

Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications

M Series



UL Recognized
CSA Certified
VDE Approved



M Series

The M series power entry modules offer the most choices of power entry components and filtering options to fit a specific need. The fully configured M series expands the options of a manufacturer whose products are marketed worldwide. One component, fully assembled and tested, provides the capability of interfacing a multi-voltage power supply to any common voltage or fusing scheme in the world, without modification.

- The IEC connector provides an internationally accepted power entry termination, which can be used with a variety of line cords.
- The selectable fuseholder allows use of single or dual European fuses, or a single North American fuse.
- The optional DPST on/off switch breaks both sides of the line and is labeled with the international I/O markings.
- The optional voltage selector provides a convenient means to change transformer primary connection, and it is available in both 2-voltage and 4-voltage configurations.
- The series is available with four filter circuits to meet a variety of applications, and convenient connections are provided on unfiltered models to allow wiring of a separate RFI filter.

The M series is a family of components offering greater flexibility and cost-effectiveness in the selection of primary power components. Wiring to the modules is accomplished via .110" terminals for labor savings and convenience.

Four filter circuits provide a choice of attenuation tailored to specific categories of susceptibility and emissions needs.

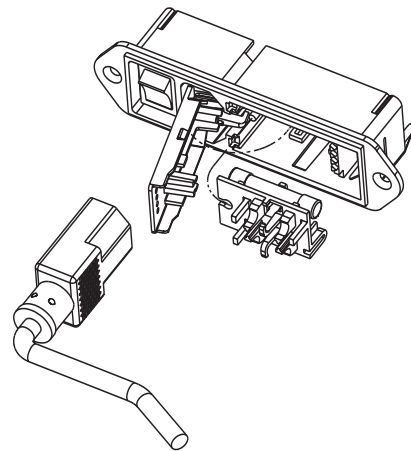
HM Models – This medical filter provides susceptibility protection without the leakage current associated with line-to-ground capacitors. Designed to allow equipment to meet UL544 for patient care and non-patient care equipment, the HM filter has a maximum leakage current of 2 μ A at 120 VAC 60 Hz. See Appendix C for more information on medical applications and UL standards.

FM Models – General purpose RFI filter designed for susceptibility applications, effectively providing RFI control of line-to-ground noise. The design is compact and meets the very low leakage current requirements of VDE portable equipment as well as (120 Volt) UL544 non-patient medical equipment.

XM Models – High performance RFI filter designed to bring most digital equipment (including switching power supplies) into compliance with FCC Part 15J, Class B conducted emissions limits.

ZM Models – Premium RFI filter designed to bring most digital equipment (including switching power supplies) into compliance with EN55022, Level B (as well as FCC Part 15J, Class B) conducted emissions limits.

Fuse Installation Instructions



1. Remove power cord.
2. Pry door open at socket.
3. Lift and swing door into socket.
4. Lift fuse holder out of housing.
5. Install one (1) AG fuse or two (2) metric fuses*.
6. Replace fuse holder into housing.
7. Swing and snap door back in place.

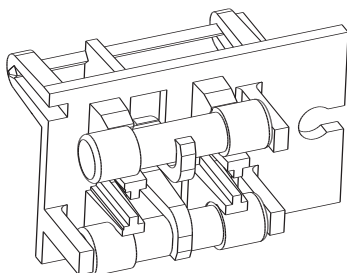
*Install fuses on one side only, do not install both AG and metric fuses at the same time.

Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications (Continued)

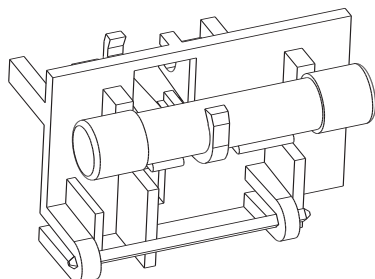
M Series

Fuse Options

European Fusing Arrangement**



North American Fusing Arrangement**

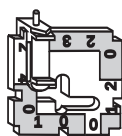


**Install fuses on one side only. Do Not install both AG and Metric fuses at the same time.

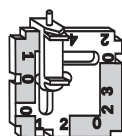
Voltage Selection

To change selected voltage: open cover, using small blade screwdriver or similar tool; set aside cover/fuse block assembly; pull voltage selector card straight out of housing, using indicator pin; orient selector card so that desired voltage is readable at the bottom; orient indicator pin to point up when desired voltage is readable at bottom (note that when indicator pin is fixed, successive voltages are selected by rotating the card 90° clockwise); insert voltage selector card into housing, *printed side of card facing forward toward IEC connector and edge containing the desired voltage first*; replace cover, and verify that indicator pin shows the desired voltage.

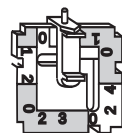
Voltage Selector Card Orientation



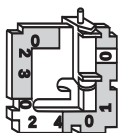
100V



120V



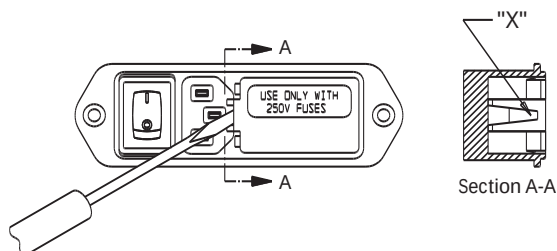
230V



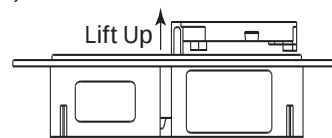
240V

Removing the Fuse Holder

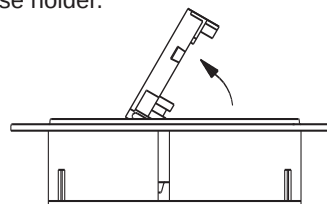
1. Insert a pocket screwdriver at point "X" as shown.



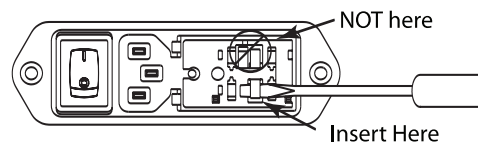
Gently lift **UP** until the entire door lifts up approximately 1/4" (minimum).



2. Once lifted, the door will pivot on it's hinges and expose the fuse holder.



3. When the fuse holder is installed in the single fuse position, apply the screwdriver as shown and gently pry up. Use screwdriver as shown, do not use fingers.



When the fuse holder is installed in the dual fuse position, it will normally release as soon as the door is opened.

Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications (Continued)

M Series

Specifications

Maximum leakage current, each line-to-ground

	HM	FM	XM/ZM
@ 120 VAC 60 Hz:	2μA	.25 mA	.30 mA
@ 250 VAC 50 Hz:	5μA	.50 mA	.50 mA

Hipot rating (one minute):

line-to-ground:	1500 VAC
line-to-line	1450 VDC
line-to-load (switch off) Unfiltered only	2500 VAC

Operating frequency: 50/60 Hz

Rated voltage (max.): 250 VAC

Operating voltages: 100, 120, 220/ 240 VAC

Switch: Double-insulated, rated for 100,000 operations at full load at 70 Amps inrush current.

Fuse (not included): Reversible fuseholder, accepts one 1/4" x 1-1/4" fuse or two 5 x 20 mm fuses

Terminals: .110 [2.79] terminals

Minimum insertion loss in dB:

Line-to-ground in 50 ohm circuit

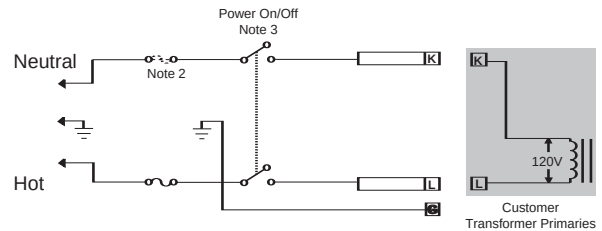
Current Rating	Frequency-MHz							
	.01	.05	.15	.5	1	5	10	30
HM								
5A	-	-	14	18	19	22	22	17
FM								
5A	-	-	14	21	26	40	45	40
XM								
3A	2	13	23	40	46	44	44	44
ZM								
3A	15	29	39	46	43	40	40	40

Line-to-line in 50 ohm circuit

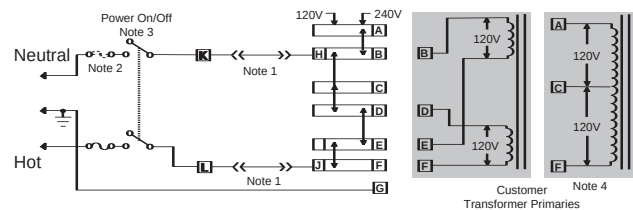
Current Rating	Frequency-MHz									
	.02	.03	.05	.07	.15	.5	1	5	10	30
XM										
3A	-	-	-	5	34	62	68	60	50	40
ZM										
3A	5	13	28	37	55	75	75	62	54	44

Electrical Schematics – Unfiltered Models

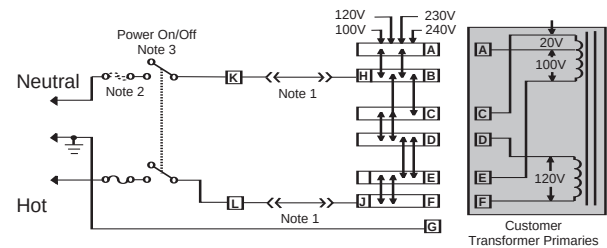
VM (1-Voltage)



VM (2-Voltage)



VM (4-Voltage)



Note 1: Jumpers required if no input filter is used.

Note 2: Provision for dual European style fusing.

Note 3: On/off switch present only with "S" suffix.

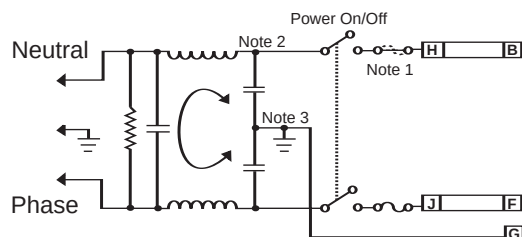
Note 4: When using a center-tapped transformer, the C-F winding should be the low voltage (high current) winding and must be capable of handling the full primary current in the 120V position.

Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications (Continued)

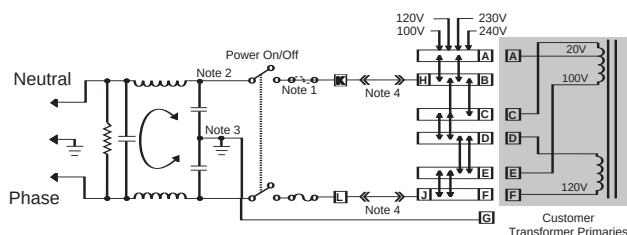
M Series

Electrical Schematics - Filtered Models

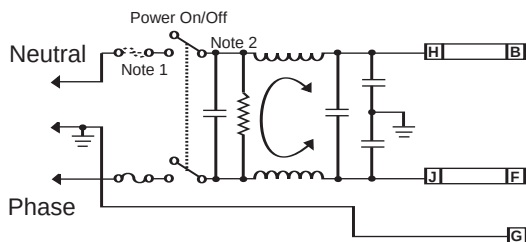
FM & HM (1-Voltage)



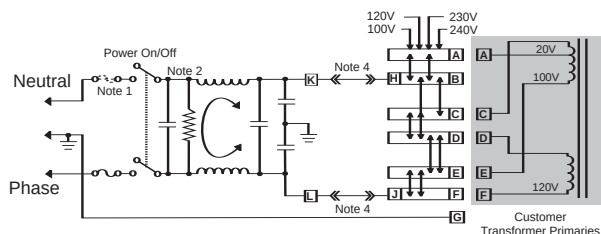
FM & HM (4-Voltage)



XM & ZM (1-Voltage)



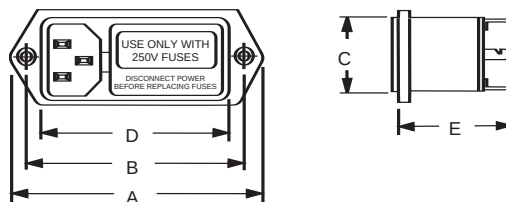
XM & ZM (4-Voltage)



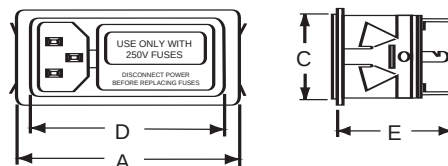
Note 1: Provision for dual fusing (Euro standard)
Note 2: Power on/off switch with suffix "S" only
Note 3: HM models without line-to-ground capacitors
Note 4: Models HM4, FM4, XM4, and ZM4 have added terminals K and L.
External switch or jumper must be placed from K to H and L to J.
230V Nomenclature relates to pending European CENELEC agreement.

Case Styles – Unfiltered Models

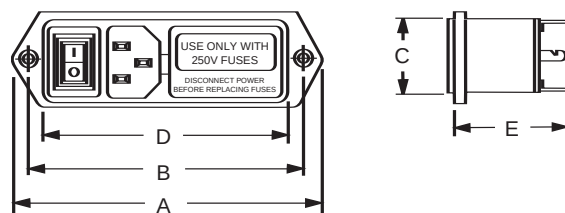
6VM1 (IEC Connector, Selectable Fuseholder)



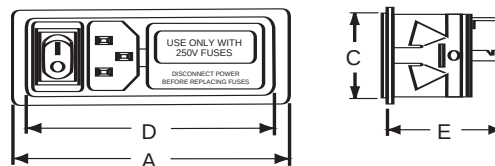
6VM1C (IEC Connector, Selectable Fuseholder, Snap-in)



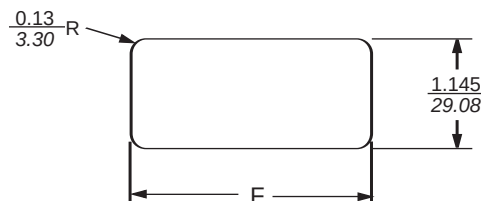
6VM1S (IEC Connector, DPST On/Off Switch, Selectable Fuseholder)



6VM1SC (IEC Connector, DPST On/Off Switch, Selectable Fuseholder, Snap-In)



Recommended Panel Cutout (Snap-In Only)



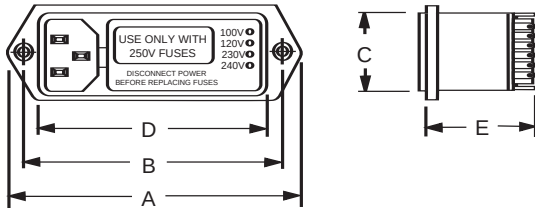
Typical dimensions:
Mounting Holes: .155 [3.94] Dia. (2) with .279 [7.09] Dia. x 82° Countersunk.
All mounting holes countersunk. Panel Thickness: .06 - .09 [1.53 - 2.29]

Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications (Continued)

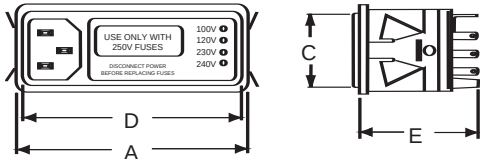
M Series

Case Styles - Unfiltered Models (cont'd)

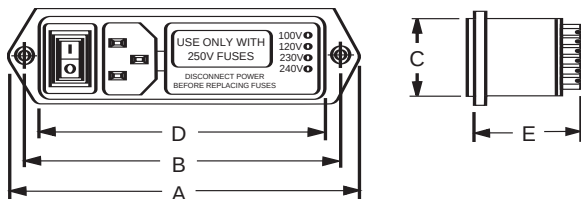
6VM2 & 6VM4 (IEC Connector, Voltage Selector, Selectable Fuseholder)



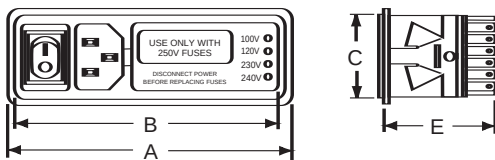
6VM4C (IEC Connector, Voltage Selector, Selectable Fuseholder, Snap-In)



6VM2S & 6VM4S (IEC Connector, DPST On/Off Switch, Voltage Selector, Selectable Fuseholder)

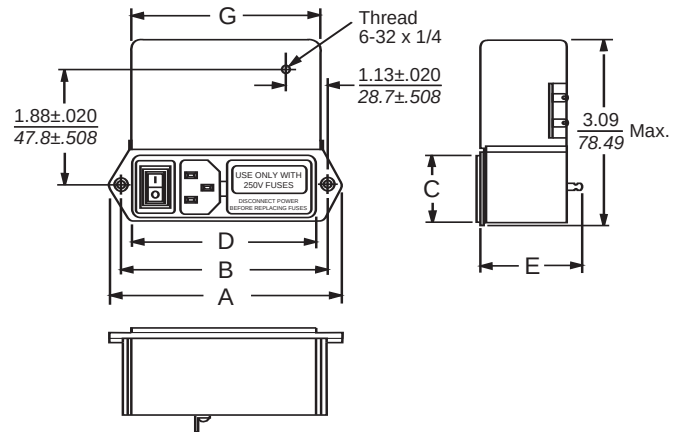


6VM4SC (IEC Connector, DPST On/Off Switch, Voltage Selector, Selectable Fuseholder, Snap-In)

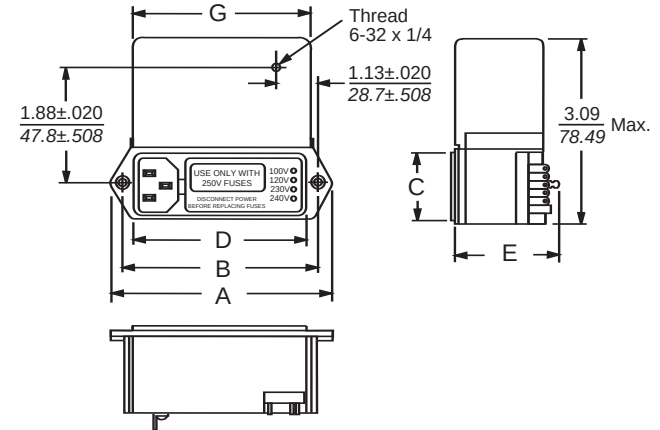


Case Styles - Filtered Models

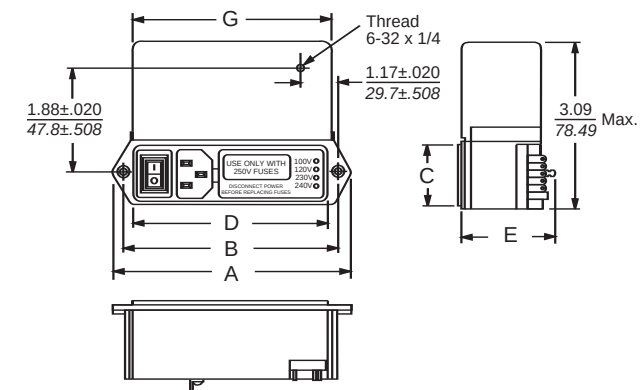
3EXM1S & 3EZM1S (IEC Connector, DPST On/Off Switch, Selectable Fuseholder)



3EXM4 & 3EZM4 (IEC Connector, Voltage Selector, Selectable Fuseholder)



3EXM4S & 3EZM4S (IEC Connector, DPST On/Off Switch, Voltage Selector, Selectable Fuseholder)

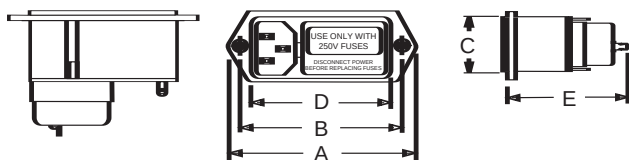


Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications (Continued)

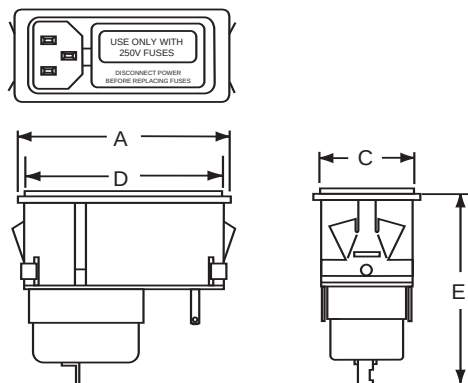
M Series

Case Styles - Filtered Models (cont'd)

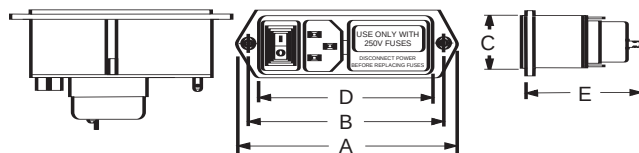
5EHM1 & 5EFM1 (IEC Connector, Selectable Fuseholder)



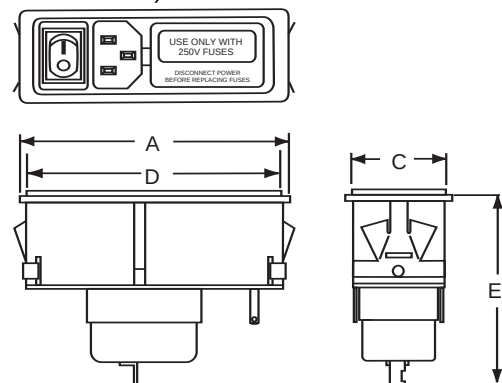
5EFM1C (IEC Connector, Selectable Fuseholder)



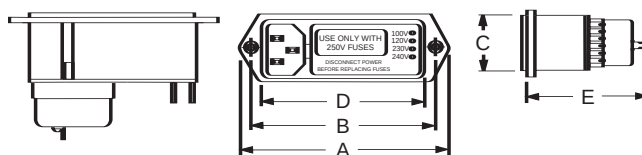
5EHM1S & 5EFM1S (IEC Connector, DPST On/Off Switch, Selectable Fuseholder)



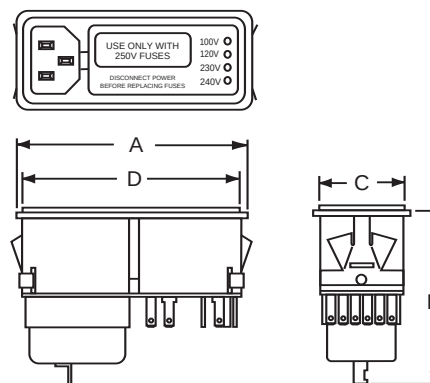
5EFM1SC (IEC Connector, DPST On/Off Switch, Selectable Fuseholder)



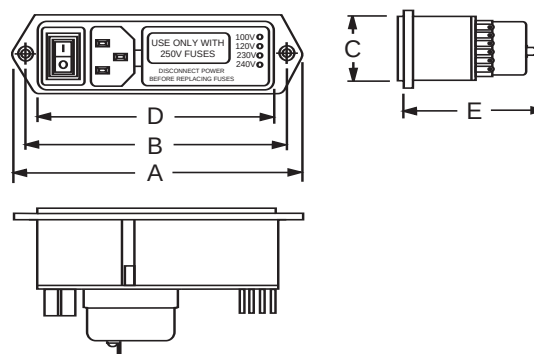
5EHM4 & 5EFM4 (IEC Connector, DPST On/Off Switch, Selectable Fuseholder)



5EFM4C (IEC Connector, Voltage Selector, Selectable Fuseholder)



5EHM4S & 5EFM4S (IEC Connector, DPST On/Off Switch, Voltage Selector, Selectable Fuseholder)



Typical dimensions:

Torque: 7 in. lb max.

Holes: .055 [1.40] Dia. $\pm .004$ [$\pm .10$] except solder lug ground tap with wire wrap.

Mounting Holes: .155 [3.94] Dia.

All parts typical.

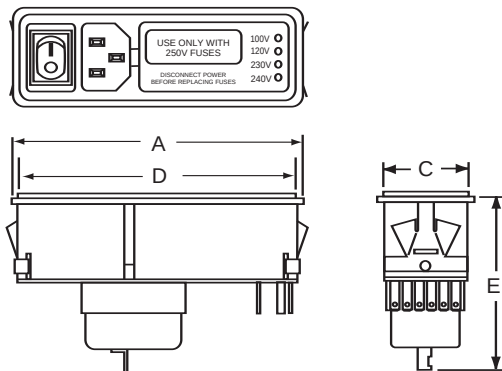
Note: Mounting holes on tabs are countersunk and take a #6 flathead screw.

Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications (Continued)

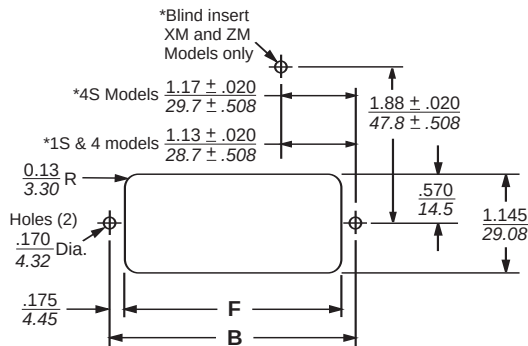
M Series

Case Styles - Filtered Models (cont'd)

5EFM4SC (IEC Connector, DPST On/Off Switch, Voltage Selector, Selectable Fuseholder)



Recommended Panel Cutout



Note: Snap-in models allow front mount only.
XM and ZM models allow back mount only.
FM and HM models allow front or back mounting.

Accessories for M series include interconnection assembly, medical standoff bracket, voltage selector cards, and insulating shroud. See page 142.

All mounting holes countersunk.

Case Dimensions

Part No.	A (max)	B ± 0.01 ± 0.038	C (max)	D (max)	E (max)	F	G
3EXM1S	4.17	3.62	1.14	3.22	1.72	3.28	3.3
3EZM1S	105.9	91.9	29.0	81.8	43.7	83.8	83.8
3EXM4	3.88	3.32	1.14	2.92	1.72	2.98	2.99
3EZM4	98.6	84.3	29.0	74.2	43.7	75.7	75.9
3EXM4S	4.65	4.1	1.14	3.72	1.72	3.76	3.8
3EZM4S	118.1	104.1	29.0	94.5	43.7	95.5	96.5
5EFM1	3.39	2.84	1.14	2.44	2.19	2.5	—
5EHM1	86.1	72.1	29.0	62.0	55.6	63.5	—
5EFM1C	2.56	—	1.14	2.44	2.19	2.49	—
	65.0	—	29.0	62.0	55.6	63.2	—
5EFM1S	4.17	3.62	1.14	3.22	2.19	3.28	—
5EHM1S	105.9	91.9	29.0	81.8	55.6	83.3	—
5EFM1SC	3.34	—	1.14	3.27	2.19	3.27	—
	84.8	—	29.0	83.1	55.6	83.1	—
5EFM4	3.88	3.32	1.14	2.92	2.19	2.98	—
5EHM4	98.6	84.3	29.0	74.2	55.6	75.7	—
5EFM4C	3.04	—	1.14	2.92	2.19	2.97	—
	77.2	—	29.0	74.2	55.6	75.4	—
5EFM4S	4.65	4.1	1.14	3.7	2.19	3.76	—
5EHM4S	118.1	104.1	29.0	94.0	55.6	95.5	—
5EFM4SC	3.82	—	1.14	3.7	2.19	3.75	—
	97.0	—	29.0	94.0	55.6	95.3	—
6VM1	3.39	2.84	1.14	2.44	1.45	2.5	—
	86.1	72.1	29.0	62.0	36.8	63.5	—
6VM1C	2.56	—	1.14	2.44	1.45	2.5	—
	86.1	—	29.0	62.0	36.8	63.2	—
6VM1S	4.17	3.62	1.14	3.22	1.45	3.28	—
	105.9	91.9	29.0	81.8	36.8	83.3	—
6VM1SC	3.34	—	1.14	3.27	1.45	3.27	—
	84.8	—	29.0	83.1	36.8	83.1	—
6VM2	3.88	3.32	1.14	2.92	1.45	2.98	—
6VM4	98.6	84.3	29.0	74.2	36.8	75.7	—
6VM4C	3.04	—	1.14	2.92	1.45	2.97	—
	98.6	—	29.0	74.2	36.8	75.4	—
6VM2S	4.65	4.1	1.14	3.72	1.45	3.76	—
6VM4S	118.1	104.1	29.0	94.5	36.8	95.5	—
6VM4SC	3.82	—	1.14	3.7	1.45	3.75	—
	97.0	—	29.0	94.0	36.8	95.3	—

Power Entry Module with Optional RFI Power Line Filters for General and Medical Applications (Continued)

M Series

FILTERED MODELS

Part Number	RFI Filter Type	Current Rating @120VAC (Amps)	Current Rating @250VAC (Amps)	Available Voltage Selection Positions [†]	DPST On/Off Switch	Mounting Style
3EXM1S	SMPS FCC-B ¹	3	2	1	•	Flange
3EXM4	SMPS FCC-B ¹	3	2	4		Flange
3EXM4S	SMPS FCC-B ¹	3	2	4	•	Flange
3EZM1S	SMPS EN55022-B ²	3	2	1	•	Flange
3EZM4	SMPS EN55022-B ²	3	2	4		Flange
3EZM4S	SMPS EN55022-B ²	3	2	4	•	Flange
5EHM1	Medical ³	5	4	1		Flange
5EHM1S	Medical ³	5	4	1	•	Flange
5EHM4	Medical ³	5	4	4		Flange
5EHM4S	Medical ³	5	4	4	•	Flange
5EFM1	General Purpose [‡]	5	4	1		Flange
5EFM1C	General Purpose [‡]	5	4	1		Snap-in
5EFM1S	General Purpose [‡]	5	4	1	•	Flange
5EFM1SC	General Purpose [‡]	5	4	1	•	Snap-in
5EFM4	General Purpose [‡]	5	4	4		Flange
5EFM4C	General Purpose [‡]	5	4	4		Snap-in
5EFM4S	General Purpose [‡]	5	4	4	•	Flange
5EFM4SC	General Purpose [‡]	5	4	4	•	Snap-in

• Includes DPST switch

UNFILTERED MODELS

Part Number	Current Rating @120VAC (Amps)	Current Rating 250VAC (Amps)	Available Voltage Selection Position [†]	DPST On/Off Switch	Mounting Style
6VM1	6	6	1		Flange
6VM1C	6	6	1		Snap-in
6VM1S	6	4	1	•	Flange
6VM1SC	6	4	1	•	Snap-in
6VM2	6	6	2		Flange
6VM2S	6	6	2	•	Flange
6VM4	6	6	4		Flange
6VM4C	6	6	4		Snap-in
6VM4S	6	4	4	•	Flange
6VM4SC	6	4	4	•	Snap-in

• Includes DPST switch

[†] 1-120V/240V Fixed, 2 - 120/240V Selectable, 4- 100, 120, 230, 240V selectable

¹ Emissions filter for switching power supply applications where FCC-B level requirements must be met

² Emissions filter for switching power supply applications where En5502-B level requirements must be met

³ Medical filter for very low leakage UL544, UL2601 and EN60601 health care applications

[‡] General purpose filter for susceptibility applications