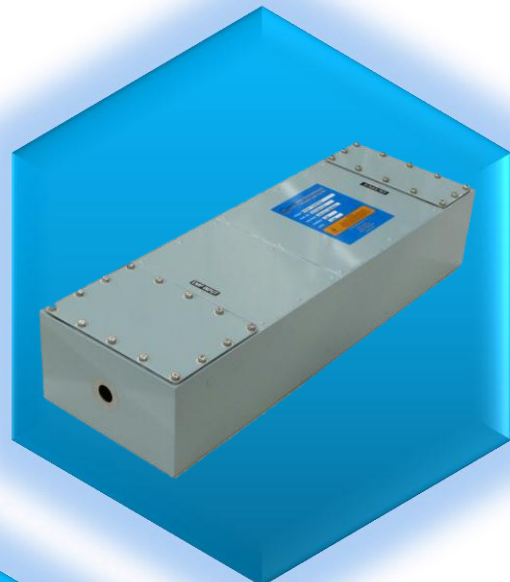




MPE
Quality, Reliability, Performance

HEMP PROTECTION FILTERS

HEMP & IEMI PROTECTION FILTERS FOR MAINS POWER LINES



**MEETS ELECTRICAL POINT-OF-ENTRY REQUIREMENTS OF MIL-STD-188-125-1 & -2
AND DEF STAN 59-188 PART 1 AND PART 2 FOR SHORT AND INTERMEDIATE PULSES**



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HEMP PROTECTION FILTERS

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Additional HEMP Filter Types Available

For 800A, single line for single or three phase See separate brochure

For 1200A, single line for single or three phase See separate brochure

For HEMP Control Line Filters See separate brochure

For HEMP Telephone Line Filters See separate brochure

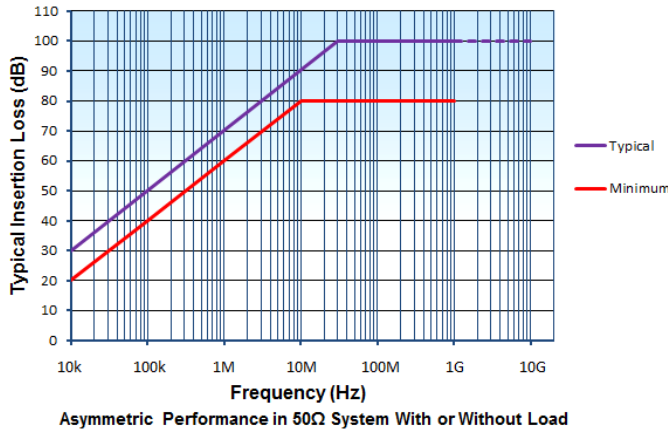
For HEMP Filters for commercial applications, please ask

All MPE HEMP power filters are tested using the test methods defined within the following standards and meet or exceed the relevant performance and/or safety criteria defined within these standards:

Mil-Std-188-125
Mil-F-15733
Mil-Std-220C
CISPR17:2011/BS EN 55017:2011
UL1283
EN60950/IEC60950/UL60950



Standard Performance Range



Description

A range of 2 line and 4 line (single & three phase) Power Line HEMP filters meeting the pci requirements of Mil-Std-188-125-1 and -2 and Def Stan 59-188 parts 1 and 2 for E1 and E2 pulses. All lines are individually filtered and feature inductive input to offer both good continuous wave EMC performance and superior transient handling performance even on supplies with low source impedance. All lines are fitted with high-energy transient suppressors.

Features

- 250V/440Vac with 6A – 400A current ratings
- 2 or 4 individually filtered lines
- Utilise MPE self-healing feedthrough capacitors
- Smaller & lighter than traditional solutions
- Lower heat dissipation than traditional solutions
- RoHS Compliant
- High energy transient suppressors for high reliability
- UL94-V0 insulating materials used
- Exceeds IEC 950 and UL1283 requirements for voltage proof for safety and reliability
- Very low residual pulse current – high safety margin

Ratings and Characteristics

Rated Voltage	All filters	250Vac 50/60Hz or 300V dc each line to case
	4 line (3 phase) filters	250/440Vac 50/60Hz (277V/480Vac on request)
Test Voltage (Prior to fitting transient suppressors)		2250Vdc each line to case
Insulation Resistance (Prior to fitting discharge resistors)	>100MΩ	
Discharge Resistors		Fitted internally from each line to case
Discharge Time to below 34V	<30s	
Maximum Temperature Rise on Full Load	25°C	
Full Load Operating Temperature Range	-40°C to +50°C	
Maximum Leakage Current at 250Vac 50Hz	See table	
Peak Surge Current	70kA (8/20μs)	

Insertion Loss Performance

Minimum insertion loss In 50Ω system with / without load (to meet Mil-Std-188-125 shielding effectiveness)						
Frequency	10kHz	100kHz	1MHz	10MHz	100MHz	1GHz
Insertion loss	20dB	40dB	60dB	80dB	80dB	80dB

Transient Suppression Performance

MIL STD 188-125-1 acceptance test, short pulse current injection, wave shape 20/500ns						
Input pulse amplitude	250A	500A	1000A	1800A	2500A	
MIL-STD-188-125 residual requirement	<10A	<10A	<10A	<10A	<10A	
Typical filter residual let-through	<1.5A	<2A	<3A	<3.5A	<4.5A	

MIL STD 188-125-1 acceptance test, intermediate pulse current injection, wave shape 1.5/3000μs	
Input pulse amplitude	250A
MIL-STD-188-125 requirement	No filter damage or performance degradation
Typical filter response	No filter damage or performance degradation

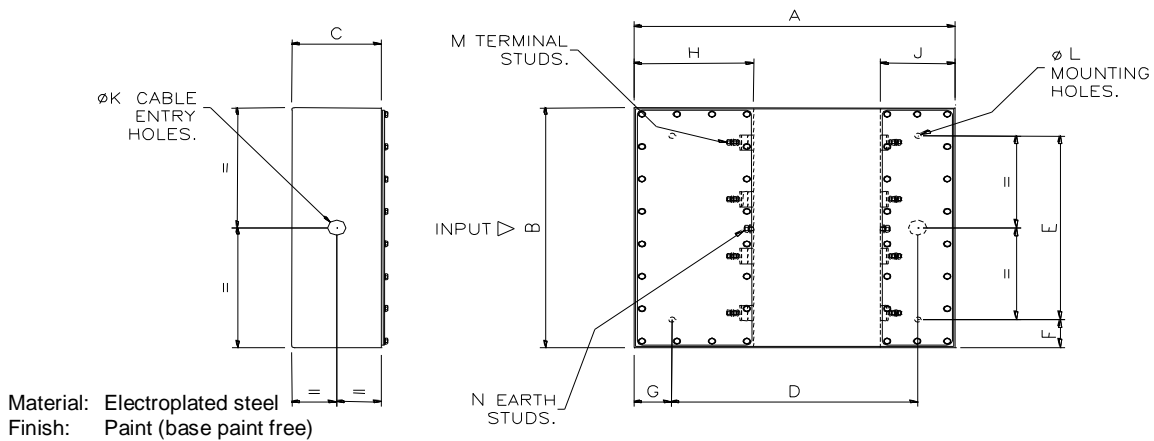


Product Range

Part Number	Current Rating per Line @ 50°C (A) *	Number of Lines	Max Leakage Current per Line (A)	Max DC Volt Drop per Line (V)	Max Heat Dissipation (W)	Major Dimensions (mm)			Approx Weight (kg)
						Length A	Width B	Depth C	
DS33330	6	2	1.5	0.1	5	420	200	120	10
DS33331	16	2	1.5	0.2	10	420	200	120	10
DS33332	32	2	1.5	0.2	20	500	250	120	14
DS33333	63	2	1.5	0.3	40	620	320	170	30
DS33334	100	2	5	0.2	65	740	350	230	40
DS33335	200	2	5	0.1	80	860	450	250	70
DS33336	400	2	8	0.1	130	1600	480	250	120
DS33340	6	4	1.5	0.1	10	420	400	120	20
DS33341	16	4	1.5	0.2	20	420	400	120	20
DS33342	32	4	1.5	0.2	40	500	500	120	30
DS33343	63	4	1.5	0.3	75	620	640	170	55
DS33344	100	4	5	0.2	125	740	700	230	80
DS33345	200	4	5	0.1	140	860	900	250	130
DS33346	400	4	8	0.1	250	1600	960	250	225

* Current derating between 50°C and 85°C $I_{\theta} = I_R \sqrt{(85 - \theta)/35}$

Dimensions and Mechanical Details

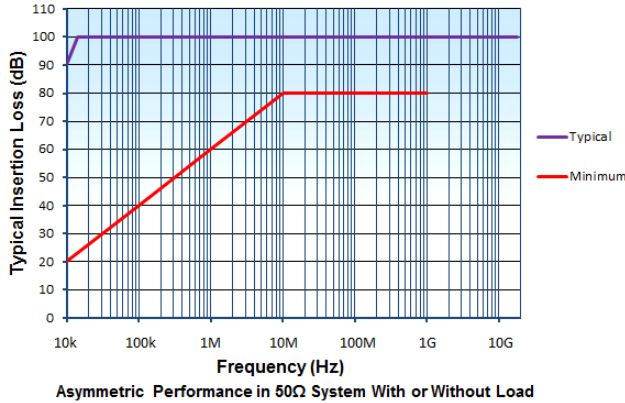


Part Number	Dimensions (mm)												
	A	B	C	D	E	F	G	H	J	K	L	M	N
DS33330	420	200	120	340	110	45	40	140	80	20	9	M5	M6
DS33331	420	200	120	340	110	45	40	140	80	20	9	M5	M6
DS33332	500	250	120	410	140	55	45	160	100	25	9	M8	M10
DS33333	620	320	170	530	210	55	45	160	100	32	11	M8	M10
DS33334	740	350	230	630	240	55	55	160	120	32	11	M8	M10
DS33335	860	450	250	710	300	75	75	200	150	51	17	M12	M16
DS33336**	1600	480	250	1140†	340	70	230	300	300	76	17	M20	M20
DS33340	420	400	120	340	310	45	40	140	80	20	9	M5	M6
DS33341	420	400	120	340	310	45	40	140	80	20	9	M5	M6
DS33342	500	500	120	410	390	55	45	160	100	25	9	M8	M10
DS33343	620	640	170	530	530	55	45	160	100	32	11	M8	M10
DS33344	740	700	230	630	590	55	55	160	120	32	11	M8	M10
DS33345	860	900	250	710	750	75	75	200	150	51	17	M12	M16
DS33346**	1600	960	250	1140†	600	180	230	300	300	76	17	M20	M20

** 400A filters additionally have lifting lugs protruding 65mm beyond each end of the filter and 8mm beyond each side to aid mounting. Lug hole size 22mm. Please request drawings P828602 or P828362 for full dimensions of 2 line and 4 line 400A filters respectively.
† Fixing centres only – See drawing P828602 or P828362 for position of cable entry hole.



Extended Performance Range



Description

A range of extended performance HEMP filters meeting the pci requirements of Mil-Std-188-125-1 and -2 and Def Stan 59-188 parts 1 and 2 for E1 and E2 pulses but having increased insertion loss performance for applications where additional performance is needed to give 100dB from 14kHz to 18GHz. All lines have individual input inductors to offer the required transient handling performance and also coupled inductors to offer superior continuous wave EMC performance in a small package. All lines feature high-energy varistor transient suppressors.

Features

- 250V/440Vac with 6A – 400A current ratings
- Single or three phase applications
- Utilise MPE self-healing feedthrough capacitors
- Smaller & lighter than traditional solutions
- Single line input inductors for pulse handling
- High energy transient suppressors for reliability
- UL94-V0 insulating materials used
- Exceeds IEC 950 & UL1283 requirements for voltage proof for safety and reliability
- Very low residual pulse current – high safety margin
- Coupled inductor for high insertion loss
- RoHS compliant

Ratings and Characteristics

Rated Voltage	Single phase	250Vac 50/60Hz
	Three phase	250/440Vac 50/60Hz (277V/480Vac on request)
Test Voltage (Prior to fitting transient suppressors)		2250Vdc each line to case
Insulation Resistance (Prior to fitting discharge resistors)		>100MΩ
Discharge Resistors		Fitted internally from each line to case
Discharge Time to below 34V		<30s
Maximum Temperature Rise on Full Load		25°C
Full Load Operating Temperature Range		-40°C to +50°C
Maximum Leakage Current per line at 250Vac 50Hz		See table
Peak Surge Current		70kA (8/20μs)

Insertion Loss Performance

Typical insertion loss In 50Ω system with / without load	
Insertion loss	14kHz – 18GHz 100dB

Transient Suppression Performance

MIL STD 188-125-1 acceptance test, short pulse current injection, wave shape 20/500ns					
Input pulse amplitude	250A	500A	1000A	1800A	2500A
MIL-STD-188-125 residual requirement	<10A	<10A	<10A	<10A	<10A
Typical filter residual let-through	<1.5A	<2A	<3A	<3.5A	<4.5A

MIL STD 188-125-1 acceptance test, intermediate pulse current injection, wave shape 1.5/3000μs	
Input pulse amplitude	250A
MIL-STD-188-125 requirement	No filter damage or performance degradation
Typical filter response	No filter damage or performance degradation

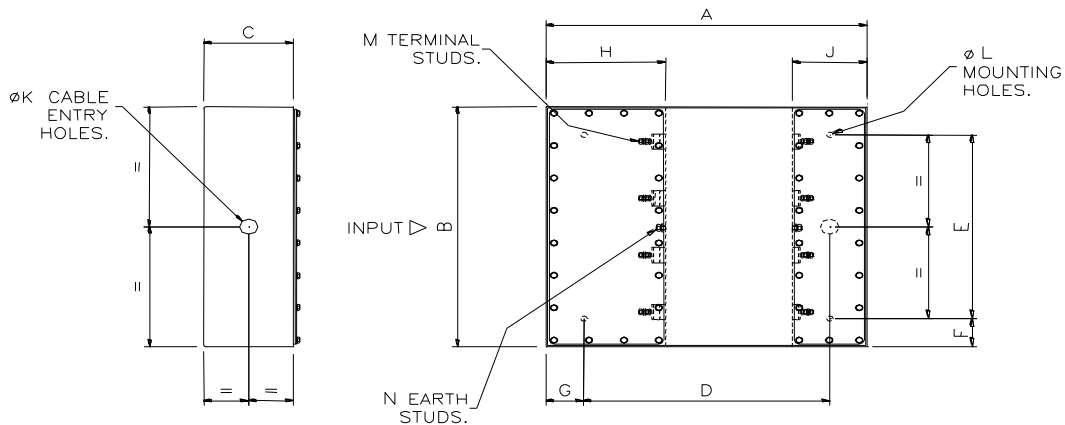


Product Range

Part Number	Current Rating per Line @ 50°C (A) *	Number of Lines	Max Leakage Current per Line (A)	Max DC Volt Drop per Line (V)	Max Heat Dissipation (W)	Major Dimensions (mm)			Approx. Weight (kg)
						Length A	Width B	Depth C	
DS33630/E	6	2 (SPN)	1.5	0.35	12	600	200	120	15
DS33631/E	16	2 (SPN)	1.5	0.55	24	600	200	120	15
DS33632/E	32	2 (SPN)	2.5	0.5	42	780	250	120	25
DS33633/E	63	2 (SPN)	2.5	0.65	90	950	320	170	45
DS33634/E	100	2 (SPN)	2.5	0.5	120	1100	350	230	70
DS33635/E	200	2 (SPN)	5	0.35	200	1220	450	250	110
DS33636/E	400	2 (SPN)	6	0.2	290	1900	480	250	190
DS33640/E	6	4 (TPN)	3	0.4	20	600	400	120	30
DS33641/E	16	4(TPN)	3	0.6	35	600	400	120	30
DS33642/E	32	4(TPN)	5	0.55	80	780	500	120	45
DS33643/E	63	4(TPN)	5	0.6	140	950	640	170	85
DS33644/E	100	4(TPN)	7	0.5	200	1100	700	230	120
DS33645/E	200	4(TPN)	8	0.3	300	1220	900	250	170
DS33646/E	400	4(TPN)	10	0.25	500	1900	960	250	300

* Current derating between 50°C and 85°C $I_{\theta} = I_R \sqrt{(85-\theta)/35}$

Dimensions and Mechanical Details



Part Number	Dimensions (mm)												
	A	B	C	D	E	F	G	H	J	K	L	M	N
DS33630/E	600	200	120	520	110	45	40	140	80	20	9	M5	M6
DS33631/E	600	200	120	520	110	45	40	140	80	20	9	M5	M6
DS33632/E	780	250	120	690	140	55	45	160	100	25	9	M8	M10
DS33633/E	950	320	170	860	210	55	45	160	100	32	11	M8	M10
DS33634/E	1100	350	230	990	240	55	55	160	120	32	11	M8	M10
DS33635/E	1220	450	250	1070	300	75	75	200	150	51	17	M12	M16
DS33636/E	1900	480	250	1440†	340	70	230	300	300	76	17	M20	M20
DS33640/E	600	400	120	520	310	45	40	140	80	20	9	M5	M6
DS33641/E	600	400	120	520	310	45	40	140	80	20	9	M5	M6
DS33642/E	780	500	120	690	390	55	45	160	100	25	9	M8	M10
DS33643/E	950	640	170	860	530	55	45	160	100	32	11	M8	M10
DS33644/E	1100	700	230	990	590	55	55	160	120	32	11	M8	M10
DS33645/E	1220	900	250	1070	750	75	75	200	150	51	17	M12	M16
DS33646/E	1900	960	250	1440†	600	180	230	300	300	76	17	M20	M20

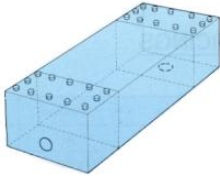
Notes** 400A filters additionally have lifting lugs protruding 65mm beyond each end of the filter and 8mm beyond each side to aid mounting.

Lug hole size 22mm. Please request outline drawings for full dimensions of 400A filters.

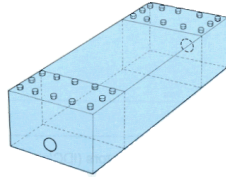
† Fixing centres only – See outline drawing for position of cable entry hole.



Cable Entry Options



Part No DS XXXXC
or DS XXXX/EC
End entry base exit
(standard cable entry configuration)



Part No DS XXXXA
or DS XXXX/EA
End entry end exit
(alternative cable entry)

Two different cable entry options are available as shown.
Standard configuration is suffix C for shielded room mounting, i.e. end entry, base exit.
For end entry and end exit, substitute suffix C with suffix A in the part number.

Installation Details



Typical Installation

The mounting surface should be clean and unpainted to ensure a low impedance earth bond and good RF seal.
Fixing screws and gland tubes can be supplied as an optional extra.

Recommended tightening torque figures:

M5 lid fixings:	1N-m
M5 terminals:	2N-m
M6 terminals:	2.5N-m
M8 terminals:	5N-m
M10 terminals:	8N-m
M12 terminals:	11N-m
M16 terminals:	20N-m
M20 terminals:	32N-m

Safety

Relevant safety standards have been adhered to in the design and manufacture of these products. However, all capacitors will store charge after power has been removed and must be treated with respect as a shock can be lethal if the voltage and charge are high enough.

Even though discharge resistors are fitted to this range of filters, terminals should always be shorted to earth prior to touching to ensure the capacitors are fully discharged.

The user should ensure he is familiar with restrictions on capacitance value, earth leakage current, test voltage, and safety labelling requirements, which may be applicable to his particular installation.

These filters must be solidly and permanently earthed, both for safe operation and to achieve optimum EMC and pulse performance.

Custom Designs

MPE offers a rapid design service for custom designs where special packaging, mounting, terminations, or multiple lines are required. Over 50% of the filters manufactured by MPE are custom designs and this can offer a very cost effective installation solution. Please ask to see examples of previously offered solutions.

Filter Selection Guide & Ordering Information

- Step 1** Choose whether standard performance or extended performance required,
- Step 2** Choose current and number of lines required
- Step 3** Select part number including /E if appropriate
- Step 4** Add cable entry suffix A or C as detailed above
- Step 5** Add extra /480 suffix if 277/480V voltage version is required