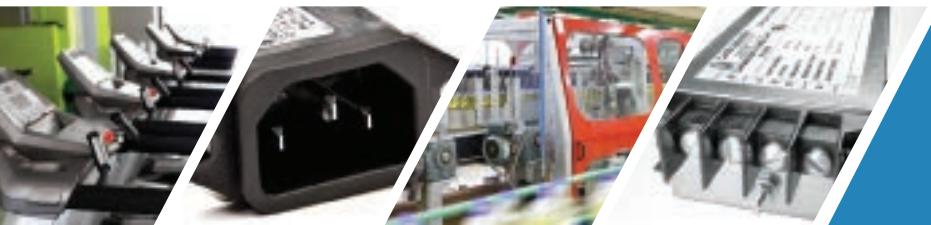


# Innovative Engineering Solutions



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# Curtis Industries Filter Selection Guide

Filter Series	PERFORMANCE RELATIVE ATTENUATION		MAXIMUM LEAKAGE CURRENT		PACKAGE/TERMINATION								Catalog Page Number		
	Common Mode	Differential Mode	mA @115VAC	mA @250VAC	Wire	Q.C.	I.E.C.	Fused I.E.C.	Volt Select	Switch	P.C. Term	Screw		Solder Term.	
<b>SINGLE PHASE</b>	F1100/1199	••	••	0.5	1.0	•	•					•	•	•	4
	F1150	•	•	0.25	0.40	•	•						•	•	4
	F1200/1299	••	••	0.5	1.0	•	•	•					•	•	7
	F1250	•	••	0.25	0.40	•	•	•					•	•	7
	F1300/1399	••••	••	0.5	1.0	•	•	•					•	•	11
	F1350	•••	••	0.25	0.40	•	•	•					•	•	11
	F1900	•	•	0.25	0.40		•							•	15
	F1400	•••••	•••••	0.25	0.40	•	•	•						•	16
	F1500	••••	•••	0.25	0.40		•	•	•					•	18
	F1600	•••••	•••	0.25	0.40	•	•	•	•				•	•	20
	F1700/1799	••	••••	0.5	1.0	•	•	•					•	•	22
	F1760/1700/1780	••••	••••	0.5	1.0	•	•						•	•	24
	F2800	•••••	•••••	0.25	0.50	•	•							•	26
	F5100	••	••	0.25	0.50			•						•	28
	F5200	••	••	0.25	0.50				•					•	30
	F5500	••••	••••	0.25	0.50			•						•	32
	F5600	•••••	••••	0.50	1.20			•	•					•	34
	F5700	••••	•••••	0.50	1.20			•						•	36
	F5900	•••••	•••••	0.50	1.20			•	•		•			•	38
<b>POWER ENTRY</b>	F2199/2200	•	•	0.25	0.40		•	•						•	44
	F2300	•••	••	0.25	0.40		•	•						•	45
	F2400/2500	•	•	0.25	0.40		•	•						•	46
	F2600	•	•	0.25	0.40		•		•		•			•	48
	F2700	•••••	•••••	0.25	0.40	•	•	•	•		•			•	50
	FPE7	•	•	0.25	0.40		•	•	•	•				•	52
	FPE8	•	•	0.25	0.40		•	•	•		•			•	52
	FPE1	••	••	0.25	0.40		•	•	•	•	•			•	56
	F3480/F3600	••••	••••			•	•						•		60
<b>DC FILTERS</b>	FD00	(See Section on DC filters for more information)											67		
	FD02	(See Section on DC filters for more information)											68		
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	FD2	(See Section on DC filters for more information)											70		
	FD3	(See Section on DC filters for more information)											70		
<b>MEDICAL</b>	F3099	•	••	0.002	0.005	•	•							•	72
	F3000/3100/3200/3400/3500	•	••	0.002	0.005		•	•						•	73
	F3300	•	•	0.015	0.025		•		•		•			•	75
	FPM7	•	•	0.002	0.005		•	•	•	•				•	77
	FPM8	•	•	0.002	0.005		•	•	•		•			•	77
	FPM1	••	••	0.002	0.005		•	•	•	•	•			•	81

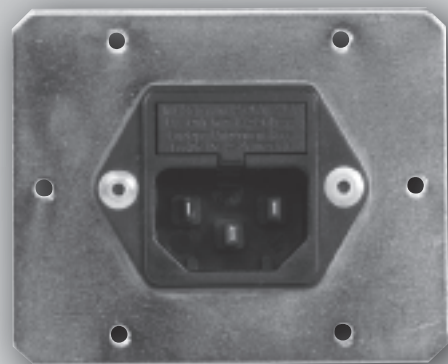
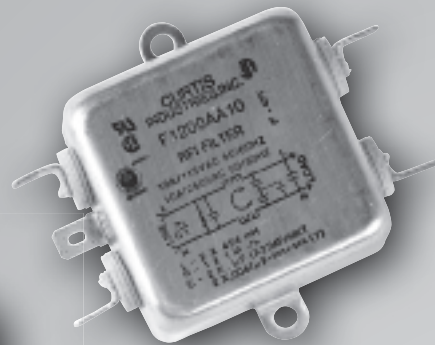


# SINGLE PHASE FILTERS ]

*General Performance*

*High Performance*

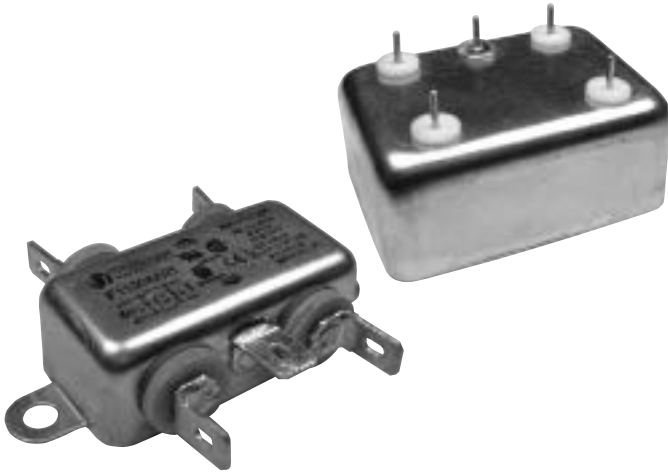
*Wide Band*



# F1100/F1150/F1199 RFI Filters

General Purpose

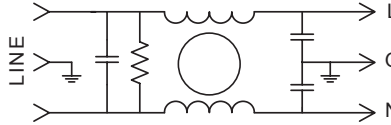
SINGLE PHASE FILTERS



## Features:

- Most Economical Design
- Designed for General Purpose, Common Mode Applications
- Available in Standard (F1100) and Low-Leakage (F1150) (F1160) (F1170) (F1180) (F1190) (F1199) Models

## F1100/F1150/F1199 Simplified Schematic



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
1A	F1100AA01 F1100BB01	QC/QC Wire/Wire	Common <b>Differential</b>	20	35	43	52 <b>55</b>	55 <b>65</b>	50 <b>50</b>
	F1150AA01 F1150BB01	QC/QC Wire/Wire	Common <b>Differential</b>	20	30	37	50 <b>55</b>	50 <b>65</b>	50 <b>50</b>
	F1199AA01	QC/QC	Common <b>Differential</b>	32 <b>5</b>	45 <b>14</b>	45 <b>23</b>	43 <b>47</b>	43 <b>50</b>	40 <b>45</b>
2A	F1199AA02 F1199BB02	QC/QC Wire/Wire	Common <b>Differential</b>	24 <b>5</b>	35 <b>13</b>	43 <b>16</b>	45 <b>45</b>	45 <b>50</b>	40 <b>45</b>
	3A	F1100AA03 F1100BB03 F1100PP03	QC/QC Wire/Wire PC/PC	Common <b>Differential</b>	20	35	43	52 <b>55</b>	55 <b>64</b>
F1150AA03 F1150BB03		QC/QC Wire/Wire	Common <b>Differential</b>	20	30	37	50 <b>55</b>	50 <b>64</b>	50 <b>46</b>
F1199AA03 F1199BB03		QC/QC Wire/Wire	Common <b>Differential</b>	20 <b>5</b>	30 <b>12</b>	38 <b>14</b>	48 <b>38</b>	48 <b>44</b>	44 <b>42</b>
6A	F1100AA06 F1100BB06	QC/QC Wire/Wire	Common <b>Differential</b>	10	22 <b>2</b>	30 <b>5</b>	46 <b>51</b>	50 <b>57</b>	45 <b>49</b>
	F1150AA06 F1150BB06	QC/QC Wire/Wire	Common <b>Differential</b>	10	20 <b>2</b>	27 <b>5</b>	45 <b>51</b>	45 <b>57</b>	45 <b>49</b>
	F1199AA06 F1199BB06	QC/QC Wire/Wire	Common <b>Differential</b>	9 <b>5</b>	20 <b>12</b>	28 <b>14</b>	42 <b>33</b>	50 <b>42</b>	47 <b>42</b>
10A	F1100AA10 F1100BB10	QC/QC Wire/Wire	Common <b>Differential</b>	10	22	30 <b>2</b>	46 <b>27</b>	50 <b>47</b>	45 <b>50</b>
	F1150AA10 F1150BB10	QC/QC Wire/Wire	Common <b>Differential</b>	10	20	27 <b>2</b>	45 <b>27</b>	45 <b>47</b>	45 <b>50</b>
	F1199AA10 F1199BB10 F1199DD10	QC/QC Wire/Wire Screw/Screw	Common <b>Differential</b>	9 <b>5</b>	20 <b>12</b>	25 <b>14</b>	38 <b>33</b>	42 <b>42</b>	40 <b>42</b>
20A	F1100AA20 F1100DD20	QC/QC Screw/Screw	Common <b>Differential</b>	8	18	22 <b>5</b>	36 <b>22</b>	42 <b>46</b>	45 <b>60</b>
	F1150AA20 F1150DD20	QC/QC Screw/Screw	Common <b>Differential</b>	8	15	20 <b>5</b>	32 <b>22</b>	38 <b>46</b>	45 <b>60</b>
	F1199AA20 F1199DD20	QC/QC Screw/Screw	Common <b>Differential</b>	10 <b>5</b>	20 <b>12</b>	28 <b>15</b>	35 <b>30</b>	38 <b>40</b>	40 <b>40</b>
30A	F1199DD30	Screw/Screw	Common <b>Differential</b>	13 <b>5</b>	23 <b>12</b>	30 <b>15</b>	35 <b>30</b>	38 <b>40</b>	40 <b>40</b>

NOTE: Other combinations of terminals may be specified on special order.

**Specifications:**

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

<b>Rated Current:</b>	115VAC	250VAC
	1A	1A
	2A	1.5A
	3A	2.5A
	6A	4A
	10A	6A
	20A	10A
	30A	15A

**Current Overload:** 6X for 8 seconds

<b>Hi-Pot Test (1 min):</b>	<b>F1100/F1150</b>	<b>F1199</b>
Line to Ground:	1500VAC	1500VAC
Line to Line:	1768VDC	1450VDC

**Insulation Resistance:** 9 x 10<sup>9</sup> Ω at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- A: QC – Quick Connect
- B: Wire
- D: Screw
- P: PCB Pins

**Maximum Leakage Current:**

Each Line to Ground	F1100	F1150	F1199
115VAC, 60Hz:	0.40mA	0.25mA	0.25mA
250VAC, 50Hz:	.75mA	0.40mA	0.45mA

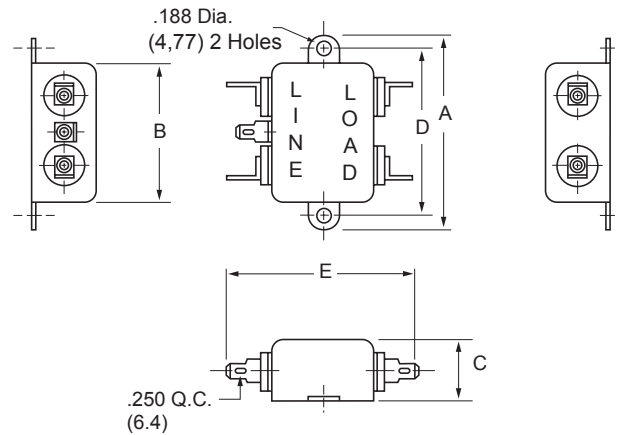
**Agency Approvals:**



**F1100AA/F1150AA**

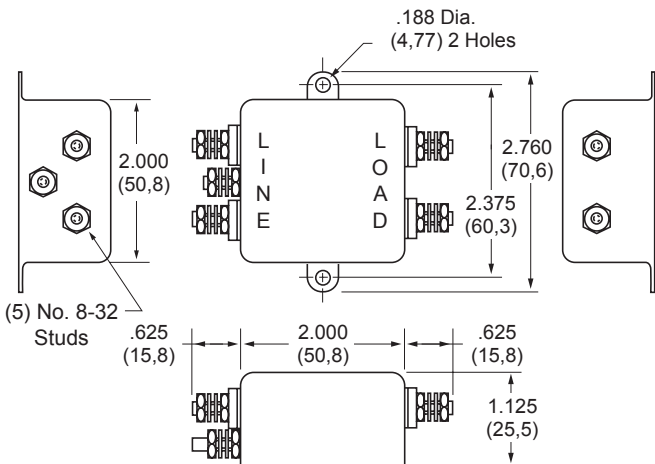
(1, 3, 6, 10 and 20Amp) Dimensions

Amps	A	B	C	D	E
1A	2.500 (63,5)	1.750 (44,5)	.625 (15,8)	2.125 (53,9)	1.425 (36,2)
3A	2.500 (63,5)	1.750 (44,5)	.750 (19,1)	2.125 (53,9)	1.8 (45,8)
6A	2.500 (63,5)	1.750 (44,5)	.750 (19,1)	2.125 (53,9)	1.8 (45,8)
10A	2.500 (63,5)	1.750 (44,5)	1.125 (28,5)	2.125 (53,9)	1.8 (45,8)
20A	2.760 (70,6)	2.000 (60,8)	1.125 (28,5)	2.375 (60,3)	2.550 (64,8)



**F1100DD/F1150DD**

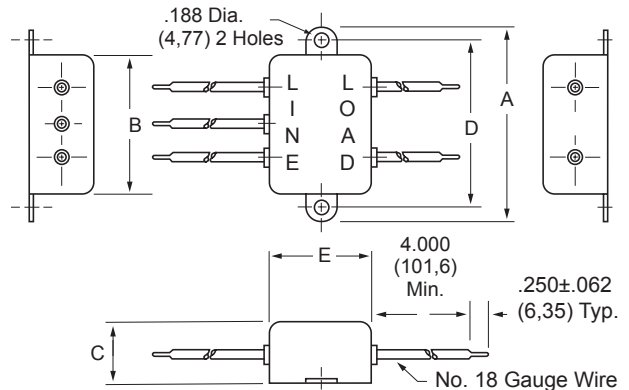
(20Amp Only) Dimensions



**F1100BB/FB1150BB**

(1, 3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
1A	2.500 (63,5)	1.750 (44,5)	.625 (15,8)	2.125 (53,9)	.875 (22,2)
3A	2.500 (63,5)	1.750 (44,5)	.750 (19,1)	2.125 (53,9)	1.250 (31,8)
6A	2.500 (63,5)	1.750 (44,5)	.750 (19,1)	2.125 (53,9)	1.250 (31,8)
10A	2.500 (63,5)	1.750 (44,5)	1.125 (28,5)	2.125 (53,9)	1.250 (31,8)



Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

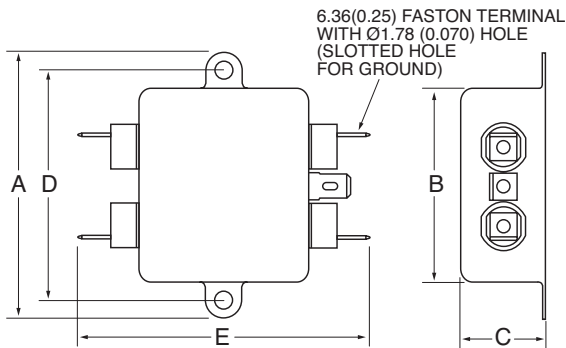
# F1100/F1150/F1199 RFI Filters (continued)

General Purpose

SINGLE PHASE FILTERS

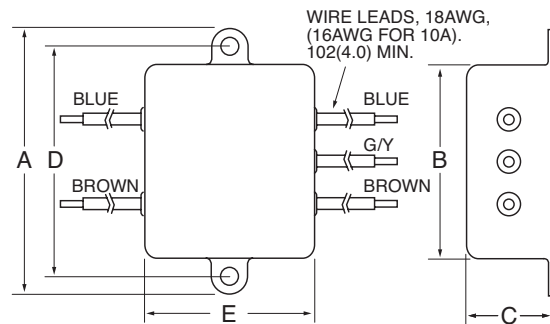
## F1199AA (1, 2, 3, 6, 10 and 20Amp) Dimensions

Amps	A	B	C	D	E
1A	2.53 (64,3)	1.82 (46,2)	0.66 (16,8)	2.126 (54,0)	2.25 (57,2)
2A	2.53 (64,3)	1.82 (46,2)	0.66 (16,8)	2.126 (54,0)	2.25 (57,2)
3A	2.53 (64,3)	1.82 (46,2)	0.78 (19,8)	2.126 (54,0)	2.61 (66,3)
6A	2.53 (64,3)	1.82 (46,2)	0.78 (19,8)	2.126 (54,0)	2.61 (66,3)
10A	2.53 (64,3)	1.82 (46,2)	1.16 (29,5)	2.126 (54,0)	2.61 (66,3)
20A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.36 (85,3)



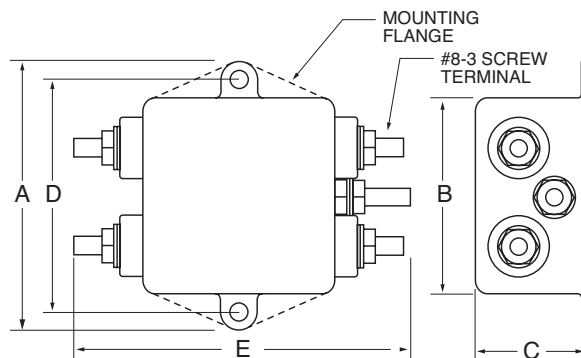
## F1199BB (2, 3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
2A	2.53 (64,3)	1.82 (46,2)	0.66 (16,8)	2.126 (54,0)	0.96 (24,4)
3A	2.53 (64,3)	1.82 (46,2)	0.78 (19,8)	2.126 (54,0)	1.32 (33,5)
6A	2.53 (64,3)	1.82 (46,2)	0.78 (19,8)	2.126 (54,0)	1.32 (33,5)
10A	2.53 (64,3)	1.82 (46,2)	1.16 (29,5)	2.126 (54,0)	1.32 (33,5)

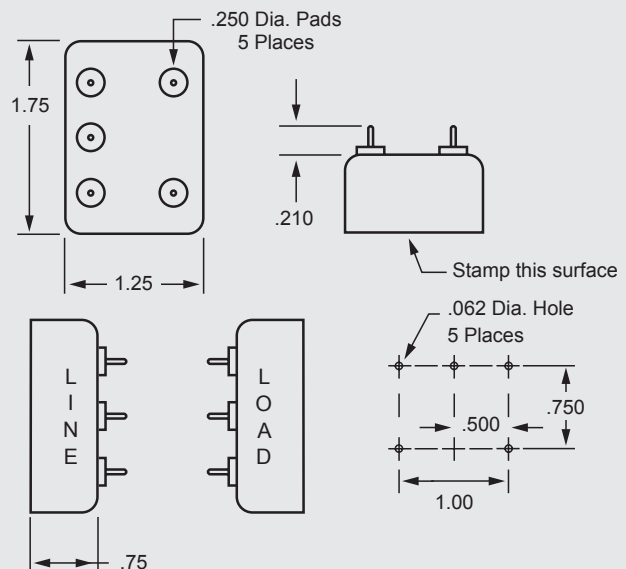


## F1199DD (10, 20 and 30Amp) Dimensions

Amps	A	B	C	D	E
10A	2.53 (64,3)	1.82 (46,2)	1.16 (29,5)	2.126 (54,0)	2.72 (69,1)
20A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.46 (87,9)
30A	4.20 (106,7)	3.38 (85,9)	1.53 (38,9)	3.75 (95,25)	5.34 (135,6)



## F1100PP Recommended PC Mounting



# F1200/F1250/F1299 RFI Filters

## Features:

- Designed for General Purpose Common Mode and Differential Mode Applications
- Higher Line-to-Line Capacitance for Protection from Pulsed, Intermittent, or Continuous RFI
- Available in Standard (F1200) and Low-Leakage (F1250) (F1260) (F1270) (F1280) (F1299) Models
- Available with Integral IEC Connector up to 10Amps



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
1A	F1200AA01	QC/QC	Common	20	35	43	52	55	50
	F1200BB01	Wire/Wire	Differential	4	38	59	66	62	54
	F1250AA01	QC/QC	Common	20	30	37	50	50	50
	F1250BB01	Wire/Wire	Differential	4	38	59	66	62	54
2A	F1299AA02	QC/QC	Common	24	35	43	45	45	40
	F1299BB02	Wire/Wire	Differential	6	35	50	55	50	45
3A	F1200AA03	QC/QC	Common	20	35	43	52	55	50
	F1200BB03	Wire/Wire	Differential	4	38	59	70	64	59
	F1200CA03	IEC/QC							
	F1250AA03	QC/QC	Common	20	30	37	50	50	50
	F1250BB03	Wire/Wire	Differential	4	38	59	70	64	59
	F1250CA03	IEC/QC							
6A	F1299AA03	QC/QC	Common	26	37	45	45	45	40
	F1299BB03	Wire/Wire	Differential	6	40	55	55	50	45
	F1299CA03	IEC/QC							
	F1200AA06	QC/QC	Common	10	22	30	46	50	45
	F1200BB06	Wire/Wire	Differential	9	25	48	70	70	62
	F1200CA06	IEC/QC							
10A	F1250AA06	QC/QC	Common	10	20	27	45	45	45
	F1250BB06	Wire/Wire	Differential	9	25	48	70	70	62
	F1250CA06	IEC/QC							
	F1299AA06	QC/QC	Common	20	31	40	45	45	40
	F1299BB06	Wire/Wire	Differential	6	35	50	55	50	45
	F1299CA06	IEC/QC							
20A	F1200AA10	QC/QC	Common	10	22	30	46	50	45
	F1200BB10	Wire/Wire	Differential	10	16	43	70	70	66
	F1200CA10	IEC/QC							
	F1250AA10	QC/QC	Common	10	20	27	45	45	45
	F1250BB10	Wire/Wire	Differential	10	16	43	70	70	66
	F1250CA10	IEC/QC							
30A	F1299AA10	QC/QC	Common	9	20	25	38	42	40
	F1299BB10	Wire/Wire	Differential	14	14	38	50	48	45
	F1299CA10	IEC/QC							
	F1299DD10	Screw/Screw							
	F1200AA20	QC/QC	Common	10	22	30	42	47	40
	F1200DD20	Screw/Screw	Differential	9	19	44	70	70	70
30A	F1250AA20	QC/QC	Common	10	20	25	38	40	40
	F1250DD20	Screw/Screw	Differential	9	19	44	70	70	70
	F1299AA20	QC/QC	Common	10	20	28	35	38	40
	F1299DD20	Screw/Screw	Differential	14	14	38	50	48	45
30A	F1200DD30	Screw/Screw	Common	7	15	20	34	42	40
			Differential	11	13	44	70	60	57
	F1299DD30	Screw/Screw	Common	12	23	30	35	38	40
			Differential	15	40	55	55	55	50

NOTE: Other combinations of terminals may be specified on special order.

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

*Curtis Industries*  
A Division of Powers Holdings, Inc.

1-800-657-0853

General Purpose

SINGLE PHASE FILTERS



# F1200/F1250/F1299 RFI Filters (continued)

## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**

115VAC	1A	2A	3A	6A	10A	20A	30A
250VAC	1A	1.5A	2.5A	4A	6A	10A	15A

**Current Overload:** 6X for 8 seconds

<b>Hi-Pot Test (1 min):</b>	<b>F1200 Series</b>	<b>F1299 Series</b>
Line to Ground:	1500VAC	1500VAC
Line to Line:	1768VDC	1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

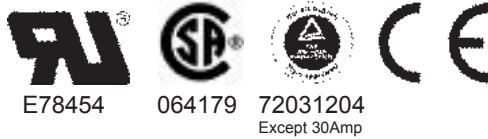
**Termination:**

A: QC – Quick Connect	C: IEC Receptacle
B: Wire	D: Screw

**Maximum Leakage Current:**

Each Line to Ground	<b>F1200</b>	<b>F1250</b>	<b>F1299</b>	<b>F1260</b>	<b>F1270</b>	<b>F1280</b>	<b>F1290</b>
115VAC, 60Hz:	0.40mA	0.25mA	.25mA	.25mA	.002mA	.015mA	.030mA
250VAC, 50Hz:	.75mA	.40mA	.45mA	.45mA	.005mA	.025mA	.050mA

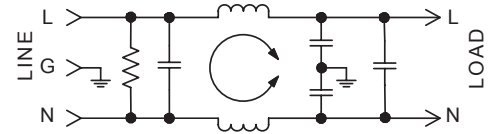
**Agency Approvals  
F1200/F1250:**



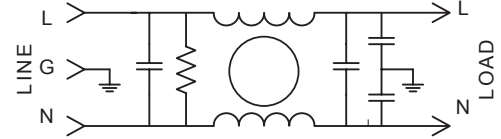
**Agency Approvals  
F1299:**



## F1200/F1250 Simplified Schematic

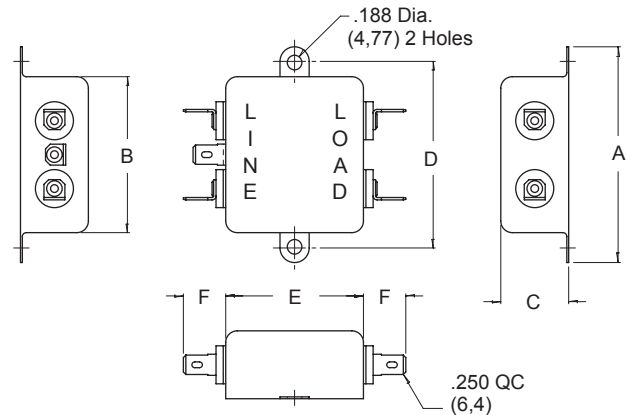


## F1299 Simplified Schematic



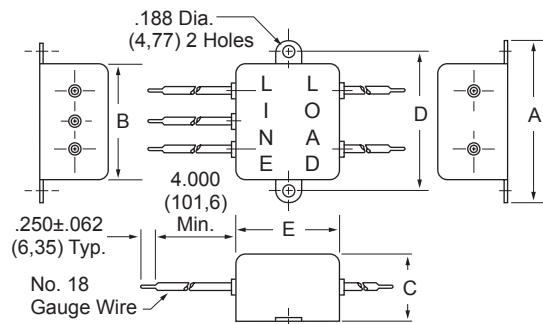
## F1200AA/F1250AA (1, 3, 6, 10 and 20Amp) Dimensions

Amps	A	B	C	D	E	F
1A	2.750 (69,9)	2.00 (50,8)	.875 (22,2)	2.375 (60,3)	1.750 (44,5)	.550 (14,0)
3A	2.750 (69,9)	2.00 (50,8)	1.125 (28,5)	2.375 (60,3)	1.750 (44,5)	.550 (14,0)
6A	2.750 (69,9)	2.00 (50,8)	1.125 (28,5)	2.375 (60,3)	1.750 (44,5)	.550 (14,0)
10A	2.750 (69,9)	2.00 (50,8)	1.125 (28,5)	2.375 (60,3)	2.000 (50,8)	.550 (14,0)
20A	3.310 (84,1)	2.50 (63,5)	1.500 (38,1)	2.940 (74,7)	2.000 (50,8)	.550 (14,0)



## F1200BB/FB1250BB (1, 3, 6 and 10Amp) Dimensions

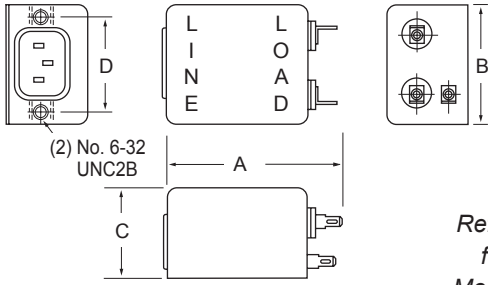
Amps	A	B	C	D	E
1A	2.750 (69,9)	2.00 (50,8)	.875 (22,2)	2.375 (60,3)	1.750 (44,5)
3A	2.750 (69,9)	2.00 (50,8)	1.125 (28,5)	2.375 (60,3)	1.750 (44,5)
6A	2.750 (69,9)	2.00 (50,8)	1.125 (28,5)	2.375 (60,3)	1.750 (44,5)
10A	2.750 (69,9)	2.00 (50,8)	1.125 (28,5)	2.375 (60,3)	2.000 (50,8)



General Purpose

SINGLE PHASE FILTERS

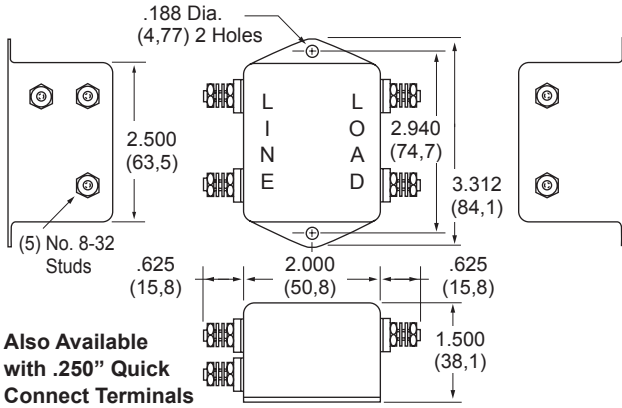
### F1200CA/F1250CA (3, 6, and 10Amp) Dimensions



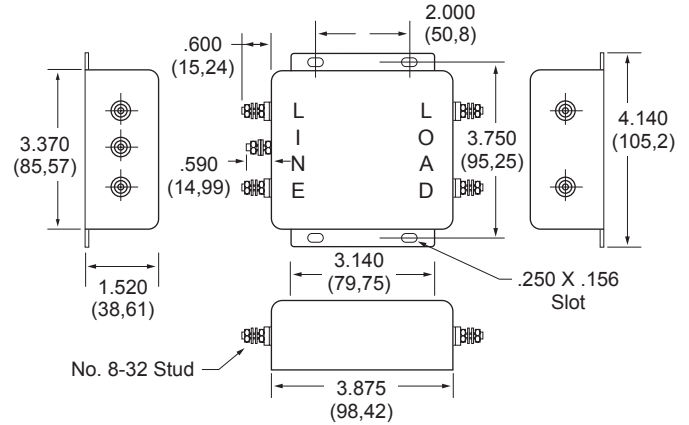
Amps	A	B	C	D
3A	2.55 (64,8)	2.000 (50,8)	1.50 (38,1)	1.575 (40,0)
6A	3.05 (77,5)	2.000 (50,8)	1.500 (38,1)	1.575 (40,0)
10A	3.05 (77,5)	2.000 (50,8)	1.500 (38,1)	1.575 (40,0)

Refer to Page 40  
for Standard  
Mounting Cutouts

### F1200DD/F1250DD (20Amp Only) Dimensions

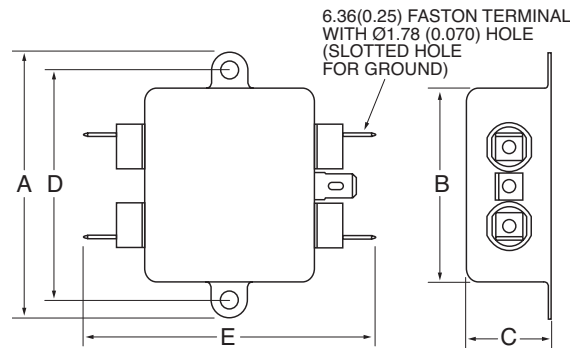


### F1200DD30 (30Amp Only) Dimensions



### F1299AA (2, 3, 6, 10 and 20Amp) Dimensions

Amps	A	B	C	D	E
2A	2.81 (71,4)	2.07 (52,6)	0.91 (23,1)	2.375 (60,33)	3.10 (78,7)
3A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.10 (78,7)
6A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.10 (78,7)
10A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.35 (85,1)
20A	3.35 (85,1)	2.56 (65,0)	1.53 (38,9)	2.938 (74,63)	3.35 (85,1)



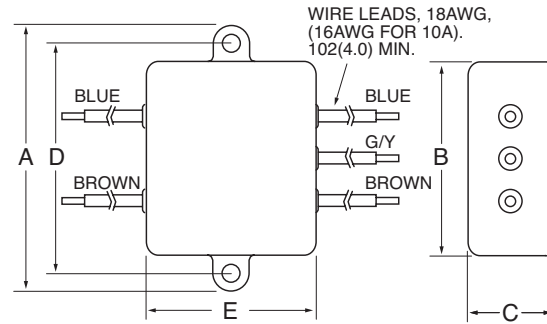
# F1200/F1250/F1299 RFI Filters (continued)

General Purpose

SINGLE PHASE FILTERS

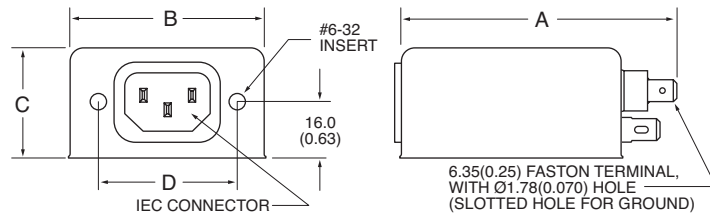
## F1299BB (2, 3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
2A	2.81 (71,4)	2.07 (52,6)	0.91 (23,1)	2.375 (60,33)	1.81 (46,0)
3A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.10 (78,7)
6A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.10 (78,7)
10A	2.81 (71,4)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	2.07 (52,6)



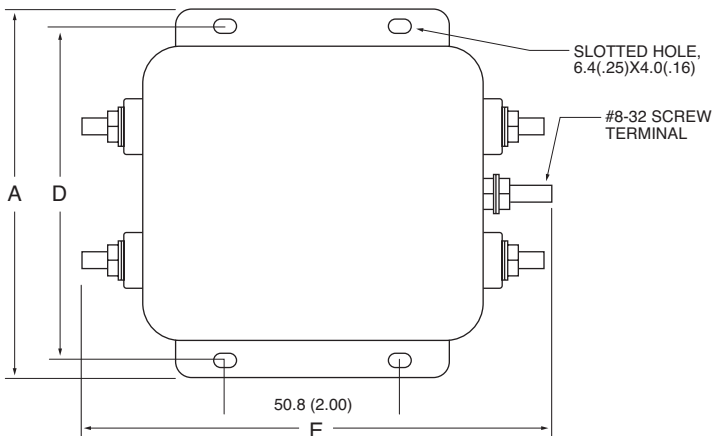
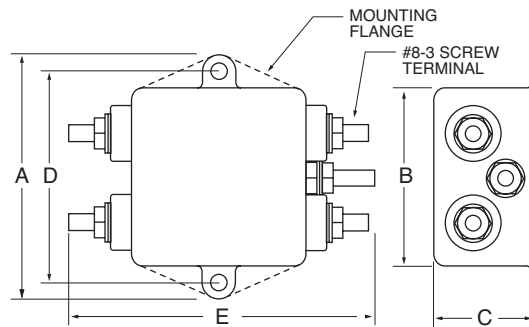
## F1299CA (3, 6 and 10Amp) Dimensions

Amps	A	B	C	D
3A	3.21 (81,5)	2.25 (57,2)	1.28 (32,5)	1.575 (40,0)
6A	3.21 (81,5)	2.25 (57,2)	1.28 (32,5)	1.575 (40,0)
10A	3.71 (94,2)	2.25 (57,2)	1.28 (32,5)	1.575 (40,0)



## F1299DD (10, 20 and 30Amp) Dimensions

Amps	A	B	C	D	E
10A	2.81 (71,40)	2.07 (52,6)	1.16 (29,5)	2.375 (60,33)	3.46 (87,9)
20A	3.35 (85,1)	2.56 (65,0)	1.53 (38,9)	2.938 (74,63)	3.46 (87,9)
30A	4.20 (106,7)	3.38 (85,9)	1.53 (38,9)	3.750 (95,25)	5.34 (135,6)



# F1300/F1350/F1399 RFI Filters

## Features:

- T Circuit Configuration—Designed for Motor, Capacitive and Other Low Impedance Loads
- Dual Coils — Higher Performance in Unknown RFI and Noise Susceptibility Applications
- Integral IEC Connector and PC Mounted Versions Now Available



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
1A	F1300AA01	QC/QC	Common	40	65	65	65	65	65
	F1300BB01	Wire/Wire	Differential	2	57	69	70	70	60
	F1350AA01	QC/QC	Common	30	60	65	65	65	65
	F1350BB01	Wire/Wire	Differential	2	57	69	70	70	60
2A	F1399AA02	QC/QC	Common	40	65	65	65	65	40
	F1399BB02	Wire/Wire	Differential	5	45	70	65	60	50
3A	F1300AA03	QC/QC	Common	40	65	65	65	65	65
	F1300BB03	Wire/Wire							
	F1300CA03	IEC/QC							
	F1300CP03	IEC/PC	Differential	7	64	70	70	70	58
	F1350AA03	QC/QC							
	F1350BB03	Wire/Wire							
F1350CA03	IEC/QC								
F1350CP03	IEC/PC	Common	30	60	65	65	65	65	
F1399AA03	QC/QC								
F1399BB03	Wire/Wire								
F1399CA03	IEC/QC	Differential	12	55	70	65	60	40	
F1399CP03	IEC/PC								
6A	F1300AA06	QC/QC	Common	12	48	60	65	65	65
	F1300BB06	Wire/Wire							
	F1300CA06	IEC/QC							
	F1350AA06	QC/QC	Common	2	40	60	65	65	65
	F1350BB06	Wire/Wire							
	F1350CA06	IEC/QC							
F1399AA06	QC/QC	Differential	5	40	70	65	60	40	
F1399BB06	Wire/Wire								
F1399CA06	IEC/QC								
10A	F1300AA10	QC/QC	Common	12	48	60	65	65	65
	F1300BB10	Wire/Wire							
	F1300CA10	IEC/QC							
	F1350AA10	QC/QC	Common	2	40	60	65	65	65
	F1350BB10	Wire/Wire							
	F1350CA10	IEC/QC							
F1399AA10	QC/QC	Differential	5	40	52	60	60	50	
F1399BB10	Wire/Wire								
F1399CA10	IEC/QC								
F1399DD10	Screw/Screw		5	12	50	65	60	55	
15A	F1300AA15	QC/QC	Common	14	35	44	56	58	55
			Differential	15	10	45	70	67	56
20A	F1300AA20	QC/QC	Common	5	44	60	65	65	60
			Differential	—	—	35	60	57	45
	F1350AA20	QC/QC	Common	2	35	61	63	60	50
			Differential	—	—	35	60	57	45
	F1399AA20	QC/QC	Common	5	40	52	60	60	52
	F1399DD20	Screw/Screw	Differential	5	12	50	65	60	55

NOTE: Other combinations of terminals may be specified on special order.

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

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1-800-657-0853

General Purpose

SINGLE PHASE FILTERS

# F1300/F1350/F1399 RFI Filters (continued)

## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**

115VAC	1A	2A	3A	6A	10A	15A	20A
250VAC	1A	1.5A	2.5A	4A	6A	15A	16A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):** **F1300/F1350**

Line to Ground: 1500VAC  
Line to Line: 1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:** A: QC – Quick Connect      C: IEC Receptacle  
B: Wire    P: PCB Pins

**Maximum Leakage Current:** Each Line to Ground

	<b>F1300</b>	<b>F1350</b>	<b>D1399</b>	<b>F1360</b>	<b>F1370</b>	<b>F1380</b>	<b>F1390</b>
115VAC, 60Hz:	0.4mA	0.25mA	0.25mA	.15mA	.002mA	.015mA	.030mA
250VAC, 50Hz:	.75mA	.40mA	0.45mA	.25mA	.005mA	.025mA	.050mA

**Agency Approvals:**

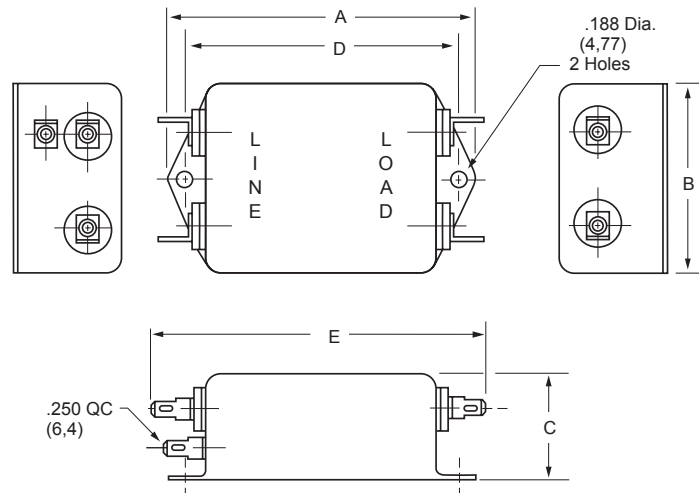


General Purpose

SINGLE PHASE FILTERS

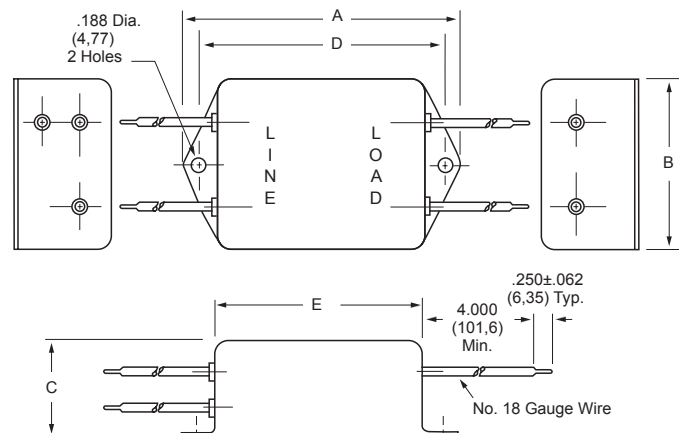
### F1300AA (1, 3, 6, 10 and 15Amp) F1350AA (1, 3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
1A	2.750 (69,9)	1.750 (44,5)	1.125 (28,5)	2.375 (60,3)	2.925 (74,3)
3A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	3.49 (88,7)
6A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	3.49 (88,7)
10A	3.312 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	3.49 (88,7)
15A	3.312 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	3.49 (88,7)

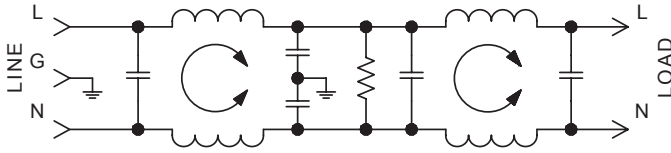


### F1300BB/F1350BB (1, 3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
1A	2.750 (69,9)	1.750 (44,5)	1.125 (28,5)	2.375 (60,3)	2.000 (50,8)
3A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	2.500 (63,5)
6A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	2.500 (63,5)
10A	3.312 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	2.500 (63,5)



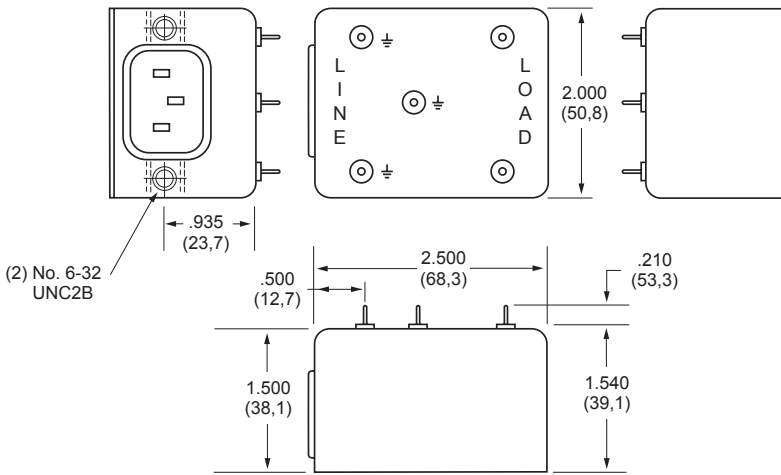
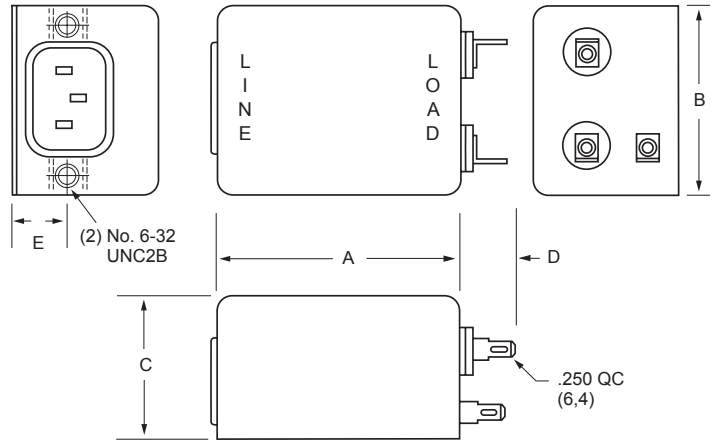
### F1300/F1350 Simplified Schematic



### F1300CA (3, 6 and 10Amp) F1350CA (3 and 6Amp) Dimensions

Refer to Page 40  
for Standard  
Mounting Cutouts

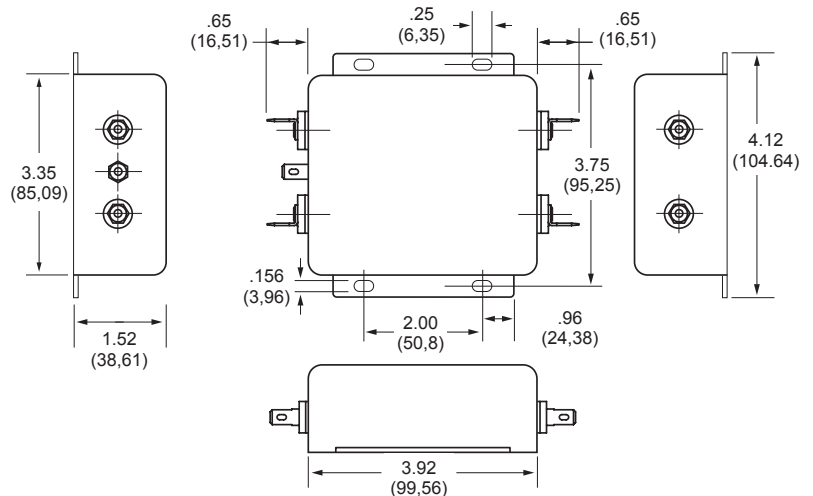
Amps	A	B	C	D	E
3A	2.500 (63,6)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
6A	2.500 (63,5)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
10A	2.880 (73,1)	2.120 (53,8)	1.500 (38,1)	.65 (16,0)	.565 (14,3)



### F1300CP/F1350CP (3Amp Only) Dimensions

Refer to Page 40  
for Standard  
Mounting Cutouts

### F1300AA/F1350AA (20Amp Only) Dimensions



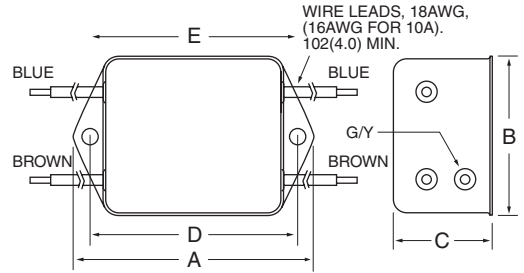
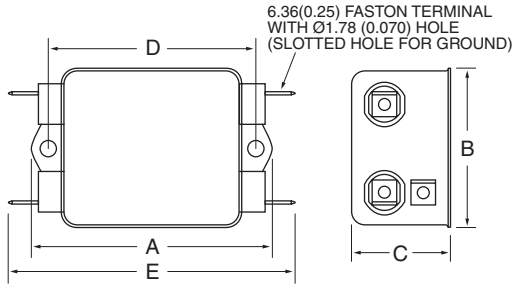
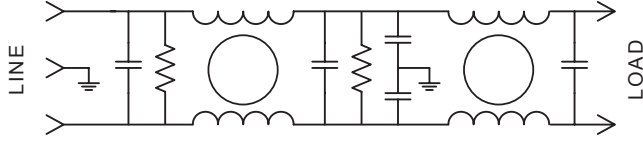
Dimensions are in inches and millimeters  
unless otherwise specified.  
Values in parentheses are metric equivalents.

# F1300/F1399 RFI Filters (continued)

General Purpose

SINGLE PHASE FILTERS

## F1399 Simplified Schematic

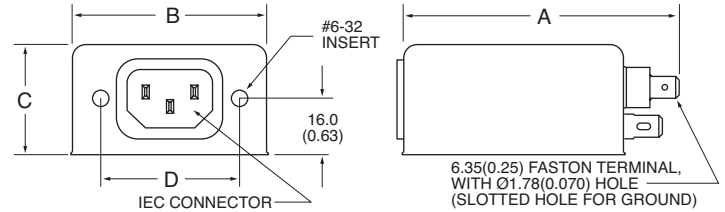


## F1399BB (2, 3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
2A	2.07 (52,6)	1.81 (46,0)	1.16 (29,5)	2.375 (60,33)	2.78 (70,6)
3A	2.56 (65,0)	2.07 (52,6)	1.16 (29,5)	2.938 (74,63)	3.35 (85,1)
6A	2.56 (65,0)	2.07 (52,6)	1.16 (29,5)	2.938 (74,63)	3.35 (85,1)
10A	2.56 (65,0)	2.07 (52,6)	1.53 (38,9)	2.938 (74,63)	3.35 (85,1)

## F1399AA (2, 3, 6, 10 and 20Amp) Dimensions

Amps	A	B	C	D	E
2A	3.35 (85,1)	1.81 (46,0)	1.16 (29,5)	2.375 (60,33)	2.78 (70,6)
3A	3.85 (97,8)	2.07 (52,6)	1.16 (29,5)	2.938 (74,63)	3.35 (85,1)
6A	3.85 (97,8)	2.07 (52,6)	1.16 (29,5)	2.938 (74,63)	3.35 (85,1)
10A	3.85 (97,8)	2.07 (52,6)	1.53 (38,9)	2.938 (74,63)	3.35 (85,1)
20A	5.23 (132,8)	3.37 (85,6)	1.53 (38,9)	3.75 (95,25)	4.20 (106,7)

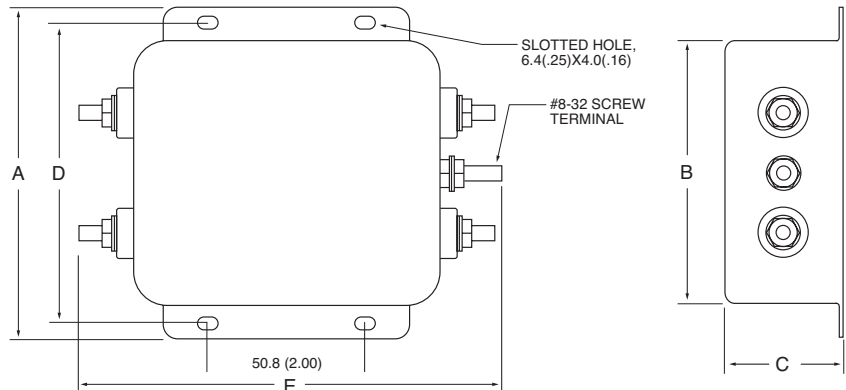
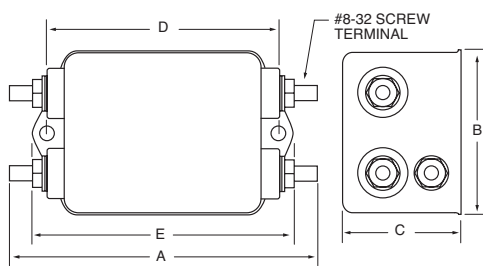


## F1399CA (3, 6 and 10Amp) Dimensions

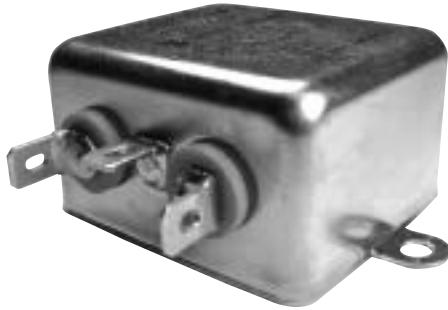
Amps	A	B	C	D
3A	4.33 (110,0)	2.25 (57,2)	1.28 (32,5)	1.575 (40,0)
6A	4.33 (110,0)	2.25 (57,2)	1.28 (32,5)	1.575 (40,0)
10A	4.33 (110,0)	2.25 (57,2)	1.53 (38,9)	1.575 (40,0)

## F1399DD (10 and 20Amp) Dimensions

Amps	A	B	C	D	E
10A	3.96 (100,6)	2.07 (52,6)	1.53 (38,9)	2.938 (74,63)	3.35 (85,1)
20A	5.34 (135,6)	3.37 (85,6)	1.53 (38,9)	3.75 (95,25)	4.20 (106,7)



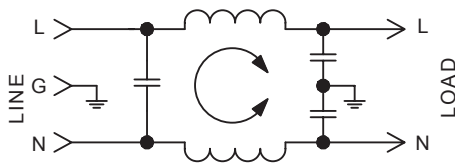
# F1900 RFI Filters



## Features:

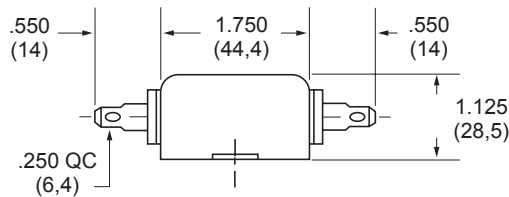
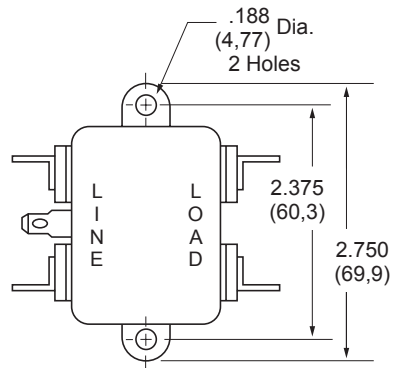
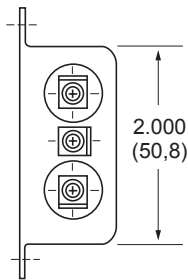
- Designed for Equipment Requiring UL1410 Approval (Consumer Electronics)
- Utilizes UL1414 Approved Components
- Greater Differential Mode Protection

## F1900 Simplified Schematic



## F1900AA

(3 and 6Amp) Dimensions



## Specifications:

**Rated Voltage:** 125VAC Maximum - 50/60 Hz

**Rated Current:** 120VAC  
3A  
6A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground 1500VAC

Line to Line 1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

A: QC – Quick Connect

**Maximum Leakage Current:**

Each Line to Ground **F1900**  
115VAC, 60Hz: 0.25mA

**Agency Approvals:**



E78454

064179

General Purpose

SINGLE PHASE FILTERS

Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F1900AA03	QC/QC	Common	20	30	37	50	50	50
			Differential	7	19	28	50	57	70
6A	F1900AA06	QC/QC	Common	10	20	27	45	45	45
			Differential	8	18	24	45	52	64

NOTE: Other combinations of terminals may be specified on special order.

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

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# F1400 RFI Filters

High Performance

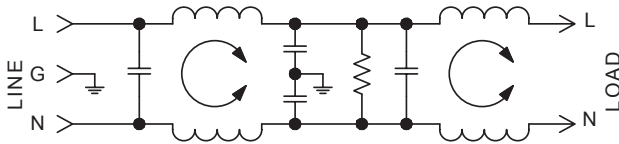
SINGLE PHASE FILTERS



## Features:

- High Peak Current Design — High Insertion Loss for Switching Power Supply Emissions
- Low-Leakage Current
- Compact Case Sizes in 6 and 10Amp Models
- Available with Integral IEC Connector in 3 and 6Amp Models

## F1400 Simplified Schematic



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

<b>Rated Current:</b>	115VAC	250VAC
	3A	1.5A
	6A	4A
	10A	6A

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground	1500VAC
Line to Line	1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

- A: QC – Quick Connect
- B: Wire
- C: IEC Receptacle

### Maximum Leakage Current:

Each Line to Ground	<b>F1400</b>
115VAC, 60Hz:	0.25mA
250VAC, 50Hz:	0.40mA

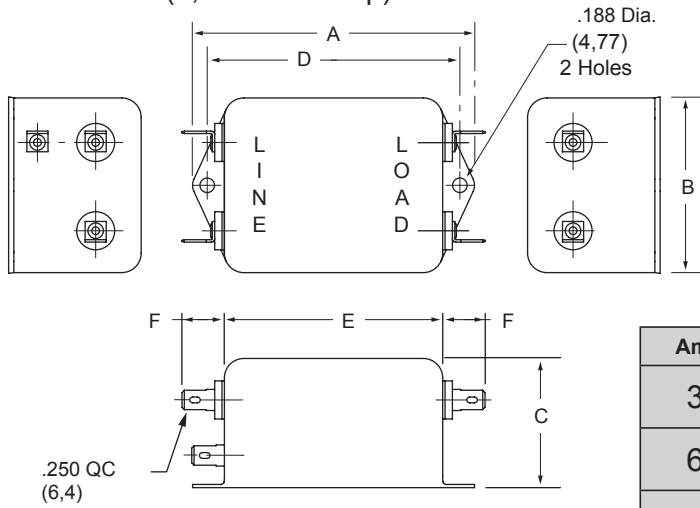
### Agency Approvals:



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F1400AA03 F1400BB03 F1400CA03	QC/QC Wire/Wire IEC/QC	Common	58	65	65	65	60	44
			Differential	40	60	65	65	65	60
6A	F1400AA06 F1400BB06 F1400CA06	QC/QC Wire/Wire IEC/QC	Common	58	65	65	65	60	54
			Differential	36	55	60	60	55	50
10A	F1400AA10 F1400BB10	QC/QC Wire/Wire	Common	56	65	65	65	60	54
			Differential	40	50	60	65	65	60

NOTE: Other combinations of terminals may be specified on special order.

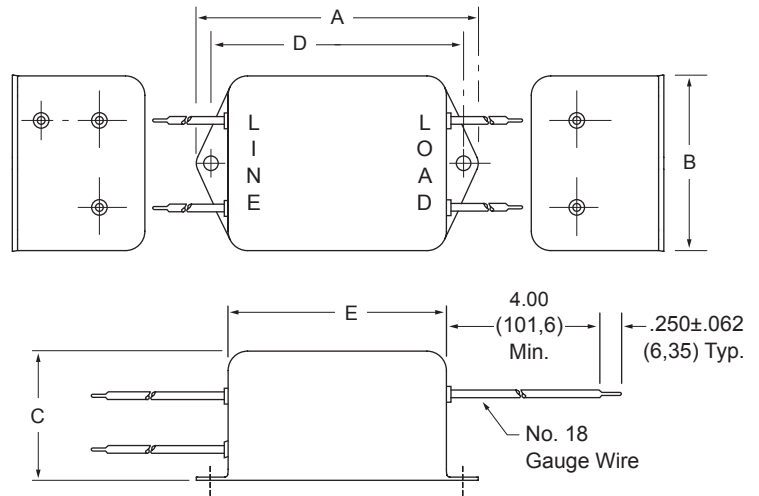
### F1400AA (3, 6 and 10Amp) Dimensions



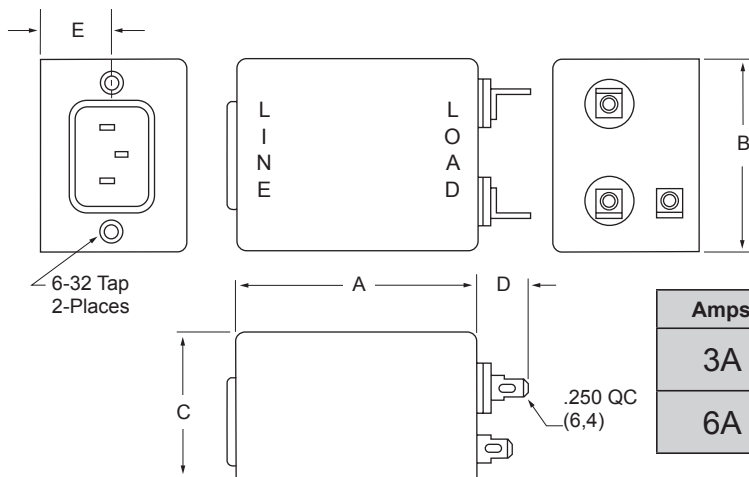
Amps	A	B	C	D	E	F
3A	3.310 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
6A	3.310 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
10A	4.70 (119,4)	2.250 (57,1)	1.750 (44,4)	4.250 (107,9)	3.750 (95,3)	.550 (14,0)

### F1400BB (3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
3A	3.310 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	2.500 (63,5)
6A	3.310 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	2.500 (63,5)
10A	4.70 (119,4)	2.250 (57,1)	1.750 (44,4)	4.250 (107,9)	3.750 (95,3)



### F1400CA (3 and 6Amp) Dimensions



Refer to Page 40  
for Standard  
Mounting Cutouts

Amps	A	B	C	D	E
3A	2.880 (73,1)	2.120 (53,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
6A	2.880 (73,1)	2.120 (53,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

# F1500 RFI Filters

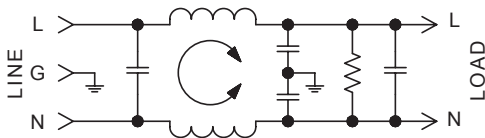
High Performance



## Features:

- IEC Connector Plus Common and Differential Mode Performance in Compact Case
- "L" Circuit Configuration — Cost-Effective in Many Linear and Switching Power Supply Applications
- High-Inductance Design for Greater Attenuation
- Available with 0.250" Quick Connect Terminals or Wire Leads on the Load Side

## F1500CA Simplified Schematic



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

<b>Rated Current:</b>	115VAC	250VAC
	3A	1.5A
	6A	3A
	10A	6A
	15A	8A

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground	1500VAC
Line to Line	1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

- A: QC – Quick Connect
- C: IEC Receptacle
- F: IEC Receptacle with Fuse Holder

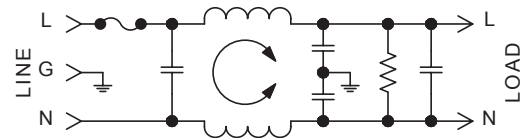
### Maximum Leakage Current:

Each Line to Ground	<b>F1500</b>
115VAC, 60Hz:	0.25mA
250VAC, 50Hz:	0.40mA

### Agency Approvals:



## F1500FA Simplified Schematic



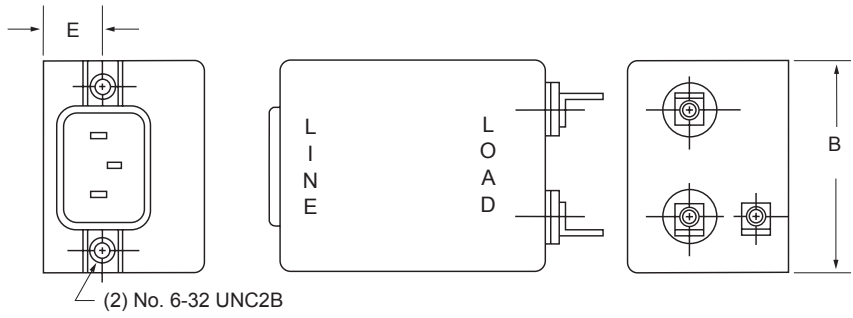
Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F1500CA03 F1500FA03	IEC/QC Fused IEC/QC	Common	32	43	50	50	50	50
			Differential	35	60	65	60	55	40
6A	F1500CA06 F1500FA06	IEC/QC Fused IEC/QC	Common	32	42	45	45	45	45
			Differential	30	60	65	65	60	50
10A	F1500CA10 F1500FA10	IEC/QC Fused IEC/QC	Common	29	36	39	45	45	45
			Differential	15	50	65	65	60	50
15A	F1500CA15	IEC/QC	Common	26	32	36	44	46	52
			Differential	35	60	65	65	65	65

NOTE: Other combinations of terminals may be specified on special order.

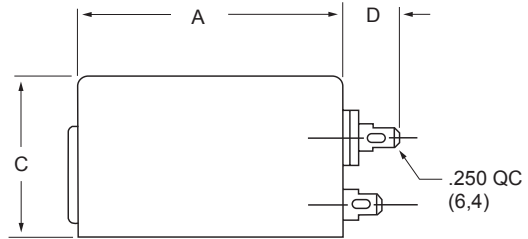
### F1500CA

(3, 6, 10 and 15Amp) Dimensions

Refer to Page 40  
for Standard  
Mounting Cutouts



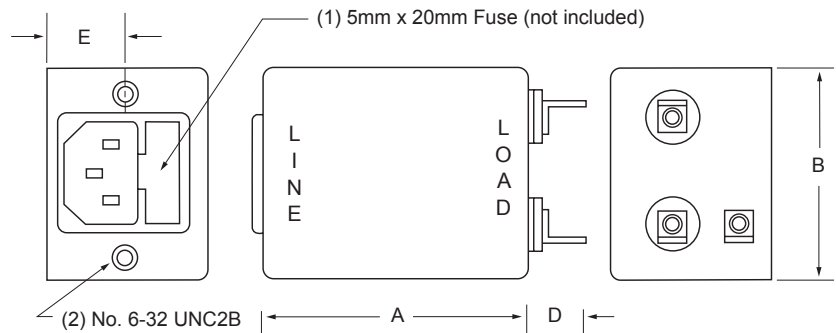
Amps	A	B	C	D	E
3A	2.000 (50,8)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
6A	2.500 (63,5)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
10A	2.500 (63,5)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
15A	3.25 (82,6)	2.25 (57,2)	1.75 (44,5)	.550 (14,0)	.705 (17,9)



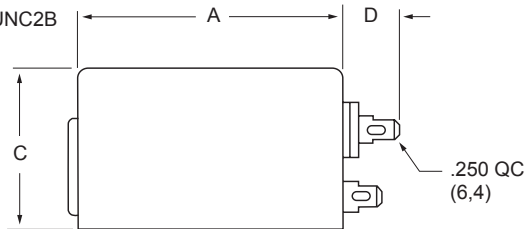
### F1500FA

(3, 6 and 10Amp) Dimensions

Refer to Page 40  
for Standard  
Mounting Cutouts



Amps	A	B	C	D	E
3A	2.000 (50,8)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.752 (19,1)
6A	2.500 (63,5)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.752 (19,1)
10A	2.500 (63,5)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.752 (19,1)



# F1600 RFI Filters

High Performance

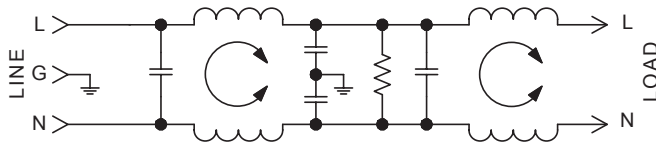
SINGLE PHASE FILTERS



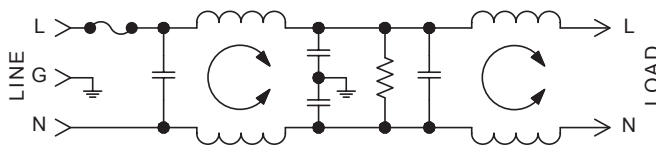
## Features:

- T Section, Dual Coil Design – High Insertion Loss for Switching Power Supply Emissions
- Low-Leakage Current Design
- Space-Efficient with Integral IEC Connector and Compact Case in Current Ratings up to 10Amps
- Available in Fused IEC Connector and PC Mounted Versions

## F1600CX Simplified Schematic



## F1600FA Simplified Schematic



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

<b>Rated Current:</b>	115VAC	250VAC
	3A	1.5A
	6A	3A
	10A	6A

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground	1500VAC
Line to Line	1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

- A: QC – Quick Connect
- B: Wire
- C: IEC Receptacle
- F: Fused IEC
- P: PCB Pins

### Maximum Leakage Current:

Each Line to Ground	<b>F1600</b>
115VAC, 60Hz:	0.25mA
250VAC, 50Hz:	0.40mA

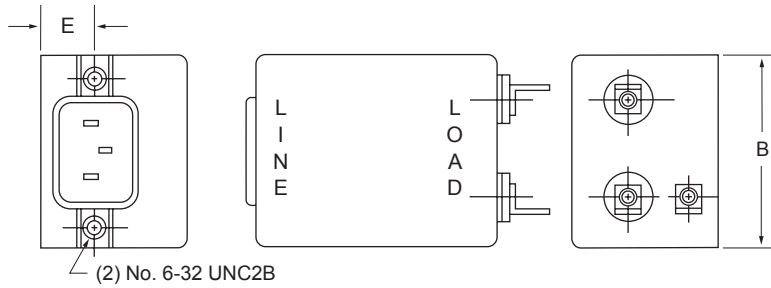
### Agency Approvals:



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F1600CA03 F1600CP03 F1600FA03 F1600CB03	IEC/QC IEC/PC Fused IEC/QC IEC/Wire	Common	52	65	65	65	65	65
			Differential	40	50	60	65	65	50
6A	F1600CA06 F1600CP06 F1600FA06 F1600CB06	IEC/QC IEC/PC Fused IEC/QC IEC/Wire	Common	45	65	65	65	65	59
			Differential	30	45	55	50	50	50
10A	F1600CA10 F1600CB10	IEC/QC IEC/Wire	Common	50	65	65	65	65	54
			Differential	23	45	55	50	50	50

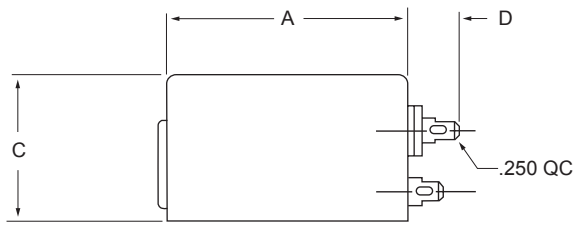
NOTE: Other combinations of terminals may be specified on special order.

**F1600CA** (3, 6 and 10Amp) Dimensions **F1600CB** (3, 6 and 10Amp) Dimensions



Refer to Page 40  
for Standard  
Mounting Cutouts

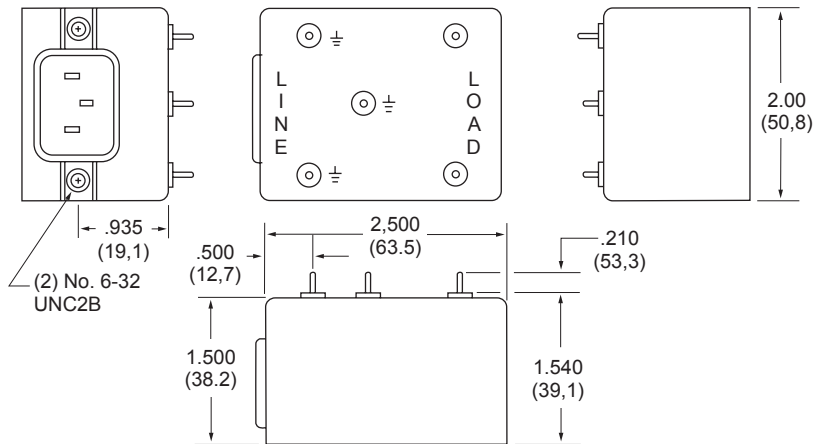
(2) No. 6-32 UNC2B



Amps	A	B	C	D	E
3A	2.500 (63,5)	2.000 (50,8)	1.500 (38,2)	.550 (14,0)	.565 (14,3)
6A	2.500 (63,5)	2.000 (50,8)	1.500 (38,2)	.550 (14,0)	.565 (14,3)
10A	3.750 (95,2)	2.250 (57,2)	1.750 (44,5)	.550 (14,0)	.640 (16,3)

**F1600CP**  
(3 and 6Amp)  
Dimensions

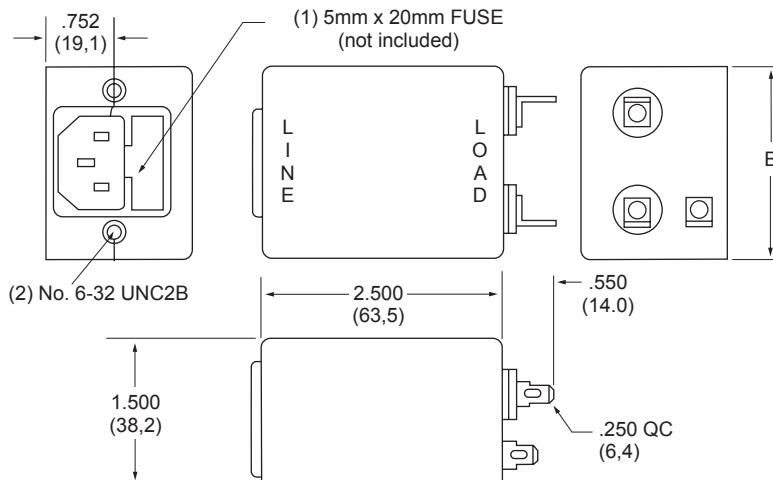
Refer to Page 40  
for Standard  
Mounting Cutouts



(2) No. 6-32  
UNC2B

**F1600FA**  
(3 and 6Amp)  
Dimensions

Refer to Page 40  
for Standard  
Mounting Cutouts



(2) No. 6-32 UNC2B

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

# F1700/F1799 RFI Filters

High Performance

## Features:

- General Purpose — Designed for Applications with Higher Differential Mode Noise
- Higher Line-to-Line Capacitance for Protection from Pulsed, Intermittent or Continuous RFI
- A Cost-Effective Replacement for Independent Coil Design in Many SMPS Applications
- Available with Integral IEC Connector



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

<b>Rated Current:</b>	115VAC	250VAC
	3A	2.5A
	6A	4A
	10A	6A
	20A	10A
30A	15A	

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground	1500VAC
Line to Line	1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

A: QC – Quick Connect	C: IEC Receptacle
B: Wire	D: Screw

### Maximum Leakage Current:

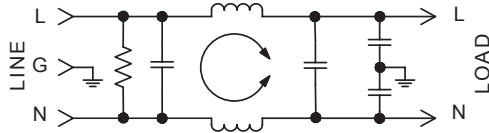
Each Line to Ground	F1700	F1710	F1720	F1740	F1799
115VAC, 60Hz:	0.40mA	.15mA	.002mA	.060mA	0.25mA
250VAC, 50Hz:	0.75mA	.25mA	.005mA	.120mA	0.45mA

### Agency Approvals:

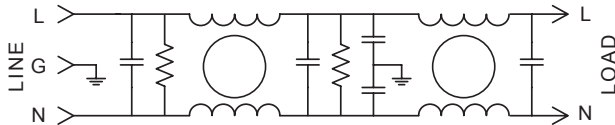


E78454    064179    72031235  
Except F1700DD30

## F1700 Simplified Schematic



## F1799 Simplified Schematic

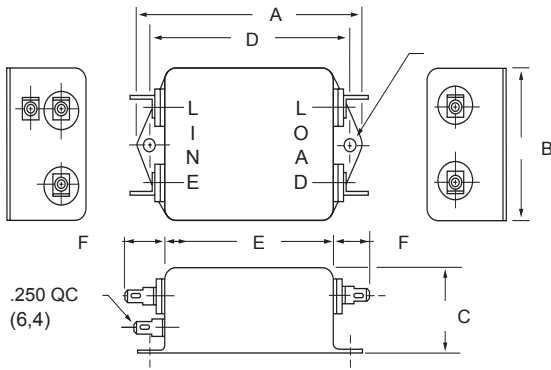


SINGLE PHASE FILTERS

Nominal Current Rating	Part Number	Termination Line/Load	MODE	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)					
				.15	.50	1.0	5.0	10	30
3A	F1700AA03	QC/QC	Common	20	35	43	52	55	50
	F1700BB03	Wire/Wire	Differential	25	60	65	65	50	50
	F1700CA03	IEC/QC							
	F1710AA03	QC/QC	Common	20	34	40	45	45	40
6A	F1720AA03	QC/QC	Differential	35	60	65	60	55	40
	F1740AA03	QC/QC	Common	20	30	35	35	35	40
	F1700AA06	QC/QC	Differential	15	50	65	60	60	45
	F1700BB06	Wire/Wire							
10A	F1700CA06	IEC/QC							
	F1700AA10	QC/QC	Common	10	22	30	46	50	45
	F1700BB10	Wire/Wire	Differential	20	45	60	65	60	55
20A	F1700CA10	IEC/QC							
	F1700AA20	QC/QC	Common	10	22	30	42	47	40
30A	F1700DD20	Screw/Screw	Differential	15	45	60	65	60	55
	F1720DD20								
30A	F1700DD30	Screw/Screw	Common	7	15	20	34	42	40
	F1799DD30	Screw/Screw	Differential	15	45	65	65	60	55
30A	F1799DD30	Screw/Screw	Common	10	45	55	60	60	50
	F1799DD30	Screw/Screw	Differential	15	65	65	65	60	55

NOTE: Other combinations of terminals may be specified on special order.

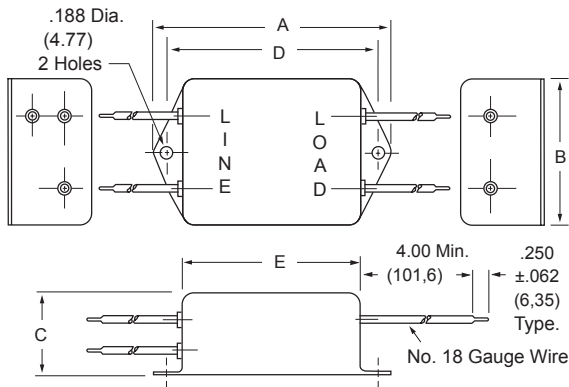
### F1700AA, 1710, 1720, 1740 (3, 6 and 10Amp) Dimensions



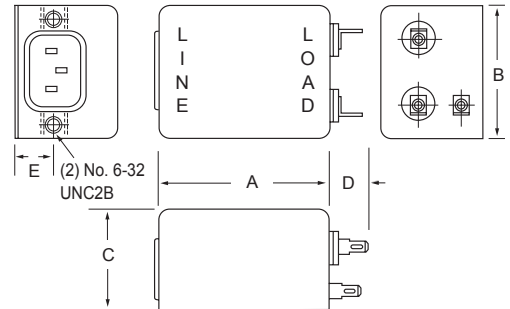
Amps	A	B	C	D	E	F
3A	2.750 (69,8)	1.750 (44,4)	1.125 (28,5)	2.375 (60,3)	2.000 (50,8)	.550 (14,0)
6A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
10A	3.312 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
20A	See 1700DD20 for Case Dimensions					

### F1700BB (3, 6 and 10Amp) Dimensions

Amps	A	B	C	D	E
3A	2.750 (69,8)	1.750 (44,4)	1.125 (28,5)	2.375 (60,3)	2.000 (50,8)
6A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	2.500 (63,5)
10A	3.312 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	2.500 (63,5)



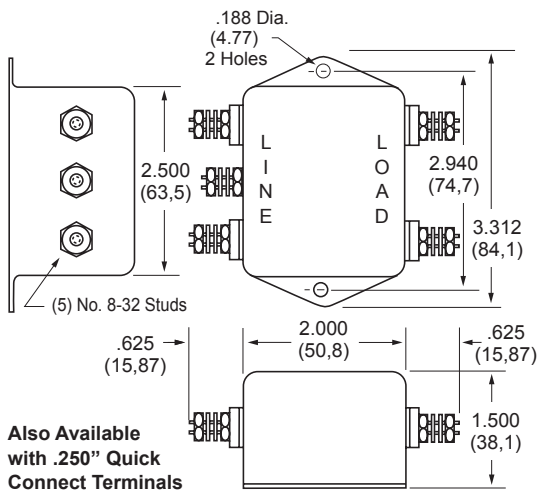
### F1700CA (3, 6 and 10Amp) Dimensions



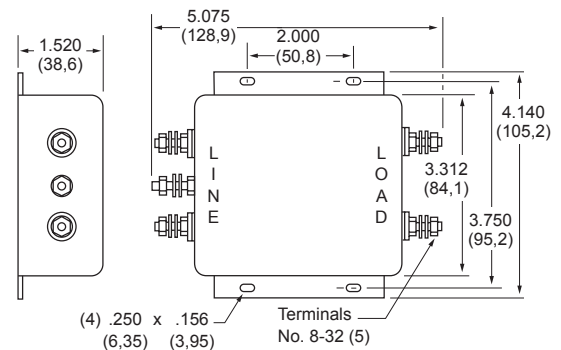
Refer to Page 40 for Standard Mounting Cutouts

Amps	A	B	C	D	E
3A	2.000 (50,8)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
6A	2.500 (63,5)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)
10A	2.500 (63,5)	2.000 (50,8)	1.500 (38,1)	.550 (14,0)	.565 (14,3)

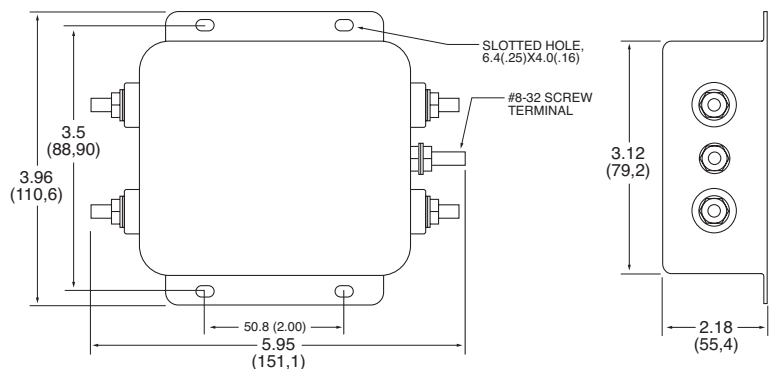
### F1700DD20 (20Amp) Dimensions



### F1700DD30 (30Amp) Dimensions



### F1799DD (30Amp) Dimensions



Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



# F1760/F1770/F1780 RFI Filters

High Performance

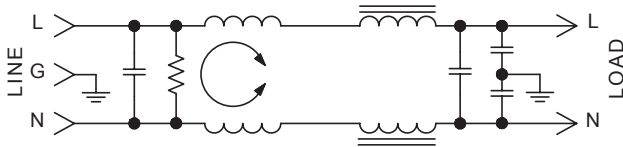
SINGLE PHASE FILTERS



## Features:

- Designed for Applications Where Switching Power Supplies, SCR's and TTL Circuits Are Utilized
- Protection from Pulsed, Intermittent or Continuous RFI
- Effective CM and DM Suppression for Most FCC VDE Requirements Down to 150KHz
- Available in Stud and Quick Connect Terminal Versions

## F1760 Simplified Schematic



## Specifications:

**Rated Voltage:** 250VAC, Maximum - 50/60 Hz

**Rated Current:** 115VAC 250VAC  
20A 14A

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground 1500VAC  
Line to Line 1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

A: QC – Quick Connect  
D: Screw

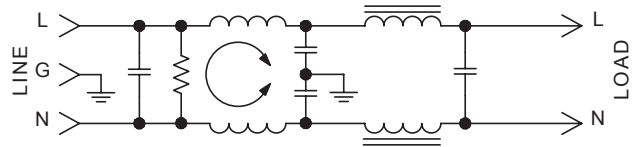
### Maximum Leakage Current:

Each Line to Ground **F1760/1770/1780**  
115VAC, 60Hz: 0.5mA  
250VAC, 50Hz: 1.0mA

### Agency Approvals:

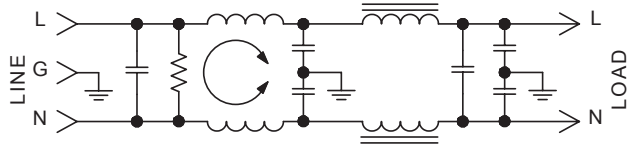


## F1770 Simplified Schematic



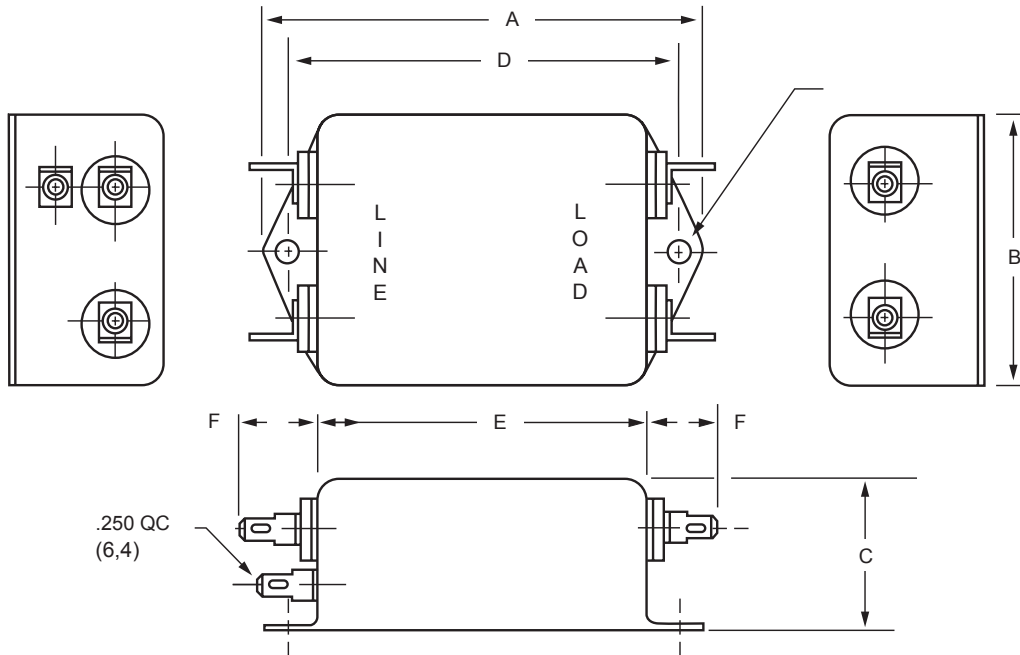
Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)								
			MODE	Frequency - MHz							
				.15	.50	1.0	5.0	10	20	30	
3A	F1760AA03	QC/QC	Common	15	30	40	45	50	45	45	
	F1760DD03	Screw/Screw		Differential	40	65	65	60	55	55	55
3A	F1780AA03	QC/QC	Common	13	25	40	60	60	55	50	
	F1780DD03	Screw/Screw		Differential	40	65	65	62	55	45	45
6A	F1760AA06	QC/QC	Common	15	30	35	35	44	43	42	
	F1760DD06	Screw/Screw		Differential	40	65	65	65	53	52	50
6A	F1780AA06	QC/QC	Common	13	30	40	65	65	53	48	
	F1780DD06	Screw/Screw		Differential	40	65	65	62	55	45	45
10A	F1760AA10	QC/QC	Common	15	30	35	50	50	40	40	
	F1760DD10	Screw/Screw		Differential	40	65	65	55	50	50	50
10A	F1780AA10	QC/QC	Common	13	20	35	65	65	55	50	
	F1780DD10	Screw/Screw		Differential	40	65	65	62	55	45	45
20A	F1760AA20	QC/QC	Common	12	25	31	42	47	50	40	
	F1760DD20	Screw/Screw		Differential	41	65	65	65	60	60	55
20A	F1780AA20	QC/QC	Common	12	30	32	60	60	60	55	
	F1780DD20	Screw/Screw		Differential	41	65	65	65	60	60	55

**F1780 Simplified Schematic**

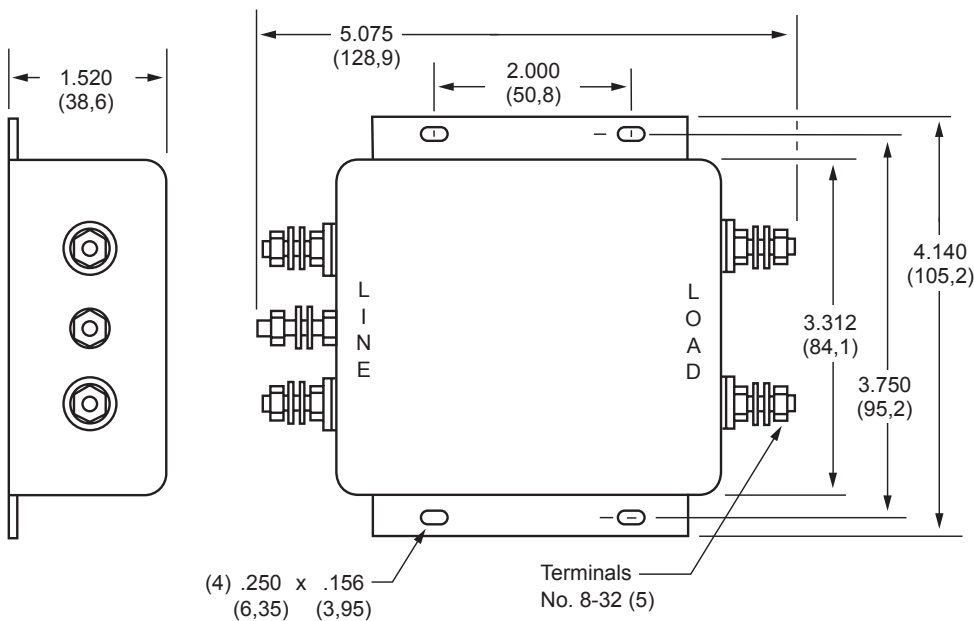


Amps	A	B	C	D	E	F
3A	2.750 (69,8)	1.750 (44,4)	1.125 (28,5)	2.375 (60,3)	2.000 (50,8)	.550 (14,0)
6A	3.312 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
10A	3.312 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)

**F1760/F1770/1780AA**  
(3, 6, and 10Amp) Dimensions



**F1760/F1770/1780** (20Amp Only) Dimensions



Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

# F2800 RFI Filters

High Performance

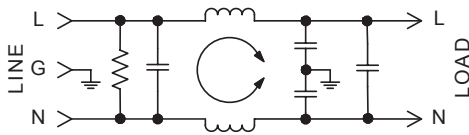
SINGLE PHASE FILTERS



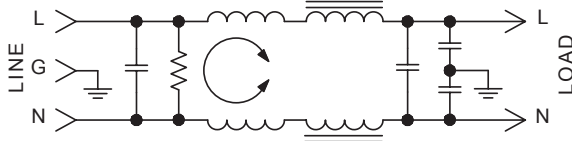
## Features:

- Designed for VDE "A" and FCC "B" Switching Power Supply Applications
- Low-Leakage Current
- Compact Case Sizes in Current Ratings up to 15A
- Effective Reduction of Common Mode and Differential Mode Noise from 100KHz to 30MHz

## F2800 Simplified Schematic 3 & 6Amp



## F2800 Simplified Schematic 10 & 15Amp



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

<b>Rated Current:</b>	115VAC	250VAC
	3A	1.5A
	6A	4A
	10A	6A
	15A	12A

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground	1500VAC
Line to Line	1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

A: QC – Quick Connect  
B: Wire

### Maximum Leakage Current:

Each Line to Ground	<b>F2800</b>
115VAC, 60Hz:	0.25mA
250VAC, 50Hz:	0.40mA

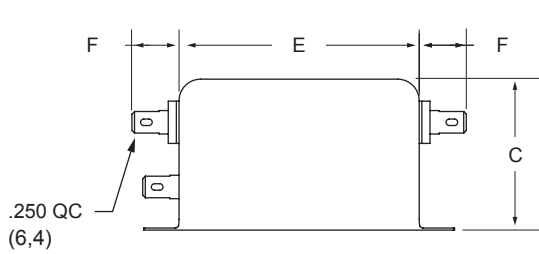
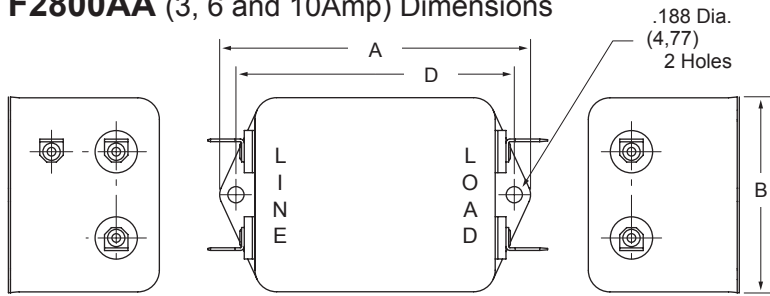
### Agency Approvals:



E78454 064179 72031309

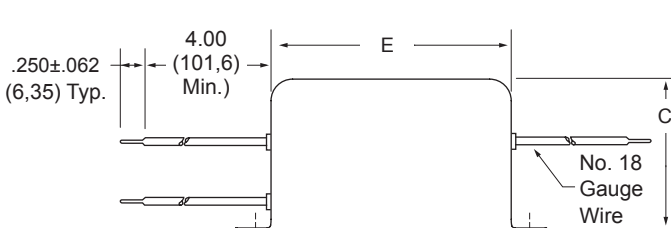
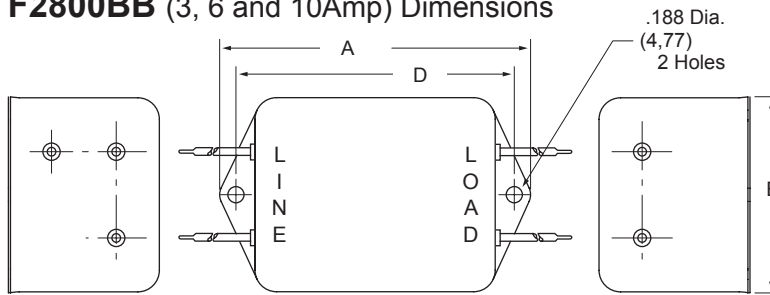
Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)										
			MODE	Frequency - MHz									
				.01	.05	.15	.50	1.0	5.0	10	30		
3A	F2800AA03 F2800BB03	QC/QC Wire/Wire	Common	10	30	35	35	35	40	45	50		
			Differential	5	25	50	60	65	50	45	45		
6A	F2800AA06 F2800BB06	QC/QC Wire/Wire	Common	5	20	30	35	40	40	40	50		
			Differential	5	10	40	60	60	50	50	45		
10A	F2800AA10 F2800BB10	QC/QC Wire/Wire	Common	5	15	25	30	35	40	45	50		
			Differential	7	20	50	60	60	60	60	55		
15A	F2800AA15 F2800BB15	QC/QC Wire/Wire	Common	8	21	29	33	36	38	45	50		
			Differential	10	30	70	70	70	70	70	60		

**F2800AA (3, 6 and 10Amp) Dimensions**



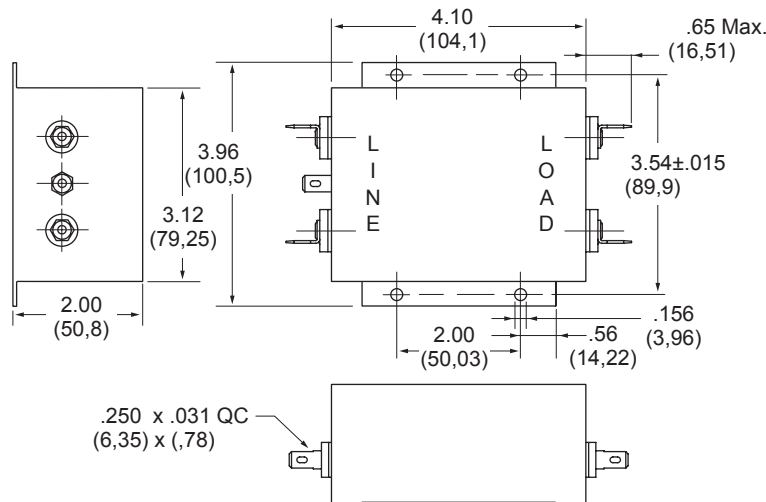
Amps	A	B	C	D	E	F
3A	3.310 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
6A	3.310 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
10A	4.44 (113)	2.250 (57,1)	1.750 (44,4)	4.063 (103,2)	3.630 (92,2)	.650 (16,5)

**F2800BB (3, 6 and 10Amp) Dimensions**



Amps	A	B	C	D	E
3A	3.310 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	2.500 (63,5)
6A	3.310 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	2.500 (63,5)
10A	4.690 (119)	2.250 (57,1)	1.750 (44,4)	4.063 (103,2)	3.630 (92,2)

**F2800AA  
F2800BB  
(15Amp)  
Dimensions**

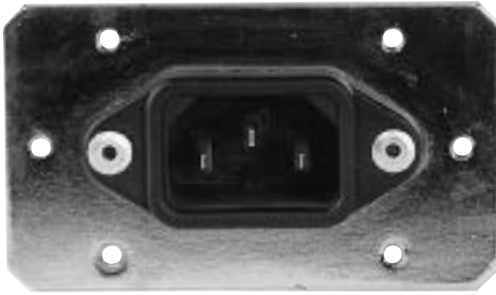


Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

# F5100 RFI Filters

Wide Band

SINGLE PHASE FILTERS



Ideal for Linear Power Supplies in Digital Equipment

### Features:

- General Purpose Filter with Extended High-Frequency Insertion Loss Characteristics
- Effective Suppression of Incoming Common Mode and Differential Mode Noise
- Low-Profile Package with Integral IEC Connector
- Available in 3, 6 and 10Amp Ratings

Nominal Current Rating	Part Number	Termination Line/Load
3A	F5100CG03	IEC/ Solder Tab
6A	F5100CG06	IEC/ Solder Tab
10A	F5100CG10	IEC/ Solder Tab

### Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**

115VAC	250VAC
3A	1.5A
6A	4A
10A	6A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground	1400VDC
Line to Line	1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- C: IEC Receptacle
- G: Wire Wrap/Solder

**Maximum Leakage Current:**

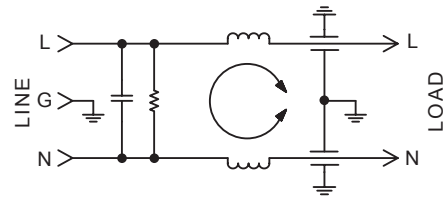
Each Line to Ground	<b>F5100</b>
115VAC, 60Hz:	0.25mA
250VAC, 60Hz:	0.50mA

**Agency Approvals:**

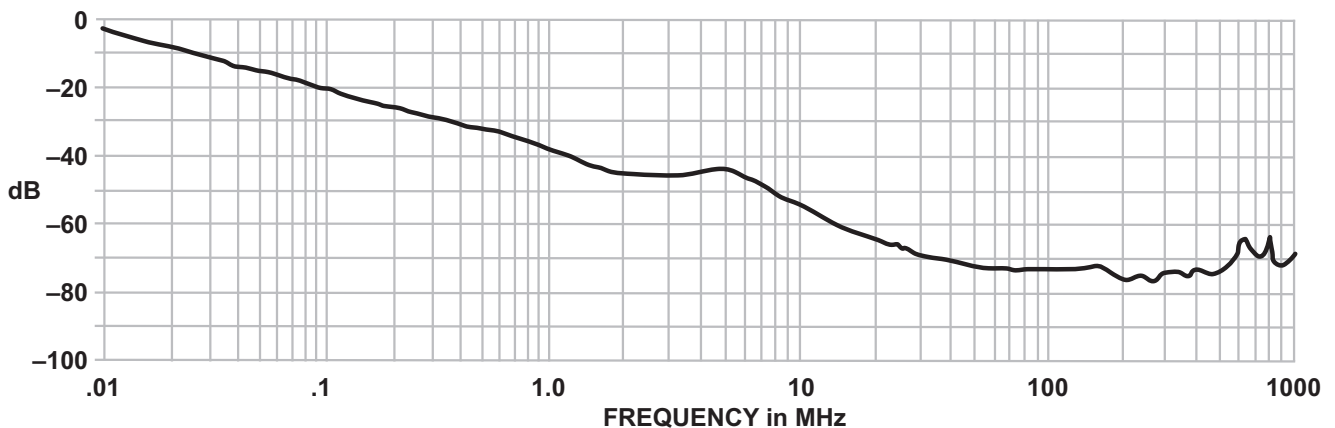


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### F5100 Simplified Schematic

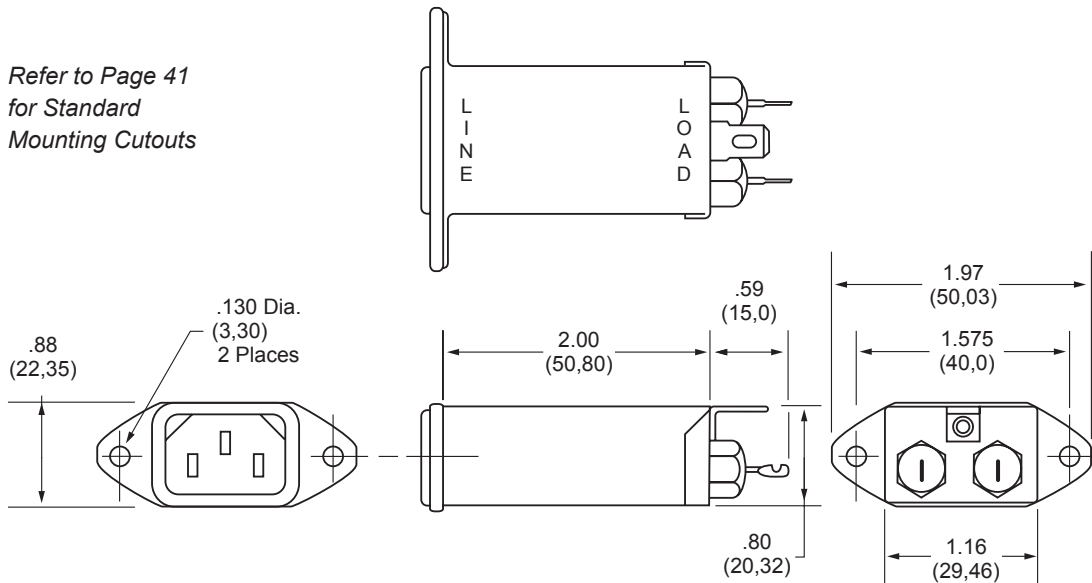


F5100 SERIES  
TYPICAL COMMON MODE  
INSERTION LOSS — dB  
(50 OHM CIRCUIT)

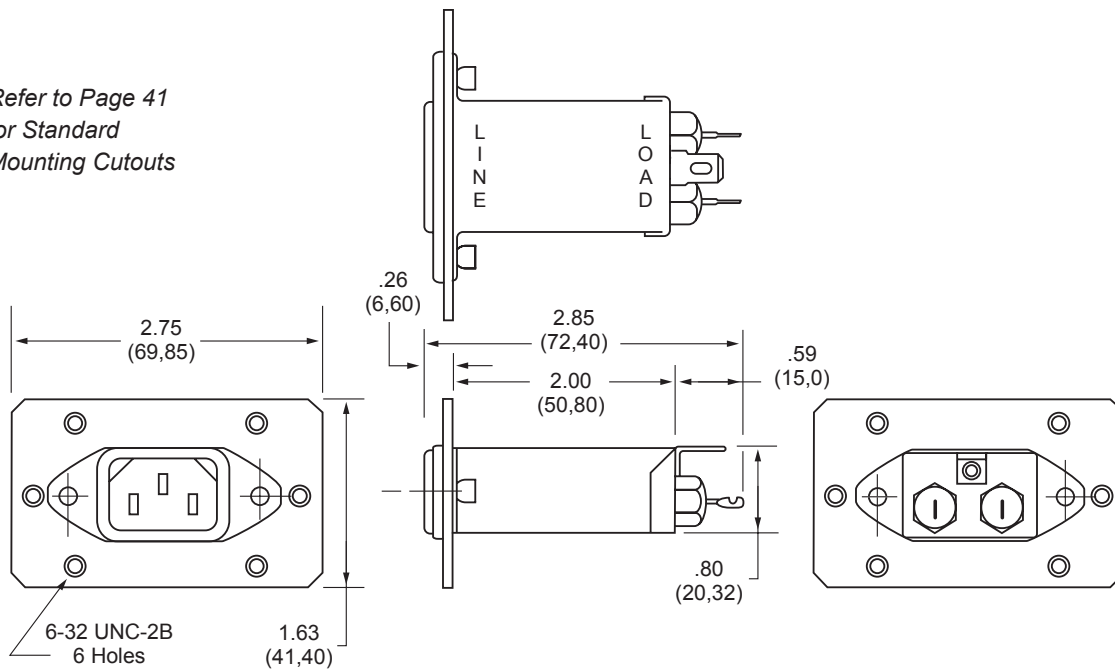


**F5100CG** (3, 6 and 10Amp) Dimensions

Refer to Page 41  
for Standard  
Mounting Cutouts

**F5101CG** (3, 6 and 10Amp) Dimensions with attached mounting plate

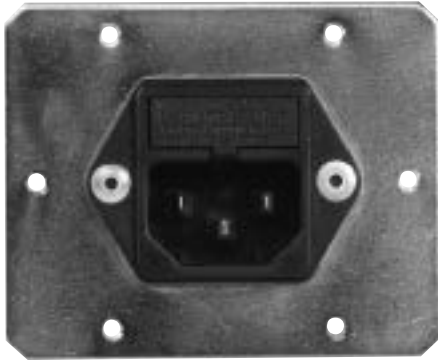
Refer to Page 41  
for Standard  
Mounting Cutouts



# F5200 RFI Filters

Wide Band

SINGLE PHASE FILTERS



Ideal for Linear Power Supplies in Digital Equipment

### Features:

- General Purpose Filter with Extended High-Frequency Insertion Loss Characteristics
- Effective Suppression of Incoming Common Mode and Differential Mode Noise
- Low-Profile Package with Integral IEC Connector
- Available in 3 and 6Amp Ratings

Nominal Current Rating	Part Number	Termination Line/Load
3A	F5200FG03	Fused IEC/ Solder Tab
6A	F5200FG06	Fused IEC/ Solder Tab

### Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**           115VAC   250VAC  
                                  3A         1.5A  
                                  6A         4A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground    1400VDC  
Line to Line       1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

F: Fused IEC Receptacle  
G: Wire Wrap/Solder

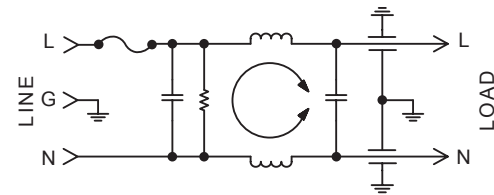
**Maximum Leakage Current:**

Each Line to Ground   **F5200**  
115VAC, 60Hz:         0.25mA  
250VAC, 60Hz:         0.50mA

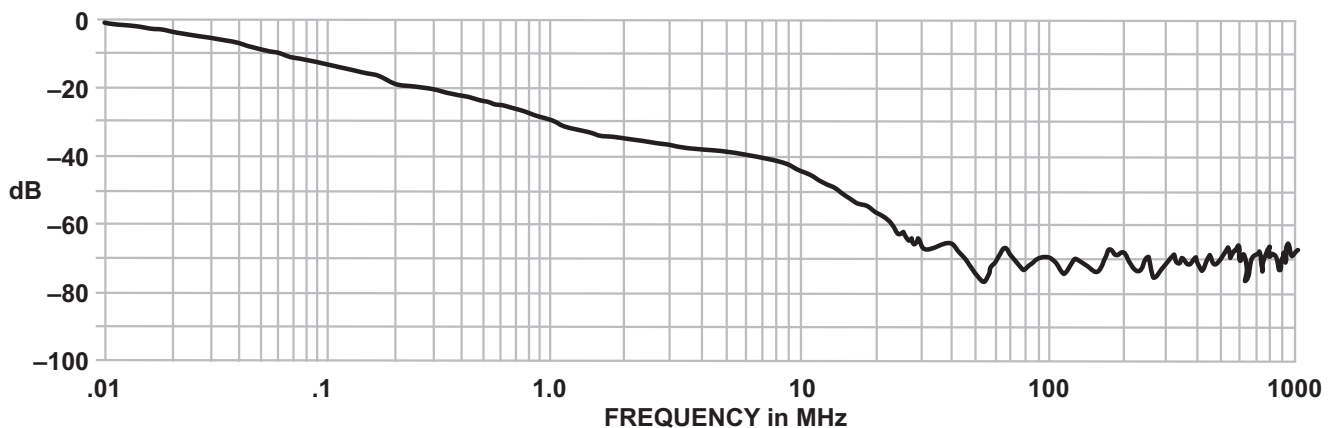
**Agency Approvals:**



### F5200 Simplified Schematic

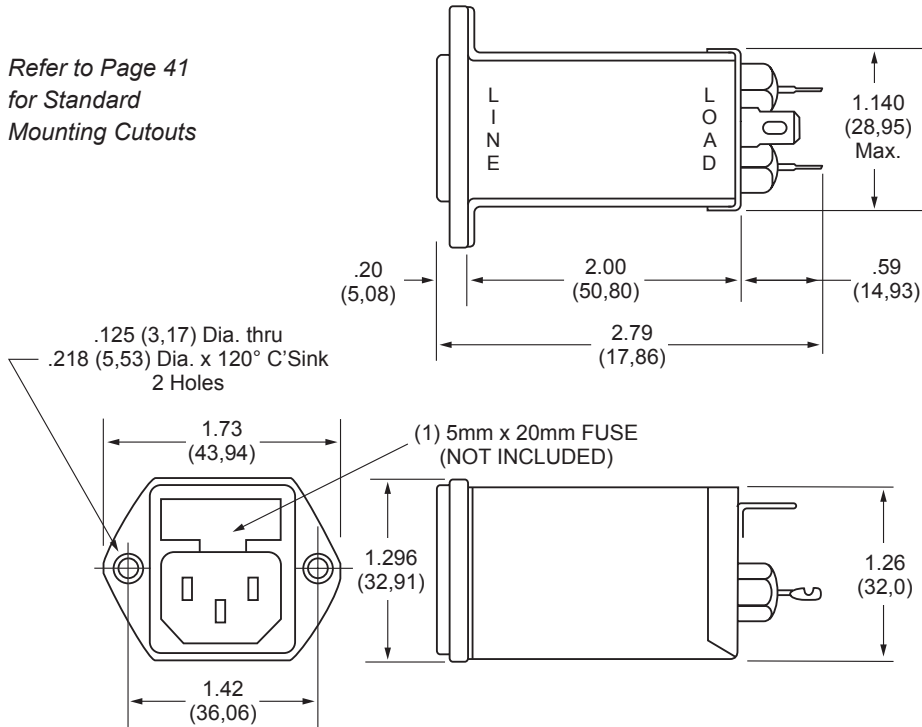


**F5200 SERIES  
TYPICAL COMMON MODE  
INSERTION LOSS — dB  
(50 OHM CIRCUIT)**

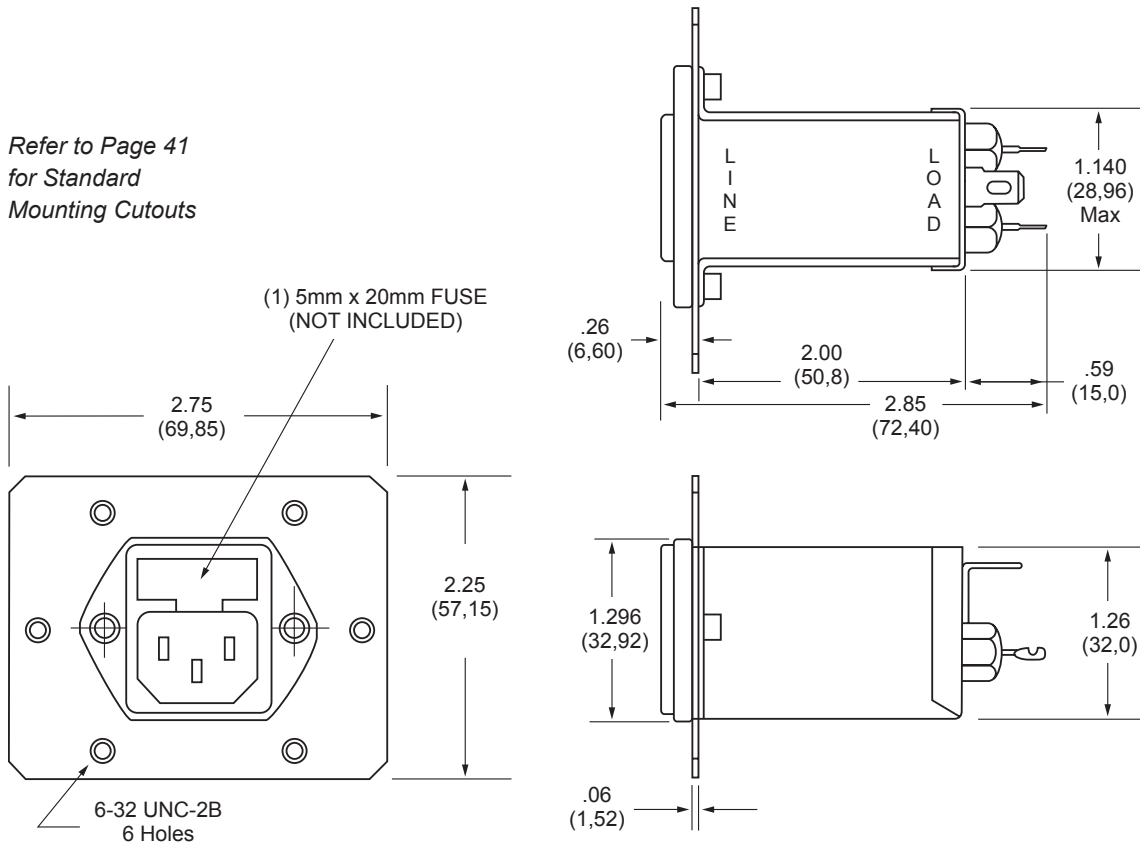


**F5200FG (3 and 6Amp) Dimensions**

Refer to Page 41  
for Standard  
Mounting Cutouts

**F5201FG (3 and 6Amp) Dimensions with attached mounting plate**

Refer to Page 41  
for Standard  
Mounting Cutouts



Dimensions are in inches and millimeters  
unless otherwise specified.  
Values in parentheses are metric equivalents.



# F5500 RFI Filters

Wide Band

SINGLE PHASE FILTERS

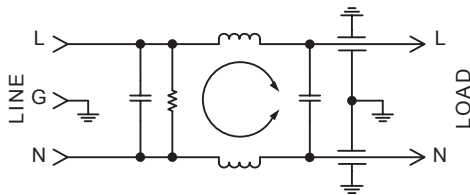


Ideal for Linear and Switching Power Supplies

## Features:

- FCC and VDE Level "A" Applications
- High Inductance Single Coil Design Provides High Common Mode and Differential Mode Performance Above 150KHz
- High-Frequency Construction Techniques Maintain >50dB Insertion Loss from 10MHz to 1GHz
- Compact, Space-Saving Package Available in 3, 6 and 10-Amp Ratings

## F5500 Simplified Schematic



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**

115VAC	250VAC
3A	3A
6A	4A
10A	6A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground	1400VDC
Line to Line	1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

C: IEC Receptacle  
G: Wire Wrap/Solder

**Maximum Leakage Current:**

Each Line to Ground	<b>F5500</b>
115VAC, 60Hz:	0.25mA
250VAC, 60Hz:	0.50mA

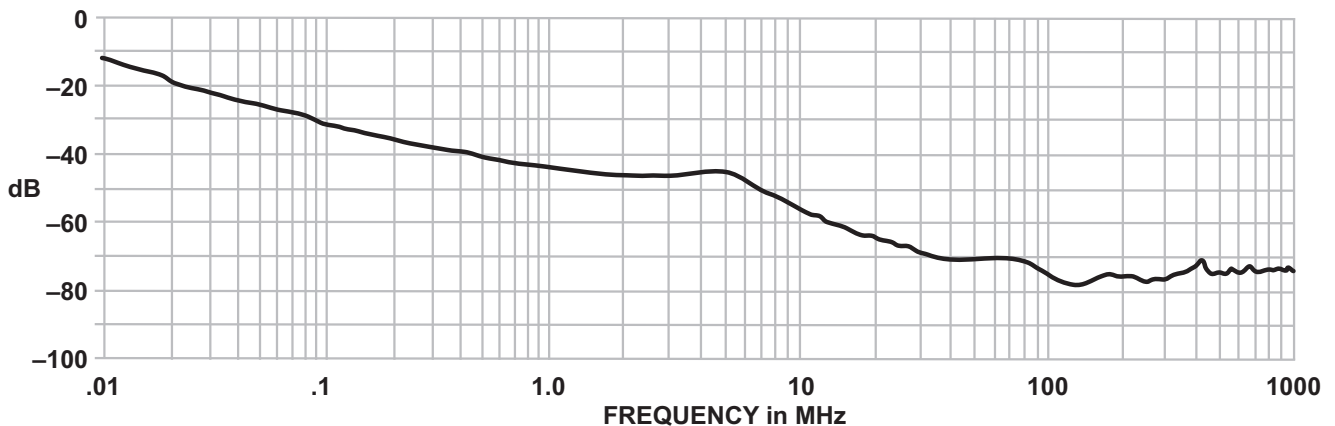
**Agency Approvals:**



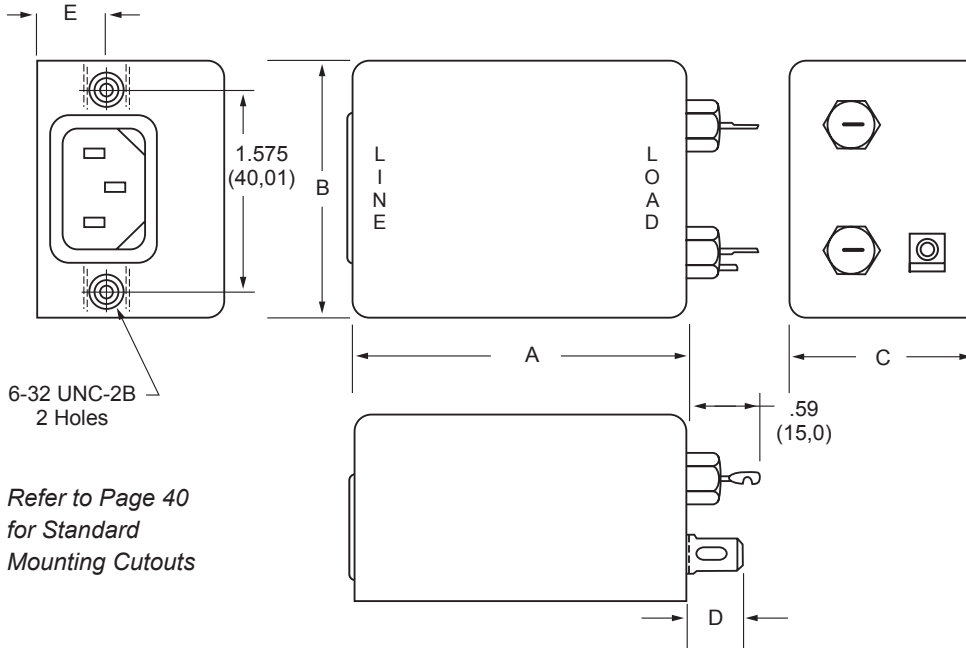
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Nominal Current Rating	Part Number	Termination Line/Load
3A	F5500CG03	IEC/ Solder Tab
6A	F5500CG06	IEC/ Solder Tab
10A	F5500CG10	IEC/ Solder Tab

**F5500 SERIES  
TYPICAL COMMON MODE  
INSERTION LOSS — dB  
(50 OHM CIRCUIT)**



**F5500CG** (3, 6 and 10Amp) Dimensions

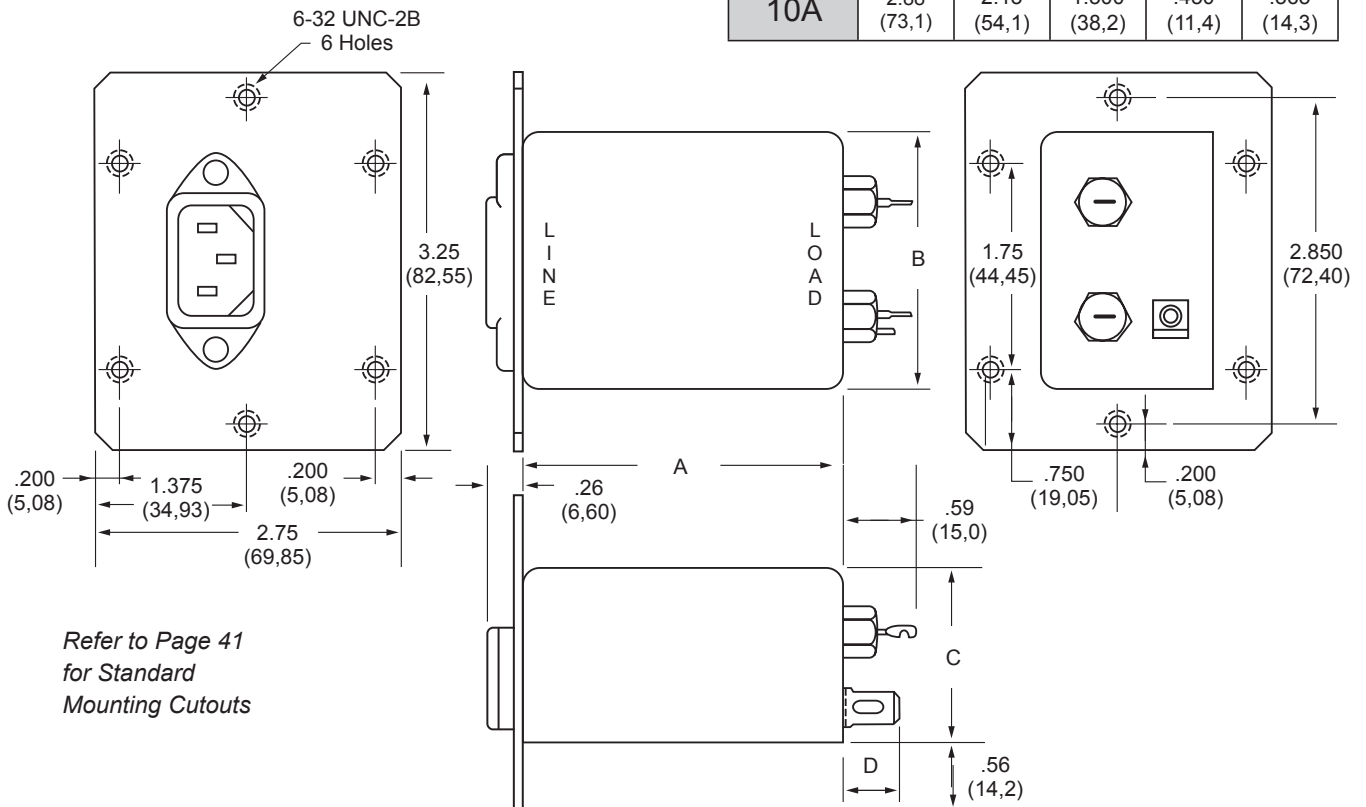


6-32 UNC-2B  
2 Holes

Refer to Page 40  
for Standard  
Mounting Cutouts

Amps	A	B	C	D	E
3A	2.000 (50,8)	2.000 (50,8)	1.500 (38,2)	.450 (11,4)	.565 (14,3)
6A	2.88 (73,1)	2.13 (54,1)	1.500 (38,2)	.450 (11,4)	.565 (14,3)
10A	2.88 (73,1)	2.13 (54,1)	1.500 (38,2)	.450 (11,4)	.565 (14,3)

**F5501CG** (3, 6 and 10Amp) Dimensions  
with attached mounting plate



6-32 UNC-2B  
6 Holes

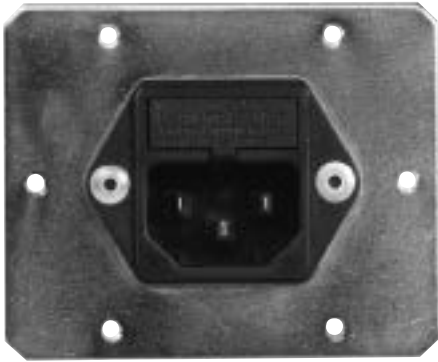
Refer to Page 41  
for Standard  
Mounting Cutouts

Dimensions are in inches and millimeters  
unless otherwise specified.  
Values in parentheses are metric equivalents.

# F5600 RFI Filters

Wide Band

SINGLE PHASE FILTERS



## Features:

- Suited for FCC "B" and VDE "A" Switching Power Supply Applications
- High Inductance, Multi-Stage Design with High Common Mode and Differential Mode Insertion Loss for Switching Power Supply Emissions
- >70dB Insertion Loss from 200KHz to 1GHz
- Compact, Space-Efficient Package Available in 3 and 6Amp Ratings

## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**

115VAC	250VAC
3A	1.5A
6A	4A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground	1400VDC
Line to Line	1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- C: IEC Receptacle
- F: Fused IEC Receptacle
- G: Wire Wrap/Solder

**Termination:** Quick Connect

**Maximum Leakage Current:**

Each Line to Ground	<b>F5600</b>
115VAC, 60Hz:	0.50mA
250VAC, 60Hz:	1.20mA

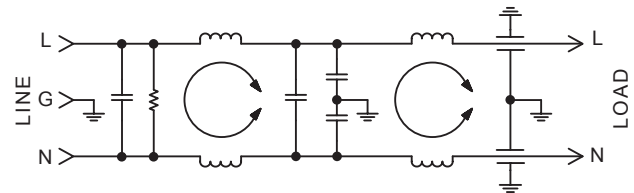
**Agency Approvals:**



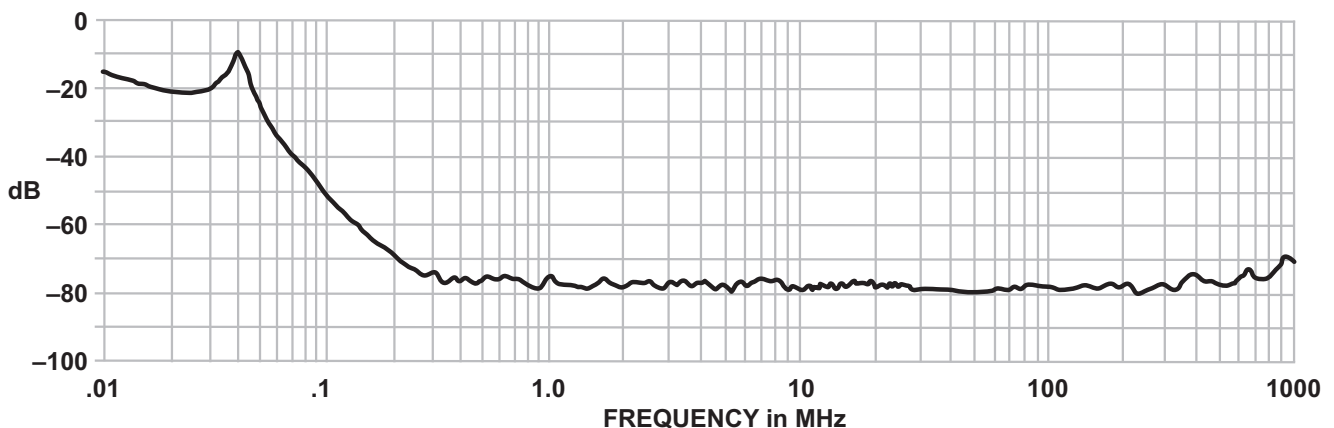
E78454

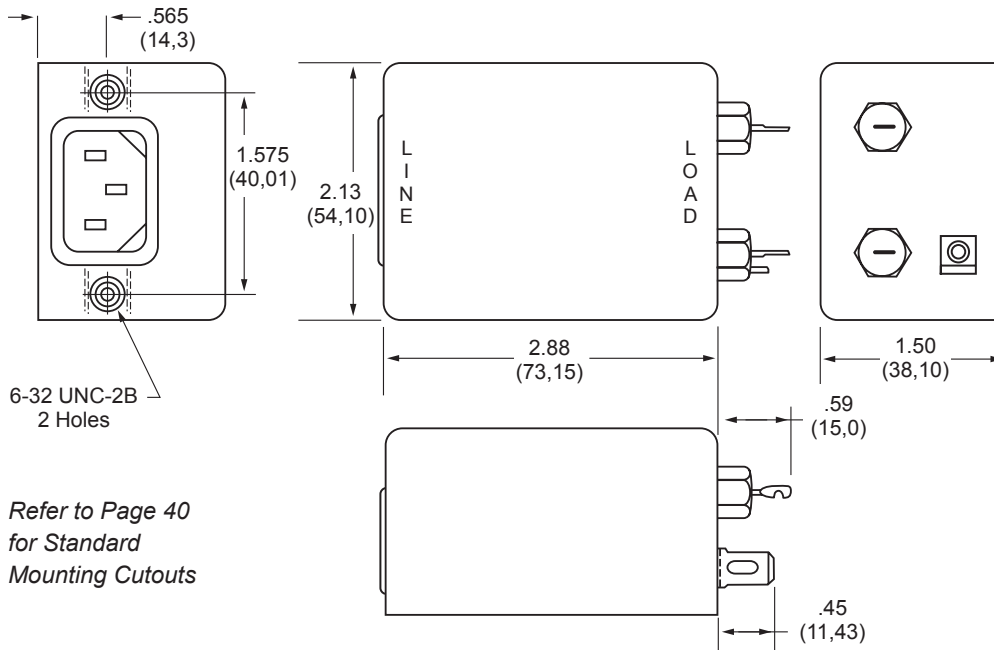
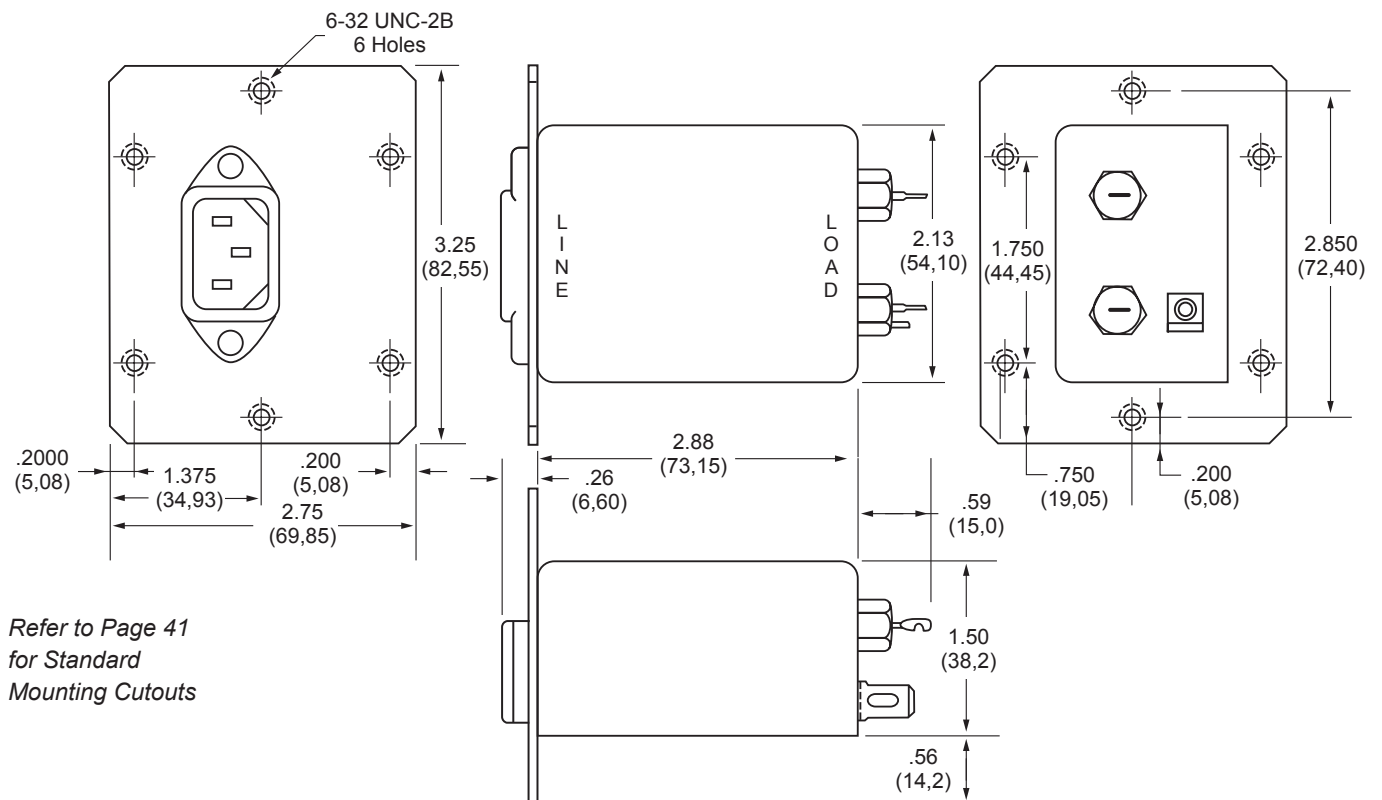
Nominal Current Rating	Part Number	Termination Line/Load
3A	F5600CG03	IEC/Solder Tab
	F5600FG03	Fused IEC/Solder Tab
6A	F5600CG06	IEC/Solder Tab
	F5600FG06	Fused IEC/Solder Tab

## F5600 Simplified Schematic



**F5600 SERIES  
TYPICAL COMMON MODE  
INSERTION LOSS — dB  
(50 OHM CIRCUIT)**



**F5600CG (3 and 6Amp) Dimensions****F5601CG (3 and 6Amp) Dimensions with attached mounting plate**

# F5700 RFI Filters

Wide Band

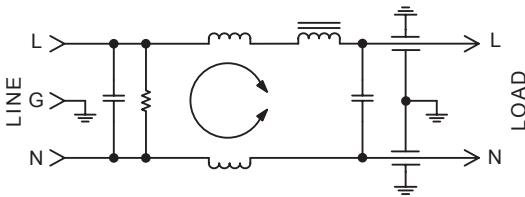
SINGLE PHASE FILTERS



## Features:

- Ideal for VDE "B" and MIL-STD-461 Switching Power Supply Applications
- Very High Inductance Design with Differential Mode Choke to Provide Improved Performance Below 100KHz
- Wide-Band Insertion Loss >60dB from 10MHz to 1GHz
- Compact, Space-Efficient Package Available in 3 and 6Amp Ratings

## F5700 Simplified Schematic



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:** 115VAC 250VAC  
3A 2A  
6A 4A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground 1400VDC  
Line to Line 1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

C: IEC Receptacle  
G: Wire Wrap/Solder

**Maximum Leakage Current:**

Each Line to Ground **F5700**  
115VAC, 60Hz: 0.50mA  
250VAC, 60Hz: 1.20mA

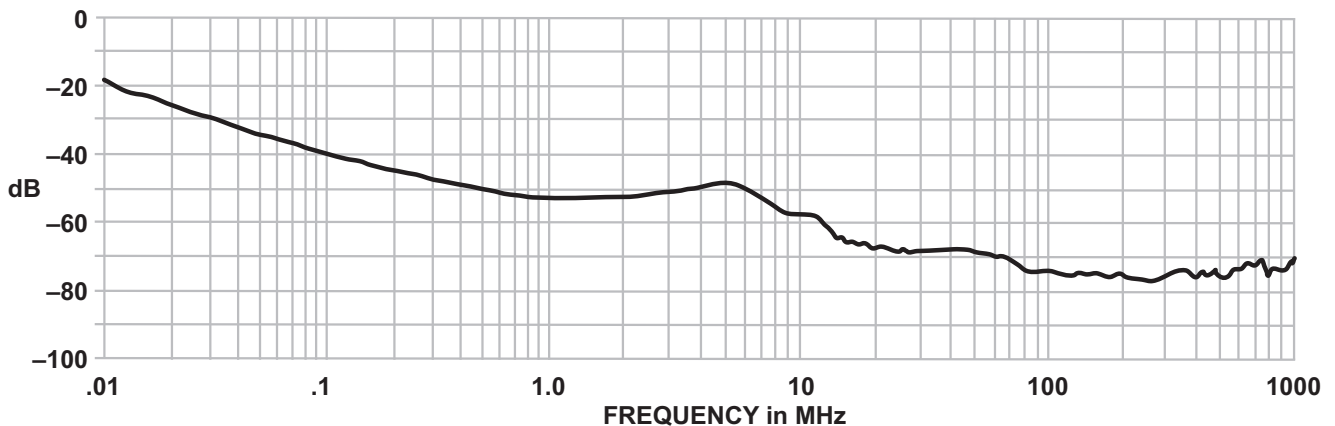
**Agency Approvals:**

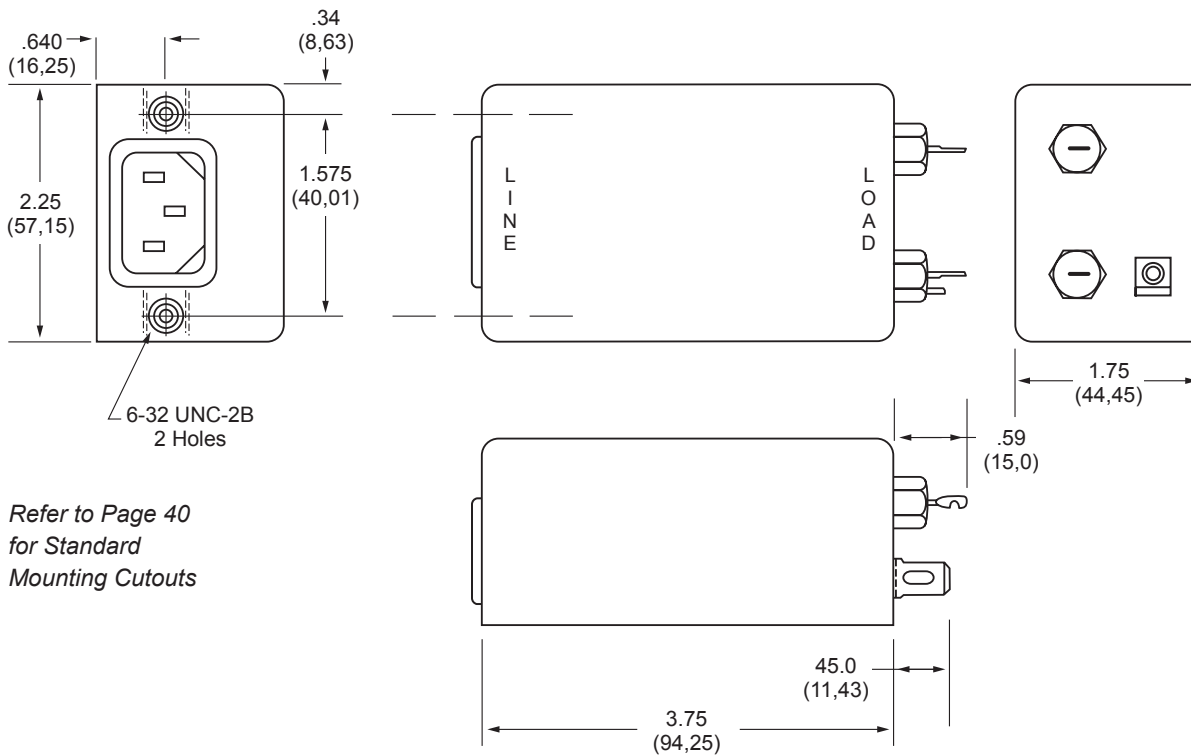
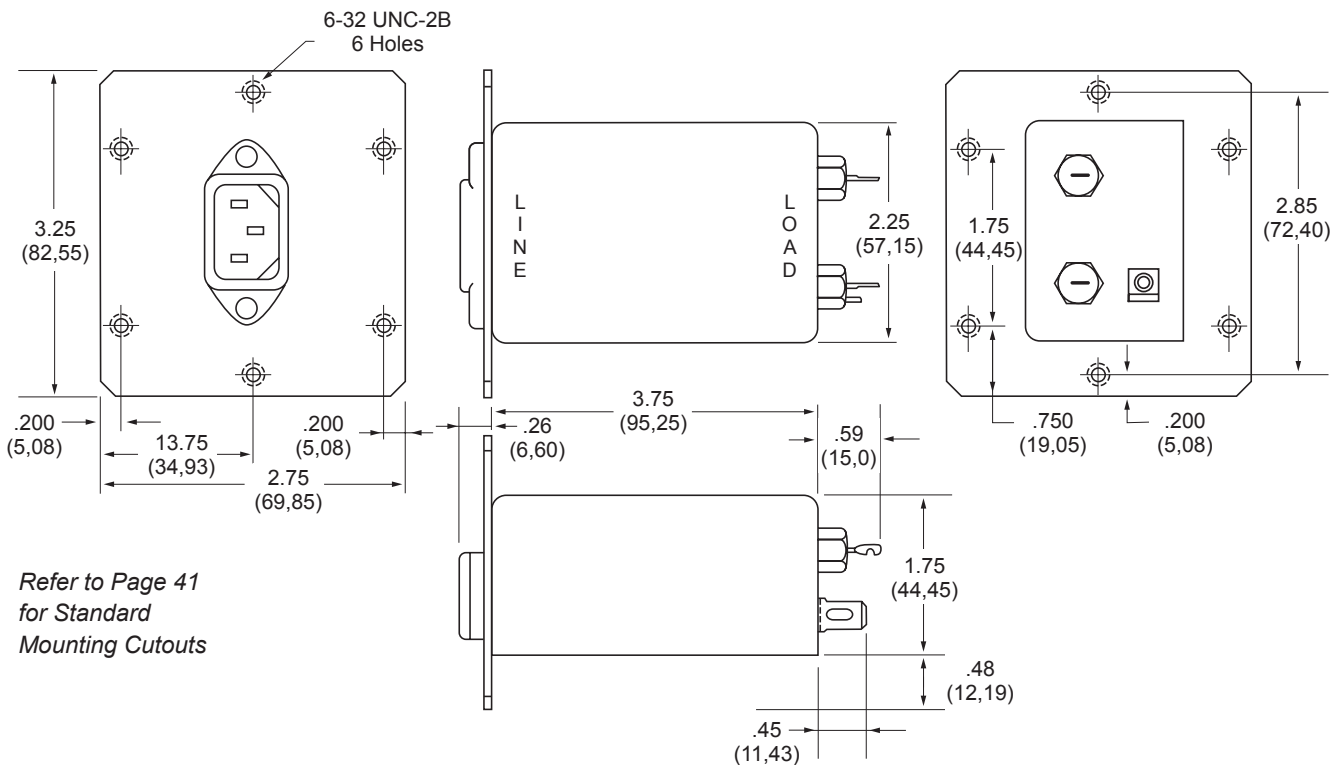


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Nominal Current Rating	Part Number	Termination Line/Load
3A	F5700CG03	IEC/ Solder Tab
6A	F5700CG06	IEC/ Solder Tab

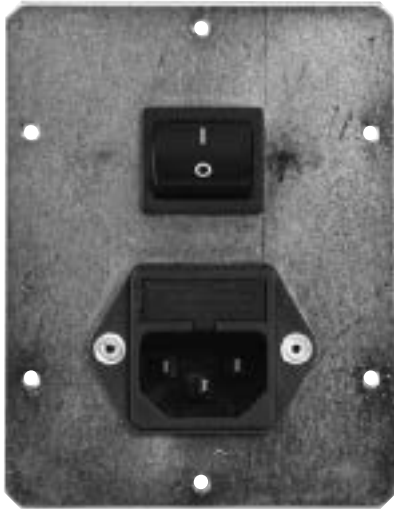
F5700 SERIES  
TYPICAL COMMON MODE  
INSERTION LOSS — dB  
(50 OHM CIRCUIT)



**F5700CG** (3 and 6Amp) Dimensions**F5701CG** (3 and 6Amp) Dimensions with attached mounting plate

# F5900 RFI Filters

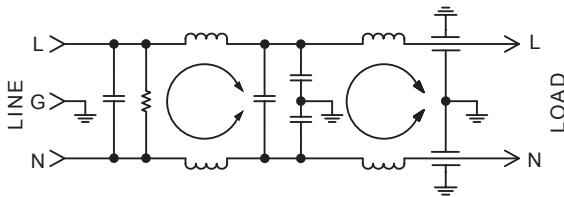
Wide Band



## Features:

- High Performance Filter Designed for Switching Power Supply Emissions
- >70dB Insertion Loss from 200KHz to 1GHz
- Integral Power Switch and 5 x 20mm Fuse Holder
- Available in 3 and 6Amp Versions with Optional Mounting Faceplates

## F5900 Simplified Schematic without Switch



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**

115VAC	250VAC
3A	1.5A
6A	4A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground	1500VDC
Line to Line	1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- C: IEC Receptacle
- F: Fused IEC
- G: Wire Wrap/Solder
- J: Switched IEC

**Maximum Leakage Current:**

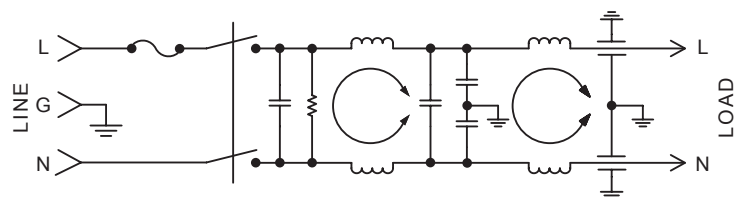
Each Line to Ground	<b>F5900</b>
115VAC, 60Hz:	0.50mA
250VAC, 60Hz:	1.20mA

**Agency Approvals:**

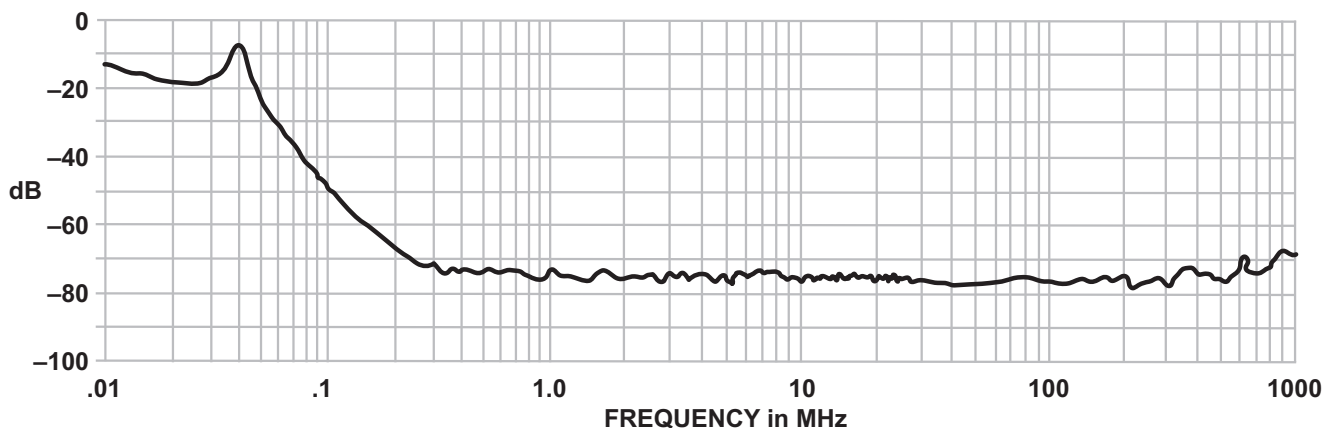


E78454

## F5900 Simplified Schematic with Switch

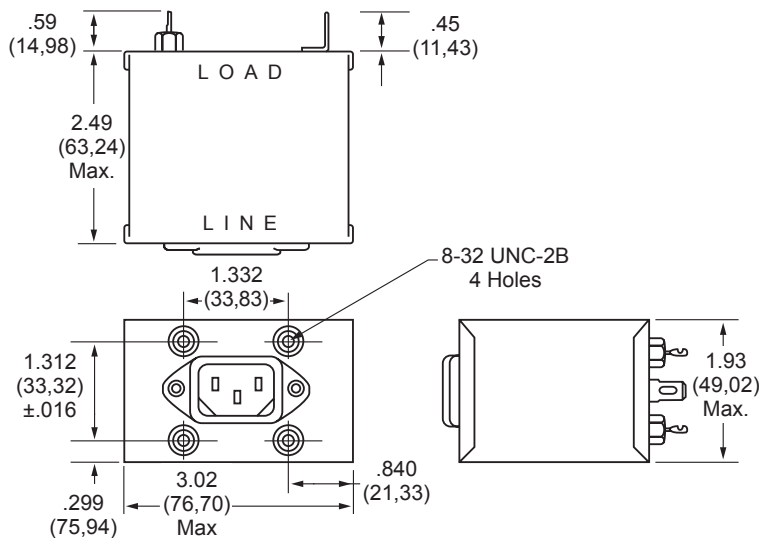


**F5900 SERIES  
TYPICAL COMMON MODE  
INSERTION LOSS — dB  
(50 OHM CIRCUIT)**



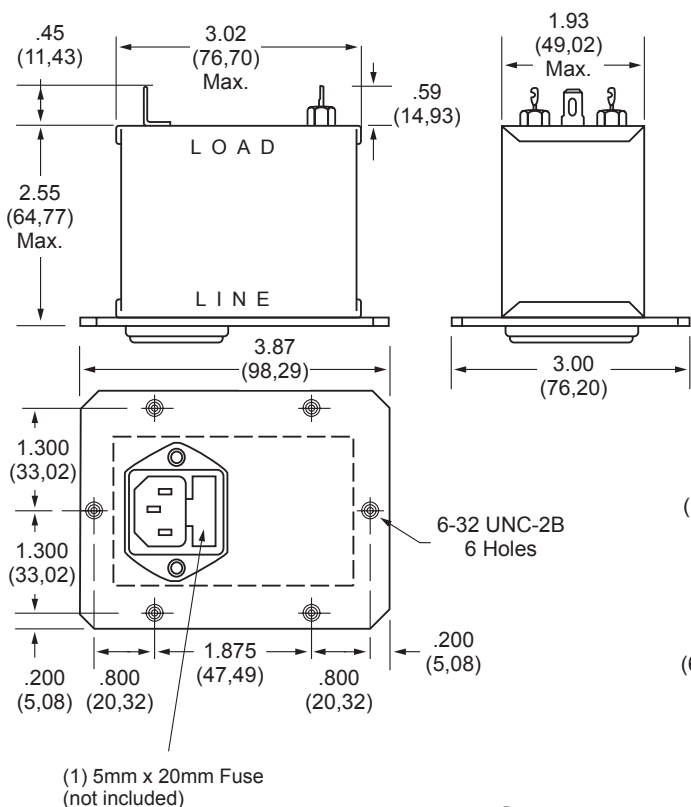
### F5900CG (3 and 6Amp) Dimensions

Refer to Page 42  
for Standard  
Mounting Cutouts



### F5900FG (3 and 6Amp) Dimensions

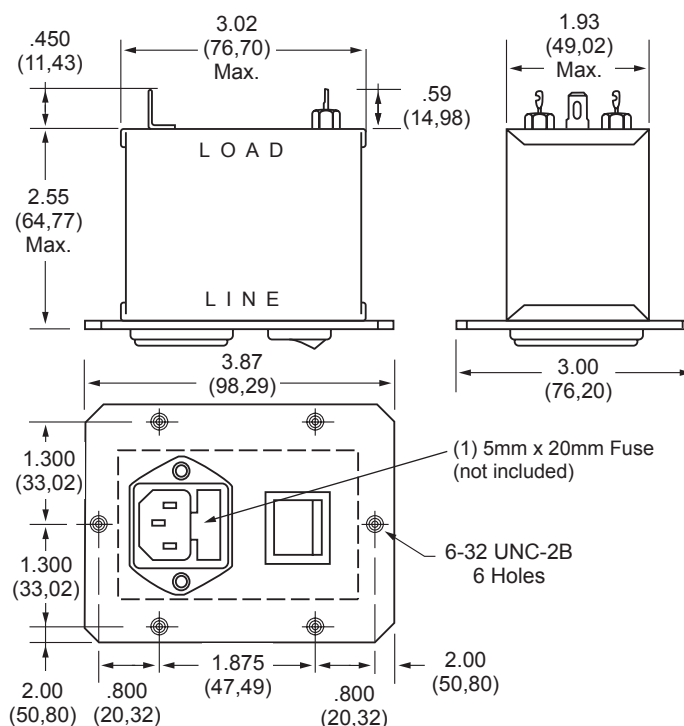
Refer to Page 42 for Standard Mounting Cutouts



Nominal Current Rating	Part Number	Termination Line/Load
3A	F5900CG03	IEC/Solder Tab
	F5900FG03	Fused IEC/Solder Tab
	F5900JG03	Switched IEC/Solder Tab
6A	F5900CG06	IEC/Solder Tab
	F5900FG06	Fused IEC/Solder Tab
	F5900JG06	Switched IEC/Solder Tab

### F5900JG (3 and 6Amp) Dimensions

Refer to Page 42  
for Standard  
Mounting Cutouts

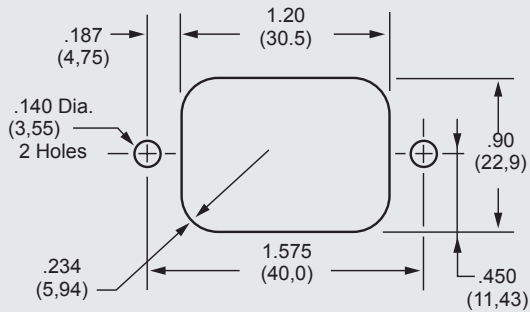


Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

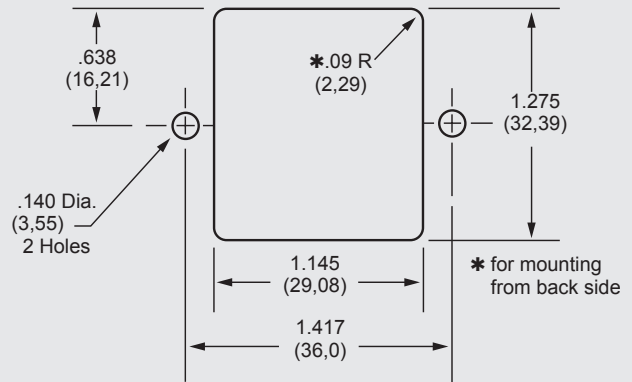


# Standard Mounting Cutouts

## F1200CA, F1250CA, F1299CA, F1300CA, F1399CA, F1400CA, F1500CA, F1600CA, F1700CA



## F1500FA, F1600FA,



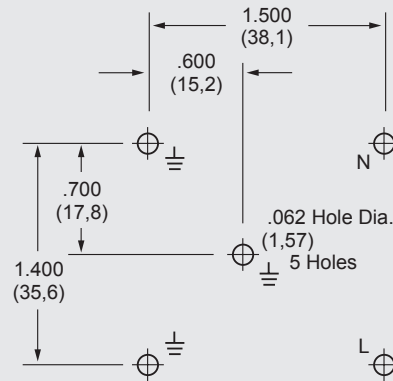
## How to Order

The Curtis part numbering system is made up of four elements. Each element denotes a specific requirement (mechanical or electrical) which, when properly sequenced, fully identifies the required catalog filter. As shown, the first five alpha/numeric characters denote the series type; the sixth character (alpha) denotes the type of line termination; the seventh character (alpha) denotes the type of load termination; the last two characters (numeric) denote the current rating.

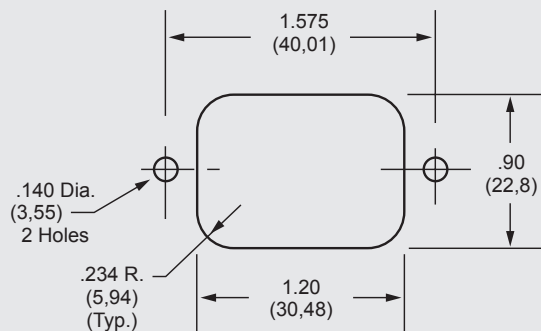
Compose your part number as follows: Select the series required, add two alpha character for the line and load termination, followed by two numeric characters for the required current rating. For example, F1100AB06 completely identifies an F1100 series filter with quick connects on line side and wire leads on load side, with a 6-amp rating.

SINGLE PHASE FILTERS

## F1300CP, F1350CP, F1600CP

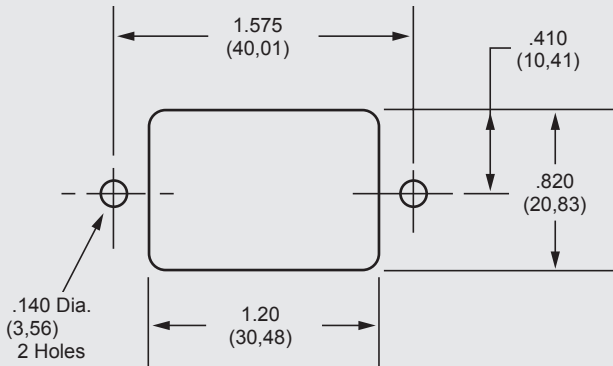


## F5500/5600/5700 SERIES

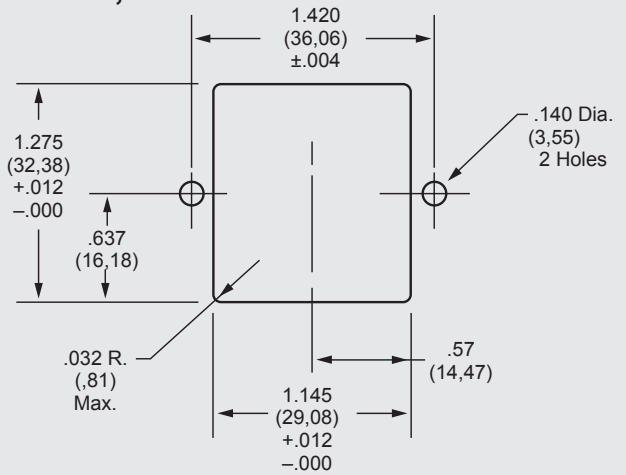


F1100	X	X	X
SERIES	LINE TERMINATION	LOAD TERMINATION	CURRENT RATING
	A = Quick Connects B = Wire Leads C = IEC Connector D = Screw Terminals F = Fused IEC P = Printed Circuit Pins W = Dual Fused IEC J = Switched IEC	A = Quick Connects B = Wire Leads D = Screw Terminals (20 & 30 amp only) P = Printed Circuit Pins G = Solder Tab	01 = 1 Amp 03 = 3 Amps 06 = 6 Amps 10 = 10 Amps 15 = 15 Amps 20 = 20 Amps 30 = 30 Amps

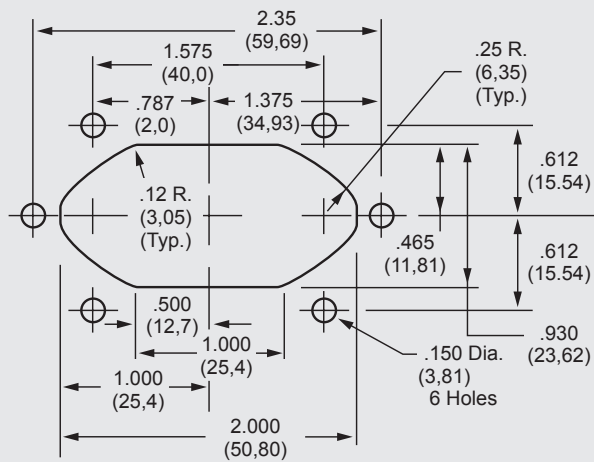
### F5100 SERIES



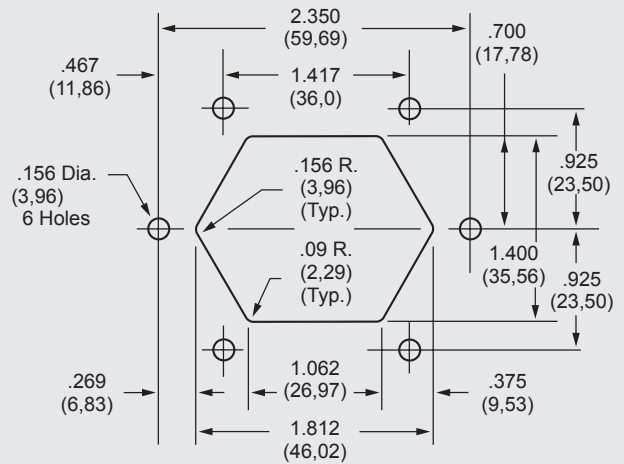
### F5200, F5600FG SERIES



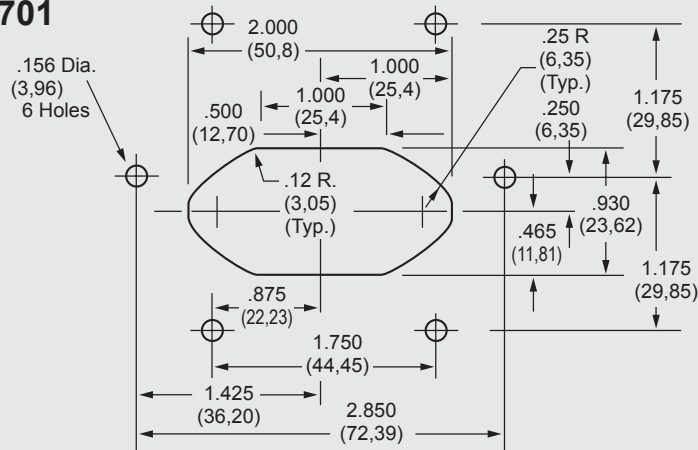
### F5101 SERIES



### F5201, F5601FG SERIES



### F5501/5601CG/5701 SERIES



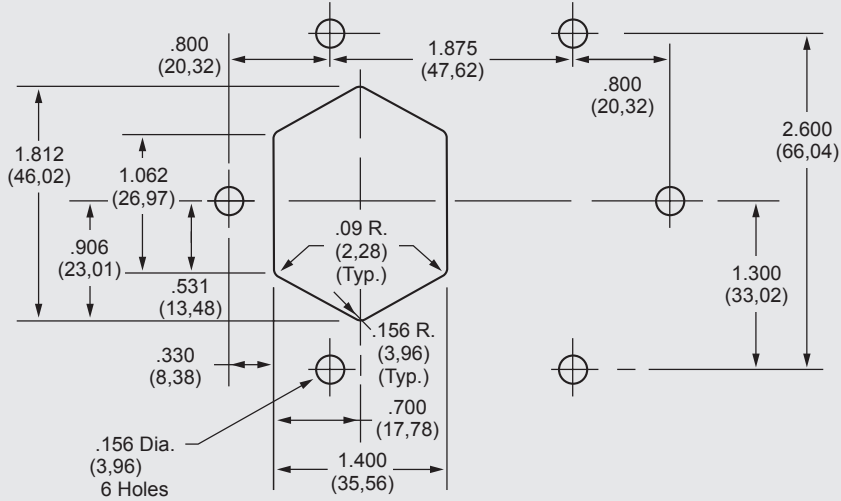
NOTE: Tolerance for all dimensions unless otherwise specified: .XXX three place ± .004, .XX two place ± 0.10

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

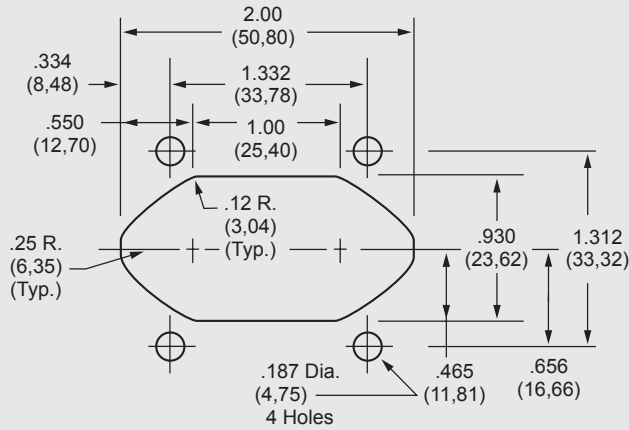
# Standard Mounting Cutouts

SINGLE PHASE FILTERS

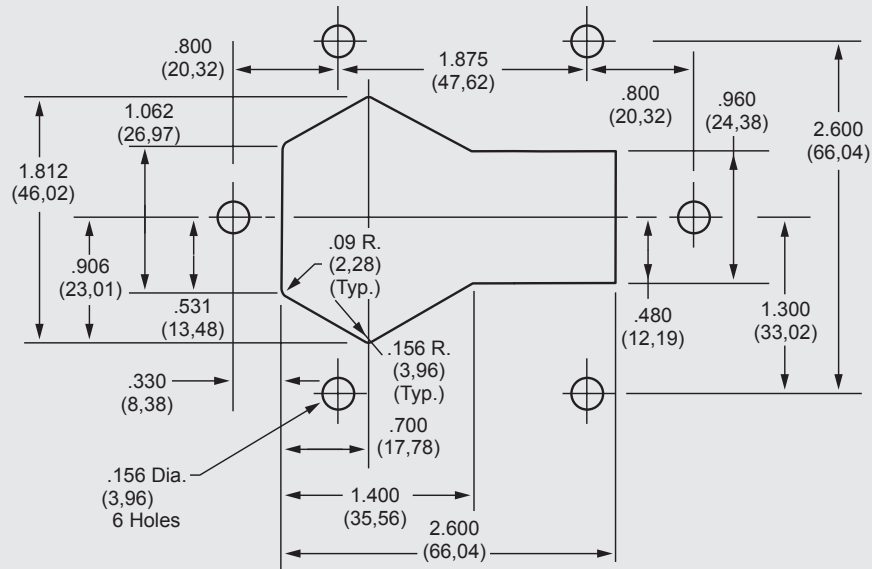
**F5900FG**



**F5900CG**



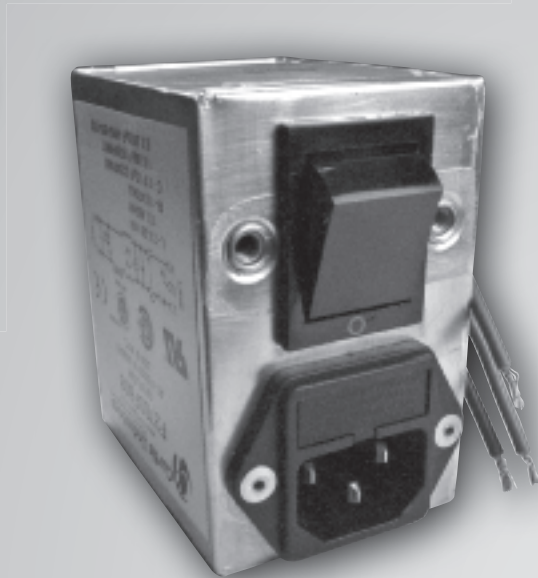
**F5900JG**



NOTE: Tolerance for all dimensions unless otherwise specified: .XXX three place ± .004, .XX two place ± 0.10

## POWER ENTRY MODULES ]

# *General Purpose Combination*



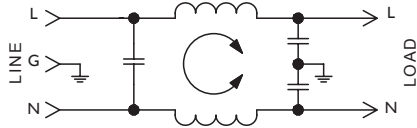
# F2199/F2200 RFI Filters

General Purpose Filtered Modules

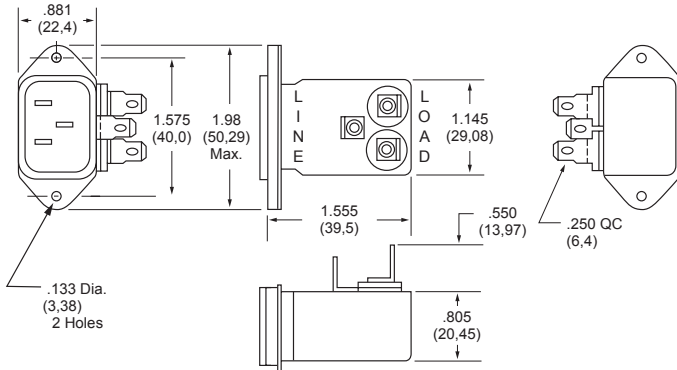
## Features:

- General Purpose Filters — Designed for Common Mode Emissions or Susceptibility Applications
- Integral IEC Connector in Space-Efficient Package
- Ideal for Linear Power Supplies in Digital Equipment

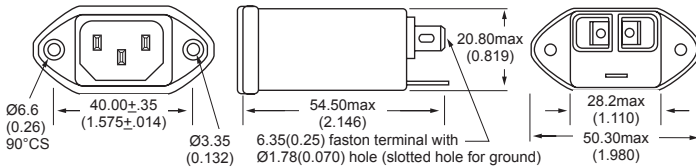
## F2199/F2200 Simplified Schematic



## F2200CA (1, 3 and 6Amp) Dimensions



## F2199CA (1, 3, 6 and 10Amp) Dimensions



Refer to Page 58  
for Standard  
Mounting Cutouts

## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**

115VAC	250VAC
1A	1A
3A	3A
6A	6A
10A	8A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground	1500VAC
Line to Line	1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

A: QC – Quick Connect  
C: IEC Receptacle

**Maximum Leakage Current:**

Each Line to Ground	<b>F2199/F2200</b>
115VAC, 60Hz:	0.25mA
250VAC, 50Hz:	0.40mA

**Agency Approvals:**



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
1A	F2199CA01	IEC/QC	Common Differential	32 5	45 14	45 23	43 47	43 50	40 45
	F2200CA01	IEC/QC	Common Differential	22 —	35 2	40 3	46 35	50 40	50 40
3A	F2199CA03	IEC/QC	Common Differential	20 5	30 12	38 14	48 38	48 44	44 42
	F2200CA03	IEC/QC	Common Differential	15 —	25 2	30 3	45 35	50 40	50 40
6A	F2199CA06	IEC/QC	Common Differential	9 5	20 12	28 14	42 33	50 42	47 42
	F2200CA06	IEC/QC	Common Differential	9 —	20 2	25 7	41 28	45 46	50 57
10A	F2199CA10	IEC/QC	Common Differential	3 5	13 12	20 16	35 20	40 28	45 40

NOTE: Other combinations of terminals may be specified on special order.

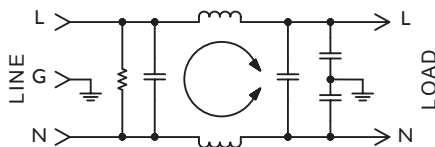
# F2300 RFI Filters



## Features:

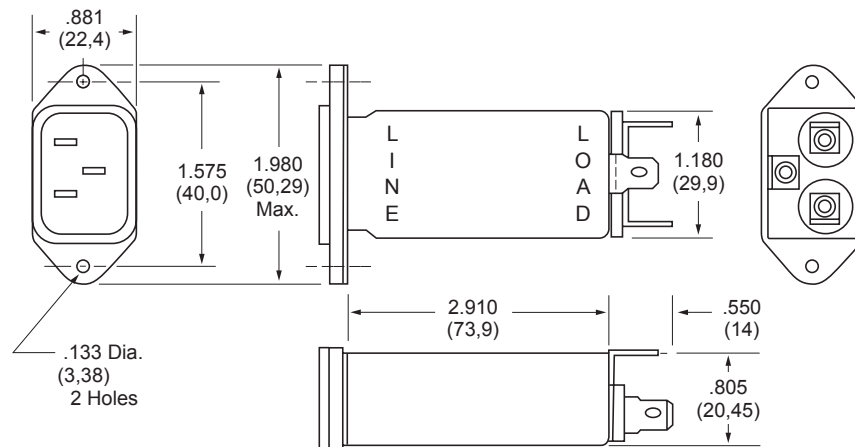
- Effective Protection from Pulsed, Intermittent or Continuous RFI for FCC "A" Applications
- High-Performance Low-Leakage Filter in Low Profile Package with Integral IEC Connector
- Increased Inductance and Line-to-Line Capacitance Provide Enhanced Common Mode and Differential Mode Attenuation

## F2300CA Simplified Schematic



## F2300CA (6Amp) Dimensions

Refer to Page 58  
for Standard  
Mounting Cutouts



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:** 115VAC 250VAC  
6A 6A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground 1500VAC  
Line to Line 1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

A: QC – Quick Connect  
C: IEC Receptacle

**Maximum Leakage Current:**

Each Line to Ground **F2300**  
115VAC, 60Hz: 0.25mA  
250VAC, 50Hz: 0.40mA

**Agency Approvals:**



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
6A	F2300CA06	IEC/QC	Common	25	37	45	45	45	45
			Differential	12	30	50	65	65	60

NOTE: Other combinations of terminals may be specified on special order.

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



**Curtis Industries**  
A Division of Powers Holdings, Inc.

1-800-657-0853

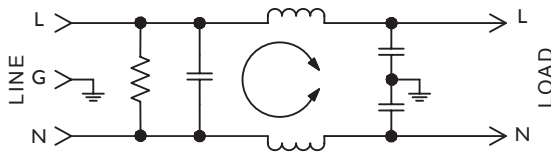
# F2400/2500 RFI Filters



## Features:

- Higher Performance Filters Designed for Common Mode and Differential Mode Applications
- 4X Greater Differential Mode Insertion Loss at 1 MHz than F2199/F2200 Series with No Increase in Physical Size
- Especially Suited for Use with Linear Power Supplies and FCC "A" Applications

## F2400/2500 Simplified Schematic



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

<b>Rated Current:</b>	115VAC	250VAC
	3A	1.5A
	6A	3A
	10A	10A
	15A	10A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground	1500VAC
Line to Line	1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

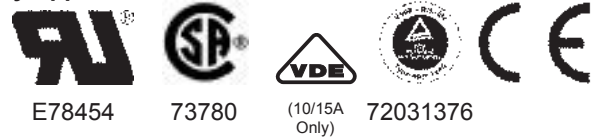
**Termination:**

A: QC – Quick Connect  
C: IEC Receptacle

**Maximum Leakage Current:**

Each Line to Ground	<b>F2400/F2500</b>
115VAC, 60Hz:	0.25mA
250VAC, 50Hz:	0.40mA

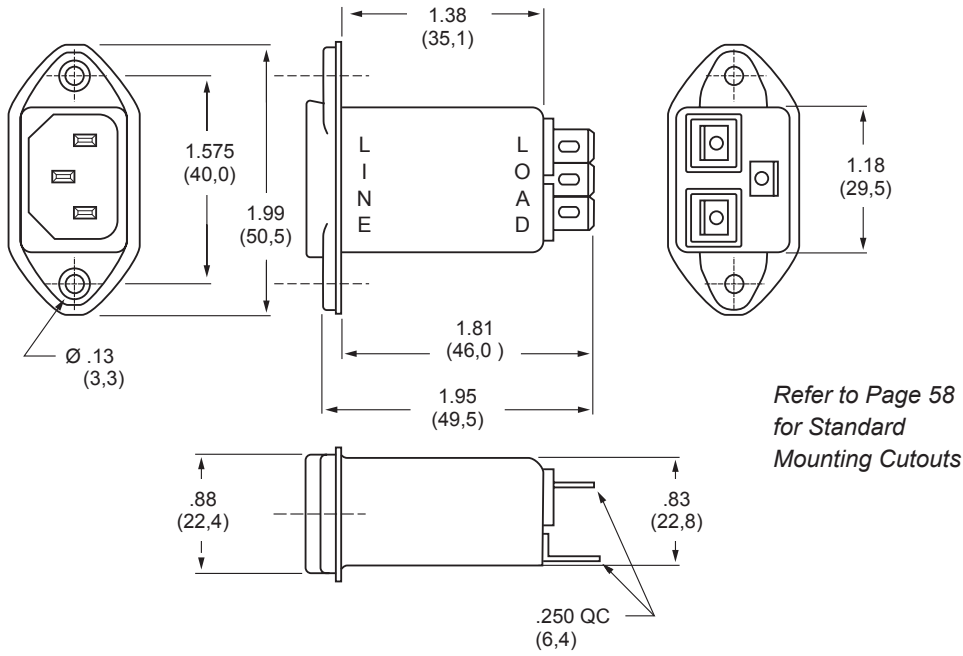
**Agency Approvals:**



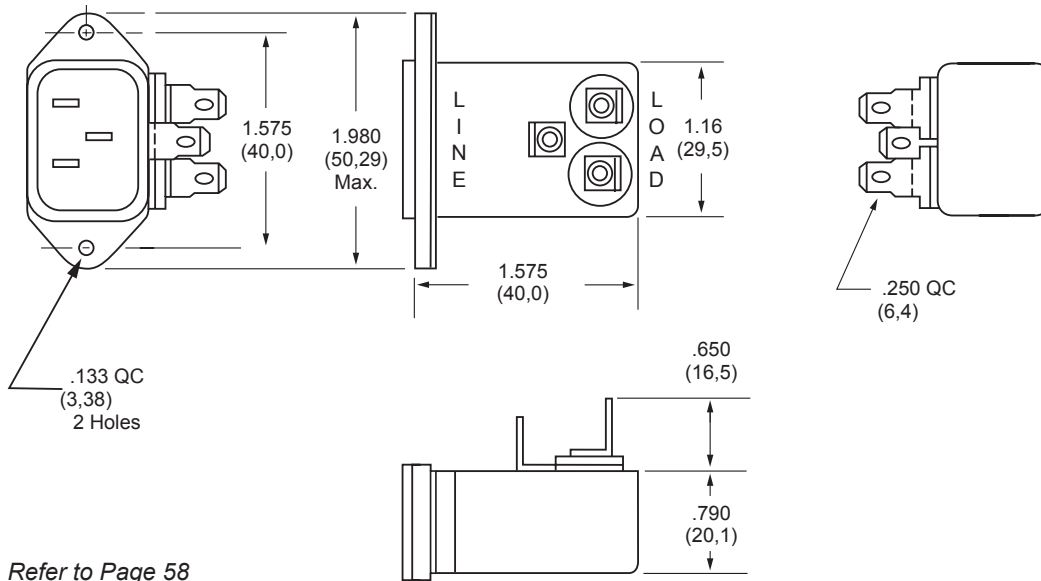
Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F2400CA03 F2500CA03	IEC/QC IEC/QC	Common	22	35	40	46	50	50
			Differential	8	18	24	40	50	40
6A	F2400CA06 F2500CA06	IEC/QC IEC/QC	Common	15	24	31	42	45	50
			Differential	8	18	24	40	50	40
10/15A	F2400CA10 F2400CA15	IEC/QC IEC/QC	Common	4	10	13	28	35	40
			Differential	2	8	15	30	35	35

NOTE: Other combinations of terminals may be specified on special order.

**F2400CA** (3, 6, 10 and 15Amp) Dimensions



**F2500CA** (3 and 6Amp) Dimensions



Refer to Page 58 for Standard Mounting Cutouts



# F2600 RFI Filters



## Features:

- General Purpose “L-Type” Circuit Effective in Reducing Both Incoming and Outgoing Powerline Noise Levels in FCC “A” Applications
- Integral 5 X 20mm Single or Dual Fused IEC Connector
- Optional SST Switched IEC Connector
- All Series Available in Labor-Saving PC Mounted Case Style

## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**            115VAC    250VAC  
    3A            3A  
    6A            6A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground    1500VAC  
 Line to Line        1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- A: QC – Quick Connect
- F: Fused IEC
- J: Switched IEC
- P: PCB Pins
- W: Dual Fused IEC

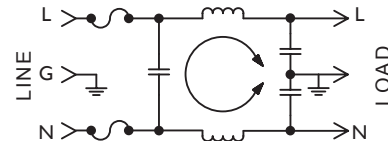
**Maximum Leakage Current:**

Each Line to Ground    **F2600**  
 115VAC, 60Hz:            0.25mA  
 250VAC, 50Hz:            0.40mA

**Agency Approvals:**



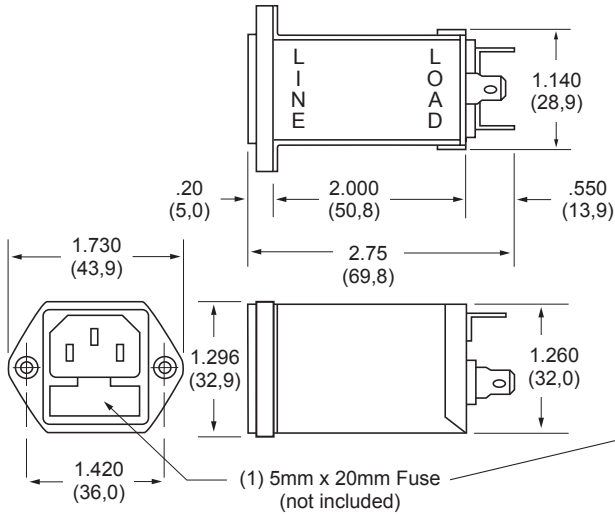
## F2600F Simplified Schematic



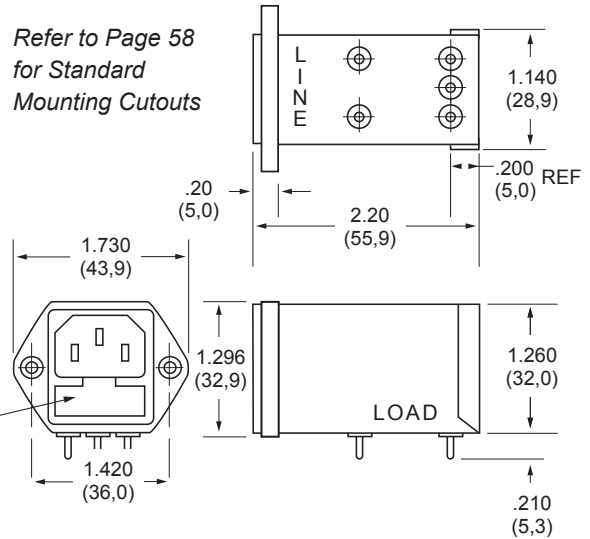
Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F2600FA03 F2600FP03	Fused IEC/QC Fused IEC/PC	Common	21	35	41	50	50	50
			Differential	8	18	24	40	50	40
6A	F2600FA06 F2600FP06	Fused IEC/QC Fused IEC/PC	Common	18	34	41	45	45	45
			Differential	8	18	24	40	50	50
3A	F2600WA03 F2600WP03	Dual Fused IEC/QC Dual Fused IEC/PC	Common	21	35	41	45	45	50
			Differential	8	18	24	40	50	40
6A	F2600WA06 F2600WP06	Dual Fused IEC/QC Dual Fused IEC/PC	Common	18	34	41	40	40	45
			Differential	8	18	24	40	50	50
3A	F2600JA03 F2600JP03	Switched IEC/QC Switched IEC/PC	Common	21	35	41	45	45	50
			Differential	8	18	24	40	50	40
6A	F2600JA06 F2600JP06	Switched IEC/QC Switched IEC/PC	Common	18	34	41	40	40	45
			Differential	8	18	24	40	50	50

NOTE: Other combinations of terminals may be specified on special order.

### F2600FA (3 and 6Amp) Dimensions

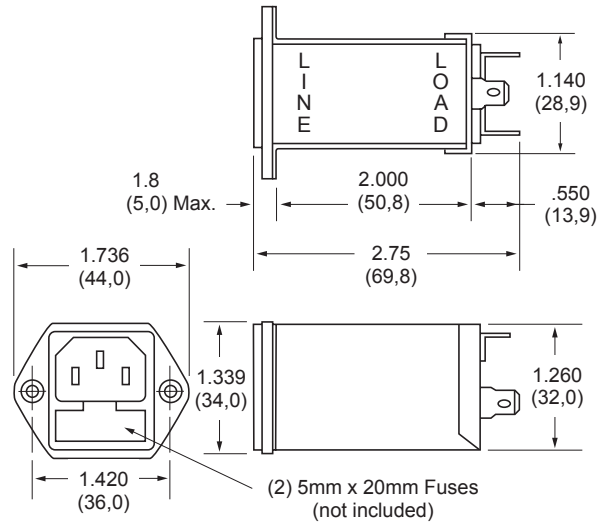
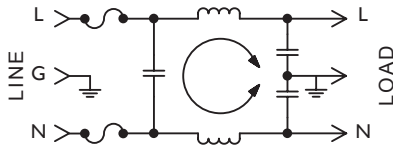


### F2600FP (3 and 6Amp) Dimensions



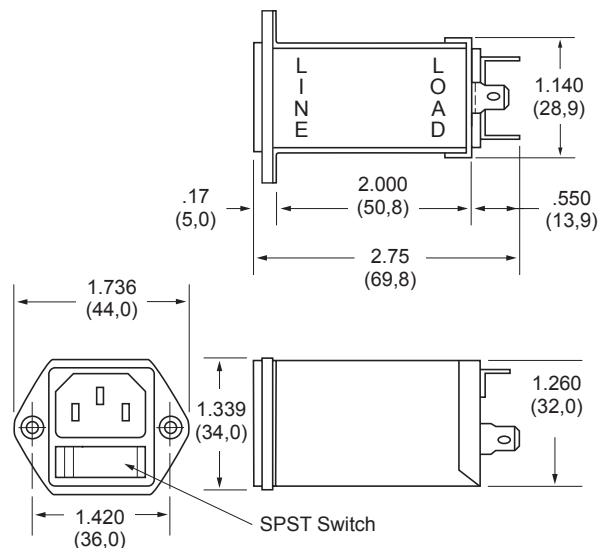
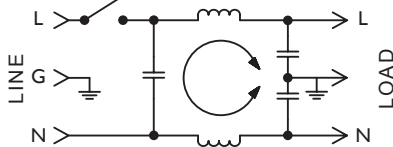
### F2600WA (3 and 6Amp) Dimensions

#### F2600W Simplified Schematic



### F2600JA (3 and 6Amp) Dimensions

#### F2600J Simplified Schematic



Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



# F2700 RFI Filters



## Features:

- Designed for FCC "B" and VDE "B" Switching Power Supply Applications
- Very High Inductance Design with Differential Mode Choke to Provide Improved Performance Below 100KHz
- Compact, Space-Efficient Package Available in 3 and 6Amp Ratings
- Also Available with Integral Fused IEC Connector and "ON/OFF" Power Switch

## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**            115VAC    250VAC  
    3A            2A  
    6A            4A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground    1500VAC  
 Line to Line        1768VDC

**Insulation Resistance:** 9 x 10<sup>9</sup> Ω at 100VDC

**Ambient Temperature:** 40°C Max. at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- A: QC – Quick Connect
- B: Wire
- C: IEC Receptacle
- F: Fused IEC

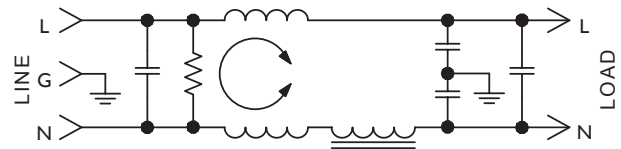
**Maximum Leakage Current:**

Each Line to Ground    **F2700**  
 115VAC, 60Hz:            0.25mA  
 250VAC, 50Hz:            0.40mA

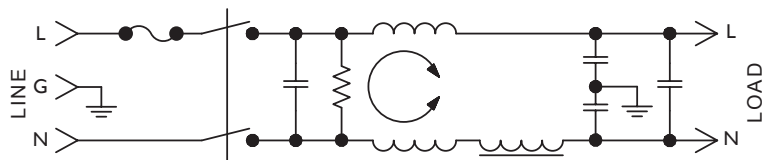
**Agency Approvals:**



## F2700 Without Switch or Fuse Simplified Schematic



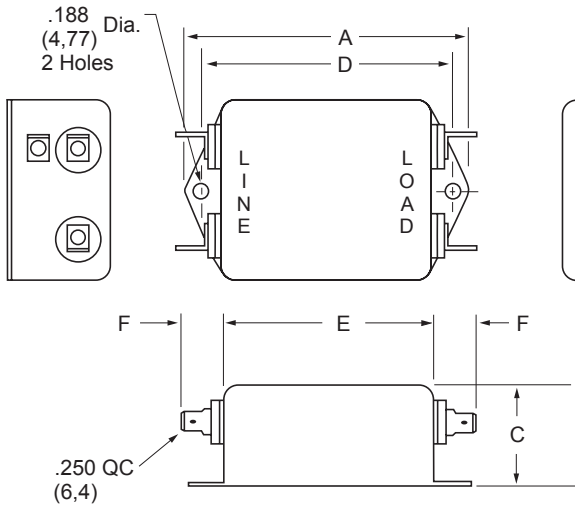
## F2700 With Switch and Fuse Simplified Schematic



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)										
			MODE	Frequency - MHz									
				.01	.02	.05	.15	.50	1.0	5.0	10	30	
3A	F2700AA03	QC/QC	Common	20	27	36	45	42	42	42	40	38	
	Differential	5	27	52	70	70	70	70	70	60	58		
3A	F2700CA03 F2700FB03	IEC/QC Fused IEC/Wire	Common	20	27	36	45	42	42	42	40	38	
	Differential	5	27	52	70	70	70	70	70	60	58		
6A	F2700AA06	QC/QC	Common	10	18	28	39	42	45	45	45	45	
	Differential	5	20	48	70	70	70	70	70	70	65		

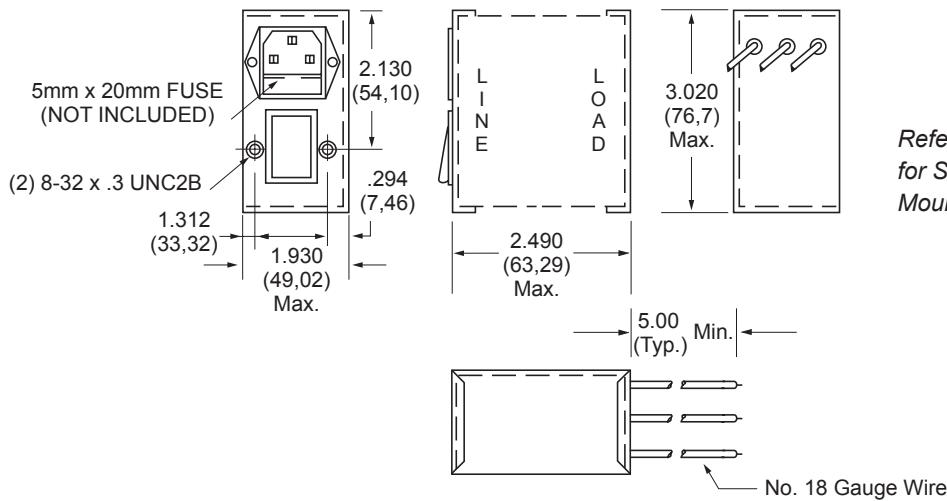
NOTE: Other combinations of terminals may be specified on special order.

### F2700AA (3 and 6Amp) Dimensions



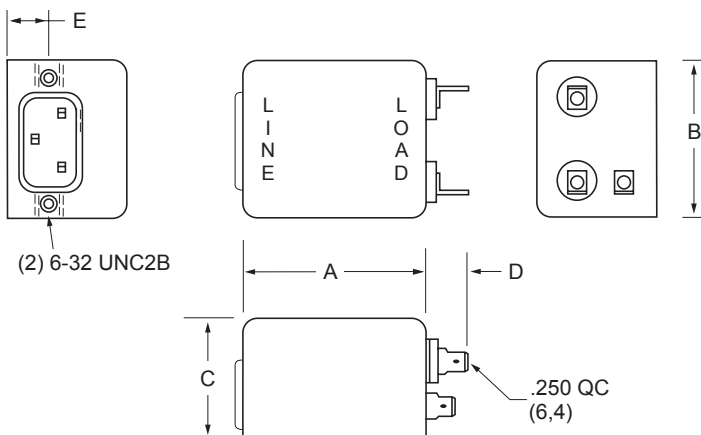
Amps	A	B	C	D	E	F
3A	3.315 (84,2)	2.000 (50,8)	1.500 (38,1)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
6A	4.440 (112,8)	2.250 (57,2)	1.750 (44,5)	4.063 (103,2)	3.620 (91,9)	.550 (14,0)

### F2700FB03 (3Amp) Dimensions



Refer to Page 58  
for Standard  
Mounting Cutouts

### F2700CA (3 and 6Amp) Dimensions



Refer to Page 58  
for Standard  
Mounting Cutouts

Amps	A	B	C	D	E
3A	2.880 (73,2)	2.125 (54,0)	1.719 (43,6)	.550 (14,0)	.575 (14,6)
6A	3.750 (95,2)	2.250 (57,1)	1.750 (44,4)	.550 (14,0)	.640 (16,29)



# FPE7/FPE8 Series

Combination



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**      115VAC    250VAC  
                                  3A            3A  
                                  6A            6A

**Current Overload:** 6X for 8 Seconds

**Hi-Pot Test (1 min):**

Line to Ground    1500VAC  
 Line to Line        1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at Rated Current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- IEC Receptacle
- Wire Wrap/Solder

**Maximum Leakage Current:**

Each Line to Ground      **PE7, PE 8, PE9**  
 115VAC, 60Hz:              0.25mA  
 250VAC, 50Hz:              0.40mA

**Voltage Select Card:** Installed in 120VAC position unless otherwise specified

**Agency Approvals:**

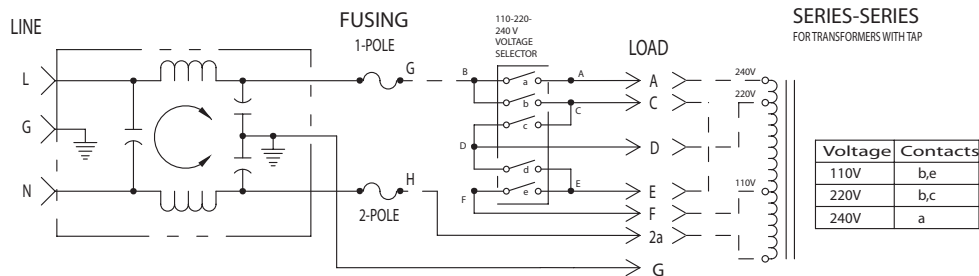


Refer to Page 55 for Ordering Instructions

## Features:

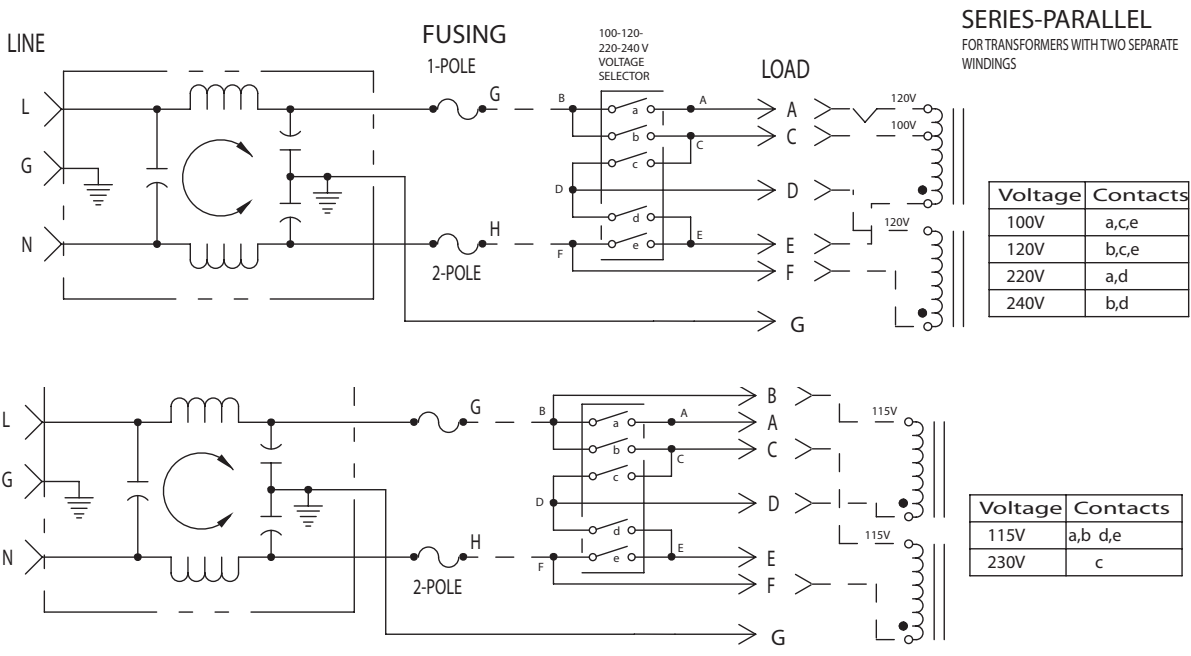
- RFI Filter Module Combines IEC Connector, Fusing, and Voltage Select Features in One Unit
- FPE7 Series Filters Provide 20% More Differential Mode Attenuation Than Comparable Units
- Accepts Either U.S. or European Standard Fuse Sizes

## FPE7 Series Simplified Schematic

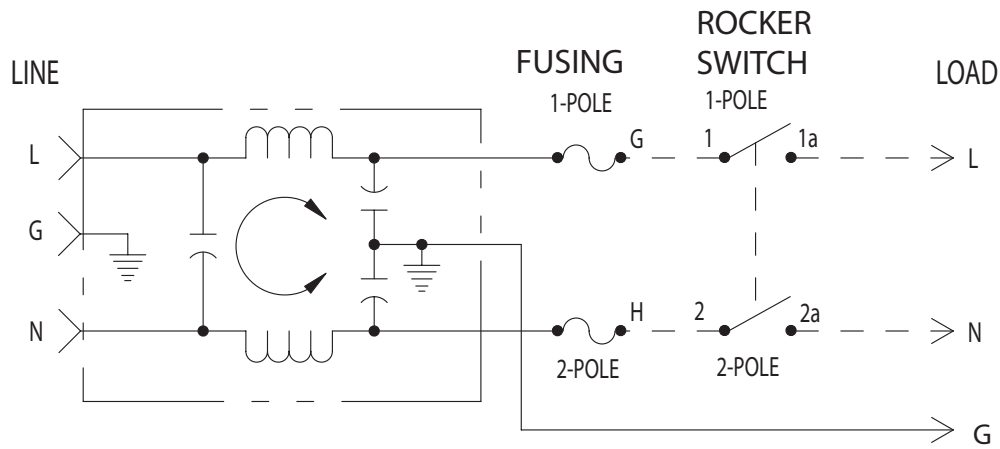


Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	FPE7XXX03 FPE8XXX03	IEC/Solder Tabs	Common	18	24	30	45	45	50
			Differential	8	18	24	46	50	40
6A	FPE7XXX06 FPE8XXX06	IEC/Solder Tabs	Common	10	19	24	39	44	50
			Differential	8	18	24	39	40	40

## FPE7 Series Simplified Schematic



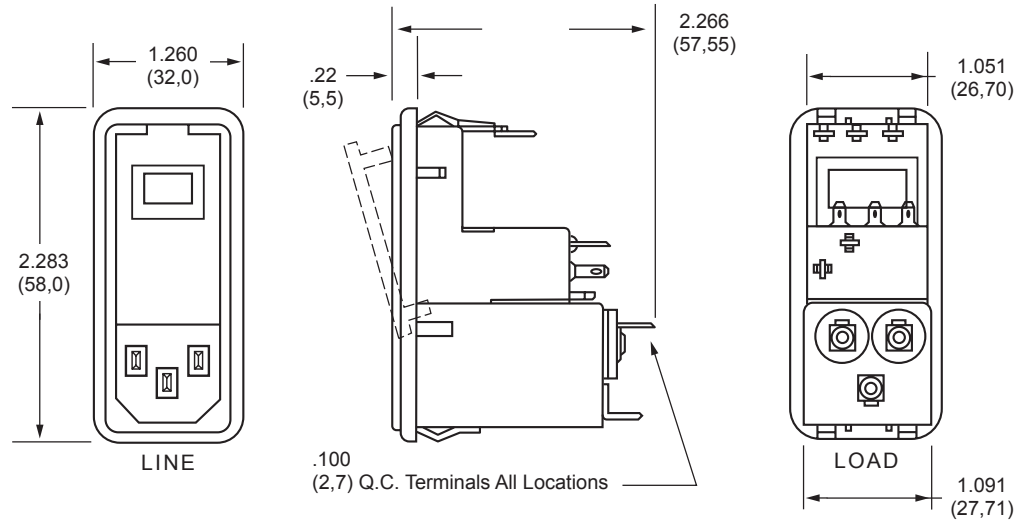
## FPE8 Series Simplified Schematic



# FPE7/FPE8 Series *(continued)*

## FPE7/FPE8 Snap-Mount Series (3 and 6Amp) Dimensions

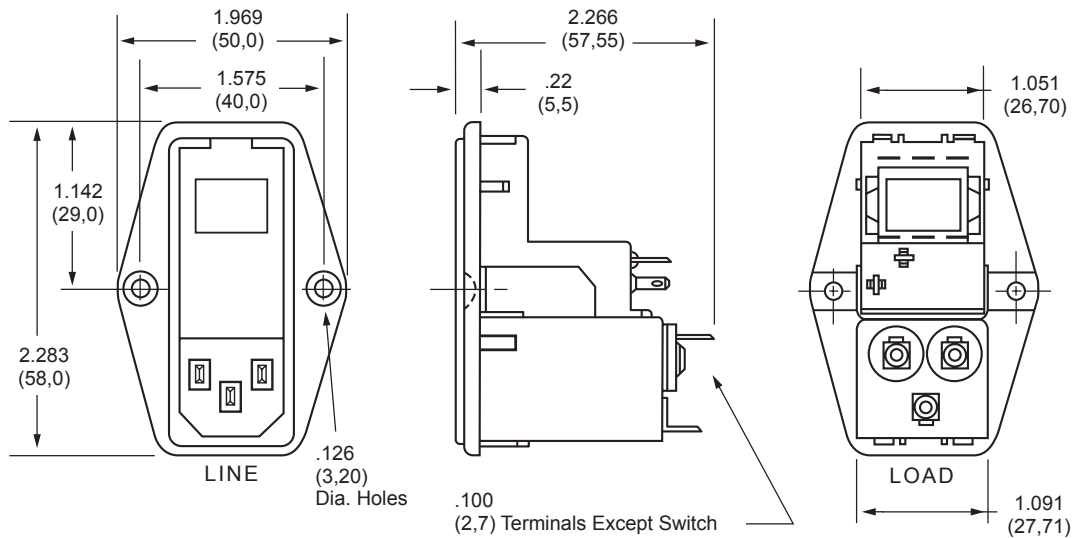
Refer to Page 55  
for Standard  
Mounting Cutouts



Combination

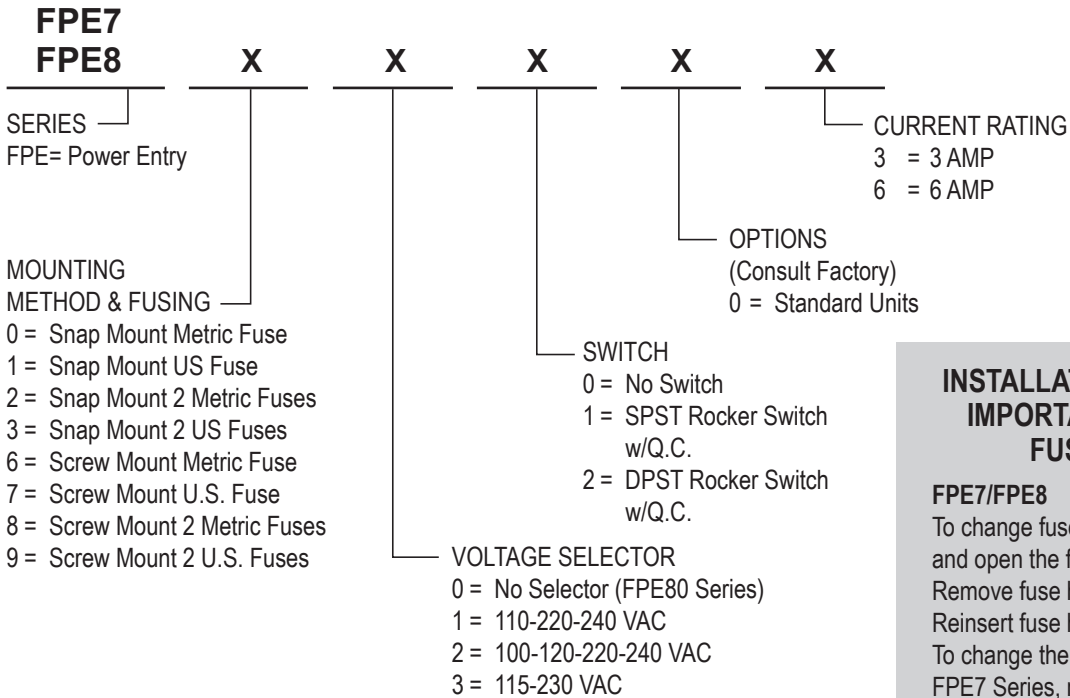
## FPE7/FPE8 Screw-Mount Series (3 and 6Amp) Dimensions

Refer to Page 55  
for Standard  
Mounting Cutouts



POWER ENTRY MODULES

## How to Order



### INSTALLATION INSTRUCTION IMPORTANT – CHANGING FUSE/VOLTAGE

#### FPE7/FPE8

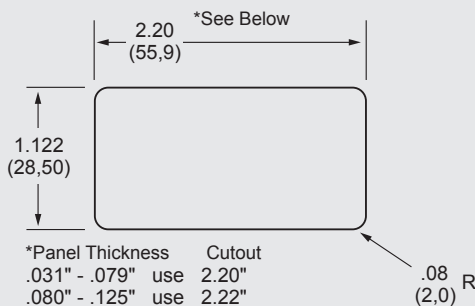
To change fuse, remove power cord and open the front cover on the module. Remove fuse holder and replace fuse. Reinsert fuse holder and close cover.

To change the operating voltage on the FPE7 Series, remove the power cord and open front cover. Rotate voltage select wheel until desired voltage appears in window of cover.

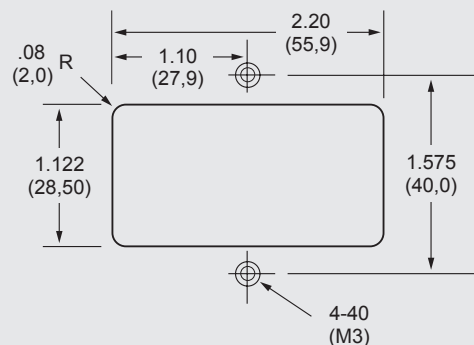
- Filter shipped without fuse.

Always use caution when selecting and changing fuses and voltage requirements. Curtis Industries is not responsible for malfunction due to improper installation/selection of fuse and/or voltage select.

### FPE7/FPE8 Snap-Mount Series



### FPE7/FPE8 Screw Mount Series





# FPE1 Series



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:** 115VAC 250VAC  
10A 10A

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground 1500VAC  
Line to Line 2250VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

- QC – Quick Connect
- IEC Receptacle

### Maximum Leakage Current:

Each Line to Ground	PE1	PE1-PO
115VAC, 60Hz:	0.25mA	0.4mA
250VAC, 50Hz:	0.40mA	.75mA

**Voltage Select Card:** Installed in 120VAC position unless otherwise specified

### Agency Approvals:



E78454 064179 72031202

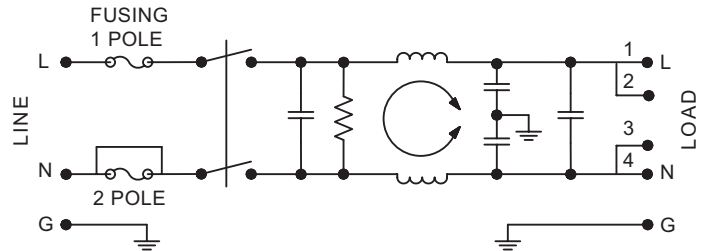
## Features:

- RFI Filter Module Combines IEC Connector, Fusing, Optional Voltage Select and On/Off Switch into a Single, Space-Efficient Assembly
- Enhanced Low Frequency Response with No Resonant Peaks
- Fully Shielded for Radiative Noise Control
- Accepts Either U.S. or European Standard Fuse Sizes. Dual or Single Power Line Fusing

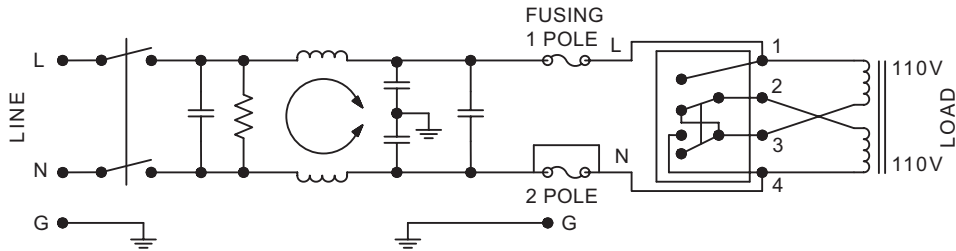
Combination

POWER ENTRY MODULES

**FPE1 Series Simplified Schematic without Voltage Selector**



**FPE1 Series Simplified Schematic with Voltage Selector**

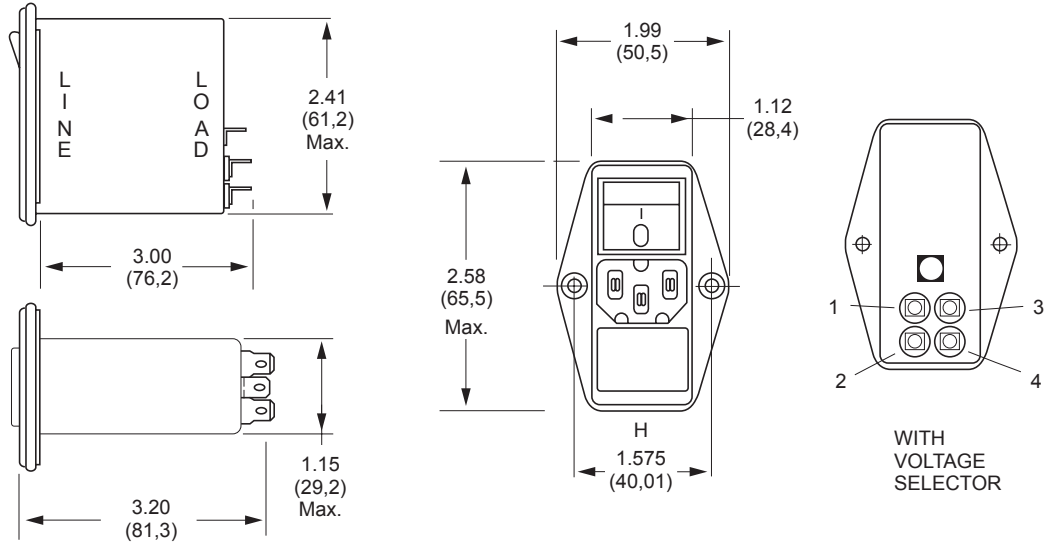


Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)								
			MODE	Frequency - MHz						10	30
				.05	.15	.50	1.0	5.0			
10A	FPE1XXX10	IEC/QC	Common	10	20	30	38	45	50	50	
			Differential	10	20	30	35	55	60	55	
	FPE1XXXP0	IEC/QC	Common	13	24	33	38	48	54	54	
			Differential	10	20	30	35	65	65	55	

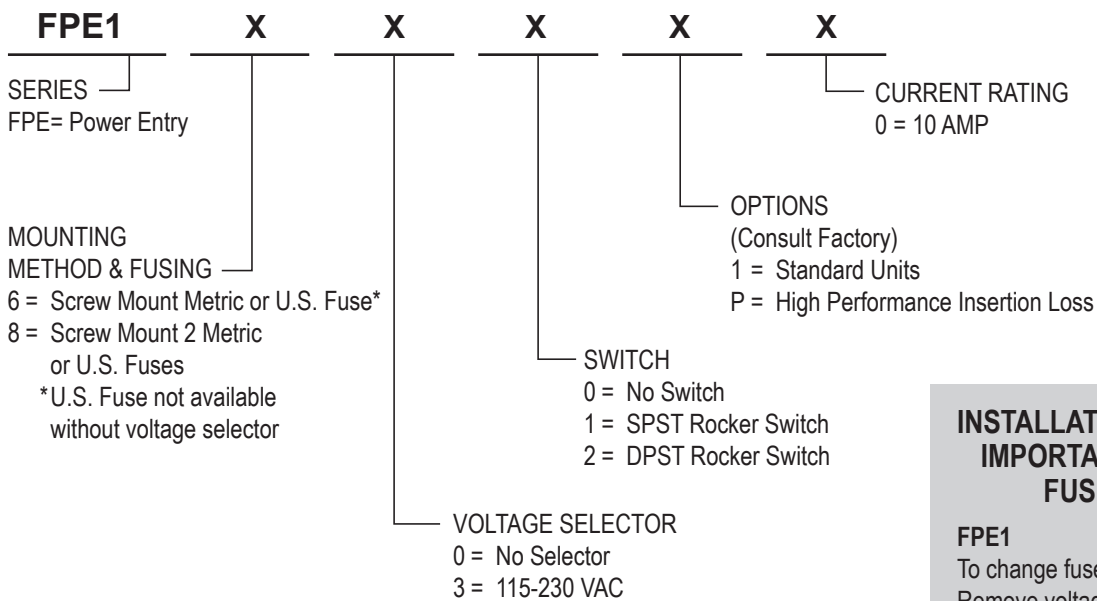
NOTE: Other combinations of terminals may be specified on special order.

**FPE1**  
(10Amp)  
Dimensions

Refer to Standard  
Mounting Cutouts on  
Page 58



**How to Order**



**INSTALLATION INSTRUCTION  
IMPORTANT – CHANGING  
FUSE/VOLTAGE**

**FPE1**

To change fuse, remove power cord. Remove voltage selector and replace fuse. Reinsert fuse holder. To change the operating voltage on the FPE1 Series, remove the power cord and rotate fuse holder block until desired voltage aligns with the mark on the module housing.

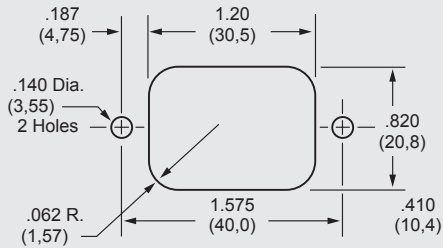
- Filter shipped without fuse.

Always use caution when selecting and changing fuses and voltage requirements. Curtis Industries is not responsible for malfunction due to improper installation/selection of fuse and/or voltage select.

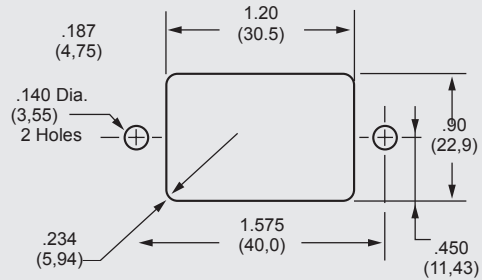


# Standard Mounting Cutouts

## F2199CA, F2200CA, F2300CA, F2400CA, F2500CA, F2700CA, F3100CA, F3200CA, F3400CA, F3500CA

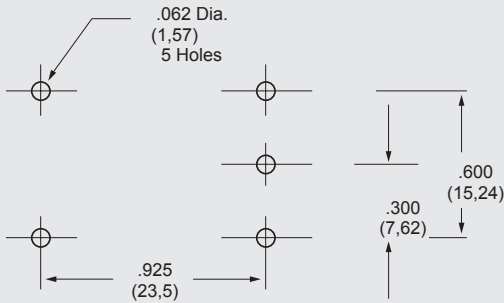


Back Mounting

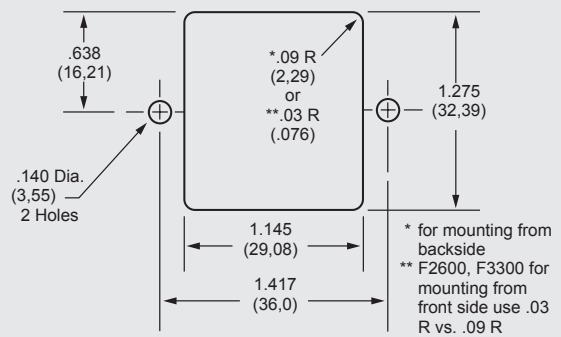


Front Mounting

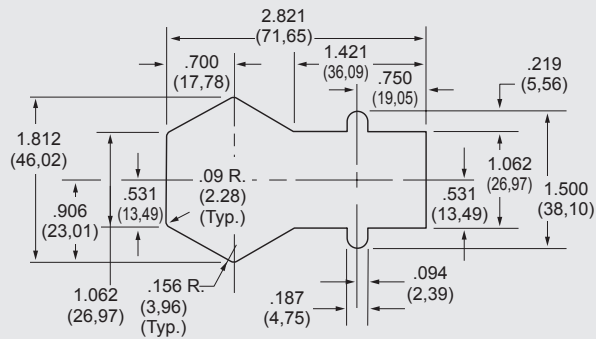
## F2600FP, F3300FP



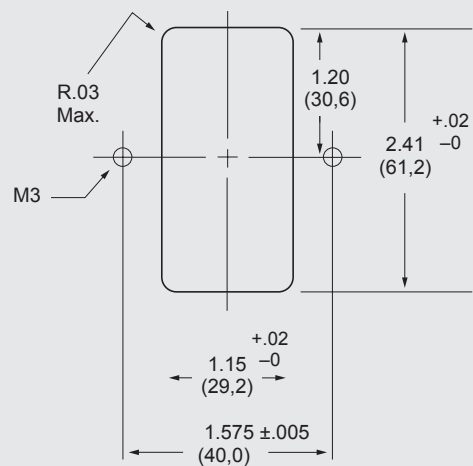
## F2600, F3300



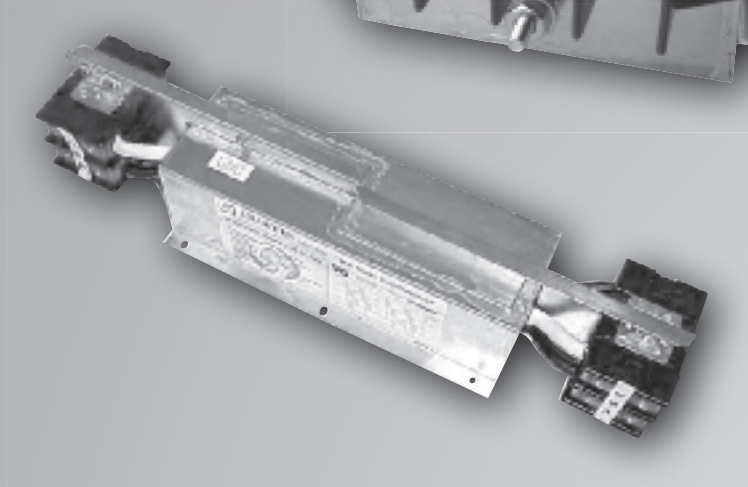
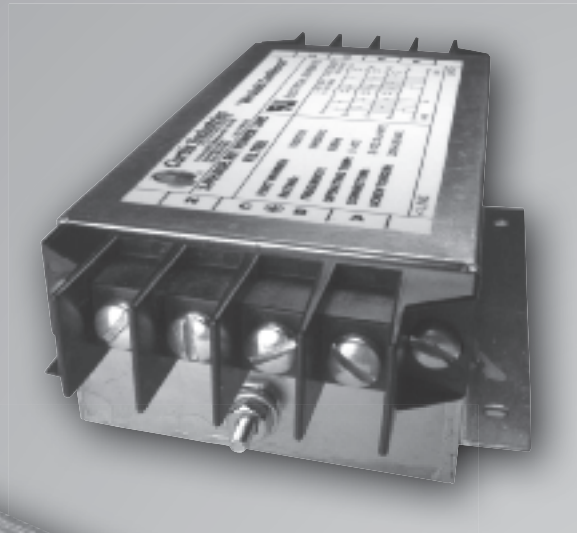
## F2700FB



## FPE1 Screw Mount Series



# THREE-PHASE FILTERS ]



# Series F3480/F3600



## Specifications:

**Rated Voltage:** 480 VAC - 50/60 Hz  
600 VAC - 50/60 Hz

**Rated Current:** 480 VAC - 9A to 608A  
600 VAC - 8A to 600A

**Current Overload:** 6X for 8 seconds

Hi-Pot Test (1 min):	480VAC	600VAC
Line to Ground	2210 VDC	3150 VDC
Line to Line	2780 VDC	3150 VDC

**Insulation Resistance:** 1000 MΩ min. at 250 VDC

**Ambient Temperature:** 0°C to 40°C (32°F to 104°F)

**Humidity Range:** 0% to 95% R.H.

### Termination:

- Wire
- Terminal Blocks
- Pressure Terminal Blocks

**Weight:** 3 to 65lbs (1.36 to 29.50kg)

### Agency Approvals:

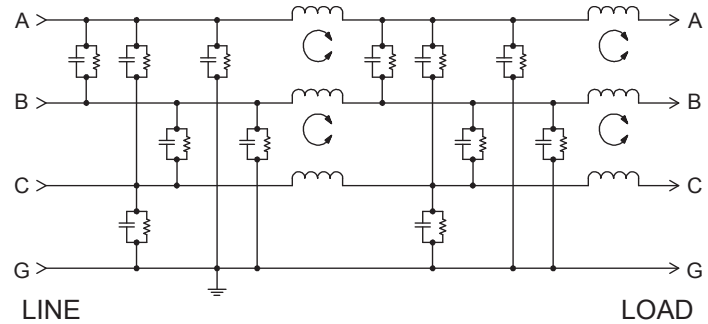


E78454

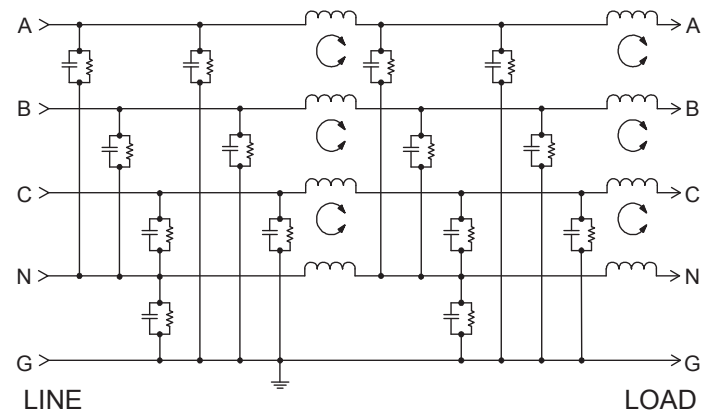
Designed to attenuate conducted interference in a small package providing excellent insertion loss, the F3480/F3600 series filters will provide effective EMC solutions up to 600A at 600VAC and power applications up to 360kVA. With effective noise suppression in the critical 150kHz-30MHz range, this advanced 2-stage filter line will support both Delta and Wye connected loads. Curtis three phase filters are designed to provide EMC solutions in many applications such as:

- Motor
- Motor Control Centers
- Facility Filters
- Uninterruptible Power Supplies
- Power Conditioning Units
- Laser Welders
- Automated Test Equipment
- Robotics
- CNC Machinery
- Elevators
- Industrial Ovens

## F3480 Simplified Schematic



## F3600 Simplified Schematic



# 3-Phase Power Line Filters

## Ordering Information:

**F3600 T 600**

3-Phase Series:  
 F3480 = 480 VAC  
 F3600 = 600 VAC

T = Terminal Blocks  
 B = Wire Leads  
 A = .250 Q.C. Terminal  
 (8 - 50A Only)

Current Rating 008 - 608  
 (Refer to Charts)

F3480 Series - 480 VAC																
Rated Current (Amps)	Part Number	Maximum Leakage Each L/G (250V, 60Hz)	Minimum Insertion Loss (dB)							Dimensions (Inches)						
			Frequency (MHz)							A	B	C	D	E	F	G
608A	F3480T608	140mA	Frequency (MHz)							18.75	5.25	5.93	41.25	16.00	8.00	.28 x .40
	.15 .5 1 5 10 30															
	CM		60	70	70	60	45	30								
	F3480B608		DM	30	40	40	35	30	20	18.75	5.25	4.50	--			
322A	F3480T322	90mA	Frequency (MHz)							10.50	5.25	4.63	23.50	8.00	4.00	.28 x .40
	.15 .5 1 5 10 30															
	CM		60	70	70	65	55	45								
	F3480B322		DM	30	40	40	40	35	20	10.50	5.25	4.50	--			
185A	F3480T185	90mA	Frequency (MHz)							11.25	4.12	4.25	20.25	10.00	5.00	.20 x .30
	.15 .5 1 5 10 30															
	CM		60	70	70	65	55	45								
	F3480B185		DM	30	35	35	45	40	30	11.25	4.12	3.50	--			
135A	F3480T136	80mA	Frequency (MHz)							8.50	4.12	4.25	16.00	7.00	3.50	.20 x .30
	.15 .5 1 5 10 30															
	CM		60	65	70	60	50	40								
	F3480B136		DM	25	35	45	30	30	20	8.50	4.12	3.50	--			
112A	F3480T112	80mA	Frequency (MHz)							8.50	4.12	4.25	16.00	7.00	3.50	.20 x .30
	.15 .5 1 5 10 30															
	CM		60	65	70	60	50	40								
	F3480B112		DM	25	35	45	30	30	20	8.50	4.12	3.50	--			
80A	F3480T080	30mA	Frequency (MHz)							8.50	4.12	4.25	16.00	7.00	3.50	.20 x .30
	.15 .5 1 5 10 30															
	CM		60	70	70	65	55	45								
	F3480B080		DM	15	25	45	40	40	30	8.50	4.12	3.50	--			
60A	F3480T060	30mA	Frequency (MHz)							8.50	4.12	4.25	16.00	7.00	3.50	.20 x .30
	.15 .5 1 5 10 30															
	CM		60	70	70	65	55	45								
	F3480B060		DM	15	25	45	40	40	30	8.50	4.12	3.50	--			
50A	F3480A050	15mA	Frequency (MHz)							8.00	5.12	2.25	--	5.00	--	.19 x .25
	.15 .5 1 5 10 30															
	CM		60	75	80	75	70	50								
	F3480B050		DM	10	40	50	50	50	40	8.00	5.12	2.25	10.10			
	F3480T050		Frequency (MHz)													
32A	F3480A032	7mA	Frequency (MHz)							8.00	5.12	2.25	--	5.00	--	.19 x .25
	.15 .5 1 5 10 30															
	CM		60	70	80	75	65	45								
	F3480B032		DM	10	45	50	50	50	40	8.00	5.12	2.25	10.10			
	F3480T032		Frequency (MHz)													
16A	F3480A016	3mA	Frequency (MHz)							6.00	3.88	2.00	--	4.00	--	.16 x .20
	.15 .5 1 5 10 30															
	CM		50	70	80	75	65	50								
	F3480B016		DM	10	50	50	40	40	40	6.00	3.88	2.00	10.10			
	F3480T016		Frequency (MHz)													
9A	F3480A009	3mA	Frequency (MHz)							6.00	3.88	2.00	--	4.00	--	.16 x .20
	.15 .5 1 5 10 30															
	CM		60	80	80	70	60	50								
	F3480B009		DM	30	45	50	50	50	50	6.00	3.88	2.00	10.10			
	F3480T009		Frequency (MHz)													

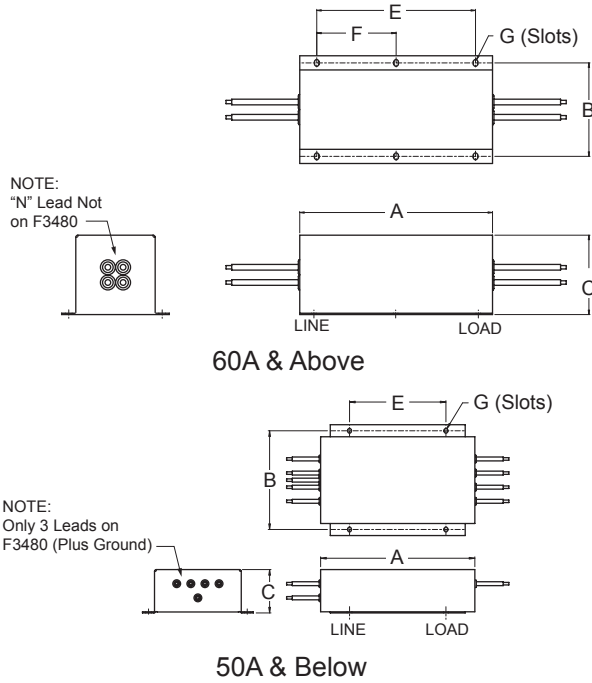
THREE-PHASE FILTERS

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

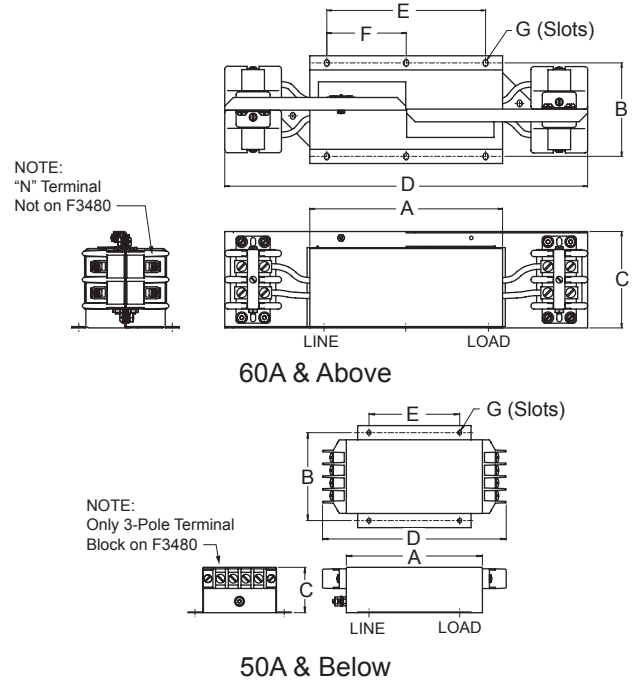


# Series F3480/F3600

## F3480B & F3600B Dimensions



## F3480T & F3600T Dimensions



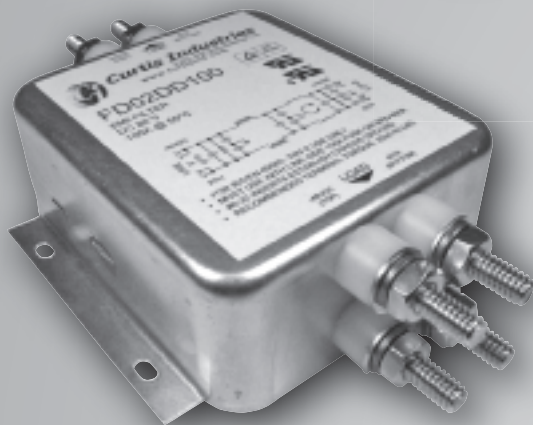
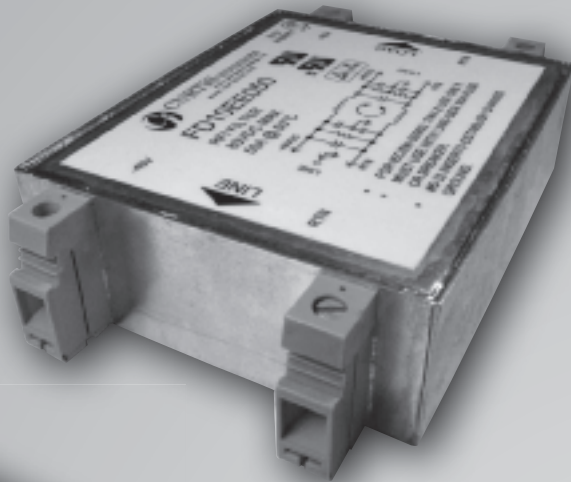
## F3600 Series - 600 VAC

Rated Current (Amps)	Part Number	Maximum Leakage Each L/G (250V, 60Hz)	Minimum Insertion Loss (dB)							Dimensions (Inches)						
			Frequency (MHz)							A	B	C	D	E	F	G
600A	F3600T600	120mA	Frequency (MHz)							18.75	5.25	5.93	41.25	16.00	8.00	.28 x .40
	CM		60	60	50	50	40	30								
	DM		20	35	35	30	25	20								
300A	F3600T300	60mA	Frequency (MHz)							10.50	5.25	5.93	26.50	8.00	4.00	.28 x .40
	CM		60	60	50	50	40	30								
	DM		25	30	35	45	30	20								
180A	F3600T180	60mA	Frequency (MHz)							11.25	4.12	4.25	20.25	10.00	5.00	.20 x .30
	CM		60	60	60	60	50	40								
	DM		20	30	35	45	40	30								
80A	F3600T080	30mA	Frequency (MHz)							8.50	4.12	4.25	16.00	7.00	3.50	.20 x .30
	CM		60	60	60	60	50	40								
	DM		15	25	25	40	40	30								
45A	F3600A045	10mA	Frequency (MHz)							8.00	5.12	2.25	--	5.00	--	.19 x .25
	CM		60	60	80	70	60	45								
	DM		10	10	15	50	40	30								
25A	F3600A025	8mA	Frequency (MHz)							8.00	5.12	2.25	--	5.00	--	.19 x .25
	CM		60	60	80	70	60	45								
	DM		5	5	30	50	40	30								
16A	F3600A016	4mA	Frequency (MHz)							6.00	3.88	2.00	--	4.00	--	.16 x .20
	CM		50	70	80	70	60	45								
	DM		5	5	35	40	40	40								
8A	F3600A008	4mA	Frequency (MHz)							6.00	3.88	2.00	--	4.00	--	.16 x .20
	CM		60	70	80	70	60	45								
	DM		5	10	50	40	40	40								



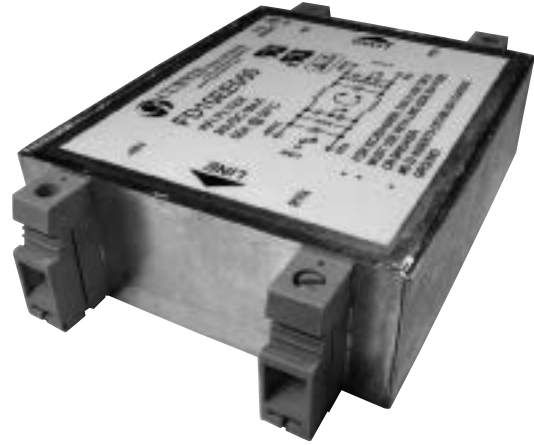
## DC FILTERS ]

# *General Purpose High Performance*





# FD Series Filters



The FD Series of DC filters are designed as a general purpose line of filters for DC applications. They are designed to comply with UL/EN 60950 and UL 1459, CISPER 22 and Telecordia (Bellcore) GR-1089 at 25Amps and above. These filters are available with and without circuit breakers for additional protection.

The FD Series is a compact size that can filter up to 300MHz ideally suited for the telecom-datacom market. The FD0 Series is available from 6Amps to 100Amps in the smallest, economical package. The FD02 is a high frequency filter up to 3GHz (3,000MHz) in a compact package.

These filters are ideally used in communications and central office equipment.

- Power Supplies for Communications Equipment
- Network Routing Equipment
- Switching Equipment
- Base Stations
- Modems
- Services
- Ethernet Hubs



## Specifications:

**Rated Voltage:** 80VDC Maximum

**Rated Current:** 6A  
10A  
20A  
25A  
50A  
75A  
100A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Rating (1 min):**

Line to Ground 1060VDC  
Line to Line 100VDC

**Insulation Resistance:** 1000 MΩ at 80VDC

**Ambient Temperature:** 0°C to 55°C (32°F to 131°F)

**Humidity Range:** 0% to 95% R.H.

**Termination:** See Chart at Right

**Wire Leads:** 18AWG 6A to 20A (FD0)  
(FD0 25Amp to 100Amp not available with wire leads)

10AWG 30Amp (FD1, FD2, FD3)  
6AWG 50Amp  
4AWG 75Amp & 100Amp

**Agency Approvals:**

6Amp to 20Amp



E78454



064179



72031306



25Amp to 100Amp



E221098



72070096  
72061592



E221098

General Purpose

DC FILTERS

# Power Line Filter Selection Guide

## FD00 & FD02 SERIES

FILTER Part Number	Current Rating (Amps)	Termination		
		Quick Connects	Wire Leads	Studs
FD00AA006	6	X		
FD00BB006	6		X	
FD00AA010	10	X		
FD00BB010	10		X	
FD00AA020	20	X		
FD00DD020	20			X
FD00DD025	25			X
FD00DD050	50			X
FD00DD075	75			X
FD00DD100	100			X
FD02DD025	25			X
FD02DD050	50			X
FD02DD075	75			X
FD02DD100	100			X

## FD1, FD2, FD3 SERIES

FILTER Part Number	Current Rating (Amps)	Disconnect Type			Termination			
		Single Pole Rocker Breaker	Double Pole Rocker Breaker	Double Pole Handle Breaker	Wire Leads	High Current Connector	Euro Connector	Dual Stud T-Block
FD10BB030	30				X			
FD10EE030	30						X	
FD10BB050	50				X			
FD10EE050	50						X	
FD10BB075	75				X			
FD10BB100	100				X			
FD20B_ _ _	30, 50, or 80				X			
FD20E_ _ _							X	
FD20R_ _ _		X						X
FD20D_ _ _			X					X
FD20H_ _ _				X				X
FD20_B_ _ _						X		
FD20_C_ _ _							X	
FD20_E_ _ _								X
FD20_T_ _ _								X
FD30B_ _ _		30, 50, 75, or 100				X		
FD30E_ _ _							X	
FD30R_ _ _	X							X
FD30D_ _ _			X					X
FD30H_ _ _				X				X
FD30_B_ _ _						X		
FD30_C_ _ _							X	
FD30_E_ _ _								X
FD30_T_ _ _								X

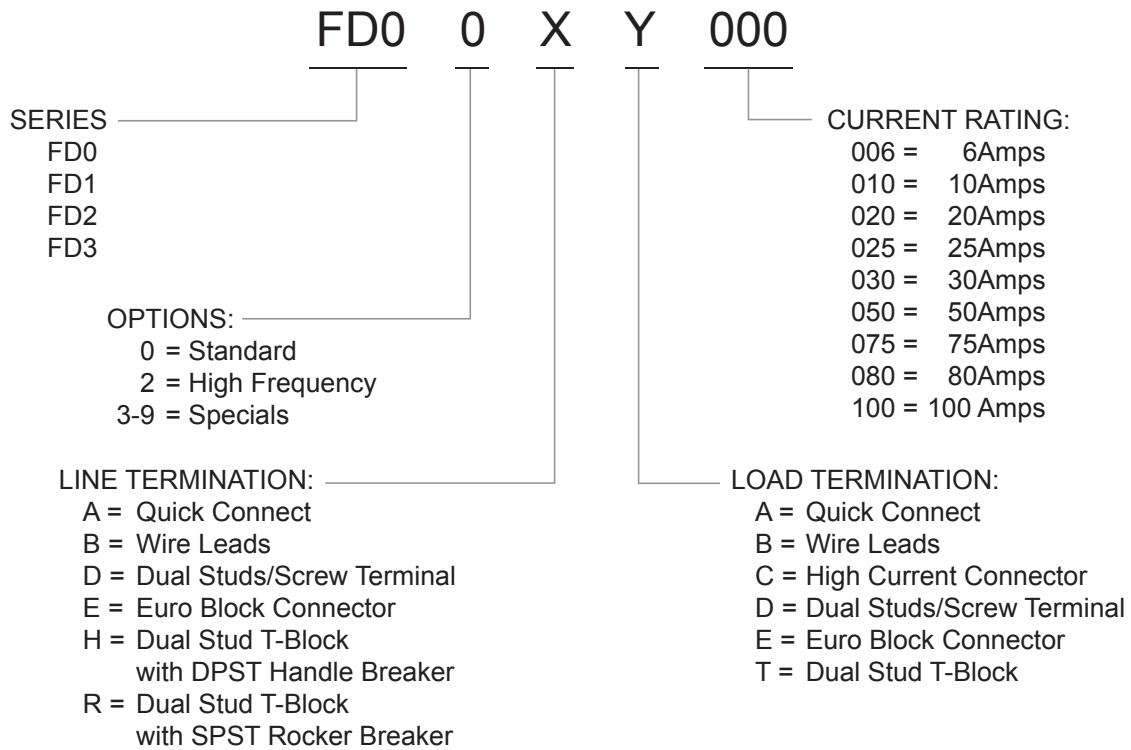
General Purpose

DC FILTERS



# FD Series Filters

## How to Order



**NOTE: Not all terminations are available in all models.**

General Purpose

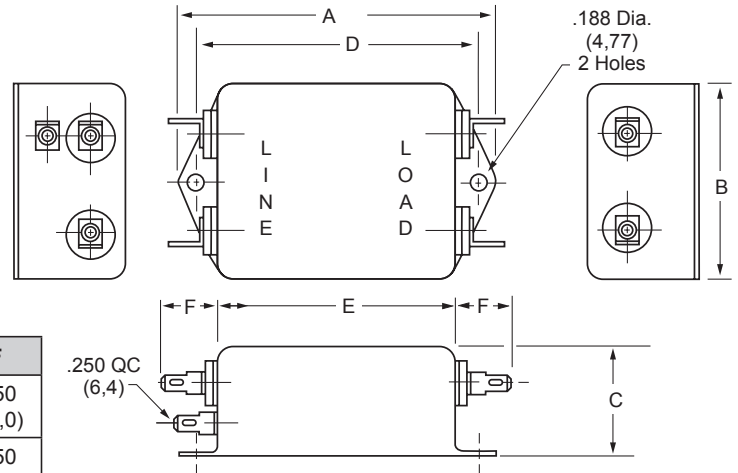
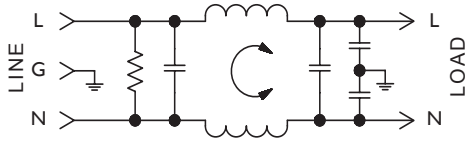
DC FILTERS

Part Number	TYPICAL INSERTION LOSS - dB (50 ohm Circuit)													
	MODE	Frequency - MHz												
		.01	.03	.10	.15	.50	1.0	5.0	10	30	100	300	1000	3000
FD00XX006 FD00XX010 FD00XX020	Common Differential	-	-	-	10 15	22 45	30 60	42 60	47 50	40 50	-	-	-	-
FD00XX025 FD00XX050 FD00XX075 FD00XX100	Common Differential	-	-	-	22 32	50 38	60 50	50 55	45 50	40 40	-	-	-	-
FD02XX025 FD02XX050 FD02XX100	Common Differential	5 40	5 45	35 45	45 45	60 48	60 50	55 45	55 55	50 48	40 45	10 15	20 58	25 40
FD10XX030 FD10XX050 FD10XX075 FD10XX100	Common Differential	5 55	15 60	48 70	60 70	65 70	65 65	60 70	60 60	55 50	25 35	25 15	-	-
FD20XX030 FD20XX050 FD20XX080	Common Differential	5 55	15 65	48 70	60 65	70 60	70 65	70 55	60 50	55 45	-	-	-	-
FD30XX030 FD30XX050 FD30XX075 FD30XX100	Common Differential	12 50	20 60	44 70	60 70	60 70	60 70	60 55	60 70	55 60	-	-	-	-



# FD00 Filters

## FD00AA (6, 10 and 20Amp) Dimensions

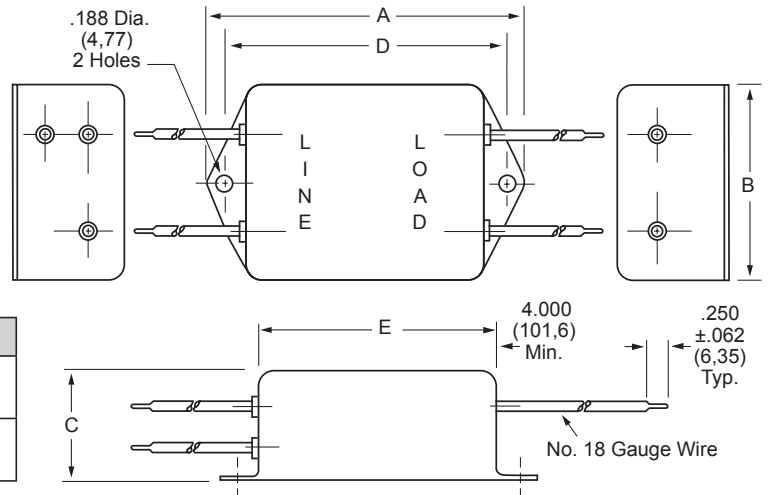


Amps	A	B	C	D	E	F
6A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
10A	3.312 (84,1)	2.000 (50,8)	1.500 (38,2)	2.940 (74,7)	2.500 (63,5)	.550 (14,0)
20A	See FD00DD below for Case Dimensions					

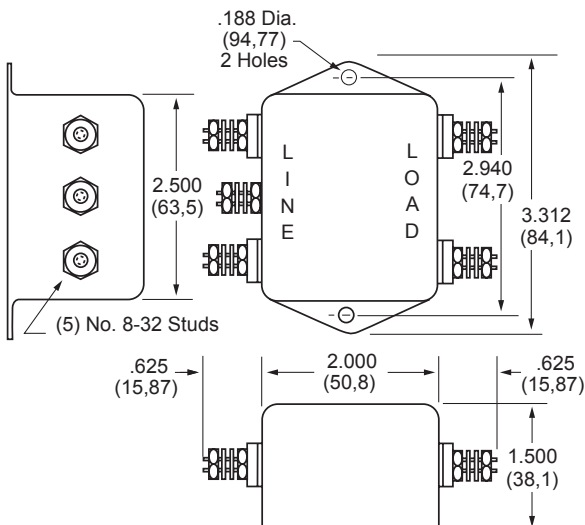
## FD00BB

### (6 and 10Amp) Dimensions

Amps	A	B	C	D	E
6A	3.312 (84,1)	2.000 (50,8)	1.125 (28,5)	2.940 (74,7)	2.500 (50,8)
10A	3.312 (84,1)	2.000 (50,8)	1.500 (38,1)	2.940 (74,70)	2.500 (50,8)



## FD00DD (20Amp) Dimensions



Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



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1-800-657-0853

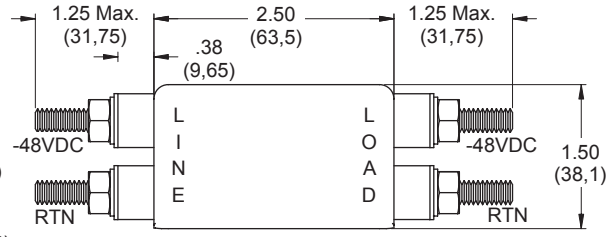
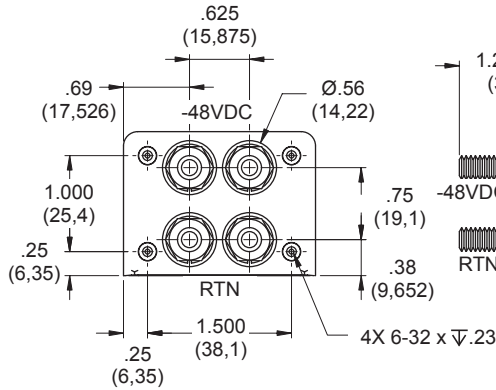
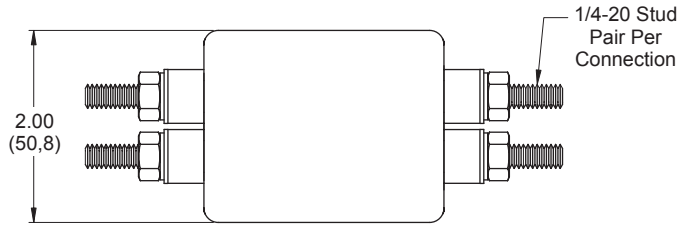
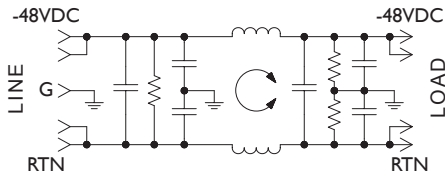
67

General Purpose

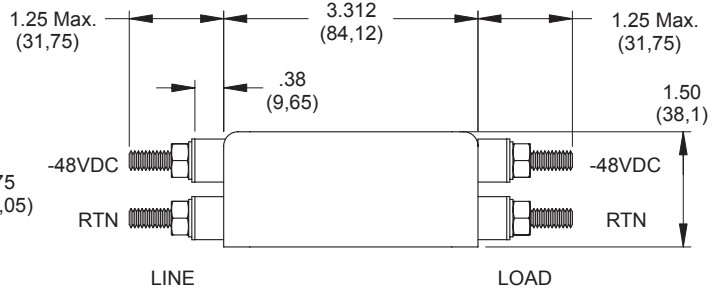
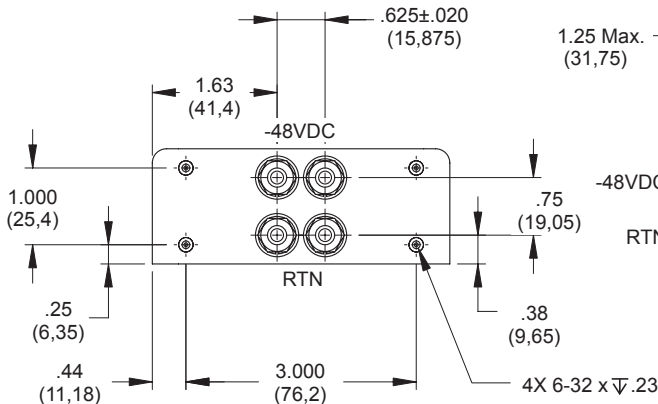
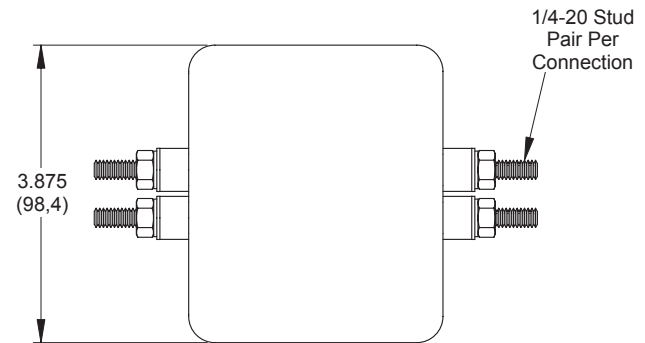
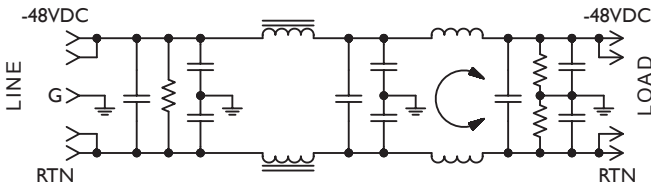
DC FILTERS

# FD00 & FD02 Filters

## FD00DD (25, 50, 75 and 100Amp) Dimensions



## FD02DD (25, 50 and 100Amp) Dimensions



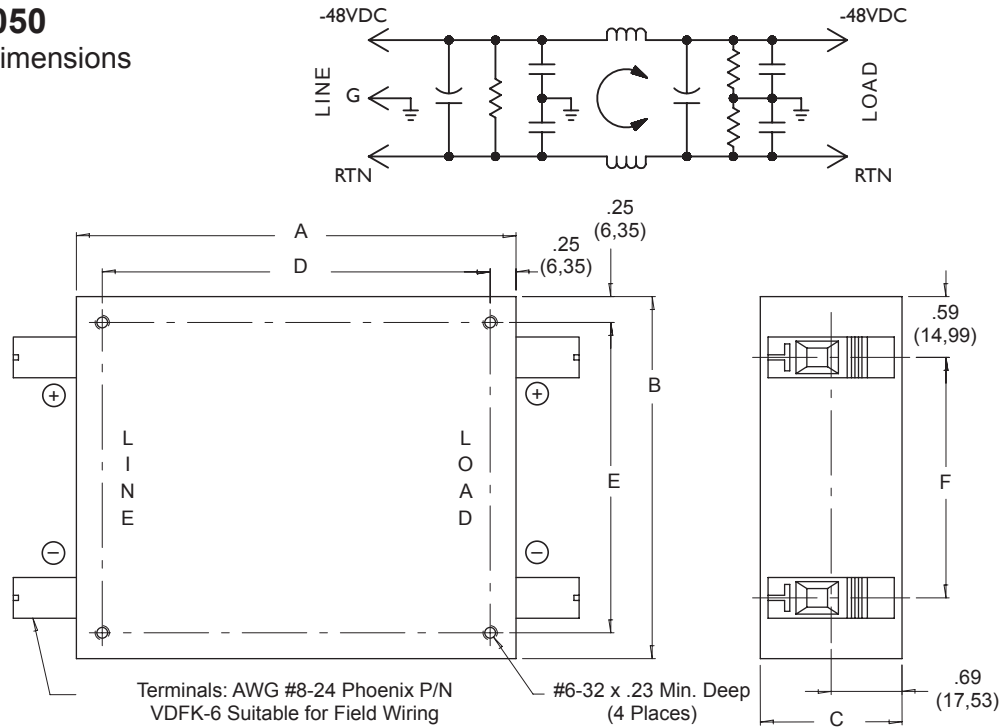
General Purpose

DC FILTERS



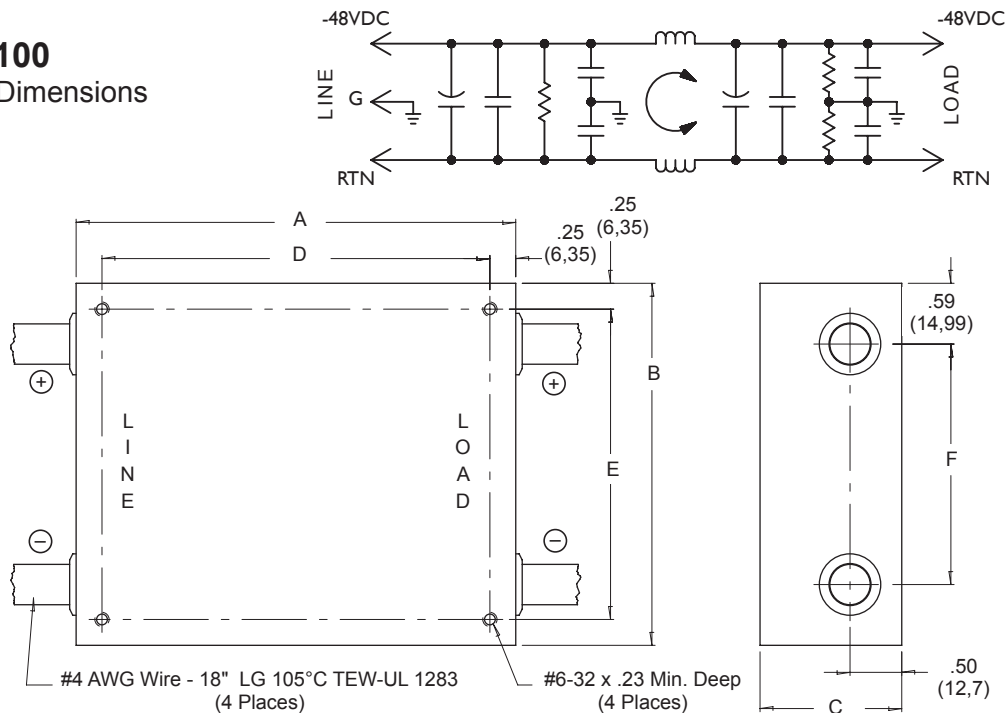
# FD1 Filters

## FD10EE050 (50Amp) Dimensions



Amps	A	B	C	D	E	F
30A, 50A	4.25 (107,95)	3.50 (88,9)	1.37 (34,79)	3.750 (95,25)	3.000 (76,2)	2.33 (59,18)
75A, 100A	4.25 (107,95)	3.50 (88,9)	1.37 (34,79)	3.750 (95,25)	3.000 (76,2)	2.33 (59,18)

## FD10BB100 (100Amp) Dimensions



High Performance

DC FILTERS

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



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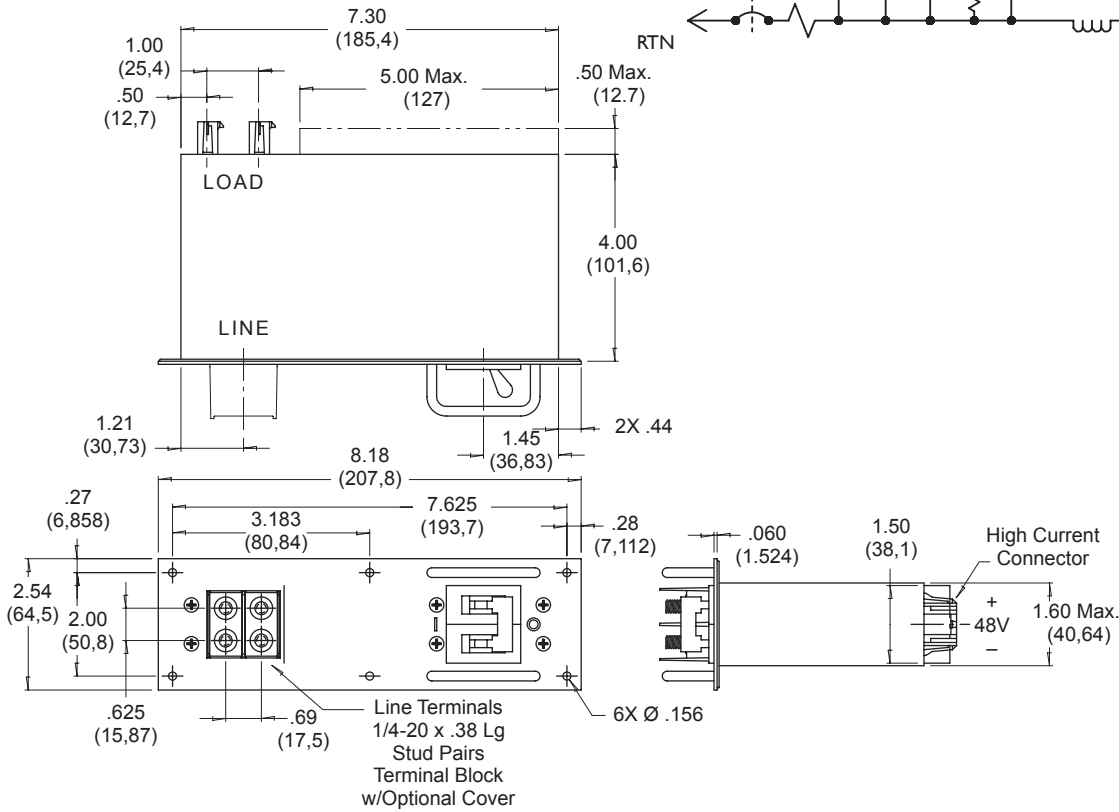
1-800-657-0853

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# FD2 & FD3 Filters

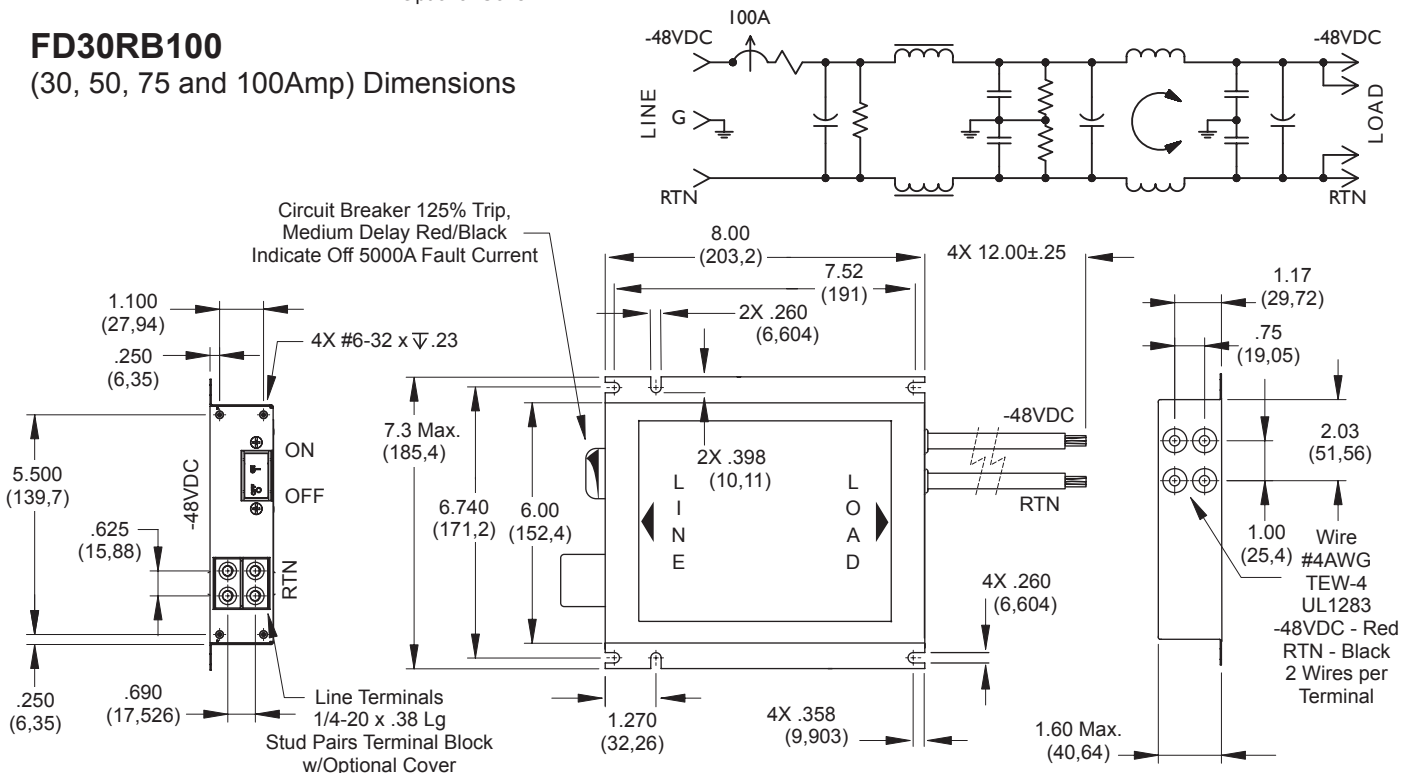
## FD20HC080

(30, 50 and 80Amp) Dimensions



## FD30RB100

(30, 50, 75 and 100Amp) Dimensions

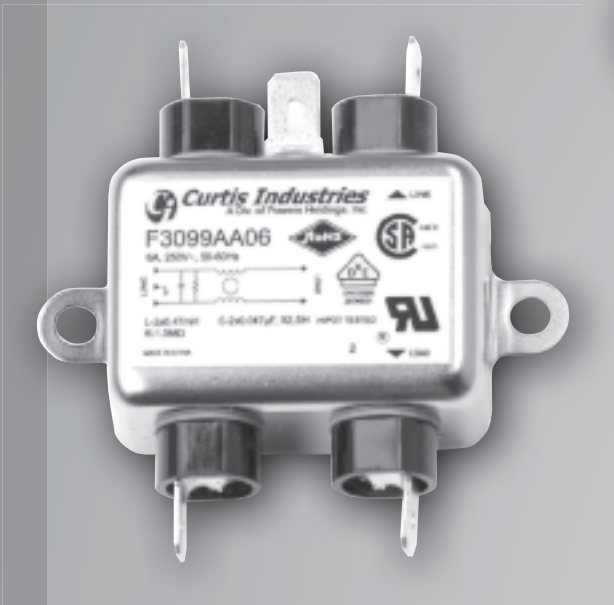
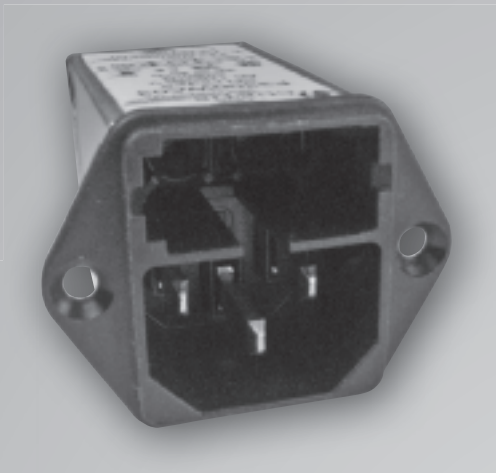


High Performance

DC FILTERS

# MEDICAL FILTERS ]

## General Purpose Combination





# F3099 RFI Filters



## Specifications:

**Maximum Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:** 250VAC  
6A

**Current Overload:** 6X for 8 seconds

### Hi-Pot Test (1 min):

Line to Ground 1500VAC

Line to Line 1450VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

### Termination:

A: Quick Connect

B: Wire

### Maximum Leakage Current:

Each Line to Ground **F3099 Series**

115VAC, 60Hz: 2  $\mu$ A

250VAC, 50Hz: 5  $\mu$ A

### Agency Approvals:



E78454



099523



72102892

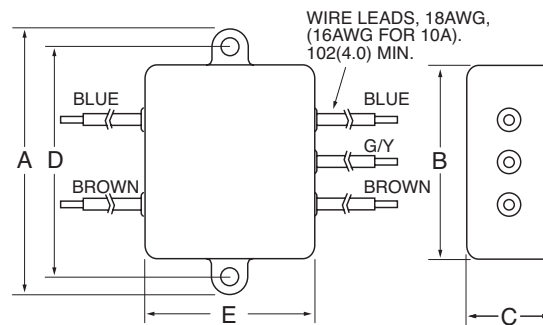
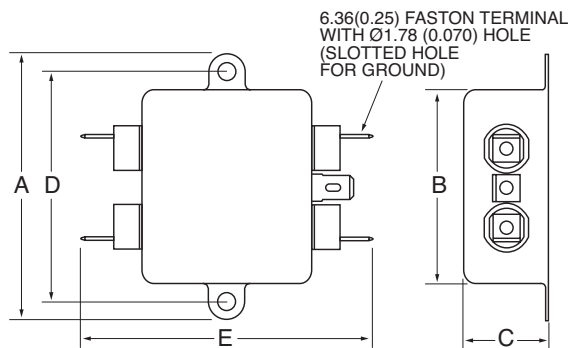
General Purpose Filtered Modules

## Features:

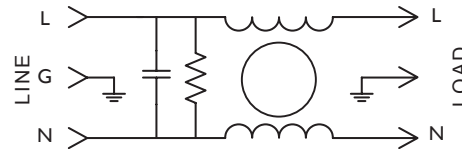
- Designed to Meet UL544 and IEC601 Specifications for Medical and Dental Equipment, both patient care and onpatient categories.
- Leakage current in this series is extremely low to satisfy the stringest leakage current limit imposed by safety regulations for medical and dental equipment.

## F3099AA (6Amp) Dimensions

Amps	A	B	C	D	E
6A	2.53 (64,30)	1.82 (46,2)	0.78 (19,8)	2.126 (54,0)	2.53 (64,30)
	2.53 (64,30)	1.82 (46,2)	0.78 (19,8)	2.126 (54,0)	1.32 (33,5)



## F3099 Series Simplified Schematic



MEDICAL FILTERS

Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)									
			MODE	Frequency - MHz								
				0.05	0.10	.15	.50	1.0	5.0	10	30	
6A	F3099AA06 F3099BB06	QC/QC Wire/Wire	Common	3	7	11	20	22	24	22	18	
			Differential	—	3	6	14	20	35	35	35	

# F3000/3100/3200/3400/3500 RFI Filters



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:** 115VAC 250VAC  
3A 3A  
6A 6A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground 1500VAC  
Line to Line 1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

A: QC – Quick Connect  
C: IEC Receptacle

**Maximum Leakage Current:**

Each Line to Ground **F3000 Series**  
115VAC, 60Hz: 2  $\mu$ A  
250VAC, 50Hz: 5  $\mu$ A

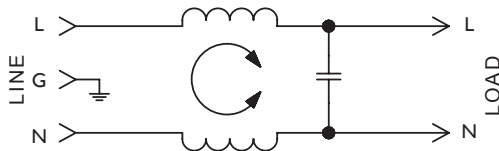
**Agency Approvals:**



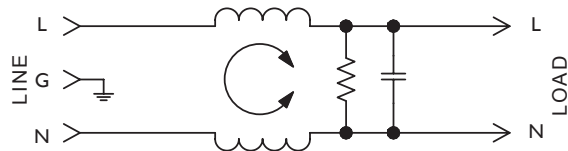
## Features:

- Designed to Meet UL544 Specification for Medical and Dental Equipment. Available to UL/IEC 60601 Standard
- F3400/F3500 Have Enhanced Differential Mode Performance
- Effective in Other Low-Leakage Current Applications

**F3000/F3100/F3200 Series Simplified Schematic**



**F3400/F3500 Series Simplified Schematic**



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F3400CA03	IEC/QC	Common	22	32	35	30	25	20
	F3500CA03	IEC/QC	Differential	8	18	24	35	35	35
6A	F3000AA06	QC/QC	Common	10	20	23	25	23	15
	F3100CA06	IEC/QC	Differential		2	8	32	34	23
	F3200CA06	IEC/QC							
	F3400CA06	IEC/QC	Common	15	21	24	24	22	26
	F3500CA06	IEC/QC	Differential	8	18	24	35	35	35

NOTE: Other combinations of terminals may be specified on special order.

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



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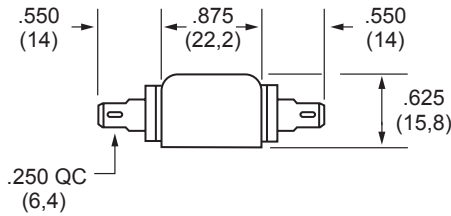
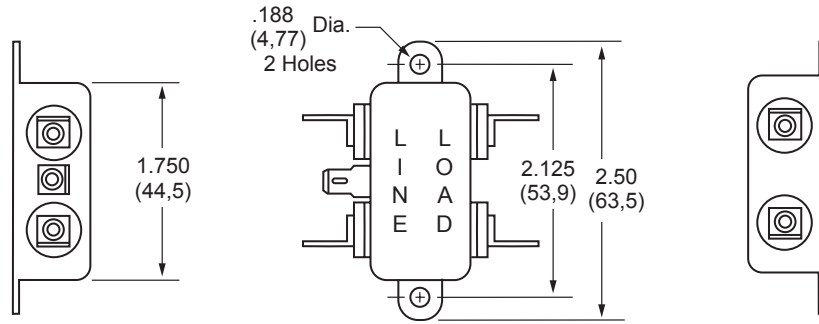
1-800-657-0853

General Purpose Filtered Modules

MEDICAL FILTERS

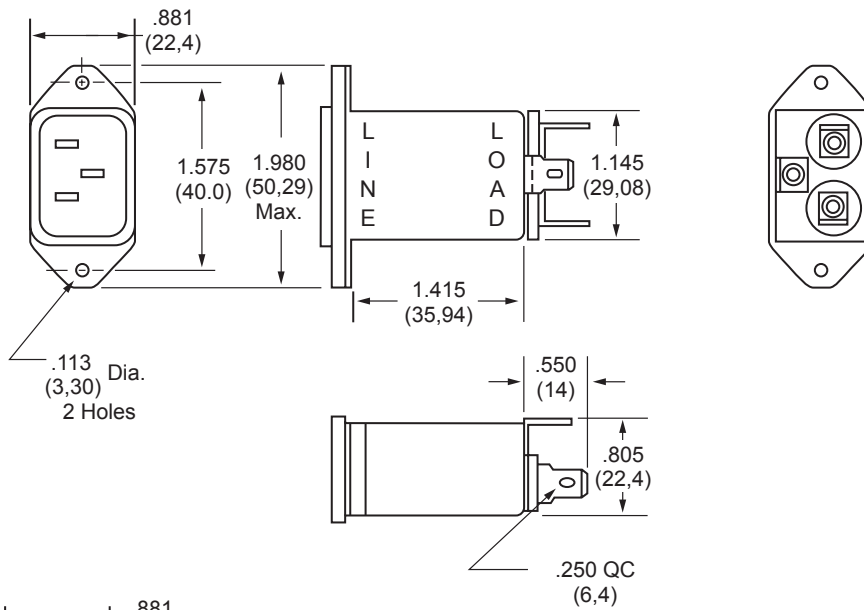
# F3000/3100/3200/3400/3500 (continued)

## F3000AA (6Amp) Dimensions

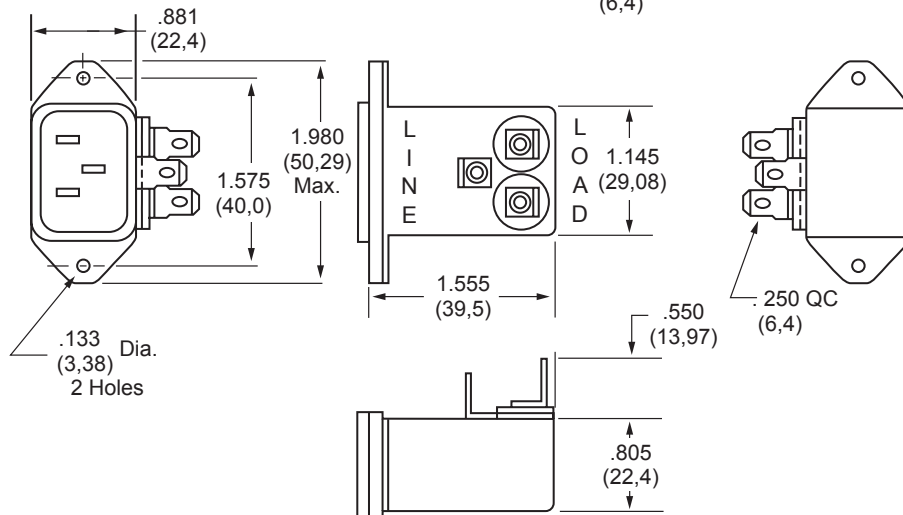


## F3100CA (6Amp) F3400CA (3 and 6Amp) Dimensions

Refer to Page 58  
for Standard  
Mounting Cutouts



## F3200CA (6Amp) F3500CA (3 and 6Amp) Dimensions



General Purpose Filtered Modules

MEDICAL FILTERS

# F3300 RFI Filters



## Features:

- General Purpose “L-Type” Circuit Effective in Reducing Both Incoming and Outgoing Powerline Noise Levels in FCC “A” Applications
- Integral 5 X 20mm Single or Dual Fused IEC Connector
- Optional SST Switched IEC Connector
- Low-Leakage
- Available to UL/IEC 60601 Standard and Meets UL 544 Specification for Medical and Dental Applications
- Available in Labor-Saving PC Mounted Case Style

## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:**           115VAC   250VAC  
                                  3A           3A  
                                  6A           6A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground   1500VAC  
Line to Line       1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at Rated Current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

A: QC – Quick Connect  
F: Fused IEC  
J: Switched IEC  
P: PCB Pins  
W: Dual Fused IEC

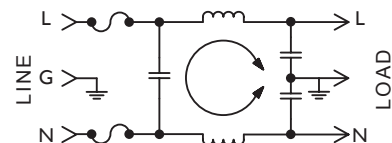
**Maximum Leakage Current:**

Each Line to Ground   **F3300**  
115VAC, 60Hz:           .015mA  
250VAC, 50Hz:           .025mA

**Agency Approvals:**



## F3300F Simplified Schematic



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	F3300FA03 F3300FP03	Fused IEC/QC Fused IEC/PC	Common	21	32	36	30	28	28
			Differential	8	18	24	35	35	35
6A	F3300FA06 F3300FP06	Fused IEC/QC Fused IEC/PC	Common	18	30	34	26	25	25
			Differential	8	18	24	35	35	35
3A	F3300WA03 F3300WP03	Dual Fused IEC/QC Dual Fused IEC/PC	Common	21	32	36	30	28	28
			Differential	8	18	24	35	35	35
6A	F3300WA06 F3300WP06	Dual Fused IEC/QC Dual Fused IEC/PC	Common	18	30	34	26	25	25
			Differential	8	18	24	35	35	35
3A	F3300JA03 F3300JP03	Switched IEC/QC Switched IEC/PC	Common	21	32	36	30	28	28
			Differential	8	18	24	35	35	35
6A	F3300JA06 F3300JP06	Switched IEC/QC Switched IEC/PC	Common	18	30	34	26	25	25
			Differential	8	18	24	35	35	35

NOTE: Other combinations of terminals may be specified on special order.

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



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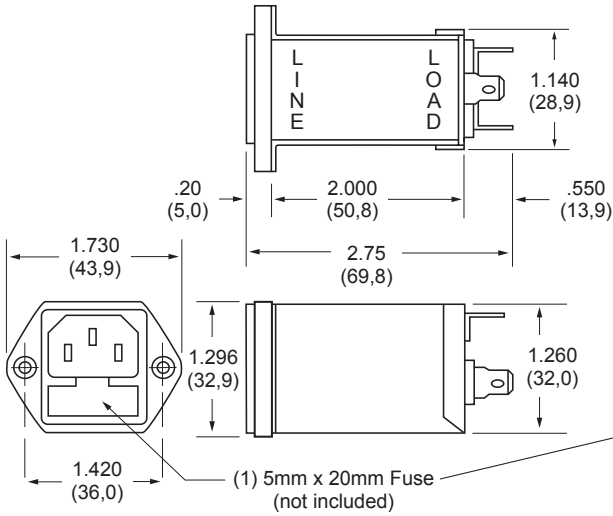
1-800-657-0853

General Purpose Filtered Modules

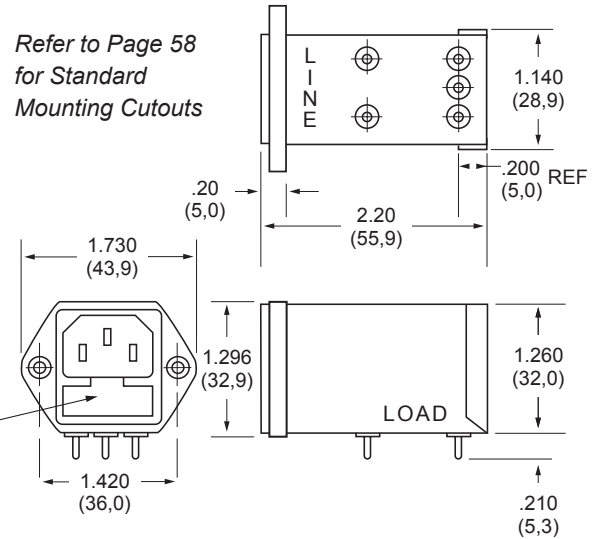
MEDICAL FILTERS

# F3300 Series (continued)

## F3300FA (3 and 6Amp) Dimensions

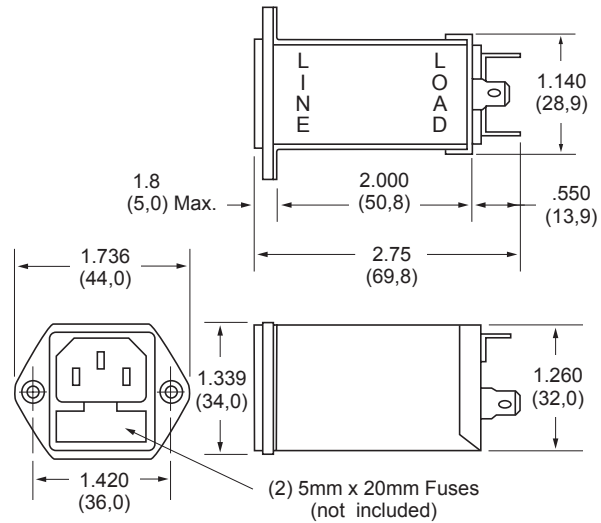
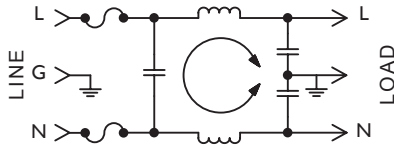


## F3300FP (3 and 6Amp) Dimensions



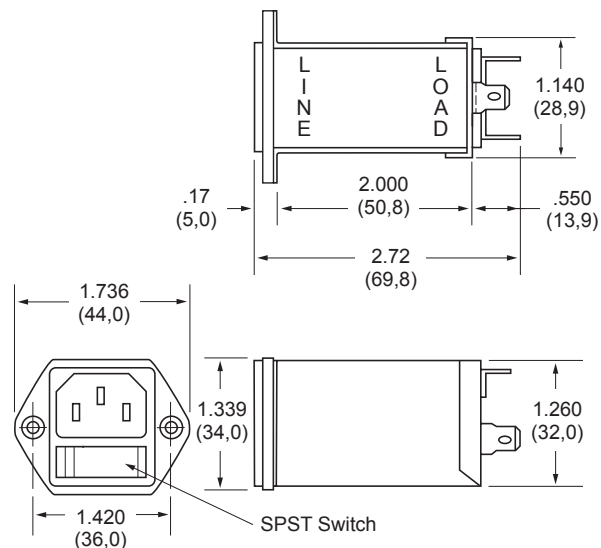
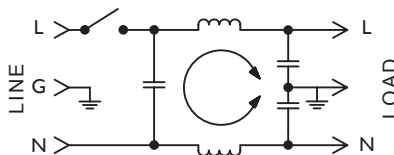
## F3300WA (3 and 6Amp) Dimensions

### F3300W Simplified Schematic



## F3300JA (3 and 6Amp) Dimensions

### F3300J Simplified Schematic



# FPM7/FPM8 Series



## Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:** 115VAC 250VAC  
3A 3A  
6A 6A

**Current Overload:** 6X for 8 Seconds

**Hi-Pot Test (1 min):**

Line to Ground 1500VAC  
Line to Line 1768VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max. at Rated Current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- IEC Receptacle
- Wire Wrap/Solder

**Maximum Leakage Current:**

Each Line to Ground **FPM7, FPM8**  
115VAC, 60Hz: 0.002mA  
250VAC, 50Hz: 0.005mA

**Voltage Select Card:** Installed in 120VAC position unless otherwise specified

**Agency Approvals:**

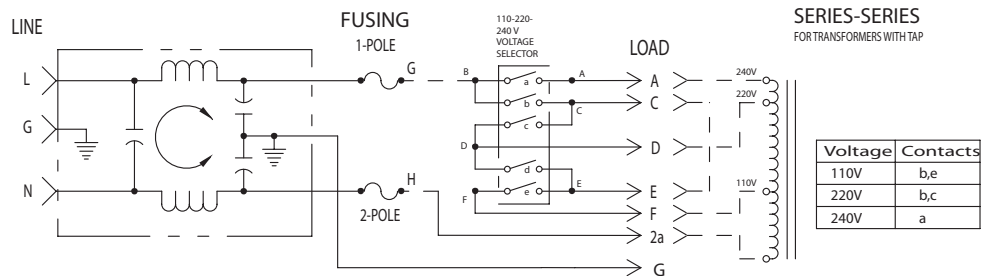


## Features:

- RFI Filter Module Combines IEC Connector, Fusing, and Voltage Select Features in One Unit
- FPM7 Series Filters Provide 20% More Differential Mode Attenuation Than Comparable Units
- Accepts Either U.S. or European Standard Fuse Sizes
- Available to UL/IEC 60601 Standard and Meets UL 544 Specification for Medical and Dental Applications

Refer to Page 80 for Ordering Instructions

## FPM7 Series Simplified Schematic



Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)						
			MODE	Frequency - MHz					
				.15	.50	1.0	5.0	10	30
3A	FPM7XXX03 FPM8XXX03	IEC/Solder Tabs	Common	14	20	22	24	22	15
			Differential	8	18	24	46	50	40
6A	FPM7XXX06 FPM8XXX06	IEC/Solder Tabs	Common	10	15	18	18	18	15
			Differential	8	18	24	39	40	40

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.



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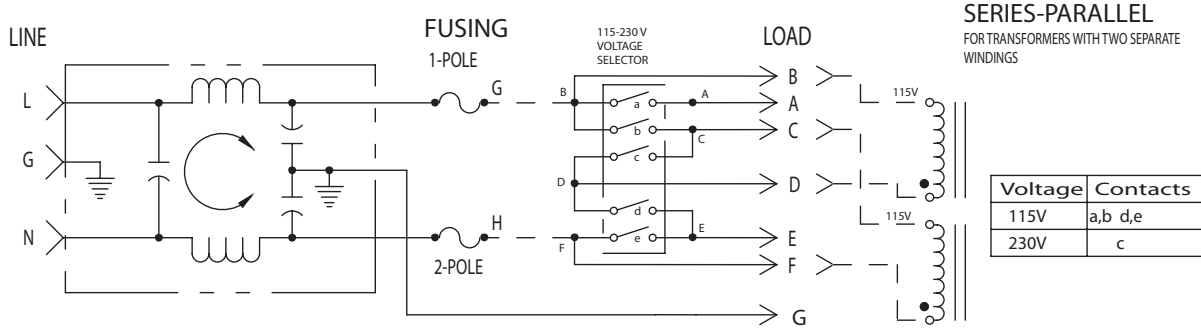
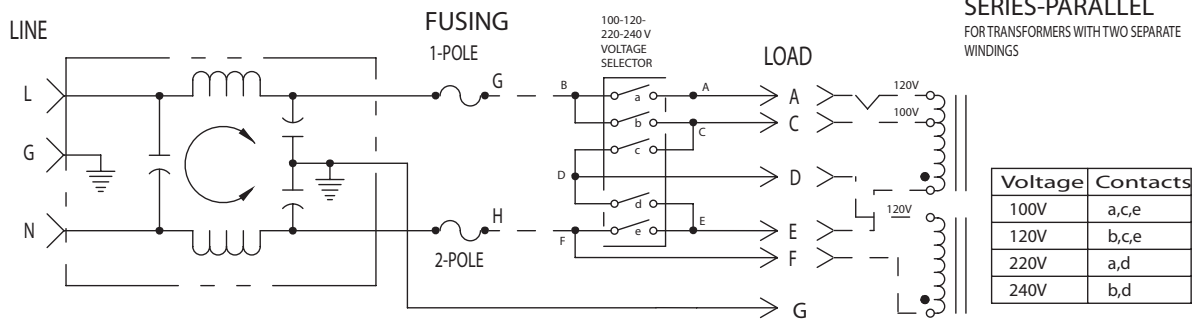
1-800-657-0853

General Purpose Filtered Modules

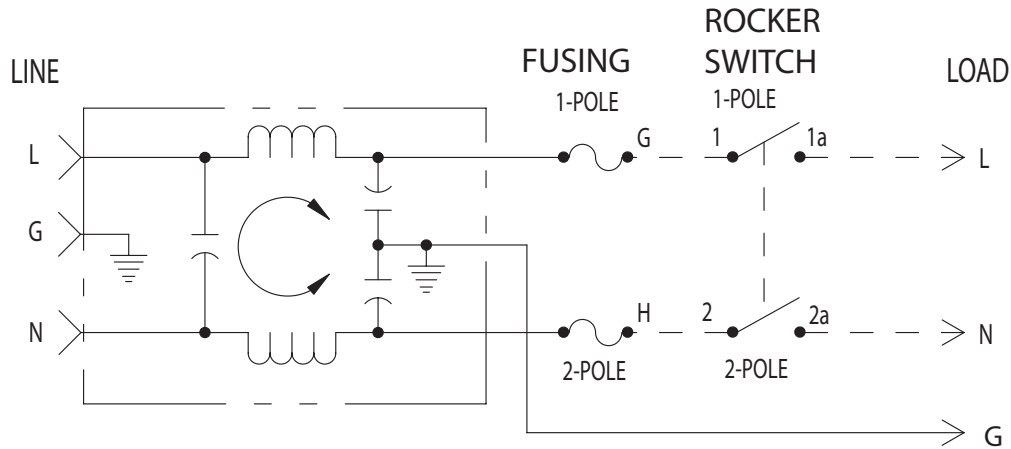
MEDICAL FILTERS

# FPM7/FPM8 Series (continued)

## FPM7 Series Simplified Schematic



## FPM8 Series Simplified Schematic

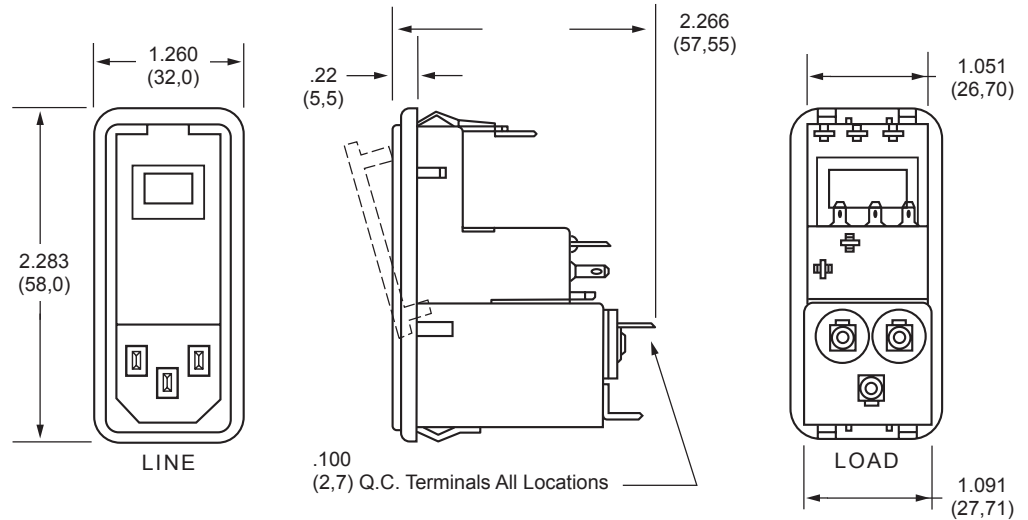


Combination

MEDICAL FILTERS

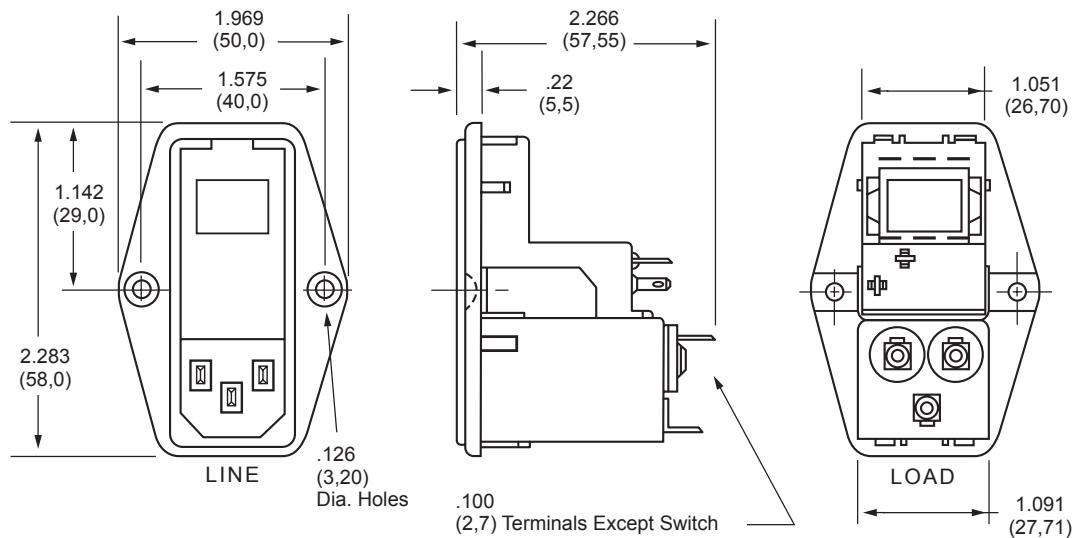
## FPM7/FPM8 Snap-Mount Series (3 and 6Amp) Dimensions

Refer to Page 80  
for Standard  
Mounting Cutouts



## FPM7/FPM8 Screw-Mount Series (3 and 6Amp) Dimensions

Refer to Page 80  
for Standard  
Mounting Cutouts

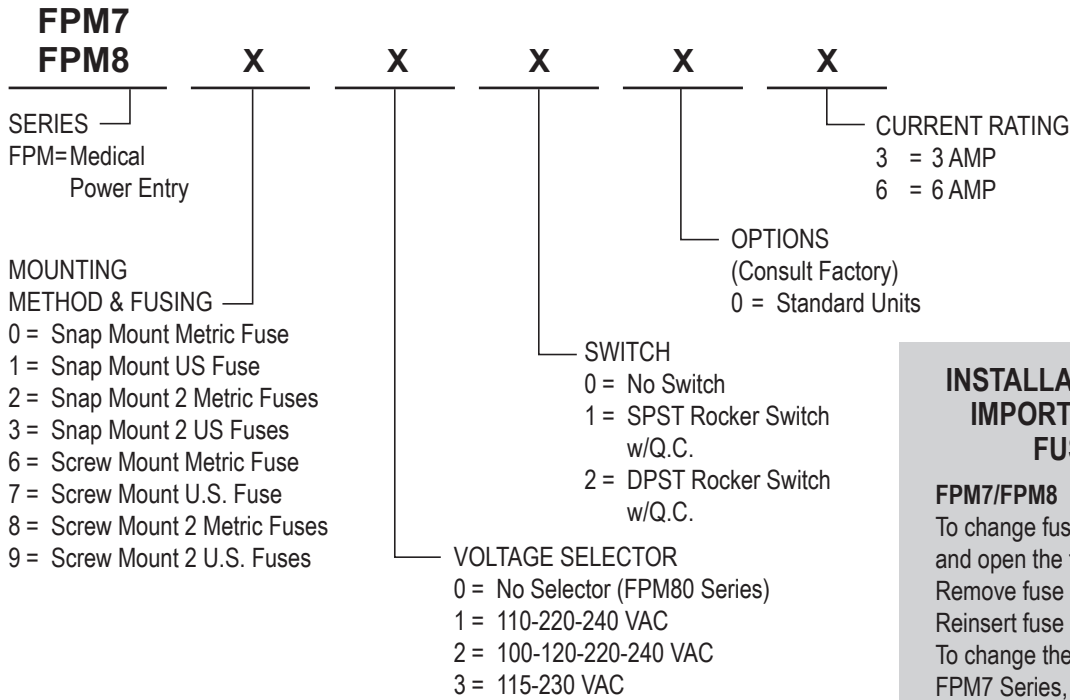




# FPM7/FPM8 Series *(continued)*



## How to Order



### INSTALLATION INSTRUCTION IMPORTANT – CHANGING FUSE/VOLTAGE

#### FPM7/FPM8

To change fuse, remove power cord and open the front cover on the module. Remove fuse holder and replace fuse. Reinsert fuse holder and close cover. To change the operating voltage on the FPM7 Series, remove the power cord and open front cover. Rotate voltage select wheel until desired voltage appears in window of cover.

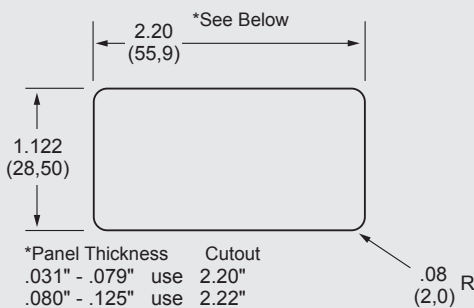
- Filter shipped without fuse.

Always use caution when selecting and changing fuses and voltage requirements. Curtis Industries is not responsible for malfunction due to improper installation/selection of fuse and/or voltage select.

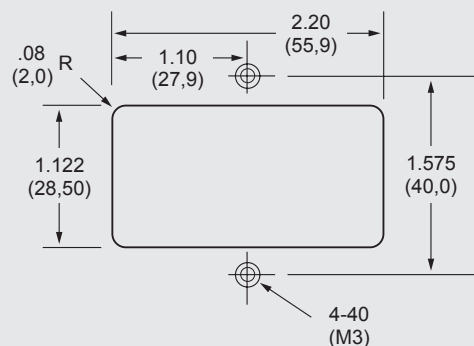
Combination

MEDICAL FILTERS

### FPM7/FPM8 Snap-Mount Series



### FPM7/FPM8 Screw Mount Series





### Features:

- RFI Filter Module Combines IEC Connector, Fusing, Optional Voltage Select and On/Off Switch into a Single, Space-Efficient Assembly
- Enhanced Low Frequency Response with No Resonant Peaks
- Fully Shielded for Radiative Noise Control
- Accepts Either U.S. or European Standard Fuse Sizes. Dual or Single Power Line Fusing
- Meets IEC 60601 Standard and Meets UL 544 Specification for Medical and Dental Applications

### Specifications:

**Rated Voltage:** 250VAC Maximum - 50/60 Hz

**Rated Current:** 115VAC 250VAC  
10A 10A

**Current Overload:** 6X for 8 seconds

**Hi-Pot Test (1 min):**

Line to Ground 1500VAC  
Line to Line 2250VDC

**Insulation Resistance:**  $9 \times 10^9 \Omega$  at 100VDC

**Ambient Temperature:** 40°C Max at rated current

**Humidity Range:** 0% to 95% R.H.

**Termination:**

- QC – Quick Connect
- IEC Receptacle

**Maximum Leakage Current:**

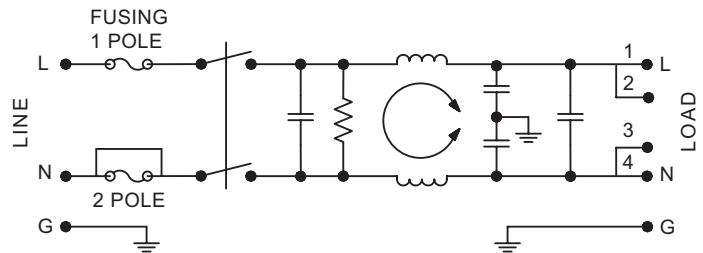
Each Line to Ground	PM1	PM1-PO
115VAC, 60Hz:	0.002mA	0.015mA
250VAC, 50Hz:	0.005mA	0.025mA

**Voltage Select Card:** Installed in 120VAC position unless otherwise specified

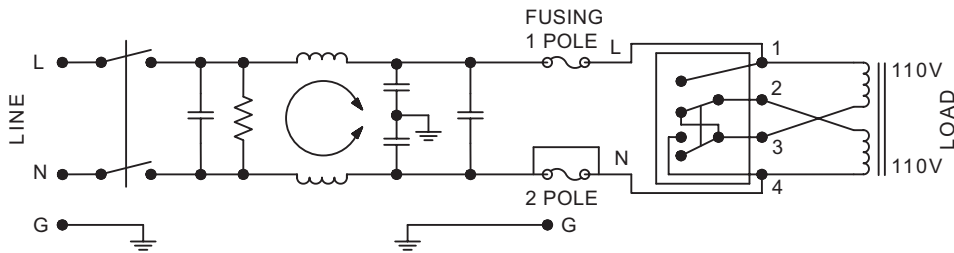
**Agency Approvals:**



**FPM1 Series Simplified Schematic without Voltage Selector**



**FPM1 Series Simplified Schematic with Voltage Selector**



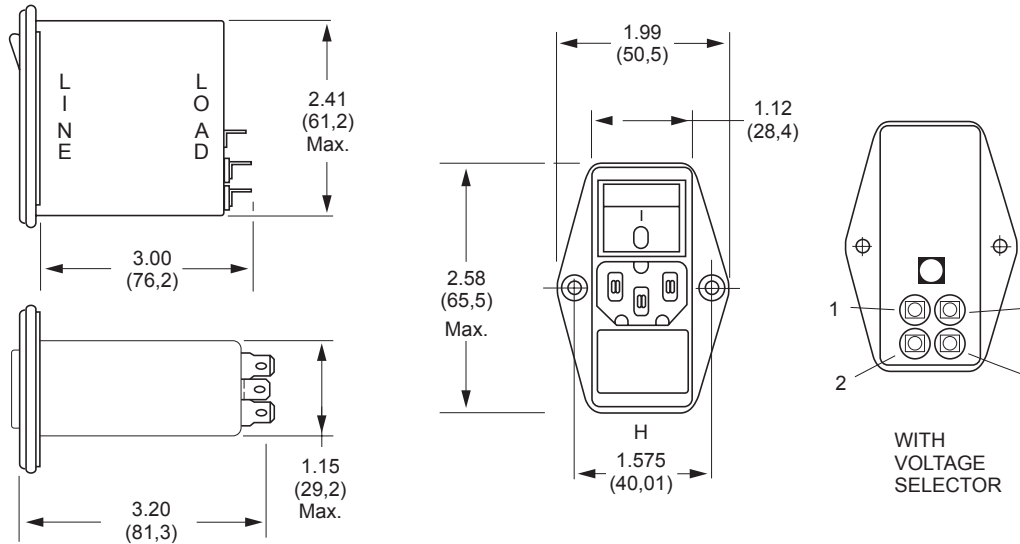
Nominal Current Rating	Part Number	Termination Line/Load	MINIMUM INSERTION LOSS - dB (50 ohm Circuit)								
			MODE	Frequency - MHz						10	30
				.05	.15	.50	1.0	5.0			
10A	FPM1XXX10	IEC/QC	Common	10	20	30	33	25	20	15	
			Differential	10	20	30	35	55	60	55	
	FPM1XXXP0	IEC/QC	Common	12	23	30	35	25	25	30	
			Differential	10	20	30	35	65	65	55	

NOTE: Other combinations of terminals may be specified on special order.

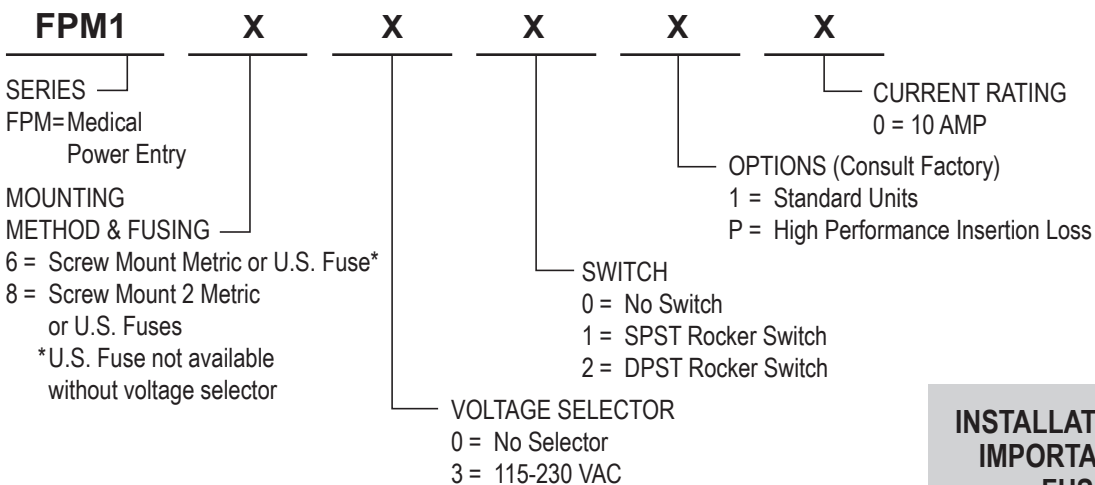


# FPM1 Series (continued)

## FPM1 (10Amp) Dimensions



## How to Order



## INSTALLATION INSTRUCTION IMPORTANT – CHANGING FUSE/VOLTAGE

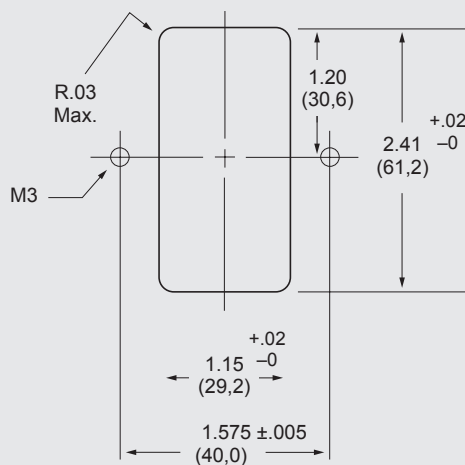
### FPM1

To change fuse, remove power cord. Remove voltage selector and replace fuse. Reinsert fuse holder. To change the operating voltage on the FPM1 Series, remove the power cord and rotate fuse holder block until desired voltage aligns with the mark on the module housing.

- Filter shipped without fuse.

**Always use caution when selecting and changing fuses and voltage requirements. Curtis Industries is not responsible for malfunction due to improper installation/selection of fuse and/or voltage select.**

## FPE1 Screw Mount Series



Combination

MEDICAL FILTERS

## **TECHNICAL CONSIDERATIONS ]**

Understanding Terminology

Technical Considerations

Conducted Emissions Testing

Custom Filter Capabilities



# Understanding Terminology

Curtis Industries, a leading manufacturer of superior-quality electronic and electrical components and assemblies for more than 70 years, offers a complete line of RFI power line filters designed to help your equipment meet FCC and CE requirements on conducted EMI.

Radio frequency interference (RFI) is unwanted noise generated by a wide variety of electronic and electrical devices. Governments of most industrial

countries, including the United States, Canada and the European Union have enacted guidelines on emitted RFI.

Curtis designs quality into every product and then tests for quality by specification compliance, including hipot, component value, grounding and leakage, on a 100% production basis. We employ a rigorous component qualification program with thorough incoming and on-line inspection procedures. Our computer-controlled 100% safety and performance testing to demanding customer requirements is your assurance of the highest quality RFI filters available today.

This section provides you with some basic knowledge on terminology and technical information helpful in solving your noise emission in power circuits. For additional information visit our website at [www.curtisind.com](http://www.curtisind.com).



## Definitions

**Attenuation:** The decrease in intensity or absorption of electromagnetic energy. Expressed in dB.

**Conducted Interference:** Electromagnetic signals entering a device through direct connection.

**Emissions:** The level of electromagnetic disturbances equipment causes to its environment.

**Filter:** Remove electrical noise or interference from the power line by cleaning up the sine wave.

**Immunity:** The level to which equipment is immune to electromagnetic disturbances in its environment

**Impedance:** Opposition to the flow of electrical current when a given voltage is applied.

**Inductor:** Passive component that produces a voltage proportional to the change in current. Measured in Henrys.

**Insertion Loss:** The electromagnetic signal loss resulting from the insertion of a filter in a transmission line. Expressed in dB.



## What is RFI?

Radio frequency interference (RFI) is the radiation or conduction of radio frequency energy (or electronic noise) produced by electrical and electronic devices at levels that interfere with the operation of adjacent equipment. Frequency ranges of most concern are 10 kHz to 30 MHz (conducted) and 30 MHz to 1 GHz (radiated).

## What causes RFI?

The most common sources include components such as switching power supplies, relays, motors and triacs. These devices are found in a wide variety of equipment used in industrial, medical, white goods, and building HVAC equipment.

## What are the types of RFI?

An electrical or electronic device emits RFI in two ways:

- **Radiated RFI** is emitted directly into the environment from the equipment itself.
- **Conducted RFI** is released from components and equipment through the power line cord into the AC power line network. This conducted RFI can affect the performance of other devices on the same network.

## How can RFI be controlled?

- **Radiated RFI** is usually controlled by providing proper shielding in the enclosure of the equipment.
- **Conducted RFI** can be attenuated to satisfactory levels by including a power line filter in the system.

The filter suppresses conducted noise leaving the unit, reducing RFI to acceptable levels. It also helps to lower the susceptibility of the equipment to incoming power line noise that can affect its performance.

## What is the government's role in regulating RFI?

Governments and safety agencies of major industrial countries, including the United States, Canada, and the European Union have established noise emission regulations that are focused on digital and other electronic equipment. The most important of these guidelines are FCC CFR 47 (Parts 15 and 18) in the United States and CISPR 11, 14 and 22 in the European Union.

FCC CFR 47 (Part 15) regulates the RF

interference of electronic computing devices, defined as any electronic device or system that generates and uses timing signals or pulses at a rate in excess of 10,000 pulses (cycles) per second and uses digital techniques. This definition includes telephone equipment that utilizes digital techniques and any device or system that generates and uses radio frequency energy for the purpose of performing data-processing functions such as electronic computations, operations, transformations, recording, filing, sorting, storage, retrieval or transfer.

FCC regulations are broken down into **Class A** computing devices marketed for use in commercial, industrial or business environments, and **Class B** devices intended for use in a residential environment.

The European Union has harmonized the various national regulations and has established the international standards CISPR 11, 14 and 22. CISPR 11 covers industrial, scientific and medical equipment. CISPR 14 covers electrical and thermal appliances and tools. CISPR 22 covers information technology equipment.

In addition to governmental regulations, safety agencies worldwide have established guidelines for all electrical/electronic components. These include UL, CSA and TUV. They are designed to protect against shock and fire hazard.

## How do RFI power line filters work?

Consisting of a multiple-port network of passive components arranged as a dual low-pass filter, the RFI filter attenuates radio frequency energy to acceptable levels, while permitting the power frequency current to pass through with little or no attenuation. Their function, essentially, is to trap noise and to prevent it from entering or leaving your equipment.

RFI is conducted through a power line in two modes. Asymmetric or **common mode** noise occurs between the line and ground. Symmetric or **differential mode** is measured from line to line. See the selection guide on page 2 under "Performance."

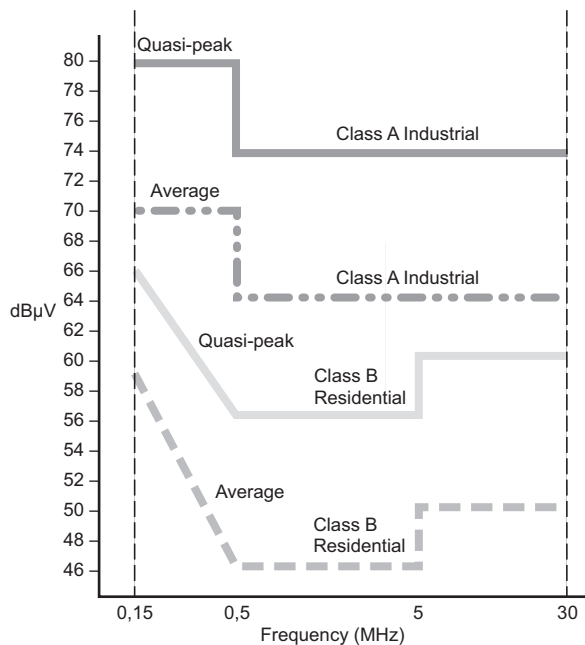


# Technical Considerations

## Meeting Emissions Standards

The emissions limits that a piece of equipment must meet will depend on the intended market for that piece of equipment. If there is more than one market, more than one emission standard may have to be met. This can have a substantial effect on the circuit, size, and cost of a filter. Standards like the CISPR's or the FCC Rules Part 15 have frequency limits of 150 kHz to 30 MHz.

### FCC 15 AND CISPR CONDUCTED EMISSION LIMITS DIGITAL EQUIPMENT



EMI measurements are generally made using Spectrum Analyzers with Average or Quasi-Peak detectors in accordance with methods described in CISPR 16. Quasi-Peak differs from Average measurements by weight-averaging the peaks into the total.

Equipment meeting these specifications can utilize a filter with a fairly high cutoff frequency. Other standards like FCC 18 with a low frequency limit of 10 kHz will result in the equipment using lower cutoff filters. As might be expected, the lower the cutoff frequency, the larger the physical size and the higher the cost of the filter.

## Conducted RFI Susceptibility

The problem of susceptibility can be extremely difficult to deal with because the amplitude and frequency of the offending RF noise are seldom known and are often intermittent. If the malfunction can be duplicated by isolating the equipment from the power line with LISN's

(Line Impedance Stabilization Network) and using signal generators to inject RF of varying amplitude and frequency, some insight can be gained as to the nature of the problem. However, the criteria for acceptable performance will have to be decided upon so that a filter yielding this level of performance can be obtained from the test procedure. Unfortunately, this still does not eliminate the need for final testing in the actual operating environment which, in many cases, occurs in the field.

Selection of a suitable filter can best be based on the type of power supply or input impedance of the equipment and on the mode of the offending RFI noise.

## Noise Modes

Power line filters attenuate noise in two different modes.

**Common Mode:** Also known as line-to-ground noise measured between the power line and ground potential.

**Differential Mode:** Also known as line-to-line noise measured between the lines of power.

Power line filters are designed to attenuate either one or both modes of noise. The need for one design over another will depend on the magnitude of each noise type present. The attenuation is measured in dB (decibels) at various frequencies of signal.

## Circuit Configuration

Power line RFI filters are generally built with two or three-pole filter networks. As the number of poles and the corresponding component count increases, the cost will increase also. Trying to typify an equipment's impedance as either high or low for purposes of filter selection may not be successful. If it is a complex impedance, it could probably be low at some frequencies, high at others, and some intermediate value at still other frequencies.

Although we have been generally successful in recommending a two-pole network for linear power supplies and three-pole networks for switching power supplies and synchronous motors, you should not limit your testing to just one circuit type if either additional circuit performance or lower cost is desired. Consider the following: If the equipment looked strictly capacitive, the performance of a two-pole network would be reduced to that of a single-pole filter.

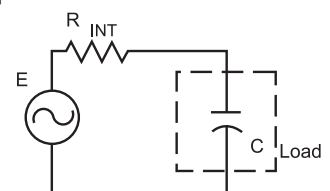


Figure 1a.  
A signal source (E) with its internal impedance driving a capacitive load.



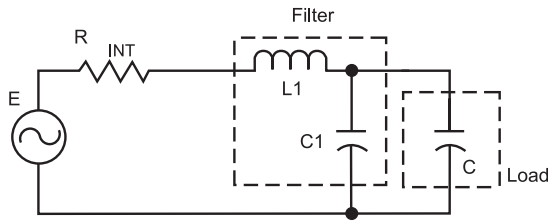
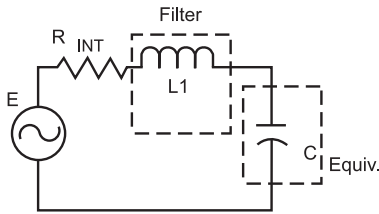


Figure 1b.

The same circuit as in Figure 1a, with the addition of a 2-pole low pass filter. Notice filter capacitor C1 is in parallel with the capacitive load.

Figure 1c.

Combining capacitor C1 in Figure 1b, with the load results in this circuit configuration.



The filter has been reduced to one inductive element, L1.

Obviously a three-pole filter would be preferred for maximum performance. Likewise, if the equipment looked strictly inductive, the performance of a three-pole network would be reduced to that of a two-pole network.

Figure 2a.

A signal source with its internal impedance driving an inductive load.

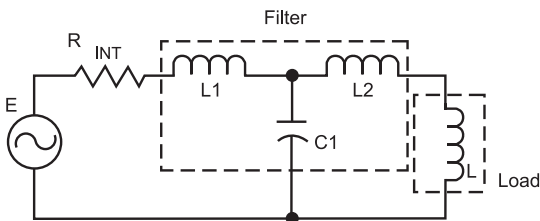
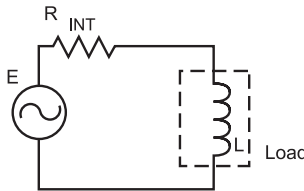


Figure 2b.

The same circuit as in Figure 2a, with the addition of a 3-pole low pass filter. Notice filter inductance L2 is in series with the inductive load.

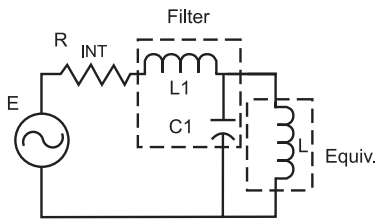


Figure 2c.

Combining inductor L2 in Figure 2b, with the load results in this circuit configuration, the filter has been reduced to two effective elements, L1 & C1.

Undoubtedly the two-pole filter would be a more economical choice with probably equal performance in this application. Since the equipment is not likely to be equivalent to either one of these simple cases, the only way to find the best cost-effective solution is to test the filters in your equipment and base your judgement on these test results.

## Leakage Current

The maximum leakage current that a device is allowed depends on the requirements of the particular safety agency involved. Here, selection of the filter is quite easy since either the filter is designed to meet a given level or it is not. Although there is no compromise when it comes to safety specifications, it should be understood that for a given level of performance, as the leakage current is reduced, the physical size of the package will increase. Curtis medical filters have a very low leakage current.

## Insertion Loss

DO NOT use the insertion loss specifications to make your final decision. Power line filters are two-terminal pair passive networks whose attenuation characteristics can be defined by a complex transfer function. How that transfer function will react in a particular system and at specific frequencies will depend on the complex impedances connected to each side of the filter. The equipment impedance and the impedance of the power line, even if a 50 ohm LISN (Line Impedance Stabilization Network) is being used during emission testing, will not generally be equal to the resistive 50 ohms used during insertion loss measurements. Therefore, the performance of the filter in the equipment cannot be related to the published insertion loss data.

## Minimum Insertion Loss

Do not be alarmed that the insertion loss figures we have published may be of lower value than those of our competition. You will only find guaranteed minimum insertion loss figures in this catalog, without any mention of typical values.

Insertion loss test data measured in a 50 ohm system is a valuable incoming inspection tool to assure you that consistent product is being shipped. The only figures of any importance are those that specify the criteria for acceptance or rejection of that product, and those figures are the minimum values.





# RFI/EMI Conducted Emissions Testing

Curtis offers full RFI/EMI conducted emissions testing services for manufacturers who must produce equipment in accordance with FCC and CE standards.

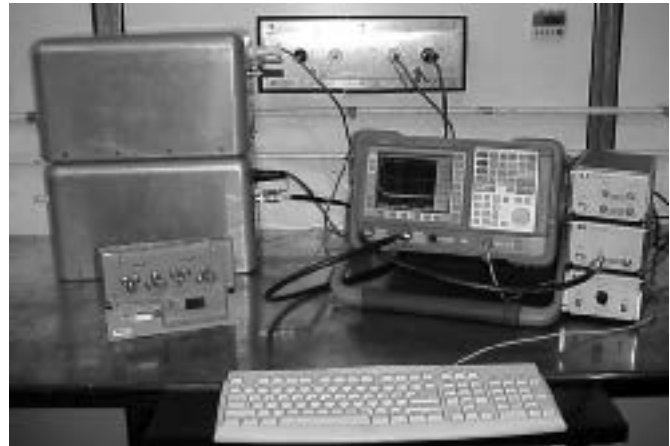
Curtis testing facilities consist of a laboratory equipped to test and evaluate EMI characteristics of equipment that must comply with FCC Part 15 and/or CISPR standards. With these facilities, Curtis can provide manufacturers with greater assistance in the selection of RFI/EMI filters to help them meet the necessary emission levels.

## Isolated Environment Enhances Test Capabilities

- Totally isolated environment for both equipment under test and test instrumentation provided by separate chambers.
- RF screen room shielded against magnetic, electric and plane wave field per MIL-STD-285.
- Specially constructed line impedance stabilization networks (LISN) for FC Part 15 and CISPR testing.
- Sensitive, reliable automatic measurement and recording of conducted emissions data from 10 KHz to 1 GHz.
- Computer-controlled Agilent E7402A Spectrum Analyzer with associated amplifiers and attenuators.
- Agilent E7402A graphics capabilities allow quick generation of hard copies of emissions test results.

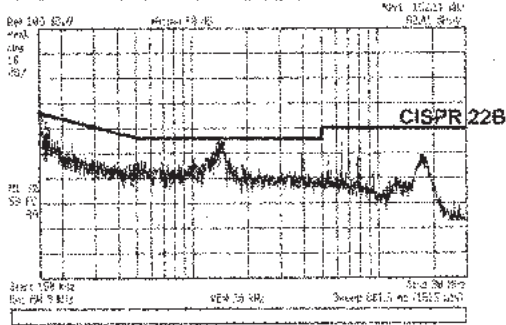


The Curtis screen room provides complete RFI isolation for equipment under test and the test instrumentation.



Computer-controlled test equipment assures fast turnaround on RFI emissions testing.

### WITH FILTER



## Fast Pre-Compliance Test Results

Computer-generated graphics and test reports provide the customer with fast turnaround on all testing.

On-site RFI filter design/applications engineers are available to assist in evaluating test results and to determine cost-effective solutions to conducted emissions problems before going to agencies.

Please contact your local Curtis representative or the factory sales staff to coordinate pre-compliance testing of your equipment at Curtis Industries.



Curtis can provide environmental testing to demonstrate performance and survival in harsh conditions.



# Family of Products

- > RFI Filters
- > Filtered Power Entry
- > Custom Filters
- > Terminal Blocks
- > Custom Terminal Blocks
- > Liquid Level Controllers
- > PCB Mount Blocks
- > DIN Rail

