

electromagnetic
**integrated
solutions**
full line catalog



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:

EMI Filter Solutions	2-3
Integration, Global & Technical Resources	4-5
Product Applications	6-7
EMC Test Capabilities	8-9
EMI Selection Guide	10-13
Ceramic Capacitors	CC1-CC20
Coaxial Filters & Interconnects	CF2-CF16
Surface Mount EMI Filters	SM1-SM21
Low Pass EMI Filters	LP1-LP43
EMI Filtered Arrays	FA1-FA23
EMI Filtered Connectors	FC1-FC64
QuietShield Caskets & Shielding .	FC68-FC73
Specialty Connectors	SC1-SC9
Power Filters	PF1-PF99
Magnetics	

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
- High current/high voltage filters
- Miniature hermetically sealed and surface mount filters
- Filter plates and terminal blocks
- D-sub and combo filtered connectors



Specialty Connectors & Custom Cable Assemblies

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



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

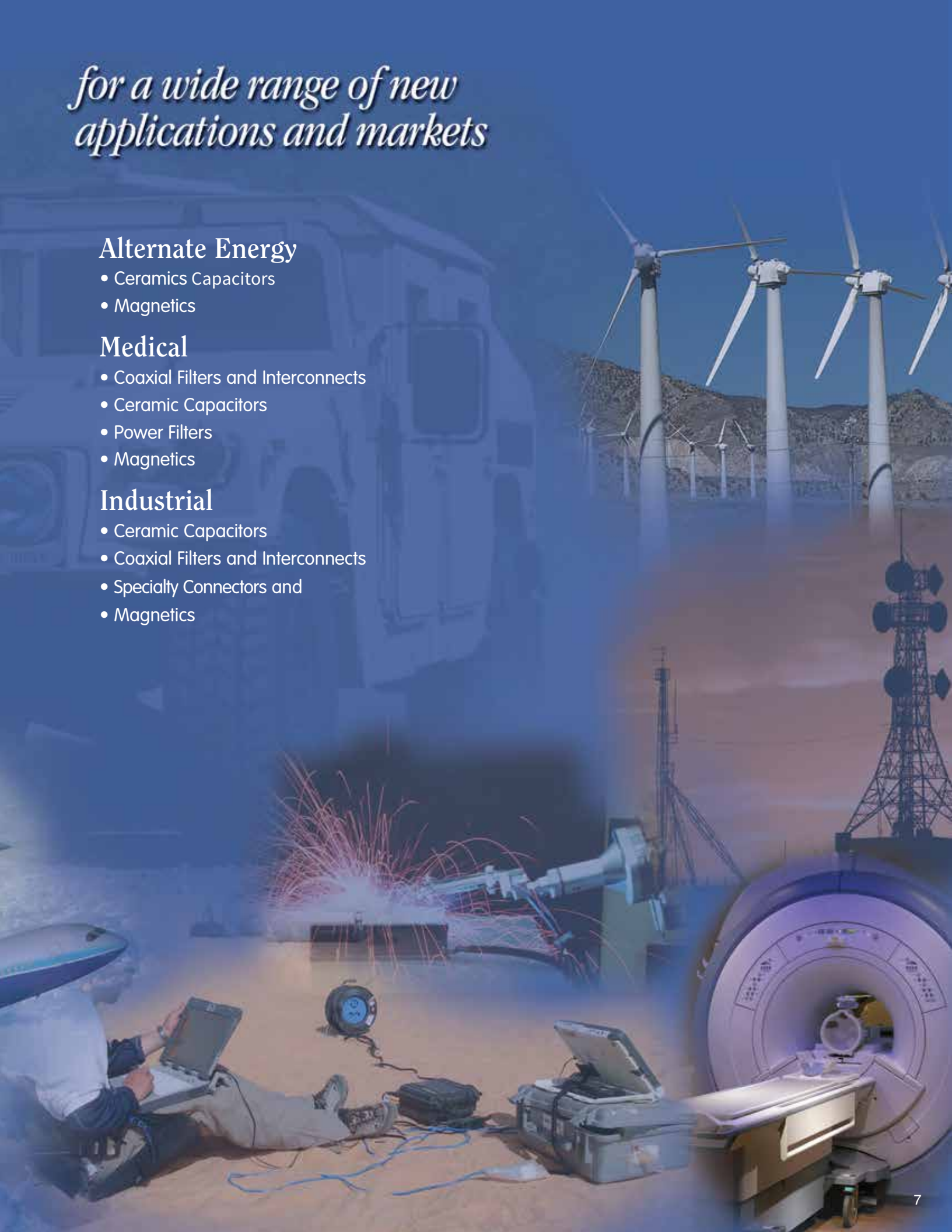
- Ceramics Capacitors
- Magnetics

Medical

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

Industrial

- Ceramic Capacitors
- Coaxial Filters and Interconnects
- Specialty Connectors and
- 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



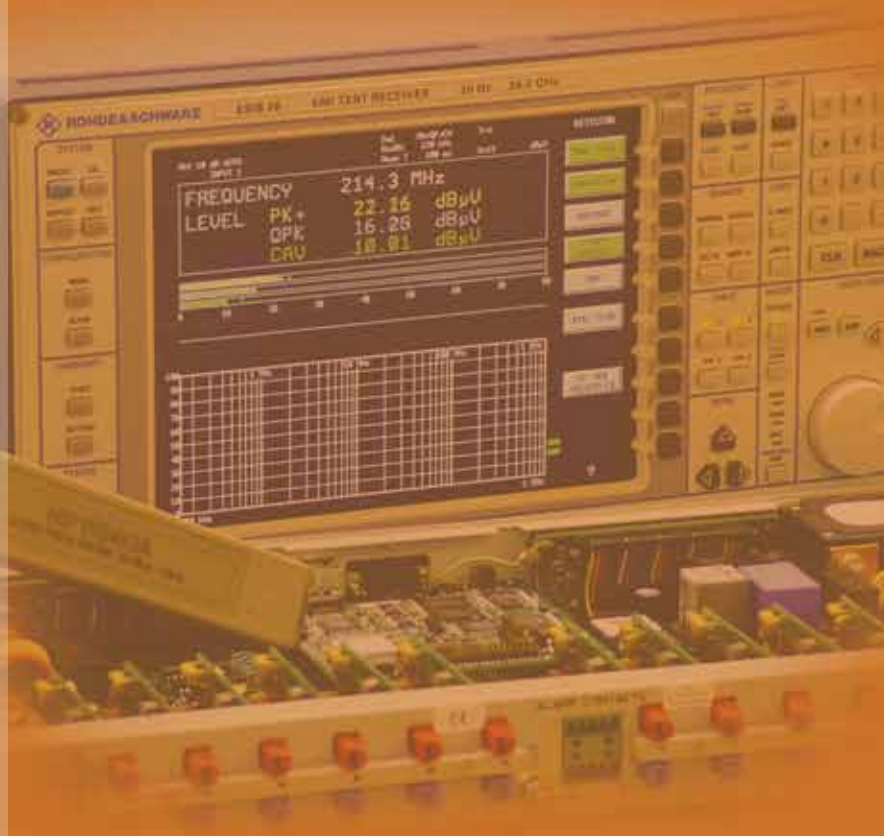
EMI/RFI Filter and Capacitor Performance Testing

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 "R" level testing

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.

Electromagnetic Integrated Solutions Selection Guide

CERAMIC CAPACITORS

Specialty Ceramic Components



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

Advanced Ceramics



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

Applications

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

■ 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

■ 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

RoHS
COMPLIANT

eis.apitech.com/ceramic

■ Structural Ceramics

Materials: Steatite, Cordierite and Alumina
Finishing methods: glazing, tumbling, plating

■ Planar & Capacitor Arrays

Capacitance values up to 40 pF 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



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

Miniature & Solder-in Filters



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

Hermetic/Resin Sealed Filters



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

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

■ 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

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
Qualified to MIL-PRF-15733, MIL-PRF-28861 and DSCC 84084

■ Safety

Some select filters U.L. 1459 recognized and CSAC22.2 certified

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 pF

■ Temp range
-55°C to +125°C

■ 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

■ Insertion loss range

Effective filtering from 10 KHz to 18 GHz with proper installation

■ Capacitance and temperature characteristics

To 5.2 pF NPO, X7R, Y5V, Z5U

■ Temperature range

-55°C to +125°C

■ Voltage ratings (max.)

To 2500 VDC

■ Current ratings (max.)

240 VAC @ 400 Hz
To 100 Amps

RoHS
COMPLIANT

eis.apitech.com/smt

RoHS
COMPLIANT

eis.apitech.com/lowpass

eis.apitech.com/lowpass

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 ECN5848, 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 workstations 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

RoHS
COMPLIANT

eis.apitech.com/data

Electromagnetic Integrated Solutions Selection Guide

SPECIALTY CONNECTORS & CUSTOM CABLE ASSEMBLIES

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

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/circular

eis.apitech.com/harness

POWER FILTERS & FILM MODULES

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**
4.7 μ F max
Class Y2 and Y4 available

RoHS
COMPLIANT

eis.apitech.com/sfilter

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

RoHS
COMPLIANT

eis.apitech.com/pem

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

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

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/power

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

eis.apitech.com/magnetics

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 .059" OD
- Arrays
- Custom style capability
- High voltage designs available
- High temperature designs available
- Square tubes for surface mount applications
- Lapped feed-through capacitors

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 $+125^{\circ}\text{C}$ are achieved with no voltage de-rating.

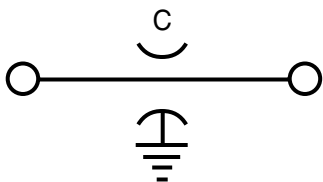
The versatile nature of our discoidals makes them ideally suited for by-pass and filtering applications. Due to their low inductance construction, these capacitors perform extremely well in high frequency applications. The circular geometry of a discoidal feed-through capacitor offers many paths to ground, 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 $+125^{\circ}\text{C}$ operation

Feed-Through Circuit



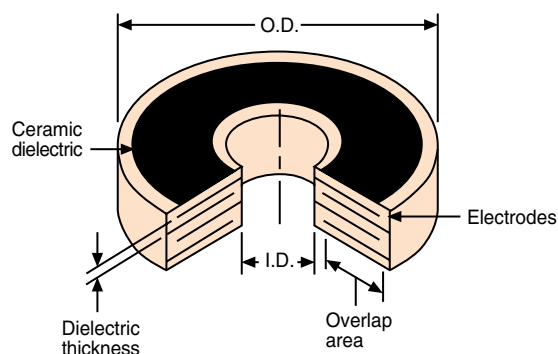
Specialty Ceramic Capacitors

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

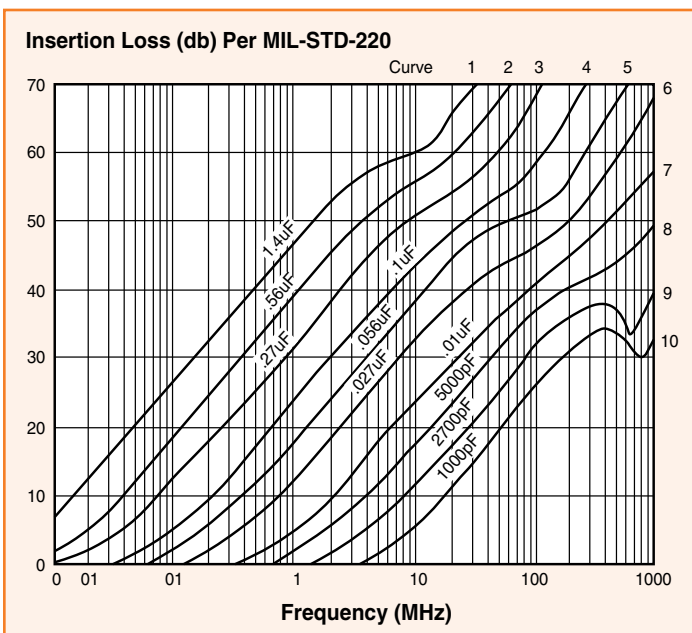
- Various OD, ID and thickness configurations
- Pressed discoidals with surface printed terminals
- Multi-hole discoidal designs
- Miniature discoidals down to .059" OD
- Arrays
- Custom style capability
- High voltage designs available
- High temperature designs available



Multilayer Discoidal

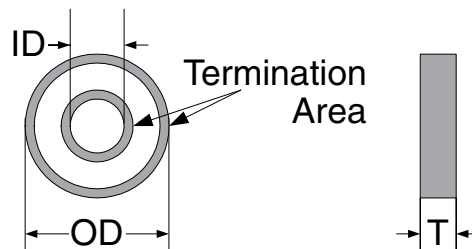


Insertion Loss



Metallization

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

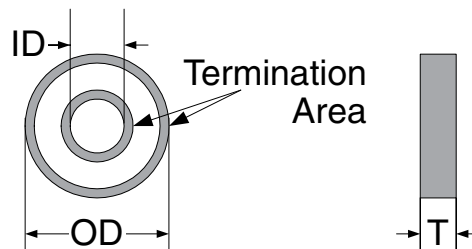


Discoidal NP0

[illegible]

Note: AC voltage determined upon request

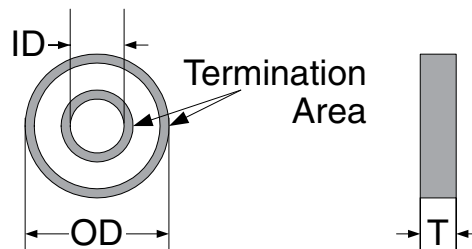
Discoidal X7R



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			
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
1,000	1,000																												
	1,200																												
	1,500																												
1,800	1,800																												
	2,200																												
	2,700																												
3,300	3,300																												
	3,900																												
	4,700																												
5,600	5,600																												
	6,800																												
	8,200																												
10,000	10,000																												
	12,000																												
	15,000																												
18,000	18,000																												
	22,000																												
	27,000																												
33,000	33,000																												
	39,000																												
	47,000																												
56,000	56,000																												
	68,000																												
	82,000																												
100,000	100,000																												
	120,000																												
	150,000																												
180,000	180,000																												
	220,000																												
	270,000																												
330,000	330,000																												
	390,000																												
	470,000																												
560,000	560,000																												
	680,000																												

Note: AC voltage determined upon request

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)		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
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
	1,800																												
	2,200																												
	2,700																												
	3,300																												
	3,900																												
	4,700																												
	5,600																												
	6,800																												
	8,200																												
	10,000																												
	12,000																												
	15,000																												
	18,000																												
	22,000																												
	27,000																												
	33,000																												
	39,000																												
	47,000																												
	56,000																												
	68,000																												
	82,000																												
	100,000																												
	120,000																												
	150,000																												
	180,000																												
	220,000																												
	270,000																												
	330,000																												
	390,000																												
	470,000																												
	560,000																												
	680,000																												
	820,000																												
	1,000,000																												
	1,200,000																												
	1,500,000																												
	1,800,000																												
	2,200,000																												
	2,700,000																												
	3,300,000																												
	3,900,000																												
	6,800,000																												
	8,200,000																												
	10,000,000																												
	12,000,000																												
	15,000,000																												

Note: AC voltage determined upon request

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

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 $+125^{\circ}\text{C}$ 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.

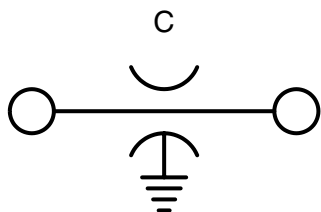
Feed-through tubular capacitors are ideally suited for by-pass and filtering applications. Due to the cylindrical design, the capacitors will have uniform insertion loss over a broad frequency range. This structure yields a low inductance when compared to conventional wound capacitors.

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

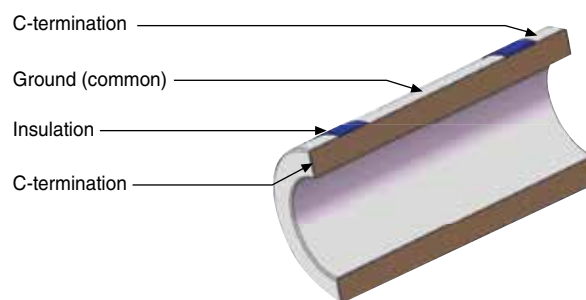
- Low cost solution for general purpose filtering
- Ideal for multi-pin connector applications
- High ratio of capacitance to volume
- Low inductance, non-polar
- Impervious to moisture and contamination
- -55°C to $+125^{\circ}\text{C}$ operation

Feed-Through Circuit

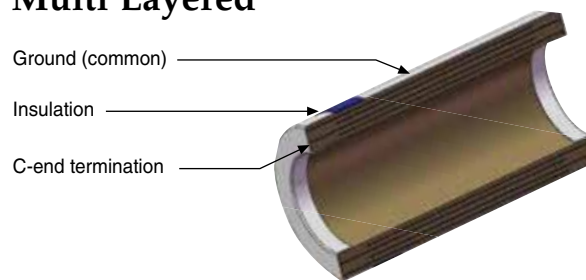


Feed-Through Construction

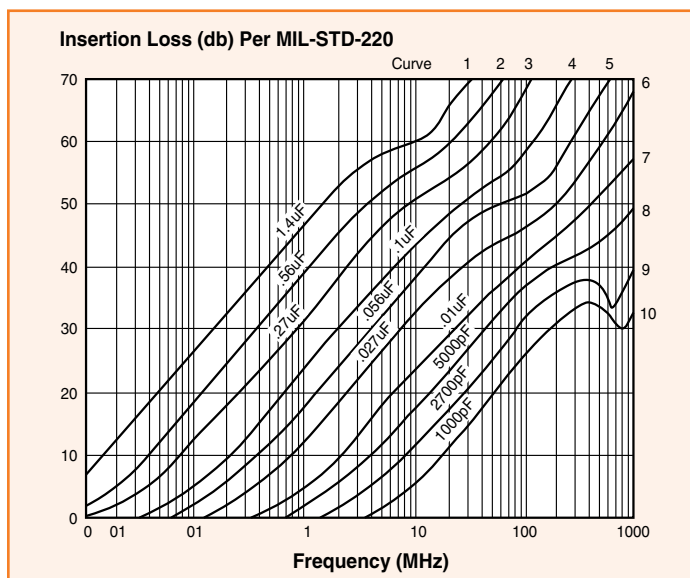
Solid



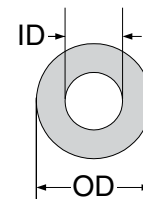
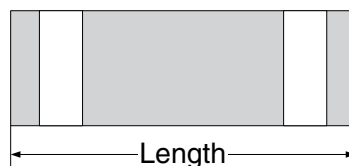
Multi Layered



Insertion Loss



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) (mm)	0.081 ±0.002						0.090 ±0.003									0.122 ±0.004					
		2.06 ±0.05						2.29 ±0.08									3.10 ±0.10					
	ID (in) (mm)	0.050 ±0.002						0.060 ±0.003									0.082 ±0.004					
		1.27 ±0.05						1.52 ±0.08									2.08 ±0.10					
	Length (in) (mm)	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		
		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																					
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																					
Y5V	5,600																					
	6,800																					
	8,200																					
	10,000																					
	12,000																					
	15,000																					
	18,000																					
	22,000																					
	27,000																					

KEY:

Solid

Multi-layered

KEY: Solid Multi-layered

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 $+125^{\circ}\text{C}$ 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.

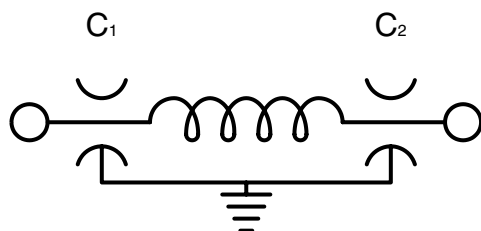
Compared to feed-through tubular capacitors, Pi tubular capacitors have a much narrower transition between the pass and stop bands. Pi capacitors are effective in stopping high frequency interference without affecting necessary frequencies immediately below the stop band.

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 $+125^{\circ}\text{C}$ operation

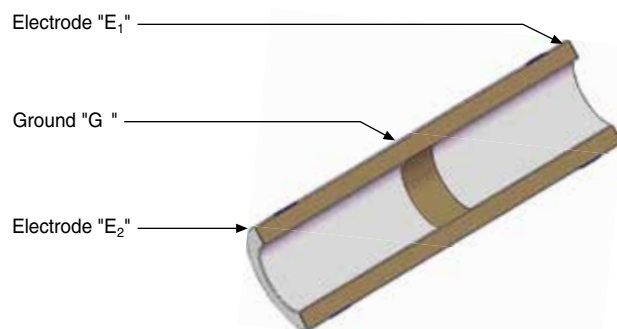
Pi Circuit



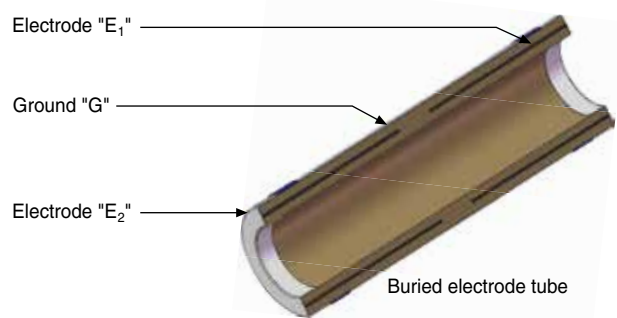
$C_1 + C_2 = C_{\text{Total}}$
Inductive Element not included.



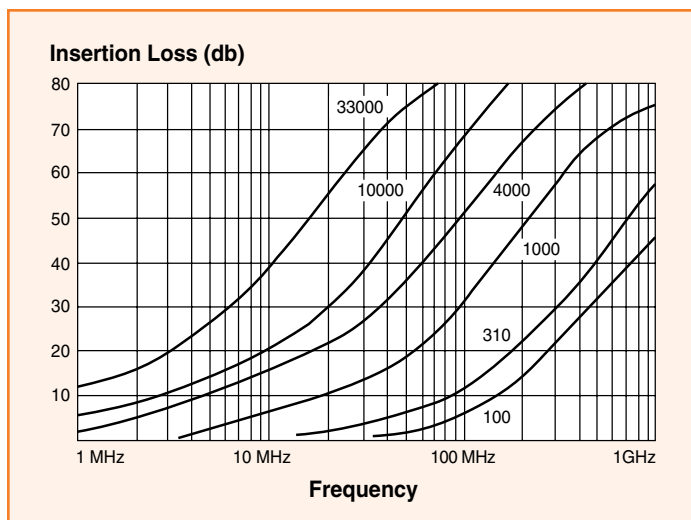
Solid



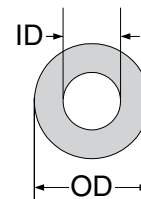
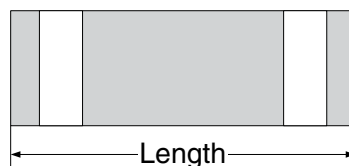
Multi-layered Tube



Insertion Loss



Tubular Pi 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) (mm)	0.081 ±0.002						0.090 ±0.003									0.122 ±0.004					
		2.06 ±0.05						2.29 ±0.08									3.10 ±0.10					
	ID (in) (mm)	0.050 ±0.002						0.060 ±0.003									0.082 ±0.004					
		1.27 ±0.05						1.52 ±0.08									2.08 ±0.10					
	Length (in) (mm)	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		
		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		
Cap(pF)	WV(VDC)	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																					
X7R	120																					
	150																					
	180																					
	220																					
	270																					
	330																					
	390																					
	470																					
	560																					
	680																					
Y5V	820																					
	1,000																					
	1,200																					
	1,500																					
	1,800																					
	2,200																					
	2,700																					
	3,300																					
	3,900																					
	4,700																					

KEY:

Solid

Multi-Layered

KEY: Solid Multi-Layered

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 C: FT, 100 VDC E: FT, 200 VDC G: Pi, 50 VDC H: Pi, 100 VDC I: Pi, 200 VDC	Example: 0.081" = 81	Example: 0.050" = 50	Example: 0.173" = 173	NP0 X7R Y5V	Example: 470 pF = 471	M: ±20% N: ±30% P: +100 -0% Z: +80 -20%

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

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

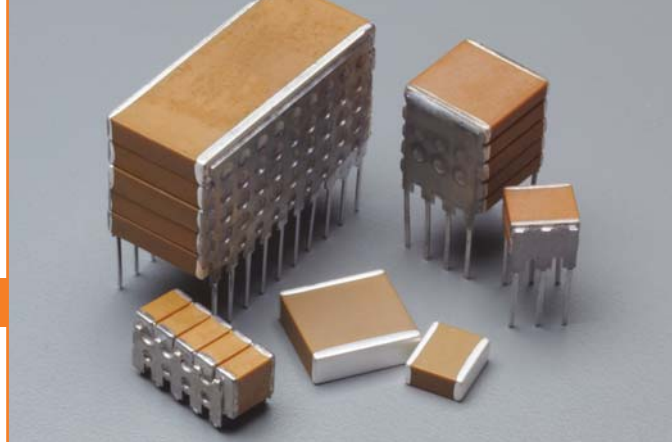
Example: **SMP3X124KENMB00**

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	P: BP	Example:	J: ±5%	Z: 25 VDC	J: Leads in	M: Marked	T: Tape & Reel	GA:87106
SMP4	Q: BQ	120,000 pF	K: ±10%	A: 50 VDC	L: Leads out	U: Unmarked	F: Foam carrier/boxed	Group A
SMP5	R: BR		M: ±20%	B: 100 VDC	N: Leads straight		W: Waffle	HR:Hi-Rel*
	X: BX			C: 200 VDC			B: Bulk	
				E: 500 VDC				

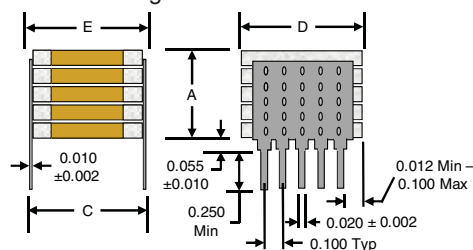
* HR: Hi-Rel designation reflects MIL-PRF-49470, level B, QPL approval

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

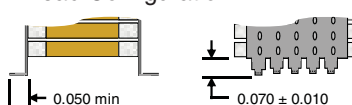


Style/Size	Dimensions					Leads/Side
	A max	B max	C ±0.025"	D ±0.025"	E max	
SMP-3 (in) (mm)	0.650 16.50	0.715 18.16	0.450 11.42	1.050 26.65	0.500 12.69	10
SMP-4 (in) (mm)	0.650 16.50	0.715 18.16	0.400 10.15	0.400 10.15	0.440 11.17	4
SMP-5 (in) (mm)	0.650 16.50	0.715 18.16	0.250 6.35	0.250 6.35	0.300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

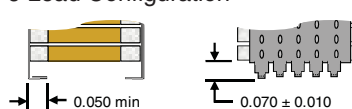
N Lead Configuration



L Lead Configuration



J Lead Configuration



6/M Surface Mount Configuration



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 $\pm 10\%$. 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.

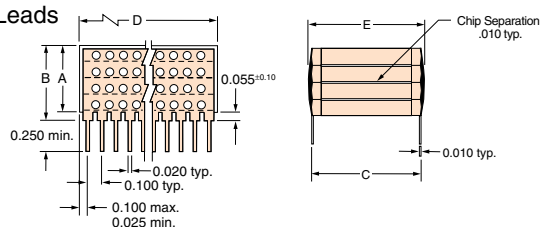
2225	X	824	K	A	J	M	B	HR
Case Size Ref Dimensions Table	Ceramic Code	EIA Cap Code	EIA Cap Tolerance	Working Voltage	Lead Configurations	Marking	Packaging	Special Requirements*
A: 1.0 B: 1.1 C: 1.2 D: 1.3 E: 1.4 F: 1.5 For dimensions $\geq 1.000"$ Substitute letters above eg. 44A5 = 44105 chip size	B: X7R Q: BQ R: BR X: BX	824= 820,000 pF= 0.82 μF 125= 1,200,000 pF= 1.2 μF 156= 15,000,000 pF= 15 μF	K: $\pm 10\%$ M: $\pm 20\%$	A: 50 VDC B: 100 VDC C: 200 VDC E: 500 VDC	J: Leads in L: Leads out N: Leads straight 6: Ag termination M: PdAg termination	M: Marked U: Unmarked (Std)	B: Bulk F: Foam carrier/boxed S: Special T: Tape & Reel - 7 in W: Waffle	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

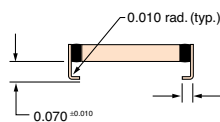
Additional package sizes, capacitance values and higher voltage ratings available, please contact factory.

SMPS Specifications

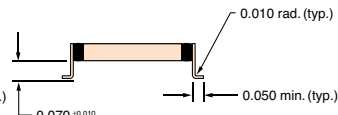
"N" Style Leads



"J" Style Leads



"L" Style Leads

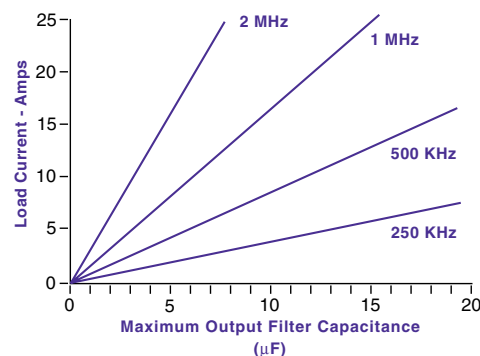


	BP				BX				BR				BQ			
	Working Volts DC				Working Volts DC				Working Volts DC				Working Volts DC			
Cap Value (µF)	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50
0.01																
0.012																
0.015																
0.018																
0.022																
0.027																
0.033																
0.039																
0.047																
0.056																
0.068																
0.082																
0.10																
0.12																
0.15																
0.18																
0.22																
0.27																
0.33																
0.39																
0.47																
0.56																
0.68																
0.82																
1																
1.2																
1.5																
1.8																
2.2																
2.7																
3.3																
3.9																
4.7																
5.6																
6.8																
8.2																
10																
12																
15																
18																
22																
27																
33																
39																
47																

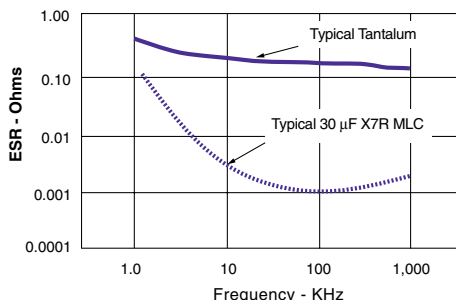
KEY: SMP-3 SMP-4 SMP-5

SMPS Capacitor Electrical Testing

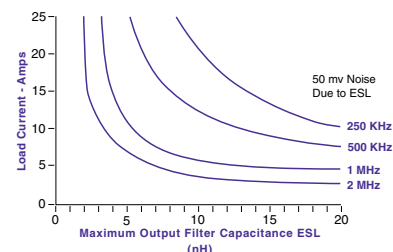
Absolute Maximum Output Capacitance
Assuming no ESL and no ESR



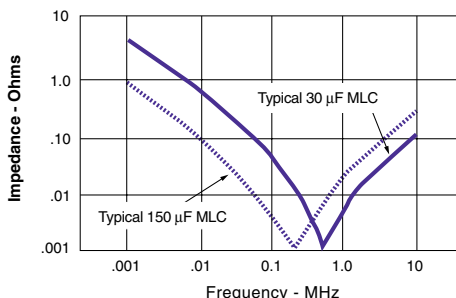
ESR vs. Frequency



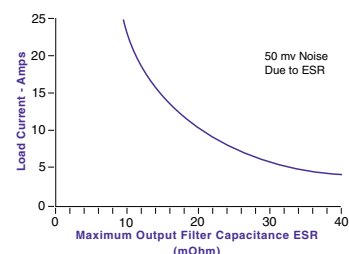
Absolute Maximum Capacitance ESL
Assuming no ESR - Capacitive Induced Ripple



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		Solderability Group A			
		Thermal Shock and Voltage Conditioning			

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

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

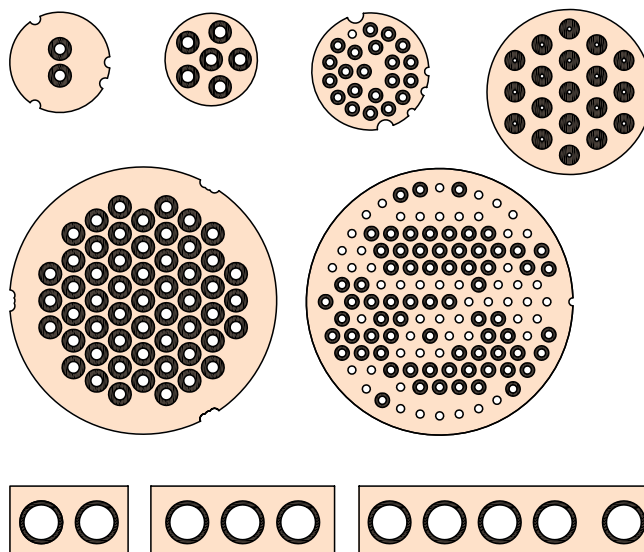


Electrical Specifications

<i>Operating Temperature</i>	-55°C - 125°C
<i>Capacitance</i>	Up to 1µF
<i>Capacitance Tolerance</i>	±10%, ±20%, +100%
<i>Capacitance Rating</i>	Up to 1500VDC
<i>Dielectric Withstanding Voltage</i>	Up to 3000VDC
<i>Dissipation Factor</i>	< 3.5%
<i>Insulation Resistance</i>	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



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

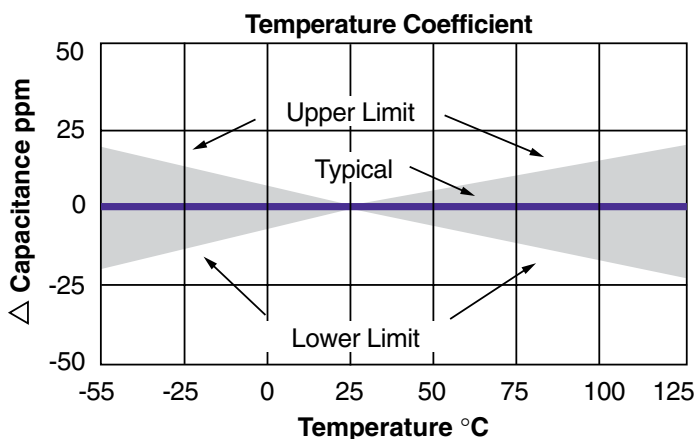
* Whichever is greater

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.

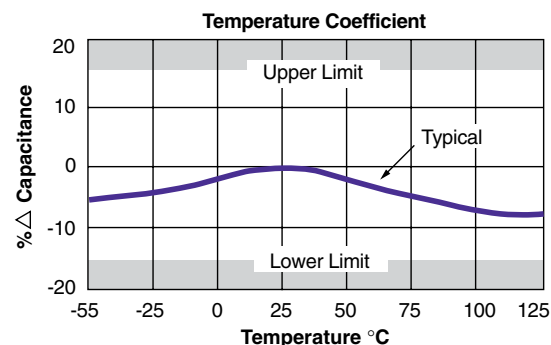


Dielectric Characteristics

Dielectric Characteristics Continued

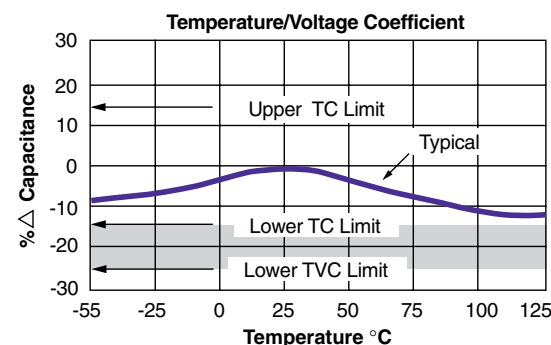
X7R

Operating Temperature Range	-55°C to 125°C
Temperature Coefficient	± 15% Δ 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



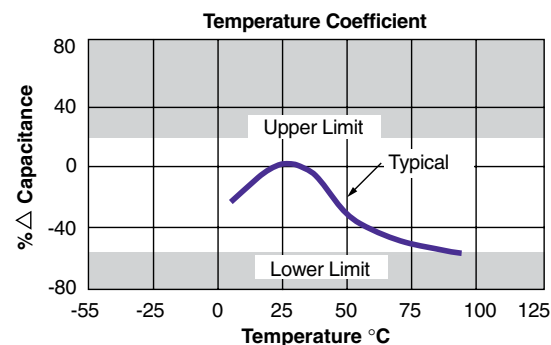
BX

Operating Temperature Range	-55°C to 125°C
Temperature Coefficient	± 15% Δ C max.
Temperature Voltage Coefficient	+ 15% - 25% Δ 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



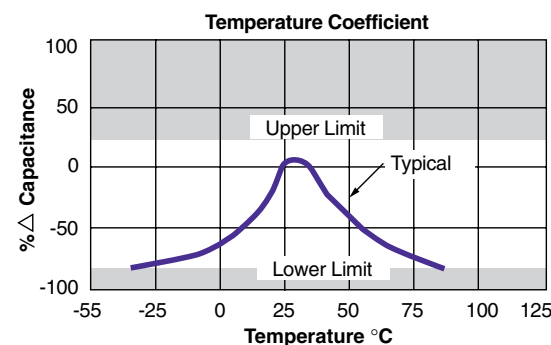
Z5U

Operating Temperature Range	+10°C to 85°C
Temperature Coefficient	+ 22% - 56% Δ 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% Δ 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

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 leaching. 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



api 
technologies corp.
Spectrum Control

Coaxial Filters & Interconnects

Introduction

Application Guidelines	CF3-CF8
Military Cross Reference	CF9-CF11
Amp Cross Reference	CF12-CF16

Surface Mount EMI Filters

Three Terminal Chips	SM2-SM7
SA Series Arrays	SM8-SM9
MSM Mini-Surface Mount	SM11
SSM Square Surface Mount	SM12-SM13
PSM Power Surface Mount	SM14-SM15
MSP Mini Surface Mount Power Filters ..	SM16
MPC Series Miniature PCB	
Power Filters	SM17-SM20
High Frequency PCB Filters	SM21

Low Pass EMI Filters

Solder-in Filters	LP3-LP7
9900 Series Filters	LP8-LP11
Spec Spin Filters	LP12
Resin Sealed Filters	LP13-LP24
High Current Resin Sealed Filters ..	LP25-LP26
Hermetically Sealed Filters	LP27-LP42
Value Added Assemblies	LP43

EMI Filtered Arrays

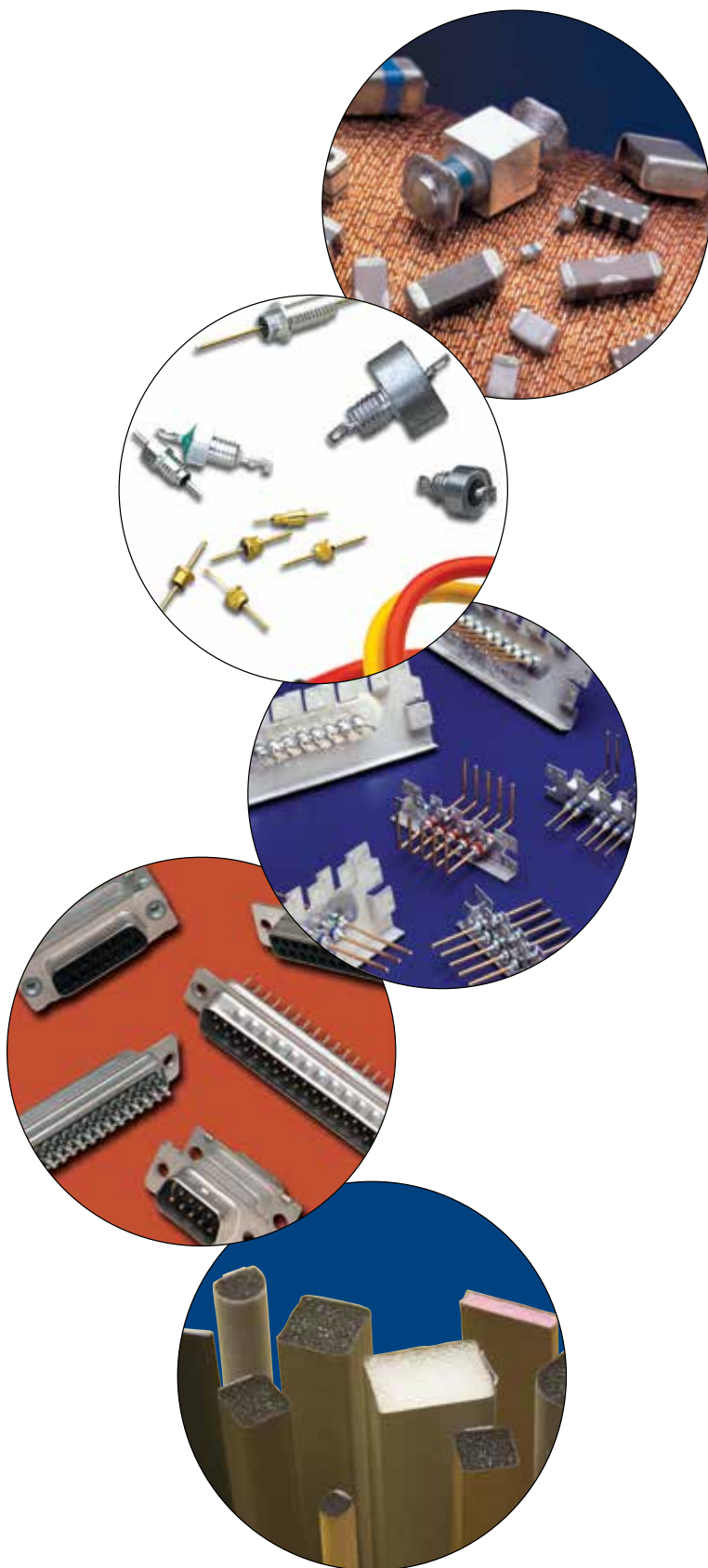
Easy Mate® Filter Plates	FA3-FA8
Bolt-In Filter Plates	FA9-FA12
Shrouded Latch Filter Plates	FA13-FA14
Barrier Strip Filtered	
Terminal Blocks	FA19-FA21
Custom Filtered Arrays	FA22

EMI Filtered Connectors

Series F Ferrite Filtered Connectors ..	FC3-FC7
Series 500 Low-Profile	
Feed-Through Connectors	FC8-FC11
Series 600 Hi-Density	
Filtered Connectors	FC12-FC13
Series 700 High	
Performance Connectors	FC16-FC37
Filtered Combo D-Sub	
Connectors	FC38-FC48
Micro D Series Connectors	FC49-FC53

Quietshield™ Gaskets & Shielding

Fabric-Over-Foam Gaskets	FC68-FC69
I/O & Waved Metal Gaskets	FC70
Shielding Tapes & Fabrics	FC71
Wire Mesh Gaskets	FC72
Conductive Silicone	FC73



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.

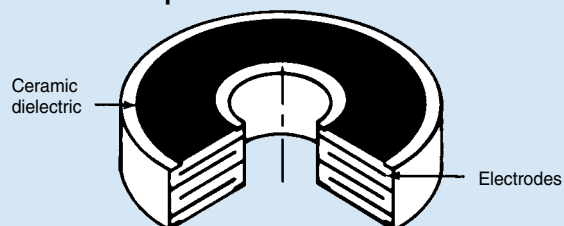
The simplest feed-through type is a ceramic tube that may have buried electrodes and can be constructed as a single capacitor or as two capacitors, as used in a Pi section filter. This type of device can have capacitance values from 10 pF to 0.1 μ F and typical working voltage ratings up to 2500 VDC. 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 μ F are available with working voltages up to 400 VDC.

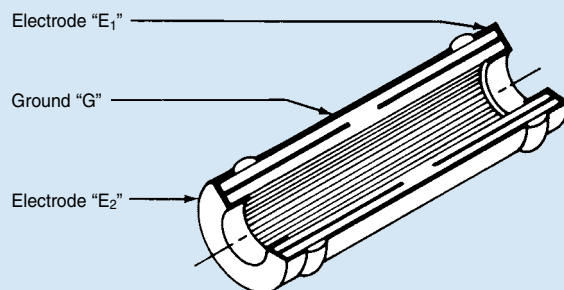
Inductive Elements

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.

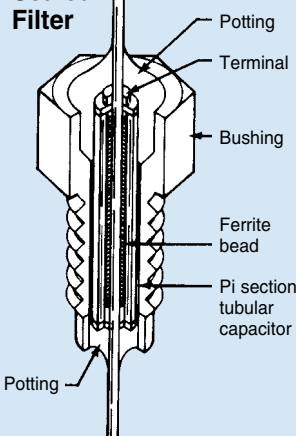
Multilayer Discoidal Capacitor



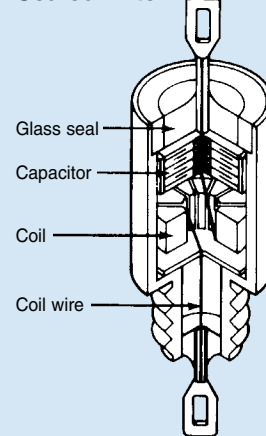
Embedded Electrode Tubular Capacitor



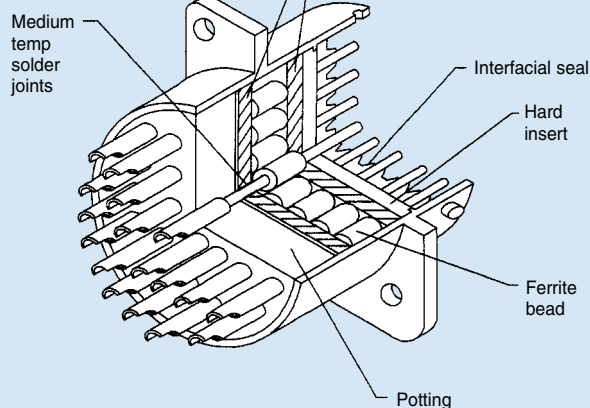
Resin Sealed Filter



Hermetically Sealed Filter



Circular Filtered Connector



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.

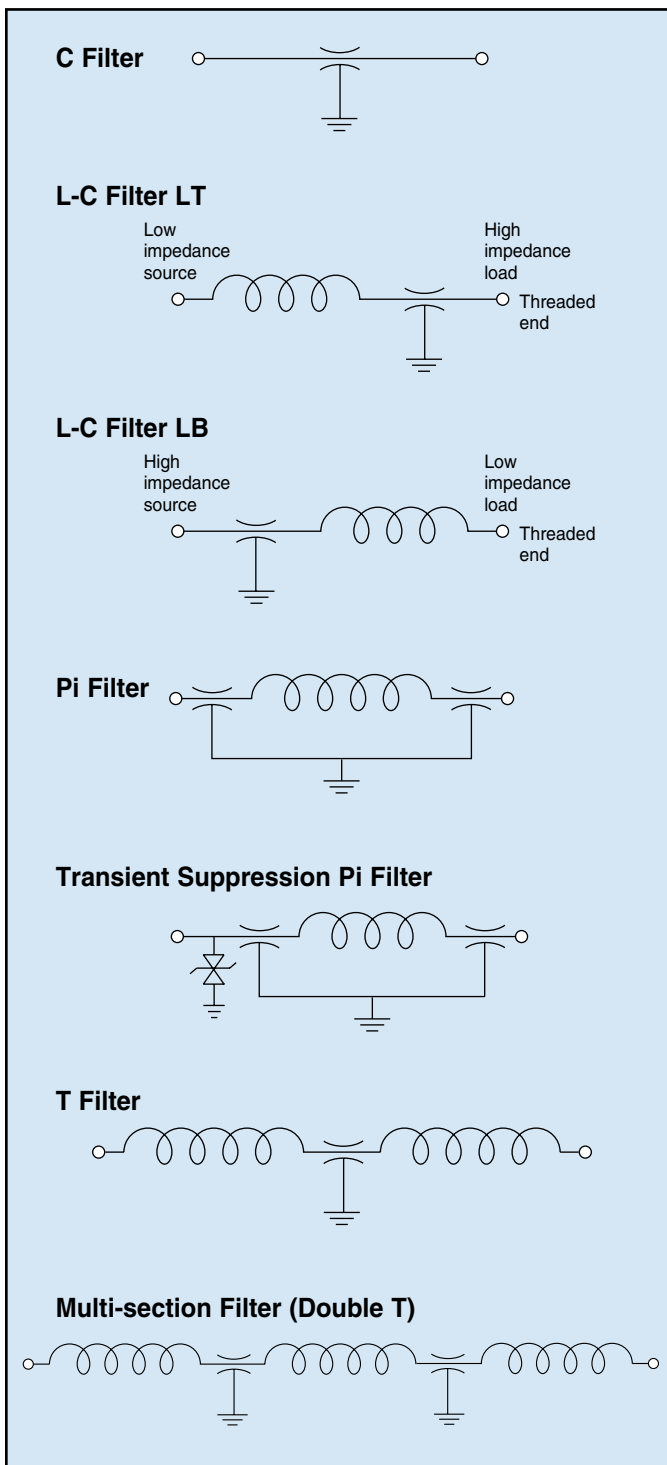
T Filter

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 μ F feed-through capacitor).

Schematics



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:

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

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:

$$IL \text{ (dB)} = 20 \log \left[1 + \frac{Z_s Z_l}{Z_t (Z_s + Z_l)} \right]$$

Where Z_s = Source impedance in ohms
 Z_l = Load impedance in ohms
 Z_t = Transfer impedance in 50 ohm system

Example:

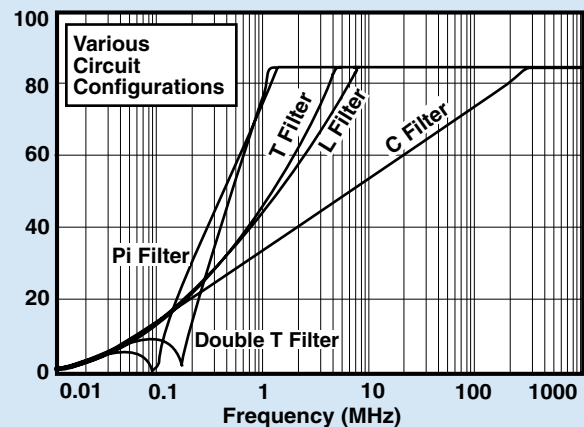
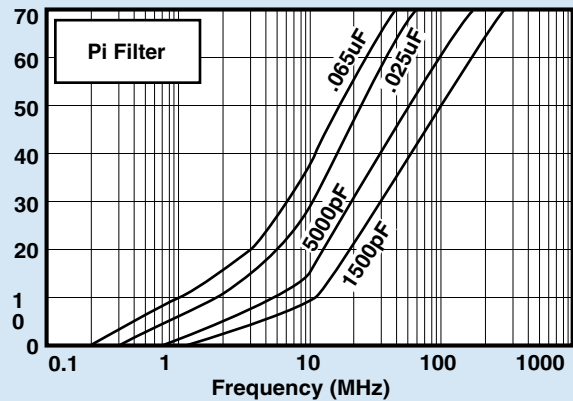
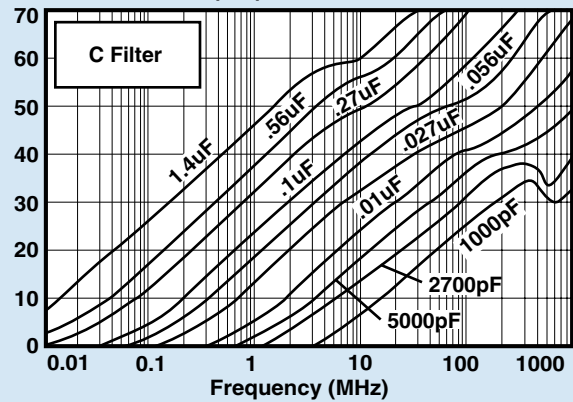
1. System source and load impedances are 100 ohms and 600 ohms respectively.
2. Selected filter has insertion loss of 50 dB at 100 MHz in a 50 ohm system.
3. From the IL vs Transfer Impedance curve (right) the transfer impedance is 0.08 ohms.

$$4. IL = 20 \log \left[1 + \frac{100 \times 600}{0.08 (100 + 600)} \right]$$

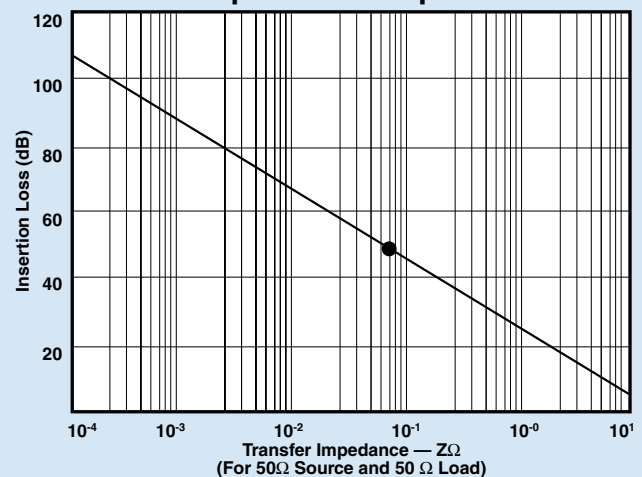
$$= 20 \log 1072$$

$$= 61 \text{ dB}$$

Insertion Loss (dB)



Transfer Impedance Graph



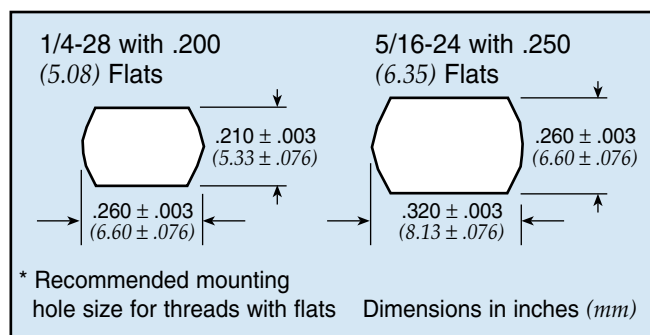
Filter Installation

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.



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.

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

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.

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
/23-0022	51-390-016
/23-0023	51-390-307
/23-0024	51-390-308
/23-0025	51-390-017
/23-0026	51-390-018
/23-0027	51-390-019
/23-0028	51-390-020
/23-0029	51-390-309
/23-0030	51-390-310
/23-0031	51-390-021
/23-0032	51-390-022
/23-0033	51-390-023
/23-0034	51-390-024
/23-0035	51-390-311
/23-0036	51-390-312
/23-0037	51-390-025
/23-0038	51-390-026
/23-0039	51-390-027
/23-0040	51-390-028
/23-0041	51-390-313
/23-0042	51-390-314
/23-0043	51-390-029
/23-0044	51-390-030
/23-0045	51-390-031
/23-0046	51-390-032
/23-0047	51-390-315
/23-0049	51-390-033
/23-0050	51-390-034
/23-0051	51-390-035
/23-0052	51-390-036
/23-0053	51-390-317
/23-0054	51-390-318
/23-0055	51-390-037
/23-0056	51-390-038
/23-0057	51-390-039
/23-0058	51-390-040

Military Designation MIL-F-15733	API Part Number
/23-0059	51-390-319
/23-0060	51-390-320
/24-0001	51-353-064
/24-0002	51-353-065
/24-0003	51-444-049
/24-0004	51-444-050
/24-0005	51-353-066
/24-0006	51-353-067
/24-0007	51-444-051
/24-0008	51-444-060
/24-0009	51-353-068
/24-0010	51-353-069
/24-0011	51-353-070
/24-0012	51-353-071
/24-0013	51-353-072
/24-0014	51-353-073
/24-0015	51-353-074
/24-0016	51-353-075
/24-0017	51-444-052
/24-0018	51-444-053
/24-0019	51-444-054
/24-0020	51-444-055
/24-0021	51-444-056
/24-0022	51-444-057
/24-0023	51-444-058
/24-0024	51-444-059
/25-0001	51-353-052
/25-0002	51-311-308
/25-0003	51-353-053
/25-0004	51-311-309
/25-0005	51-353-054
/25-0006	51-311-310
/25-0007	51-382-603
/25-0008	51-353-055
/25-0009	51-353-056
/25-0010	51-311-311
/25-0011	51-353-057
/25-0012	51-382-604
/25-0013	51-444-037
/25-0014	51-311-354
/25-0015	51-444-038
/25-0016	51-311-355
/25-0017	51-444-039
/25-0018	51-311-356
/25-0019	51-382-608
/25-0020	51-444-040
/25-0021	51-444-041
/25-0022	51-311-357
/25-0023	51-444-042
/25-0024	51-382-609
/26-0001	51-353-076
/26-0002	51-353-336
/26-0003	51-353-077
/26-0004	51-353-078
/26-0005	51-311-312
/26-0006	51-353-079
/26-0007	51-353-080
/26-0008	51-351-603

Military Designation MIL-F-15733	API Part Number
/26-0009	51-311-313
/26-0010	51-353-081
/26-0011	51-311-314
/26-0012	51-351-604
/26-0013	51-444-043
/26-0014	51-353-424
/26-0015	51-444-044
/26-0016	51-444-045
/26-0017	51-311-358
/26-0018	51-444-046
/26-0019	51-444-047
/26-0020	51-351-625
/26-0021	51-311-359
/26-0022	51-444-048
/26-0023	51-311-360
/26-0024	51-351-626
/27-0001	51-320-013
/27-0002	51-320-014
/27-0003	51-323-313
/27-0004	51-321-312
/27-0005	51-320-015
/27-0006	51-320-016
/27-0007	51-323-314
/27-0008	51-320-017
/27-0009	51-320-018
/27-0010	51-321-313
/27-0011	51-323-003
/27-0012	51-323-004
/27-0013	51-321-314
/27-0014	51-322-009
/27-0015	51-322-010
/27-0016	51-321-606
/27-0017	51-321-607
/27-0018	51-321-608
/27-0019	51-320-019
/27-0020	51-320-020
/27-0021	51-323-315
/27-0022	51-321-315
/27-0023	51-321-609
/27-0026	54-310-040
/28-0001	51-712-014
/28-0002	51-712-028
/28-0003	Superseded by /61-0014
/28-0004	51-712-060
/33-0001	51-707-006
/33-0002	51-707-007
/34-0001	51-322-016
/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
/34-0008	51-353-208
/34-0010	51-311-007
/34-0011	51-320-058
/34-0013	51-320-060

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
/34-0020	51-320-061
/34-0021	51-320-062
/34-0029	51-320-063
/34-0030	51-444-027
/34-0031	51-321-391
/34-0035	54-370-030
/34-0036	54-370-033
/34-0037	54-310-039
/38-0001	51-343-018
/38-0002	51-343-028
/38-0003	51-353-422
/38-0004	51-359-021
/38-0005	51-359-024
/38-0006	51-343-034
/38-0008	51-359-050
/39-0001	51-353-148
/39-0002	51-353-149
/39-0003	51-353-150
/39-0004	51-353-151
/39-0005	51-353-152
/39-0006	51-353-153
/39-0007	51-353-154
/39-0008	51-353-155
/39-0009	51-353-156
/39-0010	51-353-157
/39-0011	51-353-344
/39-0012	51-353-345
/39-0013	51-353-223
/39-0014	51-353-287
/39-0015	51-353-418
/39-0016	51-311-346
/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
/48-0001	51-385-038
/48-0002	51-385-040
/48-0003	51-385-049
/48-0005	51-385-050
/49-0001	51-359-053
/49-0003	51-359-034
/49-0004	51-359-035
/49-0006	51-359-044
/49-0007	51-359-055
/49-0008	54-370-032
/49-0010	54-370-034
/51-0001	51-703-007
/51-0002	51-750-313

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
/1-005	51-359-083
/1-006	54-367-051
/1-007	51-359-084
/1-008	54-367-052
/1-009	51-359-085
/1-010	54-367-053
/1-011	51-359-086
/1-012	54-367-054
/1-013	51-359-087
/1-014	54-367-055
/1-015	51-359-088
/1-016	54-367-056
/1-017	51-359-089
/1-018	54-367-057
/1-019	51-359-090
/1-020	54-367-058
/1-021	51-359-122
/1-022	54-367-085
/1-023	51-359-123
/1-024	54-367-086
/1-025	51-359-124
/1-026	54-367-087
/1-031	51-359-125
/1-032	54-367-088
/1-033	51-359-126
/1-034	54-367-089
/1-035	51-359-127
/1-036	54-367-090
/2-001	51-311-010
/2-002	51-311-011
/2-003	51-311-365
/2-004	51-311-012
/2-005	51-311-013
/2-006	51-311-366
/2-007	51-311-014
/2-008	51-311-015
/2-009	51-311-367
/2-010	51-311-016
/2-011	51-311-017
/2-012	51-311-368
/2-013	51-311-018
/2-014	51-311-019
/2-015	51-311-369
/2-016	51-311-020
/2-017	51-311-021
/2-018	51-311-370
/2-019	51-311-022
/2-020	51-311-023
/2-021	51-311-371
/2-022	51-311-024
/2-023	51-311-025
/2-024	51-311-372
/3-001	51-390-044
/3-002	51-390-045

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
/3-008	51-390-049
/3-009	51-390-323
/3-010	51-390-050
/3-011	51-390-051
/3-012	51-390-324
/3-013	51-390-052
/3-014	51-390-053
/3-015	51-390-325
/3-016	51-390-054
/3-017	51-390-055
/3-018	51-390-326
/3-019	51-390-056
/3-020	51-390-057
/3-021	51-390-327
/3-022	51-390-058
/3-023	51-390-059
/3-024	51-390-328
/3-025	51-390-060
/3-026	51-390-061
/3-027	51-390-329
/3-028	51-390-062
/3-029	51-390-063
/3-030	51-390-330
/3-031	51-390-064
/3-032	51-390-065
/3-033	51-390-331
/3-034	51-390-066
/3-035	51-390-067
/3-036	51-390-332
/5-001	51-311-026
/5-002	51-311-027
/5-003	51-311-374
/5-004	51-311-028
/5-005	51-311-029
/5-006	51-311-375
/5-007	51-311-030
/5-008	51-311-031
/5-009	51-311-376
/5-010	51-311-032
/5-011	51-311-033
/5-012	51-311-377
/5-013	51-311-034
/5-014	51-311-035
/5-015	51-311-378
/5-016	51-311-036
/5-017	51-311-037
/5-018	51-311-379
/5-019	51-311-038
/5-020	51-311-039
/5-021	51-311-380
/5-022	51-311-040
/5-023	51-311-041
/5-024	51-311-381

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

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**

AMP Part Number	API Part Number
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

AMP Part Number	API Part Number
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.

** A standard part number does not currently exist but will be assigned upon ordering.

API Technologies/AMP Part Number Cross Reference

AMP Part Number	API Part Number	AMP Part Number	API Part Number	AMP Part Number	API Part Number
1-842934-4	56-745-XXX-LI**	842610-4	56-701-086-LI	842652-4	56-724-008-LI
1-93768-0	56-701-081-LI	842611-3	56-711-088	842653-3	56-734-006
1-93769-0	56-711-085-LI	842611-4	56-711-088-LI	842653-4	56-734-006-LI
1-93770-0	56-721-070-LI	842612-3	56-721-111	842666-3	56-701-002
1-93771-0	56-731-060-LI	842612-4	56-721-111-LI	842666-4	56-701-002-LI
1-93772-0	56-706-009-LI	842613-3	56-731-076	842667-3	56-711-002
1-93773-0	56-716-009-LI	842613-4	56-731-076-LI	842667-4	56-711-002-LI
1-93774-0	56-726-009-LI	842614-3	56-703-047	842668-3	56-721-002
1-93775-0	56-736-009-LI	842614-4	56-703-047-LI	842668-4	56-721-002-LI
267028-1	56-B12-000-K	842615-3	56-713-045	842669-3	56-731-002
267100-1	56-C31-001	842615-4	56-713-045-LI	842669-4	56-731-002-LI
267116-1	56-407-001	842616-3	56-723-069	842670-3	56-703-002
267161-2	56-423-001	842616-4	56-723-069-LI	842670-4	56-703-002-LI
267290-1	56-724-008-GBL	842617-3	56-733-046	842671-3	56-713-002
267292-1	56-624-XXX**	842617-4	56-733-046-LI	842671-4	56-713-002-LI
267397-1	56-413-001	842618-3	56-702-033	842672-3	56-723-002
267533-1	56-B22-000-S	842618-4	56-702-033-LI	842672-4	56-723-002-LI
267534-1	56-B42-000-S	842619-3	56-712-039	842673-3	56-733-002
267534-2	56-B42-000-K	842619-4	56-712-039-LI	842673-4	56-733-002-LI
267809-1	56-703-022	842620-3	56-722-060	842674-3	56-702-002
267810-1	56-713-021	842620-4	56-722-060-LI	842674-4	56-702-002-LI
267811-1	56-723-022	842621-3	56-732-023-LI	842675-3	56-712-002
2-842919-6	56-743-003-LI	842621-4	56-732-023-LI	842675-4	56-712-002-LI
2-842920-2	56-701-042	842622-3	56-704-035	842675-5	56-712-002-LIM
2-842927-2	56-726-XXX**	842622-4	56-704-035-LI	842676-3	56-722-002
3-842917-1	56-723-045-LI	842623-3	56-714-031	842676-4	56-722-002-LI
3-842917-2	56-723-XXX**	842623-4	56-714-031-LI	842677-3	56-732-002
3-842917-3	56-723-XXX**	842624-3	56-724-046	842677-4	56-732-002-LI
842582-3	56-701-047	842624-4	56-724-046-LI	842678-3	56-704-002
842582-4	56-701-047-LI	842625-3	56-734-021	842678-4	56-704-002-LI
842583-3	56-711-048	842625-4	56-734-021-LI	842679-3	56-714-002
842583-4	56-711-048-LI	842638-3	56-701-028	842679-4	56-714-002-LI
842584-3	56-721-063	842638-4	56-701-028-LI	842680-3	56-724-002
842584-4	56-721-063-LI	842639-3	56-711-028	842680-4	56-724-002-LI
842585-3	56-731-048	842639-4	56-711-028-LI	842681-3	56-734-002
842585-4	56-731-048-LI	842640-3	56-721-033	842681-4	56-734-002-LI
842586-3	56-703-036	842640-4	56-721-033-LI	842697-3	56-705-008
842586-4	56-703-036-LI	842641-3	56-731-028	842697-4	56-705-008-LI
842587-3	56-713-037	842641-4	56-731-028-LI	842697-5	56-705-026-LI
842587-4	56-713-037-LI	842642-3	56-703-022	842697-6	56-705-XXX**
842588-3	56-723-045	842642-4	56-703-022-LI	842698-3	56-715-007
842588-4	56-723-045-LI	842643-3	56-713-021	842698-4	56-715-007-LI
842589-3	56-733-035	842643-4	56-713-021-LI	842699-3	56-725-019
842589-4	56-733-035-LI	842644-3	56-723-023	842699-4	56-725-019-LI
842590-3	56-702-013	842644-4	56-723-023-LI	842699-5	56-725-019-LI
842590-4	56-702-013-LI	842645-3	56-733-021	842700-3	56-735-008
842591-3	56-712-017	842645-4	56-733-021-LI	842700-4	56-735-008-LI
842591-4	56-712-017-LI	842646-3	56-702-007	842737-3	56-705-002
842592-3	56-722-027	842646-4	56-702-007-LI	842737-4	56-705-002-LI
842592-4	56-722-027-LI	842647-3	56-712-007	842738-3	56-705-026
842593-3	56-732-009	842647-4	56-712-007-LI	842738-4	56-705-026-LI
842593-4	56-732-009-LI	842648-3	56-722-008	842738-5	56-705-026-HV
842594-3	56-704-018	842648-4	56-722-008-LI	842739-3	56-705-049
842594-4	56-704-018-LI	842649-3	56-732-006	842739-4	56-705-049-LI
842595-3	56-714-017	842649-4	56-732-006-LI	842740-3	56-715-002
842595-4	56-714-017-LI	842650-3	56-704-007	842740-4	56-715-002-LI
842596-3	56-724-021	842650-4	56-704-007-LI	842741-3	56-715-015
842596-4	56-724-021-LI	842651-3	56-714-006	842741-4	56-715-015-LI
842597-3	56-734-012	842651-4	56-714-006-LI	842742-3	56-715-040
842597-4	56-734-012-LI	842652-3	56-724-008	842742-4	56-715-040-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.

API Technologies/AMP Part Number Cross Reference

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

* 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.

API Technologies/AMP Part Number Cross Reference

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

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

AMP Part Number	API Part Number
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**



Surface Mount EMI Filters Three Terminal Chips

Features

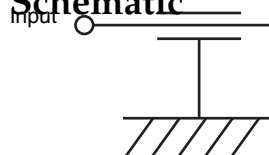
- Excellent performance in high current applications
- Non-polar, surface mountable
- Superior filtering characteristics
- Superb ability to withstand transient voltages and surge
- Offers exceptional solderability and resistance to solder heat
- Available in 0603, 0805, 1205 and 1806 body size
- Two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

<i>Capacitance</i>	
<i>Range</i>	COG (NPO) 22 pF to 470 pF
	X7R 470 pF to 47,000 pF
	YV5 220,000 pF
	X5R 100,000 pF
<i>Capacitance</i>	
<i>Tolerance</i>	COG (NPO) +50/-20%
	X7R +50/-20%
	Y5V +80/-20%
	X5R +/- 20%
<i>Temperature</i>	
<i>Coefficient</i>	COG (NPO) 0 ±30 ppm/°C,
	-55 to +125°C
	X7R +/-15%,
	-55 to +125°C
	Y5V -25 to +85°C
	X5R -55 to +85°C
<i>Insulation</i>	
<i>Resistance</i>	.. up to 100,000 pF 10000 Megohms
	47,000 pF 5000 Megohms
<i>DC</i>	
<i>Resistance</i>	0.4 Amp or less 0.3 ohm max.
	1 Amp 0.08 ohm max.
	2 Amp 0.04 ohm max.
<i>Rated</i>	
<i>Voltage</i>	up to 100 VDC
<i>Rated</i>	
<i>Current</i>	up to 2 Amps

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
SF0603R104MAND-*	0603	100,000	+/- 20%	X5R	25	1.0	10,000	0.08	-55/+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

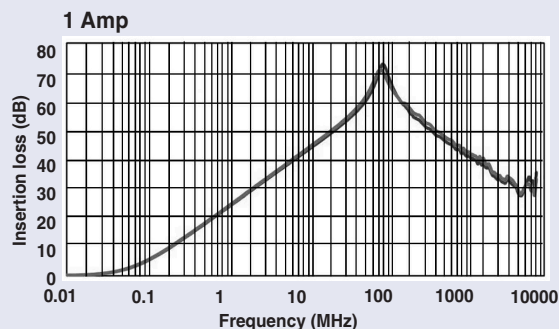
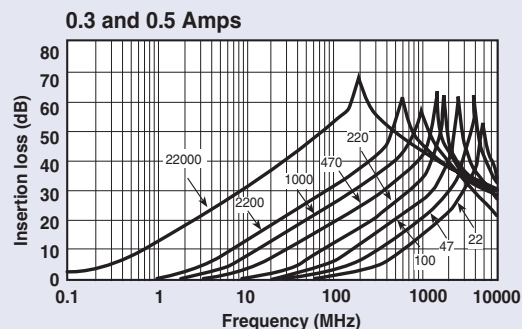
Bold Letter = High Current Applications
† = Temperature Characteristic is +30/-80%

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

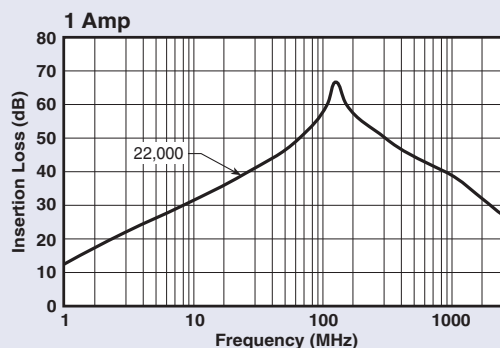
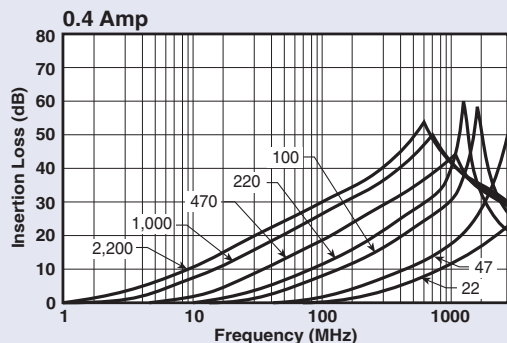
Surface Mount EMI Filters Three Terminal Chips

Insertion Loss (Per MIL-STD-220)

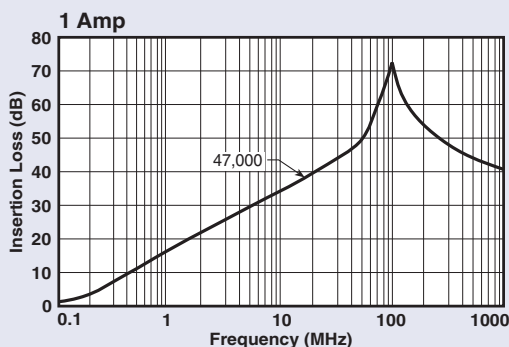
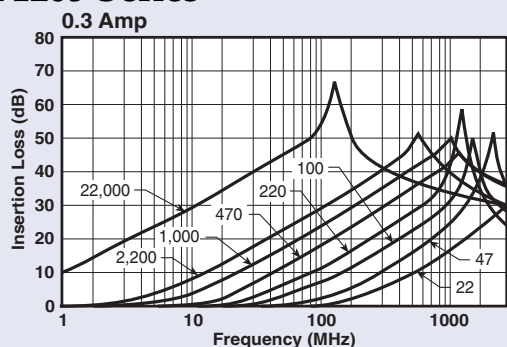
SF0603 Series



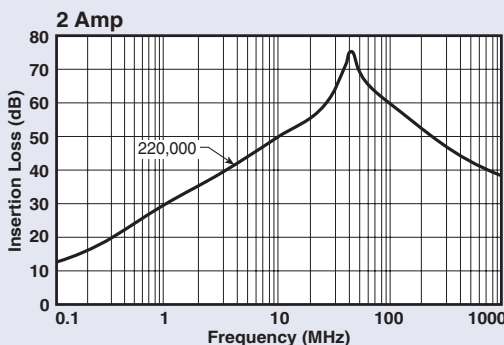
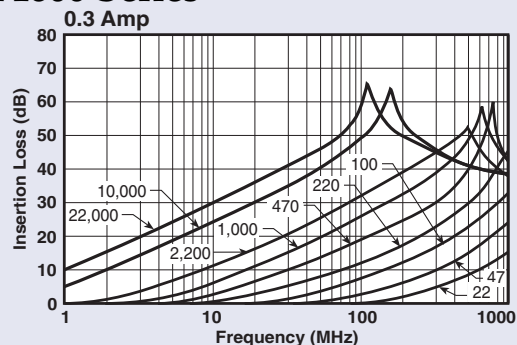
SF0805 Series



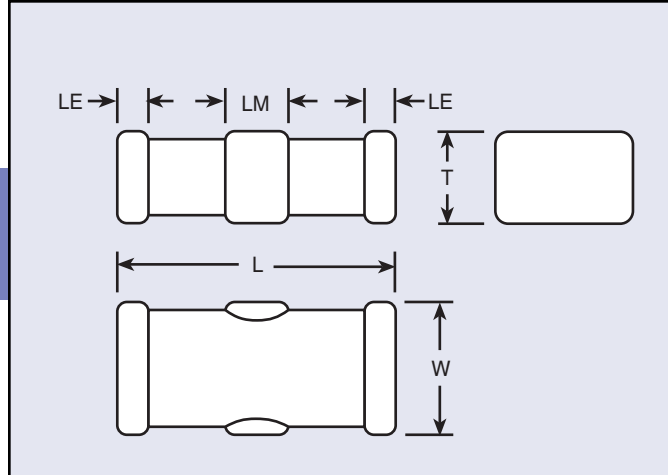
SF1205 Series



SF1806 Series



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

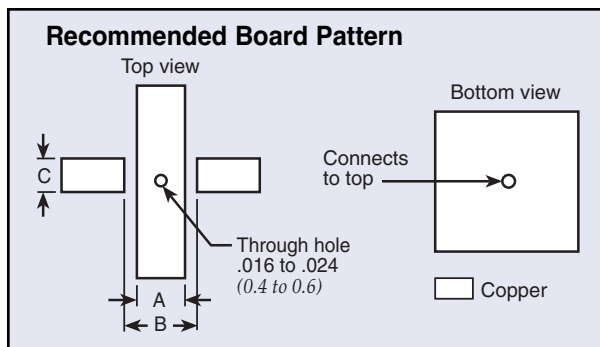
This part number represents a three terminal chip with a body size of 0805 with a COG (NPO) dielectric. The capacitance is 220 pF with a capacitance tolerance of +50%/-20%. Voltage rating is 50 Volts DC. It has nickel barrier, solder plated terminations and a current rating of 0.4 Amp, (400 milliamps). 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 R - X5R	First two numbers are significant, the third number refers to number of zeroes	S - +50%/-20% Z - +80%/-20% M - +/- 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

Surface Mount EMI Filters Three Terminal Chips Soldering Specifications

Soldering Instructions

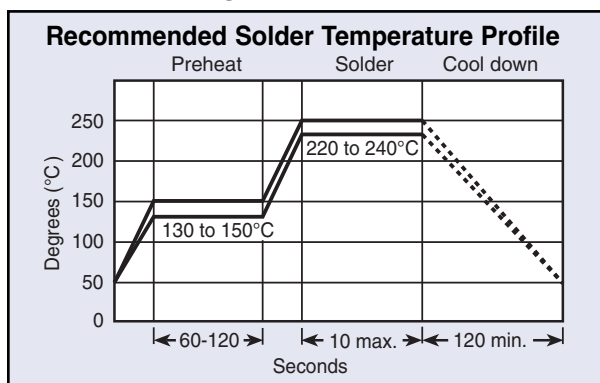
Reflow Soldering



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)

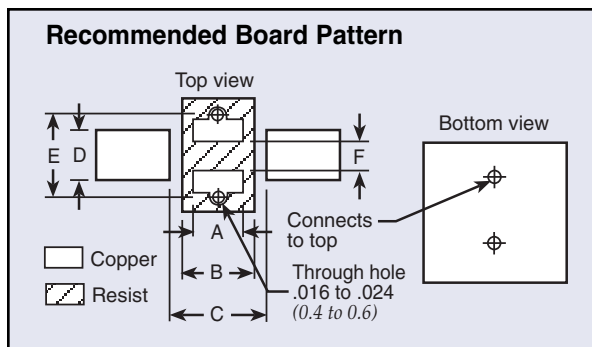
Reflow Soldering



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.

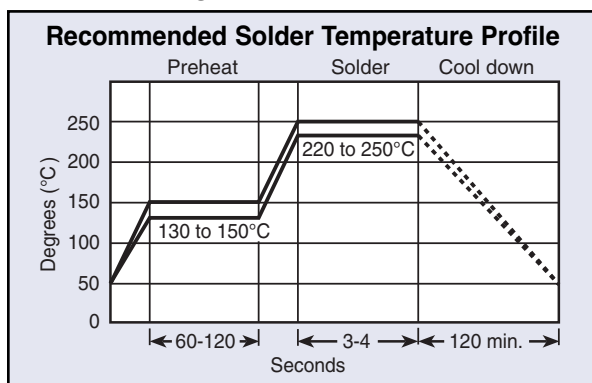
Flow Soldering



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)

Flow Soldering



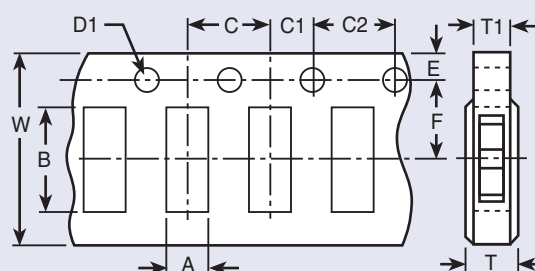
3. Use mild flux (less than 0.2% by weight of Chlorine), preferable rosin based. If water soluble, wash thoroughly to assure all residue is removed from the underside of components.
4. Ultrasonic Cleaning
When using an ultrasonic cleaning method, the following range is recommended:
Frequency: Not to 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)

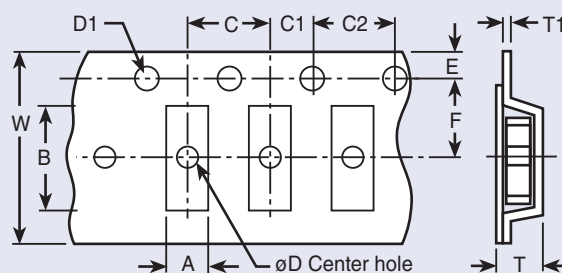
Body Style/Size	Chip Cavity		Tape			Holes			Hole Diameter		Thickness	
	Length A	Width B	Width W	Center to End F	Indexing to End E	Center to Center C	Indexing to Center C1	Indexing to Indexing C2	Indexing D1		Overall T (Max.)	Carrier Tape T1 (Max.)
SF0603	0.039 +/-0.00? (1.0 +/-0.?)	0.075 +/-0.00? (1.9 +/-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)

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

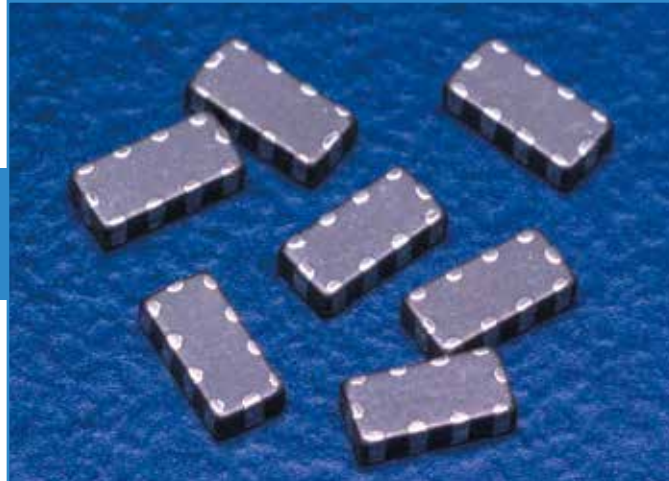
IR 10,000 MΩ Min.

DC Resistance 0.3 Ω Max.

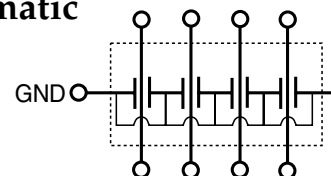
Temperature Range -55°C to +125°C

Capacitance Range 22 pF to 22,000 pF

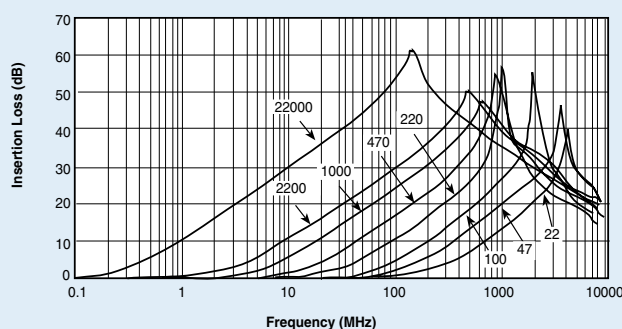
Capacitance Tolerance ±20%



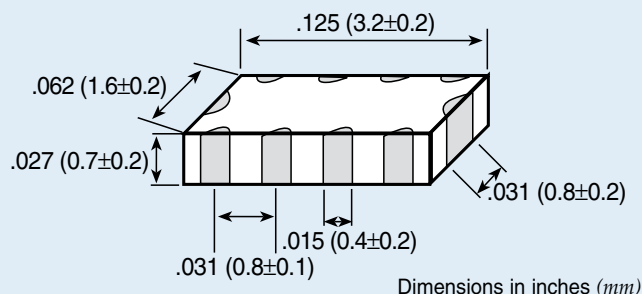
Circuit Schematic



Insertion Loss



Dimensions



Specifications

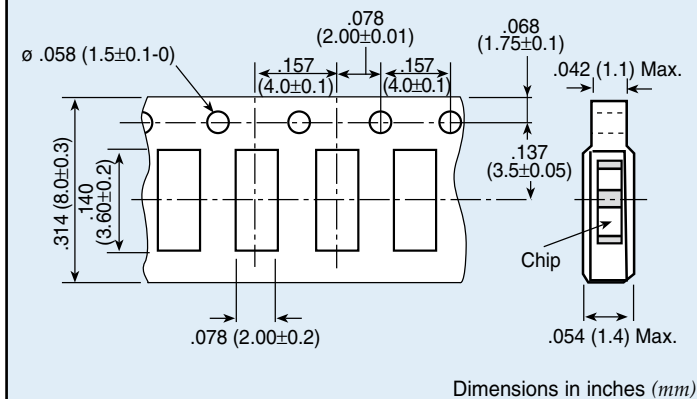
Part Number	Rated Voltage (@ 50/60Hz)	Rated Current	Temperature Characteristic	IR	DC Resistance	Operating Temp	Capacitance (pF)
SA1206C220	50 VDC	0.3A DC	C	10,000 MΩ min.	0.3Ω max.	-55/+125°C	22
SA1206C470			C				47
SA1206C101			C				100
SA1206C221			C				220
SA1206R471			U				470
SA1206R102			R				1,000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

Surface Mount Filter Arrays SA Series

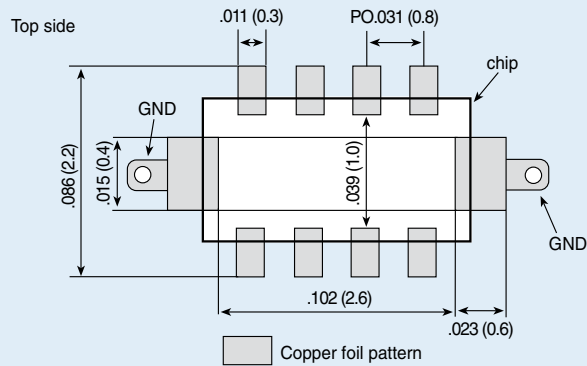
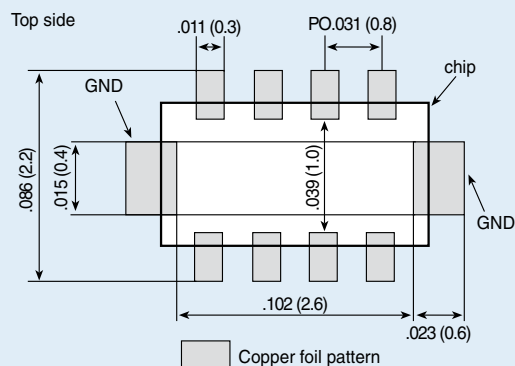
Ordering Information

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



Recommended Board Pattern

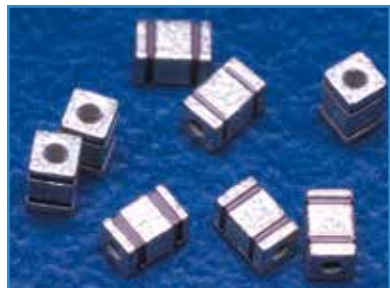


Dimensions in inches (mm)

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

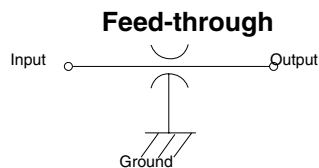


The PSM series filters feature high temperature construction and have current ratings up to 20 Amps. This filter series is nonpolar and surface mountable with excellent performance characteristics and comes in either a Feed-through or Pi circuit configuration. Applications include telecommunication equipment,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

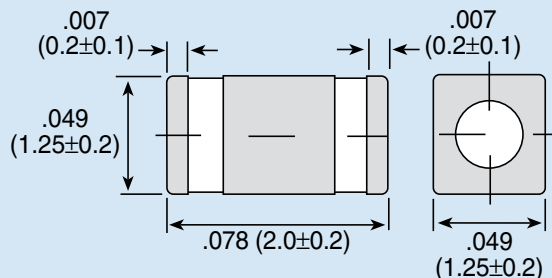
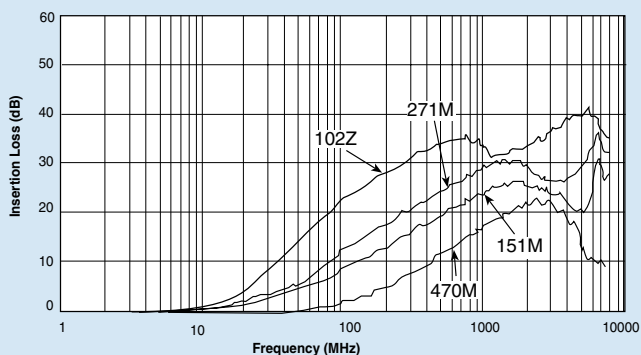
Surface Mount Low Pass Filters MSM Series

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

Style

MSM
(Miniature)

4

Circuit
Configuration
4 - Feed-Through

T

Temperature
Characteristic
R - +/-15%
T - +22/-33%
V - +22/-82%

470M

Capacitance

Value	Tolerance
47 pF	+50/- 20%

10

Current
Rating
10 Amps

T

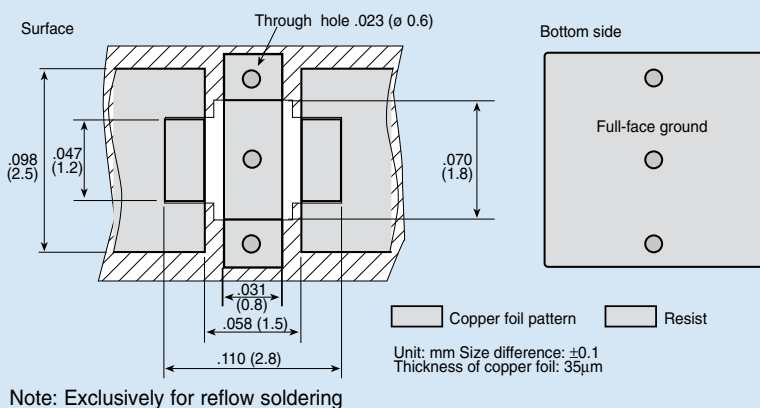
Packaging

T - Tape and Reel
2,000 pcs/reel
B - Bulk pack
1,000pcs/reel

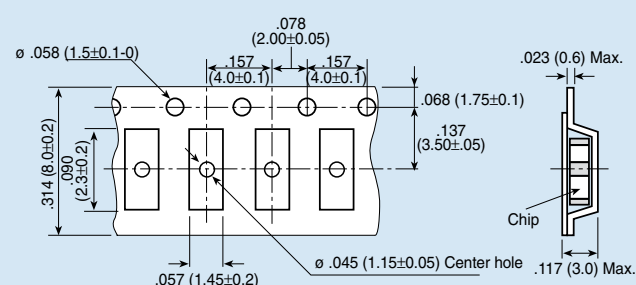
Specifications

Part Number	Temperature Characteristics	Capacitance	Capacitance Tolerance	Current Rating	Rated 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



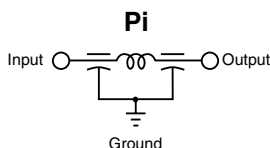
MSM Tape and Reel Packaging



Dimensions in inches (mm)

Surface Mount Low Pass Filters SSM & RSM Series

SSM



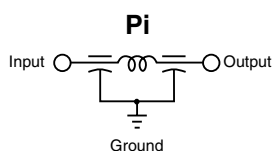
Working Voltage..... 100 VDC
Test Voltage..... 250 VDC
Current Max. 10 Amps
Insulation
Resistance Min. 10^4 M Ω
Terminations Silver Ni-Tin plated
Soldering
Conditions Max. 250°C -5 sec.
Marking..... None
Packaging..... Bulk or tape and reel

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

101Z
501P
202P

*Additional IL charts available by request.

RSM



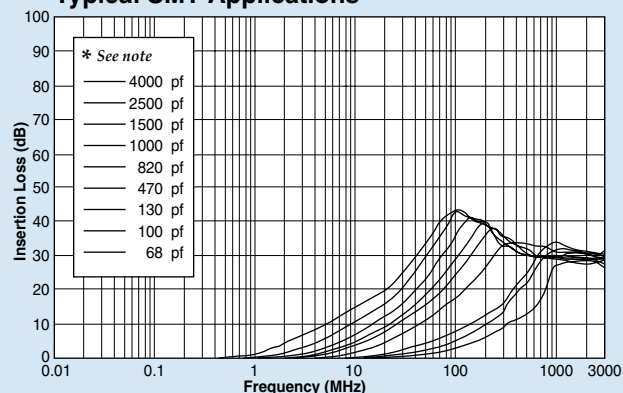
Working Voltage..... 100 VDC
Test Voltage..... 250 VDC
Current Max. 10 Amps
Insulation
Resistance Min. 10^4 M Ω
Terminations Silver Ni-Tin plated
Soldering
Conditions Max. 250°C -5 sec.
Marking..... None
Packaging..... Bulk or tape and reel

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

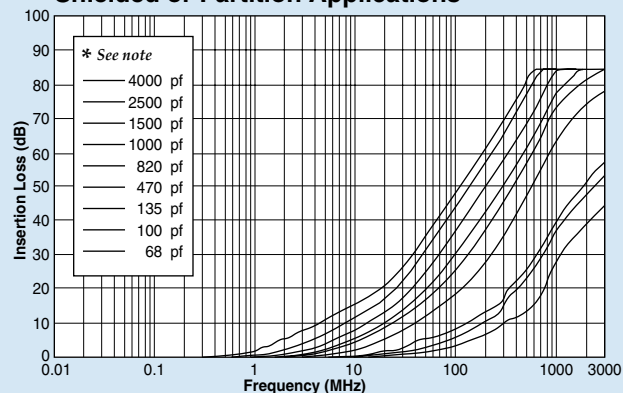
152P
402Z

Pi Insertion Loss

Typical SMT Applications

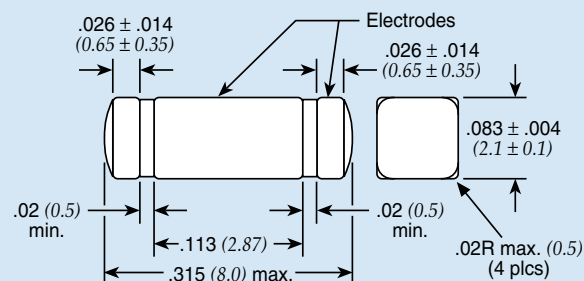


Shielded or Partition Applications

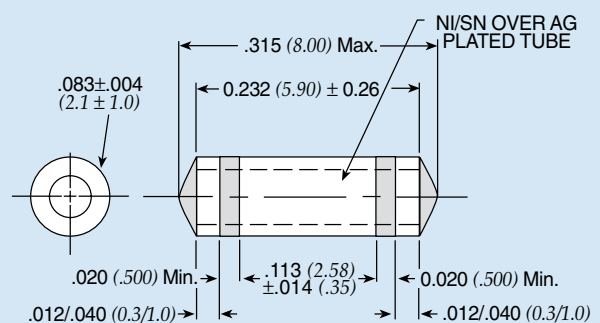


* Capacitance values for insertion loss curves are displayed left to right in the order shown.

SSM



RSM

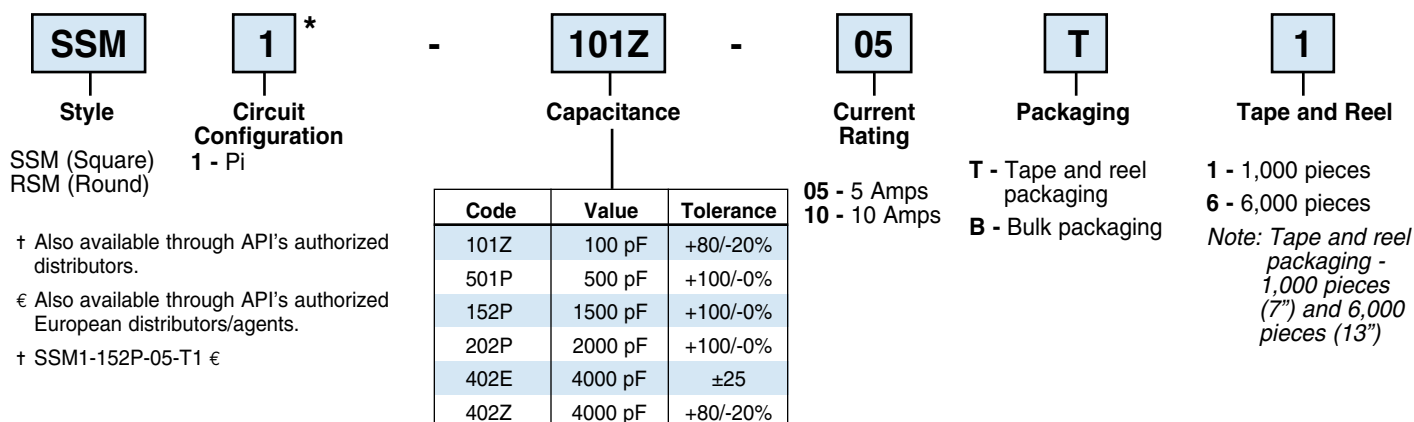


Dimensions in inches (mm)

Surface Mount Low Pass Filters SSM & RSM Series

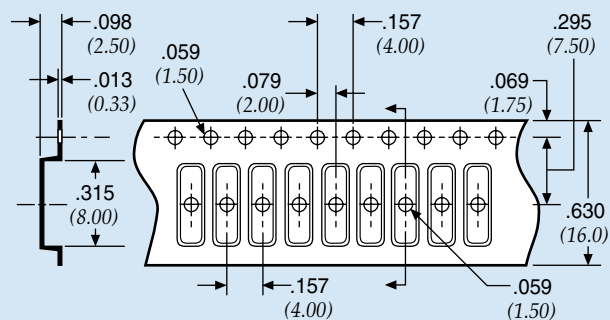
SSM & RSM Ordering Information

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

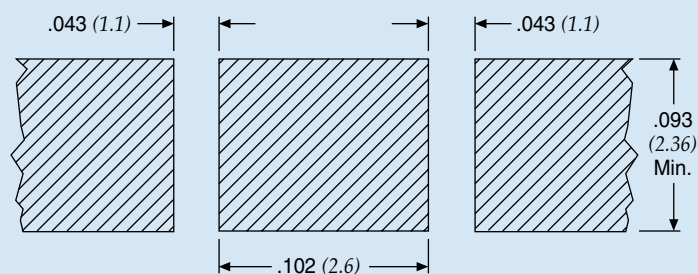


* Add "F" before "-" for RoHS compliant version

SSM/RSM Tape and Reel Packaging



SSM Recommended Board Pattern

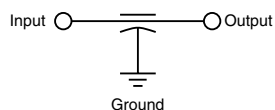


Dimensions in inches (*mm*)

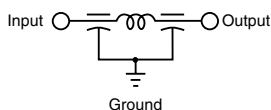
Surface Mount Low Pass Filters PSM Series

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

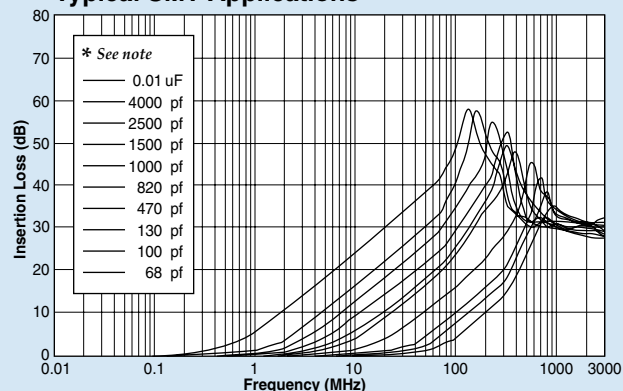
Dissipation

Factor 4.0% maximum

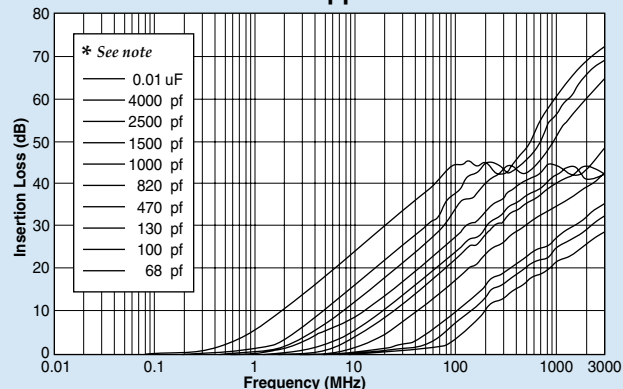
D.C.R. Max. .0005Ω, typ. .0002Ω

Feed-Through Insertion Loss

Typical SMT Applications

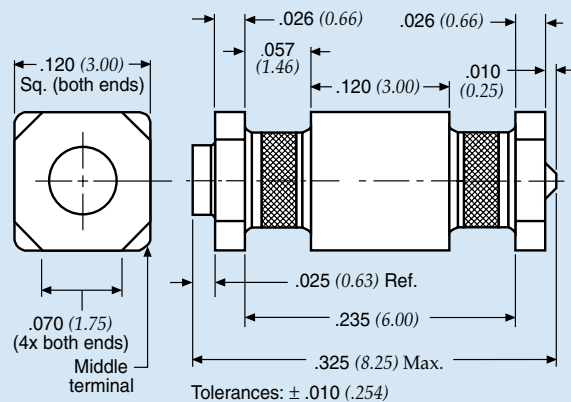


Shielded or Partition Applications



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

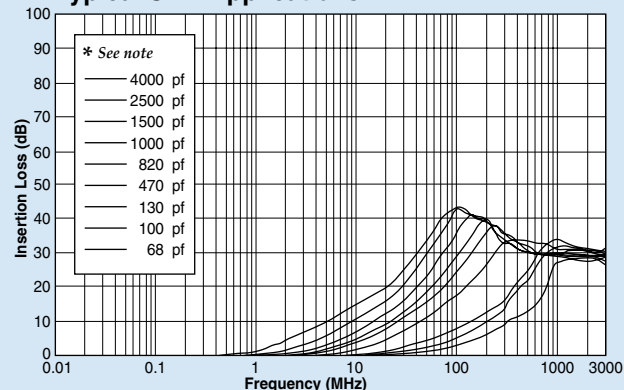
PSM



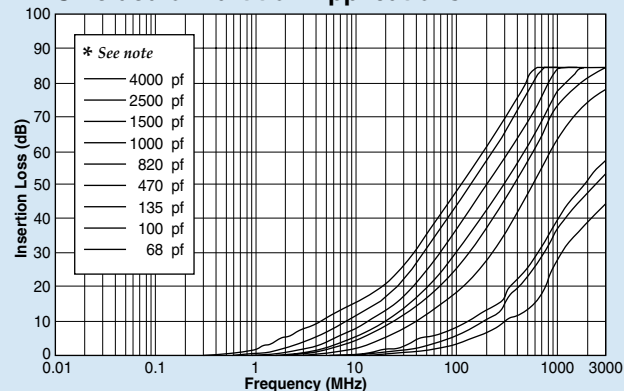
Dimensions in inches (mm)

Pi Insertion Loss

Typical SMT Applications



Shielded or Partition Applications



Surface Mount Low Pass Filters PSM Series

PSM Ordering Information

Example: **PSM4-402Z-20T0**

PSM	4	-	402Z	-	20	T	0
Style	Circuit Configuration		Capacitance		Current Rating	Packaging	Tape and Reel
PSM (Power)	1 - Pi 4 - Feed-through				10 - 10 Amps (Pi) 20 - 20 Amps (Feed-through)	T - Tape and reel packaging B - Bulk packaging	0 - 500 pieces 2 - 2,000 pieces <i>Note: Tape and reel packaging - 500 pieces (7") and 2,000 pieces (13")</i>
† Also available through API's authorized distributors.							
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%					

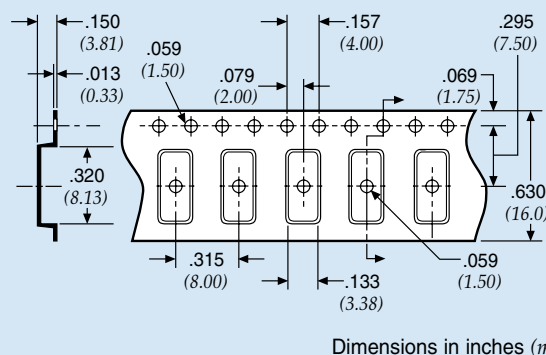
* Other capacitance values available as special order.

** Available in Feed-through circuit only.

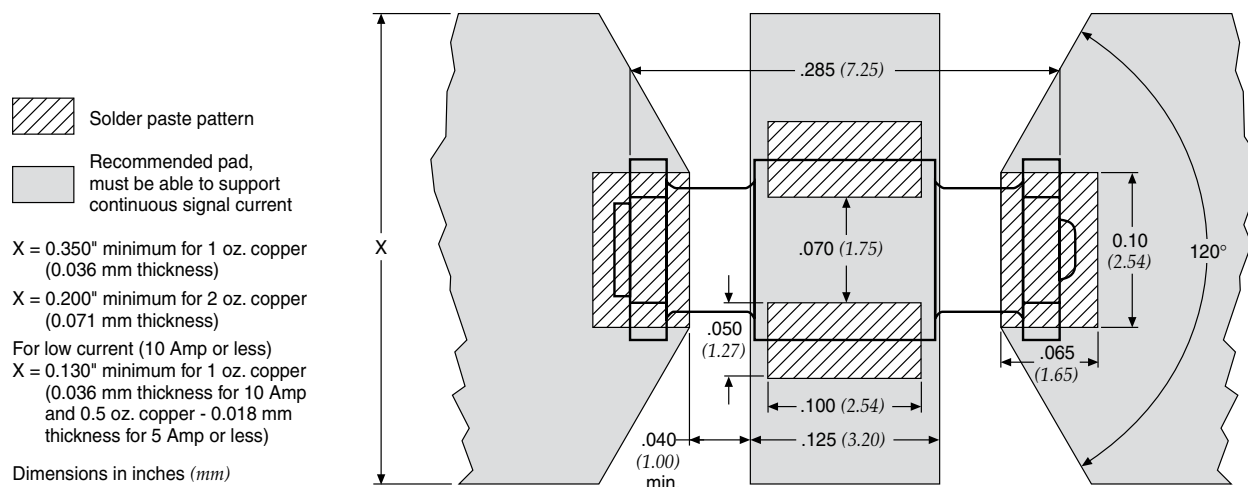
Technical Notes

- 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



PSM Recommended Board Pattern



Mini Surface Mount Power Filters MSP Series

Features

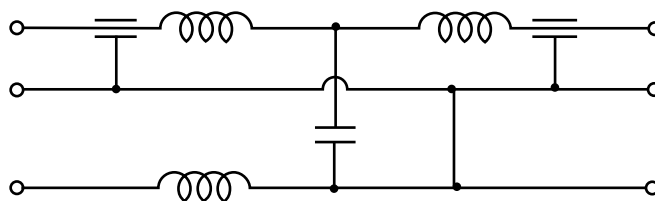
- Designed for 10A DC power lines
- Offers high insertion loss in a wide frequency band by combining feed-through capacitors, multilayer ceramic capacitors and ferrite bead inductors with high self resonance frequency.
- Compact EMI package with plus and minus lines

Applications

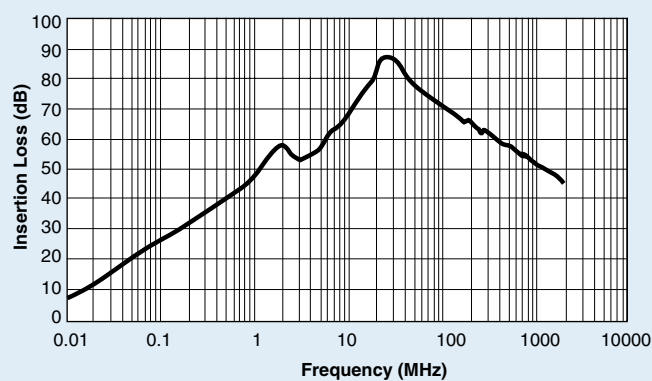
- Electronic measuring instruments
- Industrial equipment
- Automotive electronics
- Switching power supplies
- DC-DC converters



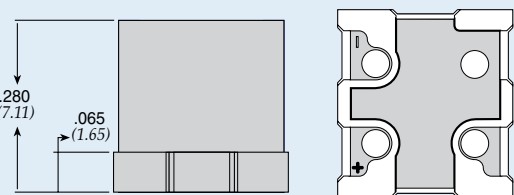
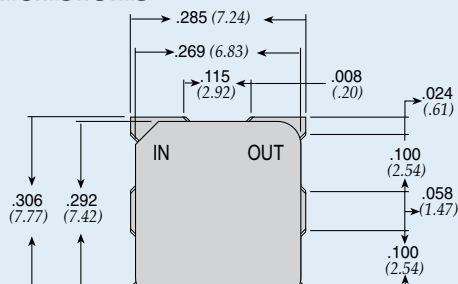
Circuit Schematic



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

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

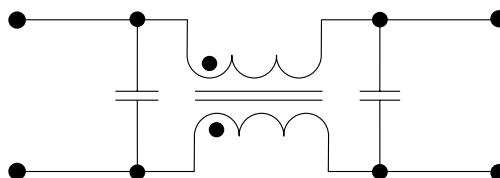
The compact design of the MPC-010 and -015 series power filters integrates a feed-through capacitor, multilayer ceramic capacitor and ferrite bead inductors. This series is ideally suited for dense PCB's and where both positive and negative lines have reduced EMI in one housing. Applications include:

- 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

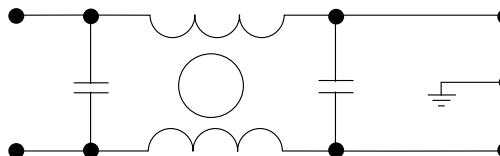


Circuit Diagrams

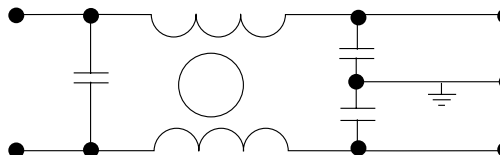
Circuit 1



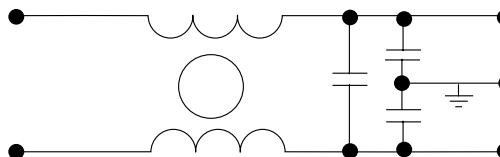
Circuit 2



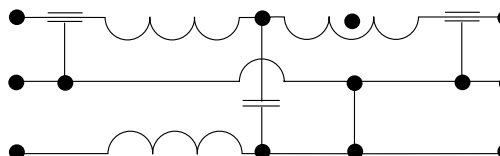
Circuit 3



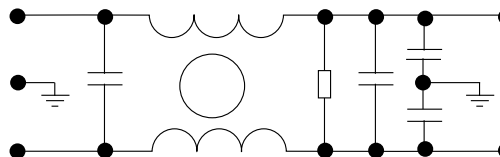
Circuit 4



Circuit 5



Circuit 6



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		4				E	
11-MPC-002-5-D						F	
11-MPC-003-5-E		3				B1	
11-MPC-006-5-B						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						

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

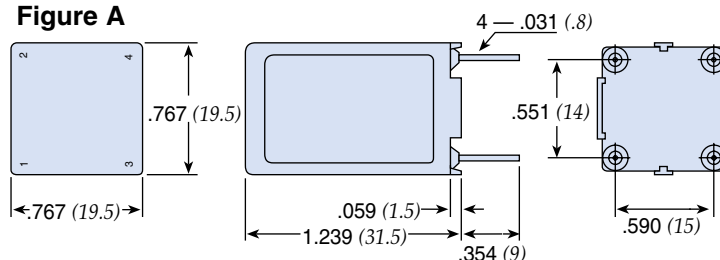


Figure B

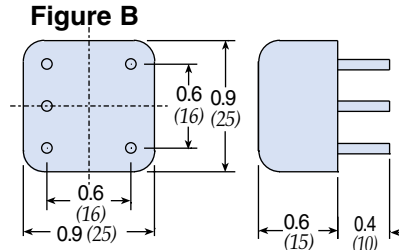


Figure B1

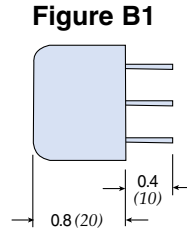


Figure C

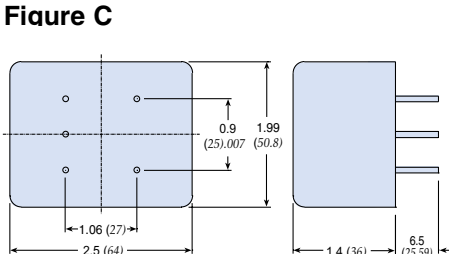


Figure D

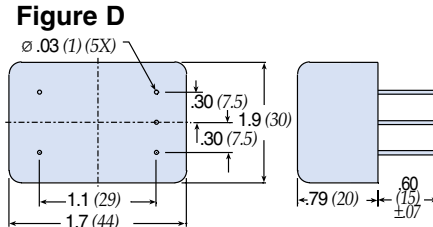


Figure E

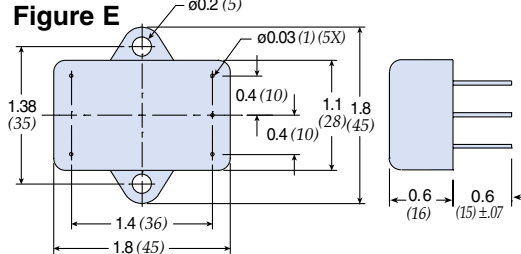


Figure F

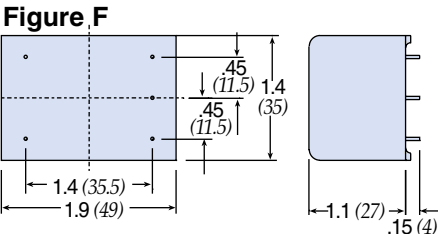
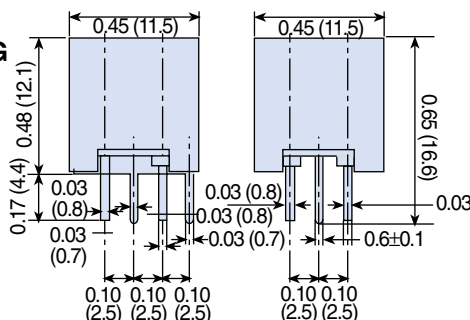


Figure G

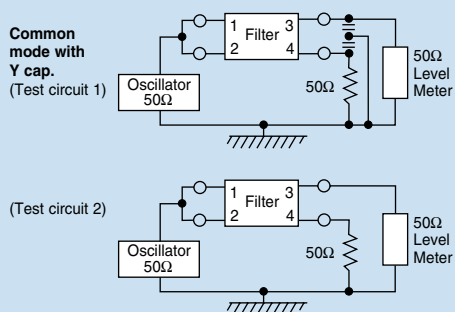


Dimensions in inches (mm)

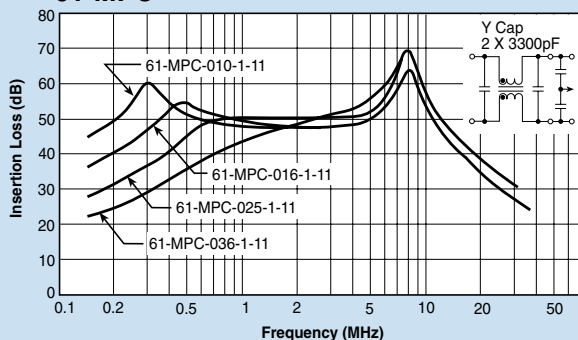
Miniature PCB Power Filters MPC Series

61-MPC Series

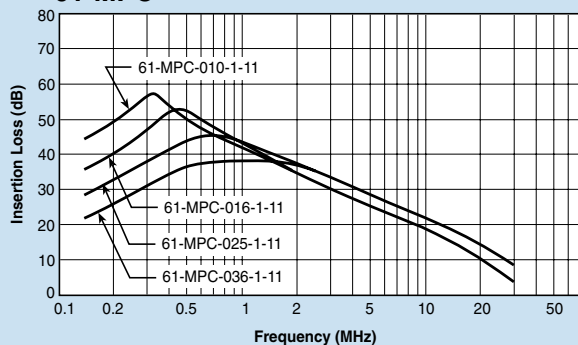
Common Mode



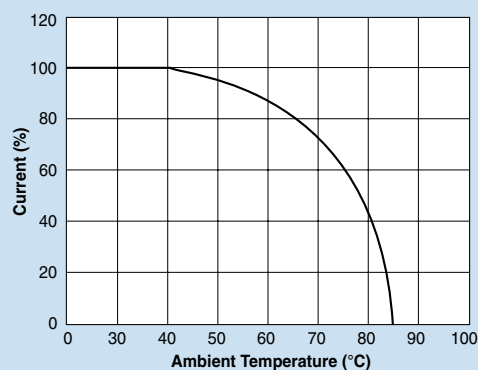
61-MPC



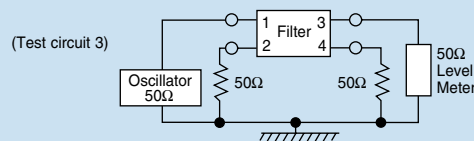
61-MPC



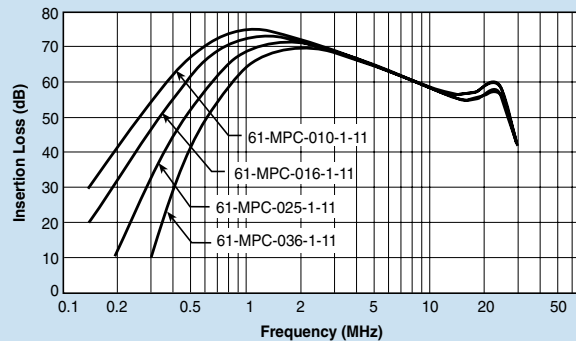
Temperature Characteristics



Normal Mode



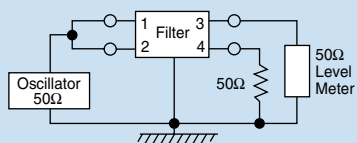
61-MPC



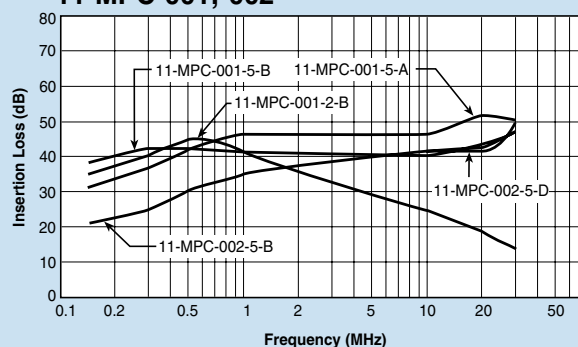
Miniature PCB Power Filters MPC Series

11-MPC Series

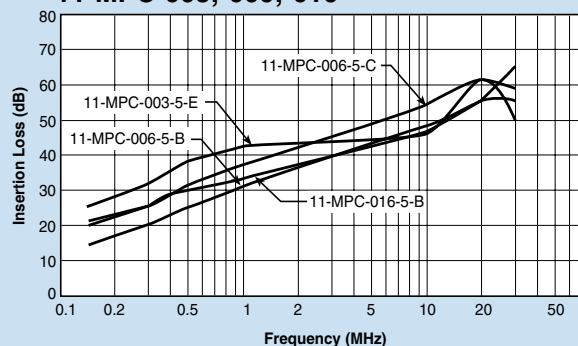
Common Mode



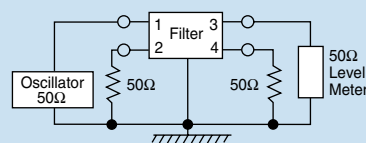
11-MPC-001;-002



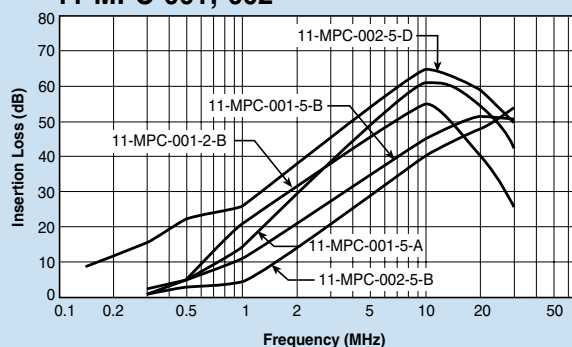
11-MPC-003;-006;-016



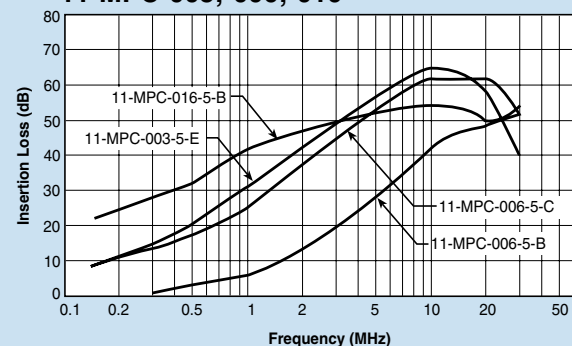
Normal Mode



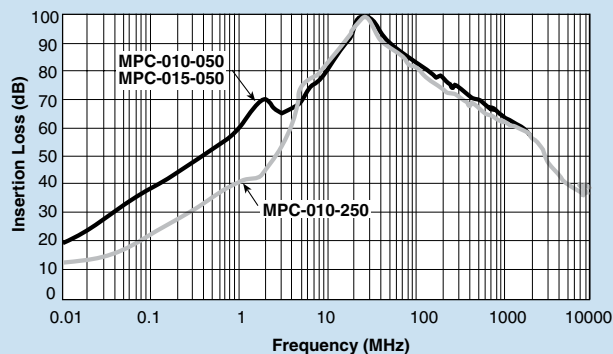
11-MPC-001;-002



11-MPC-003;-006;-016



MPC-010 & 015 Series



Through-hole Filters High Frequency PCB Filters

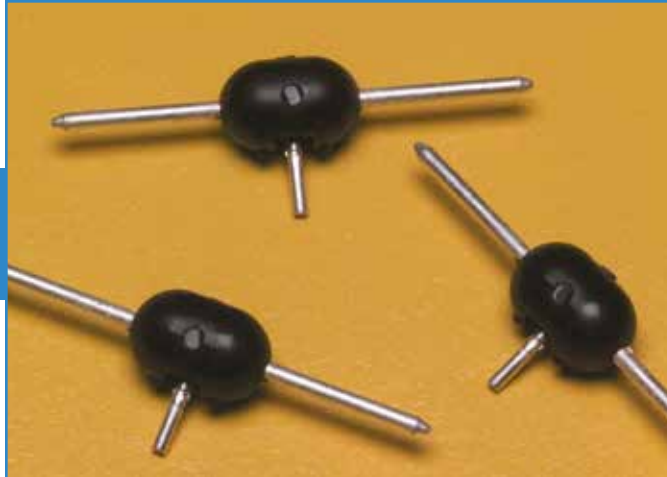
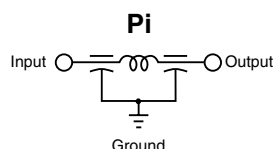
API Technologies' Spectrum Control line of high frequency PCB filter provides EMI filtering to protect low power digital circuits, while meeting most government and industrial specifications for EMI control. With low assembly and installation costs, the PCB filter helps keep your project on budget. By 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.

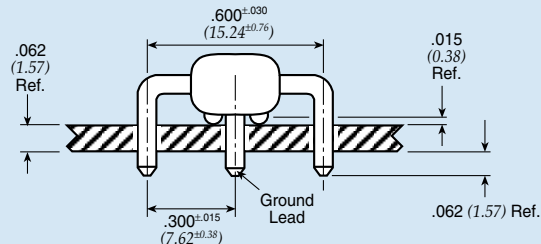
Minimum No-Load

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

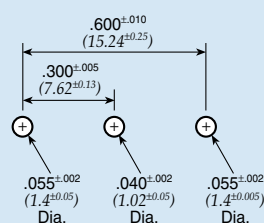
Preformed to Recommended Mounting Configuration Part Number 842448-2

Recommended Mounting Configuration



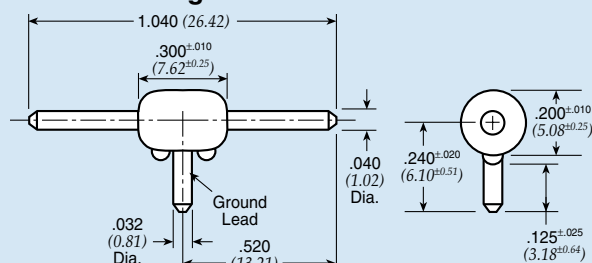
Dimensions in inches (mm)

Recommended PCB Hole Layout



Dimensions in inches (mm)

Standard Configuration Part Number 842448-1



Dimensions in inches (mm)

Low Pass EMI Filters

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



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**

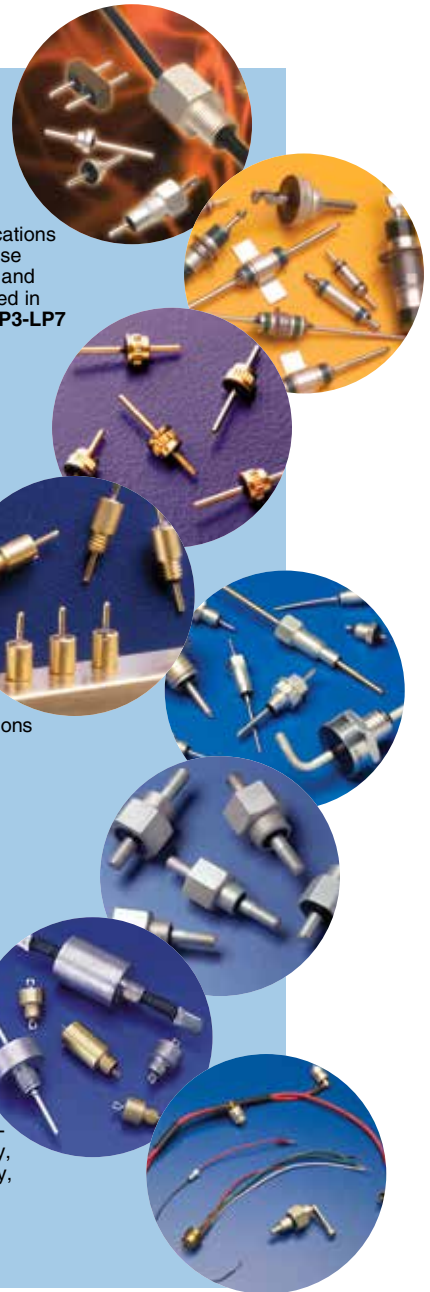
Spec Spin Filters are an excellent choice for applications that require many lines to be filtered in close proximity to each other due to their space saving #2-56 threaded miniature EMI spanner design. These filters are designed without a hex and do not require soldering for installation... **LP12**

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

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

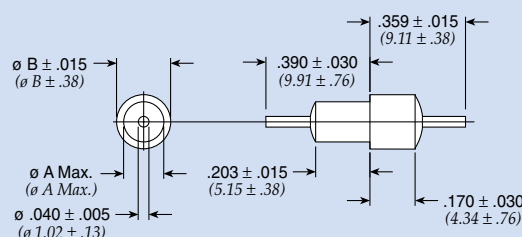


Figure 1

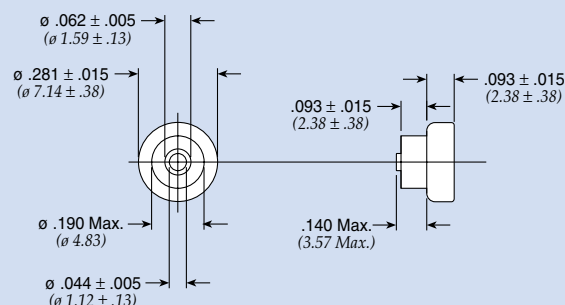


Figure 2

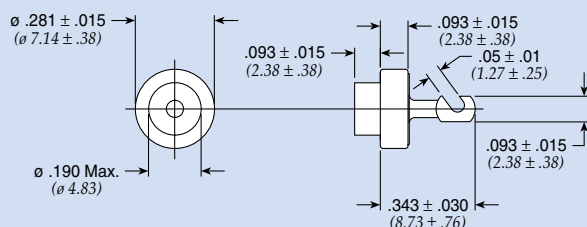


Figure 3

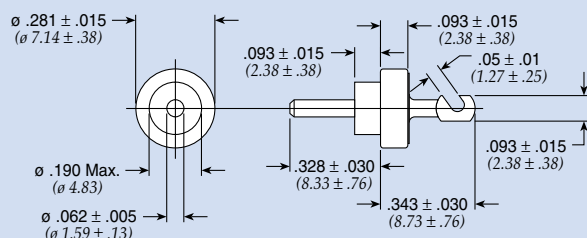


Figure 4

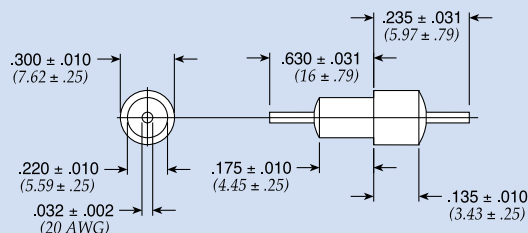


Figure 5

Dimensions in inches (mm)

Solder-in Filters

Solder-in C Circuit

Part Number	See Pg. LP3 for Fig.	A		B		Rated Voltage 125°C DC	I Amp	Cap*	Minimum Insertion Loss (dB)						
		In	(mm)	In	(mm)				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 μ F	32	47	54	60	66	70	70
54-785-002	1	0.125	(3.18)	0.184	(4.67)	100	10	0.05 μ F (min)	16	33	41	45	48	50	50
54794002X5R101M	4	—	—	—	—	250	25	100 pF $\pm$ 20%	—	—	—	—	10	20	20
54803004X5R101M	3	—	—	—	—	250	25	100 pF $\pm$ 20%	—	—	—	—	10	20	20
54802002X5R101M	2	—	—	—	—	250	25	100 pF $\pm$ 20%	—	—	—	—	10	20	20
† 54794002X5R471M	4	—	—	—	—	250	25	470 pF $\pm$ 20%	—	—	—	12	22	25	25
† 54803004X5R471M	3	—	—	—	—	250	25	470 pF $\pm$ 20%	—	—	—	12	22	25	25
54802002X5R471M	2	—	—	—	—	250	25	470 pF $\pm$ 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

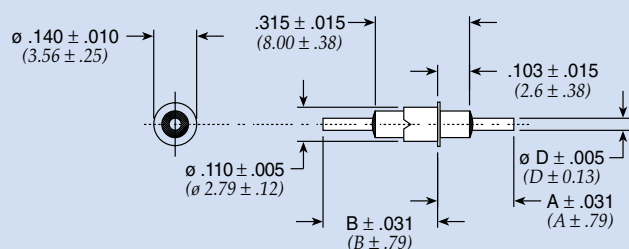


Figure 1

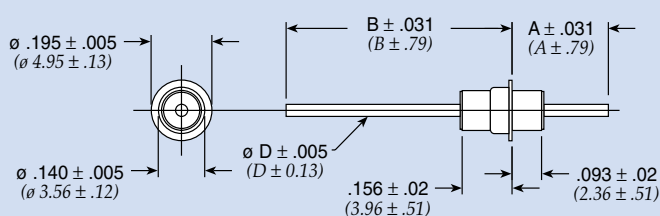


Figure 2

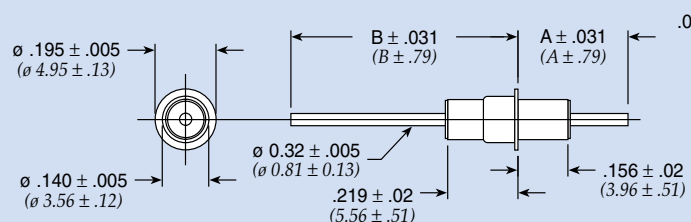


Figure 3

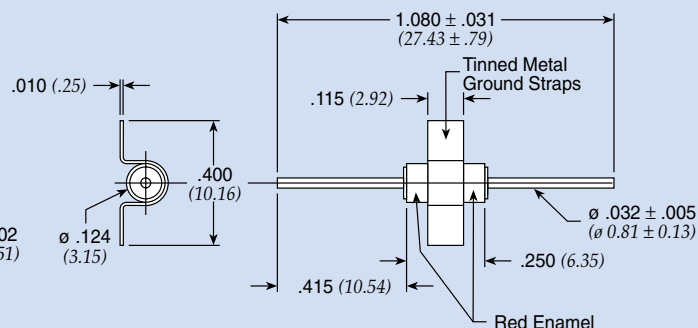


Figure 4

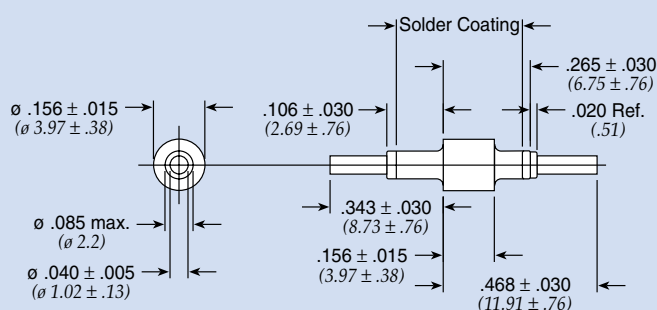


Figure 5

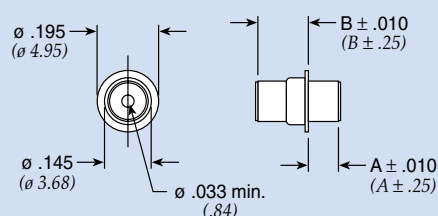


Figure 6

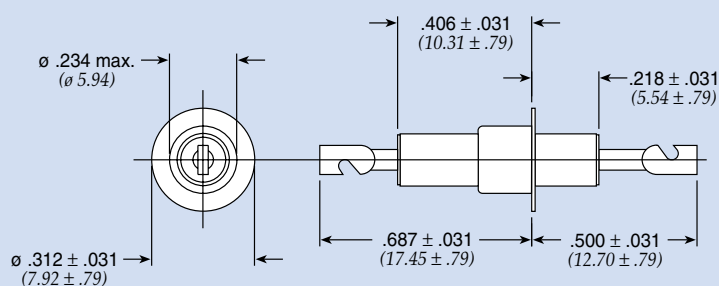


Figure 7

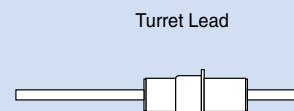


Figure 8

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 Amp	Min Cap	Minimum Insertion Loss (dB)							
			In	(mm)	In	(mm)	In	(mm)	DC	AC			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.

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

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

Marking C Circuit

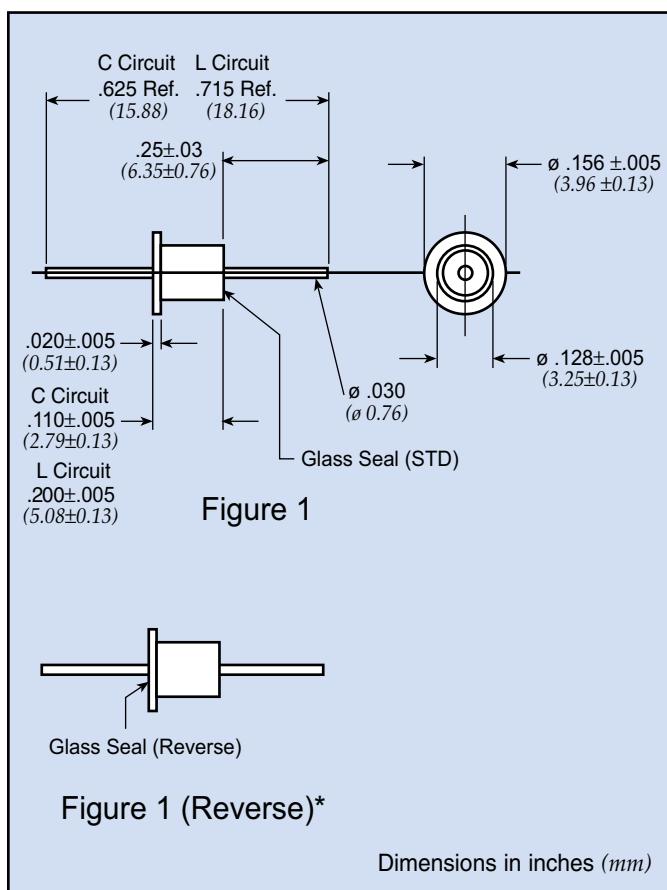
Color dot standard as follows:

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

Marking L Circuit

Color dot standard as follows:

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



Miniature Solder-in Filters 9900 Series

Miniature Solder-in C Circuit

Part Number*	Figure	Rated Voltage 125°C		I Amp	Min Cap	Minimum Insertion Loss (dB)						
		DC	AC			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		I Amp	Min Cap	Minimum Insertion Loss (dB)				
		DC	AC			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 µF	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 µF	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 µF	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.

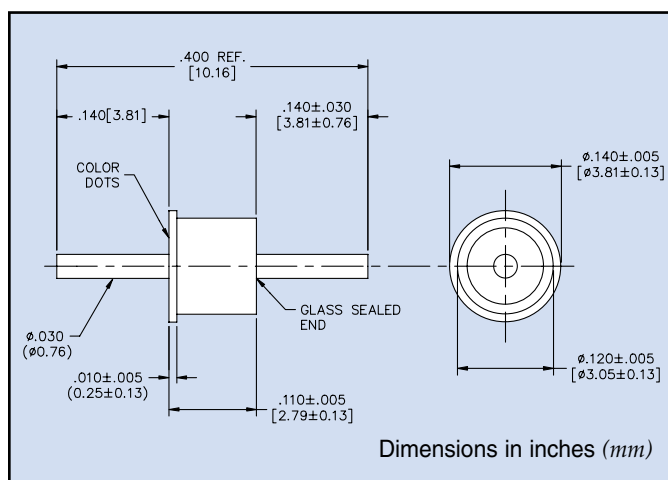
Parts are RoHS Compliant

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.

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

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).

Mechanical Specifications

Installation Press-in

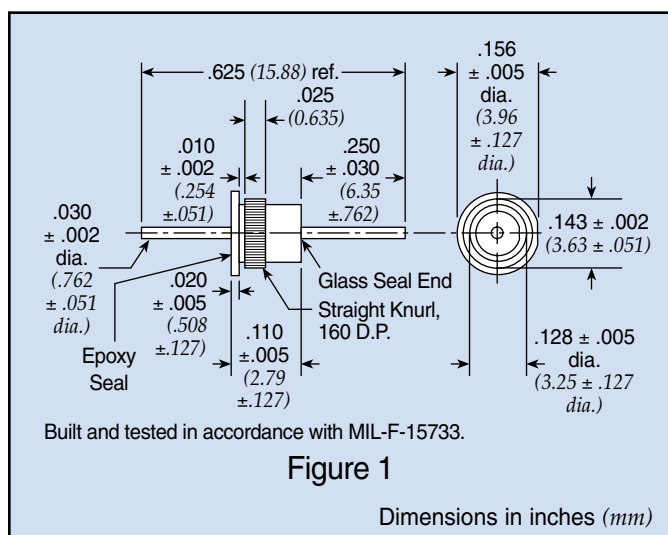
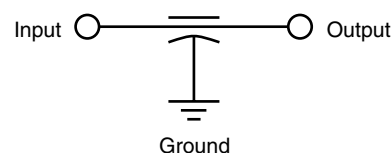
Plating Gold

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	I Amp	Cap	Minimum Insertion Loss (dB)						
		DC			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

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

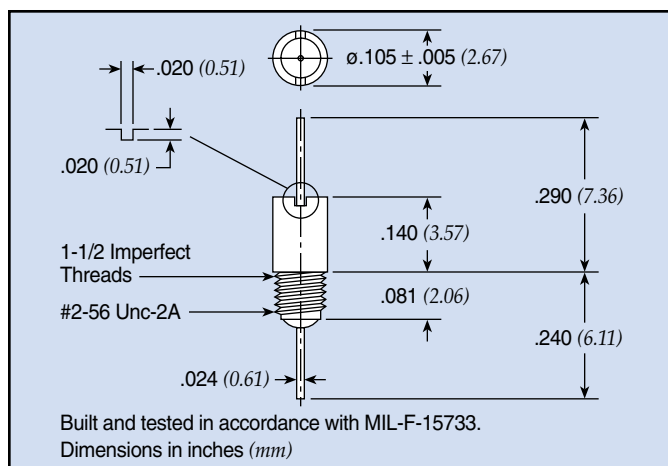
Current Rating 5 A

Effective Filtering From. . . 1 MHz to 10 GHz

Capacitance to 10,000 pF

Dielectric Withstanding

Voltage 125 VDC



Mechanical Specifications

Center Spacing0110"

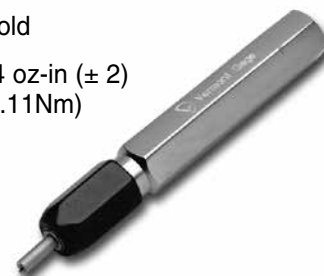
Lead Finish Gold

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	+100%/-0%						
54-874-016	3,300							
54-874-017	4,700							
54-874-018	10,000	+80%/-20%						

Note: Parts are RoHS Compliant

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

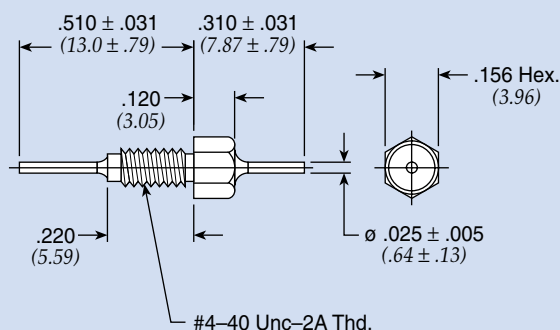


Figure 1

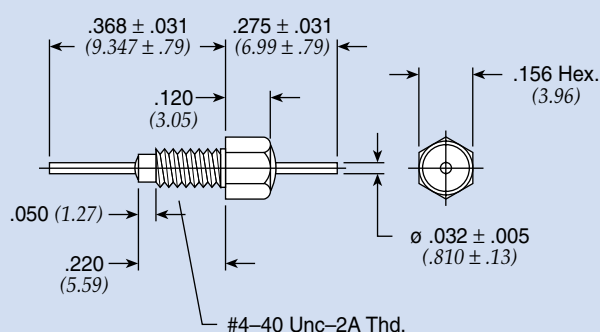


Figure 2

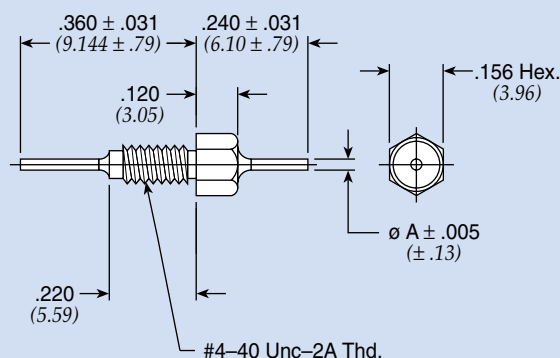


Figure 3

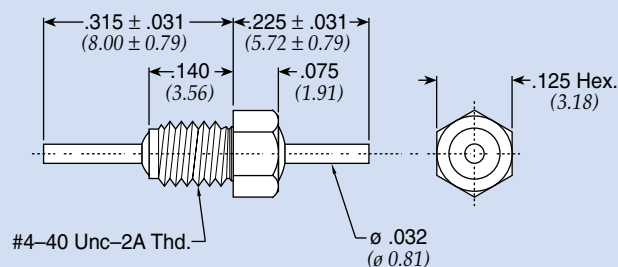


Figure 4

Dimensions in inches (mm)

Resin Sealed Bolt-in Filters

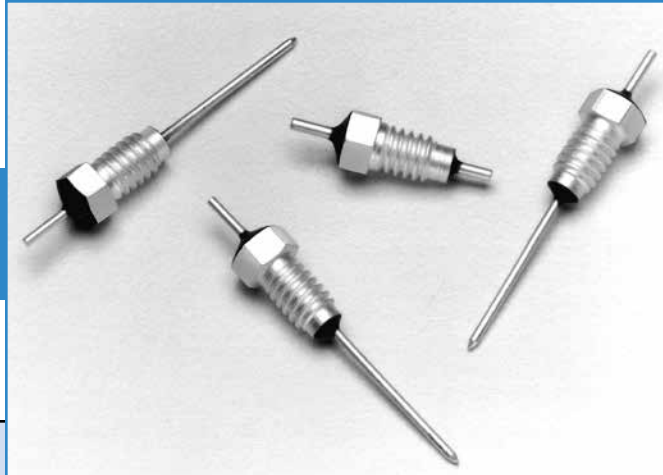
4-40 C Circuit

Part Number	See Pg. LP12 for Fig.	Rated Voltage 125°C		I Amp	Min Cap	A		Minimum Insertion Loss (dB)							
		DC	AC			In	(mm)	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	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.

Resin Sealed Bolt-in Filters



4-40 L and Pi Circuit

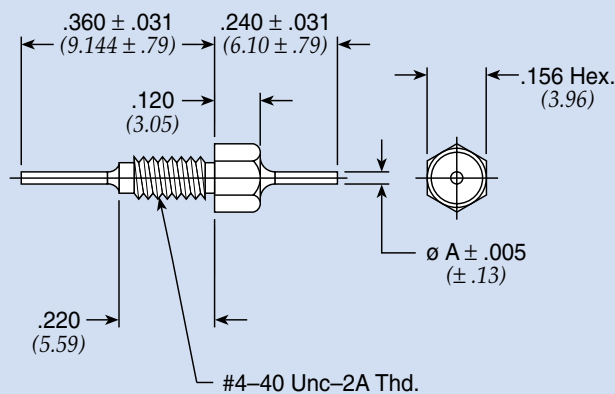


Figure 1

Dimensions in inches (mm)

Part Number	Figure	Rated Voltage 125°C		I Amp	CKT	Min Cap	A In	(mm)	Minimum Insertion Loss (dB)							
		DC	AC						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	(.46)	—	7	14	40	60	70	70	70
+51-729-312	1	50	—	3	Pi	7000 pF	0.018	(.46)	—	8	15	40	65	70	70	70
SCI-3102-002	1	50	—	3	LB	0.075 µF	0.016	(.41)*	18	25	37	42	52	55	70	70
SCI-3102-000	1	50	—	5	LB	0.075 µF	0.016	(.41)	18	25	37	42	52	55	70	70
SCI-3102-007	1	50	—	10	LB	0.075 µF	0.025	(.64)	18	25	37	42	52	55	70	70
+51-729-304	1	100	—	3	LB	0.022 µF	0.018	(.46)	7	17	27	34	43	47	55	55
+SCI-3112-002	1	100	—	5	LB	0.027 µF	0.016	(.41)*	10	20	30	38	45	45	65	70
+SCI-3112-000	1	100	—	5	LB	0.027 µF	0.016	(.41)	10	20	30	38	45	45	65	70
SCI-3112-007	1	100	—	10	LB	0.027 µF	0.025	(.64)	10	20	30	38	45	45	65	70
SCI-3112-102	1	100	—	3	LB	0.05 µF	0.016	(.41)*	15	24	35	42	54	56	70	70
SCI-3112-100	1	100	—	5	LB	0.05 µF	0.016	(.41)	15	24	35	42	54	56	70	70
SCI-3112-107	1	100	—	10	LB	0.05 µF	0.025	(.64)	15	24	35	42	54	56	70	70
+51-729-303	1	200	—	3	Pi	1500 pF	0.018	(.46)	—	—	5	15	42	65	70	70
SCI-3122-002	1	200	115	3	LB	0.01 µF	0.016	(.41)*	—	12	21	30	41	45	70	70
SCI-3122-000	1	200	115	5	LB	0.01 µF	0.016	(.41)	—	12	21	30	41	45	70	70
SCI-3122-007	1	200	115	10	LB	0.01 µF	0.025	(.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

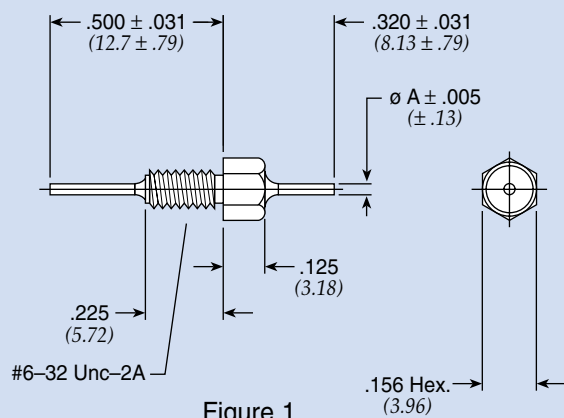


Figure 1

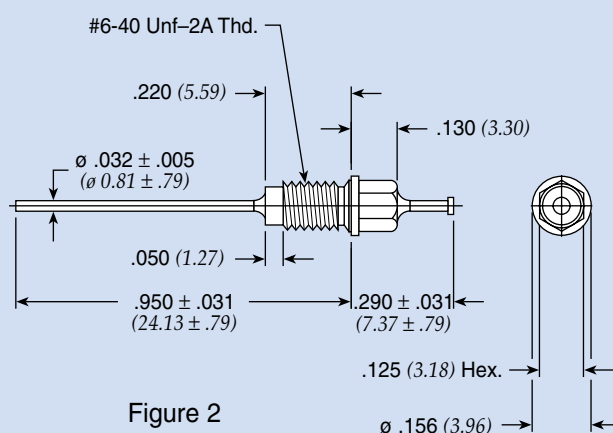


Figure 2

Same as Figure 1
except with turret lead

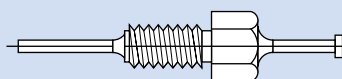


Figure 3

Dimensions in inches (mm)

Part Number	Figure	Rated Voltage 125°C		I Amp	CKT	Min Cap	A In	Minimum Insertion Loss (dB)							
		DC	AC					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.

Resin Sealed Bolt-in Filters

8-32 C Circuit

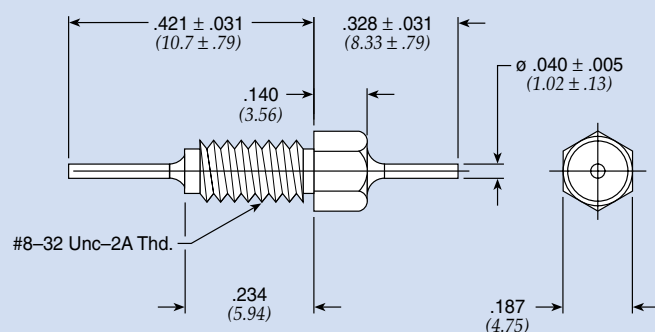


Figure 1

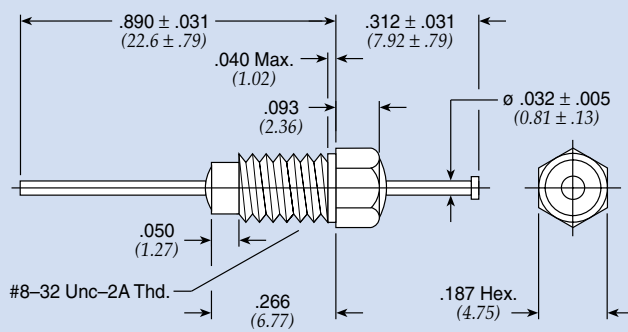


Figure 2

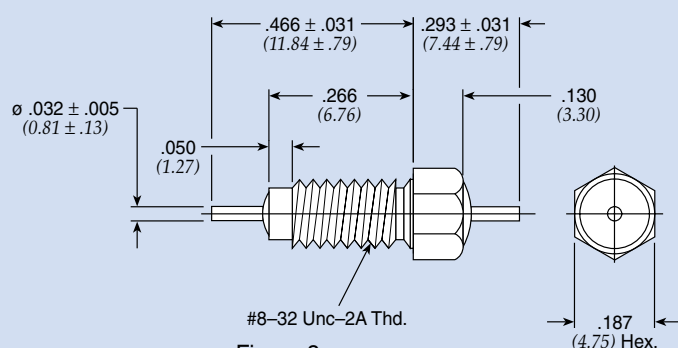


Figure 3

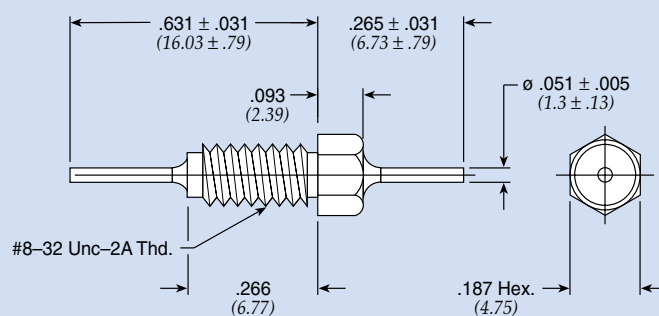


Figure 4

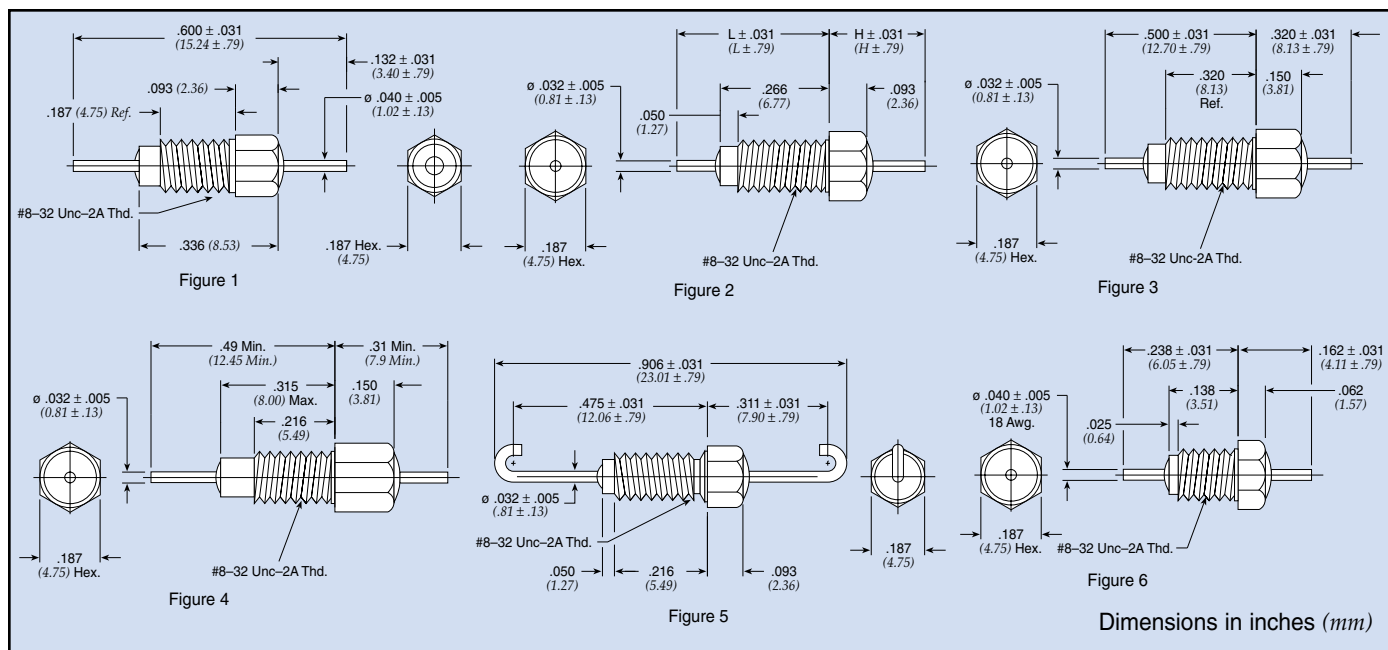
Dimensions in inches (mm)

Part Number	Figure	Rated Voltage 125°C		I Amp	Min Cap	Minimum Insertion Loss (dB)							
		DC	AC			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.

Resin Sealed Bolt-in Filters

8-32 L & Pi Circuit



Part Number	M15733 MIL Number	Fig.	Rated Voltage 125°C		I Amp	CKT	Min Cap	In	H (mm)	L In	L (mm)	Minimum Insertion Loss (dB)							
			DC	AC								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

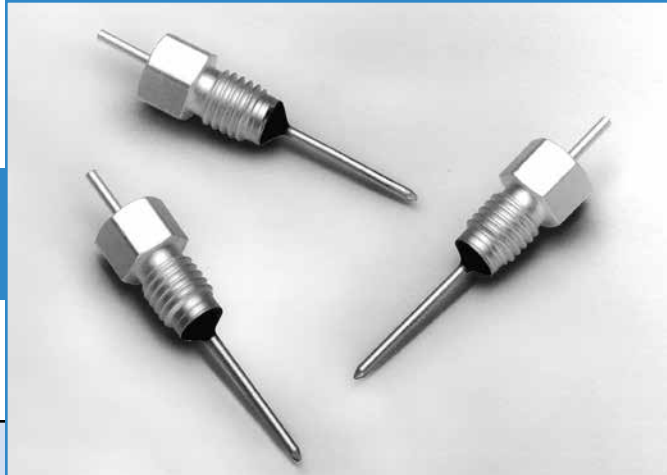
† Also available through API's authorized distributors.

◇ Supplied with .040" (1.02mm) diameter lead.

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

* Denotes parts with turret lead.

Resin Sealed Bolt-in Filters



10-32 C & Pi Circuit

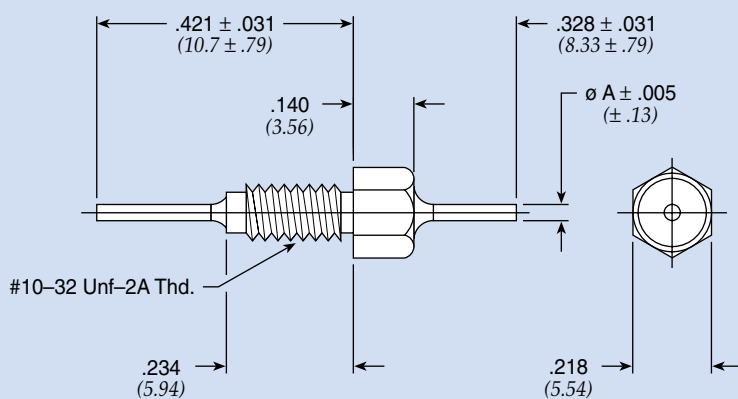


Figure 1

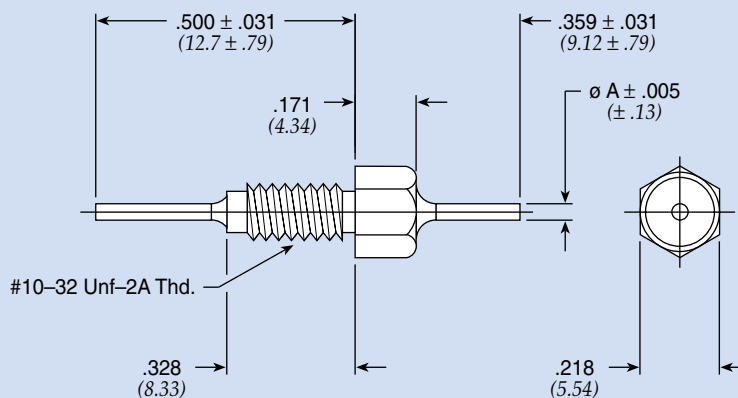


Figure 2

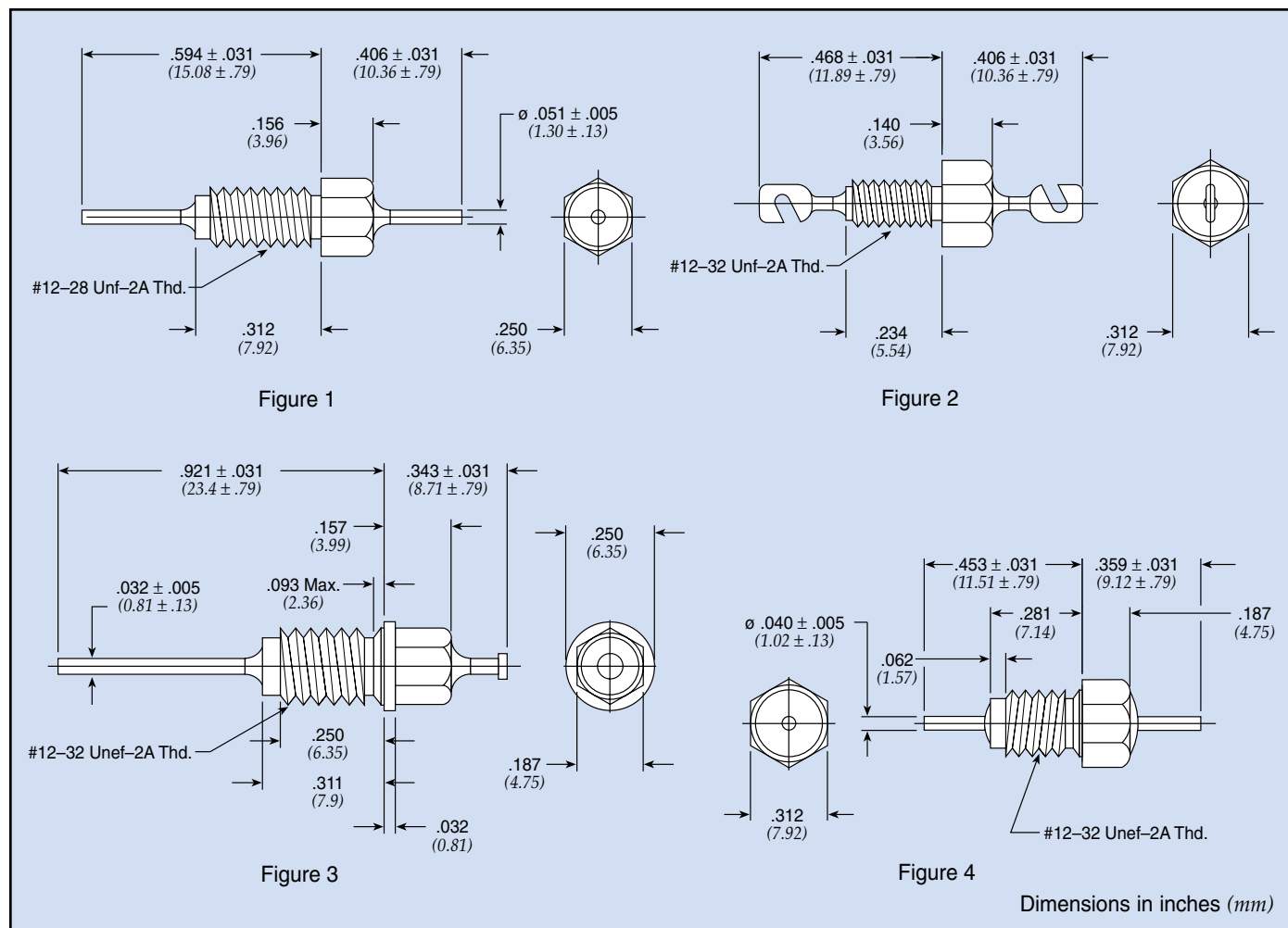
Dimensions in inches (mm)

Part Number	Figure	Rated Voltage 125°C		I Amp	CKT	Min Cap	A In	(mm)	Minimum Insertion Loss (dB)							
		DC	AC						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



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

Resin Sealed Bolt-in Filters

12-28 & 12-32 Pi Circuit

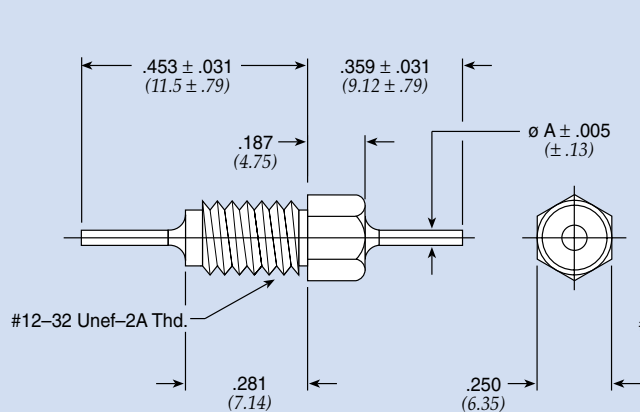


Figure 1

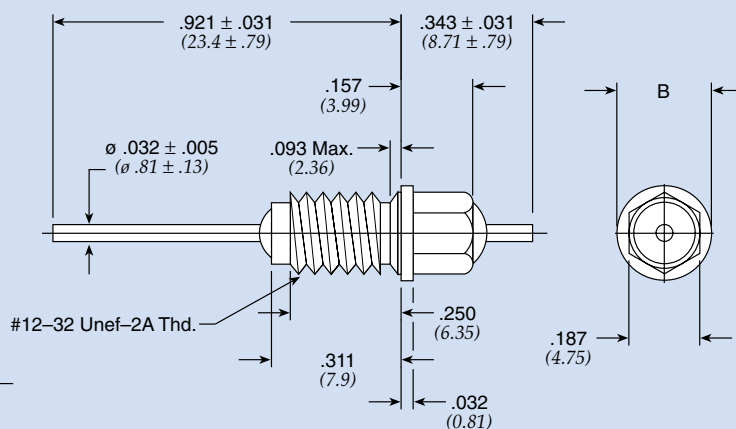


Figure 2

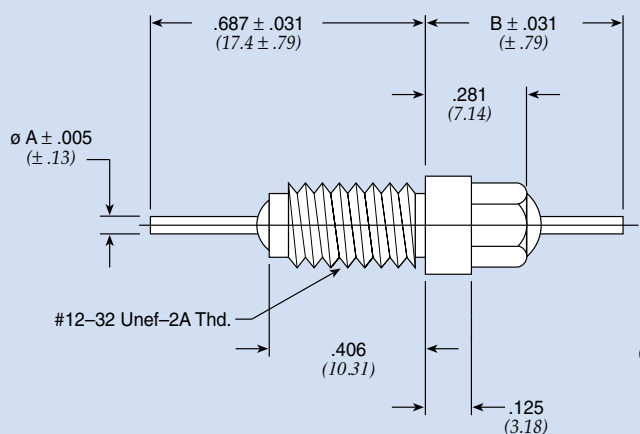
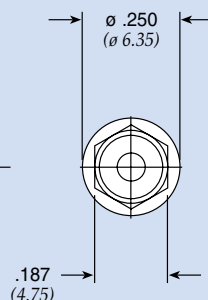


Figure 3



Same as Figure 3
Except as Shown.

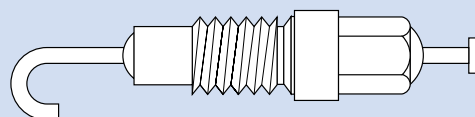


Figure 4

Same as Figure 1
Except as Shown.

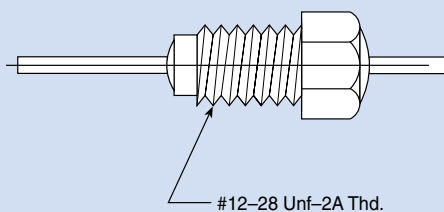


Figure 5

Same as Figure 2
Except as Shown.

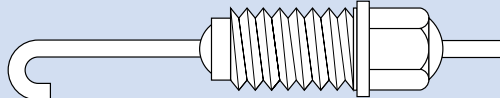


Figure 6

Turret Lead

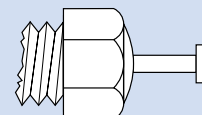


Figure 7

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		I Amp	Min Cap	A		B		Minimum Insertion Loss (dB)							
			DC	AC			In	(mm)	In	(mm)	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.

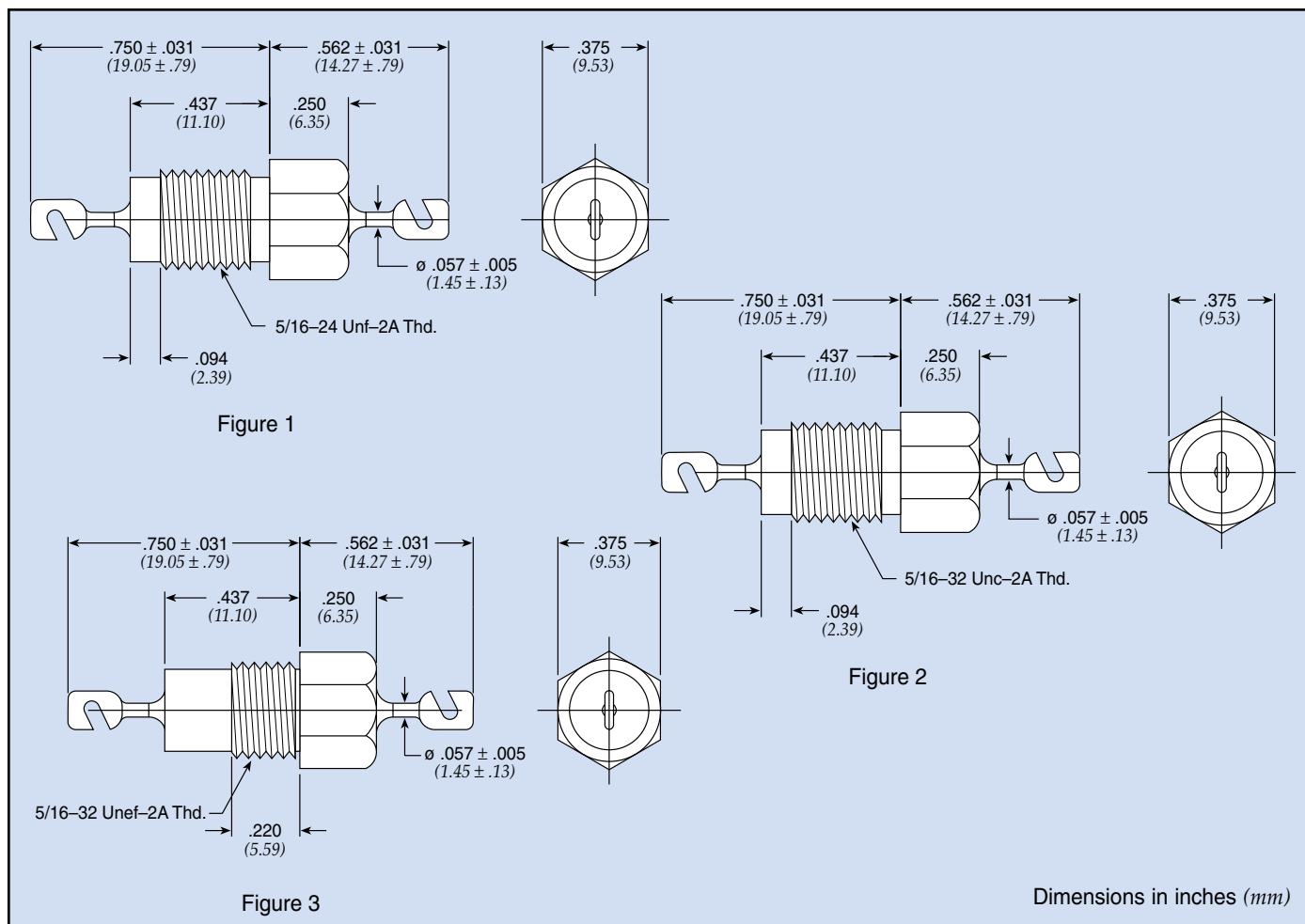
€ Also available through API's authorized European distributors/agents.

* 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



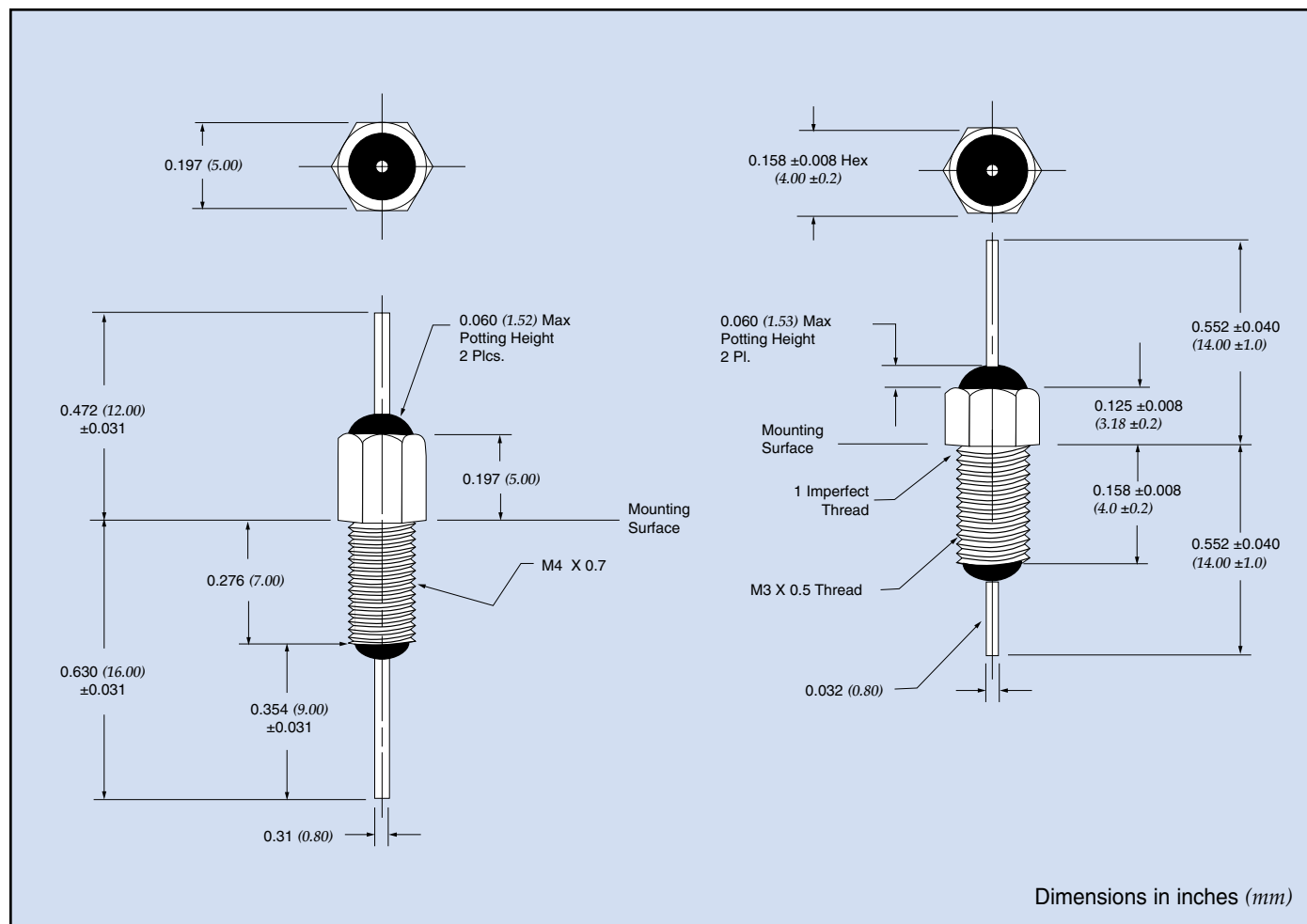
Part Number	M15733 MIL Number	Fig.	Rated Voltage 125°C		I Amp	CKT	Min Cap	Minimum Insertion Loss (dB)							
			DC	AC				1 MHz	3 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
SCI-9510-503	—	1	100	—	25	C	0.05 μ F	15	24	35	41	45	60	60	60
SCI-3513-000	—	1	100	—	25	Pi	0.1 μ F	10	18	28	37	70	70	70	70
SCI-3523-000	—	1	200	115	25	Pi	0.02 μ F	—	—	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 μ F	—	—	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



Part Number	Figure	Rated Voltage	I Amp	CKT	Min Cap	Temperature Range
		125°C DC				
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.

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

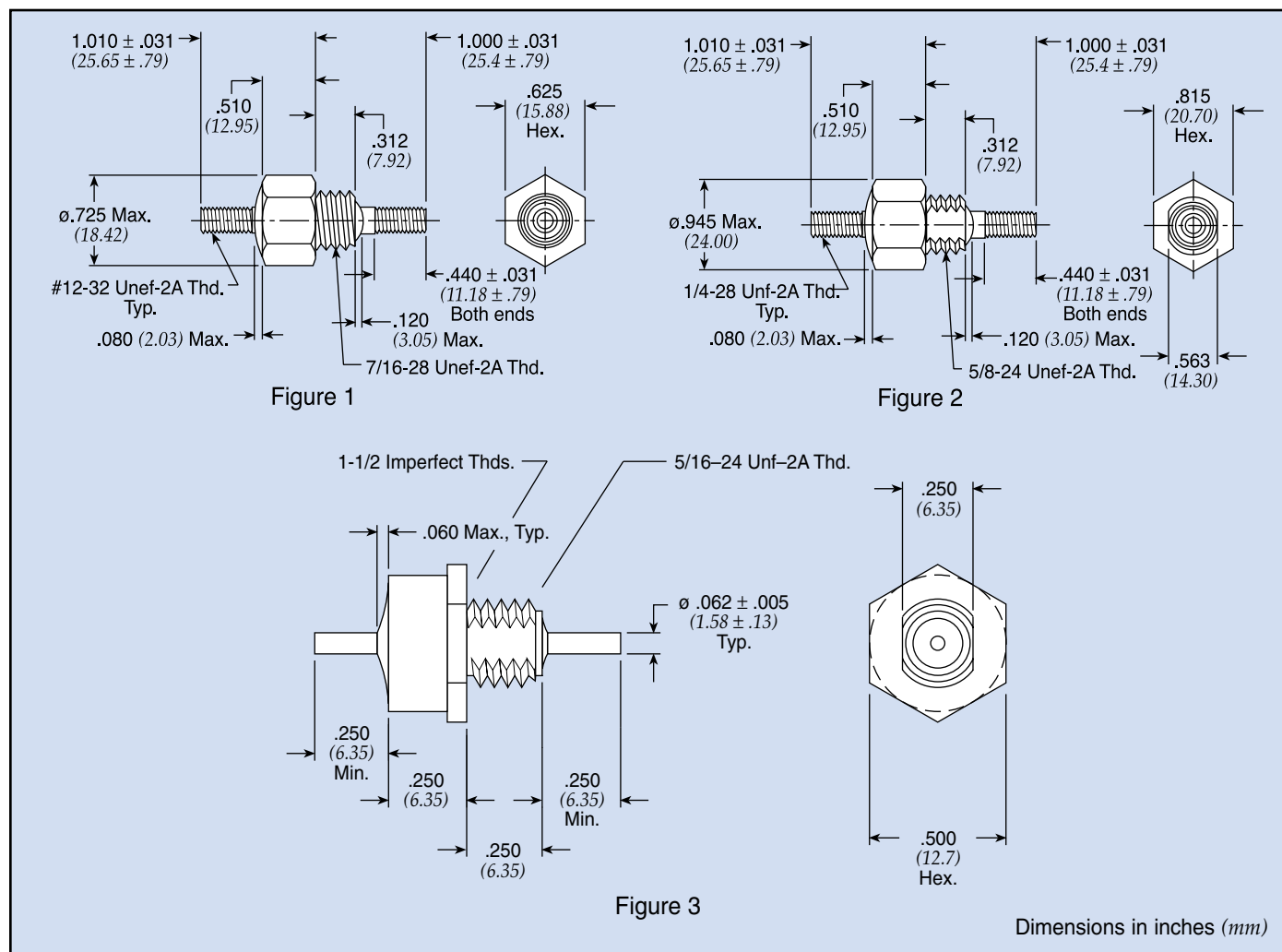


Installation Notes

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

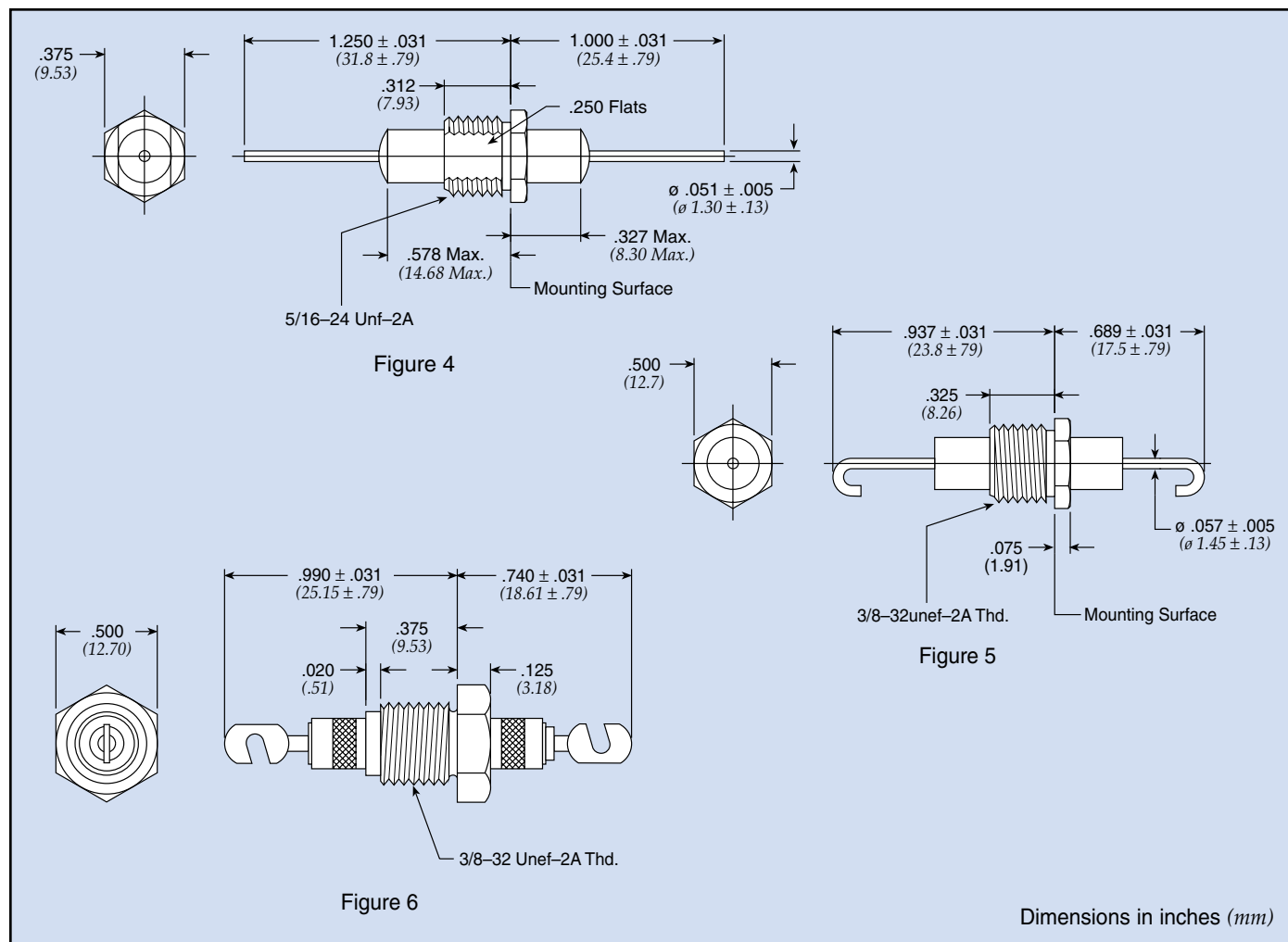
1. Mounting installation torque
Method A: Mounting in full threaded through-hole
Maximum torque: 96 in-lbs
Method B: Mounting w/hardware
Maximum torque: 84 in-lbs
2. Terminal installation torque
Maximum torque: 20 in-lbs

Note: Use two-wrench method to install terminal hardware



High Current/High Voltage Resin Sealed Filters

High Current High Voltage Feed-through



Part Number	Figure	Rated Voltage 125°C		I Amp	CKT	Min Cap	Minimum Insertion Loss (dB)							
		DC	AC***				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

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)

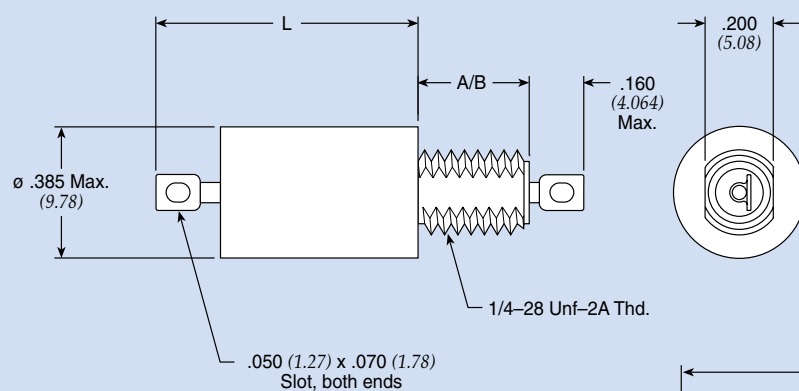


Figure 1

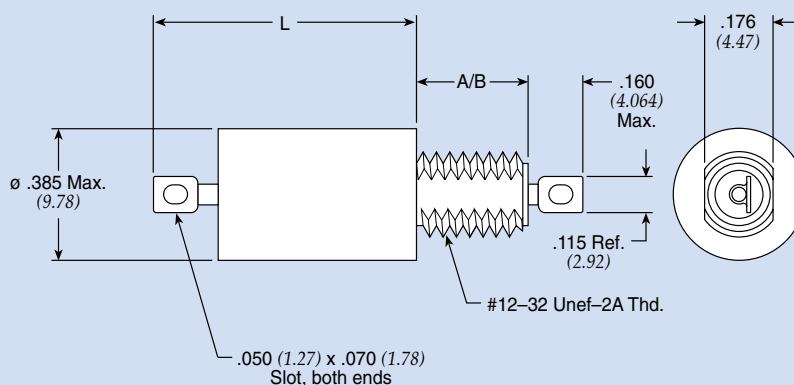


Figure 2

Dimensions in inches (mm)

Note: ø .410 Max. for M28861 parts

Hermetically Sealed Threaded Case Filters

.375 ø C Circuit Standard

Part Number	MIL No	See Pg. LP26 for Fig.	Rated Voltage				I Amp	Min Cap μF	DCR Max Ohms	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C		125°C					In	L (mm)		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	

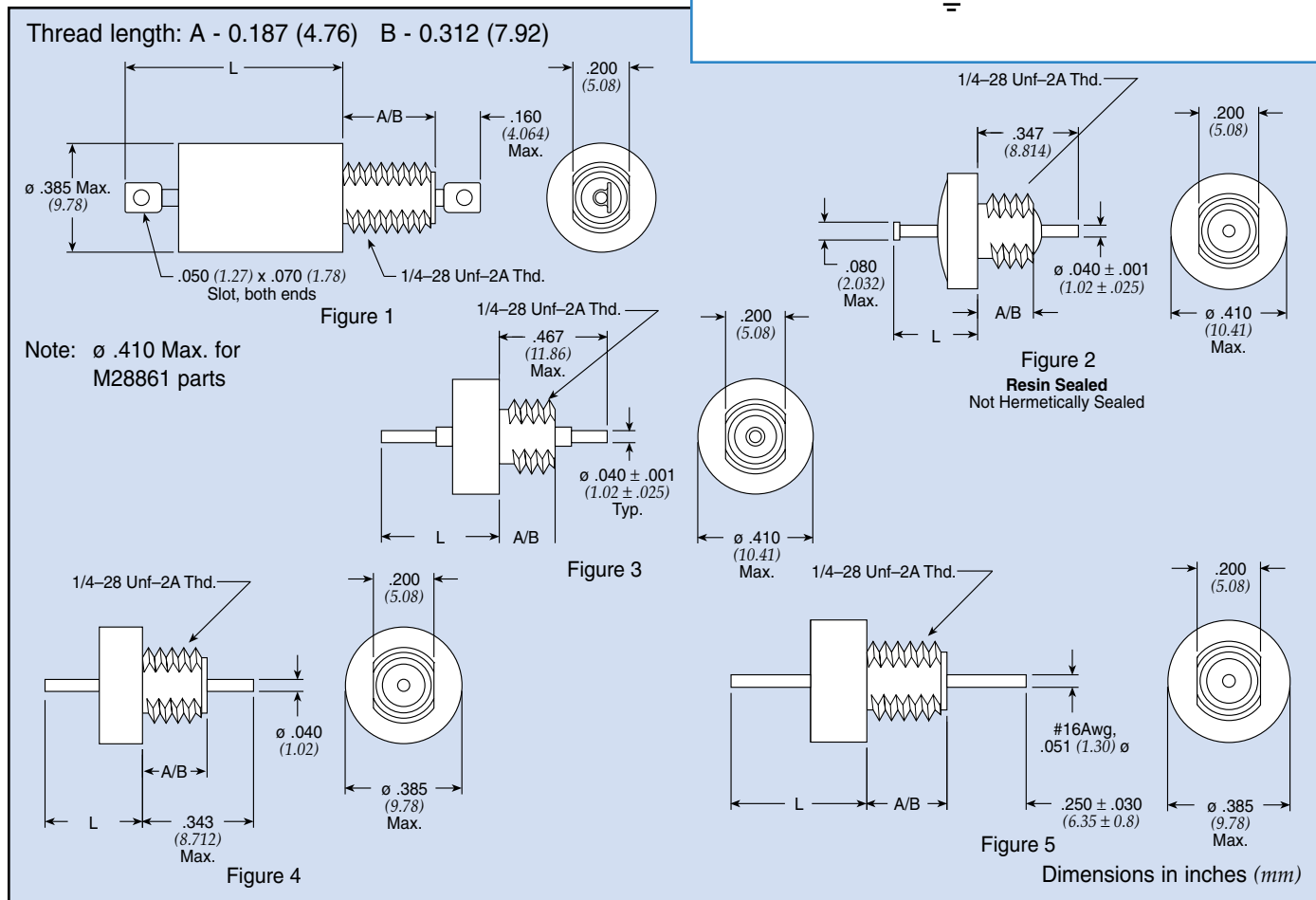
.375 ø C Circuit MIL Qualified (See MIL index on pages CF9-11 for complete MIL part number listing)

Part Number	M15733 M28861 MIL No	See Pg. LP26 for Fig.	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C		125°C					In	(mm)		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	

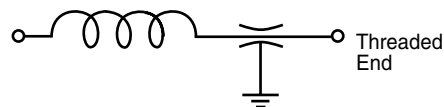
† Also available through API's authorized distributors.

Hermetically Sealed Threaded Case Filters

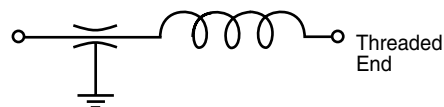
.375 ø L Circuit



L-C Filter LT



L-C Filter LB



.375 ø L Standard Low Profile

Part Number	MIL No	Figure	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Thd Lgth	Minimum Insertion Loss (dB)						
			85°C DC	85°C AC	125°C DC	125°C AC					(mm)		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 ⁰ *	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.

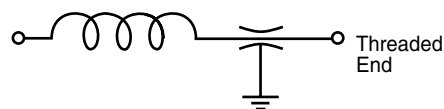
† Also available through API's authorized distributors.

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

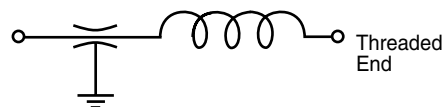
◇ Note: 0.462" (11.73mm) length from mounting surface to end of lead — not 0.347" (8.8mm).

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				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C		125°C						In	(mm)		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)

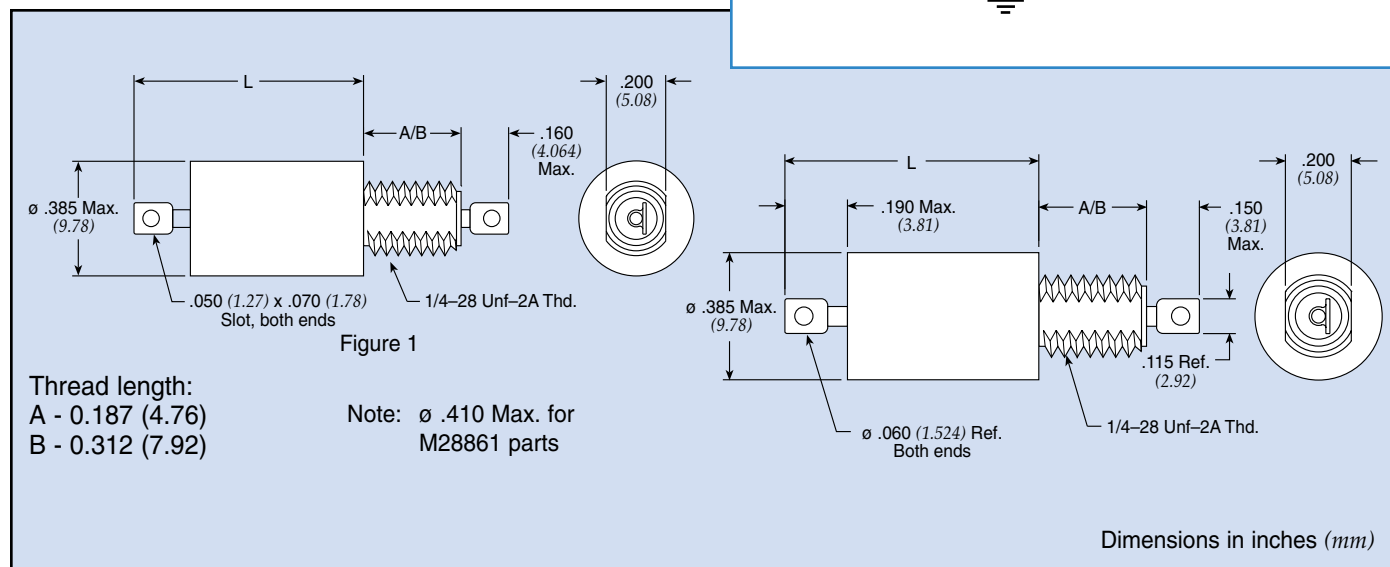
Part Number	M15733 M28861 MIL No	See Pg. LP28 for Fig	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C		125°C						In	(mm)		30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz	
+ 51-359-021	38-0004	1		—	50	—	10	1.400	0.008	LB	0.370	(9.398)	A	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.

Hermetically Sealed Threaded Case Filters

.375 ø L Circuit



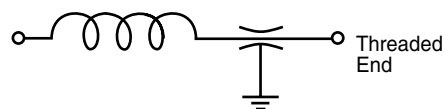
.375 ø L Circuit Standard Product

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

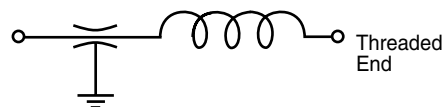
† Also available through API's authorized distributors.

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				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In (mm)	Thd Lgth	Minimum Insertion Loss (dB)							
			85°C DC	85°C AC	125°C DC	125°C AC							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	

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

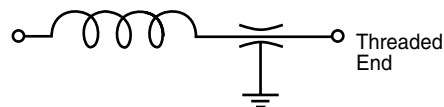
.375 ø L Circuit MIL Qualified Profile

Part Number	M15733 MIL No	See Pg. LP30 for Fig	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C DC	125°C AC	85°C DC	125°C AC					In	(mm)		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	

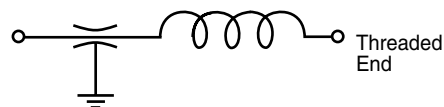
† Also available through API's authorized distributors.

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)

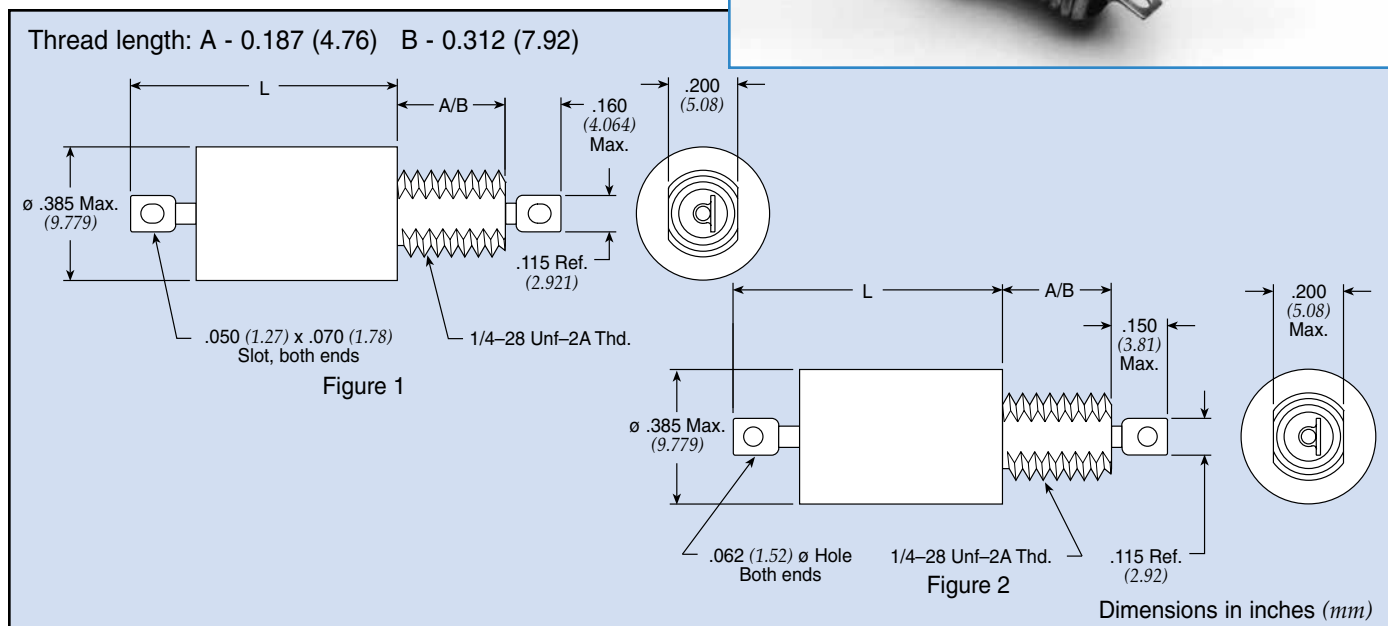
Part Number	M15733 MIL No	See Pg. LP30 for Fig	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C DC	AC	125°C DC AC						In	(mm)		30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz	
51-444-040	25-0020	1	—	—	100		5.00	0.450	0.015	LB	0.738	(18.745)	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.

Hermetically Sealed Threaded Case Filters



.375 ø Pi Circuit



.375 ø Pi Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	Max L In (mm)	Thd Lgth	Minimum Insertion Loss (dB)						
			85°C DC	85°C AC	125°C DC	125°C AC						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	1.000	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				I Amp	Min Cap µF	DCR Max Ohms	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C DC	AC	125°C DC	AC				In	(mm)		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*				Length In (mm)		Max Thd Lgth	Minimum Insertion Loss (dB)					
							VR* (VDC)	BV* (VDC)	IT* (MA)	IPP* (A)				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

Hermetically Sealed Threaded Case Filters



.375 ø T Circuit

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

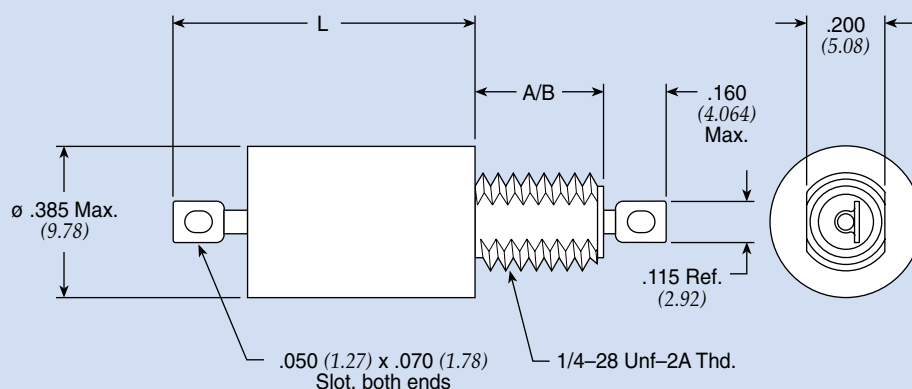


Figure 1

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				I Amp	Min Cap μF	DCR Max Ohms	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C		125°C					In	(mm)		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.

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

.375 ø T Circuit MIL Qualified Product

Part Number	M15733 MIL No	Figure	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	Max L <i>(mm)</i>	Thd Lgth	Minimum Insertion Loss (dB)							
			85°C DC	AC	125°C DC	AC						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

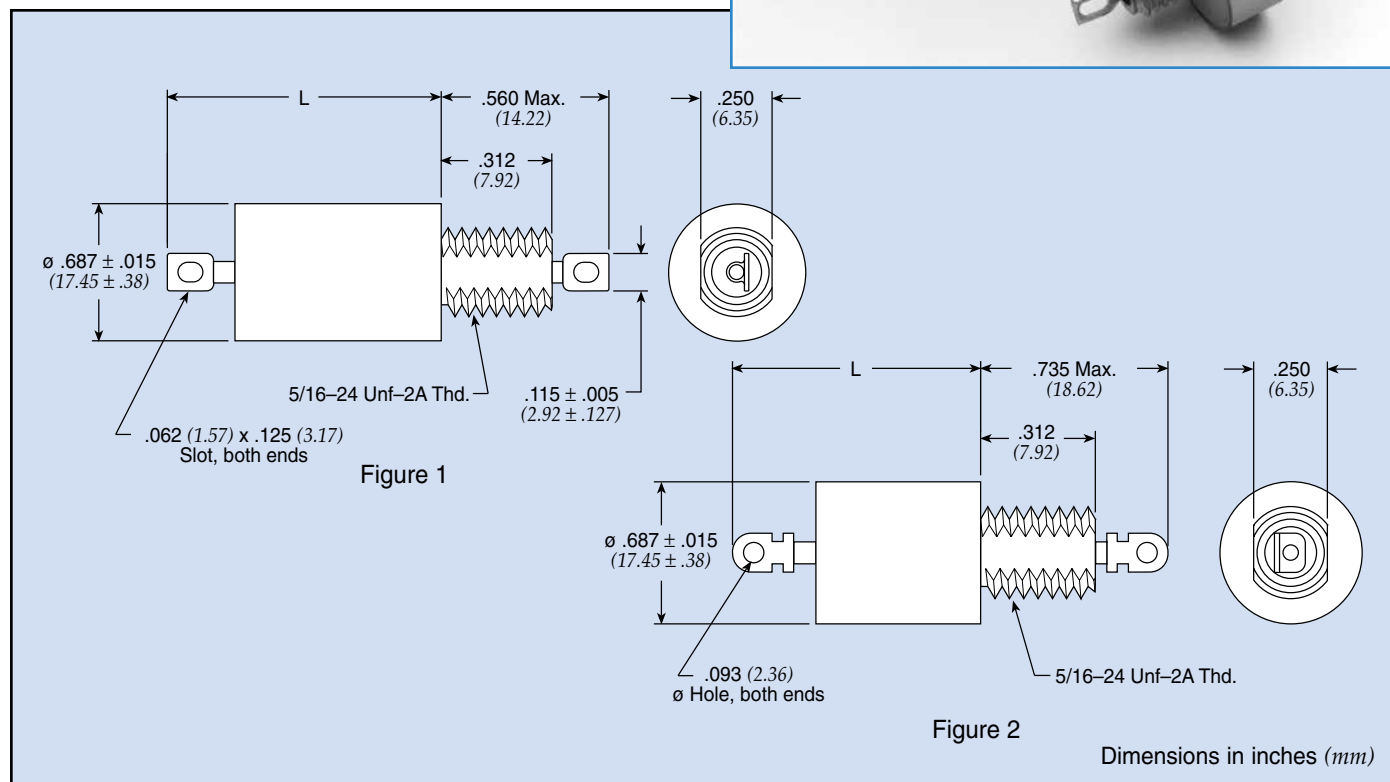
.375 ø TT Circuit Standard Product

Part Number	MIL No	See Pg. LP35 for Fig.	Rated Voltage				I Amp	Min Cap μF	DCR Max Ohms	Max L		Thd Lgth	Minimum Insertion Loss (dB)							
			85°C		125°C					In	L (mm)		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	70	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	

Hermetically Sealed Threaded Case Filters



.690 ø C Circuit



.690 ø C Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	Max		Minimum Insertion Loss (dB)						
			85°C		125°C					L <i>(mm)</i>	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				I Amp	Min Cap µF	DCR Max Ohms	Max		Minimum Insertion Loss (dB)						
			85°C		125°C					In	L <i>(mm)</i>	30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
			DC	AC	DC	AC												
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

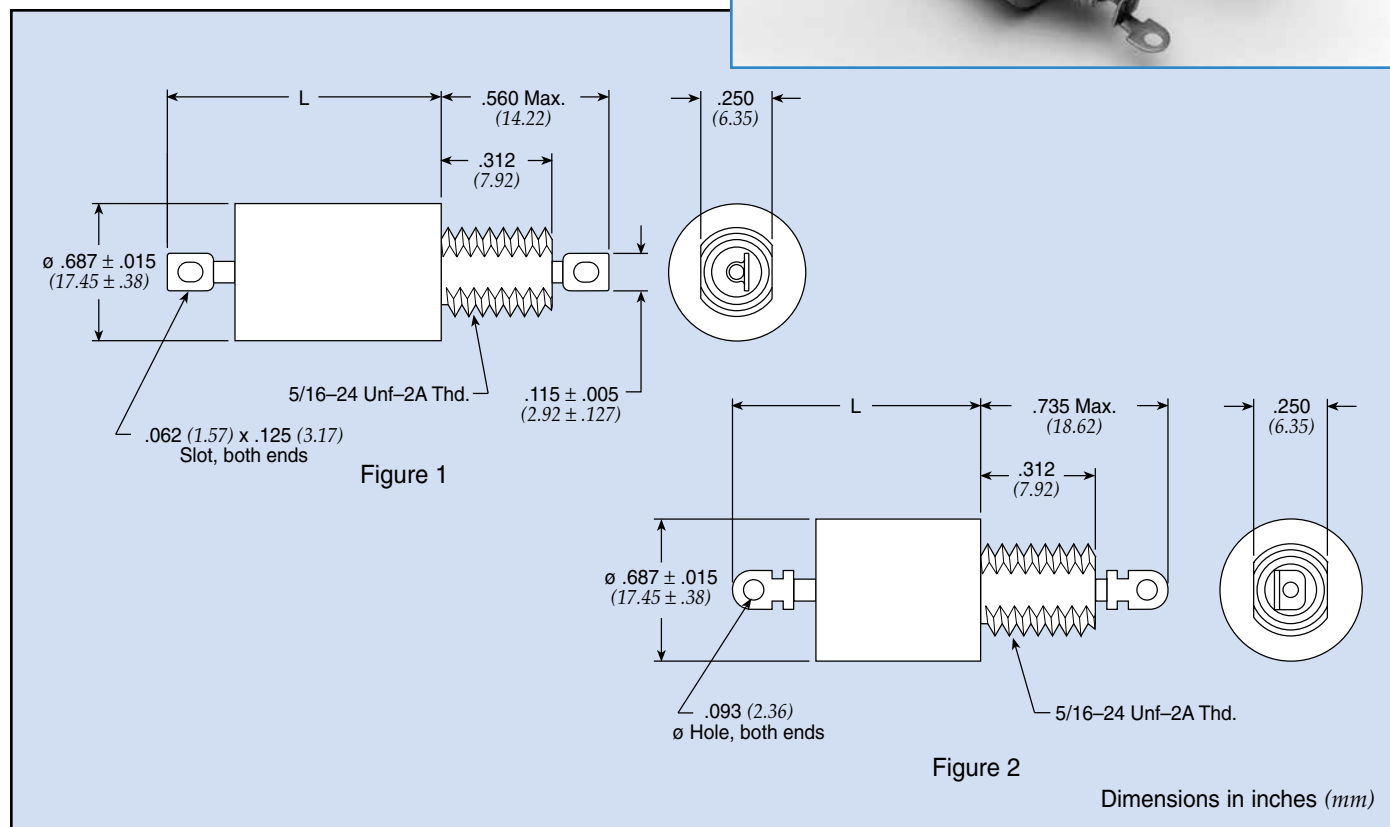
Part Number	84084 No	Figure	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	Max		Minimum Insertion Loss (dB)						
			85°C		125°C					In	L (mm)	30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
			DC	AC	DC	AC												
54-310-042	-001	1	—	—	400	230	15	0.150	0.005	0.700	(17.780)	—	10	16	26	40	52	70

† Also available through API's authorized distributors.

Hermetically Sealed Threaded Case Filters



.690 ø L Circuit



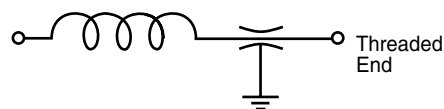
.690 ø L Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage				I Amp	Min Cap μF	DCR Max Ohms	CKT	Max L		Minimum Insertion Loss (dB)						
			85°C DC	AC	125°C DC	AC					In	(mm)	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

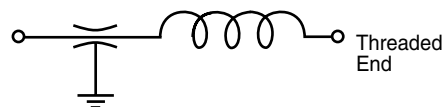
† Also available through API's authorized distributors.

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				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L		Minimum Insertion Loss (dB)							
			85°C		125°C						In	(mm)	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	

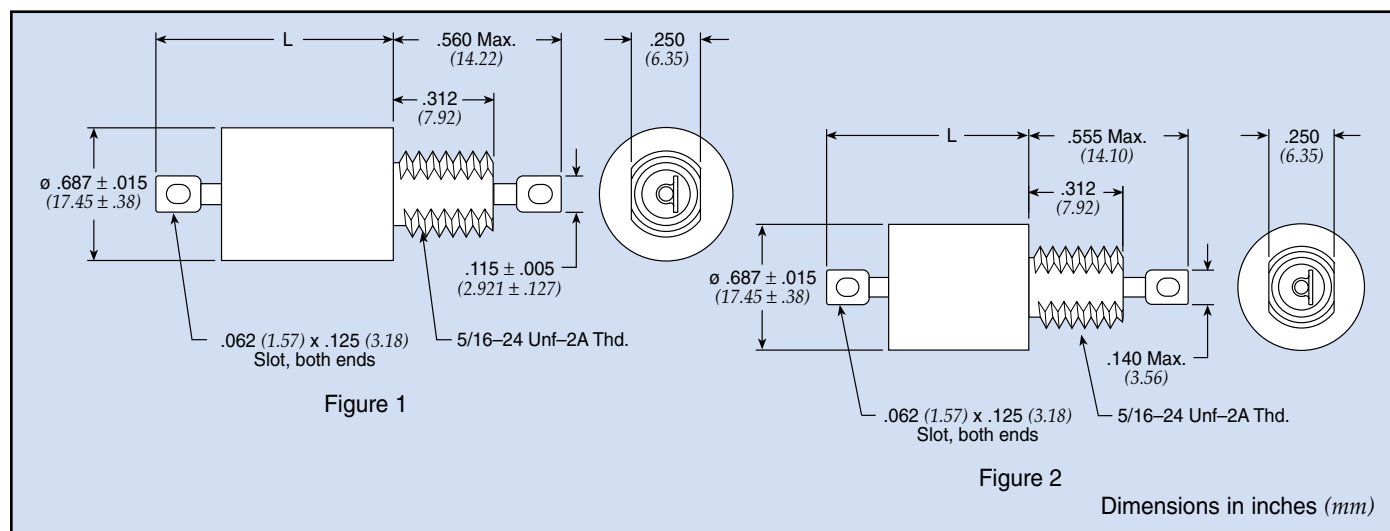
.690 ø L Circuit DSCC 84084 Product

Part Number	84084 No	See Pg. LP38 for Fig.	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L <i>(mm)</i>	Minimum Insertion Loss (dB)							
			85°C		125°C							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.

Hermetically Sealed Threaded Case Filters

.690 ø Pi Circuit



.690 ø Pi Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage				I Amp	Min Cap μF	DCR Max Ohms	Max L <i>(mm)</i>		Minimum Insertion Loss (dB)						
			85°C		125°C					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	
SCI-6130-009	—	1	150	—	100	—	20.0	5.200	0.001	1.195	(30.353)	23	31	35	35	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	
†51-321-318	—	1	450	240	400	*240	3.00	0.720	0.030	1.195	(30.353)	—	31	51	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	

* 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				I Amp	Min Cap μF	DCR Max Ohms	Max		Minimum Insertion Loss (dB)						
			85°C		125°C					In	L <i>(mm)</i>	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
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

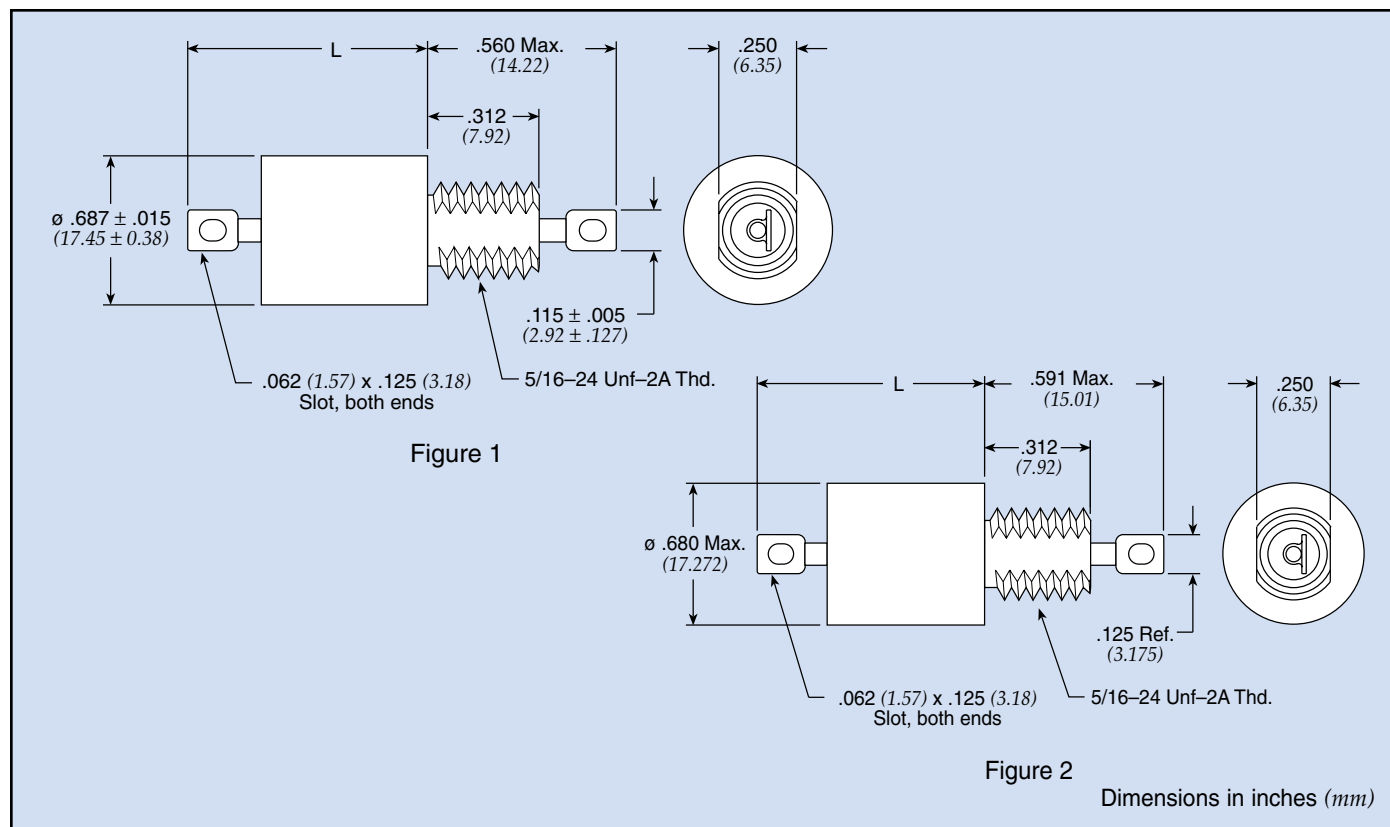
.690 ø Pi Circuit DSCC 84084 Product

Part Number	84084 No	Figure	Rated Voltage				I Amp	Min Cap μ F	DCR Max Ohms	Max L		Minimum Insertion Loss (dB)						
			85°C		125°C					In	L (mm)	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



.690 ø T Circuit Standard Product

Part Number	MIL No	Figure	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	Max L		Minimum Insertion Loss (dB)						
			85°C		125°C					In	L (mm)	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	
SCI-6140-006	—	1	150	—	100	—	3.00	2.600	0.100	1.195	(30.353)	21	35	46	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	
SCI-6140-009	—	1	150	—	100	—	20.0	2.600	0.002	1.195	(30.353)	21	35	41	50	60	70	
51-321-649	—	1	250	125	200	125	2.00	0.360	0.090	1.195	(30.353)	—	24	38	65	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	

.690 ø T Circuit MIL Qualified Product

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

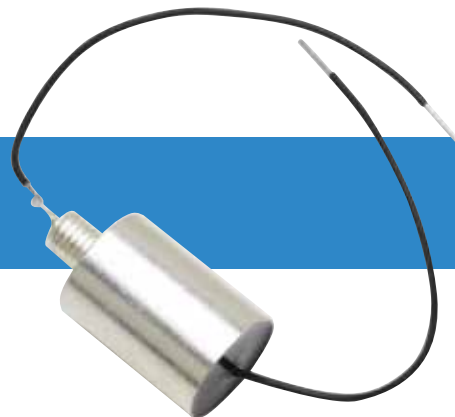
Part Number	M15733 MIL No	Figure	Rated Voltage				I Amp	Min Cap µF	DCR Max Ohms	Max		Minimum Insertion Loss (dB)						
			85°C		125°C					L <i>(mm)</i>	In	30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-321-607	27-0017	1	—	—	200	125	1.50	0.250	0.133	1.195	(30.353)	—	19	32	62	70	70	70
51-321-608	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.

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

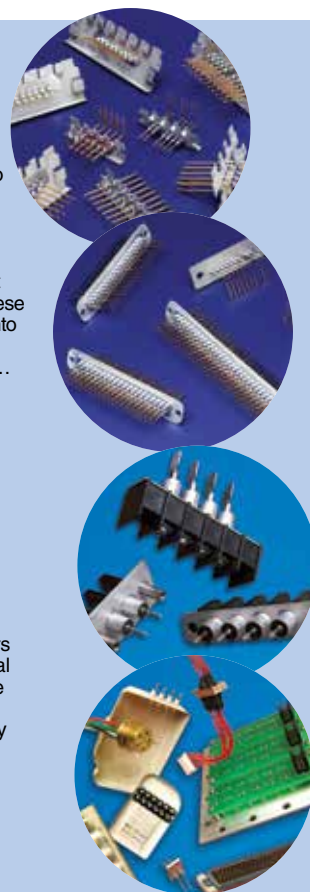


Easy Mate® Filter Plates reduce installation time and overall cost with its patented snap-in design to maximize real estate on PCBs. The Easy Mate® Jr. offers a lower profile for installation of feed-through filters into small hardware applications...**FA3-FA8**

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**

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

Filter Plates

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.

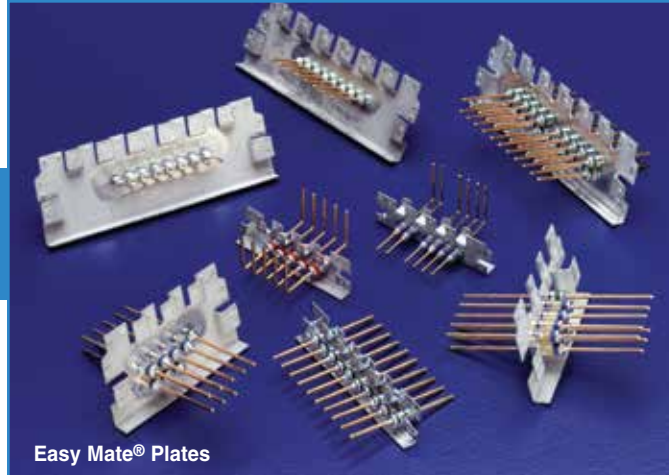
Shielding alone is unsatisfactory in shunting unwanted harmonics, conducted or radiated, on power/control lines that run through compartments of an electronic enclosure. This is particularly applicable in systems operating at frequencies above 50 MHz. Isolation and the incorporation of feed-through filters (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

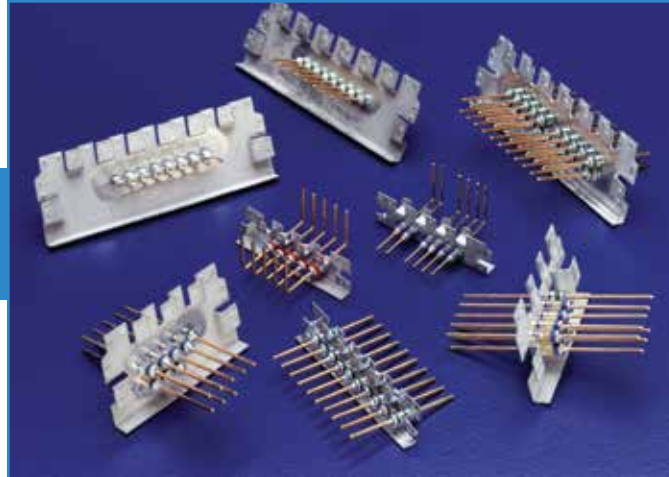
- Provide an EMI filtered signal line between electronic system modules
- Reduce cost . . . economical method to meet EMC requirements
- Reduce labor . . . eliminate need to assemble filters into a bulkhead
- Outperform surface mount EMI filters at frequencies above 50 MHz
- Reduce risk of damage to 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



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-density centers (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.



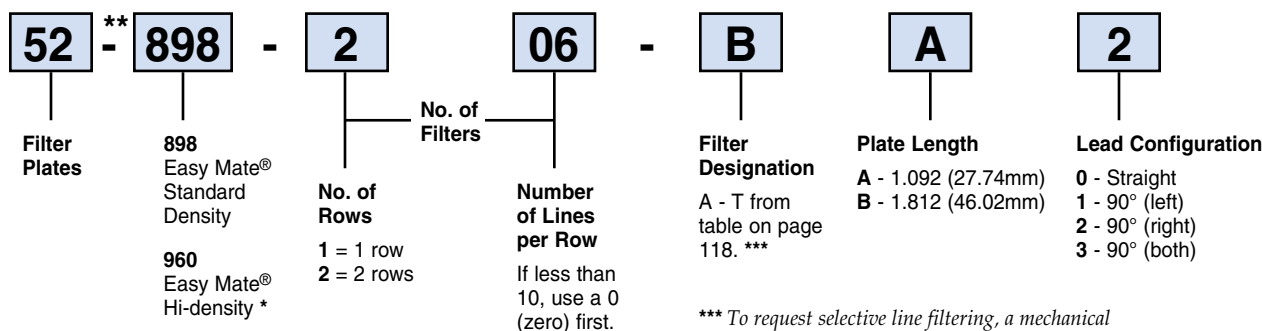
Easy Mate® Advantages

- 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-B A 2

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.

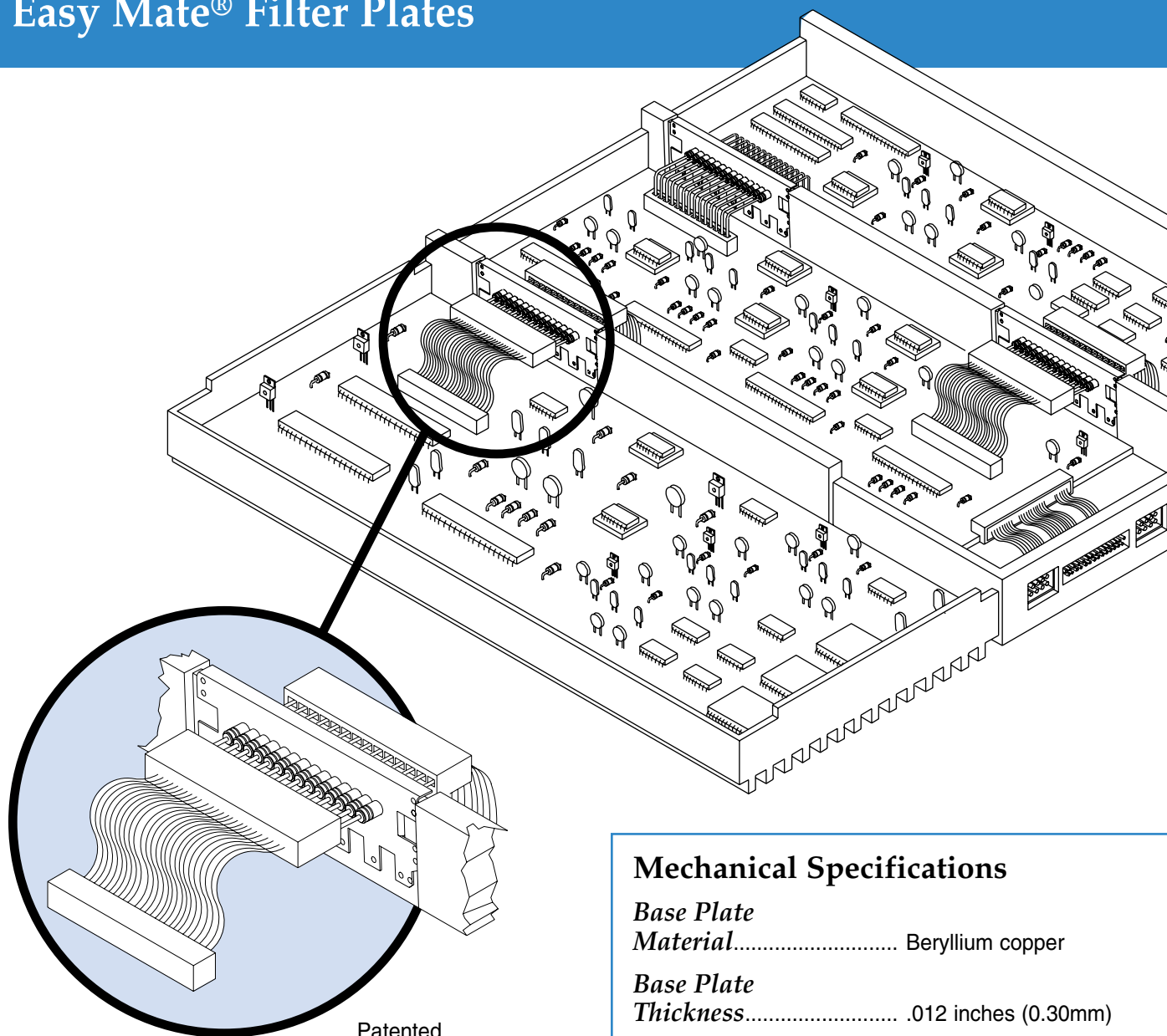


* Maximum capacitance
up to 4000pF C style filter

** 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.

Easy Mate® Filter Plates



Patented

Soldering to Filter Terminals

- Use a temperature controlled soldering iron with tip temperature of $525 \pm 10^\circ \text{F}$ ($275 \pm 5^\circ \text{C}$).
- 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

..... $\varnothing$.025" (.64mm) for 0.100"
centers (2.54mm)
 $\varnothing$.020 (.51mm) for 0.079"
centers (2.00mm)

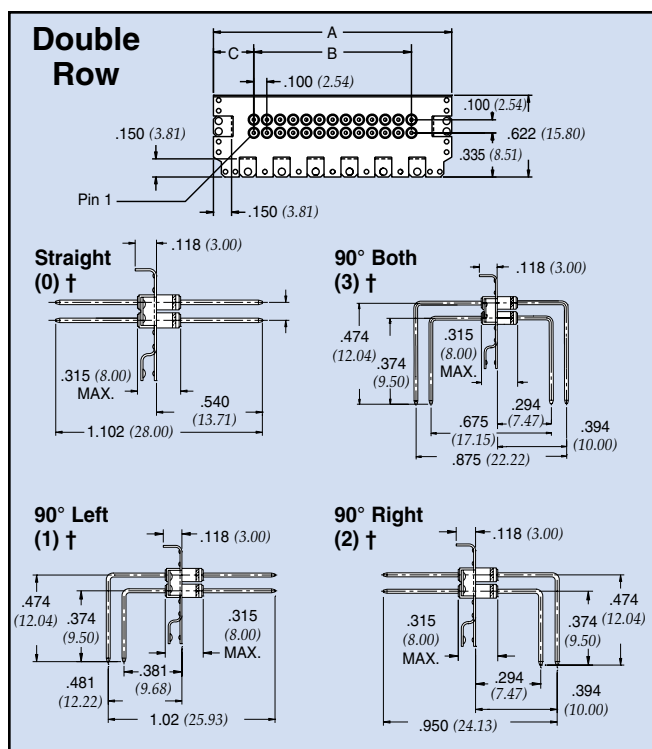
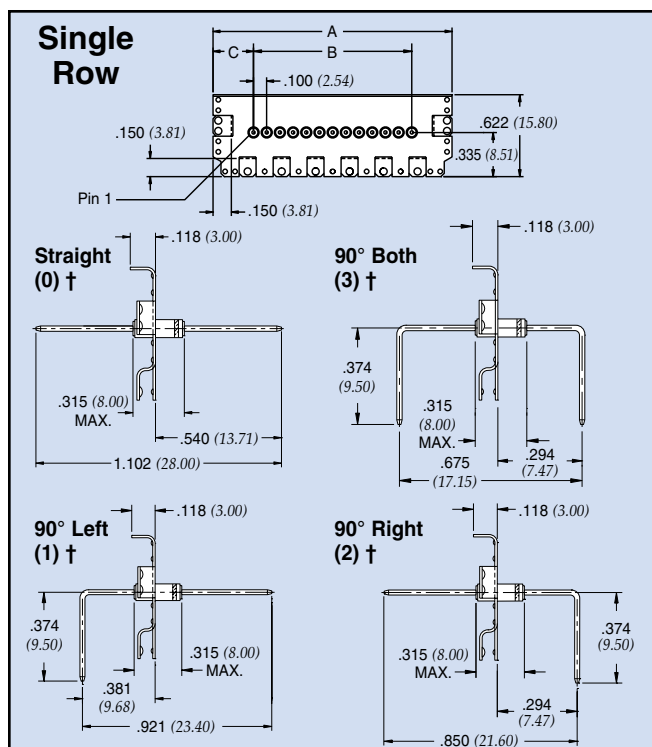
Current Rating

..... 5 Amps for .025" $\varnothing$
(.64mm)
3 Amps for .020" $\varnothing$
(.51mm)

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

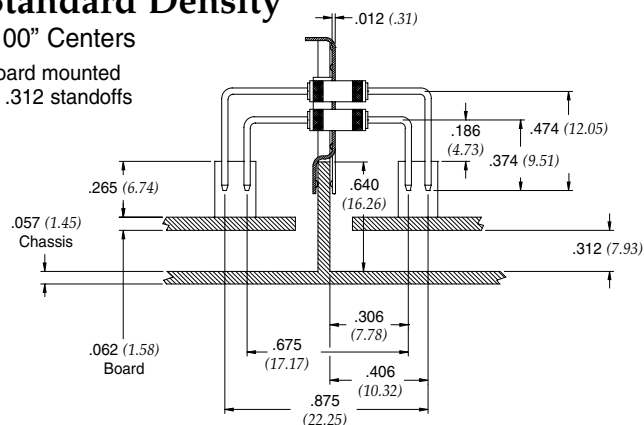
Plate length (A)	No. of filtered lines per row	52-898-XXX-XXX	
		B	C
1.092 (27.74)	1	0 (0.00)	0.496 (12.60)
	2	0.1 (2.54)	0.496 (12.60)
	3	0.2 (5.08)	0.396 (10.06)
	4	0.3 (7.62)	0.396 (10.06)
	5	0.4 (10.16)	0.296 (7.52)
	6	0.5 (12.70)	0.296 (7.52)
1.812 (46.02)	1	0 (0.00)	0.906 (23.01)
	2	0.1 (2.54)	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

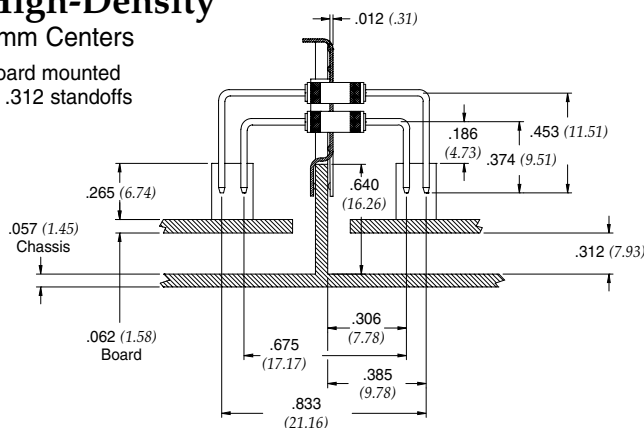
Board mounted to .312 standoffs



High-Density

2mm Centers

Board mounted to .312 standoffs



Easy Mate® Filter Plates Hi-Density Centers 2mm

Dimensions: inches and (mm)

Lead Spacing: .079" (2.00 mm)

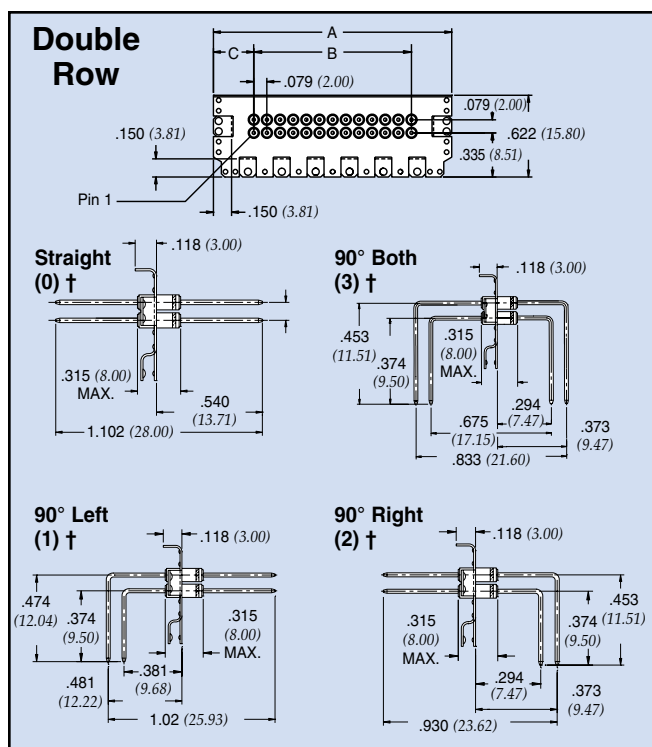
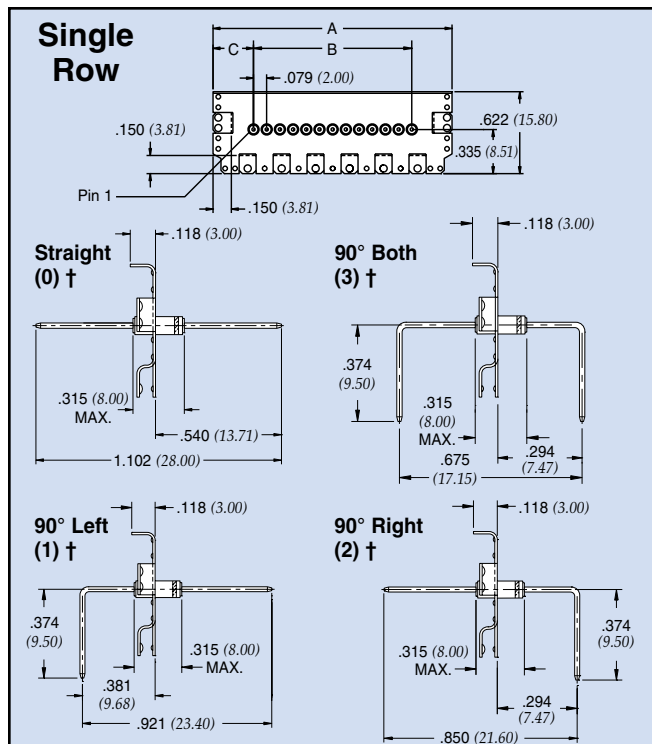


Plate length (A)	No. of filtered lines per row	52-960-XXX-XXX	
		B	C
1.092 (27.74)	2	0.079 (2.00)	0.463 (11.77)
	3	0.157 (4.00)	0.463 (11.77)
	4	0.236 (6.00)	0.385 (9.77)
	5	0.315 (8.00)	0.385 (9.77)
	6	0.394 (10.00)	0.306 (7.77)
	7	0.472 (12.00)	0.306 (7.77)
1.812 (46.02)	2	0.079 (2.00)	0.866 (22.00)
	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

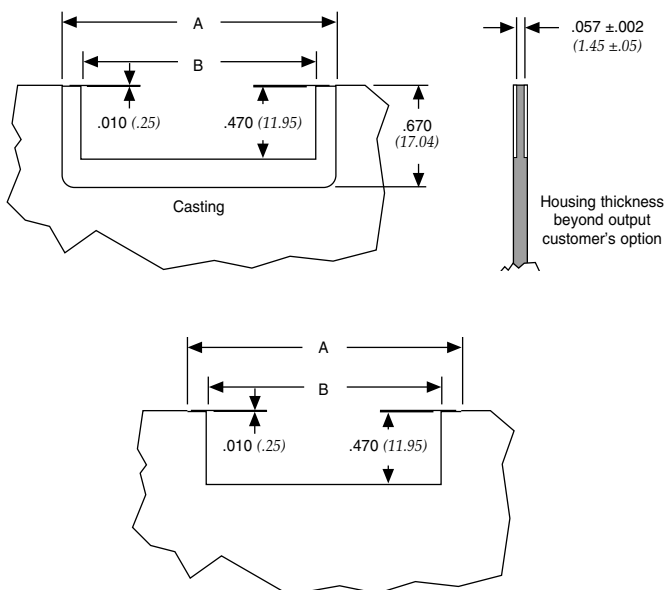


Plate Length	A	B
1.092 (27.74)	1.117 (28.41)	0.816 (20.75)
1.812 (46.02)	1.837 (46.71)	1.535 (39.04)

Patented

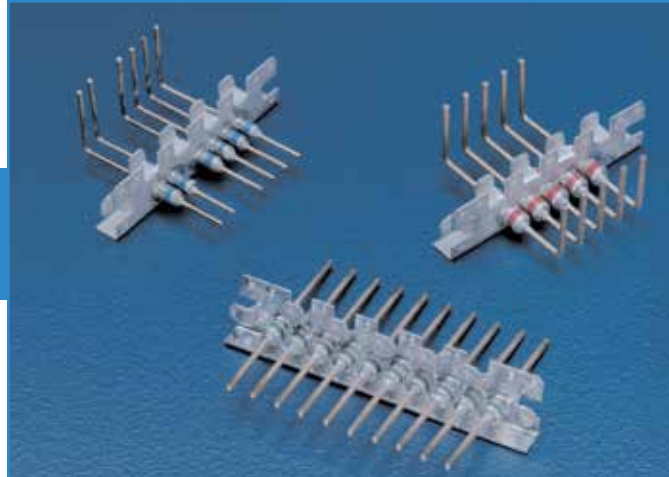
† Refers to lead configuration for part number/ordering information

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

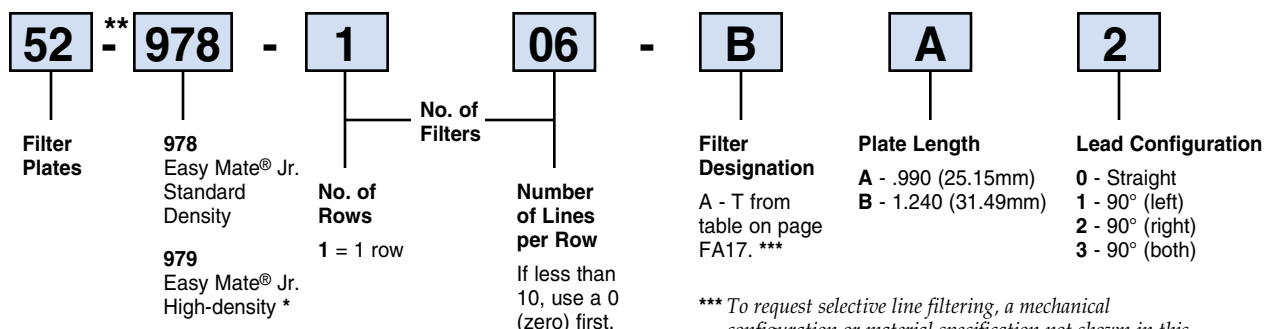
Lead Diameter..... $\varnothing$.025" (.64mm)
for 0.100" centers (2.54mm)
 $\varnothing$.020 (.51mm)
for 0.079" centers (2.00mm)

Current Rating 5 Amps for .025" $\varnothing$ (.64mm)
3 Amps for .020" $\varnothing$ (.51mm)

Ordering Information

Example: 52-978-1-06-B-A-2

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.



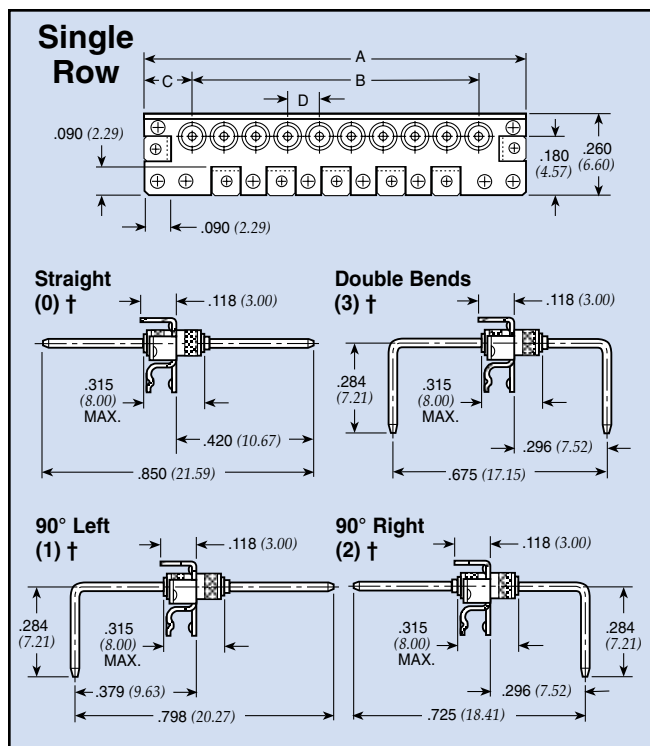
* Maximum capacitance
up to 4000pF C style filter

**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.

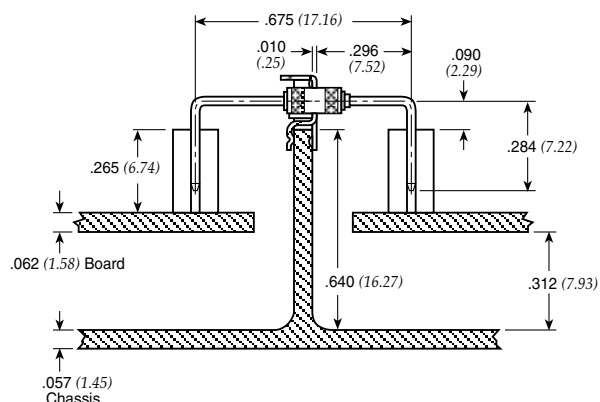
Easy Mate® Jr. Filter Plates

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	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	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

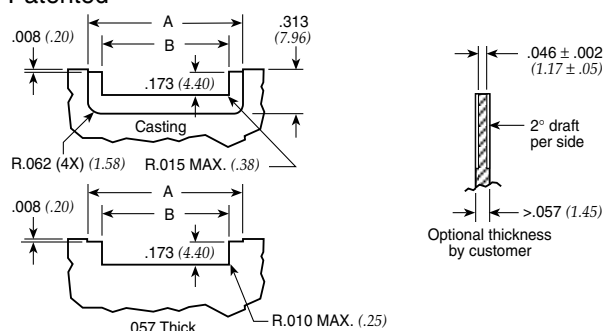
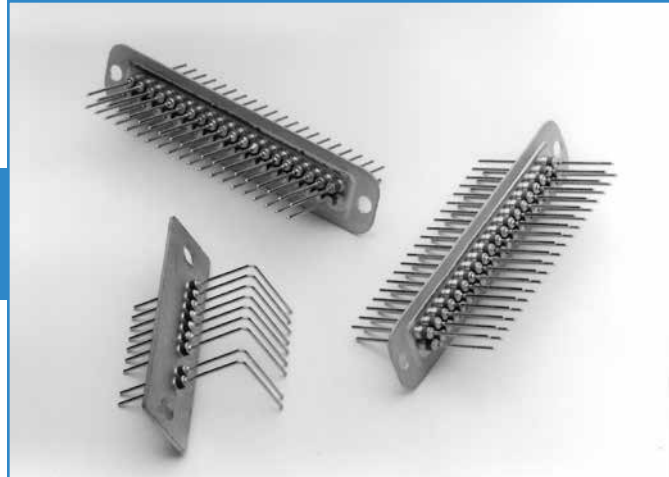


Plate Length	A	B
.990 (25.15)	1.015 (25.78)	0.834 (21.18)
1.24 (31.49)	1.265 (32.13)	1.084 (27.53)

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.



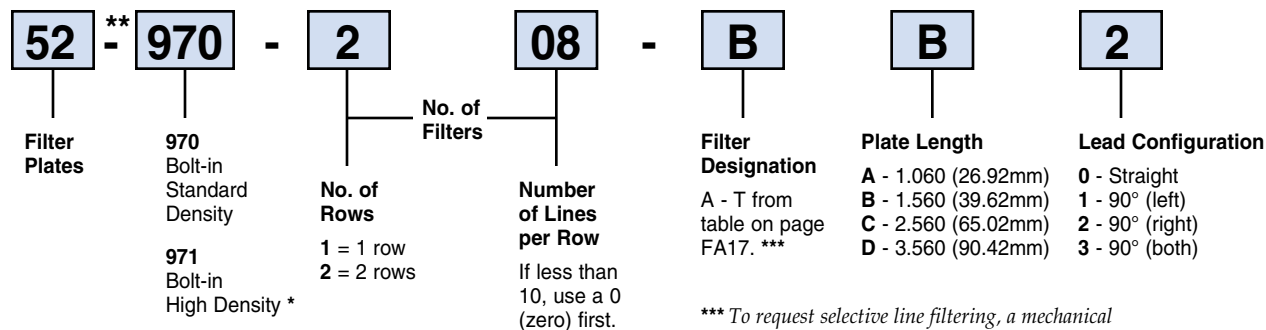
Bolt-in Filter Plate Advantages

- 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.

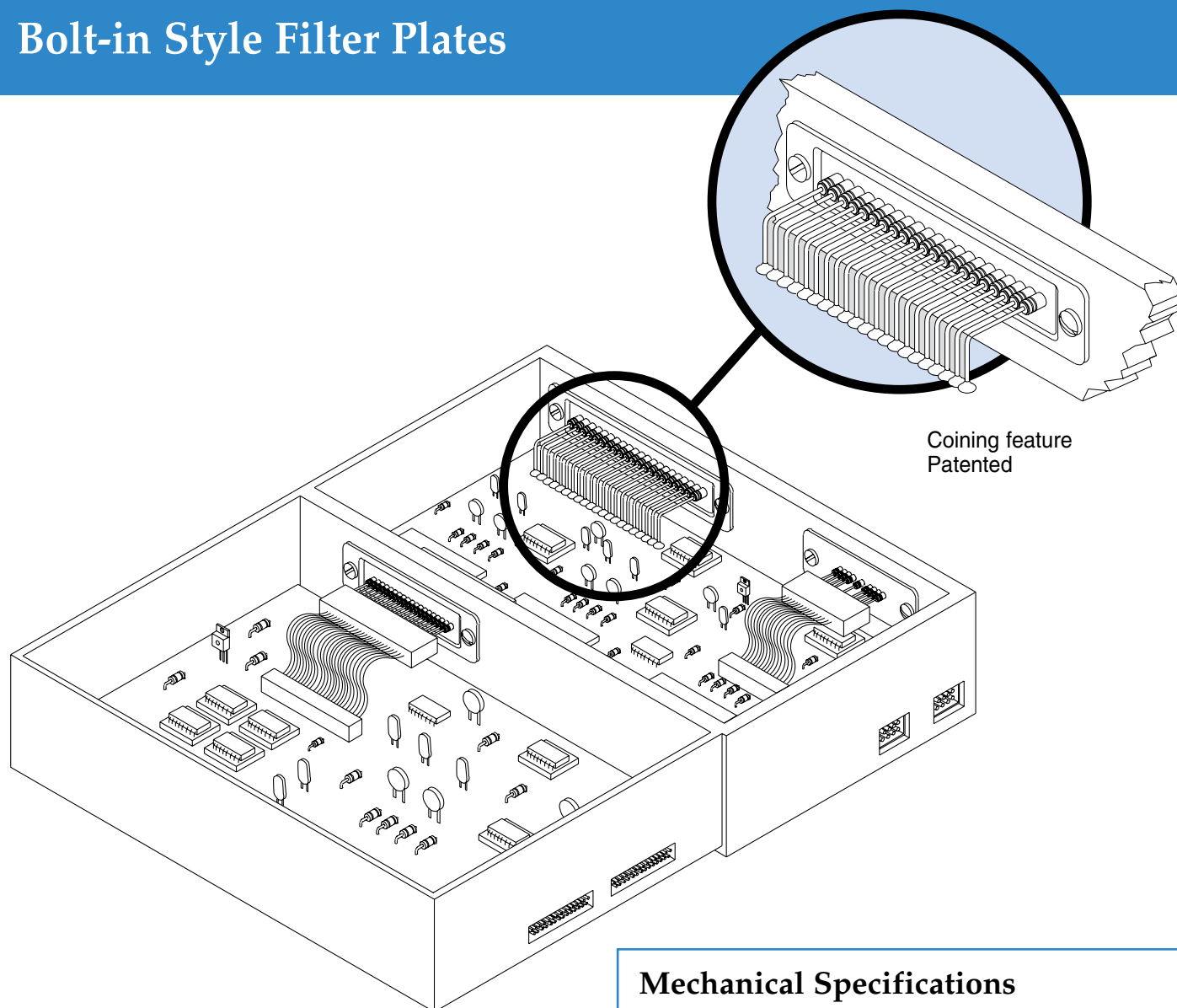


* Maximum capacitance up to 4000pF C style filter

**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.

Bolt-in Style Filter Plates



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..... $\varnothing$.025" (.64mm)
for 0.100" centers (2.54mm)
 $\varnothing$.020 (.51mm)
for 0.079" centers (2.00mm)

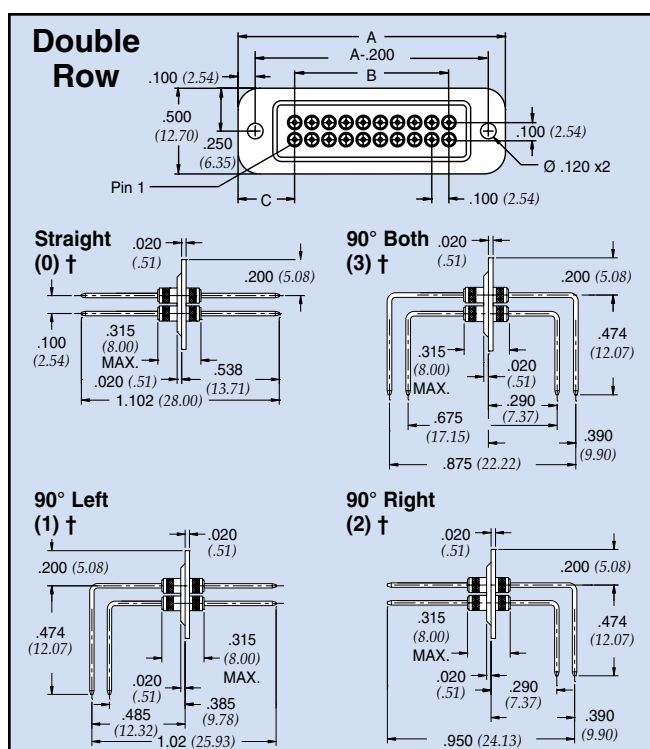
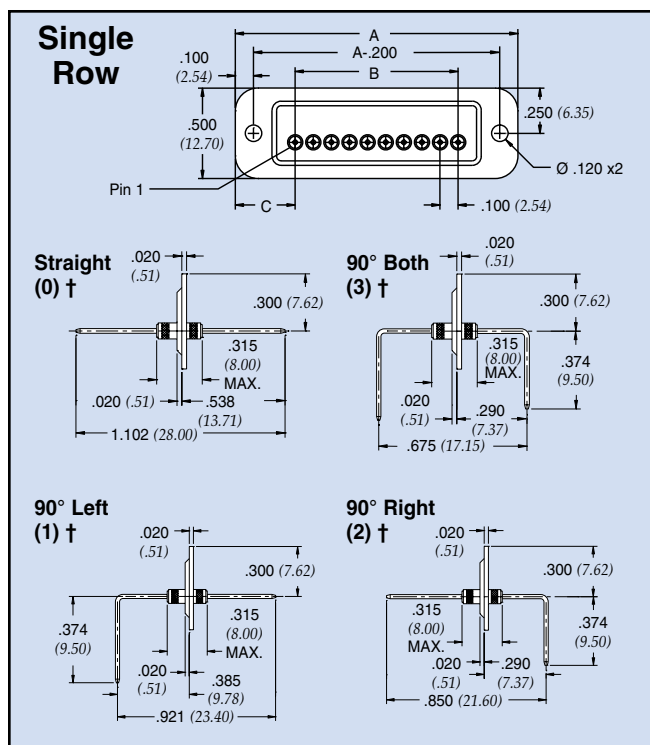
Current Rating..... 5 Amps for .025" (.64mm) $\varnothing$
3 Amps for .020" (.51mm) $\varnothing$

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

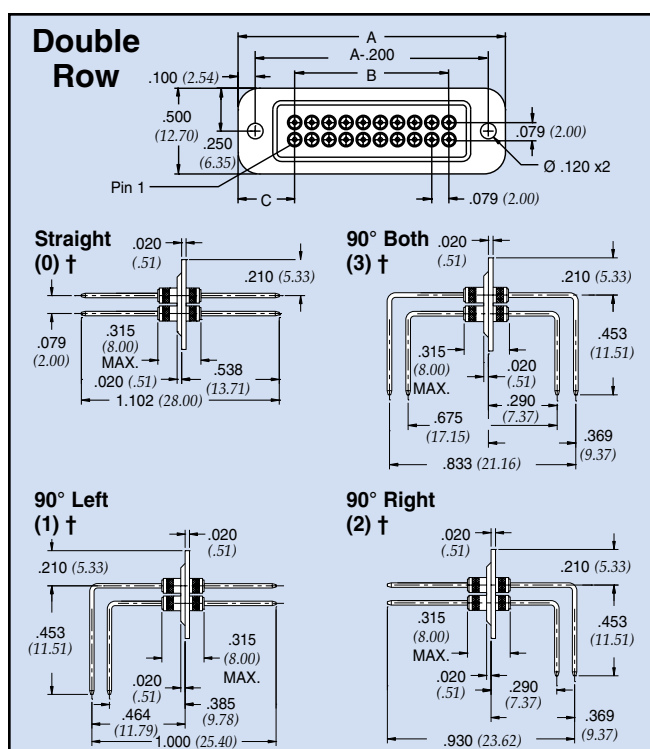
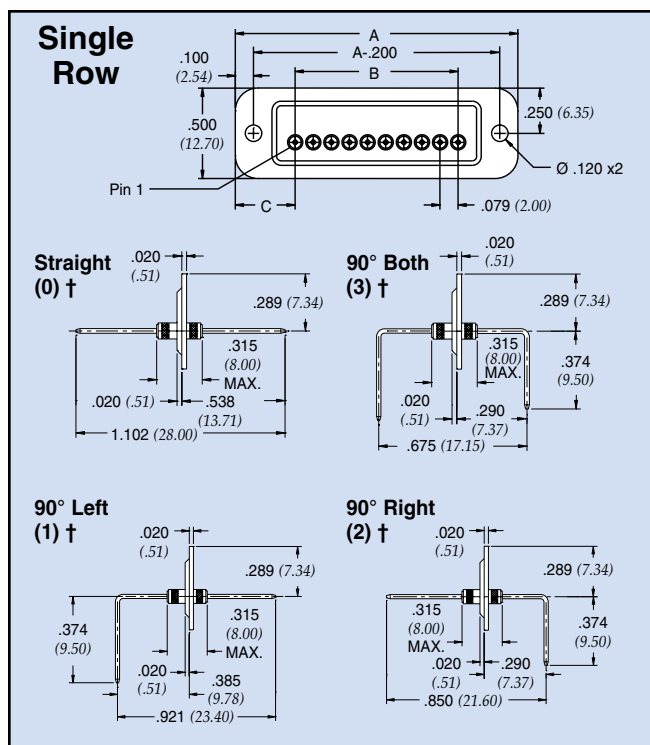
Plate length (A)	No. of filtered lines per row	52-970-XXX-XXX	
		B	C
1.060 * (26.92)	1	0 (0.00)	0.53 (13.46)
	2	0.1 (2.54)	0.43 (10.92)
	3	0.2 (5.08)	0.43 (10.92)
	4	0.3 (7.62)	0.33 (8.38)
	5	0.4 (10.16)	0.33 (8.38)
1.560 * (39.62)	1	0.0 (0.00)	0.73 (18.54)
	2	0.1 (2.54)	0.73 (18.54)
	3	0.2 (5.08)	0.63 (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.

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	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)
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)
3.560 (90.42)	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)
	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.

Custom Filter Plates

High Volume Industrial

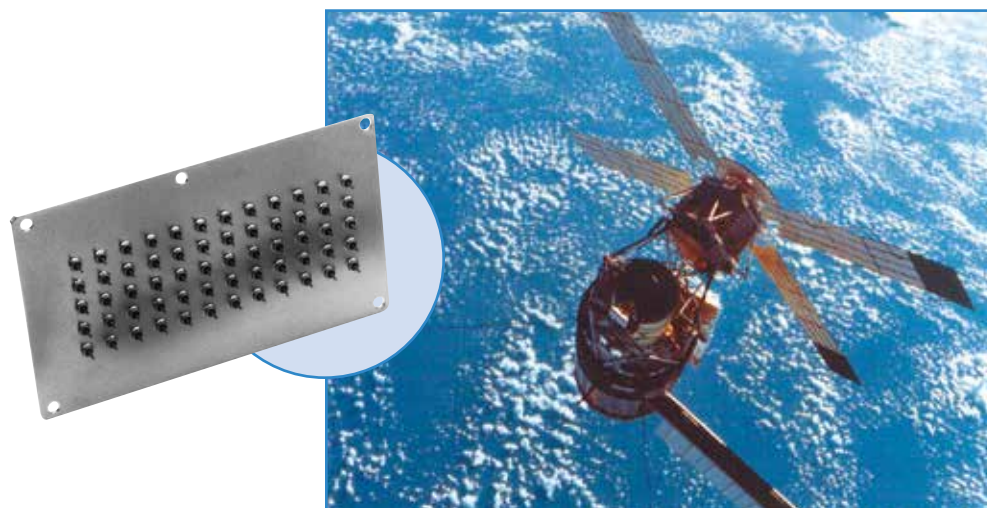
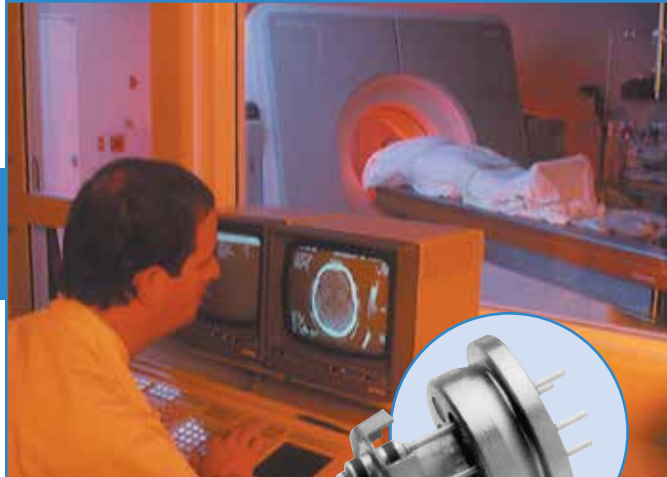
As a long-term producer of filter plates for industrial applications, API Technologies understands the cost requirements of this market. In turn, we have established a program to develop and manufacture custom designed filter plates for cost sensitive industrial applications.

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.



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

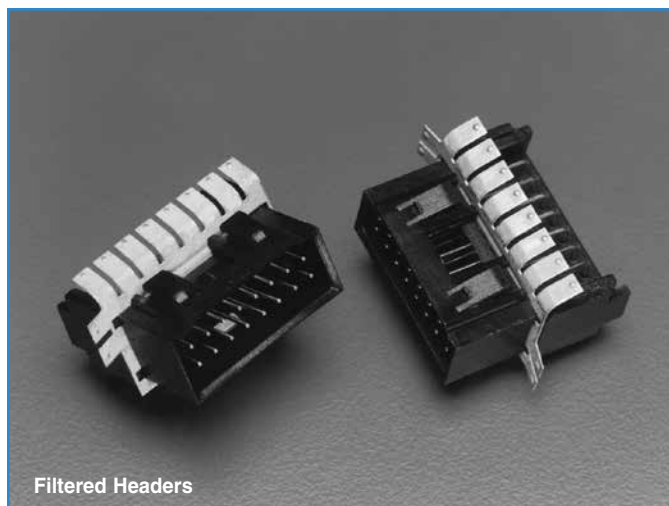
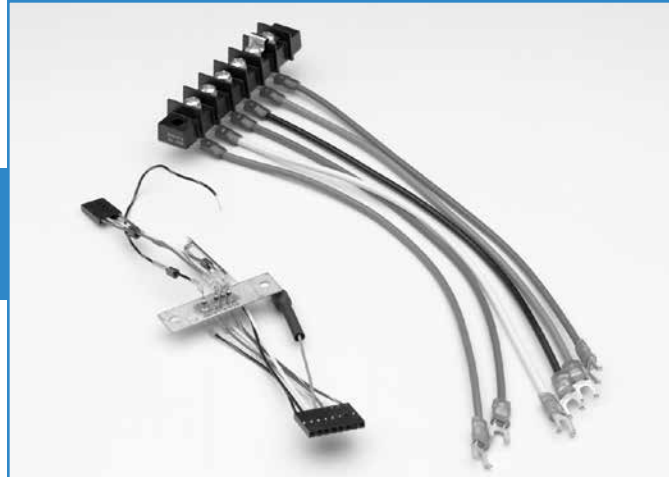
Replace the unfiltered connector on your PC board with API's low cost filtered header. This innovative new product allows you to meet EMC emissions and susceptibility standards with minimal or no board change.

Flat Conductor Cables

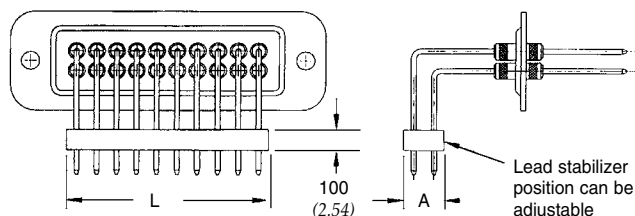
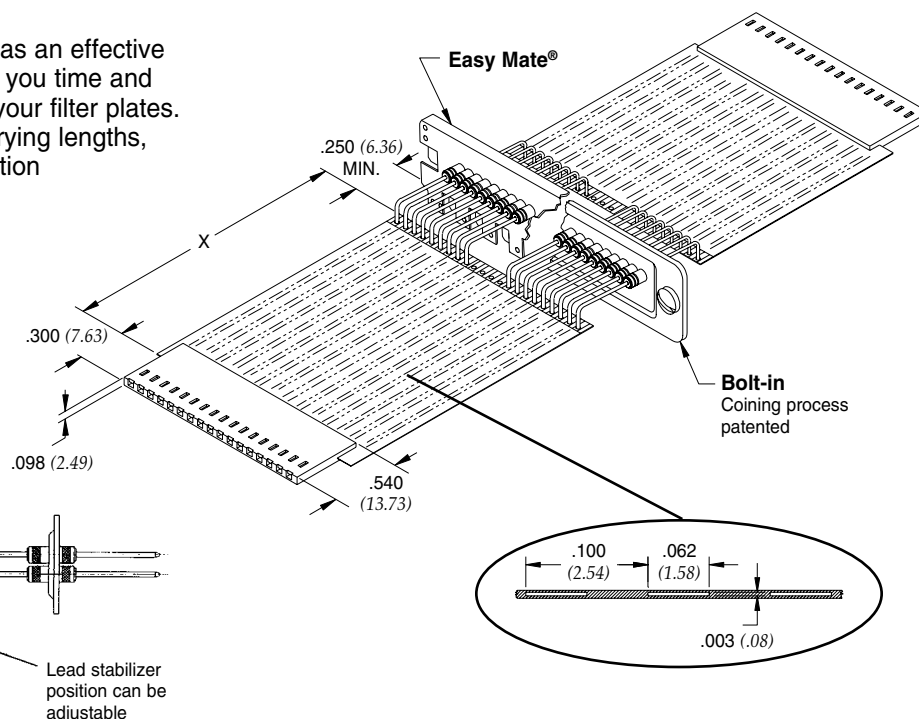
Flat conductor cables are often selected as an effective method of interconnection. API can save you time and money by installing conductor cables to your filter plates. Flat conductor cables are available in varying lengths, conductor counts, and in several termination configurations.

Lead Stabilizer

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



Filtered Headers



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.

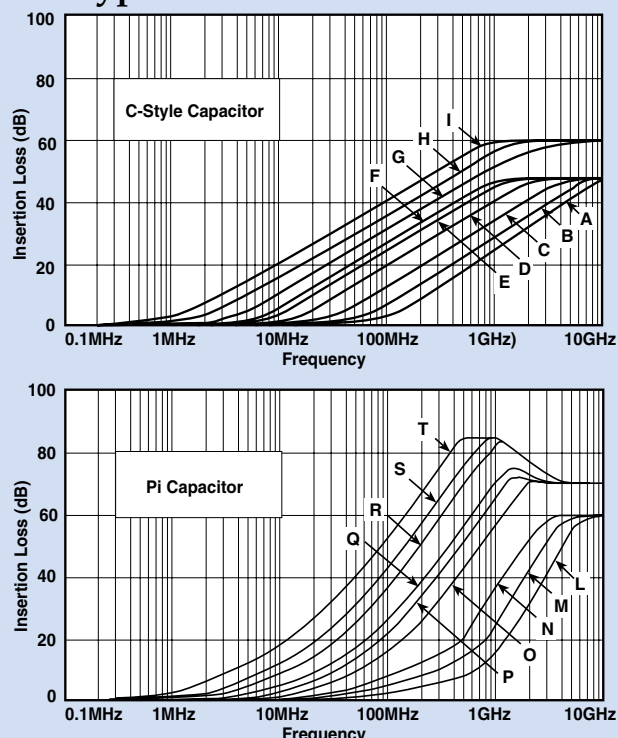
Custom Filtering

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	10	F	F	F	R	R	6
Based on front view of plate	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		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	C	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		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	Pi	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		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.

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)

<u>Lead Diameter</u>	<u>Total Lead Length</u>	<u>Lead Material</u>	<u>Lead Plating</u>
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			
<u>Plate Thickness (± 0.002")</u> (0.010" for Easy Mate® Jr.) (0.012" for Easy Mate®) (0.020" for Bolt-in) 0.026" 0.033" 0.041"		<u>Plating of Base Plate</u> Tin Silver 90/10 Solder Nickel	
<u>Center-to-Center Spacing</u> (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

Barrier Strip Filtered Terminal Blocks

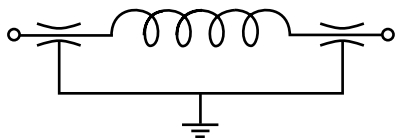
The barrier strip filtered terminal block is designed to provide excellent EMI/RFI filtering of AC and DC power lines and control lines. This terminal block is available in various sizes, with terminals for soldering or spade lugs. Application examples include filtering power supplies in telecommunications 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. Resistance01 ohms max.

Typical Loss (dB) In 50 Ohm Circuit

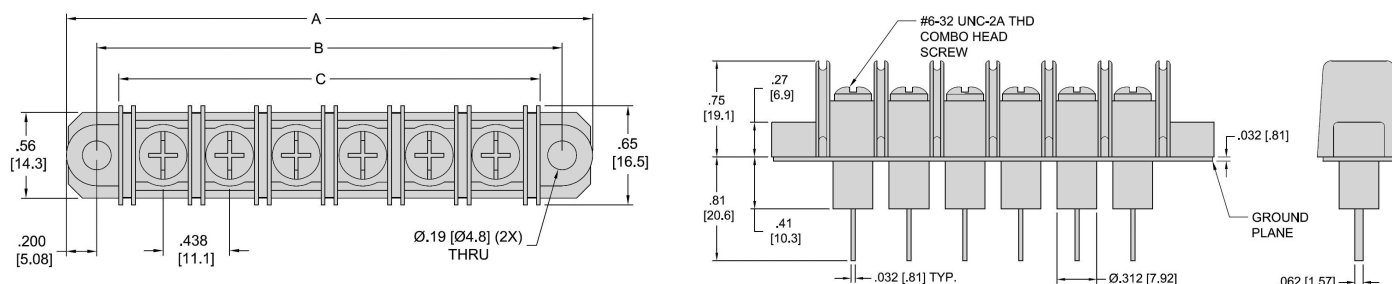
Frequency	Insertion Loss (dB)
30 MHz	22
50 MHz	32
100 MHz	48
300 MHz	70
500 MHz	75
1000 MHz	75

The diagram shows a side view of a terminal block with a top cap. Dimensions are given in inches and millimeters. The top cap has a width of .758 (19.3). The distance from the top of the cap to the top of the terminal block is .820 (20.9). The total height of the terminal block is 1.30 (33.1) MAX. The terminal block has a circular hole in the center. The distance from the bottom of the terminal block to the bottom of the cap is .187 (4.8). The distance from the bottom of the terminal block to the bottom of the cap is .250 (6.4). The distance from the bottom of the terminal block to the bottom of the cap is .032 (.8) THK. FOR BOTH.

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)

Barrier Strip Filtered Terminal Blocks

Front panel mount



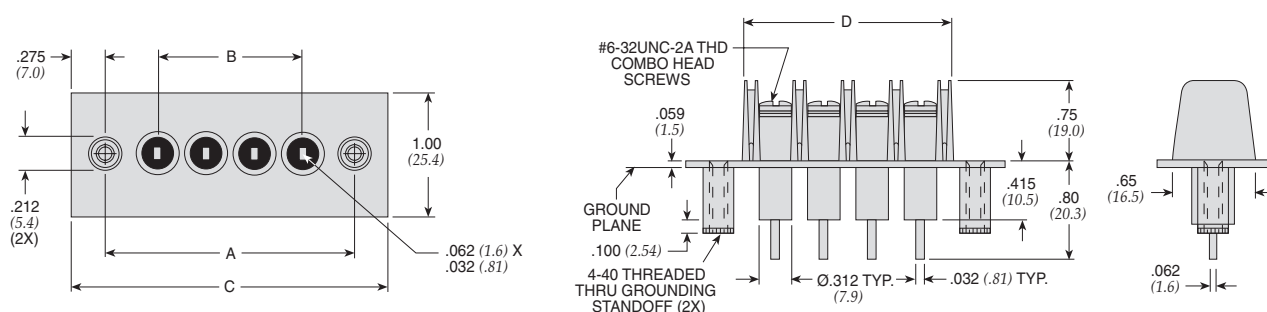
20 Amps

Dimensions in inches (mm)

Part Number	Number of Circuits	in. A (mm)	in. B (mm)	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)

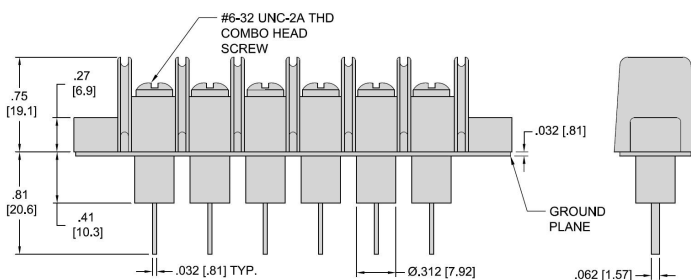
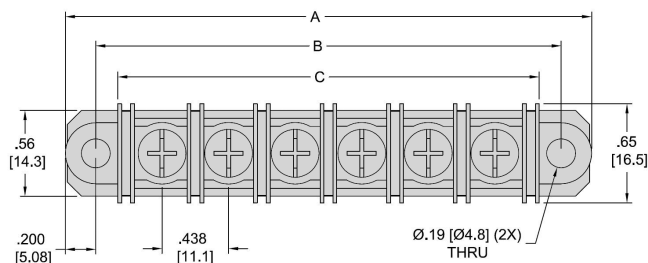
Part Number	Number of Circuits	in. A (mm)	in. B (mm)	in. C (mm)	in. D (mm)
52-188-002-A	2	1.31 (33.3)	.438 (11.1)	1.86 (47.3)	1.02 (25.9)
52-188-003-A	3	1.75 (44.4)	.875 (22.2)	2.30 (58.4)	1.46 (37.1)
52-188-004-A	4	2.19 (55.6)	1.313 (33.3)	2.74 (69.5)	1.90 (48.3)
52-188-005-A	5	2.62 (66.6)	1.750 (44.4)	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)

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 phillslot
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	in. A (mm)	in. B (mm)	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)

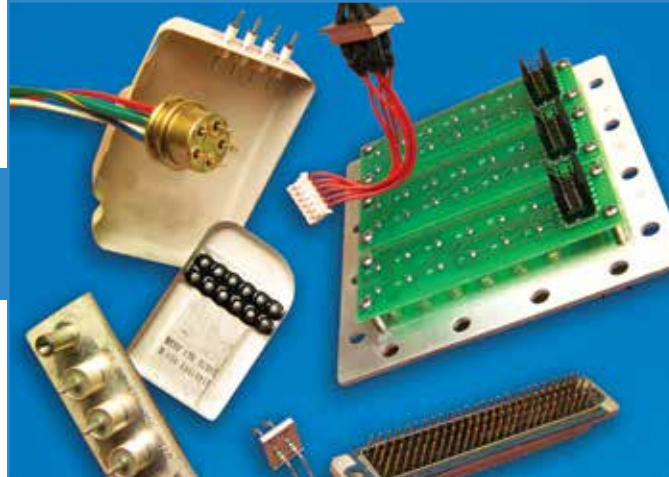
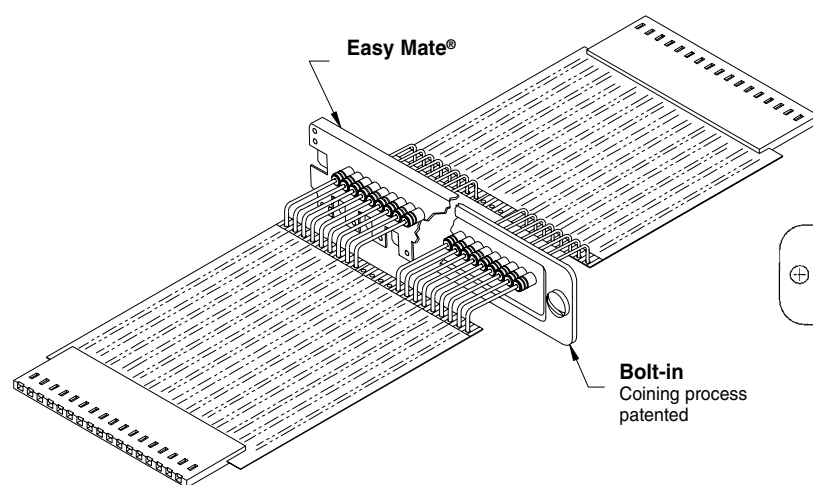
Custom Filtered Arrays

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

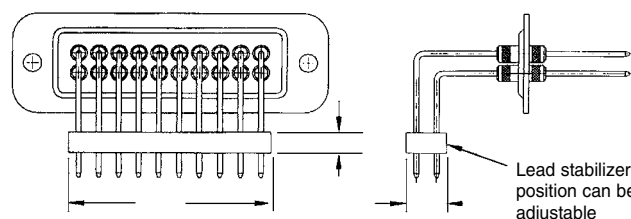
Replace the unfiltered connector on your PC board with API's low cost filtered header. This innovative new product allows you to meet EMC emissions and susceptibility standards with minimal or no board change.

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.

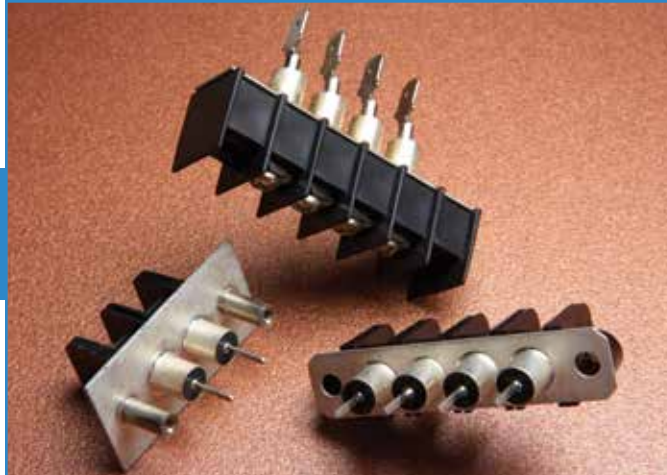
Lead Stabilizer

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



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: _____	

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**

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

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.



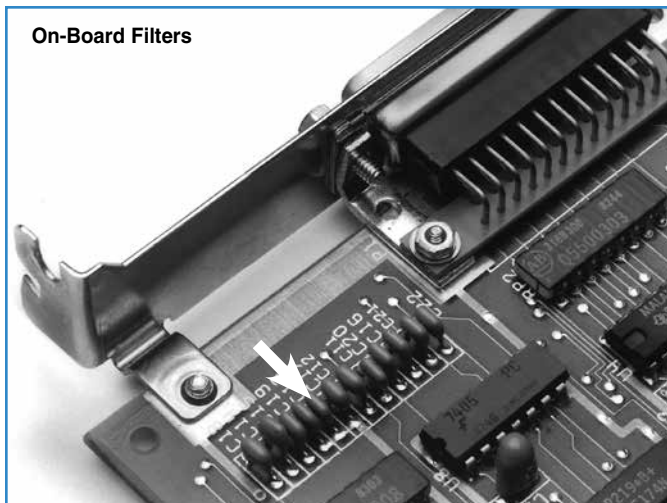
D-Subminiature Connectors



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

On-Board Filters



Series F Ferrite Filtered Connectors

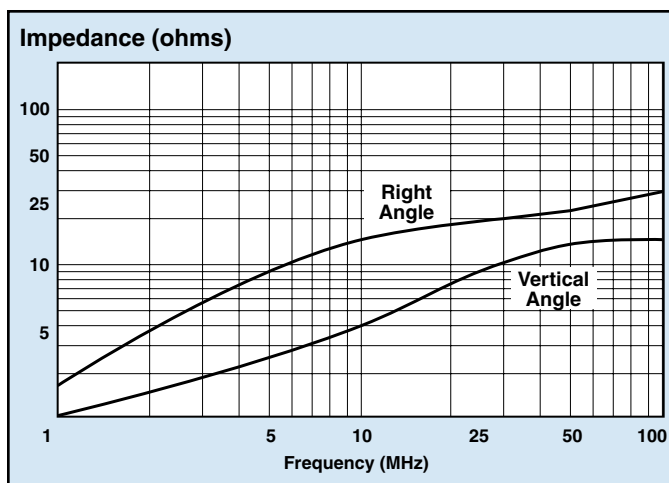
The Series F filtered D-subminiature connectors incorporate a solid slab of ferrite material as the filtering element. This rugged one-piece design provides a com-compact connector that is a drop-in replacement for standard connectors. The ferrite material has been chosen for optimum filtering performance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

Series F Applications

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

Features

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



Mechanical Specifications

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

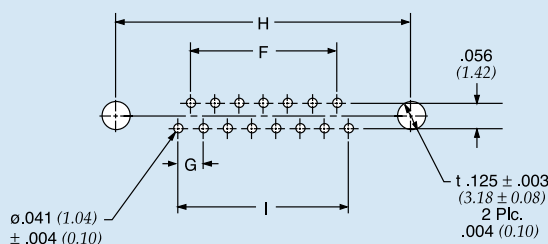
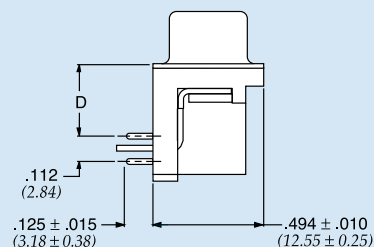
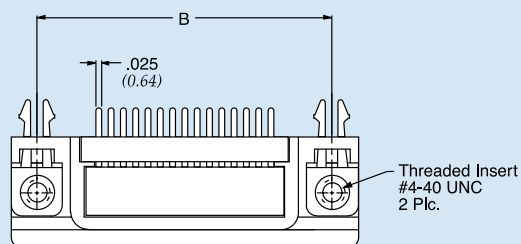
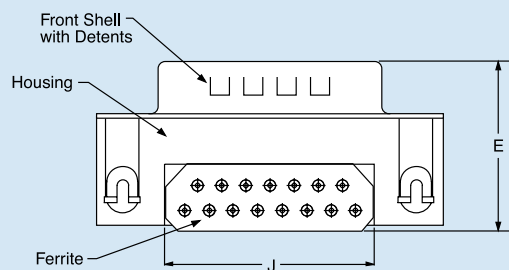
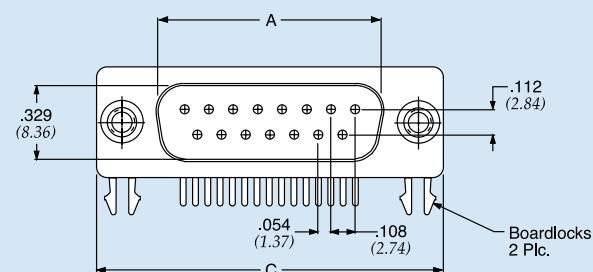
Electrical Specifications

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

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

Series F Ferrite Filtered Connectors

Pin Contact – Right Angle Mount



PC Board Mounting Dimensions

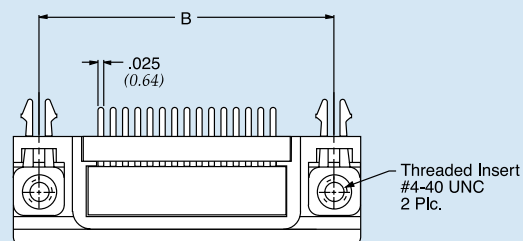
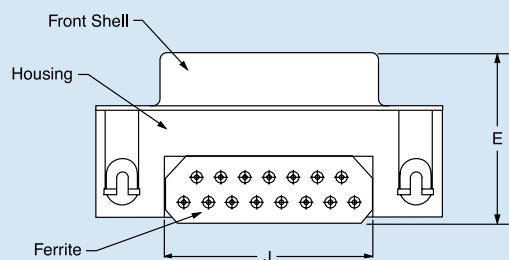
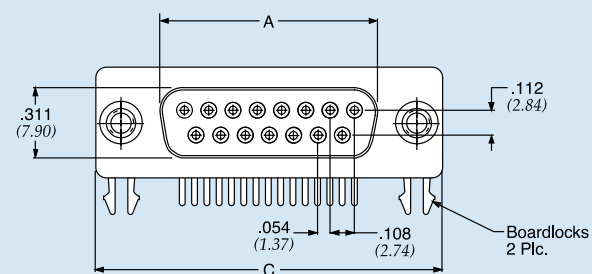
Part Number	Description	Typ. Impedance (Ohms)		Frequency Range	A +/- 0.010 (0.25)	B +/- 0.005 (0.13)	C +/- 0.015 (0.38)	D +/- 0.010 (0.25)	E +/- 0.015 (0.38)	F +/- 0.005 (0.13)	G +/- 0.004 (0.10)	H +/- 0.005 (0.13)	I +/- 0.005 (0.13)	J +/- 0.005 (0.13)
		30 MHz	100 MHz											
€ 56-402-001	D-Sub 9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

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

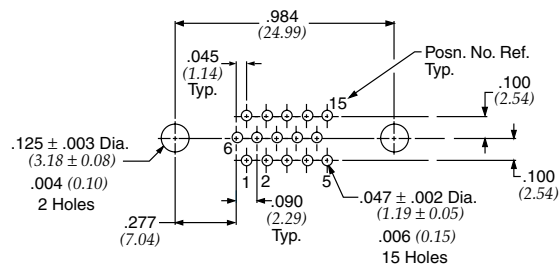
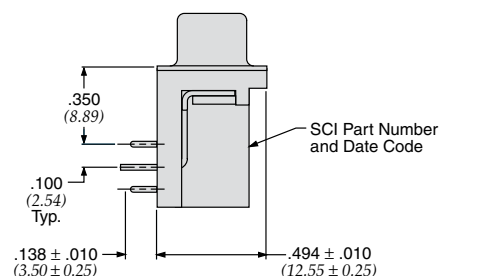
Dimensions in inches (mm)

Series F Ferrite Filtered Connectors

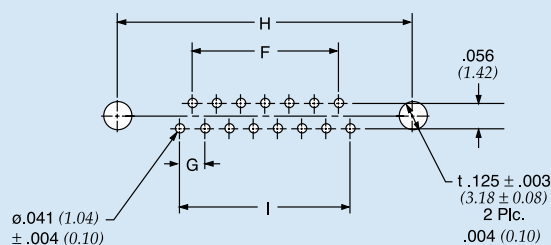
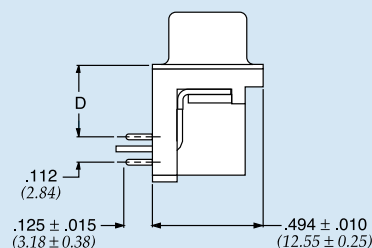
Socket Contact – Right Angle Mount



*High-Density



PC Board Mounting Dimensions



PC Board Mounting Dimensions

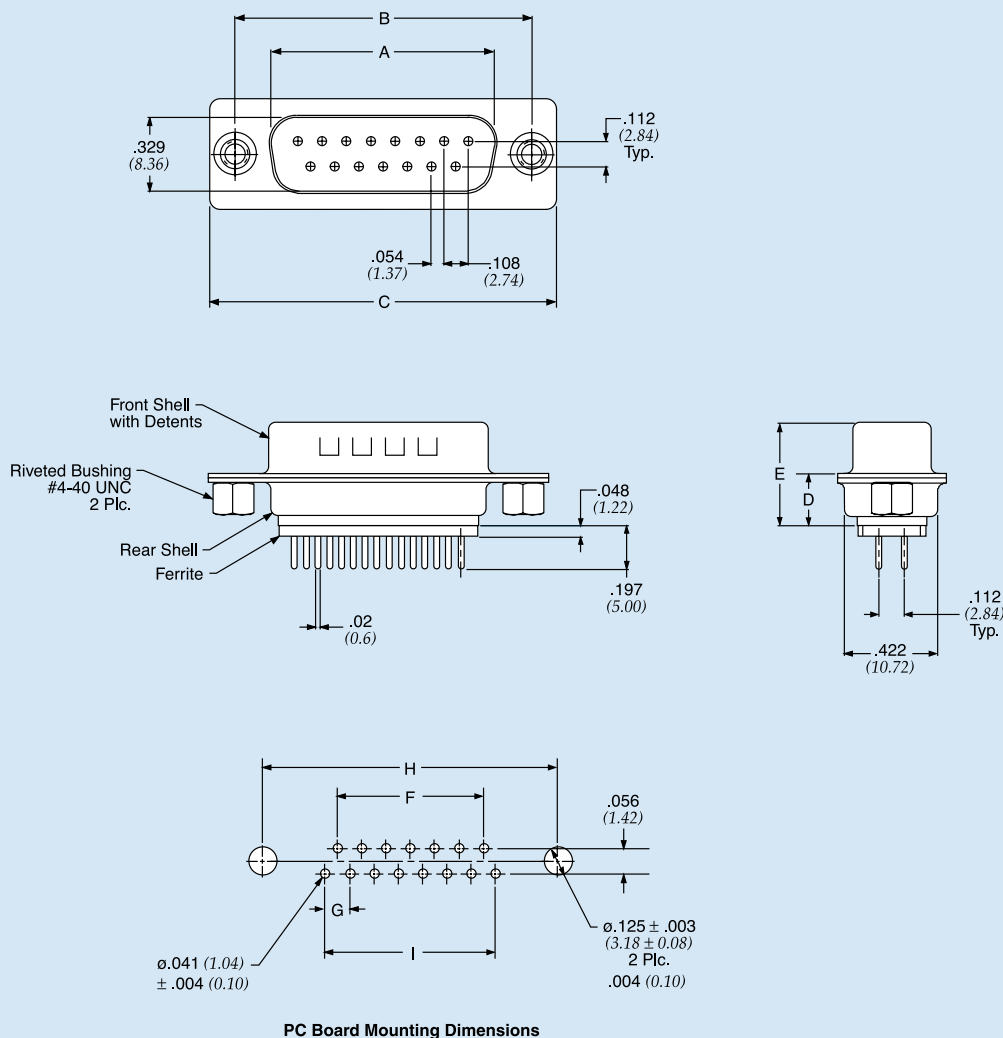
Part Number	Description	Typ. Impedance (Ohms)		Frequency Range	A +/-	B +/-	C +/-	D +/-	E +/-	F +/-	G +/-	H +/-	I +/-	J +/-
		30 MHz	100 MHz		0.010 (0.25)	0.005 (0.13)	0.015 (0.38)	0.010 (0.25)	0.015 (0.38)	0.005 (0.13)	0.004 (0.10)	0.005 (0.13)	0.005 (0.13)	0.005 (0.13)
€ 56-404-001	D-Sub 9 socket	20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

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

Dimensions in inches (mm)

Series F Ferrite Filtered Connectors

Pin Contact – Vertical Mount

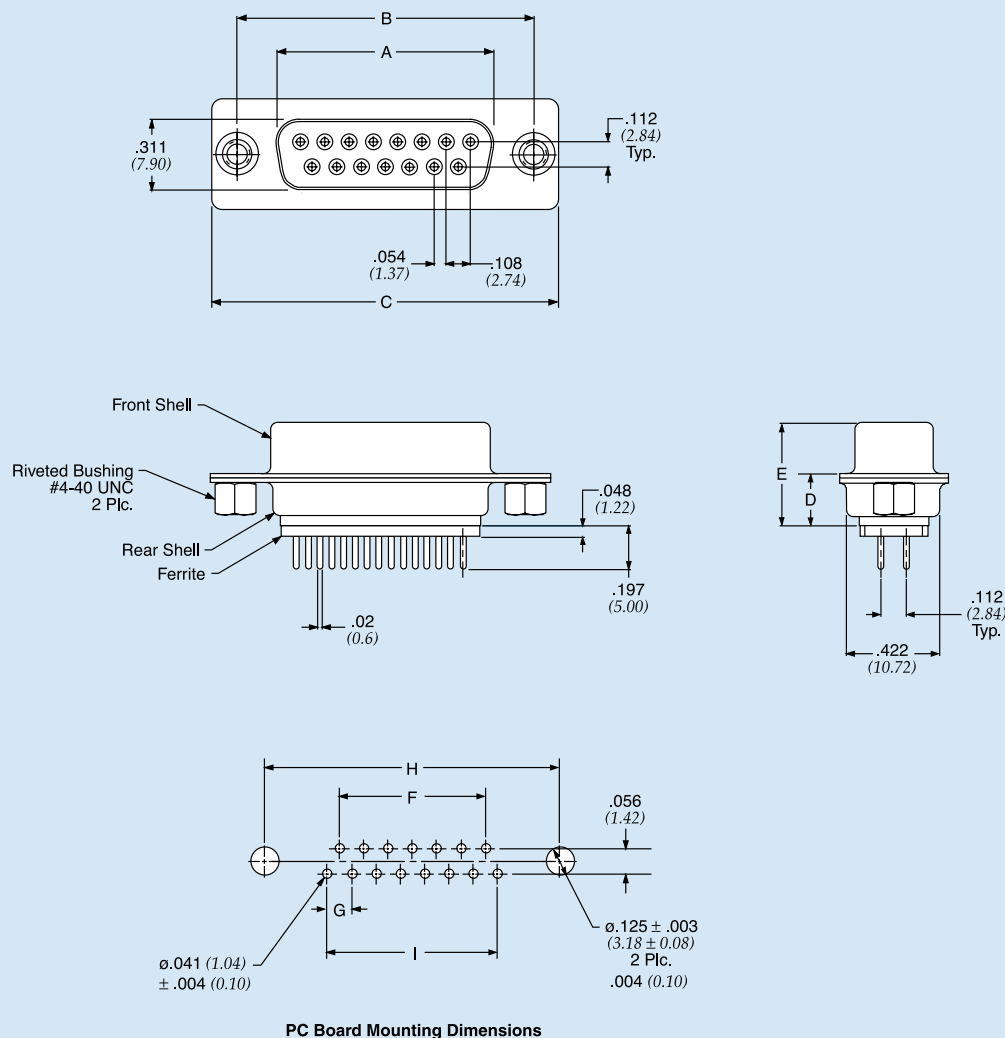


Part Number	Description	Typ. Impedance (Ohms)		Frequency Range	A +/- 0.010 <i>(0.25)</i>	B +/- 0.005 <i>(0.13)</i>	C +/- 0.015 <i>(0.38)</i>	D +/- 0.010 <i>(0.25)</i>	E +/- 0.015 <i>(0.38)</i>	F +/- 0.005 <i>(0.13)</i>	G +/- 0.004 <i>(0.10)</i>	H +/- 0.005 <i>(0.13)</i>	I +/- 0.005 <i>(0.13)</i>
		30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

Dimensions in inches (mm)

Series F Ferrite Filtered Connectors

Socket Contact – Vertical Mount



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

Dimensions in inches (mm)

Series 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-sub connectors 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.

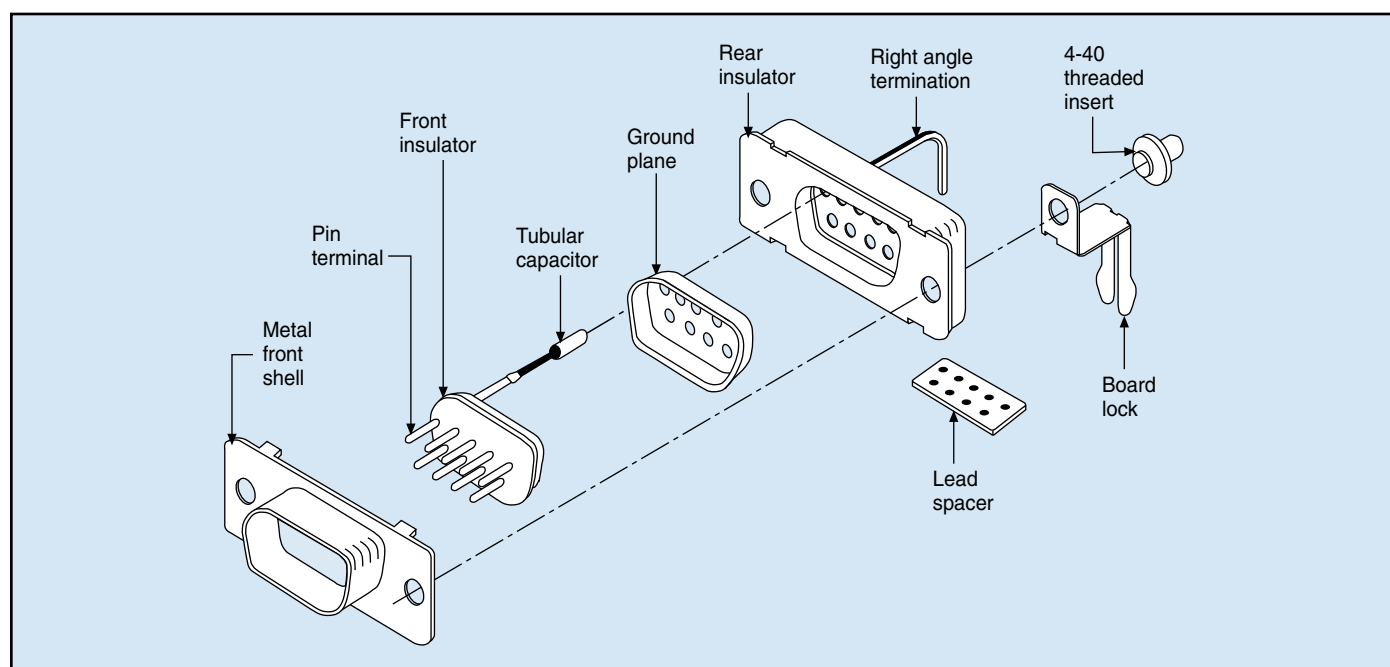
Series 500 Applications

- 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



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 $\pm 30\%$

**Working
Voltage** 100 VDC

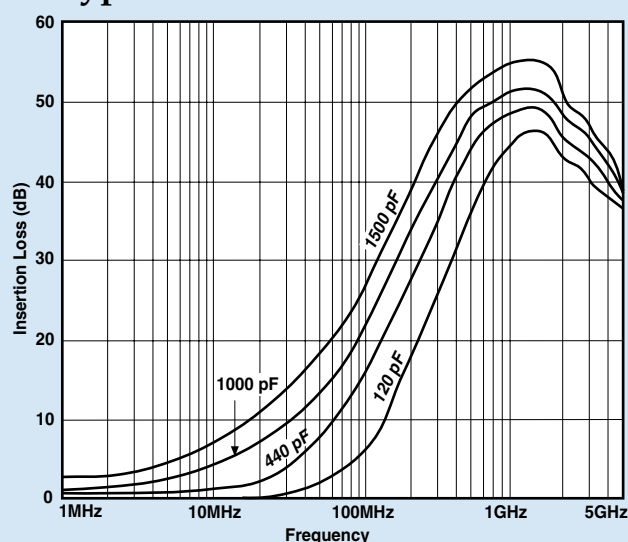
**Dielectric
Withstanding
Voltage** 300 VDC

**Insulation
Resistance** 1 Gohm minimum

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



Typical Insertion Loss



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

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

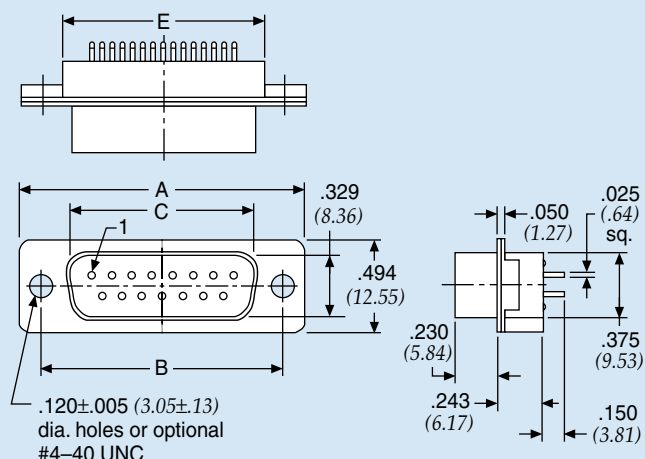
Filter Performance

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

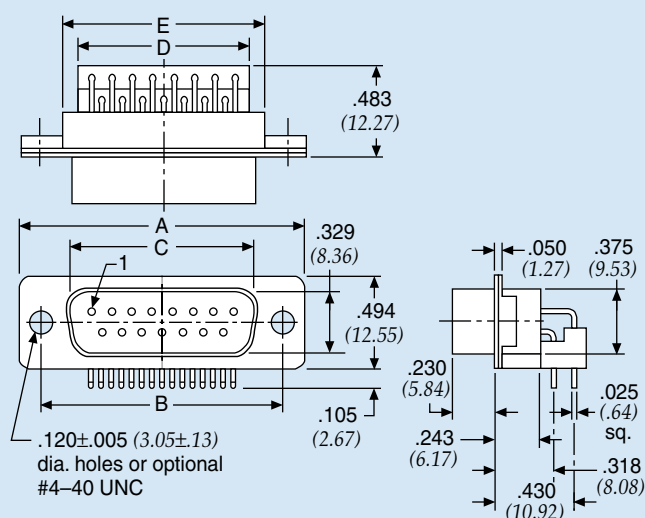
Insertion loss measured per MIL-STD-220, no load, 50 ohm source and load.
Above data represents guaranteed minimum.

Series 500 Low Profile Filtered Connectors

Pin Contact (plug) Straight PC Mount



90° PC Mount

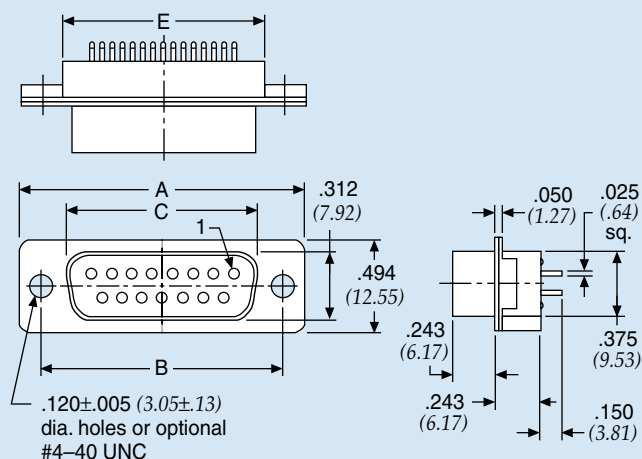


Size	A	B	C	D	E
9	1.213 (30.81)	0.984 (24.99)	0.666 (16.92)	0.540 (13.72)	0.748 (19.00)
15	1.541 (39.14)	1.312 (33.32)	0.994 (25.25)	0.867 (22.02)	1.076 (27.33)
25	2.088 (53.04)	1.852 (47.04)	1.534 (38.96)	1.412 (35.86)	1.616 (41.05)

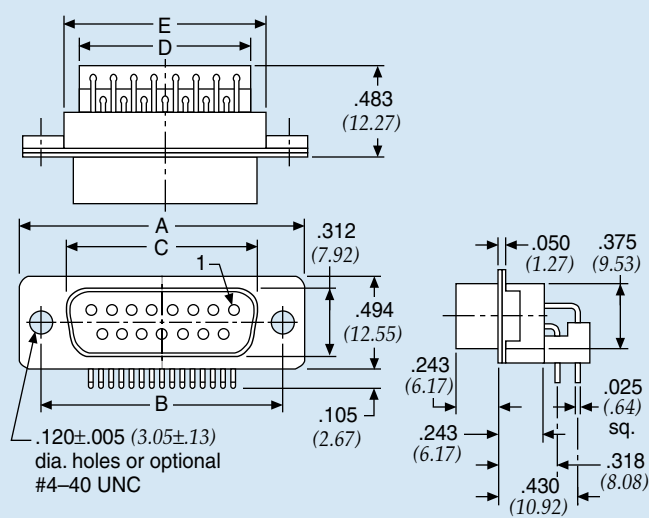
Standard Tolerance = ±.015 (0.38)

Dimensions in inches (mm)

Socket Contact (receptacle) Straight PC Mount



90° PC Mount



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

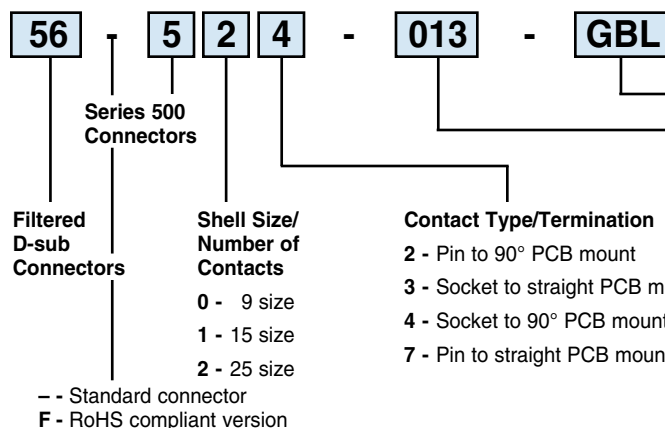
Standard Tolerance = ±.015 (0.38)

Dimensions in inches (mm)

Series 500 Low Profile Filtered Connectors

Ordering Information

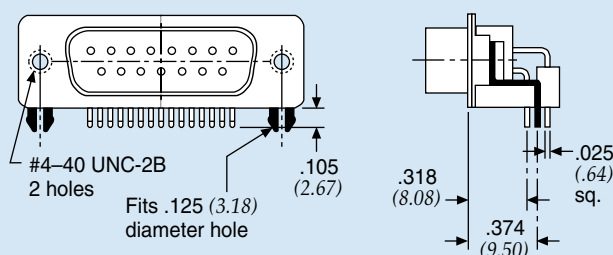
Example: **56-524-013-GBL**



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.

GBL Option



Features

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

Board Layout

Dimensions in inches (mm)

Typical Layout for .318" (8.08) Footprint		Shell Size	A	B	C	D
		9	.984 (24.99)	.436 = 4 x .109 (11.07 = 4 x 2.77)	.327 = 3 x .109 (8.31 = 3 x 2.77)	.492 (12.50)
		15	1.312 (33.32)	.763 = 7 x .109 (19.38 = 7 x 2.77)	.654 = 6 x .109 (16.61 = 6 x 2.77)	.656 (16.66)
		25	1.852 (47.04)	1.308 = 12 x .109 (33.22 = 12 x 2.77)	1.199 = 11 x .109 (30.45 = 11 x 2.77)	.926 (23.52)

Dimensions in inches (mm)

Series 600 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-sub in the High-Density format.

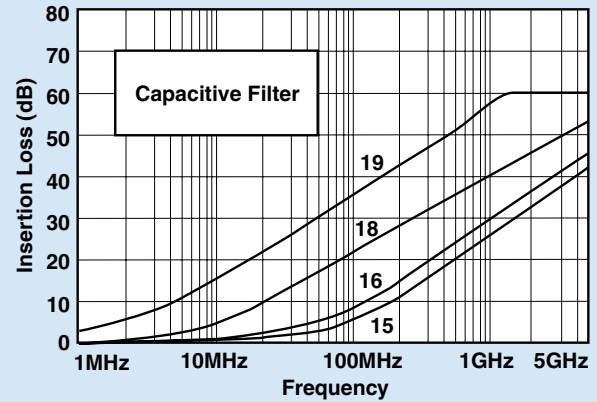
Features

- 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 Rating3 Amps

RF Current Rating . . .0.3 Amps

Contact Resistance . . 15 milliohms maximum

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

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

Above data represents guaranteed minimum.

Ordering Information

Example: 56-605-015-LI

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

D-Sub Connector
Hi-Density

Shell Size**

0 = 15
1 = 26
2 = 44
3 = 62
4 = 78

Contact/Termination

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

Special

0 = All positions same
9 = Special loading

** 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

- Standard connector
F - RoHS compliant version

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.

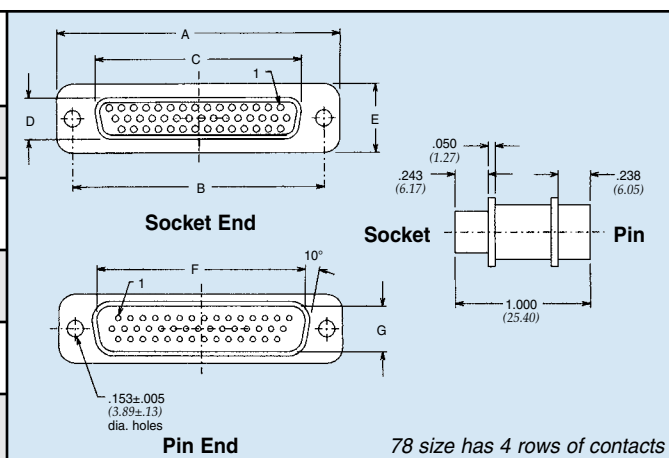
Note: VGA adapters also available. Consult factory

Series 600 High-Density Filtered Connectors



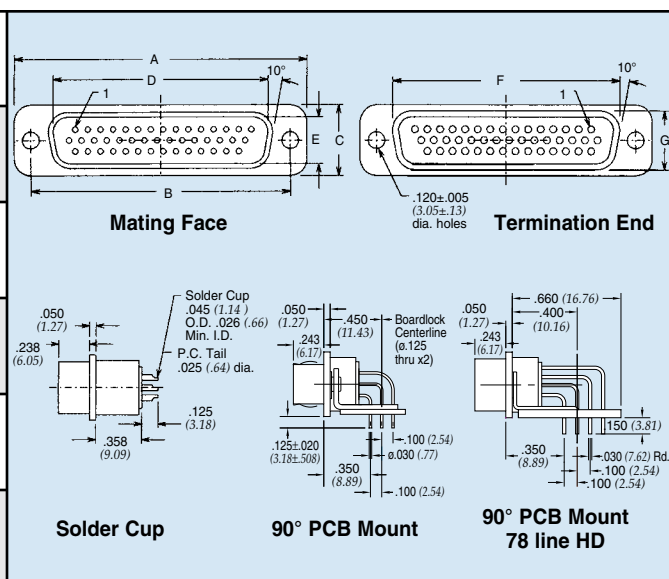
Pin/Socket Adapter

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)

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

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

Electrical Specifications

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

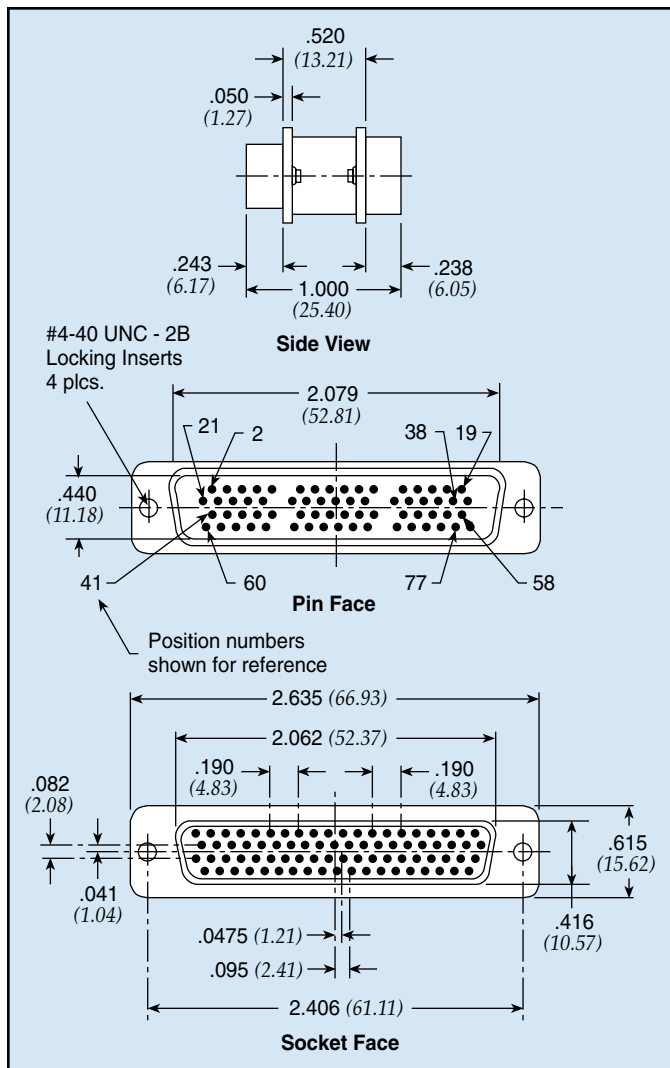
High-Density Filtered Adapter for Telecommunications

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

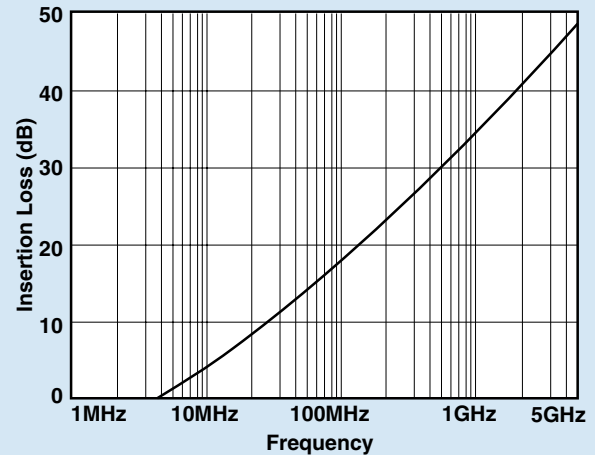
Insertion loss measured per MIL-STD-220, no load, 50 ohm source and load. Above data represents guaranteed minimum.

Part Number for Ordering: #56-645-002



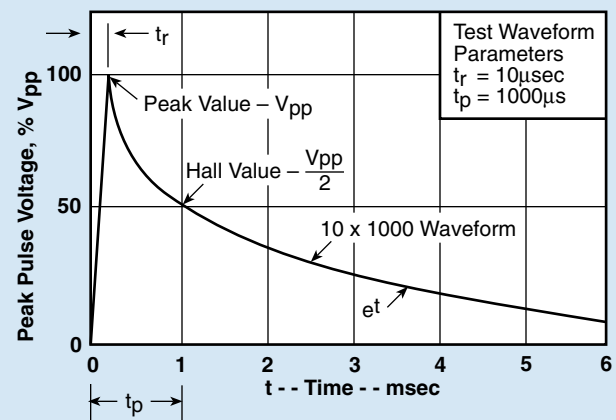
Dimensions in inches (mm)

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, $V_{pp} = 1000V$

Series 700 High Performance Filtered Connectors

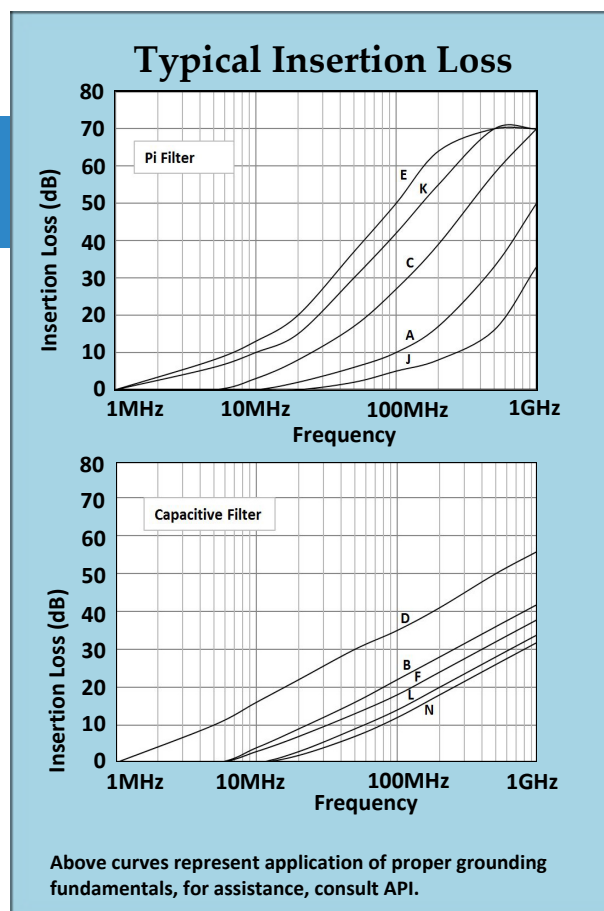
Filter Selection

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.



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

Electrical Specifications: High Performance Connectors

Filter Designations	Filter Circuits	Capacitance		3 dB Cut-off Frequency Max. (MHz)	Dielectric With-standing Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB)									
		Value	Tol.				5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz		
J	Pi	100 pF	+100 -0%	32	300V	100V	—	—	—	2	5	8	16	33		
A		310 pF	±20%	17	300V	100V	—	—	2	6	10	17	33	50		
C		1000 pF	+150 -0%	3.2	300V	100V	—	3	8	17	27	39	58	70		
K		2500 pF	+100 -0%	1.3	150V	50V	6	10	15	30	42	55	70	70		
E		4000 pF	+100 -0%	0.8	150V	50V	8	13	20	37	50	64	70	70		
N	C	375 pF	±20%	14	600V	200V	—	—	2	7	12	18	26	32		
L		500 pF	±20%	10.6	600V	200V	—	—	3	9	14	20	28	34		
F		830 pF	±20%	6.4	600V	200V	—	3	7	13	18	24	32	38		
B		1000 pF	+100 -0%	3.2	600V	200V	—	4	9	16	22	28	36	42		
D		5000 pF	+100 -0%	0.64	300V	100V	10	16	22	30	35	41	50	56		

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

Above data represents guaranteed minimum.

Series 700

Specifications and Connector Ordering

Mechanical Specifications

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

Insulators Glass-filled polyester,
flammability UL94V-0

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

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

* Heavier gold plating available upon request.
See pg. 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.

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

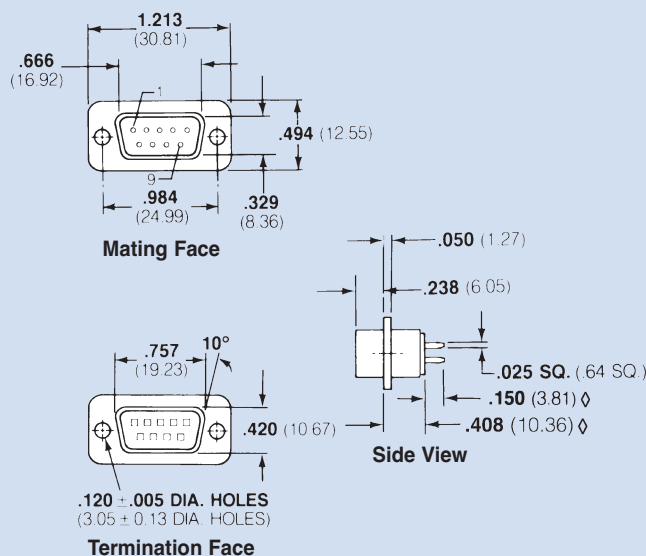
- Refer to page FC43 for special options including heavy gold plating, 4-40 mounting threads, grounding brackets, hardware, and others.
- Most options are available within the standard lead times.
- Some options require a part number suffix, while other combinations may require factory assistance for 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.

9 Series 700 Shell Size Pin Contact



Printed Circuit Board Mount

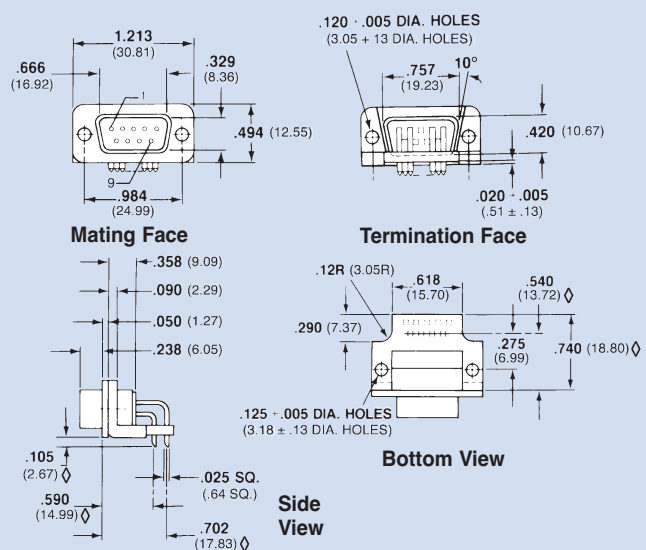
Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-701-001	A	310 pF Pi
56-701-002	B	1000 pF C
56-701-003	C	1000 pF Pi
56-701-004	D	5000 pF C
56-701-005	E	4000 pF Pi
56-701-028	F	830 pF C
56-701-029	J	100 pF Pi
56-701-030	K	2500 pF Pi
56-701-047	N	375 pF C
56-701-086	L	500 pF C



*Replace "56-" with "56F" to indicate RoHS compliant

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



*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

9 Series 700 Shell Size Pin Contact



Solderless Wire Wrap

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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

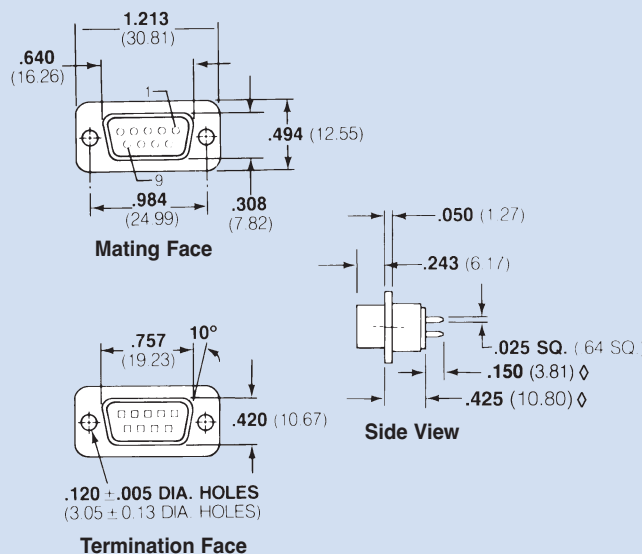
Dimensions in inches (mm)

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



Printed Circuit Board Mount

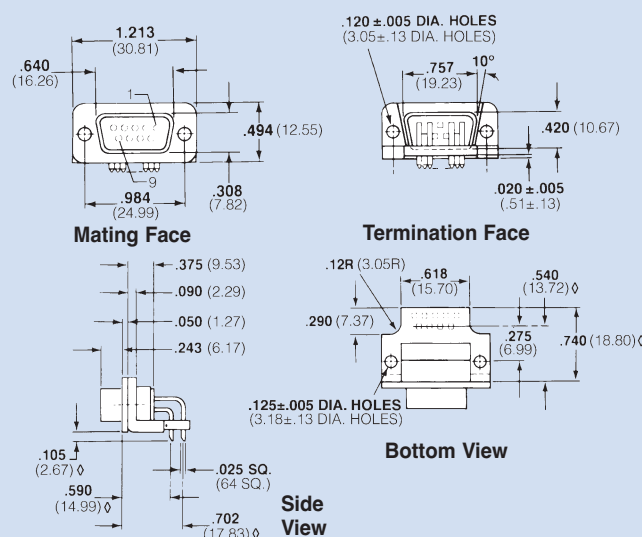
Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-703-001	A	310 pF Pi
56-703-002	B	1000 pF C
56-703-003	C	1000 pF Pi
56-703-004	D	5000 pF C
56-703-005	E	4000 pF Pi
56-703-022	F	830 pF C
56-703-023	J	100 pF Pi
56-703-024	K	2500 pF Pi
56-703-036	N	375 pF C
56-703-047	L	500 pF C



*Replace "56-" with "56F" to indicate RoHS compliant

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



*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

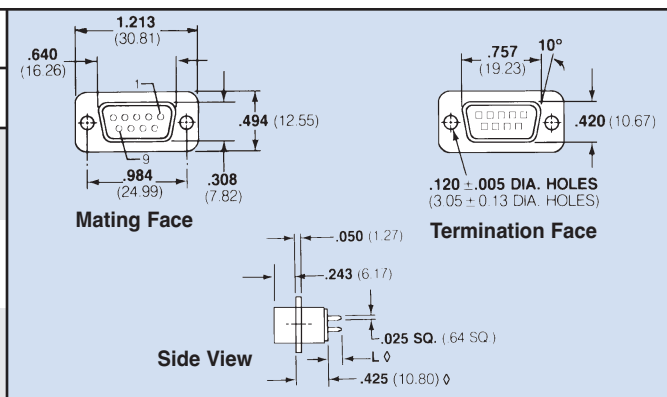
Standard Tolerance = ± 0.005 except where noted, $\phi = \pm 0.015$



Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				Filter Desig.**	Cap. Value
	L .500	L .375	L .250			
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

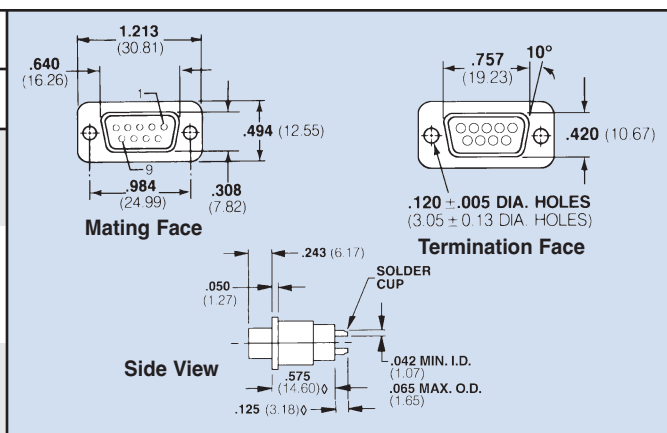
*Replace "56-" with "56F" to indicate RoHS compliant



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

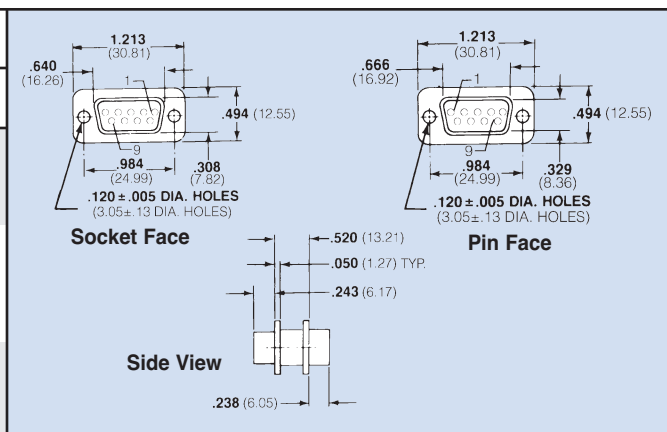
*Replace "56-" with "56F" to indicate RoHS compliant



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

*Replace "56-" with "56F" to indicate RoHS compliant



Dimensions in inches (mm)

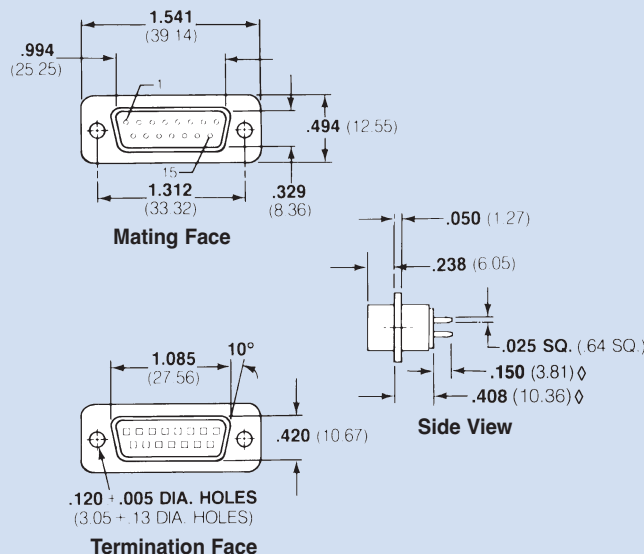
Standard Tolerance = ±.005 except where noted, Ø = ±.015

15 Series 700 Shell Size Pin Contact



Printed Circuit Board Mount

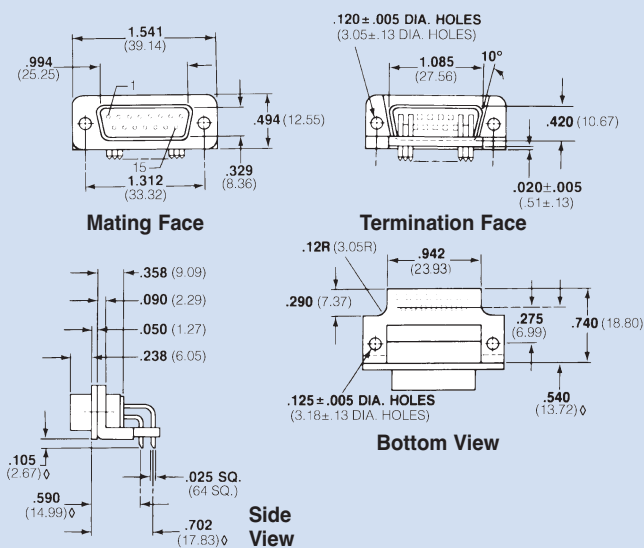
Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-711-001	A	310 pF Pi
56-711-002	B	1000 pF C
56-711-003	C	1000 pF Pi
56-711-004	D	5000 pF C
56-711-005	E	4000 pF Pi
56-711-028	F	830 pF C
56-711-029	J	100 pF Pi
56-711-030	K	2500 pF Pi
56-711-048	N	375 pF C
56-711-088	L	500 pF C



*Replace "56-" with "56F" to indicate RoHS compliant

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



*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

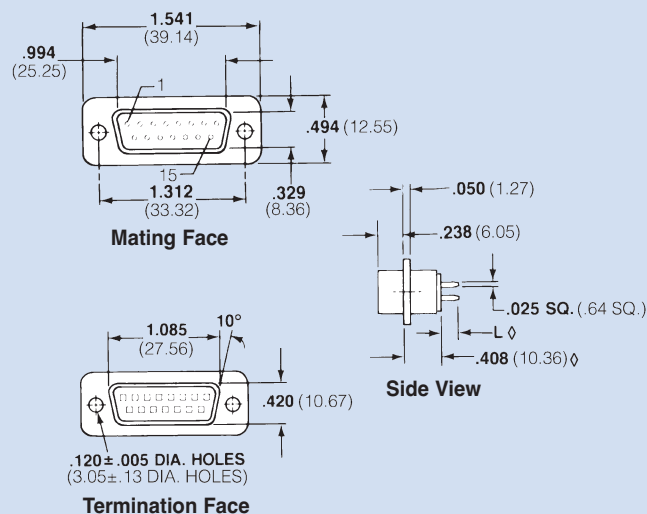
Standard Tolerance = ± 0.005 except where noted, $\diamond = \pm 0.015$

15 Series 700 Shell Size Pin Contact



Solderless Wire Wrap

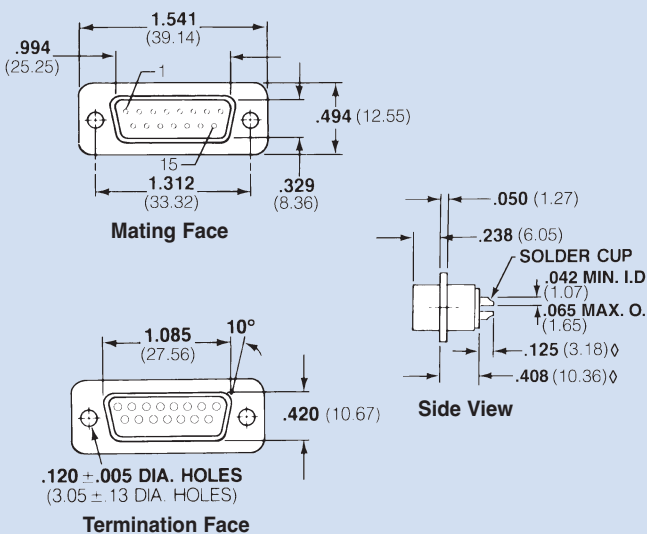
Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-711 -006 -023 -018				A	310 pF Pi
56-711 -007 -024 -019				B	1000 pF C
56-711 -008 -025 -020				C	1000 pF Pi
56-711 -009 -026 -021				D	5000 pF C
56-711 -010 -027 -022				E	4000 pF Pi
56-711 -037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



*Replace "56-" with "56F" to indicate RoHS compliant

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



*Replace "56-" with "56F" to indicate RoHS compliant

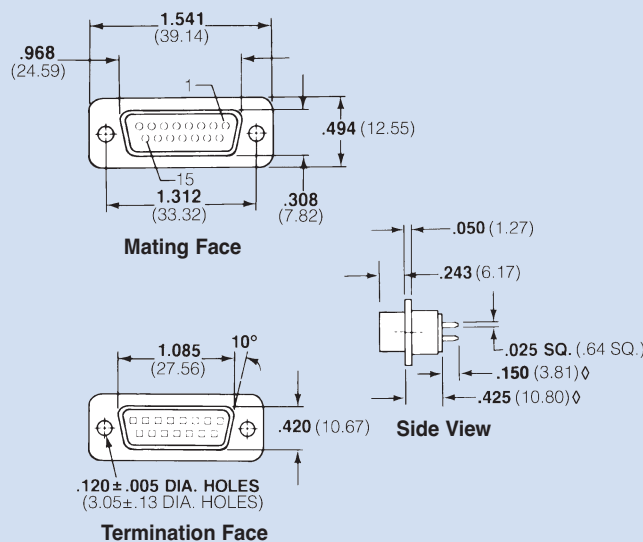
Dimensions in inches (mm)

15 Series 700 Shell Size Socket Contact



Printed Circuit Board Mount

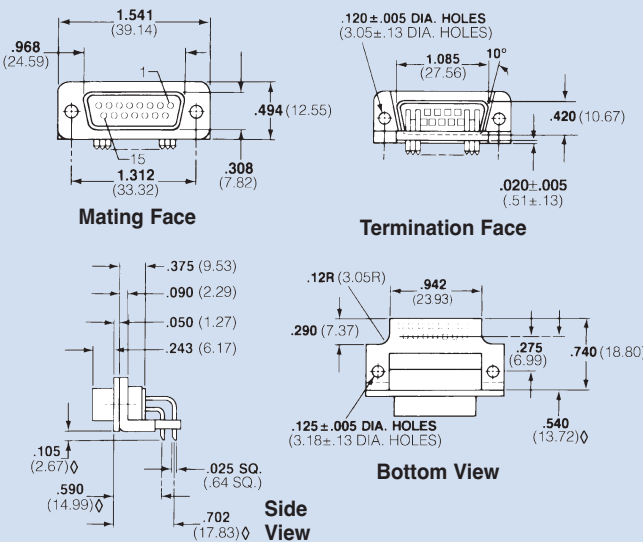
Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-713-001	A	310 pF Pi
56-713-002	B	1000 pF C
56-713-003	C	1000 pF Pi
56-713-004	D	5000 pF C
56-713-005	E	4000 pF Pi
56-713-021	F	830 pF C
56-713-022	J	100 pF Pi
56-713-023	K	2500 pF Pi
56-713-037	N	375 pF C
56-713-045	L	500 pF C



*Replace "56-" with "56F" to indicate RoHS compliant

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



*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

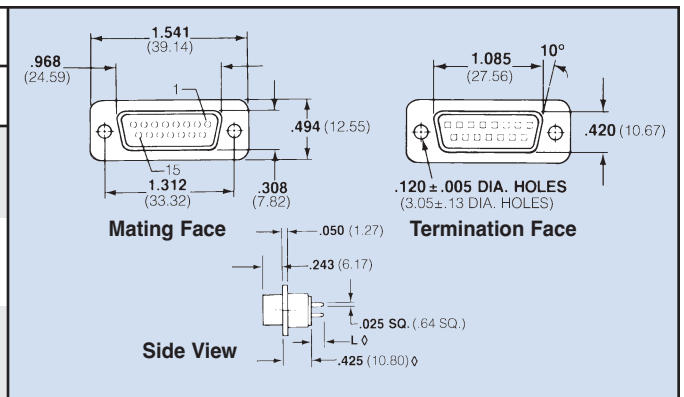
15 Series 700 Shell Size Pin/Socket Adapter



Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				Filter Desig.**	Cap. Value
	L .500	L .375	L .250			
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

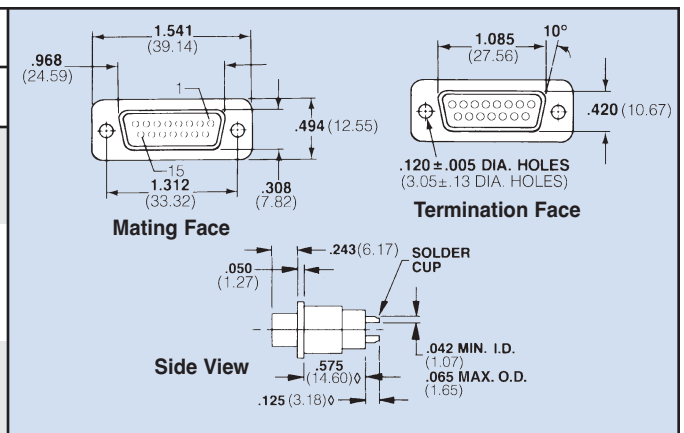
*Replace "56-" with "56F" to indicate RoHS compliant



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

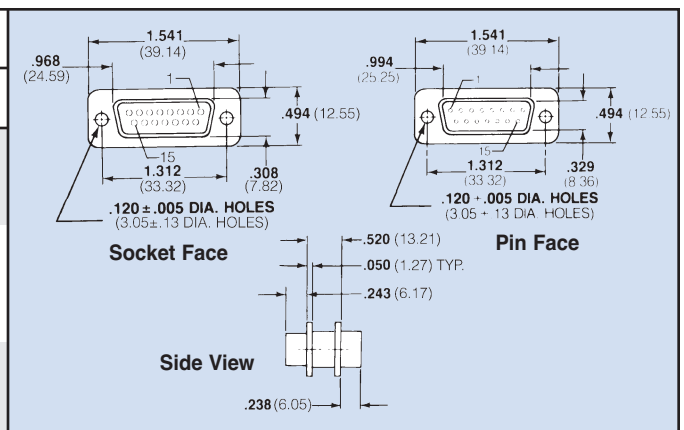
*Replace "56-" with "56F" to indicate RoHS compliant



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

*Replace "56-" with "56F" to indicate RoHS compliant



Dimensions in inches (mm)

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

25 Series 700 Shell Size 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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

25 Series 700 Shell Size Pin Contact



Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Design.**	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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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



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

The technical drawings show three views of the EMI filter:

- Mating Face:** Shows overall dimensions: total length 2.088 (53.04), mounting hole centers 1.508 (38.30) apart, terminal width .494 (12.55), distance from mounting hole to terminal edge 1.852 (47.04), and terminal thickness .308 (7.82).
- Termination Face:** Shows termination dimensions: distance between termination points 1.625 (41.28), angle 10°, terminal width .420 (10.67), and termination hole specifications: .120 ± .005 DIA. HOLES and (3.05 ± .13 DIA. HOLES).
- Side View:** Shows profile dimensions: top flange thickness .050 (1.27), body height .243 (6.17), bottom flange thickness .025 SQ. (.64 SQ.), and mounting hole diameters .150 (3.81) and .425 (10.80).

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

Mating Face

Termination Face

Side View

Bottom View

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

25 Series 700 Shell Size Pin/Socket Adapter



Solderless Wire Wrap

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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

API TECHNOLOGIES • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • eis.apitech.com

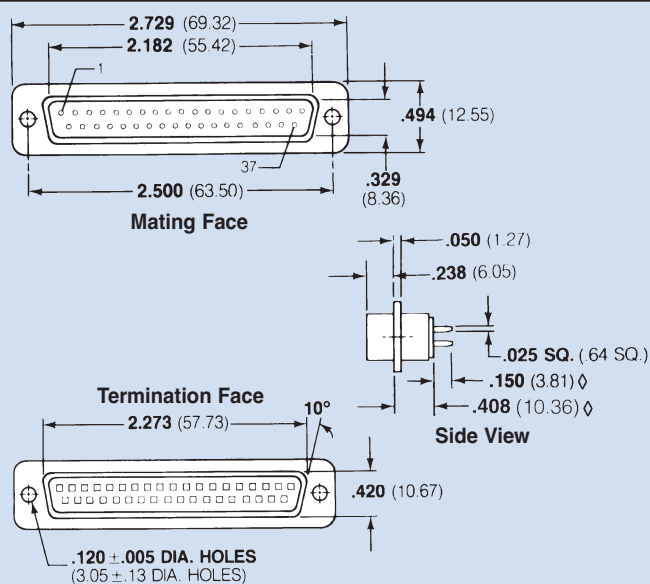
API TECHNOLOGIES' SPECTRUM CONTROL GmbH • Hansastrasse 6 • 91126 Schwabach, Germany • Phone: (49)-9122-795-0 • Fax: (49)-9122-795-58

37 Series 700 Shell Size Pin Contact



Printed Circuit Board Mount

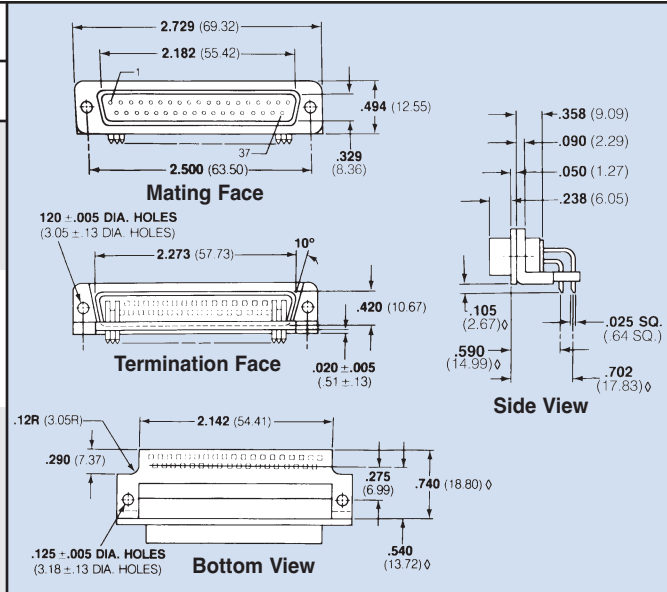
Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-731-001	A	310 pF Pi
56-731-002	B	1000 pF C
56-731-003	C	1000 pF Pi
56-731-004	D	5000 pF C
56-731-005	E	4000 pF Pi
56-731-028	F	830 pF C
56-731-029	J	100 pF Pi
56-731-030	K	2500 pF Pi
56-731-048	N	375 pF C
56-731-076	L	500 pF C



*Replace "56-" with "56F" to indicate RoHS compliant

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



*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

37 Series 700 Shell Size Pin Contact



Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>	EMI Filter				
	L .500	L .375	L .250	Filter Design.**	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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

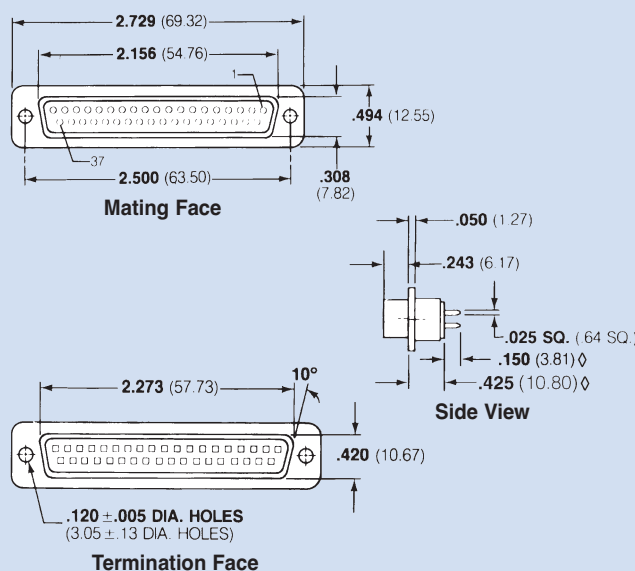
Standard Tolerance = ± 0.005 except where noted, $\phi = \pm 0.015$

37 Series 700 Shell Size Socket Contact



Printed Circuit Board Mount

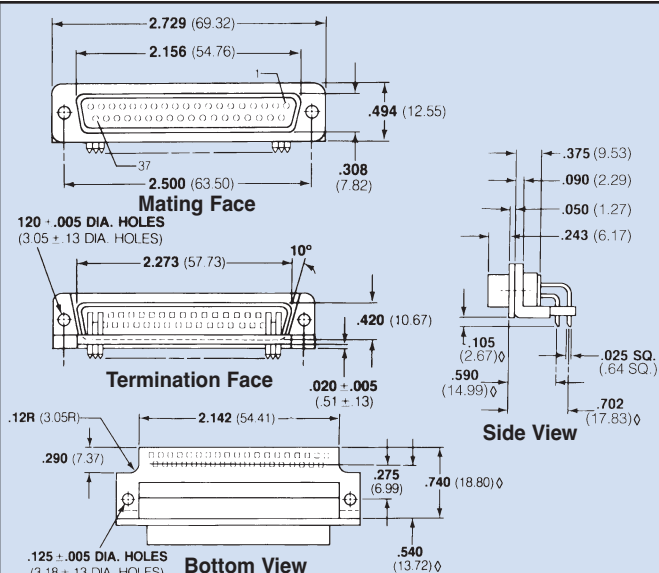
Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-733-001	A	310 pF Pi
56-733-002	B	1000 pF C
56-733-003	C	1000 pF Pi
56-733-004	D	5000 pF C
56-733-005	E	4000 pF Pi
56-733-021	F	830 pF C
56-733-022	J	100 pF Pi
56-733-023	K	2500 pF Pi
56-733-035	N	375 pF C
56-733-046	L	500 pF C



*Replace "56-" with "56F" to indicate RoHS compliant

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

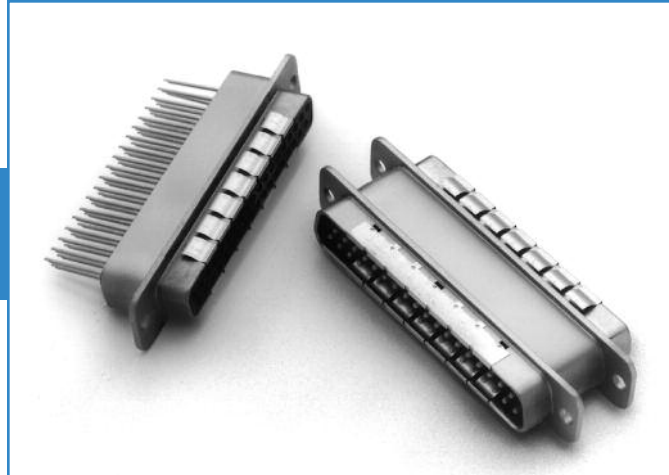


*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

37 Series 700 Shell Size Pin/Socket Adapter



Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>				EMI Filter	
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
* 56-733	-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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

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

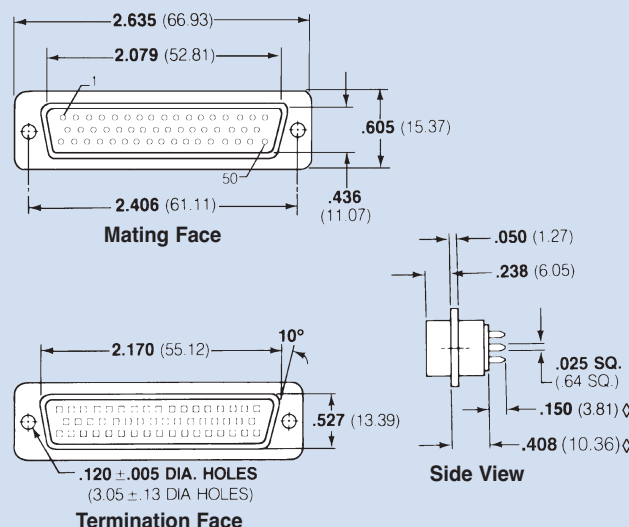
FC33

50 Series 700 Shell Size Pin Contact



Printed Circuit Board Mount

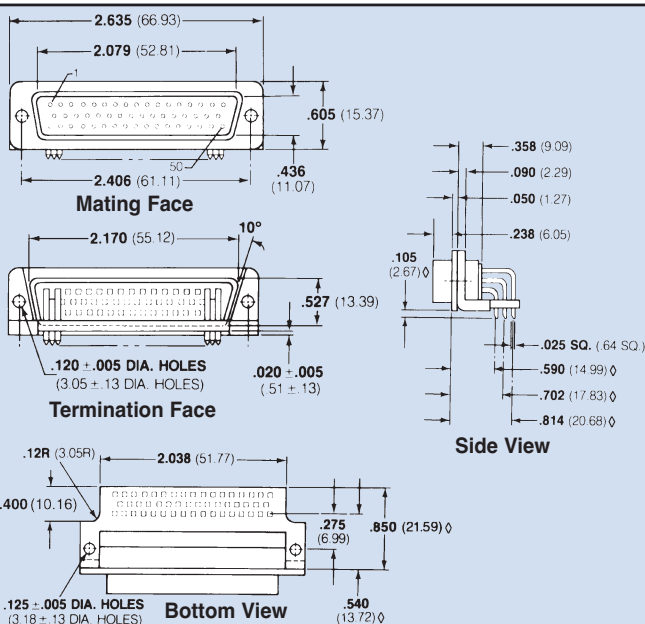
Spectrum Part Number	EMI Filter	
	Filter Designation**	Cap. Value
56-741-001	A	310 pF Pi
56-741-002	B	1000 pF C
56-741-003	C	1000 pF Pi
56-741-004	D	5000 pF C
56-741-005	E	4000 pF Pi
56-741-027	F	830 pF C
56-741-028	J	100 pF Pi
56-741-029	K	2500 pF Pi
56-741-042	N	375 pF C
56-741-066	L	500 pF C



*Replace "56-" with "56F" to indicate RoHS compliant

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



*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

50 Series 700 Shell Size Pin Contact



Solderless Wire Wrap

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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

50 Series 700 Shell Size 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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

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



Solderless Wire Wrap

Spectrum Part Number <i>Select one</i>				EMI Filter	
	L .500	L .375	L .250	Filter Desig.**	Cap. Value
56-743	-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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

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

*Replace "56-" with "56F" to indicate RoHS compliant

Dimensions in inches (mm)

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

D-Subminiature Part Numbering System

Ordering Information

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

56 - **5** - **1** - **3** - **0** - **12** - **TI**

Product Series	Shell Size
4 = Series F Ferrite	Series F & Series 500
5 = Series 500 Low Profile	0 = 9 Contacts
6 = Series 600 Hi-Density	1 = 15 Contacts
7 = Series 700 High Performance	2 = 25 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

Filtered D-Subminiature Connectors

- Standard connector
- F - RoHS compliant version

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/Solder Cups*

50G = 50 μ (1.27 μ m) 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 μ m) gold plating

S = Solder dipped tails/Solder Cups*

JS = Jackscrew mounting

For option combinations, consult factory.

*Dipped Solder Cup

- No socket to solder cup product
- Solder cups may be full of solder
- Standard part: Sn60 or equivalent
- RoHS Part: Sn96 or equivalent

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

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

D-Subminiature Connector Options

Threaded Inserts

Available on Series 500, 600 & 700

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

Grounding Bracket

For right angle mount PCB connectors, available on Series 700

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

Stand-off with Board Lock Feature

For straight PCB connectors, available on Series 700

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

Grounding Bracket with Board Lock

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

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

Gold Plating

Available on Series 600 & 700

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

Solder Dipped Tails

Available on Series 600 & 700 connectors

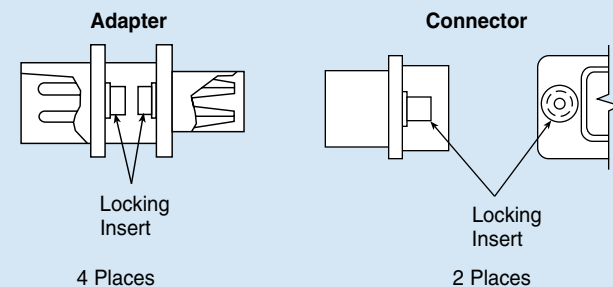
- Solder dipped tails added to standard gold flash

Water Block

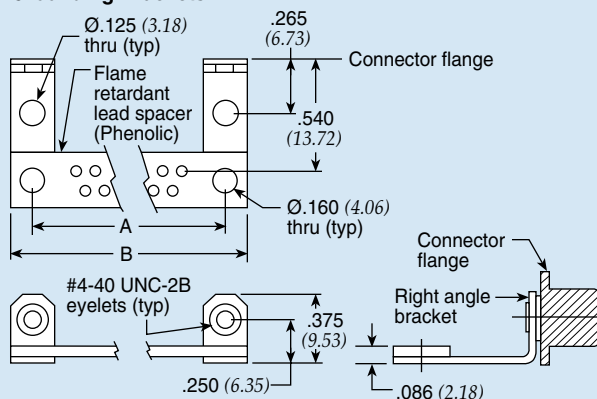
Consult API engineers for specifics.

- 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

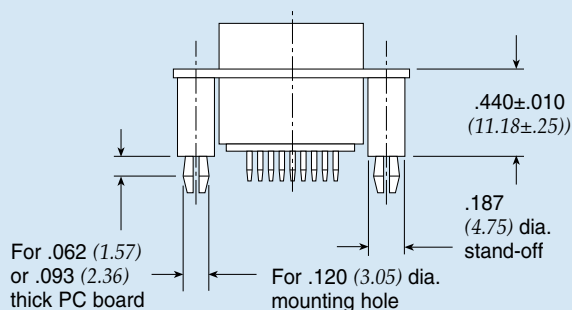


Grounding Brackets

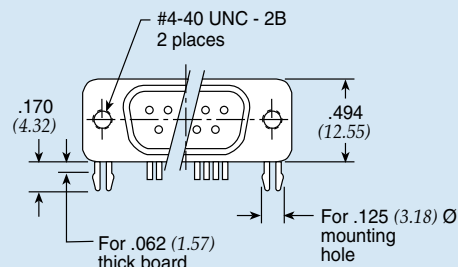


Size	A	B
9	.984 (24.99)	1.214 (30.84)
15	1.312 (33.32)	1.542 (39.17)
25	1.852 (47.04)	2.088 (53.04)
37	2.500 (63.50)	2.730 (69.34)

Stand-off with Board Lock



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



Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors

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

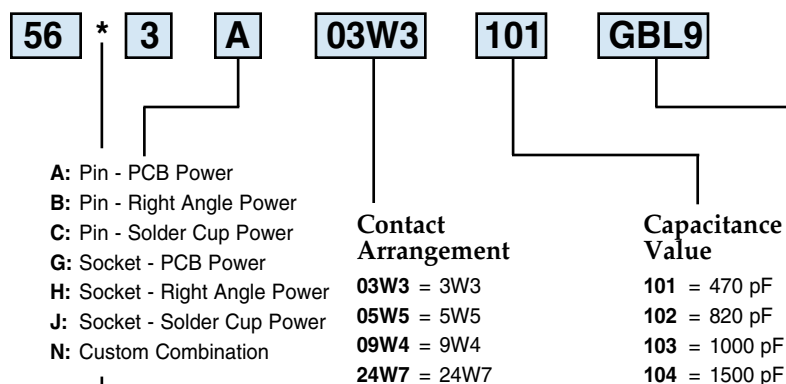
Capacitive filtering is available in 470, 820, 1000 and 1500 pF. Additional capacitance ranges and configurations can be provided upon request. Please consult factory for more information.

Applications

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

Ordering Information

Example: **563A03W3101GBL9**



* Insert "F" for RoHS compliant



Mechanical Specifications

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

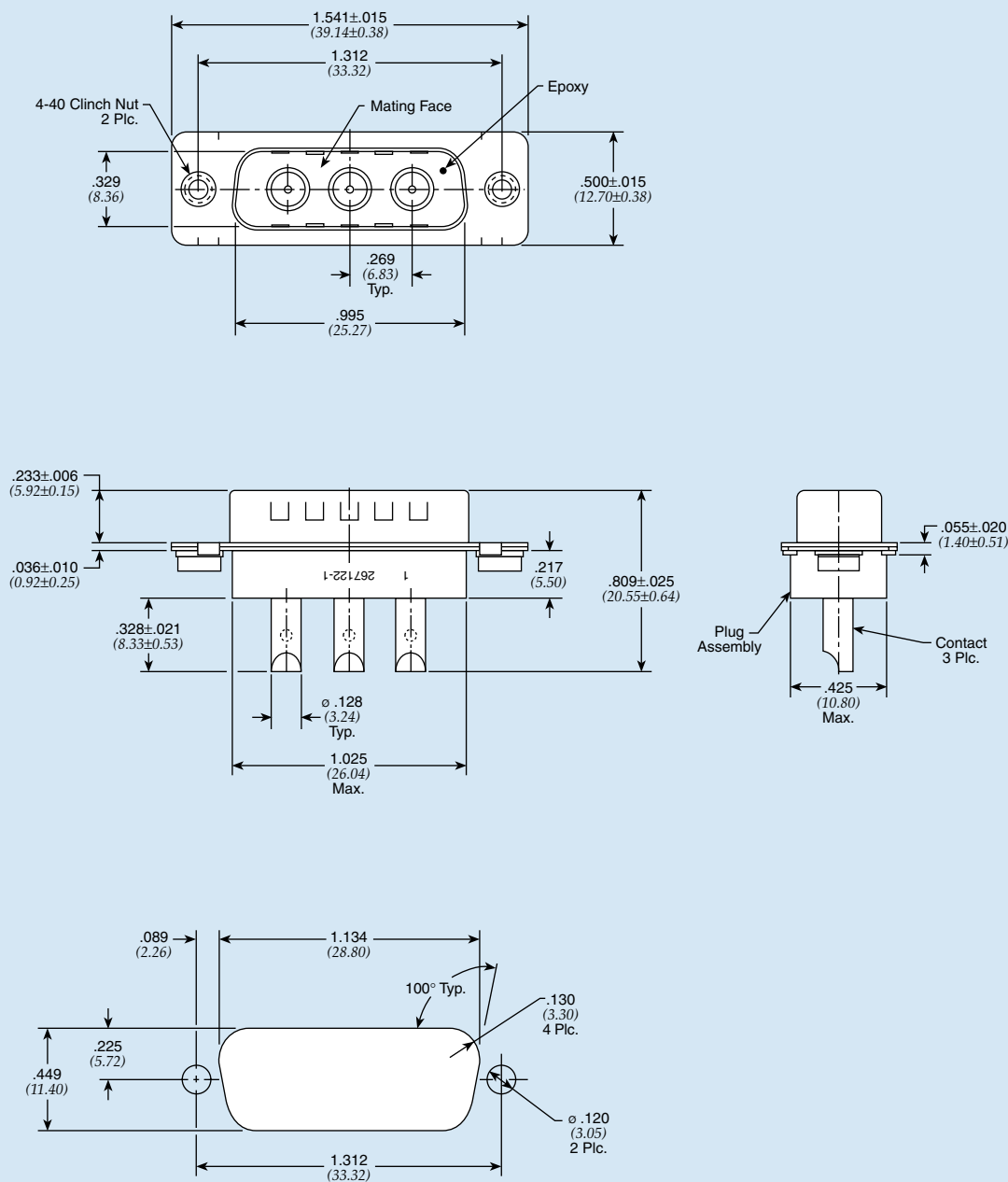
Options

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 μ m) gold plating
 - S** = Solder dipped tails
 - JS** = Jackscrew mounting
- For option combinations, consult factory.

Filtered Combo D-Subminiature Connectors 3W3

Plug - Solder Cup



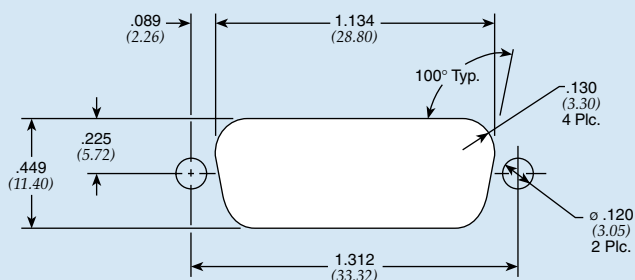
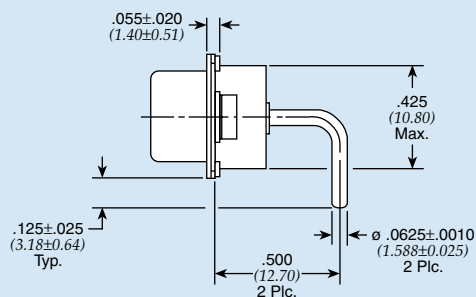
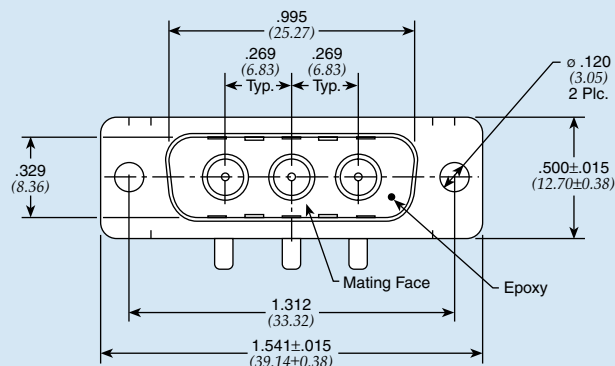
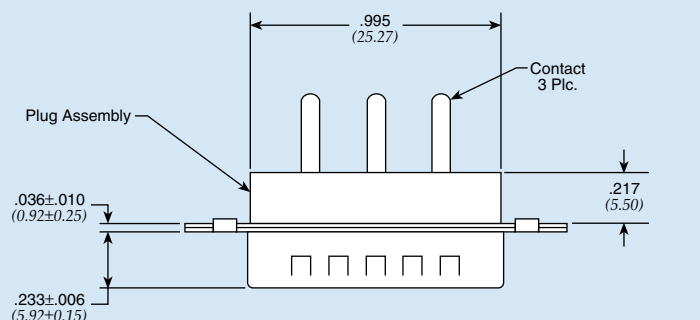
Recommended Panel Cutout

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

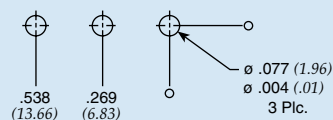
Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors 3W3

Plug - Right Angle



Recommended Panel Cutout

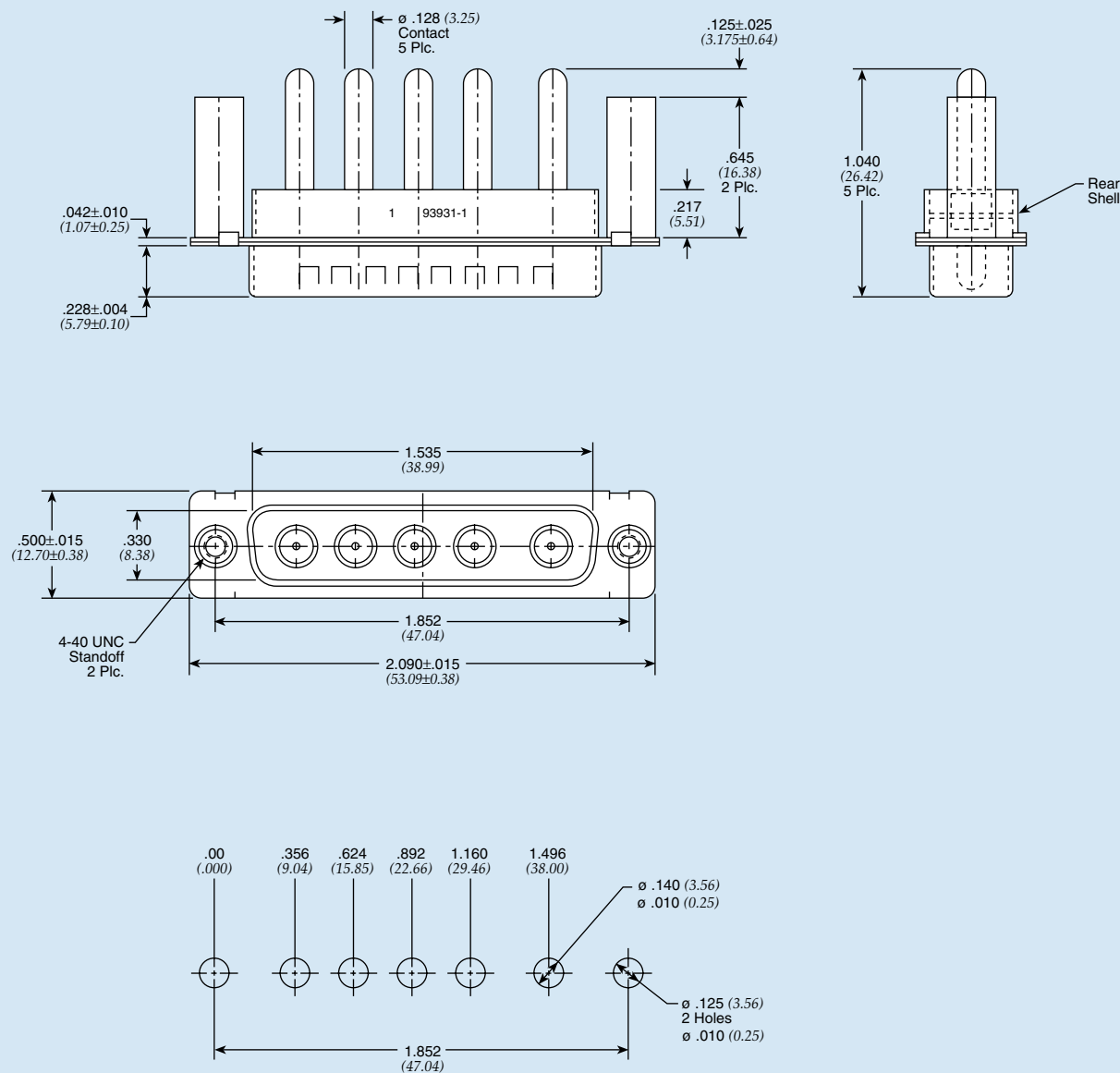


Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors 5W5

Plug - Vertical



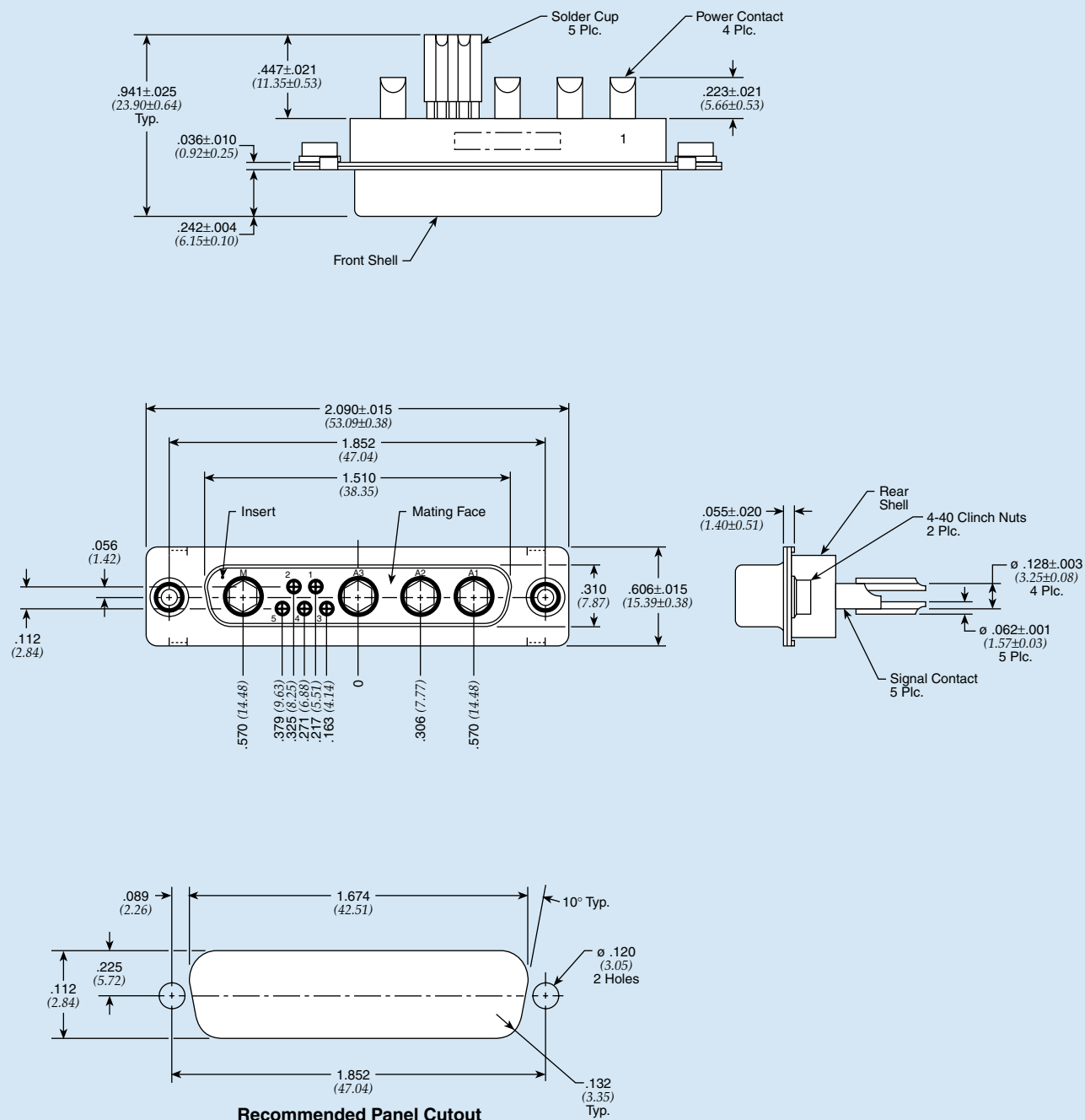
Recommended PCB Layout

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

Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors

Socket - Solder Cup

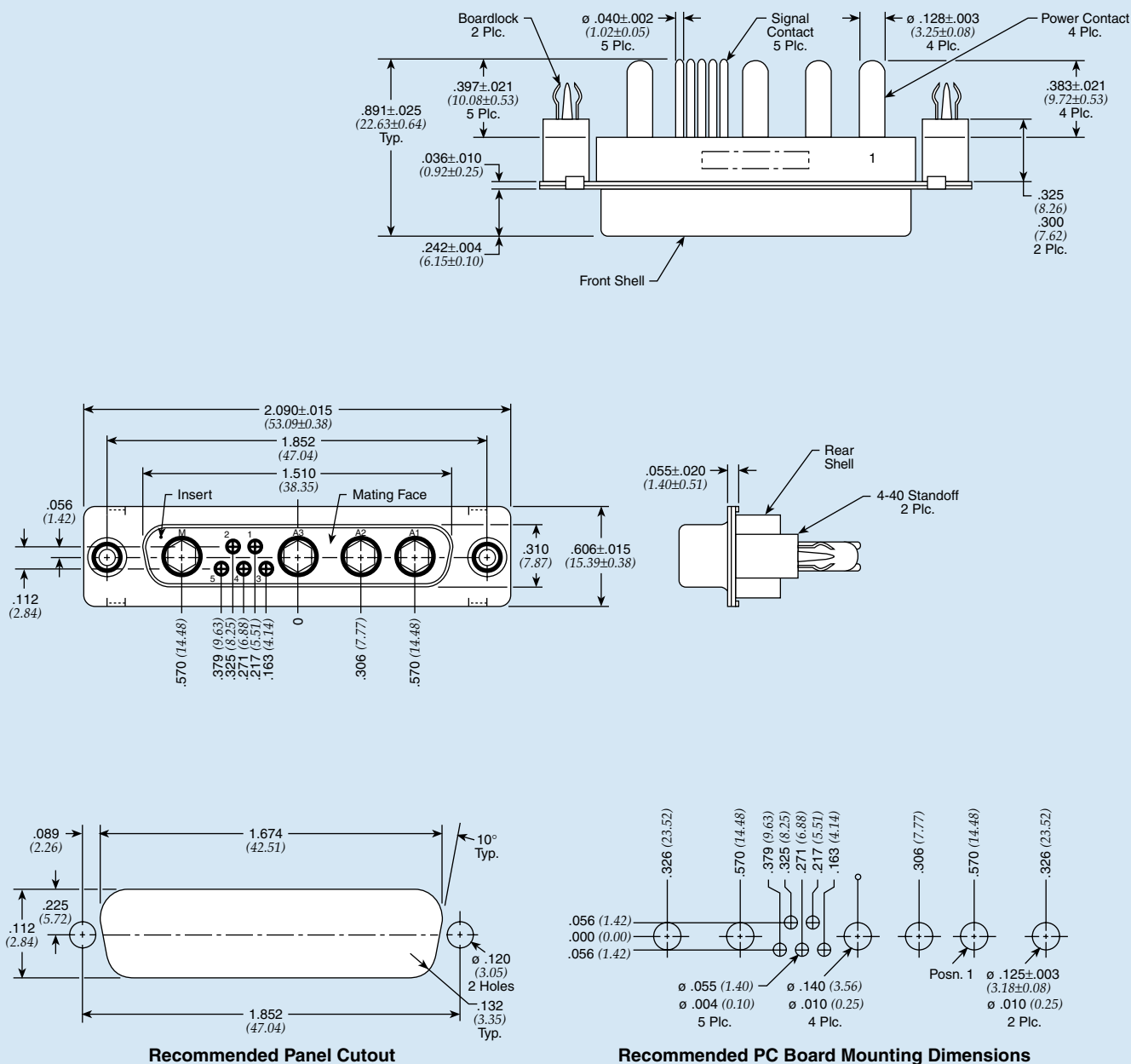


Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (*mm*)

Filtered Combo D-Subminiature Connectors 9W4

Socket - Vertical

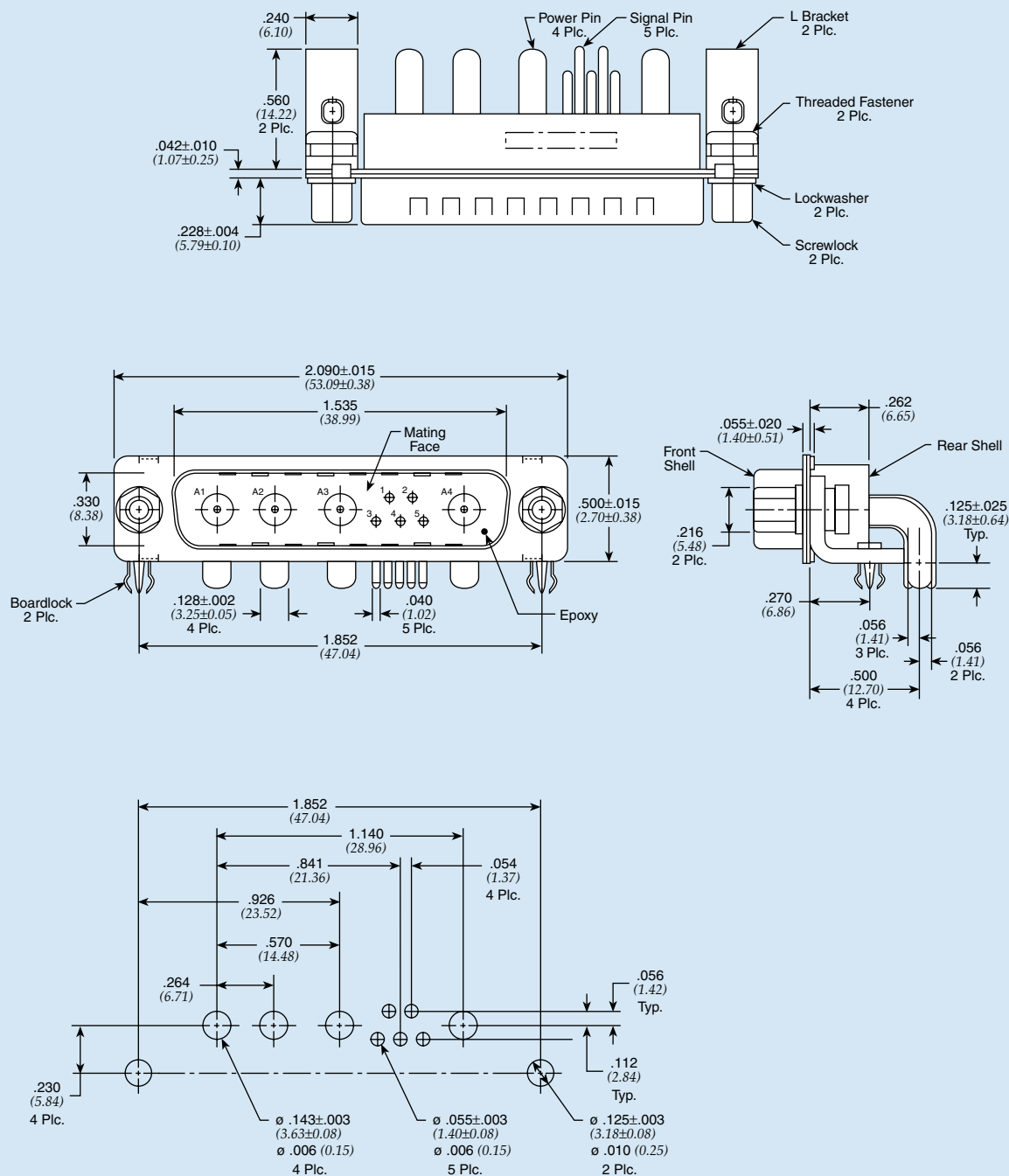


Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors 9W4

Plug - Right Angle

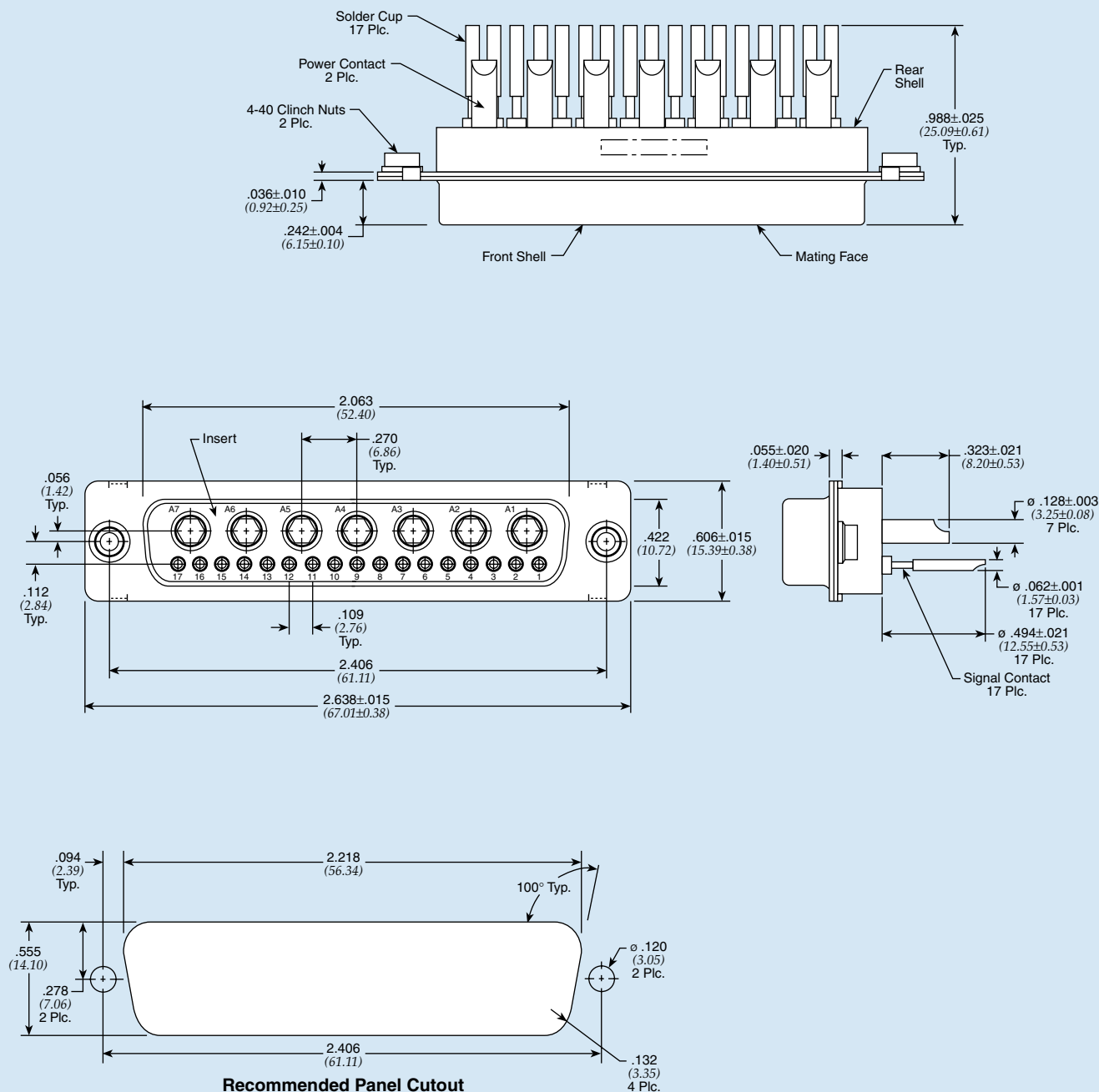


Only represents a few of our available configurations. Consult factory for more information.

Dimensions in inches (mm)

Filtered Combo D-Subminiature Connectors 24W7

Socket - Solder Cup



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

Dimensions in inches (mm)

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

Ordering Information

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



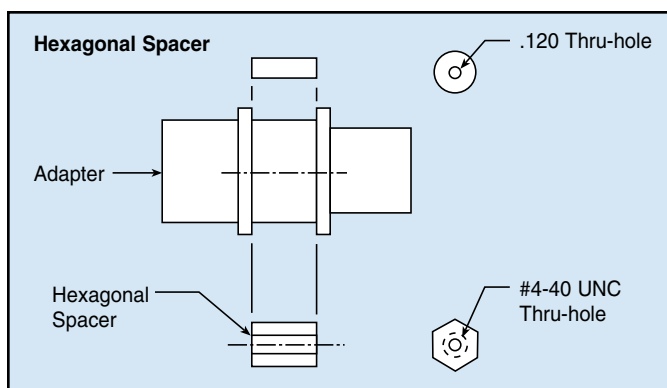
Adapter Test Kit

Hardware

Designed to provide simple and effective mounting

Hexagonal Spacer

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



Jackscrew Mounting Hardware

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

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

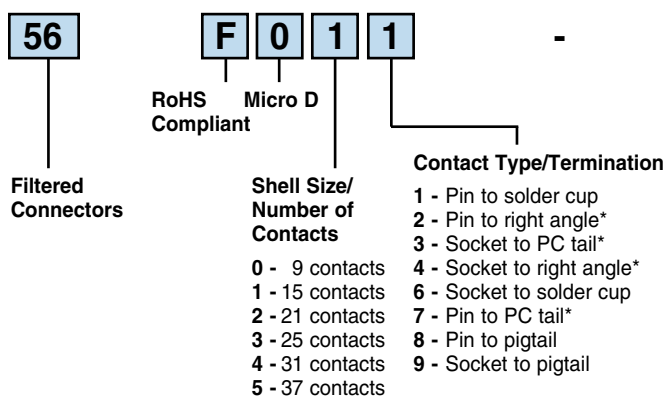
Shell	Aluminum, electroless nickel plated 500 µ in (12.7 µm) minimum
Insulator	High temperature plastic, flammability UL94V-0
Contacts	Copper alloy, gold plated 50 µ in (1.27 µm) minimum
Potting	Flammability UL94V-0
Interfacial Seal	Silicon

Electrical Specifications

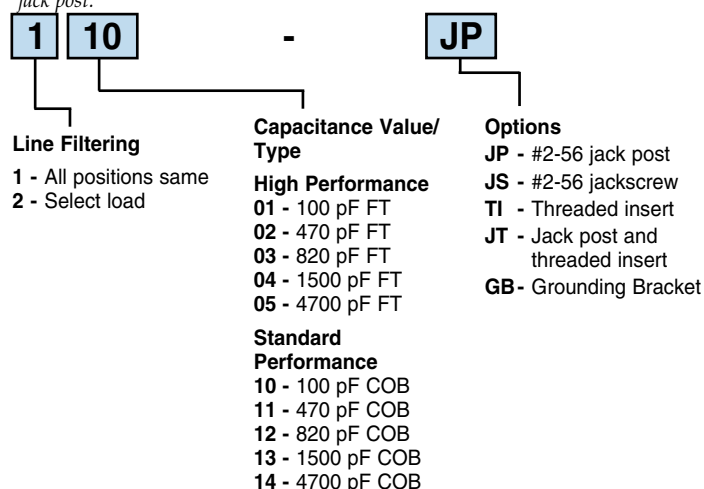
Operating Voltage	100 VDC
Dielectric	
Withstanding Voltage	300 VDC
Current Rating	3 Amps
Insulation Resistance	5G ohms @ 100 VDC

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.



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

All capacitance values ±20% @ 25°C

Micro D Series Filtered Connectors

High Performance

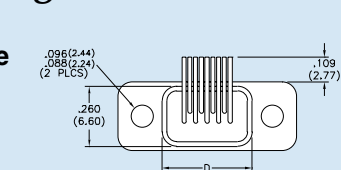
Filter Designation	Type	Capacitance		Dielectric Withstanding Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB) 50 ohm system per MIL-STD-220 (no load)							
		Value	Tolerance			5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz
01	FT	100 pF	±20%	300V	100V	—	—	—	—	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

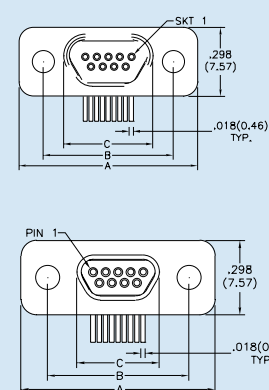
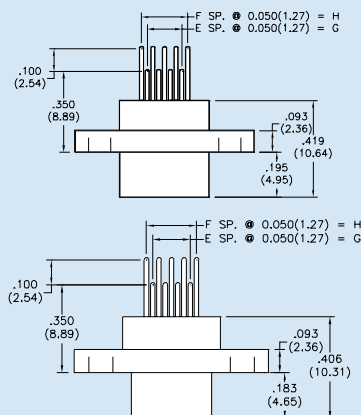
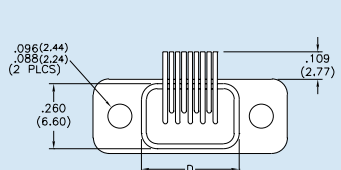
Filter Designation	Type	Capacitance		Dielectric Withstanding Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB) 50 ohm system per MIL-STD-220 (no load)							
		Value	Tolerance			5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz
10	COB	100 pF	±20%	300V	100V	—	—	—	—	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)

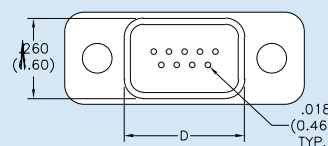
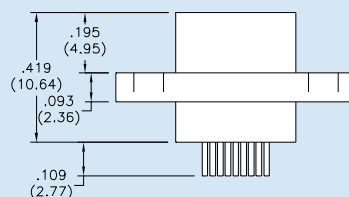
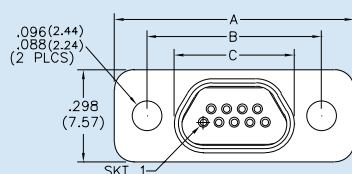
Micro D Series Filtered Connectors

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)

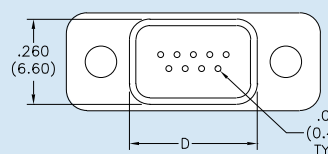
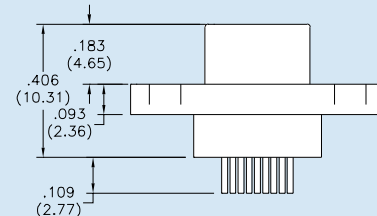
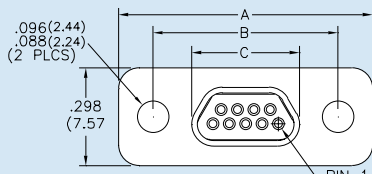
Dimensions in inches (mm)

Vertical PCB

Receptacle

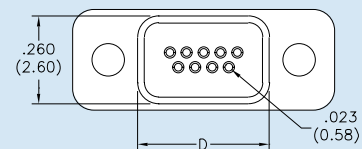
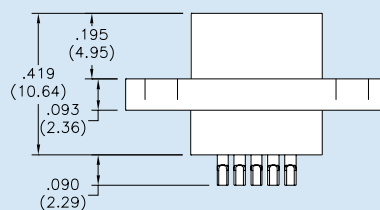
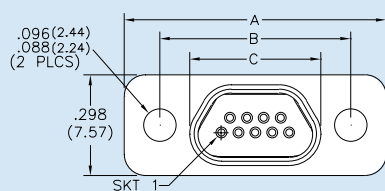


Plug

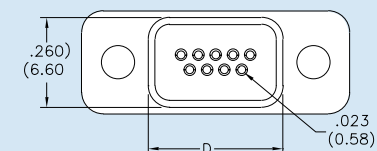
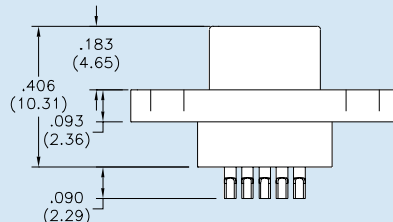
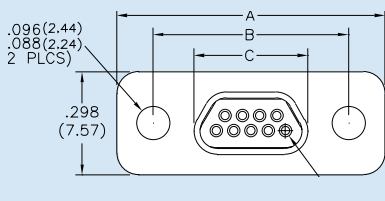


Solder Cup

Receptacle

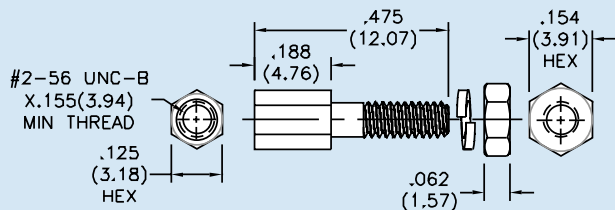


Plug

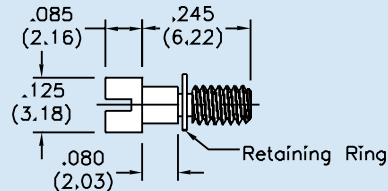


Micro D Series Filtered Connectors Options

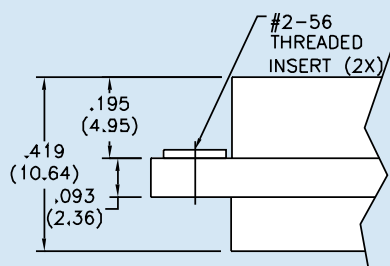
JP - #2-56 Jack Post M83513/05-07



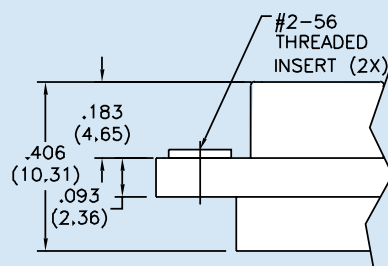
JS - #2-56 Jack Screw M83513/05-05



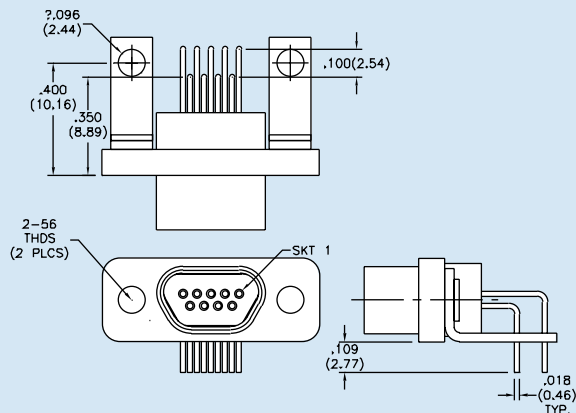
TI - Threaded Insert Receptacle



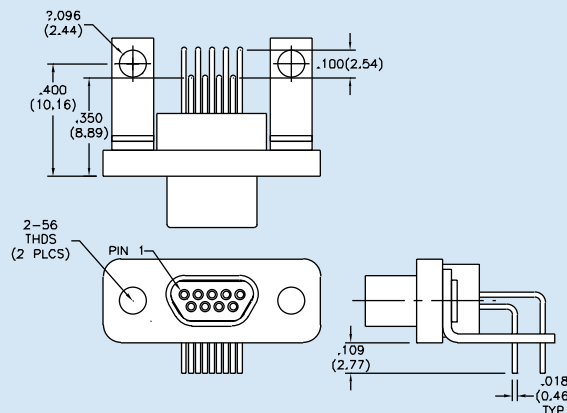
TI - Threaded Insert Plug



GB - Ground Bracket Receptacle



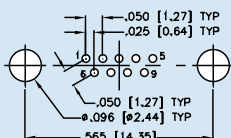
GB - Ground Bracket Plug



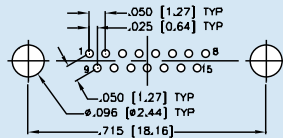
Micro D Series Filtered Connectors Board and Panel Cutouts

Vertical PCB Layouts Pin Connector Shown

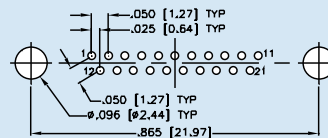
9 Contacts



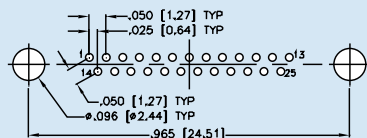
15 Contacts



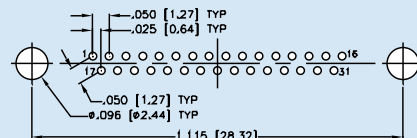
21 Contacts



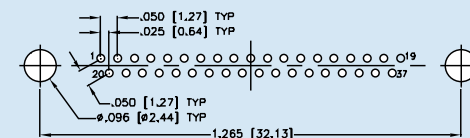
25 Contacts



31 Contacts

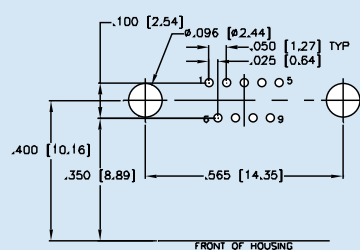


37 Contacts

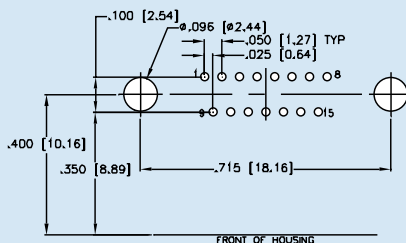


Right Angle PCB Layouts Pin Connector Shown

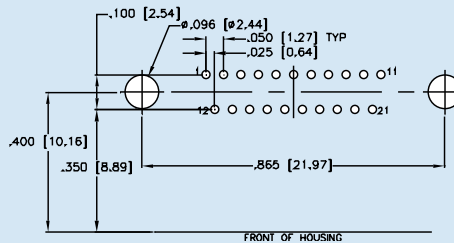
9 Contacts



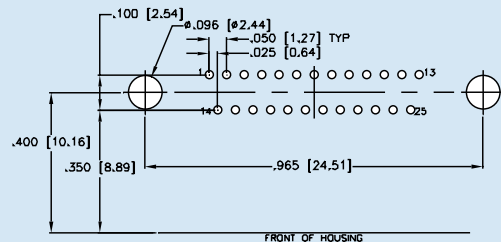
15 Contacts



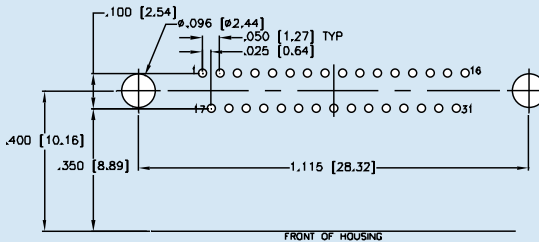
21 Contacts



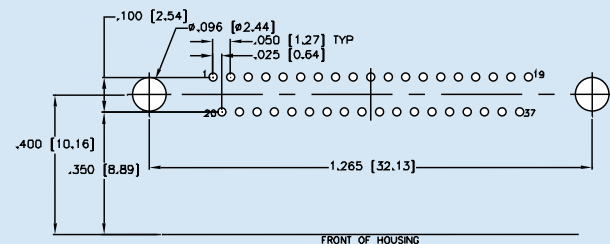
25 Contacts



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.

Custom Engineered Solutions

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

Special Mounting Flanges

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

Value-added Assemblies

- 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

- 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

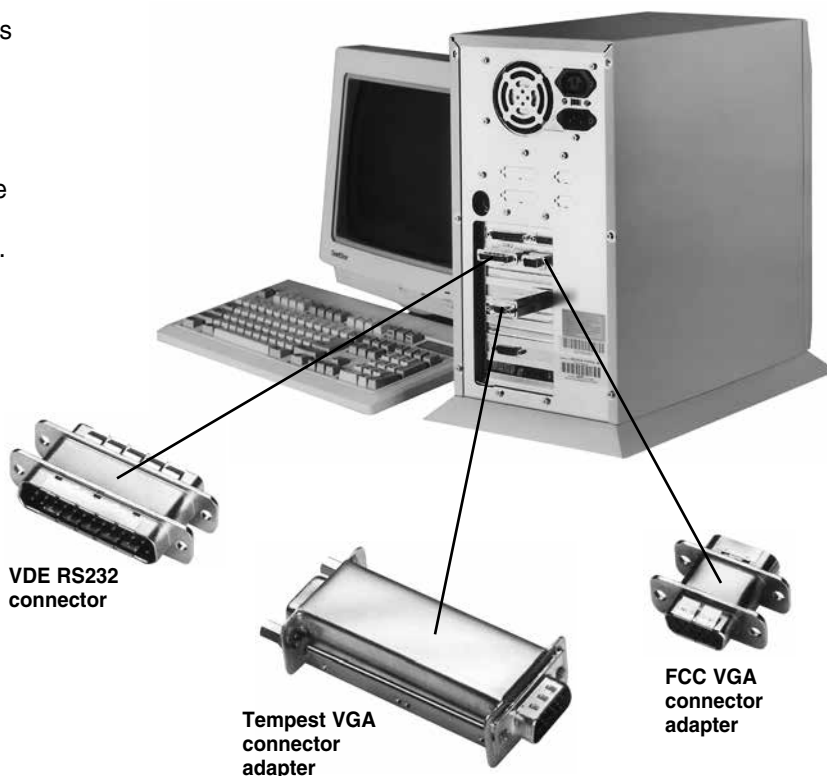
- Manufacturer specific connectors also can be filtered. Our involvement ranges from complete design to implementing minor modifications to include the addition of the filter components. Medical equipment and hand-held devices are examples of excellent applications for these connectors.



Special Mounting Flanges & Value-added



Custom Filter Arrangements & Connectors



VDE RS232 connector

Tempest VGA connector adapter

FCC VGA connector adapter

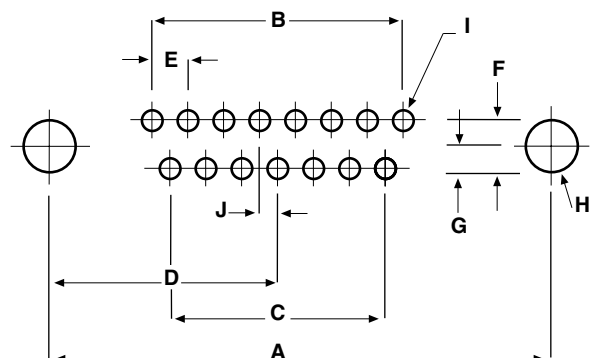
Filtered Connector Performance Specifications

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

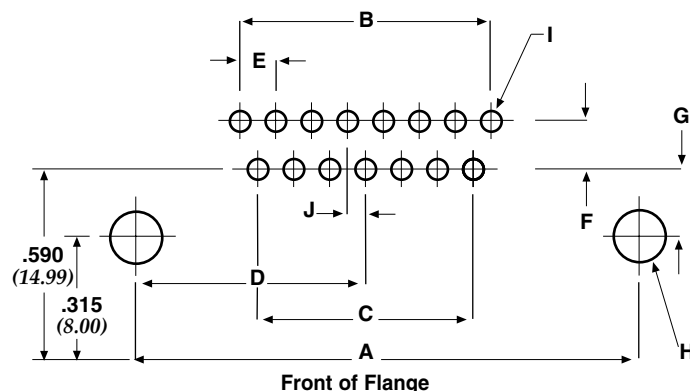
The information shown can be used as a basis for your filtered connector specifications. (Contact API for additional details.)

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.

Board & Panel Cutouts



Printed Circuit
Vertical Board Mount (standard density)



Printed Circuit
Right Angle Mount (standard density)

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

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

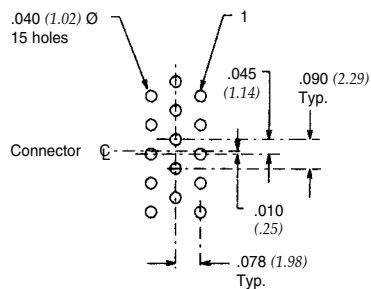
Panel Cutouts (Front or Rear Mounting) for Standard and High-Density D-Sub Connectors

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)	

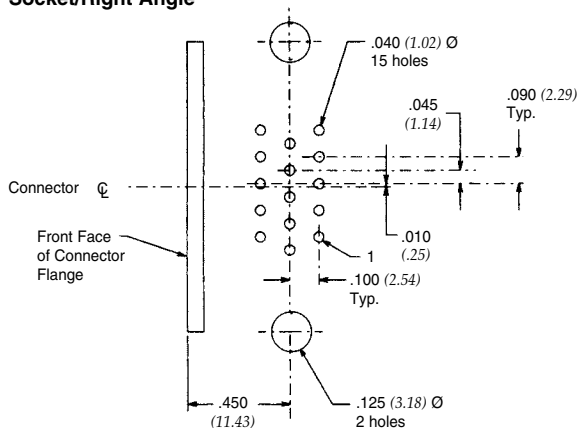
Dimensions in inches (mm)

Board & Panel Cutouts

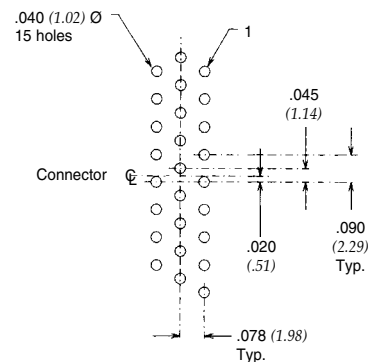
**15 High-Density
Pin/PCB**



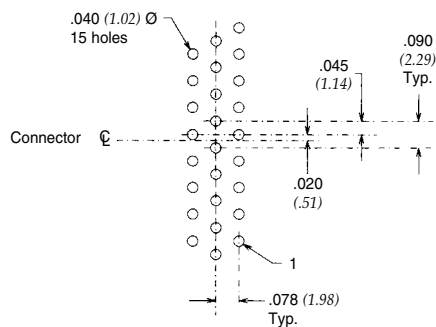
**15 High-Density
Socket/Right Angle**



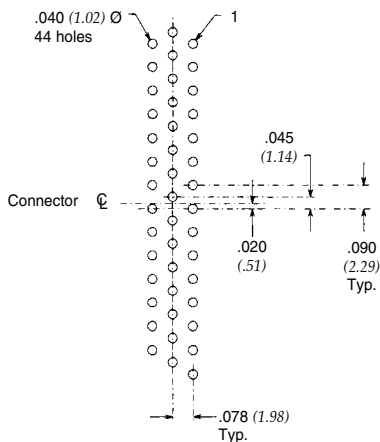
**26 High-Density
Pin/PCB**



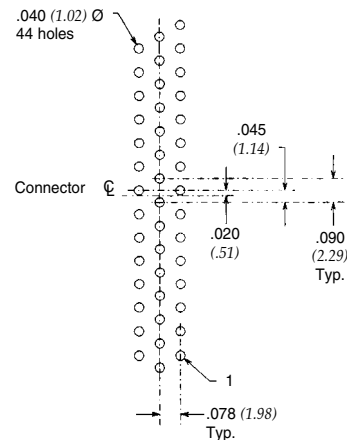
**26 High-Density
Socket/PCB**



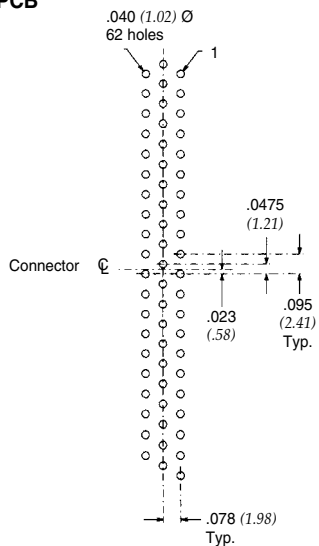
**44 High-Density
Pin/PCB**



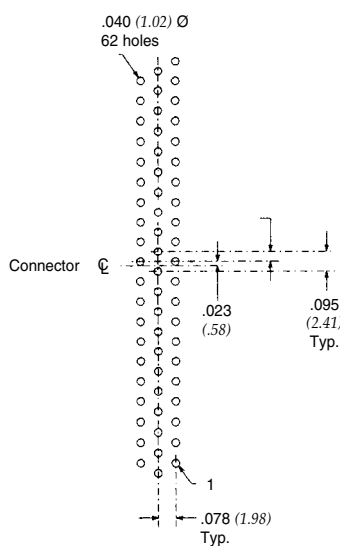
**44 High-Density
Socket/PCB**



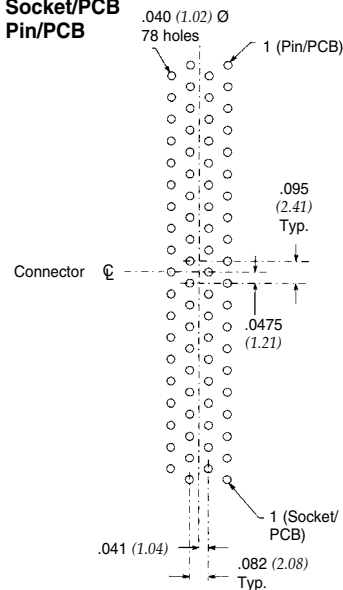
**62 High-Density
Pin/PCB**



**62 High-Density
Socket/PCB**



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



Dimensions in inches (mm)

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

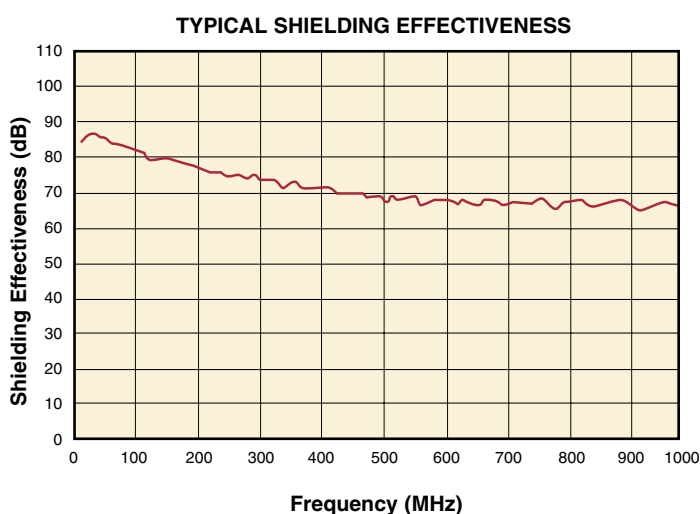
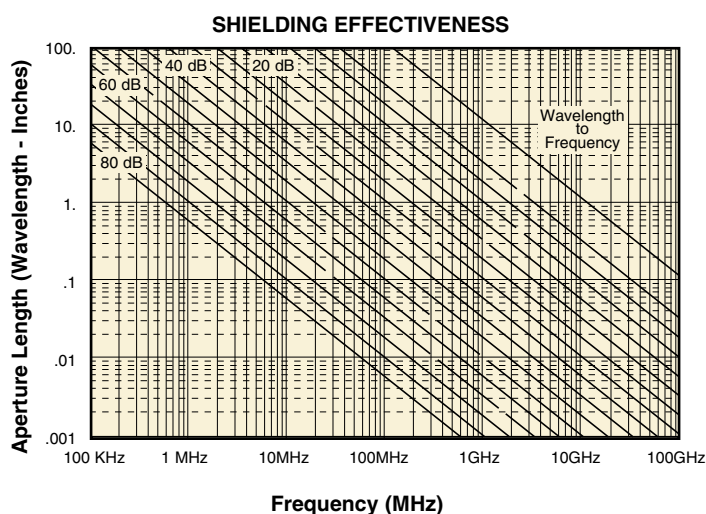
The electromagnetic shield in most cases is the electronic housing itself. The housing/shield forms a metal cage around the electronic circuits in a device. Most of the electromagnetic signal is absorbed with a small portion (3 to 10 dB) of the signal reflected off the metal housing. Most of the absorbed 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.



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

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

Thickness005" (.13mm) compressed

Wave

Height030" +.020/- .015
(.76 +.51/- .38mm)

Length increase

when flattened 0.008" (.20mm) per inch

Waved Metal Gaskets (Select part number by filling in "xxx": 572019-00xxx-70)



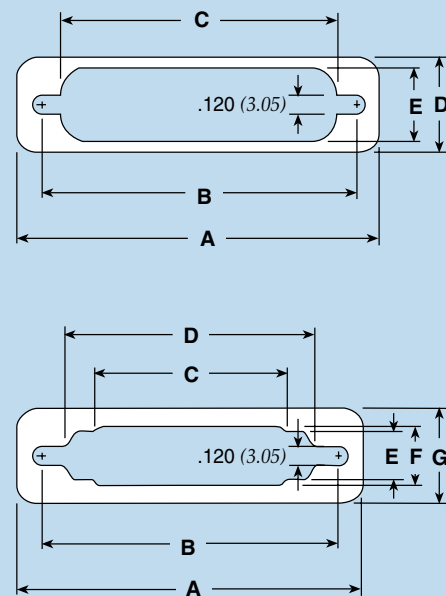
**Waved Metal
Grounding/Shielding Gasket**
(shown in free state)

Front Mount

Wave Height

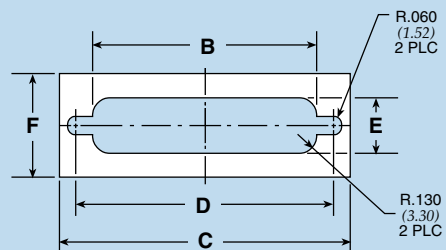
Rear Mount

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	Dimensions					Fabric Type	Part Number
	A	B	C	D	E	F		
1	0.012	0.746 (18.95)	1.213 (30.81)	0.984 (24.99)	0.400 (10.16)	0.750 (19.05)	nonwoven	57F01-D112-1275
	0.040						woven	57F11-D140-1275
	0.070						woven	57F11-D170-1275
2	0.012	1.074 (27.28)	1.541 (39.14)	1.312 (33.32)	0.400 (10.16)	0.750 (19.05)	nonwoven	57F01-D212-1575
	0.040						woven	57F11-D240-1575
	0.070						woven	57F11-D270-1575
3	0.012	1.614 (41.00)	2.088 (53.04)	1.852 (47.04)	0.400 (10.16)	0.750 (19.05)	nonwoven	57F01-D312-2075
	0.040						woven	57F11-D340-2075
	0.070						woven	57F11-D370-2075
4	0.012	2.266 (57.56)	2.720 (69.09)	2.500 (63.50)	0.400 (10.16)	0.750 (19.05)	nonwoven	57F01-D412-2775
	0.040						woven	57F11-D440-2775
	0.070						woven	57F11-D470-2775
5	0.012	2.158 (54.81)	2.63 (66.80)	2.406 (61.11)	0.500 (12.70)	0.850 (21.59)	nonwoven	57F01-D512-2685
	0.040						woven	57F11-D540-2685
	0.070						woven	57F11-D570-2685



Dimensions in inches (mm)

[illegible]

api 
technologies corp.
Spectrum Control

Specialty Connectors

*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**



- 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

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-55116
- MIL-DTL-83723 ■ MIL-DTL-24308
- MIL-DTL-26482 ■ 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.

Custom Unfiltered Connectors

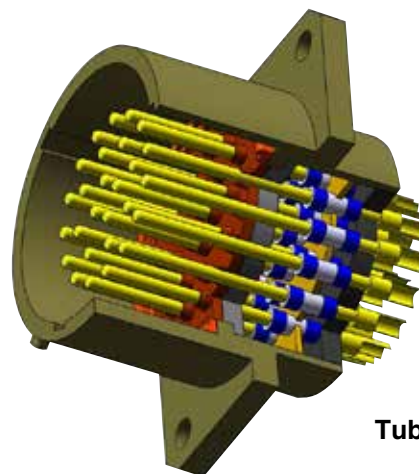
API also offers unfiltered custom connector design and manufacturing. Parts can be designed to meet your mechanical and environmental specifications or those of similar QPL connectors.

Features

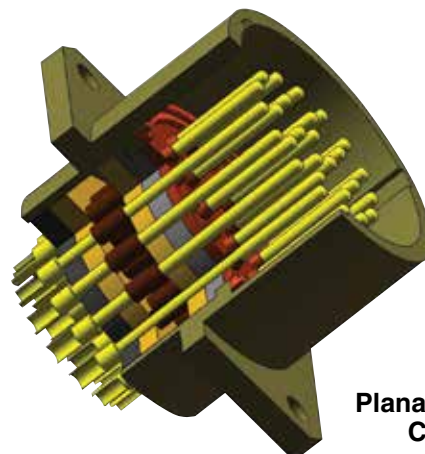
- Built to MIL specifications
- Custom shells to fit your available space
- Multiple terminations available
- Built to meet various environmental requirements
- Integral strain relief
- Power, signal and coax line combinations

Vertically Integrated

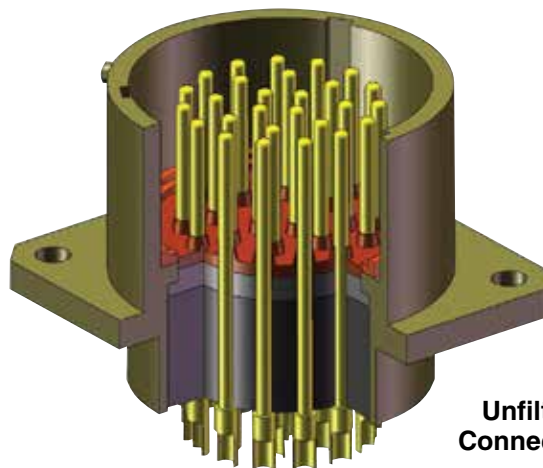
API's Spectrum Control line of custom filtered and unfiltered connector offerings are fully vertically integrated. Components including capacitors and shells are manufactured by API, providing our customers high quality parts at very competitive prices, with the industry's shortest lead times.



Tubular Filtered Connector



Planar Filtered Connector



Unfiltered Connectors

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

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)

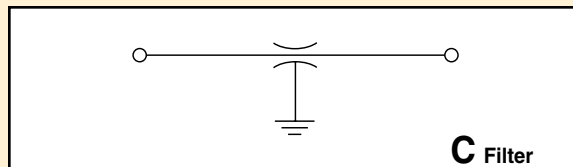


Figure B (2)

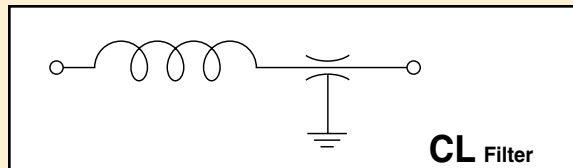


Figure C (3)

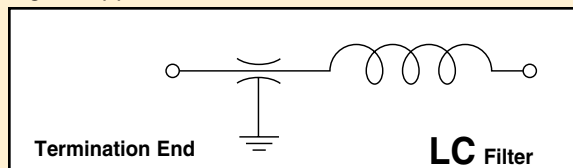
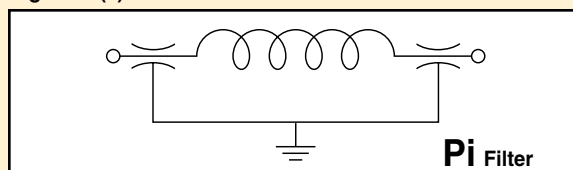
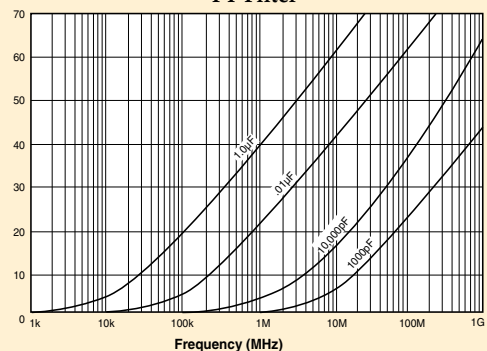


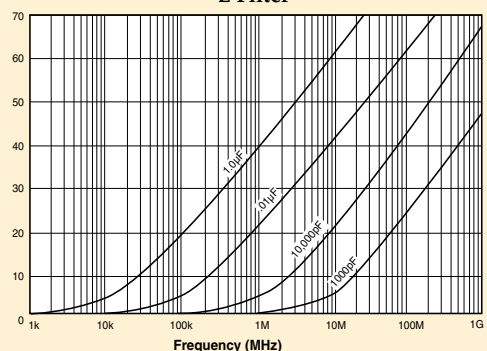
Figure D (4)



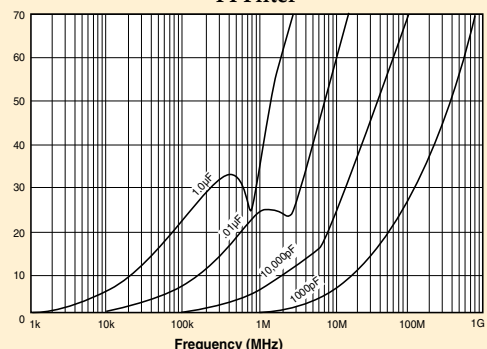
Insertion Loss (db) Per MIL-STD-220
FT Filter



Insertion Loss (db) Per MIL-STD-220
L Filter



Insertion Loss (db) Per MIL-STD-220
PI Filter



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.

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	C	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		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	Pi	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		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

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		Comments**
Description	Method	Condition	Method	Condition	
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
Solderability	-	-	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).

emi power filters



api 
technologies corp.
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



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

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**



- 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

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 flowthrough 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.

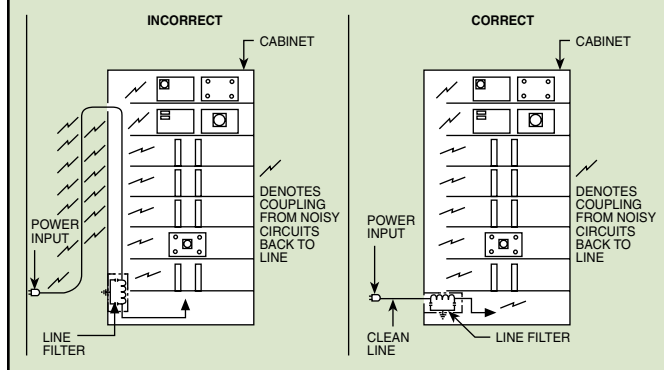
EMI generated from power electrical products cause the most concern. These man-made sources, such as power lines, rotating machinery, power supplies and electronic transmission devices, all have their own signatures and noise pollution.

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.

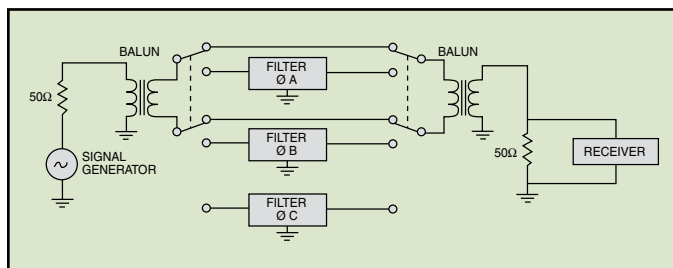
Measurement Guidelines

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

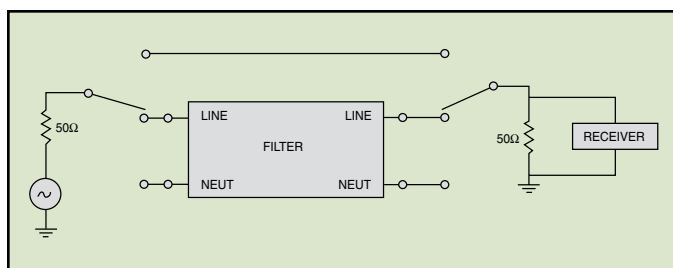
Differential mode noise is caused by non-sinusoidal conduction of rectifiers and other switching devices creating harmonic distortion.

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.



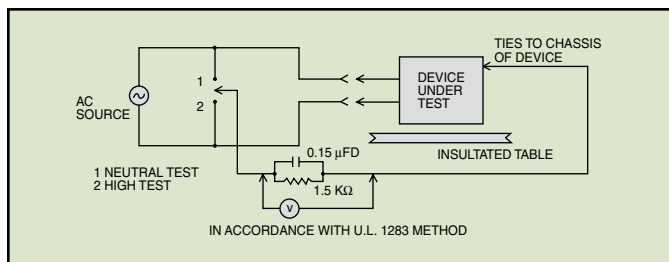
Common (Asymmetrical) Mode Insertion Loss

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

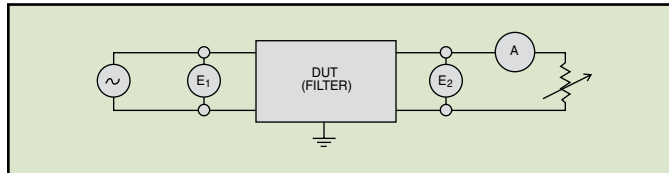
Leakage is a measurement of reactive current (capacitance) to ground per line. Spectrum uses the following test setup for leakage current measurement.



AC Voltage Drop

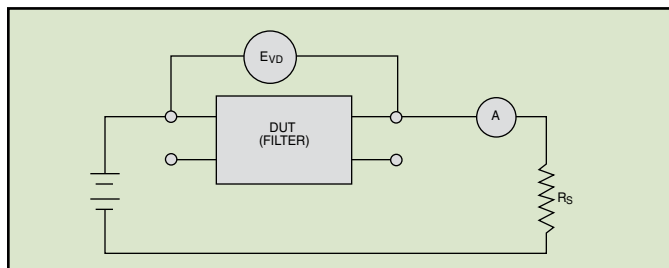
AC voltage drop is defined as $E_{in} - E_{out} = AC$ voltage drop.

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:



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		Product Style		Current Rating		Leakage Current (Y Cap)		Outline Drawing/ Case Style
10 = Filtered IEC Inlets		BBF = 3 Phase, terminal block connection		001 = 1.0 Amp		250 VAC		1 Select case style from following
11 = Printed Circuit Board Mount		BFF = Bolt-in fused filter		002 = 2.0 Amps		0 = 0.075 mA	125VAC	* Cylindrical
12 = Power Line Filters		BPF = Bolt-in IEC w/Fast-on rear terminals		003 = 3.0 Amps		1 = 0.01 mA	DC = DC	* Power line w/Fast-on
13 = Three Phase Power Line Filters		BPL = Bolt-in IEC w/wire lead termination		005 = 5.0 Amps		2 = 0.20 mA		* Power line w/threaded studs
14 = Fused or Switched & Fused Power Entry Filters (250V)		BSF = Bolt-in switched & fused		006 = 6.0 Amps		3 = 0.35 mA		* Power line w/wire leads
15 = Switched & Dual Fused		CCL = Cylindrical, capacitive inputs w/Fast-ons		010 = 10 Amps		4 = 0.10mA		* PCB mount
16 = Single Phase (250V)		CLF = Cylindrical, inductive inputs w/wire leads		015 = 15 Amps		5 = 0.50 mA		* Large case 3 Phase delta
		MMB = Multiple stage filtering w/threading studs		016 = 16 Amps		6 = 0.60 mA		* Large case 3 Phase wye
		MMF = Multiple stage filtering w/Fast-on terminal		020 = 20 Amps		7 = 0.70 mA		* IEC Inlet
		MPC = Miniature PCB mountable		025 = 25 Amps		8 = 1.0 mA		
		PDB = 3 Phase, delta w/threaded studs		030 = 30 Amps		9 = 3.0 mA		
		PDF = 3 Phase, delta w/Fast-ons		035 = 35 Amps		10 = 2.0 mA		
		PDL = 3 Phase, delta w/wire leads		050 = 50 Amps		11 = 1.5 mA		
		PMB = Power line filter w/threaded studs		100 = 100 Amps		12 = 4.5 mA		
		PMF = Power line filter w/Fast-ons		150 = 150 Amps		13 = 9.0 mA		
		PML = Power line filter w/wire leads		160 = 16.0 Amps		14 = 20.0 mA		
		PWB = 3 Phase, wye w/threaded studs		200 = 200 Amps		15 = 15.0 mA		
		PWE = 3 Phase, wye w/busbar		300 = 300 Amps		17 = 33.0 mA		
		PWF = 3 Phase, wye w/Fast-ons		400 = 400 Amps		18 = 71.5 mA		
		PWL = 3 Phase, wye w/wire leads		500 = 500 Amps		DC = DC		
				600 = 600 Amps				

* Note: Not all series offer the product style, rating and leakage current

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 μ F.

60	-	BPR	-	060	-	5	-	4
Product Line Series		Product Style		Current Rating		Leakage Current (Y Cap)		Capacitance (X Cap)
60 = Power Entry Modules		AFL = Appliance filter w/ inductive input		010 = 1.0 Amps	250 VAC	125VAC		0 = none
61 = Mini PCB Power Filters		AFC = Appliance filter w/ capacitive input		015 = 1.5 Amps	0 = 0.075 mA	0 = 0.035 mA		1 = 0.01 μ F
62 = Power Line Filters		ARL = AFL plus bleeder resistor		016 = 1.6 Amps	1 = 0.01 mA	1 = 0.005 mA		2 = 0.022 μ F
63 = Three Phase Power Line Filters		BFF = Fused filter w/ Fast-on terminals		020 = 2.0 Amps	2 = 0.20 mA	3 = 0.35 mA		3 = 0.033 μ F
64 = Fused or Switched & Fused Power Entry Filters (250V)		BFS = Fused filter w/solder lug terminals		030 = 3.0 Amps	3 = 0.35 mA	4 = 0.05 mA		4 = 0.047 μ F
65 = Fused or Switched & Fused Power Entry Filters (125V)		BHP = High frequency bolt-in for PCB		040 = 4.0 Amps	4 = 0.10 mA	5 = 0.50 mA		5 = 0.050 μ F
66 = Fused or Switched & Fused Low Leakage Power Entry Filters (250V)		BHS = High frequency bolt-in w/solder lugs		050 = 5.0 Amps	5 = 0.50 mA	6 = 0.60 mA		6 = 0.068 μ F
67 = Fused or Switched & Fused Low Leakage Power Entry Filters (125V)		BPF = Bolt-In right angle terminals		060 = 6.0 Amps	6 = 0.60 mA	7 = 0.70 mA		01 = 2 x 0.01 μ F
68 = Switched & Dual Fused Power Entry Filters		BPL = Bolt-in w/wire leads		080 = 8.0 Amps	7 = 0.70 mA	8 = 1.00 mA		02 = 0.10 μ F & 0.22 μ F
69 = Dual Fused Only or Dual Switched Only Power Entry Filters		BPP = Bolt-in PCB mount		100 = 10.0 Amps	8 = 1.00 mA	9 = 3.00 mA		04 = 2 x 0.22 μ F
		BPR = Bolt-in w/Fast-on tab terminals		150 = 15.0 Amps	9 = 3.00 mA			06 = 2 x 0.4 μ F & 0.22 μ F
		BPS = Bolt-in w/ solder lug terminals		160 = 16.0 Amps				10 = 0.15 μ F
		BSF = Bolt-in switched & fused		200 = 20.0 Amps				11 = 0.10 μ F
		MMF = Metal case w/fast-on tabs		300 = 30.0 Amps				12 = 0.22 μ F
		MPC = Miniature printed circuit board		400 = 40.0 Amps				13 = 0.33 μ F
		PMB = Metal case w/bolt-on terminals						14 = 0.47 μ F
		PMF = Metal case w/Fast-on tabs						16 = 0.22 μ F & 2 x 0.33 μ F
		PML = Metal case w/wire leads						21 = 1.00 μ F
		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						

* Note: Not all series offer the product style, rating and leakage current

High Current DC Single Line Feed-through Series

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

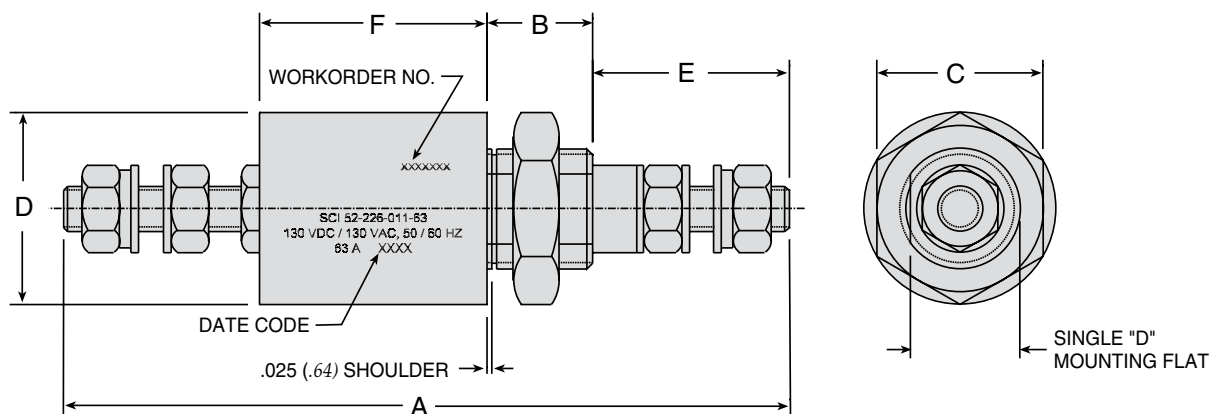
Part Number	Rated Current	Min. Cap.	Minimum Insertion Loss (db)*					
			.01MHz	.10MHz	1MHz	10MHz	100MHz	1000MHz
52F226-011-10	10A	10nF	-	-	4	21	41	60
52F226-011-16	16A							
52F226-011-32	32A							
52F226-011-63	63A							
52F226-011-100	100A	47nF		2	15	34	53	74
52F226-011-200	200A	100nF		5	21	40	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



RoHS
COMPLIANT

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)		1.81 (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)		1.81 (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					1.02 (26)	
52F226-041-63	3.98 (101)	0.75 (19)		1.5 (38.10)	1.26 (32)	1.97 (50)
52F226-041-100	5.24 (133)		1.57 (40)	2 (50.80)	1.57 (40)	2.68 (68)
52F226-041-200						

Dimensions in inches (mm)

High Current DC Single Line Pi Series

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

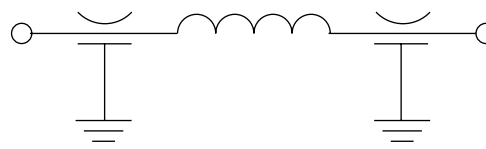
Applications

- 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



RoHS
COMPLIANT

Circuit Diagram

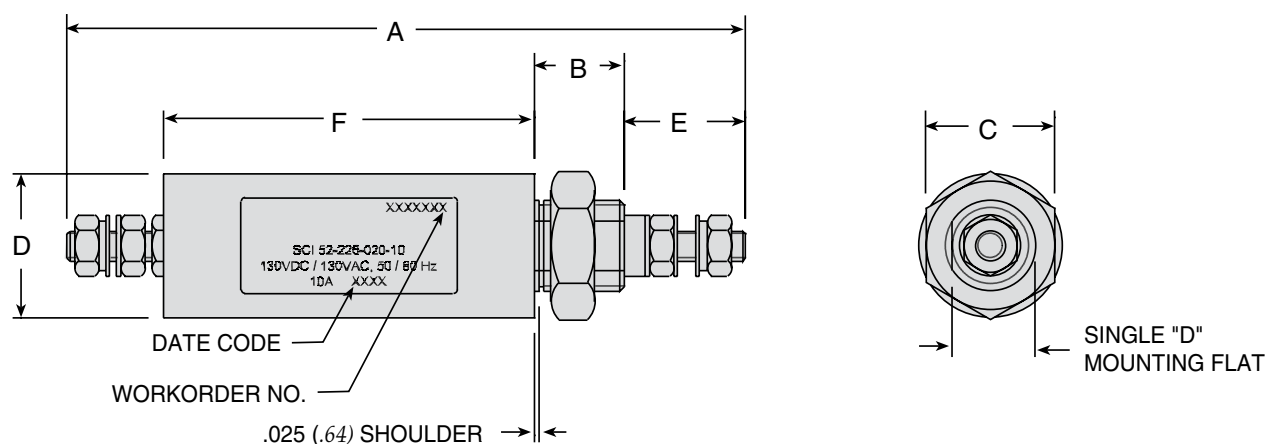


Specifications

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			23	50			
52F226-020-63	63A	100nF		8	27	67	90	
52F226-020-100	100A	470nF	4	21	70			
52F226-020-200	200A		7	23	30	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		
52F226-029-100	100A	1000nF	8	26	57	73		
52F226-029-200	200A	4700nF	20	40	85	90		

* Optimum performance with proper installation

High Current DC Single Line Pi 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)

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

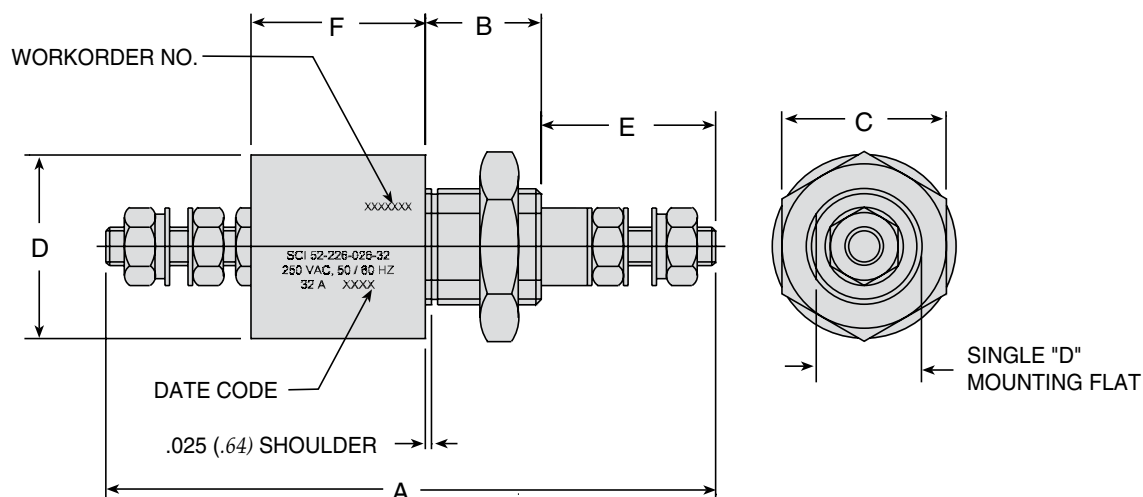
- Telecommunications (cellular base stations, telephone switching racks, etc.)
- Power supplies
- Medical equipment
- C.O.T.S. (Commercial-Off-The-Shelf) Military
- Industrial equipment controls
- Data transmission equipment

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					4	21	41	60	
52F226-016-63	63A	10nF			2	15	34	53	74	
52F226-016-100	100A	47nF		5	21	40	60	85		
52F226-016-200	200A	100nF								
52F226-016-250	250A									
52F226-016-300	300A	4.7nF		-	2	15	34	54		
52F226-026-10	10A				10nF	4	21	41	60	
52F226-026-16	16A					2	15	34	53	74
52F226-026-32	32A						21	40	60	85
52F226-026-63	63A	47nF		10	27	47	67	90		
52F226-026-100	100A	100nF								
52F226-026-200	200A	220nF								
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

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)

High Current AC Single Line Pi Series

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

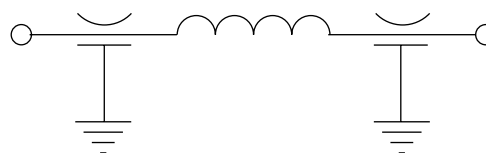
Applications

- 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



RoHS
COMPLIANT

Circuit Diagram

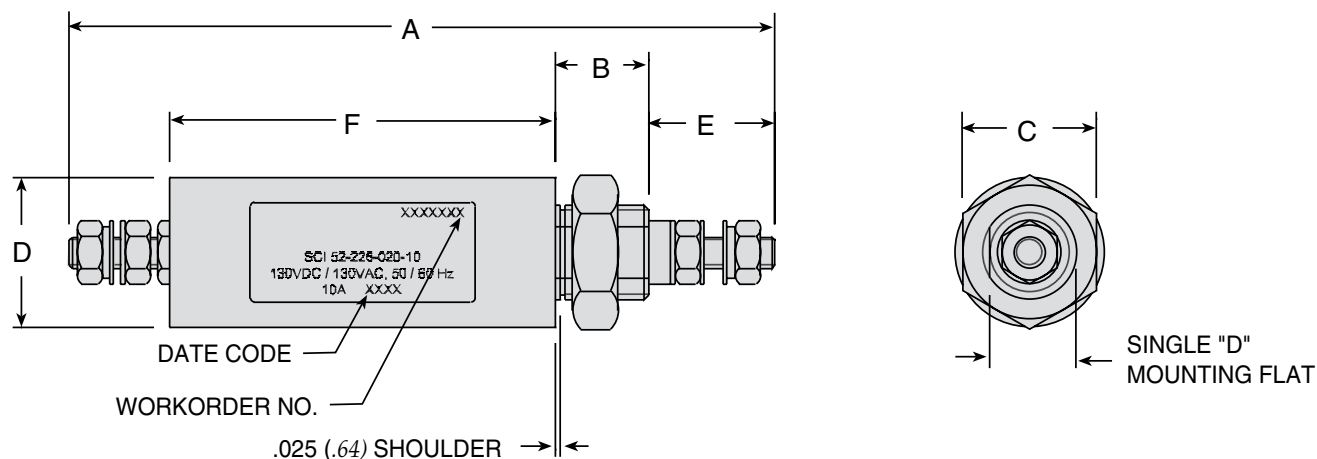


Specifications

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			4	21	52	80	
52F226-037-63	63A	47nF		8	25	73	90	
52F226-037-100	100A	100nF	1	9	26	75		
52F226-037-200	200A							
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			150nF	1	12	27	
52F226-019-63	63A	470nF	4	21	39	85	90	
52F226-019-100	100A				57			
52F226-019-200	200A							
52F226-019-250	250A							
52F226-019-300	300A							

* Optimum performance with proper installation

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)		1.81 (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)		1.57 (40)		2 (50.80)	1.57 (40)	6.30 (160)
52F226-019-300							

Dimensions in inches (mm)

Power Entry Modules Bolt-in Rear Terminals

60-BPR & BPS 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
- 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

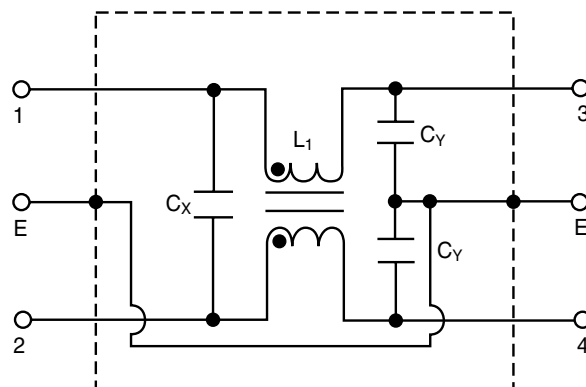
- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units



Tested and found to be
IAW VDE 0565 Part 3.



Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
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%	.022uF ± 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

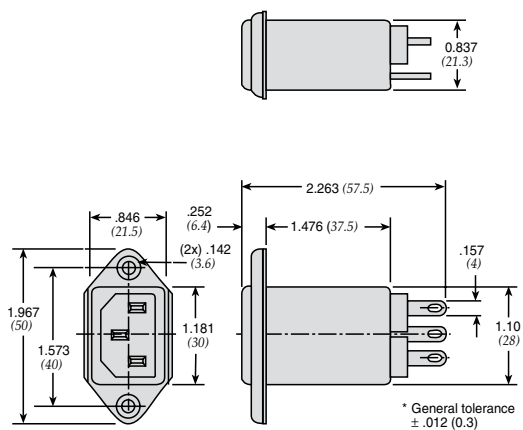
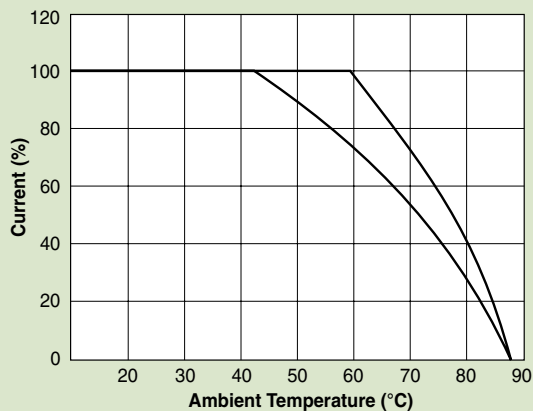
* Substitute BPR or BPS for XXX

BPS - Solder lug terminals
BPR - Fast-on tab terminals

Power Entry Modules Bolt-in Rear Terminals

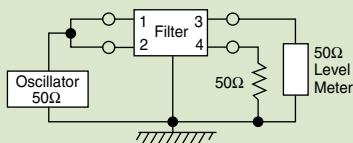
60-BPR & BPS Series

Temperature Characteristics

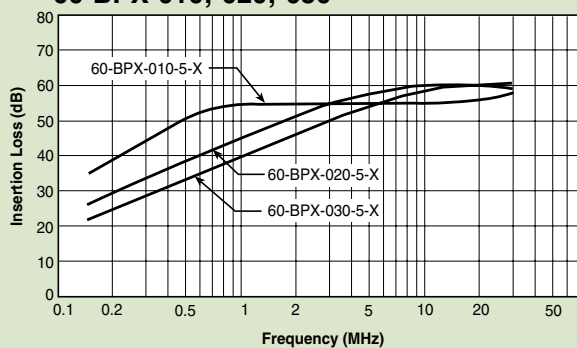


Dimensions in inches (mm)

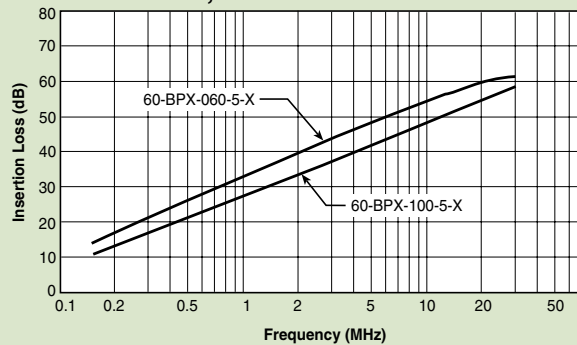
Common Mode



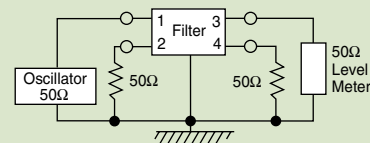
60-BPX-010;-020;-030



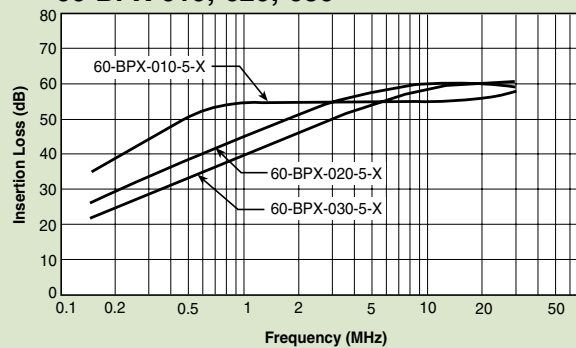
60-BPX-060;-100



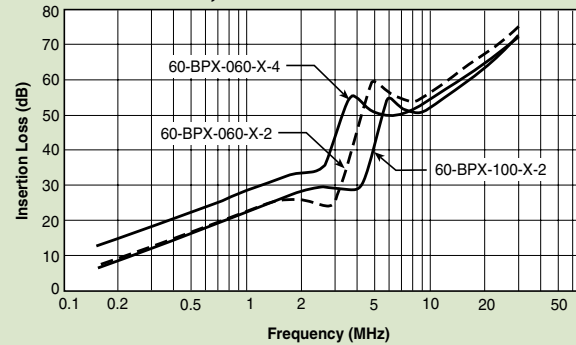
Normal Mode



60-BPX-010;-020;-030



60-BPX-060;-100



Power Entry Modules Bolt-in Right Angle Terminals

60-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
- 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

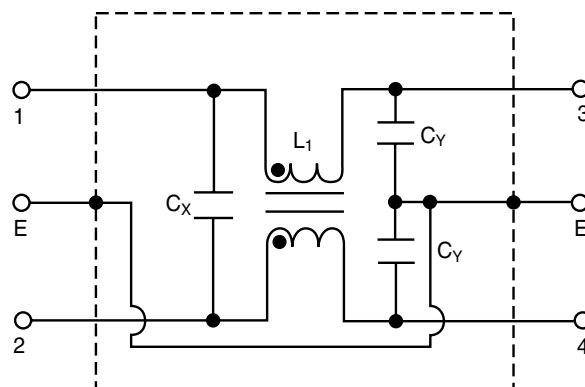
- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units



Tested and found to be
IAW VDE 0565 Part 3.



Circuit Diagram



Specifications

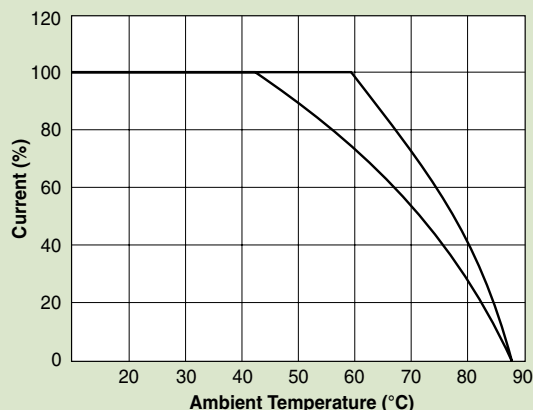
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
60-BPF-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	.022uF ± 20%	6.0mH	30°C
60-BPF-010-3-4					.047uF ± 20%		
60-BPF-010-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-BPF-010-5-4					.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

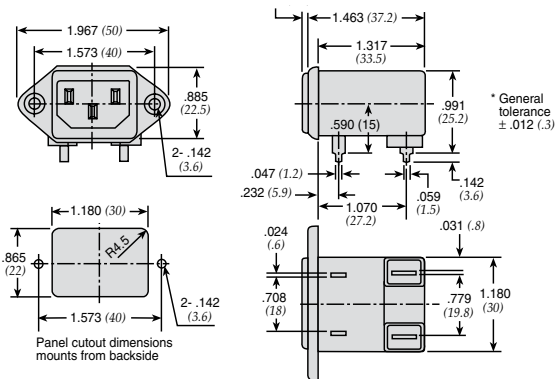
Power Entry Modules Bolt-in Right Angle Terminals

60-BPF Series

Temperature Characteristics

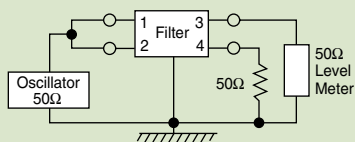


60-BPF Fast-on Terminals

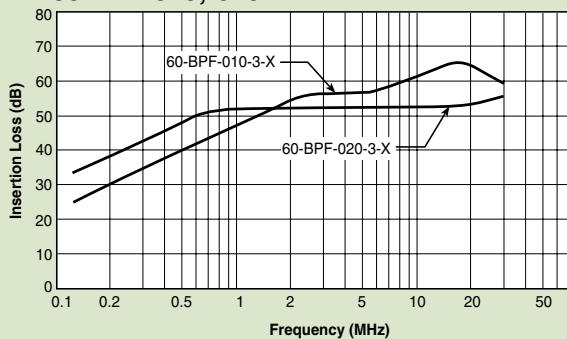


Dimensions in inches (mm)

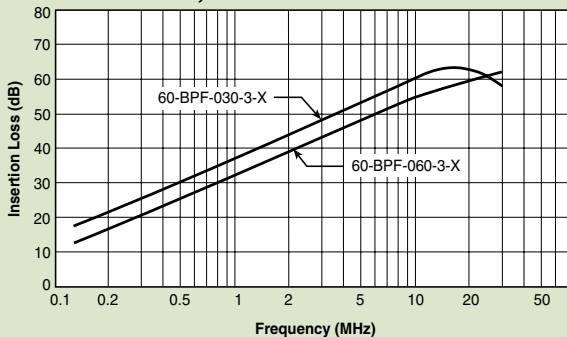
Common Mode



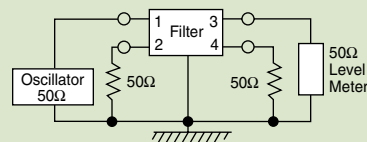
60-BPF-010;-020



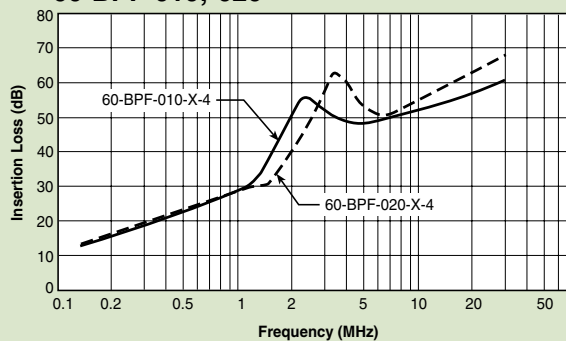
60-BPF-030;-060



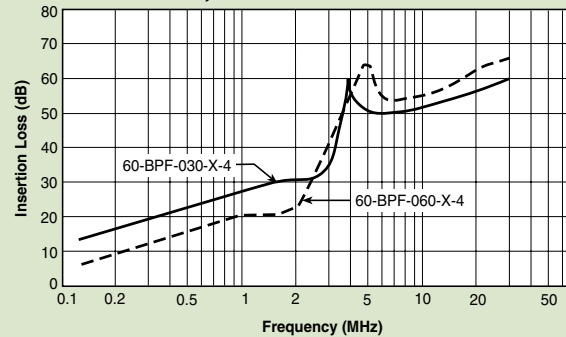
Normal Mode



60-BPF-010;-020



60-BPF-030;-060



Power Entry Modules High Frequency Attenuation

60-BHS Series

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

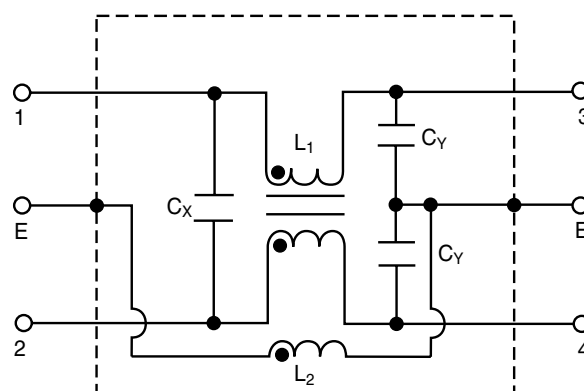
- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units



Tested and found to be
IAW VDE 0565 Part 3.



Circuit Diagram



Specifications

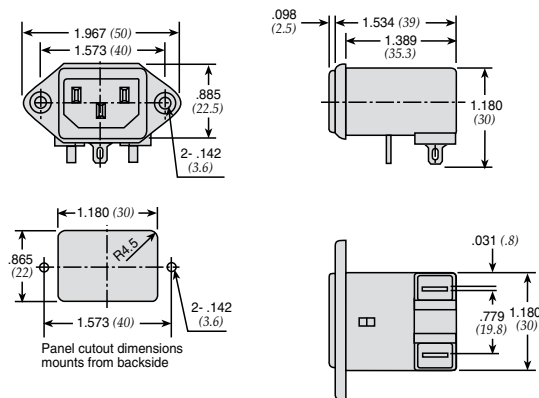
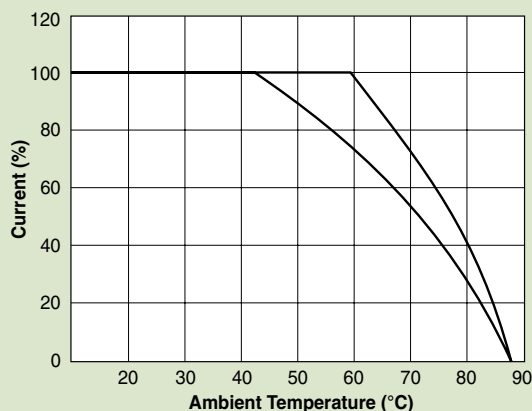
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance		Temperature Rise (Max.)
				C _Y	C _X	(L ₁)	(L ₂)	
60-BHS-010-3-11	250VAC	1A	0.35mA	2200pF ± 20%	0.1uF ± 20%	6mH	18.3uH	30°C
60-BHS-010-3-4					.047uF ± 20%			
60-BHS-010-5-11			0.50mA	3300pF ± 20%	0.1uF ± 20%			
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

Power Entry Modules High Frequency Attenuation

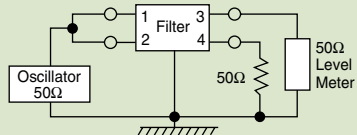
60-BHS Series

Temperature Characteristics

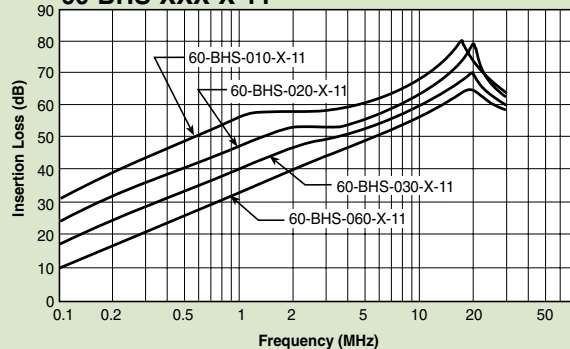


Dimensions in inches (mm)

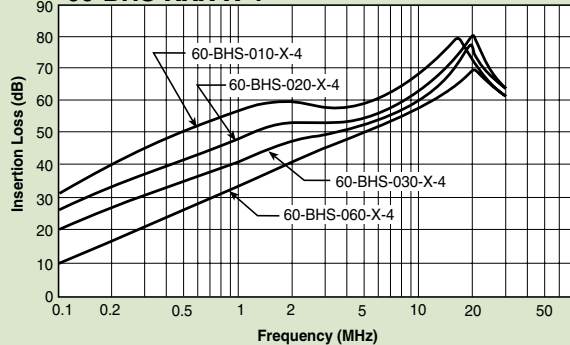
Common Mode



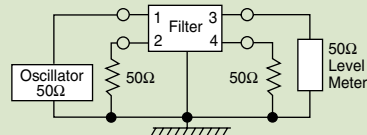
60-BHS-XXX-X-11



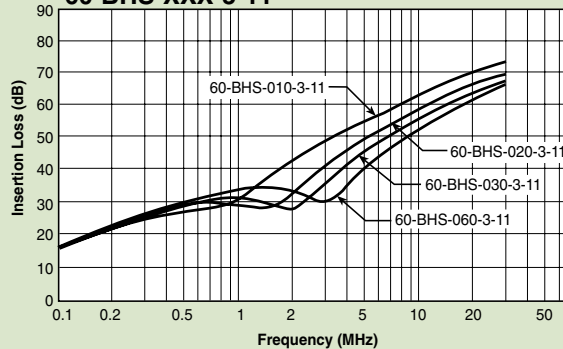
60-BHS-XXX-X-4



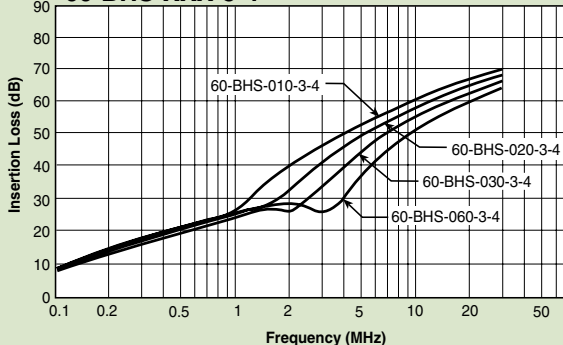
Normal Mode



60-BHS-XXX-3-11



60-BHS-XXX-3-4



Power Entry Modules Bolt-in Rear Terminals For General Purpose Applications

10-BPF Series



Features

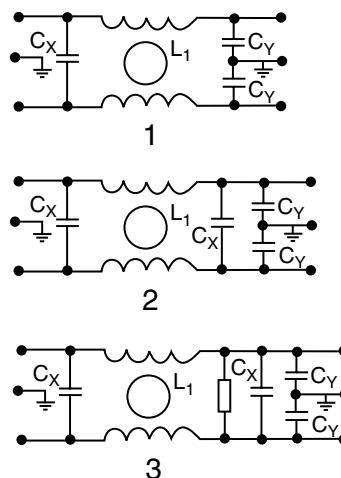
- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Operating temperature: -25°C to +70°C
- Compact configuration

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		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		4700pF	0.01uF	1.5mH	2	A		
10-BPF-003-5-C								C		
10-BPF-003-5-D		6A		3300pF	3300pF & 0.01uF	0.5mH	1	A		
10-BPF-006-5-A								C		
10-BPF-006-5-C				3300pF		1.5mH	2	B		
10-BPF-006-5-D										
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

Power Entry Modules Bolt-in Rear Terminals For General Purpose Applications

Figure A

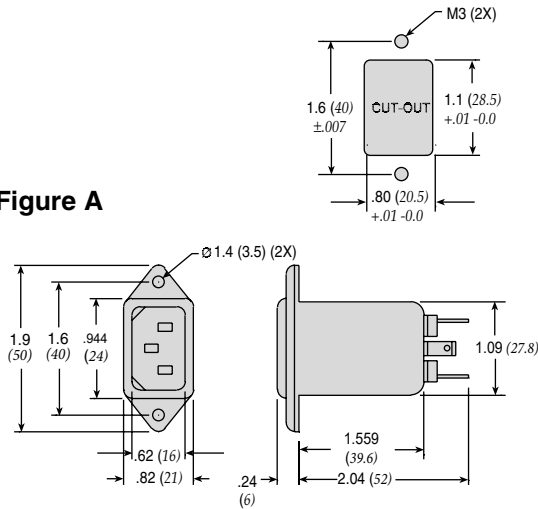


Figure B

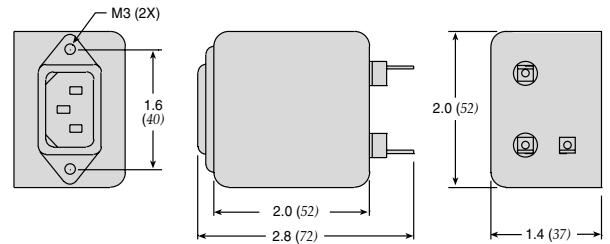
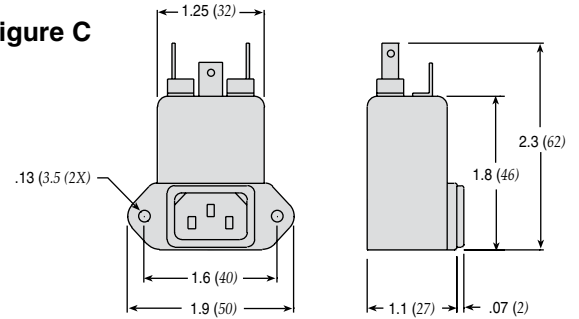
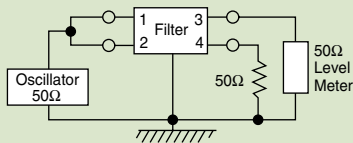


Figure C

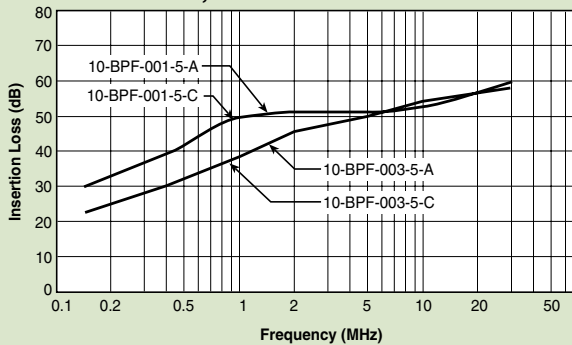


Dimensions in inches (mm)

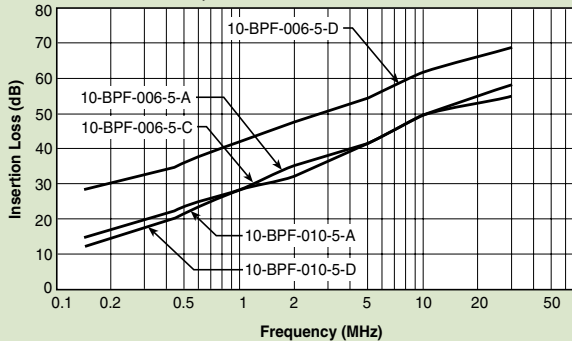
Common Mode



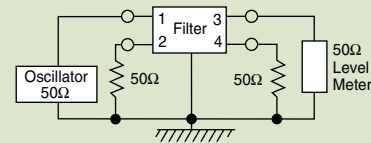
10-BPF-001;-003



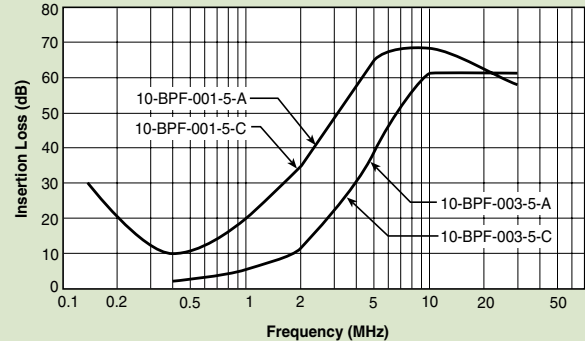
10-BPF-006;-010



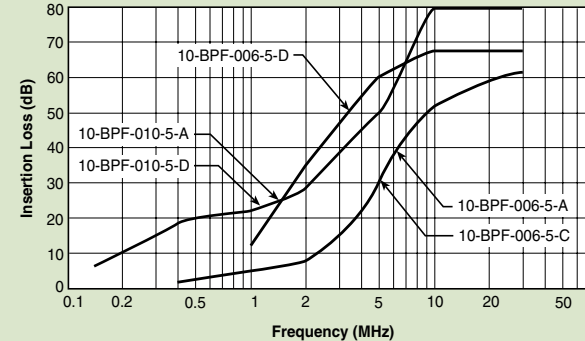
Normal Mode



10-BPF-001;-003



10-BPF-006;-010



Power Entry Modules Bolt-in Rear Terminals For Medical Purpose Applications

10-BPF Series



Features

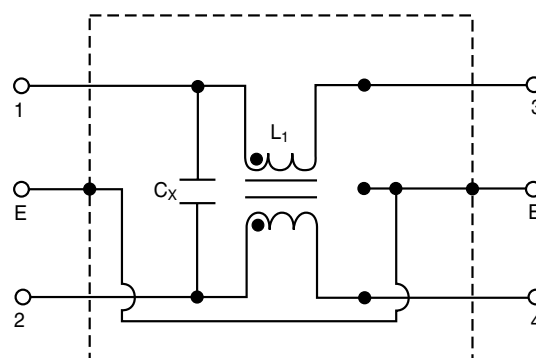
- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Operating temperature: -25°C to +70°C
- Compact configuration
- Low leakage current

Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units



Circuit Diagram



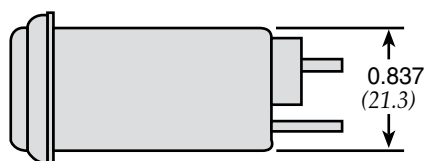
Specifications

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			

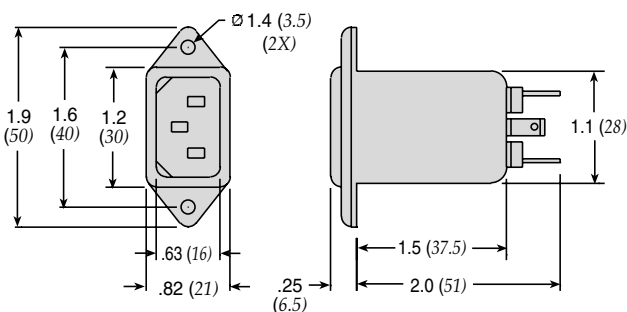
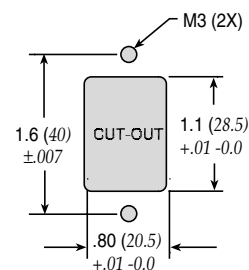
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 45g
Input: Compatible with IEC-320

Power Entry Modules Bolt-in Rear Terminals For Medical Purpose Applications

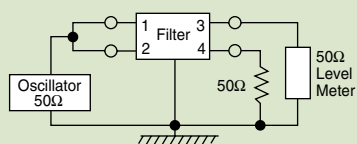
10-BPF Series



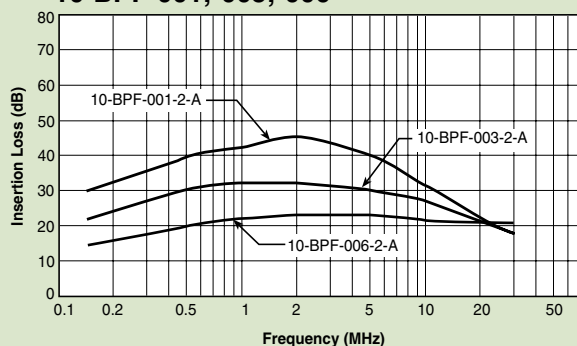
Dimensions in inches (mm)



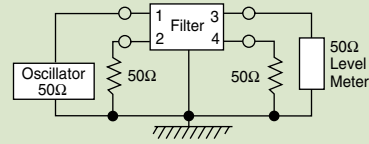
Common Mode



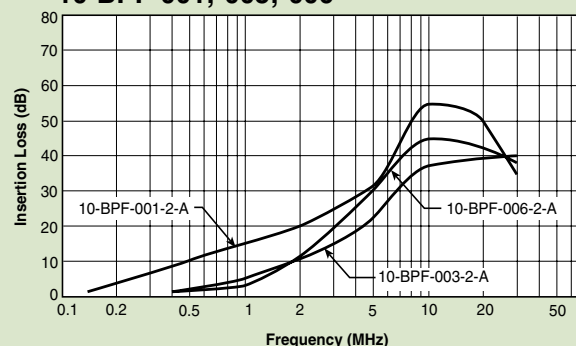
10-BPF-001;-003;-006



Normal Mode



10-BPF-001;-003;-006



Power Entry Modules Snap-in with Wire Leads

60-SPL Series

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

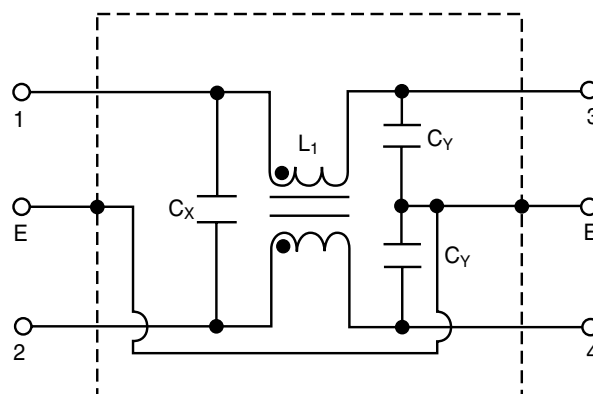
- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units



Tested and found to be
IAW VDE 0565 Part 3.



Circuit Diagram



Specifications

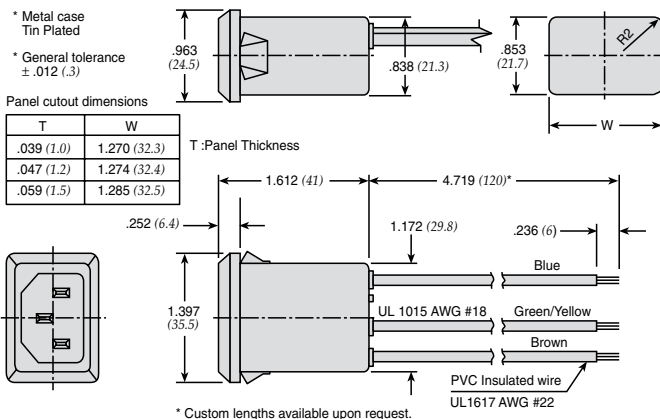
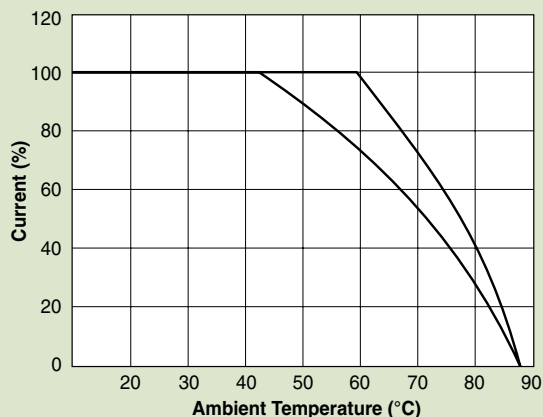
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
60-SPL-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	22nF ± 20%	6.0mH	30°C
60-SPL-010-3-3					33nF ± 20%		
60-SPL-010-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-SPL-010-5-3					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

Power Entry Modules Snap-in with Wire Leads

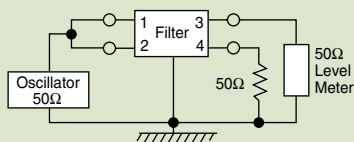
60-SPL Series

Temperature Characteristics

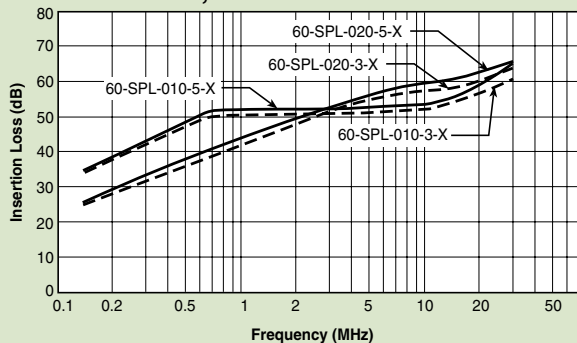


Dimensions in inches (mm)

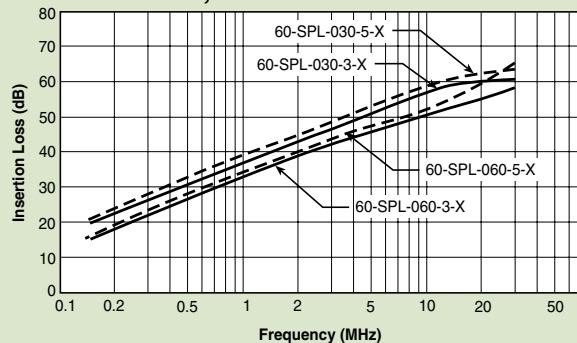
Common Mode



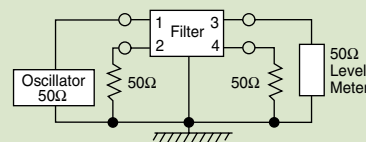
60-SPL-010;-020



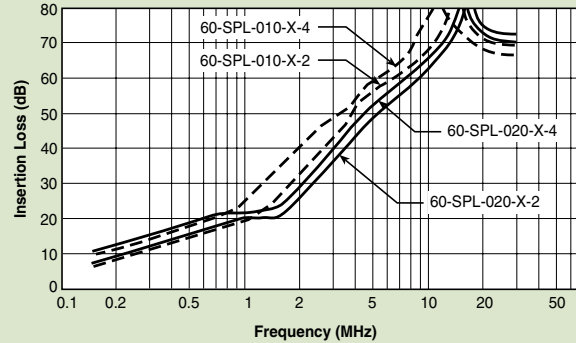
60-SPL-030;-060



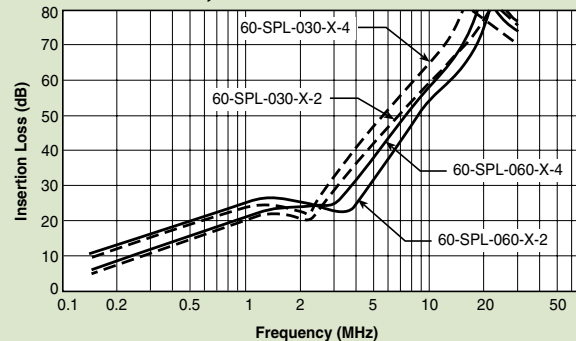
Normal Mode



60-SPL-010;-020



60-SPL-030;-060



Power Entry Modules Bolt-in with Wire Leads

60-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 +85°C (including temperature rise, see graph on page PF28)

Applications

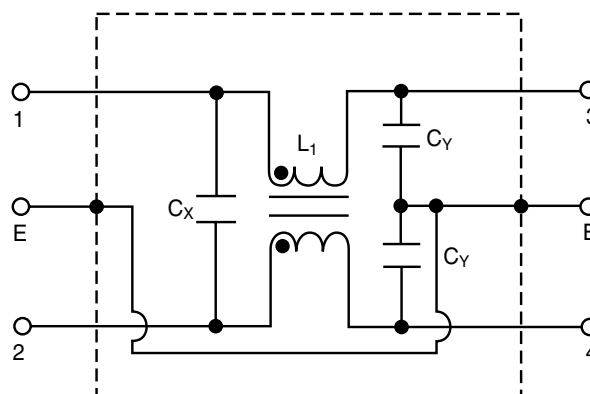
- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Monitor and display units



Tested and found to be
IAW VDE 0565 Part 3.



Circuit Diagram



Specifications

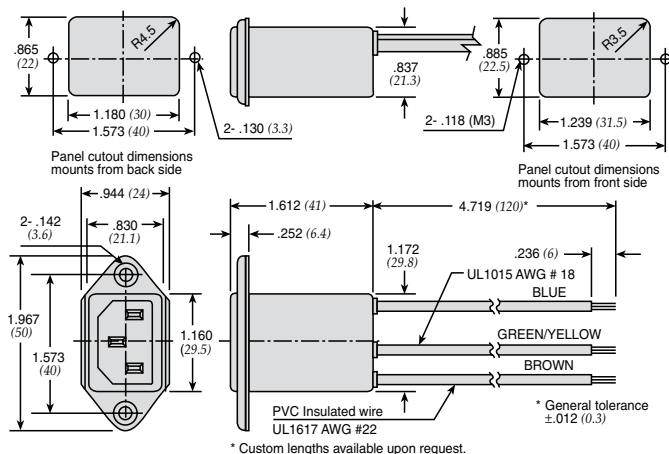
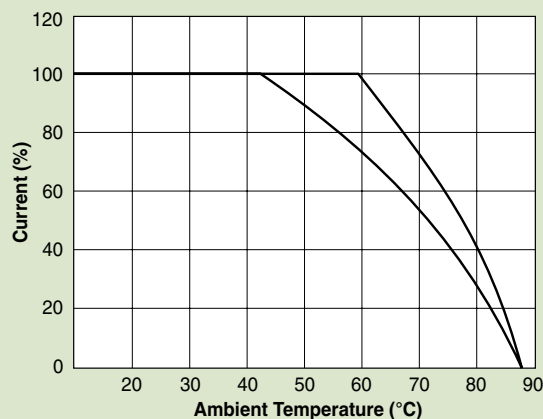
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
60-BPL-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	22nF ± 20%	6.0mH	30°C
60-BPL-010-3-3					33nF ± 20%		
60-BPL-010-5-2			0.50mA	3300pF ± 20%	22nF ± 20%		
60-BPL-010-5-3					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

Power Entry Modules Bolt-in with Wire Leads

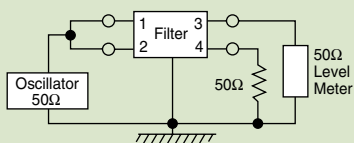
60-BPL Series

Temperature Characteristics

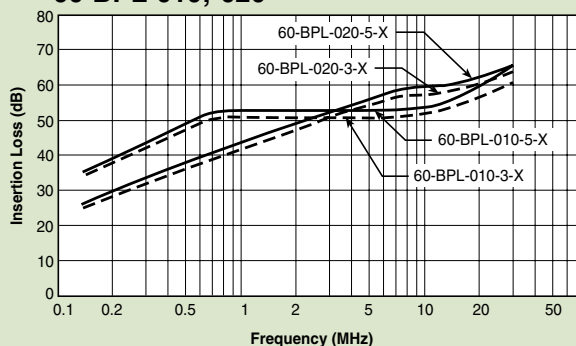


Dimensions in inches (mm)

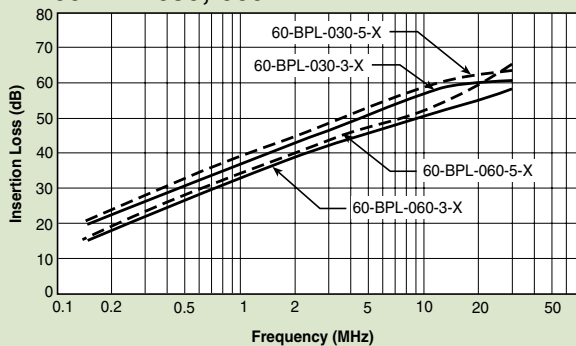
Common Mode



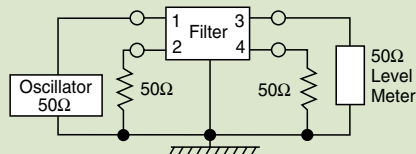
60-BPL-010;-020



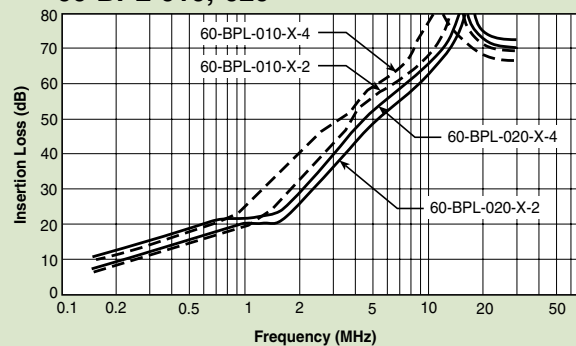
60-BPL-030;-060



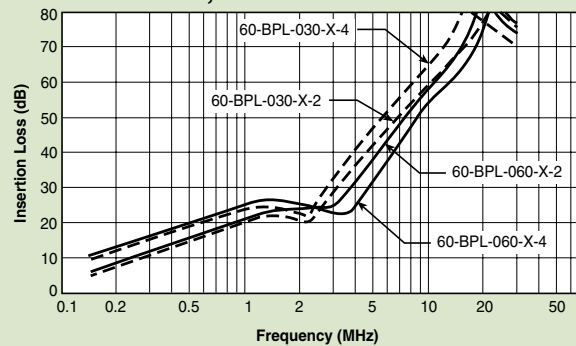
Normal Mode



60-BPL-010;-020



60-BPL-030;-060



Power Entry Modules Bolt-in with Wire Leads

10-BPL Series



Features

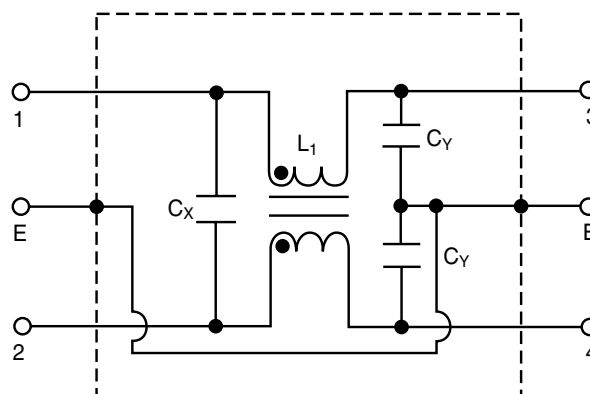
- Ideally suited for products that must conform to FCC part 15 regulations
- Metal case filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Uses IEC connector that meets most safety standards
- Wire output for minimizing space use and economical installation
- 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

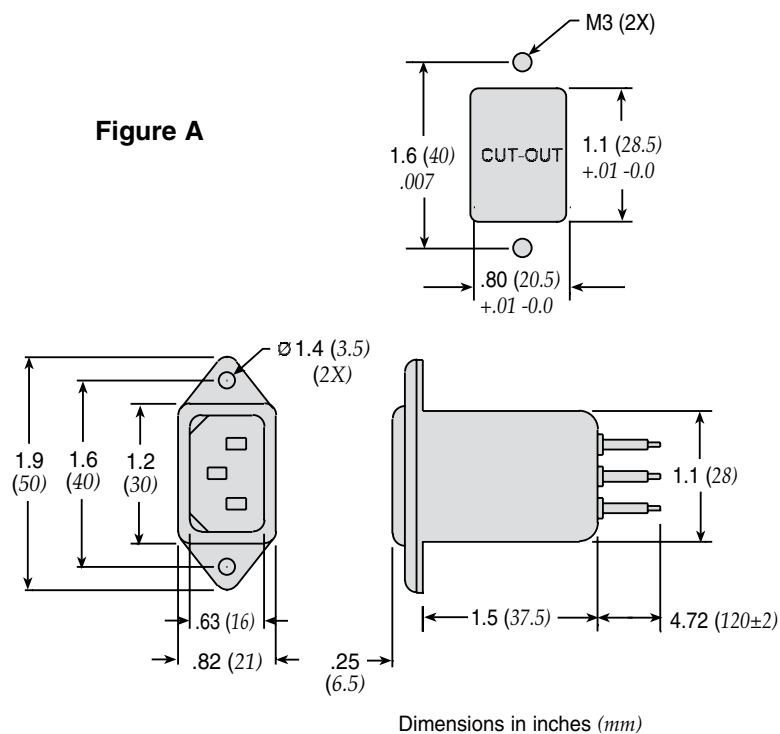
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Circuit Diagram	Figure	Temperature Rise (Max.)
				C _Y	C _X				
10-BPL-001-5-B	250VAC	1A	0.50mA	3300pF	0.01uF	3.0mH	1	A	30°C
10-BPL-003-5-B		3A				1.5mH			
10-BPL-006-5-B		6A				0.5mH			

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

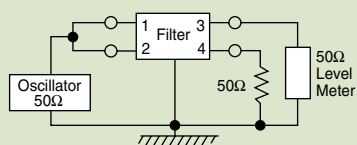
Power Entry Modules Bolt-in with Wire Leads

10-BPL Series

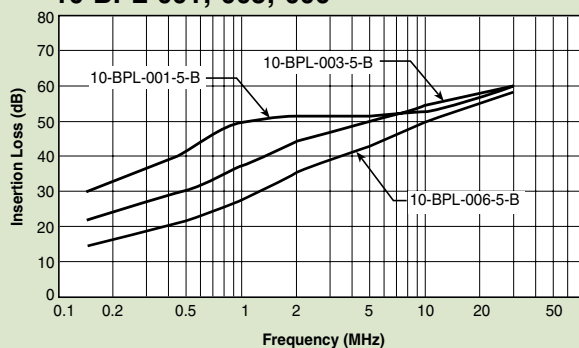
Figure A



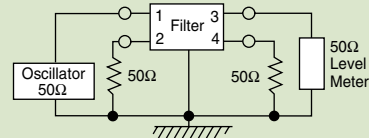
Common Mode



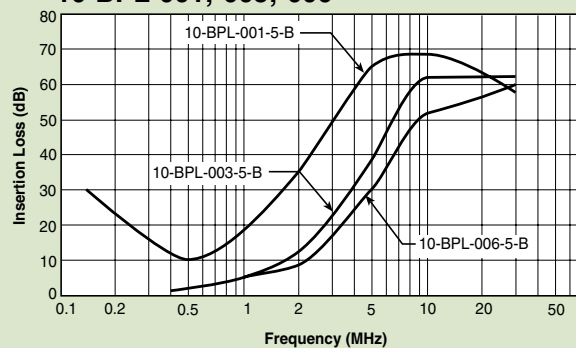
10-BPL-001;-003;-006



Normal Mode



10-BPL-001;-003;-006



Power Entry Modules Snap-in Mount

60-SPR & SPS Series

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

Specifications

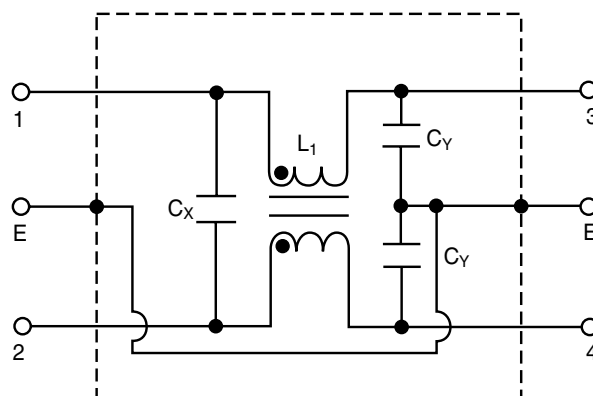
Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
60-XXX-010-3-2	250VAC	1A	0.35mA	2200pF ± 20%	.022uF ± 20%	6.0mH	30°C
60-XXX-010-3-4					.047uF ± 20%		
60-XXX-010-5-2			0.50mA	3300pF ± 20%	.022uF ± 20%		
60-XXX-010-5-4					.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



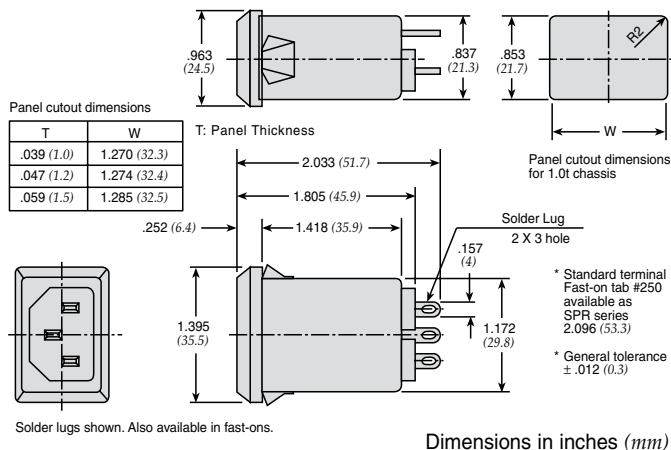
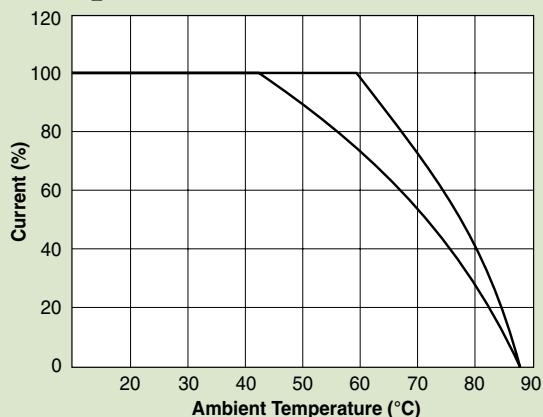
Circuit Diagram



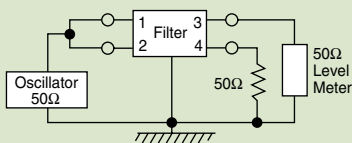
Power Entry Modules Snap-in Mount

60-SPR & SPS Series

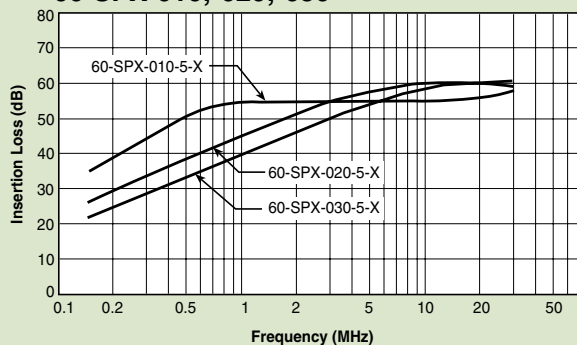
Temperature Characteristics



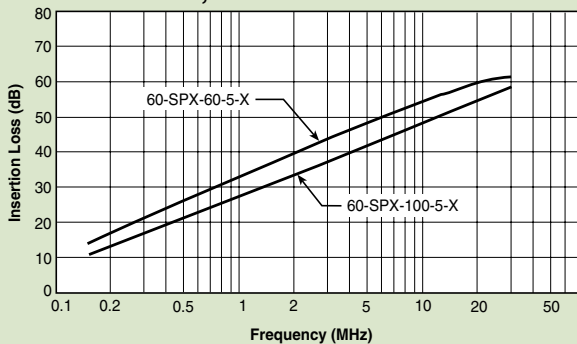
Common Mode



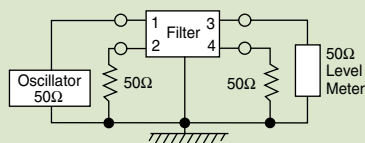
60-SPX-010;-020;-030



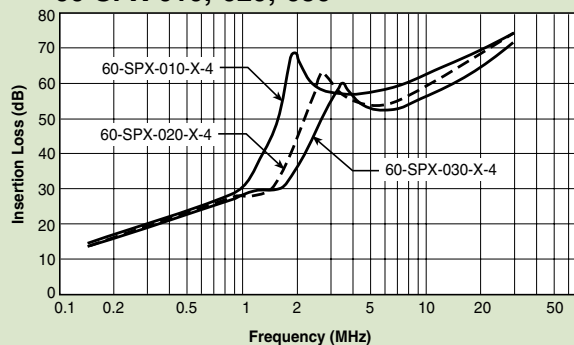
60-SPX-060;-100



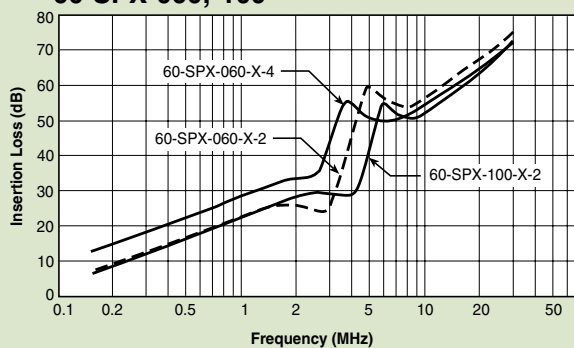
Normal Mode



60-SPX-010;-020;-030



60-SPX-060;-100



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)

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		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
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%			

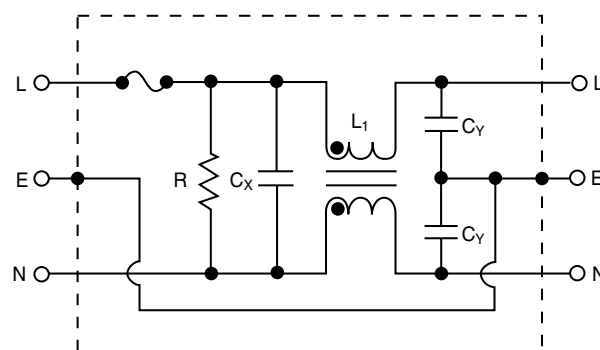
Note: Test Voltage 1500VAC one minute, line to ground
Insulation Resistance: 300 M min. at 500VDC
F(S) = Fast-on or (Solder lug terminals)

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



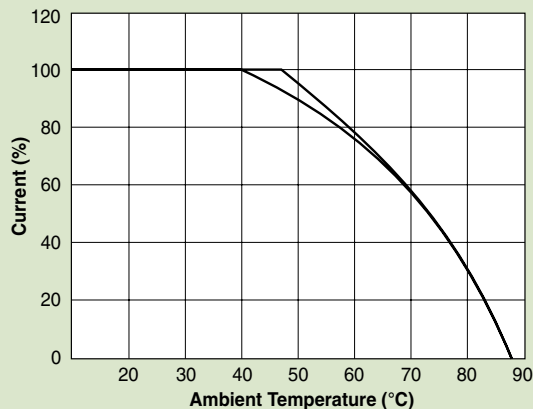
Circuit Diagram



Fused Filtered Power Entry Modules For General Purpose Applications

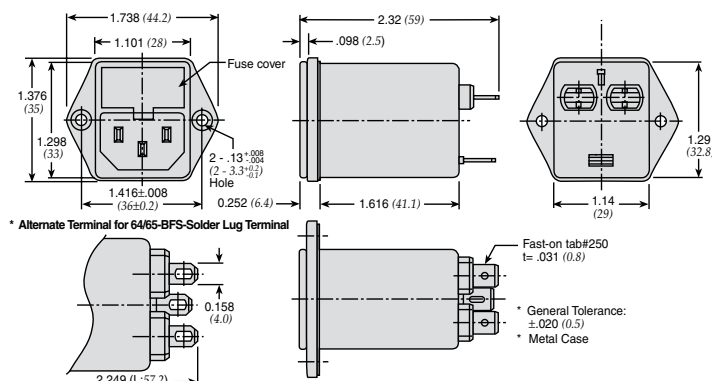
64-65-BFF/64-65-BFS Series

Temperature Characteristics



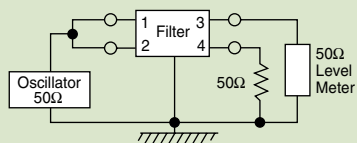
Dimensions

64/65-BFF Series

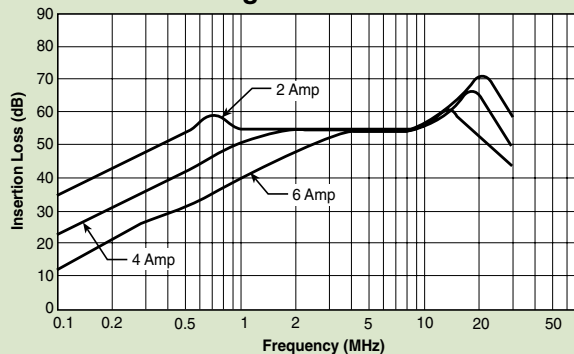


Dimensions in inches (mm)

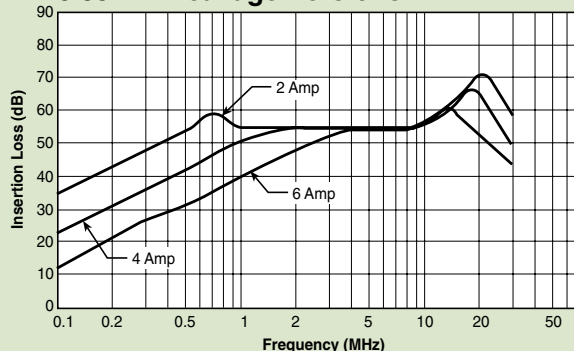
Common Mode



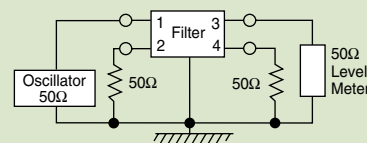
0.50 mA Leakage Versions



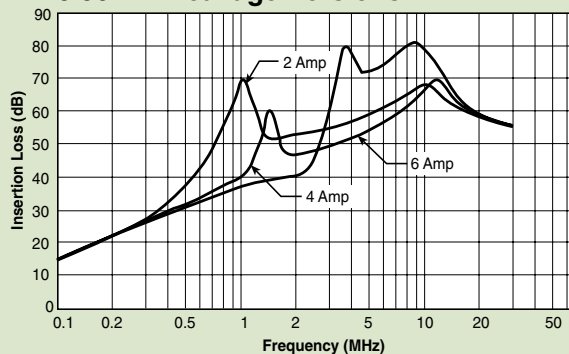
0.35 mA Leakage Versions



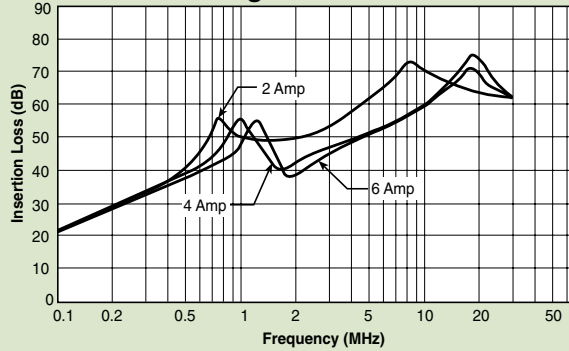
Normal Mode



0.50 mA Leakage Versions



0.35 mA Leakage Versions



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)

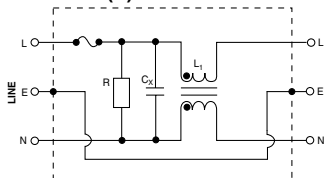


Applications

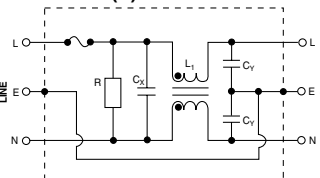
- Medical equipment
- Electronic equipment
- Digital equipment
- Industrial equipment
- Telecommunications equipment
- Measuring and testing instruments
- Personal computers and peripherals

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		Inductance (L ₁)	Temperature Rise (Max.)	
				C _Y	C _X			
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%			
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%			
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%			
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%			
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%			
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%			
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

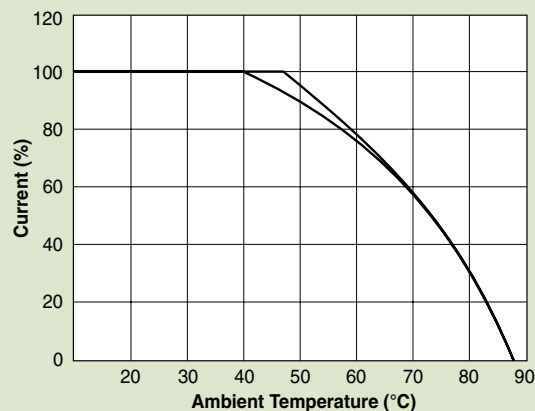
* **Substitute BFF or BFS for XXX**
BFF - Fast-on terminals
BFS - Solder lug terminals

Fused Filtered Power Entry Modules

For Medical or General Purpose Applications

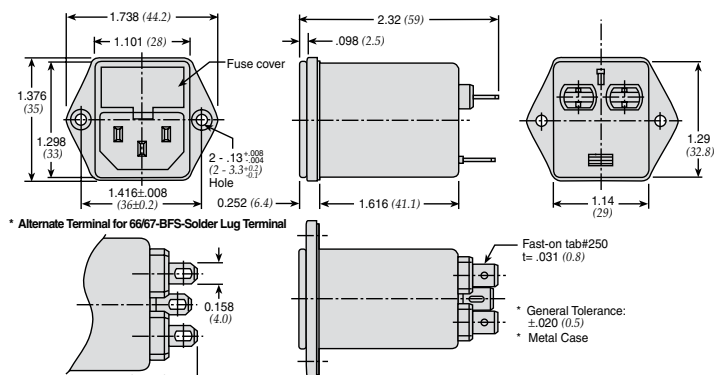
66-67-BFF/66-67-BFS Series

Temperature Characteristics



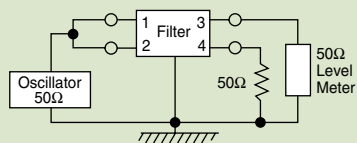
Dimensions

66-67-BFF/66-67-BFS Series

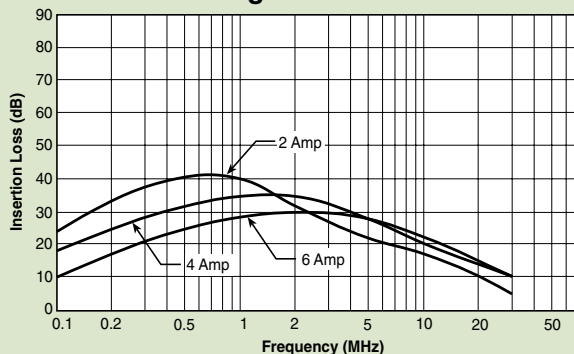


Dimensions in inches (mm)

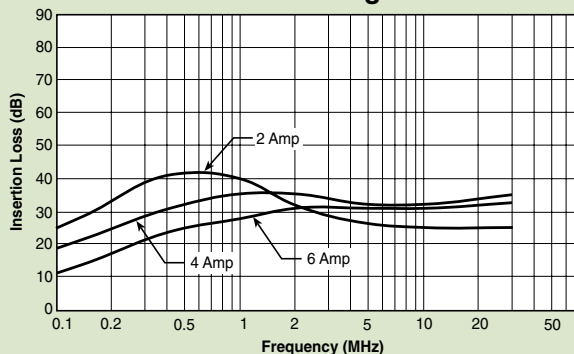
Common Mode



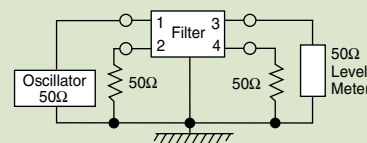
0.01 mA Leakage Current



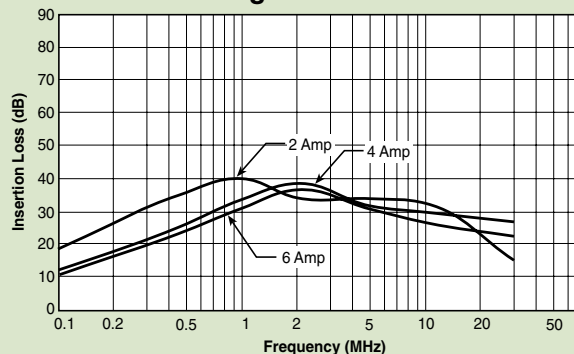
0.075 and 0.1 mA Leakage Current



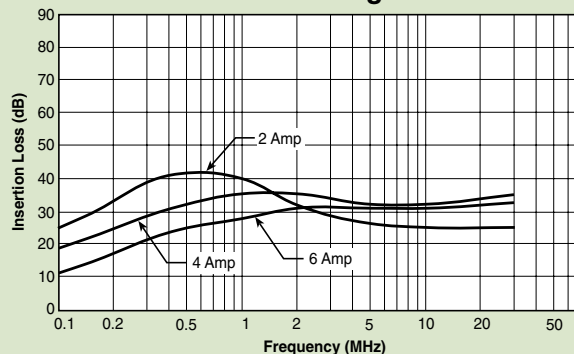
Normal Mode



0.01 mA Leakage Current



0.075 and 0.1 mA Leakage Current



Switched and Fused Filtered Power Entry Modules For General Purpose Applications

64-65-BSF/64-65-SSF Series

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)



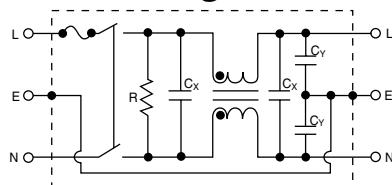
Tested and found to be
IAW VDE 0565 Part 3.



Applications

- Computers and peripheral equipment
- Digital equipment
- Electronic equipment
- Measuring and testing instruments
- Telecommunications equipment

Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance			Inductance (L ₁)	Temperature Rise (Max.)
				C _y	C _{x1}	C _{x2}		
64-XXX-020-3-12	250VAC	2A	0.35mA	2200pF	0.22uF	NONE	10.5mH	45°C
64-XXX-020-3-04					0.47uF	0.22uF		
64-XXX-020-3-14					0.22uF	NONE		
64-XXX-020-3-06			0.50mA	3300pF	0.22uF	0.22uF		
64-XXX-020-5-12					0.47uF	NONE		
64-XXX-020-5-04					0.22uF	0.22uF		
64-XXX-020-5-14	250VAC	4A	0.35mA	2200pF	0.22uF	NONE	4.2mH	45°C
64-XXX-020-5-06					0.47uF	0.22uF		
64-XXX-040-3-12					0.22uF	NONE		
64-XXX-040-3-04			0.50mA	3300pF	0.22uF	0.22uF		
64-XXX-040-3-14					0.47uF	NONE		
64-XXX-040-3-06					0.22uF	0.22uF		
64-XXX-040-5-12	250VAC	6A	0.35mA	2200pF	0.22uF	NONE	1.6mH	45°C
64-XXX-040-5-04					0.47uF	0.22uF		
64-XXX-040-5-14					0.22uF	NONE		
64-XXX-060-3-12			0.50mA	3300pF	0.22uF	0.22uF		
64-XXX-060-3-04					0.47uF	NONE		
64-XXX-060-3-14					0.22uF	0.22uF		
65-XXX-020-3-12	125VAC	2A	0.20mA	2200pF	0.22uF	NONE	10.5mH	45°C
65-XXX-020-3-04					0.47uF	0.22uF		
65-XXX-020-3-14					0.22uF	NONE		
65-XXX-020-3-06			0.25mA	3300pF	0.22uF	0.22uF		
65-XXX-020-5-12					0.47uF	NONE		
65-XXX-020-5-04					0.22uF	0.22uF		
65-XXX-020-5-14	125VAC	4A	0.20mA	2200pF	0.22uF	NONE	4.2mH	45°C
65-XXX-020-5-06					0.47uF	0.22uF		
65-XXX-040-3-12					0.22uF	NONE		
65-XXX-040-3-04			0.25mA	3300pF	0.22uF	0.22uF		
65-XXX-040-3-14					0.47uF	NONE		
65-XXX-040-3-06					0.22uF	0.22uF		
65-XXX-040-5-12	125VAC	6A	0.20mA	2200pF	0.22uF	NONE	1.6mH	45°C
65-XXX-040-5-04					0.47uF	0.22uF		
65-XXX-040-5-14					0.22uF	NONE		
65-XXX-060-3-12			0.25mA	3300pF	0.22uF	0.22uF		
65-XXX-060-3-04					0.47uF	NONE		
65-XXX-060-3-14					0.22uF	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)

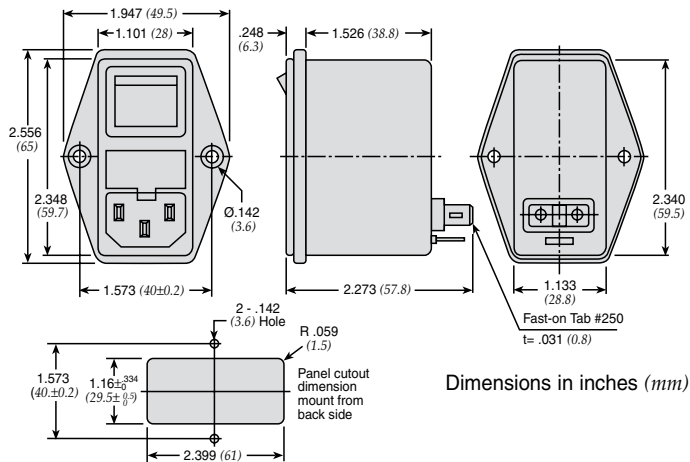
Voltage Drop: 1V max. at rated current
Weight: 130g
Inlet: Compatible with IEC-320

* **Substitute BSF or SSF for XXX**
BSF - Bolt-in switched and fused
SSF - Snap-in switched and fused

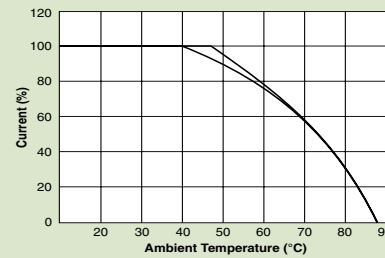
Switched and Fused Filtered Power Entry Modules For General Purpose Applications

Dimensions

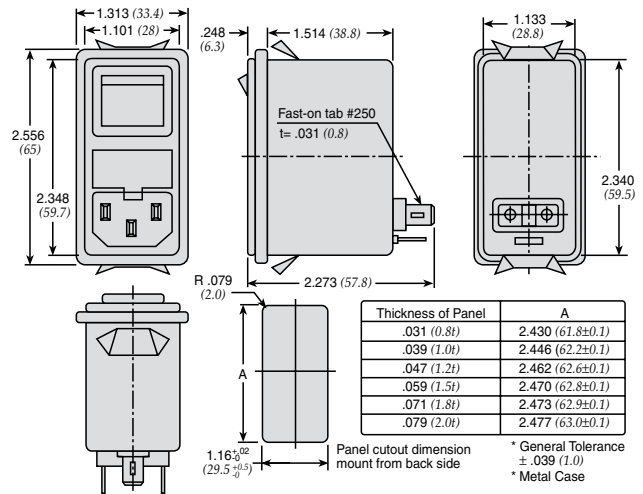
64/65-BSF Series



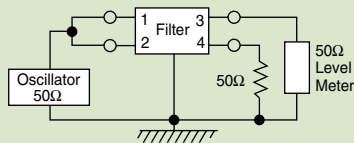
Temperature Characteristics



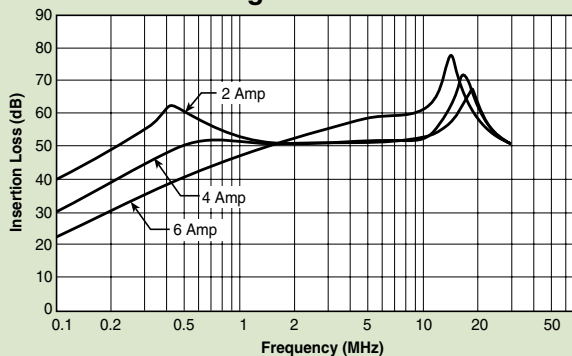
64/65-SSF Series



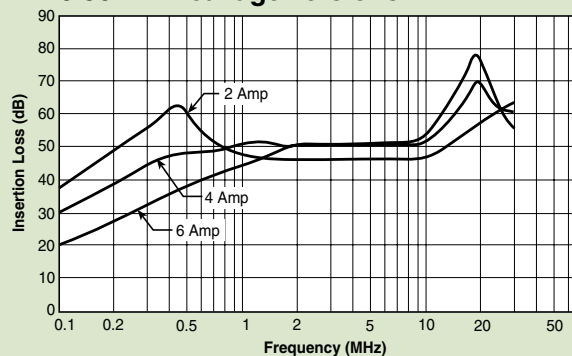
Common Mode



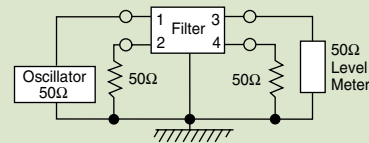
0.35 mA Leakage Versions



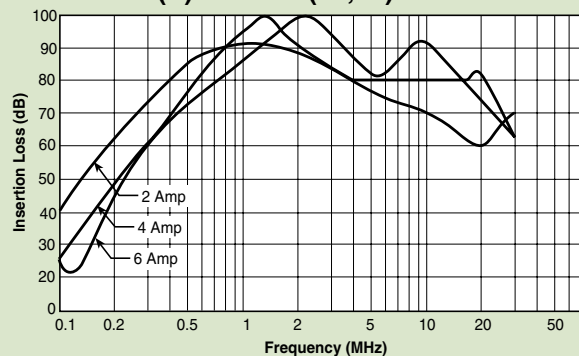
0.50 mA Leakage Versions



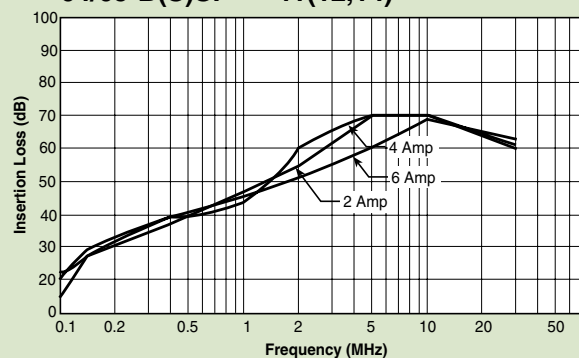
Normal Mode



64/65-B(S)SF-*-02(04,06)



64/65-B(S)SF-*-11(12,14)



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)

Specifications

Model*	Rated Voltage 50/60Hz	Rated Current	Leakage Current (Max.)	Capacitance C _y C _{x1} C _{x2}	Temp. Induct. (L ₁)	Rise (Max.)
66-XXX-020-0-12	250 VAC	2A	.075mA	330pF	10.5mH	40°C
66-XXX-020-0-04						
66-XXX-020-0-14						
66-XXX-020-0-06						
66-XXX-020-1-12						
66-XXX-020-1-04						
66-XXX-020-1-14						
66-XXX-020-1-06						
66-XXX-020-4-12						
66-XXX-020-4-04						
66-XXX-020-4-14						
66-XXX-020-4-06						
66-XXX-040-0-12		4A	.075mA	330pF	4.2mH	45°C
66-XXX-040-0-04						
66-XXX-040-0-14						
66-XXX-040-0-06						
66-XXX-040-1-12						
66-XXX-040-1-04						
66-XXX-040-1-14						
66-XXX-040-1-06						
66-XXX-040-4-12						
66-XXX-040-4-04						
66-XXX-040-4-14						
66-XXX-040-4-06						
66-XXX-060-0-12		6A	.075mA	330pF	1.6mH	45°C
66-XXX-060-0-04						
66-XXX-060-0-14						
66-XXX-060-0-06						
66-XXX-060-1-12						
66-XXX-060-1-04						
66-XXX-060-1-14						
66-XXX-060-1-06						
66-XXX-060-4-12						
66-XXX-060-4-04						
66-XXX-060-4-14						
66-XXX-060-4-06						

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

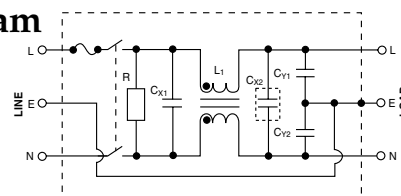


Applications

- 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



Model*	Rated Voltage 50/60Hz	Rated Current	Leakage Current (Max.)	Capacitance C _y C _{x1} C _{x2}	Temp. Induct. (L ₁)	Rise (Max.)
67-XXX-020-0-12	125 VAC	2A	0.04mA	330pF	10.5mH	40°C
67-XXX-020-0-04						
67-XXX-020-0-14						
67-XXX-020-0-06						
67-XXX-020-1-12						
67-XXX-020-1-04						
67-XXX-020-1-14						
67-XXX-020-1-06						
67-XXX-020-4-12						
67-XXX-020-4-04						
67-XXX-020-4-14						
67-XXX-020-4-06						
67-XXX-040-0-12		4A	0.04mA	330pF	4.2mH	45°C
67-XXX-040-0-04						
67-XXX-040-0-14						
67-XXX-040-0-06						
67-XXX-040-1-12						
67-XXX-040-1-04						
67-XXX-040-1-14						
67-XXX-040-1-06						
67-XXX-040-4-12						
67-XXX-040-4-04						
67-XXX-040-4-14						
67-XXX-040-4-06						
67-XXX-060-0-12		6A	0.04mA	330pF	1.6mH	45°C
67-XXX-060-0-04						
67-XXX-060-0-14						
67-XXX-060-0-06						
67-XXX-060-1-12						
67-XXX-060-1-04						
67-XXX-060-1-14						
67-XXX-060-1-06						
67-XXX-060-4-12						
67-XXX-060-4-04						
67-XXX-060-4-14						
67-XXX-060-4-06						

A line graph showing the relationship between Ambient Temperature (°C) on the x-axis and Current (%) on the y-axis for a 100W LED. The x-axis ranges from 20 to 90 with major grid lines every 10 units. The y-axis ranges from 0 to 120 with major grid lines every 20 units. The graph shows a constant current of 100% from 20°C to 40°C. Above 40°C, the current decreases as temperature increases, reaching 0% at 90°C. The curve is slightly concave down.

Ambient Temperature (°C)	Current (%)
20	100
30	100
40	100
50	100
60	90
70	60
80	30
90	0

[illegible]

Technical drawings of the M250 metal case showing front, side, and rear views with dimensions in inches and millimeters.

Front View Dimensions:

- Overall Height: 2.556 (65)
- Top Section Width: 1.313 (33.4)
- Top Section Height: 1.101 (28)
- Bottom Section Height: 2.348 (59.7)

Side View Dimensions:

- Overall Width: 1.514 (38.8)
- Top Flange Thickness: .248 (6.3)
- Base Width: 2.273 (57.8)
- Fast-on tab #250, $t = .031 (0.8)$

Rear View Dimensions:

- Overall Width: 1.133 (28.8)
- Base Height: 2.340 (59.5)

Panel Cutout Dimensions:

Panel cutout dimension mount from back side

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 $\pm .039 (1.0)$
 * Metal Case

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

The graph shows the insertion loss of a 100 ohm resistor as a function of frequency and current. The y-axis represents Insertion Loss in dB on a logarithmic scale from 0 to 90. The x-axis represents Frequency in MHz on a logarithmic scale from 0.1 to 50. Three curves are plotted for different current levels: 2 Amp, 4 Amp, and 6 Amp. The 2 Amp curve shows the highest loss, peaking at approximately 45 dB around 0.5 MHz. The 4 Amp and 6 Amp curves show lower losses, with the 6 Amp curve being the lowest across the frequency range shown.

Frequency (MHz)	2 Amp (dB)	4 Amp (dB)	6 Amp (dB)
0.1	35	20	20
0.2	40	25	22
0.5	45	30	25
1.0	40	35	30
2.0	35	30	25
5.0	25	20	15
10.0	18	15	10
20.0	12	10	8
50.0	8	6	4

The graph plots Insertion Loss (dB) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (0.1 to 50). Three curves are shown for different power levels: 2 Amp, 4 Amp, and 6 Amp. The 2 Amp curve starts at ~32 dB at 0.1 MHz, peaks at ~45 dB at 0.5 MHz, and then decreases to ~25 dB at 10 MHz. The 4 Amp curve starts at ~20 dB at 0.1 MHz and increases steadily to ~35 dB at 50 MHz. The 6 Amp curve starts at ~18 dB at 0.1 MHz and increases to ~32 dB at 50 MHz.

Frequency (MHz)	2 Amp (dB)	4 Amp (dB)	6 Amp (dB)
0.1	32	20	18
0.2	40	25	22
0.5	45	30	25
1.0	40	33	28
2.0	35	34	29
5.0	28	35	30
10.0	25	35	30
20.0	-	35	30
50.0	-	35	32

The graph shows the insertion loss of a 100 pF capacitor as a function of frequency and current. The x-axis represents Frequency in MHz on a logarithmic scale from 0.1 to 50. The y-axis represents Insertion Loss in dB on a linear scale from 0 to 90. Three curves are plotted for different current levels: 2 Amp (top curve), 4 Amp (middle curve), and 6 Amp (bottom curve). All curves show a peak in insertion loss around 5 MHz. The insertion loss increases with both frequency and current.

Frequency (MHz)	2 Amp (dB)	4 Amp (dB)	6 Amp (dB)
0.1	12	11	10
0.2	15	14	13
0.5	22	20	18
1	30	27	24
2	40	35	30
5	48	43	37
10	45	40	34
20	35	30	25
50	20	15	10

The graph shows the insertion loss of a 100 pF capacitor as a function of frequency and current. The x-axis represents Frequency in MHz on a logarithmic scale from 0.1 to 50. The y-axis represents Insertion Loss in dB on a linear scale from 0 to 90. Three curves are plotted for currents of 2 Amp, 4 Amp, and 6 Amp. All curves start at approximately 12 dB at 0.1 MHz. The 2 Amp curve rises to about 50 dB at 5 MHz and then levels off. The 4 Amp curve rises to about 45 dB at 10 MHz and then levels off. The 6 Amp curve rises to about 40 dB at 10 MHz and then levels off.

Frequency (MHz)	2 Amp (dB)	4 Amp (dB)	6 Amp (dB)
0.1	12	12	12
0.2	15	15	15
0.5	20	20	20
1	25	25	25
2	35	35	35
5	50	40	35
10	50	45	40
20	50	45	40
50	50	45	40

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)

Applications

- Computers and peripheral equipment
- Electronic equipment
- Digital equipment
- Measuring and testing instruments
- Telecommunications equipment

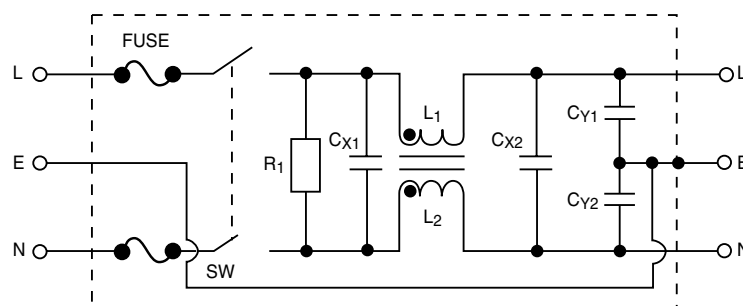
Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	C _{Y1}	Capacitance			Inductance (L ₁)	Temperature Rise (Max.)
					C _{Y2}	C _{X1}	C _{X2}		
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



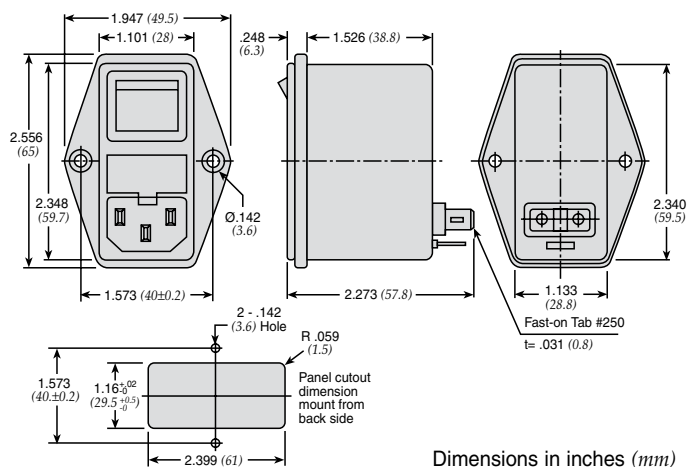
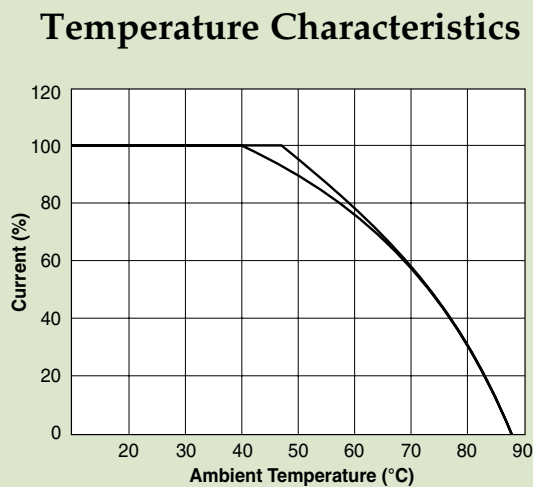
Circuit Diagram



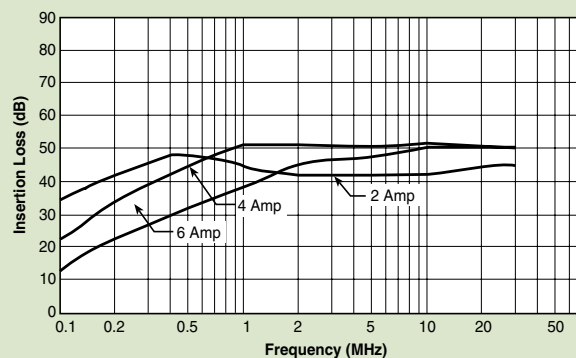
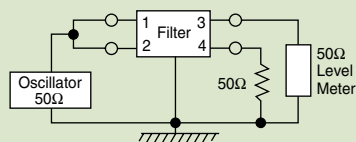
Switched and Fused Filtered Power Entry Modules

Dual Fuse for European Applications

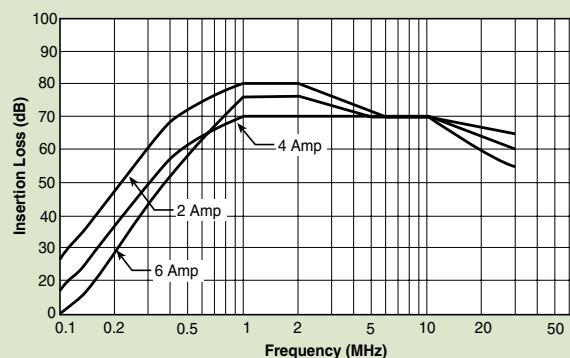
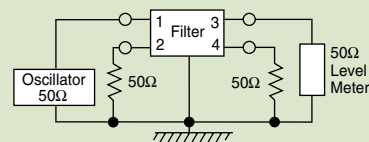
68-BSF Series



Common Mode



Normal Mode



PCB Power Filters Miniature Printed Circuit Board

61-MPC Series



Tested and found to be
IAW VDE 0565 Part 3

Features

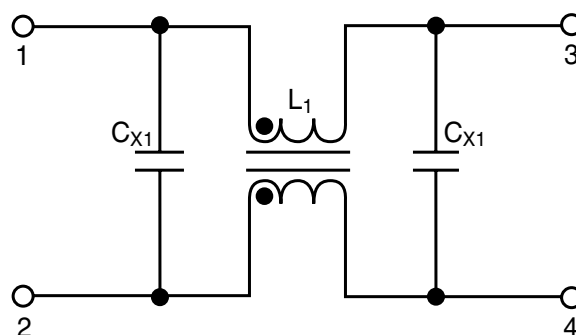
- Miniature general purpose PCB mounted filter
- Requires minimal PCB real estate space
- Low cost
- Designed for two wire cord systems
- For three wire cord systems, Y capacitors can be attached externally
- Operating temperature: -25°C to +85°C (including temperature rise, see graph on page PF45)

Applications

- Personal computers and peripherals
- Digital equipment
- Measuring instruments and medical equipment
- TV & VCR monitors and display units
- Home appliances



Circuit Diagram



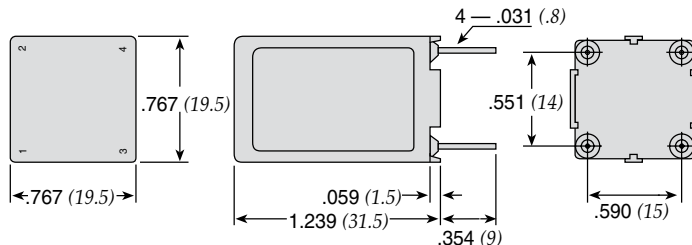
Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _{x1}	C _{x2}		
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

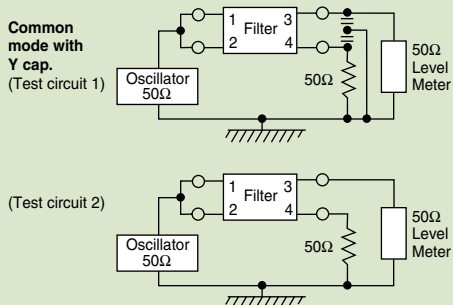
PCB Power Filters Miniature Printed Circuit Board

61-MPC Series

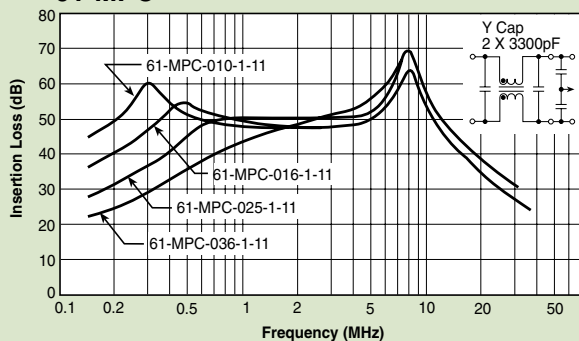


Dimensions in inches (mm)

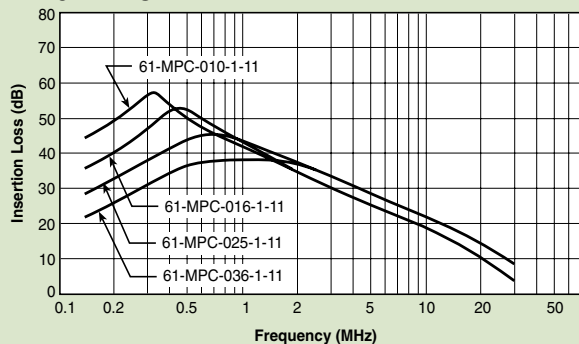
Common Mode



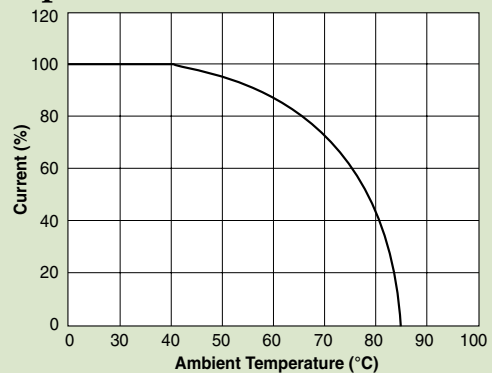
61-MPC



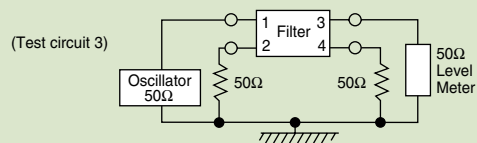
61-MPC



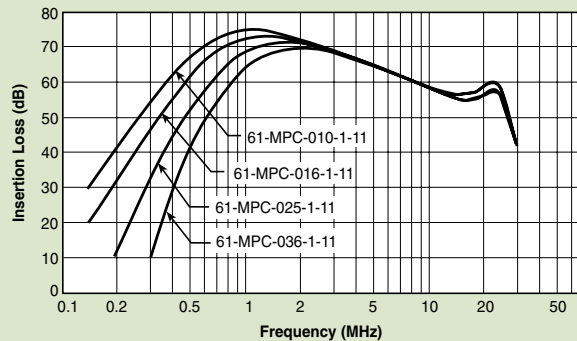
Temperature Characteristics



Normal Mode



61-MPC



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

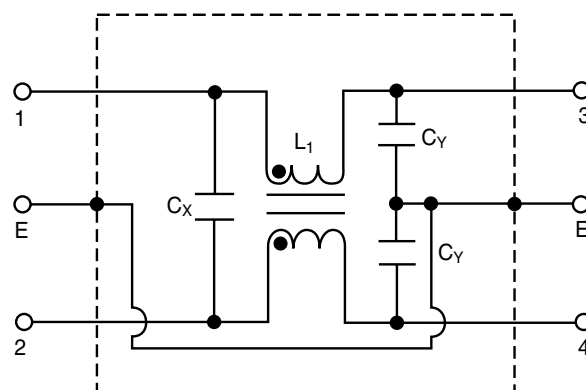
Specifications

Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
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



Circuit Diagram

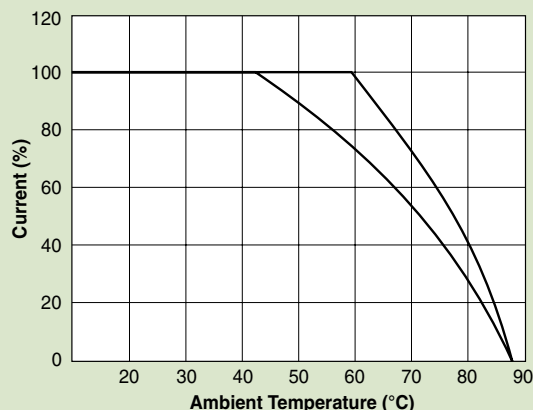


Power Entry Modules Bolt-in Right Angle Terminals

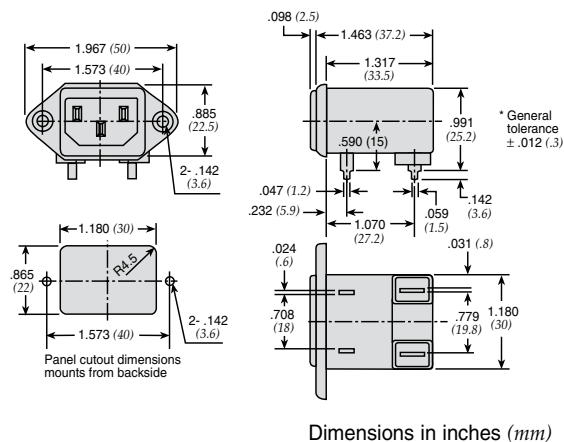
for PCB Applications

60-BPP Series

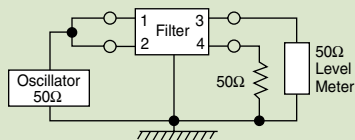
Temperature Characteristics



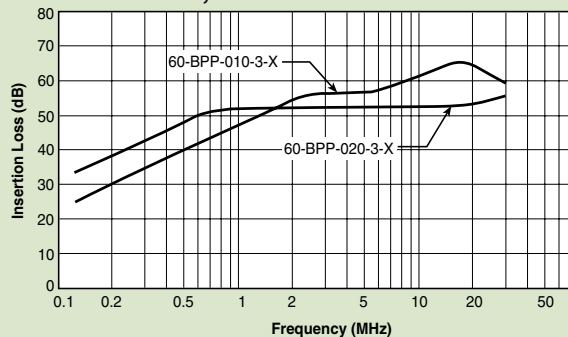
60-BPP PCB Mounting Type



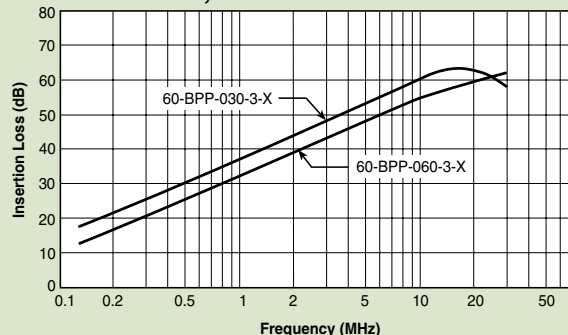
Common Mode



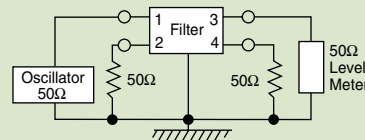
60-BPP-010;-020



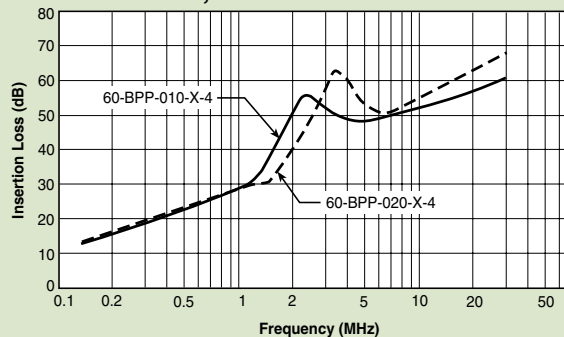
60-BPP-030;-060



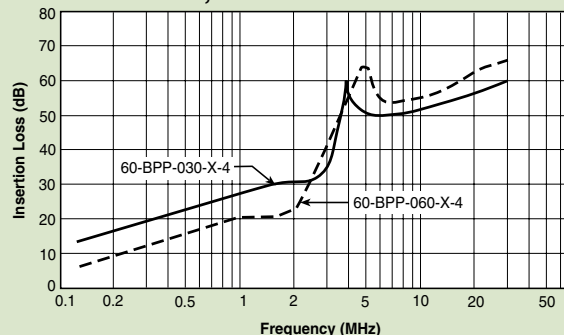
Normal Mode



60-BPP-010;-020



60-BPP-030;-060



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

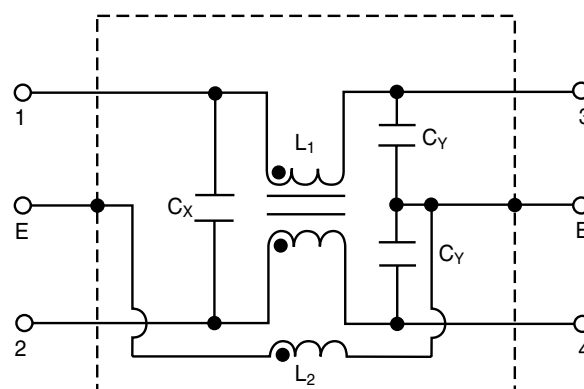
- Ideally suited for products that must conform to FCC part 15 regulations
- Metal cased filter offers high performance
- Meets over voltage of IEC 664 category II and complies with IEC 950
- Solder lug, Fast-on tab styles available (see page PF20)
- PCB mounting minimizes space and provides economical 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		Inductance		Temperature Rise (Max.)
				C _Y	C _X	(L ₁)	(L ₂)	
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%			

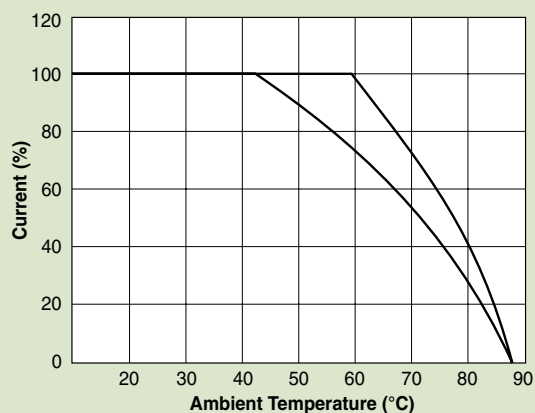
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Weight: 50g
Input: Compatible with IEC-320

Power Entry Modules High Frequency Attenuation

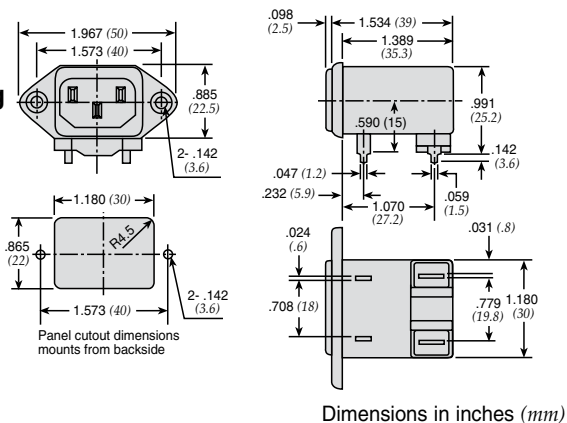
Bolt-in for PCB Applications

60-BHP Series

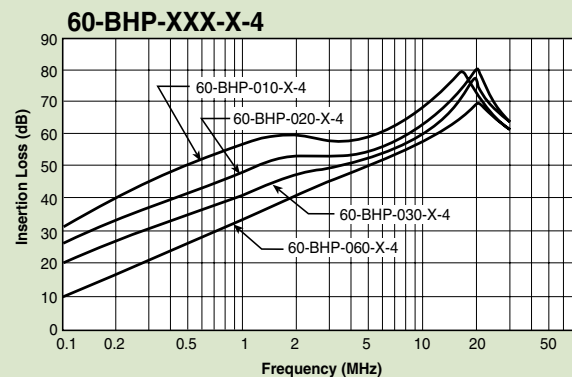
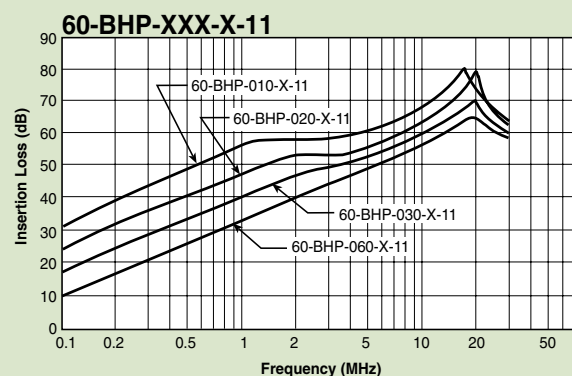
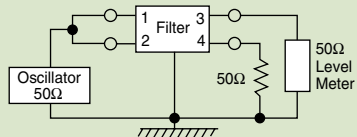
Temperature Characteristics



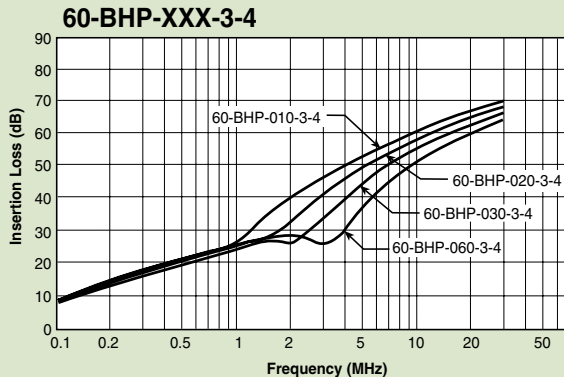
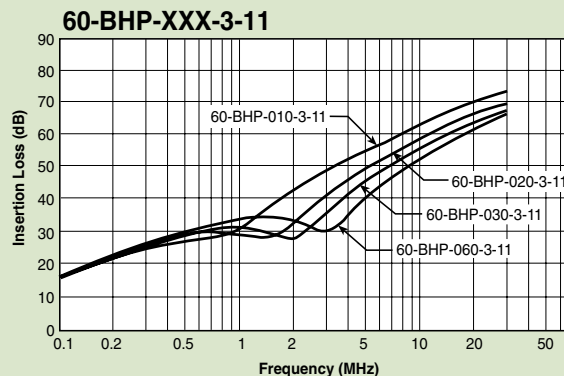
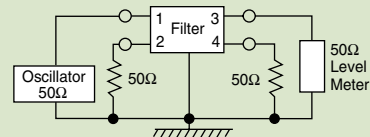
60-BHP PCB Mounting Type



Common Mode



Normal Mode



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

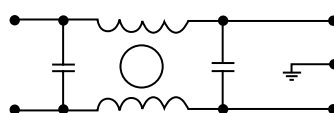
Applications

- Personal computers and peripherals
- Digital equipment
- Measuring instruments and medical equipment
- TV & VCR monitors and display units
- Home appliances

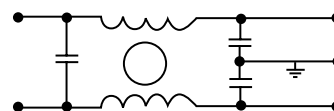


Circuit Diagram

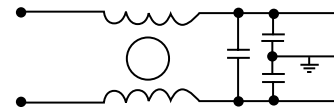
Circuit 1



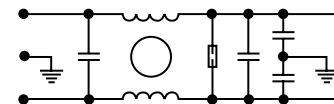
Circuit 2



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		3	D	
11-MPC-002-5-D					E	
11-MPC-003-5-E		3A		2	A1	
11-MPC-006-5-B					C	
11-MPC-006-5-C		6A	4	B		
11-MPC-016-5-B				16A	0.2mA	

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

PCB Power Filters Miniature Printed Circuit Board

11-MPC Series

Figure A

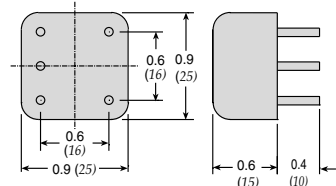


Figure A1

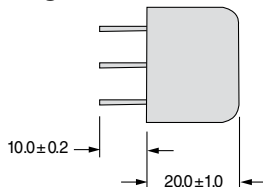


Figure B

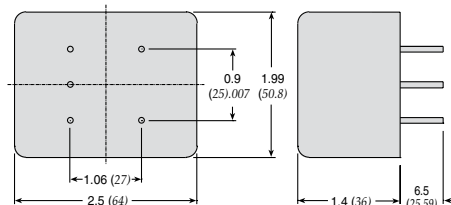


Figure C

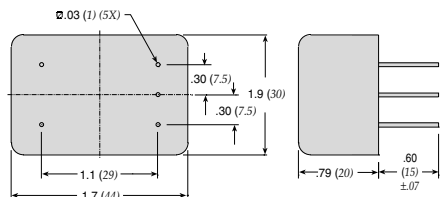


Figure D

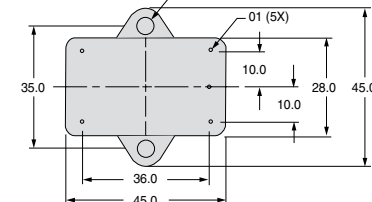
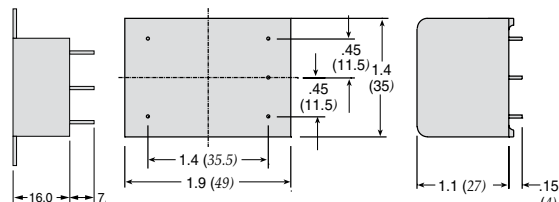
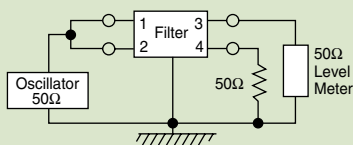


Figure E

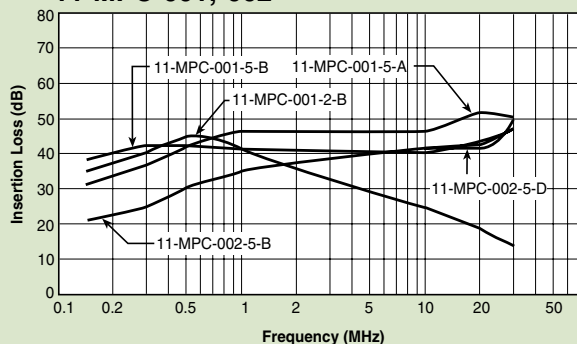


Dimensions in inches (mm)

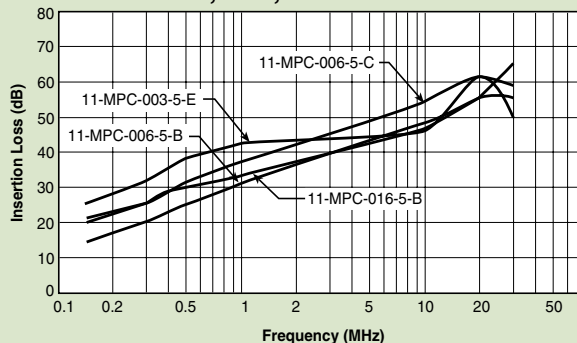
Common Mode



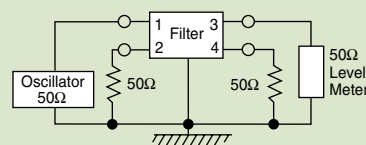
11-MPC-001;-002



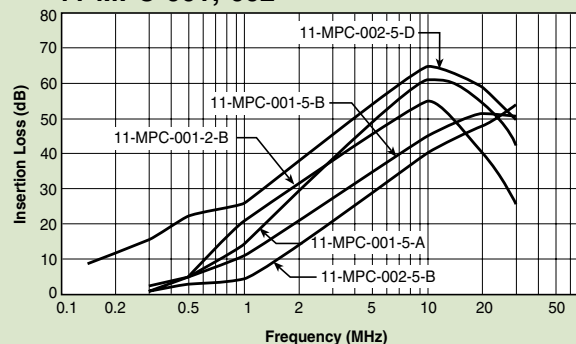
11-MPC-003;-006;-016



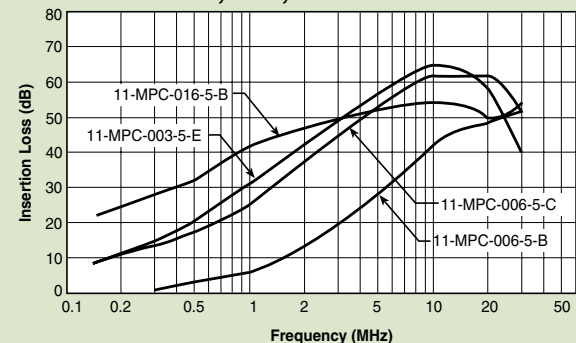
Normal Mode



11-MPC-001;-002



11-MPC-003;-006;-016



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)

Applications

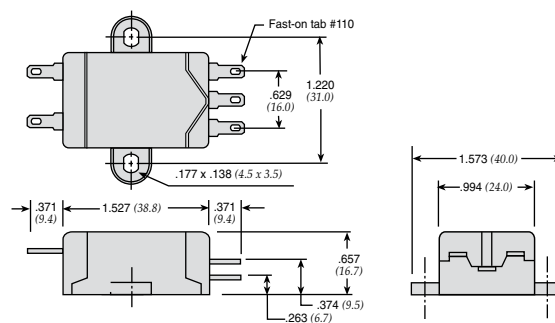
- Personal computers and peripherals
- Digital equipment
- Industrial equipment
- Vending machines
- Home appliances
- Office equipment

Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
62-AFL-010-3-11	250VAC	1.0A	0.35mA		0.1uF	11.0mH	40°C
62-AFC-010-3-11			0.50mA				
62-AFL-010-5-11		1.6A	0.35mA	2200pF		6.0mH	
62-AFC-010-5-11			0.50mA	3300pF			
62-AFL-016-3-11		3.0A	0.35mA	2200pF		2.4mH	
62-AFC-016-3-11			0.50mA	3300pF			
62-AFL-016-5-11		4.5A	0.35mA	2200pF		1.0mH	
62-AFC-016-5-11			0.50mA	3300pF			
62-AFL-030-3-11		6.0A	0.35mA	2200pF		0.53mH	
62-AFC-030-3-11			0.50mA	3300pF			
62-AFL-030-5-11							
62-AFC-030-5-11							
62-AFL-045-3-11							
62-AFC-045-3-11							
62-AFL-045-5-11							
62-AFC-045-5-11							
62-AFL-060-3-11							
62-AFC-060-3-11							
62-AFL-060-5-11							
62-AFC-060-5-11							

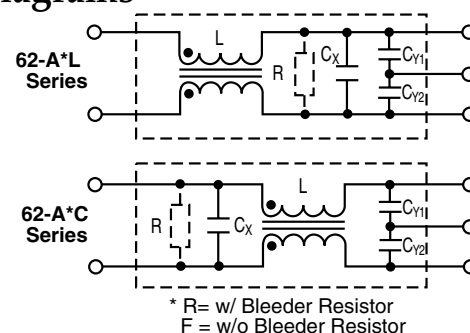
Note: All types are designed to meet the requirement of UL 1283, CSA 22.2. VDE 0565-3
Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max.

* Available with bleeder resistor
Replace F with R for part number



Dimensions in inches (mm)

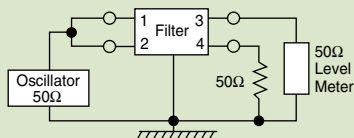
Circuit Diagrams



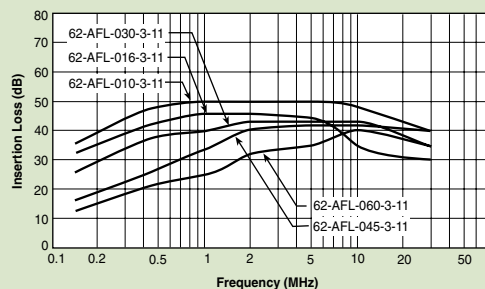
Power Line Filters Appliance Filters

62-AL/62-AC Series

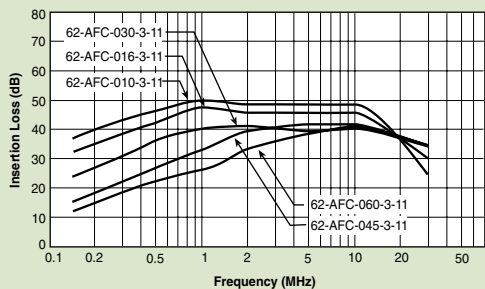
Common Mode



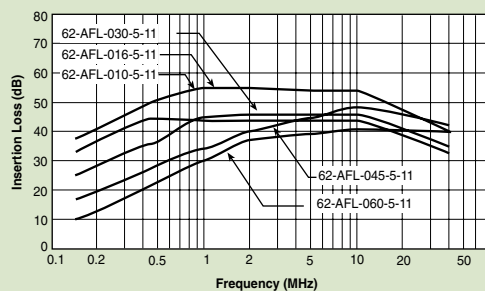
62-AFL-xxx-3-11



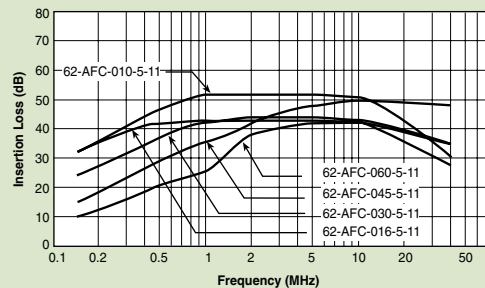
62-AFC-xxx-3-11



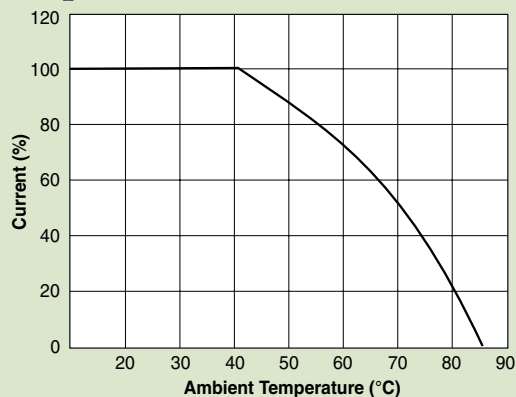
62-AFL-xxx-5-11



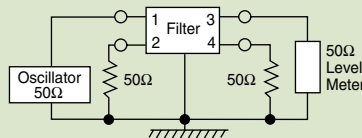
62-AFC-xxx-5-11



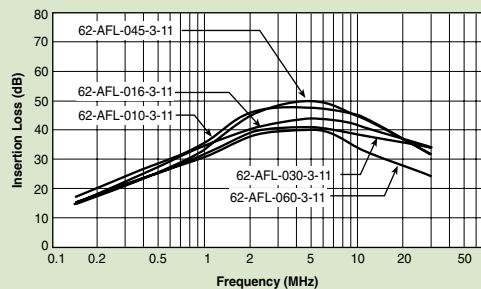
Temperature Characteristics



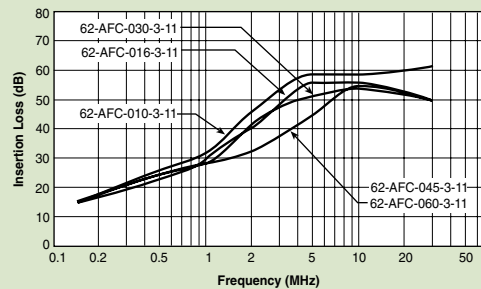
Normal Mode



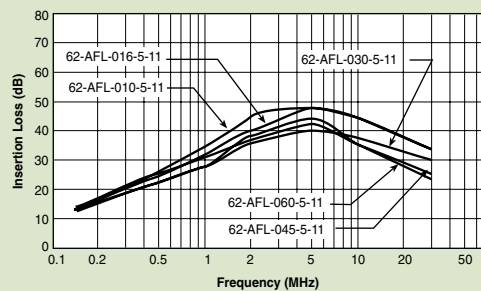
62-AFL-XXX-3-11



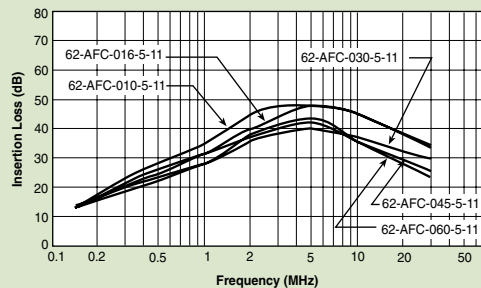
62-AFC-XXX-3-11



62-AFL-xxx-5-11



62-AFC-xxx-5-11



Power Line Filters Single Stage

62-PPF/PQF/PRF Series



Tested and found to be
IAW VDE 0565 Part 3

Features

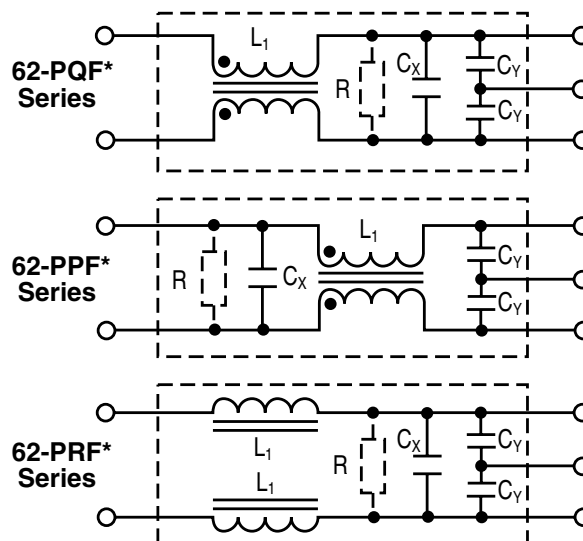
- Low-cost plastic case
- Compact design requires minimal real estate space
- Suitable for products that must conform to FCC and FTZ regulations
- Wide variety of circuit and filtering options
- Good filtering characteristics for both normal mode and common mode
- Epoxy molded for reliability
- Operating 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		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
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

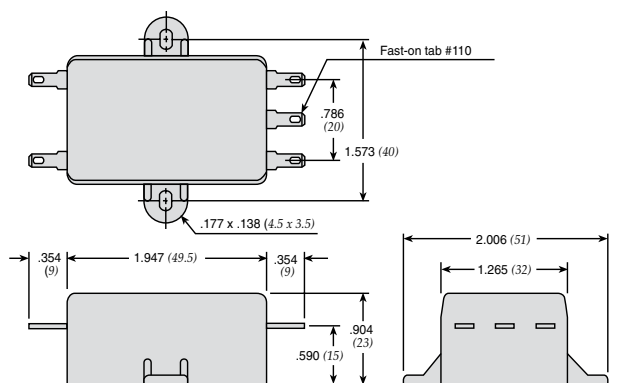
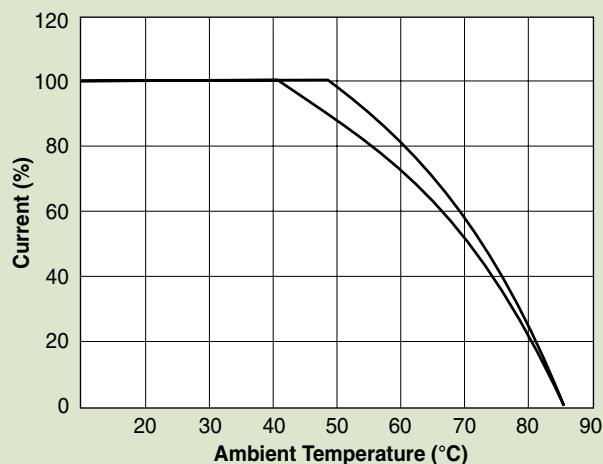
Weight: 62-PPF & PQF Series: 2.11 ounces (60 grams)

62-PRF Series: 1.76 ounces (50 grams)

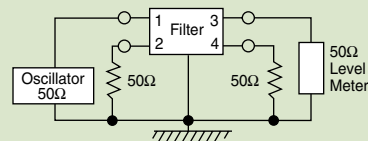
Power Line Filters Single Stage

62-PPF/PQF/PRF Series

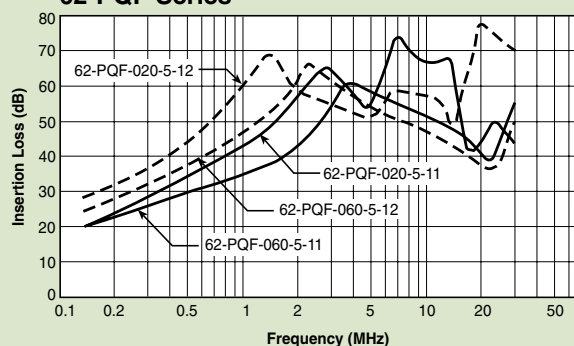
Temperature Characteristics



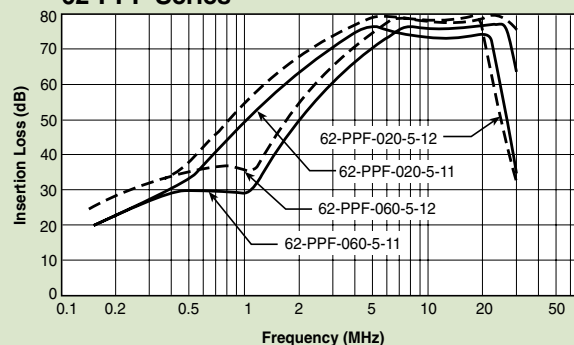
Normal Mode



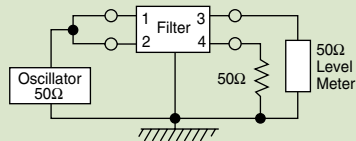
62-PQF Series



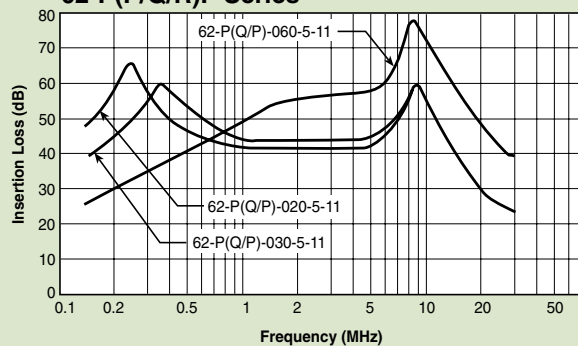
62-PPF Series



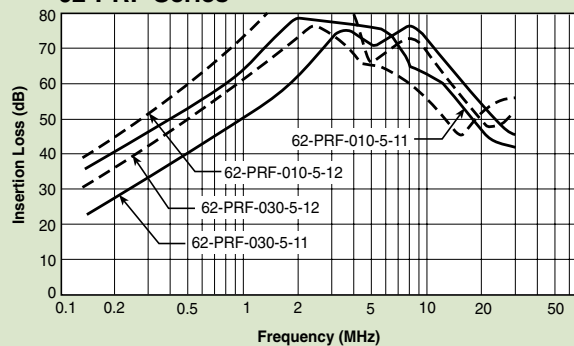
Common Mode



62-P(P/Q/R)F Series



62-PRF Series



Power Line Filters Single Stage Wire Leads

62-PML Series



Tested and found to be
IAW VDE 0565 Part 3

Features

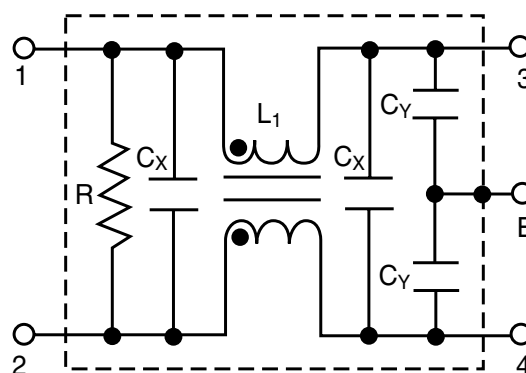
- Compact design requires minimal real estate space
- Suitable for products that must conform to FCC and FTZ regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Structure provides 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		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
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)

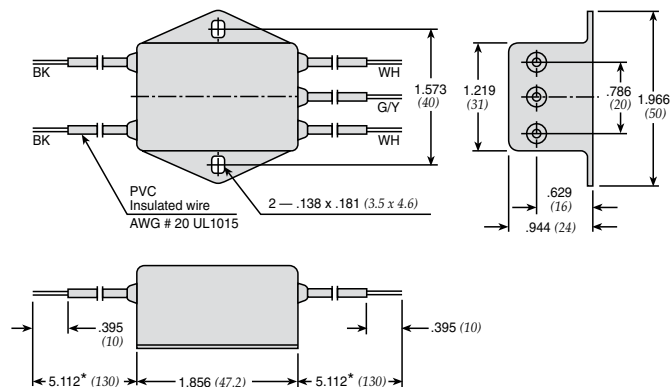
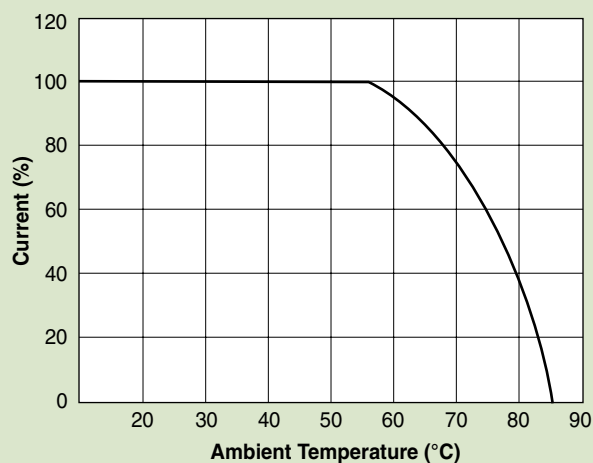
62-PML-050 Series: 3.28 ounces (93 grams)

Discharge time: 0.4 sec. max.

Power Line Filters Single Stage Wire Leads

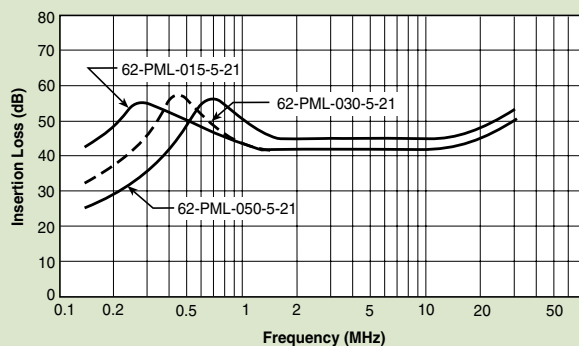
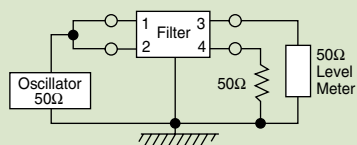
62-PML Series

Temperature Characteristics

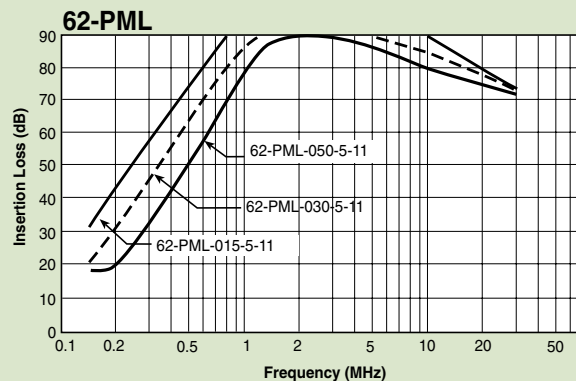
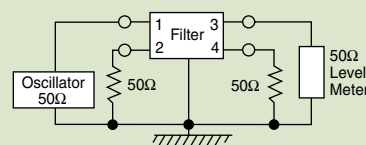


* Custom lengths available upon request. Dimensions in inches (mm)

Common Mode



Normal Mode



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

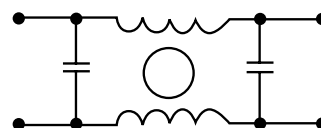
Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments
- Medical equipment
- Factory automation equipment

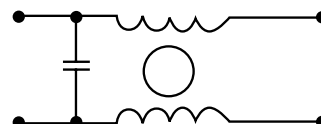


Circuit Diagram

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.

Power Line Filters Single Stage Wire Leads

for Medical Purpose Applications

12-PML & 12-PMF Series

Figure A

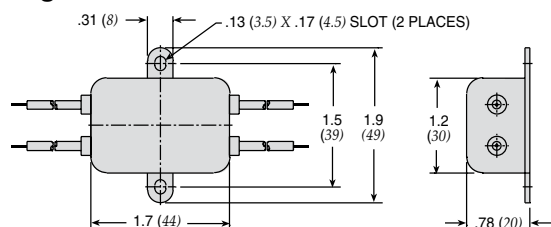


Figure C

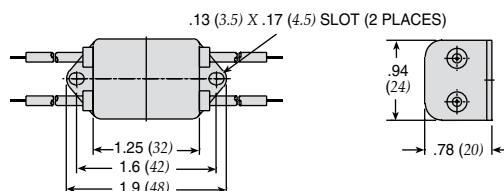
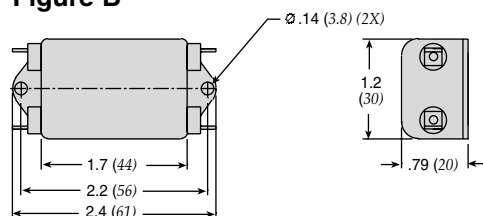
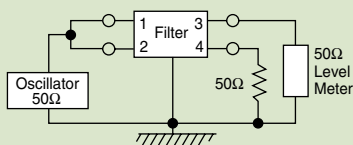


Figure B

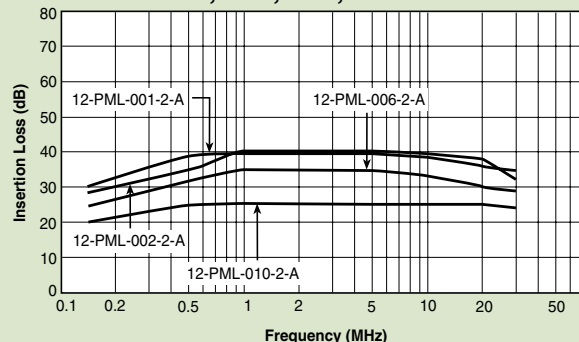


Dimensions in inches (mm)

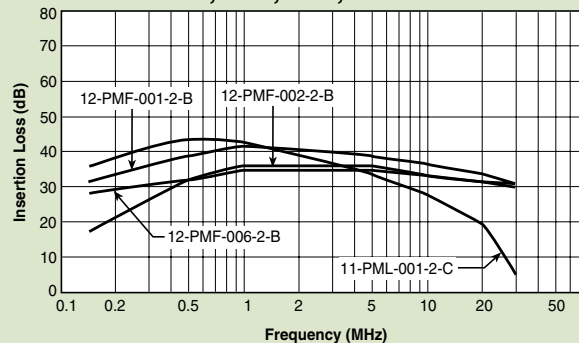
Common Mode



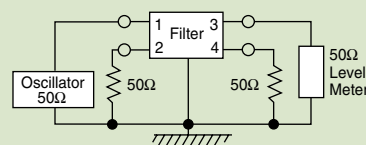
12-PML-001;-002;-006;-010



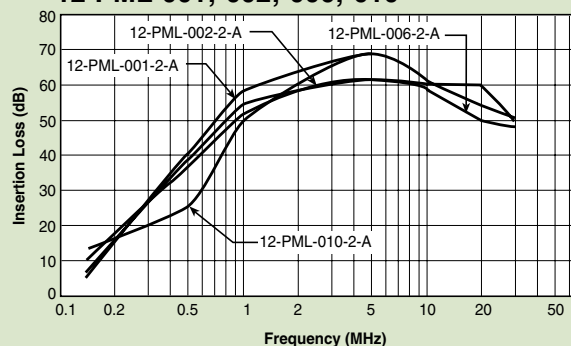
12-PMF-001;-002;-006;-010



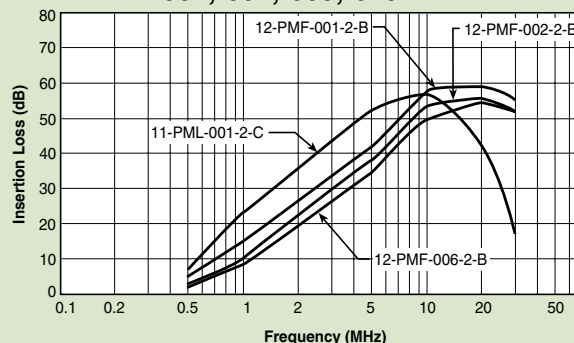
Normal Mode



12-PML-001;-002;-006;-010



12-PMF-001;-002;-006;-010



Power Line Filters Single Stage

62-LMF & LMB Series

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

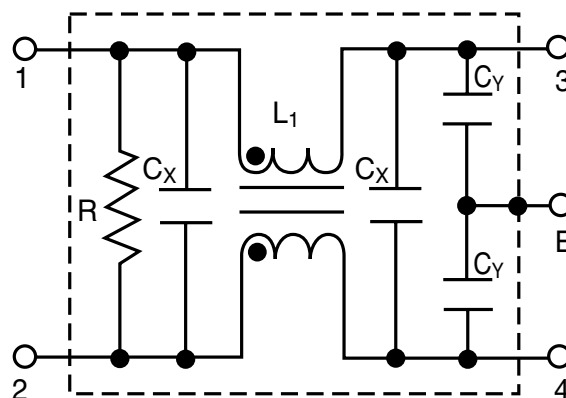
- Digital equipment
- Office automation equipment, such as copy and fax machines
- Computers and peripherals
- Instrumentation and controls



Tested and found to be
IAW VDE 0565 Part 3



Circuit Diagram



Specifications

Model*	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
62-LMB-030-5-11	250VAC	3A	0.50mA	3300pF	0.1uF	14mH	45°C
62-LMF-030-5-11		5A			0.1uF & .22uF	7.0mH	
62-LMB-050-5-11							
62-LMF-050-5-11		8A			.22uF	4.2mH	
62-LMB-080-5-11							
62-LMF-080-5-11		10A			.33uF	2.2mH	
62-LMB-100-5-11							
62-LMF-100-5-11							

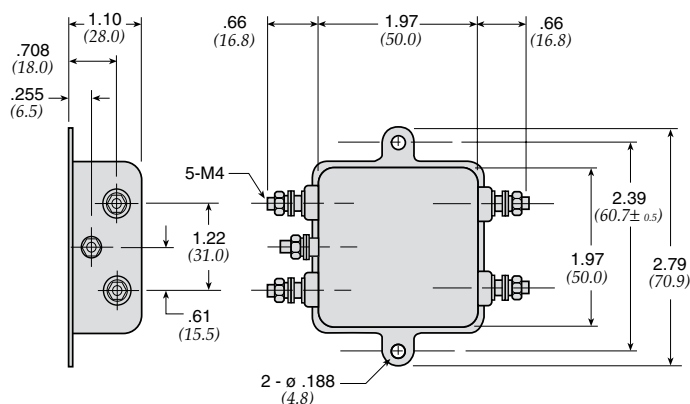
Note: Test voltage: 1500VAC one minute, line to ground
Insulation resistance: 300 Mohm min. at 500VDC
Voltage drop: 1V max. at rated current
Discharge time: 0.4 sec. max.
Weight: 5.3 ounces (150 grams)

*62-LMF - designates Fast-on terminals
62-LMB - designates Bolt-in terminals
62-LML - wire lead in/outputs also available

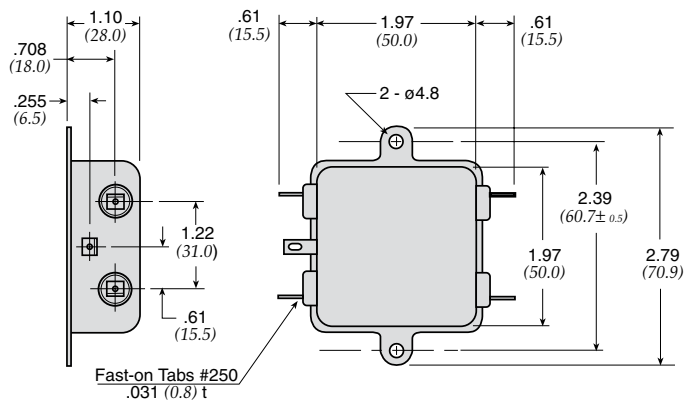
Power Line Filters Single Stage

62-LMF & LMB Series

62-LMB

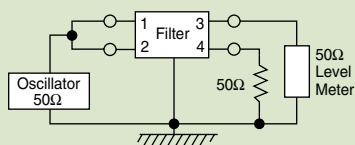


62-LMF

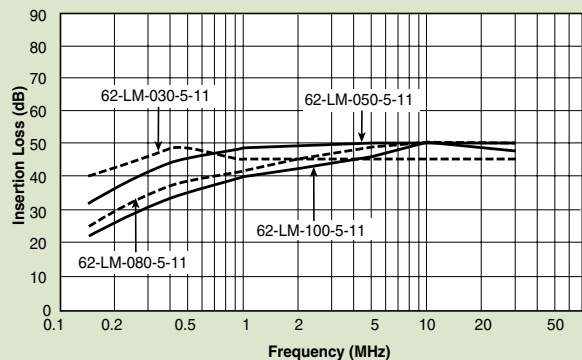


Dimensions in inches (mm)

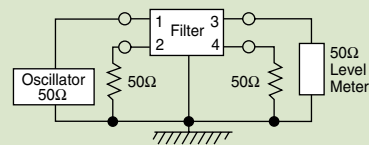
Common Mode



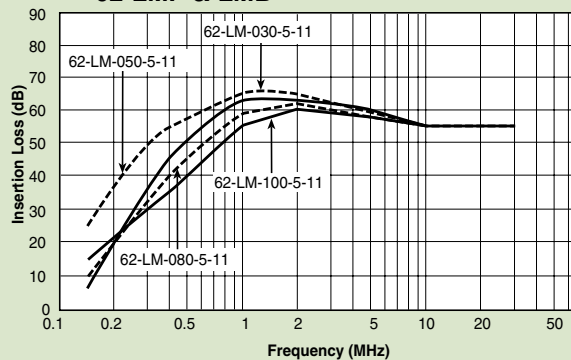
62-LMF & LMB



Normal Mode



62-LMF & LMB



Power Line Filters Single Stage

62-PMF & PMB Series



Tested and found to be
IAW VDE 0565 Part 3

Features

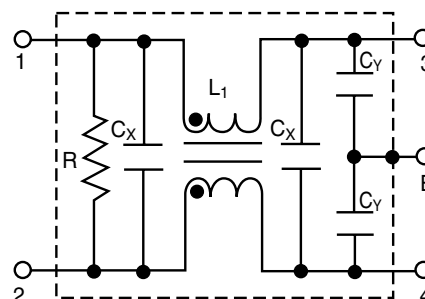
- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective EMI shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component 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		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
62-PMB-050-5-11	250VAC	5A	0.50mA	3300pF	0.1uF	14mH	45°C
62-PMF-050-5-11		8A			.1uF	7.0mH	
62-PMB-080-5-11							
62-PMF-080-5-11							
62-PMB-100-5-12		10A			.22uF	4.2mH	45°C
62-PMF-100-5-12		15A					
62-PMB-150-5-13							
62-PMF-150-5-13							
62-PMB-200-5-13		20A			.33uF	2.2mH	45°C
62-PMF-200-5-13						1.8mH	

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

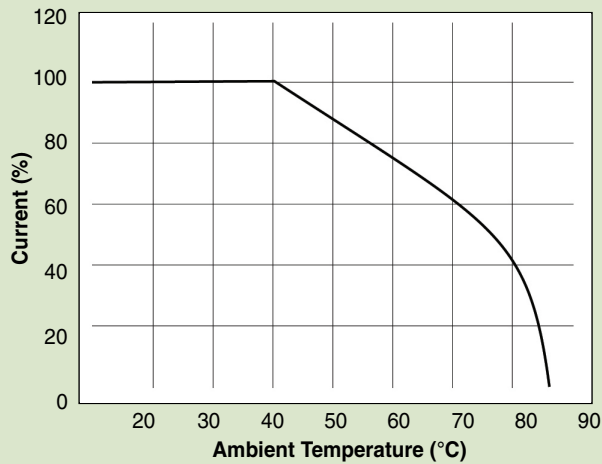
PMB - designates Bolt-in terminals

** 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

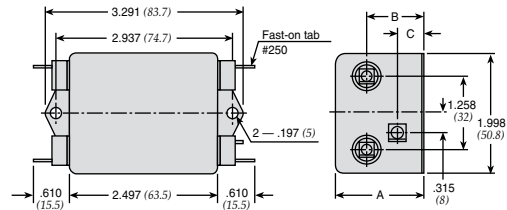
Power Line Filters Single Stage

62-PMF & PMB Series

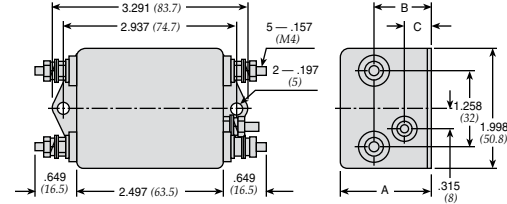
Temperature Characteristics



62-PMF



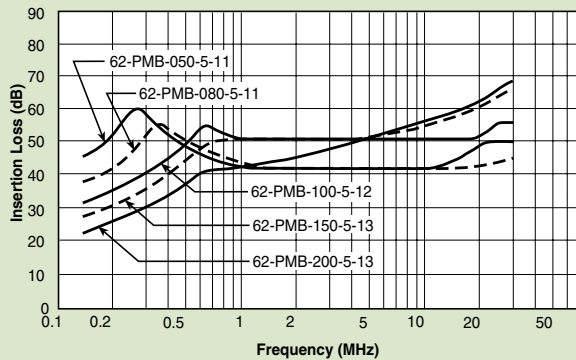
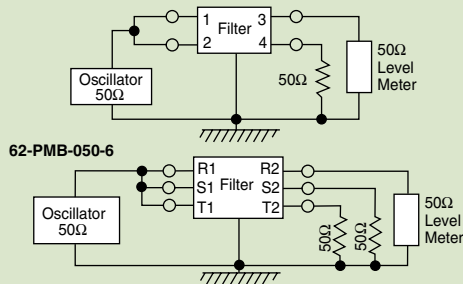
62-PMB



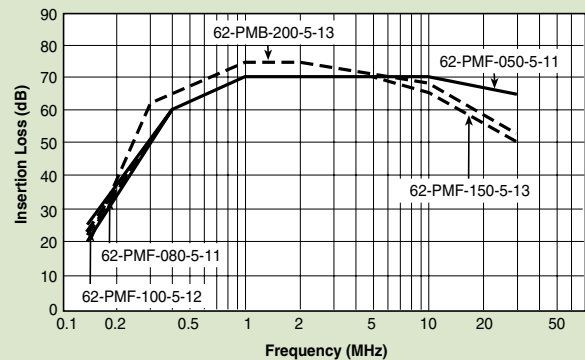
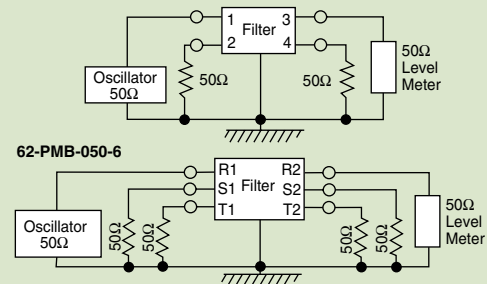
MODEL	A	B	C
62-PMF/PMB-100-200	1.490 (38)	.944 (24)	.433 (11)
62-PMF/PMB-050-080	1.258 (32)	.786 (20)	0 (0)

Dimensions in inches (mm)

Common Mode



Normal Mode



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

Specifications

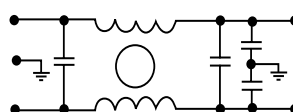
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Figure	Temperature Rise (Max.)
12-PMF-001-5-A	120/250VAC	1A	0.5mA	1	A	30°C
12-PMF-002-5-B		2A		2	B	
12-PMF-003-5-A		3A		4	A	
12-PMF-003-5-B				2	B	
12-PMF-006-5-A		6A		4	A	
12-PMF-006-5-C				1	C	
12-PMF-006-5-D				6	D	
12-PMF-010-5-A		10A		2	A	
12-PMF-010-5-C				3	C	
12-PMF-015-5-C		15A		5	E	
12-PMF-015-5-E					C	
12-PMF-020-5-C		D				
12-PMF-020-5-D		D				
12-PMF-020-5-E		E				
	20A					

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.

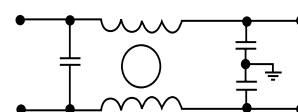


Circuit Diagram

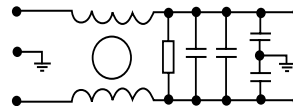
Circuit 1



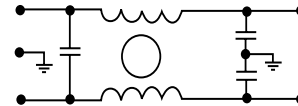
Circuit 2



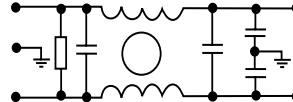
Circuit 3



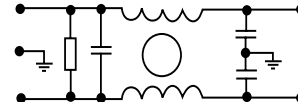
Circuit 4



Circuit 5



Circuit 6



Power Line Filters Single Stage

12-PMF Series

Figure A

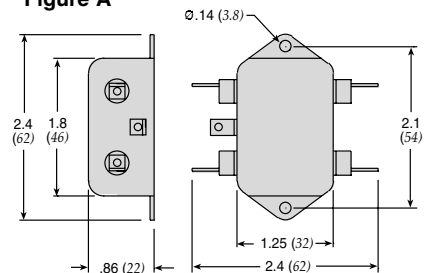


Figure B

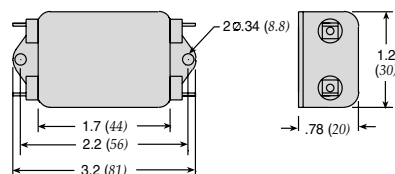


Figure C

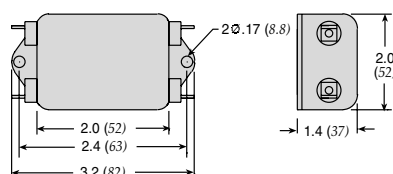


Figure D

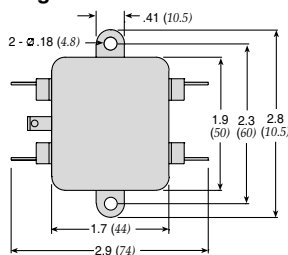
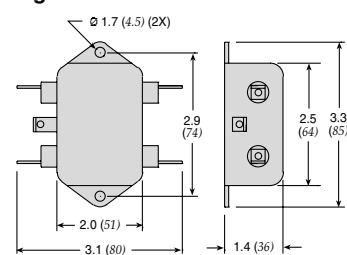
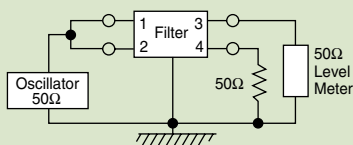


Figure E

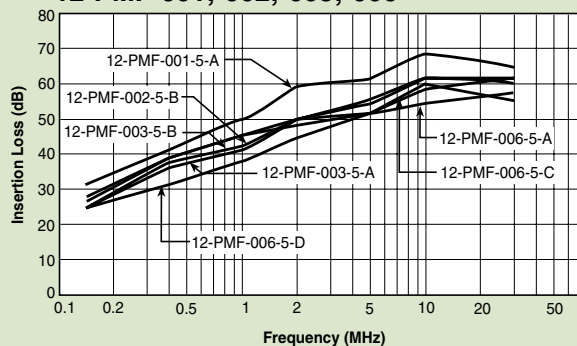


Dimensions in inches (mm)

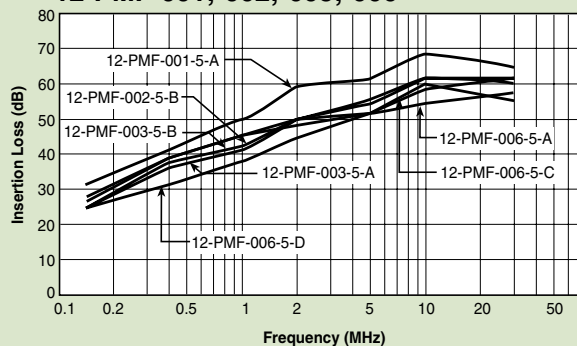
Common Mode



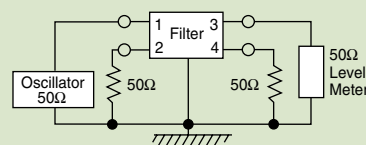
12-PMF-001;-002;-003;-006



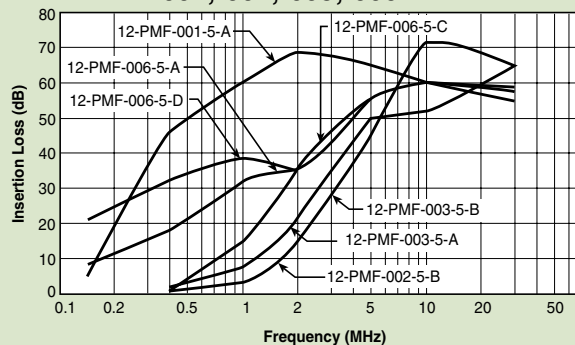
12-PMF-001;-002;-003;-006



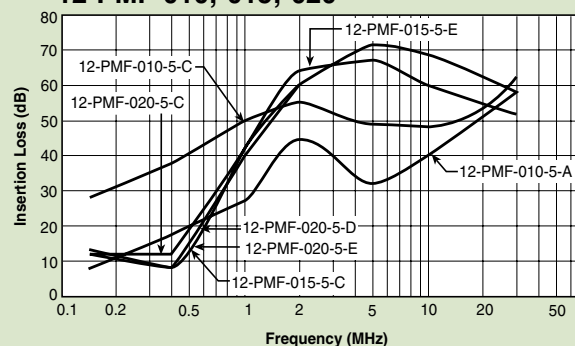
Normal Mode



12-PMF-001;-002;-003;-006



12-PMF-010;-015;-020



Power Line Filters Single Stage - Higher Current

62-PMB Series

Features

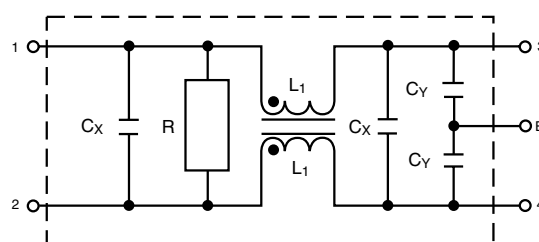
- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- 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

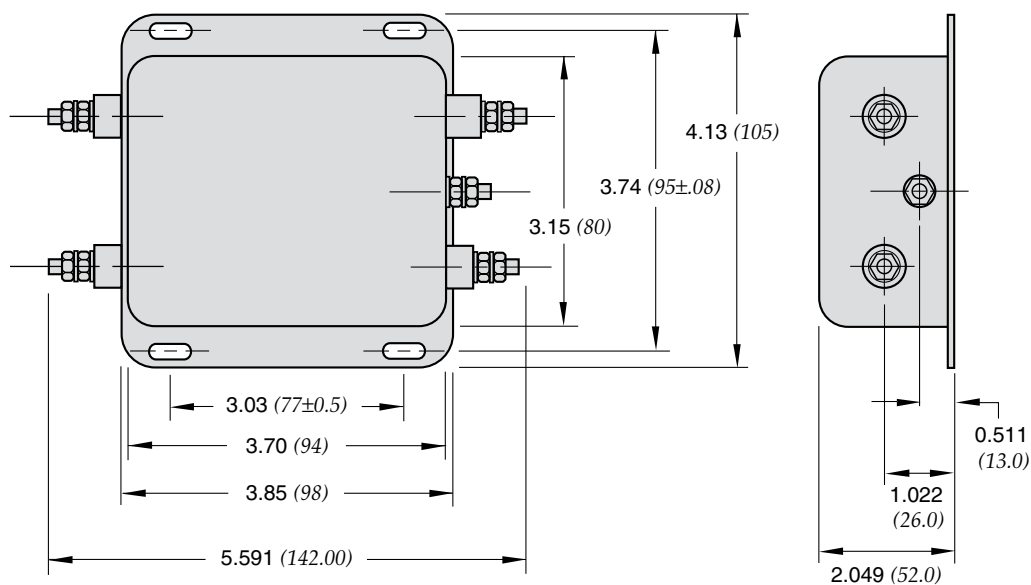
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Capacitance		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
62-PMB-300-5-14	250VAC	30A	0.50mA	3300pF	.47uF	1.6mH	45°C
62-PMB-400-5-14		40A				0.8mH	

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)

Power Line Filters Single Stage - Higher Current

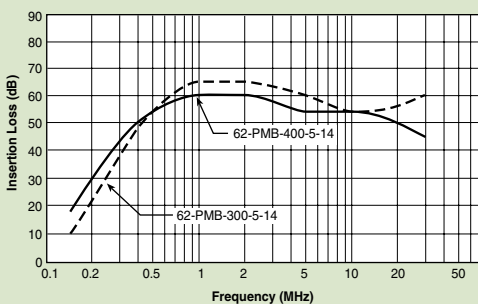
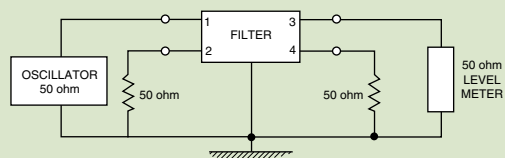
62-PMB Series

62-PMB-300-5-14 and 62-PMB-400-5-14

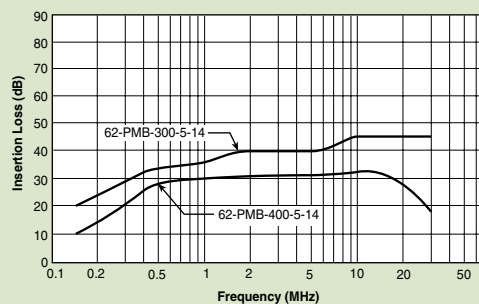
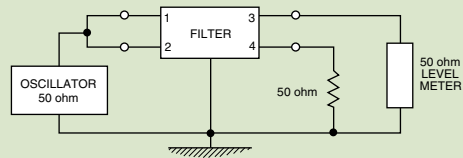


Dimensions in inches (mm)

Normal Mode



Common Mode



Power Line Filters Single Stage - Higher Current

12-PMB Series

Features

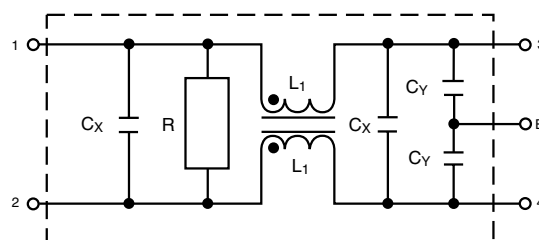
- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- 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			B				
12-PMB-035-5-B		35A							
12-PMB-050-5-B		50A			C				
12-PMB-100-8-C		100A	1.0mA						
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)

Power Line Filters Single Stage - Higher Current

12-PMB Series

Figure A

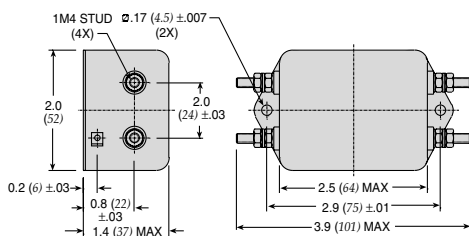


Figure B

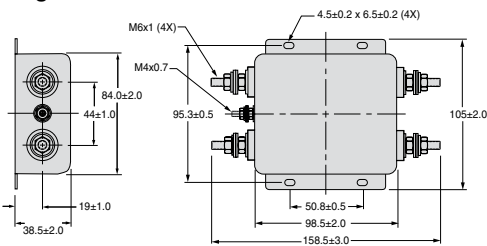
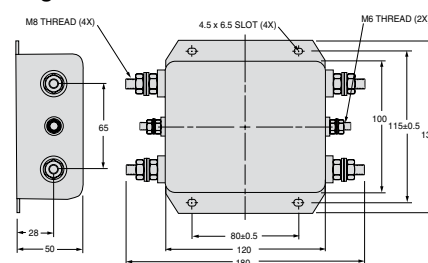
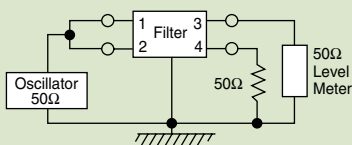


Figure C

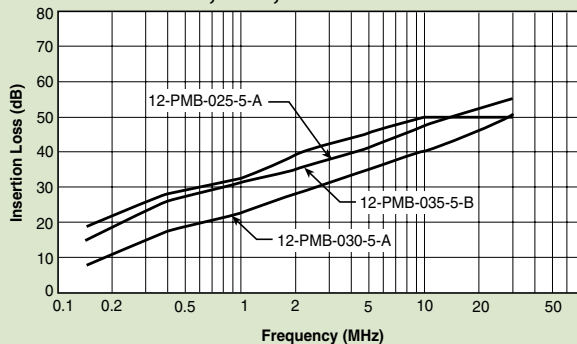


Dimensions in inches (mm)

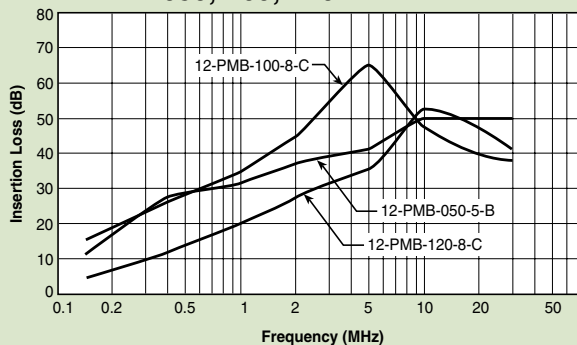
Common Mode



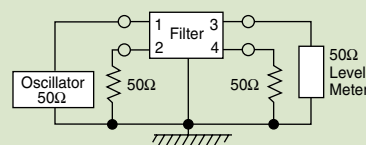
12-PMB-025;-030;-035



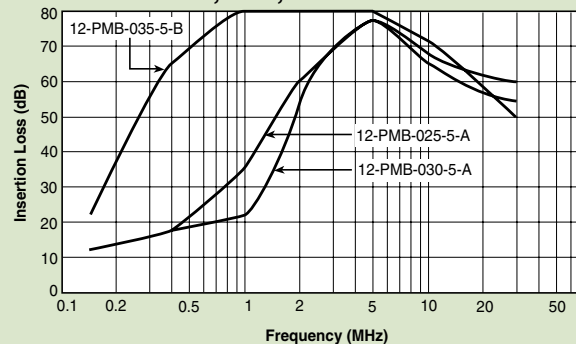
12-PMB-050;-100;-120



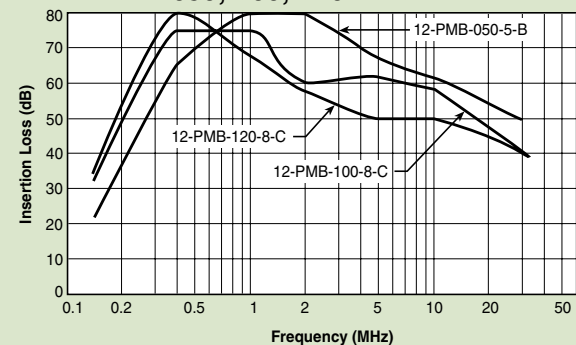
Normal Mode



12-PMB-025;-030;-035



12-PMB-050;-100;-120



Power Line Filters DC - Higher Current

12-PMF & 12 PMB DC Series

Features

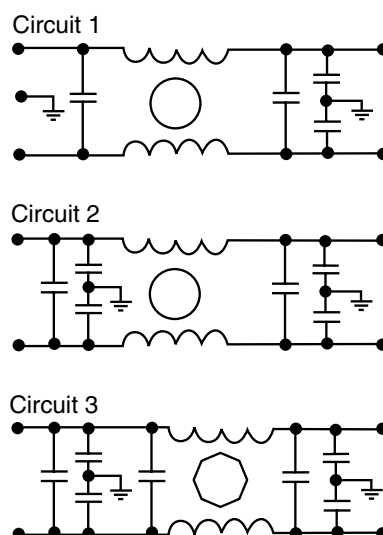
- Space-saving, compact designs
- Suitable for products that must conform to FCC regulations
- Excellent attenuation for high voltage impulse
- Metal case provides effective shielding
- Excellent filtering characteristics for both normal mode and common mode
- Epoxy molded for internal component reliability
- 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



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		50A		D		
12-PMB-050-DC-B			60A			
12-PMB-060-DC-B			80A	2		E
12-PMB-080-DC-G		100A	3	F		
12-PMB-080-DC-C						120A
12-PMB-100-DC-C						140A
12-PMB-120-DC-C		180A				
12-PMB-140-DC-C		200A	2	G		
12-PMB-180-DC-E						
12-PMB-200-DC-E						
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)

Power Line Filters DC - Higher Current

12-PMF & 12-PMB DC Series

Figure B

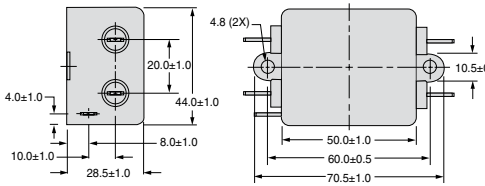


Figure C

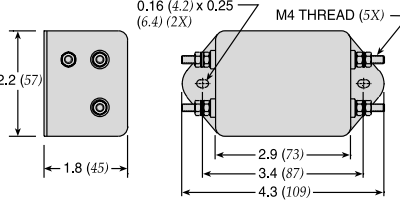


Figure A

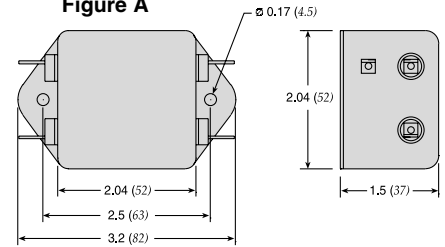


Figure D

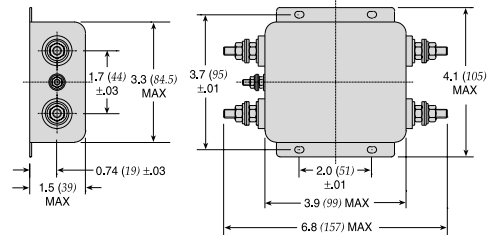


Figure E

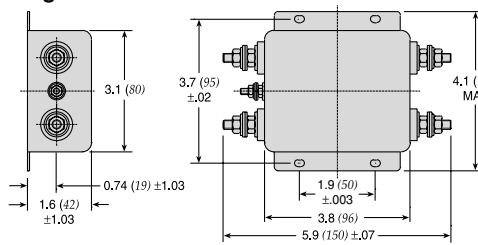


Figure F

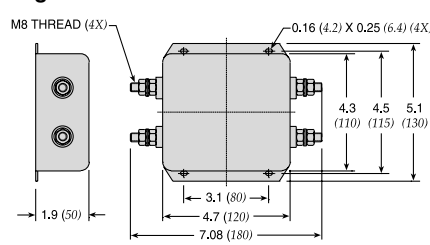
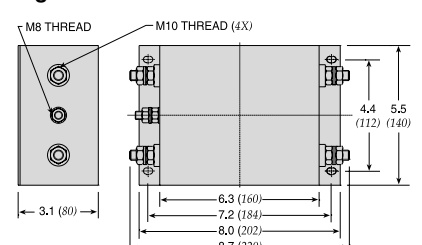
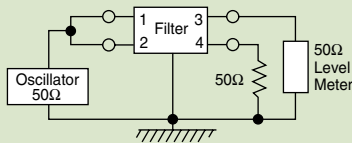


Figure G

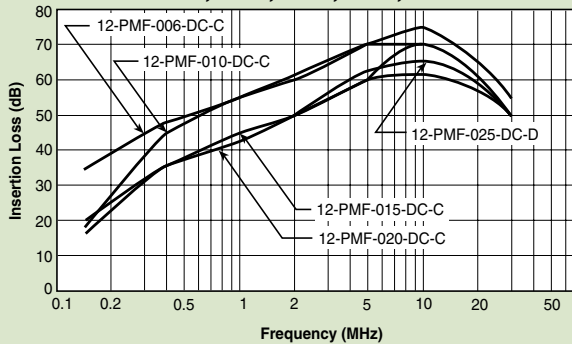


Dimensions in inches (mm)

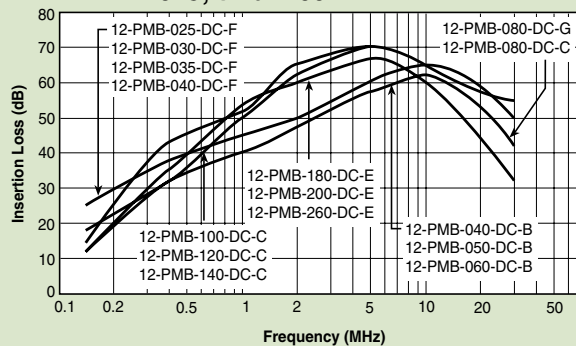
Common Mode



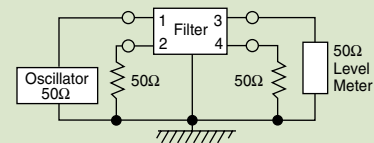
12-PMF-006;-010;-015;-020;-025



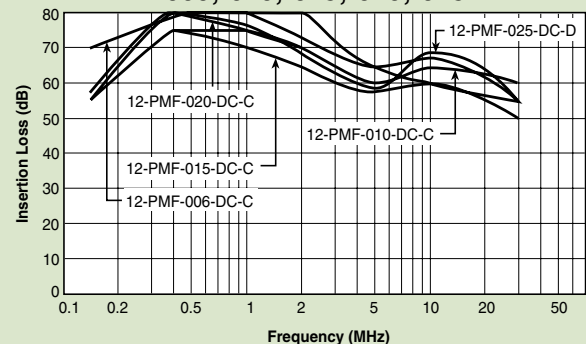
12-PMB-025; thru -260



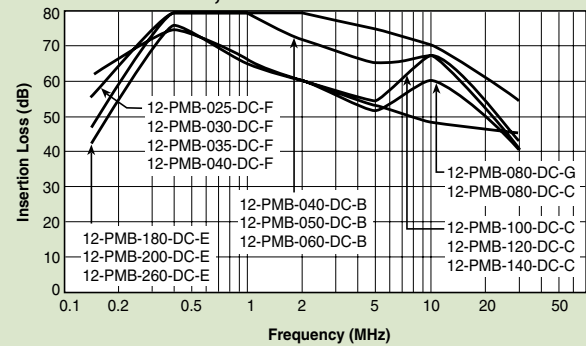
Normal Mode



12-PMF-006;-010;-015;-020;-025



12-PMB-025; thru -260



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)

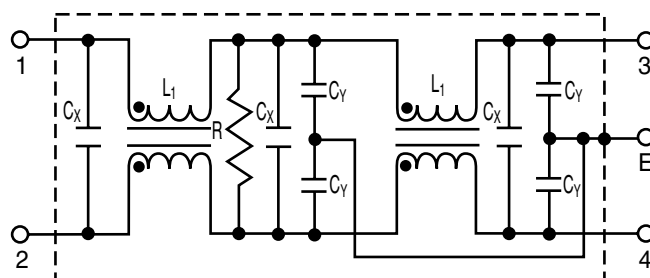
Applications

- 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			Inductance (L ₁) (2X)	Temperature Rise (Max.)
				C _{Y1}	C _{Y2}	C _X		
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.

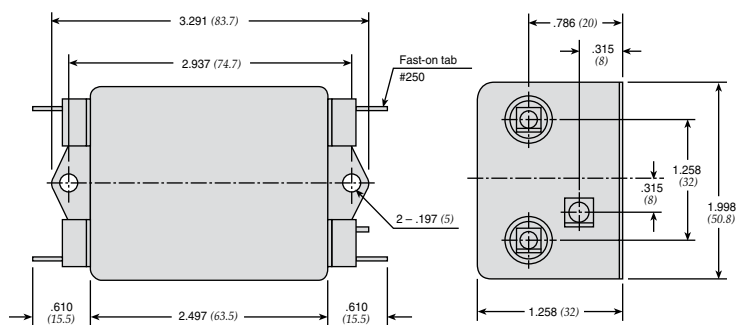
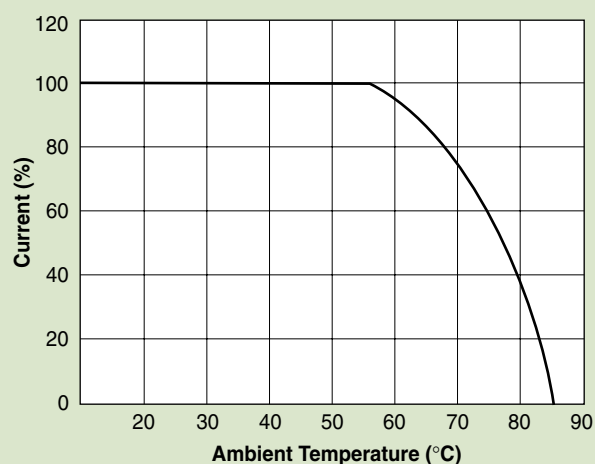
Discharge time: 0.4 sec. max.

Weight: 6.0 ounces (170 grams)

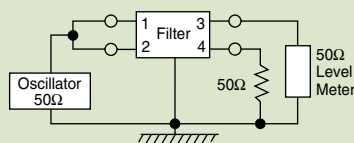
Power Line Filters Dual Stage

62-MMF Series

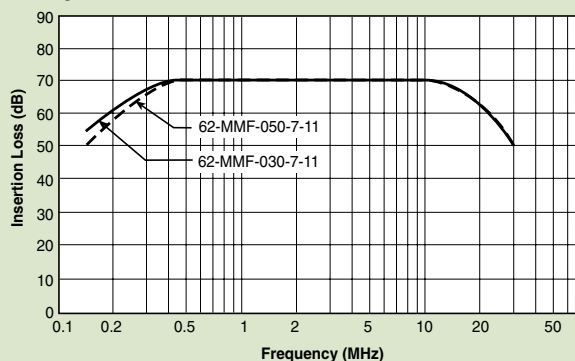
Temperature Characteristics



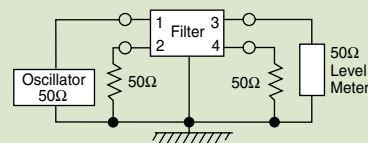
Common Mode



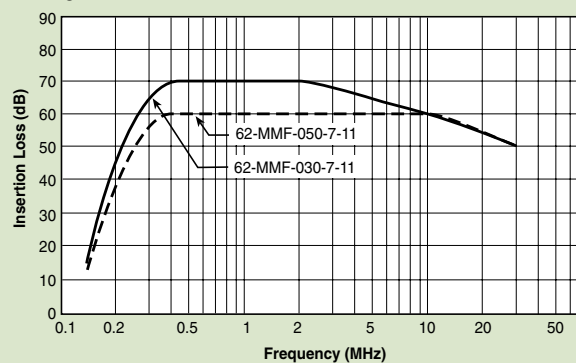
62-MMF



Normal Mode



62-MMF



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

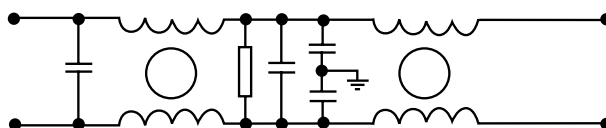
Applications

- Digital equipment
- Switching power supplies
- Personal computers and peripherals
- Measuring instruments and medical equipment
- Telecommunications equipment
- Equipment requiring very high noise attenuation

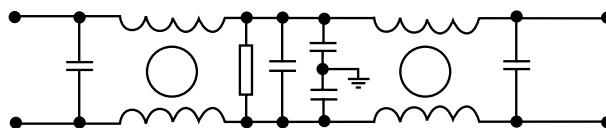


Circuit Diagram

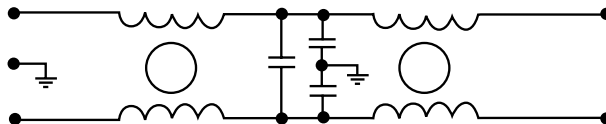
Circuit 1



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					B	
12-MMF-006-5-F		6A		2	A	
12-MMF-006-5-G					C	
12-MMF-008-5-B		8A			A	
12-MMF-010-5-F		10A			A1	
12-MMF-010-5-G					C	
12-MMF-012-5-B		12A			D	
12-MMB-015-5-E		15A			G	
12-MMB-020-5-F		20A			E	
12-MMB-030-5-D		30A			F	
12-MMB-050-5-C		50A				

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.

Power Line Filters Dual Stage

12-MMF & 12-MMB Series

Figure B

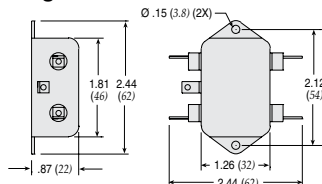


Figure C

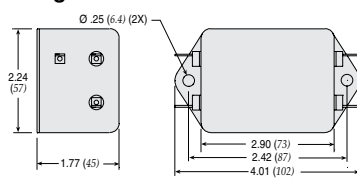


Figure A

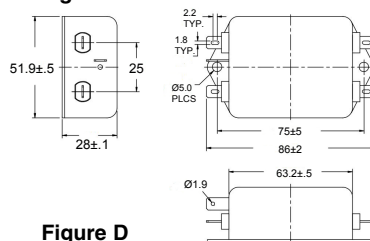


Figure A1

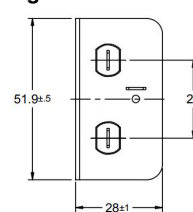


Figure D

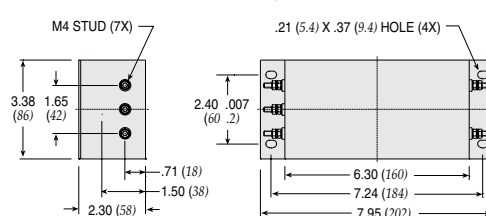


Figure G

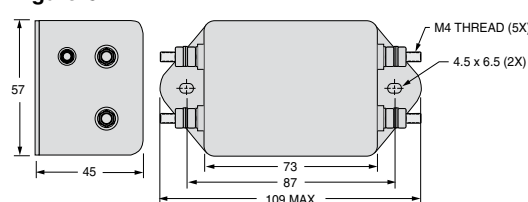


Figure E

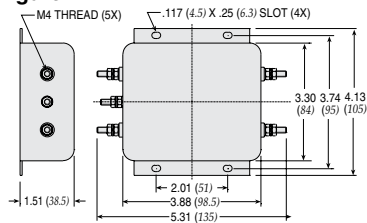
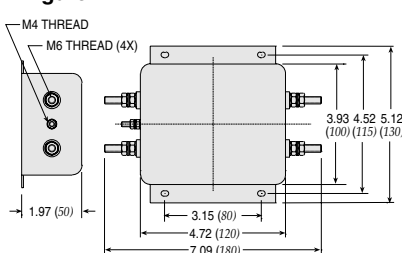
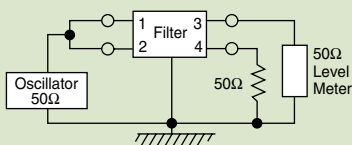


Figure F

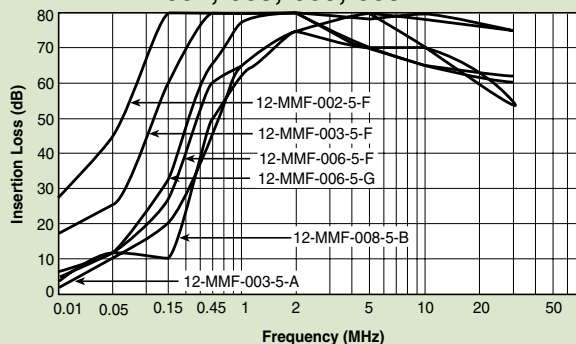


Dimensions in inches (mm)

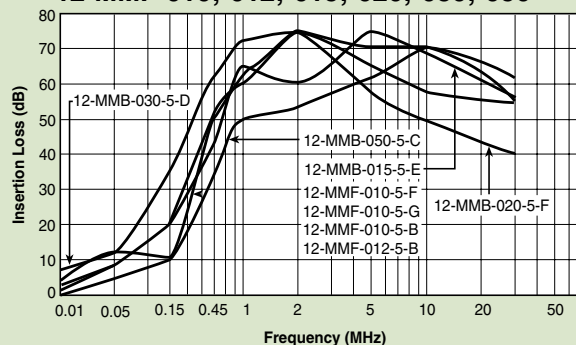
Common Mode



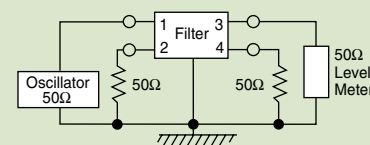
12-MMF-002;-003;-006;-008



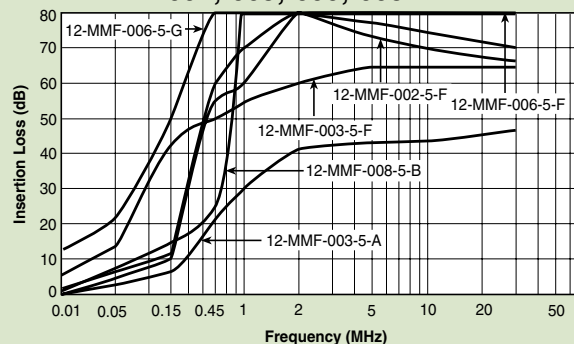
12-MMF-010;-012;-015;-020;-030;-050



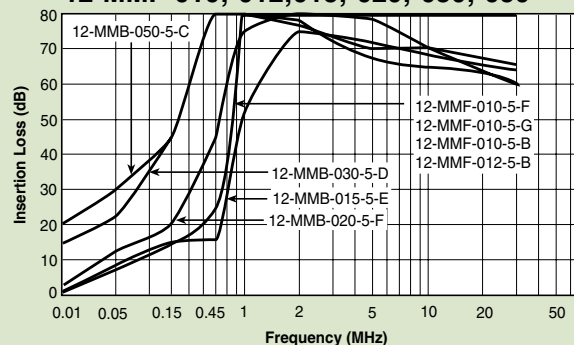
Normal Mode



12-MMF-002;-003;-006;-008



12-MMF-010;-012;-015;-020;-030;-050



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

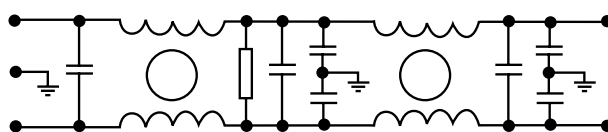
Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments and medical equipment
- Telecommunications equipment
- Equipment requiring very high noise attenuation

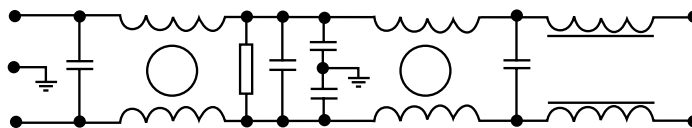


Circuit Diagram

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			C	
12-MMF-010-11-F		10A			B	
12-MMF-015-11-G		15A		1	D	
12-MMB-020-11-D		20A			E	
12-MMB-030-11-D		30A		2	F	
12-MMB-040-11-B		40A		1		
12-MMB-040-11-E		40A				
12-MMB-050-11-H		50A				

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)

Power Line Filters Dual Stage

12-MMF & 12-MMB Series

Figure A

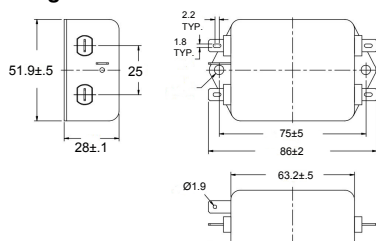


Figure B

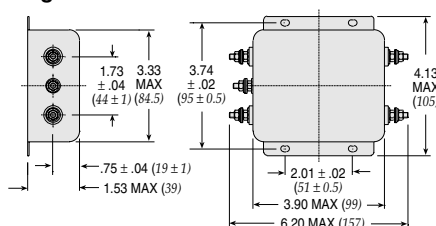


Figure C

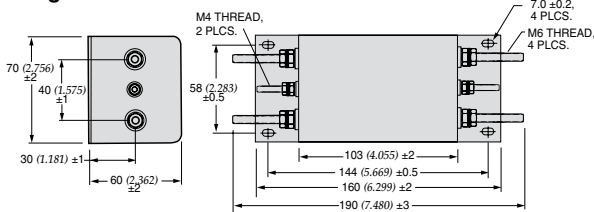


Figure D

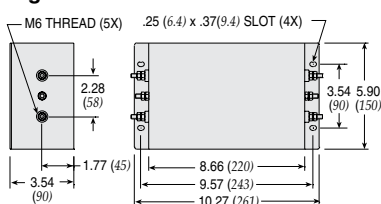


Figure E

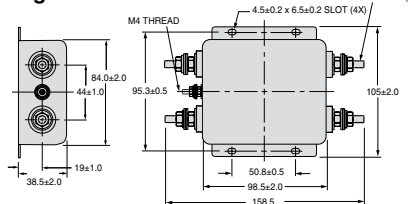
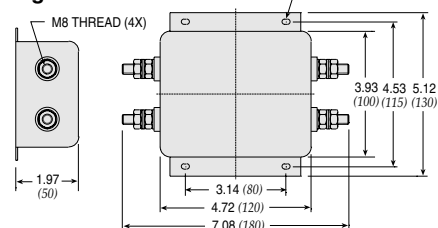
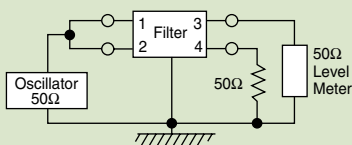


Figure F

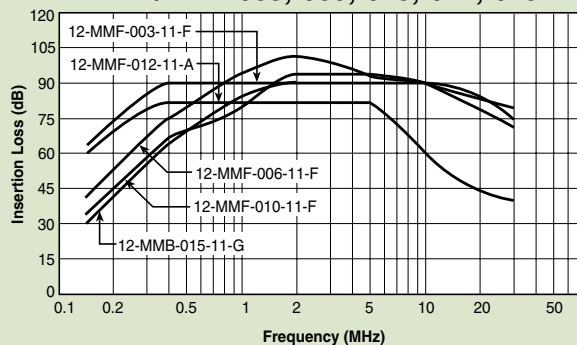


Dimensions in inches (mm)

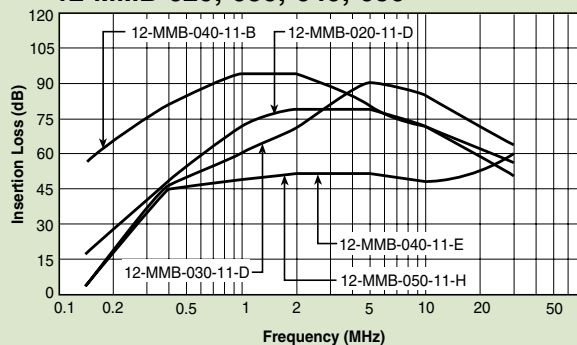
Common Mode



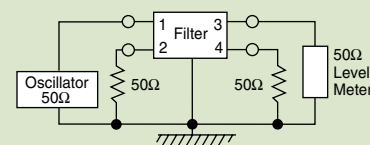
12-MMF/MMB-003;-006;-010;-012;-015



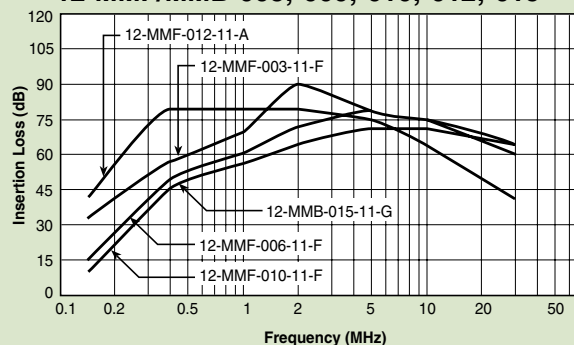
12-MMB-020;-030;-040;-050



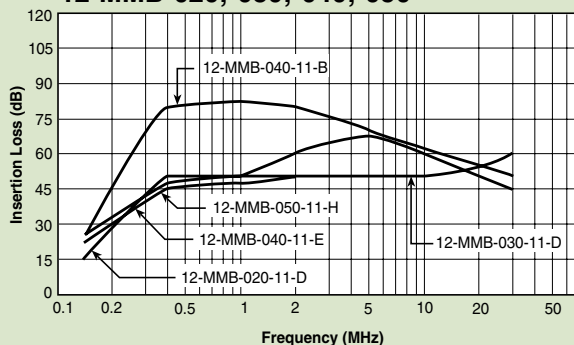
Normal Mode



12-MMF/MMB-003;-006;-010;-012;-015



12-MMB-020;-030;-040;-050



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

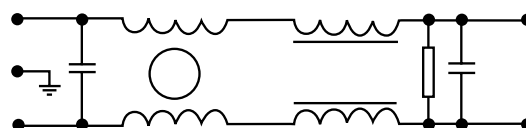
Applications

- Digital equipment
- Personal computers and peripherals
- Measuring instruments and medical equipment
- Telecommunications equipment
- Equipment requiring very high noise attenuation

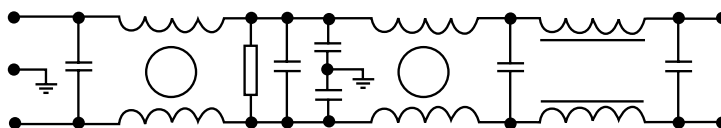


Circuit Diagram

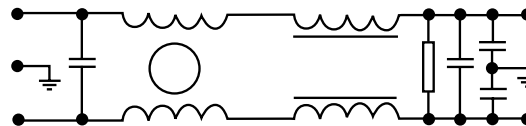
Circuit 1



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			5uA	
12-MMF-003-2-G						
12-MMF-006-5-G		6A	0.5mA	2	C	
12-MMB-010-5-D		10A			D	
12-MMB-015-5-E		15A				
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)

Power Line Filters Dual Stage

12-MMF & 12-MMB Series

Figure A

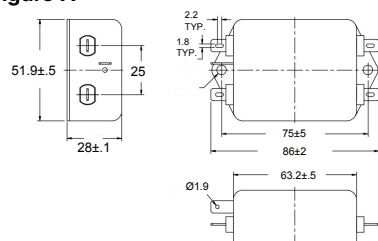


Figure B

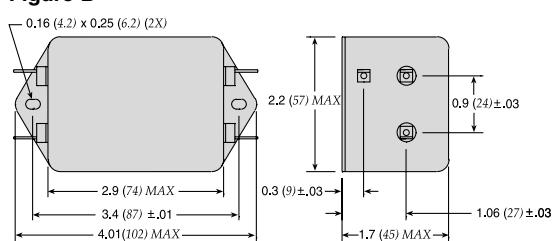


Figure C

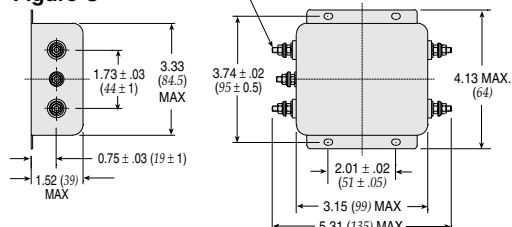
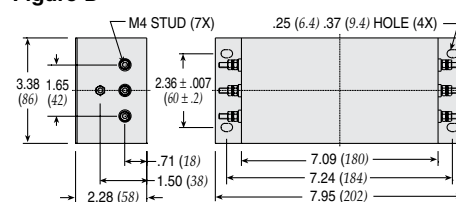
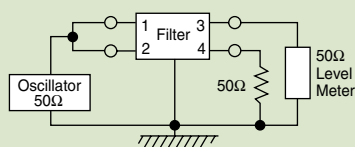


Figure D

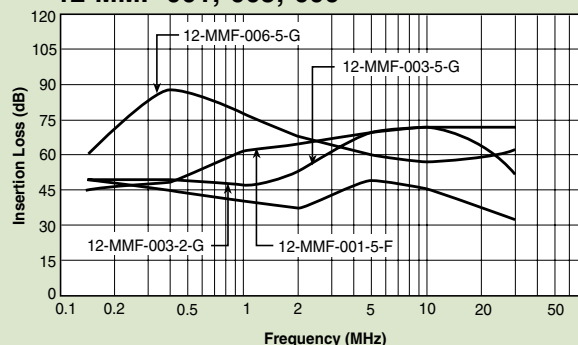


Dimensions in inches (mm)

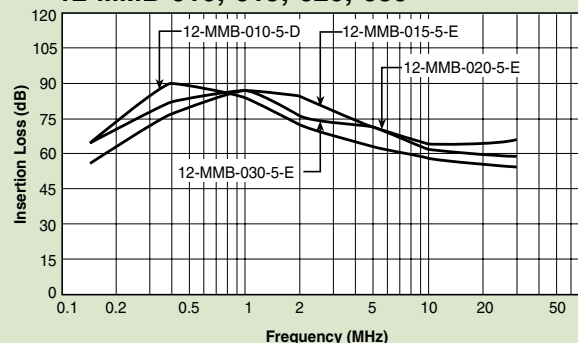
Common Mode



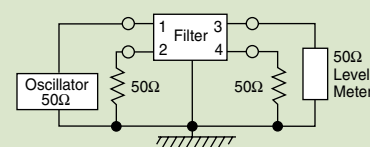
12-MMF-001;-003;-006



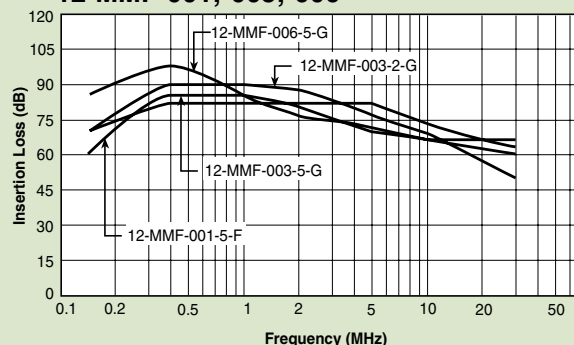
12-MMB-010;-015;-020;-030



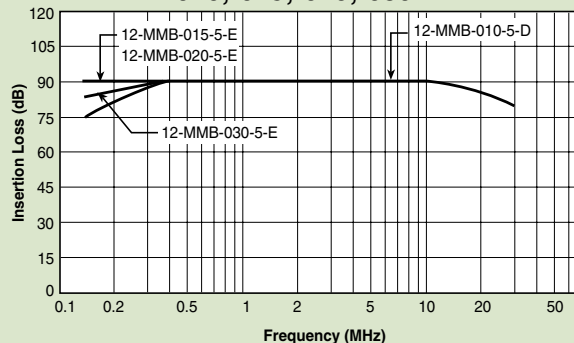
Normal Mode



12-MMF-001;-003;-006



12-MMB-010;-015;-020;-030



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)

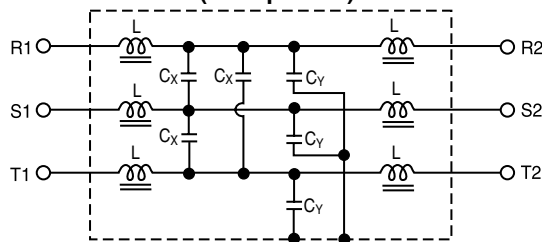
Applications

- Digital equipment
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Computerized washing machines

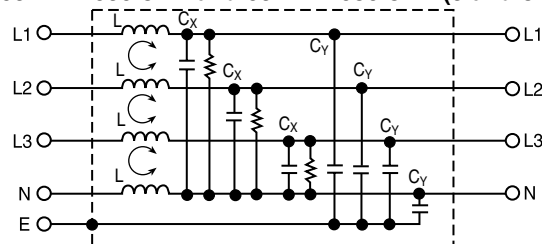


Circuit Diagram

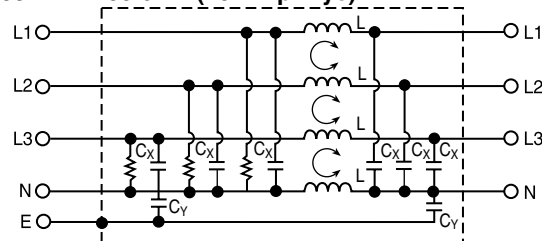
62-PMB-050-6-12 (5 Amp Delta)



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		Inductance (L ₁)	Temperature Rise (Max.)
				C _Y	C _X		
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

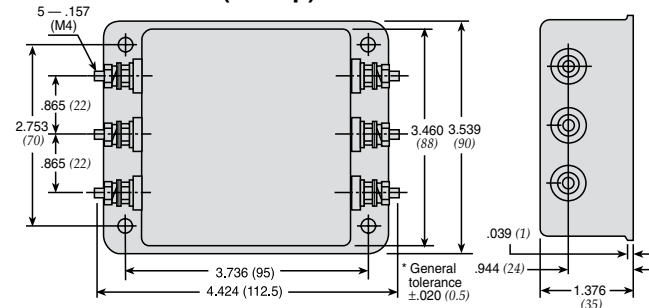
Note: Test Voltage 1500VAC one minute, line to ground.
Insulation Resistance: 300 MΩ min. at 500VDC.
Voltage Drop: 1V max. at rated current.
Weight: 8.82 ounces (250 grams) for 63-PMF-030-8-14 and 63-PMF-080-8-14
19.4 ounces (550 grams) for 62-PMB-050-6-12
51.5 ounces (1450 grams) for 63-PMF-160-9-21

Power Line Filters Three Phase

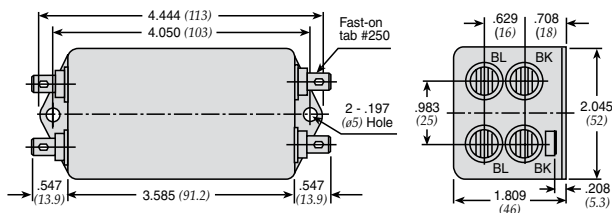
Low Current/High Performance

62-PMB/63-PMF Series

62-PMB-050-6-12 (5 Amp)

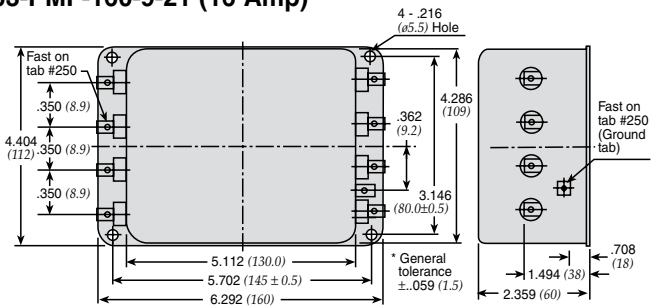


63-PMF-030-8-14 and 63-PMF-080-8-14 (3 and 8 Amp)



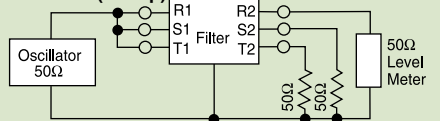
Dimensions in inches (mm)

63-PMF-160-9-21 (16 Amp)

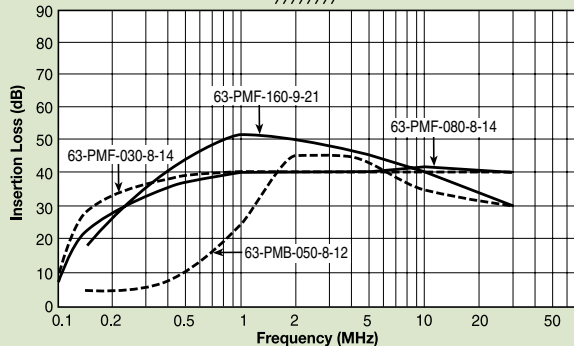
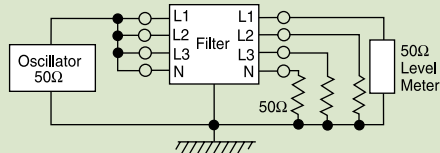


Common Mode

62-PMB-050-6-12 (5 Amp)

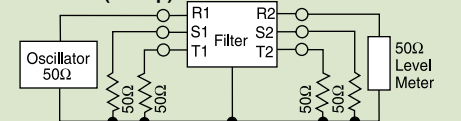


63-PMF (3, 8 and 16 Amp)

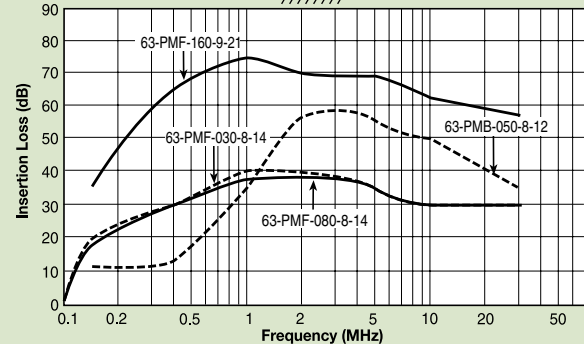
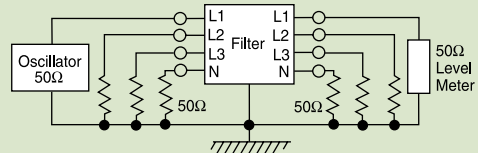


Normal Mode

62-PMB-050-6-12 (5 Amp)



63-PMF (3, 8 and 16 Amp)



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

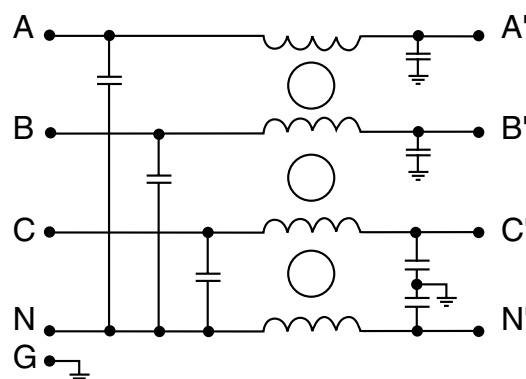
Applications

- Digital equipment
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Computerized washing machines

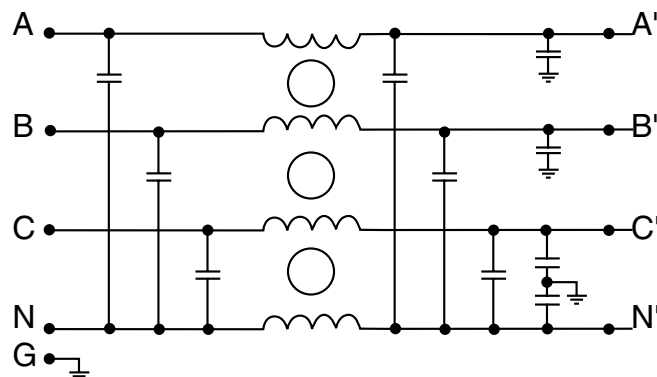


Circuit Diagram

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					A	
13-PWL-010-12-C					B	
13-PWB-010-12-D		10A		2	C	
13-PWB-015-12-D						
13-PWB-020-12-D						
13-PWB-025-12-D						
13-PWB-030-12-D						

Note: Test Voltage 1500VAC one minute, line to ground.
Insulation Resistance: 300 MΩ min. at 500VDC.
Voltage Drop: 1V max. at rated current.

Power Line Filters Three Phase

13-PWF/PWL/PWB Series

Figure A

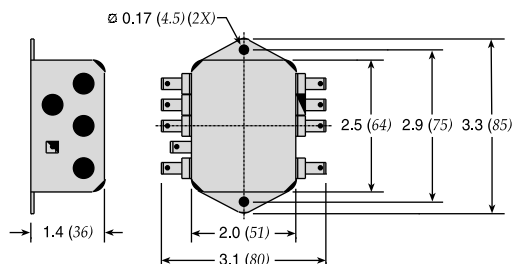


Figure B

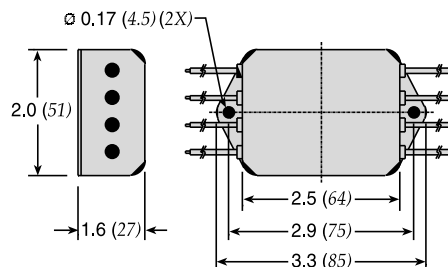
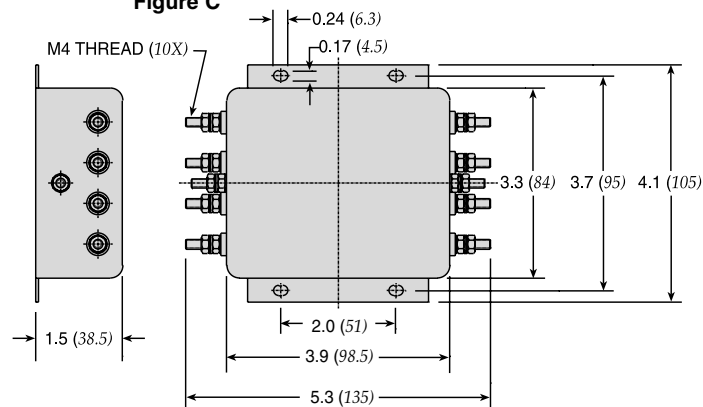
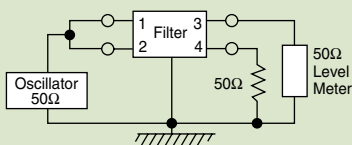


Figure C

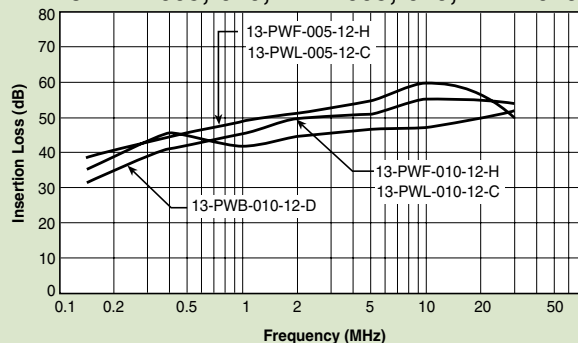


Dimensions in inches (mm)

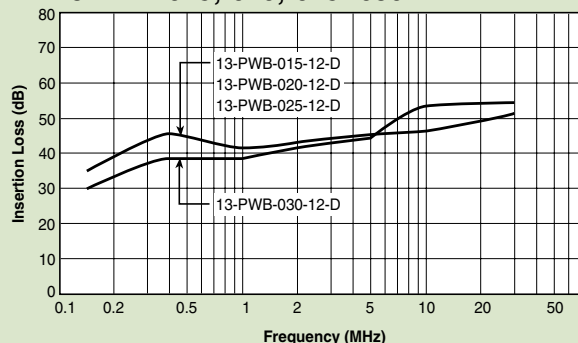
Common Mode



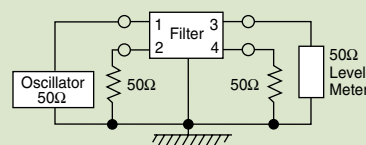
13-PWF-005;-010;-PWL-005;-010;-PWB-010



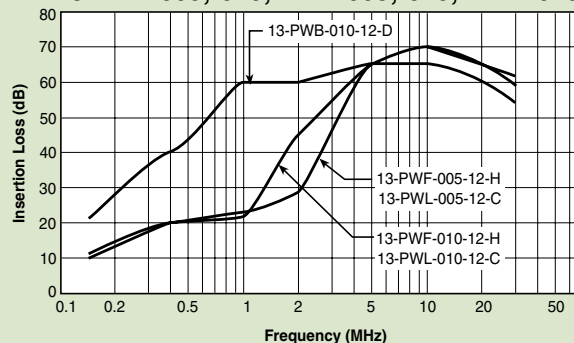
13-PWB-015;-020;-025;-030



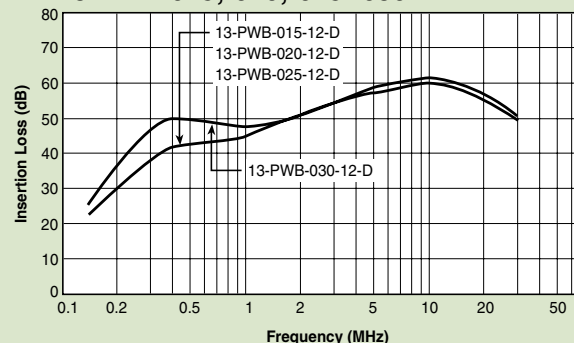
Normal Mode



13-PWF-005;-010;-PWL-005;-010;-PWB-010



13-PWB-015;-020;-025;-030



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

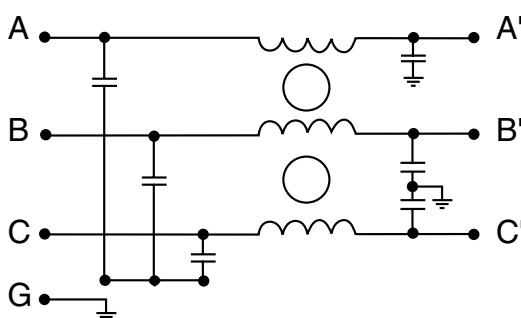
Applications

- Digital equipment
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Switching power supplies

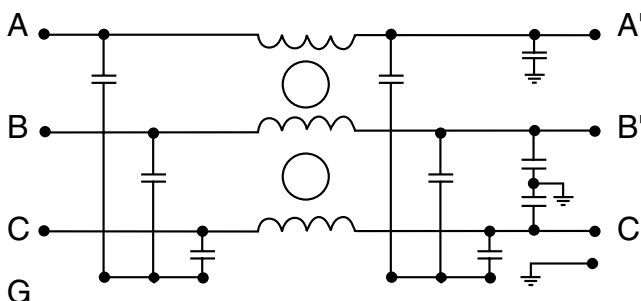


Circuit Diagram

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						
13-PDB-020-11-D						
13-PDB-025-11-D						
13-PDB-030-11-D						

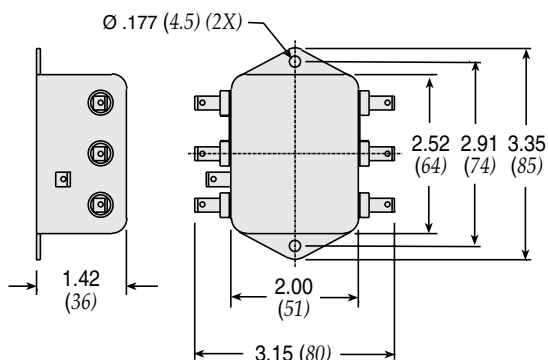
Note: Test Voltage 1500VAC one minute, line to ground.
Insulation Resistance: 300 MΩ min. at 500VDC.
Voltage Drop: 1V max. at rated current.

Power Line Filters Three Phase

High Performance

13-PDF/PDL/PDB Series

Figure A



Dimensions in inches (mm)

Figure B

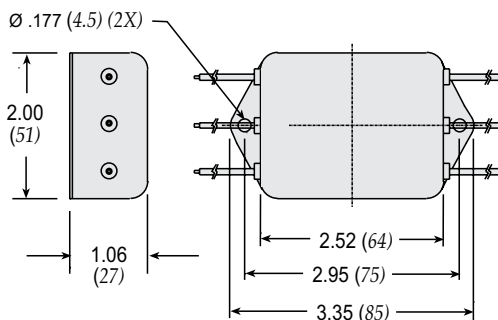
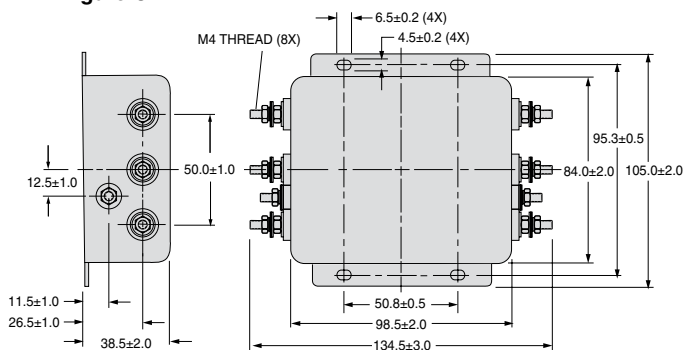
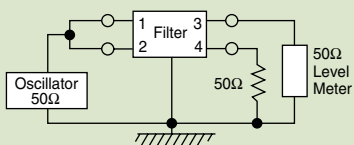


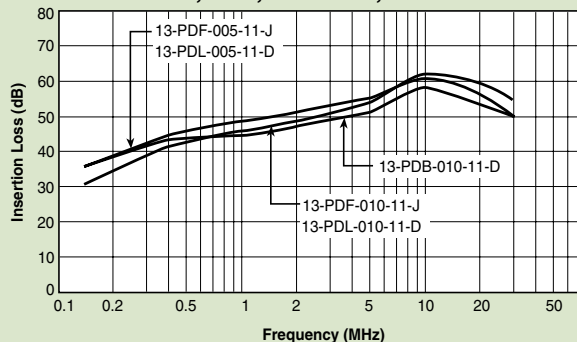
Figure C



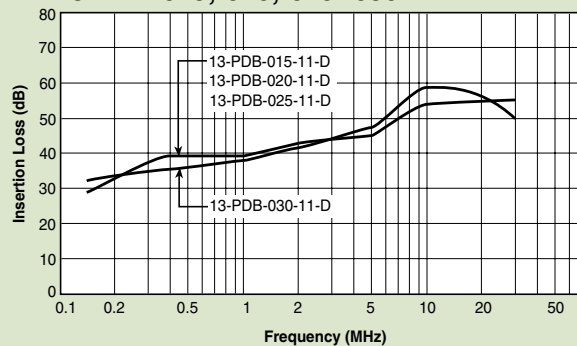
Common Mode



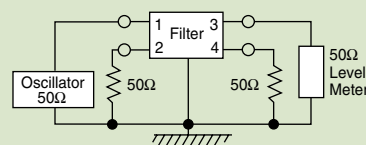
13-PDF-005;-010; PDL-005;-010 PDB-010



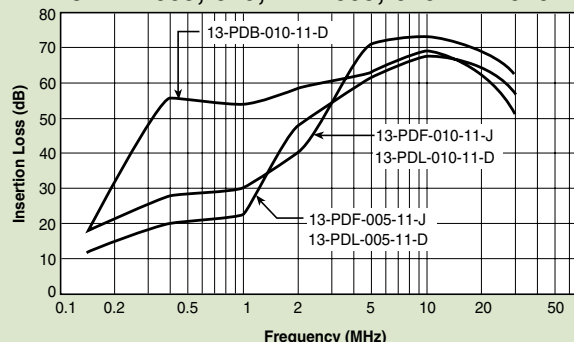
13-PDB-015;-020;-025;-030



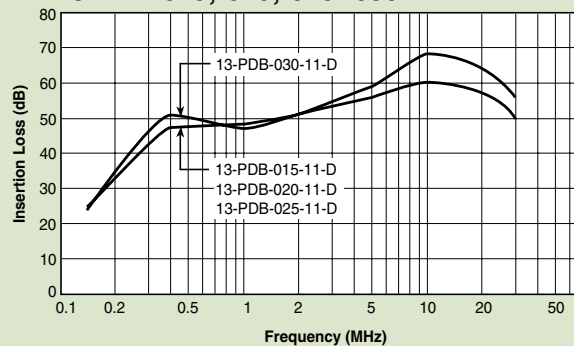
Normal Mode



13-PDF-005;-010; PDL-005;-010 PDB-010



13-PDB-015;-020;-025;-030



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

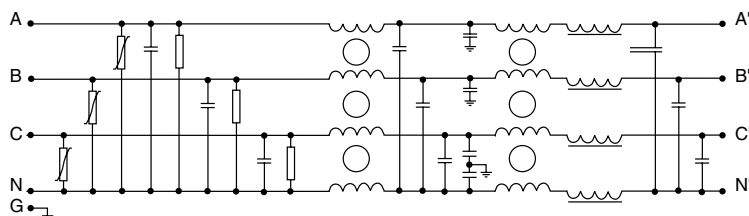
Applications

- Power supplies for data systems
- Industrial equipment (UPS, inverters and converters)
- Automation equipment
- Telecommunications systems and equipment

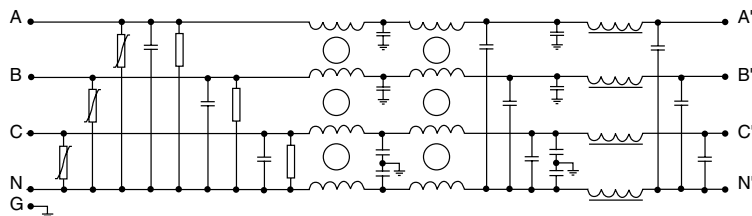


Circuit Diagram

Circuit 1



Circuit 2



Specifications

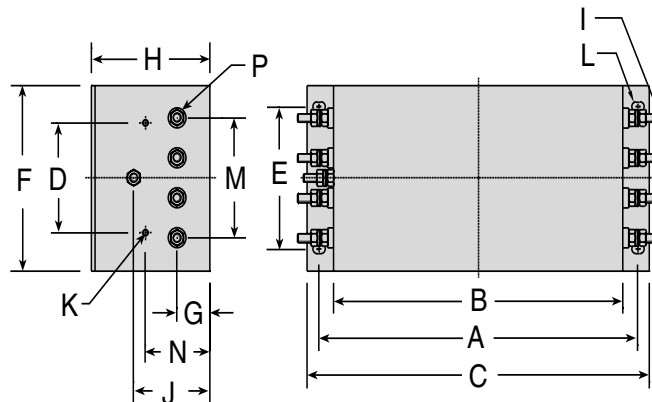
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Temperature Rise (Max.)
13-PWB-005-12-A	480/277VAC	5A	4.5mA	1	30°C
13-PWB-010-12-B		10A			
13-PWB-020-12-B		20A			
13-PWB-035-12-C		35A			
13-PWB-050-13-C		50A	9.0mA	2	
13-PWB-080-14-D		80A	20mA		
13-PWB-100-14-D		100A			
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.

Power Line Filters Three Phase

High Performance

13-PWB Series

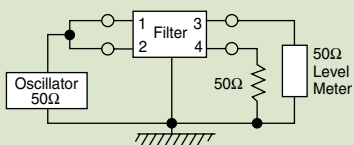


Dimensions

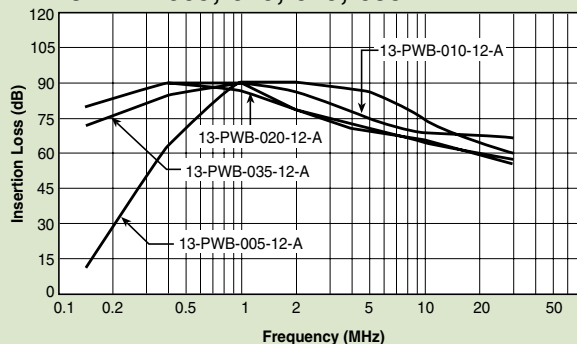
Dimensions in inches (mm)

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)		M6					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)	2.9 (74)	1.9 (49)	M6	.25 x .38 (6.4 x 9.7)
13-PWB-050-13-C	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)	M4		3.4 (86)	2.2 (56)	M8		.25 x .38 (6.4 x 9.8)
13-PWB-080-14-D																.25 x .39 (6.4 x 9.9)
13-PWB-100-14-D											7.5 (190)				8.7 (220)	1.4 (35)
13-PWB-150-14-E															.25 x .36 (6.4 x 9.11)	

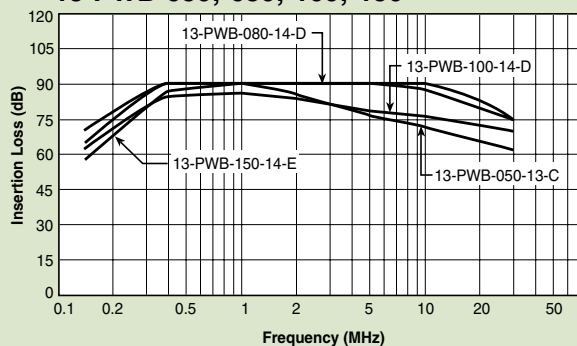
Common Mode



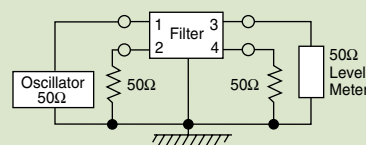
13-PWB-005;-010;-020;-035



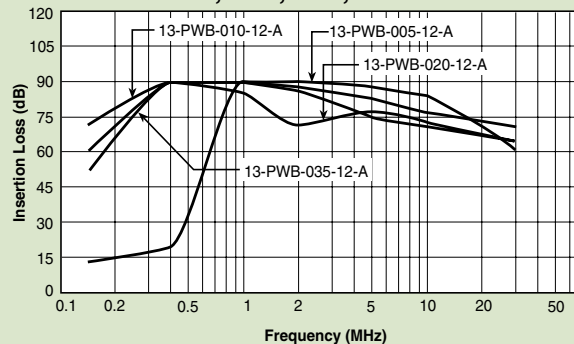
13-PWB-050;-080;-100;-150



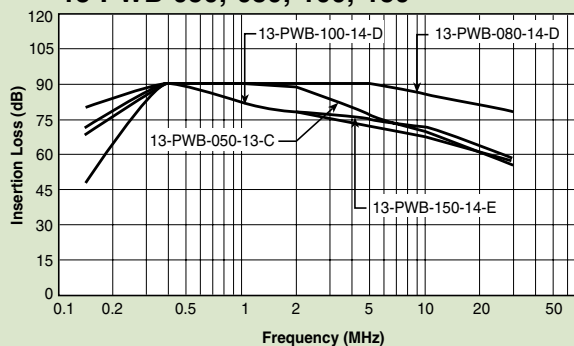
Normal Mode



13-PWB-005;-010;-020;-035



13-PWB-050;-080;-100;-150



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

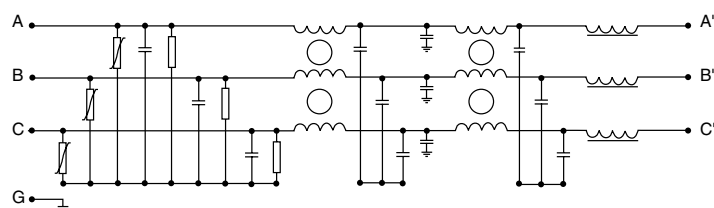
Applications

- Digital equipment
- Industrial equipment (UPS, inverters and converters)

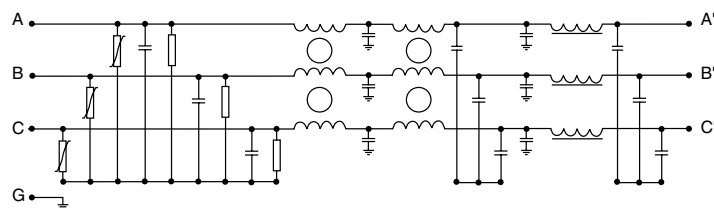


Circuit Diagram

Circuit 1



Circuit 2



Specifications

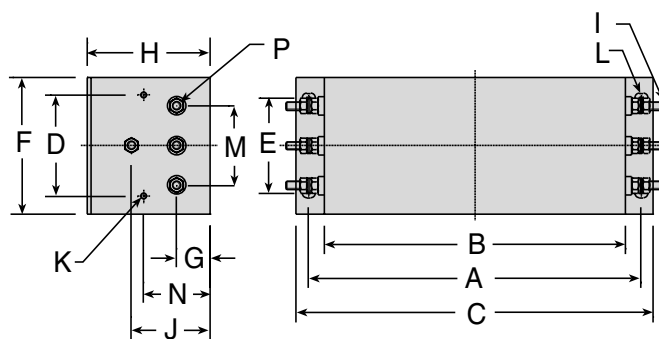
Model	Rated Voltage (@ 50/60Hz)	Rated Current	Leakage Current (Max.)	Circuit Diagram	Temperature Rise (Max.)
13-PDB-005-12-A	480/277VAC	5A	4.5mA	1	30°C
13-PDB-010-12-A		10A			
13-PDB-020-12-B		20A			
13-PDB-035-12-B		35A			
13-PDB-050-12-B		50A	9.0mA		
13-PDB-080-13-C		80A			
13-PDB-100-14-C		100A	20mA	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.

Power Line Filters Three Phase

High Performance

13-PDB Series

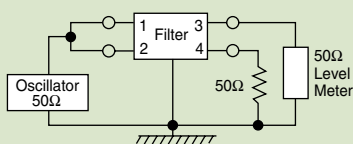


Dimensions

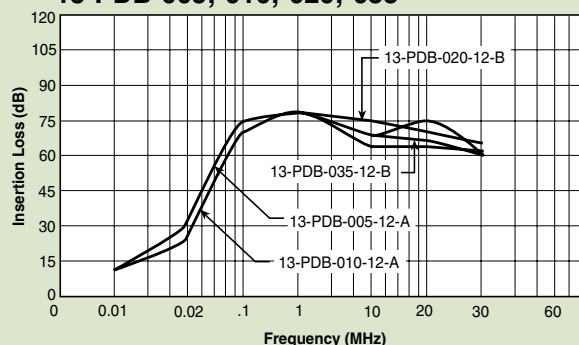
Dimensions in inches (mm)

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															.25 x .38 (6.4 x 9.6)
13-PDB-035-12-B	9.6 (243)	8.7 (220)	10.3 (261)	2.3 (58)	2.7 (70)	3.9 (100)	.98 (25)		M6	2.3 (58)		2.9 (74)	1.9 (49)	M6	.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								3.5 (90)							.25 x .39 (6.4 x 9.9)
13-PDB-100-14-C					6.1 (155)	7.3 (185)	1.2 (30)								.25 x .36 (6.4 x 9.10)
13-PDB-150-14-C	13.9 (354)	12.6 (320)	15.1 (384)	2.5 (66)					M8	2.4 (62)		3.3 (86)	2.2 (56)	M8	.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)

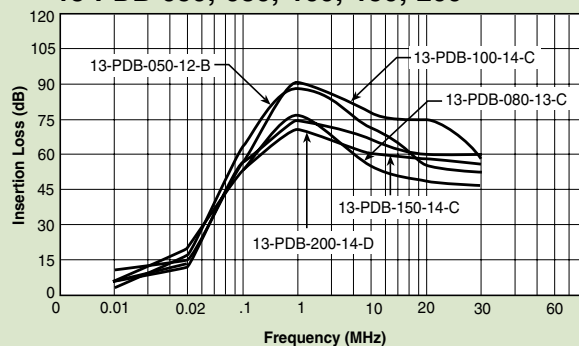
Common Mode



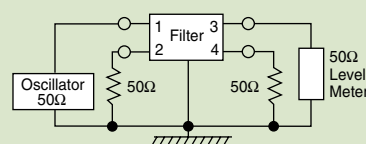
13-PDB-005;-010;-020;-035



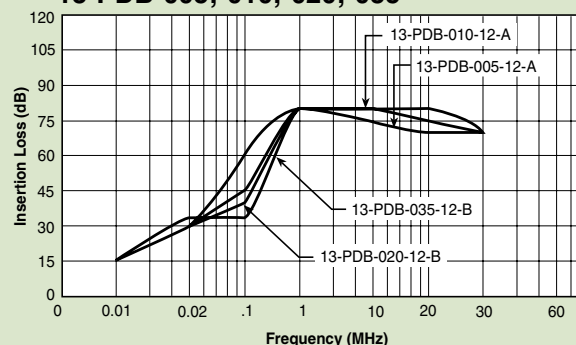
13-PDB-050;-080;-100;-150;-200



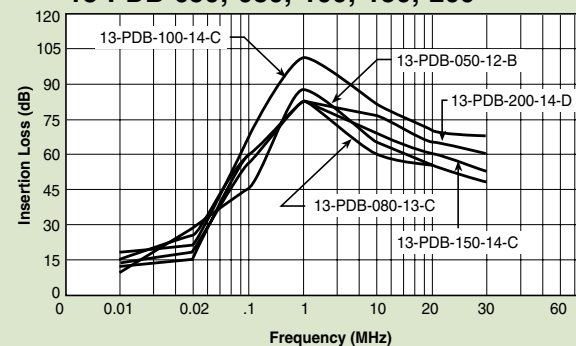
Normal Mode



13-PDB-005;-010;-020;-035



13-PDB-050;-080;-100;-150;-200

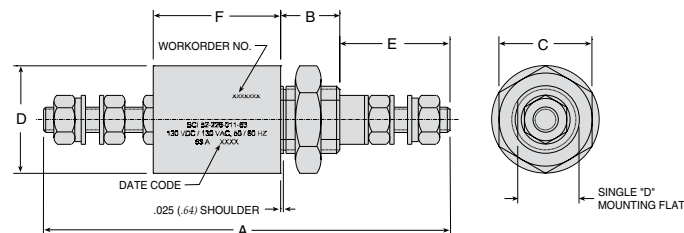


Commercial-Off-The-Shelf (COTS) Filters

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.



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

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).



Applications

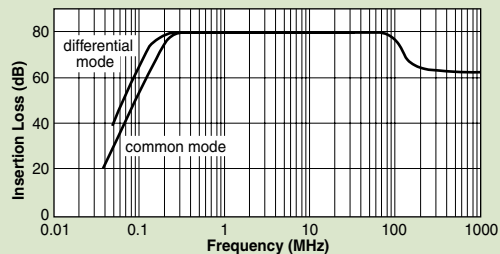
- Military
- Commercial and military/aerospace
- Secured communications
- Switching power supplies
- Data processing equipment
- Ruggedized computers
- Radar
- Electronic warfare
- Ground/air weapon systems
- Satellites
- Ship board systems
- Land based vehicles
- Fixed and mobile control stations

Test 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.

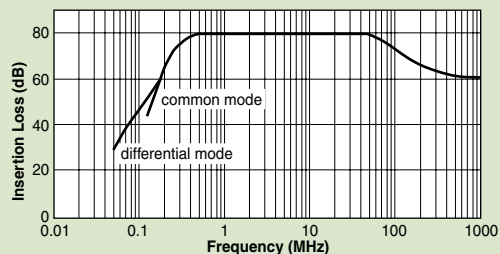
Military/Aerospace Multisection Filters

Insertion Loss

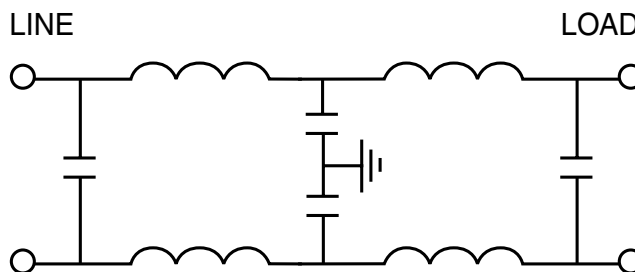
52-600-001



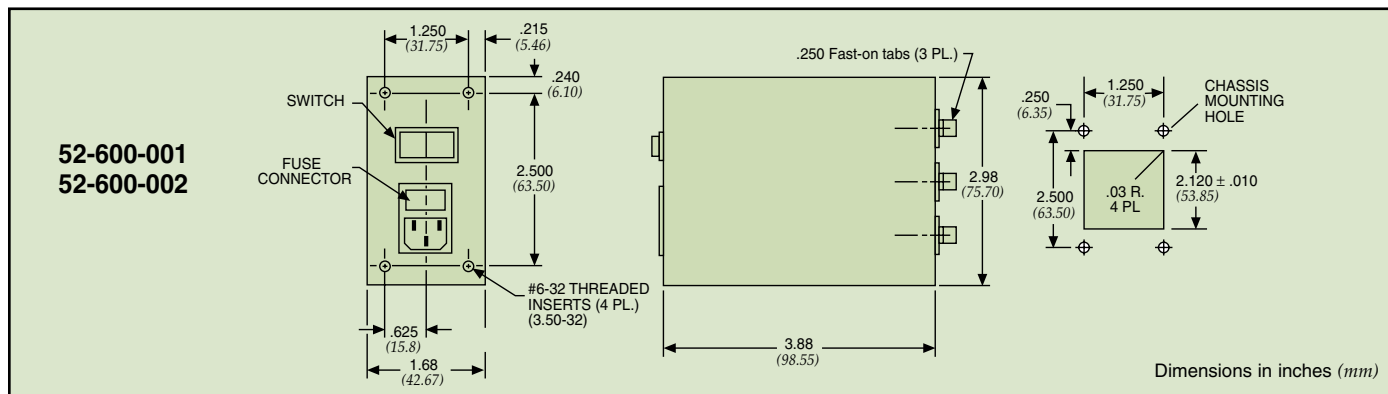
52-600-002



Circuit Schematic



Dimensions



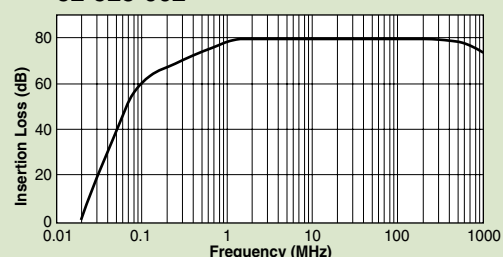
Model	Current Rating	Voltage Rating	Temperature Rating	DCR. max. (ohms)	Leakage Current (max.)	Mode (max.)	Minimum Insertion Loss (db) Per MIL-STD-220						
							50K	150K	300K	1M	10M	100M	1G
52-600-001	5A	120/240VAC 60 Hz	-40°C to +65°C	.20	1 mA	COMM	33	65	80	80	80	80	60
						DIFF	37	65	80	80	80	-	-
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.

Military/Aerospace Multisection Filters

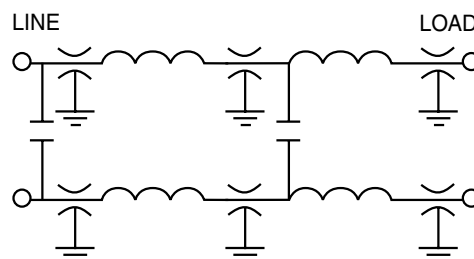
Insertion Loss

52-523-002



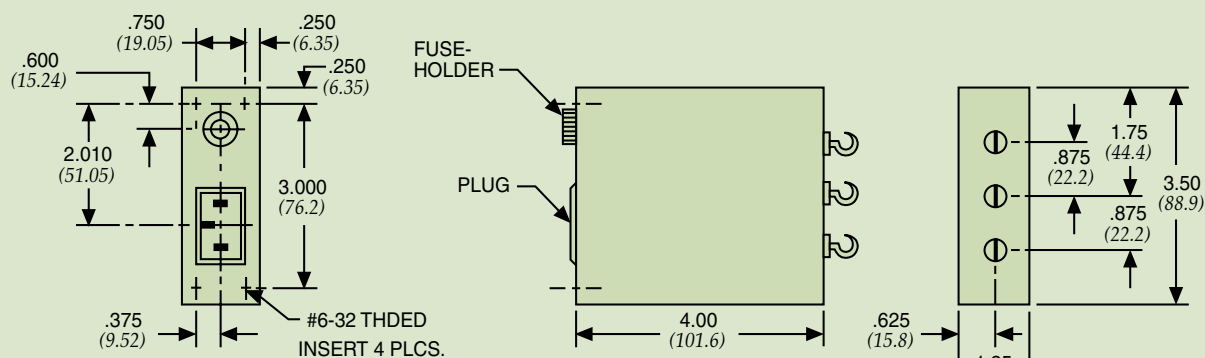
Circuit Schematic

52-523-002



Dimensions

52-523-002



Dimensions in inches (mm)

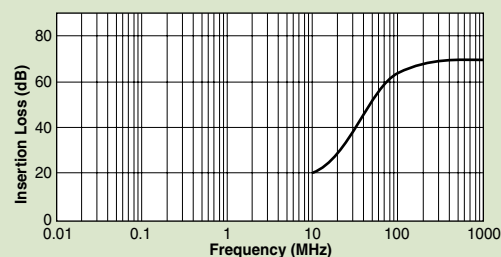
Model	Current Rating	Voltage Rating	Temperature Rating	DCR max. (ohms)	Leakage Current (max.)	Mode (max.)	Minimum Insertion Loss (db) Per MIL-STD-220						
							50K	150K	300K	1M	10M	100M	1G
52-523-002	5A	120/240VAC 60 Hz	-40°C to +65°C	.25	1 mA	COMM	—	55	60	80	80	70	60
						DIFF	—	50	60	80	80	—	—

Consult factory for UL/CSA approval availability.

Military/Aerospace Multisection Filters

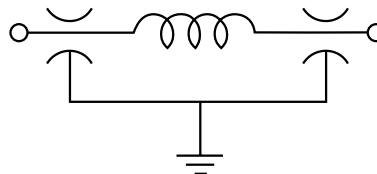


**Insertion Loss
1212-0502**



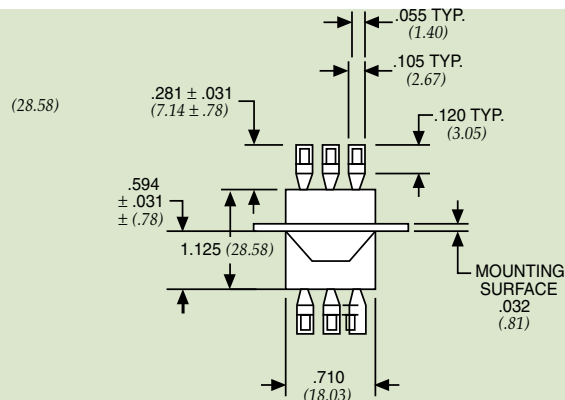
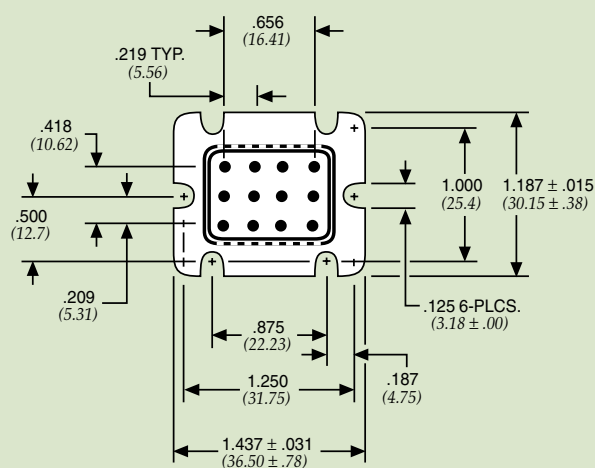
Circuit Schematic

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.

Military/Aerospace Multisection Filters

Secure Communications

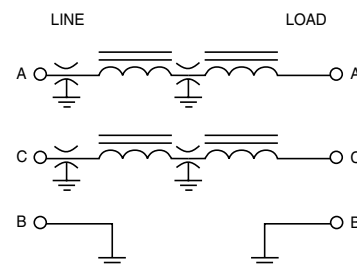
API's electromagnetic compatibility expertise in the secure communication or "TEMPEST" arena is represented by this group of high performance filters. These units are especially well suited for use in MIL-STD-461 applications to reduce conducted emissions. The filters are manufactured with glass sealed terminals and connectors.

Features

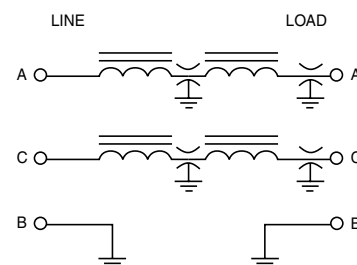
- Excellent insertion loss profile
- Available for DC & AC applications up to 400 Hz
- Available for 3-14 Amp applications
- Custom systems can be designed to your specific needs



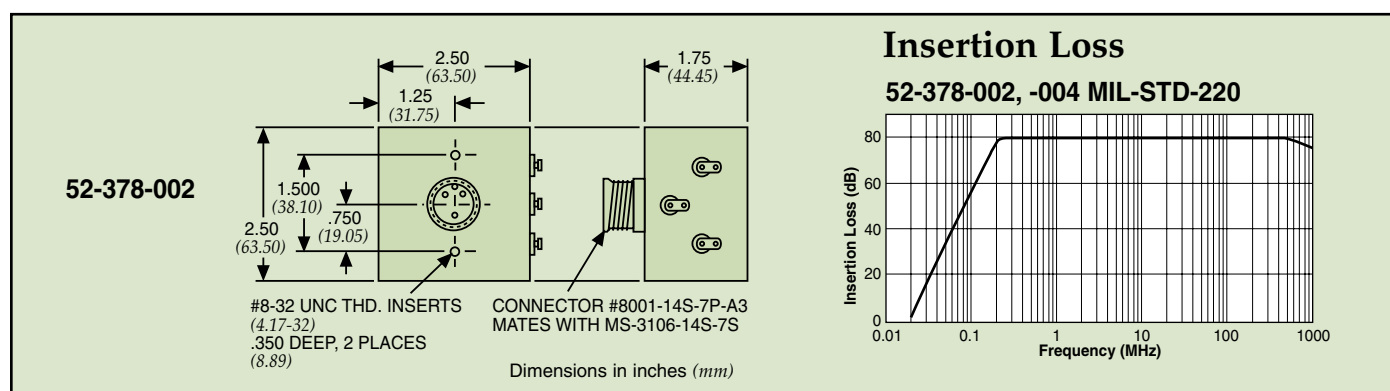
Filter Schematic A



Filter Schematic B



Dimensions

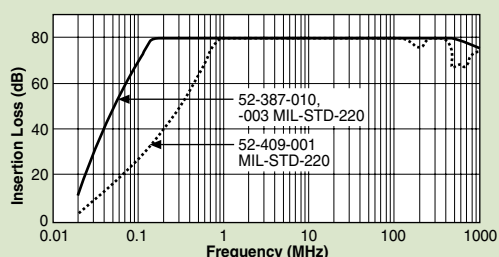


Model	Current Rating	Voltage Rating	Temperature Range	DCR max. (ohms)	Leakage Current (max.)	Schematic	Minimum Insertion Loss (db)						
							50 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
52-378-001	3 Amps	240VAC 60 Hz Line to Line	-55°C to 85°C	.3	50 mA	A	30	60	70	80	80	70	70
52-378-002	5 Amps	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

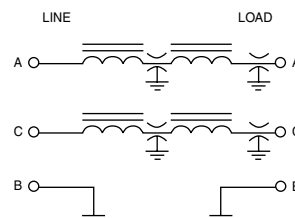
Military/Aerospace Multisection Filters

Insertion Loss

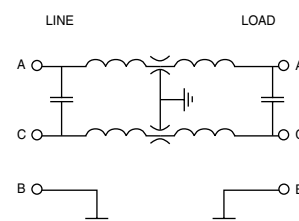
52-387-010, -003 MIL-STD-220
52-409-001 MIL-STD-220



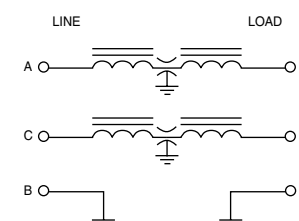
Filter Schematic C



Filter Schematic D

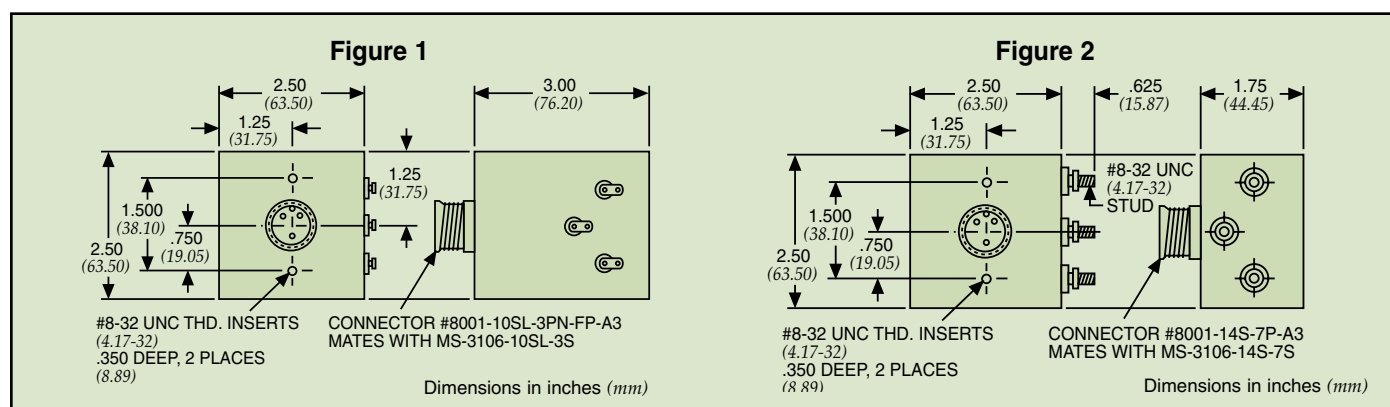


Filter Schematic E



3 Phase and 400 Hz models available.
Please consult the factory.

Dimensions



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 70	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	
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 60	2	14 Amps	240VAC 60 Hz Line to Line	-55°C to 85°C	.04	50 mA	E	common	14	30	45	80	80	70	

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

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

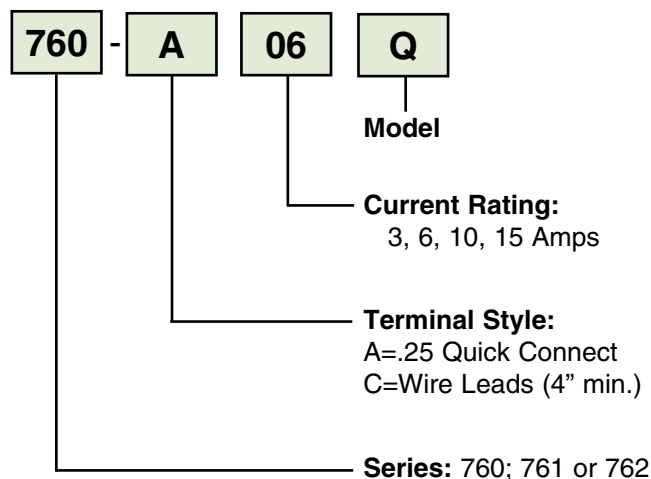
Test voltage

 Line-to-Line 1450VDC

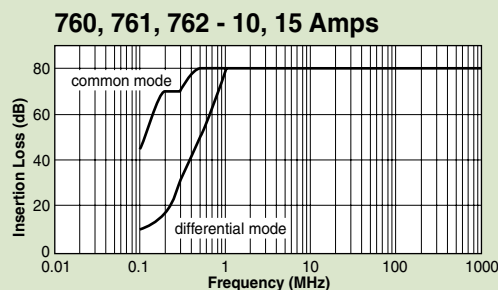
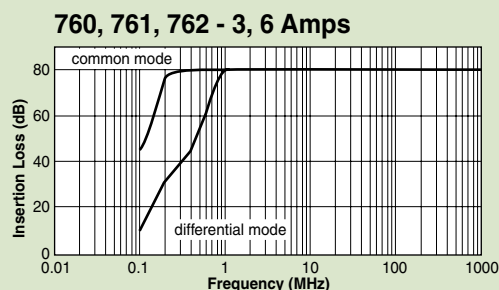
 Line-to-Ground 2250VDC



Part Numbering System:



Insertion Loss

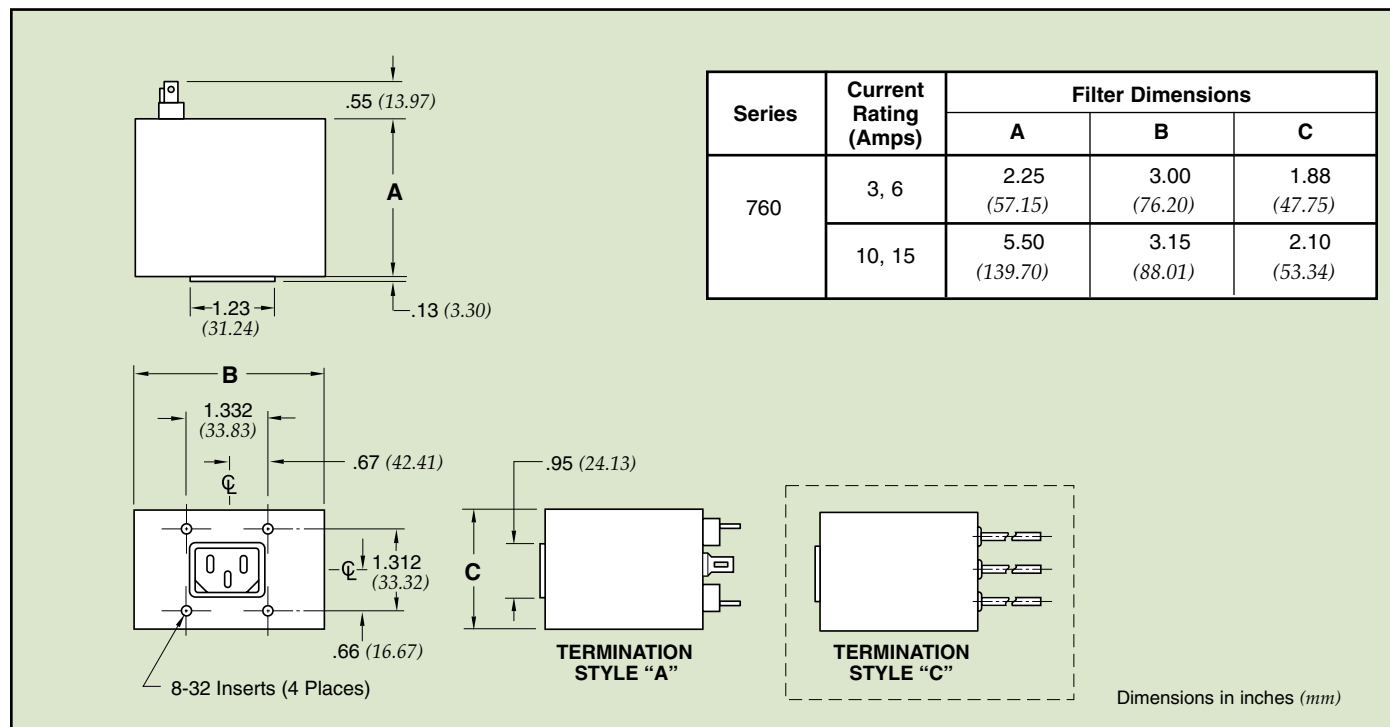


Common Mode (CM) is tested in a 50 ohm system with all lines tied together on the line and load sides of the filter.

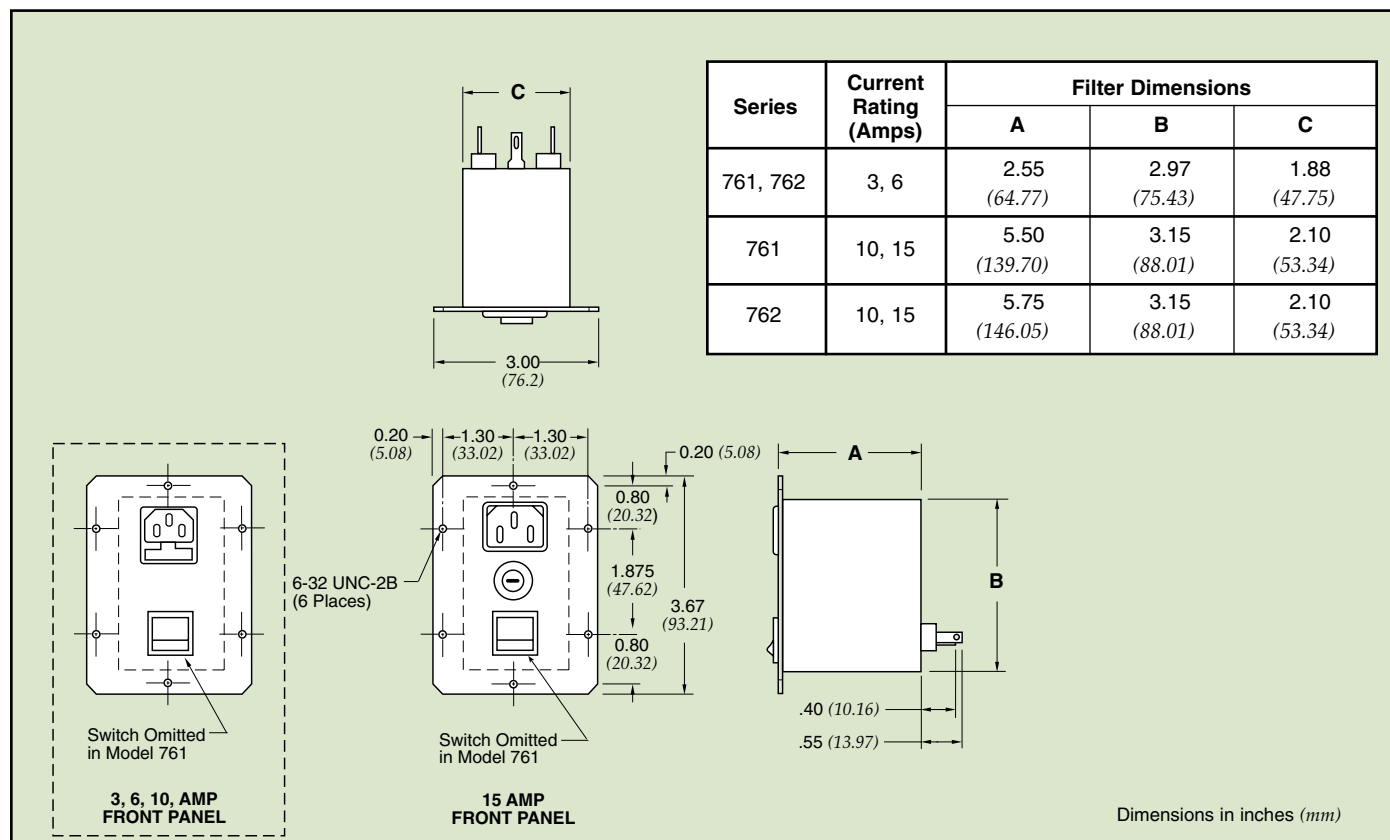
Differential Mode (DM) is tested in a 50 ohm system using a 180° phase splitter on both sides of the filter.

Military/Aerospace Multisection Filters

Dimensions - 760 Series



Dimensions - 761, 762 Series



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

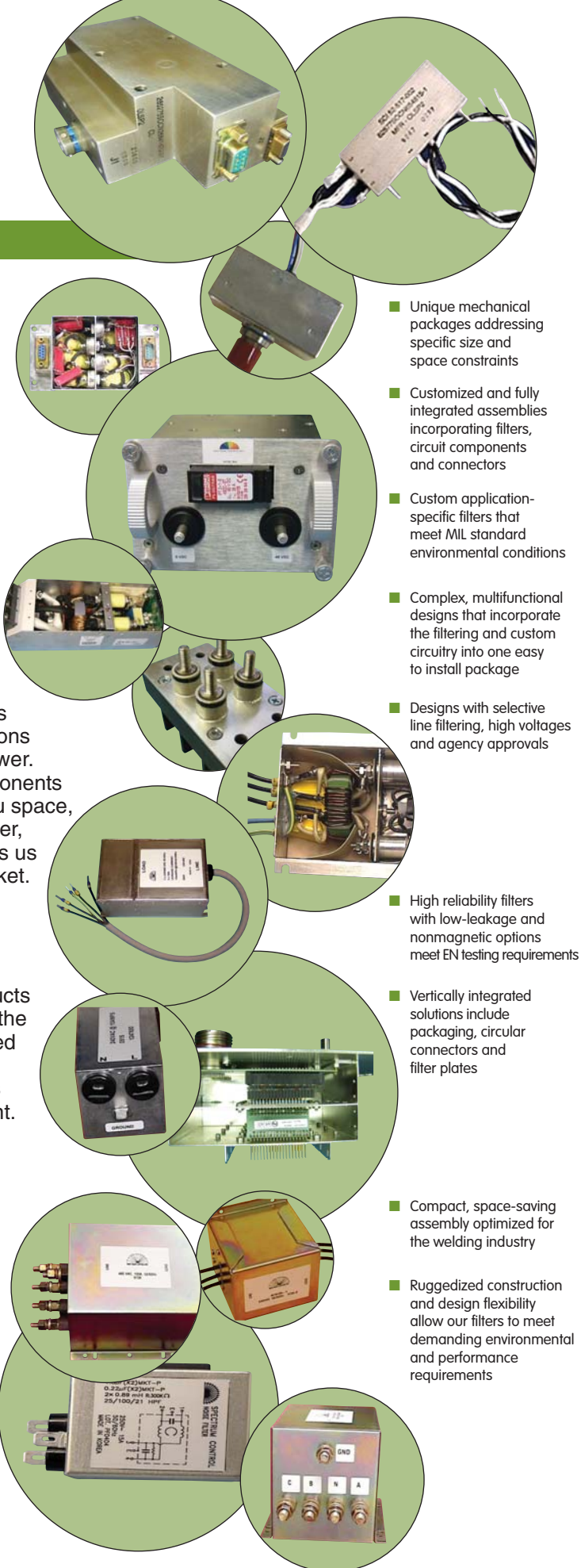
API's Spectrum Control line of power filter solutions can create an agency-approved product that will filter and condition the power to your communications infrastructure equipment, as well as eliminate emissions that can contaminate your distributed AC and DC power. Our custom power filters will incorporate 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



Magnetics

we offer a variety of transformers, inductors, choke, coils and custom solutions to meet your magnetics needs



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.

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.

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.

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 ammeters, wattmeters, relays and cross current compensation

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



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



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

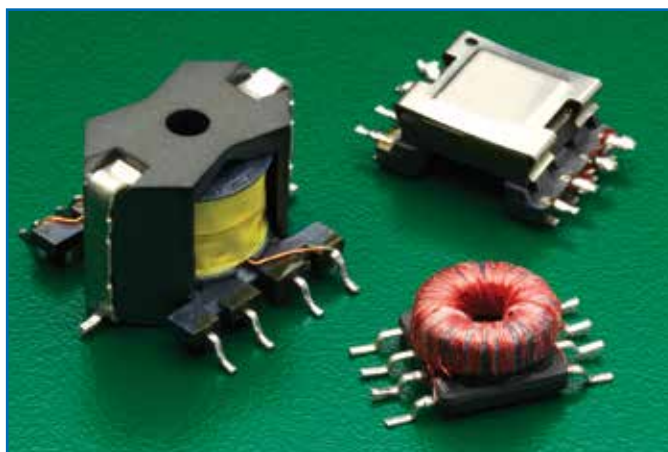
- Value ranges from 3 VA to 100,000 VA
- Transform line voltage to any other voltage
- Apps include audio power conditioning, low-wattage indoor and outdoor lighting solutions, military and commercial UPS systems, power supplies, mono crystalline and crystalline solar processing

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

AS 9100

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
www.apitech.com

api 
technologies corp.