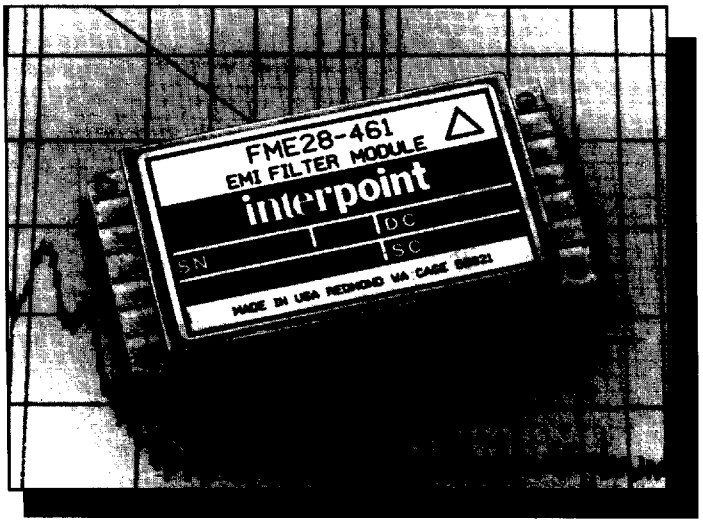
FMD/FME-461 Series EMI Filter



General Description

The FMD/FME-461 Series™ EMI filter modules are specifically designed to reduce the input line reflected ripple current of Interpoint's high frequency DC/DC converters. FME/FME filters minimize EMI for the MHE, MHL, MLP, MRH, MTO, MHF, MHF+, MHV, MHD, MTR, MFL, MHP, MFLHP and MK200[1] Series. These filters are intended for use in 28 or 270 volt applications which must meet MIL-STD-461 levels of conducted emissions.

Attenuation

When used in conjunction with Interpoint's DC/DC converters, FMD/FME-461 filters reduce input ripple current by as much as 60 dB at 500 kHz and by 55 dB at 1 MHz.

Transients

The transients listed below will not damage the filters but will be passed on to the converters:

- All filters: ±600 volts (50 ohm source impedance) for up to 10 µs.
- 28 volt filter: ±100 volts (0.5 ohm source impedance) for up to 100 ms.
- 270 volt filter: ±500 volts (independent of source impedance) for up to 100 ms.

Operation over Temperature

All FMD/FME-461 Series filters are rated for full power operation from –55°C to +125°C case temperature. Current is derated linearly to zero at +135°C case temperature.

Insertion Loss

The maximum dc insertion loss at full load and nominal input voltage represents a power loss of less than 4%.

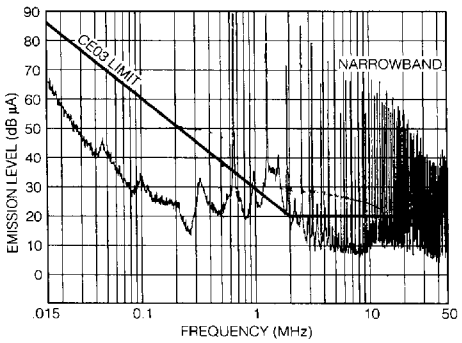
Package

FMD/FME-461 filters are packaged in metal hermetic side-leaded cases. The FMD28-461 filter is also available in a metal hermetic down-leaded package.

Environmental Screening

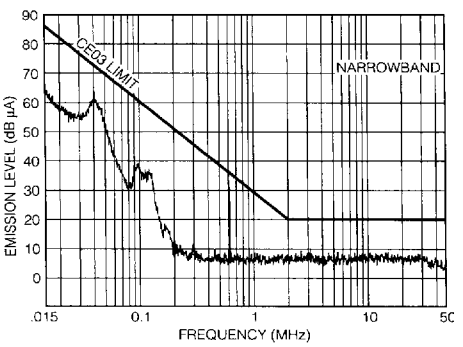
All of the FMD/FME-461 filters can be ordered with standard environmental screening or "ES" screening. Refer to the table on page two for a description of screening options. The FME28-461 and the FME270-461 filters are available to DESC Drawings, fully compliant to MIL-STD-883.

DESC Number	Interpoint Similar Part
9500401HXC	FME28-461/883
9500901HXC	FME270-461/883



Three paralleled and synchronized MFL2815D converters without filtering.

Figure 1



Three paralleled and synchronized MFL2815D converters with FME28-461 filtering.

Figure 2

Note: 1. The FMD/FME filters can be used with the MK200 Series up to the filter's maximum current.

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PREMIER POWER SOLUTIONS

FMD/FME-461 Series EMI Filters

- Meets MIL-STD-461 standards for Interpoint high frequency converters
- Up to 60 dB attenuation at 500 kHz.
- -55°C to +125°C operation at maximum rated current
- MIL-STD-704D DC power bus compatibility
- Up to 15 amps output current

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PREMIER POWER SOLUTIONS

FMD/FME-461 SERIES EMI FILTERS

CHARACTERISTICS (ALL MODELS): Tc = 25°C

Operating Temperature Range (Case) • Full Current: –55°C to +125°C
• Absolute: –55°C to +135°C

Storage Temperature Range (Case) • –65°C to +150°C

Isolation • 100 M ohms at 500 VDC, any pin to case except down leaded case pin

Weight: • Side-leaded — 77 grams, typical
• Down-leaded — 55 grams, typical

		FMD28-461			FMD270-461			FME28-461			FME270-461			
PARAMETER	**CONDITION**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**	**UNITS**
INPUT VOLTAGE	STEADY STATE	0	28	40	0	270	400	0	28	40	0	270	400	VDC
	TRANSIENT 100 ms[1]	–100	—	100	–500	—	500	–100	—	100	–500	—	500	
OUTPUT VOLTAGE	STEADY STATE	$V_{OUT} = V_{IN} - I_{IN}(R_{DC})$												VDC
OUTPUT CURRENT[2]	STEADY STATE	—	—	7	—	—	0.7	—	—	15	—	—	1.5	Amps
DC RESISTANCE (R_{DC})	MAX. CURRENT Tc=25°C	—	—	0.12	—	—	5.0	—	—	0.07	—	—	2.0	Ohms
	Tc=125°C	—	—	0.15	—	—	6.3	—	—	0.07	—	—	3.2	
POWER DISSIPATION	MAX. CURRENT Tc=25°C	—	—	6.0	—	—	2.5	—	—	15.75	—	—	4.5	Watts
	Tc=125°c	—	—	7.4	—	—	3.1	—	—	15.75	—	—	7.2	
NOISE	500 kHz	50	60	—	50	60	—	30	40	—	40	50	—	dB
REDUCTION	1 MHz	45	55	—	45	55	—	40	50	—	45	55	—	
CAPACITANCE	ANY PIN TO CASE	—	20,000	—	—	30,000	—	—	60,000	—	—	30,000	—	pF

1. 28 V models = 0.5 Ω source impedance, 270 V models = independent of source impedance. 2. Derate output current linearly from 100% at +125°C to 0% at +135°C.

OPTIONAL ENVIRONMENTAL SCREENING REFERENCED TO MIL-STD-883

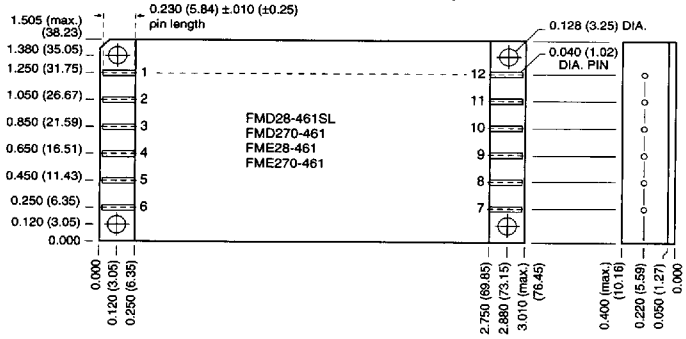
TEST	/ES	/883
PRE-CAP INSPECTION Method 2017, 2032	•	•
TEMPERATURE CYCLE (10 times) Method 1010, Cond. C, -65°C to +135°C		•
Method 1010, Cond. B, -55°C to +125°C	•	
CONSTANT ACCELERATION Method 2001, Cond. A, 5000 g		•
Method 2001, 500 g	•	
BURN-IN Method 1015, 160 hours at 125°C		•
96 hours at 125°C case (typ.)	•	

TEST	/ES	/883
FINAL VISUAL INSPECTION Method 2009	•	•
FINAL ELECTRICAL TEST MIL-PRF-38534, Group A Subgroups 1 through 6: -55°C, +25°C, +125°C		•
Subgroups 1 and 4: +25°C case	•	
HERMETICITY TESTING Fine Leak, Method 1014, Cond. A	•	•
Gross Leak, Method 1014, Cond. C	•	•

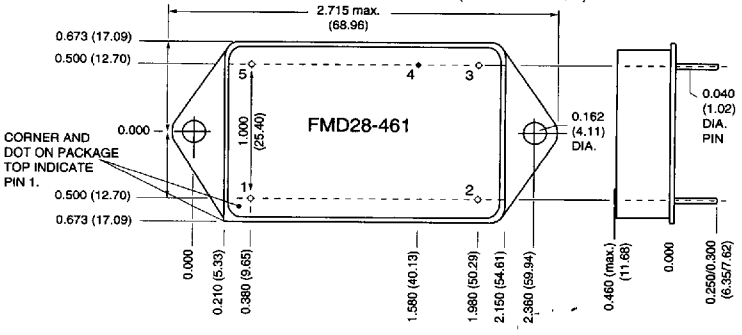
To order model options, enter screening designation as a suffix to the part number. For example, FME-461/883. All products have a screening code block. On products with standard screening, the block is blank or marked "01"; on /ES products the block is marked "02" or "/ES"; on /883 products the block is marked "883". Custom screening may have additional screening code marking.

METAL HERMETIC PACKAGE: FMD/FME-461 SERIES CASE DRAWINGS

TOP VIEW SIDE-LEADED CASE



TOP VIEW DOWN-LEADED CASE (PINS ON BOTTOM)



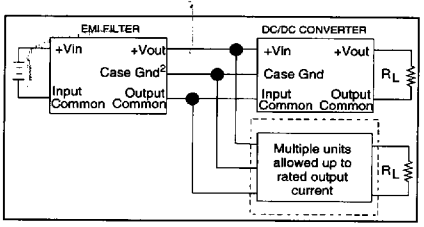
Pins

Designation	Side-Leaded[1] Cases	Down-Leaded Cases FMD28-461
Positive input	1, 2, 3	1
Positive output	10, 11, 12	2
Case Ground[2]	—	4
Output Common	7, 8, 9	3
Input Common	4, 5, 6	5

NOMINAL CASE DIMENSIONS IN INCHES (MM)
TOLERANCE X.XXX ±0.005 (0.13)

CAUTION: Heat from reflow or wave soldering may damage this part. Solder pins individually with heat application NOT exceeding 300°C for 10 seconds per pin.

Notes:
1. On FME cases, connections to all pins are required. On FMD side-leaded cases, connections to multiple pins may improve the performance but are optional.
2. Case ground on side-leaded cases is made by contact of the base plate to the chassis. On down-leaded cases, connect the baseplate to chassis to improve EMI performance.



FMD/FME CONNECTION[1] DIAGRAM

FMD/FME-461 Series is a trademark of Interpoint Corporation.

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