## RFI/EMC FILTERS

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## POWERLINE FILTERS

# FIL-TEL COMMUNICATION & SIGNAL LINE FILTERS

# RF FILTERED & SHIELDED CIRCUIT BREAKER PANELBOARDS

FILTRON

RFI Corporation

100 Pine Aire Drive • Bay Shore, Long Island, New York 11706
Phone: 516-231-6406 • FAX: 516-231-6465





## POWERLINE SHIELDED ROOM FILTERS

From the early days of radio frequency interference suppression to its present-day developments and refinements, the electronic engineering profession has accepted FILTRON POWERLINE Series Filters as the ultimate in performance for shielded room and other RFI suppression applications. All of the components of the various filter assemblies are meticulously designed and manufactured to provide minimum voltage drop, high attenuation and dependable, trouble-free performance under continuous operation. Each filter is tested for voltage breakdown, insulation resistance, hermetic sealing leakage, and conformance to design specifications.

Powerline filters are designed not only for dependable performance but also for ease of installation. The cases have large wiring compartments to accommodate heavy cables with large bending radii. The terminal assembly design incorporates a flexible lead attached to a U/L recognized stand-off insulator. Electrical connection is

made at the stand-off insulator end of the flexible lead, not to the terminal itself. Installation and wiring hazards, excessive torque, mishandling, improper tools, etc. cannot damage the hermetic seal of the terminal.

Powerline filters are impregnated with a high quality dielectric material and hermetically sealed in corrosion-resistant steel cases. All of the seams are continuously heliarc welded, and the terminals are welded to the case. As a result, these filters are truly leakproof.

Field service and accelerated life tests have conclusively demonstrated the dependability and long range economy of the FILTRON POWERLINE Series of RFI Suppression Filters. You can specify them with absolute confidence for your next shielded enclosure, interference-free laboratory or other applications where RFI suppression is mandatory.

## ARCHITECTS' & ENGINEERS' SPECIFICATIONS

#### GENERAL

Powerline filters are designed for filtering of radio frequency interference and to meet the requirements of Military Specifications MIL-F-15733, where applicable.

#### ELECTRICAL

Insertion Loss: 100 db minimum over its indicated frequency range when measured in accordance with the applicable MIL-STD-220A, full load condition.

Current Rating: The filters are capable of withstanding 140% of rated current overload for 15 minutes without any deterioration.

Voltage: The filters are capable of operating continuously at full-rated voltage and of withstanding an over-voltage test of twice the rated voltage for one minute

#### MECHANICAL

Case: Internal filter cases are made of cold rolled steel, minimum thickness #16 gauge, external cabinets #12 gauge, and painted with suitable lacquer over primer to resist corrosion. All unfinished grounding surfaces are protected by suitable plating or made of stainless steel. Each phase filter in the FSR-U, series filters are individually replaceable.

Terminals: The terminals are made of high temperature alumina ceramic and welded to the filter cases. The ceramic terminal has a flexible insulated lead, one end of which is connected to the terminal stud. The other end is terminated in a permanently affixed lug which is mounted on a U/L recognized flame-retardant plastic stand-off insulator. The lug is secured to the stand-off insulator with a suitable hexagon-head screw. All service connections are made only at the stand-off insulator.

Construction: Input and output terminals are completely enclosed in RF shielded compartments. Covers on the input and output RF shielded compartments for the FSR-U series filters are held down with hex-head screws. Gasketing of woven corrosion resistant metal mesh is used between the cover and the inside fitting flange to maintain RF integrity. Internal components shall be mounted and fixed to prevent damage when subjected to shock and vibration tests.



## FSR-U

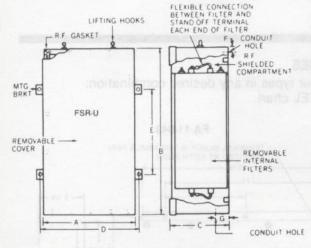
LISTED POWERLINE SERIES

RFI/EMC Filters for 10 to 225 Amp. Circuits (1.)

Attenuation: 100db from 14 KHz to 10 GHz measured in accordance with MIL-STD-220A load condition Special: Also measured under full load condition from 14 KHz to 20 MHz with extended range buffer networks.

#### **FEATURES**

- All filters are rated for 0-60 Hz powerline frequencies (Non UL versions also available at other operating frequencies).
- Voltage rating 0-277 VAC line to neutral or 0-480 VAC line to line, 600 VDC max.
- · Maximum voltage drop less than 2%.
- Maximum temperature rise 25°C.
- Overload safety 140% of rated current for 15 minutes. Short term current surge capability in excess of ten times rating.
- All filters comply with the applicable requirements of MIL-F-15733.
- UL 1283 Listed.
- Bleeder resistors installed for filter discharge.



	Current	THO	Dimensions, inches Conduit							Approx	
Part no.	Amperes	A	В	С	D	E	F	G	dia.	(lbs.)	
FSR-U-10BN	10	121/4	29	5	141/4	17	2	2	7/8	45	
FSR-U-10B2*	2 x 10	121/4	29	5	141/4	17	2	2	7/8	60	
FSR-U-10B3*	3 x 10	20	29	5	22	17	2	2	7/8	80	
FSR-U-10B4	4 x 10	20	29	5	22	17	2	2	7/8	90	
FSR-U-30BN	30	121/4	37	5	141/4	25	3	2	13/8	85	
FSR-U-30B2*	2 x 30	121/4	37	5	141/4	25	3	2	13/8	120	
FSR-U-30B3*	3 × 30	20	37	5	22	25	3	2	13/8	165	
FSR-U-30B4	4 x 30	20	37	5	22	25	3	2	13/8	200	
FSR-U-60BN	60	121/4	37	5	141/4	25	3	2	13/4	85	
FSR-U-60B2*	2 x 60	121/4	37	5	141/4	25	3	2	13/4	120	
FSR-U-60B3*	3 x 60	20	37	5	22	25	3	2	1 3/4	165	
FSR-U-60B4	4 x 60	20	37	5	22	25	3	2	13/4	200	
FSR-U-100BN	100	161/2	37	11	181/2	25	5	5	2	135	
FSR-U-100B2*	2 x 100	161/2	37	11	181/2	25	5	5	2	190	
FSR-U-100B3*	3 x 100	25	37	11	27	25	5	5	2	270	
FSR-U-100B4	4 x 100	25	37	11	27	25	5	5	2	325	
FSR-U-225BN	225	171/2	40	17	191/2	28	5	5	3	235	
FSR-U-225B2*	2 x 225	171/2	40	17	191/2	28	5	5	3	350	
FSR-U-225B3*	3 x 225	25	40	17	27	28	5	5	3	500	
FSR-U-225B4	4 x 225	25	40	17	27	28	5	5	3	615	

N in the part number denotes grounded neutral conductor terminals in the case.

\* Also available with grounded neutral conductor terminals (add N to part number).
For Power Factor Correction Coils contact our Sales Dept.

1. Larger than 225 Amp. Circuits available on request.

#### **Attenuation Characteristics** 100 100 DB OUGH EN 80 ATTENUATION 60 40 MEASURED IN A 50 ~ SYSTEM PER MIL-STD - 220A | 20 0 10 GHz 1 GHz 10 MHz 100 MHz 100 KHz 1 MHz 10 KHz FREQUENCY





### FIL-TEL

Secure Communications & Signal Line Filters

Filtron FIL-TEL® Filters are used in teletype, communication and telephone lines in conjunction with shielded and controlled facilities to achieve secure communication standards such as those required for DCA RED/BLACK ENGINEERING - INSTALLATION CRITERIA (U) per Specification DCA CIR C175-6A; DCA ENSP-422-5C, DCA C 300-175-1; and BuShips Inst. 011120.12C.

The FIL-TEL communication and signal line filters meet or exceed the attenuation characteristics, and all other requirements, of the above specifications. All units are hermetically sealed and housed in plated metal cases provided with mounting flanges and/or threaded necks for convenient mounting. Terminals are of compression-type glass, solder sealed. Duty cycle is continuous for all units. When installed on a shield-room wall, the filters remove spurious high-frequency energy, while providing a continuous RF-tight shield for the filtered signal. Filtron also supplies assemblies of any combination of filters, completely pre-wired to terminal strips and enclosed in an RF-tight cabinet.

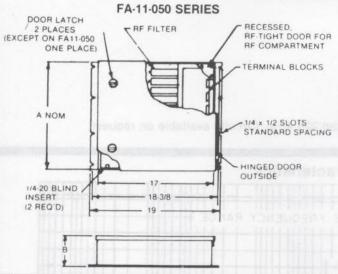
#### ARCHITECTS AND ENGINEERS SPECIFICATIONS

General: All filters shall be fabricated, tested and installed accordance with military specification MIL-F-15733 and in accordance with the following detail requirements.

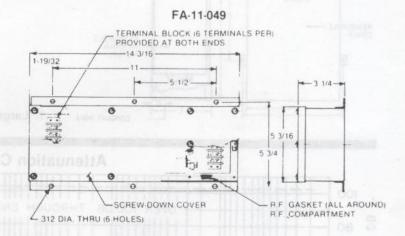
Telephone and data type filters can be installed and wired (optional) in a metallic shielded enclosure. The enclosures used to house the individual filters shall be constructed so that the input and output circuits of the filter will be shielded from each other to provide the required attenuation. The shielded compartment of the filter enclosure shall incorporate a removable cover to provide easy access for installation. This shielded compartment will have an RF gasket between the cover and the cover mounting surface to maintain the RF integrity of the filter. This filter enclosure shall be fabricated from sheet steel, no less than .075 inches thick (14 gauge). Each filter enclosure shall be provided with mounting brackets whose surfaces shall be clean, free of paint, and shall be plated in order to provide a low-impedance ground. The surfaces to which these filters mount will be clean, unpainted surfaces, suitable plated.

#### FILTER MODULE CASES

These cases will accommodate any of the following filter types in any desired combination: which are listed on the FIL-TEL chart.



No. of Filters		Dime	Case mode		
Single	Dual	A	В	number	
6	3	STORY A	DE A UNI	FA-11-049	
20	10	8 3/4	104	FA-11-050	
50	25	19'4	10%	FA-11-051	
100	50	19%	19%	FA-11-052	
200	100	364	19%	FA-11-053	



FA11 049 NOTE CASE WILL HOUSE A MAXIMUM OF 6 TUBULAR OR 3 DUAL FILTERS

ORDERING INFORMATION

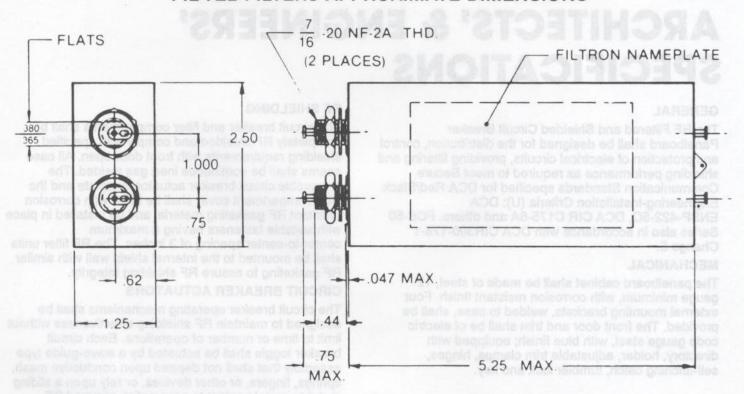
- 1 SELECT MODULE CASE LARGE ENOUGH FOR QUANTITY OF FILTERS REQUIRED AND FUTURE EXPANSION IF NECESSARY FROM MODULE CASE LIST
- 2 SELECT QUANTITY AND TYPE OF FILTER OR FILTERS FROM FILTER LIST

### FIL-TEL

Secure Communications & Signal Line Filters

Part No.	Туре	Impedance (ohms)	Circuit	Data Trans- mission Rate	Max. Current (amps)	Rated Voltage (vdc)	Typical Use
FA10-884	Voice	300/600	Dual	1.2 KB	0.20	600	Tel
FA60-1302	Data	300/600	Dual	9.6 KB	0.20	300	Modem
FA60-1580	Data	50/50	Dual	9.6 KB	0.20	100	Modem
FA60-1608	Data	50/50	Dual	56.0 KB	0.20	100	Tel/Data
FA60-2007	Alarm	300/600	Dual	9.6 KB	1.00	300	Fire Alarm
FA60-2030	Data	50/50	Dual	160.0 KB	0.02	600	Tel/Data
FA60-2031	Data	50/50	Dual	190.0 KB	0.02	600	Tel/Data
FA60-2082	Data	50/50	Dual	256.0 KB	0.02	300	Tel/Data
FA60-2085	Voice	450/900	Dual	2.4 KB	0.20	300	Tel
FA60-2088	Data	50/50	Dual	10.0 MB	1.00	300	BNC-Etherne
FA60-2089	Data	60/120	Dual	230.4 KB	1.00	100	Apple Talk
FA60-2090	Data	300/600	Dual	19.2 KB	0.20	100	Tel/Data
FA60-3022	Data	50/50	Dual	2.4 KB	0.20	150	Tel/Data
FA60-3038	Alarm	75/150	Dual	9.6 KB	1.00	150	Fire Alarm
FA60-3044	Data	50/50	Dual	64.0 KB	0.20	150	Tel/Data
FA60-3049	Data	67.5/135	Dual	56.0 KB	0.20	200	Tel/Data

#### FIL-TEL FILTERS APPROXIMATE DIMENSIONS





## 5/15FRON

## FCB-10 FCB-5C

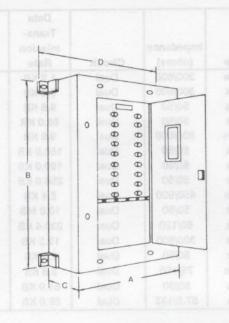
Filtered & Shielded Circuit Breaker Panelboards

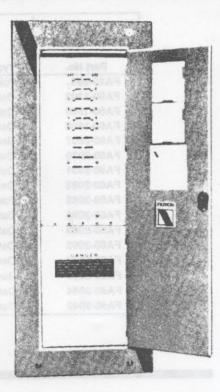
#### **FEATURES:**

Designed to prevent undesired emanation of intelligence from secure communication installations by conducted or radiated RF

The most important feature is that the circuit breaker panelboard is completely RF shielded even when the front door of the cabinet is open. RF integrity is maintained by mounting the RF Filters in an internal shielded compartment with Filtron RF gasketing of a corrosion resistant metal assuring proper RF contact between the filters and the shield wall.

The circuit breaker actuator mechanisms are designed so that their RF shielding effectiveness will be maintained for the life of the panelboard. Each circuit breaker toggle is operated by a wave-guide assembly which does not use metal contact fingers or shims, metal mesh gasketing or other devices which rely on a sliding or moving metal-to-metal contact to maintain the shielding effectiveness of the operating mechanism.





## **ARCHITECTS' & ENGINEERS' SPECIFICATIONS**

#### GENERAL

The RF Filtered and Shielded Circuit Breaker Panelboard shall be designed for the distribution, control and protection of electrical circuits, providing filtering and shielding performance as required to meet Secure Communication Standards specified for DCA Red/Black Engineering-Installation Criteria (U): DCA ENSP-422-5C, DCA CIR C175-6A and others. FCB-50 Series also in accordance with DCA CIR300-175-1 Change 5.

#### MECHANICAL

The panelboard cabinet shall be made of steel, 12 gauge minimum, with corrosion resistant finish. Four external mounting brackets, welded to case, shall be provided. The front door and trim shall be of electric code gauge steel, with blue finish; equipped with directory, holder, adjustable trim clamps, hinges, self-latching catch, tumbler lock and key.

#### RF SHIELDING

The circuit breaker and filter compartments shall be completely RF shielded and comply with specified shielding requirements with front door open. All case seams shall be continuous inert gas welded. The removable circuit breaker actuator faceplate and the filter compartment cover shall be fitted with corrosion resistant RF gasketing material and be installed in place with suitable fasteners having a maximum center-to-center spacing of 3 inches. The RF filter units shall be mounted to the internal shield wall with similar RF gasketing to assure RF shielding integrity.

#### CIRCUIT BREAKER ACTUATORS

The circuit breaker operating mechanisms shall be designed to maintain RF shielding effectiveness without limit to time or number of operations. Each circuit breaker toggle shall be actuated by a wave-guide type assembly that shall not depend upon conductive mesh, springs, fingers, or other devices, or rely upon a sliding metal-to-metal contact to accomplish required RF shielding requirements.

### FCB-10 FCB-50

RF Filtered & Shielded Circuit Breaker Panelboards

ATTENUATION: 100 db from 14 KHz to 10GHz measured in accordance with MIL-STD-220A, load condition. SPECIAL: FCB-50 also measured under full load condition from 14 KHz to 20 MHz with extended range buffer networks.

	HE LIGHTION	Service -	- 60 Hz N	IOTE#1		ters are	B assetT a	sture Rand	ing Temper	lerra			
Part no.‡	Vo	Volts		T2-Jihi)		ber at	wins parries	annot a see	a atmena at	hon			
	Line-to- ground	Line-to-	Amps	Phase	Wires	Max. no. of poles	Shipping weight, lbs.	Internal filter	Net filter weight, lbs.	A	Dime B	C	S D
FCB-12A(*)	120	240	50	andless.	2 or 3	12	325	FCB-12-1	30	20	53	131/4	26
FCB-12B(*)	120	208	50	3	3 or 4	12	325	FCB-12-1	30	20	53	131/4	26
FCB-13A(*)	120	240	50	T8-1110	2 or 3	20	335	FCB-13-1	30	20	53	131/4	26
FCB-13B(*)	120	208	50	3	3 or 4	20	335	FCB-13-1	30	20	53	131/4	26
FCB-14A(*)	120	240	100	ms 1 PF	2 or 3	12	325	FCB-14-1	50	20	53	131/4	26
FCB-14B(*)	120	208	100	3	3 or 4	12	325	FCB-14-1	50	20	53	131/4	26
FCB-15A(*)	120	240	100	1 90	2 or 3	20	335	FCB-15-1	50	20	53	131/4	26
FCB-15B(*)	120	208	100	3	3 or 4	20	335	FCB-15-1	50	20	53	131/4	26
FCB-16A(*)	120	240	200	1	2 or 3	42	560	FCB-16-1	100	20	53	131/4	26
FCB-16B(*)	120	208	200	3	3 or 4	42	560	FCB-16-1	100	20	53	131/4	26
FCB-52A(*)	120	240	50	1	2 or 3	12	500	FCB-52-1	100	24	71	14	30
FCB-52B(*)	120	208	50	3	3 or 4	12	500	FCB-52-1	100	24	71	14	30
FCB-53A(*)	120	240	50	1	2 or 3	20	525	FCB-53-1	100	24	71	14	30
FCB-53B(*)	120	208	50	3	3 or 4	20	525	FCB-53-1	100	24	71	14	30
FCB-54A(*)	120	240	100	1 1	2 or 3	12	500	FCB-54-1	135	24	71	14	30
FCB-54B(*)	120	208	100	3	3 or 4	12	500	FCB-54-1	135	24	71	14	30
FCB-55A(*)	120	240	100	DI 1301	2 or 3	20	525	FCB-55-1	135	24	7.1	14	30
FCB-55B(*)	120	208	100	3	3 or 4	20	525	FCB-55-1	135	24	71	14	30
FCB-56A(*)	120	240	200	auth Rh	2 or 3	42	650	FCB-56-1	375	50	59	27	56
FCB-56B(*)	120	208	200	3	3 or 4	42	650	FCB-56-1	375	50	59	27	56

‡Add number (\*) to indicate how many lines are to be filtered; if neutral is to be unfiltered, add letter N to indicate requirement for grounded solid neutral buss. E.g. FCB-52B-3N; this indicates an FCB-52B assembly with three 50 ampere filters and one solid neutral buss suitable for 4 wire, 3 phase grounded neutral service. Circuit breaker complement must be specified when ordering. State quantity of breakers, rating and numbers of poles. E.g. six pieces, 30 amps breaker, single pole.

Shipping weight does not include net weight of filters to be installed in assembly.

Note1: 400 Hz available. Consult engineering dept.

Note 2: See Attenuation below for difference between FCB-50 and FCB-10 Series.

For Filter Discharge Unit FDU-100 series

#### CIRCUIT BREAKERS

All circuit breakers shall be 'E' frame style, rated 7,500 amperes asymmetrical AC interrupting capacity, 5,000 amperes DC, based on NEMA test procedure, and meet Federal Specification W-C-375a, for Classes 2a, 2b, 2c, 12/11/62. 'E' frame one, two or three pole breakers, either 120, 240 or 277 volt rating may be used to the maximum pole space capacity of the selected panelboard.

#### RF FILTERS

The RF filter units shall be designed to suppress and reduce the amplitude of undesired RF energy conducted by power service lines. The RF filter units shall be designed in compliance with applicable requirements of the Military Specification for Radio Interference Filters, MIL-F-15733.

#### MECHANICAL

The filter case shall be made of steel, 16 gauge minimum, corrosion resistant finish; blue lacquer over zinc chromate primer. Conductive grounding surfaces shall be either plated or made of stainless steel. Components shall be firmly mounted to withstand applicable shock and virbration test requirements without damage.

#### **TERMINALS**

Filter terminals shall be of high temperature alumina ceramic, continuously brazed to filter case. The ceramic

terminal shall incorporate a permanently attached flexible lead, with a suitable electrical lug. Incoming service connections will be made to the filter lead at a UL recognized, flame retardent standoff insulator mounted in the filter compartment.

#### **ATTENUATION**

FCB-10 Series: Each filter unit shall provide a minimum insertion loss of l00db over the frequency range 14KHz-10 GHz, measured in accordance with MIL-STD-220A, load condition.

FCB-50 Series: Each filter shall provide a minimum insertion loss of 100 db over the frequency range 14 KHz-10 GHz, measured in accordance with MIL-STD-220A, load condition, and in addition, at full rated load in the frequency range 14 KHz-20 MHz, using extended range buffer networks to enable measurement down to 14 KHz.

#### CURRENT

Each filter unit shall be capable of carrying its full rated current continuously without heat rise exceeding 50° C above ambient temperature. Each filter shall be capable of withstanding of 100% overload for 30 seconds without damage.

#### **VOLTAGE**

Each filter unit shall be capable of continuous operation at its full rated voltage and withstanding an initial voltage test of twice its rated voltage without damage.

#### PERFORMANCE CHARACTERISTICS

- 1. Rating. These filters are designed for continuous operation at rated current and voltage.
- 2. Operating Temperature Range. These filters are designed to operate over a temperature range of -55° C to + 85° C.
- 3. Working Voltage. The working voltage is the maximum operating voltage for continuous duty at the rated temperature.
- 4. Insulation Resistance. The insulation resistance from either terminal to case shall be greater than 2000 megohms-microfarads at 25° C.
- 4-1 Measurements shall be made after a two-minute charge at rated DC working voltage.
- 5. Dielectric Withstanding Voltage. Filters shall withstand a DC potential of twice the rated voltage applied between either terminal and case for one minute.
- 5-1 The test voltage shall be applied and discharged through a resistor whose value limits current to 50 mA max.
- 6. Voltage Drop. The maximum voltage drop shall not exceed 1.0% of the rated voltage.
- 7. Insertion Loss. Filters shall meet the insertion loss requirements shown when measured in accordance with MIL-STD-220 and at full-rated load.
- 8. Seal. Filters shall withstand the seal test specified in Military Specification MIL-F-15733 (MIL-STD-202, Method 112, Test Condition B).
- 9. Barometric Pressure. Filters shall withstand the barometric pressure test specified in Military Specification MIL-F-15733 (MIL-STD-202, Method 105, Test Condition C).
- 10. Terminal Strength. These filters shall withstand the pull test specified in Military Specification MIL-F-15733 (see paragraphs 4,6,11).

- 11. Resistance to Soldering Heat. Filters shall withstand the resistance to soldering heat test specified in Military Specification MIL-F-15733 (MIL-STD-202, Method 210, Test Condition B).
- 12. Corrosion. Filters shall withstand the corrosion. test specified in Military Specification MIL-F-15733 (MIL-STD-202, Method 101, Test Condition A).
- 13. Temperature Cycling. Filters shall withstand the temperature cycling test specified in Military Specification MIL-F-15733 (MIL-STD-202, Method 102, Test Condition D).
- 14. Immersion Cycling. Filters shall withstand the immersion cycling test specified in Military Specification MIL-F-15733 (MIL-SAD-202, Method 104, Test Condition A).
- 15. Overload. Filters shall withstand the overload test (140 percent rated current for 15 minutes) specified in Military Specification MIL-F-15733.
- 16. Shock. Filters shall withstand the stock test specified in Military Specification MIL-F-15733 (MIL-STD-202, Method 205, Test Condition C).
- 17. Vibration. Filters shall withstand the vibration test specified in Military Specification MIL-F-15733 (MIL-SAD-202, Method 204, Test Condition B).
- 18. Moisture Resistance. Filters shall withstand the moisture resistance test specified in Military Specification MIL-F-15733 (MIL-SAD-202, Method 102, Test Condition D, and Method 106).
- 19. Life Test. Filters shall withstand the life test specified in Military Specification MIL-F-15733 (MIL-STD-202, Method 108, Test Condition B).
- 20. Marking. Units shall be marked with the Filtron type description, voltage, rating current and EIA date code.

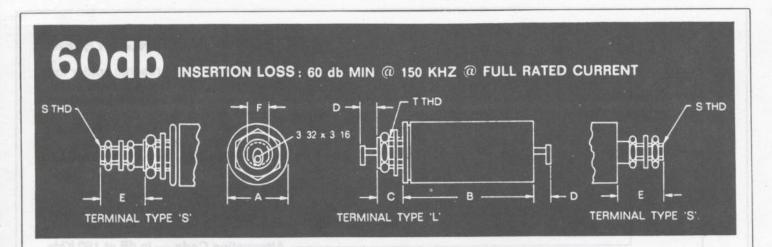
Note: In the construction of the components described, the full intent of the specification will be met. RFI, however, reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the design of its products. Components made under military approvals will be in accordance with the approval requirements.

## 40db INSERTION LOSS: 40 db MIN @ 150 KHZ @ FULL RATED CURRENT TERMINAL TYPE S TERMINAL TYPE 'L' TERMINAL TYPE S'

PART NO.	VOLTAGE	CURRENT IN AMPS	A ± .015	B ± .060	C ± .020	D (MAX)	E (MAX)	F	T THD	S THD
F201D100AE101L	100 VDC	.1	.670	1.500	.250	.187	~	.206 / .196	1/4-28	~
F201D100AF501L	100 VDC	.5	.670	1.812	.250	.187	~	.206 / .196	1/4-28	~
F201D100AG102L	100 VDC	1.0	.670	1.937	.250	.187	~	.206 / .196	1/4-28	~
F201D100AL302L	100 VDC	3.0	.750	2.375	.281	.187	~	.255 / .250	5/16-24	9 ~
F201D100BA502L	100 VDC	5.0	1.125	2.250	.437	.250	~	.380 / .365	7/16-20	~
F201D100BH103L	100 VDC	10.0	1.250	2.562	.437	.250	~	.380 / .365	7/16-20	~
F201D100BJ153S	100 VDC	15.0	1.250	2.875	.375	~	.687	.661 / .656	3/4-20	#8-32
F201D100BK203S	100 VDC	20.0	1.250	3.250	.375	~	.687	.661 / .656	3/4-20	#8-32
F201D100CC303S	100 VDC	30.0	1.750	3.875	.375	~	.843	.661 / .656	3/4-20	#10-32
F201D100CL503S	100 VDC	50.0	2.250	4.000	.562	~	.843	1.070 / 1.055	1-1/8-18	1/4-20
F201D400AF101L	130 VAC / 400 VDC	.1	.670	1.812	.250	.187	~	.206 / .196	1/4-28	~
F201D400AG501L	130 VAC / 400 VDC	.5	.670	1.937	.250	.187	~	.206 / .196	1/4-28	~
F201D400AK102L	130 VAC / 400 VDC	1.0	.670	2.250	.250	.187	~	.206 / .196	1/4-28	
F201D400AU302L	130 VAC / 400 VDC	3.0	1.000	2.437	.437	.250	~	.380 / .365	7/16-20	~
F201D400BB502L	130 VAC / 400 VDC	5.0	1.125	2.812	.437	.250	~	.380 / .365	7/16-20	~
F201D400BK103L	130 VAC / 400 VDC	10.0	1.250	3.250	.437	.250	~	.380 / .365	7/16-20	~
F201D400BL153S	130 VAC / 400 VDC	15.0	1.250	3.812	.375	~	.687	.661 / .656	3/4-20	#8-32
F201D400BT203S	130 VAC / 400 VDC	20.0	1.500	3.625	.375	~	.687	.661 / .656	3/4-20	#8-32
F201D400CH303S	130 VAC / 400 VDC	30.0	2.000	4.000	.500	~	.843	.930 / .915	1-14	#10-32
F201D400CL503S	130 VAC / 400 VDC	50.0 .	2.250	4.000	.562	~	.843	1.070 / 1.055	1-1/8-18	1/4-20
F201D600AM101L	250 VAC / 600 VDC	.1	.750	2.250	.281	.187	~	.255 / .250	5/16-24	~
F201D600AM501L	250 VAC / 600 VDC	.5	.750	2.250	.281	.187	~	.255 / .250	5/16-24	~
F201D600AN102L	250 VAC / 600 VDC	1.0	.750	2.875	.281	.187	~	.255 / .250	5/16-24	~
F201D600AV302L	250 VAC / 600 VDC	3.0	1.000	3.125	.437	.250	~	.380 / .365	7/16-20	~
F201D600BM502L	250 VAC / 600 VDC	5.0	1.250	3.625	.437	.250	~	.380 / .365	7/16-20	~
F201D600BN103L	250 VAC / 600 VDC	10.0	1.250	4.250	.437	.250	~	.380 / .365	7/16-20	~
F201D600BU153S	250 VAC / 600 VDC	15.0	1.500	4.000	.375	~	.687	.661 / .656	3/4-20	#8-32
F201D600BV203S	250 VAC / 600 VDC	20.0	1.500	4.500	.375	~	.687	.661 / .656	3/4-20	#8-32
F201D600CM303S	250 VAC / 600 VDC	30.0	2.250	4.625	.562	~	.843	1.070 / 1.055	1-1/8-18	#10-32
F201D600CN503S	250 VAC / 600 VDC	50.0	2.250	5.000	.562	~	.843	1.070 / 1.055	1-1/8-18	1/4-20

### 80db INSERTION LOSS: 80 db MIN @ 150 KHZ @ FULL RATED CURRENT STHD STHD TERMINAL TYPE 'S' TERMINAL TYPE 'L' TERMINAL TYPE 'S'

PART NO.	VOLTAGE	CURRENT IN AMPS	A ± .015	B ± .060	C ± .020	D (MAX)	E (MAX)	901 F	T THD	STHD
F201H100AM101L	100 VDC	.1	.750	2.250	.281	.187	~	.255 / .250	5/16-24	~
F201H100AY501L	100 VDC	.5	1.000	2.250	.437	.250	~	.380 / .365	7/16-20	~
F201H100AX102L	100 VDC	1.0	1.000	2.500	.437	.250	~	.380 / .365	7/16-20	~
F201H100BR302L	100 VDC	3.0	1.250	4.062	.437	.250	~	.380 / .365	7/16-20	~
F201H100BT502L	100 VDC	5.0	1.500	3.625	.375	.500	~	.661 / .656	3/4-20	~
F201H100CH103L	100 VDC	10.0	2.000	4.000	.500	.500	~	.930 / .915	1-14	~
F201H100CH103S	100 VDC	10.0	2.000	4.000	.500	~	.843	.930 / .915	1-14	#8-32
F201H400AT101L	130 VAC / 400 VDC	.1	.875	2.875	.437	.250	~	.380 / .365	7/16-20	~
F201H400AZ501L	130 VAC / 400 VDC	.5	1.000	3.000	.437	.250	~	.380 / .365	7/16-20	~
F201H400BS102L	130 VAC / 400 VDC	1.0	1.250	3.312	.437	.250	~	.380 / .365	7/16-20	~
F201H400CA302L	130 VAC / 400 VDC	3.0	1.500	4.250	.375	.500	~	.661 / .656	3/4-20	~
F201H400CB502L	130 VAC / 400 VDC	5.0	1.500	4.187	.375	.500	~	.661 / .656	3/4-20	~
F201H400CJ103L	130 VAC / 400 VDC	10.0	2.000	5.125	.500	.500	~	.930 / .915	1-14	~
F201H400CJ103S	130 VAC / 400 VDC	10.0	2.000	5.125	.500	~	.843	.930 / .915	1-14	#8-32
F201H600BF101L	250 VAC / 600 VDC	.1	1.125	3.250	.437	.250	~	.380 / .365	7/16-20	~
F201H600BG501L	250 VAC / 600 VDC	.5	1.125	3.500	.437	.250	~	.380 / .365	7/16-20	~
F201H600BN102L	250 VAC / 600 VDC	1.0	1.250	4.250	.437	.250	~	.380 / .365	7/16-20	~
F201H600CD302L	250 VAC / 600 VDC	3.0	1.750	4.375	.375	.500	~	.661 / .656	3/4-20	~
F201H600CD302S	250 VAC / 600 VDC	3.0	1.750	4.375	.375	~	.687	.661 / .656	3/4-20	#8-32
F201H600CF502L	250 VAC / 600 VDC	5.0	1.750	5.375	.375	.500	~	.661 / .656	3/4-20	~
F201H600CF502S	250 VAC / 600 VDC	5.0	1.750	5.375	.375	~	.687	.661 / .656	3/4-20	#8-32
F201H600CK103L	250 VAC / 600 VDC	10.0	2.000	6.250	.500	.500	~	.930 / .915	1-14	2
F201H600CK103S	250 VAC / 600 VDC	10.0	2.000	6.250	.500	~	.843	.930 / .915	1-14	#8-32



PART NO.	VOLTAGE	CURRENT IN AMPS	A ± .015	B ± .060	C ± .020	D (MAX)	E (MAX)	F	T THD	S THD
F201F100AG101L	100 VDC	.1	.670	1.937	.250	.187	2	.206 / .196	1/4-28	~
F201F100AP501L	100 VDC	.5	.750	2.125	.281	.187	~	.255 / .250	5/16-24	~
F201F100AL102L	100 VDC	1.0	.750	2.375	.281	.187	~	.255 / .250	5/16-24	~
F201F100BC302L	100 VDC	3.0	1.125	2.375	.437	.250	~	.380 / .365	7/16-20	~
F201F100BD502L	100 VDC	5.0	1.125	2.625	.437	.250	~	.380 / .365	7/16-20	~
F201F100BW103L	100 VDC	10.0	1,500	3.312	.375	.500	~	.661 / .656	3/4-20	~
F201F100BW103S	100 VDC	10.0	1.500	3.312	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F100BT153S	100 VDC	15.0	1.500	3.625	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F100BT203S	100 VDC	20.0	1.500	3.625	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F100CH303S	100 VDC	30.0	2.000	4.000	.500	~	.843	.930 / .915	1-14	#10-3
F201F100CP503S	100 VDC	50.0	2.250	4.500	.562	~	.843	1.070 / 1.055	1-1/8-18	1/4-20
F201F400AM101L	130 VAC / 400 VDC	.1	.750	2.250	.281	.187	~	.255 / .250	5/16-24	~
F201F400AR501L	130 VAC / 400 VDC	.5	.750	2.750	.281	.187	~	.255 / .250	5/16-24	~
F201F400AW102L	130 VAC / 400 VDC	1.0	1.000	2.375	.437	.250	~	.380 / .365	7/16-20	~
F201F400BE302L	130 VAC / 400 VDC	3.0	1.125	3.000	.437	.250	~	.380 / .365	7/16-20	~
F201F400BP502L	130 VAC / 400 VDC	5.0	1.250	3.875	.437	.250	~	.380 / .365	7/16-20	~
F201F400BY103L	130 VAC / 400 VDC	10.0	1.500	4.125	.375	.500	~	.661 / .656	3/4-20	~
F201F400BY103S	130 VAC / 400 VDC	10.0	1.500	4.125	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F400CD153S	130 VAC / 400 VDC	15.0	1.750	4.375	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F400CE203S	130 VAC / 400 VDC	20.0	1.750	5.000	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F400CO303S	130 VAC / 400 VDC	30.0	2.250	4.875	.562	~	.843	1.070 / 1.055	1-1/8-18	#10-3
F201F400CR503S	130 VAC / 400 VDC	50.0	2.250	5.750	.562	~	.843	1.070 / 1.055	1-1/8-18	1/4-20
F201F600AY101L	250 VAC / 600 VDC	.1	1.000	2.250	.437	.250	~	.380 / .365	7/16-20	~
F201F600AX501L	250 VAC / 600 VDC	.5	1.000	2.500	.437	.250	~	.380 / .365	7/16-20	~
F201F600AV102L	250 VAC / 600 VDC	1.0	1.000	3.125	.437	.250	~	.380 / .365	7/16-20	~
F201F600BQ302L	250 VAC / 600 VDC	3.0	1.250	3.750	.437	.250	~	.380 / .365	7/16-20	~
F201F600BZ502L	250 VAC / 600 VDC	5.0	1.500	3.750	.375	.500	~	.661 / .656	3/4-20	~
F201F600BZ502S	250 VAC / 600 VDC	5.0	1.500	3.750	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F600BX103L	250 VAC / 600 VDC	10.0	1.500	5.000	.375	.500	~	.661 / .656	3/4-20	~
F201F600BX103S	250 VAC / 600 VDC	10.0	1.500	5.000	.375	~	.687	.661 / .656	3/4-20	#8-32
F201F600CG153S	250 VAC / 600 VDC	15.0	2.000	5.000	.500	~	.843	.930 / .915	1-14	#10-3
F201F600CN203S	250 VAC / 600 VDC	20.0	2.250	5.000	.562	~	.843	1.070 / 1.055	1-1/8-18	#10-3

