectors. This new line of connectors incorporates the high performance and reliable filtering of API's standard D-subs 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 position
- Available in feed-through capacitive configurations

Mechanical Specifications:
Same as Series 700 connectors, page FC21.

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

Electrical Specifications: High-Density Connectors

Filter Designations	Filter Circuits	Capacitance		3 dB Cut-off Frequency Max. (MHz)	Dielectric Withstanding 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**

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.

56 - [ ][ ][ ] - [ ][ ] - [ ]

D-Sub Connector
Hi-Density
- Standard connector
F - RoHS compliant version

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

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

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

* Required on right angle parts

Note: VGA adapters also available. Consult factory

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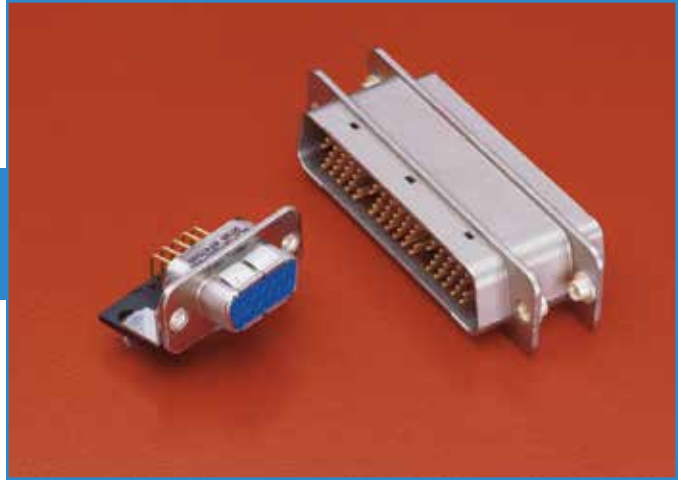
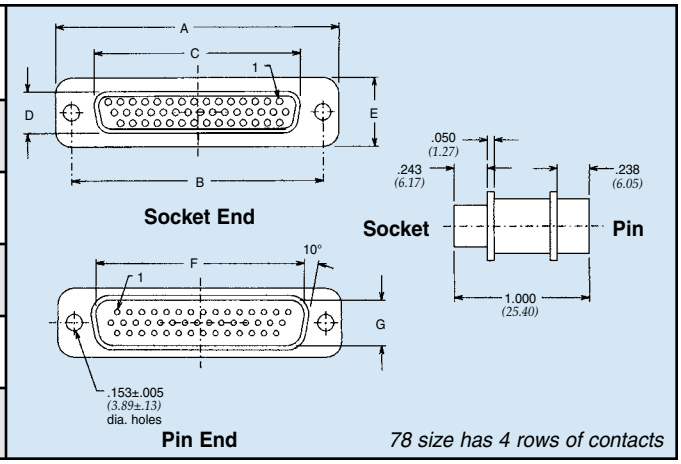
Series 600 High-Density Filtered Connectors



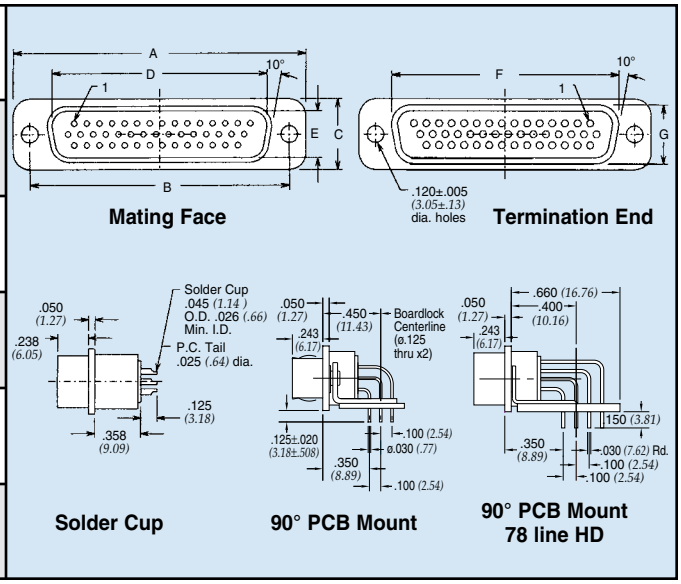
Pin/Socket Adapter

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)*

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High-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

API's Spectrum Control brand, in response to these unique requirements of the telecommunication industry, has developed a new high-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 high-density arrangements
- 64 contact positions standard, with 78 positions available by request in any filter combination

Mechanical Specifications

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

Electrical Specifications

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

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Spectrum Control

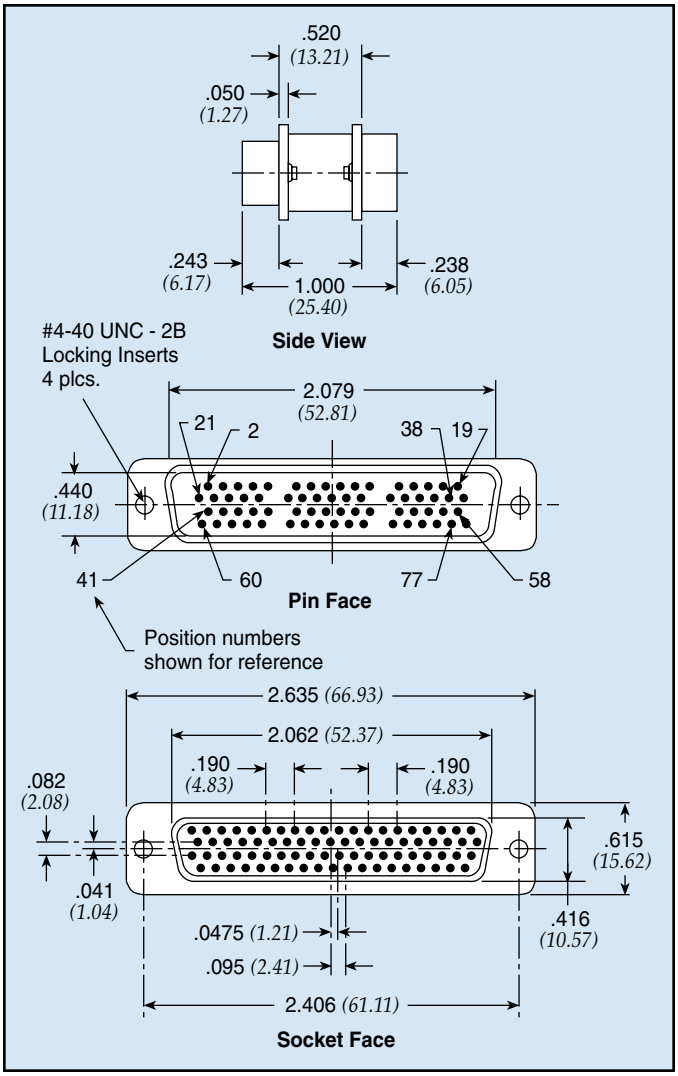
High-Density Filtered Adapter for Telecommunications

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

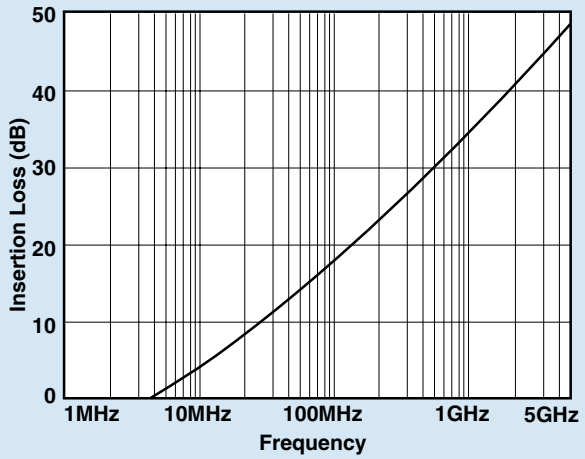
Insertion loss measured per MIL-STD-220, no load, 50 ohm source and load. Above data represents guaranteed minimum.

Part Number for Ordering: #56-645-002



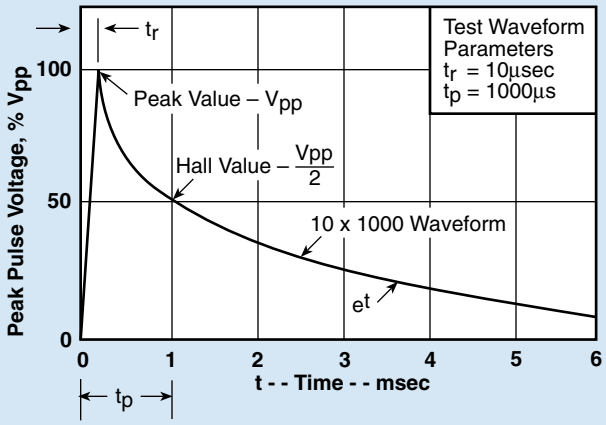
Dimensions in inches *(mm)*

Typical Insertion Loss



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

Pulse Wave Form* (10 x 1000)



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

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Spectrum Control

Series 700 High Performance Filtered Connectors

Filter Selection

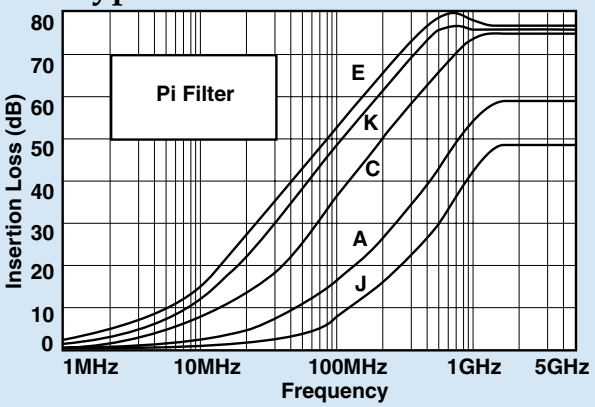
API's Spectrum Control brand of Series 700 connectors offer the highest performance filtering for all types of professional applications.

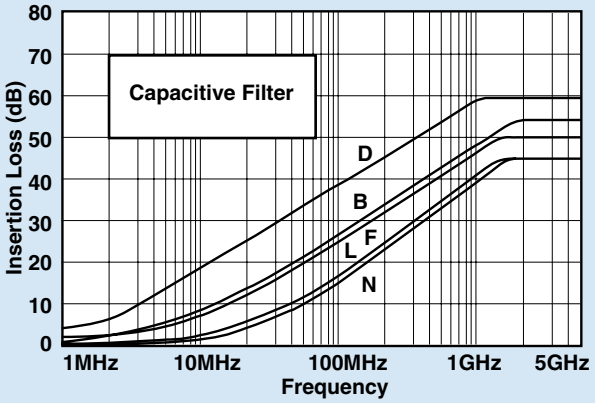
Features

- 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 API.

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 Withstanding 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.

api technologies corp.
Spectrum Control

Series 700
Specifications and Connector Ordering

Mechanical Specifications

Shell . . . . . Zinc or aluminum diecast, nickel plated 150 µ inches *(3.81 µm)* min.

Insulators . . . . . Glass-filled polyester, flammability UL94V-0

Pin Contacts . . . . . Copper alloy, 15 µ inches *(0.38 µm)* gold plated * over nickel

Socket Contacts . . . . Copper alloy, 30 µ inches *(0.76 µm)* gold plated * over nickel

* *Heavier gold plating available upon request.*
See pg. FC43: 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 FC79.

Ordering Your Connector

STEP 1: SELECTING THE FILTER

- Using the insert loss graphs on page FC20 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-through capacitor or Pi. The Pi is generally considered better due to its superior high frequency performance and steeper curve. The feed-through capacitor is lower cost.
- Select capacitance value.
- Note the Spectrum letter designation for the filter chosen from the table on page FC20.

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 FC43 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.

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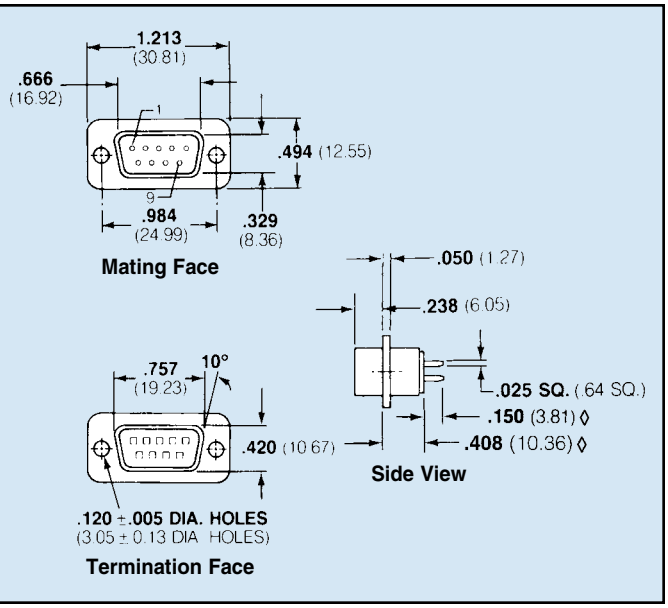
9 Shell Size Series 700 Pin Contact

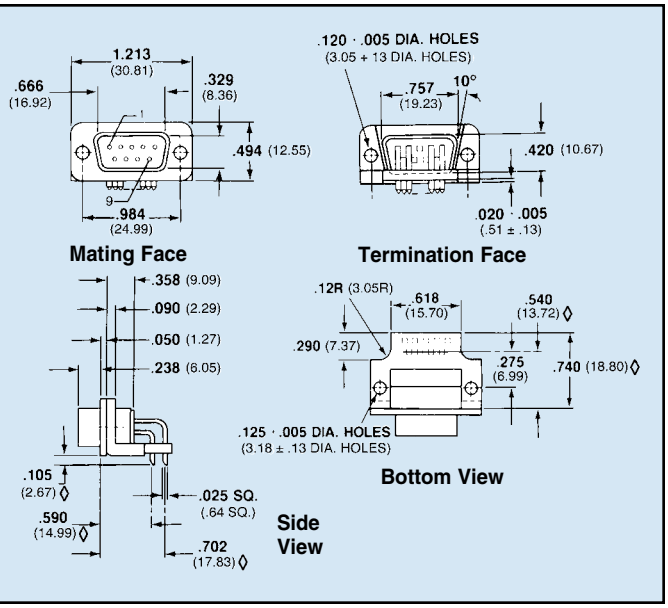
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

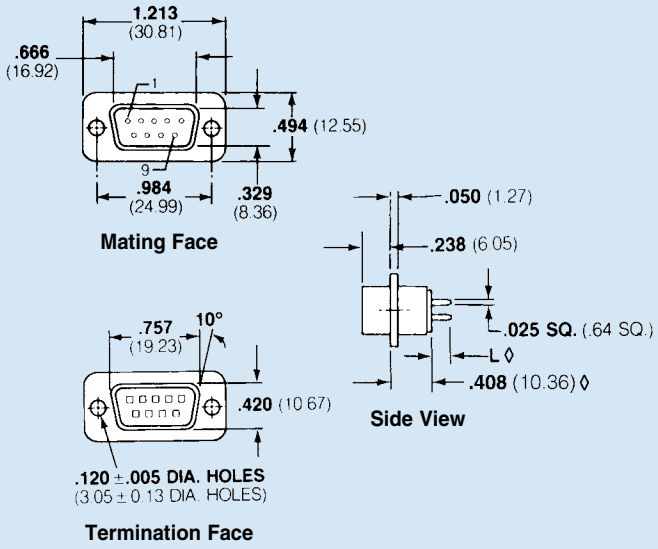
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

9 Shell Size Series 700 Pin Contact

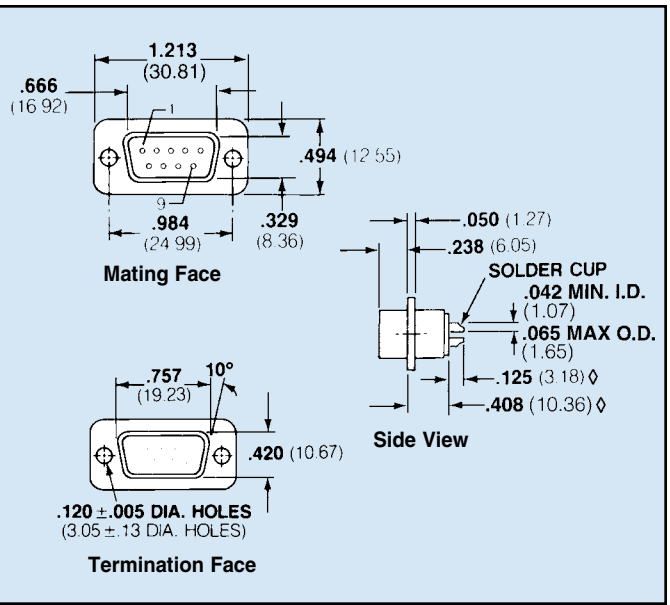
Solderless Wire Wrap

Spectrum Part Number (Select one)				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

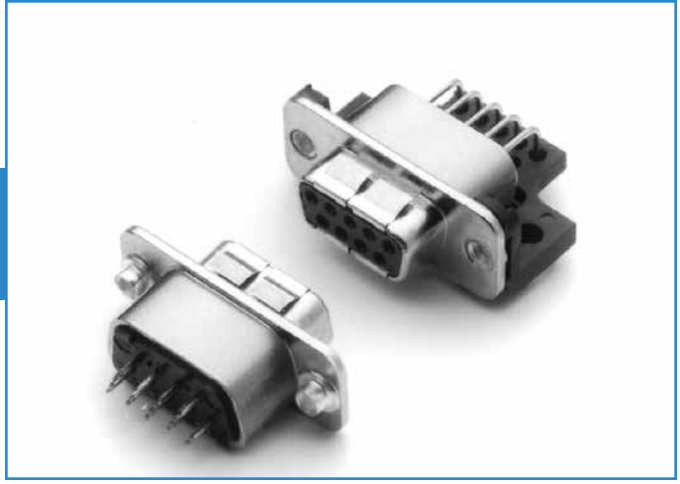


* **May be available from distributor stock.**
** **See page FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

Dimensions in inches *(mm)*

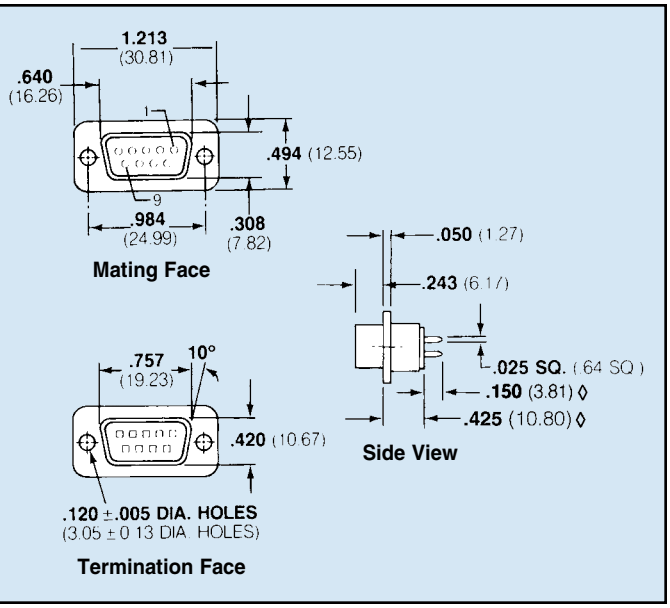
api technologies corp.
Spectrum Control

9 Shell Size Series 700 Socket Contact



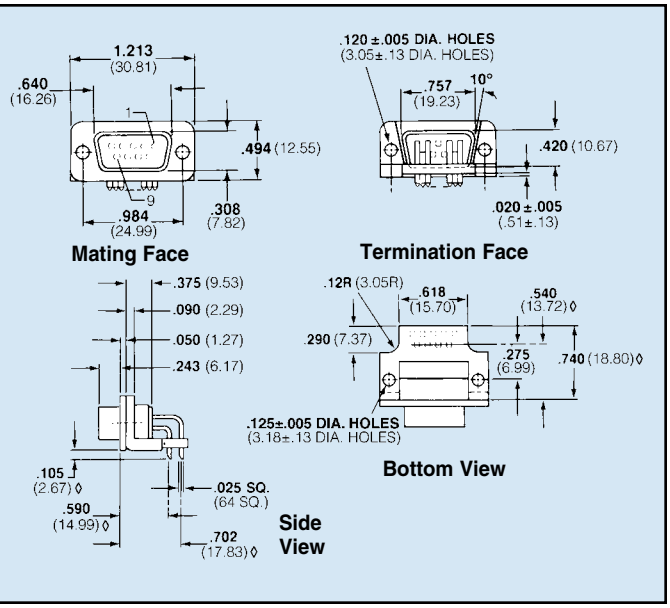
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

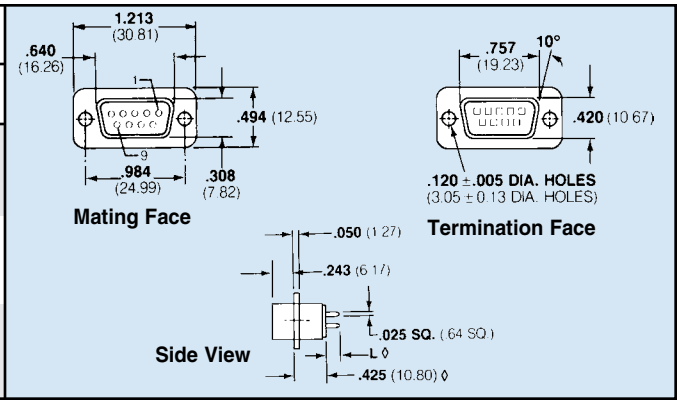
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

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

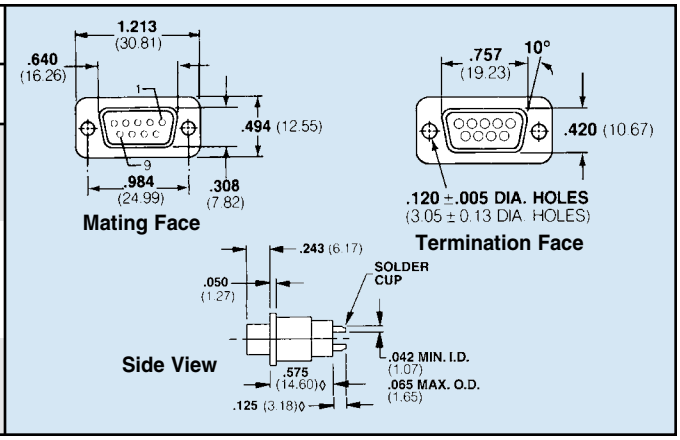
Solderless Wire Wrap

Spectrum Part Number (Select one)				EMI Filter	
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-703	-006	-016	-011	A	310 pF Pi
56-703	-007	-017	-012	B	1000 pF C
56-703	-008	-018	-013	C	1000 pF Pi
56-703	-009	-019	-014	D	5000 pF C
* 56-703	-010	-020	* -015	E	4000 pF Pi
56-703	-031	-028	-025	F	830 pF C
56-703	-032	-029	-026	J	100 pF Pi
56-703	-033	-030	-027	K	2500 pF Pi
56-703	-039	-038	-037	N	375 pF C



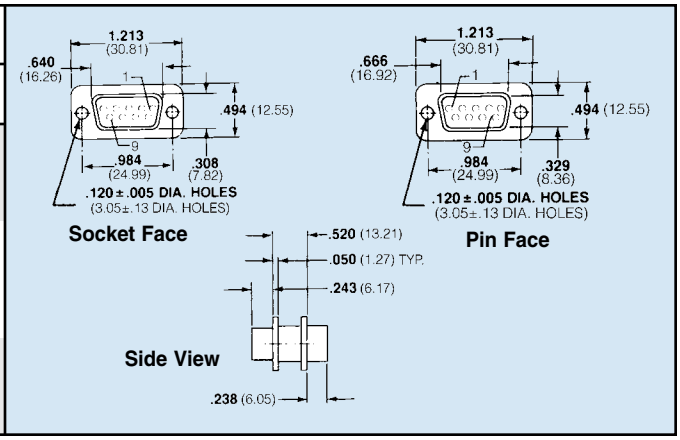
Solder Cup Termination

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-706-001	A	310 pF Pi
56-706-002	B	1000 pF C
* 56-706-003	C	1000 pF Pi
56-706-004	D	5000 pF C
* 56-706-005	E	4000 pF Pi
56-706-006	F	830 pF C
56-706-007	J	100 pF Pi
* 56-706-008	K	2500 pF Pi
56-706-009	N	375 pF C
56-706-017	L	500 pF C



Pin/Socket Adapter

Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
* 56-705-001	A	310 pF Pi
56-705-002	B	1000 pF C
* 56-705-003 €	C	1000 pF Pi
56-705-004	D	5000 pF C
* 56-705-005 €	E	4000 pF Pi
* 56-705-008	F	830 pF C
56-705-009	J	100 pF Pi
56-705-010	K	2500 pF Pi
56-705-026	N	375 pF C
56-705-049	L	500 pF C



€ **Also available through API's authorized European distributors/agents.**
* **May be available from distributor stock.**
** **See page FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

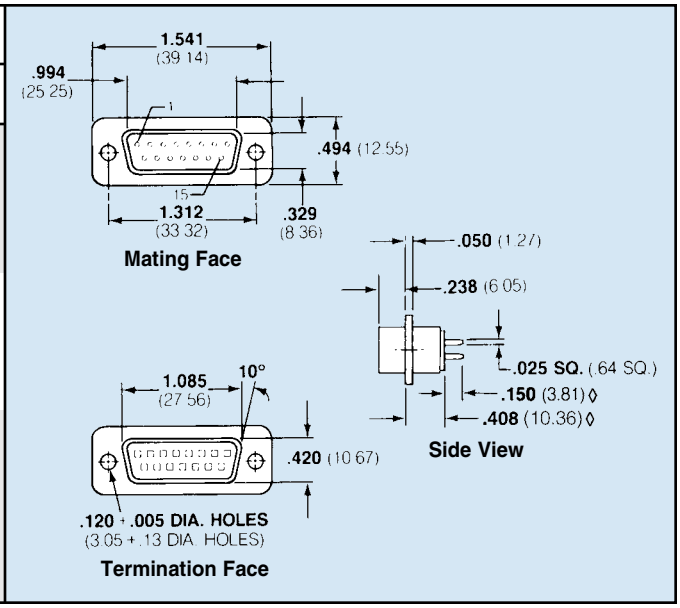
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

15 Shell Size Series 700 Pin Contact

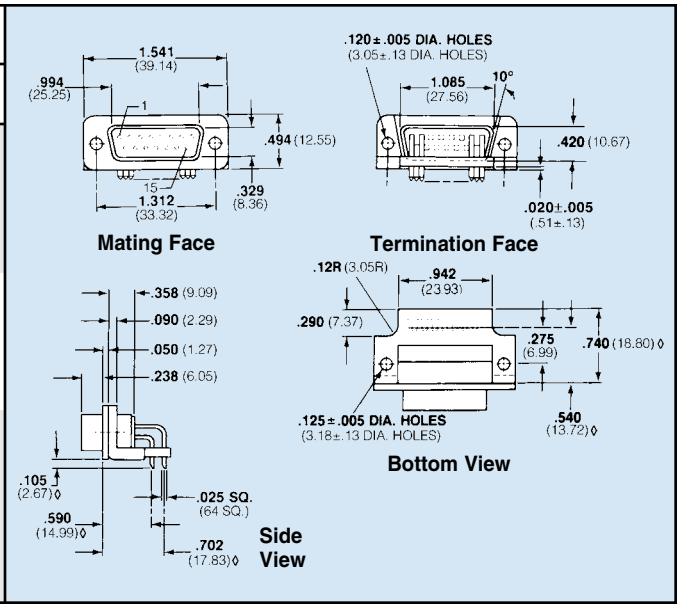
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

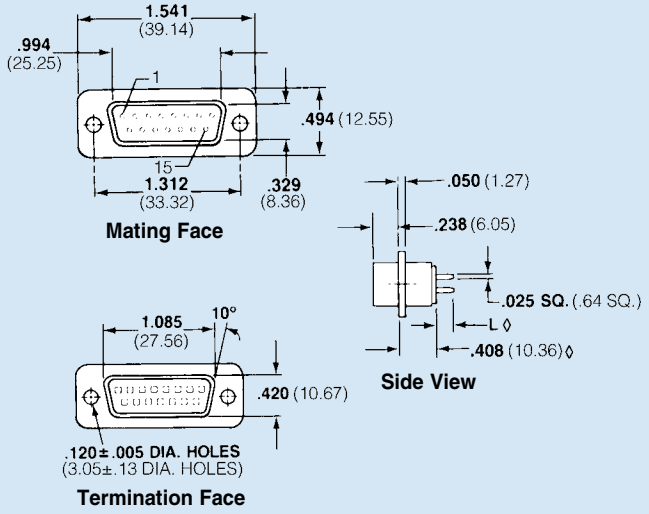
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

15 Shell Size Series 700 Pin Contact

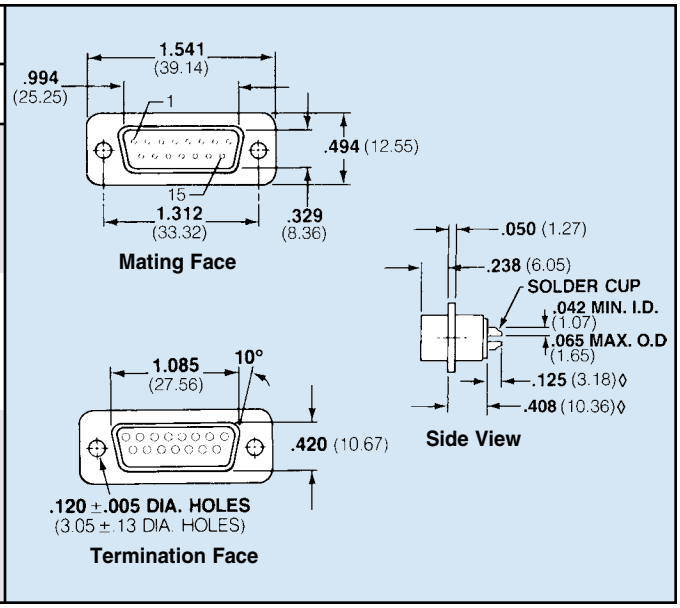
Solderless Wire Wrap

Spectrum Part Number (Select one)				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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

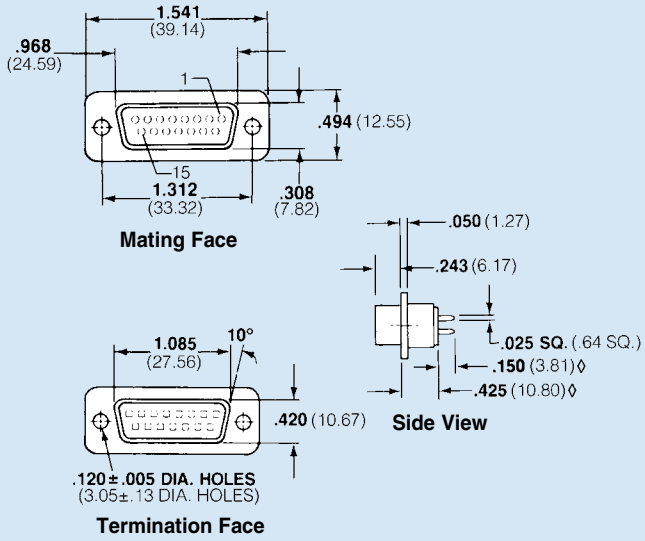
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

15 Shell Size Series 700 Socket Contact

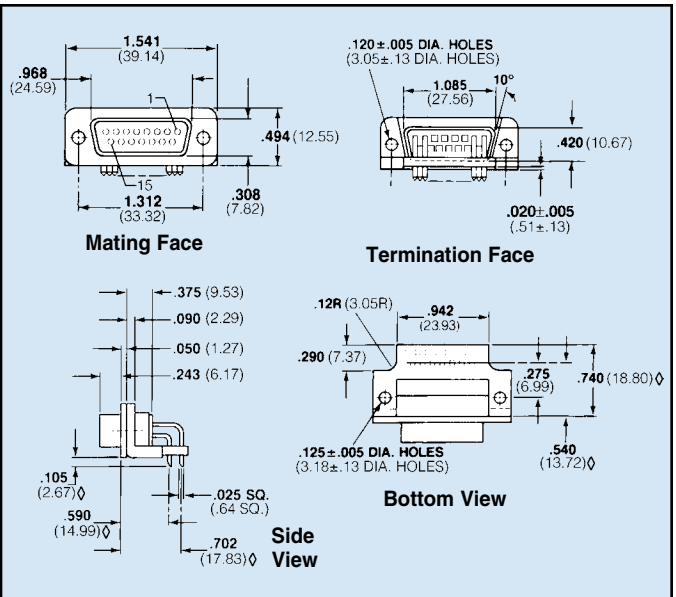
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

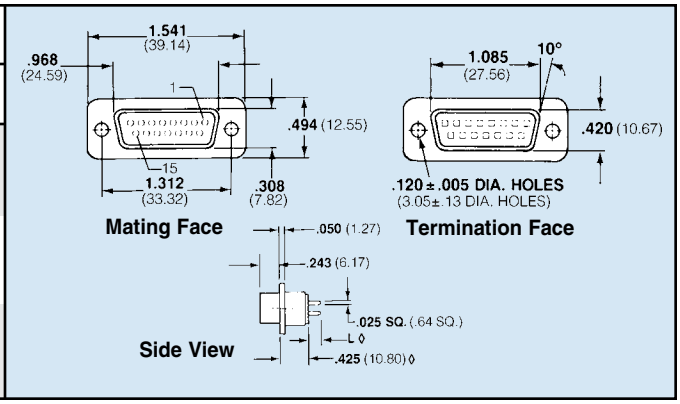
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

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

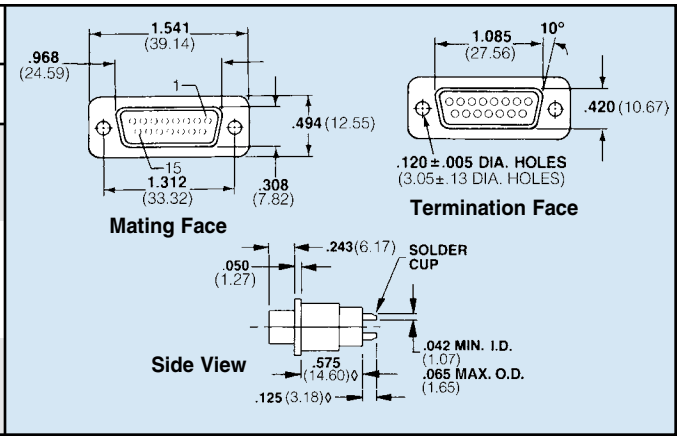
Solderless Wire Wrap

Spectrum Part Number (Select one)				EMI Filter	
	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



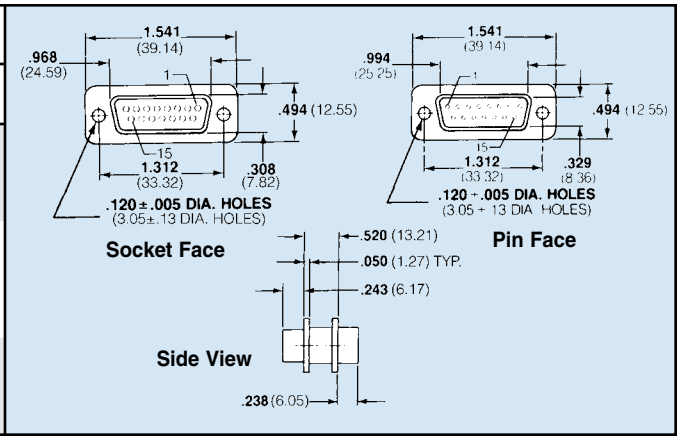
Solder Cup Termination

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 API's authorized European distributors/agents.**
* **May be available from distributor stock.**
** **See page FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

Dimensions in inches *(mm)*

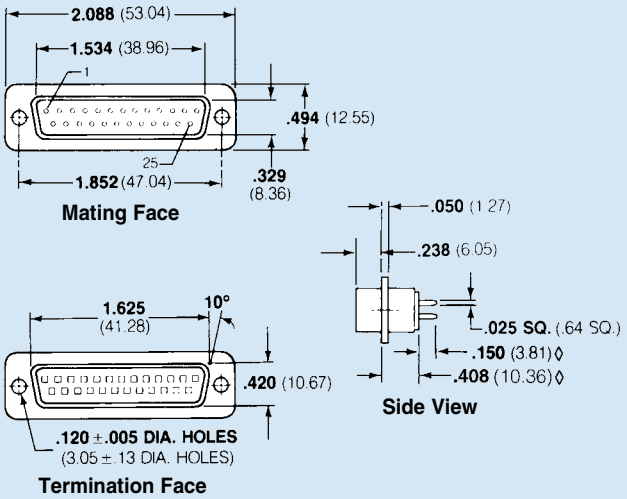
API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

api technologies corp.
Spectrum Control

25 Shell Size Series 700 Pin Contact

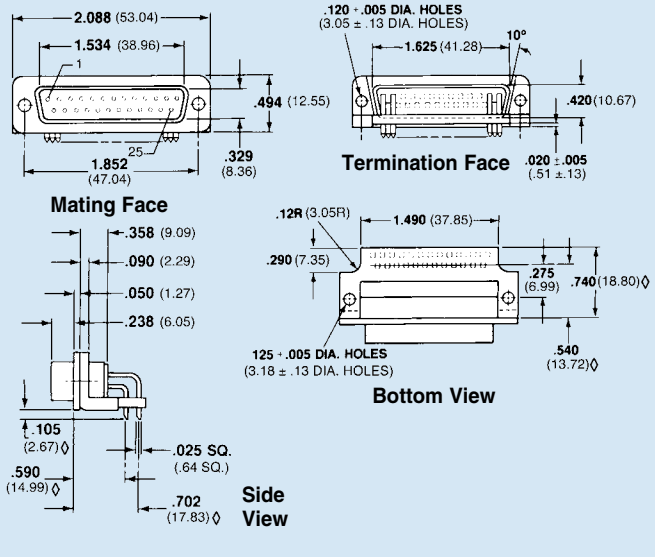
Printed Circuit Board Mount

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



Printed Circuit Board Right Angle Mount

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



* **May be available from distributor stock.**
** **See page FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

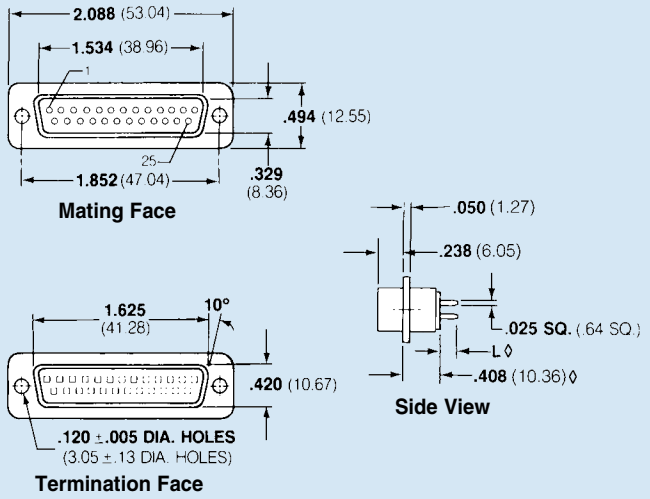
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

25 Shell Size Series 700 Pin Contact

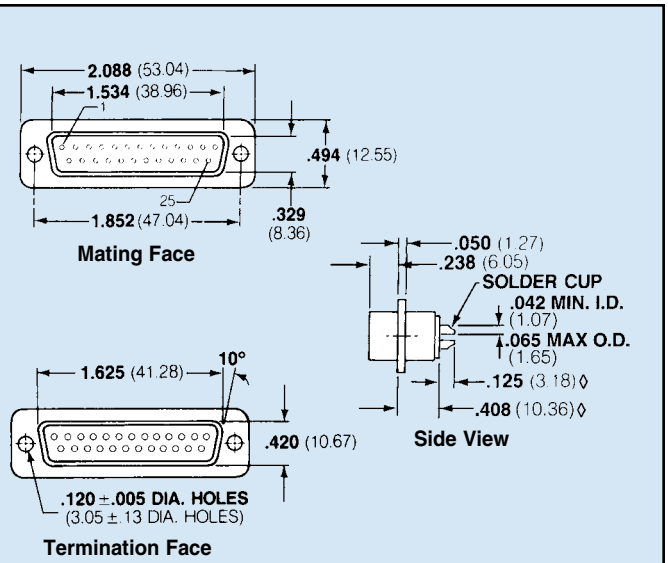
Solderless Wire Wrap

Spectrum Part Number (Select one)				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

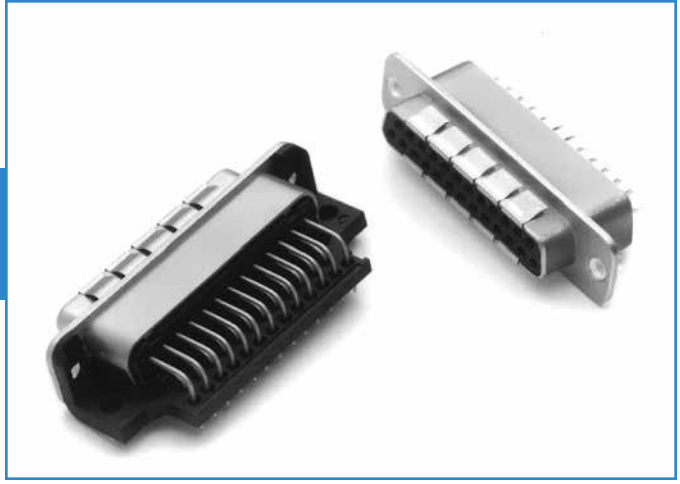


* **May be available from distributor stock.**
** **See page FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

Dimensions in inches *(mm)*

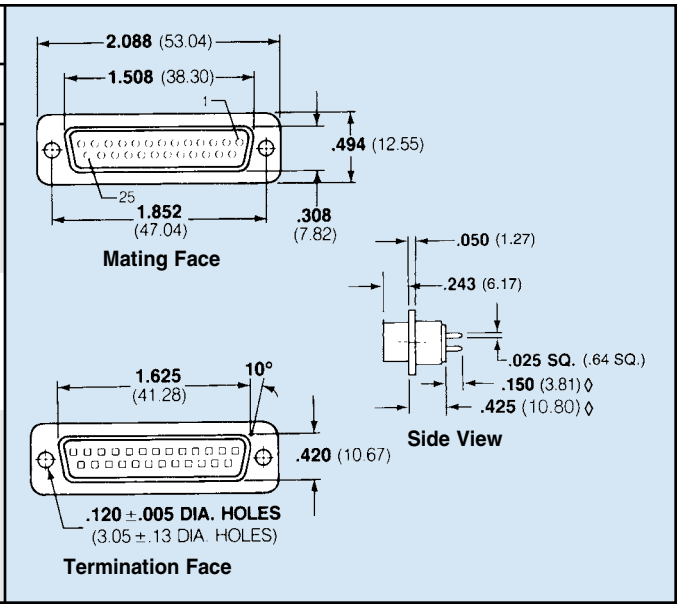
api technologies corp.
Spectrum Control

25 Shell Size Series 700 Socket Contact



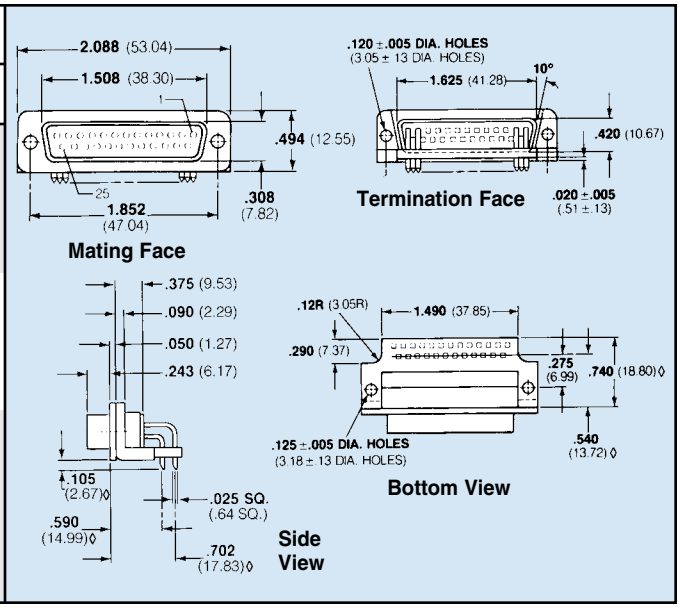
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

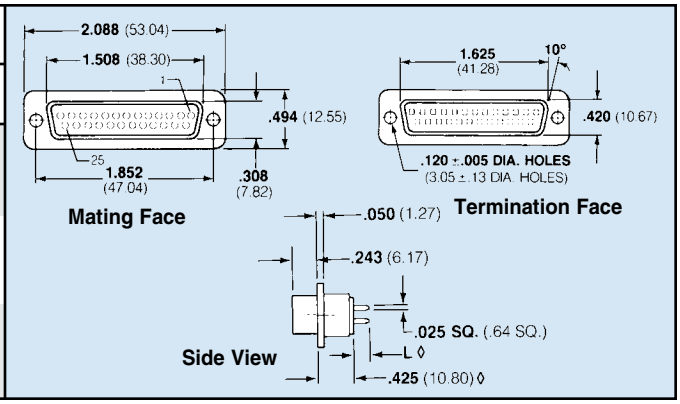
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

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

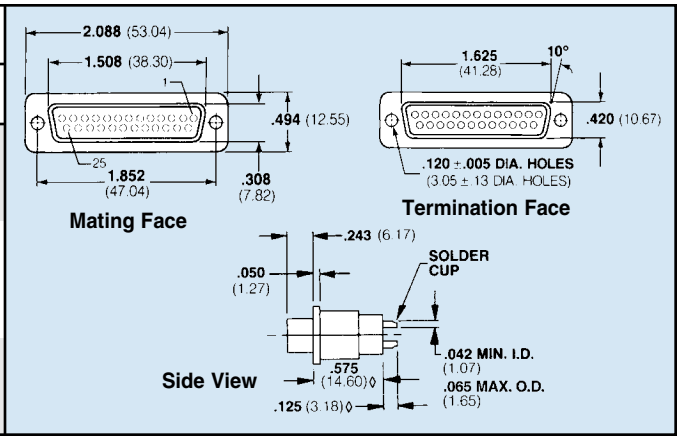
Solderless Wire Wrap

Spectrum Part Number (Select one)				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



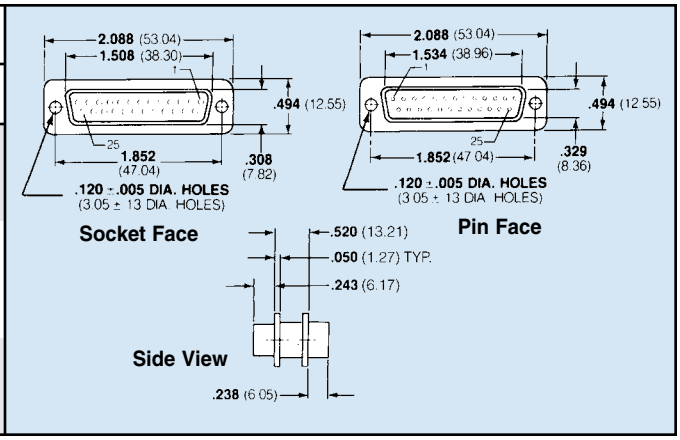
Solder Cup Termination

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 API's authorized European distributors/agents.**
* **May be available from distributor stock.**
** **See page FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

Dimensions in inches *(mm)*

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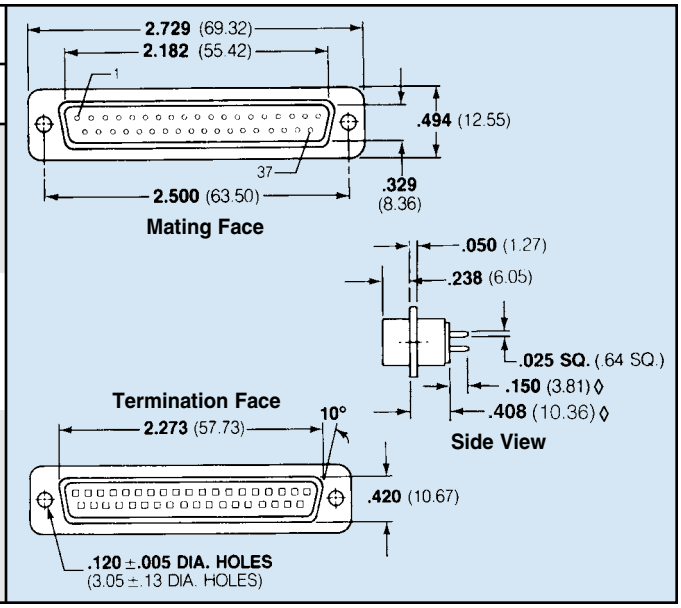
api technologies corp.
Spectrum Control

37 Shell Size Series 700 Pin Contact

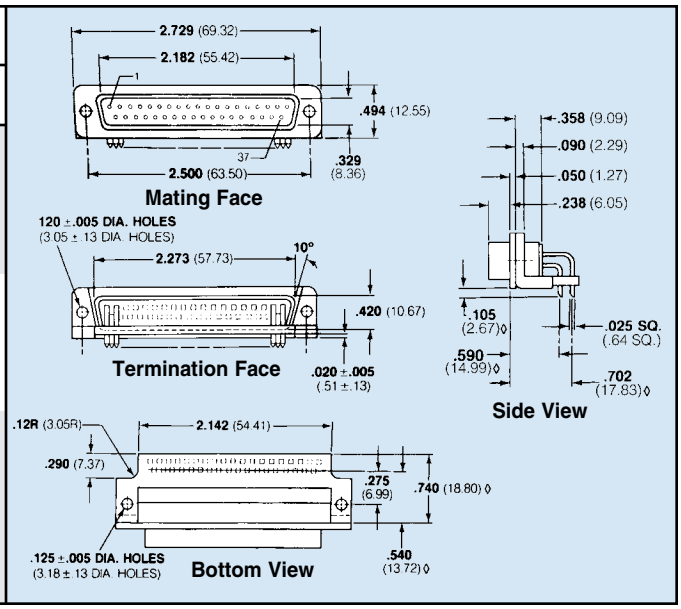
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

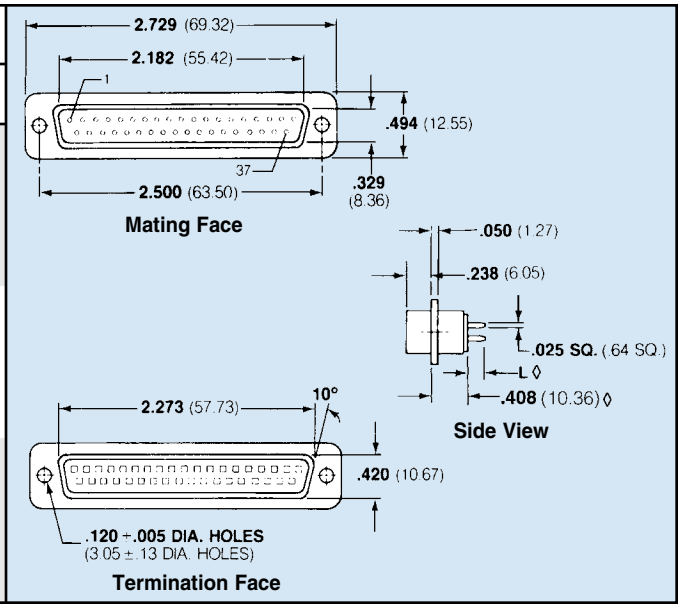
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

37 Shell Size Series 700 Pin Contact

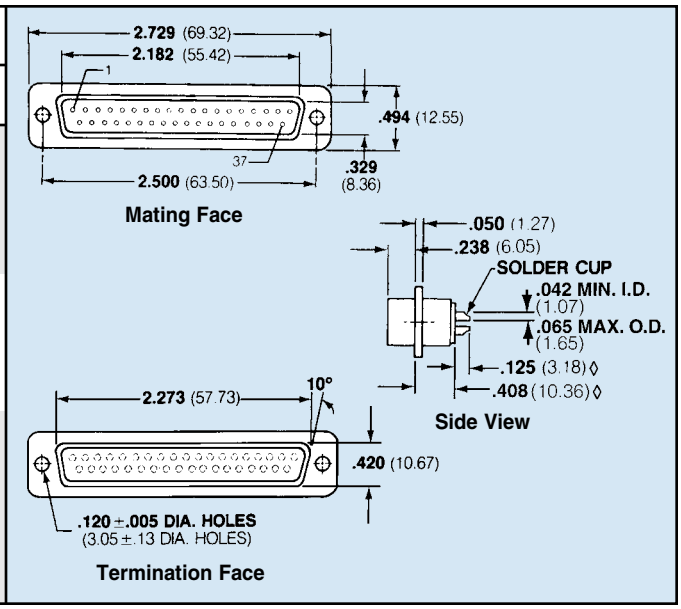
Solderless Wire Wrap

Spectrum Part Number (Select one)				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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

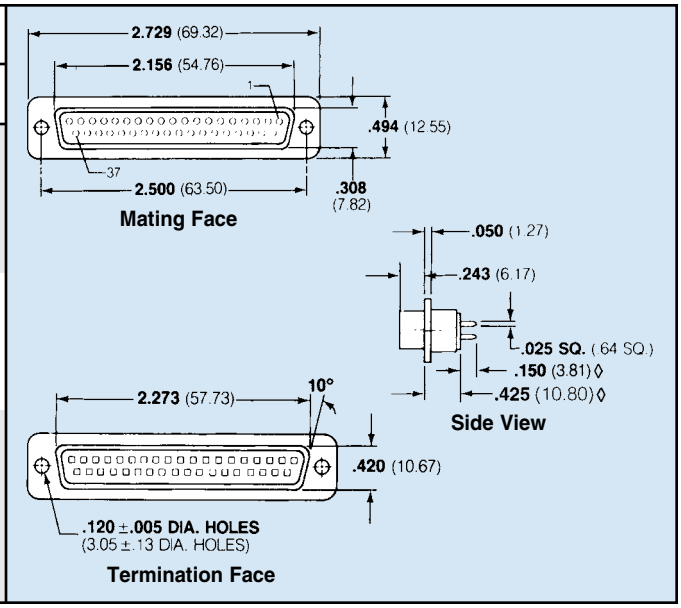
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

37 Shell Size Series 700 Socket Contact

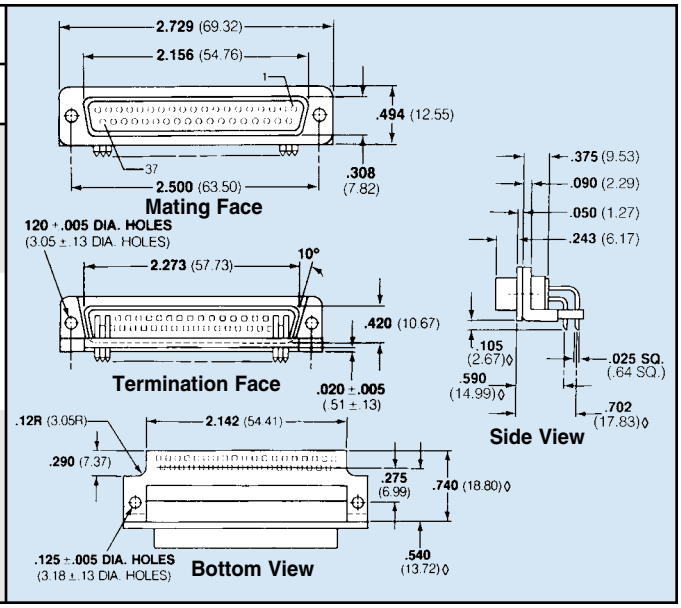
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

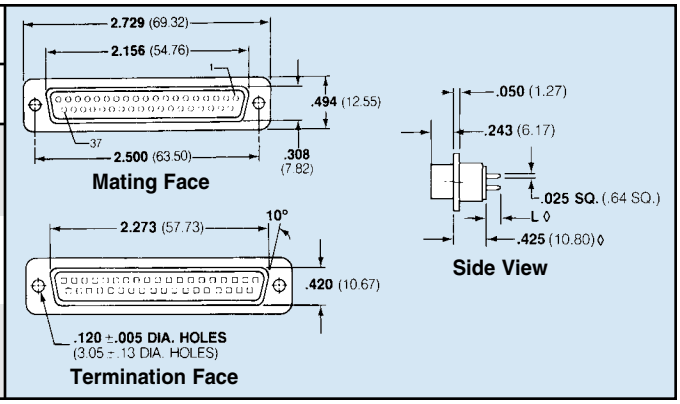
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

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

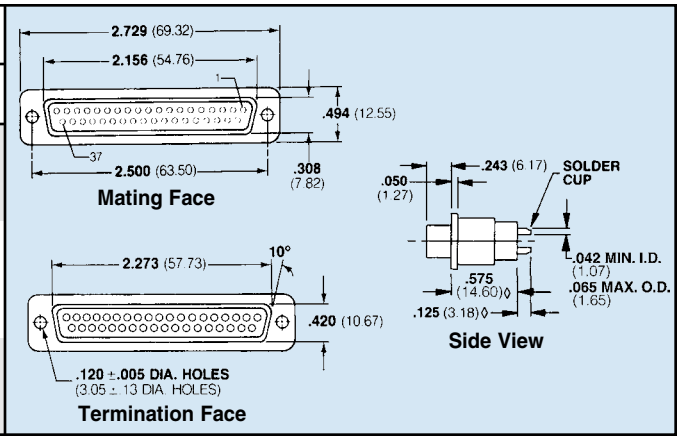
Solderless Wire Wrap

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



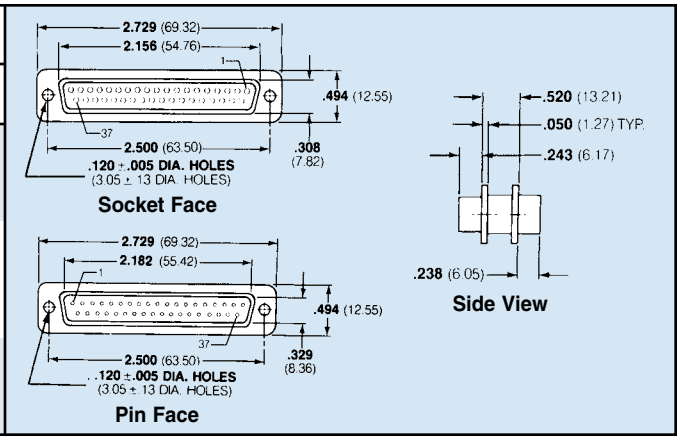
Solder Cup Termination

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 API's authorized European distributors/agents.**
* **May be available from distributor stock.**
** **See page FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

Dimensions in inches *(mm)*

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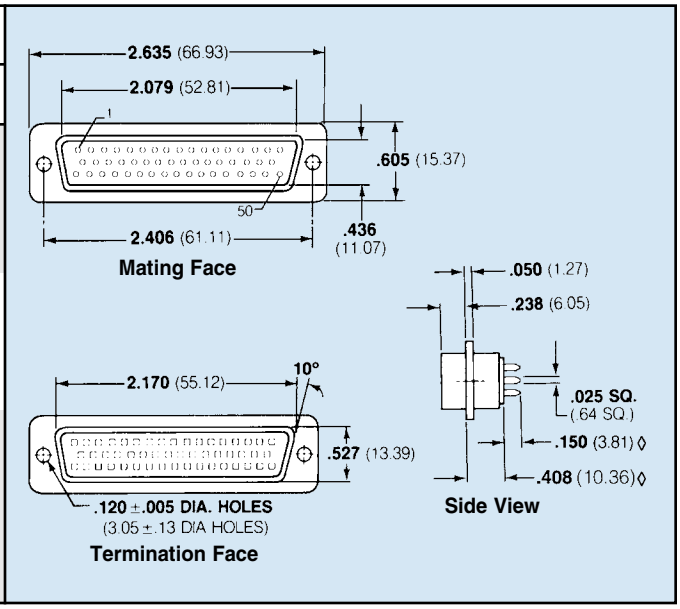
api technologies corp.
Spectrum Control

50 Shell Size Series 700 Pin Contact

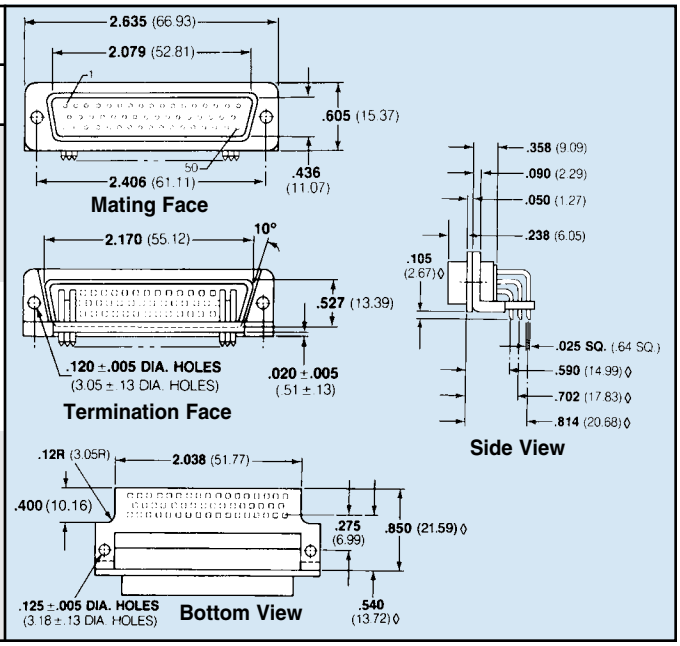
Printed Circuit Board Mount

Spectrum Part Number	EMI Filter	
	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	
	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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

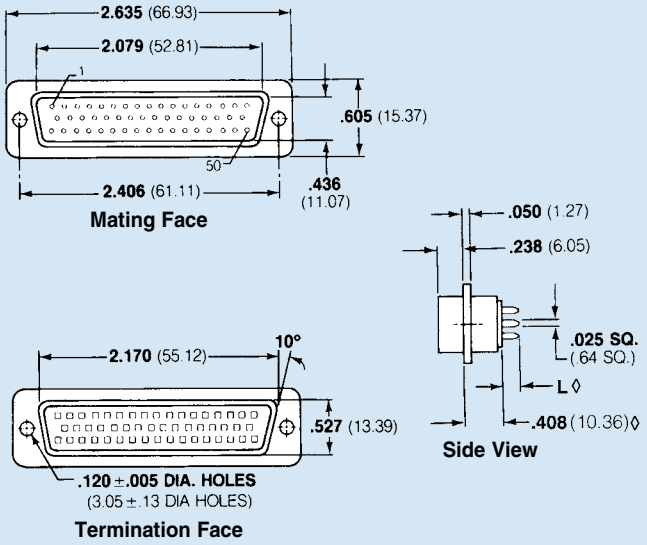
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

50 Shell Size Series 700 Pin Contact

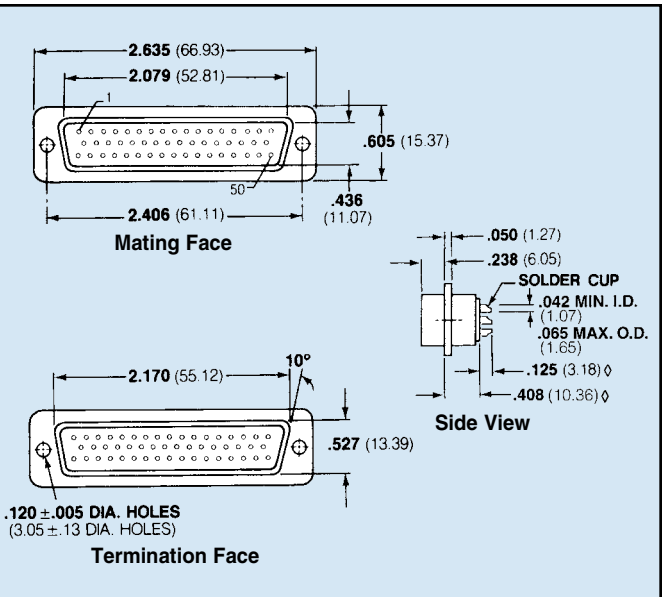
Solderless Wire Wrap

Spectrum Part Number (Select one)				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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

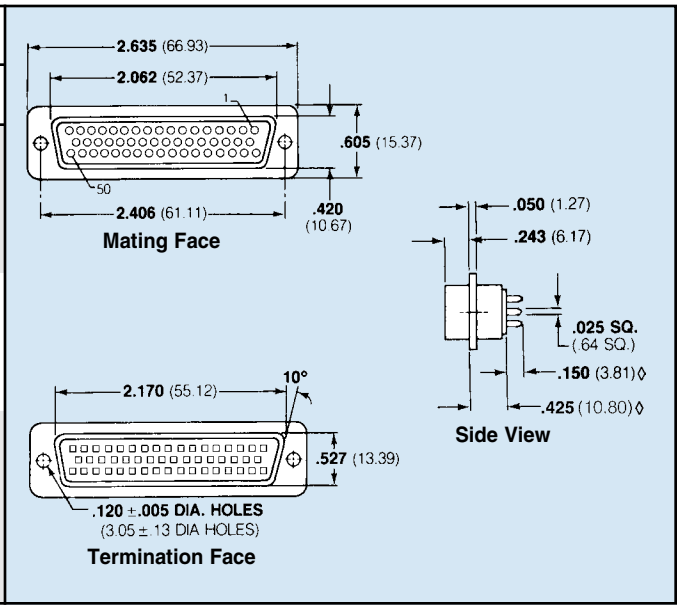
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

50 Shell Size Series 700 Socket Contact

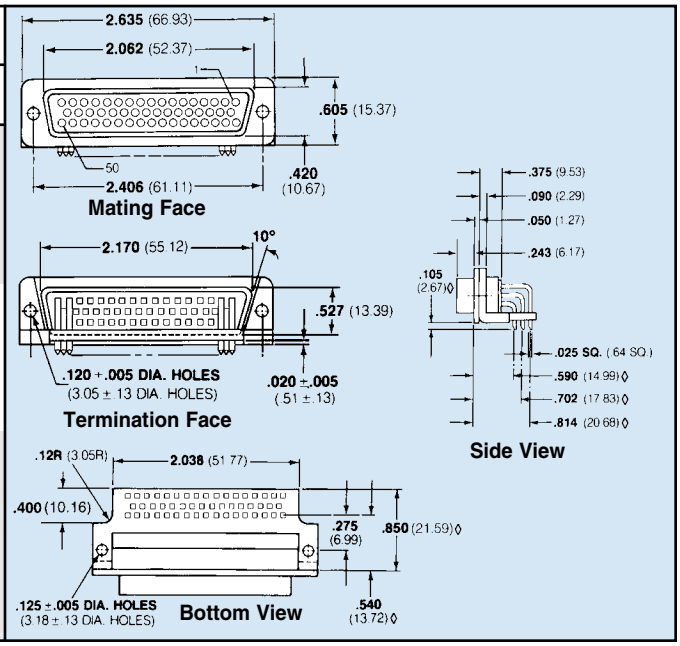
Printed Circuit Board Mount

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

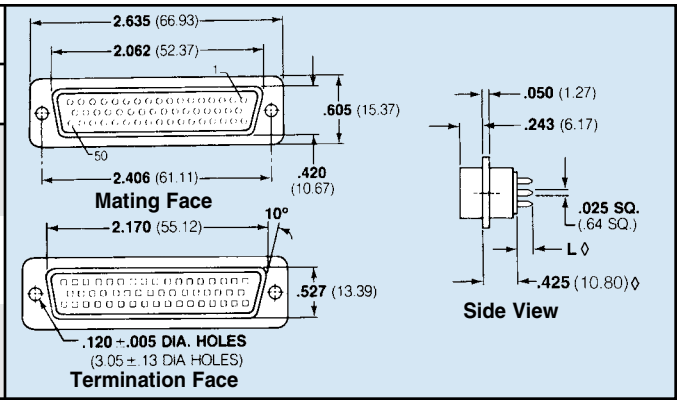
Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

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

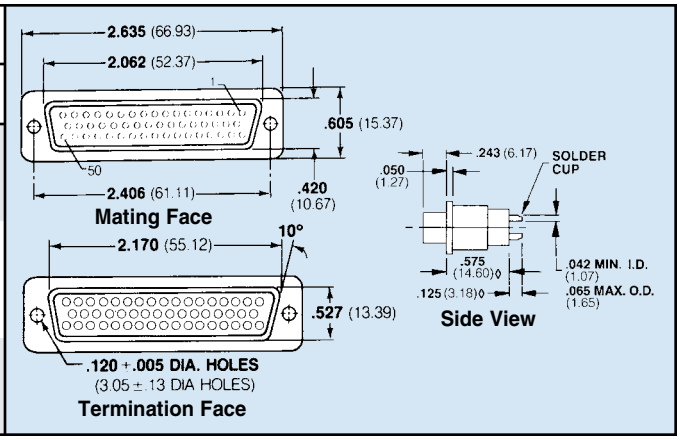
Solderless Wire Wrap

Spectrum Part Number (Select one)				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



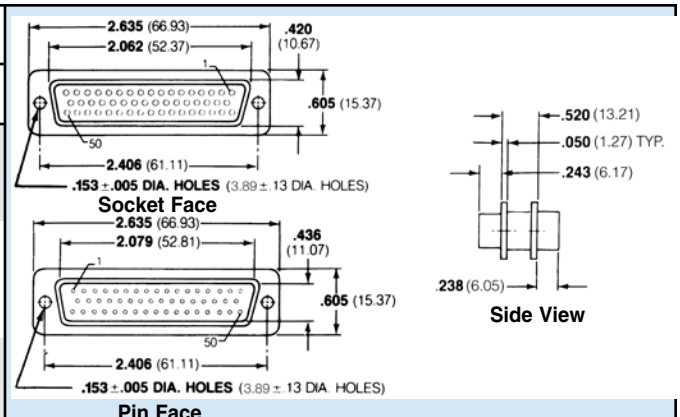
Solder Cup Termination

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 FC20 for filter performance.**
Standard Tolerance = ±.005 except where noted, ◊ = ±.015

Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

D-Subminiature Part Numbering System

Ordering Information

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

56 - 5 1 3 - 0 12 - TI

Filtered D-Subminiature Connectors

- Standard connector
F - RoHS compliant version

Product Series

4 = **Series F Ferrite**
5 = **Series 500 Low Profile**
6 = **Series 600 Hi-Density**
7 = **Series 700 High Performance**

Shell Size

Series 400 & Series 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

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 500 only 2, 3, 4 & 7
Series 600 only 1, 2, 3, 4, 5
Series 700 1 thru 7

Note: 1 can be Pin to solder cup or Pin to PCB for Series 700. See charts pages FC22-FC41.

Line Filtering

0 = All positions same
9 = Special loading (Series 600 only)

Capacitance Value

Series 400
01 = Always

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 FC20 and select part numbers from Series 700 charts pages FC22-FC41.

Options

See options descriptions on page FC43 add suffix ending

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 PCB mount) (1.57mm)
GBL9 = for .093" boards (straight PCB mount (2.36mm)
50G = 50 µ *(1.27 µm)* gold plating
S = Solder dipped tails
JS = Jackscrew mounting

For option combinations, consult factory.

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.*

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Spectrum Control

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

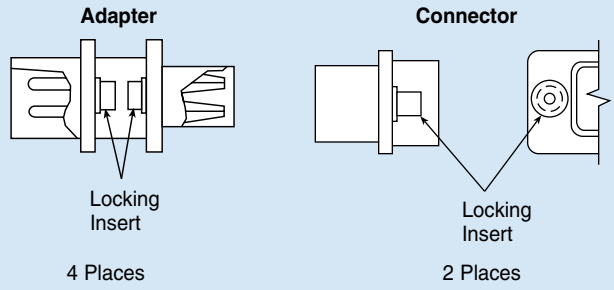
- Solder dipped tails added to standard gold flash

Water Block

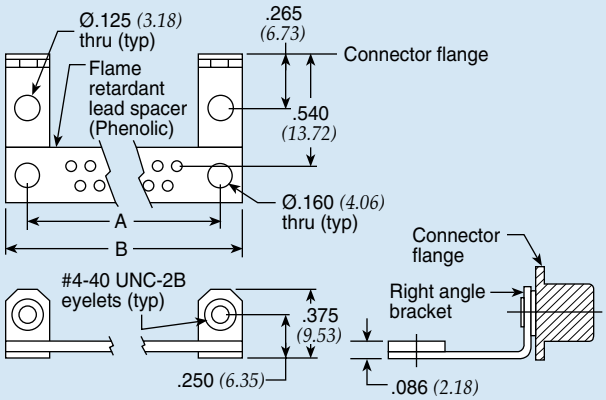
Consult API engineers for specifics.

- 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

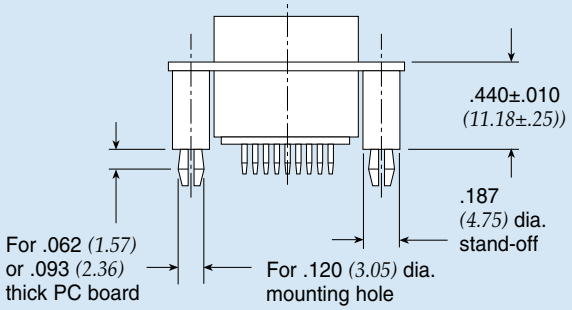


Grounding Brackets

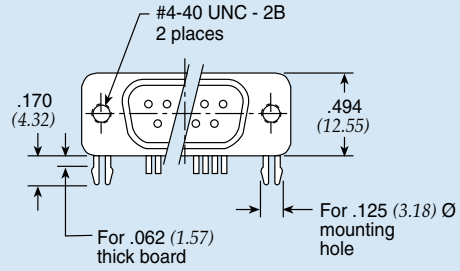


Size	A		B	
9	.984	(24.99)	1.214	(30.84)
15	1.312	(33.32)	1.542	(39.17)
25	1.852	(47.04)	2.088	(53.04)
37	2.500	(63.50)	2.730	(69.34)

Stand-off with Board Lock



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



Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

Filtered Combo D-Subminiature Connectors

API's Spectrum Control line of filtered combo D-subs 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 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

Mechanical Specifications

Shell	Steel, tin plated
Power Contacts	Brass, gold plated .000030 in. *(0.762 µm)* minimum
Signal Contacts	Pin: brass, gold plated .000015 in. *(0.762 µm)* min. Socket: copper alloy, gold plated .000030 in. *(0.762 µm)* min.
Insulator	Glass-filled polyester, flammability UL94V-0
Operating Temperature	-55°C to +125°C
Capacitors	MLCC

Electrical Specifications

Operating Voltage	200 VDC
*Current Rating**	40 Amp power/ 5 Amp signal
Insulation Resistance	1 Gohm at 100 VDC
Capacitance	See below for MLCC values. For other capacitance values contact factory.
Dielectric Withstanding Voltage	600 VDC

***30 Amp available. Consult factory.**

Ordering Information

Example: **563A03W3101GBL9**

56 * **3** [ ] [ ] [ ] [ ]

A: Pin - PCB Power
B: Pin - Right Angle Power
C: Pin - Solder Cup Power
G: Socket - PCB Power
H: Socket - Right Angle Power
J: Socket - Solder Cup Power
N: Custom Combination

* Insert "F" for RoHS compliant

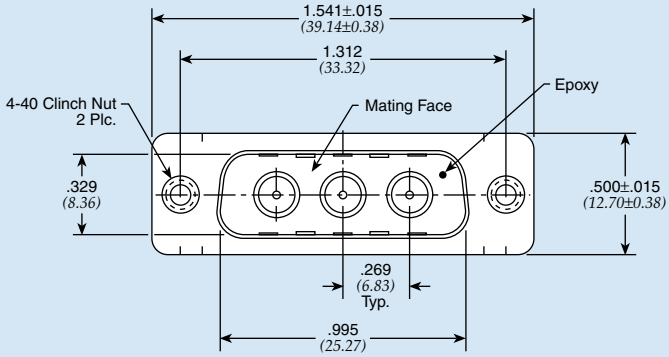
Contact Arrangement
03W3 = 3W3
05W5 = 5W5
09W4 = 9W4
24W7 = 24W7

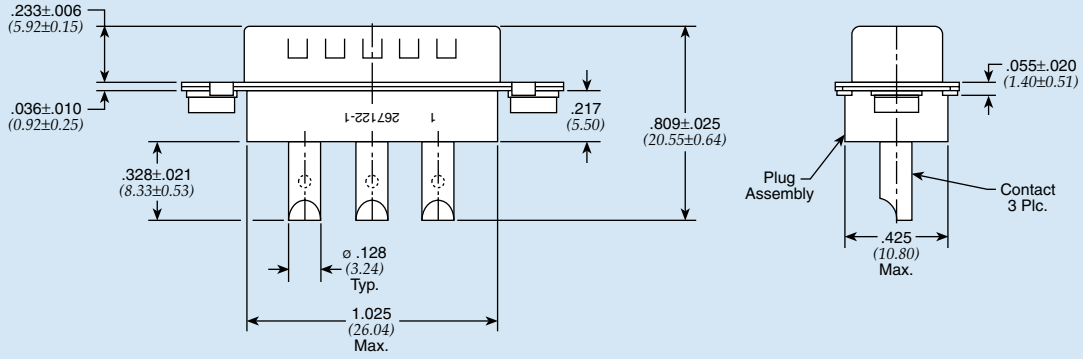
Capacitance Value
MLCC
201 = 470 pF
202 = 820 pF
203 = 1000 pF
204 = 1500 pF

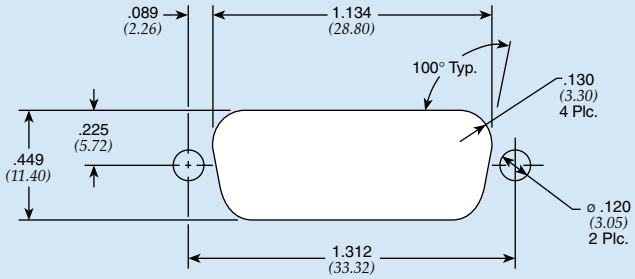
Options
See options descriptions on page FC43 add suffix ending
LI = 4-40 UNC inserts
LIM = Metric M3.0 self-locking threads
GB = Metal bracket provides ground connection, includes 4-40 self-locking threads (for right angle mount only)
GBL = Grounded board lock (right angle)
GBL6 = for .062" boards (straight PCB mount)
GBL9 = for .093" boards (straight PCB mount
50G = 50 µ *(1.27 µm)* gold plating
S = Solder dipped tails
JS = Jackscrew mounting
For option combinations, consult factory.

Filtered Combo D-Subminiature Connectors
3W3

Plug - Solder Cup







Recommended Panel Cutout

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

Dimensions in inches *(mm)*

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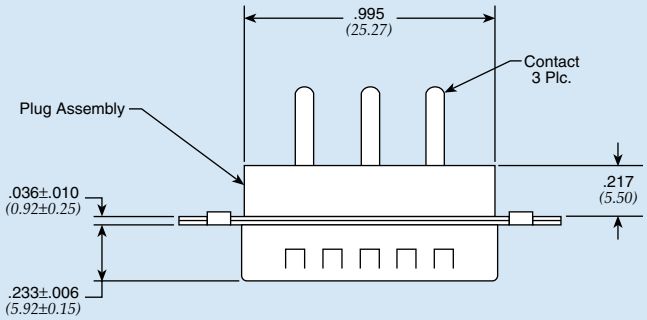
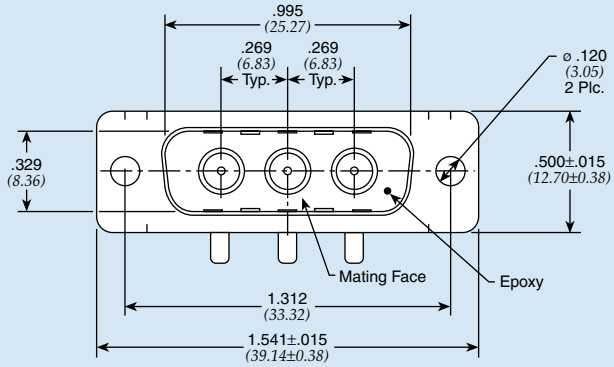
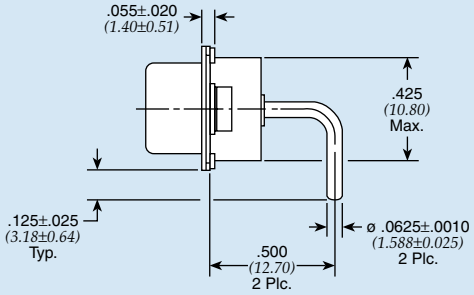
Spectrum Control

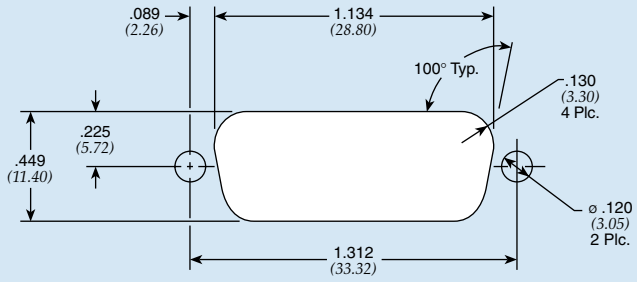
Filtered Combo D-Subminiature Connectors
3W3

Plug - Right Angle

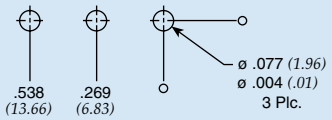








Recommended Panel Cutout

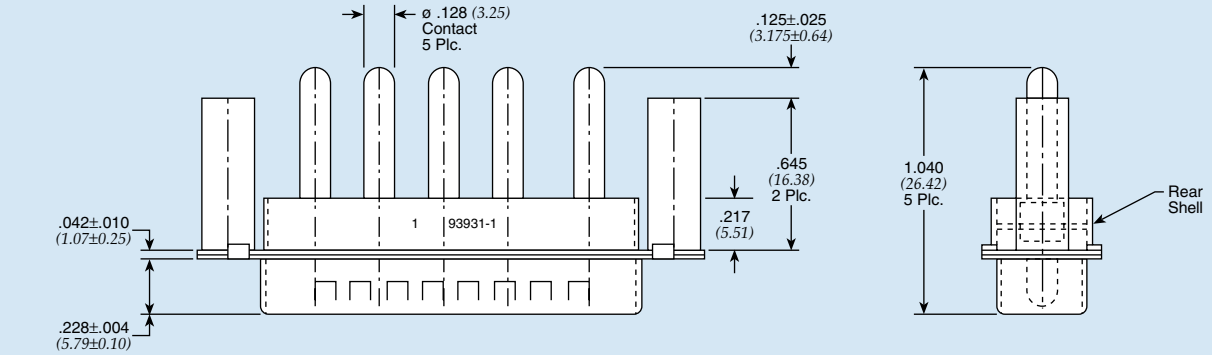


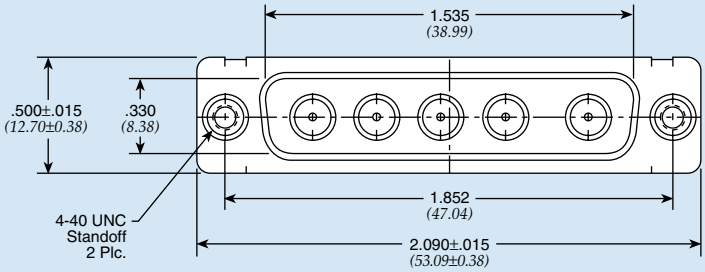
Only represents a few of our available configurations. Consult factory for more information.

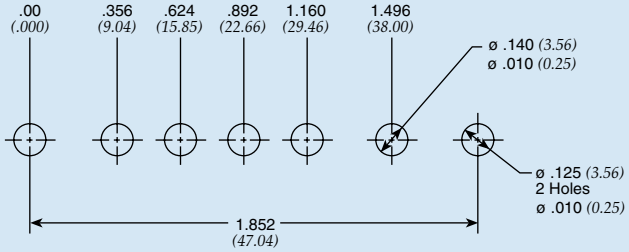
Dimensions in inches *(mm)*

Filtered Combo D-Subminiature Connectors
5W5

Plug - Vertical







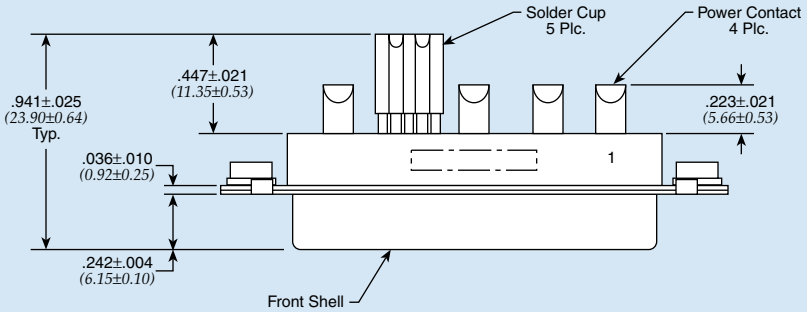
Recommended PCB Layout

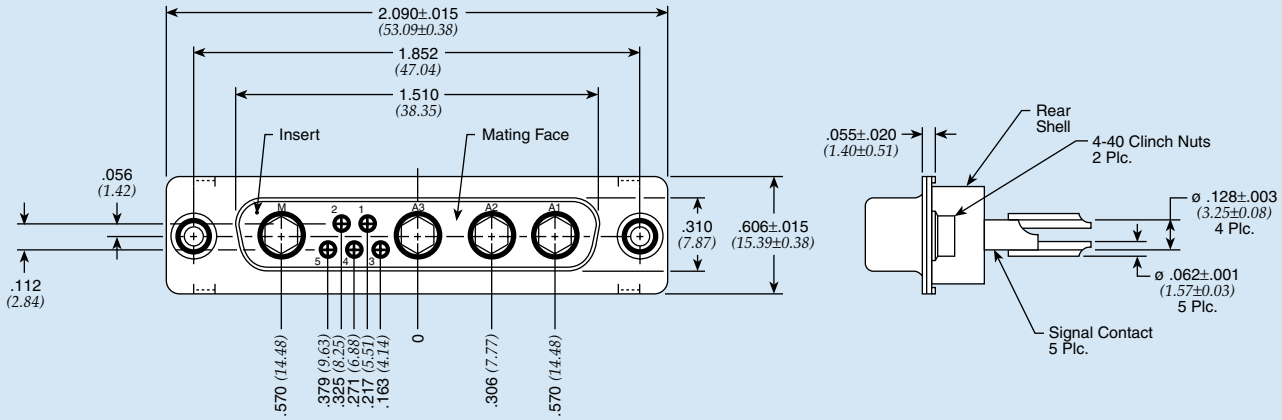
Only represents a few of our available configurations. Consult factory for more information.

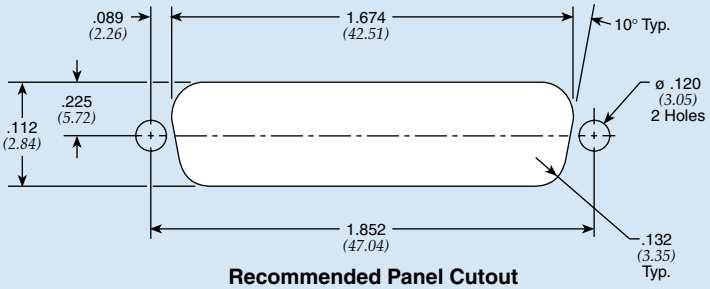
Dimensions in inches *(mm)*

Filtered Combo D-Subminiature Connectors
9W4

Socket - Solder Cup







Recommended Panel Cutout

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

Dimensions in inches *(mm)*

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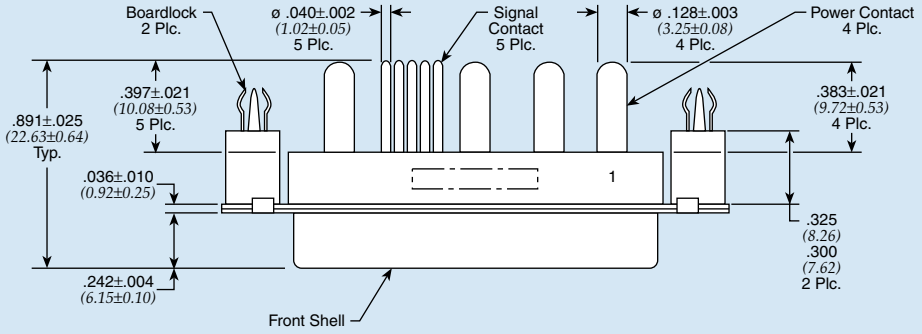
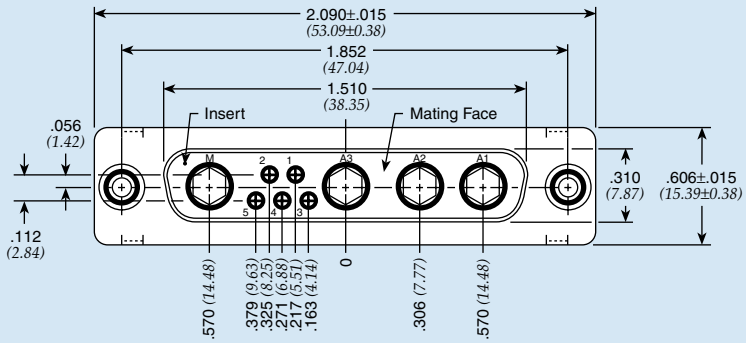
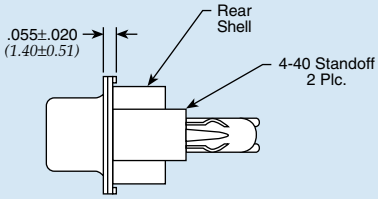
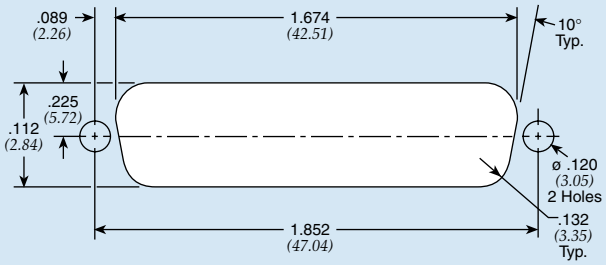
Filtered Combo D-Subminiature Connectors
9W4

Socket - Vertical

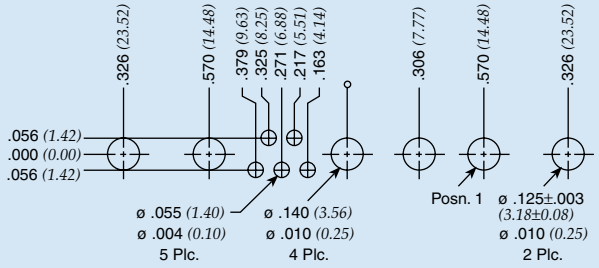








Recommended Panel Cutout



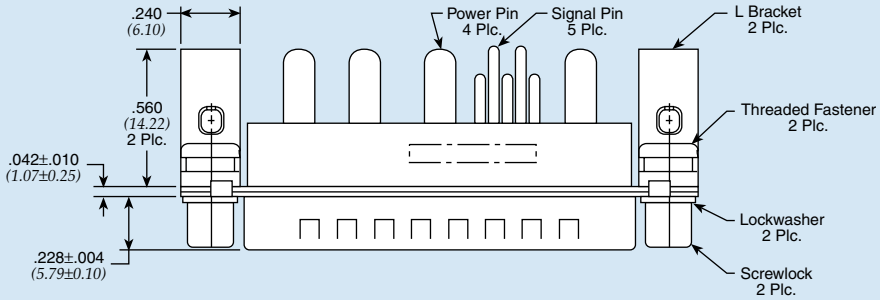
Recommended PC Board Mounting Dimensions

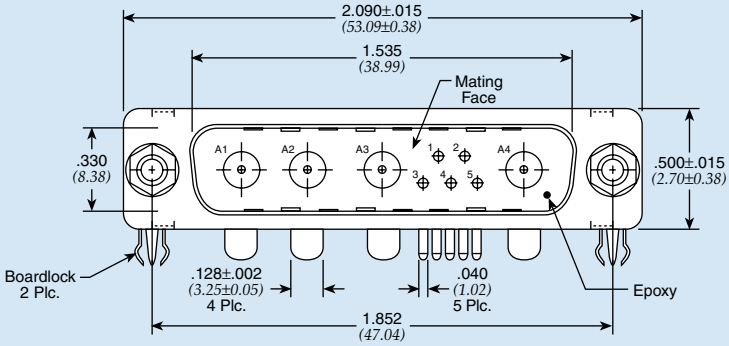
Only represents a few of our available configurations. Consult factory for more information.

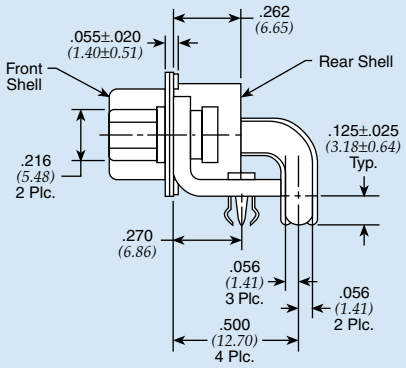
Dimensions in inches *(mm)*

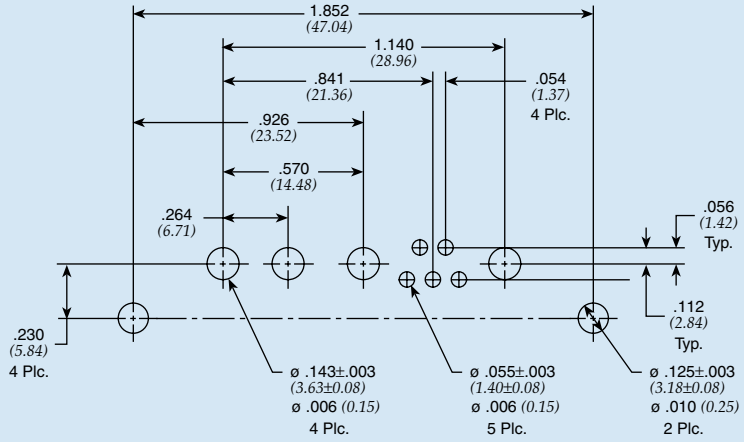
Filtered Combo D-Subminiature Connectors
9W4

Plug - Right Angle









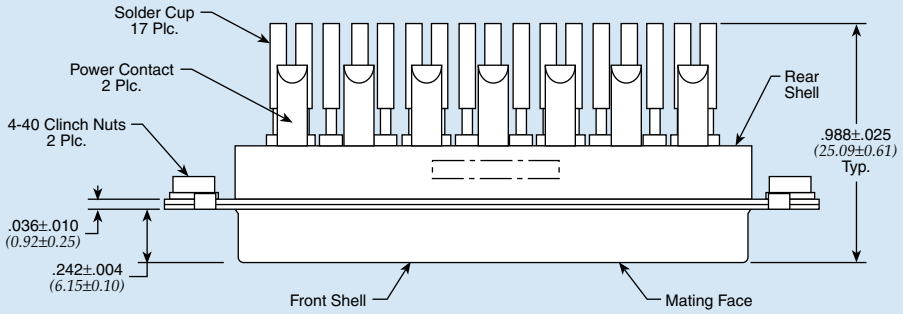
Recommended PC Board Mounting Dimensions

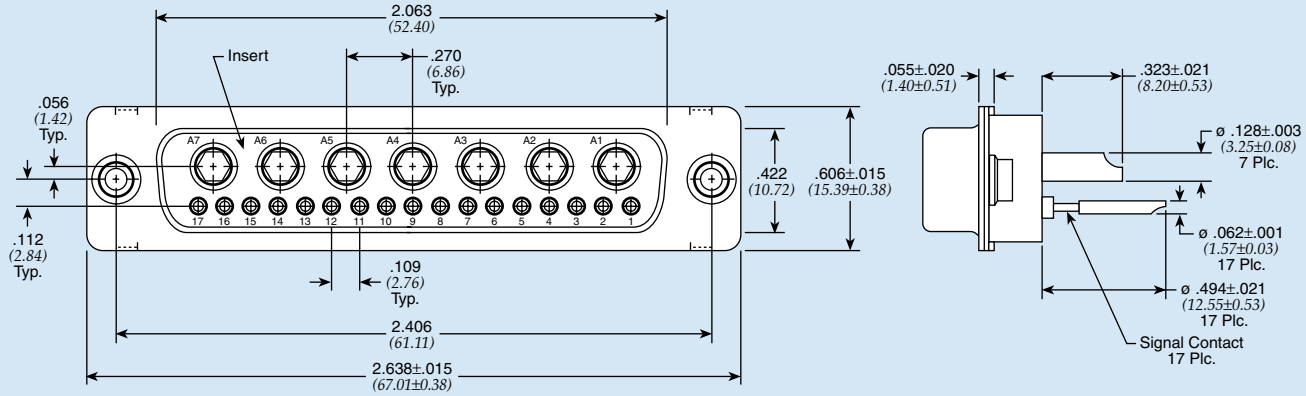
Only represents a few of our available configurations. Consult factory for more information.

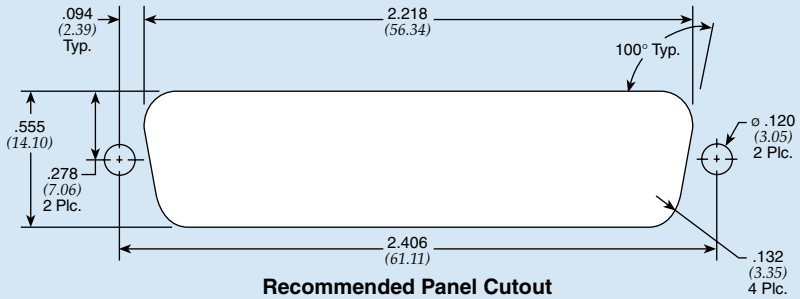
Dimensions in inches *(mm)*

Filtered Combo D-Subminiature Connectors
24W7

Socket - Solder Cup







Recommended Panel Cutout

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

Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

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

    - 310 pF Pi
    - 830 pF FT
    - 1000 pF Pi
    - 4000 pF Pi

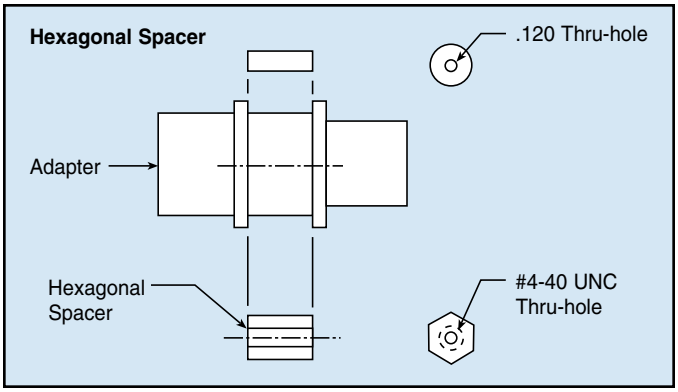
Adapter Test Kit

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

Ordering Information

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

api technologies corp.
Spectrum Control

Micro D Series
Filtered Connectors

For designs that require even smaller connector packages, API's Spectrum Control brand has designed a line of filtered Micro D-Subminiature connectors. This line of connectors offers a range of reliable filtering options, including capacitive and ESD versions, and several sizes and termination options. API has a Micro D-sub connector 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

Mechanical Specifications

Shell . . . . . Aluminum, electroless nickel plated 500 µ in (12.7 µm) minimum

Insulator . . . . . High temperature plastic, flammability UL94V-0

Contacts . . . . . Copper alloy, gold plated 50 µ in (1.27 µm) minimum

Potting . . . . . Flammability UL94V-0

Interfacial Seal . . . . . Silicon

Electrical Specifications

Operating Voltage . . . . . 100 VDC

Dielectric Withstanding Voltage . . . 300 VDC

Current Rating . . . . . 3 Amps

Insulation Resistance . . . 5G ohms @ 100 VDC

Ordering Information

Example: **56-F011-110-JP**

This part number represents a micro D-sub connector with a shell size of 15 and a pin to solder cup configuration. All lines are filtered with same capacitance value, which is 100 pF COB. The connector includes an optional #2-56 jack post.

56 **F** **0** **1** **1** - **1** **10** - **JP**

56 — **Filtered Connectors**

F — **RoHS Compliant**

0 — **Micro D**

1 — **Shell Size/ Number of Contacts**
- **0 -** 9 contacts
- **1 -** 15 contacts
- **2 -** 21 contacts
- **3 -** 25 contacts
- **4 -** 31 contacts
- **5 -** 37 contacts

1 — **Contact Type/Termination**
- **1 -** Pin to solder cup
- **2 -** Pin to right angle*
- **3 -** Socket to PC tail*
- **4 -** Socket to right angle*
- **6 -** Socket to solder cup
- **7 -** Pin to PC tail*
- **8 -** Pin to pigtail
- **9 -** Socket to pigtail

1 — **Line Filtering**
- **1 -** All positions same
- **2 -** Select load

10 — **Capacitance Value/ Type**

High Performance
- **01 -** 100 pF FT
- **02 -** 470 pF FT
- **03 -** 820 pF FT
- **04 -** 1500 pF FT
- **05 -** 4700 pF FT

Standard Performance
- **10 -** 100 pF COB
- **11 -** 470 pF COB
- **12 -** 820 pF COB
- **13 -** 1500 pF COB
- **14 -** 4700 pF COB

JP — **Options**
- **JP -** #2-56 jack post
- **JS -** #2-56 jackscrew
- **TI -** Threaded insert
- **JT -** Jack post and threaded insert
- **GB -** Grounding Bracket

** Right angle and PC tail length is 0.109. Other lengths available, consult factory.*

All capacitance values ±20% @ 25°C

api technologies corp.
Spectrum Control

Micro D Series Filtered Connectors

High Performance

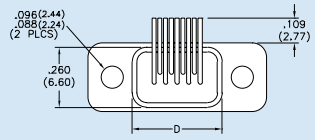
Filter Designation	Type	Capacitance		Dielectric Withstanding Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB) 50 ohm system per MIL-STD-220 (no load)							
		Value	Tolerance			5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz
01	FT	100 pF	±20%	300V	100V	—	—	—	—	1	6	14	20
02	FT	470 pF	±20%	300V	100V	—	—	2	8	14	20	28	34
03	FT	820 pF	±20%	300V	100V	—	2	6	13	19	25	33	39
04	FT	1500 pF	±20%	300V	100V	—	5	10	18	24	30	38	44
05	FT	4700 pF	±20%	300V	100V	8	14	20	28	34	40	48	54

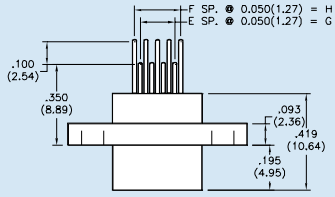
Standard Performance

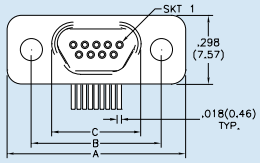
Filter Designation	Type	Capacitance		Dielectric Withstanding Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB) 50 ohm system per MIL-STD-220 (no load)							
		Value	Tolerance			5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz
10	COB	100 pF	±20%	300V	100V	—	—	—	—	1	6	14	20
11	COB	470 pF	±20%	300V	100V	—	—	2	8	14	20	28	32
12	COB	820 pF	±20%	300V	100V	—	2	6	13	19	25	32	32
13	COB	1500 pF	±20%	300V	100V	—	5	10	18	24	30	32	32
14	COB	4700 pF	±20%	300V	100V	8	14	20	28	32	32	32	32

Right Angle PCB

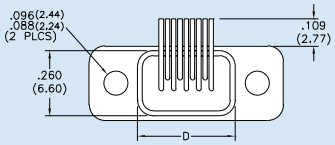
Receptacle

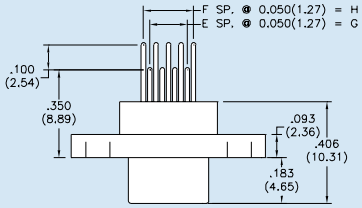


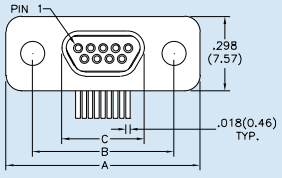




Plug







Size	A	B	C (RCPT)	C (Plug)	D	E	F	G	H
9	.775 *(19.69)*	.565 *(14.35)*	.388 *(9.86)*	.330 *(8.38)*	.390 *(9.91)*	4	5	.200 *(5.08)*	.250 *(6.35)*
15	.925 *(23.50)*	.715 *(18.16)*	.538 *(13.67)*	.480 *(12.19)*	.540 *(13.72)*	7	8	.350 *(8.89)*	.400 *(10.16)*
21	1.075 *(27.31)*	.865 *(21.97)*	.688 *(17.48)*	.630 *(16.00)*	.690 *(17.53)*	10	11	.500 *(12.70)*	.550 *(13.97)*
25	1.175 *(29.85)*	.965 *(24.51)*	.788 *(20.02)*	.730 *(18.54)*	.790 *(20.07)*	12	13	.600 *(15.24)*	.650 *(16.51)*
31	1.325 *(33.66)*	1.115 *(28.32)*	.938 *(23.83)*	.880 *(22.35)*	.940 *(23.88)*	15	16	.750 *(19.05)*	.800 *(20.32)*
37	1.475 *(37.47)*	1.265 *(32.13)*	1.088 *(27.64)*	1.030 *(26.16)*	.1.090 *(27.69)*	18	19	.900 *(22.86)*	.950 *(24.13)*

Dimensions in inches *(mm)*

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

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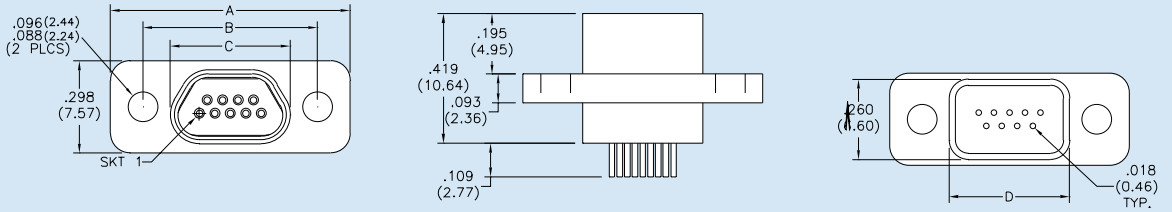
Micro D Series
Filtered Connectors

Size	A	B	C (RCPT)	C (Plug)	D
9	.775 *(19.69)*	.565 *(14.35)*	.388 *(9.86)*	.330 *(8.38)*	.390 *(9.91)*
15	.925 *(23.50)*	.715 *(18.16)*	.538 *(13.67)*	.480 *(12.19)*	.540 *(13.72)*
21	1.075 *(27.31)*	.865 *(21.97)*	.688 *(17.48)*	.630 *(16.00)*	.690 *(17.53)*
25	1.175 *(29.85)*	.965 *(24.51)*	.788 *(20.02)*	.730 *(18.54)*	.790 *(20.07)*
31	1.325 *(33.66)*	1.115 *(28.32)*	.938 *(23.83)*	.880 *(22.35)*	.940 *(23.88)*
37	1.475 *(37.47)*	1.265 *(32.13)*	1.088 *(27.64)*	1.030 *(26.16)*	.1.090 *(27.69)*

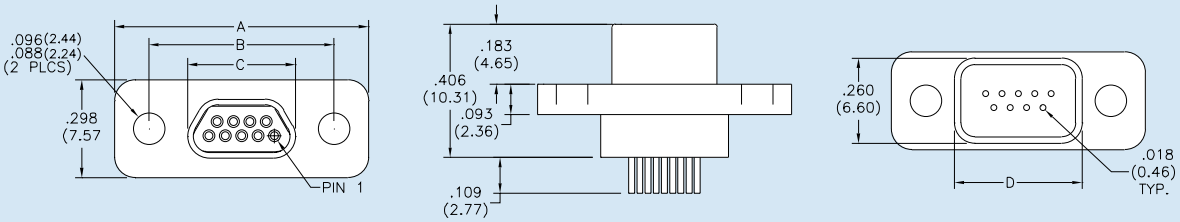
Dimensions in inches *(mm)*

Vertical PCB

Receptacle

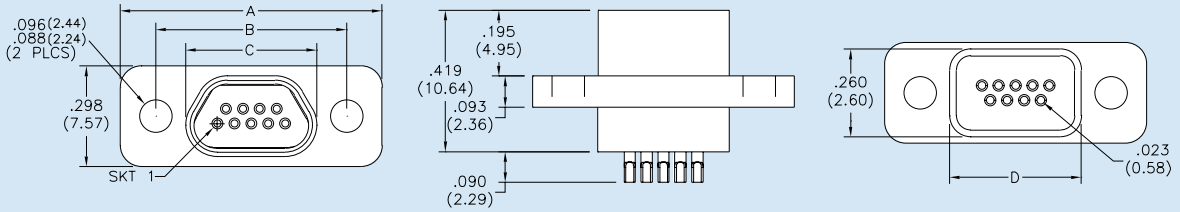


Plug

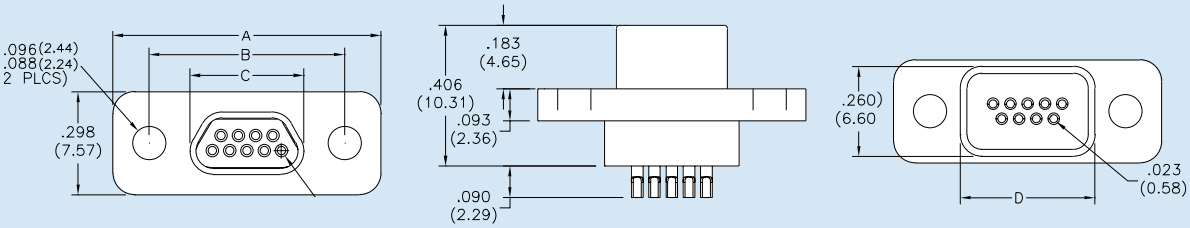


Solder Cup

Receptacle



Plug



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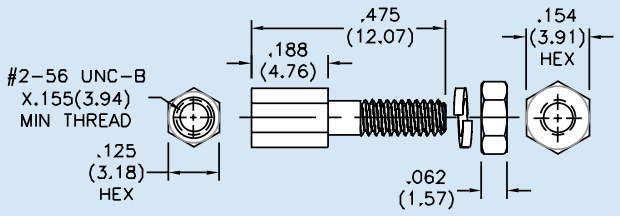
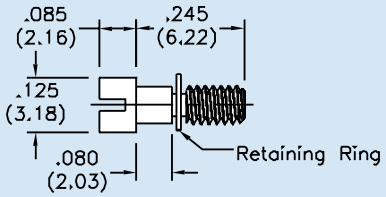
Micro D Series Filtered Connectors
Options

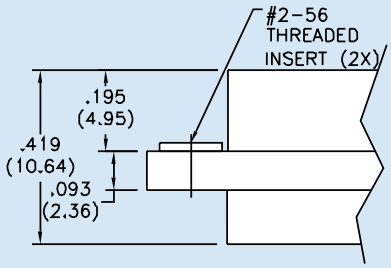
JP - #2-56 Jack Post M83513/05-07



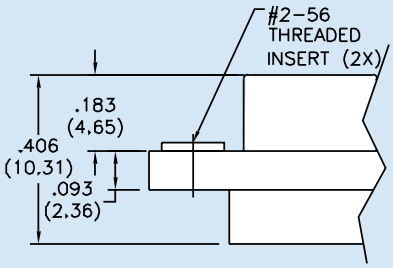
JS - #2-56 Jack Screw M83513/05-05



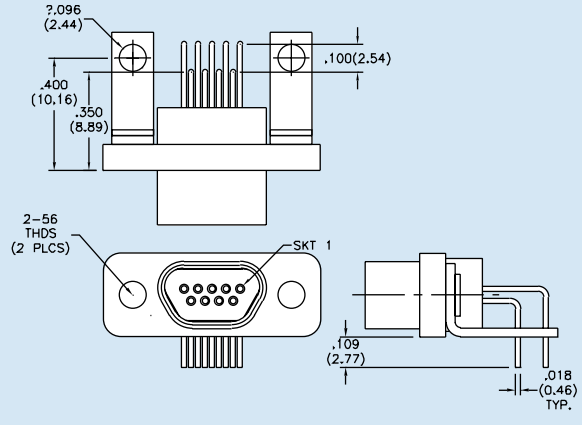
TI - Threaded Insert Receptacle



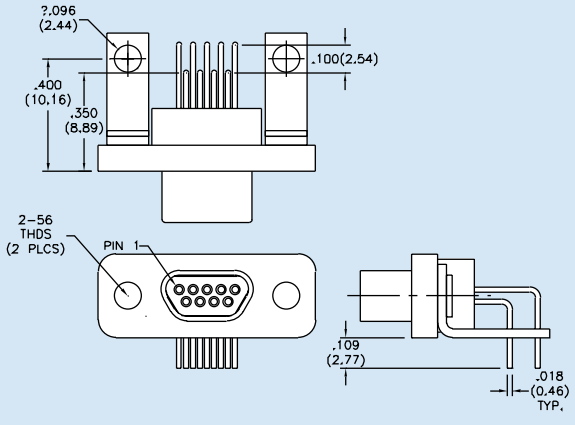
TI - Threaded Insert Plug



GB - Ground Bracket Receptacle



GB - Ground Bracket Plug



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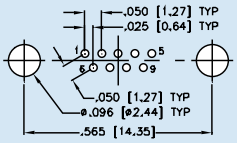
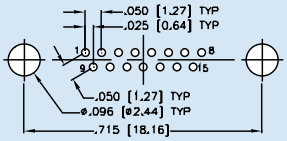
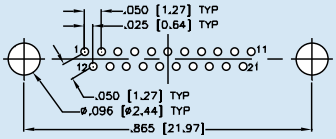
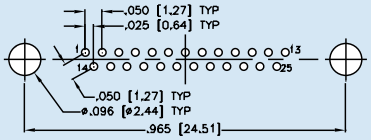
Micro D Series Filtered Connectors
Board and Panel Cutouts

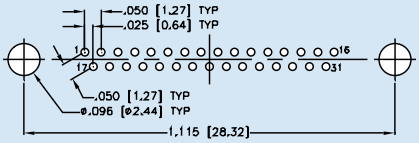
Vertical PCB Layouts
Pin Connector Shown

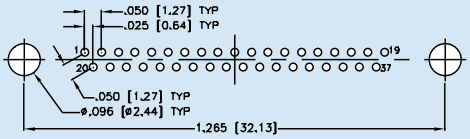
9 Contacts


15 Contacts


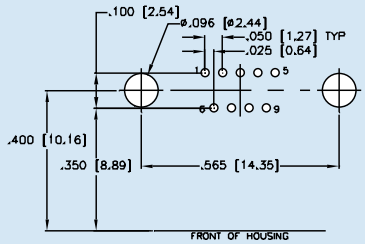
21 Contacts


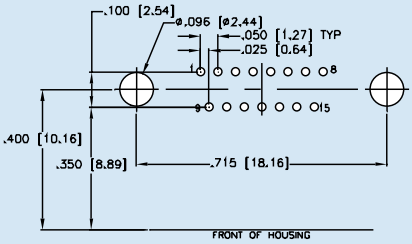
25 Contacts


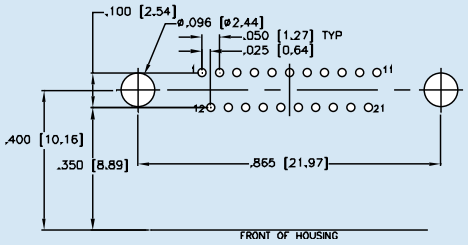
31 Contacts


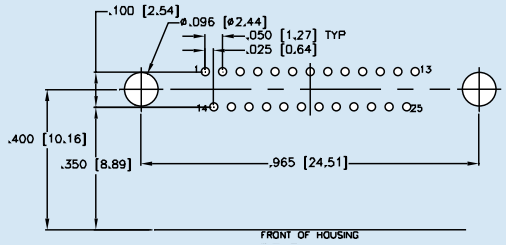
37 Contacts


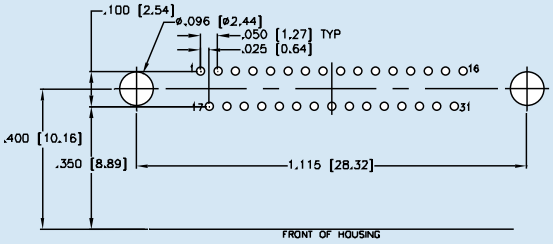
Right Angle PCB Layouts
Pin Connector Shown

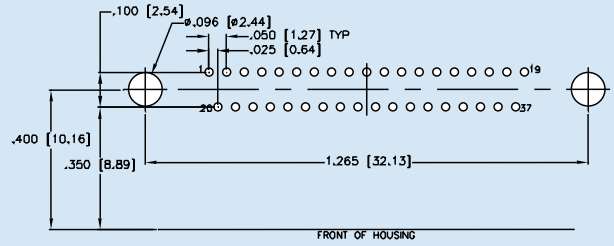
9 Contacts


15 Contacts


21 Contacts


25 Contacts


31 Contacts


37 Contacts


Notes: PC Tail Diameter 0.018 ±0.002 (0.46 ±0.05) Contact numbers shown are pin connector.
Reverse for socket. Patterns shown are for connector mounting side of PC board.

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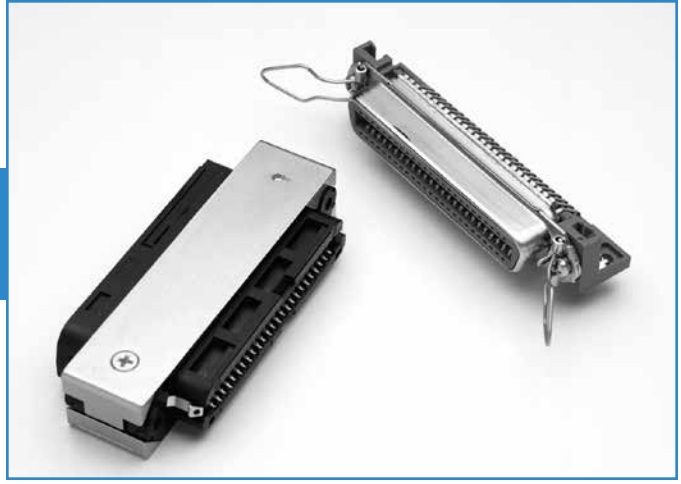
Filtered Miniature Ribbon Connectors



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

Mechanical Specifications - Adapter

Shell . . . . . Zinc

Thermoplastic Insert . . . . . Black, high strength

Contacts . . . . . Copper alloy

Contact Plating . . . . . 30uin (.76um) (min.) gold over nickel

Mechanical Specifications - Connector

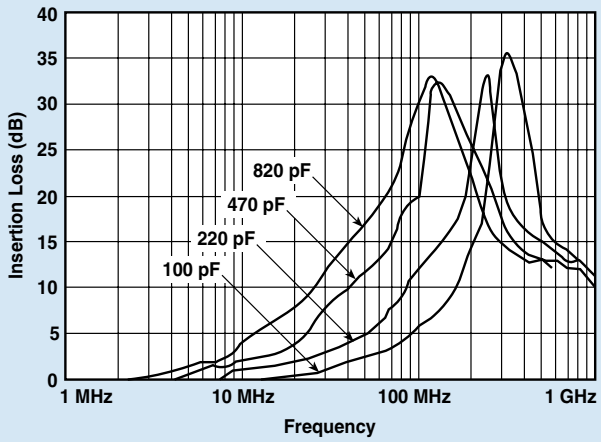
Shell . . . . . Steel, tin plated

Thermoplastic Insert . . . . . Blue, 30% glass filled

Contacts . . . . . Phosphor bronze

Contact Plating . . . . . Gold flash (<10 µ in) over nickel

Typical Insertion Loss



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)

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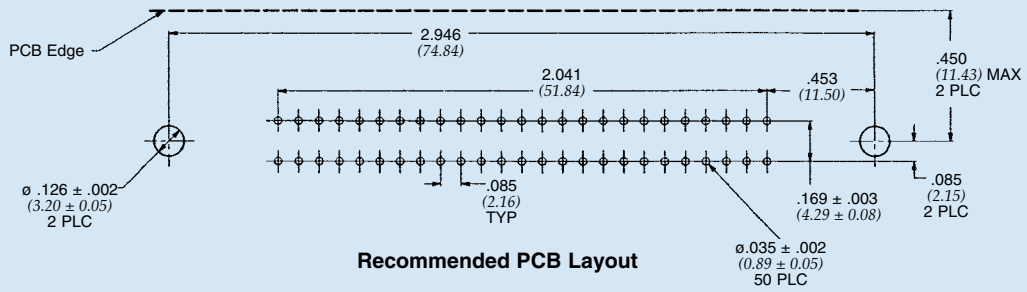
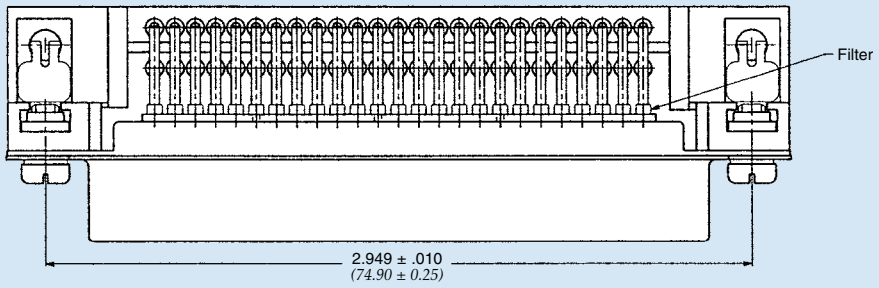
Filtered Miniature Ribbon Connectors
50 Position

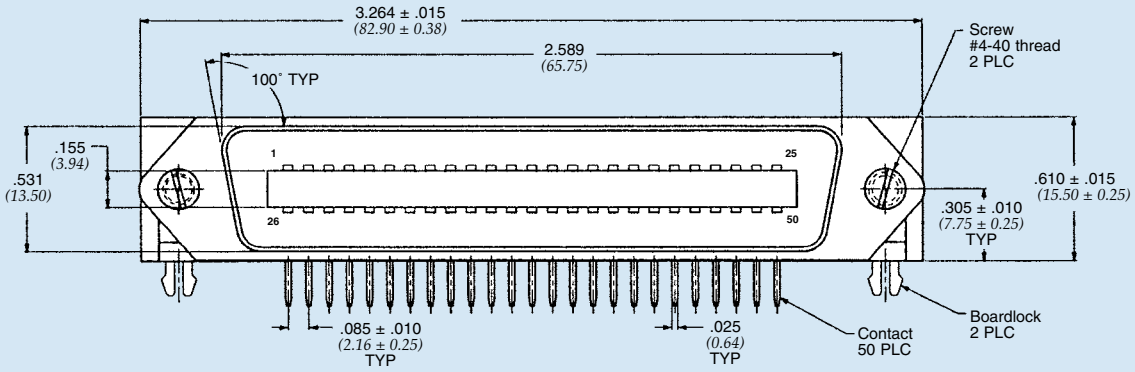
Pin Contact *(plug)*



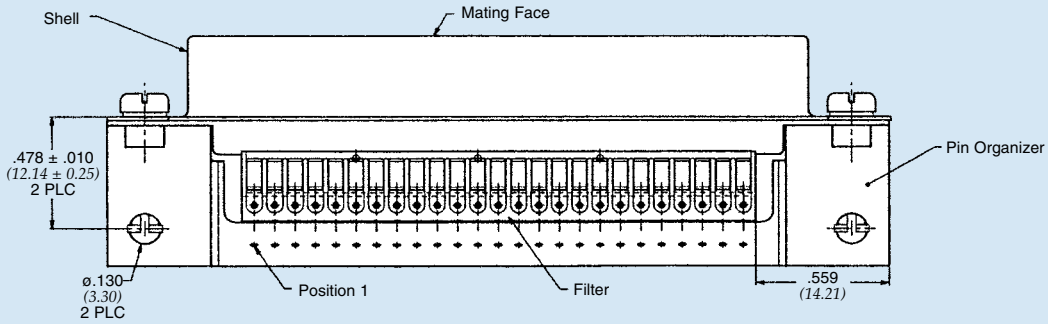
Recommended PCB Layout

Top





Bottom



Dimensions in inches *(mm)*

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

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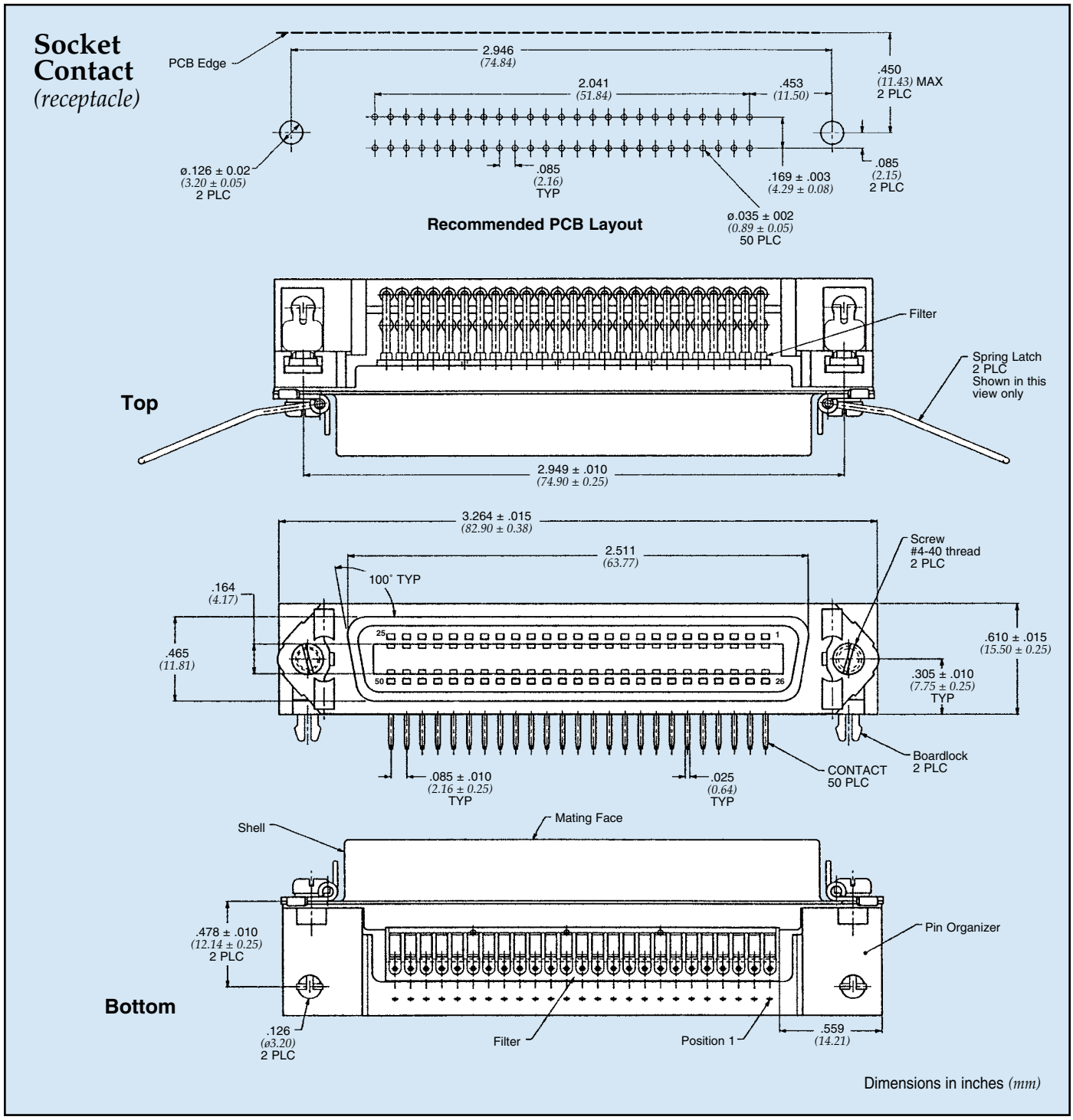
Filtered Miniature Ribbon Connectors
50 Position



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

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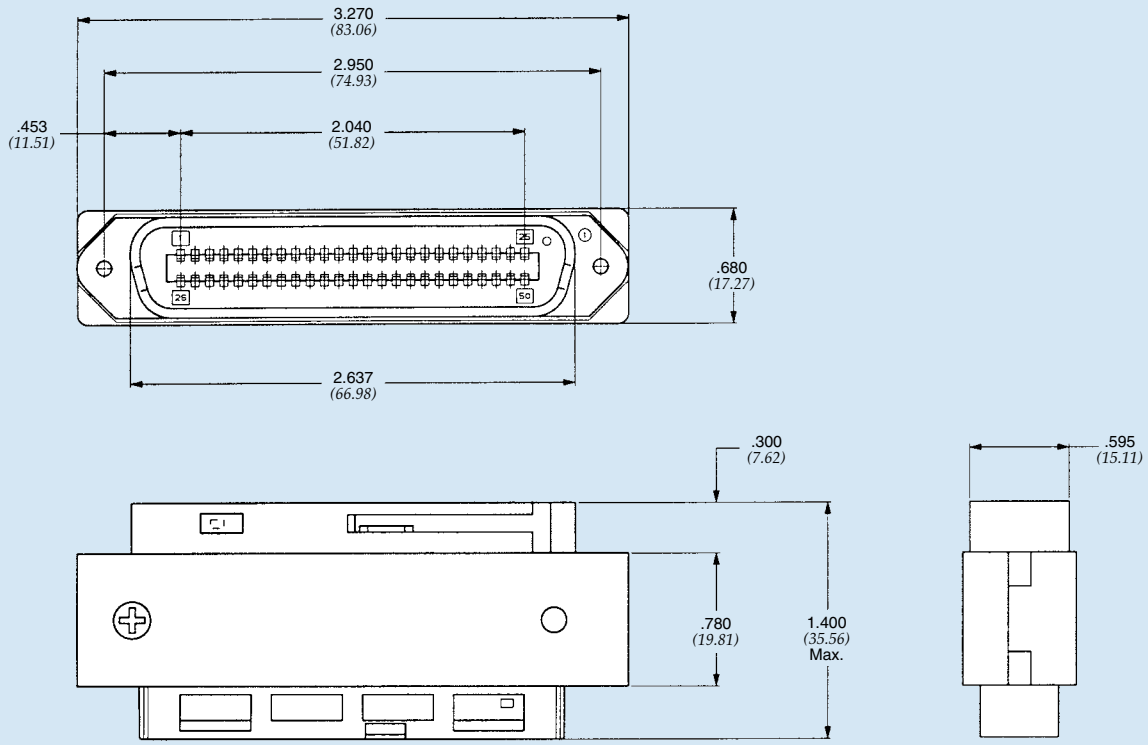
Filtered Miniature Ribbon Connectors
50 Position

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.

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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.

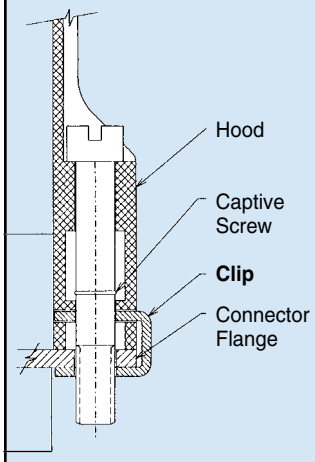
Since most filter connectors are larger than standard connectors, there had been a problem fitting most commercially available hoods. Spectrum Control solves this problem. Our hoods are molded of thin wall plastic, providing extra internal space to accommodate larger filter connectors. The hood is constructed 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-subs, most other filtered D-subs, and most standard D-subs.
- **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.

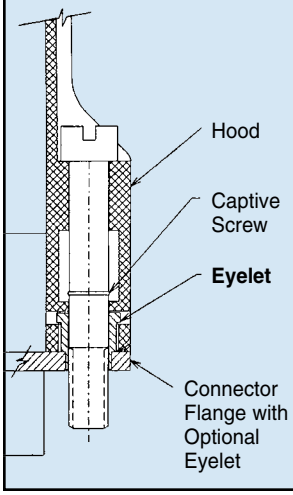
#2560-9000-XX

Retention Clip Version
(For use with most connectors)



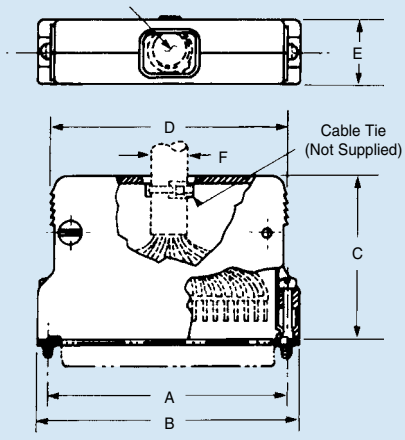
#2560-9001-XX

"Eyelet"
(For use with "Eyelet" connectors)



Ordering Information and Dimensions

Part Number	Con-nector 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)*

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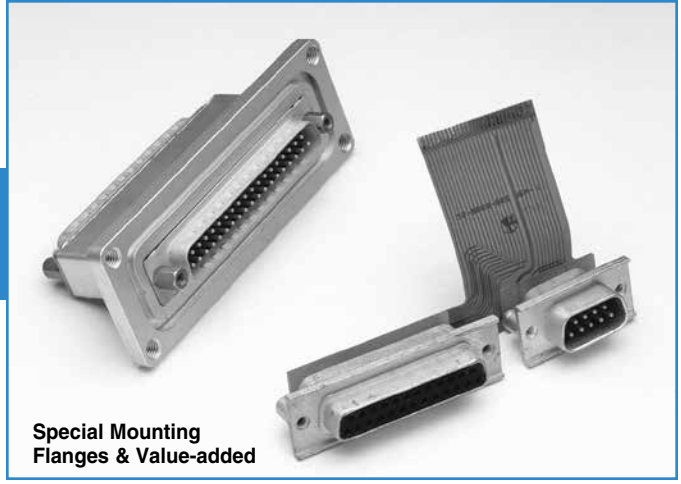
Custom Engineered Solutions

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 & Value-added

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

- API'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.

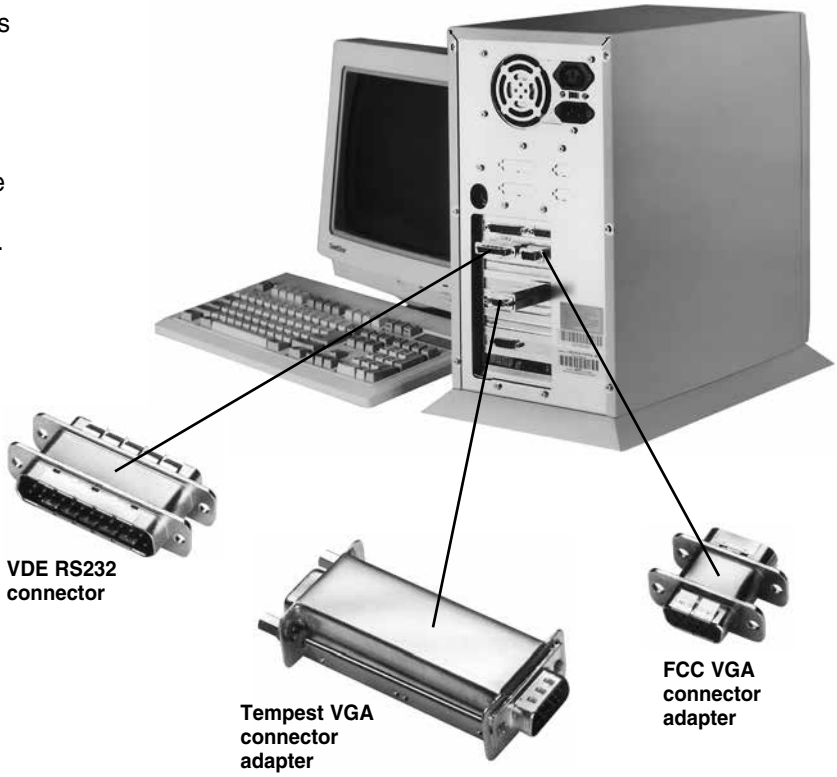
Custom Filter Arrangements & Connectors

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.



VDE RS232 connector

Tempest VGA connector adapter

FCC VGA connector adapter

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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 API 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 millohms 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 millohms 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.

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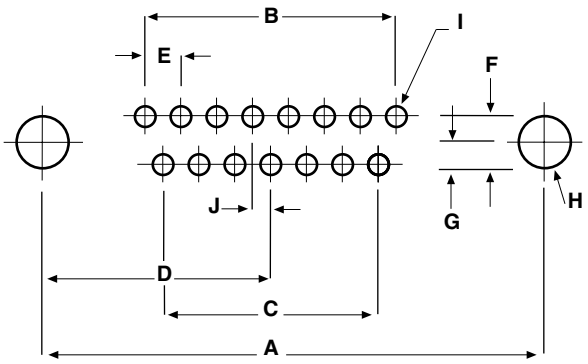
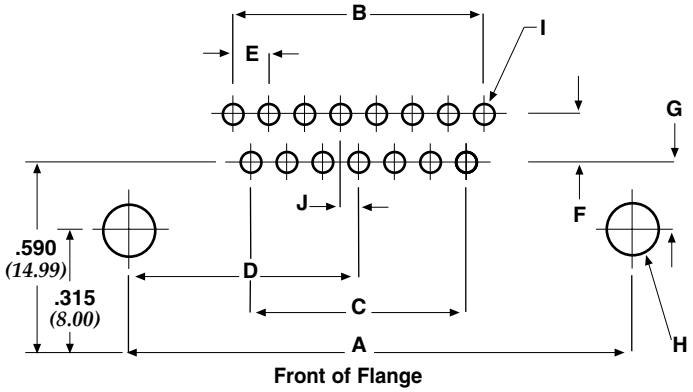
Board & Panel Cutouts



Printed Circuit
Vertical Board Mount (standard density)



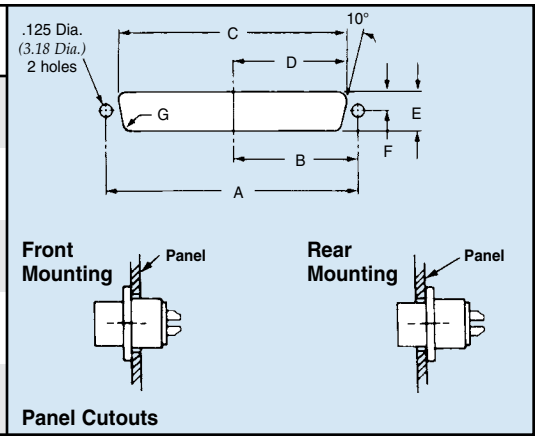
Printed Circuit
Right Angle Mount (standard density)

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)*	.109 *(2.77)*	.112 *(2.84)*	PCB Mount .056 *(1.42)*	.125 *(3.18)*	.045 *(1.14)*	.054 *(1.37)*
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)*			
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)*						
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)*			0.112 2 rows			
50 (4)	2.406 *(61.11)*	1.744 = 16 x .109 *(44.30)* *(2.77)* 2 rows	1.635 = 15 x .109 *(41.35)* *(2.77)* 1 row	1.203 *(30.56)*			0.00 1 row			

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

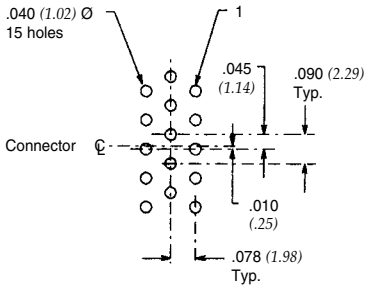
Shell Size	A ±.015 *(.38)*	B ±.015 *(.38)*	C ±.015 *(.38)*	D ±.015 *(.38)*	E ±.003 *(.08)*	F ±.005 *(.13)*	G ±.002 *(.05)*
9 (0)	.984 *(24.99)*	.492 *(12.49)*	.777 *(19.74)*	.388 *(9.87)*	.440 *(11.18)*	.220 *(5.59)*	.150 *(3.81)*
15 (1)	1.312 *(33.32)*	.656 *(16.66)*	1.105 *(28.07)*	.552 *(14.03)*	.440 *(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)*



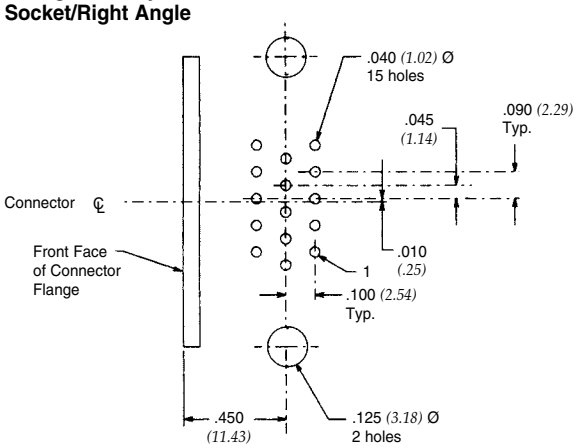
Dimensions in inches *(mm)*

Board & Panel Cutouts

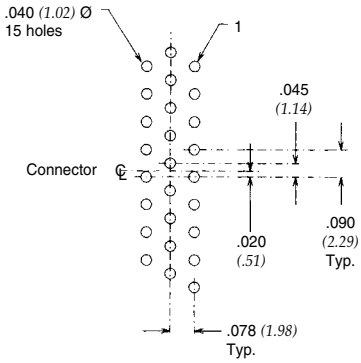
15 High-Density Pin/PCB



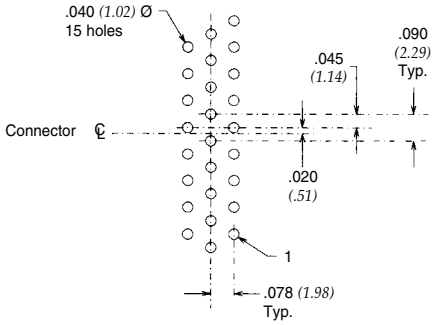
15 High-Density Socket/Right Angle



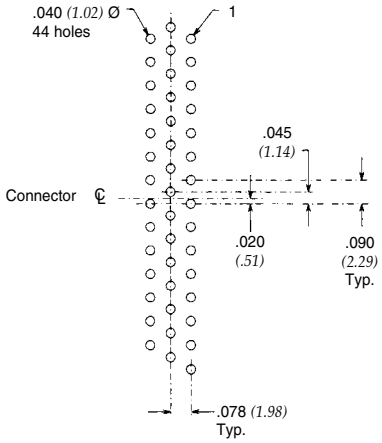
26 High-Density Pin/PCB



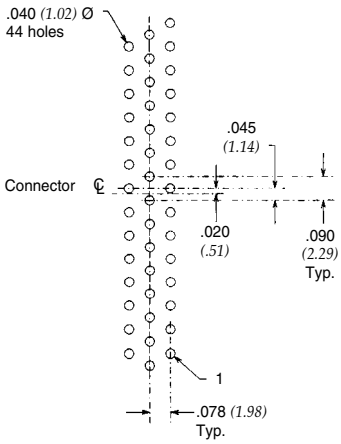
26 High-Density Socket/PCB



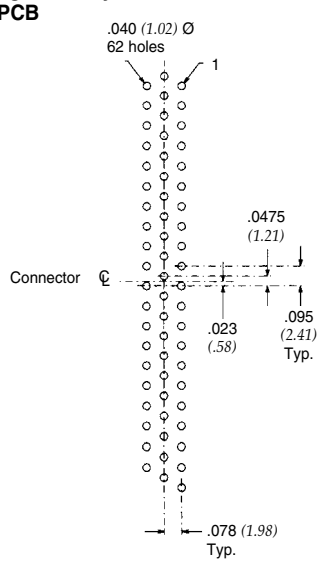
44 High-Density Pin/PCB



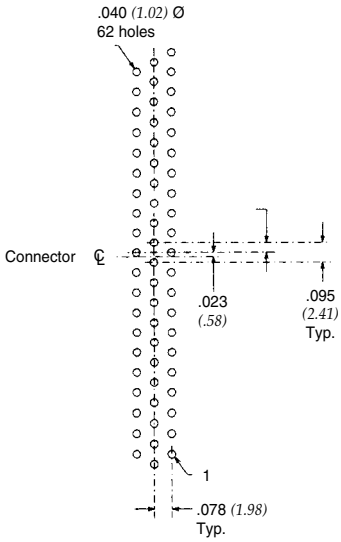
44 High-Density Socket/PCB



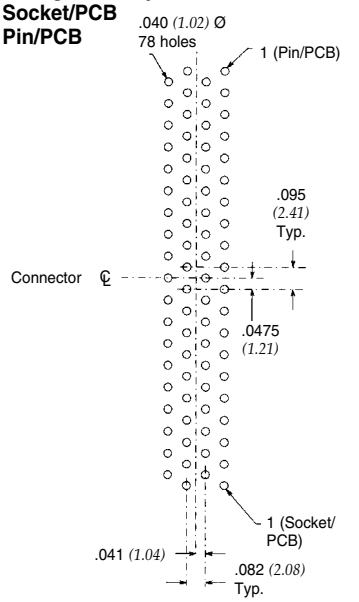
62 High-Density Pin/PCB



62 High-Density Socket/PCB



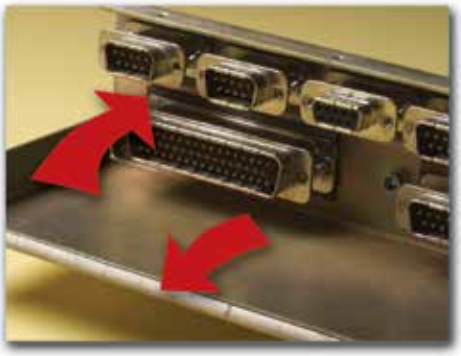
78 High-Density Socket/PCB Pin/PCB



Dimensions in inches *(mm)*

Quietshield™ Gaskets & Shielding

flexible, conformable and lightweight Quietshield™ products deliver effective EMI shielding across seams or gaps within an enclosure



Fabric-Over-Foam Gaskets are low cost, soft and easy to apply. These gaskets are available in a variety of materials and profiles, including rectangular, "D" shaped, FL shaped and DD shaped… **FC67-FC68**

Waved Metal and Fabric-Over-Foam I/O Gaskets are flat products used to provide a ground contact between a metal connector and the electronic enclosure or mating connector… **FC69**

Shielding Tapes and Fabrics are flexible, lightweight, and easy-to-install shielding materials offering high conductivity with a low electrical resistance and are available in a variety of fabric styles… **FC70**

Wire Mesh Gaskets are available as all mesh or elastomer core mesh gaskets. They provide excellent heat and corrosion resistance and are used between two surfaces to maintain electrical continuity while shielding electromagnetic waves… **FC71**

Conductive Silicone is used for its heat resistant properties and can be produced in many different forms such as sheets, molded parts, die-cuts or strips. These conductive elastomers are water resistant, can eliminate static electricity, and act as an absorber at high frequencies… **FC72**

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Shielding Theory and Introduction

Shielding Theory

Electromagnetic shielding is used to prevent electromagnetic signals such as radio signals from leaving or entering a box or enclosure. Signals inadvertently emitted by an electronic device can cause distortion or interruption in normal radio communications in a localized area. This is the basis of most laws and regulations concerning electromagnetic interference. In addition, normal radio signals can cause unprotected electronic devices to malfunction. Depending on the device's function, a malfunction in the device could be a minor inconvenience such as static on a radio, or life threatening such as the malfunction of a life support system at a hospital.

Introduction

The electromagnetic shield in most cases is the electronic housing itself. The housing/shield forms a metal cage around the electronic circuits in a device. Most of the electromagnetic signal is absorbed with a small portion (3 to 10 dB) of the signal reflected off the metal housing. Most of the absorbed signal creates alternating currents at radio frequencies which travels on the surface of metal. This allows the electromagnetic shield to keep signals from outside the enclosure on the outside of the shield and signals from inside signals on the inside of the shield.

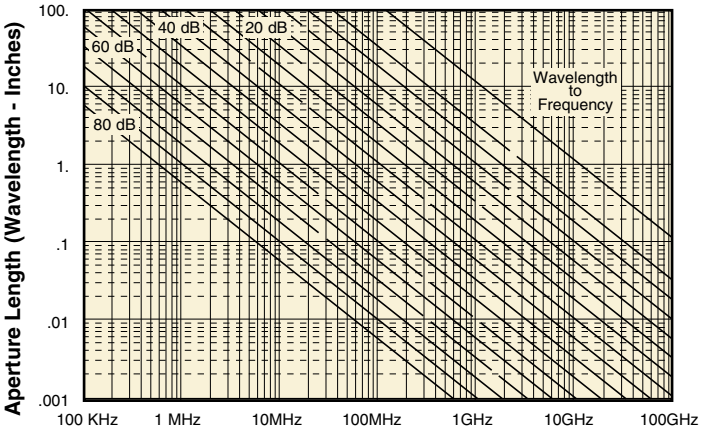
The shield will continue to function as long as there are no holes in the electromagnetic shield which would allow the currents to flow from one side of the shield to the other. Holes are a necessity in an electronic enclosure. Connectors, wires, and cables are needed to transmit information to and from electronic devices. Doors and covers are needed to get access to components to maintenance, service, and keypads may also be required. The problem is that all of these items cause openings in the shield which reduce the performance of the shield.

Special devices such as shielding gaskets, shielding ventilation panels, shielded filtered connectors, and shielded switches minimize the effect of a hole in the shield.

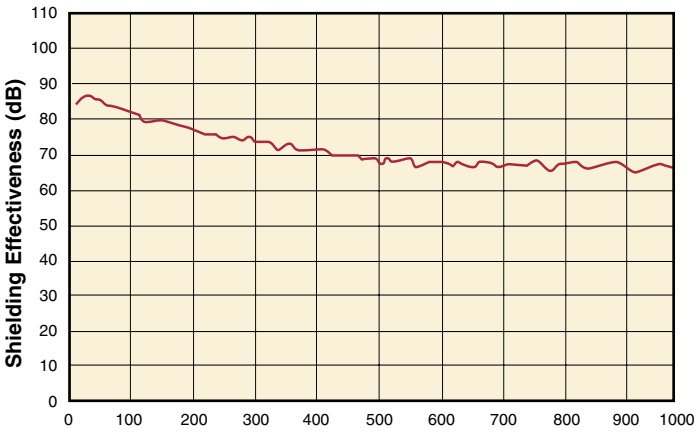
The length of the hole and wavelength of the signal that needs to be shielded are the major factors determining the shielding effectiveness of an electronic enclosure. The distance between spotwelds, or screws which hold a metal housing together count as long narrow holes. Higher frequencies (lower wavelengths) flow more easily through smaller holes, and so the highest frequency needed to be shielded is the frequency of concern when designing shielding.

Aperture versus frequency charts can give a rough estimate of the shielding effectiveness of a metallic electronic housing.

SHIELDING EFFECTIVENESS



TYPICAL SHIELDING EFFECTIVENESS



Test Methods: ASTM D-4935-89
Test Fixture: Flanged coaxial transmission line

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Quietshield™ Part Number System

Example: **57D1211205 - 7200**

The part number shown represents a gasket with woven foam made of neoprene, conductive PSA.
The gasket has copper-nickel plating that is 0.120" wide x 0.050" thick x 72" long.

Gaskets

Shapes/Styles

D, R, L, P, C, K, O, V, U — Fabric-over-Foam

R, P, O, V — Mesh

A, D, H, J, P, O, P, Z — Conductive Elastomer

F — Formed/Stamped

T — Tape/Foil/Fabric

S – Special

Fabric/Foil

0 — Non-woven
1 — Woven
2 — Woven Ripstop
3 — Woven DTY Filament
4 — Mesh
5 — Net
6 — Knit
7 — Aluminum Foil
8 — Copper Foil
9 — None

Material

0 — None
1 — Foam neoprene, no PSA
2 — Foam neoprene, conductive PSA
3 — Foam neoprene, non-conductive PSA
4 — Solid
5 — Sponge
6 — Silicone
7 — Hollow silicone
8 — Conductive elastomer
9 — Hollow conductive elastomer
A — No core, conductive PSA one side
B — No core, non-conductive PSA one side
C — No core, conductive PSA double side
D — No core, non-conductive PSA double side
E — Monel mesh with silicone sponge
F — Al wire with silicone sponge
G — No core, conductive, no PSA
H — Monel mesh solid
Z — Z-foam

Note: PSA = pressure sensitive adhesive

Plating

0 — Copper - Nickel (std)
2 — Copper - Nickel - Gold
4 — Copper - Nickel - Resin
5 — Copper - Nickel - P.S. Coating
6 — Iron - Copper - Nickel
7 — Copper - Nickel - Carbon
9 — Ni - Graphite

Height/Thickness

Profiles — thickness in inches

I/O — height in inches

Width or Type & Size

Profiles — width in inches

I/O — first digit is I/O Type
(D, d-sub)
second digit is shell size
(1, 2, 3, 4, or 5)

Length

Length (ex: -1205 = 12.05)
[Standard is 36 (-3600)]

Custom part number for special application (-X001)
X must be the first character

Sample Kit

Quietshield sample kits are available from API Technologies. Order number KIT-QSHIELD-57.

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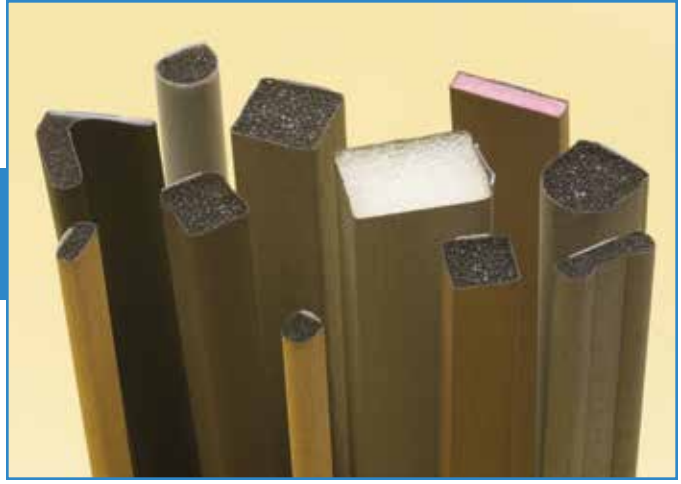
Quietshield™ Fabric-over-Foam Gaskets



Features

- Maintain shielding effectiveness across seams or gaps
- Shielding Effectiveness (SE) of 70 - 100 dB between 1 MHz to 18 GHz
- Flexible and conformable
- No creasing or tearing
- Lightweight material

Profile Gaskets

Quietshield™ EMI/RFI Gaskets maintain shielding effectiveness (SE) across a seam or gap in the electronic equipment's shielding material.

Quietshield gaskets provide unique solutions to your most stringent shielding, grounding, ESD and packaging requirements. It's the cost-effective avenue for creativity in design. These gaskets consist of polyurethane foam combined with highly conductive fabrics. Specially designed polyurethane foam is soft, resilient and provides the perfect fit. Our gaskets are made with seven different types of fabric plating and two types of thermal adhesive, standard or flame retardant. Our flame retardant adhesive complies with UL94VTM-1 and VTM-0. If necessary, the polyurethane foam core can also be plated with Cu and Ni to provide additional conductivity.

Fabric-over-Foam Gaskets, unlike elastomer or finger strip gaskets, provide softness for easy application with a variety of materials and designs at low cost. The best quality with high conductivity, low electrical resistance and minimum oxidation can be achieved by using gold gaskets with additional gold plating to provide superior shielding.

Profile gaskets are currently available in a variety of shapes and lengths. API's Spectrum Control line of gaskets provide a variety of applications with lightweight and flexible solutions. Various thicknesses and shapes are available. These range from commonly used ones such as rectangular and "D" shape, to uncommon ones such as FL-shape (folding leaf) and DD-shape (Double DD-shape). We are able to produce gaskets with different shapes and sizes, based upon the customer's requests.

The mounting style available for most profile gaskets is pressure sensitive adhesive.These adhesives allow simple place and press mounting on smooth and clean metal surfaces.The parts can be cut to the desired length with common scissors or ordered to the exact length required. The adhesive provides high strength with aggressive initial tack, which increases in strength over time or after exposure to elevated temperatures.

I/O Gaskets

API offers a complete line of standard and custom I/O connector Electromagnetic Shielding Gaskets. I/O gaskets are flat gaskets used to provide a ground contact between a metal connector and the electronic enclosure or mating connector. They ensure that the shield remains continuous from the input/output cable to the electronic enclosure.

I/O Gaskets are available in the same materials as the fabric-over-foam profile gaskets, or as all-metal waved gaskets.

API's line of metal waved gaskets is designed to minimize the gaps between a D-Sub connector and the panel it is mounted to. These gaskets ensure the maximum "gap length" will not exceed the wave pitch, 0.200" (5.08 MM), even on surfaces with poor flatness. This ensures maximum filter performance to 1GHz and beyond.

Test	Performance
Shielding Effectiveness*	68 dB - 88 dB
Composition (STD)	Woven
Plating (STD)	Copper and Nickel
Temperature Limit	200°C
Abrasion Resistance	Good
Electric Resistance	<0.08 Ohm
Flamibility Rating**	94VTM-1, V0 Grade
Shelf Life***	20 years

* Provides shielding effectiveness of 68 dB min. between 30 MHz to 1 GHz, this will vary slightly depending on fabric type.

** Rubber rating only.

*** Fabric-over-foam gaskets.

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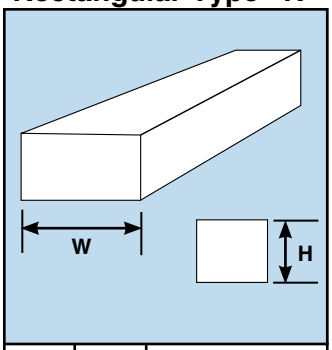
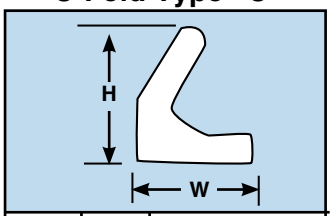
Quietshield™ Fabric-over-Foam Profile Gaskets

Rectangular Type "R"



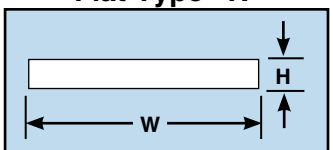
W	H	Part Number
1.000	0.374	57R121C037-xxxx
0.118	0.079	57R1211208-xxxx
0.154	0.118	57R1211512-xxxx
0.158	0.079	57R1211608-xxxx
0.158	0.158	57R1211616-xxxx
0.130	0.189	57R1211913-xxxx
0.197	0.197	57R1212020-xxxx
0.252	0.126	57R1212512-xxxx
0.315	0.472	57R1213247-xxxx
0.374	0.126	57R1213713-xxxx
0.374	0.374	57R1213737-xxxx
0.394	0.394	57R1213939-xxxx
0.102	0.400	57R1214012-xxxx
0.394	0.236	57R1214022-xxxx
0.488	0.370	57R1214937-xxxx
0.500	0.126	57R1215013-xxxx
0.252	0.500	57R1215025-xxxx
0.500	0.500	57R1215050-xxxx
0.512	0.118	57R1215112-xxxx
0.512	0.394	57R1215140-xxxx
0.984	0.394	57R1219839-xxxx

C-Fold Type "C"



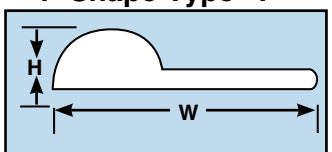
W	H	Part Number
0.295	0.138	57L1213014-xxxx
0.315	0.315	57L1213232-xxxx
0.394	0.394	57L1213939-xxxx
0.421	0.386	57L1214339-xxxx
0.681	0.591	57L1216859-xxxx

Flat Type "R"



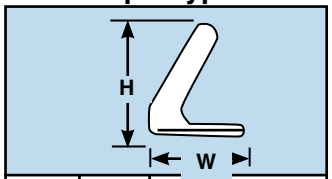
W	H	Part Number
0.118	0.039	57R1211204-xxxx
0.158	0.031	57R1211603-xxxx
0.158	0.035	57R1211604-xxxx
0.158	0.039	57R1211604-xxxx
0.158	0.047	57R1211605-xxxx
0.197	0.020	57R1212002-xxxx
0.197	0.039	57R1212004-xxxx
0.197	0.047	57R1212005-xxxx
0.197	0.059	57R1212006-xxxx
0.197	0.071	57R1212007-xxxx
0.236	0.039	57R1212404-xxxx
0.236	0.059	57R1212406-xxxx
0.276	0.020	57R1212802-xxxx
0.276	0.039	57R1212804-xxxx
0.276	0.047	57R1212805-xxxx
0.276	0.059	57R1212806-xxxx
0.276	0.071	57R1212807-xxxx
0.299	0.063	57R1213006-xxxx
0.315	0.031	57R1213203-xxxx
0.315	0.039	57R1213204-xxxx
0.354	0.039	57R1213604-xxxx
0.394	0.020	57R1214002-xxxx
0.394	0.039	57R1214004-xxxx
0.394	0.047	57R1214005-xxxx
0.394	0.071	57R1214007-xxxx
0.472	0.039	57R1214704-xxxx
0.472	0.059	57R1214706-xxxx
0.512	0.028	57R1215103-xxxx
0.512	0.035	57R1215104-xxxx
0.512	0.059	57R1215106-xxxx
0.551	0.059	57R1215506-xxxx

P-Shape Type "P"



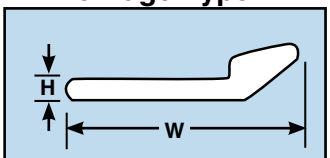
W	H	Part Number
0.315	0.079	57P1213208-xxxx
0.520	0.130	57P1215216-xxxx

L-Shape Type "L"



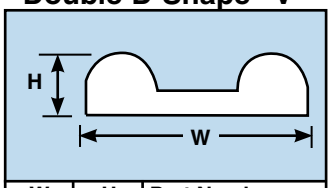
W	H	Part Number
0.430	0.395	57L1214339-7200
0.433	0.433	57L1214343-7200
0.551	0.591	57L1215559-7200
0.578	0.673	57L1215767-7200

Knife Edge Type "K"



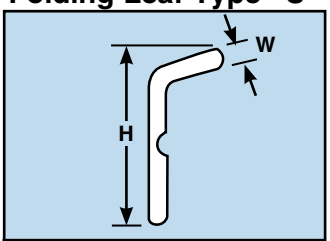
W	H	Part Number
0.492	0.138	57K1214914-xxxx
0.500	0.094	57K1215009-xxxx
0.500	0.098	57K1215010-xxxx
0.752	0.252	57K1217525-xxxx

Double D-Shape "V"



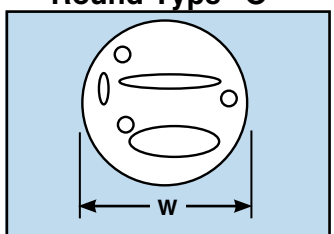
W	H	Part Number
0.378	0.126	57V1213813-xxxx

Folding Leaf Type "U"



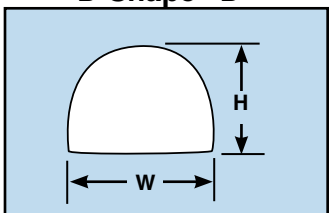
W	H	Part Number
0.709	0.311	57U1217131-xxxx

Round Type "O"

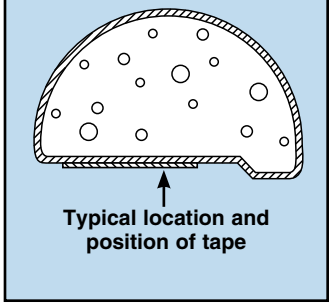


W	Part Number
0.098	57O1211010-xxxx
0.106	57O1211111-xxxx
0.126	57O1211313-xxxx
0.177	57O1211818-xxxx
0.197	57O1212020-xxxx
0.347	57O1213535-xxxx
0.394	57O1213939-xxxx
0.433	57O1214343-xxxx

D-Shape "D"



W	H	Part Number
0.090	0.091	57D1210909-xxxx
0.091	0.126	57D1210912-xxxx
0.102	0.126	57D1211012-xxxx
0.118	0.079	57D1211208-xxxx
0.118	0.138	57D1211214-xxxx
0.150	0.059	57D1211506-xxxx
0.150	0.118	57D1211512-xxxx
0.158	0.157	57D1211616-xxxx
0.197	0.197	57D1212020-xxxx
0.236	0.079	57D1212408-xxxx
0.236	0.177	57D1212418-xxxx
0.236	0.197	57D1212420-xxxx
0.236	0.217	57D1212422-xxxx
0.252	0.118	57D1212512-xxxx
0.256	0.134	57D1212514-xxxx
0.256	0.197	57D1212520-xxxx
0.315	0.394	57D1213240-xxxx
0.354	0.118	57D1213512-xxxx
0.354	0.126	57D1213513-xxxx
0.374	0.236	57D1213725-xxxx
0.386	0.252	57D1213925-xxxx
0.394	0.157	57D1213916-xxxx
0.394	0.177	57D1213918-xxxx
0.394	0.197	57D1213920-xxxx
0.394	0.217	57D1213922-xxxx
0.394	0.236	57D1213924-xxxx
0.394	0.276	57D1213928-xxxx
0.394	0.295	57D1213930-xxxx
0.394	0.394	57D1213939-xxxx
0.433	0.138	57D1214314-xxxx
0.433	0.177	57D1214318-xxxx
0.433	0.217	57D1214322-xxxx
0.709	0.551	57D1217155-xxxx
0.709	0.787	57D1217177-xxxx
0.709	0.906	57D1217191-xxxx



NOTE: All dimensions in inches

api technologies corp.
Spectrum Control

Quietshield™ Fabric-over-Foam I/O & Waved Metal Gaskets

Specifications

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

Finish . . . . . STD: Electro tin plate, 100 micro inches (per MIL-T-10727)

For RoHS: Nickel - change last 2 p/n digits to - NI

For Hi-Rel: Gold - change last 2 p/n digits to - AU

Material Thickness . . . . . .005" (.13mm) compressed

Wave Height. . . . . .030"+.020/-.015 (.76+.51/-.38mm)

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

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

Front Mount

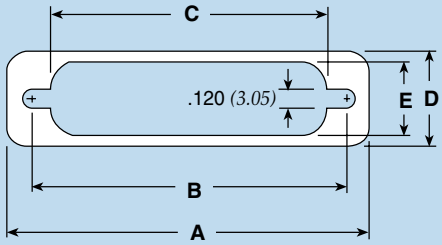
Wave Height

Rear Mount

Waved Metal Gaskets *(Select part number by filling in "xxx": 572019-00xxx-70)*

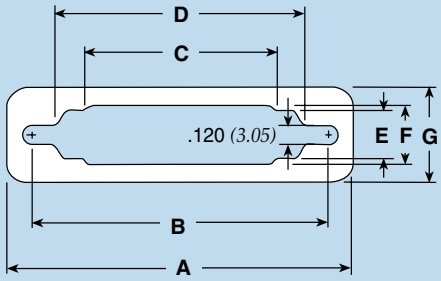
Mounting: Front mounted pin or socket connector, rear mounted pin connector.

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



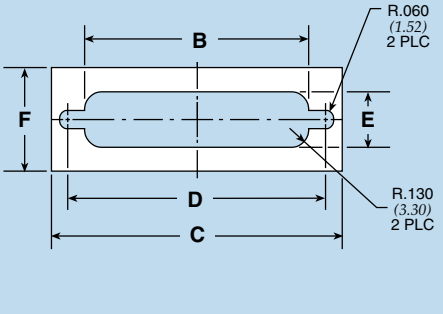
Mounting: Rear mounted socket connectors only.

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



Fabric-over-Foam I/O Gaskets

Shell Size	Thickness A	Dimensions B	C	D	E	F	Fabric Type	Part Number
1	0.012 0.040 0.070	0.746 (18.95)	1.213 (30.81)	0.984 (24.99)	0.400 (10.16)	0.750 (19.05)	nonwoven woven woven	57F01-D112-1275 57F11-D140-1275 57F11-D170-1275
2	0.012 0.040 0.070	1.074 (27.28)	1.541 (39.14)	1.312 (33.32)	0.400 (10.16)	0.750 (19.05)	nonwoven woven woven	57F01-D212-1575 57F11-D240-1575 57F11-D270-1575
3	0.012 0.040 0.070	1.614 (41.00)	2.088 (53.04)	1.852 (47.04)	0.400 (10.16)	0.750 (19.05)	nonwoven woven woven	57F01-D312-2075 57F11-D340-2075 57F11-D370-2075
4	0.012 0.040 0.070	2.266 (57.56)	2.720 (69.09)	2.500 (63.50)	0.400 (10.16)	0.750 (19.05)	nonwoven woven woven	57F01-D412-2775 57F11-D440-2775 57F11-D470-2775
5	0.012 0.040 0.070	2.158 (54.81)	2.63 (66.80)	2.406 (61.11)	0.500 (12.70)	0.850 (21.59)	nonwoven woven woven	57F01-D512-2685 57F11-D540-2685 57F11-D570-2685



Dimensions in inches *(mm)*

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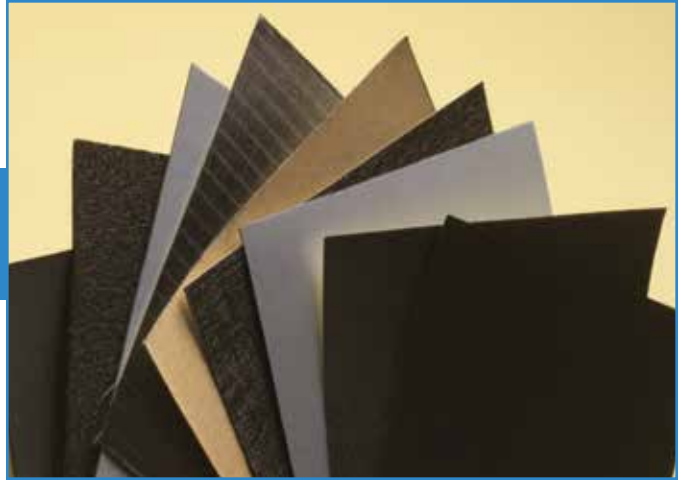
api technologies corp.
Spectrum Control

Shielding Tapes & Fabric



Flexible and lightweight tapes provide easy installation and high conductivity and low electrical resistance provide a good shielding effect. Our products use stronger pressure sensitive adhesive to provide better adhesion. Standard widths are 1", 2", 3" and 42". Standard roll lengths are 200'.

API Technologies' Spectrum Control brand of conductive tapes consist of conductive fabric and adhesive which can be either conductive or non-conductive. Conductive tapes come in various types: conductive fabric tapes, Cu/Al foil tapes and double side conductive adhesive tapes. Anticorrosion coating is done on foil tapes and flame retardant coating is available, which complies with UL94VTM-1 and VTM-0.

Styles

- Nonwoven polyester taffeta
- Conductive woven polyester taffeta
- Woven ripstop
- Woven DTY filament
- Mesh
- Aluminum foil
- Copper foil

Material	Plating	Weight (lb/sf)	Weight (g/sm)	Thickness (mm)	Tensile Strength (Kgf)	Surface Resistance (ohm/sq)	Shielding Effectiveness (min dB)	Part Number
Conductive Woven	Cu/Ni	0.015566	76.0	0.08	38.0	0.20	58	57T1A14200-XXXX
Conductive Woven	Cu/Ni/Au	0.005325	26.0	0.10	29.0	0.06	72	57T1A24200-XXXX
Conductive Woven	Cu/Ni/Fe	0.016385	80.0	0.10	32.0	0.06	63	57T1A64200-XXXX
Conductive Woven	Cu/Ni/Ag	0.015975	78.0	0.10	32.0	0.06	67	57T1A34200-XXXX
Conductive Woven	Cu/Ni/Resin	0.016385	80.0	0.11	32.0	0.06	78	57T1A44200-XXXX
Conductive Rip-Stop	Cu/Ni	0.014951	73.0	0.09	39.0	0.08	62	57T2A14200-XXXX
Conductive Rip-Stop	Cu/Ni/Ag	0.015566	76.0	0.10	34.0	0.06	78	57T2A34200-XXXX
Conductive Rip-Stop	Cu/Ni/Fe	0.014951	73.0	0.09	33.0	0.06	63	57T2A64200-XXXX
Conductive Rip-Stop	Cu/Ni/Resin	0.014951	73.0	0.09	34.0	0.06	68	57T2A44200-XXXX
Conductive Non-Woven	Cu/Ni	0.013927	68.0	0.16	10.0	0.08	72	57T0A14206-XXXX
Conductive Non-Woven	Cu/Ni	0.024372	119.0	0.32	21.0	0.06	80	57T0A14201-XXXX
Conductive Non-Woven	Cu/Ni	0.024577	120.0	0.43	30.0	0.06	83	57T0A14202-XXXX
Conductive Mesh	Cu/Ni	0.005120	25.0	0.08	18.0	0.20	52	57T4014200-XXXX
Conductive Mesh	Cu/Ni/Resin	0.005523	27.0	0.08	19.0	0.10	53	57T4044200-XXXX
Conductive Mesh	Cu/Ni/Au	0.003072	15.0	0.08	17.0	0.10	57	57T4034200-XXXX
Aluminum				0.08		0.05		57T7A-4200-XXXX
Aluminum				0.08		0.07		57T7C-4200-XXXX
Copper				0.80		0.02		57T8A-4200-XXXX

api technologies corp.
Spectrum Control

Wire Mesh Gaskets

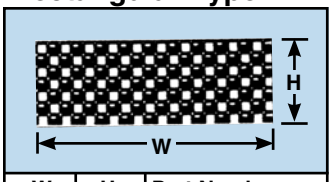
API's Spectrum Control brand mesh gaskets include all mesh gaskets and elastomer core mesh gaskets.

Layers of knitted wire are covered over the wire core in API's all mesh gaskets. Using its electrical conductivity, they are used between two surfaces to maintain electrical continuity while shielding electromagnetic waves. They offer good resilience and excellent heat and corrosion resistance. Any types of metal can be used to produce mesh gaskets but common materials used are aluminum, stainless steel and monel.

API's elastomer core mesh gaskets are composed of wire mesh over elastomer core. Both these materials provide excellent shielding effects creating the maximum outcome. Both all-mesh gaskets and Elastomer-core mesh gaskets can be produced with different types of materials and also in many different forms.

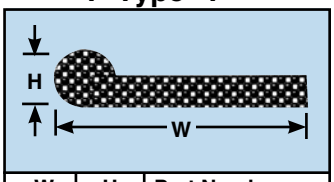
All Mesh Gaskets - Structure

Rectangular Type "R"



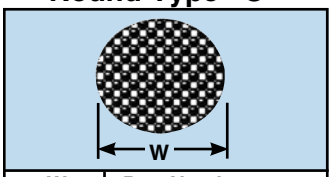
W	H	Part Number
0.138	0.059	57R40-1406-xxxx
0.142	0.098	57R40-1410-xxxx
0.181	0.102	57R40-1810-xxxx
0.197	0.118	57R40-2012-xxxx
0.189	0.189	57R40-2020-xxxx
0.236	0.118	57R40-2412-xxxx
0.252	0.063	57R40-2506-xxxx
0.256	0.177	57R40-2618-xxxx
0.354	0.118	57R40-3512-xxxx

P-Type "P"



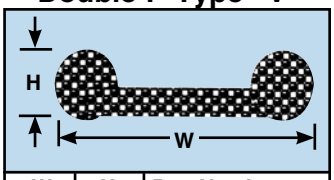
W	H	Part Number
0.138	0.512	57P40-1451-xxxx
0.138	0.638	57P40-1464-xxxx
0.138	0.795	57P40-1478-xxxx
0.205	0.516	57P40-2152-xxxx
0.205	0.768	57P40-2177-xxxx
0.264	0.764	57P40-2626-xxxx

Round Type "O"



W	Part Number
0.039	57O40-0404-xxxx
0.059	57O40-0606-xxxx
0.079	57O40-0808-xxxx
0.102	57O40-1010-xxxx
0.138	57O40-1414-xxxx
0.157	57O40-1616-xxxx
0.185	57O40-1919-xxxx
0.217	57O40-2222-xxxx
0.307	57O40-3131-xxxx
0.362	57O40-3636-xxxx

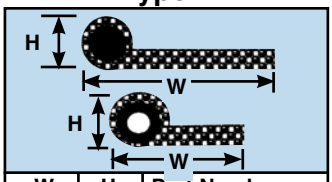
Double P-Type "V"



W	H	Part Number
0.138	0.386	57V40-1439-xxxx
0.138	0.512	57V40-1451-xxxx
0.138	0.638	57V40-1464-xxxx
0.205	0.642	57V40-2164-xxxx
0.205	0.768	57V40-2177-xxxx
0.205	1.016	57V40-2100-xxxx
0.264	0.638	57V40-2669-xxxx
0.264	0.764	57V40-2676-xxxx
0.264	1.012	57V40-2600-xxxx

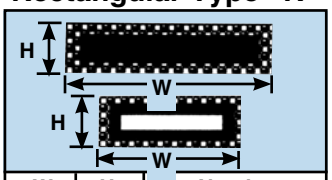
Elastomer Core Mesh Gaskets

P-Type "P"



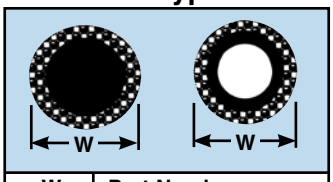
W	H	Part Number
0.138	0.512	57P46-1451-xxxx
0.138	0.638	57P46-1464-xxxx
0.138	0.795	57P46-1480-xxxx
0.205	0.516	57P46-2152-xxxx
0.205	0.768	57P46-2177-xxxx
0.264	0.764	57P46-2676-xxxx

Rectangular Type "R"



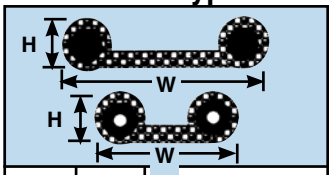
W	H	Part Number
0.138	0.059	57R46-1406-xxxx
0.142	0.098	57R46-1410-xxxx
0.181	0.102	57R46-1810-xxxx
0.189	0.189	57R46-1919-xxxx
0.197	0.118	57R46-2012-xxxx
0.236	0.118	57R46-2412-xxxx
0.252	0.063	57R46-2506-xxxx
0.256	0.157	57R46-2616-xxxx
0.256	0.177	57R46-2618-xxxx
0.354	0.118	57R46-3512-xxxx

Round Type "O"



W	Part Number
0.039	57O46-0404-xxxx
0.059	57O46-0606-xxxx
0.079	57O46-0808-xxxx
0.102	57O46-1010-xxxx
0.138	57O46-1414-xxxx
0.157	57O46-1616-xxxx
0.185	57O46-1919-xxxx
0.217	57O46-2222-xxxx
0.307	57O46-3131-xxxx
0.362	57O46-3636-xxxx

Double P-Type "V"



W	H	Part Number
0.138	0.386	57V46-1439-xxxx
0.138	0.512	57V46-1451-xxxx
0.138	0.638	57V46-1464-xxxx
0.205	1.016	57V46-2100-xxxx
0.205	0.642	57V46-2164-xxxx
0.205	0.768	57V46-2177-xxxx
0.264	1.012	57V46-2600-xxxx
0.264	0.638	57V46-2669-xxxx
0.264	0.764	57V46-2676-xxxx

NOTE: All dimensions in inches

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api technologies corp.
Spectrum Control

Conductive Elastomers

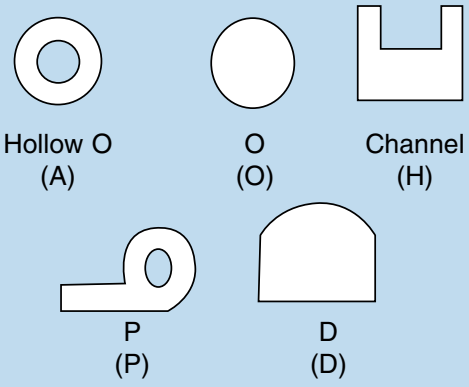
API's Spectrum Control line of conductive elastomers are composed of silicon rubber using its heat resistant property. Unique features of conductive elastomers include water resistance and elimination of static electricity, which is different from general foam gaskets. It also acts as an absorber at high frequency showing 60dB shielding at 30MHz ~ 10GHz.

Excellent electrical conductivity, grounding and shielding are provided. Due to its superior properties conductive elastomers are often used in military equipment. They can be produced in many forms such as sheets, molded parts, die-cuts or strips.

Typical Properties of Silicone Gaskets

Material	Conductive Silicone (Rubber) Gasket
Hardness Shore Micro	97-5
Volume Resistivity ohms	5-10
Elongation %	240
Tensile Strength Mpa	4.43
Tear Resistance KN/m	10.4
Texture and Color	Black or Beige
Specific Gravity	1.39
Temperature Range	-55 to +200

Profiles



Part Number	ID Size	OD Size	Type	Profile
57A99-0606-xxxx	0.019	0.059	Hollow	A
57A99-0909-xxxx	0.039	0.091	Hollow	A
57A99-2828-xxxx	0.196	0.276	Hollow	A
57D98-2525-xxxx	W:0.250	H:0.250	D-Tubing	D
57H98-3022-xxxx	W:0.295	H:0.217	Channel	H
57O98-1414-xxxx		0.138	O-Profile	O
57P98-9830-xxxx	W:0.984	H:0.295	P-Shape	P

NOTE: All dimensions in inches

specialty connectors & harnessing

api technologies corp.
Spectrum Control

Specialty Connectors & Custom Cable Assemblies

a premium line of custom and specialty filtered and unfiltered connectors with a range of value-added cable and harnessing products

Custom Filtered Connectors provide filtered versions of MIL-STD connectors in custom configurations. Tubular and planar filtered arrays are available with Pi, LC, T and C circuits… **SC3**

Custom Unfiltered Connectors are built to meet various environmental requirements and MIL specifications with power, signal and coax line combinations and multiple terminations available… **SC3**

Mini-MIL Connectors offer space and weight savings with MIL-DTL-38999 equivalent performance… **SC5**

Rapid Mate Connectors provide positive mating force to ensure a reliable connection, offering the ease and reliability of hot shoe style mating with the added benefit of integral EMI filtering.… **SC6**

Harnessing Products and Services are designed in accordance with IPC-A-610 and J-STD-001 for military, commercial and industrial applications. We provide assemblies for both unfiltered and filtered interconnects including lead wire preparation, soldering and tinning, marking and ribbon cable processing… **SC8**

Custom Cable Assemblies include discrete and signal cables, RF cables, power cables, system integration and overmolded connector backshells… **SC9**

- Audio, circular and hermetically sealed connectors
- Connector harnessing built to IAW, IPC-A-610 and J-Std-001
- Complete electro-mechanical assembly and testing services
- Custom connectors can be designed to meet RTCA/DO-160 Section 22 Lightning Strike
- EMI filtered connectors with complex schematics available

For complete specs and drawings, visit eis.apitech.com/specialty_connectors_cabling.asp

api technologies corp.
Spectrum Control

Specialty Connectors

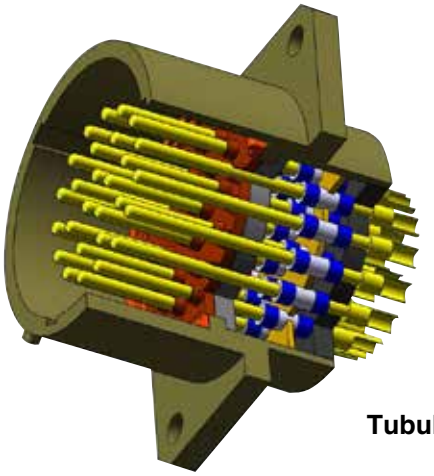
Custom Filtered Connectors for MIL & Hi-Rel Applications

API Technologies' Spectrum Control brand offers a complete line of compact and extended shell filtered connectors providing a wide range of design flexibility. Our compact shell filtered connectors offer designers an effective filtering device that reduces the amount of real estate required within a product enclosure. Our extended shell connectors are constructed by adding either planar or tubular capacitor filtering to the rear of a standard connector, which makes them ideal when quick turnaround is required for prototype devices.

Styles offered include the following, as well as custom designs.

- MIL-DTL-38999
- MIL-DTL-83723
- MIL-DTL-26482
- MIL-DTL-55116
- MIL-DTL-24308
- MIL-DTL-5015

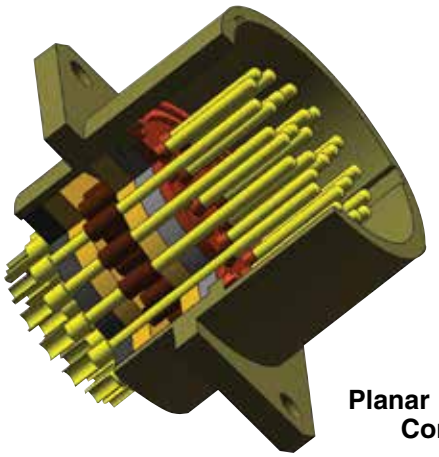
We offer tubular and planar style filtered arrays in Pi, LC, T and C circuits with TVS protection also available. Reliability is ensured through 100% testing of each position for critical electrical parameters.



Tubular Filtered Connector

Custom Unfiltered Connectors

API also offers unfiltered custom connector design and manufacturing. Parts can be designed to meet your mechanical and environmental specifications or those of similar QPL connectors.



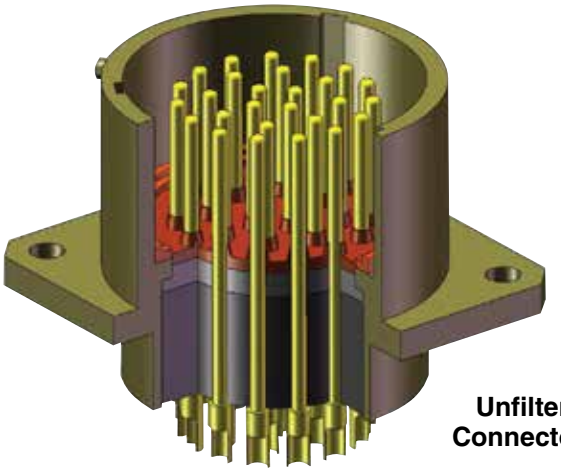
Planar Filtered Connector

Features

- Built to MIL specifications
- Custom shells to fit your available space
- Multiple terminations available
- Built to meet various environmental requirements
- Integral strain relief
- Power, signal and coax line combinations

Vertically Integrated

API's Spectrum Control line of custom filtered and unfiltered connector offerings are fully vertically integrated. Components including capacitors and shells are manufactured by API, providing our customers high quality parts at very competitive prices, with the industry's shortest lead times.



Unfiltered Connectors

For complete specs and drawings, visit eis.apitech.com/specialty_connectors_cabling.asp

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

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Custom Filtered Connectors MIL and High Reliability

API's Spectrum Control brand 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).

Electrical Specifications

Operating Temperature . . . . . -55°C - 125°C
Capacitance . . . . . Up to 1µF
Capacitance Tolerance . . . . . ±10%, ±20%, +100%
Capacitance Rating . . . . . Up to 1500VDC
Dielectric Withstanding Voltage . . . . . Up to 3000VDC
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.

Figure A (1)

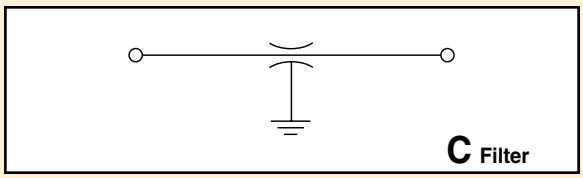


Figure B (2)

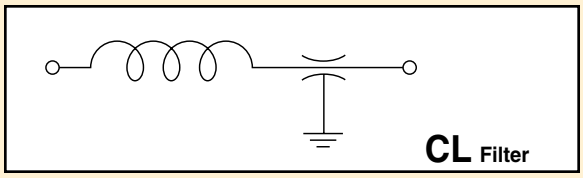


Figure C (3)

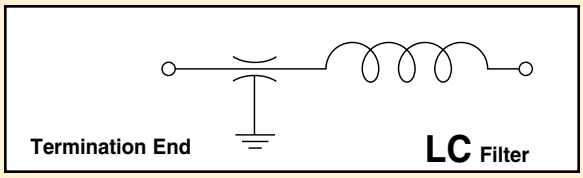
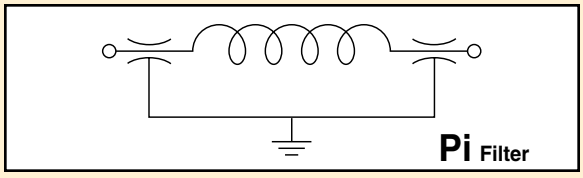
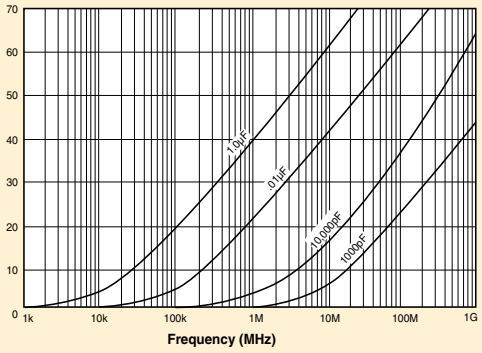


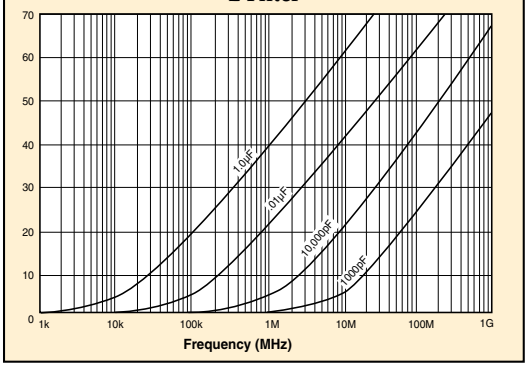
Figure D (4)



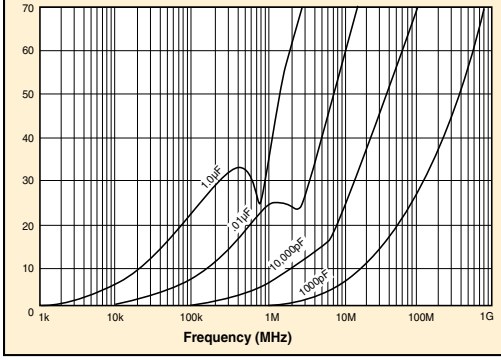
Insertion Loss (db) Per MIL-STD-220
FT Filter



Insertion Loss (db) Per MIL-STD-220
L Filter



Insertion Loss (db) Per MIL-STD-220
PI Filter



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Mini-MIL Connectors

API's Spectrum Control line of 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, and can be customized to satisfy various mechanical and electrical requirements. These connectors are ideal for military, industrial and medical applications where space restrictions do not allow for larger 38999 connectors.

Specifications

Engagement Types:

- Double-start ACME thread
- Triple-start ACME thread

Termination Types:

- PC tail
- Solder cup
- Crimp removable

Receptacle Types:

- Flange mount
- Jam nut

Mechanical Specifications

Shell . . . . . Six shell sizes are available in either pin or socket contact genders

Shell Materials . . . . . Aluminum, stainless steel

Contacts . . . . . Pin and socket contacts are available in various combinations of size 23 to size 12.

Electrical Characteristics with C Filter

Capacitance (pF, GMV)*	Working Voltage		Dielectric Withstanding Voltage (VDC)	Minimum Insertion Loss (dB)					
	DC 85°C	AC 85°C		Cut-Off Freq. MHz	1 MHz	10 MHz	100 MHz	500 MHz	1,000 MHz
1,000	200	115	500	5	—	4	21	34	39
2,000	200	115	500	1	—	9	26	39	44
3,000	200	115	500	1	—	12	30	43	48
5,000	200	115	500	1	1	16	34	46	52
7,000	200	115	500	1	3	19	37	49	55
10,000	200	115	500	1	4	21	39	52	57
20,000	100	—	250	.50	9	26	44	57	58

Electrical Characteristics with Pi Filter

Capacitance (pF, GMV)*	Working Voltage		Dielectric Withstanding Voltage (VDC)	Minimum Insertion Loss (dB)					
	DC 85°C	AC 85°C		Cut-Off Freq. MHz	1 MHz	10 MHz	100 MHz	500 MHz	1,000 MHz
1,000	200	115	500	5	—	4	28	54	65
2,000	200	115	500	1	—	8	39	65	70
3,000	200	115	500	1	—	11	47	70	70
5,000	200	115	500	1	1	14	54	70	70
7,000	200	115	500	1	3	18	60	70	70
10,000	200	115	500	1	4	22	64	70	70
20,000	100	—	250	.50	9	33	70	70	70

* Custom values available.

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Rapid Mate Connectors

API's Spectrum Control brand Rapid Mate connectors offer the ease and reliability of hot shoe style mating with the added benefit of integral EMI filtering. By mating via spring loaded, compliant contacts, Rapid Mate connectors provide positive mating force to ensure a reliable connection. This method provides rapid connection with low mating force, allowing for some misalignment during mating.

Additionally, the EMI filter experts at API can design a filtered Rapid Mate connector built to your requirements, providing the advantages of hot shoe style mating while ensuring system functionality in EMI-prone applications.

Applications

- Military and commercial communications systems
- Thermal and ambient light imaging cameras
- Docking stations
- Scanners

EMI Filter Performance

The electrical characteristics table indicates the performance of feed-through capacitors and Pi type filters. Utilize this information to specify the EMI filtering components included in your connector. Selective loading and custom values can also be designed.

Features

- Custom filtering
- 100% tested before shipment
- Rugged and reliable
- Resists sand, dust and water
- Low, flexible mating force

Filter Designation	Filter* Circuits	Capacitance		3 dB Max Cut-off Frequency (MHz)	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB) 50 ohm system per MIL-STD-220 (no load)							
		Value	Tolerance			5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz
A		68 pF	±20%	77	100V	—	—	—	—	—	3	10	16
B		100 pF	±20%	53	100V	—	—	—	—	1	6	14	19
C		135 pF	+100/-0%	23	100V	—	—	—	1	5	10	16	20
D	C	470 pF	±20%	11	100V	—	—	2	7	13	19	25	27
E		820 pF	±20%	6	100V	—	2	6	12	18	24	30	33
F		1000 pF	±20%	5	100V	—	3	7	14	20	26	32	35
G		1500 pF	±20%	3.5	100V	1	4	10	16	22	29	36	37
H		2500 pF	+100/-0%	1.3	100V	5	11	17	23	29	35	38	40
I		4000 pF	+100/-0%	.8	100V	9	15	21	27	34	38	42	46
J	Insulated	10 pF	Max.	635	100V	—	—	—	—	—	—	—	—
K	Grounded Insert					—	—	—	—	—	—	—	—
L		68 pF	±20%	65	100V	—	—	—	—	1	6	17	23
M		100 pF	±20%	46	100V	—	—	—	—	2	9	22	28
N		135 pF	+100/-0%	25	100V	—	—	—	1	6	17	26	34
O	Pi	470 pF	±20%	11	100V	—	—	—	9	18	22	36	43
P		820 pF	±20%	6	100V	—	—	4	13	23	31	45	52
Q		1000 pF	±20%	5	100V	—	2	7	16	24	36	51	59
R		1700 pF	+100/-0%	1.9	100V	1	6	14	28	35	49	64	69
S		2500 pF	+100/-0%	1.3	50V	4	9	16	28	41	54	70	70
T		5000 pF	+100/-0%	.7	100V	9	15	28	41	53	66	70	70

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Quality Acceptance Test Specifications

All filtered connectors undergo extensive testing to assure that all product meets our high quality expectations. Many of the tests are performed 100% as routine and others are carried out on a sample basis when this is deemed more meaningful.

Visual
The connectors shall be manufactured and processed in a careful and workmanlike manner in accordance with good design and sound practice. All connectors shall be checked 100% to insure dimensions are as shown in this catalog.

Capacitance
Checked on 100% of the contacts per detailed specifications when measured @ 25°C, 1 KHz, 0.1 to 1.0VRMS. On insulated feed-thru lines, the maximum capacitance is 25 pF.

Dissipation factor
4% maximum, checked 100% @ 25°C, 1KHz, 0.1 to 1.0VRMS

Dielectric withstanding voltage
Performed on 100% of the filtered contacts. The test voltage unless otherwise specified will be 2.5 times the working voltage as specified at 25°C. This voltage will be applied for 1 to 5 seconds with the charging current limited to 50 milliamps.

Insulation resistance
Performed on 100% of the filtered contacts at 25°C. The minimum acceptance level will be 1000 megohms at 25°C and 100 megohms at 125°C if required. This test will be carried out in accordance with MIL-STD-202 Method 302, test voltage of 100VDC or at rated voltage whichever is less.

Insertion loss
Performed on a sample quantity of filtered contacts, minimum acceptance levels as specified by typical insertion loss graphs.

Resistance to ground
The RDC on ground lines is 5 milliohms max.

Marking
As a minimum, all connectors shall have the Spectrum part number, date code and logo. Upon request, customer specified marking can be incorporated into the manufacturing cycle.

Special Testing

Spectrum has a fully qualified test laboratory and is willing to provide additional acceptance testing upon customers request, at minimal additional costs.

Minimum Design Specifications

All of the filtered connectors are designed to meet minimum standards shown in table below.

Environmental Performance

Test*	MIL-STD-1344		MIL-STD-202		
Description	**Method**	**Condition**	**Method**	**Condition**	**Comments****
Vibration	-	-	204	G	30G for 10 to 2000 Cycles
Thermal Shock	-	-	107	A-1	Except Step 3 is +125 degrees C
Immersion	1016	-	104	A	-
Salt Spray	1001	-	101	B	-
Moisture Resistance	1002	II	106	-	Except Step 7
Shock	2004	-	213	I	-
Barometric Pressure	3001	-	105	C	125% rated voltage
Resistance to Solder Heat	-	-	210	B	-
Terminal Strength	-	-	211	A	The applied force shall be 5 lbs.
Contact Resistance	-	-	307	-	.0152 max.
Life	-	-	108	D	1000 hrs.
Durability	-	-	-	-	500 cycles
Solderabilty	-	-	208	-	-

*** All tests are performed per applicable MIL spec.**

**** All parts will meet post test electricals (i.e. dielectric withstanding voltage, insulation resistance, capacitance, insertion loss and visual/mechanical).**

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Harnessing Products & Services

API Technologies' Spectrum Control brand offers custom harnessing products and services for military, aerospace, commercial and industrial applications. Our skilled operators and supervisors work in a modern well-equipped facility to provide interconnect assemblies made to the highest workmanship standards.

Our manufacturing engineers design tooling and fixturing, which meet the tightest tolerances. From simple to complex, API can provide assemblies in compliance with all requirements.

Product Capabilities

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

Manufacturing Capabilities

- Lead wire preparation
- Soldering and tinning
- Strip and removal of insulation
- Wire, component and assembly marking
- Ribbon cable processing

Wire Harnesses

API will add wires to a filtered or unfiltered 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 adding strength to the total harness.

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

API'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.

Markets Served

- Medical
- Electronics
- Automotive
- Telecom
- MIL Spec
- Military instrumentation
- Marine
- Industrial

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Custom Cables Assemblies

API Technologies' Spectrum Control brand has developed a range of capabilities to produce custom cable assemblies that 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. We also have in-house low and high volume PCB manufacturing capabilities.

Signal & Discrete Cables

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

RF Cables

- Frequency up to 40 GHz
- Phase matching
- Rigid/semi-rigid cable
- Custom RF cable builder tool

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
- In-house high and low volume PCB manufacturing capabilities

API custom cable assemblies are ideal for aerospace, military, high-end commercial and medical applications.

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 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 20x less expensive than traditional backshells
- More attractive final assembly, custom mold imprinting available

emi power filters

api
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Spectrum Control

EMI Power Filters

find the ideal method to filter the AC or DC power entering your system to prevent radiated or conducted EMI with our line of standard power filters and custom power solutions

Power Entry Modules, Power Line & 3 Phase Power Filters are designed in multiple configurations to cover a range of industrial applications. These have excellent attenuation for high voltage impulse, are available in single and dual stage and address FCC Part 15 regulations while meeting your power filtering needs… **PF5-PF6 & PF16-PF89**

Single Line Feed-Through (SLFT) Power Filters provide superior filtering in a compact, durable package with single, dual, and triple feed-throughs available. These filters are ideal for meeting broad frequency applications with a bolt-in style for easy installation… **PF7-PF14**

Military/Aerospace Multisection Filters provide excellent EMI filtering for demanding high reliability applications. We offer standard filters, as well as custom designed mechanical packages for unusual or tight fitting spaces and higher performance filtering and expanded voltage ratings… **PF91-PF98**

EMI Power Filter Solutions will lower your costs and reduce your time to market while providing your system with protection from radiated or conducted EMI. Our comprehensive consulting, diagnostic testing and world class manufacturing allows us to meet your design/project parameters… **PF99**

EMI Filter Expertise

We differentiate ourselves from typical filter suppliers by offering our customers an integrated approach to EMC problem solving through consulting, diagnostic testing, design and manufacturing.

- In-house test facilities to provide a total solution for your compliance issues – anechoic chamber, shielded room and NARTE certified engineers ready to test for European emission and immunity regulations, FCC Part 15 and MIL standards
- Global manufacturing and design support with agency approved products available
- Engineering expertise and vertical integration reduce your time to market and save you money
- High reliability products with low leakage and nonmagnetic options available
- Available to meet MIL-PRF-15733 and MIL-STD-461 standards

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Spectrum Control

Application Guidelines

Need for EMI suppression

Global regulatory agencies have established limits to the amount of noise that man-made electronic devices can radiate or conduct. These regulations have gained greater importance as the world's electronic population intensifies and the proximity of electronic devices becomes closer.

EMI can propagate through two basic avenues: Conducted and Radiated

Conducted refers to events where the EMI energy flowsthrough power lines, data cables and other wiring that carries functional data or power.

Radiated refers to energy that is propagated by magnetic or electric fields, which originate from other electronic or electrical systems.

Interference types

There are two modes of conducted noise: differential mode (symmetrical or normal mode) and common mode (asymmetrical mode).

Differential mode interference signals are present on one side of the line, referenced to the other. The currents flow along one phase and return along another phase.

Common mode interference signals are present on both sides of the line referenced to ground. The current flows from the source to ground along the ground path and returns along the phases.

Sources of EMI

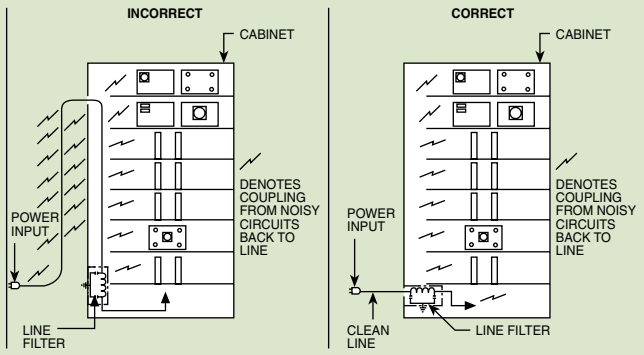
Electromagnetic interference can occur naturally or through electronic sources. Lightning discharges, precipitation, sand and dust storms, and cosmic noise are sources of natural EMI.

EMI generated from power electrical products cause the most concern. These man-made sources, such as power lines, rotating machinery, power supplies and electronic transmission devices, all have their own signatures and noise pollution.

EMI filters, insertion loss and attenuation

Power line EMI filters are designed to attenuate (or reduce) all radio frequency emissions or energy that is above the applicable EMC specification. Most power line EMI filters utilize inductor/capacitor "low pass" component configurations that pass all DC or low frequency AC necessary energy and attenuate (suppress) higher frequencies containing noise or unwanted energy.

Power Filter Installation



To insure a customer's "in system" unit to unit attenuation uniformity of power line filters, an insertion loss production line test is performed by API Technologies.

Each of the specific frequencies is measured using RF test equipment and the "reference signal level" of each frequency is stored. Some systems sweep the entire frequency range and store this "reference signal level". The filter to be measured, tested, or evaluated is then "inserted" between the generator and receiver that established the stored "reference signal level" on the RF test analyzer.

The measured difference without a filter ("the reference signal level") and with the filter "inserted" into the RF test equipment/analyzer is defined as insertion loss. The unit of measure for insertion loss is the decibel (dB). As noted on most curves in this bulletin, as frequency increases, the higher the insertion loss or dB value. The plot of frequency versus dB value establishes the typical insertion loss curve.

Installation Criteria

Proper installation of a filter network is critical to achieving successful filtering of electromagnetic interference. API recommends that power line filters be installed where the power line enters the equipment. The filter acts as a barrier between polluted energy and clean energy going into your equipment. It is important that the filter is connected to an effective ground plane and where proximity does not couple radiated noise to the clean lines.

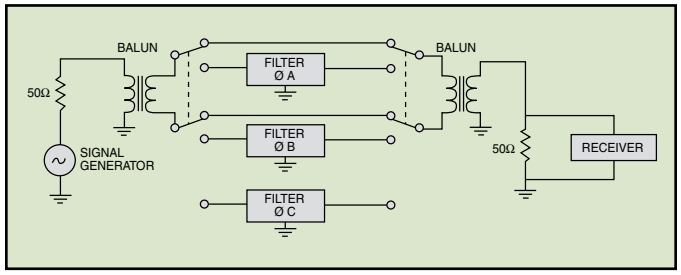
Measurement Guidelines

API Technologies has the capability to perform a wide range of tests for EMI filters. Unique custom testing systems designed by Spectrum assure the accuracy required in today's demanding environments. Testing is performed by employing a 50 ohm source and load impedance per MIL-STD-220. The individual filter performance is stated in terms of insertion loss. Overall attenuation reflects the filter's interaction within the system. Individual filter performance may differ from system to system and each application should be verified through system testing. Examples of various testing abilities and configurations are outlined below.

Differential (Normal or Symmetrical) Mode Insertion Loss

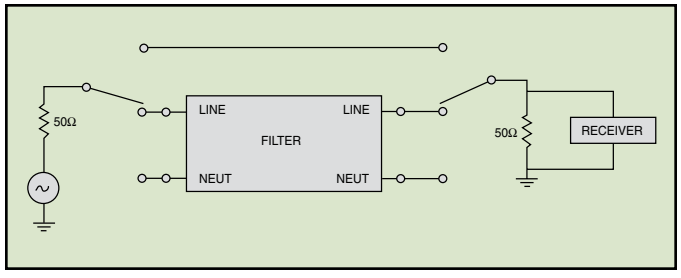
Differential mode noise is caused by non-sinusoidal conduction of rectifiers and other switching devices creating harmonic distortion.

This noise is predominant from the power frequency to approximately 10 MHz. Since it follows conventional current flow, it is considered to be of the same magnitude but opposite phase of the other line. Spectrum measures differential mode insertion loss in a 50 ohm system with Balun transformers as shown.



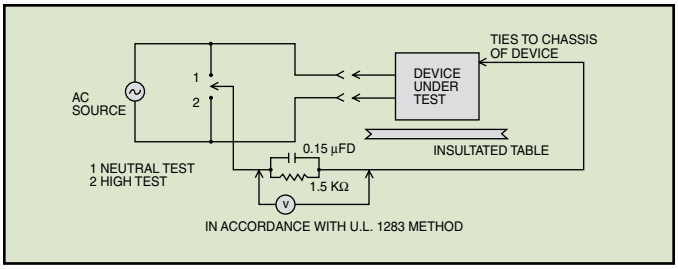
Common (Asymmetrical) Mode Insertion Loss

Since common mode insertion loss is of the same phase as the opposite line, they may not be of the same magnitude, depending on the end system circuitry. Spectrum Control tests common mode insertion loss on each line in a 50 ohm system as shown.



Leakage Current

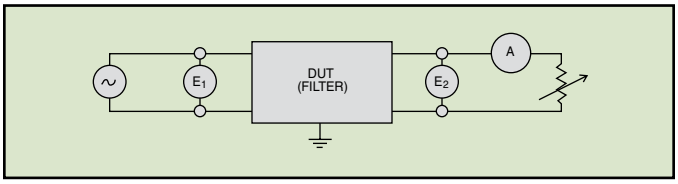
Leakage is a measurement of reactive current (capacitance) to ground per line. Spectrum uses the following test setup for leakage current measurement.



AC Voltage Drop

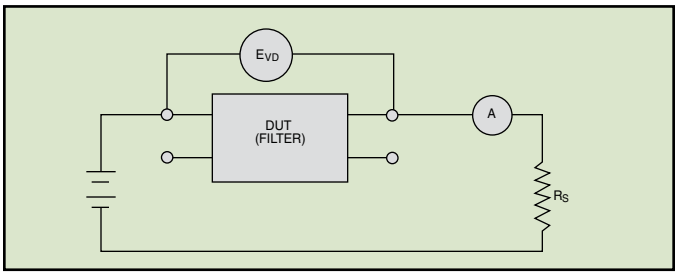
AC voltage drop is defined as E in - E out = AC voltage drop.

Spectrum Control uses the following circuit for AC voltage drop testing:



DC Voltage Drop

DC voltage drop is performed on each line individually. This test provides the total DC voltage drop for that line of the filter. The following circuit is used in testing:



api technologies corp.
Spectrum Control

Power Entry Modules, Power Line Filters & 3 Phase Power Filters Part Numbering System

Part Numbering System

Example: **12-PMB-025-5-A**

Part number 12-PMB-025-5A represents a power line filter with threaded studs, current rated for 25 Amps and with a leakage current of 0.50 mA.

12 - **PMB** - **025** - **5** - **A**

Product Line Series

10 = Filtered IEC Inlets
11 = Printed Circuit Board Mount
12 = Power Line Filters
13 = Three Phase Power Line Filters
14 = Fused or Switched & Fused Power Entry Filters (250V)
15 = Switched & Dual Fused
16 = Single Phase (250V)

Product Style

BBF = 3 Phase, terminal block connection
BFF = Bolt-in fused filter
BPF = Bolt-in IEC w/Fast-on rear terminals
BPL = Bolt-in IEC w/wire lead termination
BSF = Bolt-in switched & fused
CCL = Cylindrical, capacitive inputs w/Fast-ons
CLF = Cylindrical, inductive inputs w/wire leads
MMB = Multiple stage filtering w/threading studs
MMF = Multiple stage filtering w/Fast-on terminal
MPC = Miniature PCB mountable
PDB = 3 Phase, delta w/threaded studs
PDF = 3 Phase, delta w/Fast-ons
PDL = 3 Phase, delta w/wire leads
PMB = Power line filter w/threaded studs
PMF = Power line filter w/Fast-ons
PML = Power line filter w/wire leads
PWB = 3 Phase, wye w/threaded studs
PWE = 3 Phase, wye w/busbar
PWF = 3 Phase, wye w/Fast-ons
PWL = 3 Phase, wye w/wire leads

Current Rating

001 = 1.0 Amp
002 = 2.0 Amps
003 = 3.0 Amps
005 = 5.0 Amps
006 = 6.0 Amps
010 = 10 Amps
015 = 15 Amps
016 = 16 Amps
020 = 20 Amps
025 = 25 Amps
030 = 30 Amps
035 = 35 Amps
050 = 50 Amps
080 = 80 Amps
100 = 100 Amps
150 = 150 Amps
160 = 16.0 Amps
200 = 200 Amps
300 = 300 Amps
400 = 400 Amps
500 = 500 Amps
600 = 600 Amps

Leakage Current (Y Cap)

250 VAC
0 = 0.075 mA
1 = 0.01 mA
2 = 0.20 mA
3 = 0.35 mA
4 = 0.10mA
5 = 0.50 mA
6 = 0.60 mA
7 = 0.70 mA
8 = 1.0 mA
9 = 3.0 mA
10 = 2.0 mA
11 = 1.5 mA
12 = 4.5 mA
13 = 9.0 mA
14 = 20.0 mA
15 = 15.0 mA
17 = 33.0 mA
18 = 71.5 mA
DC = DC

125VAC
DC = DC

Outline Drawing/ Case Style

1 Select case style from following
* Cylindrical
* Power line w/Fast-on
* Power line w/threaded studs
* Power line w/wire leads
* PCB mount
* Large case 3 Phase delta
* Large case 3 Phase wye
* IEC Inlet

2 Refer to drawing list per selected case style

3 Letter at the end of the part is found in the case style drawing list: A, B, C, D, E, F, etc.

** Note: Not all series offer the product style, rating and leakage current*

api technologies corp.
Spectrum Control

Power Entry Modules, Power Line Filters & 3 Phase Power Filters Part Numbering System

Part Numbering System

Example: **60-BPR-060-5-4**

Part number 60-BPR-060-5-4 represents a power entry module, bolt-in style with fast-on terminals, a current rating of 6 Amps, leakage current of 0.50 mA and capacitance of 0.047 µF.

60 - **BPR** - **060** - **5** - **4**

Product Line Series

- **60** = Power Entry Modules
- **61** = Mini PCB Power Filters
- **62** = Power Line Filters
- **63** = Three Phase Power Line Filters
- **64** = Fused or Switched & Fused Power Entry Filters (250V)
- **65** = Fused or Switched & Fused Power Entry Filters (125V)
- **66** = Fused or Switched & Fused Low Leakage Power Entry Filters (250V)
- **67** = Fused or Switched & Fused Low Leakage Power Entry Filters (125V)
- **68** = Switched & Dual Fused Power Entry Filters
- **69** = Dual Fused Only or Dual Switched Only Power Entry Filters

Product Style

- **AFL** = Appliance filter w/ inductive input
- **AFC** = Appliance filter w/ capacitive input
- **ARL** = AFL plus bleeder resistor
- **BFF** = Fused filter w/ Fast-on terminals
- **BFS** = Fused filter w/solder lug terminals
- **BHP** = High frequency bolt-in for PCB
- **BHS** = High frequency bolt-in w/solder lugs
- **BPF** = Bolt-In right angle terminals
- **BPL** = Bolt-in w/wire leads
- **BPP** = Bolt-in PCB mount
- **BPR** = Bolt-in w/Fast-on tab terminals
- **BPS** = Bolt-in w/ solder lug terminals
- **BSF** = Bolt-in switched & fused
- **MMF** = Metal case w/fast-on tabs
- **MPC** = Miniature printed circuit board
- **PMB** = Metal case w/bolt-on terminals
- **PMF** = Metal case w/Fast-on tabs
- **PML** = Metal case w/wire leads
- **PPF** = Plastic case w/Fast-on tabs
- **PQF** = Plastic case w/Fast-on tabs
- **PRF** = Plastic case w/Fast-on tabs
- **SOF** = Switched filter w/ Fast-on tabs
- **SOS** = Switched filter w/ solder tabs
- **SPL** = Snap-in w/wire leads
- **SPR** = Snap-in w/Fast-on terminals
- **SPS** = Snap-in w/solder lug terminals
- **SSF** = Snap-in switched & fused
- **ARC** = AFC plus bleeder resistor

Current Rating

- **010** = 1.0 Amps
- **015** = 1.5 Amps
- **016** = 1.6 Amps
- **020** = 2.0 Amps
- **030** = 3.0 Amps
- **040** = 4.0 Amps
- **050** = 5.0 Amps
- **060** = 6.0 Amps
- **080** = 8.0 Amps
- **100** = 10.0 Amps
- **150** = 15.0 Amps
- **160** = 16.0 Amps
- **200** = 20.0 Amps
- **300** = 30.0 Amps
- **400** = 40.0 Amps

Leakage Current (Y Cap)

250 VAC	125VAC
0 = 0.075 mA	**0** = 0.035 mA
1 = 0.01 mA	**1** = 0.005 mA
2 = 0.20 mA	**3** = 0.35 mA
3 = 0.35 mA	**4** = 0.05 mA
4 = 0.10 mA	**5** = 0.50 mA
5 = 0.50 mA	**6** = 0.60 mA
6 = 0.60 mA	**7** = 0.70 mA
7 = 0.70 mA	**8** = 1.00 mA
8 = 1.00 mA	**9** = 3.00 mA
9 = 3.00 mA	

Capacitance (X Cap)

- **0** = none
- **1** = 0.01µF
- **2** = 0.022µF
- **3** = 0.033µF
- **4** = 0.047µF
- **5** = 0.050µF
- **6** = 0.068µF
- **01** = 2 x 0.01µF
- **02** = 0.10µF & 0.22µF
- **04** = 2 x 0.22µF
- **06** = 2 x 0.4µF & 0.22µF
- **10** = 0.15µF
- **11** = 0.10µF
- **12** = 0.22µF
- **13** = 0.33µF
- **14** = 0.47µF
- **16** = 0.22µF & 2 x 0.33µF
- **21** = 1.00µF

** Note: Not all series offer the product style, rating and leakage current*

api technologies corp.
Spectrum Control

High Current
DC Single Line Feed-through Series

RoHS COMPLIANT

Features

- Voltage rating of 130VDC
- C configuration with Class Y4 capacitors
- Current rating up to 300 Amps
- Operating temperature range: -40°C to +85°C
- Excellent filtering in compact package
- Bolt-in style with D-shaped bushing for easy installation
- Low cost EMI solution
- Design flexibility
- UL and Semko approved

Applications

- Telecommunications (cellular base stations, telephone switching racks, etc.)
- Power supplies
- Medical equipment
- C.O.T.S. (Commercial-Off-The-Shelf) Military
- Industrial equipment controls
- Data transmission equipment

Specifications

Part Number	Rated Current	Min. Cap.	Minimum Insertion Loss (db)*					
			.01MHz	.10MHz	1MHz	10MHz	100MHz	1000MHz
52F226-011-10	10A	10nF	–	–	4	21	41	60
52F226-011-16	16A							
52F226-011-32	32A							
52F226-011-63	63A							
52F226-011-100	100A	47nF		2	15	34	53	74
52F226-011-200	200A	100nF		5	21	40	60	85
52F226-011-250	250A							
52F226-011-300	300A							
52F226-021-16	16A	47nF		2	15	34	53	74
52F226-021-32	32A							
52F226-021-63	63A							
52F226-021-100	100A	100nF		5	21	40	60	85
52F226-021-200	200A	470nF	2	16	33	52	75	90
52F226-021-250	250A							
52F226-021-300	300A							
52F226-031-16	16A	100nF	–	5	21	40	60	85
52F226-031-32	32A							
52F226-031-63	63A							
52F226-031-100	100A	470nF	2	16	33	52	75	90
52F226-031-200	200A	1000nF	6	20	40	60	85	
52F226-031-250	250A							
52F226-031-300	300A							
52F226-041-16	16A	470nF	2	16	33	52	75	
52F226-041-32	32A							
52F226-041-63	63A							
52F226-041-100	100A	1000nF	6	20	40	60	85	
52F226-041-200	200A	4700nF	15	35	54	74	90	

* Optimum performance with proper installation

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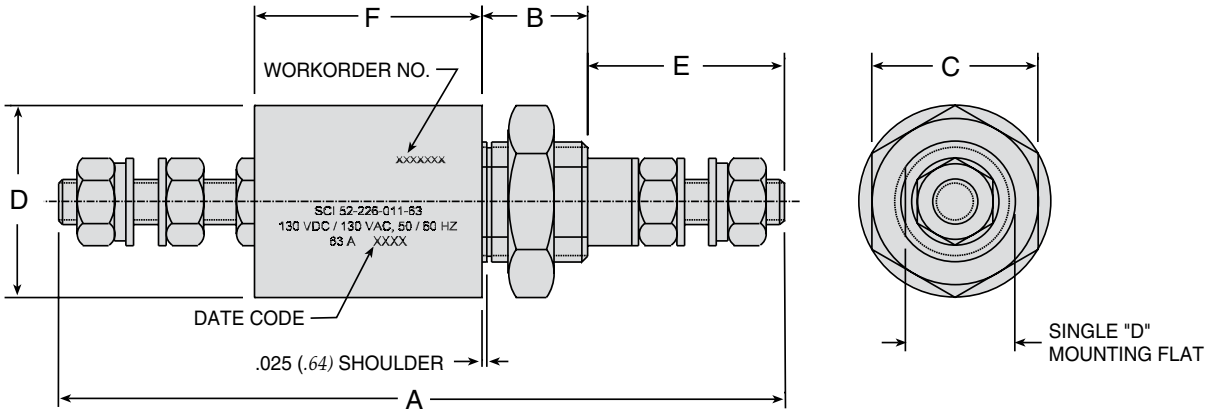
api technologies corp.
Spectrum Control

High Current
DC Single Line Feed-through Series



Dimensions

Part Number	A	B	C	D	E	F
52F226-011-10	2.24 *(57)*	0.39 *(10)*	0.51 *(13)*	0.56 *(14.29)*	0.63 *(16)*	0.71 *(18)*
52F226-011-16	2.48 (63)	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.71 *(18)*	
52F226-011-32						
52F226-011-63	3.78 *(96)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	1.18 *(30)*
52F226-011-100	4.45 *(113)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.26 *(32)*	1.30 *(33)*
52F226-011-200	5.12 *(130)*	0.75 *(19)*			1.57 *(40)*	
52F226-011-250	5.83 *(148)*		1.57 *(40)*	2 *(50.80)*	1.81 *(46)*	1.65 *(42)*
52F226-011-300						
52F226-021-16	2.95 *(75)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.71 *(18)*	1.18 *(30)*
52F226-021-32						
52F226-021-63	3.78 *(96)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	
52F226-021-100	4.45 *(113)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.26 *(32)*	1.30 *(33)*
52F226-021-200	5.12 *(130)*	0.75 *(19)*			1.57 *(40)*	
52F226-021-250	6.30 *(160)*		1.57 *(40)*	2 *(50.80)*	1.81 *(46)*	2.13 *(54)*
52F226-021-300						
52F226-031-16	2.95 *(75)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.71 *(18)*	1.18 *(30)*
52F226-031-32						
52F226-031-63	3.78 *(96)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	
52F226-031-100	4.45 *(113)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.26 *(32)*	1.30 *(33)*
52F226-031-200	5.79 *(147)*	0.75 *(19)*		1.5 *(38.10)*	1.57 *(40)*	1.97 *(50)*
52F226-031-250	7.01 *(178)*		1.57 *(40)*	2 *(50.80)*	1.81 *(46)*	2.83 *(72)*
52F226-031-300						
52F226-041-16	3.23 *(82)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	0.71 *(18)*	1.30 *(33)*
52F226-041-32						
52F226-041-63	3.98 *(101)*				1.02 *(26)*	
52F226-041-100	5.24 *(133)*	0.75 *(19)*		1.5 *(38.10)*	1.26 *(32)*	1.97 *(50)*
52F226-041-200	6.50 *(165)*		1.57 *(40)*	2 *(50.80)*	1.57 *(40)*	2.68 *(68)*

Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

High Current
DC Single Line Pi Series

RoHS COMPLIANT

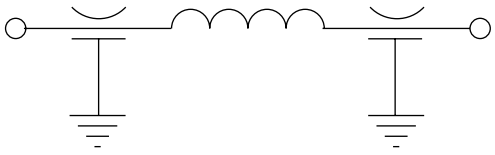
Features

- Voltage rating of 130VDC
- Pi configuration with Class Y4 capacitors
- Current rating up to 200 Amps
- Excellent filtering in compact package
- Bolt-in style with D-shaped bushing for easy installation
- Low cost EMI solution
- UL and Semko approved

Applications

- Telecommunications (cellular base stations, telephone switching racks, etc.)
- Power supplies
- Medical equipment
- C.O.T.S. (Commercial-Off-The-Shelf) Military
- Industrial equipment controls
- Data transmission equipment

Circuit Diagram



Specifications

Part Number	Rated Current	Min. Cap. (2X)	Minimum Insertion Loss (db) *					
			.01MHz	.10MHz	1MHz	10MHz	100MHz	1000MHz
Standard Performance								
52F226-020-10	10A	10nF	–	0.5	8	23	70	90
52F226-020-16	16A					35		
52F226-020-32	32A			2	10	23	50	
52F226-020-63	63A	100nF		8	27	67	90	
52F226-020-100	100A	470nF	4	21	30	70		
52F226-020-200	200A		7	23		60		
High Performance								
52F226-029-10	10A	100nF	–	8	25	75	90	90
52F226-029-16	16A							
52F226-029-32	32A							
52F226-029-63	63A	470nF	4	21	35	70		
52F226-029-100	100A	1000nF	8	26	57	73		
52F226-029-200	200A	4700nF	20	40	85	90		

* Optimum performance with proper installation

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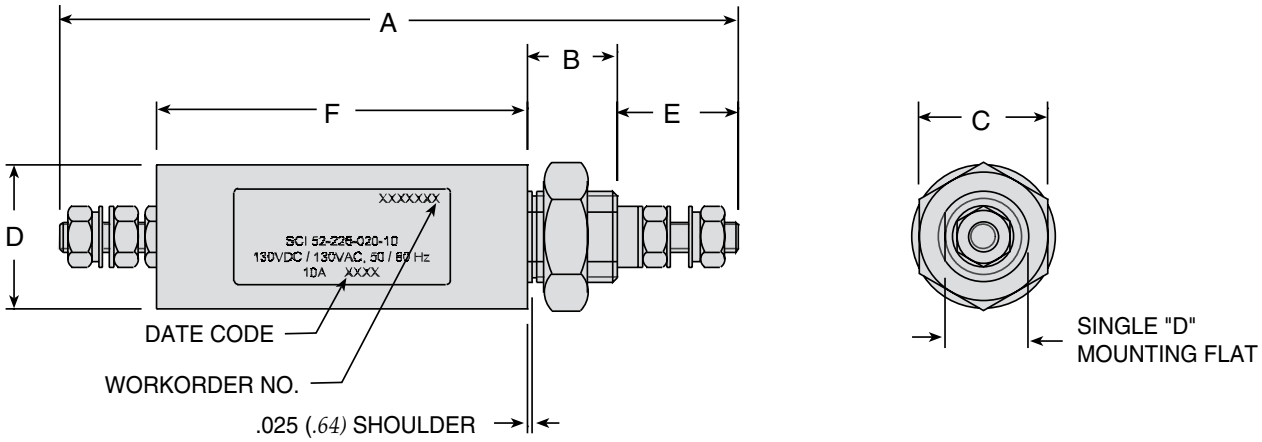
Spectrum Control

High Current
DC Single Line
P_i Series



Dimensions

Part Number	A	B	C	D	E	F
Standard Performance						
52F226-020-10	3.54 *(90)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.63 *(16)*	1.93 *(49)*
52F226-020-16	3.86 (98)				0.71 *(18)*	2.09 *(53)*
52F226-020-32						
52F226-020-63	6.30 *(160)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	3.70 *(94)*
52F226-020-100	7.24 *(184)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.26 *(32)*	4.09 *(104)*
52F226-020-200	8.23 *(209)*	0.75 *(19)*		1.50 *(38.10)*	1.57 *(40)*	4.41 *(112)*
High Performance						
52F226-029-10	5.12 *(130)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.63 *(16)*	3.50 *(89)*
52F226-029-16	5.47 *(139)*				0.71 *(18)*	3.70 *(94)*
52F226-029-32						
52F226-029-63	6.81 *(173)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.02 *(26)*	4.13 *(105)*
52F226-029-100	8.98 *(228)*	0.75 *(19)*		1.50 *(38.10)*	1.26 *(32)*	5.71 *(145)*
52F226-029-200	11 *(279)*		1.57 *(40)*	2 *(50.80)*	1.57 *(40)*	7.17 *(182)*

Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

High Current
AC Single Line Feed-through Series

RoHS COMPLIANT

Features

- Voltage rating of 250VAC
- C configuration with Class Y2 capacitors
- Current rating up to 300 Amps
- Excellent filtering in compact package
- Bolt-in style with D-shaped bushing for easy installation
- Low cost EMI solution
- Design flexibility
- UL and Semko approvals pending

Applications

- Telecommunications (cellular base stations, telephone switching racks, etc.)
- Power supplies
- Medical equipment
- C.O.T.S. (Commercial-Off-The-Shelf) Military
- Industrial equipment controls
- Data transmission equipment

Specifications

Part Number	Rated Current	Min. Cap.	Minimum Insertion Loss (db) *					
			.01MHz	.10MHz	1MHz	10MHz	100MHz	1000MHz
52F226-016-10	10A	2.2nF			-	9	30	45
52F226-016-16	16A	4.7nF		–	2	15	34	54
52F226-016-32	32A							
52F226-016-63	63A	10nF			4	21	41	60
52F226-016-100	100A	47nF		2	15	34	53	74
52F226-016-200	200A	100nF		5	21	40	60	85
52F226-016-250	250A							
52F226-016-300	300A							
52F226-026-10	10A	4.7nF			2	15	34	54
52F226-026-16	16A	10nF		–	4	21	41	60
52F226-026-32	32A		–					
52F226-026-63	63A	47nF		2	15	34	53	74
52F226-026-100	100A	100nF		5	21	40	60	85
52F226-026-200	200A	220nF		10	27	47	67	90
52F226-026-250	250A							
52F226-026-300	300A							
52F226-036-16	16A	47nF		2	15	34	53	74
52F226-036-32	32A	33nF		3	16	35		90
52F226-036-63	63A	100nF		5	21	40	60	85
52F226-036-100	100A	220nF		10	27	47	67	90
52F226-036-200	200A	470nF	2	16	33	52	75	
52F226-036-250	250A							
52F226-036-300	300A							
52F226-046-16	16A	100nF		5	21	40	60	85
52F226-046-32	32A	47nF	–	2	15	34	53	74
52F226-046-63	63A	220nF		10	27	47	67	90
52F226-046-100	100A	470nF	2	16	33	52	75	
52F226-046-200	200A	1000nF	6	20	40	60	85	
52F226-046-250	250A							
52F226-046-300	300A							

* Optimum performance with proper installation

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
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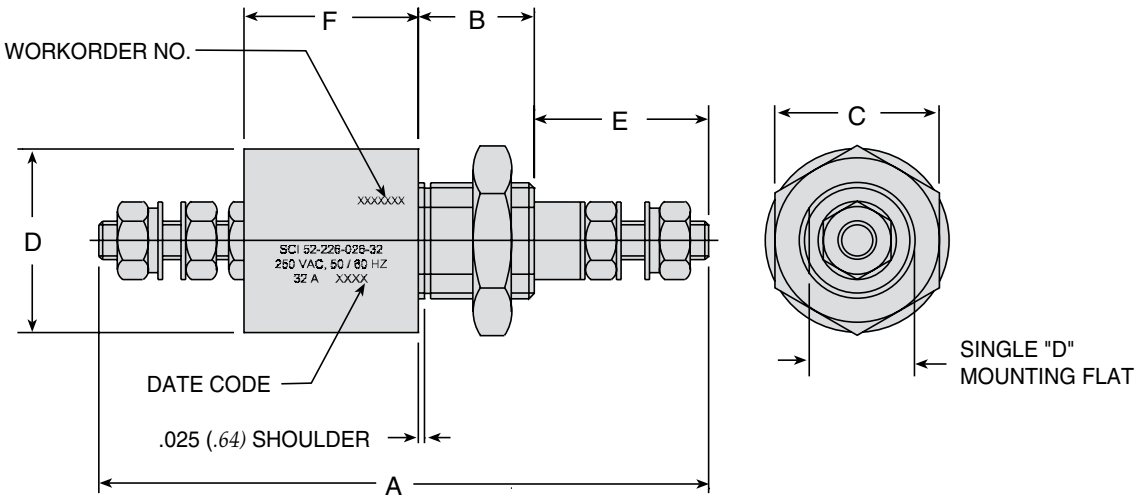
api technologies corp.
Spectrum Control

High Current
AC Single Line Feed-through Series



Dimensions

Part Number	A	B	C	D	E	F
52F226-016-10	2.24 *(57)*	0.39 *(10)*	0.51 *(13)*	0.56 *(14.29)*	0.63 *(16)*	0.71 *(18)*
52F226-016-16	2.48 (63)	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.71 *(18)*	
52F226-016-32						
52F226-016-63	3.78 *(96)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	1.18 *(30)*
52F226-016-100	4.45 *(113)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.26 *(32)*	1.30 *(33)*
52F226-016-200	5.12 *(130)*	0.75 *(19)*		1.5 *(38.10)*	1.57 *(40)*	
52F226-016-250	5.83 *(148)*		1.57 *(40)*	2 *(50.80)*	1.81 *(46)*	1.65 *(42)*
52F226-016-300						
52F226-026-10	2.24 *(57)*	0.39 *(10)*	0.51 *(13)*	0.56 *(14.29)*	0.63 *(16)*	0.71 *(18)*
52F226-026-16	2.48 *(63)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.71 *(18)*	
52F226-026-32						
52F226-026-63	3.78 *(96)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	1.18 *(30)*
52F226-026-100	4.45 *(113)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.26 *(32)*	1.30 *(33)*
52F226-026-200	5.12 *(130)*	0.75 *(19)*		1.5 *(38.10)*	1.57 *(40)*	
52F226-026-250	5.83 *(148)*		1.57 *(40)*	2 *(50.80)*	1.81 *(46)*	1.65 *(42)*
52F226-026-300						
52F226-036-16	2.95 *(75)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.71 *(18)*	1.18 *(30)*
52F226-036-32						
52F226-036-63	3.78 *(96)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	
52F226-036-100	4.57 *(116)*	0.75 *(19)*	1.06 *(27)*	1.5 *(38.10)*	1.26 *(32)*	1.30 *(33)*
52F226-036-200	5.79 *(147)*		1.57 *(40)*		1.57 *(40)*	1.97 *(50)*
52F226-036-250	6.30 *(160)*			2 *(50.80)*	1.81 *(46)*	2.13 *(54)*
52F226-036-300						
52F226-046-16	3.03 *(77)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	0.71 *(18)*	1.18 *(30)*
52F226-046-32	2.95 *(75)*	0.47 *(12)*	0.67 *(17)*			
52F226-046-63	4.45 *(113)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.02 *(26)*	1.30 *(33)*
52F226-046-100	5.24 *(133)*	0.75 *(19)*		1.5 *(38.10)*	1.26 *(32)*	1.97 *(50)*
52F226-046-200	5.79 *(147)*		1.57 *(40)*	2 *(50.80)*	1.57 *(40)*	
52F226-046-250	6.30 *(160)*				1.81 *(46)*	2.13 *(54)*
52F226-046-300						

Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

High Current
AC Single Line Pi Series

RoHS COMPLIANT

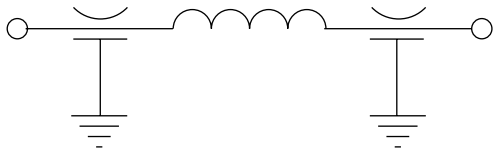
Features

- Voltage rating of 250VAC
- Pi configuration with Class Y2 capacitors
- Current rating up to 300 Amps
- Excellent filtering in compact package
- Bolt-in style with D-shaped bushing for easy installation
- Low cost EMI solution
- Design flexibility
- UL and Semko approvals pending

Applications

- Telecommunications (cellular base stations, telephone switching racks, etc.)
- Power supplies
- Medical equipment
- C.O.T.S. (Commercial-Off-The-Shelf) Military
- Industrial equipment controls
- Data transmission equipment

Circuit Diagram



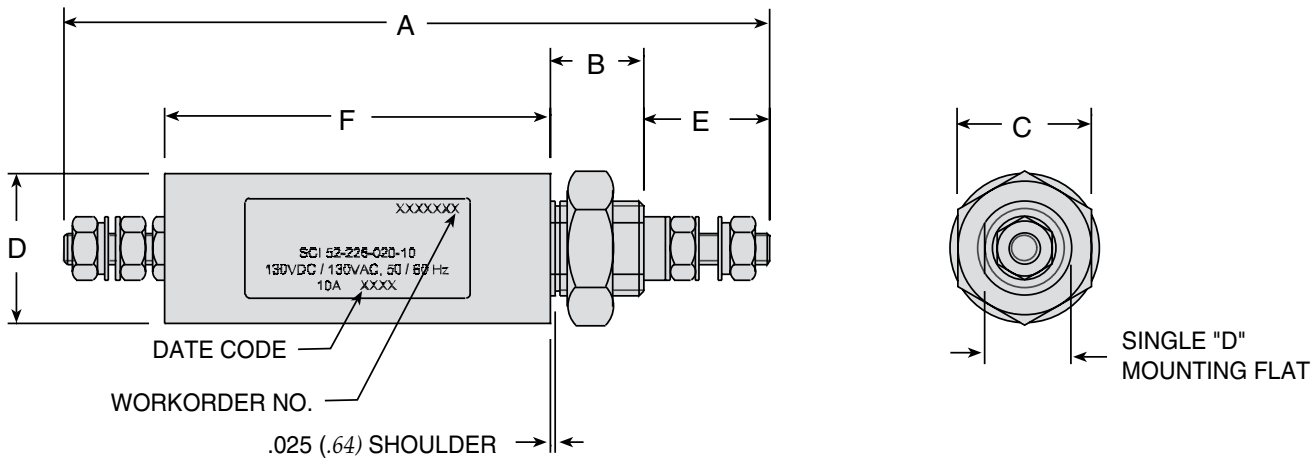
Specifications

Part Number	Rated Current	Min. Cap. (2X)	Minimum Insertion Loss (db) *					
			.01MHz	.10MHz	1MHz	10MHz	100MHz	1000MHz
Standard Performance								
52F226-037-10	10A	4.7nF	–	–	4	19	77	90
52F226-037-16	16A	10nF		1	8	22	50	
52F226-037-32	32A							
52F226-037-63	63A	47nF		4	21	52	80	
52F226-037-100	100A	100nF	1	8	25	73	90	
52F226-037-200	200A			9	26	75		
52F226-037-250	250A							
52F226-037-300	300A							
High Performance								
52F226-019-10	10A	10nF	–	1	9	30	80	90
52F226-019-16	16A	22nF		3	15	47		
52F226-019-32	32A							
52F226-019-63	63A	150nF	1	12	27	75	90	
52F226-019-100	100A	470nF	4	21	39	85		
52F226-019-200	200A				57			
52F226-019-250	250A							
52F226-019-300	300A							

* Optimum performance with proper installation

api technologies corp.
Spectrum Control

High Current
AC Single Line
Pi Series



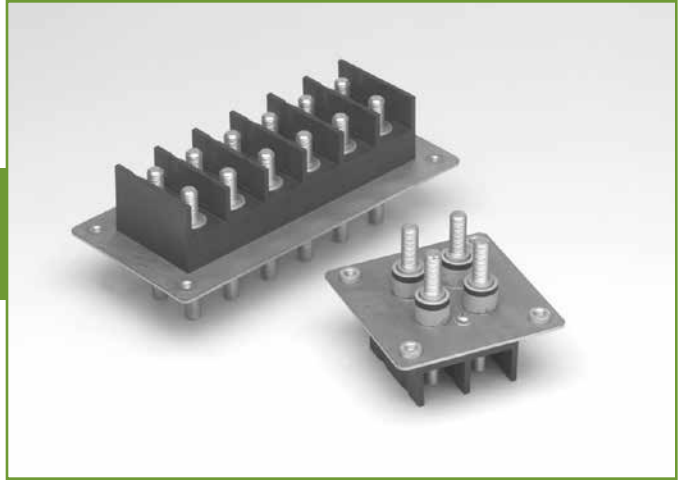
Dimensions

Part Number	A	B	C	D	E	F
Standard Performance						
52F226-037-10	3.86 *(98)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.63 *(16)*	2.24 *(57)*
52F226-037-16	4.17 (106)				0.71 *(18)*	2.40 *(61)*
52F226-037-32						
52F226-037-63	6.30 *(160)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	1.02 *(26)*	3.7 *(94)*
52F226-037-100	7.24 *(184)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.26 *(32)*	4.09 *(104)*
52F226-037-200	8.23 *(209)*	0.75 *(19)*		1.5 *(38.10)*	1.57 *(40)*	4.41 *(112)*
52F226-037-250	7.87 *(200)*		1.57 *(40)*		1.81 *(46)*	3.66 *(93)*
52F226-037-300						
High Performance						
52F226-019-10	4.21 *(107)*	0.47 *(12)*	0.67 *(17)*	0.75 *(19.05)*	0.63 *(16)*	2.6 *(66)*
52F226-019-16	4.57 *(116)*	0.55 *(14)*	0.87 *(22)*	1 *(25.40)*	0.71 *(18)*	2.72 *(69)*
52F226-019-32						
52F226-019-63	6.81 *(173)*	0.63 *(16)*	1.06 *(27)*	1.25 *(31.75)*	1.02 *(26)*	4.13 *(105)*
52F226-019-100	8.98 *(228)*	0.75 *(19)*		1.5 *(38.10)*	1.26 *(32)*	5.71 *(145)*
52F226-019-200	9.57 *(243)*		1.57 *(40)*	2 *(50.80)*	1.57 *(40)*	5.75 *(146)*
52F226-019-250	10.5 *(267)*					6.30 *(160)*
52F226-019-300						

Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

High Current Filtered Terminal Blocks

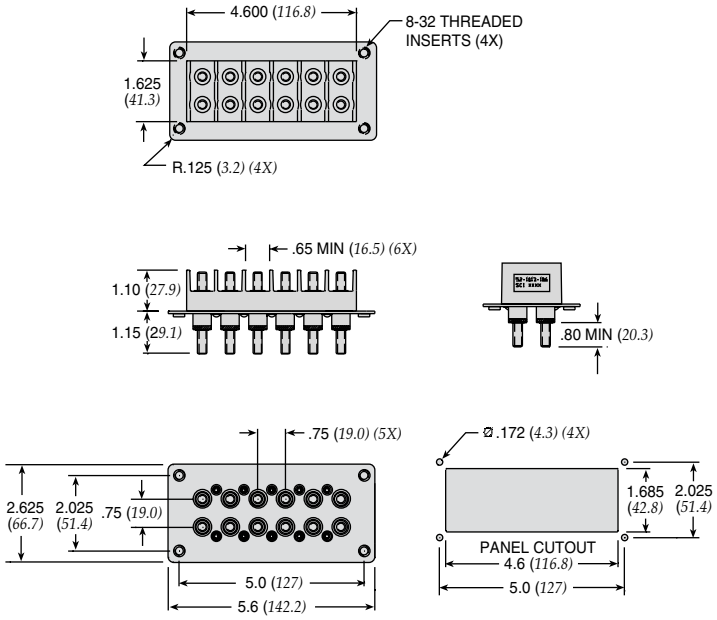


Features

- Ideal for high current applications
- Design flexibility
- Available in 2 x 2 through 2 x 6 positions
- UL approved

Applications

- Telecommunications switching networks
- Cellular base stations
- Power supplies
- UPS
- Instrumentation
- High reliability radar and transmission systems
- Industrial controls
- Power distribution



Specifications

ELECTRICAL

Voltage rating:	100 VDC per terminal
Capacitance:	.015µF* +80% / -20% per cap .030µF +80% / -20% per pair
Dielectric withstanding voltage:	1000VDC for 1 minute
Current rating:	60 Amps max per terminal

Typical Insertion Loss — dB: In 50 Ohm Circuit

1 MHz..... 8	70 MHz..... 36
5 MHz..... 24	100 MHz..... 33
10 MHz..... 32	160 MHz..... 25
50 MHz..... 38	200 MHz..... 25

MECHANICAL

Center spacing:	US .200: (5.08 mm)
Wire size:	AWG #12-26
Screw material:	Steel, zinc chromate plate
Recommended PCB hole diameter:	.05" (1.30 mm) contact hole
Molded material:	UL rated 94VO polyamide
Tightening torque:	2.5 in.-lbs. max. (28 Ncm)
Terminal:	Brass, tin-plated

*** For filter elements with additional capacitance values, consult factory.**

Part Number	Number of Terminals	A		B		C	
		in.	(mm)	in.	(mm)	in.	(mm)
52-1013-102	2x2	2.60	66.04	2.00	50.80	1.66	42.16
52-1013-103	2x3	3.35	85.09	2.75	69.85	2.41	61.21
52-1013-104	2x4	4.10	104.14	3.50	88.90	3.16	80.25
52-1013-105	2x5	4.85	123.19	4.25	107.95	3.91	99.31
52-1013-106	2x6	5.60	142.24	5.00	127.00	4.66	118.36

Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Rear Terminals

60-BPR & BPS Series

Tested and found to be IAW VDE 0565 Part 3.

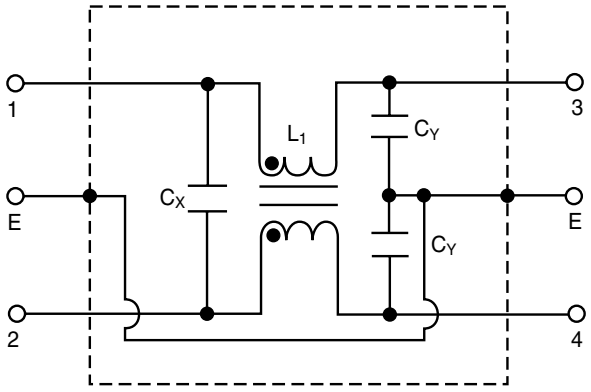
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Solder lug and Fast-on tab terminals available
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF17)
- UL approved low leakage version also available

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
60-XXX-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	.022uF ± 20%	6.0mH	30°C
60-XXX-010-3-4					.047uF ± 20%		
60-XXX-010-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-010-5-4					.047uF ± 20%		
60-XXX-020-3-2	250VAC	2A	0.35mA	2200pF ± 20%	.022uF ± 20%	2.4mH	30°C
60-XXX-020-3-4					.047uF ± 20%		
60-XXX-020-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-020-5-4					.047uF ± 20%		
60-XXX-030-3-2	250VAC	3A	0.35mA	2200pF ± 20%	.022uF ± 20%	1.2mH	30°C
60-XXX-030-3-4					.047uF ± 20%		
60-XXX-030-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-030-5-4					.047uF ± 20%		
60-XXX-060-3-2	250VAC	6A	0.35mA	2200pF ± 20%	.022uF ± 20%	0.53mH	45°C
60-XXX-060-3-4					.047uF ± 20%		
60-XXX-060-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-060-5-4					.047uF ± 20%		
60-XXX-100-3-2	250VAC	10A	0.35mA	2200pF ± 20%	.022uF ± 20%	0.26mH	45°C
60-XXX-100-5-2			0.50mA	3300pF ± 20%			
60-BPR-150-3-11	250VAC	15A	0.35mA	2200pF ± 20%	.1uF ± 20%	0.15mH	45°C

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 45g
Input: Compatible with IEC-320

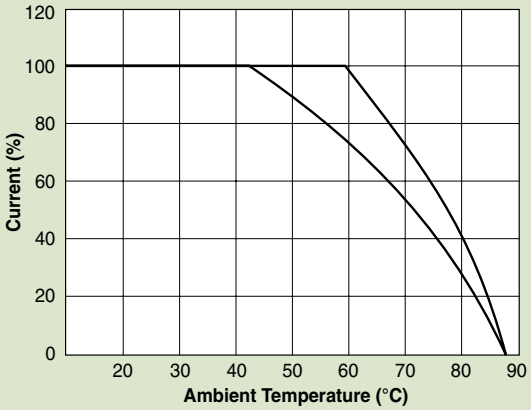
*** Substitute BPR or BPS for XXX**
BPS - Solder lug terminals
BPR - Fast-on tab terminals

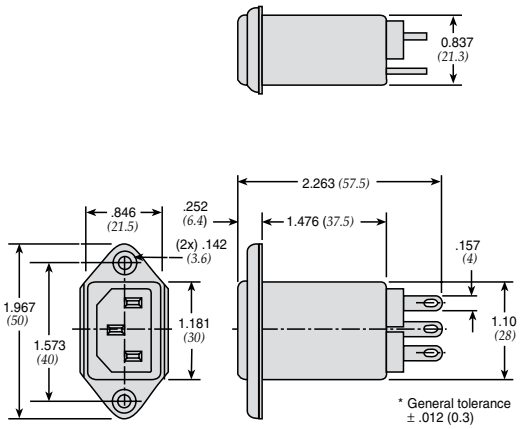
api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Rear Terminals

60-BPR & BPS Series

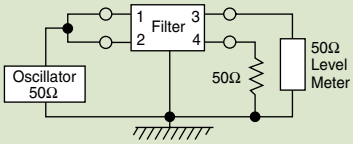
Temperature Characteristics



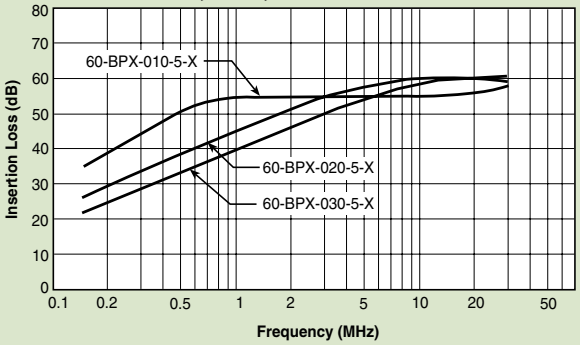


Dimensions in inches (*mm*)

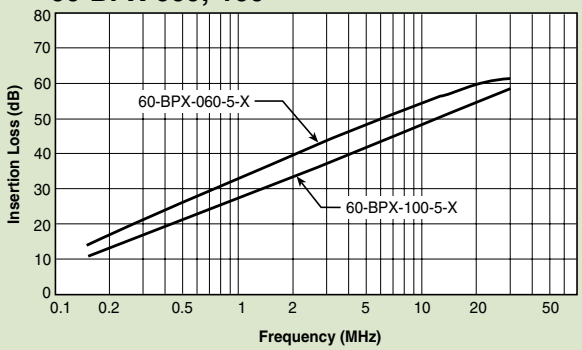
Common Mode



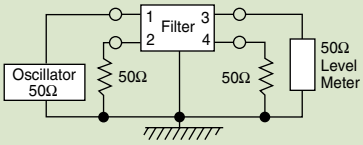
60-BPX-010;-020;-030



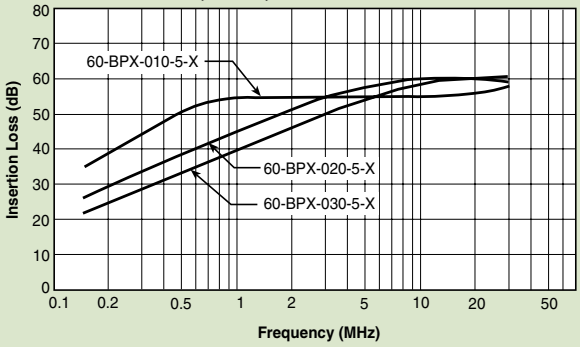
60-BPX-060;-100



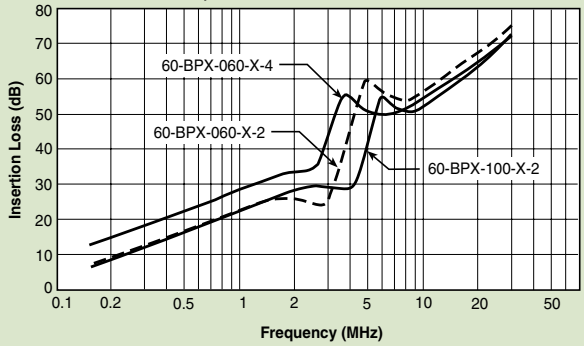
Normal Mode



60-BPX-010;-020;-030



60-BPX-060;-100



api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Right Angle Terminals

60-BPF Series

Tested and found to be IAW VDE 0565 Part 3.

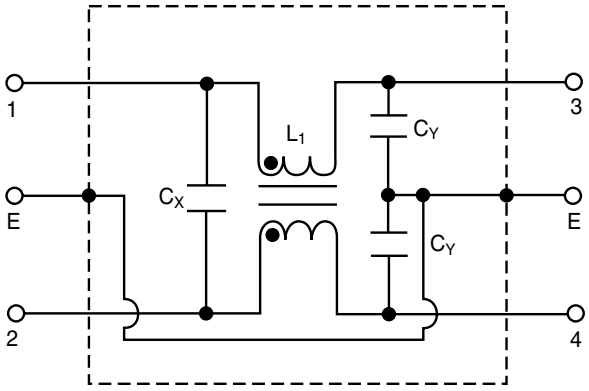
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- PCB mounting types available (see page PF46)
- Length under tab is shortened for small spaces
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF19)
- UL approved low leakage version also available

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
60-BPF-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	.022uF ± 20%	6.0mH	30°C
60-BPF-010-3-4					.047uF ± 20%		
60-BPF-010-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-BPF-010-5-4					.047uF ± 20%		
60-BPF-020-3-2	250VAC	2A	0.35mA	2200pF ± 20%	.022uF ± 20%	2.4mH	30°C
60-BPF-020-3-4					.047uF ± 20%		
60-BPF-020-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-BPF-020-5-4					.047uF ± 20%		
60-BPF-030-3-2	250VAC	3A	0.35mA	2200pF ± 20%	.022uF ± 20%	1.2mH	30°C
60-BPF-030-3-4					.047uF ± 20%		
60-BPF-030-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-BPF-030-5-4					.047uF ± 20%		
60-BPF-060-3-2	250VAC	6A	0.35mA	2200pF ± 20%	.022uF ± 20%	0.53mH	45°C
60-BPF-060-3-4					.047uF ± 20%		
60-BPF-060-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-BPF-060-5-4					.047uF ± 20%		

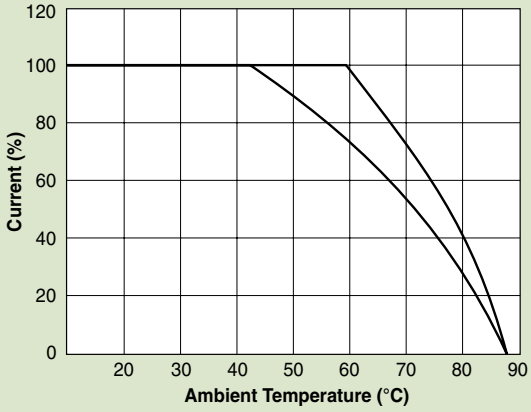
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

api technologies corp.
Spectrum Control

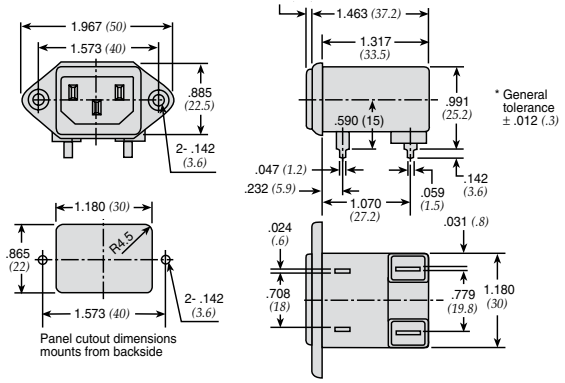
Power Entry Modules
Bolt-in Right Angle Terminals

60-BPF Series

Temperature Characteristics

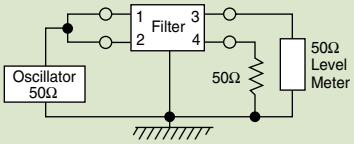


60-BPF Fast-on Terminals

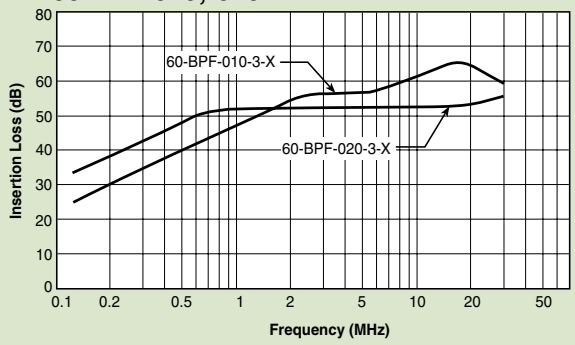


Dimensions in inches *(mm)*

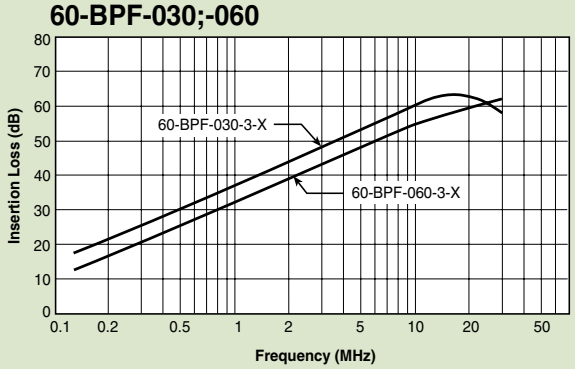
Common Mode



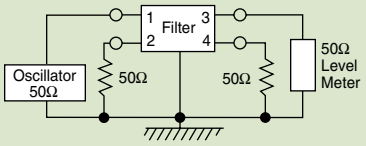
60-BPF-010;-020



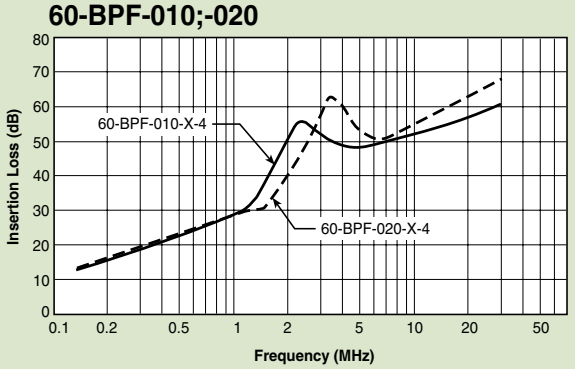
60-BPF-030;-060



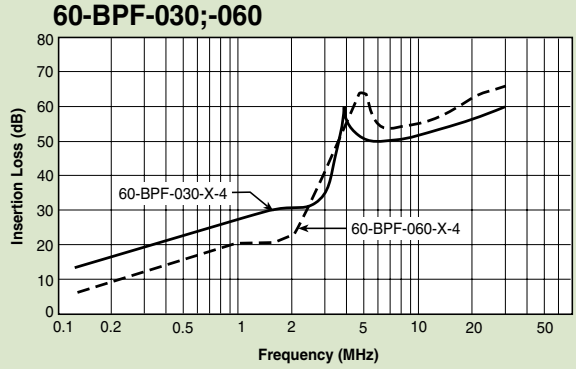
Normal Mode



60-BPF-010;-020



60-BPF-030;-060



api technologies corp.
Spectrum Control

Power Entry Modules
High Frequency Attenuation

60-BHS Series

Tested and found to be IAW VDE 0565 Part 3.

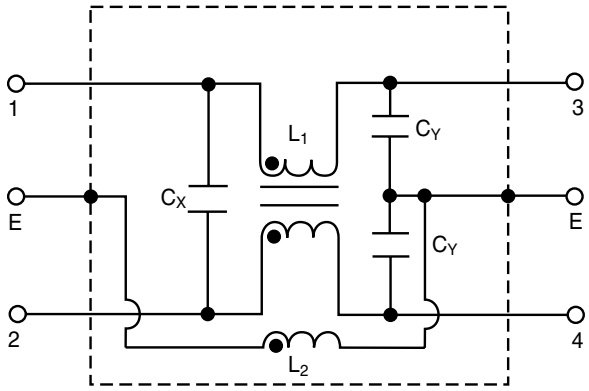
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal cased miniature filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- PCB mounting types available (see page PF48)
- PCB mounting minimizes space and provides economical installation
- Excellent filtering characteristics for high frequencies
- Earth coil standard
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF21)

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Inductance (L_2)	Temperature Rise (Max.)
60-BHS-010-3-11	250VAC	1A	0.35mA	2200pF ± 20%	0.1uF ± 20%	6mH	18.3uH	30°C
60-BHS-010-3-4					.047uF ± 20%			
60-BHS-010-5-11			0.50mA	3300pF ± 20%	0.1uF ± 20%			
60-BHS-010-5-4					.047uF ± 20%			
60-BHS-020-3-11	250VAC	2A	0.35mA	2200pF ± 20%	0.1uF ± 20%	2.4mH	18.3uH	30°C
60-BHS-020-3-4					.047uF ± 20%			
60-BHS-020-5-11			0.50mA	3300pF ± 20%	0.1uF ± 20%			
60-BHS-020-5-4					.047uF ± 20%			
60-BHS-030-3-11	250VAC	3A	0.35mA	2200pF ± 20%	0.1uF ± 20%	1.2mH	18.3uH	30°C
60-BHS-030-3-4					.047uF ± 20%			
60-BHS-030-5-11			0.50mA	3300pF ± 20%	0.1uF ± 20%			
60-BHS-030-5-4					.047uF ± 20%			
60-BHS-060-3-11	250VAC	6A	0.35mA	2200pF ± 20%	0.1uF ± 20%	.53mH	18.3uH	45°C
60-BHS-060-3-4					.047uF ± 20%			
60-BHS-060-5-11			0.50mA	3300pF ± 20%	0.1uF ± 20%			
60-BHS-060-5-4					.047uF ± 20%			

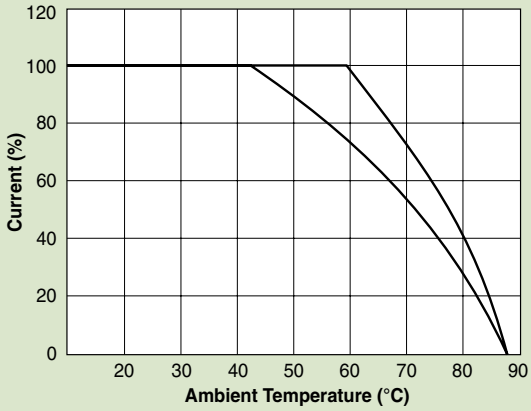
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

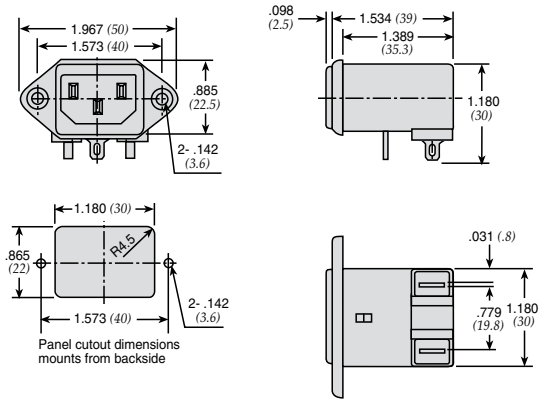
api technologies corp.
Spectrum Control

Power Entry Modules
High Frequency Attenuation

60-BHS Series

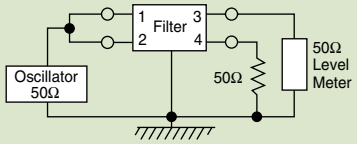
Temperature Characteristics



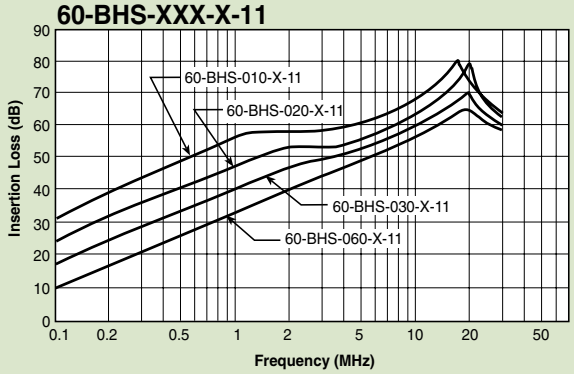


Dimensions in inches *(mm)*

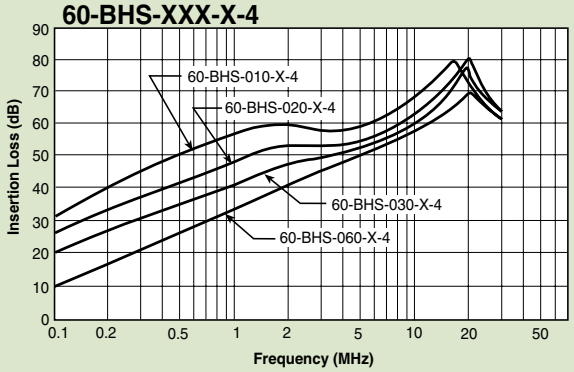
Common Mode



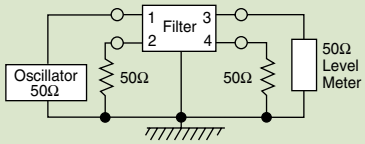
60-BHS-XXX-X-11



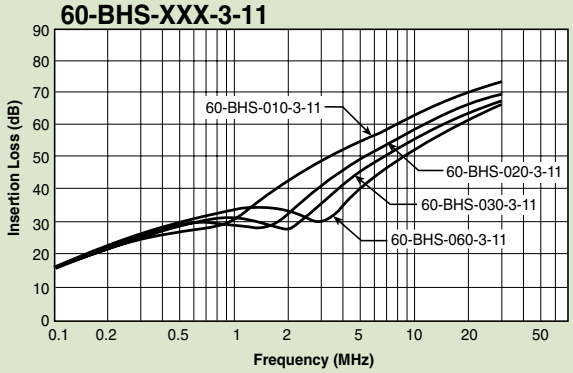
60-BHS-XXX-X-4



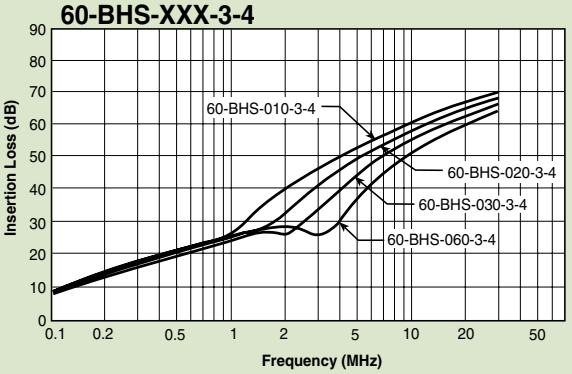
Normal Mode



60-BHS-XXX-3-11



60-BHS-XXX-3-4



api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Rear Terminals
For General Purpose Applications

10-BPF Series

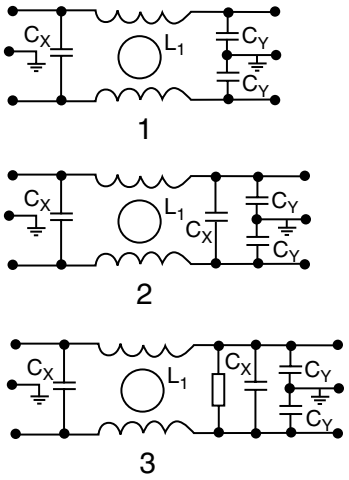
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Operating temperature: -25°C to +70°C
- Compact configuration

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Circuit Diagram	Figure	Temperature Rise (Max.)
10-BPF-001-5-A	120/250VAC	1A	0.50mA	3300pF	2200pF	3.0mH	1	A	30°C
10-BPF-001-5-C								C	
10-BPF-003-5-A		3A			0.01uF	1.5mH		A	
10-BPF-003-5-C								C	
10-BPF-003-5-D				4700pF			2	B	
10-BPF-006-5-A		6A		3300pF		0.5mH	1	A	
10-BPF-006-5-C								C	
10-BPF-006-5-D				3300pF & 0.01uF	3300pF & 0.01uF	1.5mH	2	B	
10-BPF-010-5-A		10A		3300pF	0.01uF	0.5mH	1	A	
10-BPF-010-5-D				3300pF & 0.01uF	3300pF & 0.01uF	1.5mH	3	B	

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 45g
Input: Compatible with IEC-320

api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Rear Terminals
For General Purpose Applications

Figure A

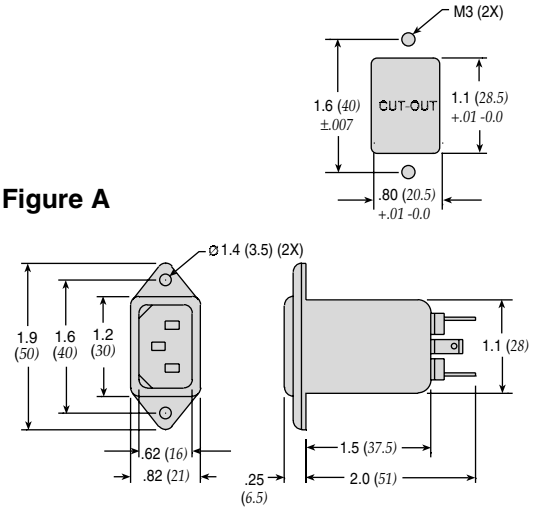


Figure B

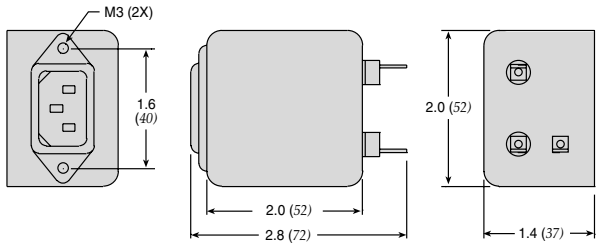
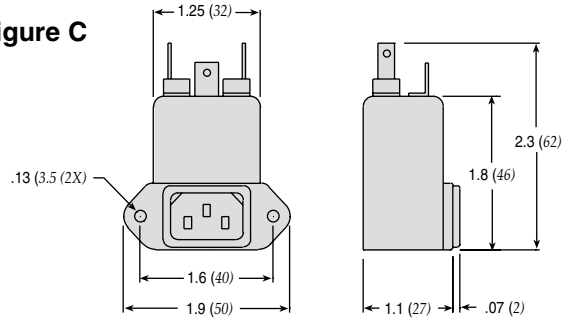
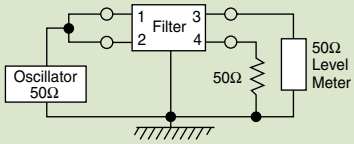


Figure C

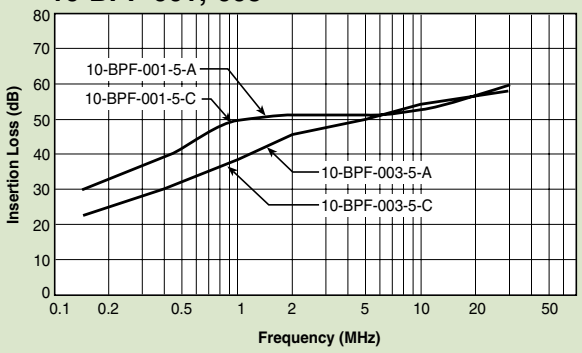


Dimensions in inches (*mm*)

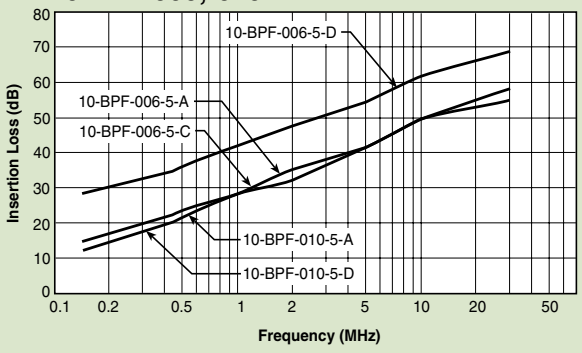
Common Mode



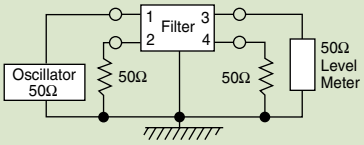
10-BPF-001;-003



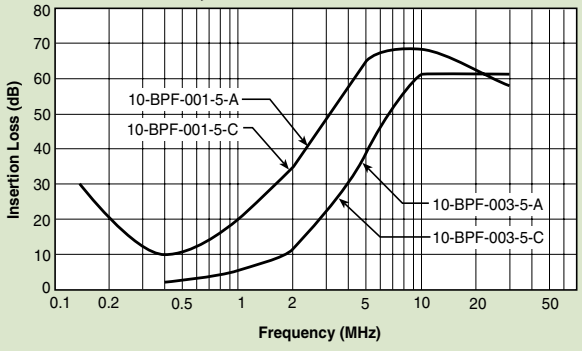
10-BPF-006;-010



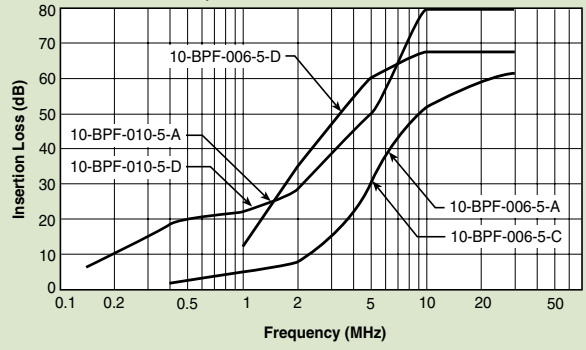
Normal Mode



10-BPF-001;-003



10-BPF-006;-010



api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Rear Terminals
For Medical Purpose Applications

10-BPF Series

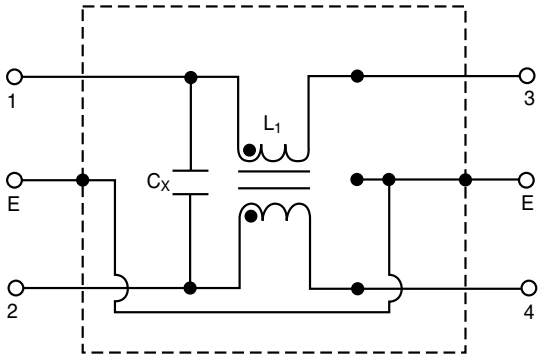
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Operating temperature: -25°C to +70°C
- Compact configuration
- Low leakage current

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

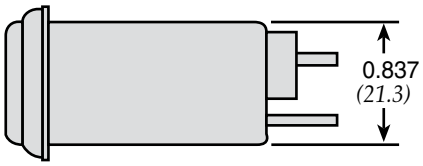
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_X	Inductance (L_1)	Circuit Diagram	Figure	Temperature Rise (Max.)
10-BPF-001-2-A	120/250VAC	1A	5uA	0.01uF	3.0mH	1	A	30°C
10-BPF-003-2-A		3A			1.5mH			
10-BPF-006-2-A		6A			0.5mH			

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 45g
Input: Compatible with IEC-320

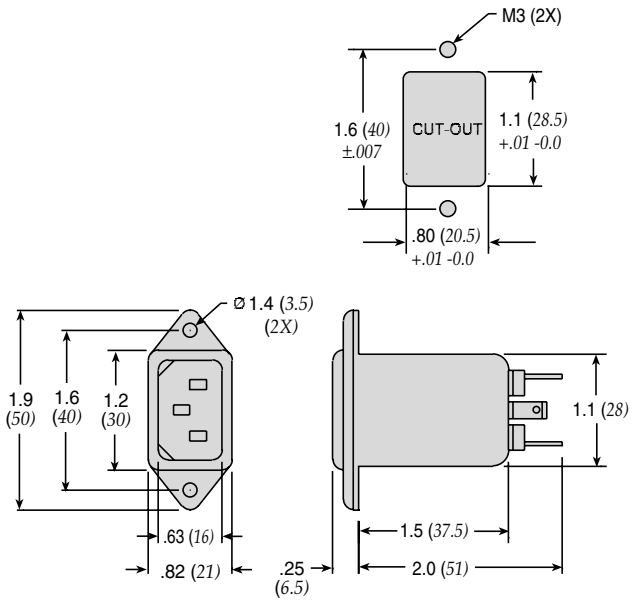
api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Rear Terminals
For Medical Purpose Applications

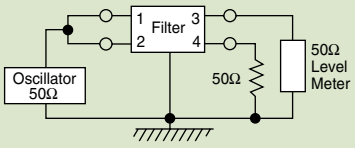
10-BPF Series



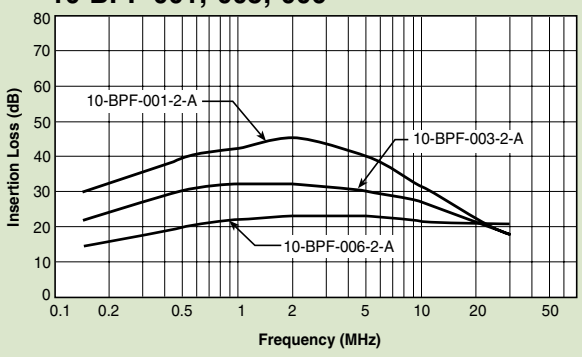
Dimensions in inches (*mm*)



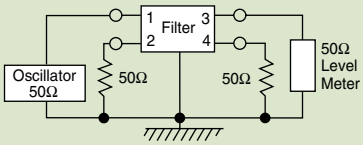
Common Mode



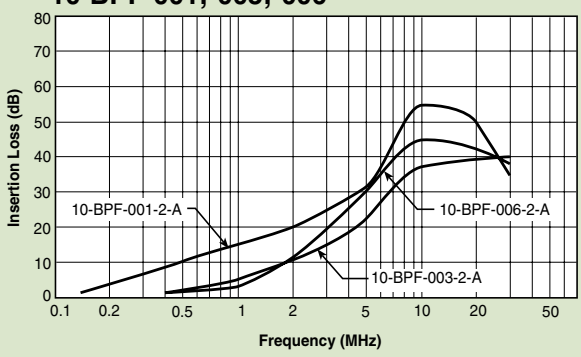
10-BPF-001;-003;-006



Normal Mode



10-BPF-001;-003;-006



api technologies corp.
Spectrum Control

Power Entry Modules
Snap-in with Wire Leads

60-SPL Series

Tested and found to be IAW VDE 0565 Part 3.

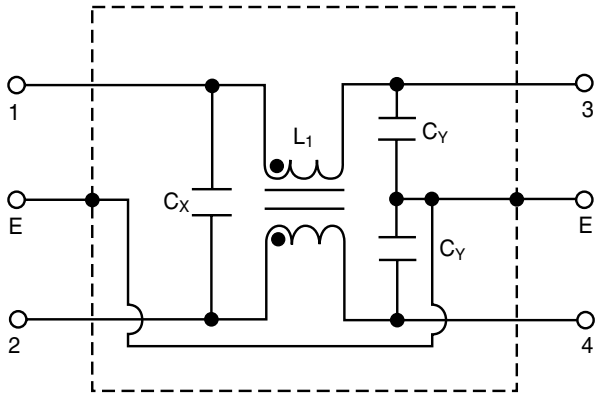
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal cased miniature filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Snap-in style saves labor and hardware inventory
- Wire output minimizes space and provides economical installation
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF27)

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
60-SPL-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	22nF ± 20%	6.0mH	30°C
60-SPL-010-3-3					33nF ± 20%		
60-SPL-010-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-SPL-010-5-3					33nF ± 20%		
60-SPL-020-3-2	250VAC	2A	0.35mA	2200pF ± 20%	22nF ± 20%	2.4mH	30°C
60-SPL-020-3-3					33nF ± 20%		
60-SPL-020-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-SPL-020-5-3					33nF ± 20%		
60-SPL-030-3-2	250VAC	3A	0.35mA	2200pF ± 20%	.022uF ± 20%	1.2mH	30°C
60-SPL-030-3-3				3300pF ± 20%			
60-SPL-030-5-2			0.50mA	2200pF ± 20%	.033uF ± 20%		
60-SPL-030-5-3				3300pF ± 20%			
60-SPL-060-3-2	250VAC	6A	0.35mA	2200pF ± 20%	22nF ± 20%	0.53mH	45°C
60-SPL-060-3-3					33nF ± 20%		
60-SPL-060-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-SPL-060-5-3					33nF ± 20%		

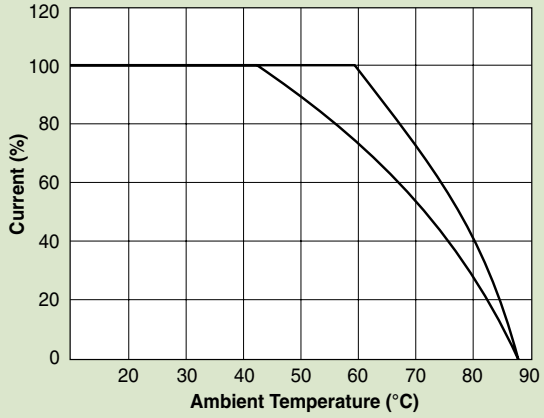
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

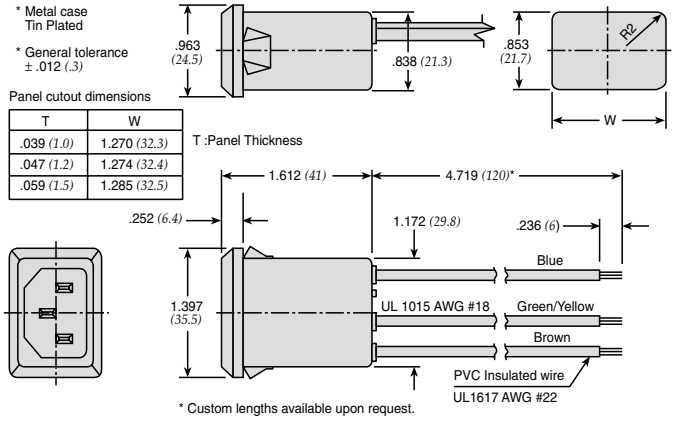
api technologies corp.
Spectrum Control

Power Entry Modules
Snap-in with Wire Leads

60-SPL Series

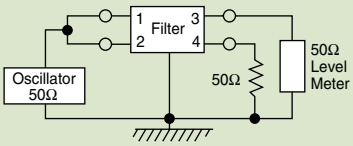
Temperature Characteristics



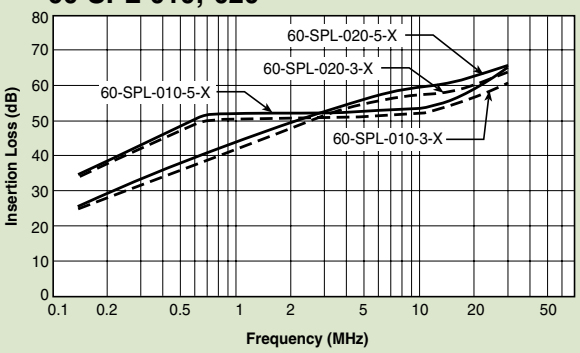


Dimensions in inches *(mm)*

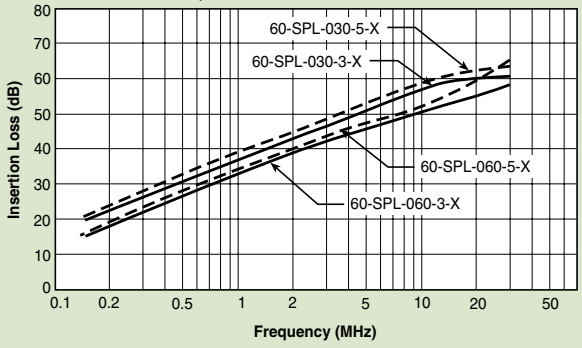
Common Mode



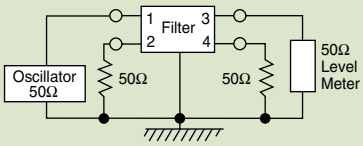
60-SPL-010;-020



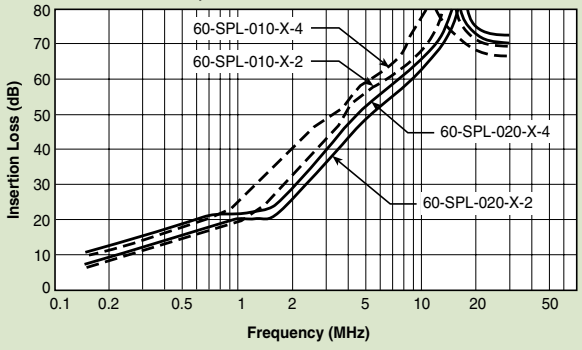
60-SPL-030;-060



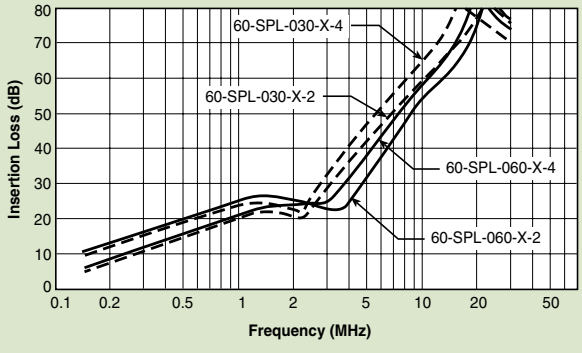
Normal Mode



60-SPL-010;-020



60-SPL-030;-060



api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in with Wire Leads

60-BPL Series

Tested and found to be IAW VDE 0565 Part 3.

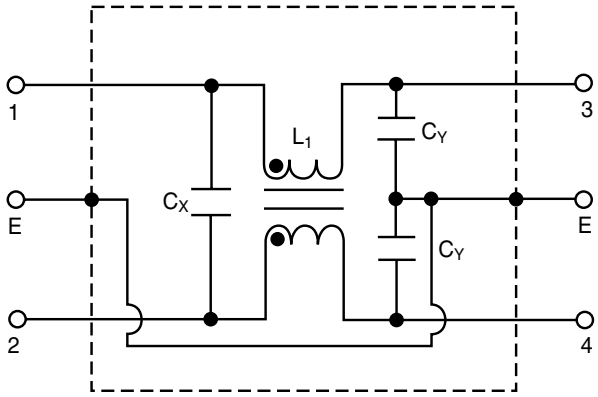
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Wire output for minimizing space use and economical installation
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF28)

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
60-BPL-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	22nF ± 20%	6.0mH	30°C
60-BPL-010-3-3					33nF ± 20%		
60-BPL-010-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-BPL-010-5-3					33nF ± 20%		
60-BPL-020-3-2	250VAC	2A	0.35mA	2200pF ± 20%	22nF ± 20%	2.4mH	30°C
60-BPL-020-3-3					33nF ± 20%		
60-BPL-020-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-BPL-020-5-3					33nF ± 20%		
60-BPL-030-3-2	250VAC	3A	0.35mA	2200pF ± 20%	.022uF ± 20%	1.2mH	30°C
60-BPL-030-3-3				3300pF ± 20%			
60-BPL-030-5-2			0.50mA	2200pF ± 20%	.033uF ± 20%		
60-BPL-030-5-3				3300pF ± 20%			
60-BPL-060-3-2	250VAC	6A	0.35mA	2200pF ± 20%	22nF ± 20%	0.53mH	45°C
60-BPL-060-3-3					33nF ± 20%		
60-BPL-060-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-BPL-060-5-3					33nF ± 20%		

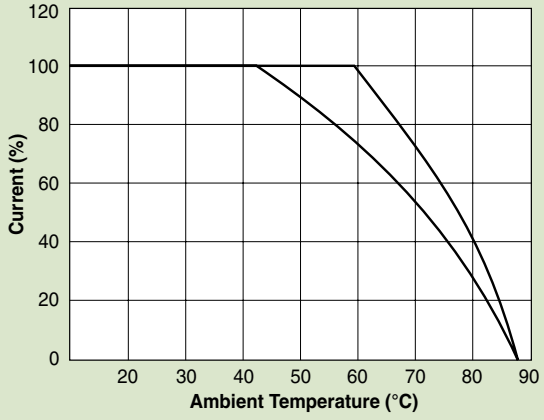
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

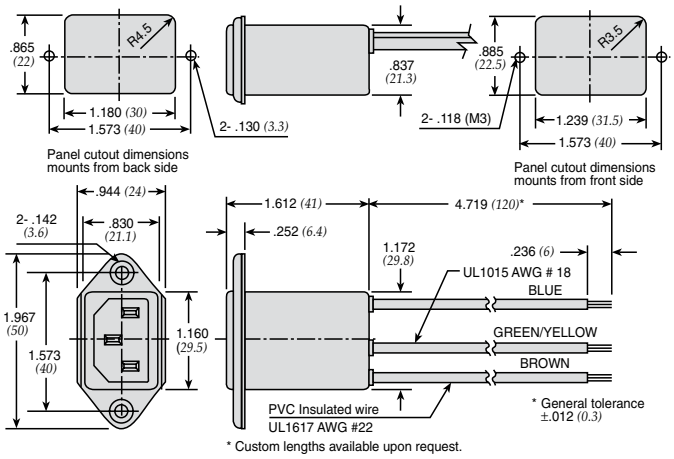
api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in with Wire Leads

60-BPL Series

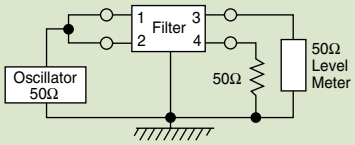
Temperature Characteristics



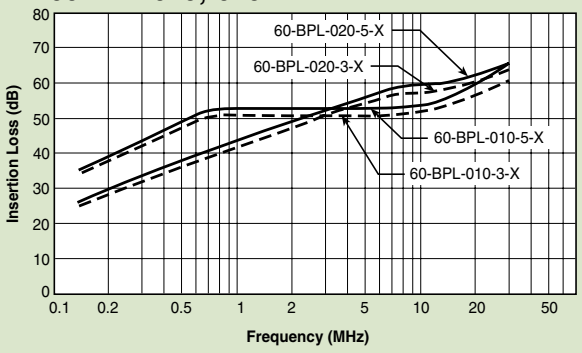


Dimensions in inches *(mm)*

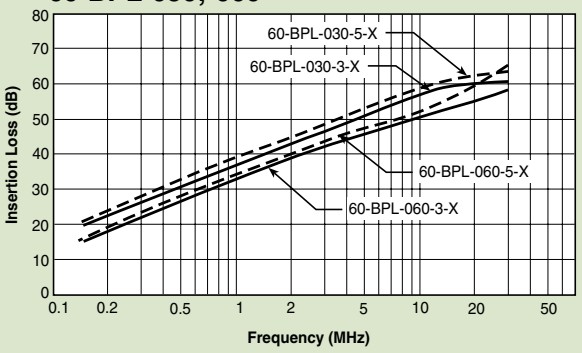
Common Mode



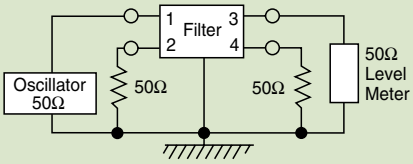
60-BPL-010;-020



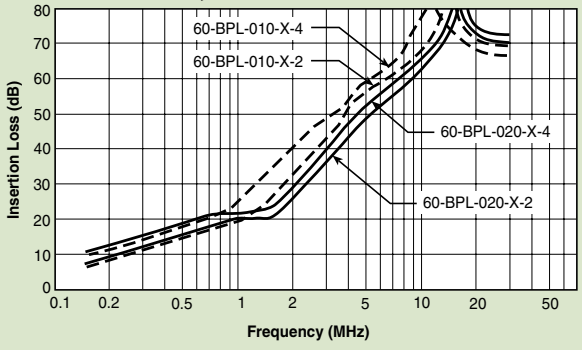
60-BPL-030;-060



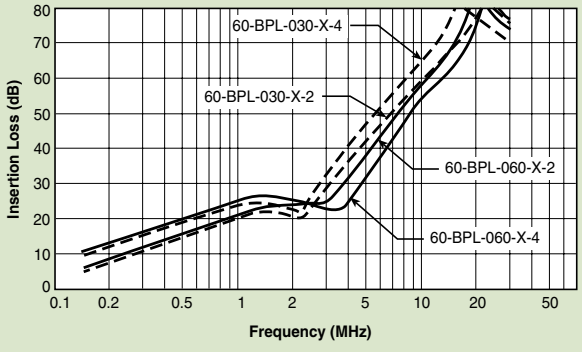
Normal Mode



60-BPL-010;-020



60-BPL-030;-060



api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in with Wire Leads

10-BPL Series

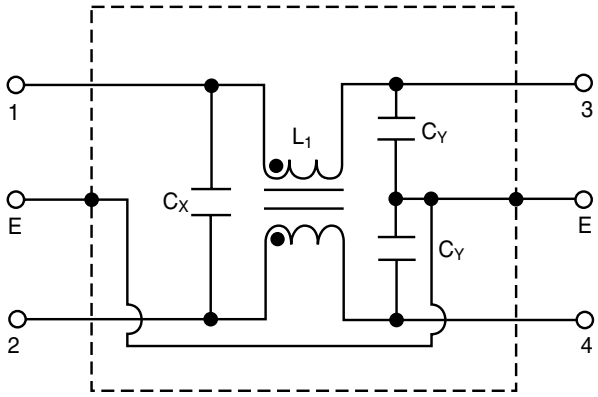
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Wire output for minimizing space use and economical installation
- Operating temperature: -25°C to +70°C
- Compact configuration

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Circuit Diagram	Figure	Temperature Rise (Max.)
10-BPL-001-5-B	250VAC	1A	0.50mA	3300pF	0.01uF	3.0mH	1	A	30°C
10-BPL-003-5-B		3A				1.5mH			
10-BPL-006-5-B		6A				0.5mH			

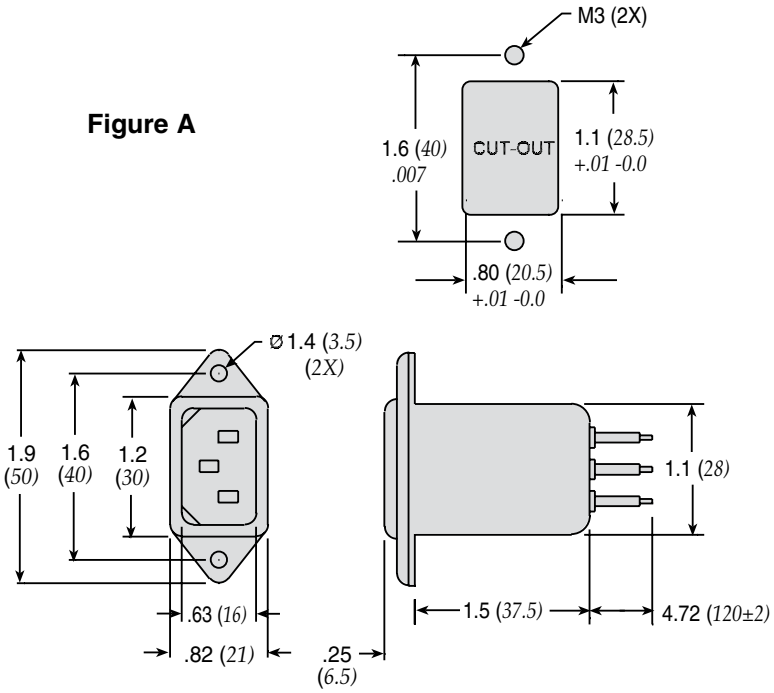
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in with Wire Leads

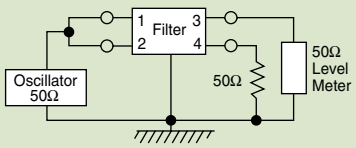
10-BPL Series

Figure A

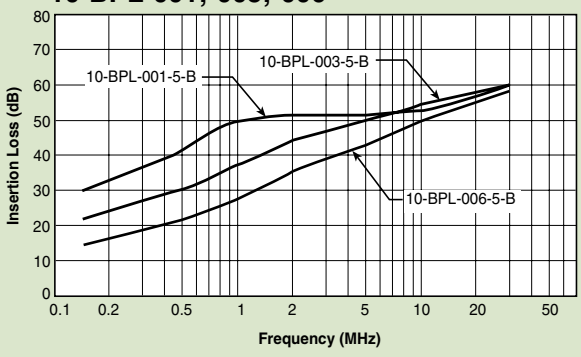


Dimensions in inches *(mm)*

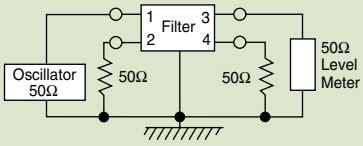
Common Mode



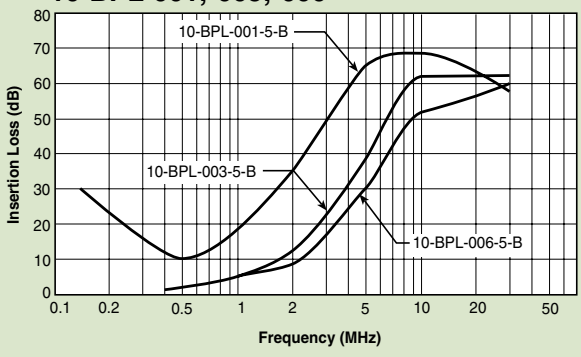
10-BPL-001;-003;-006



Normal Mode



10-BPL-001;-003;-006



api technologies corp.
Spectrum Control

Power Entry Modules
Snap-in Mount

60-SPR & SPS Series

Tested and found to be IAW VDE 0565 Part 3.

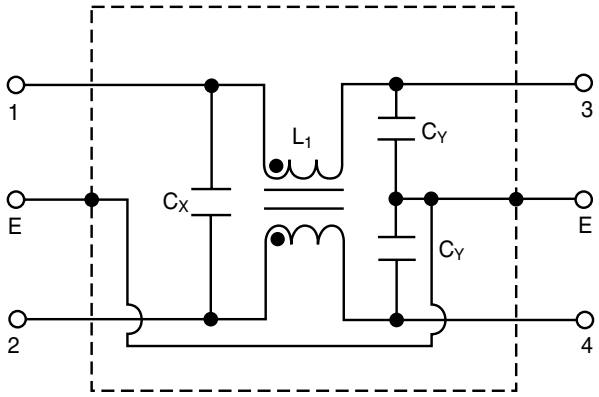
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal cased miniature filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Snap-in style saves labor and hardware inventory
- Solder lug and fast-on tab terminations available
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF33)
- UL approved low leakage version also available

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
60-XXX-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	.022uF ± 20%	6.0mH	30°C
60-XXX-010-3-4					.047uF ± 20%		
60-XXX-010-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-010-5-4					.047uF ± 20%		
60-XXX-020-3-2	250VAC	2A	0.35mA	2200pF ± 20%	.022uF ± 20%	2.4mH	30°C
60-XXX-020-3-4					.047uF ± 20%		
60-XXX-020-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-020-5-4					.047uF ± 20%		
60-XXX-030-3-2	250VAC	3A	0.35mA	2200pF ± 20%	.022uF ± 20%	1.2mH	30°C
60-XXX-030-3-4					.047uF ± 20%		
60-XXX-030-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-030-5-4					.047uF ± 20%		
60-XXX-060-3-2	250VAC	6A	0.35mA	2200pF ± 20%	.022uF ± 20%	0.53mH	45°C
60-XXX-060-3-4					.047uF ± 20%		
60-XXX-060-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-060-5-4					.047uF ± 20%		
60-XXX-100-3-2	250VAC	10A	0.35mA	2200pF ± 20%	.022uF ± 20%	0.26mH	45°C
60-XXX-100-5-2			0.50mA	3300pF ± 20%			
60-SPR-150-3-11	250VAC	15A	0.35mA	2200pF ± 20%	.1uF ± 20%	0.15mH	45°C

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 45g
Input: Compatible with IEC-320

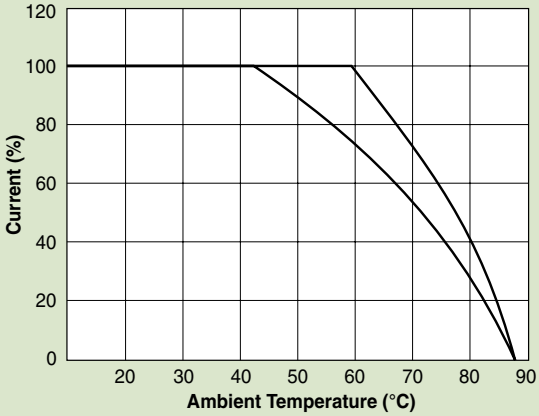
*** Substitute SPR or SPS for XXX**
60-SPR - Fast-on terminals
60-SPS - Solder lug terminals

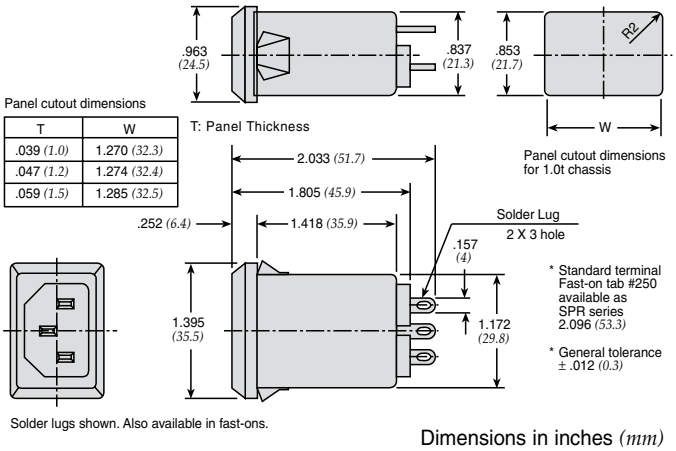
api technologies corp.
Spectrum Control

Power Entry Modules
Snap-in Mount

60-SPR & SPS Series

Temperature Characteristics





Panel cutout dimensions

T	W
.039 (1.0)	1.270 (32.3)
.047 (1.2)	1.274 (32.4)
.059 (1.5)	1.285 (32.5)

T: Panel Thickness

Panel cutout dimensions for 1.0t chassis

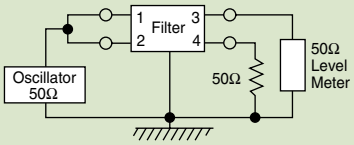
* Standard terminal Fast-on tab #250 available as SPR series 2.096 (53.3)

* General tolerance ± .012 (0.3)

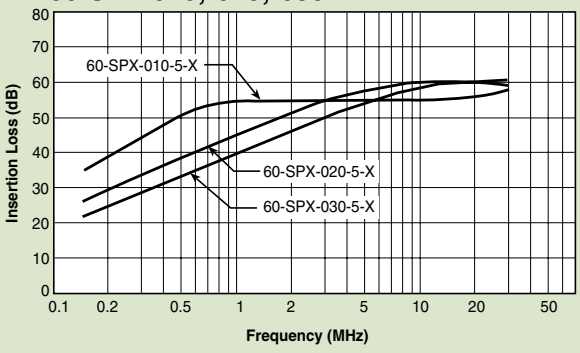
Solder lugs shown. Also available in fast-ons.

Dimensions in inches (mm)

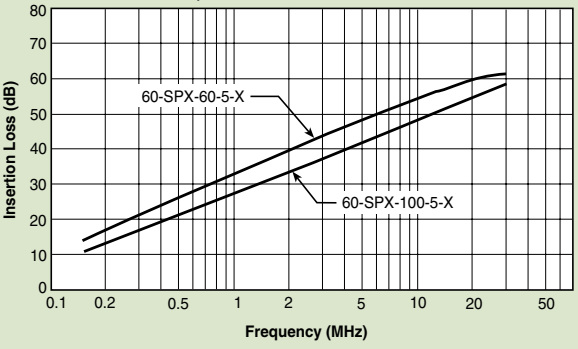
Common Mode



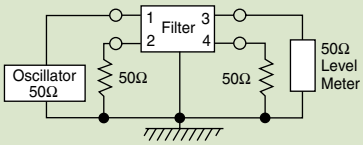
60-SPX-010;-020;-030



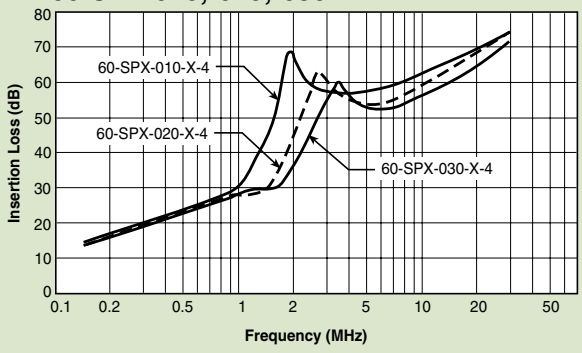
60-SPX-060;-100



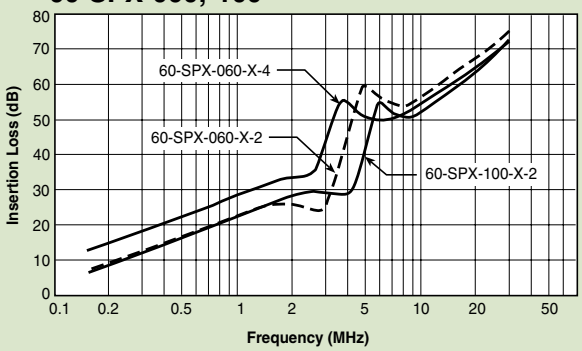
Normal Mode



60-SPX-010;-020;-030



60-SPX-060;-100



api technologies corp.
Spectrum Control

Fused Filtered Power Entry Modules
For General Purpose Applications

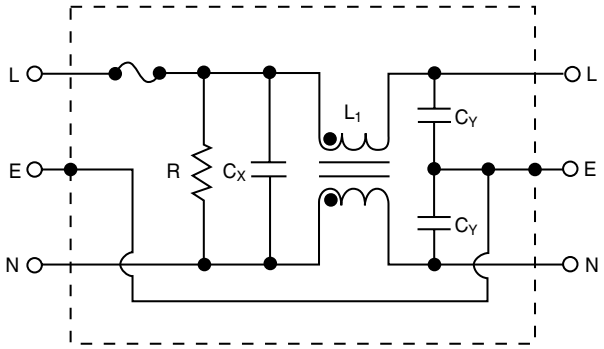
64-65-BFF/64-65-BFS Series

Tested and found to be IAW VDE 0565 Part 3.

Features

- North American and Metric fuse holders available
- Fuse holder provides effective EMI suppression of common and differential mode
- Suitable for products that must conform to FCC and FTZ requirements
- Meets over voltage category II of IEC 664 and complies with IEC 950
- Fast-on terminals or solder lug terminals
- Metal case provides effective EMI shielding
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF35)

Circuit Diagram



Applications

- Computers and peripheral equipment
- Electronic equipment
- Digital equipment
- Measuring and testing instruments
- Telecommunications equipment

Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
64-XXX-020-3-11	250VAC	2A	0.35mA	2200pF ± 20%	0.1uF	6.5mH	40°C
64-XXX-020-5-11			0.50mA	3300pF ± 20%			
64-XXX-020-3-12			0.35mA	2200pF ± 20%	0.22uF		
64-XXX-020-5-12			0.50mA	3300pF ± 20%			
64-XXX-040-3-11	250VAC	4A	0.35mA	2200pF ± 20%	0.1uF	4.2mH	45°C
64-XXX-040-5-11			0.50mA	3300pF ± 20%			
64-XXX-040-3-12			0.35mA	2200pF ± 20%	0.22uF		
64-XXX-040-5-12			0.50mA	3300pF ± 20%			
64-XXX-060-3-11	250VAC	6A	0.35mA	2200pF ± 20%	0.1uF	1.6mH	45°C
64-XXX-060-5-11			0.50mA	3300pF ± 20%			
64-XXX-060-3-12			0.35mA	2200pF ± 20%	0.22uF		
64-XXX-060-5-12			0.50mA	3300pF ± 20%			
65-XXX-020-3-11	125VAC	2A	0.20mA	2200pF ± 20%	0.1uF	6.5mH	40°C
65-XXX-020-5-11			0.25mA	3300pF ± 20%			
65-XXX-020-3-12			0.20mA	2200pF ± 20%	0.22uF		
65-XXX-020-5-12			0.25mA	3300pF ± 20%			
65-XXX-040-3-11	125VAC	4A	0.20mA	2200pF ± 20%	0.1uF	4.2mH	45°C
65-XXX-040-5-11			0.25mA	3300pF ± 20%			
65-XXX-040-3-12			0.20mA	2200pF ± 20%	0.22uF		
65-XXX-040-5-12			0.25mA	3300pF ± 20%			
65-XXX-060-3-11	125VAC	6A	0.20mA	2200pF ± 20%	0.1uF	1.6mH	45°C
65-XXX-060-5-11			0.25mA	3300pF ± 20%			
65-XXX-060-3-12			0.20mA	2200pF ± 20%	0.22uF		
65-XXX-060-5-12			0.25mA	3300pF ± 20%			

Note: Test Voltage 1500VAC one minute, line to ground
Insulation Resistance: 300 M min. at 500VDC
F(S) = Fast-on or (Solder lug terminals)

Voltage Drop: 1V max. at rated current
Weight: 78g
Inlet: Compatible with IEC-320

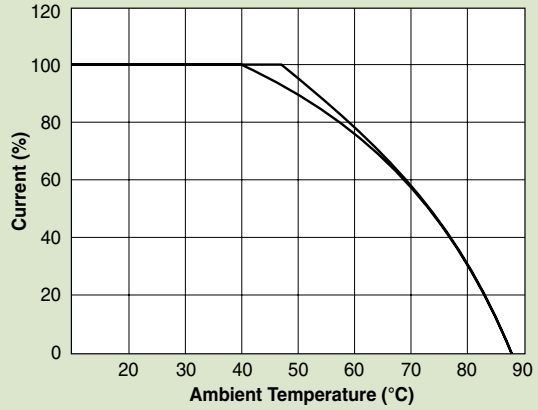
* **Substitute BFF or BFS for XXX**
BFF - Fast-on terminals
BFS - Solder lug terminals

api technologies corp.
Spectrum Control

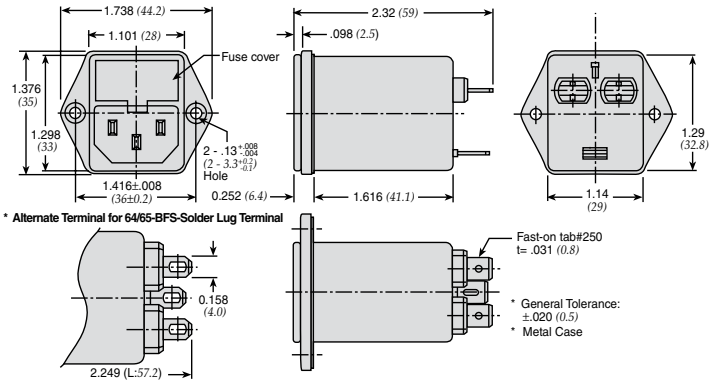
Fused Filtered Power Entry Modules
For General Purpose Applications

64-65-BFF/64-65-BFS Series

Temperature Characteristics

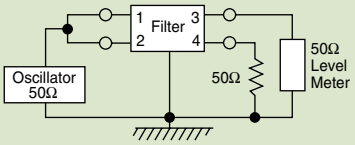


Dimensions
64/65-BFF Series

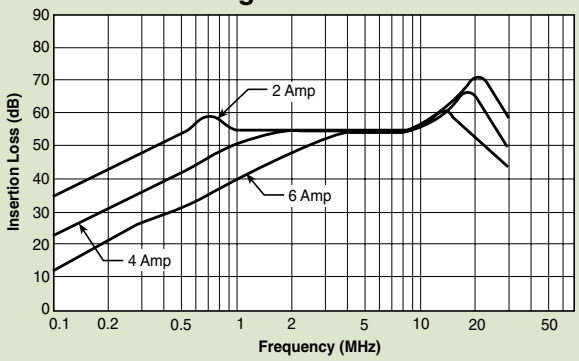


Dimensions in inches *(mm)*

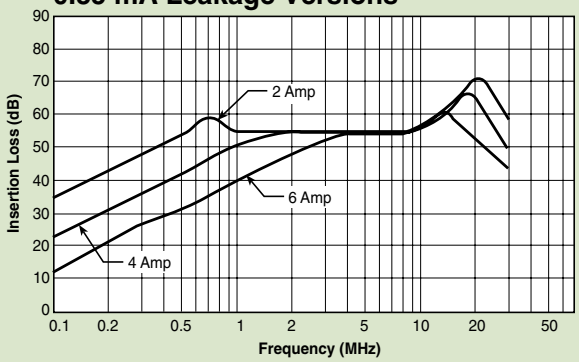
Common Mode



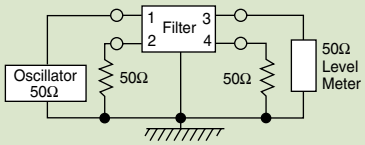
0.50 mA Leakage Versions



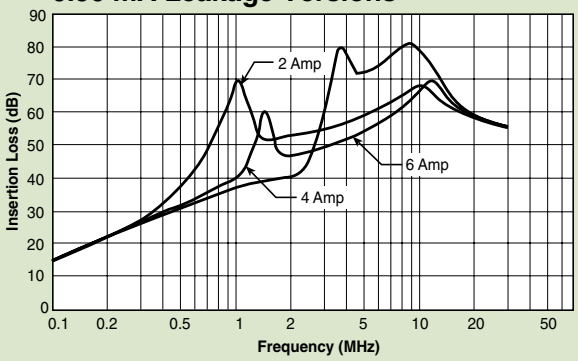
0.35 mA Leakage Versions



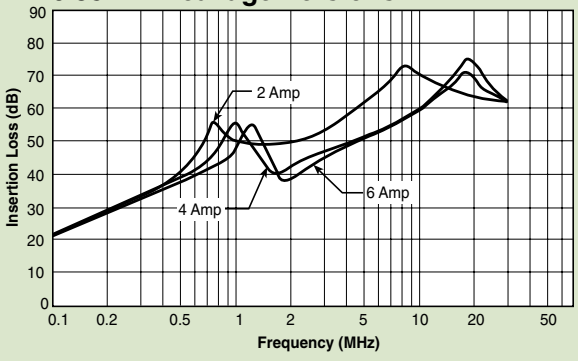
Normal Mode



0.50 mA Leakage Versions



0.35 mA Leakage Versions



api technologies corp.
Spectrum Control

Fused Filtered Power Entry Modules
For Medical or General Purpose Applications

66-67-BFF/66-67-BFS Series

Tested and found to be IAW VDE 0565 Part 3.

Features

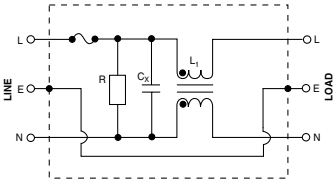
- Metric and North American fuse holders available
- Fuse holder provides effective EMI suppression of common and differential mode
- Suitable for products that must conform to FCC and FTZ requirements
- Meets over voltage category II of IEC 664 and complies with IEC 950
- Fast-on terminations or solder lug terminations
- Metal case provides effective EMI shielding
- Provides susceptibility protection without the leakage current associated with line-to-ground capacitance
- Reduces the line to ground capacitance in order to meet patient care requirements
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF37)

Applications

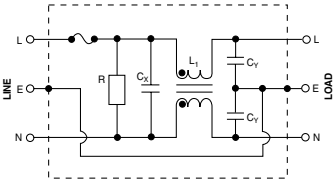
- Medical equipment
- Electronic equipment
- Digital equipment
- Industrial equipment
- Telecommunications equipment
- Measuring and testing instruments
- Personal computers and peripherals

Circuit Diagrams

66/67-BFF(S)-XXX-1-X Filter



66/67-BFF(S)-XXX-0-X and 66/67-BFF(S)-XXX-4-X Filters



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
66-XXX-020-1-11	250VAC	2A	0.01mA	none	0.1uF	6.5mH	40°C
66-XXX-020-1-12					0.22uF		
66-XXX-020-0-11			0.075mA	330pF ± 20%	0.1uF		
66-XXX-020-4-11			0.1mA	470pF ± 20%			
66-XXX-020-0-12			0.075mA	330pF ± 20%	0.22uF		
66-XXX-020-4-12			0.1mA	470pF ± 20%			
66-XXX-040-1-11	250VAC	4A	0.01mA	none	0.1uF	2.4mH	45°C
66-XXX-040-1-12					0.22uF		
66-XXX-040-0-11			0.075mA	330pF ± 20%	0.1uF		
66-XXX-040-4-11			0.1mA	470pF ± 20%			
66-XXX-040-0-12			0.075mA	330pF ± 20%	0.22uF		
66-XXX-040-4-12			0.1mA	470pF ± 20%			
66-XXX-060-1-11	250VAC	6A	0.01mA	none	0.1uF	1.6mH	45°C
66-XXX-060-1-12					0.22uF		
66-XXX-060-0-11			0.075mA	330pF ± 20%	0.1uF		
66-XXX-060-4-11			0.1mA	470pF ± 20%			
66-XXX-060-0-12			0.075mA	330pF ± 20%	0.22uF		
66-XXX-060-4-12			0.1mA	470pF ± 20%			
67-XXX-020-1-11	125VAC	2A	0.005mA	none	0.1uF	6.5mH	40°C
67-XXX-020-1-12					0.22uF		
67-XXX-020-0-11			0.035mA	330pF ± 20%	0.1uF		
67-XXX-020-4-11			0.05mA	470pF ± 20%			
67-XXX-020-0-12			0.035mA	330pF ± 20%	0.22uF		
67-XXX-020-4-12			0.05mA	470pF ± 20%			
67-XXX-040-1-11	125VAC	4A	0.005mA	none	0.1uF	2.4mH	45°C
67-XXX-040-1-12					0.22uF		
67-XXX-040-0-11			0.035mA	330pF ± 20%	0.1uF		
67-XXX-040-4-11			0.05mA	470pF ± 20%			
67-XXX-040-0-12			0.035mA	330pF ± 20%	0.22uF		
67-XXX-040-4-12			0.05mA	470pF ± 20%			
67-XXX-060-1-11	125VAC	6A	0.005mA	none	0.1uF	1.6mH	45°C
67-XXX-060-1-12					0.22uF		
67-XXX-060-0-11			0.035mA	330pF ± 20%	0.1uF		
67-XXX-060-4-11			0.05mA	470pF ± 20%			
67-XXX-060-0-12			0.035mA	330pF ± 20%	0.22uF		
67-XXX-060-4-12			0.05mA	470pF ± 20%			

Note: Test Voltage 1500VAC one minute, line to ground
Insulation Resistance: 300 M min. at 500VDC
F(S) = Fast-on or (Solder lug terminals)

Voltage Drop: 1V max. at rated current
Weight: 78g
Inlet: Compatible with IEC-320

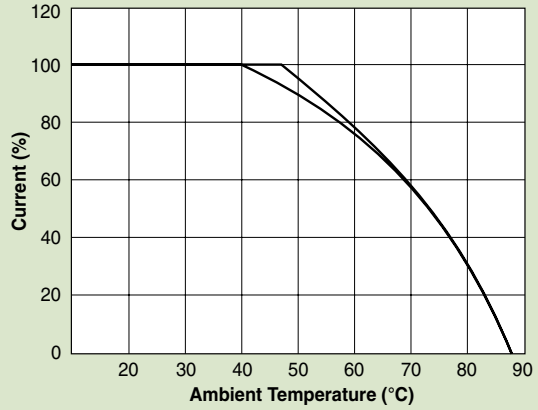
*** Substitute BFF or BFS for XXX**
BFF - Fast-on terminals
BFS - Solder lug terminals

api technologies corp.
Spectrum Control

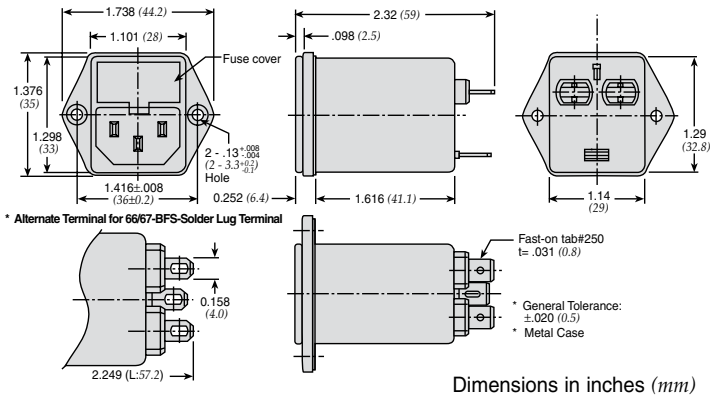
Fused Filtered Power Entry Modules
For Medical or General Purpose Applications

66-67-BFF/66-67-BFS Series

Temperature Characteristics

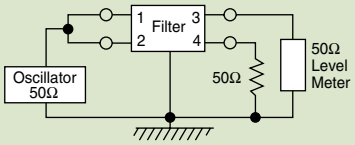


Dimensions
66-67-BFF/66-67-BFS Series

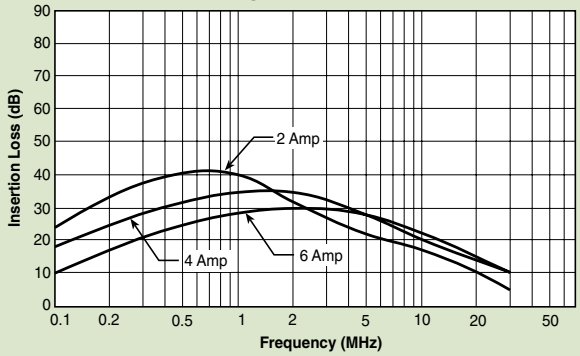


Dimensions in inches *(mm)*

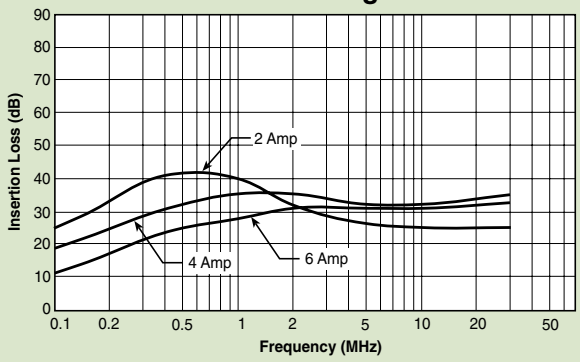
Common Mode



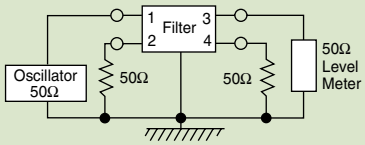
0.01 mA Leakage Current



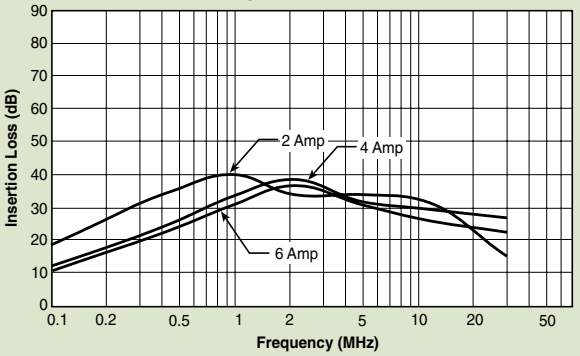
0.075 and 0.1 mA Leakage Current



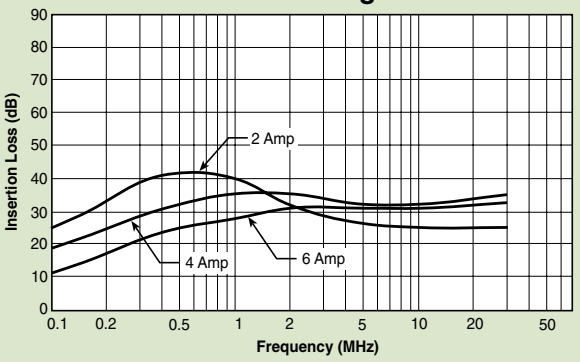
Normal Mode



0.01 mA Leakage Current



0.075 and 0.1 mA Leakage Current



api technologies corp.
Spectrum Control

Switched and Fused Filtered Power Entry Modules
For General Purpose Applications

64-65-BSF/64-65-SSF Series

Tested and found to be IAW VDE 0565 Part 3.

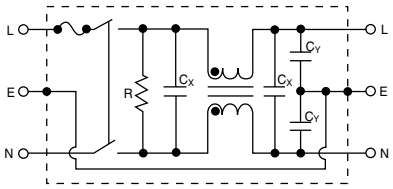
Features

- North American and Metric fuse holders available
- Fuse holder and double pole power ON/OFF switch provided in a convenient/compact package
- Suitable for products that must conform to FCC and FTZ requirements
- Meets over voltage category II of IEC 664 and complies with IEC 950
- Metal case provides effective EMI shielding
- Easy access fuse drawer with space for spare fuse
- Flange-mounted or snap-in styles available for quick mounting
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF39)

Applications

- Computers and peripheral equipment
- Electronic equipment
- Digital equipment
- Measuring and testing instruments
- Telecommunications equipment

Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_{X1}	Capacitance C_{X2}	Inductance (L_1)	Temperature Rise (Max.)
64-XXX-020-3-12	250VAC	2A	0.35mA	2200pF	0.22uF	NONE	10.5mH	45°C
64-XXX-020-3-04						0.22uF		
64-XXX-020-3-14					0.47uF	NONE		
64-XXX-020-3-06						0.22uF		
64-XXX-020-5-12			0.50mA	3300pF	0.22uF	NONE		
64-XXX-020-5-04						0.22uF		
64-XXX-020-5-14					0.47uF	NONE		
64-XXX-020-5-06						0.22uF		
64-XXX-040-3-12	250VAC	4A	0.35mA	2200pF	0.22uF	NONE	4.2mH	45°C
64-XXX-040-3-04						0.22uF		
64-XXX-040-3-14					0.47uF	NONE		
64-XXX-040-3-06						0.22uF		
64-XXX-040-5-12			0.50mA	3300pF	0.22uF	NONE		
64-XXX-040-5-04						0.22uF		
64-XXX-040-5-14					0.47uF	NONE		
64-XXX-040-5-06						0.22uF		
64-XXX-060-3-12	250VAC	6A	0.35mA	2200pF	0.22uF	NONE	1.6mH	45°C
64-XXX-060-3-04						0.22uF		
64-XXX-060-3-14					0.47uF	NONE		
64-XXX-060-3-06						0.22uF		
64-XXX-060-5-12			0.50mA	3300pF	0.22uF	NONE		
64-XXX-060-5-04						0.22uF		
64-XXX-060-5-14					0.47uF	NONE		
64-XXX-060-5-06						0.22uF		
65-XXX-020-3-12	125VAC	2A	0.20mA	2200pF	0.22uF	NONE	10.5mH	45°C
65-XXX-020-3-04						0.22uF		
65-XXX-020-3-14					0.47uF	NONE		
65-XXX-020-3-06						0.22uF		
65-XXX-020-5-12			0.25mA	3300pF	0.22uF	NONE		
65-XXX-020-5-04						0.22uF		
65-XXX-020-5-14					0.47uF	NONE		
65-XXX-020-5-06						0.22uF		
65-XXX-040-3-12	125VAC	4A	0.20mA	2200pF	0.22uF	NONE	4.2mH	45°C
65-XXX-040-3-04						0.22uF		
65-XXX-040-3-14					0.47uF	NONE		
65-XXX-040-3-06						0.22uF		
65-XXX-040-5-12			0.25mA	3300pF	0.22uF	NONE		
65-XXX-040-5-04						0.22uF		
65-XXX-040-5-14					0.47uF	NONE		
65-XXX-040-5-06						0.22uF		
65-XXX-060-3-12	125VAC	6A	0.20mA	2200pF	0.22uF	NONE	1.6mH	45°C
65-XXX-060-3-04						0.22uF		
65-XXX-060-3-14					0.47uF	NONE		
65-XXX-060-3-06						0.22uF		
65-XXX-060-5-12			0.25mA	3300pF	0.22uF	NONE		
65-XXX-060-5-04						0.22uF		
65-XXX-060-5-14					0.47uF	NONE		
65-XXX-060-5-06						0.22uF		

Note: Test Voltage 1500VAC one minute, line to ground
Insulation Resistance: 300 M min. at 500VDC
B(S) = Bolt-in terminals or (Snap-in terminals)

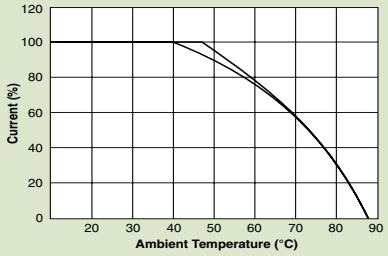
Voltage Drop: 1V max. at rated current
Weight: 130g
Inlet: Compatible with IEC-320

* **Substitute BSF or SSF for XXX**
BSF - Bolt-in switched and fused
SSF - Snap-in switched and fused

api technologies corp.
Spectrum Control

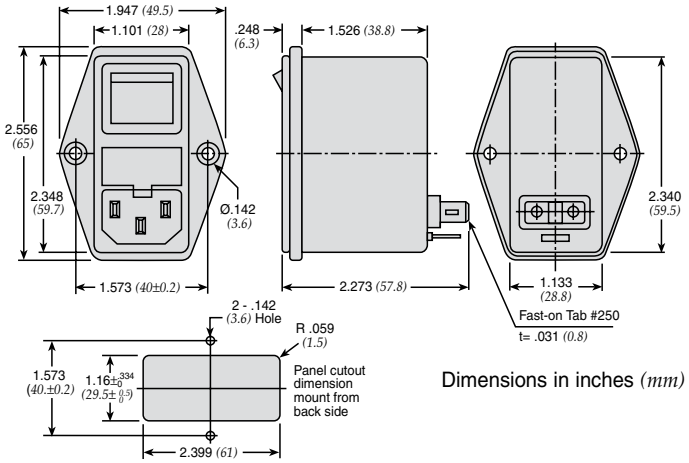
Switched and Fused Filtered Power Entry Modules
For General Purpose Applications

Temperature Characteristics



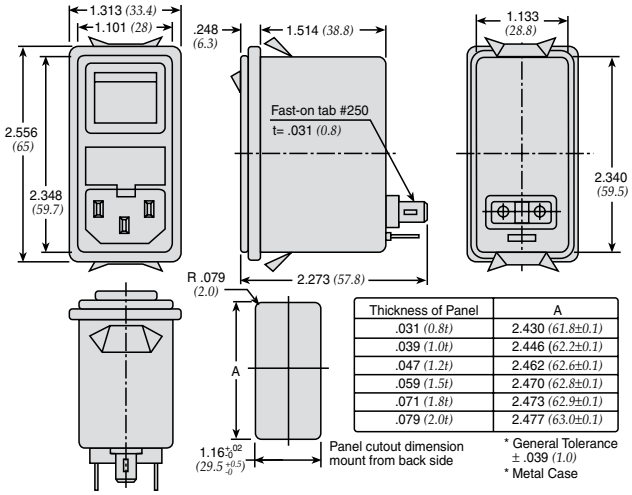
Dimensions

64/65-BSF Series



Dimensions in inches *(mm)*

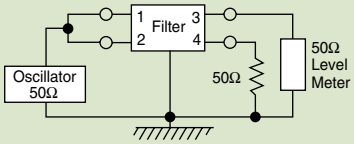
64/65-SSF Series



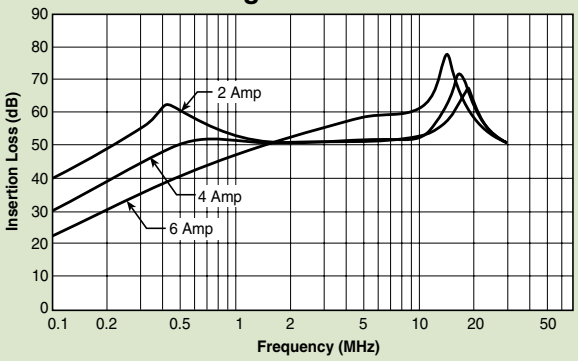
Thickness of Panel	A
.031 (0.8t)	2.430 (61.8±0.1)
.039 (1.0t)	2.446 (62.2±0.1)
.047 (1.2t)	2.462 (62.6±0.1)
.059 (1.5t)	2.470 (62.8±0.1)
.071 (1.8t)	2.473 (62.9±0.1)
.079 (2.0t)	2.477 (63.0±0.1)

* General Tolerance ± .039 (1.0)
* Metal Case

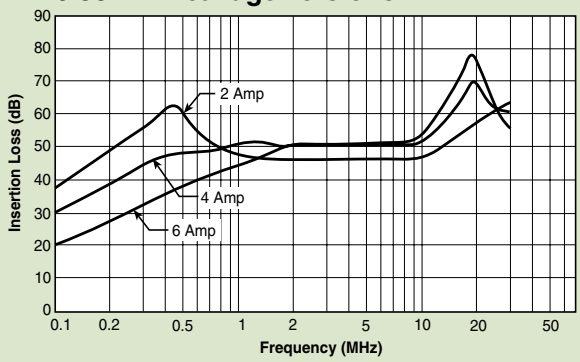
Common Mode



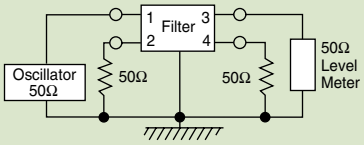
0.35 mA Leakage Versions



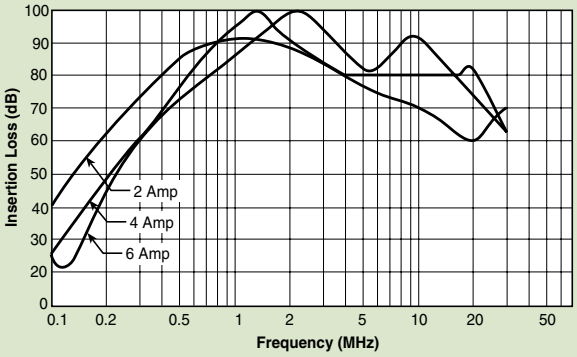
0.50 mA Leakage Versions



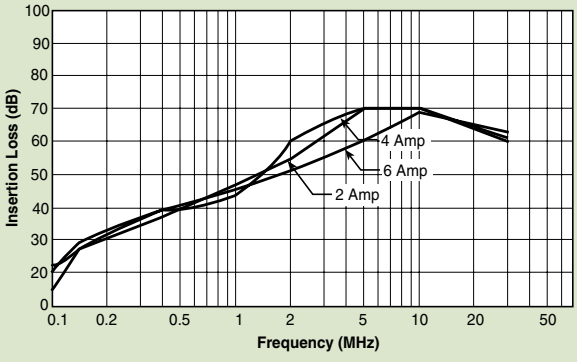
Normal Mode



64/65-B(S)SF-*-*-02(04,06)



64/65-B(S)SF-*-*-11(12,14)



api technologies corp.
Spectrum Control

Switched and Fused Filtered Power Entry Modules

For Medical or General Purpose Applications

66-67-BSF/66-67-SSF Series

Tested and found to be IAW VDE 0565 Part 3

Features

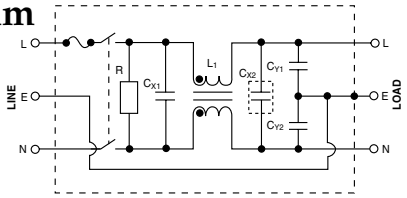
- Metric and North American fuse holders available
- Fuse holder and a double pole power ON/OFF switch provides a convenient/compact package
- Suitable for products that must conform to FCC and FTZ requirements
- Meets over voltage category II of IEC 664 and complies with IEC 950
- Provides susceptibility protection without the leakage current associated with line-to-ground capacitors
- Designed to meet requirements for non-patient and patient care equipment
- Metal case provides effective EMI shielding
- Easy access fuse drawer - space for spare fuse
- Flange-mounted or snap-in styles available for quick mounting
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF41)

Applications

- Medical equipment
- Industrial equipment
- Telecommunications equipment
- Measuring and testing instruments
- Digital equipment (including switching power supplies)
- General purpose filter for susceptibility or high frequency "clean up" applications

Circuit Diagram

Note: C_{Y1} and C_{Y2} capacitors omitted on 66/67 B(S)F-XXX-1-X Filters



Specifications

Model*	Rated Voltage 50/60Hz	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_{X1}	Capacitance C_{X2}	Temp. Induct. (L_1)	Rise (Max.)
66-XXX-020-0-12	250 VAC	2A	.075mA	330pF	0.22uF	NONE	10.5mH	40°C
66-XXX-020-0-04						0.22uF		
66-XXX-020-0-14					0.47uF	NONE		
66-XXX-020-0-06						0.22uF		
66-XXX-020-1-12			.01mA	NONE	0.22uF	NONE		
66-XXX-020-1-04						0.22uF		
66-XXX-020-1-14					0.47uF	NONE		
66-XXX-020-1-06						0.22uF		
66-XXX-020-4-12			0.1mA	470pF	0.22uF	NONE		
66-XXX-020-4-04						0.22uF		
66-XXX-020-4-14					0.47uF	NONE		
66-XXX-020-4-06						0.22uF		
66-XXX-040-0-12		4A	.075mA	330pF	0.22uF	NONE	4.2mH	45°C
66-XXX-040-0-04						0.22uF		
66-XXX-040-0-14					0.47uF	NONE		
66-XXX-040-0-06						0.22uF		
66-XXX-040-1-12			.01mA	NONE	0.22uF	NONE		
66-XXX-040-1-04						0.22uF		
66-XXX-040-1-14					0.47uF	NONE		
66-XXX-040-1-06						0.22uF		
66-XXX-040-4-12			.01mA	470pF	0.22uF	NONE		
66-XXX-040-4-04						0.22uF		
66-XXX-040-4-14					0.47uF	NONE		
66-XXX-040-4-06						0.22uF		
66-XXX-060-0-12		6A	.075mA	330pF	0.22uF	NONE	1.6mH	
66-XXX-060-0-04						0.22uF		
66-XXX-060-0-14					0.47uF	NONE		
66-XXX-060-0-06						0.22uF		
66-XXX-060-1-12			.01mA	NONE	0.22uF	NONE		
66-XXX-060-1-04						0.22uF		
66-XXX-060-1-14					0.47uF	NONE		
66-XXX-060-1-06						0.22uF		
66-XXX-060-4-12			0.1mA	470pF	0.22uF	NONE		
66-XXX-060-4-04						0.22uF		
66-XXX-060-4-14					0.47uF	NONE		
66-XXX-060-4-06						0.22uF		

Model*	Rated Voltage 50/60Hz	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_{X1}	Capacitance C_{X2}	Temp. Induct. (L_1)	Rise (Max.)
67-XXX-020-0-12	125 VAC	2A	0.04mA	330pF	0.22uF	NONE	10.5mH	40°C
67-XXX-020-0-04						0.22uF		
67-XXX-020-0-14					0.47uF	NONE		
67-XXX-020-0-06						0.22uF		
67-XXX-020-1-12			.005mA	NONE	0.22uF	NONE		
67-XXX-020-1-04						0.22uF		
67-XXX-020-1-14					0.47uF	NONE		
67-XXX-020-1-06						0.22uF		
67-XXX-020-4-12			0.05mA	470pF	0.22uF	NONE		
67-XXX-020-4-04						0.22uF		
67-XXX-020-4-14					0.47uF	NONE		
67-XXX-020-4-06						0.22uF		
67-XXX-040-0-12		4A	0.04mA	330pF	0.22uF	NONE	4.2mH	45°C
67-XXX-040-0-04						0.22uF		
67-XXX-040-0-14					0.47uF	NONE		
67-XXX-040-0-06						0.22uF		
67-XXX-040-1-12			.005mA	NONE	0.22uF	NONE		
67-XXX-040-1-04						0.22uF		
67-XXX-040-1-14					0.47uF	NONE		
67-XXX-040-1-06						0.22uF		
67-XXX-040-4-12			0.05mA	470pF	0.22uF	NONE		
67-XXX-040-4-04						0.22uF		
67-XXX-040-4-14					0.47uF	NONE		
67-XXX-040-4-06						0.22uF		
67-XXX-060-0-12		6A	0.04mA	330pF	0.22uF	NONE	1.6mH	
67-XXX-060-0-04						0.22uF		
67-XXX-060-0-14					0.47uF	NONE		
67-XXX-060-0-06						0.22uF		
67-XXX-060-1-12			.005mA	NONE	0.22uF	NONE		
67-XXX-060-1-04						0.22uF		
67-XXX-060-1-14					0.47uF	NONE		
67-XXX-060-1-06						0.22uF		
67-XXX-060-4-12			0.05mA	470pF	0.22uF	NONE		
67-XXX-060-4-04						0.22uF		
67-XXX-060-4-14					0.47uF	NONE		
67-XXX-060-4-06						0.22uF		

Note: Test Voltage: 1500VAC one minute, line to ground
Insulation Resistance: 300 MΩ min. at 500VDC
Voltage Drop: 1V max. at rated current

Weight: 130g
Inlet: Compatible with IEC-320
B(S) = Bolt-in terminals or (Snap-in terminals)

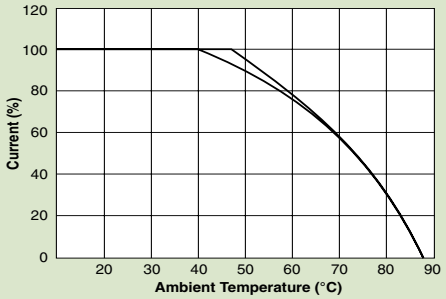
*** Substitute BSF or SSF for XXX**
BSF - Bolt-In Switched and Fused
SSF - Snap-In Switched and Fused

api technologies corp.
Spectrum Control

Switched and Fused Filtered Power Entry Modules

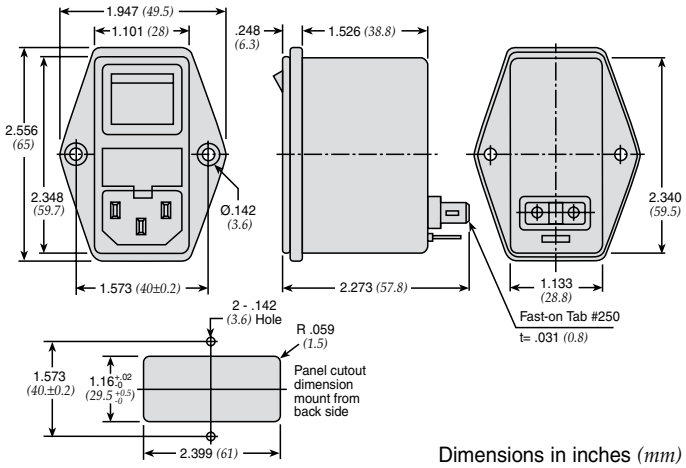
For Medical or General Purpose Applications

Temperature Characteristics



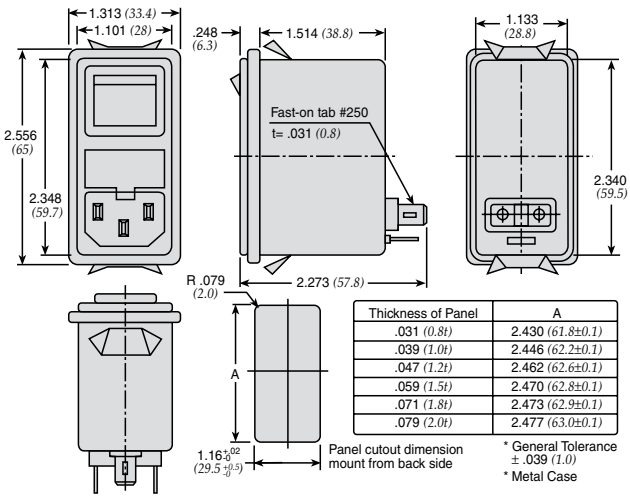
Dimensions

66/67-BSF Series



Dimensions in inches *(mm)*

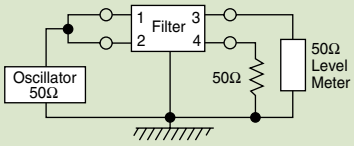
66/67-SSF Series



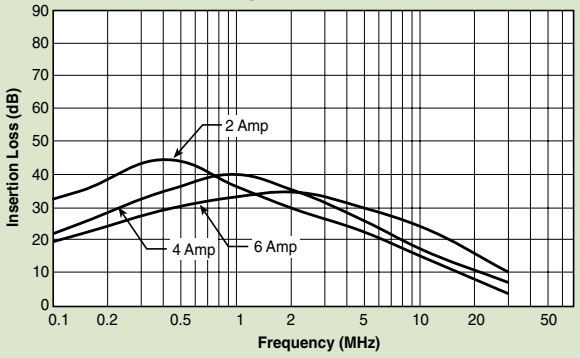
Thickness of Panel	A
.031 (0.8t)	2.430 (61.8±0.1)
.039 (1.0t)	2.446 (62.2±0.1)
.047 (1.2t)	2.462 (62.6±0.1)
.059 (1.5t)	2.470 (62.8±0.1)
.071 (1.8t)	2.473 (62.9±0.1)
.079 (2.0t)	2.477 (63.0±0.1)

* General Tolerance ± .039 (1.0)
* Metal Case

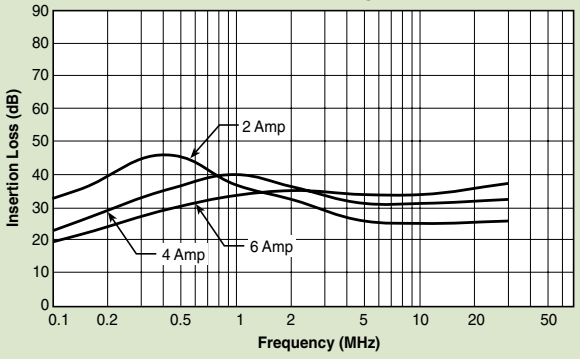
Common Mode



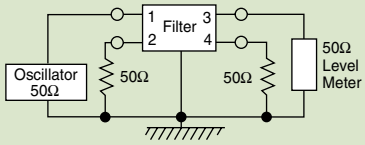
0.01 mA Leakage Current



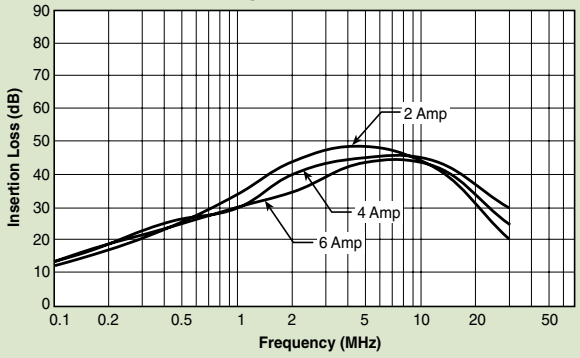
0.075 and 0.1 mA Leakage Current



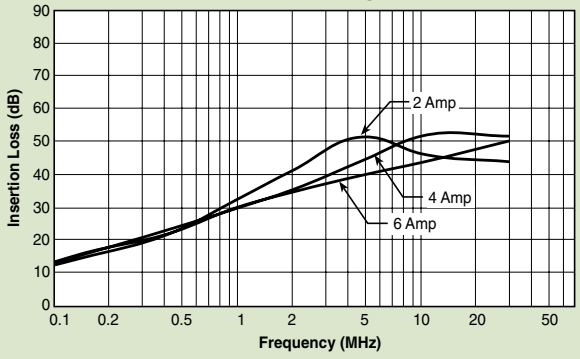
Normal Mode



0.01 mA Leakage Current



0.075 and 0.1 mA Leakage Current



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API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

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Spectrum Control

Switched and Fused Filtered Power Entry Modules

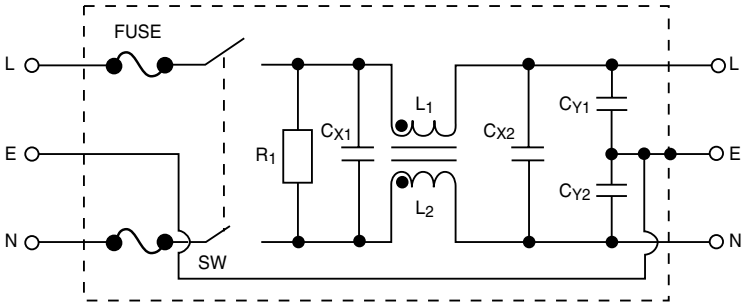
Dual Fuse for European Applications

68-BSF Series

Features

- Dual fuse for European applications
- Fuse holder and double pole power ON/OFF switch provides a convenient/compact package
- Suitable for products that must conform to FCC and FTZ requirements
- Meets over voltage category II of IEC 664 and complies with IEC 950
- Metal case provides effective EMI shielding
- IEC connector meets the safety standards of most certifying agencies
- Easy access fuse drawer
- Flange-mounted
- UL, CSA, and SEMKO approved
- Designed to be in accordance with VDE 0565, part 3
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF43)

Circuit Diagram



Applications

- Computers and peripheral equipment
- Electronic equipment
- Digital equipment
- Measuring and testing instruments
- Telecommunications equipment

Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_{Y1}	Capacitance C_{Y2}	Capacitance C_{X1}	Capacitance C_{X2}	Inductance (L_1)	Temperature Rise (Max.)
68-BSF-020-3-01	250VAC	2A	0.35mA	2200pF	2200pF	0.1uF	0.1uF	10.5mH	45°C
68-BSF-020-3-04						0.22uF	0.22uF		
68-BSF-040-3-01		4A				0.1uF	0.1uF	4.2mH	
68-BSF-040-3-04						0.22uF	0.22uF		
68-BSF-060-3-01		6A				0.1uF	0.1uF	1.6mH	
68-BSF-060-3-04						0.22uF	0.22uF		

Note: Test Voltage 1500VAC one minute, line to ground
Insulation Resistance: 300 MΩ min. at 500VDC
Voltage Drop: 1V max. at rated current
Weight: 130g
Inlet: Compatible with IEC-320
B(S) = Bolt-in terminals

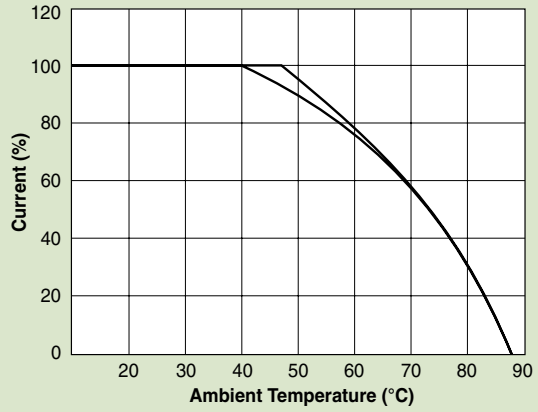
api technologies corp.
Spectrum Control

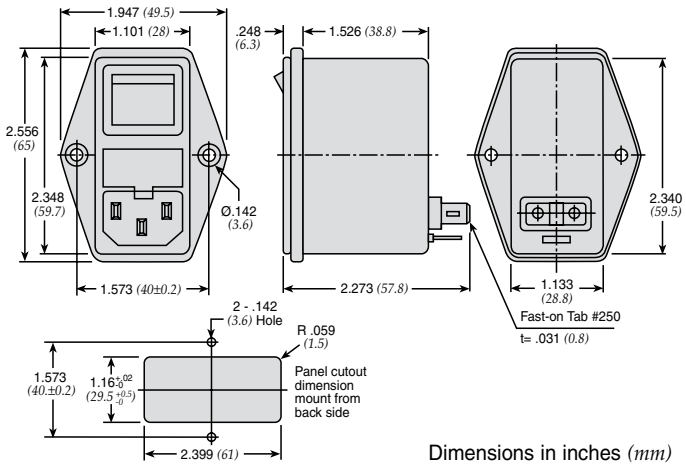
Switched and Fused Filtered Power Entry Modules

Dual Fuse for European Applications

68-BSF Series

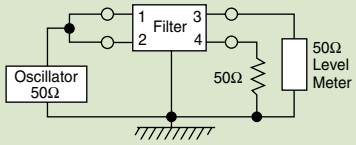
Temperature Characteristics

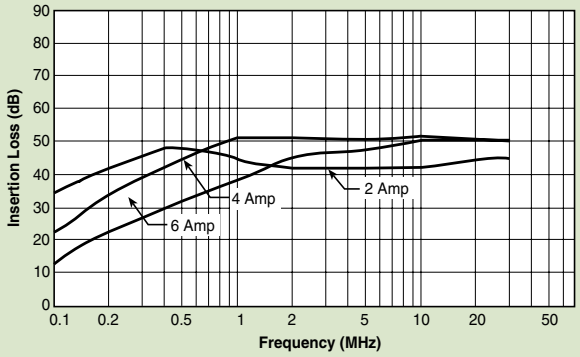




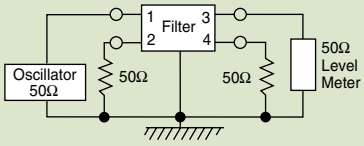
Dimensions in inches *(mm)*

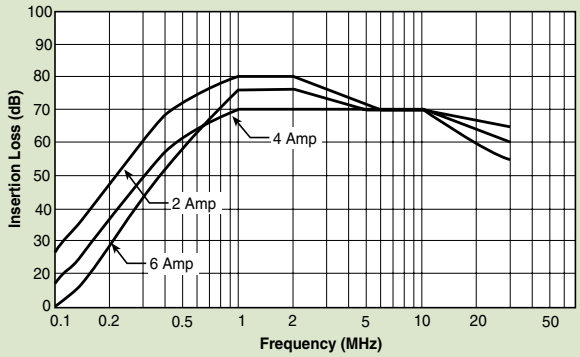
Common Mode





Normal Mode





api technologies corp.
Spectrum Control

PCB Power Filters
Miniature Printed Circuit Board

61-MPC Series

Tested and found to be
IAW VDE 0565 Part 3

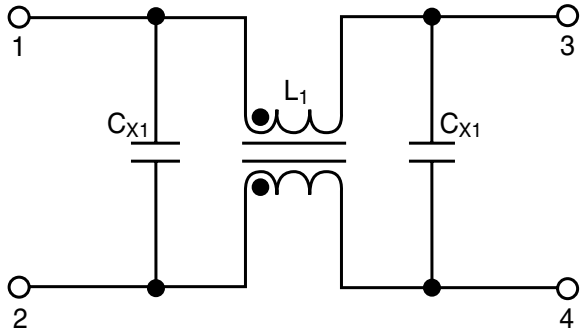
Features

- Miniature general purpose PCB mounted filter
- Requires minimal PCB real estate space
- Low cost
- Designed for two wire cord systems
- For three wire cord systems, Y capacitors can be attached externally
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF45)

Applications

- Personal computers and peripherals
- Digital equipment
- Measuring instruments and medical equipment
- TV & VCR monitors and display units
- Home appliances

Circuit Diagram



Specifications

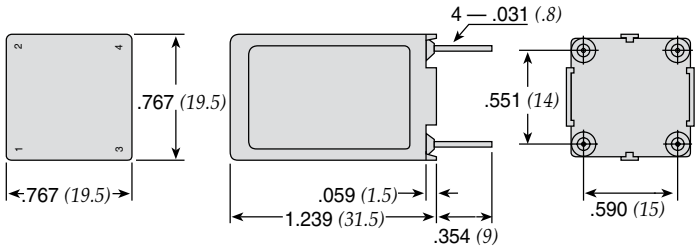
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_{X1}	Capacitance C_{X2}	Inductance (L_1)	Temperature Rise (Max.)
61-MPC-010-1-11	250VAC	1A	0.1mA	0.1uF	0.1uF	11mH	40°C
61-MPC-016-1-11		1.6A				6.0mH	
61-MPC-025-1-11		2.5A				2.4mH	
61-MPC-036-1-11		3.6A				1.2mH	

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 17.5g

api technologies corp.
Spectrum Control

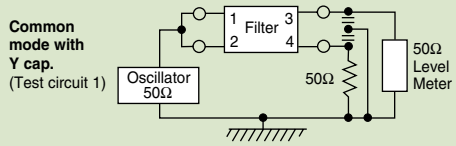
PCB Power Filters
Miniature Printed Circuit Board

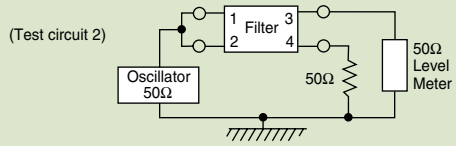
61-MPC Series



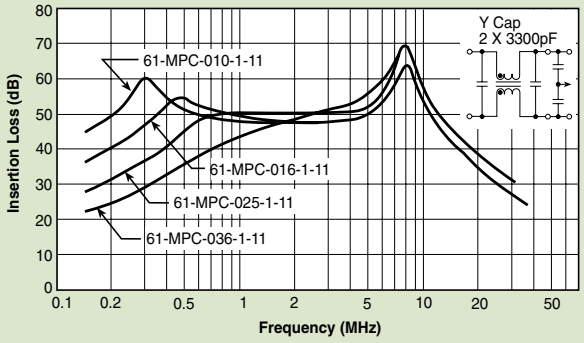
Dimensions in inches *(mm)*

Common Mode

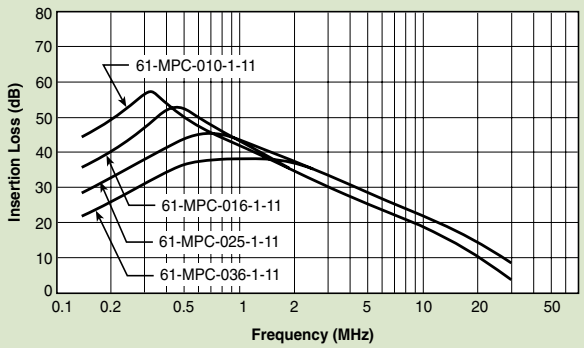




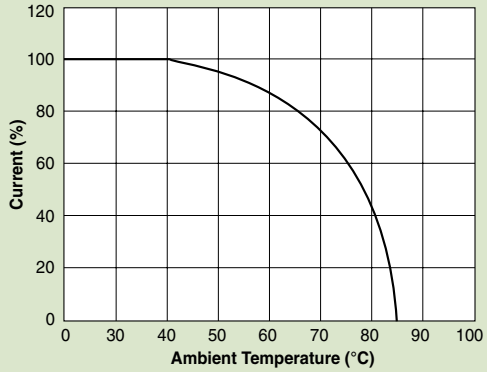
61-MPC



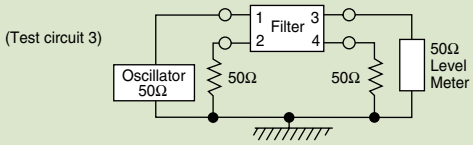
61-MPC



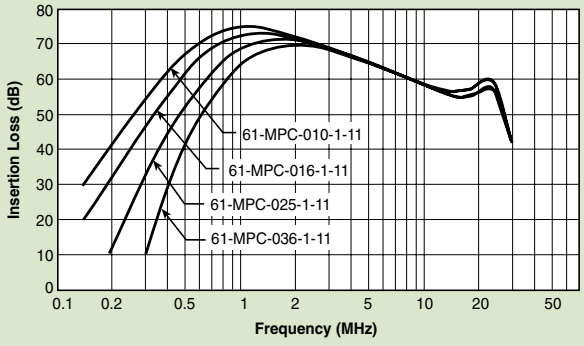
Temperature Characteristics



Normal Mode



61-MPC



api technologies corp.
Spectrum Control

Power Entry Modules
Bolt-in Right Angle Terminals
for PCB Applications

60-BPP Series

Tested and found to be IAW VDE 0565 Part 3

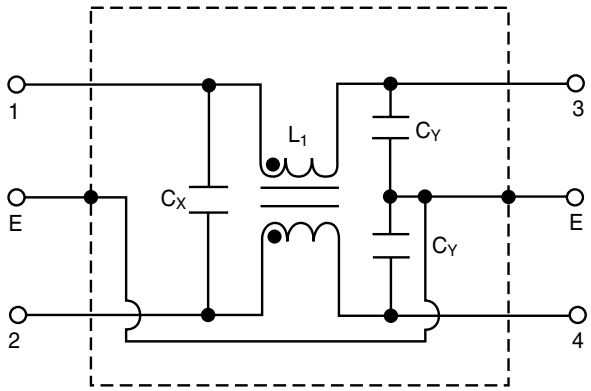
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards Solder lug, Fast-on tab styles available (see page PF18)
- PCB mounting style minimizes space and provides economical installation
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF47)
- UL approved low leakage version also available

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
60-BPP-010-3-2	250VAC	1A	0.35mA	2200pF	0.022uF	6.0mH	30°C
60-BPP-010-3-4					0.047uF		
60-BPP-010-5-2			0.50mA	3300pF	0.022uF		
60-BPP-010-5-4					0.047uF		
60-BPP-020-3-2		2A	0.35mA	2200pF	0.022uF	2.4mH	
60-BPP-020-3-4					0.047uF		
60-BPP-020-5-2			0.50mA	3300pF	0.022uF		
60-BPP-020-5-4					0.047uF		
60-BPP-030-3-2		3A	0.35mA	2200pF	0.022uF	1.2mH	
60-BPP-030-3-4					0.047uF		
60-BPP-030-5-2			0.50mA	3300pF	0.022uF		
60-BPP-030-5-4					0.047uF		
60-BPP-060-3-2		6A	0.35mA	2200pF	0.022uF	0.53mH	45°C
60-BPP-060-3-4					0.047uF		
60-BPP-060-5-2			0.50mA	3300pF	0.022uF		
60-BPP-060-5-4					0.047uF		

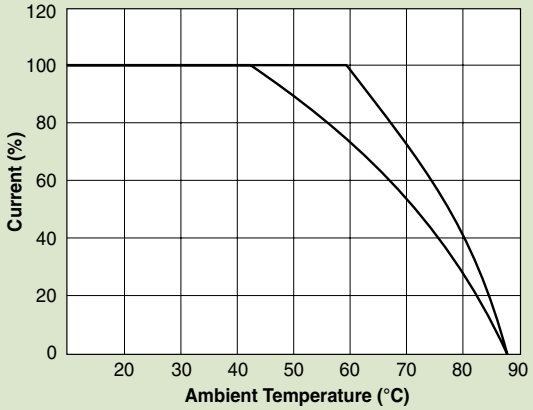
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

api technologies corp.
Spectrum Control

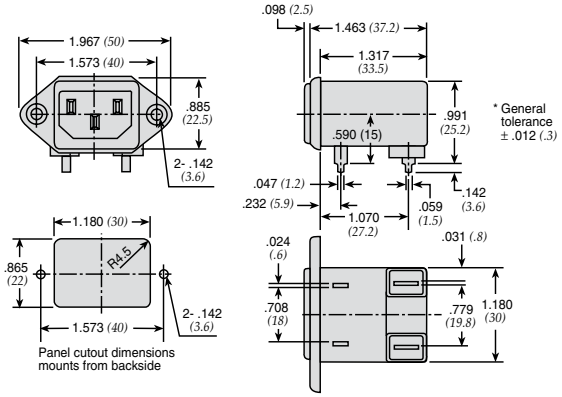
Power Entry Modules
Bolt-in Right Angle Terminals
for PCB Applications

60-BPP Series

Temperature Characteristics

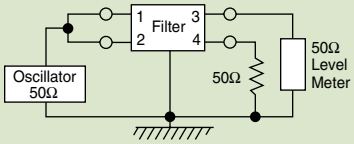


60-BPP PCB Mounting Type

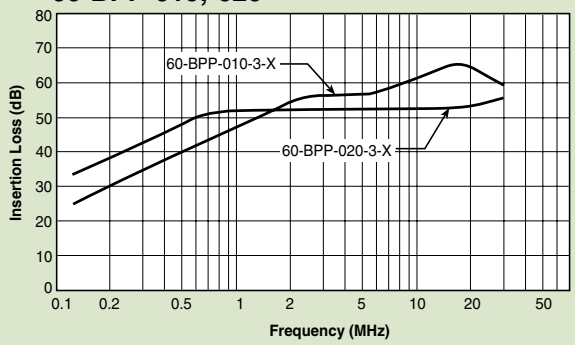


Dimensions in inches *(mm)*

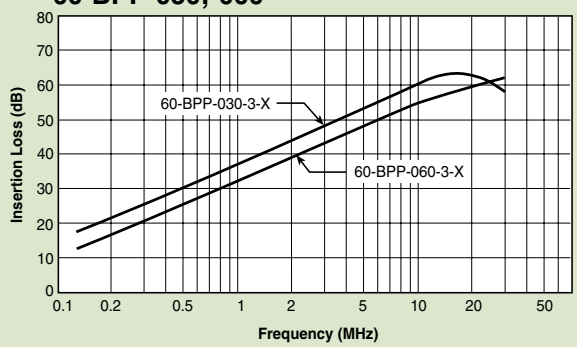
Common Mode



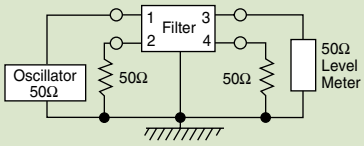
60-BPP-010;-020



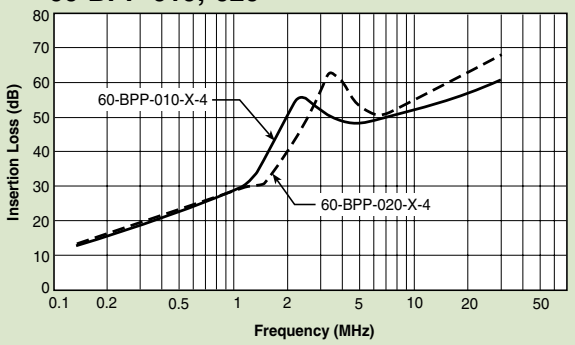
60-BPP-030;-060



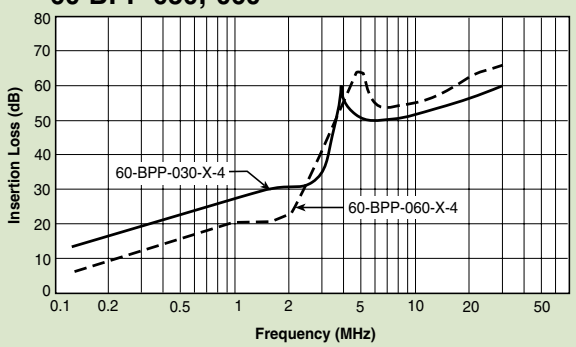
Normal Mode



60-BPP-010;-020



60-BPP-030;-060



api technologies corp.
Spectrum Control

Power Entry Modules
High Frequency Attenuation

Bolt-in for PCB Applications

60-BHP Series

Tested and found to be IAW VDE 0565 Part 3

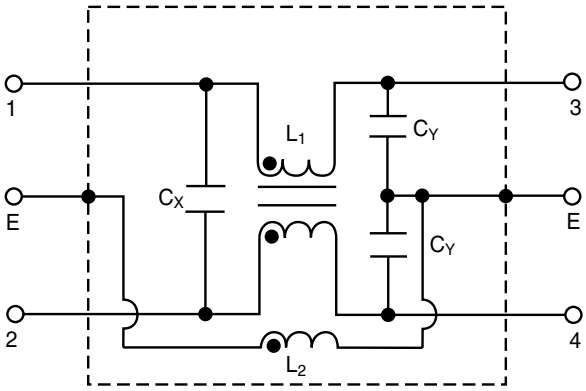
Features

- Ideally suited for products that must conform to FCC part 15 regulations
- Metal cased filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Solder lug, Fast-on tab styles available (see page PF20)
- PCB mounting minimizes space and provides economical installation
- Excellent filtering characteristics for high frequencies
- Earth coil standard
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF49)

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Inductance (L_2)	Temperature Rise (Max.)
60-BHP-010-3-11	250VAC	1A	0.35mA	2200pF±20%	0.1uF±20%	6mH	18.3 uH	30°C
60-BHP-010-3-4					.047uF±20%			
60-BHP-010-5-11			0.50mA	3300pF±20%	0.1uF±20%			
60-BHP-010-5-4					.047uF±20%			
60-BHP-020-3-11		2A	0.35mA	2200pF±20%	0.1uF±20%	2.4mH		
60-BHP-020-3-4					.047uF±20%			
60-BHP-020-5-11			0.50mA	3300pF±20%	0.1uF±20%			
60-BHP-020-5-4					.047uF±20%			
60-BHP-030-3-11		3A	0.35mA	2200pF±20%	0.1uF±20%	1.2mH		
60-BHP-030-3-4					.047uF±20%			
60-BHP-030-5-11			0.50mA	3300pF±20%	0.1uF±20%			
60-BHP-030-5-4					.047uF±20%			
60-BHP-060-3-11		6A	0.35mA	2200pF±20%	0.1uF±20%	0.53mH		45°C
60-BHP-060-3-4					.047uF±20%			
60-BHP-060-5-11			0.50mA	3300pF±20%	0.1uF±20%			
60-BHP-060-5-4					.047uF±20%			

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

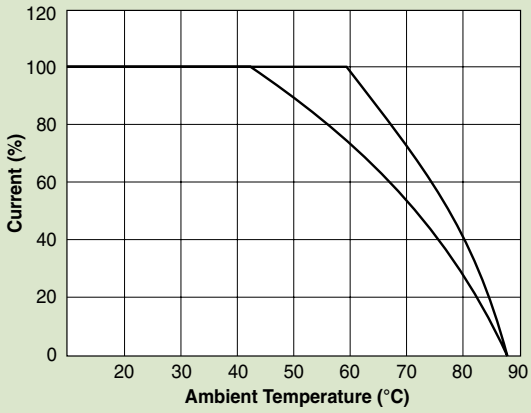
api technologies corp.
Spectrum Control

Power Entry Modules
High Frequency Attenuation

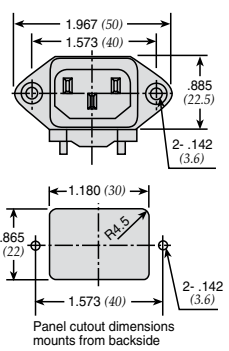
Bolt-in for PCB Applications

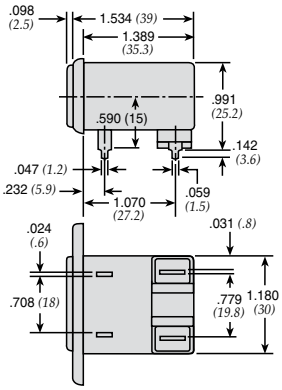
60-BHP Series

Temperature Characteristics



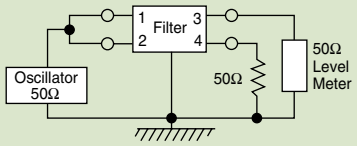
60-BHP PCB Mounting Type



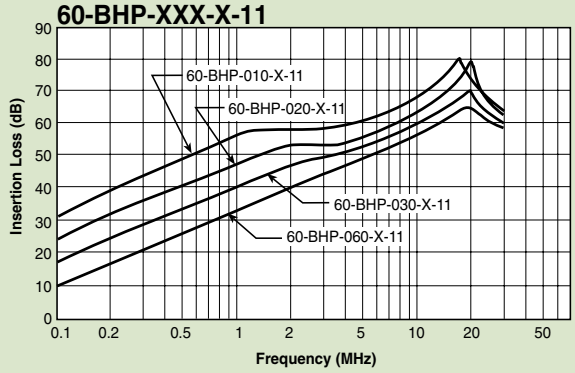


Dimensions in inches *(mm)*

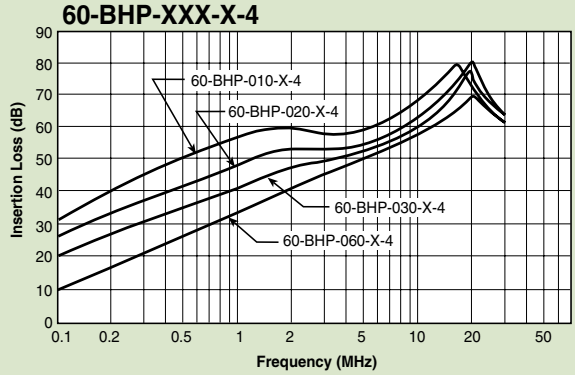
Common Mode



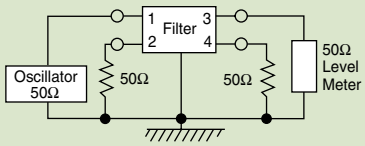
60-BHP-XXX-X-11



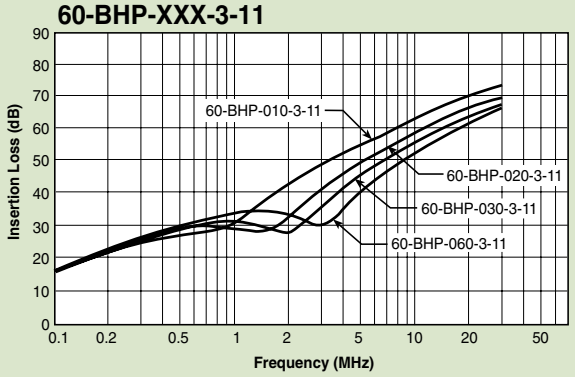
60-BHP-XXX-X-4



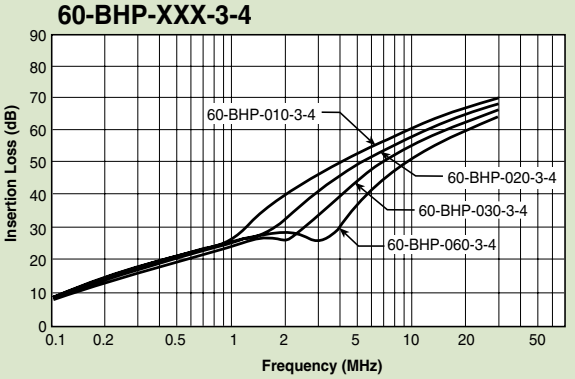
Normal Mode



60-BHP-XXX-3-11



60-BHP-XXX-3-4



api technologies corp.
Spectrum Control

Power Line Filters
Appliance Filters

11-MPC Series

Features

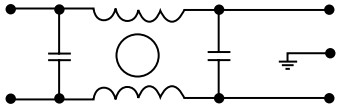
- Miniature general purpose PCB mounted filter
- Requires minimal PCB real estate space
- Low cost
- Operating temperature: -25°C to +70°C
- Two forms of cases are available: metal case and plastic case

Applications

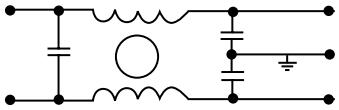
- Personal computers and peripherals
- Digital equipment
- Measuring instruments and medical equipment
- TV & VCR monitors and display units
- Home appliances

Circuit Diagram

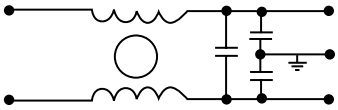
Circuit 1



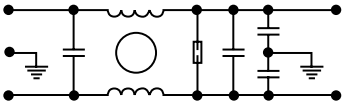
Circuit 2



Circuit 3



Circuit 4



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
11-MPC-001-2-B	120/250VAC	1A	5uA	1	A1	30°C
11-MPC-001-5-A			0.50mA	2	A	
11-MPC-001-5-B					A1	
11-MPC-002-5-B		2A				
11-MPC-002-5-D				3	D	
11-MPC-003-5-E		3A			E	
11-MPC-006-5-B		6A		2	A1	
11-MPC-006-5-C					C	
11-MPC-016-5-B		16A	0.2mA	4	B	

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 17.5g

api technologies corp.
Spectrum Control

PCB Power Filters
Miniature Printed Circuit Board

11-MPC Series

Figure A

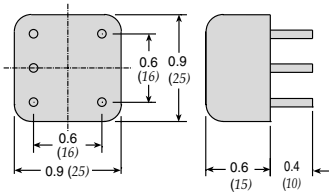


Figure A1

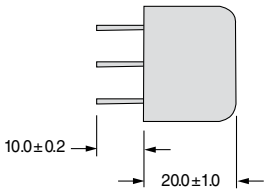


Figure B

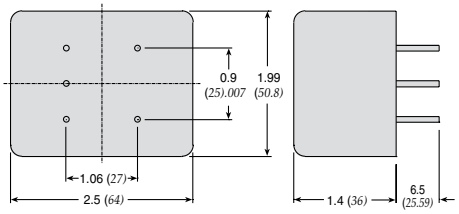


Figure C

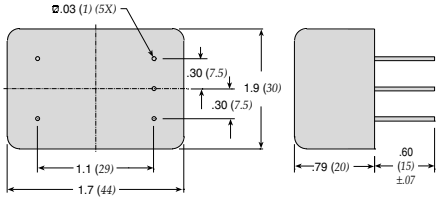


Figure D

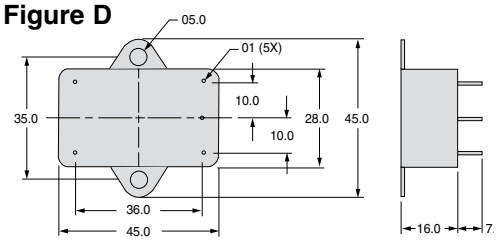
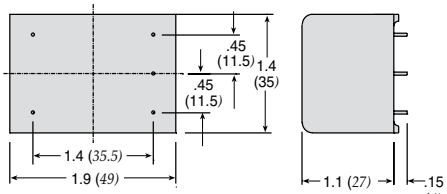
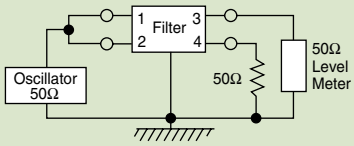


Figure E

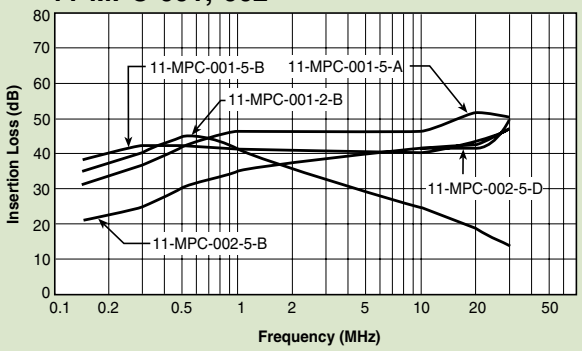


Dimensions in inches *(mm)*

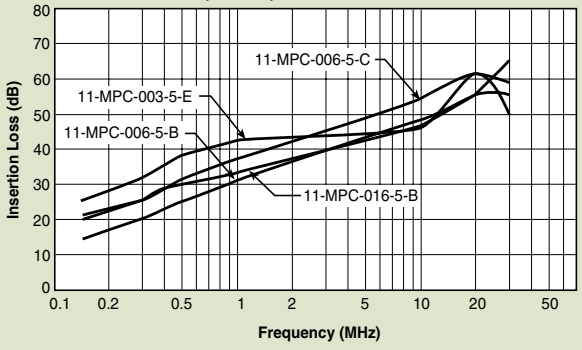
Common Mode



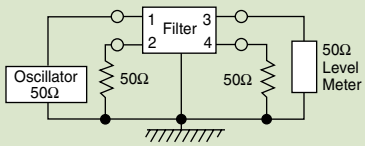
11-MPC-001;-002



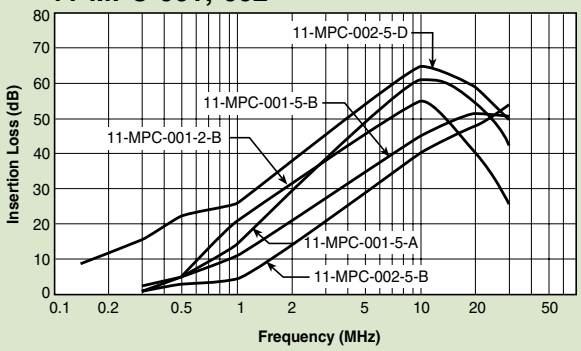
11-MPC-003;-006;-016



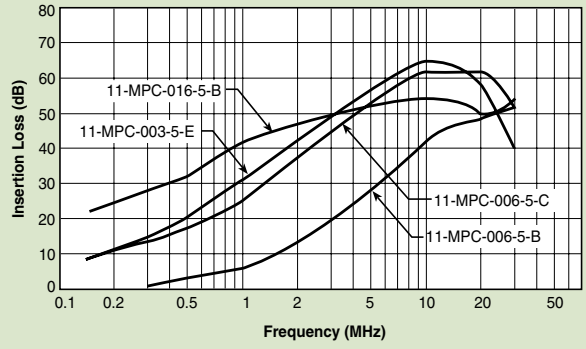
Normal Mode



11-MPC-001;-002



11-MPC-003;-006;-016



api technologies corp.
Spectrum Control

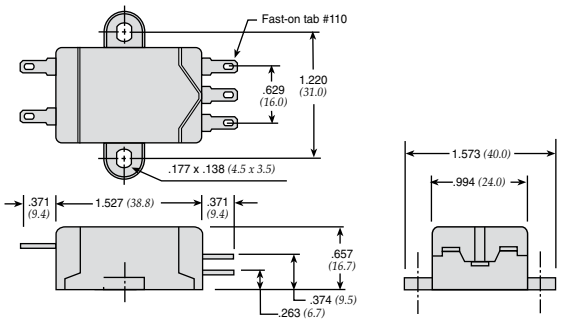
Power Line Filters
Appliance Filters

62-AL/62-AC Series

Tested and found to be IAW VDE 0565 Part 3

Features

- Low-cost plastic case
- Compact design requires minimal real estate space
- Suitable for products that must conform to FCC regulations
- Wide variety of circuit and filtering options
- Good filtering characteristics for both normal mode and common mode
- Epoxy molded for reliability
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF53)

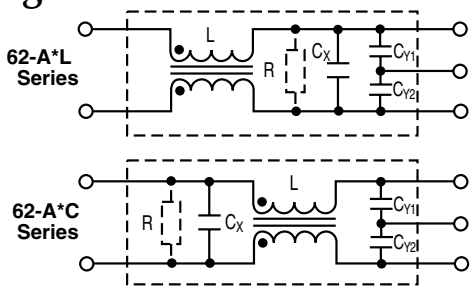


Dimensions in inches *(mm)*

Applications

- Personal computers and peripherals
- Digital equipment
- Industrial equipment
- Vending machines
- Home appliances
- Office equipment

Circuit Diagrams



* R= w/ Bleeder Resistor
F = w/o Bleeder Resistor

Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
62-AFL-010-3-11	250VAC	1.0A	0.35mA		0.1uF	11.0mH	40°C
62-AFC-010-3-11							
62-AFL-010-5-11			0.50mA				
62-AFC-010-5-11							
62-AFL-016-3-11		1.6A	0.35mA	2200pF		6.0mH	
62-AFC-016-3-11							
62-AFL-016-5-11			0.50mA	3300pF			
62-AFC-016-5-11							
62-AFL-030-3-11		3.0A	0.35mA	2200pF		2.4mH	
62-AFC-030-3-11							
62-AFL-030-5-11			0.50mA	3300pF			
62-AFC-030-5-11							
62-AFL-045-3-11		4.5A	0.35mA	2200pF		1.0mH	
62-AFC-045-3-11							
62-AFL-045-5-11			0.50mA	3300pF			
62-AFC-045-5-11							
62-AFL-060-3-11		6.0A	0.35mA	2200pF		0.53mH	
62-AFC-060-3-11							
62-AFL-060-5-11			0.50mA	3300pF			
62-AFC-060-5-11							

Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.

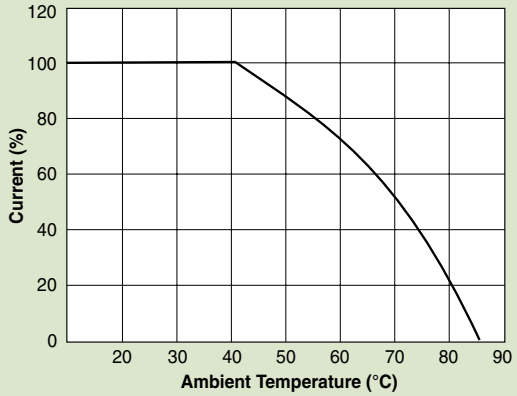
* Available with bleeder resistor
Replace F with R for part number

api technologies corp.
Spectrum Control

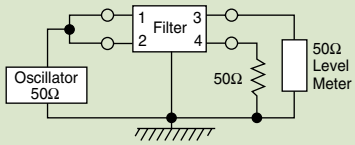
Power Line Filters
Appliance Filters

62-AL/62-AC Series

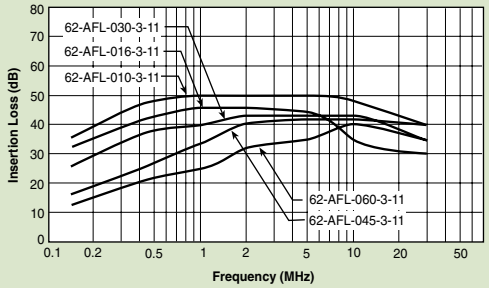
Temperature Characteristics



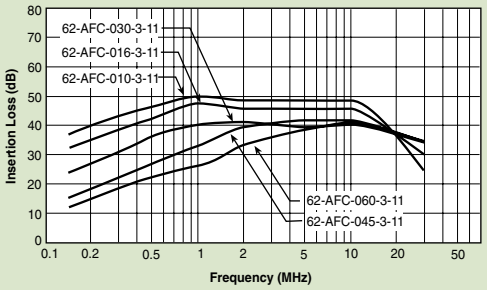
Common Mode



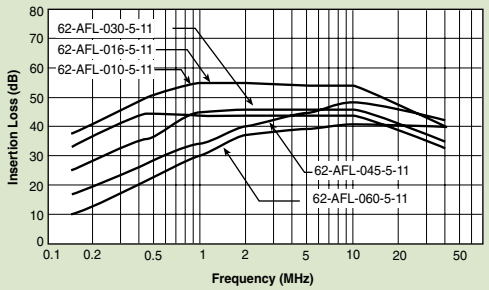
62-AFL-xxx-3-11



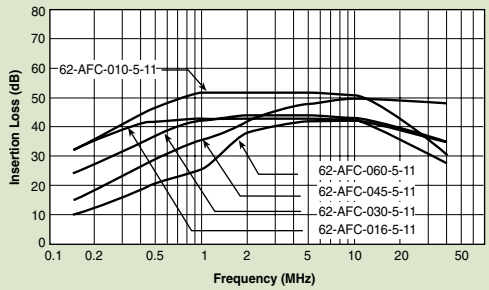
62-AFC-XXX-3-11



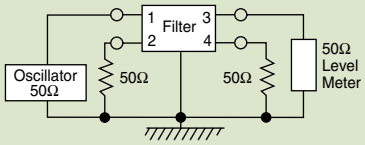
62-AFL-xxx-5-11



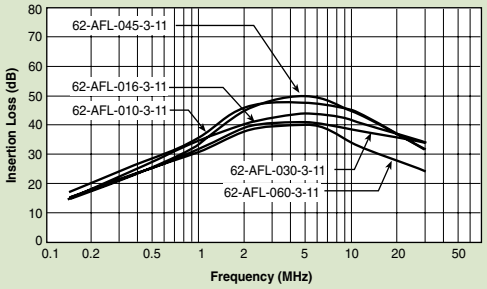
62-AFC-xxx-5-11



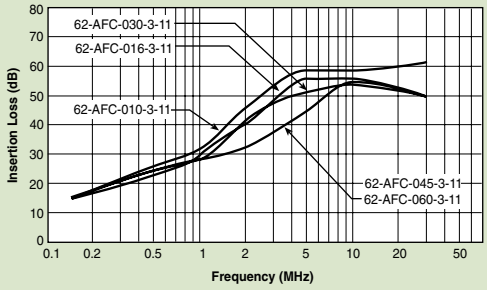
Normal Mode



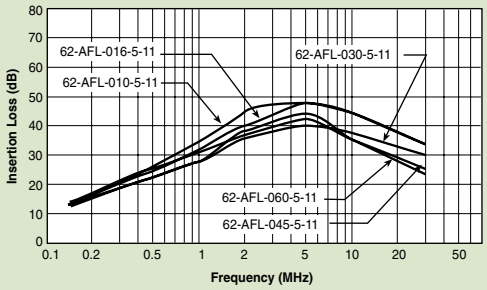
62-AFL-XXX-3-11



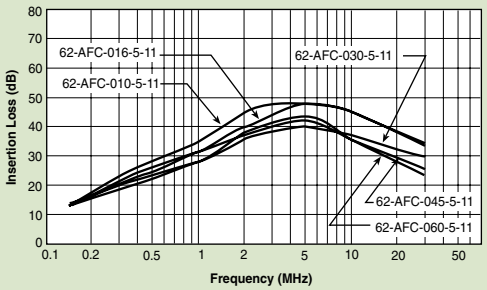
62-AFC-XXX-3-11



62-AFL-xxx-5-11



62-AFC-xxx-5-11



api technologies corp.
Spectrum Control

Power Line Filters
Single Stage

62-PPF/PQF/PRF Series

Tested and found to be
IAW VDE 0565 Part 3

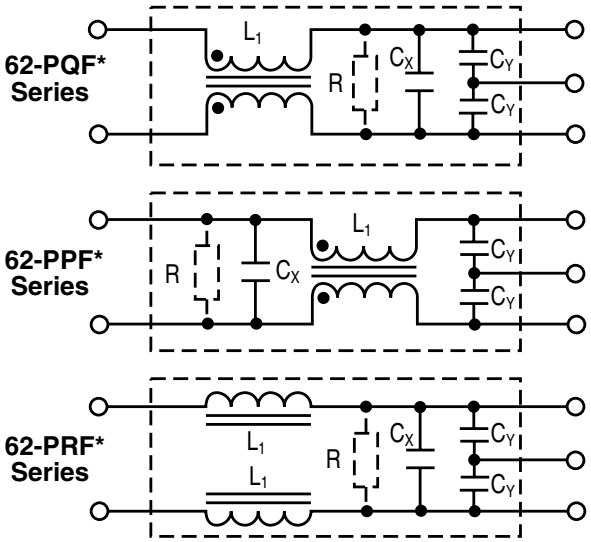
Features

- Low-cost plastic case
- Compact design requires minimal real estate space
- Suitable for products that must conform to FCC and FTZ regulations
- Wide variety of circuit and filtering options
- Good filtering characteristics for both normal mode and common mode
- Epoxy molded for reliability
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF55)

Applications

- Personal computers and peripherals
- Digital equipment
- Industrial equipment
- Vending machines
- Office equipment

Circuit Diagrams



* Bleeder Resistor is available only for 62-P(Q/R/P)F-XXX-X-12

Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
62-PQF-020-5-11	250VAC	2A	0.50mA	3300pF	0.1uF	15mH	30°C
62-PQF-020-5-12					.22uF		
62-PPF-020-5-11					0.1uF		
62-PPF-020-5-12					.22uF		
62-PQF-030-5-11		3A			0.1uF	8mH	
62-PQF-030-5-12					.22uF		
62-PPF-030-5-11					0.1uF		
62-PPF-030-5-12					.22uF		
62-PQF-060-5-11		6A			0.1uF	2.1mH	
62-PQF-060-5-12					.22uF		
62-PPF-060-5-11					0.1uF		
62-PPF-060-5-12					.22uF		
62-PRF-010-5-11		1A			0.1uF	486uH	
62-PRF-010-5-12					.22uF		
62-PRF-020-5-11		2A			0.1uF	181uH	
62-PRF-020-5-12					.22uF		
62-PRF-030-5-11		3A			0.1uF	97uH	
62-PRF-030-5-12					.22uF		

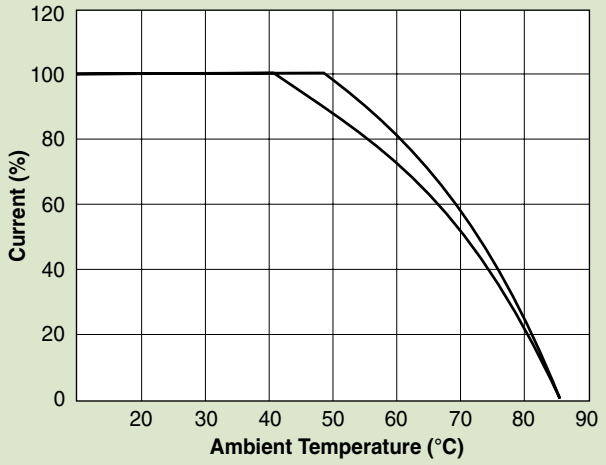
Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. (except 62-PRF-010-5-11) at rated current
62-PRF-010-5-11: 1.5V max. at rated current
Weight: 62-PPF & PQF Series: 2.11 ounces (60 grams)
62-PRF Series: 1.76 ounces (50 grams)

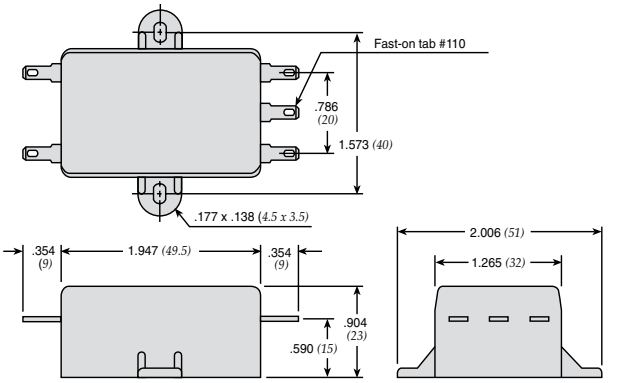
api technologies corp.
Spectrum Control

Power Line Filters
Single Stage

62-PPF/PQF/PRF Series

Temperature Characteristics

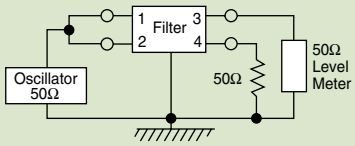




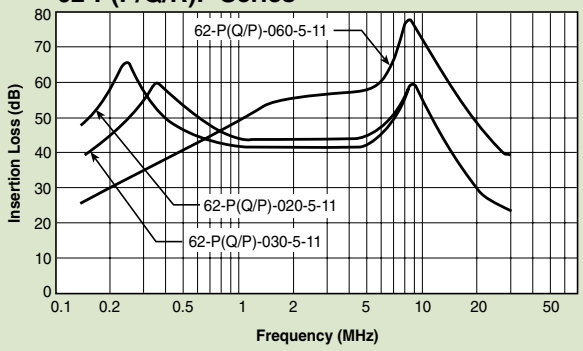
Also available with .250 Fast-ons

Dimensions in inches *(mm)*

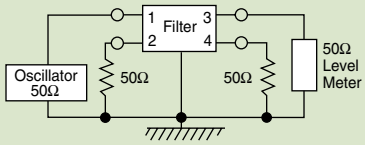
Common Mode



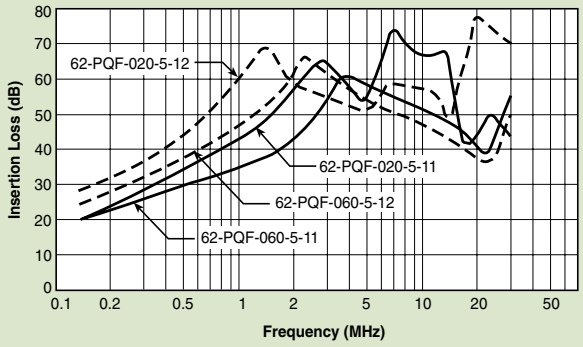
62-P(P/Q/R)F Series



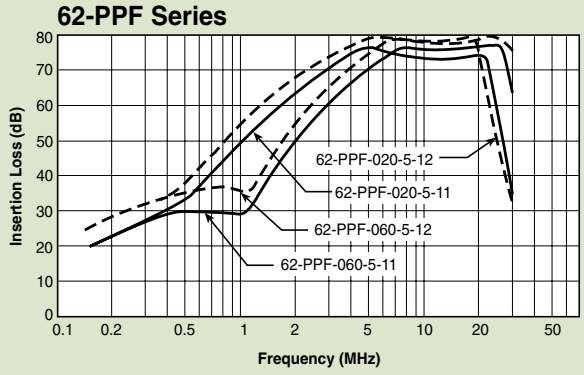
Normal Mode



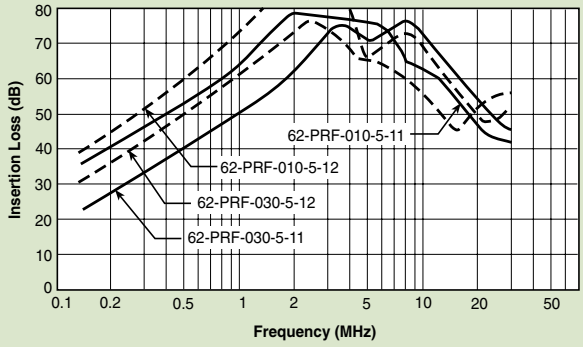
62-PQF Series



62-PPF Series



62-PRF Series



api technologies corp.
Spectrum Control

Power Line Filters
Single Stage Wire Leads

62-PML Series

Tested and found to be
IAW VDE 0565 Part 3

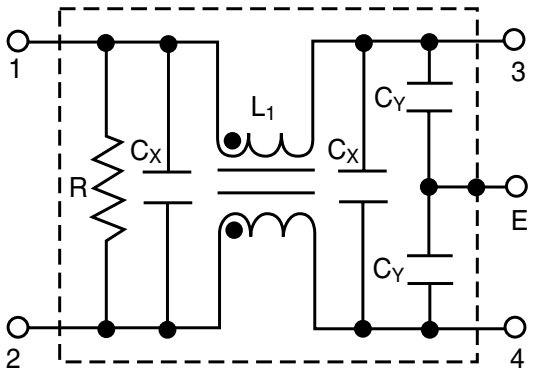
Features

- Compact design requires minimal real estate space
- Suitable for products that must conform to FCC and FTZ regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Structure provides effective shielding for noise generated externally and internally
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF57)

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Medical equipment
- Factory automation equipment

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
62-PML-015-3-11	250VAC	1.5A	0.35mA	2200pF	0.1uF	10.0mH	30°C
62-PML-015-5-11			0.50mA	3300pF			
62-PML-030-3-11		3A	0.35mA	2200pF		4.3mH	
62-PML-030-5-11			0.50mA	3300pF			
62-PML-050-3-11		5A	0.35mA	2200pF		2.4mH	
62-PML-050-5-11			0.50mA	3300pF			

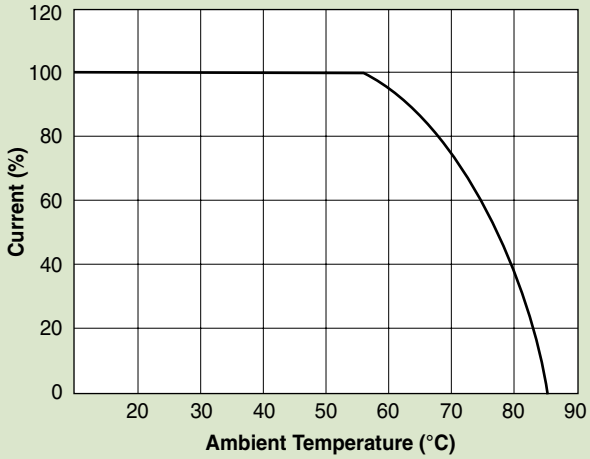
Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 62-PML-015 Series: 3.06 ounces (87 grams)
62-PML-030 Series: 3.17 ounces (90 grams)
62-PML-050 Series: 3.28 ounces (93 grams)
Discharge time: 0.4 sec. max.

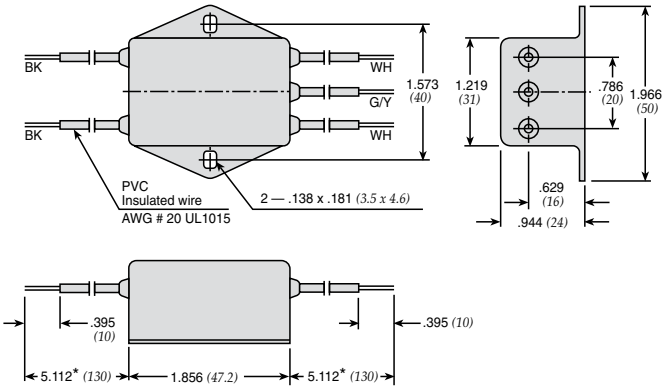
api technologies corp.
Spectrum Control

Power Line Filters
Single Stage Wire Leads

62-PML Series

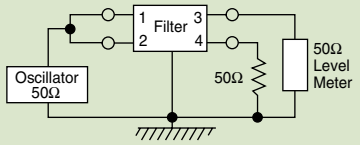
Temperature Characteristics

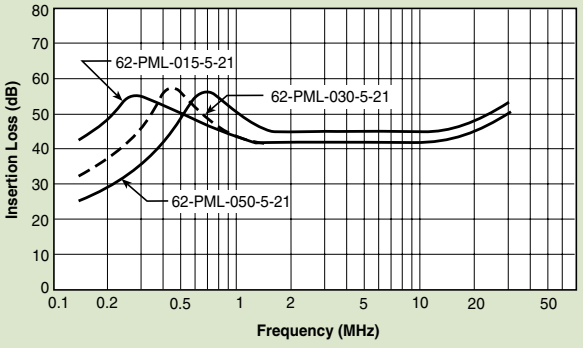




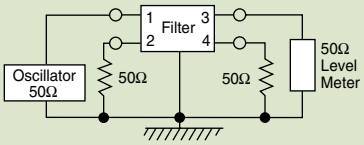
* Custom lengths available upon request. Dimensions in inches *(mm)*

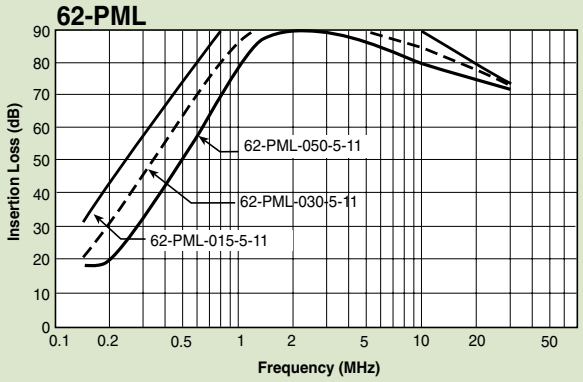
Common Mode





Normal Mode





api technologies corp.
Spectrum Control

Power Line Filters
Single Stage Wire Leads
for Medical Purpose Applications

12-PML & 12-PMF Series

Features

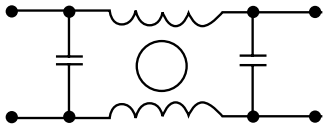
- Compact design requires minimal real estate space
- Suitable for products that must conform to FCC and FTZ regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Structure provides effective shielding for noise generated externally and internally
- Operating temperature: -25°C to +70°C
- Low leakage current

Applications

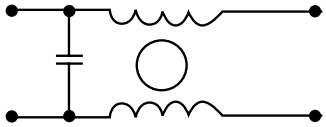
- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Medical equipment
- Factory automation equipment

Circuit Diagram

Circuit 1



Circuit 2



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
12-PML-001-2-A	120/250VAC	1A	5uA	1	A	30°C
12-PML-002-2-A		2A				
12-PML-006-2-A		6A				
12-PML-010-2-A		10A				
12-PMF-001-2-B		1A		2	B	
12-PMF-002-2-B		2A				
12-PMF-006-2-B		6A				
12-PML-001-2-C		1A		1	C	

Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Discharge time: 0.4 sec. max.

api technologies corp.
Spectrum Control

Power Line Filters
Single Stage Wire Leads
for Medical Purpose Applications

12-PML & 12-PMF Series

Figure A

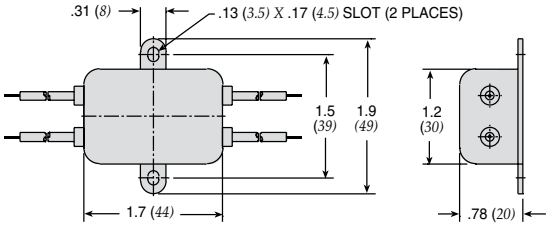


Figure B

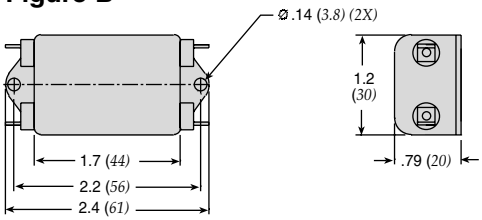
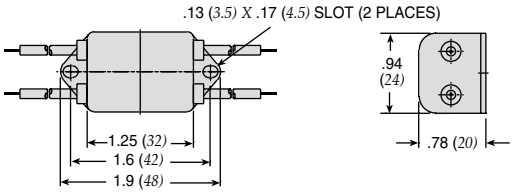
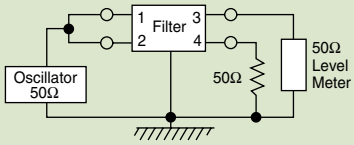


Figure C

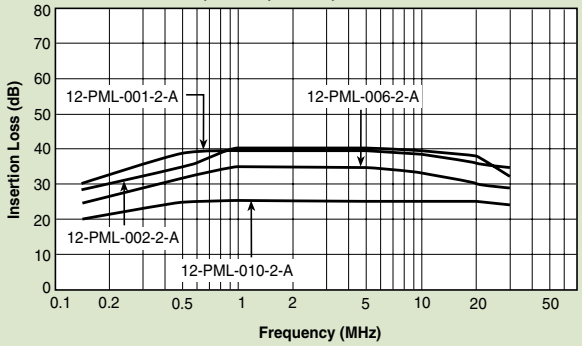


Dimensions in inches *(mm)*

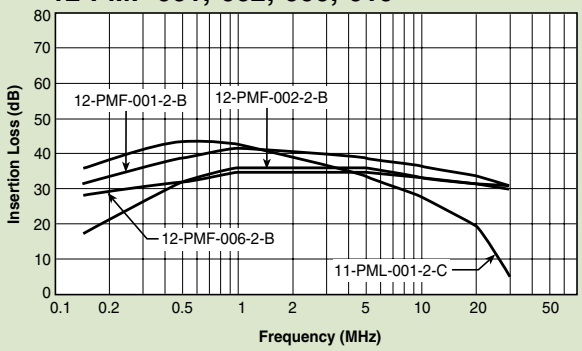
Common Mode



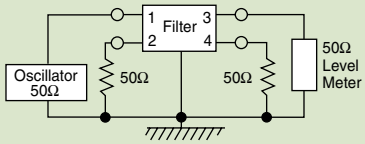
12-PML-001;-002;-006;-010



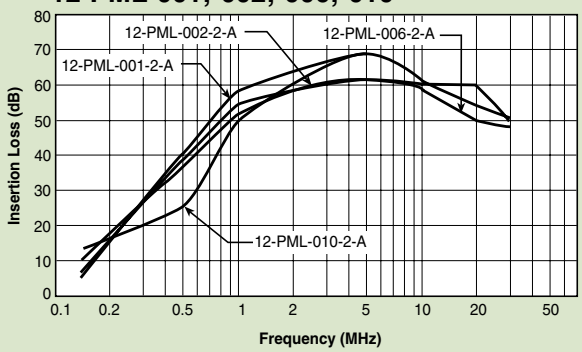
12-PMF-001;-002;-006;-010



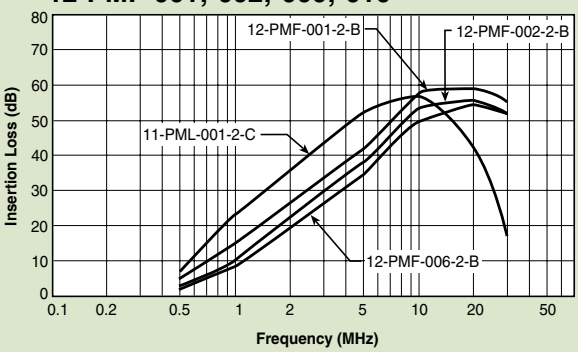
Normal Mode



12-PML-001;-002;-006;-010



12-PMF-001;-002;-006;-010



api technologies corp.
Spectrum Control

Power Line Filters
Single Stage

62-LMF & LMB Series

Tested and found to be
IAW VDE 0565 Part 3

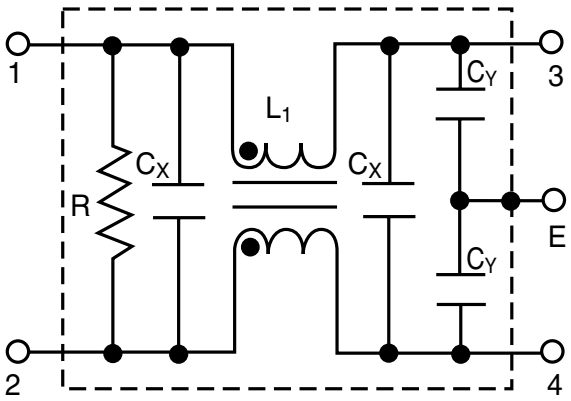
Features

- Space saving, compact designs
- Suitable for products that must conform to FCC and FTZ regulations
- Excellent filtering characteristics for both normal mode and common mode
- Structure provides effective shielding for noise generated externally and internally
- Metal case provides effective shielding
- Rugged construction
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF61)

Applications

- Digital equipment
- Office automation equipment, such as copy and fax machines
- Computers and peripherals
- Instrumentation and controls

Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
62-LMB-030-5-11	250VAC	3A	0.50mA	3300pF	0.1uF	14mH	45°C
62-LMF-030-5-11							
62-LMB-050-5-11		5A			0.1uF & .22uF	7.0mH	
62-LMF-050-5-11							
62-LMB-080-5-11		8A			.22uF	4.2mH	
62-LMF-080-5-11							
62-LMB-100-5-11		10A			.33uF	2.2mH	
62-LMF-100-5-11							

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Discharge time: 0.4 sec. max.
Weight: 5.3 ounces (150 grams)

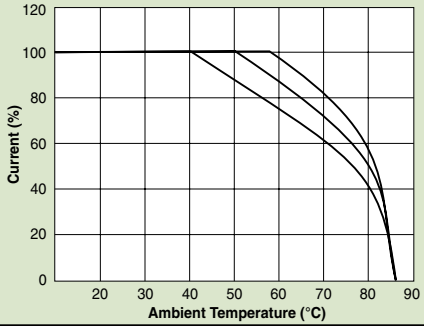
*62-LMF - designates Fast-on terminals
62-LMB - designates Bolt-in terminals
62-LML - wire lead in/outputs also available

api technologies corp.
Spectrum Control

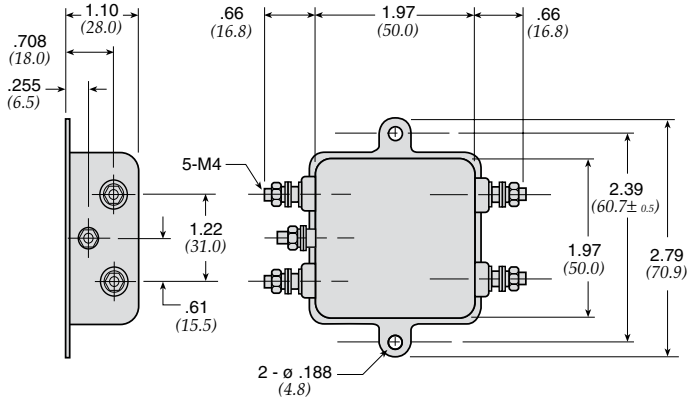
Power Line Filters
Single Stage

62-LMF & LMB Series

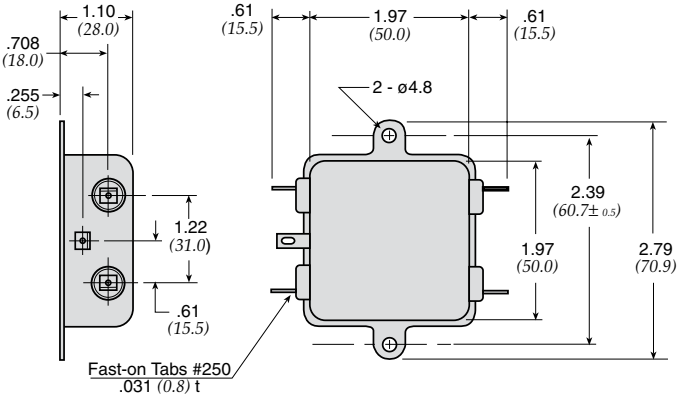
Temperature Characteristics



62-LMB

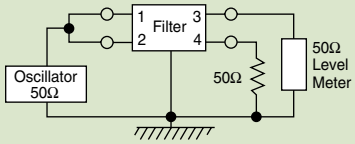


62-LMF

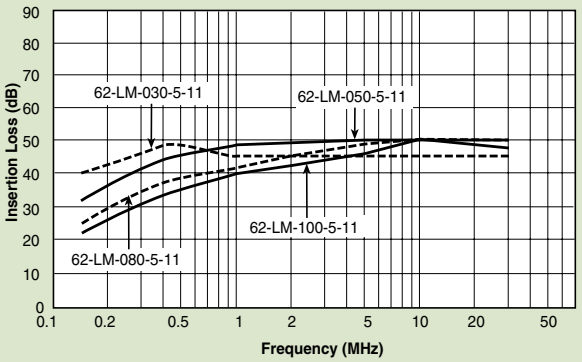


Dimensions in inches *(mm)*

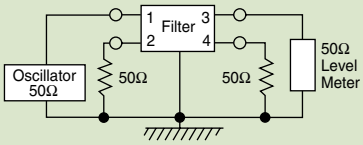
Common Mode



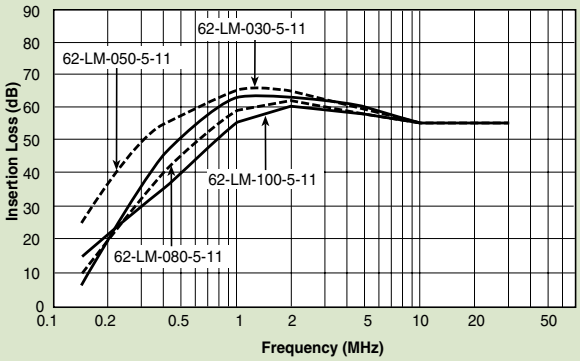
62-LMF & LMB



Normal Mode



62-LMF & LMB



API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

api technologies corp.
Spectrum Control

Power Line Filters
Single Stage

62-PMF & PMB Series

Tested and found to be IAW VDE 0565 Part 3

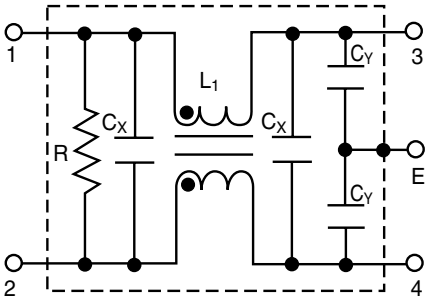
Features

- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- Structure provides effective shielding for noise generated externally and internally
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF63)

Applications

- Digital equipment
- Computers and peripherals
- Measuring instruments
- Medical equipment
- Equipment requiring very high impulse attenuation
- Factory automation equipment
- Industrial equipment such as UPS, inverters and converters
- Telecommunications equipment
- Office automation equipment, such as copy and fax machines

Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
62-PMB-050-5-11	250VAC	5A	0.50mA	3300pF	0.1uF	14mH	30°C
62-PMF-050-5-11							
62-PMB-080-5-11		8A			.1uF	7.0mH	
62-PMF-080-5-11							
62-PMB-100-5-12		10A			.22uF	4.2mH	
62-PMF-100-5-12							
62-PMB-150-5-13		15A			.33uF	2.2mH	35°C
62-PMF-150-5-13							
62-PMB-200-5-13		20A				1.8mH	45°C**
62-PMF-200-5-13							

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.
Weight: 8.82 ounces (250 grams)

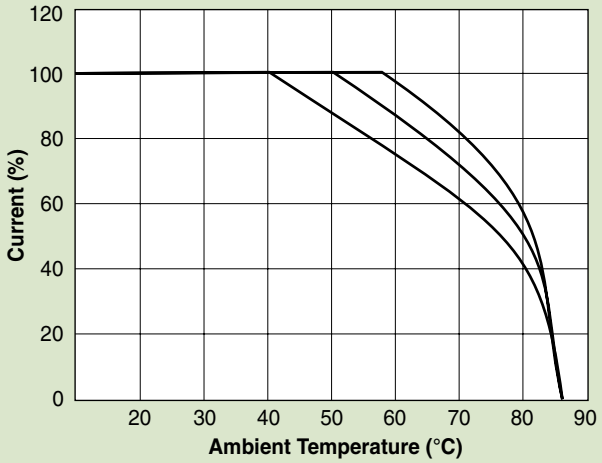
* PMF - designates Fast-on terminals
PMB - designates Bolt-in terminals
** The temperature rise of 20 amp units can be decreased to 30°C by mounting on 200 X 200 x 1.0(mm) steel chassis

api technologies corp.
Spectrum Control

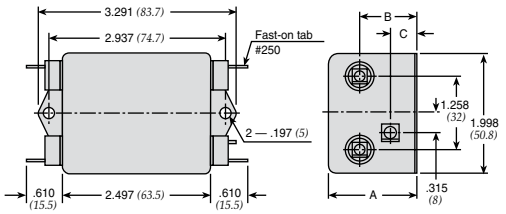
Power Line Filters
Single Stage

62-PMF & PMB Series

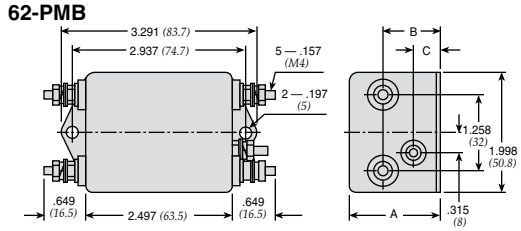
Temperature Characteristics



62-PMF



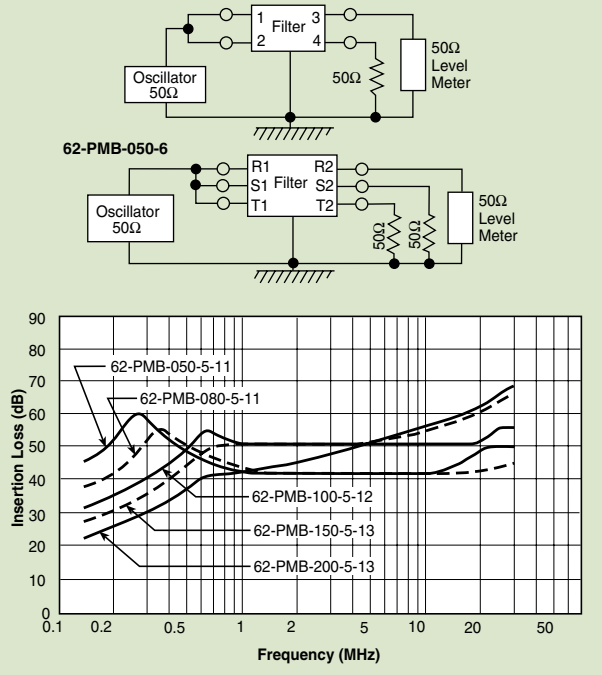
62-PMB



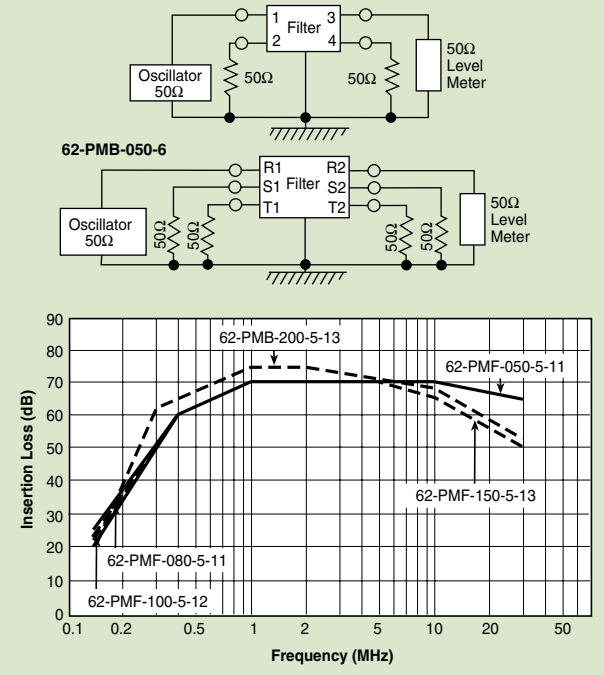
MODEL	A	B	C
62-PMF/PMB-100-200	1.490 (38)	.944 (24)	.433 (11)
62-PMF/PMB-050-080	1.258 (32)	.786 (20)	0 (0)

Dimensions in inches *(mm)*

Common Mode



Normal Mode



api technologies corp.
Spectrum Control

Power Line Filters
Single Stage

12-PMF Series

Features

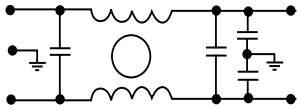
- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- Structure provides effective shielding for noise generated externally and internally
- Operating temperature: -25°C to +85°C

Applications

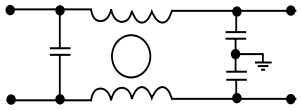
- Digital equipment
- Computers and peripherals
- Measuring instruments
- Medical equipment
- Equipment requiring very high impulse attenuation
- Factory automation equipment
- Industrial equipment such as UPS, inverters and converters
- Telecommunications equipment
- Office automation equipment, such as copy and fax machines

Circuit Diagram

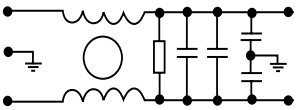
Circuit 1



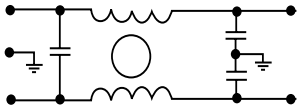
Circuit 2



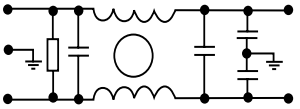
Circuit 3



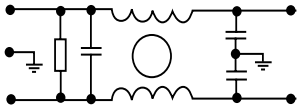
Circuit 4



Circuit 5



Circuit 6



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
12-PMF-001-5-A	120/250VAC	1A	0.5mA	1	A	30°C
12-PMF-002-5-B		2A		2	B	
12-PMF-003-5-A		3A		4	A	
12-PMF-003-5-B				2	B	
12-PMF-006-5-A		6A		4	A	
12-PMF-006-5-C				1	C	
12-PMF-006-5-D				6	D	
12-PMF-010-5-A		10A		2	A	
12-PMF-010-5-C				3	C	
12-PMF-015-5-C		15A		5		
12-PMF-015-5-E					E	
12-PMF-020-5-C		20A			C	
12-PMF-020-5-D					D	
12-PMF-020-5-E					E	

Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.

api technologies corp.
Spectrum Control

Power Line Filters
Single Stage

12-PMF Series

Figure A

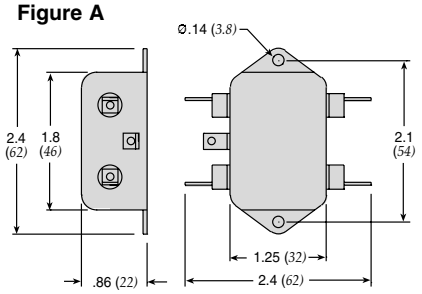


Figure B

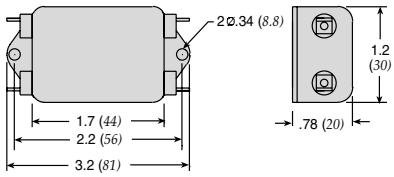


Figure C

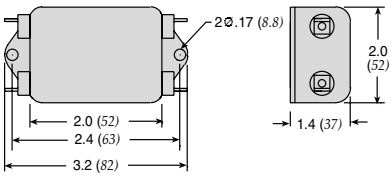


Figure D

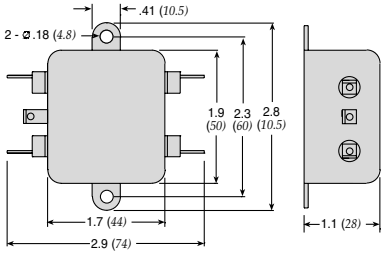
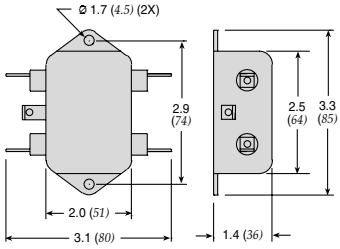
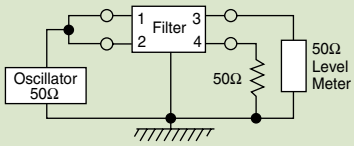


Figure E

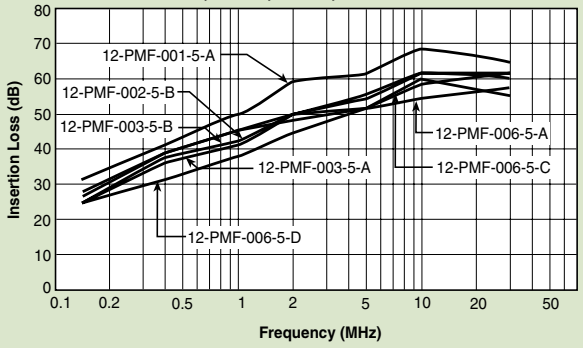


Dimensions in inches *(mm)*

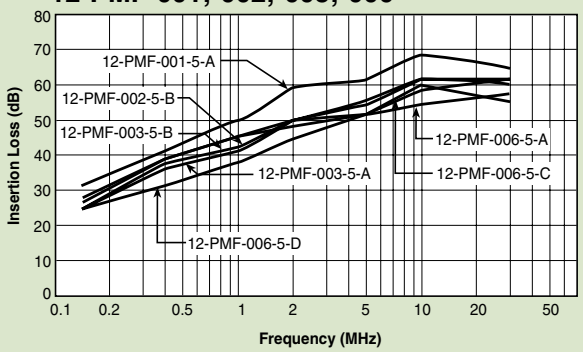
Common Mode



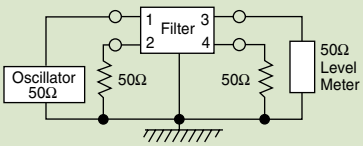
12-PMF-001;-002;-003;-006



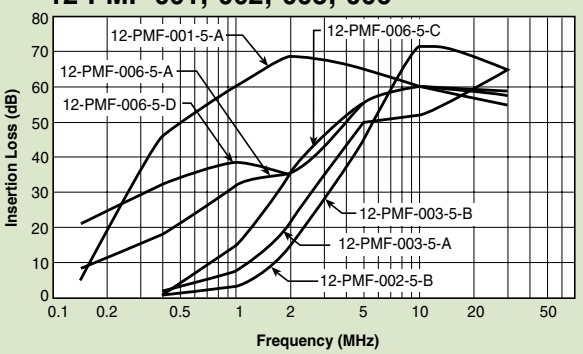
12-PMF-001;-002;-003;-006



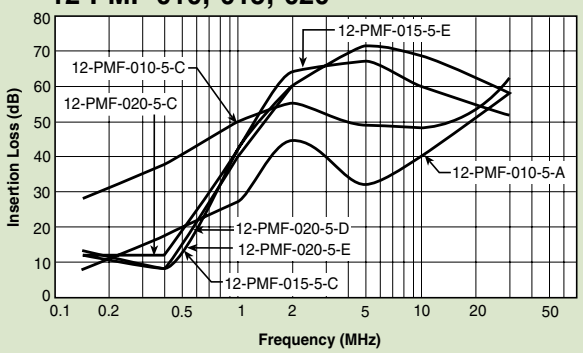
Normal Mode



12-PMF-001;-002;-003;-006



12-PMF-010;-015;-020



api technologies corp.
Spectrum Control

Power Line Filters
Single Stage - Higher Current

62-PMB Series

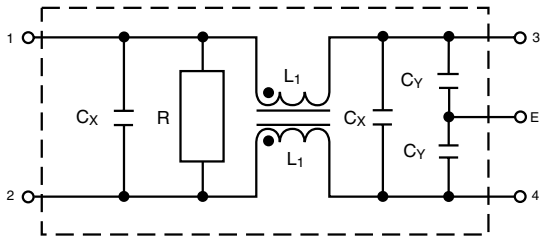
Features

- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- Structure provides effective shielding for noise generated externally and internally
- Safety agency approvals pending
- Designed to be in accordance with VDE 0565 Part 3
- Operating temperature: -25°C to +85°C (including temperature rise)

Applications

- Digital equipment
- Computers and peripherals
- Measuring instruments
- Medical equipment
- Equipment requiring very high impulse attenuation
- Factory automation equipment
- Industrial equipment such as UPS, inverters and converters
- Telecommunications equipment
- Office automation equipment, such as copy and fax machines

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
62-PMB-300-5-14	250VAC	30A	0.50mA	3300pF	.47uF	1.6mH	45°C
62-PMB-400-5-14		40A				0.8mH	

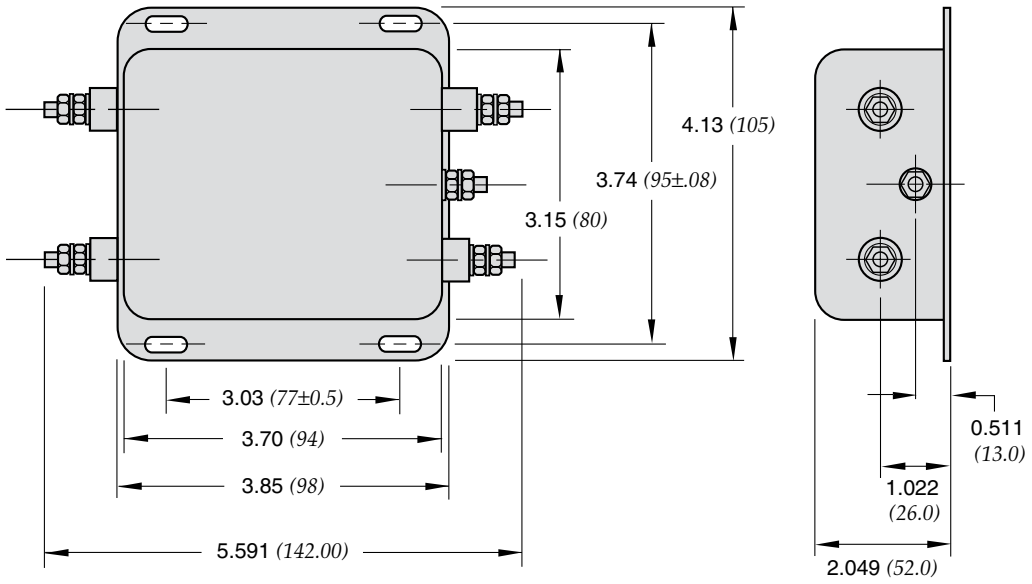
Note: Test voltage: 1500VAC one minute, line to earth
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.
Weight: 8.82 ounces (250 grams)

api technologies corp.
Spectrum Control

Power Line Filters
Single Stage - Higher Current

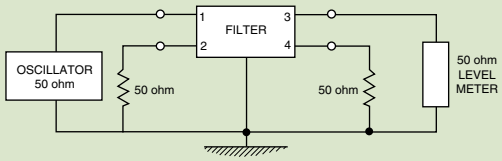
62-PMB Series

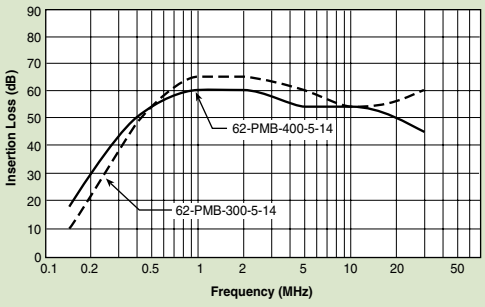
62-PMB-300-5-14 and 62-PMB-400-5-14



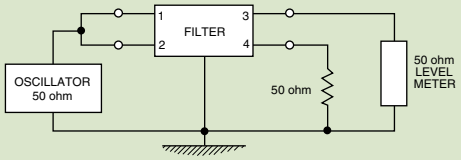
Dimensions in inches *(mm)*

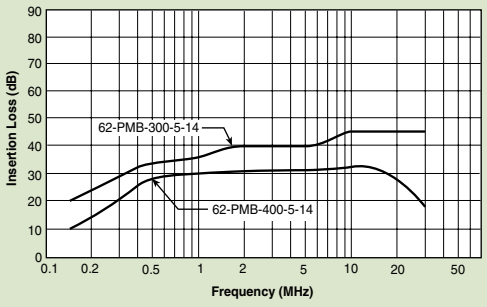
Normal Mode





Common Mode





api technologies corp.
Spectrum Control

Power Line Filters
Single Stage - Higher Current

12-PMB Series

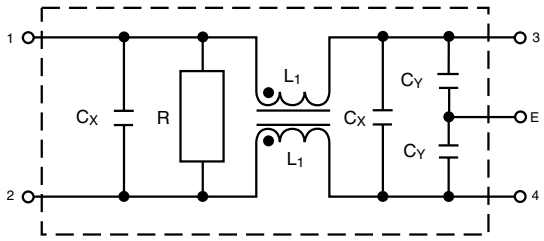
Features

- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- Structure provides effective shielding for noise generated externally and internally
- Designed to be in accordance with VDE 0565 Part 3
- Operating temperature: -25°C to +85°C

Applications

- Digital equipment
- Computers and peripherals
- Measuring instruments
- Medical equipment
- Equipment requiring very high impulse attenuation
- Factory automation equipment
- Industrial equipment such as UPS, inverters and converters
- Telecommunications equipment
- Office automation equipment, such as copy and fax machines

Circuit Diagram



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
12-PMB-025-5-A	120/250VAC	25A	0.5mA	1	A	30°C
12-PMB-030-5-A		30A				
12-PMB-035-5-B		35A			B	
12-PMB-050-5-B		50A				
12-PMB-100-8-C		100A	1.0mA		C	
12-PMB-120-8-C		120A				

Note: Test voltage: 1500VAC one minute, line to earth
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.
Weight: 8.82 ounces (250 grams)

api technologies corp.
Spectrum Control

Power Line Filters
Single Stage - Higher Current

12-PMB Series

Figure A

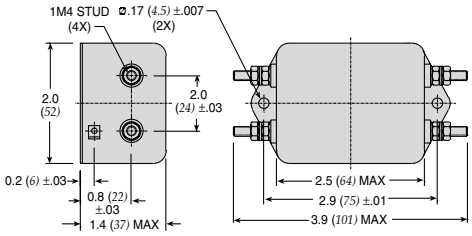


Figure B

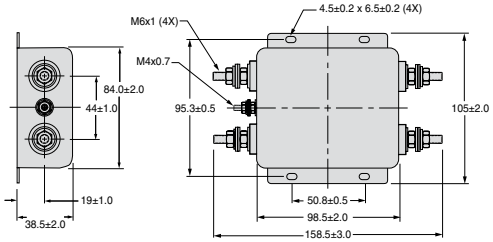
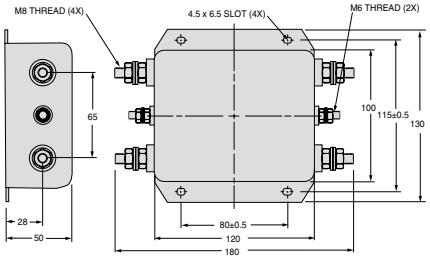
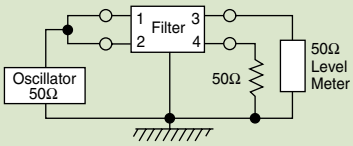


Figure C

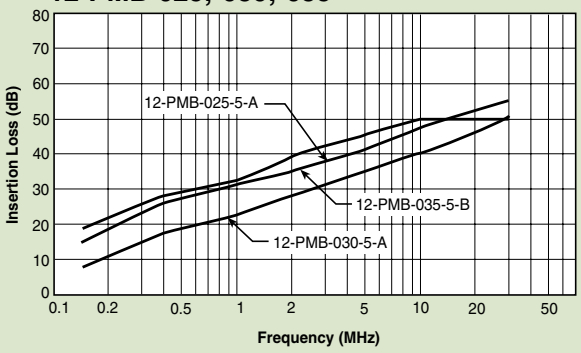


Dimensions in inches *(mm)*

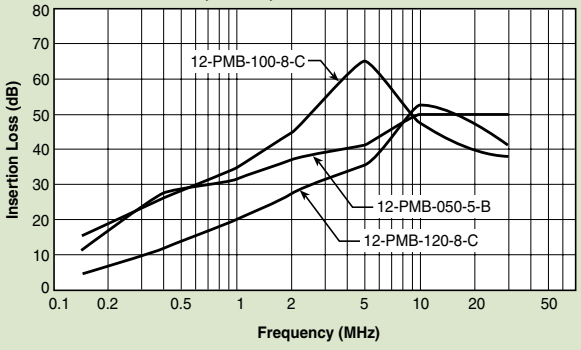
Common Mode



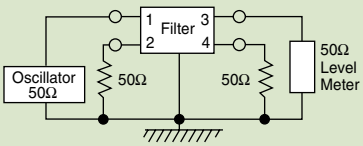
12-PMB-025;-030;-035



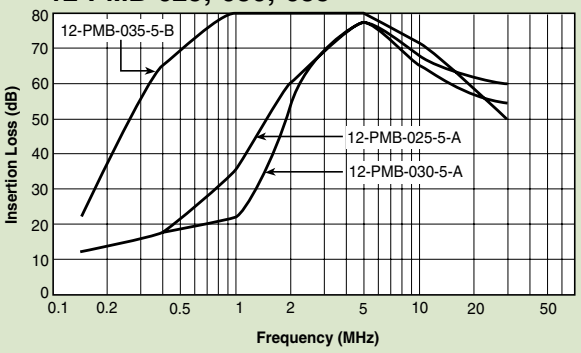
12-PMB-050;-100;-120



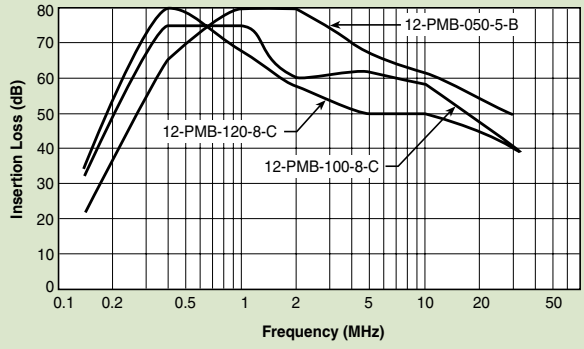
Normal Mode



12-PMB-025;-030;-035



12-PMB-050;-100;-120



api technologies corp.
Spectrum Control

Power Line Filters
DC - Higher Current

12-PMF & 12 PMB DC Series

Features

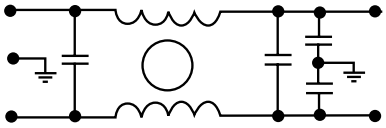
- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- Structure provides effective shielding for noise generated externally and internally
- Designed to be in accordance with VDE 0565 Part 3
- Operating temperature: -40°C to +85°C

Applications

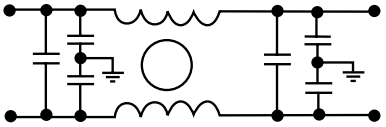
- Digital equipment
- Computers and peripherals
- Measuring instruments
- Equipment requiring very high impulse attenuation
- Factory automation equipment
- Industrial equipment such as UPS, inverters and converters
- Telecommunications equipment

Circuit Diagram

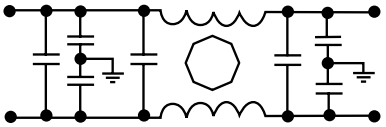
Circuit 1



Circuit 2



Circuit 3



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Circuit Diagram	Figure	Temperature Rise (Max.)
12-PMF-006-DC-C	48/250 VDC	6A	1	A	30°C
12-PMF-010-DC-C		10A			
12-PMF-015-DC-C		15A			
12-PMF-020-DC-C		20A			
12-PMF-025-DC-D		25A		B	
12-PMB-025-DC-F				C	
12-PMB-030-DC-F		30A			
12-PMB-035-DC-F		35A			
12-PMB-040-DC-F		40A			
12-PMB-040-DC-B				D	
12-PMB-050-DC-B		50A			
12-PMB-060-DC-B		60A			
12-PMB-080-DC-G		80A	2	E	
12-PMB-080-DC-C				F	
12-PMB-100-DC-C		100A	3		
12-PMB-120-DC-C		120A			
12-PMB-140-DC-C		140A			
12-PMB-180-DC-E		180A	2	G	
12-PMB-200-DC-E		200A			
12-PMB-260-DC-E		260A			

Note: Test voltage: 1500VAC one minute, line to earth
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.
Weight: 8.82 ounces (250 grams)

api technologies corp.
Spectrum Control

Power Line Filters
DC - Higher Current

12-PMF & 12-PMB DC Series

Figure A

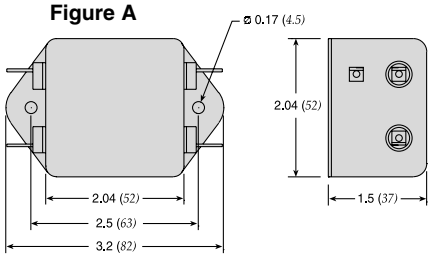


Figure B

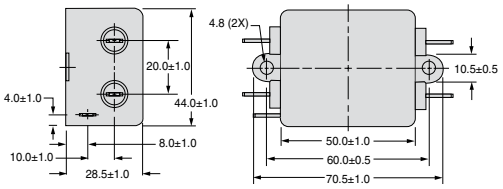


Figure C

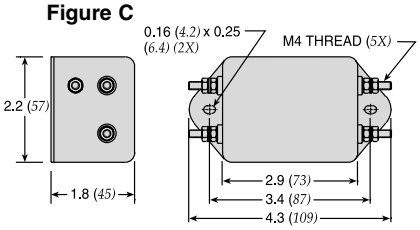


Figure D

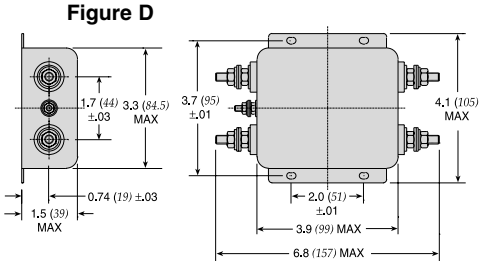


Figure E

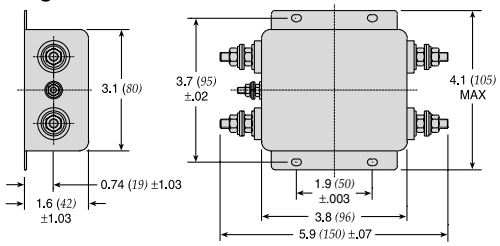


Figure F

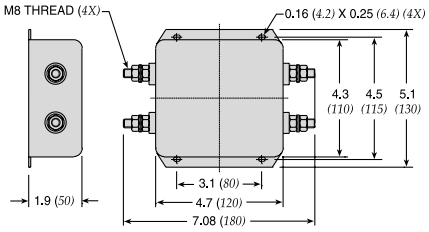
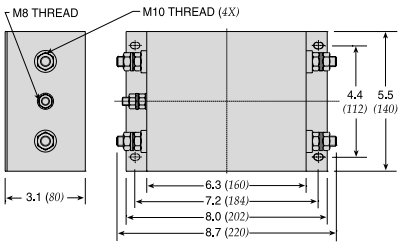
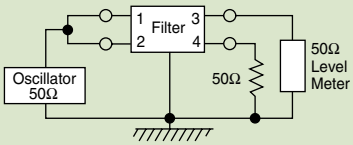


Figure G

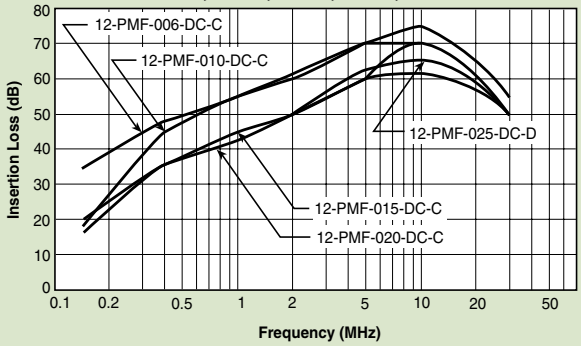


Dimensions in inches *(mm)*

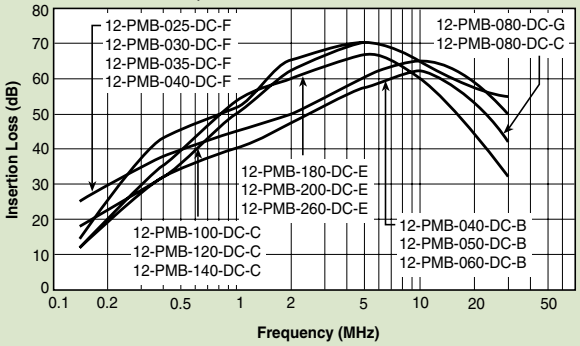
Common Mode



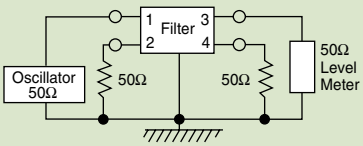
12-PMF-006;-010;-015;-020;-025



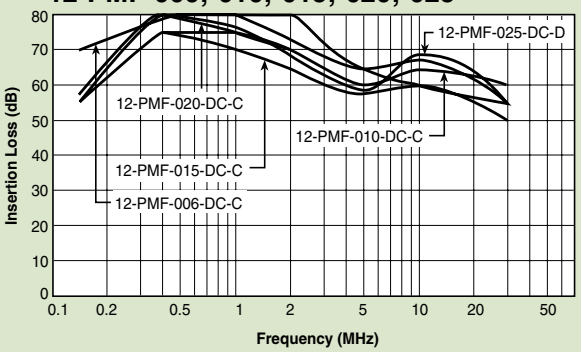
12-PMB-025; thru -260



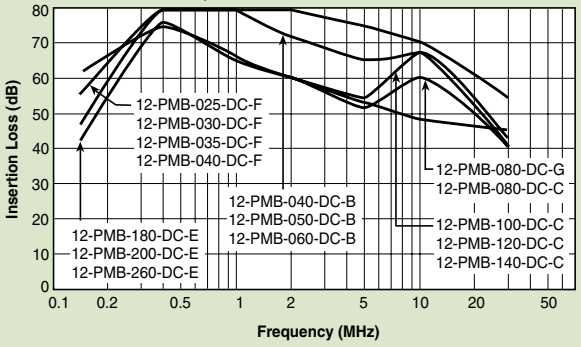
Normal Mode



12-PMF-006;-010;-015;-020;-025



12-PMB-025; thru -260



api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

62-MMF Series

Features

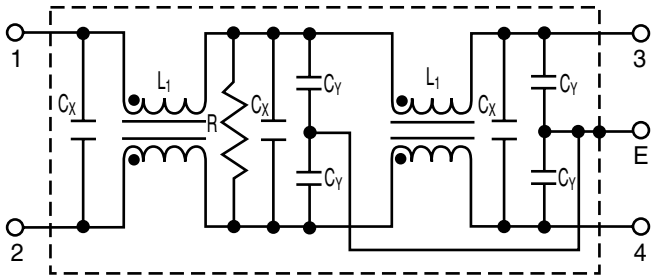
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Two stages for excellent filtering characteristics
- Epoxy molded for reliability
- Structure provides effective shielding for noise generated both externally and internally
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF73)

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments and medical equipment
- Telecommunications equipment
- Equipment requiring very high noise attenuation

Circuit Diagram

62-MMF-XXX-7-11



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_{Y1}	Capacitance C_{Y2}	Capacitance C_X	Inductance (L_1) (2X)	Temperature Rise (Max.)
62-MMF-030-7-11	250VAC	3A	.7mA	3300pF	1000pF	0.1uF	3.7mH	30°C
62-MMF-050-7-11	250VAC	5A	.7mA	3300pF	1000pF	0.1uF	2.9mH	30°C

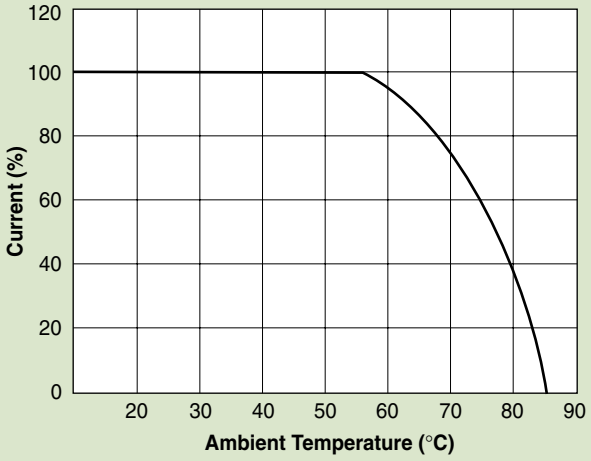
Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Leakage current: 0.7 mA max.
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.
Weight: 6.0 ounces (170 grams)

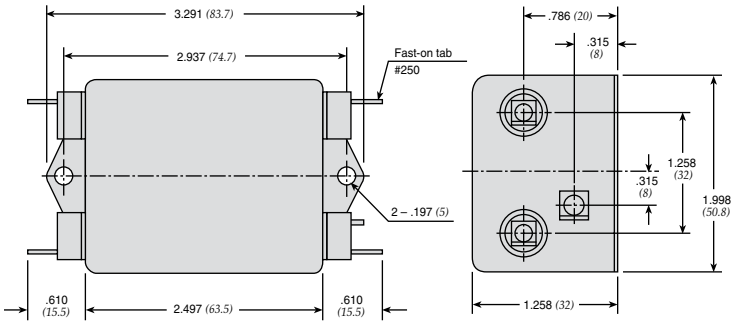
api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

62-MMF Series

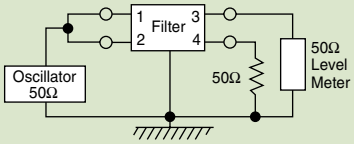
Temperature Characteristics



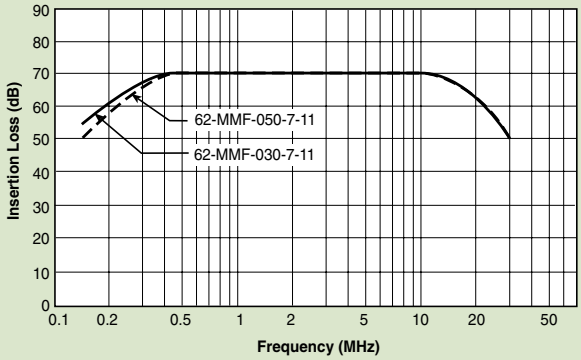


Dimensions in inches *(mm)*

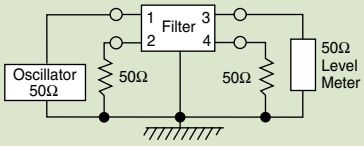
Common Mode



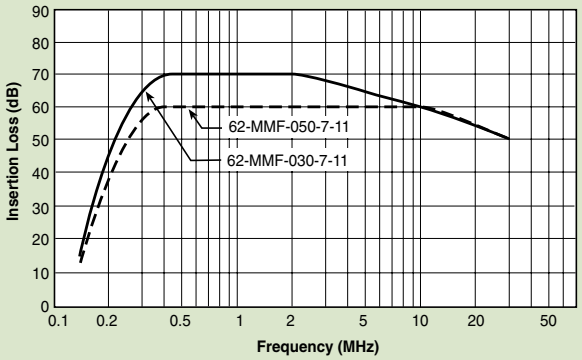
62-MMF



Normal Mode



62-MMF



api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

12-MMF & 12-MMB Series

Features

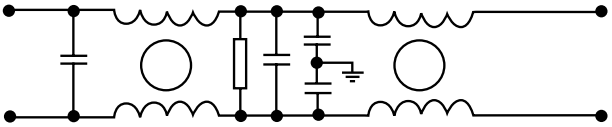
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Two stages for excellent filtering characteristics
- Structure provides effective shielding for noise generated both externally and internally
- Operating temperature: -40°C to +85°C
- High performance
- Low leakage current

Applications

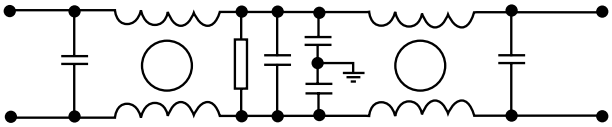
- Digital equipment
- Switching power supplies
- Personal computers and peripherals
- Measuring instruments and medical equipment
- Telecommunications equipment
- Equipment requiring very high noise attenuation

Circuit Diagram

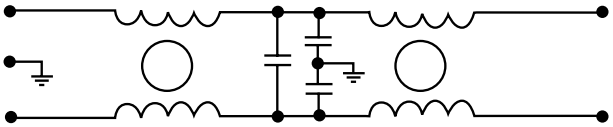
Circuit 1



Circuit 2



Circuit 3



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
12-MMF-002-5-F	120/250VAC	2A	0.25mA@120VAC/ 0.5mA@250VAC	1	A	30°C
12-MMF-003-5-F		3A			A	
12-MMF-003-5-A				3	B	
12-MMF-006-5-F		6A		2	A	
12-MMF-006-5-G					C	
12-MMF-008-5-B		8A				
12-MMF-010-5-F		10A			A	
12-MMF-010-5-G					A1	
12-MMF-010-5-B					C	
12-MMF-012-5-B		12A				
12-MMB-015-5-E		15A			D	
12-MMB-020-5-F		20A			G	
12-MMB-030-5-D		30A			E	
12-MMB-050-5-C		50A			F	

Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.

api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

12-MMF & 12-MMB Series

Figure A

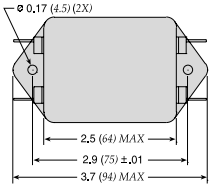


Figure A1

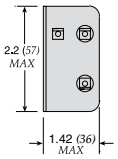


Figure B

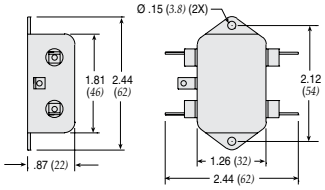


Figure C

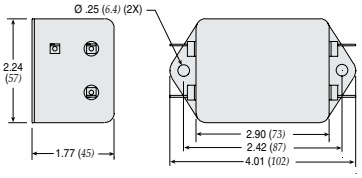


Figure D

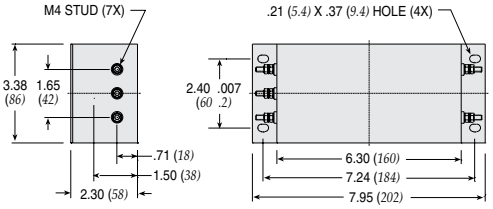


Figure E

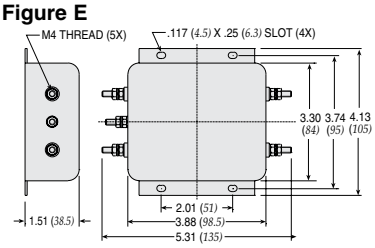


Figure F

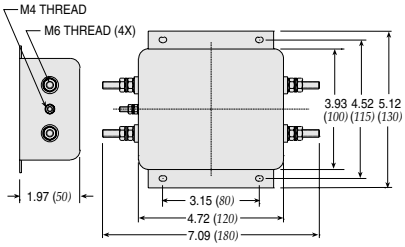
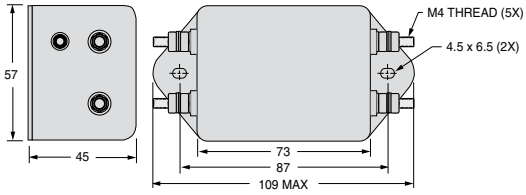
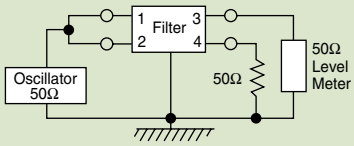


Figure G

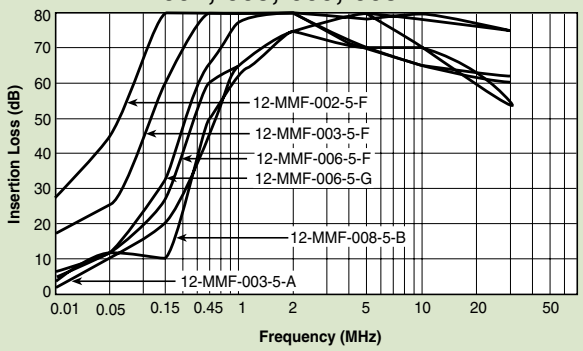


Dimensions in inches *(mm)*

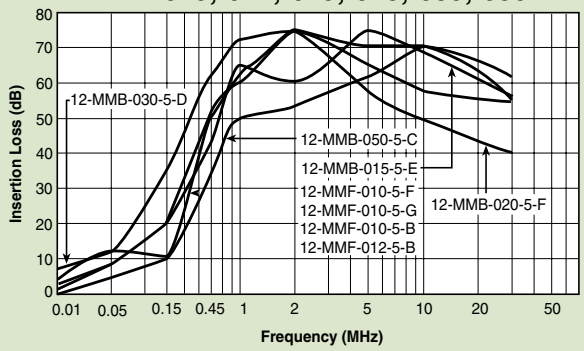
Common Mode



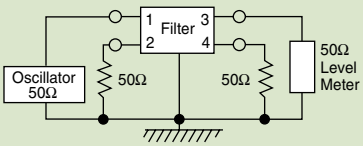
12-MMF-002;-003;-006;-008



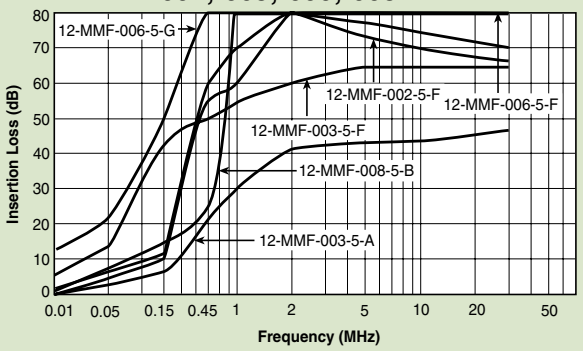
12-MMF-010;-012;-015;-020;-030;-050



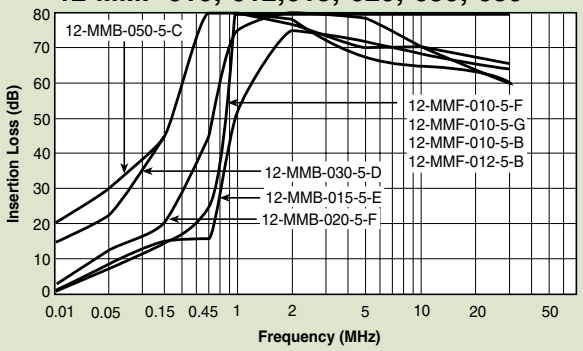
Normal Mode



12-MMF-002;-003;-006;-008



12-MMF-010;-012;015;-020;-030;-050



api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

12-MMF & 12-MMB Series

Features

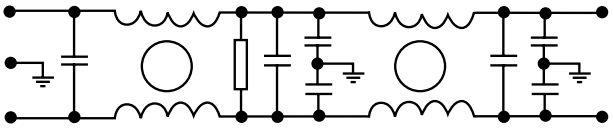
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Two stages for excellent filtering characteristics
- Structure provides effective shielding for noise generated both externally and internally
- Operating temperature: -40°C to +85°C
- High performance

Applications

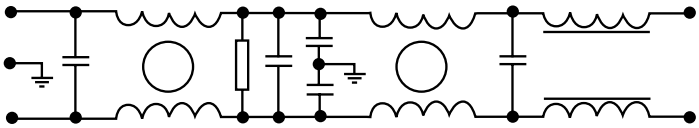
- Digital equipment
- Personal computers and peripherals
- Measuring instruments and medical equipment
- Telecommunications equipment
- Equipment requiring very high noise attenuation

Circuit Diagram

Circuit 1



Circuit 2



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
12-MMF-003-11-F	120/250VAC	3A	1.5mA	1	A	30°C
12-MMF-006-11-F		6A				
12-MMF-010-11-F		10A				
12-MMB-015-11-G		15A		1	C	
12-MMB-020-11-D		20A			B	
12-MMB-030-11-D		30A				
12-MMB-040-11-B		40A		2	D	
12-MMB-040-11-E				1	E	
12-MMB-050-11-H		50A			F	

Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Leakage current: 0.7 mA max.
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.
Weight: 6.0 ounces (170 grams)

api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

12-MMF & 12-MMB Series

Figure A

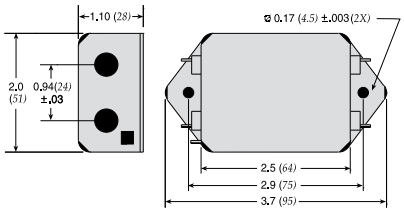


Figure B

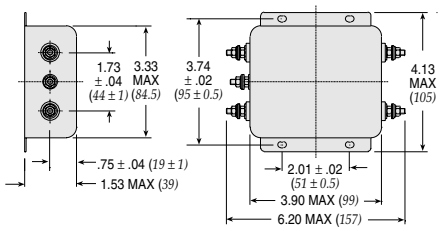


Figure C

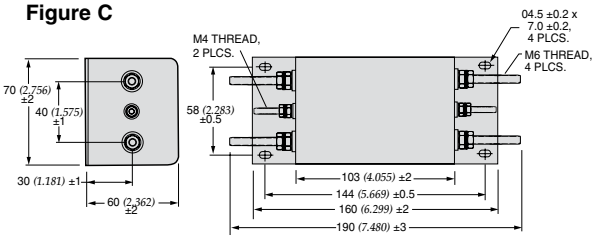


Figure D

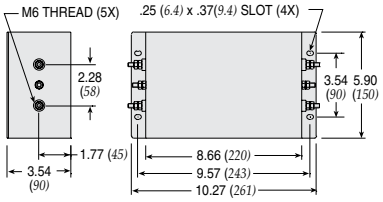


Figure E

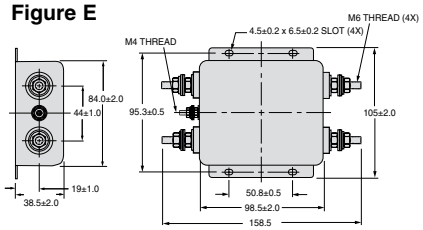
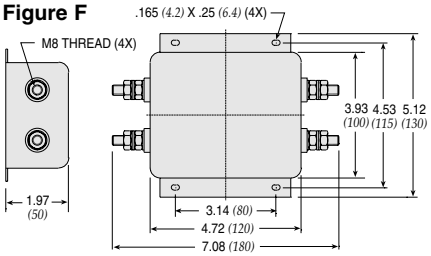
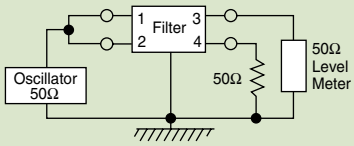


Figure F

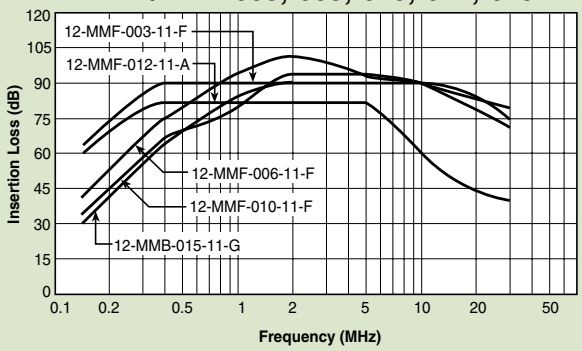


Dimensions in inches *(mm)*

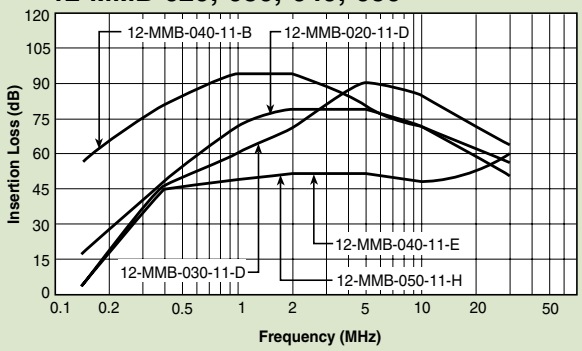
Common Mode



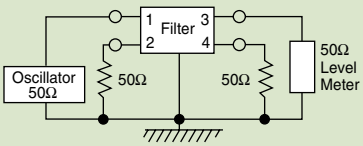
12-MMF/MMB-003;-006;-010;-012;-015



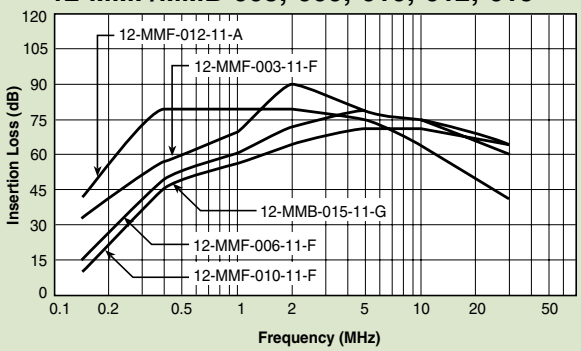
12-MMB-020;-030;-040;-050



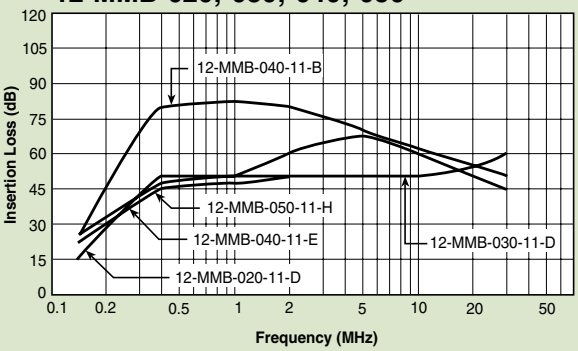
Normal Mode



12-MMF/MMB-003;-006;-010;-012;-015



12-MMB-020;-030;-040;-050



api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

12-MMF & 12-MMB Series

Features

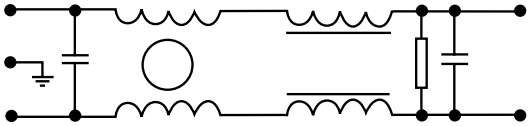
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Two stages for excellent filtering characteristics
- Epoxy molded for reliability
- Structure provides effective shielding for noise generated both externally and internally
- Operating temperature: -25°C to +85°C

Applications

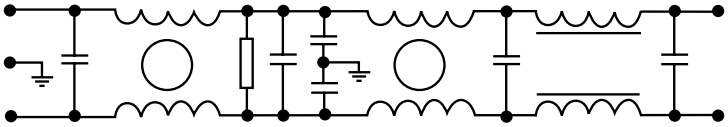
- Digital equipment
- Personal computers and peripherals
- Measuring instruments and medical equipment
- Telecommunications equipment
- Equipment requiring very high noise attenuation

Circuit Diagram

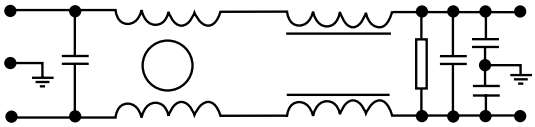
Circuit 1



Circuit 2



Circuit 3



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
12-MMF-001-5-F	120/250VAC	1A	0.5mA	3	A	30°C
12-MMF-003-5-G		3A			B	
12-MMF-003-2-G			5uA	1		
12-MMF-006-5-G		6A	0.5mA	2		
12-MMB-010-5-D		10A			C	
12-MMB-015-5-E		15A			D	
12-MMB-020-5-E		20A				
12-MMB-030-5-E		30A				

Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Leakage current: 0.7 mA max.
Voltage drop: 1V max.
Discharge time: 0.4 sec. max.
Weight: 6.0 ounces (170 grams)

• 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
• Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

api technologies corp.
Spectrum Control

Power Line Filters
Dual Stage

12-MMF & 12-MMB Series

Figure A

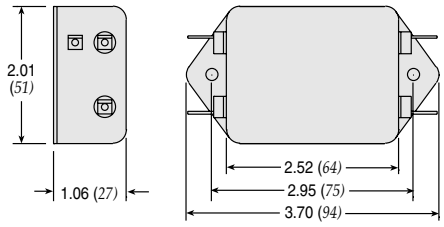


Figure B

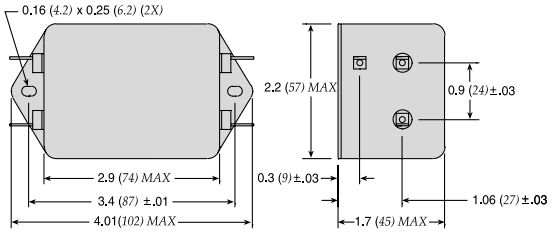


Figure C

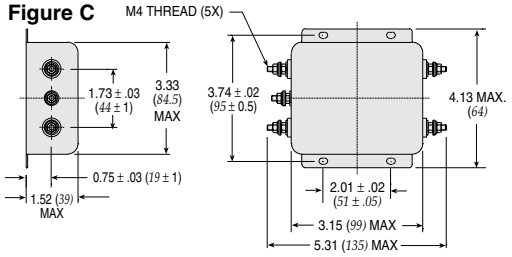
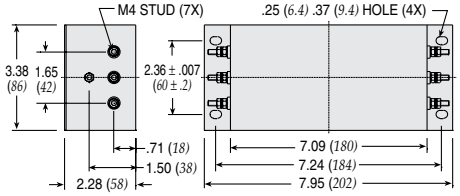
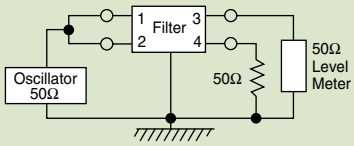


Figure D

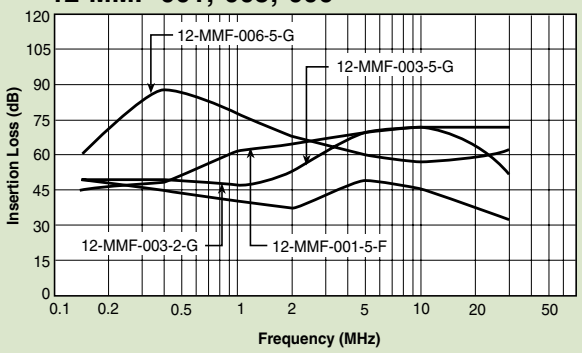


Dimensions in inches *(mm)*

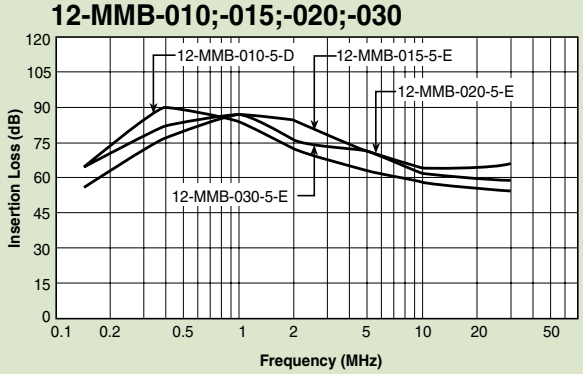
Common Mode



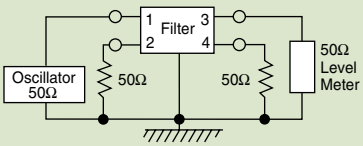
12-MMF-001;-003;-006



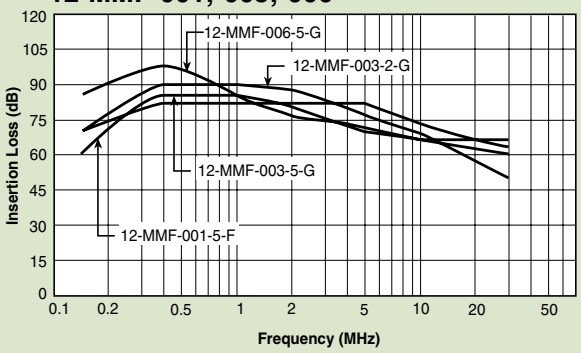
12-MMB-010;-015;-020;-030



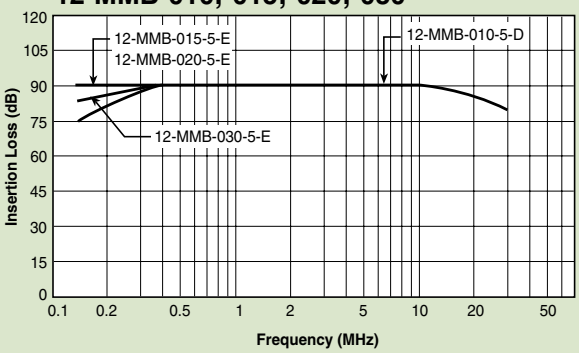
Normal Mode



12-MMF-001;-003;-006



12-MMB-010;-015;-020;-030



api technologies corp.
Spectrum Control

Power Line Filters
Three Phase

Low Current/High Performance

62-PMB/63-PMF Series

Features

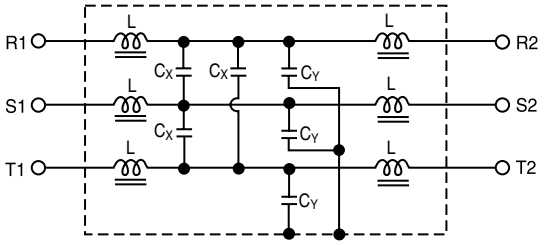
- Excellent attenuation for high voltage impulse
- Effective for both balanced and unbalanced three-phase loads
- Metal case provides effective EMI shielding
- Epoxy molded for internal component reliability
- Compact and economical
- Excellent filtering characteristics for both normal and common mode
- Various current ratings available: 3, 5, 8 and 16 Amps
- Safety agency approvals pending
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF81)

Applications

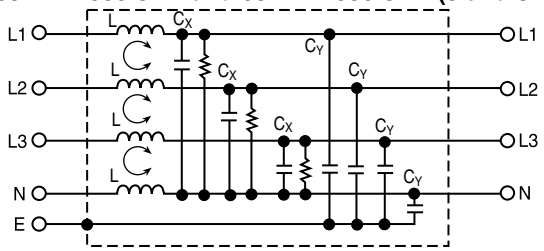
- Digital equipment
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Computerized washing machines

Circuit Diagram

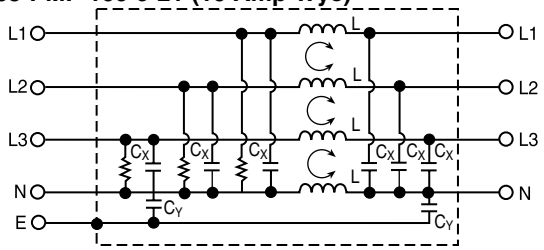
62-PMB-050-6-12 (5 Amp Delta)



63-PMF-030-8-14 and 63-PMF-080-8-14 (3 and 8 Amp Wye)



63-PMF-160-9-21 (16 Amp Wye)



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance C_Y	Capacitance C_X	Inductance (L_1)	Temperature Rise (Max.)
62-PMB-050-6-12	250VAC	5A	0.6mA	2200pF	0.22uF	115mH	45°C
63-PMF-030-8-14	480VAC	3A	1.0mA	4700pF (4X)	470uF (3X)	1.0mH (4X)	30°C
63-PMF-080-8-14		8A				0.74mH (4X)	40°C
63-PMF-160-9-21		16A	3.0mA	0.015uF (2X)	1.0uF (6X)	1.2mH (4X)	45°C

Note: Test Voltage 1500VAC one minute, line to ground.
Insulation Resistance: 300 MΩ min. at 500VDC.
Voltage Drop: 1V max. at rated current.
Weight: 8.82 ounces (250 grams) for 63-PMF-030-8-14 and 63-PMF-080-8-14
19.4 ounces (550 grams) for 62-PMB-050-6-12
51.5 ounces (1450 grams) for 63-PMF-160-9-21

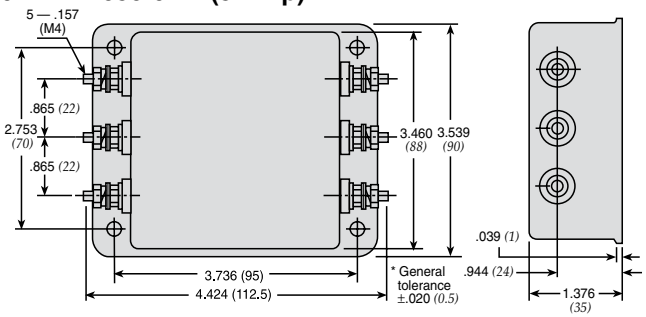
api technologies corp.
Spectrum Control

Power Line Filters
Three Phase

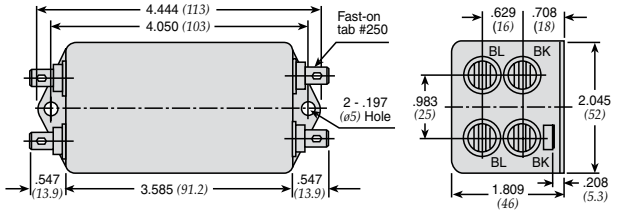
Low Current/High Performance

62-PMB/63-PMF Series

62-PMB-050-6-12 (5 Amp)

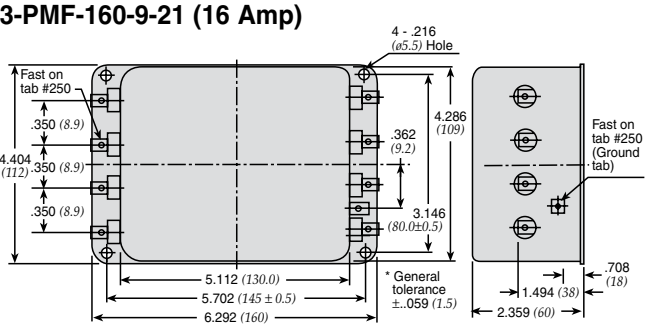


63-PMF-030-8-14 and 63-PMF-080-8-14 (3 and 8 Amp)

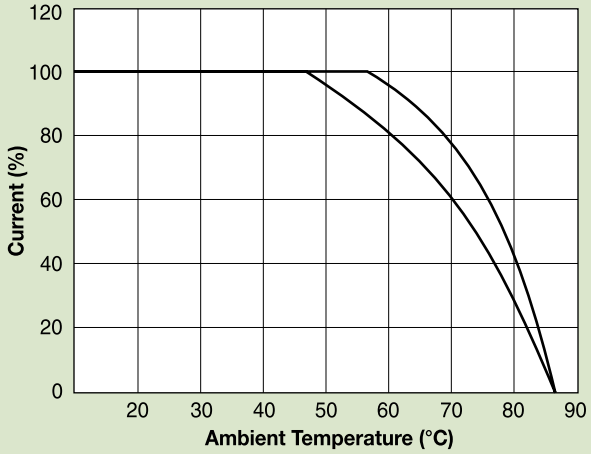


Dimensions in inches *(mm)*

63-PMF-160-9-21 (16 Amp)

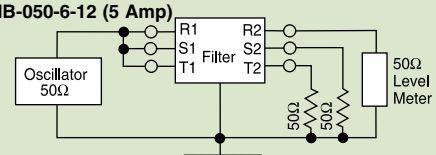


Temperature Characteristics

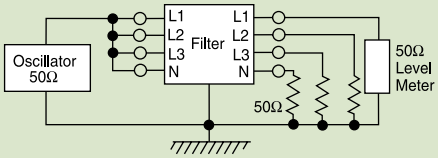


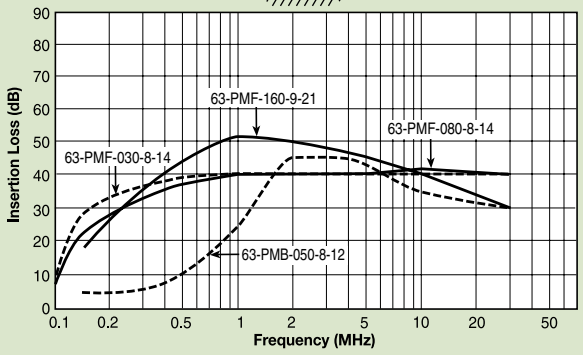
Common Mode

62-PMB-050-6-12 (5 Amp)



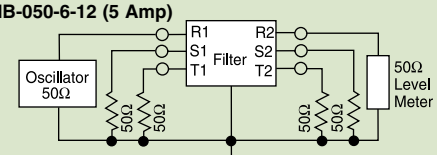
63-PMF (3, 8 and 16 Amp)



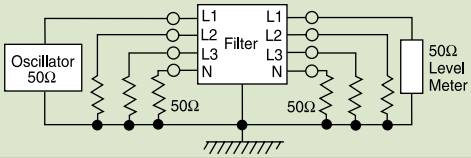


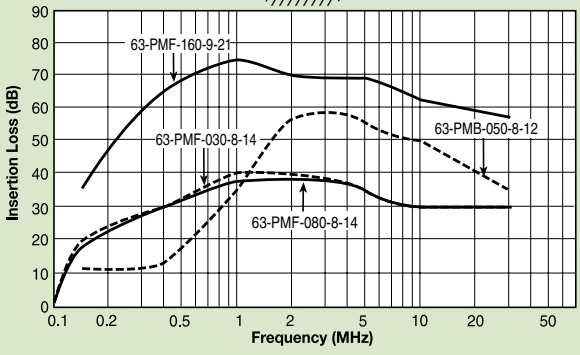
Normal Mode

62-PMB-050-6-12 (5 Amp)



63-PMF (3, 8 and 16 Amp)





api technologies corp.
Spectrum Control

Power Line Filters
Three Phase

13-PWF/PWL/PWB Series

Features

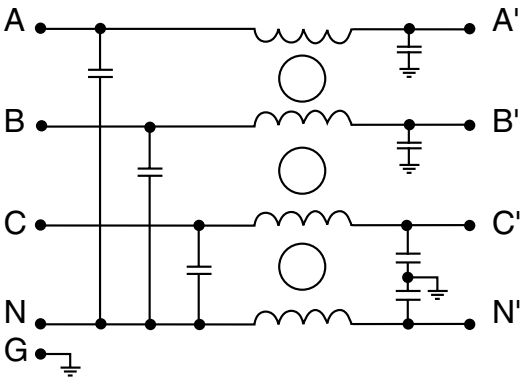
- Excellent attenuation for high voltage impulse
- Effective for both balanced and unbalanced three-phase loads
- Metal case provides effective EMI shielding
- Epoxy molded for internal component reliability
- Suitable for both Wye and Delta connection
- Excellent filtering characteristics for both normal and common mode
- Operating temperature: -40°C to +85°C
- Designed for 3-phase 4-line power supply systems

Applications

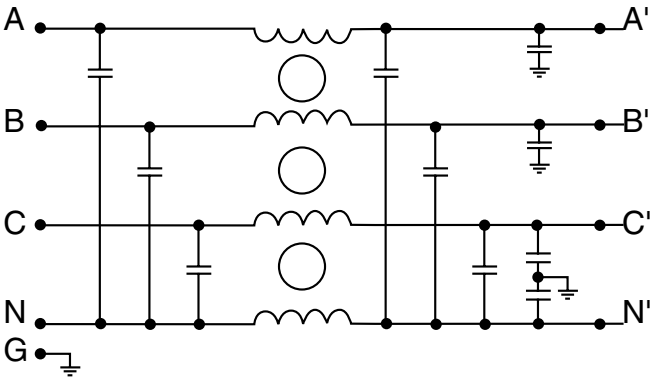
- Digital equipment
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Computerized washing machines

Circuit Diagram

Circuit 1



Circuit 2



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
13-PWF-005-12-H	440/250VAC	5A	1.5mA	1	A	30°C
13-PWL-005-12-C					B	
13-PWF-010-12-H		10A			A	
13-PWL-010-12-C					B	
13-PWB-010-12-D				2	C	
13-PWB-015-12-D		15A				
13-PWB-020-12-D		20A				
13-PWB-025-12-D		25A				
13-PWB-030-12-D		30A				

Note: Test Voltage 1500VAC one minute, line to ground.
Insulation Resistance: 300 MΩ min. at 500VDC.
Voltage Drop: 1V max. at rated current.

api technologies corp.
Spectrum Control

Power Line Filters Three Phase

13-PWF/PWL/PWB Series

Figure A

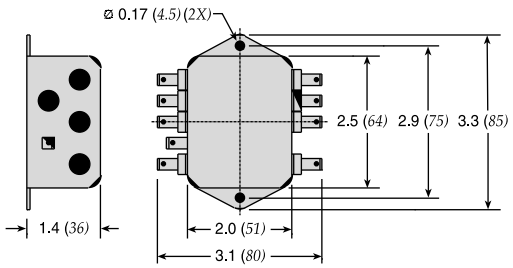


Figure B

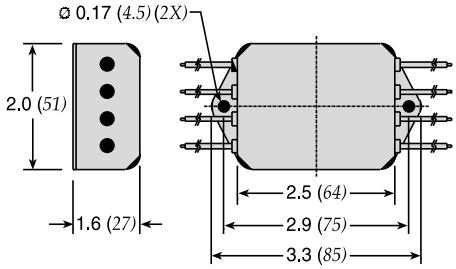
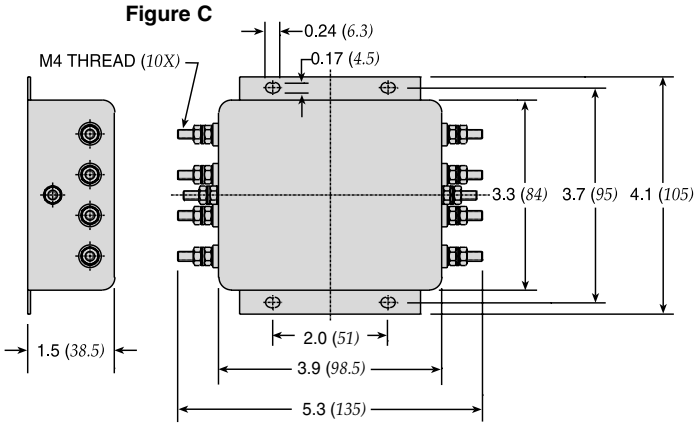
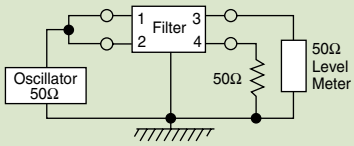


Figure C

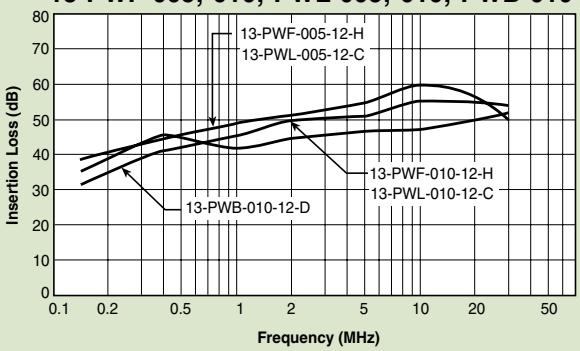


Dimensions in inches *(mm)*

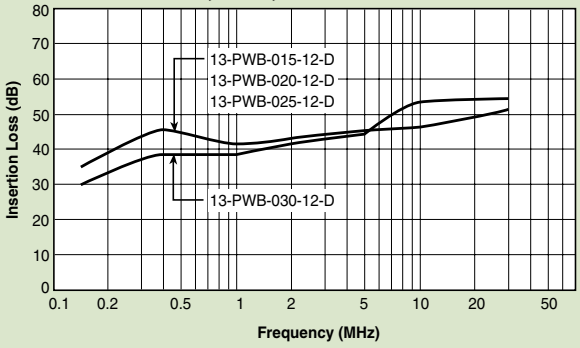
Common Mode



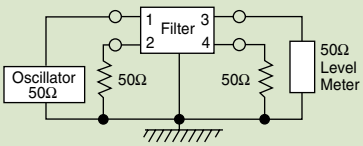
13-PWF-005;-010;-PWL-005;-010;-PWB-010



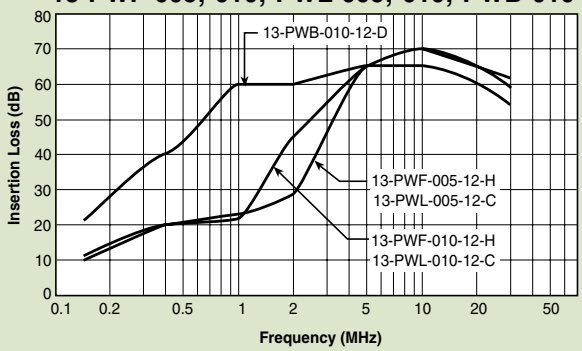
13-PWB-015;-020;-025:-030



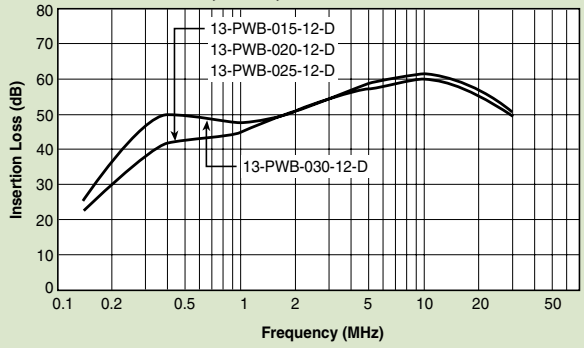
Normal Mode



13-PWF-005;-010;-PWL-005;-010;-PWB-010



13-PWB-015;-020;-025:-030



api technologies corp.
Spectrum Control

Power Line Filters Three Phase

High Performance

13-PDF/PDL/PDB Series

Features

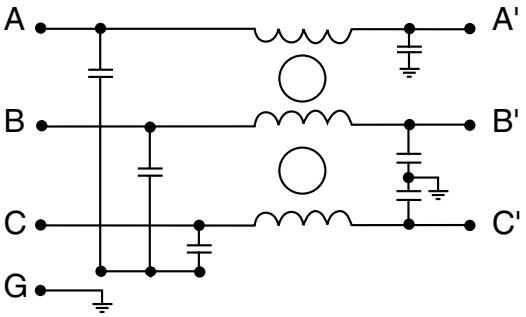
- Excellent attenuation for high voltage impulse
- Effective for both balanced and unbalanced three-phase loads
- Metal case provides effective EMI shielding
- Epoxy molded for internal component reliability
- Compact and economical
- Excellent filtering characteristics for both normal and common mode
- Operating temperature: -40°C to +85°C
- Designed for 3-phase, 3-Delta connection system

Applications

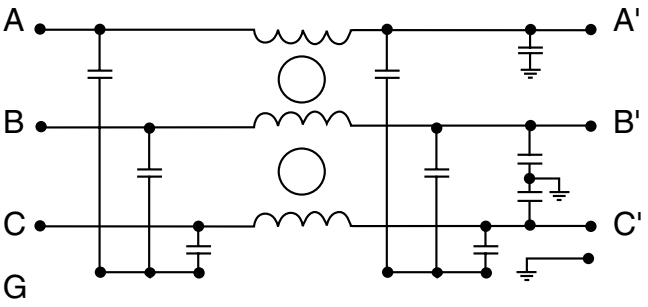
- Digital equipment
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Switching power supplies

Circuit Diagram

Circuit 1



Circuit 2



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
13-PDF-005-11-J	440/250VAC	5A	1.5mA	1	A	30°C
13-PDL-005-11-D					B	
13-PDF-010-11-J		10A			A	
13-PDL-010-11-D					B	
13-PDB-010-11-D				2	C	
13-PDB-015-11-D		15A				
13-PDB-020-11-D		20A				
13-PDB-025-11-D		25A				
13-PDB-030-11-D		30A				

Note: Test Voltage 1500VAC one minute, line to ground.
Insulation Resistance: 300 MΩ min. at 500VDC.
Voltage Drop: 1V max. at rated current.

api technologies corp.
Spectrum Control

Power Line Filters
Three Phase
High Performance

13-PDF/PDL/PDB Series

Figure A

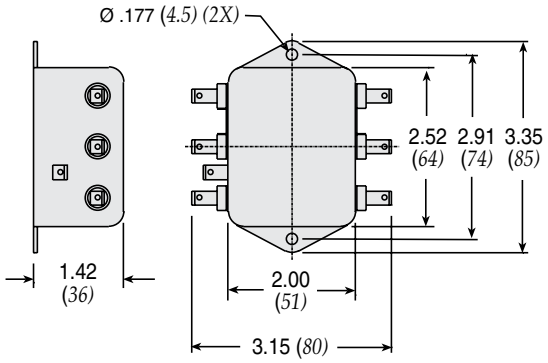


Figure B

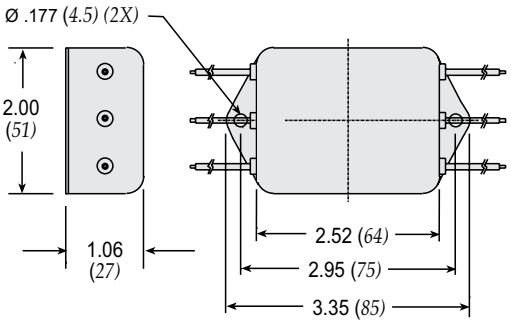
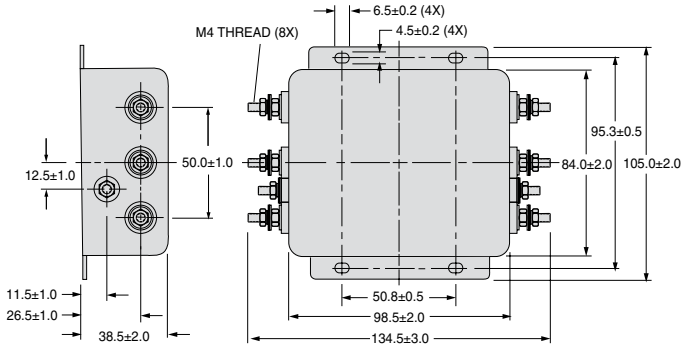
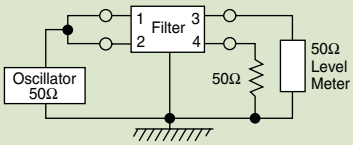


Figure C

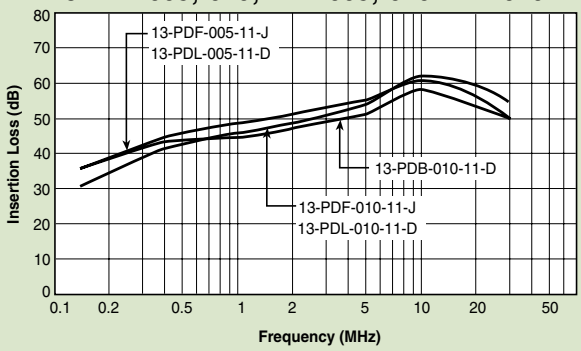


Dimensions in inches *(mm)*

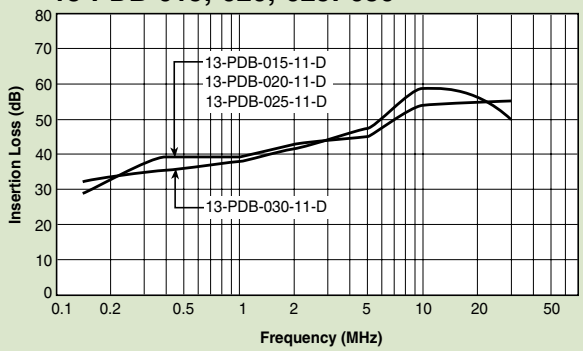
Common Mode



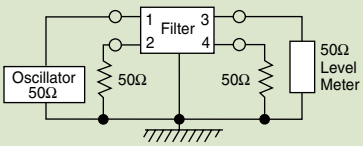
13-PDF-005;-010; PDL-005;-010 PDB-010



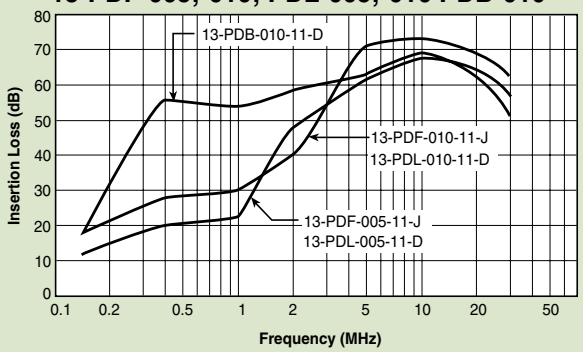
13-PDB-015;-020;-025:-030



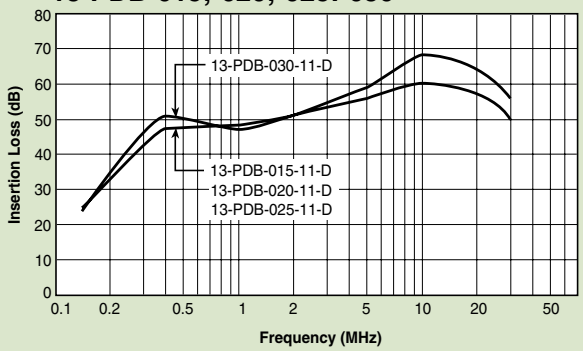
Normal Mode



13-PDF-005;-010; PDL-005;-010 PDB-010



13-PDB-015;-020;-025:-030



api technologies corp.
Spectrum Control

Power Line Filters
Three Phase
High Performance

13-PWB Series

Features

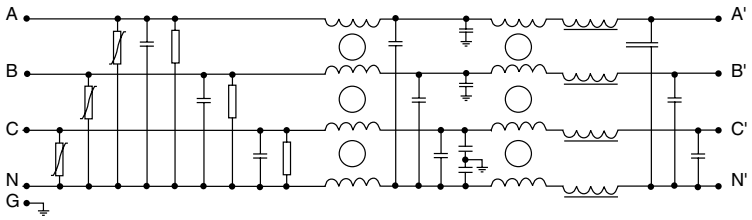
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Epoxy molded for internal component reliability
- Excellent filtering characteristics for both normal and common mode
- Various current ratings available: from 5 to 150 Amps
- Operating temperature: -40°C to +85°C
- Designed for 3-phase, 4-line power systems

Applications

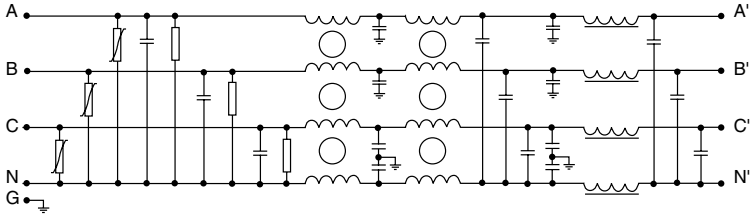
- Power supplies for data systems
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Telecommunications systems and equipment

Circuit Diagram

Circuit 1



Circuit 2



Specifications

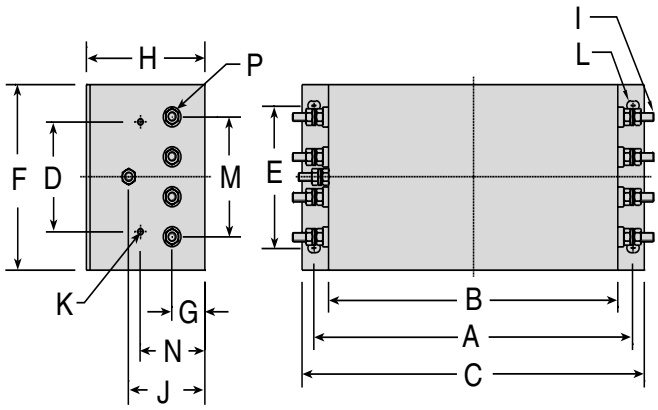
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Temperature Rise (Max.)
13-PWB-005-12-A	480/277VAC	5A	4.5mA	1	30°C
13-PWB-010-12-B		10A			
13-PWB-020-12-B		20A			
13-PWB-035-12-C		35A			
13-PWB-050-13-C		50A	9.0mA	2	
13-PWB-080-14-D		80A	20mA		
13-PWB-100-14-D		100A			
13-PWB-150-14-E		150A			

Note: Test Voltage 1500VAC one minute, line to ground.
Insulation Resistance: 300 MΩ min. at 500VDC.
Voltage Drop: 1V max. at rated current.

api technologies corp.
Spectrum Control

Power Line Filters
Three Phase
High Performance

13-PWB Series

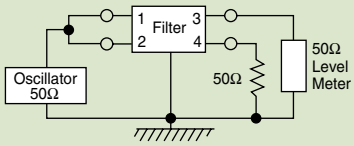


Dimensions

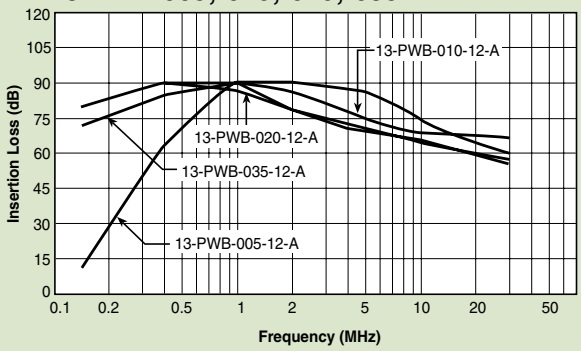
Dimensions in inches *(mm)*

Model	A	B	C	D	E	F	G	H	I	J	K	M	N	P	L
13-PWB-005-12-A	7.2 *(184)*	6.3 *(160)*	7.9 *(202)*	2.4 *(60)*	1.7 *(44)*	3.5 *(86)*	.70 *(18)*	2.3 *(58)*	M4	1.5 *(38)*	–	–	–	M4	.25 x .37 *(6.4 x 9.4)*
13-PWB-010-12-B	9.6 *(243)*	8.7 *(220)*	10.3 *(261)*			3.9 *(100)*	.98 *(25)*	3.5 *(90)*		1.8 *(45)*					.25 x .37 *(6.4 x 9.5)*
13-PWB-020-12-B															.25 x .38 *(6.4 x 9.6)*
13-PWB-035-12-C				3.1 *(81)*	3.8 *(96)*	4.9 *(125)*			M6	2.3 *(58)*	M4	2.9 *(74)*	1.9 *(49)*	M6	.25 x .38 *(6.4 x 9.7)*
13-PWB-050-13-C															.25 x .38 *(6.4 x 9.8)*
13-PWB-080-14-D	13.9 *(354)*	12.6 *(320)*	15.1 *(384)*	3.9 *(99)*	6.1 *(155)*	7.3 *(185)*	1.2 *(30)*		M8	2.4 *(62)*		3.4 *(86)*	2.2 *(56)*	M8	.25 x .39 *(6.4 x 9.9)*
13-PWB-100-14-D															.25 x .36 *(6.4 x 9.10)*
13-PWB-150-14-E					7.5 *(190)*	8.7 *(220)*	1.4 *(35)*	3.9 *(100)*					2.4 *(61)*		.25 x .36 *(6.4 x 9.11)*

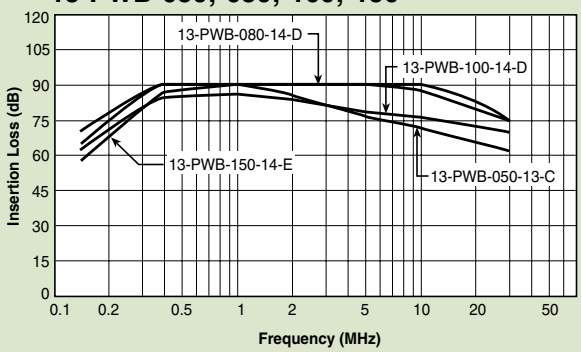
Common Mode



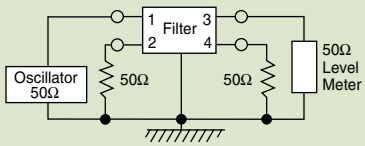
13-PWB-005;-010;-020;-035



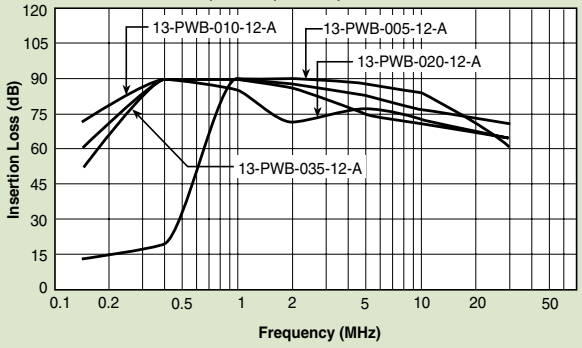
13-PWB-050;-080;-100;-150



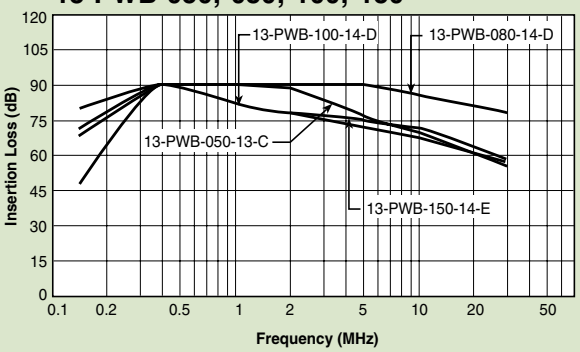
Normal Mode



13-PWB-005;-010;-020;-035



13-PWB-050;-080;-100;-150



api technologies corp.
Spectrum Control

Power Line Filters
Three Phase
High Performance

13-PDB Series

Features

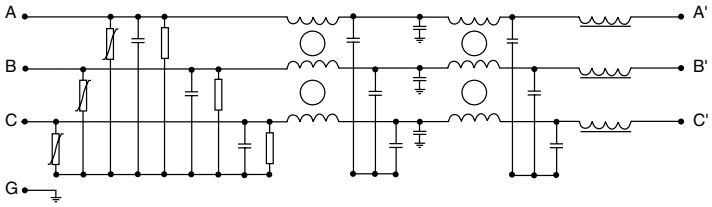
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Epoxy molded for internal component reliability
- Excellent filtering characteristics for both normal and common mode
- Various current ratings available: from 5 to 200 Amps
- Operating temperature: -40°C to +85°C
- Designed for 3-phase, 3-line connection systems

Applications

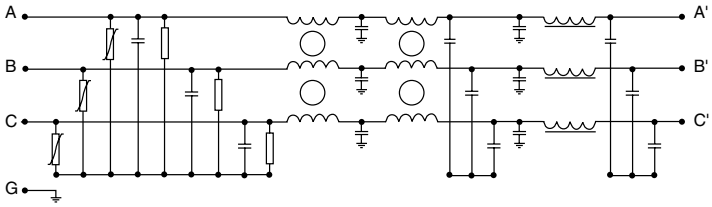
- Digital equipment
- Industrial equipment (UPS, inverters and converters)

Circuit Diagram

Circuit 1



Circuit 2



Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Temperature Rise (Max.)
13-PDB-005-12-A	480/277VAC	5A	4.5mA	1	30°C
13-PDB-010-12-A		10A			
13-PDB-020-12-B		20A			
13-PDB-035-12-B		35A			
13-PDB-050-12-B		50A	9.0mA		
13-PDB-080-13-C		80A			
13-PDB-100-14-C		100A	20mA	2	
13-PDB-150-14-C		150A			
13-PDB-200-14-D		200A			

Note: Test Voltage 2250VDC one minute, line to ground.
Insulation Resistance: 500MΩ.

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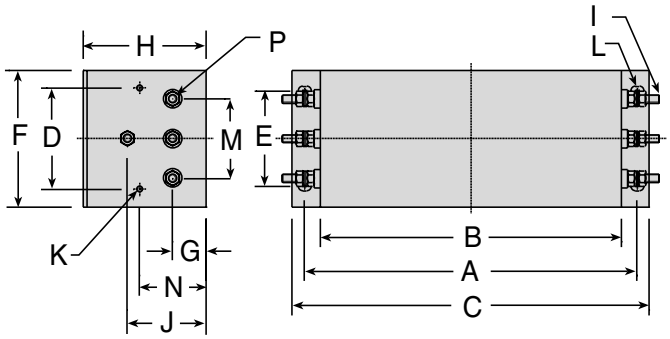
Spectrum Control

Power Line Filters
Three Phase
High Performance

13-PDB Series

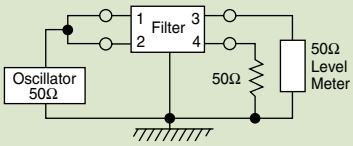


Dimensions

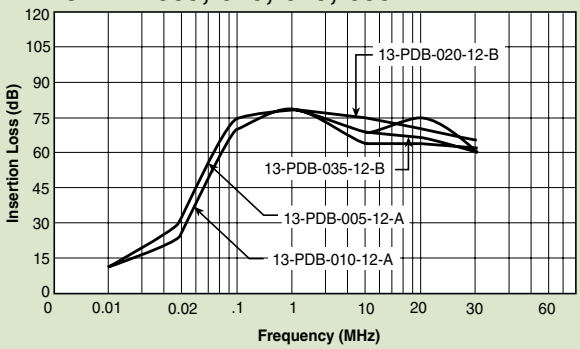
Dimensions in inches *(mm)*

Model	A	B	C	D	E	F	G	H	I	J	K	M	N	P	L
13-PDB-005-12-A	7.2 *(184)*	6.3 *(160)*	7.9 *(202)*	1.6 *(42)*	2.4 *(60)*	3.3 *(86)*	.70 *(18)*	2.3 *(58)*	M4	1.5 *(38)*	–	–	–	M4	.25 x .37 *(6.4 x 9.4)*
13-PDB-010-12-A															.25 x .37 *(6.4 x 9.5)*
13-PDB-020-12-B	9.6 *(243)*	8.7 *(220)*	10.3 *(261)*	2.3 *(58)*	2.7 *(70)*	3.9 *(100)*	.98 *(25)*	3.5 *(90)*	M6	2.3 *(58)*	M4	2.9 *(74)*	1.9 *(49)*	M6	.25 x .38 *(6.4 x 9.6)*
13-PDB-035-12-B															.25 x .38 *(6.4 x 9.7)*
13-PDB-050-12-B															.25 x .38 *(6.4 x 9.8)*
13-PDB-080-13-C	13.9 *(354)*	12.6 *(320)*	15.1 *(384)*	2.5 *(66)*	6.1 *(155)*	7.3 *(185)*	1.2 *(30)*		M8	2.4 *(62)*		3.3 *(86)*	2.2 *(56)*	M8	.25 x .39 *(6.4 x 9.9)*
13-PDB-100-14-C															.25 x .36 *(6.4 x 9.10)*
13-PDB-150-14-C															.25 x .36 *(6.4 x 9.11)*
13-PDB-200-14-D					7.5 *(190)*	8.6 *(220)*	1.4 *(35)*	3.9 *(100)*					2.4 *(61)*		.25 x .36 *(6.4 x 9.12)*

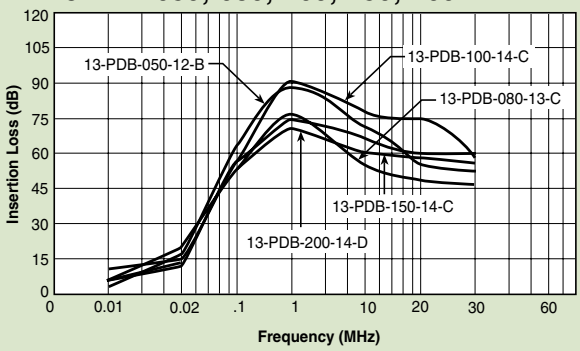
Common Mode



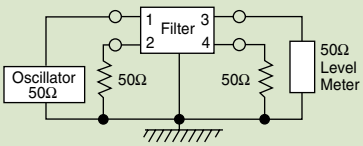
13-PDB-005;-010;-020;-035



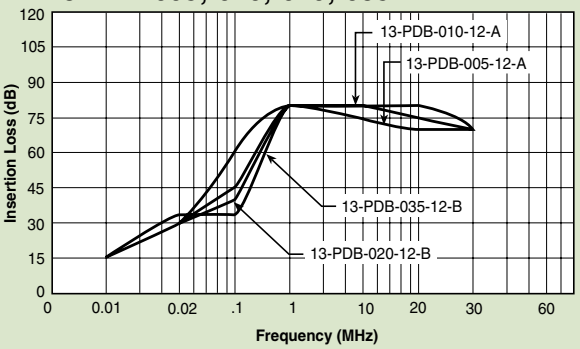
13-PDB-050;-080;-100;-150;-200



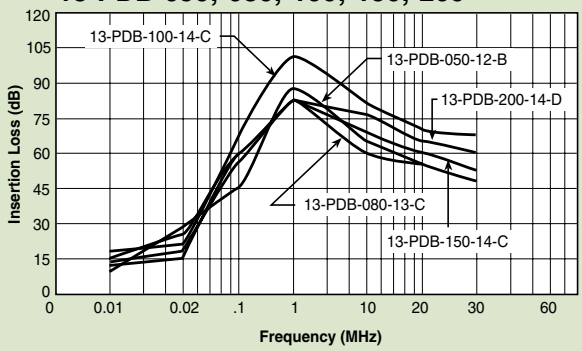
Normal Mode



13-PDB-005;-010;-020;-035



13-PDB-050;-080;-100;-150;-200

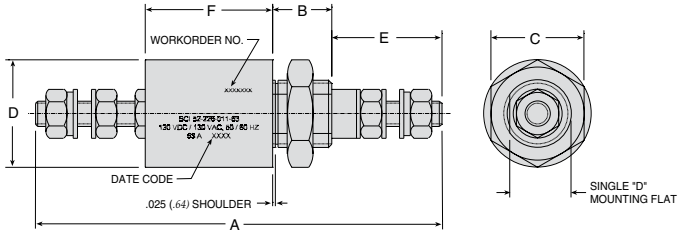


api technologies corp.
Spectrum Control

Commercial-Off-The-Shelf (COTS) Filters

API Technologies' Spectrum Control brand now offers COTS single line feed-through EMI filters that are the commercial equivalent to M15733-PRF/72, M15733-PRF/73 and M15733-PRF/74. These reliable AC and DC high performance filters provide an excellent source of filtering in a compact package and are well suited for the military and aerospace industries. They filter up to 500 A with an attenuation of 40 to 90 dB from 1 MHZ to 1 GHz and voltage rating of 130 VDC to 250 VAC. Please reference API mechanical drawing.

Dimensions



MIL part M15733/	Part Number	A ±0.100	B ±0.032	C ±0.010	D ±0.010	E ±0.100	F Max	Mounting Flat ±0.015
72-0034	5004-7053-100-A	6.750	0.375	0.930	1.500	0.750	4.875	0.656
72-0046	5004-7053-100-A	6.750	0.375	0.930	1.500	0.750	4.875	0.656
72-0043	5004-7053-100-A	6.750	0.375	0.930	1.500	0.750	4.875	0.656
72-0049	5004-7059-100-A	7.250	0.375	0.930	2.000	0.750	5.375	0.656
72-0053	5004-7065-100-A	8.781	0.531	1.625	2.250	1.000	6.250	1.046
73-0034	5004-7058-125-A	7.250	0.375	0.930	2.000	0.750	5.375	0.656
73-0043	5004-7058-125-A	7.250	0.375	0.930	2.000	0.750	5.375	0.656
73-0046	5004-7052-125-A	6.750	0.375	0.930	1.500	0.750	4.875	0.656
73-0049	5004-7058-125-A	7.250	0.375	0.930	2.000	0.750	5.375	0.656
73-0051	5004-7059-250-A	7.250	0.375	0.930	2.000	0.750	5.375	0.656
73-0053	5004-7064-125-A	8.781	0.531	1.625	2.250	1.000	6.250	1.046
74-0030	5004-7041-250-A	4.750	0.310	0.616	1.000	0.600	3.400	0.437
74-0036	5004-7047-250-A	6.500	0.310	0.616	1.000	0.750	4.750	0.473
74-0042	5004-7053-250-A	6.750	0.375	0.930	1.500	0.750	4.875	0.656
74-0045	5004-7059-250-A	7.250	0.375	0.930	2.000	0.750	5.375	0.656

Shielded Filters

API has developed a new MRI filter product line which provides MRI/RF shielding solutions for medical, commercial and government applications. Offers 100 dB insertion loss per MIL-STD 220 from 14 KHz to 10 GHZ.

Shielded Room Filters

P/N Series	Configuration*	Description
52-1490	1 x 5	1 x 5 A, 277 VAC
	1 x 30	1 x 30 A, 277 VAC
	1 x 100	1 x 100 A, 277 VAC
	1 x 150	1 x 150 A, 277 VAC
	1 x 200	1 x 200 A, 277 VAC
	1 x 225	1 x 225 A, 277 VAC
	2 x 0.5	Speaker Filter
	2 x 1 ALRM	Fire Alarm Filter
	2 x 5	2 x 5 A, 277 VAC
	2 x 20	2 x 20 A, 277 VAC
	2 x 30	2 x 30 A, 277 VAC
	2 x 50	2 x 50 A, 277 VAC
	2 x 60	2 x 60 A, 277 VAC

* Add to P/N series (eg. 52-1490-1x5)

Options are available with or without discharge light "L" at the end of the part (52-1490-1x5L). Custom configurations are available. Consult factory.

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

api technologies corp.
Spectrum Control

Military/Aerospace Multisection Filters

API Technologies' Spectrum Control brand will address virtually any requirement for a military/custom power product. Our engineering expertise and vertical integrations reduce your speed to market as well as saves you money. Our electromagnetic compatibility expertise in the tempest arena can help you meet MIL-F-15733 and MIL-STD 461 standard requirements.

Features

- High common and differential mode attenuation
- Standard designs up to 400 Amps
- Excellent insertion loss characteristics up to 10 GHz
- Voltage rating 115-250VAC and 400VDC up to 400 Hz
- Available to meet TEMPEST and FCC requirements
- Custom designs for application-specific requirements

Applications

- Military
- Commercial and military/aerospace
- Secured communications
- Switching power supplies
- Data processing equipment
- Ruggedized computers
- Radar
- Electronic warfare
- Ground/air weapon systems
- Satellites
- Ship board systems
- Land based vehicles
- Fixed and mobile control stations

Test Specifications

The high performance power line filters shown on pages 59 and 60 are designed to meet the following criteria.

The information shown can be used as a basis for filter specifications. (Contact factory for additional details).

Test Group	Order of Test	Examination or Test	Test Method (Per MIL-STD-202)	Post Test Requirements
IIA	1	Voltage Drop	Paragraph 4.6.8 of MIL-F-15733	Three percent of rated voltage max.
	2	Leakage Current	UL 1283	Per applicable specification
	3	Temperature Rise	MIL-F-15733 Paragraph 4.6.4	25°C max.
	4	Terminal Strength	Method 211, Condition A	No evidence of loosening or rupture. 5 lb. applied force. Line Cords: 35 Lbs.
IIB	1	Shock, Medium Impact	Method 213, Condition G	Must pass DWV and Insertion Loss
	2	Vibration, High Frequency	Method 204, Condition A	Monitor for shorts or open
	3	Thermal Shock	Method 107, Test Condition A	Pass 90% DWV IR to be 30% of initial
	4	Humidity	Method 107, Condition B, except temperature equals 25°C	Pass 90% DWV IR to be 30% of initial
III	1	Life	Method 108, Condition D 1.2 x Rated AC voltage at max. operating temp. or 1.4 x DC voltage	Pass 90% DWV insulation resistance to be 30% of initial.

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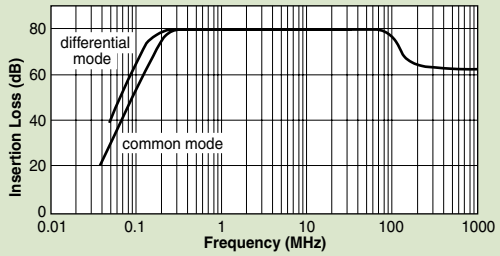
Spectrum Control

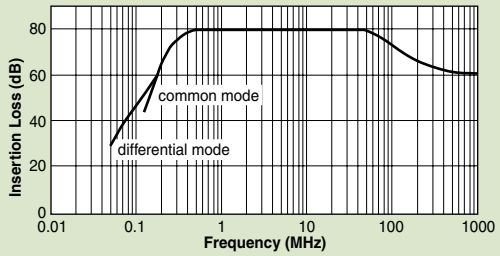
Military/Aerospace Multisection Filters

Insertion Loss

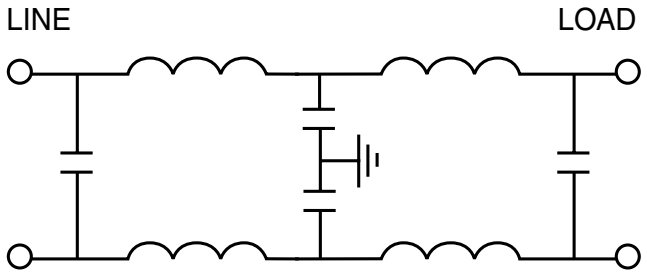
52-600-001



52-600-002

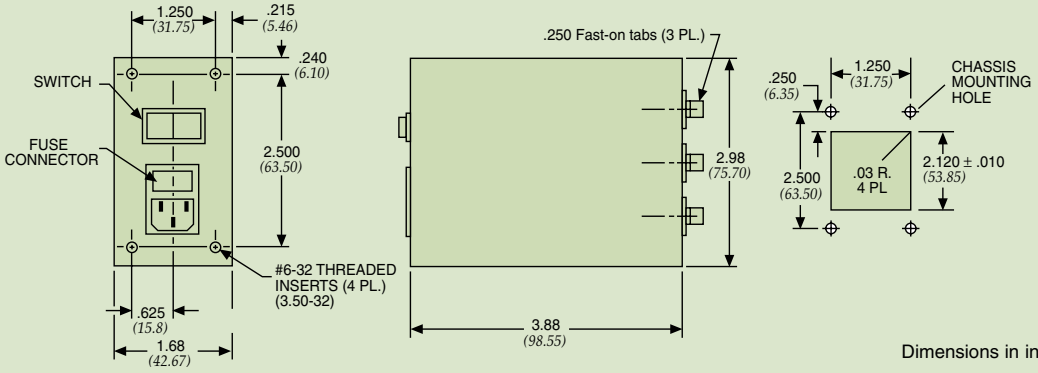


Circuit Schematic



Dimensions

52-600-001
52-600-002



Dimensions in inches *(mm)*

Model	Current Rating	Voltage Rating	Temperature Rating	DCR. max. (ohms)	Leakage Current (max.)	Mode (max.)	Minimum Insertion Loss (db) Per MIL-STD-220						
							50K	150K	300K	1M	10M	100M	1G
52-600-001	5A	120/240VAC 60 Hz	-40°C to +65°C	.20	1 mA	COMM	33	65	80	80	80	80	60
						DIFF	37	65	80	80	80	–	–
52-600-002	10A	120/240VAC 60 Hz	-40°C to +65°C	.10	1 mA	COMM	–	50	70	80	80	70	60
						DIFF	25	50	75	80	80	–	–

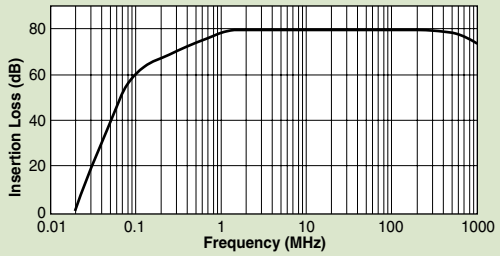
Consult factory for UL/CSA approval availability.

api technologies corp.
Spectrum Control

Military/Aerospace Multisection Filters

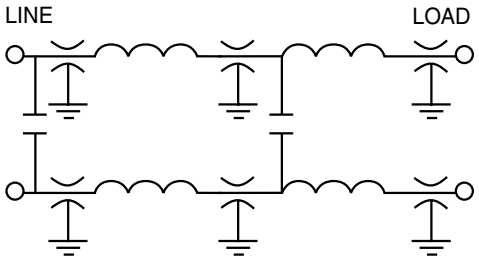
Insertion Loss

52-523-002



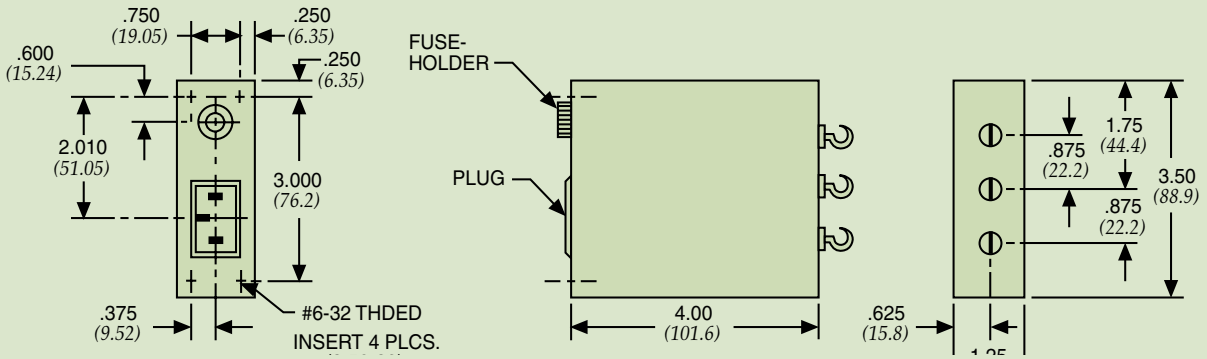
Circuit Schematic

52-523-002



Dimensions

52-523-002



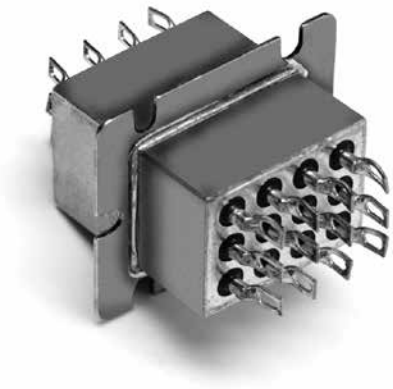
Dimensions in inches *(mm)*

Model	Current Rating	Voltage Rating	Temperature Rating	DCR max. (ohms)	Leakage Current (max.)	Mode (max.)	Minimum Insertion Loss (db) Per MIL-STD-220						
							50K	150K	300K	1M	10M	100M	1G
52-523-002	5A	120/240VAC 60 Hz	-40°C to +65°C	.25	1 mA	COMM	–	55	60	80	80	70	60
						DIFF	–	50	60	80	80	–	–

Consult factory for UL/CSA approval availability.

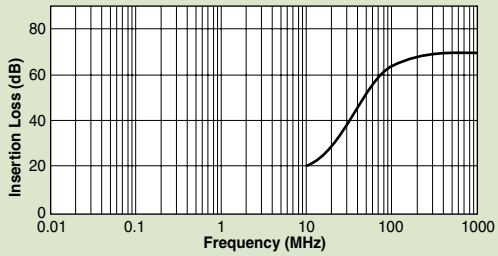
api technologies corp.
Spectrum Control

Military/Aerospace Multisection Filters



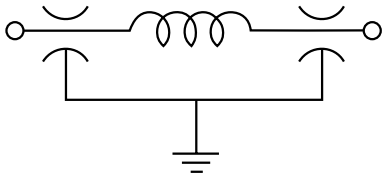
Insertion Loss

1212-0502



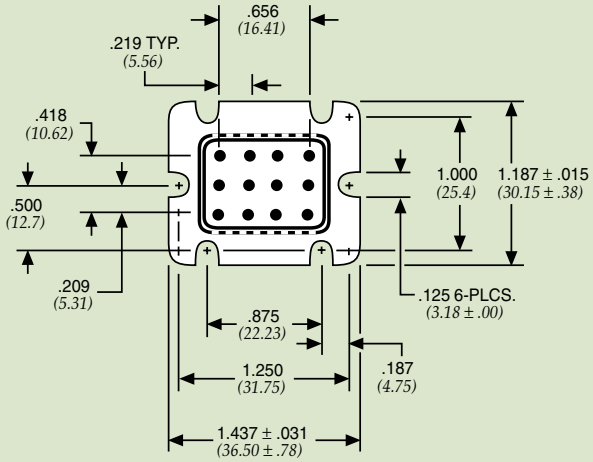
Circuit Schematic

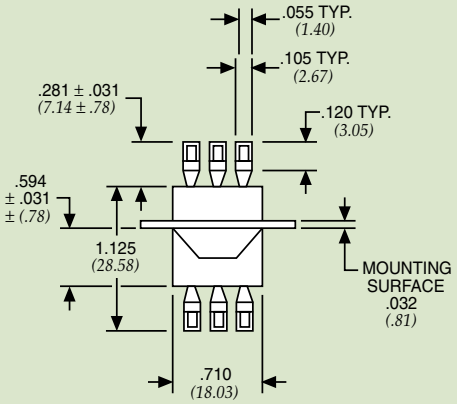
1212-0502



Dimensions

1212-0502





Dimensions in inches *(mm)*

Model	Current Rating	Voltage Rating	Temperature Rating	DCR max. (ohms)	Leakage Current (max.)	C_X Value	Minimum Insertion Loss (db) Per MIL-STD-220			
							10M	100M	500M	1G
1212-0502	10A	350VDC 240VAC 60 Hz	-55°C to +125°C	.01	1 mA	5000pF	20	65	70	70

Consult factory for UL/CSA approval availability.

api technologies corp.
Spectrum Control

Military/Aerospace Multisection Filters

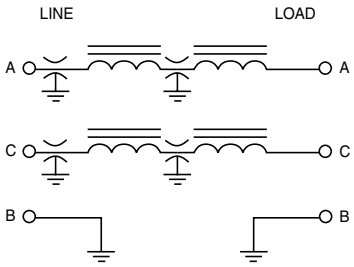
Secure Communications

API's electromagnetic compatibility expertise in the secure communication or "TEMPEST" arena is represented by this group of high performance filters. These units are especially well suited for use in MIL-STD-461 applications to reduce conducted emissions. The filters are manufactured with glass sealed terminals and connectors.

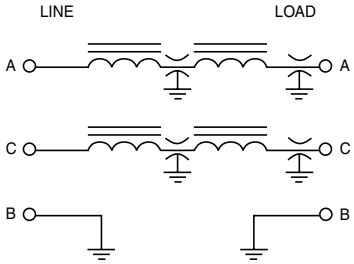
Features

- Excellent insertion loss profile
- Available for DC & AC applications up to 400 Hz
- Available for 3-14 Amp applications
- Custom systems can be designed to your specific needs

Filter Schematic A

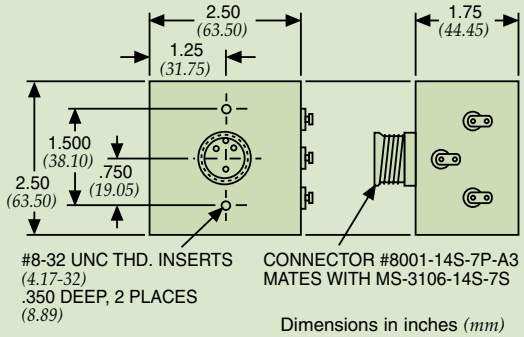


Filter Schematic B



Dimensions

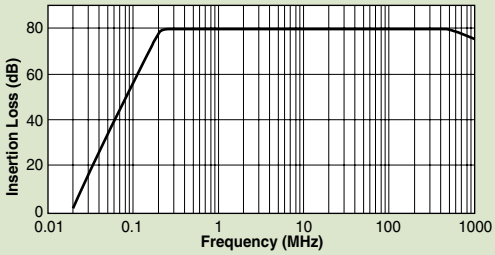
52-378-002



Dimensions in inches *(mm)*

Insertion Loss

52-378-002, -004 MIL-STD-220



Model	Current Rating	Voltage Rating	Temperature Range	DCR max. (ohms)	Leakage Current (max.)	Schematic	Minimum Insertion Loss (db)						
							50 KHz	150 KHz	300 KHz	1 MHz	10 MHZ	100 MHZ	1 GHz
52-378-001	3 Amps	240VAC 60 Hz Line to Line	-55°C to 85°C	.3	50 mA	A	30	60	70	80	80	70	70
52-378-002	5 Amps	240VAC 60 Hz Line to Line	-55°C to 85°C	.2	50 mA	B	24	64	70	80	80	70	70
52-378-004	5 Amps	240VAC 60 Hz Line to Line	-55°C to 85°C	.2	50 mA	A	34	64	70	80	80	70	70
52-378-005	3 Amps	240VAC 60 Hz Line to Line	-55°C to 85°C	.3	50 mA	B	40	70	80	80	80	70	60

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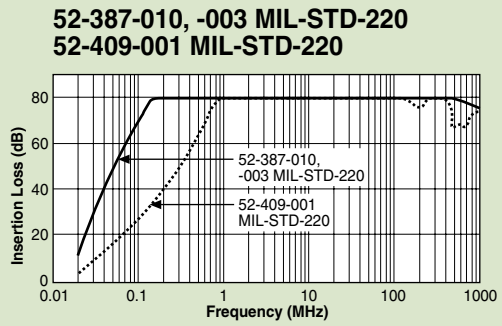
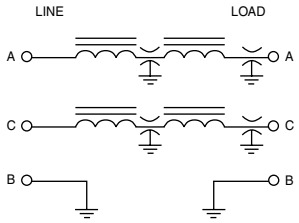
Military/Aerospace Multisection Filters

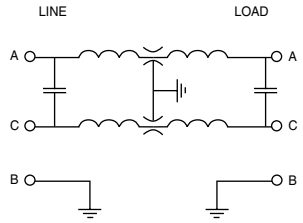
Insertion Loss



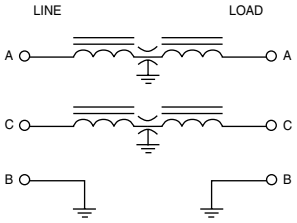
Filter Schematic C



Filter Schematic D



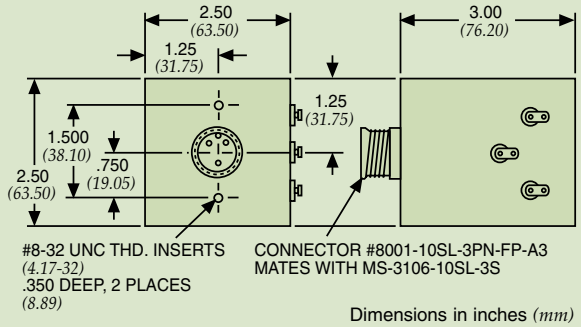
Filter Schematic E



3 Phase and 400 Hz models available.
Please consult the factory.

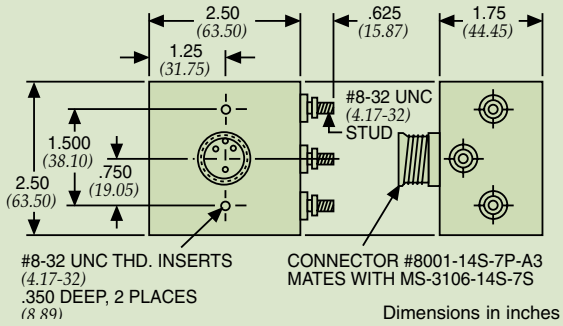
Dimensions

Figure 1



Dimensions in inches *(mm)*

Figure 2



Dimensions in inches *(mm)*

Model	Fig.	Current Rating	Voltage Rating	Temperature Range	DCR max. (ohms)	Leakage Current (max.)	Sch.	Mode	Minimum Insertion Loss (db)						
									50 KHz	150 KHz	300 KHz	1.0 MHz	10 MHz	100 MHz	1 GHz
52-387-010	1	10 Amps	240VAC 60 Hz Line to Line	-55°C to 85°C	.2	50 mA	C	common	24	60	70	80	80	70	
70															
52-387-012	1	5 Amps	240VAC 400 Hz Line to Line	-55°C to 85°C	.2	5 mA	D	common	34	64	70	80	80	70	70
								differential	30	30	70	80	80	–	–
52-409-001	2	14 Amps	240VAC 60 Hz	-55°C to 85°C	.04	50 mA	E	common	14	30	45	80	80	70	
60			Line to Line												

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Military/Aerospace Multisection Filters

Secure Communications

Features

- Meets applicable sections of MIL-F-15733
- Excellent performance
- Integral IEC connector
- Available with integral fused IEC connector and two pole switch
- Current ratings to 15 Amps
- Custom designs available

Part Numbering System:

760 - **A** **06** **Q**

Model

Current Rating:
3, 6, 10, 15 Amps

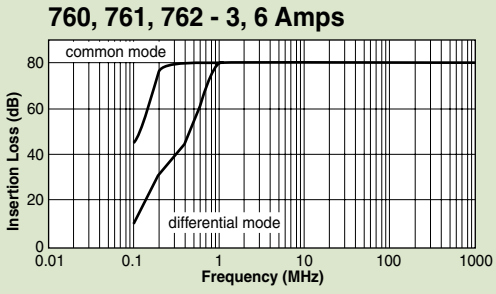
Terminal Style:
A=.25 Quick Connect
C=Wire Leads (4" min.)

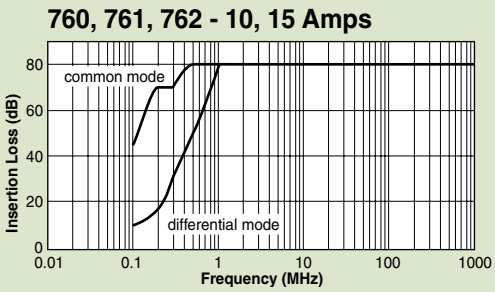
Series: 760; 761 or 762

Electrical Specifications

Rated current ranges	3, 6, 10, 15 Amps
Rated voltage	115-250VAC
Operating frequency	50-60 Hz
Maximum leakage current	
@115VAC 60 Hz	1.2 mA
@250VAC 50 Hz	2.5 mA
Test voltage	
Line-to-Line	1450VDC
Line-to-Ground	2250VDC

Insertion Loss

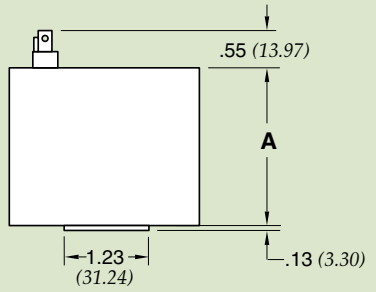




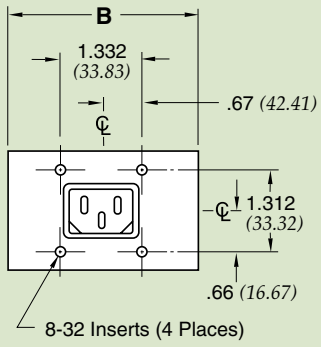
Common Mode (CM) is tested in a 50 ohm system with all lines tied together on the line and load sides of the filter.
Differential Mode (DM) is tested in a 50 ohm system using a 180˚ phase splitter on both sides of the filter.

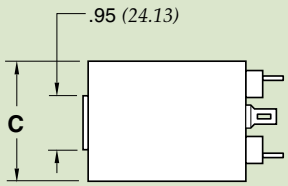
Military/Aerospace Multisection Filters

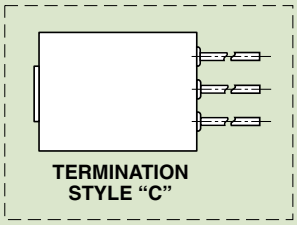
Dimensions - 760 Series



Series	Current Rating (Amps)	Filter Dimensions		
		A	B	C
760	3, 6	2.25 (57.15)	3.00 (76.20)	1.88 (47.75)
	10, 15	5.50 (139.70)	3.15 (88.01)	2.10 (53.34)

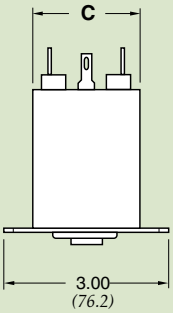




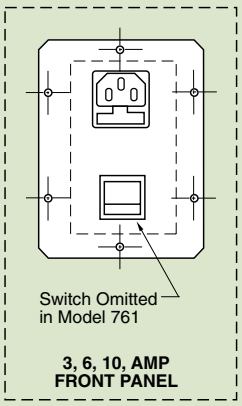


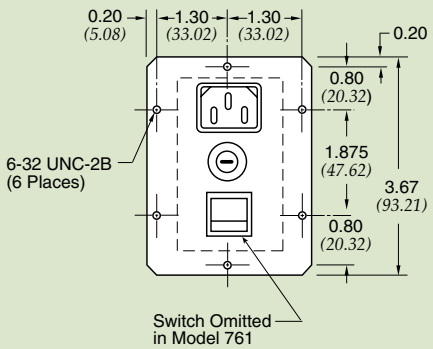
Dimensions in inches *(mm)*

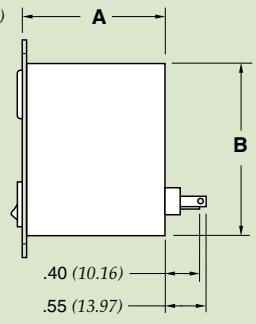
Dimensions - 761, 762 Series



Series	Current Rating (Amps)	Filter Dimensions		
		A	B	C
761, 762	3, 6	2.55 (64.77)	2.97 (75.43)	1.88 (47.75)
761	10, 15	5.50 (139.70)	3.15 (88.01)	2.10 (53.34)
762	10, 15	5.75 (146.05)	3.15 (88.01)	2.10 (53.34)







Dimensions in inches *(mm)*

api technologies corp.
Spectrum Control

EMI Power Filter Solutions

Military and Aerospace

API Technologies has a long history of partnering with leading suppliers of the defense industry. Our ability to find solutions to suppress or eliminate electromagnetic interference (EMI) allows us to provide the high reliability filters required for military and aerospace applications. API's Spectrum Control brand can design your custom filter with a unique mechanical package for those unusual or tight fitting spaces, higher performance filtering and the voltage rating you need to address all of your AC and DC power issues.

Communications

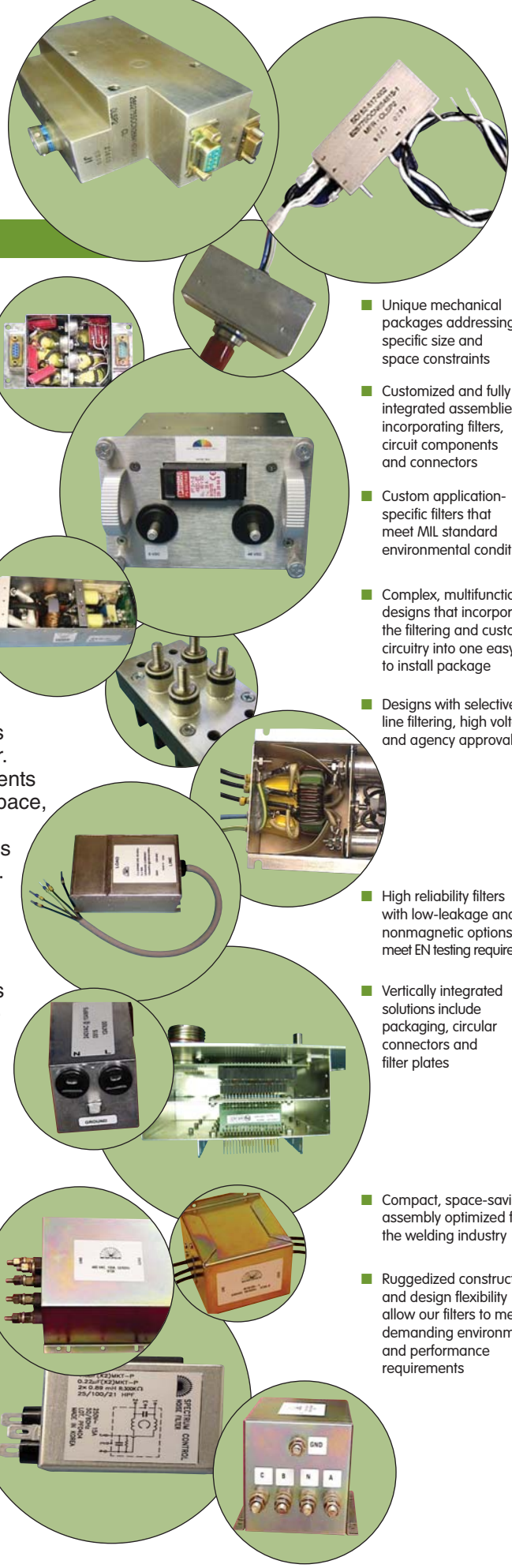
API's Spectrum Control line of power filter solutions can create an agency-approved product that will filter and condition the power to your communications infrastructure equipment, as well as eliminate emissions that can contaminate your distributed AC and DC power. Our custom power filters will incorporate all the components and the filtering in one complete package to save you space, time and money. And as a vertically integrated supplier, API offers global low cost manufacturing which allows us to produce fast prototypes and a quicker time to market.

Medical

Our many years of experience in providing EMI/RFI solutions has given us the know-how to design products to meet the specific constraints and requirements of the medical industry. Much of the medical equipment used today requires complete suppression of any and all EMI, as well as low-leakage, nonmagnetic properties to prevent negatively affecting surrounding equipment. We will design and build a high reliability, high performance custom power filter to meet your system and all EN requirements.

Industrial

At API, we do everything from package design and metalworking to EMI filtering to EMC testing, which means a lower cost for you. Our engineers will design and build a custom power filter that will satisfy global EMC regulations, improve speed-to-market times, overcome space constraints and withstand harsh environmental conditions. Our plug-and-play designs cover a range of industrial and instrumentation applications that will address any of your power filtering needs with current ratings as high as 500 Amps.



- Unique mechanical packages addressing specific size and space constraints
- Customized and fully integrated assemblies incorporating filters, circuit components and connectors
- Custom application-specific filters that meet MIL standard environmental conditions
- Complex, multifunctional designs that incorporate the filtering and custom circuitry into one easy to install package
- Designs with selective line filtering, high voltages and agency approvals
- High reliability filters with low-leakage and nonmagnetic options meet EN testing requirements
- Vertically integrated solutions include packaging, circular connectors and filter plates
- Compact, space-saving assembly optimized for the welding industry
- Ruggedized construction and design flexibility allow our filters to meet demanding environmental and performance requirements

magnetics

api technologies corp.
Spectrum Control

Magnetics

we offer a variety of transformers, inductors, choke, coils and custom solutions to meet your magnetics needs

Custom Magnetic Solutions

We offer extensive design and manufacturing capabilities, including more than two dozen magnetic core materials and winding wire from 6 to 45 gauge with many coatings, leads and terminations. We produce toroids ranging in size from 0.5" to 18" in diameter with up to 4,000 turns and accuracy to +/- 1 turn, and a wide variety of encapsulation and laminate options. Below are some of the critical design criteria we will work with your engineering team to address.

Electrical Characteristics - Identifying the circuit function/ application and/or specifying electrical requirements such as amperage, voltage, inductance, frequency response, leakage, and noise reduction often determines selection of materials and components.

Mechanical Constraints - Restrictions on maximum height and available board area and mounting style (surface mount or through-hole) set physical parameters that often are difficult to change. Mechanical size restrictions can strongly affect component temperature rise.

Environmental Conditions - Maximum/minimum operating temperatures and allowed surface and/or internal temperatures of components, including UL compliance, as well as conditions such as air flow, sealing of container, high shock, and vibration will influence material selection and design.

Regulating Requirements - Considerations include safety standards to be met (eg. IEC/UL 60950-1, UL61010-1, UL 1585 etc), listing of the unit with a regulatory agency such as UL, CSA or VDE and requirements for UL thermal insulation system marking.

Qualification Conditions - Identify the qualification process required prior to approval, be it customer standards, or Hi-Rel standards such as MIL-PRF-27 or MIL-STD-981 and whether formal testing or the ability to demonstrate compliance by design is necessary.

Our magnetics group combines the people, products and technologies of several brands, including Filtran, Keytronics and RTI Electronics, in order to satisfy your magnetics requirements. API Technologies is a key supplier to many of the world's leading OEMs, serving the military, aerospace, medical, telecom, transport, RF and industrial/test measurement markets.

Quality Construction

API's commitment to quality begins with a rigorous raw material selection and inspection process and continues through highly trained operators utilizing state-of-the-art equipment. The end result are the highest quality magnetics consistently manufactured to meet some of the industry's most stringent requirements including many MIL, ANSI and ISO certifications.

api technologies corp.
Spectrum Control

Magnetics

Current Transformers

Current Sensors

- Measures electrical current (AC & DC) and can transform current from high to low measurable values
- Wide primary current range of 3.5 Amps to 800 Amps
- Apps include advanced fault tolerant computers and workstations, control panels reading current flowing to electric transformer, telecom and communications

High Frequency Current Transformers

- 20 kHz-100 kHz operating frequency
- Available totally encapsulated, with or without wound primary turns and loading resistor
- Built to UL, MIL, VDE, CE specs, EMRL current transformers meet UL1244
- Ideal for ampmeters, wattmeters, relays and cross current compensation

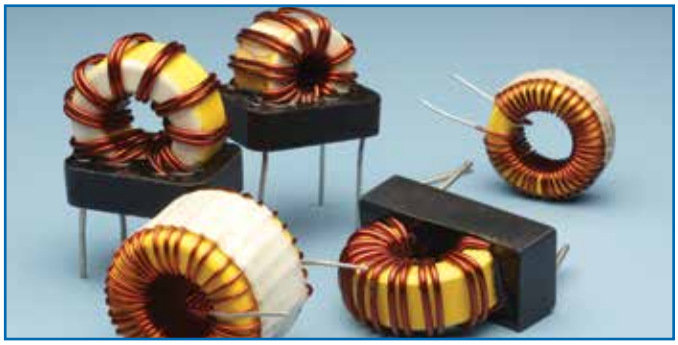
Load Detector Current Sensors

- Innovative Snap-On load detectors mount on pre-wired systems without disrupting existing connections
- Broad frequency response of 30Hz to 15 kHz
- Measure currents up to 40 Amps RMS continuous and 120 Amps intermittent
- Excellent for economical energy management and automation control

Power Inductors/Chokes

- Precision wound heavy-duty toroidal inductors
- Stores energy as a magnetic field, can delay and reshape alternating current
- Up to 100 amps, standard
- Semi or full epoxy molded, horizontal and vertical mounting
- Lighting dimmers – low wattage residential to higher wattage commercial, motor controls, SCR controls and line filters

Switch Mode Power Supply Inductors



- Filter inductors, toroidal current sense transformers and high frequency inverter transformers
- Performance verified in 25kHz power supply
- 10 to 1,000 watts with low power losses
- Switching frequencies from 5 to 100 kHz
- Open winding, semi-encapsulated and encapsulated construction
- Custom designs up to 200 Amps

Lighting Chokes & Inductor/Filters

- Precision wound heavy-duty toroidal inductors
- Rugged design
- 120 volt models from 12.5 to 100 Amps
- 240 volt models from 8.3 to 60 Amps
- High quality noise rejection filter
- Ideal for lighting dimmers, EMI/RFI filters, PWM and PM circuits primarily for motor controls, UPS Systems, differential mode line filters

api technologies corp.
Spectrum Control

Magnetics

Toroidal Power Transformers

- 50/60HZ, 5-15,000V Power Transformers (Europe ER series)
- 60 Hz 120V Power Transformers (U.S. FR series)
- 400Hz 115-230V Power transformer (Military DR series)
- Convert power-level voltages from one level or phase configuration
- Lower magnetic leakage, lower electrical noise and mechanical hum
- Excellent as isolation step-down and high voltage step-up transformers, autotransformer, ferroresonant transformer and smoothing inductor

Laminate Power Transformers

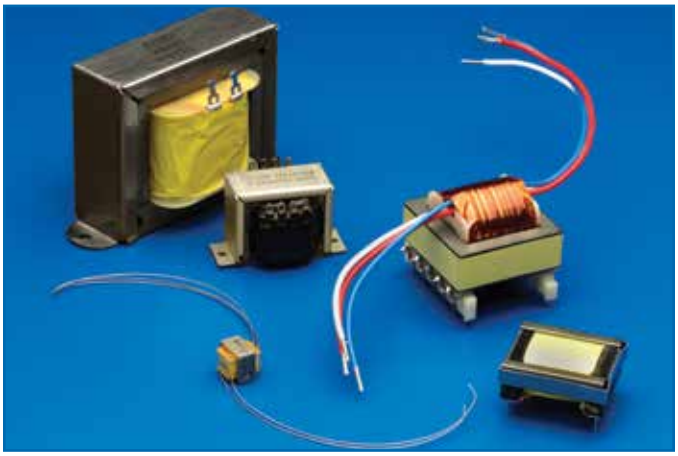
- Value ranges from 3 VA to 100,000 VA
- Transform line voltage to any other voltage
- Apps include audio power conditioning, low-wattage indoor and outdoor lighting solutions, military and commercial UPS systems, power supplies, mono crystalline and crystalline solar processing

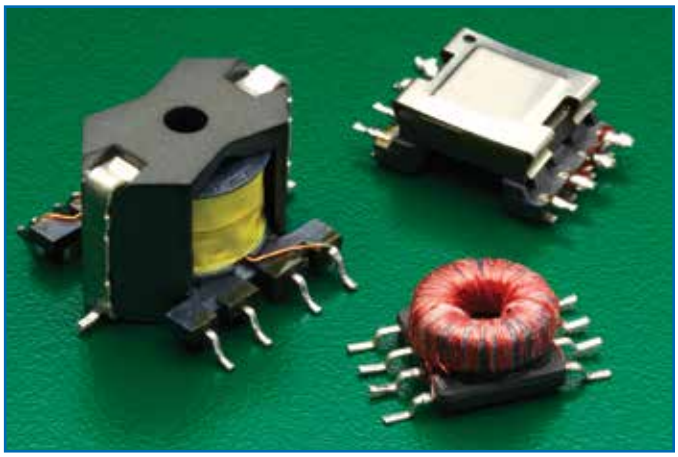
Modem & Module Transformers

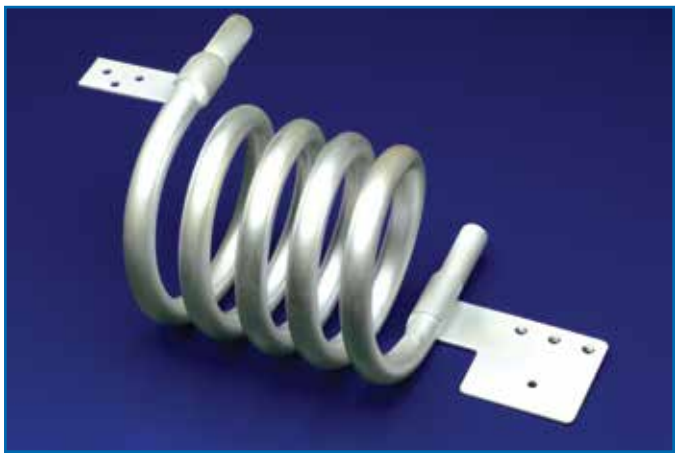
- Broadband and voiceband transformers used for datacom and telecom applications
- xDSL, T1/E1, T3/DS3/E3/STS-1, ISDN interface modules
- ADSL / POTS splitter modules
- Impedance and line matching transformers

Air Coils

- Custom and build-to-print air coils for RF power, filter and sensing applications
- Made with specialized custom tooling to meet customer dimensional and electrical requirements







electromagnetic

integrated solutions

api technologies corp.
Spectrum Control

eis.apitech.com

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

Sales Offices

NORTH AMERICA
8061 Avonia Road
Fairview, Pennsylvania 16415
Phone: 814-474-1571
Fax: 814-474-3110

EUROPE
Spectrum Control GmbH
Hansastrasse 6
91126 Schwabach, Germany
Phone: (49)-9122-795-0
Fax: (49)-9122-795-58

CHINA
Spectrum Control Limited
2nd Industrial Area
Ling Tou Industrial Road
Qiad Tou Town, Dong Guan City
Guang Dong Province 523530
Peoples Republic of China
Phone: (011)-86-769-8343-7761
Fax: (011)-86-769-8343-7760

ISO 9001:2008 CERTIFIED
AS 9100 CERTIFIED
RoHS COMPLIANT

Power Solutions

RF/Microwave & Microelectronics

Electromagnetic Integrated Solutions

Electronics Manufacturing Services

Secure Systems & Information Assurance

About API Technologies

API Technologies Corp. is a trusted provider of RF/microwave, microelectronics, power 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 70 years. API Technologies trades on the NASDAQ under the symbol ATNY.

+1 855.294.3800
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