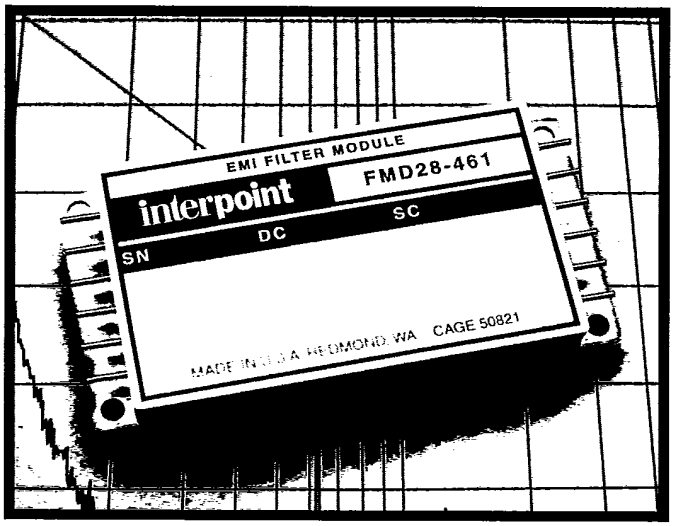
interpoint

FMD/FME-461 EMI FILTERS

10301 Willows Road P.O. Box 97005 Redmond, WA 98073-9705 TEL: (206) 882-3100 TEL: (800) 822-8782 FAX: (206) 882-1990



- **–55 to +125°C operation**
- **Up to 30 dB minimum attenuation at 200 kHz**
- **Optional environmental screening**
- **Meets MIL-STD-461 CE03 standards for Interpoint high frequency dc-dc converters**
- **MIL-STD-704D DC power bus compatibility**

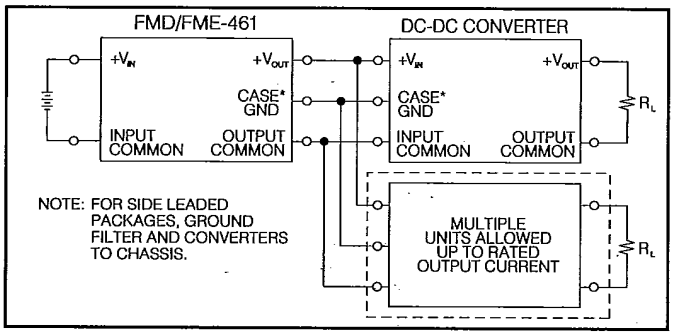
The FMD/FME-461 EMI filter modules have been specifically designed to reduce the input line reflected ripple current of Interpoint's high frequency dc-dc converters (MSA, MHF, MHF+, MHE, MLP, MHL, MHD, MTR, MFL, and MFLHP series). They are intended for use in 28 or 270 volt applications which must meet MIL-STD-461 levels of conducted and radiated emissions.

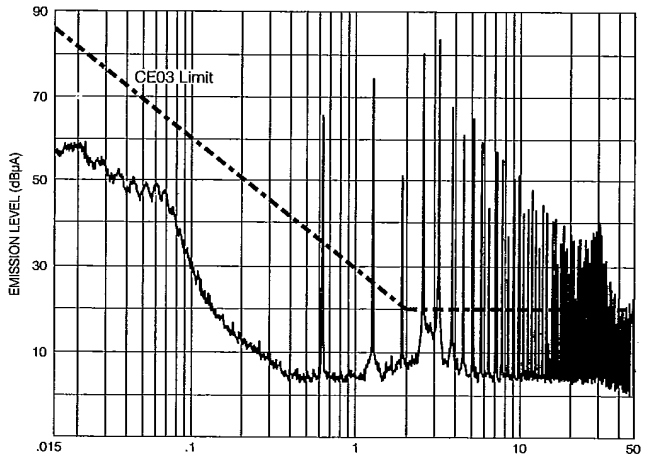
When used in conjunction with Interpoint converters, the FMD/FME filters reduce input ripple current by 30 dB at 500 kHz and by more than 50 dB from 1 to 50 MHz. This attenuation gives the converter-filter combination a performance which exceeds MIL-STD-461C's CE03 test (see figure for typical performance with an MFL Series converter).

All filters in the series offer protection against spikes of up to ±600 volts (50 Ohm source impedance) for up to 10 µsec. The 28-volt parts will pass on but not be damaged by transients of ±100 V (0.5 Ohm source) for up to 100 msec. The 270-volt models will pass on but be undamaged by ±500V transients independent of source impedance for up to 100 msec.

All FMD/FME series models are rated for full power operation from –55 to +125°C baseplate temperature. Operation is offered up to 135°C with derating as defined on the reverse. The maximum dc insertion loss at full load and nominal input voltage represents a power loss of less than 2%. All FMD/FME series models are available in metal hermetic side-leaded packages. The FMD 28 volt model is also available in a metal hermetic down-leaded package. Environmental screening is optional.

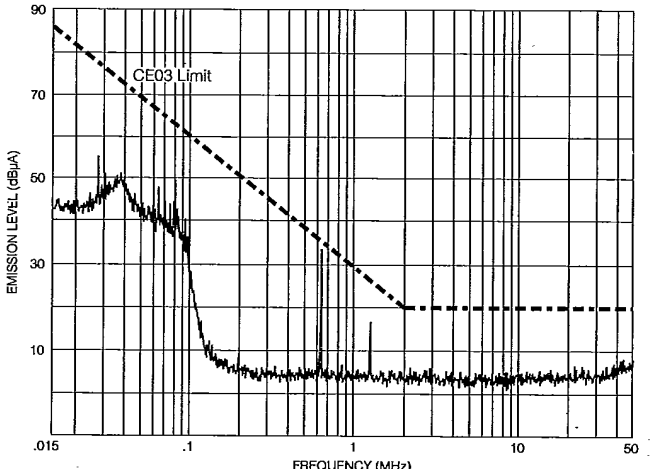
FMD/FME CONNECTION DIAGRAM





Three paralleled and synchronized MFL2815D converters without filtering.

Figure 1



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

Figure 2

interpoint

FMD/FME-461 EMI FILTERS

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CHARACTERISTICS

		FMD28-461			FMD270-461			FME28-461			FME270-461			UNITS
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
INPUT VOLTAGE	STEADY STATE TRANSIENT	–40 –100	28	40 100	–400 –500	270	400 500	–40 –100	28 —	40 100	–400 –500	270 —	400 500	Vdc
OUTPUT[1] VOLTAGE	STEADY STATE	$V_{OUT} = V_{IN} - I_N(Rdc)$												Vdc
OUTPUT[2] CURRENT	STEADY STATE	—	—	7	—	—	0.7	—	—	15	—	—	1.5	Amps
DC RESISTANCE (Rdc)	MAX. CURRENT T = 25°C T = 125°C	— —	— —	0.09 0.14	— —	— —	2.0 3.2	— —	— —	0.03 0.05	— —	— —	2.0 3.2	Ohm
POWER DISSIPATION	MAX. CURRENT T = 25°C T = 125°C	— —	— —	4.4 6.9	— —	— —	1.0 1.6	— —	— —	6.8 11.3	— —	— —	4.5 7.2	Watts
NOISE REDUCTION	200-500 kHz 500 kHz to 1 MHz 1 to 50 MHz	30 60 70	40 70 80	— — —	20 30 40	30 40 50	— — —	30 60 70	40 70 80	— — —	20 30 40	30 40 50	— — —	dB
CAPACITANCE	ANY PIN TO CASE	—	20,000	—	—	30,000	—	—	50,000	—	—	30,000	—	pF
ISOLATION	ANY PIN TO CASE, 500 Vdc	100	—	—	100	—	—	100	—	—	100	—	—	Mohm
OPERATING TEMP[2]	CASE BASE PLATE	–55	—	+125	–55	—	+125	–55	—	+125	–55	—	+125	°C
STORAGE TEMP	CASE BASEPLATE	–65	—	+150	–65	—	+150	–65	—	+150	–65	—	+150	°C
WEIGHT	SL CASE DL CASE	— —	77 55	— —	— —	77 N/A	— —	— —	77 N/A	— —	— —	77 N/A	— —	Grams

[1] Typical applications result in V_{OUT} within 2% of V_{IN}

[2] Derate output current linearly from 100% at 125°C to 0 at 135°C.

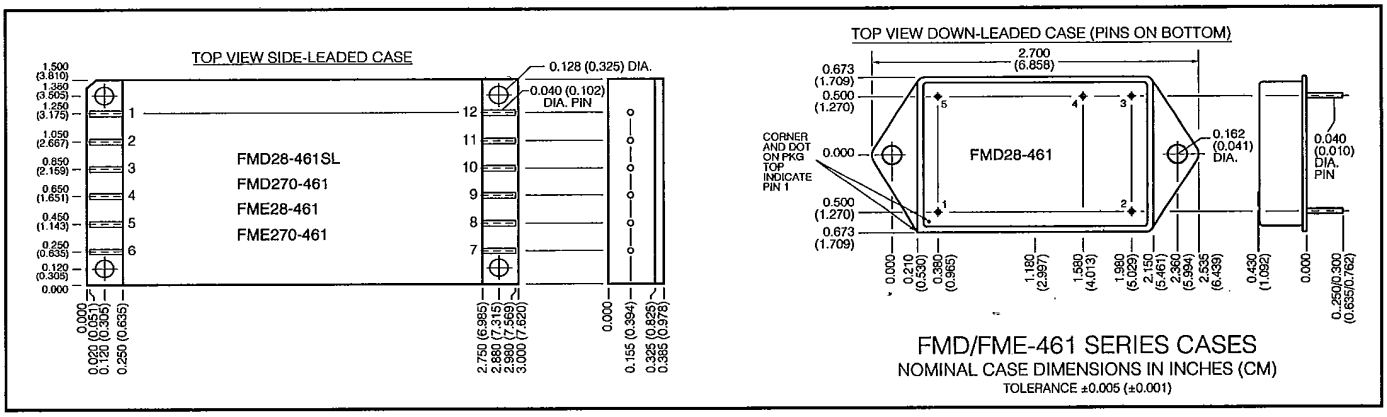
OPTIONAL ENVIRONMENTAL SCREENING

Environmental screening, referenced to MIL-STD-883 per Interpoint's in-house screening procedure, consists of the following:

- Pre-cap internal visual inspection: Per method 2017
- Stabilization bake: 24 hrs. at 125°C per method 1008 cond. B
- Temperature cycle: 10 times, –55°C to +125°C per method 1010
- Constant acceleration: 500 g per method 2001
- Fine leak: Per method 1014, cond. A
- Gross leak: Per method 1014, cond. C
- Burn-in: 96 hr. at 125°C case (typ.)
- Final electrical test (25°C)
- Final external visual inspection: Per method 2009

To order optional screening, add suffix -/ES to model number. Example: FMD28-461/ES. On unscreened parts, the screening code block is marked with "01." On screened parts, the block is marked "ES" or "02." Contact your Interpoint representative for information about additional Hi-Rel screening options.

METAL HERMETIC PACKAGES



FMD/FME-461 SERIES CASES
NOMINAL CASE DIMENSIONS IN INCHES (CM)
TOLERANCE ±0.005 (±0.001)

DESIGNATION	PINS: SIDE-LEADED* CASES	PINS: DOWN-LEADED CASE (FMD28-461)
$+V_{in}$	1, 2, 3	1
$+V_{out}$	10, 11, 12	2
Case Ground**	—	4
Out Common	7, 8, 9	3
In Common	4, 5, 6	5

* On FMD side-leaded cases, connections to multiple pins may improve performance but is optional. ON FME CASES CONNECTION TO ALL PINS IS REQUIRED.

** Case ground on side-leaded packages made by contact of the base plate to the chassis. On down-leaded cases, connect baseplate to chassis for satisfactory EMI performance.

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.

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JANUARY 1993