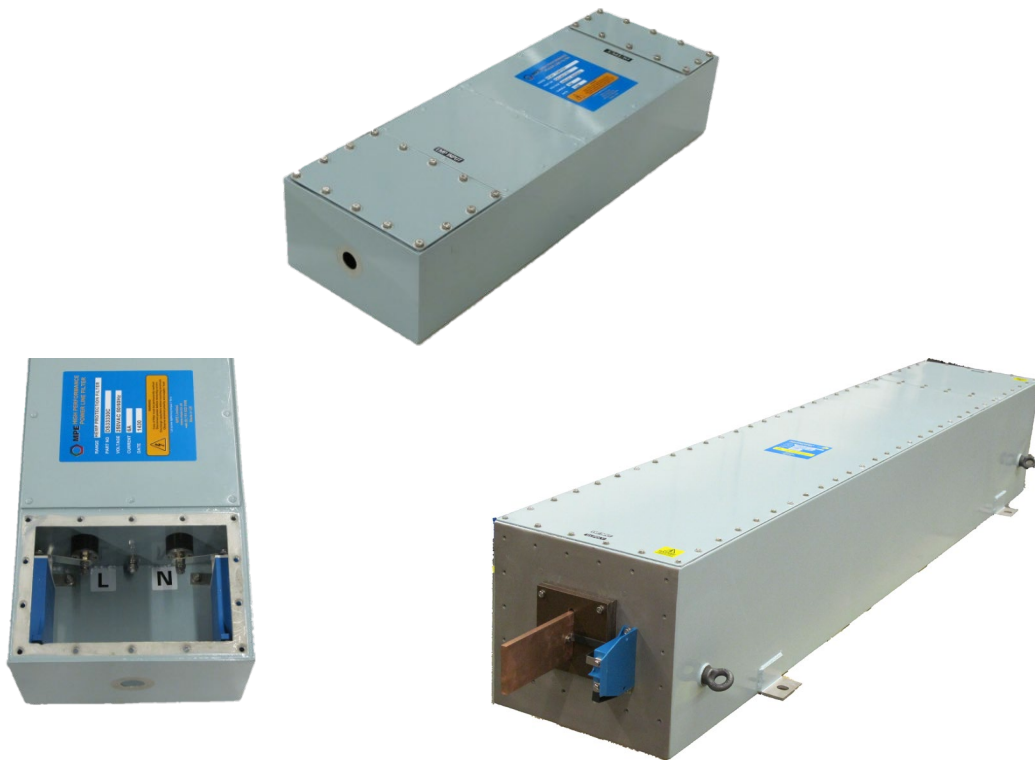




HEMP & IEMI PROTECTION FILTERS FOR MAINS POWER LINES UP TO 3600A RATING TO MIL-STD-188-125-1 & -2 & DEF STAN 59-188-1 & -2



**CONFORMS TO ELECTRICAL POINT-OF-ENTRY REQUIREMENTS
FOR SHORT (E1) AND INTERMEDIATE (E2) PULSES
AND SHIELDING EFFECTIVENESS**



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This catalogue covers MPE's range of power line filters used to protect equipment against the effects of high-altitude electromagnetic pulse (HEMP), as well as the effects of high frequency, hyperband intentional electromagnetic interference (IEMI). Filters in this catalogue are designed for standard mains voltages / frequencies at current ratings up to 3600A.

MPE's HEMP & IEMI protection filters have been specifically designed to meet the point-of-entry requirements of standards MIL-STD-188-125 parts 1 & 2 and DEF STAN 59-188 parts 1 & 2, for short (E1) and intermediate (E2) pulses. The filters combine high-energy transient suppression with low loss power chokes and high frequency feedthrough plastic film capacitors to provide superior HEMP and IEMI protection.

The filters will also attenuate lower frequency electromagnetic interference (EMI) and unintentional transmissions, in particular the Extended Performance filter circuits offer extensive low-pass suppression of common mode and differential mode EMI, using passive multi stage components.

Construction

All capacitors are wound in house and use metallised high-grade polypropylene or polyester film. This film attains low power losses and a dielectric self-healing capacity. Our feedthrough capacitor technology provides frequency performance of 100dB of attenuation up to 40GHz and beyond. The filters incorporate non-saturating power chokes, achieving low losses and maintaining full frequency performance under all load conditions. Transient suppressors are provided in the form of high-energy absorbing SIOV metal oxide block varistors. The filter components are housed in a compartmentalised, fully RF sealed enclosure. To maintain shielding effectiveness the enclosure is supplied complete with access lids, screws and a set of EMI / environmental gaskets.

Reliability & Service Life

MPE's power and EMP filters have been in service in strategic installations for over 30 years and have been demonstrated to be very reliable. They have been found not to exhibit any signs of safety or performance degradation, endorsing the claims of high reliability. Some EMP filters have been removed after 20 years continuous service to be upgraded to the new HEMP filters, and when tested were found to still conform to their original electrical specification. Customer returns of filters within this catalogue due to electrical problems have been less than 0.1% over a 15 year period.

Transient suppressors must be considered as consumable devices that could potentially degrade over time. Transient suppressors should be regularly inspected for overheating and degradation as part of an equipment maintenance schedule.

Production Tests

Our production process requires that 100% of filters are tested under ISO9001:2015 controls before dispatch.

All filters in this catalogue are electrically tested at multiple stages of the product manufacturing process including proof test voltage, capacitance, dissipation factor ($\tan \delta$), inductance, discharge resistance and dc volt drop across the filter. All filters in this catalogue are proof voltage tested at 2250VDC between each live line and earth. The Extended Performance range has coupled lines and they are proof voltage tested to at least 1500VDC between all live lines and neutral, and between neutral and earth.

Approvals

Filter safety requirements to UL1283, LVD 2014/35/EU and UK Electrical Equipment (Safety) Regulations 2016.

All filters in this catalogue have been pulse current injection (PCI) acceptance tested by an independent laboratory and have been shown to conform to the point-of-entry requirements of MIL-STD-188-125 and Def STAN 59-188.

Filter insertion loss performance measured using Mil-F-15733, Mil-Std-220C and CISPR17:2011/BS EN 55017:2011.

Filters have been tested to show compliance with US Army Corps of Engineers specification USACE 13.27.54.01 and Unified Facilities Guide Specification UFGS 13.49.20.01.

All filters in this catalogue are compliant with RoHS 2011/65/EU and UK RoHS Regulations 2012.

Earth Bonding for Performance

It is important to achieve as low as possible earth bond impedance to the unpainted base or mounting flange of the filter. We normally recommend that filters be mounted on a steel surface, which has been electroplated with tin or zinc. This should be unpainted and must be flat and smooth. This type of large area connection to the box ensures that at high frequencies, inductive and capacitive values are kept small allowing a clear path to ground potential.

Earth Bonding for Safety

The installer must ensure the filter is permanently & solidly earthed. This is essential for filters with direct capacitance from phase to metal enclosure. In the event of the earth connection to the enclosure becoming disconnected, the enclosure will rise in voltage to an unsafe level.

Discharging after Isolation

All filters in this catalogue contain large values of capacitance. These capacitors can store a hazardous electrical charge long after the power has been removed. Therefore as a safety measure, all filters are fitted with internal discharge resistors intended to lower the stored voltage to a safe level after removal of the power.

It is important to follow a safe disconnection procedure when working on cables and filters. Always ensure the voltage between phases, between phase and neutral, and between phase and ground are safe before working on any part of the cabling connected to a filter.



Description

A range of HEMP & IEMI power line filters meeting the pulse current injection (PCI) requirements of MIL-STD-188-125 parts 1 and 2, and DEF STAN 59-188 parts 1 and 2 for E1 and E2 pulses. All lines are individually filtered, featuring inductive input to provide both the required transient handling performance and good continuous wave EMC performance even on supplies with low source impedance. The filters are fitted with high-energy transient suppressors and are housed in a compact, RF sealed enclosure. They provide 100dB attenuation against electromagnetic noise present on the power lines between a frequency range of 30MHz to 18GHz, and will achieve compliance with shielding effectiveness requirements of the HEMP shield.

Filters up to 400A current rating are supplied in either 2-line or 4-line enclosures for use on single phase and neutral or three phase and neutral power supplies respectively. High current filters (800A and above) are supplied in single line enclosures for ease of installing on-site.

Typical Applications

- Fixed ground-based C⁴I military facilities
- Transportable ground-based C⁴I military systems
- Proven to meet PCI and SE requirements of MIL-STD-188-125-1&2 and DEF STAN 59-188-1&2
- USACE 13.27.54.01
- UFGS 13.49.20.01
- UL 1283



Features

All filters feature:

- Individually filtered lines
- High-energy transient suppressor for reliability against E2 pulse
- Very low residual pulse current – high safety margin
- Utilises self-healing feedthrough capacitors
- UL 94 V-0 insulating materials

High current (800A+) filters feature:

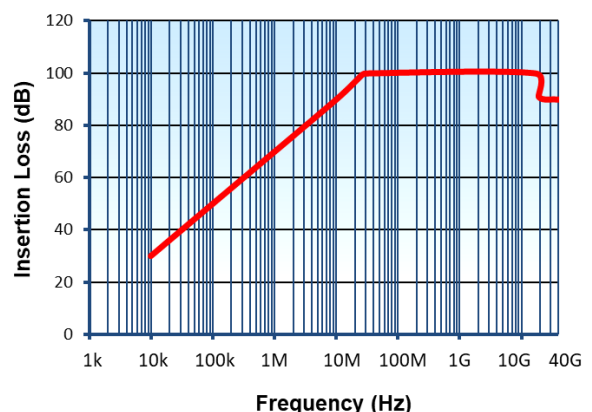
- Single line construction for quick and easy installation
- Supplied with lifting eyebolts to aid installation



Insertion Loss Performance

Asymmetric attenuation shown as measured in 50Ω system, at all loading conditions, in accordance with CISPR-17.

Standard Performance filters meet:
100dB attenuation from 30MHz to 18GHz
then 90dB attenuation up to 40GHz



Shielding Effectiveness

Frequency	10kHz	100kHz	1MHz	10MHz	100MHz	1GHz
Minimum Shielding Effectiveness to meet MIL-STD-188-125	20dB	40dB	60dB	80dB	80dB	80dB
Typical Filter Shielding Effectiveness	30dB	50dB	70dB	100dB	100dB	100dB

Technical Specification

Rated Voltage	All Filters	250VAC 50/60Hz or 300VDC each line to case
	4 Line (TP&N) Filters	440/250VAC 50/60Hz
Note: 277VAC 50/60Hz and 480/277VAC 50/60Hz voltage ratings also available – see ordering codes		
Test Voltage		2250VDC each line to case (prior to fitting transient suppressors)
Rated Current		16A to 1200A (each individual line, see range available)
Current Overload		10 x maximum rated current for 1 sec. 1.5 x max rated current for 10 minutes.
Bleeder/Discharge Resistors		Fitted internally from each line to case
Discharge time		30 seconds to below 34V
Max. Temperature Rise on Full Load		25°C
Temperature Range	Operating	-40°C to +50°C
	Storage	-40°C to +85°C
Peak Surge Current		70kA (8/20µs)
MTBF		>0.1 million hours (calculated using Mil Hdbk 217F)

Transient Suppression Performance

All the filters in this catalogue have passed acceptance pulse current injection (PCI) tests for the short (E1) and intermediate (E2) pulses by an independent test laboratory in accordance with MIL-STD-188-125 and DEF STAN 59-188.

MIL-STD-188-125-1&-2 acceptance test, short pulse current injection (E1), wave shape 20/500ns					
Input pulse amplitude	250A	500A	1kA	1.8kA	2.5kA
MIL-STD-188-125 residual current (let-through) requirement	<10A	<10A	<10A	<10A	<10A
Typical 6A - 400A filter residual current (let-through)	<1.5A	<2A	<3A	<3.5A	<4.5A
Typical 800A+ filter residual current (let-through)	<3A	<4.5A	<6.5A	<7A	<8A

MIL-STD-188-125-1&-2 acceptance test, intermediate pulse current injection (E2), 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

Range Available

Rated Current (A)	Part Number	DC Resistance (mΩ)	Earth Leakage* (A)	Residual Current** [2.5kA] (A)	Major Dimensions			Terminal Size	Approx. Weight (kg)
					Length A (mm)	Width B (mm)	Height C (mm)		
2-Line (SP&N)									
16	DS33331	12	1.5	2.4	420	200	120	M5	10
32	DS33332	6	1.5	3.4	500	250	120	M8	15
63	DS33333	5	1.5	4.1	620	320	170	M8	30
100	DS33334	2	5	1.3	740	350	230	M8	40
200	DS33335	0.5	5	2.6	860	450	250	M12	70
250	DS33904	0.5	6	8.4	1220	450	210	M16	90
400	DS33336	0.2	8	9.2	1600	480	250	M20	120

4-Line (TP&N)									
16	DS33341	12	1.5	2.4	420	400	120	M5	20
32	DS33342	6	1.5	3.4	500	500	120	M8	30
63	DS33343	5	1.5	4.1	620	640	170	M8	55
100	DS33344	2	5	1.3	740	700	230	M8	80
200	DS33345	0.5	5	2.6	860	900	250	M12	130
250	DS33905	0.5	6	8.4	1220	900	210	M16	170
400	DS33346	0.2	8	9.2	1600	960	250	M20	225

1-Line									
800	DS33737	0.1	14	7.6	1750	410	320	50 x 8	300
1200	DS33738	0.05	14	7.6	1750	410	320	80 x 10	300
2400	2 x DS33738 single line filters connected in parallel – see installation details on page 14								
3600	3 x DS33738 single line filters connected in parallel – see installation details on page 15								

Earth Leakage

*Measurement taken from phase line to earth at 250V 50Hz.

Important, all filters in this catalogue can NOT be protected by a standard 30mA residual circuit breaker (RCCB). However, a RCCB protection device can be placed down line / load side of filter (see application note).

Residual Current

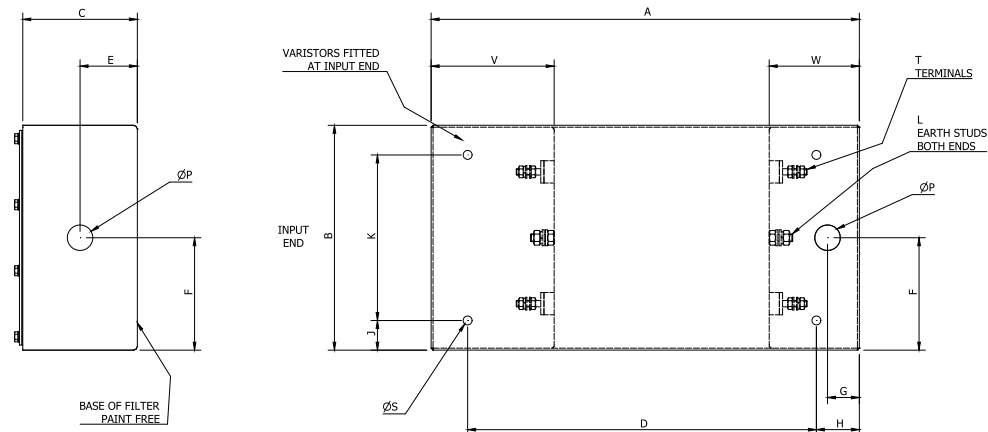
**Typical residual current value measured with 2Ω (or V/I) load resistance on filter output during 2.5kA short pulse current injection (E1) acceptance test, wave shape 20/500ns, when previously independently tested in accordance with MIL-STD-188-125-1&-2 and DEF STAN 59-188-1&-2.

Mechanical Details

Electrical Fixing	16A – 400A 800A+	Brass spindles (electroless bright nickel plated) Copper bus-bar (see size in table above)
Enclosure Material	16A – 400A 800A+	Mild steel (electroplated dull tin plated) 304 grade stainless steel
Finish		Gloss epoxy paint to DEF-STAN 80-161
Colour		Light admiralty grey BS 381C 697
Enclosure Rating		IP 54
Potting Compound Flammability Rating		UL 94 V-0

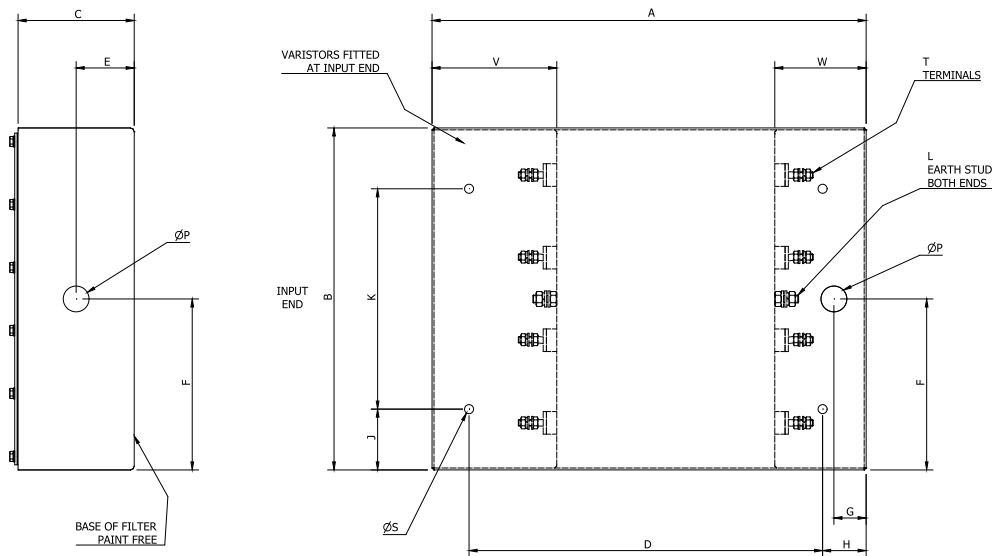
Full Dimensions (16A – 400A)

2-Line



Part No.	A	B	C	D	E	F	G	H	J	K	L	P	S	T	V	W
DS33331	420	200	120	340	60	100	40	40	45	110	M6	20	9	M5	140	80
DS33332	500	250	120	410	60	125	45	45	55	140	M10	25	9	M8	160	100
DS33333	620	320	170	530	85	160	45	45	55	210	M10	32	11	M8	160	100
DS33334	740	350	230	630	115	175	55	55	55	240	M10	32	11	M8	160	120
DS33335	860	450	250	710	125	225	75	75	75	300	M16	50	17	M12	200	150
DS333904	1220	450	220	1020	110	225	100	100	75	300	M20	50	17	M16	235	235
DS33336	1600*	480*	250	1140	125	240	85	230	70	340	M20	75	17	M20	300	300

4-Line



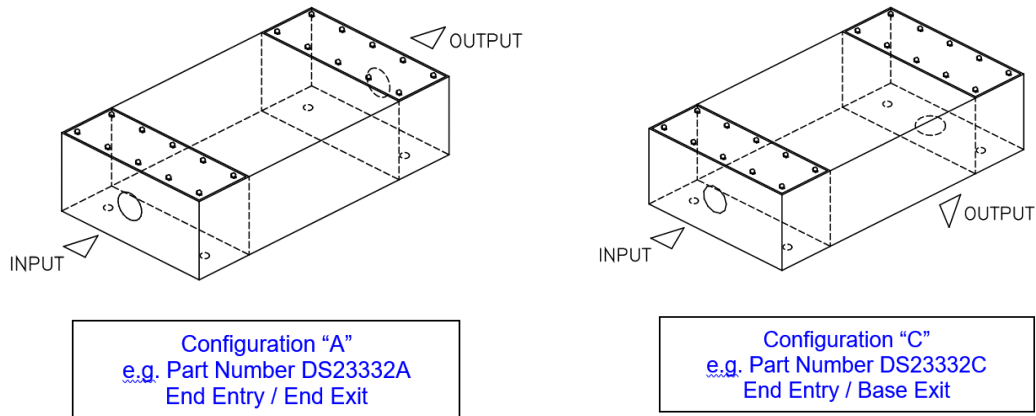
Part No.	A	B	C	D	E	F	G	H	J	K	L	P	S	T	V	W
DS33341	420	400	120	340	60	200	40	40	45	310	M6	20	9	M5	140	80
DS33342	500	500	120	410	60	250	45	45	55	390	M10	25	9	M8	160	100
DS33343	620	640	170	530	85	320	45	45	55	530	M10	32	11	M8	160	100
DS33344	740	700	230	630	115	350	55	55	55	590	M10	32	11	M8	160	120
DS33345	860	900	250	710	125	450	75	75	75	750	M16	50	17	M12	200	150
DS333905	1220	900	220	1020	110	450	100	100	75	750	M20	50	17	M16	235	235
DS33346	1600*	960*	250	1140	125	480	85	230	180	600	M20	75	17	M20	300	300

*Note: 400A filters DS33336 and DS33346 have additional lifting lugs protruding 65mm beyond each end of the filter and 8mm beyond each side to aid with mounting. The lifting lug hole size is 22mm. Please request drawings P828602 or P828362 respectively for full dimensions.

Cable Entry Options

Rectangular case style filters can be supplied with different cable entry hole positions to suit alternative mounting arrangements. The cable entry option can be identified by the suffix in the part number. See the illustrations below showing the standard cable entry positions.

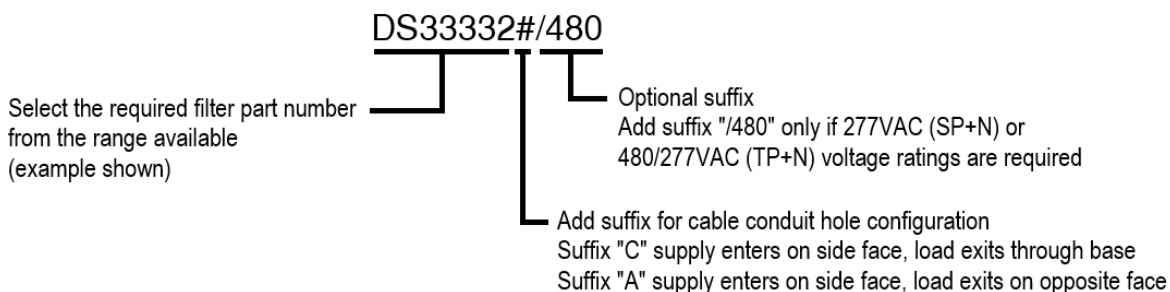
For alternative entry options as well as un-pierced boxes please contact sales@mpe.co.uk



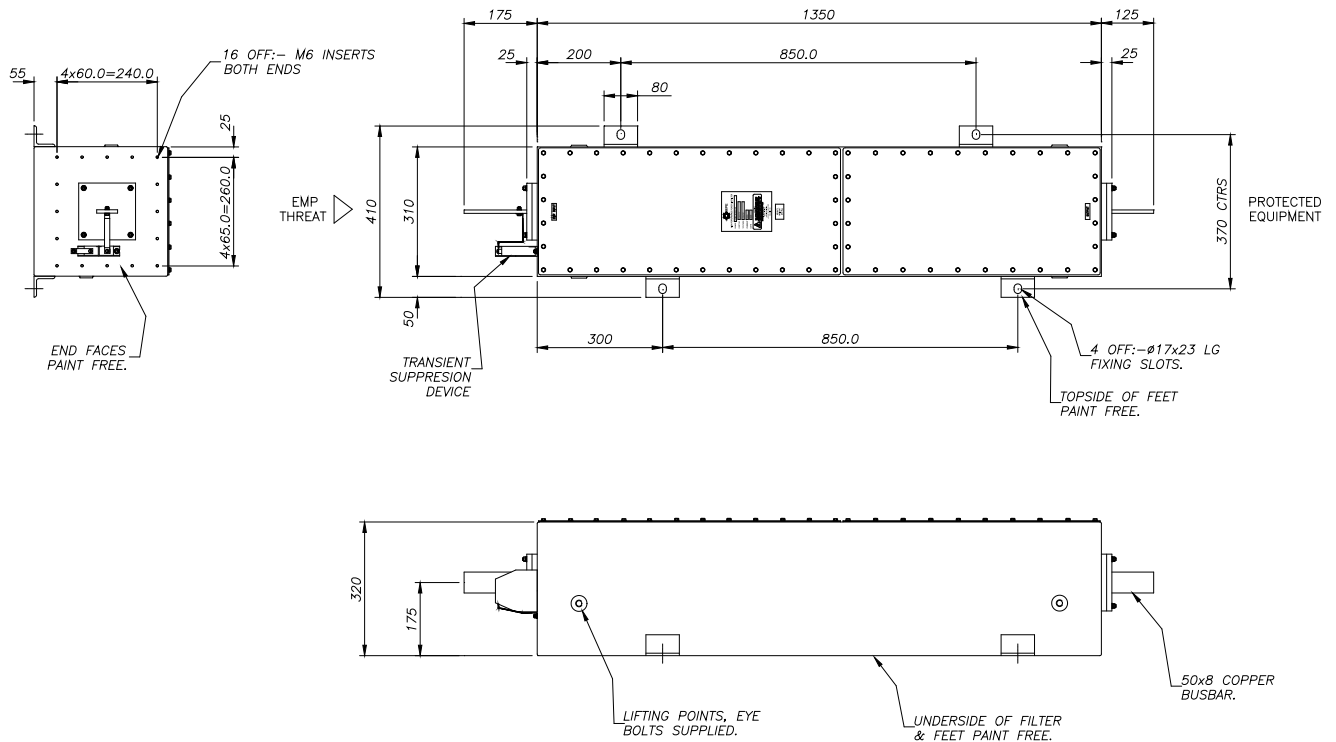
Ordering Codes

The ordering code consists of the filter part number and the cable entry hole position suffix.

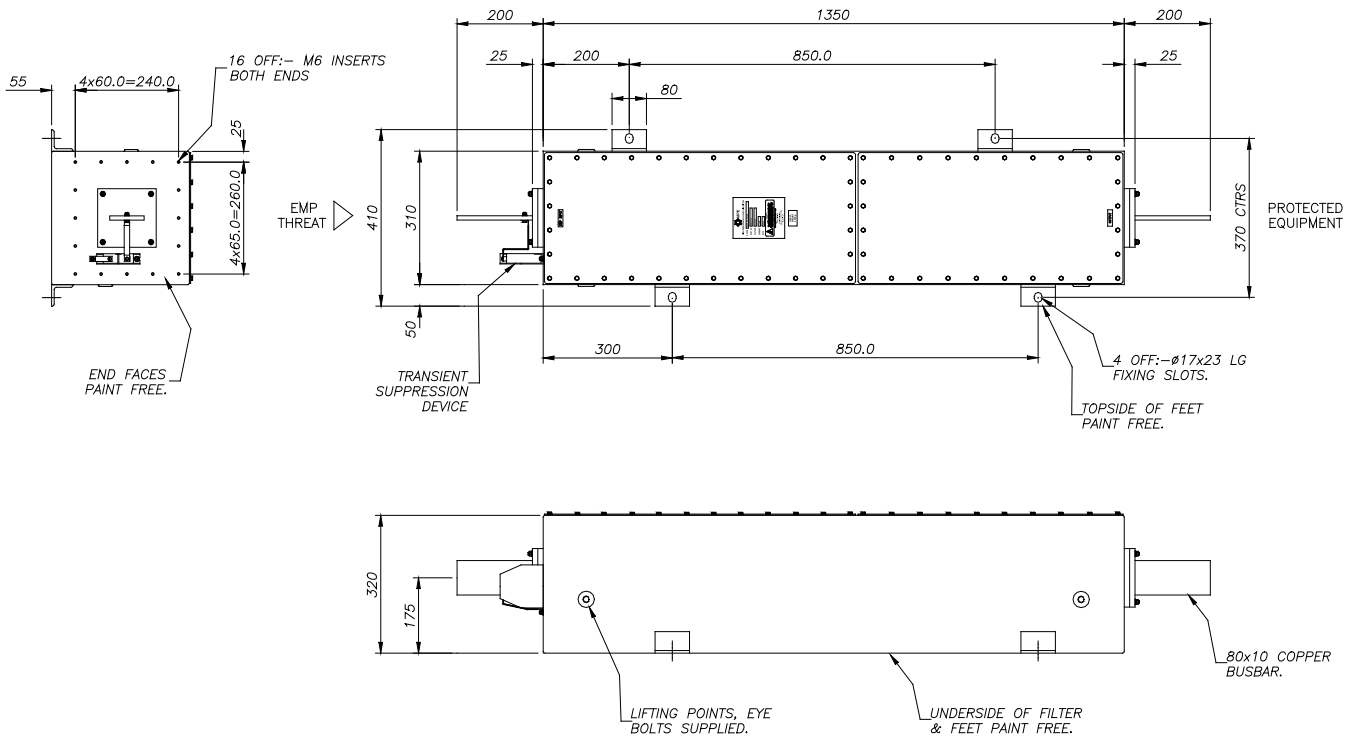
If 277VAC (SP+N) or 480/277VAC (TP+N) voltage ratings are required a secondary /480 suffix is added to the ordering code.



Full Dimensions – 800A Single Line Filter DS33737



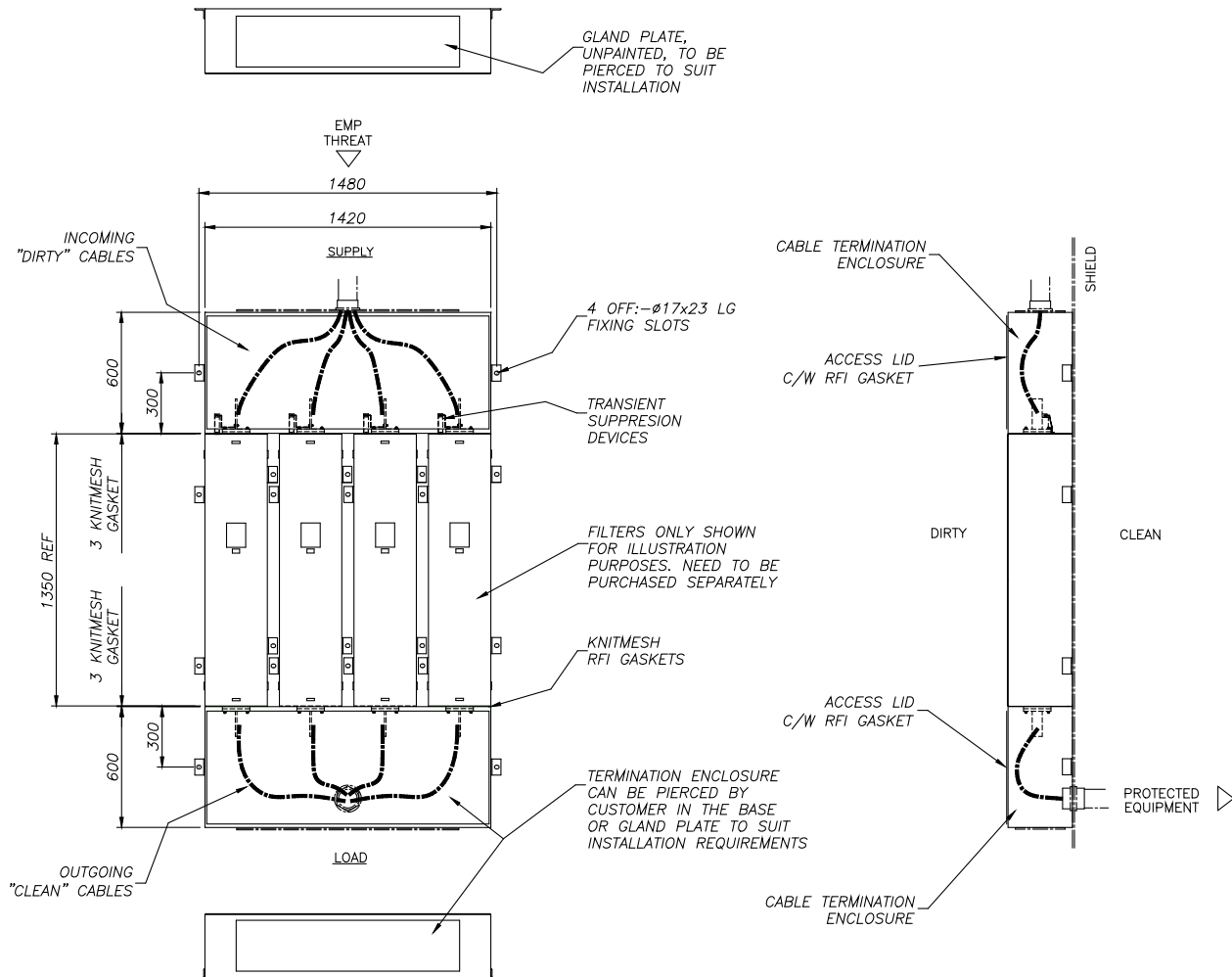
Full Dimensions – 1200A Single Line Filter DS33738



800A TP+N Installation Kit 99/831140

To facilitate installation of these very high current filters, MPE have developed a standard installation kit comprising input and output termination boxes with blank gland plates that can be pierced on-site to suit the specific installation. This allows the installer to make safe, secure and EMI shielded connections of the incoming and outgoing power to the filter bus-bar terminals. Knitted wire mesh RFI gaskets are provided to fit between the filter end faces and termination boxes to maintain high frequency performance. Hardware to connect the filters and termination boxes is also included.

Hardware for mounting the termination boxes onto the wall is not provided, however an M16 fixing screw kit can be supplied separately (see page 20).



As installations of high current filters can depend largely on where the power cables are situated, a customised installation kit may be required. MPE can work with your specific requirements to develop bespoke termination enclosures, bus-bar piercings and enclosure piercings to suit your installation.

Ordering Codes

Single line 800A HEMP power filter rated 250VAC 50/60Hz
 For 3 phase, 3 wire supply rated at 440/250VAC 50/60Hz
 For 3 phase + N, 4 wire supply rated at 440/250VAC 50/60Hz

DS33737
 3 x DS33737
 4 x DS33737

Single line 800A HEMP power filter rated 277VAC 50/60Hz
 For 3 phase, 3 wire supply rated at 480/277VAC 50/60Hz
 For 3 phase + N, 4 wire supply rated at 480/277VAC 50/60Hz

DS33737/480
 3 x DS33737/480
 4 x DS33737/480

Spare knitted wire mesh RFI gasket

99/829654

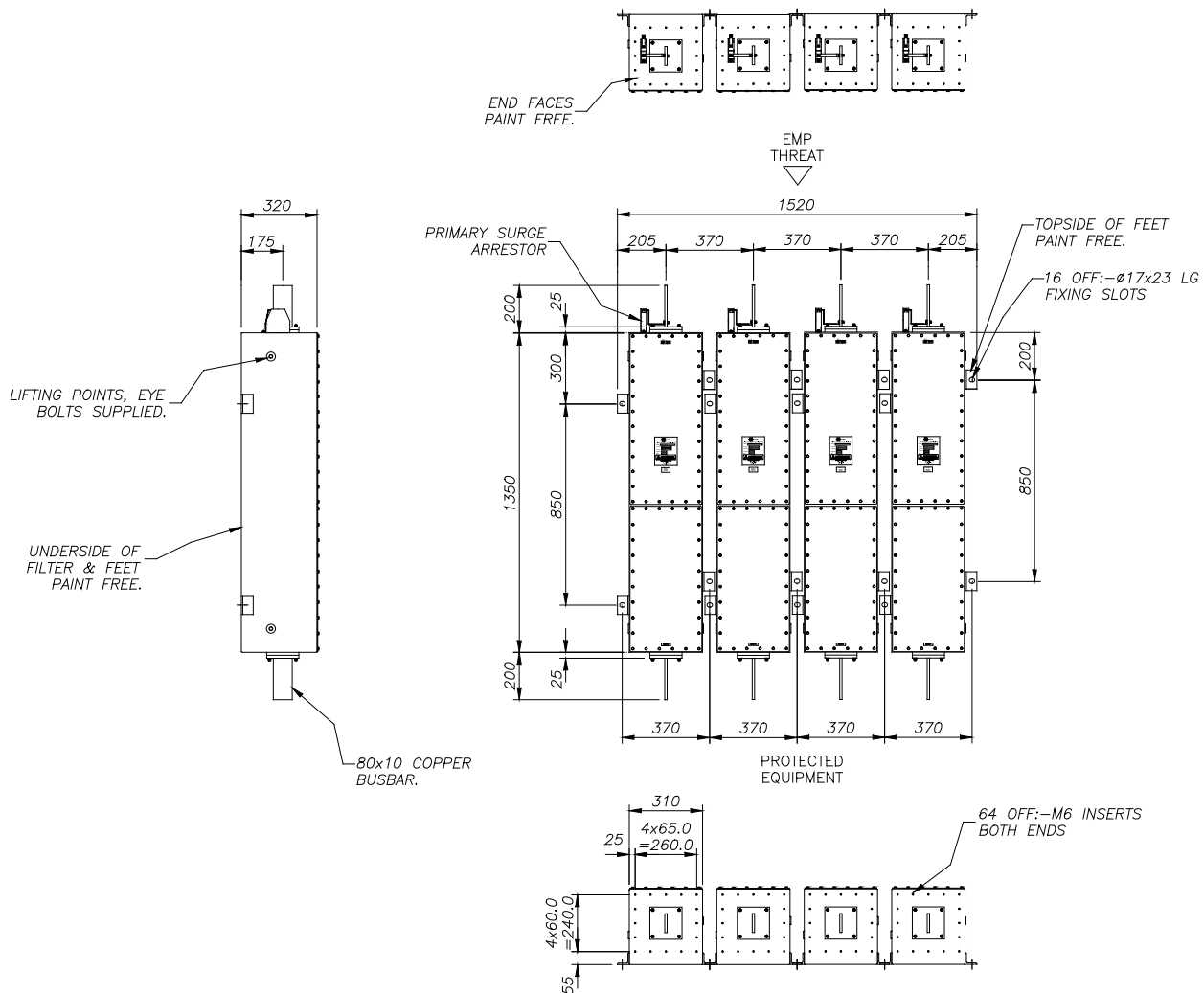
800A Installation kit (as described above)

99/831140



Typical 1200A TP+N Installation Details

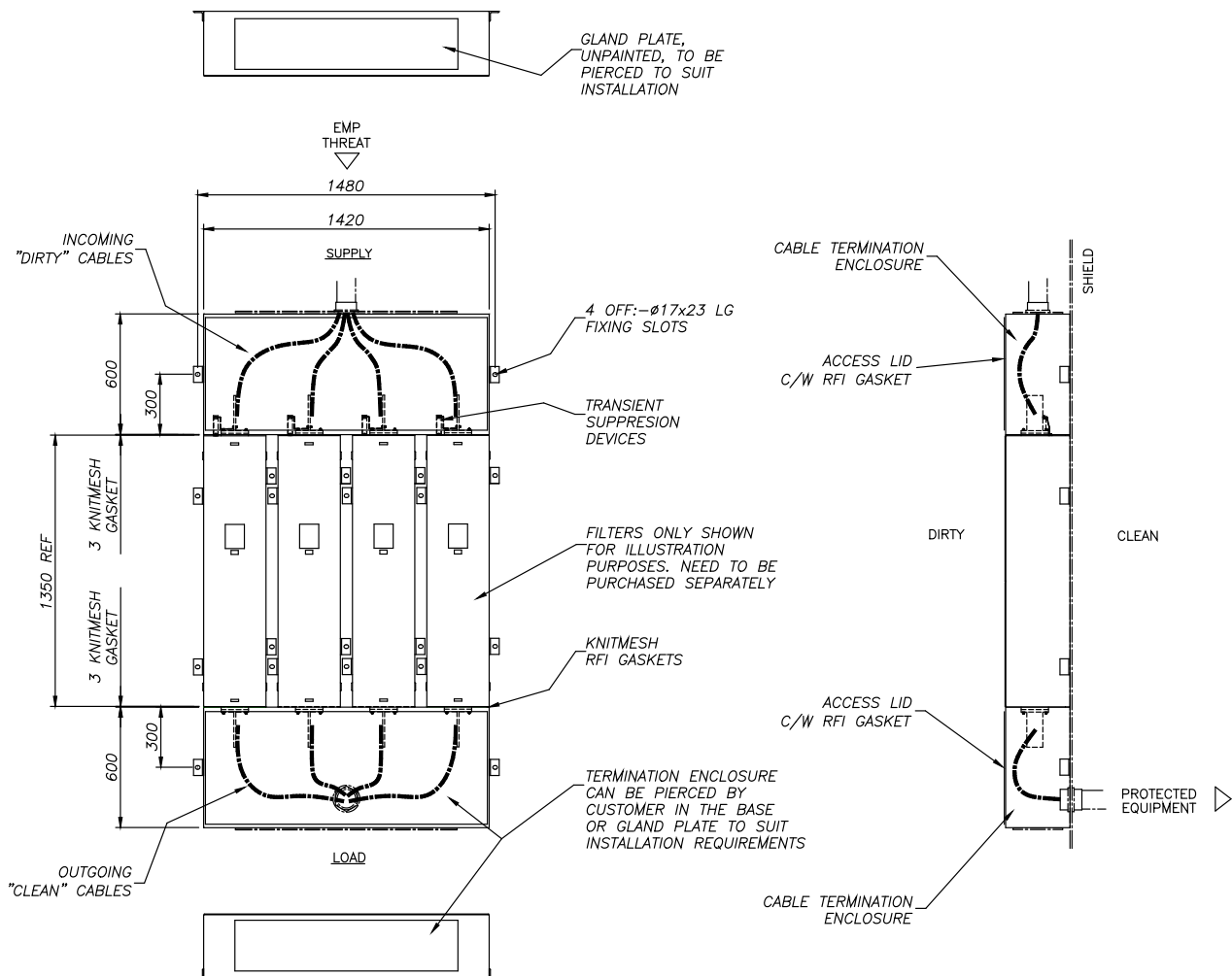
Three (or four) of the DS33738 single line filters are used together for use on three phase (+ neutral) power systems rated up to 1200A. Filters are ordered and supplied as single lines for ease of shipping and installation. They are designed for mounting in close proximity as shown below. All filters should be mounted on a clean, unpainted, flat mounting surface to ensure a good low-impedance earth bond and RF connection is made to the underside of each filter.



1200A TP+N Installation Kit 99/831141

To facilitate installation of these very high current filters, MPE have developed a standard installation kit comprising input and output termination boxes with blank gland plates that can be pierced on-site to suit the specific installation. This allows the installer to make safe, secure and EMI shielded connections of the incoming and outgoing power to the filter bus-bar terminals. Knitted wire mesh RFI gaskets are provided to fit between the filter end faces and termination boxes to maintain high frequency performance. Hardware to connect the filters and termination boxes is also included.

Hardware for mounting the termination boxes onto the wall is not provided, however an M16 fixing screw kit can be supplied separately (see page 20).



As installations of high current filters can depend largely on where the power cables are situated, a customised installation kit may be required. MPE can work with your specific requirements to develop bespoke termination enclosures, bus-bar piercings and enclosure piercings to suit your installation.

Ordering Codes

Single line 1200A HEMP power filter rated 250VAC 50/60Hz
 For 3 phase, 3 wire supply rated at 440/250VAC 50/60Hz
 For 3 phase + N, 4 wire supply rated at 440/250VAC 50/60Hz

DS33738
 3 x DS33738
 4 x DS33738

Single line 1200A HEMP power filter rated 277VAC 50/60Hz
 For 3 phase, 3 wire supply rated at 480/277VAC 50/60Hz
 For 3 phase + N, 4 wire supply rated at 480/277VAC 50/60Hz

DS33738/480
 3 x DS33738/480
 4 x DS33738/480

Spare knitted wire mesh RFI gasket

99/829712

1200A Installation kit (as described above)

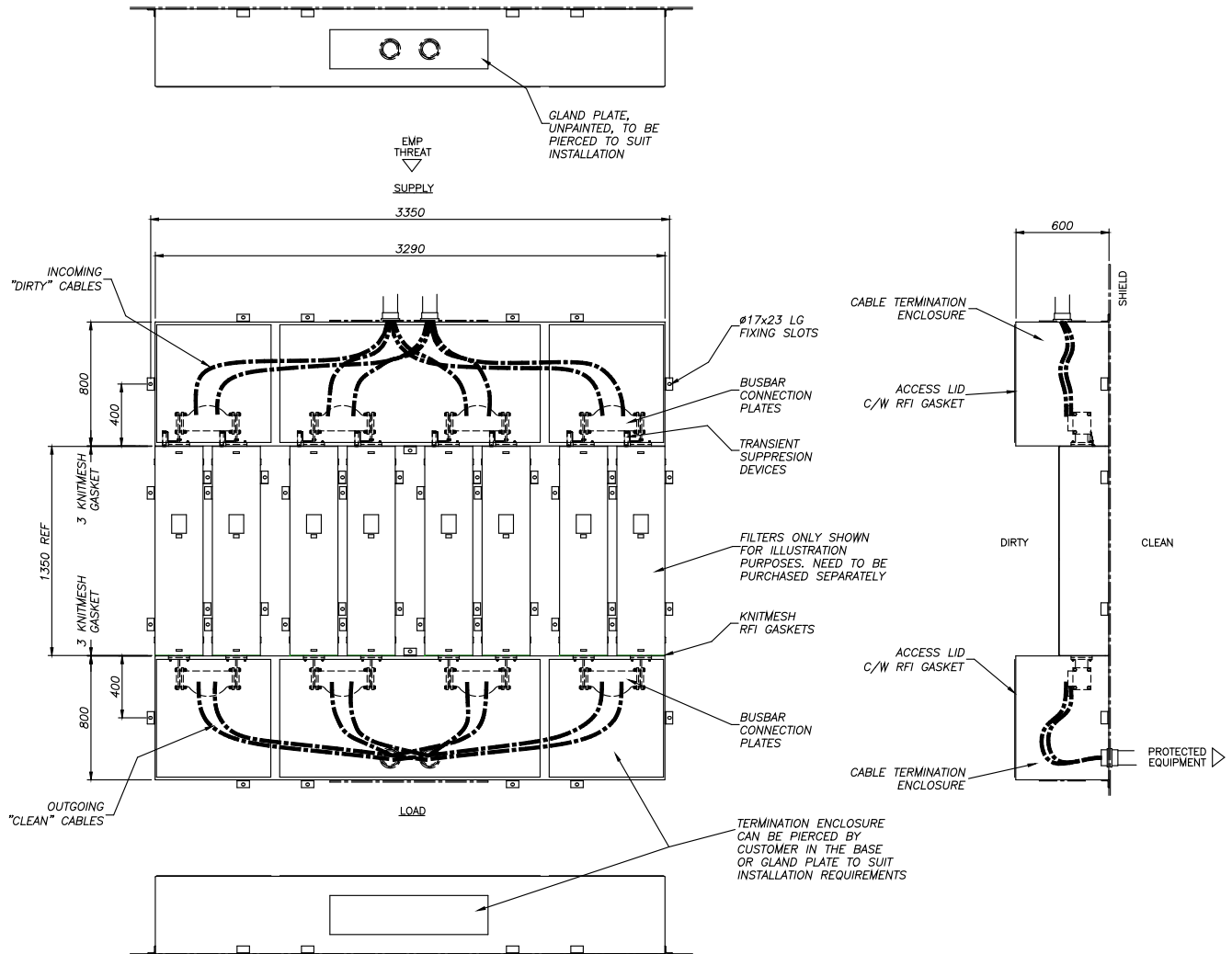
99/831141



2400A Installation Kit 99/834586

To facilitate installation of these very high current filters, MPE have developed a standard installation kit comprising input and output termination boxes with blank gland plates that can be pierced on-site to suit the specific installation. This allows the installer to make safe, secure and EMI shielded connections of the incoming and outgoing power to the filter bus-bar terminals. Knitted wire mesh RFI gaskets are provided to fit between the filter end faces and termination boxes to maintain high frequency performance. Hardware to connect the filters and termination boxes is also included.

Hardware for mounting the termination boxes onto the wall is not provided, however an M16 fixing screw kit can be supplied separately (see page 20).



As installations of high current filters can depend largely on where the power cables are situated, a customised installation kit may be required. MPE can work with your specific requirements to develop bespoke termination enclosures, bus-bar piercings and enclosure piercings to suit your installation.

Ordering Codes

Single line 1200A HEMP power filter rated 250VAC 50/60Hz
For 3 phase + N, 4 wire supply rated at 440/250VAC 50/60Hz

DS33738
8 x DS33738

Single line 1200A HEMP power filter rated 277VAC 50/60Hz
For 3 phase + N, 4 wire supply rated at 480/277VAC 50/60Hz

DS33738/480
8 x DS33738/480

Spare knitted wire mesh RFI gasket

99/829712

2400A Installation kit (as described above)

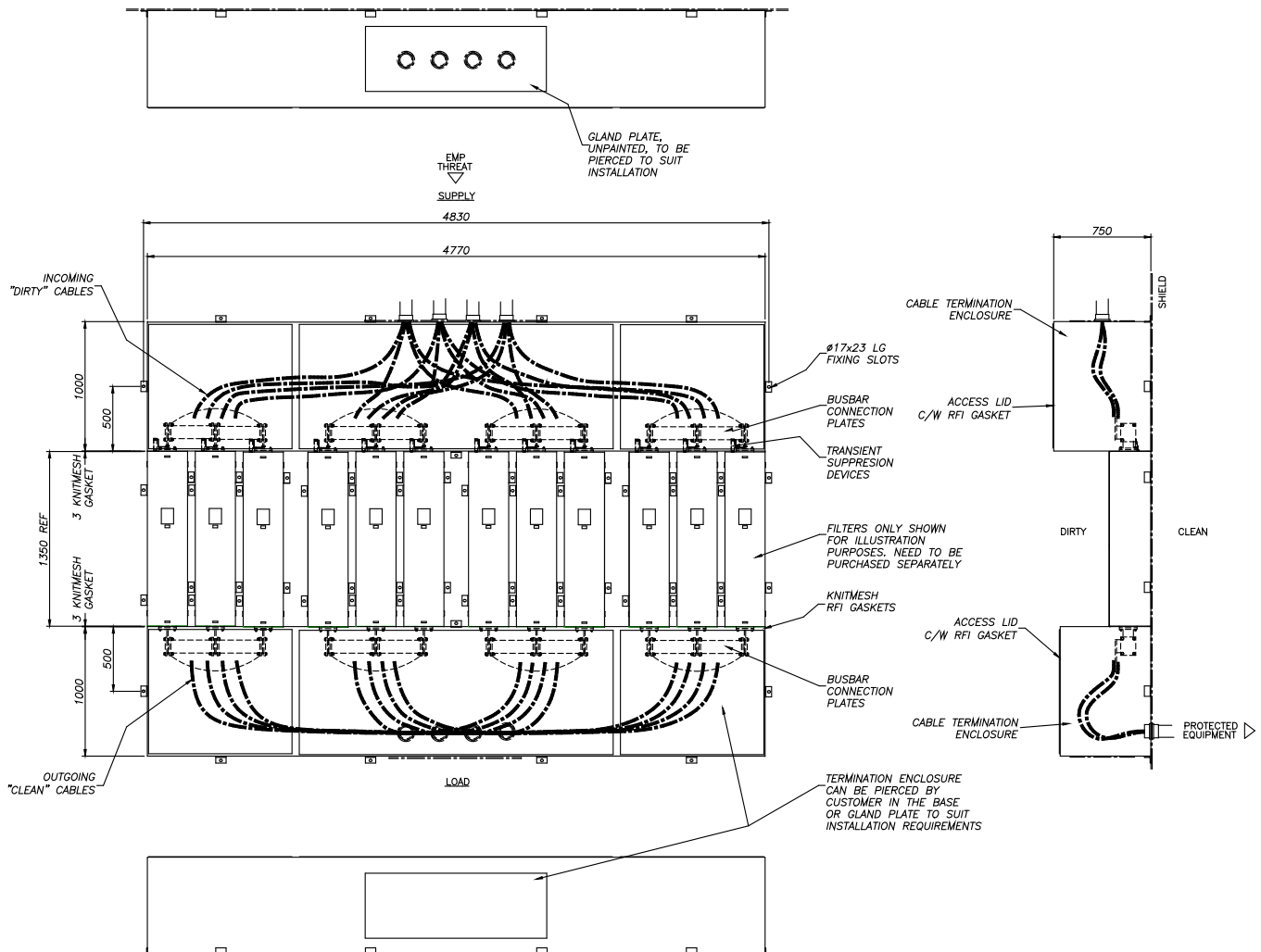
99/834586



3600A Installation Kit 99/834587

To facilitate installation of these very high current filters, MPE have developed a standard installation kit comprising input and output termination boxes with blank gland plates that can be pierced on-site to suit the specific installation. This allows the installer to make safe, secure and EMI shielded connections of the incoming and outgoing power to the filter bus-bar terminals. Knitted wire mesh RFI gaskets are provided to fit between the filter end faces and termination boxes to maintain high frequency performance. Hardware to connect the filters and termination boxes is also included.

Hardware for mounting the termination boxes onto the wall is not provided, however an M16 fixing screw kit can be supplied separately (see page 20).



As installations of high current filters can depend largely on where the power cables are situated, a customised installation kit may be required. MPE can work with your specific requirements to develop bespoke termination enclosures, bus-bar piercings and enclosure piercings to suit your installation.

Ordering Codes

Single line 1200A HEMP power filter rated 250VAC 50/60Hz
For 3 phase + N, 4 wire supply rated at 440/250VAC 50/60Hz

DS33738
12 x DS33738

Single line 1200A HEMP power filter rated 277VAC 50/60Hz
For 3 phase + N, 4 wire supply rated at 480/277VAC 50/60Hz

DS33738/480
12 x DS33738/480

Spare knitted wire mesh RFI gasket

99/829712

3600A Installation kit (as described above)

99/834587



Description

A range of 2 line and 4 line HEMP & IEMI power line filters meeting the pulse current injection (PCI) requirements of MIL-STD-188-125 parts 1 and 2, and DEF STAN 59-188 parts 1 and 2 for E1 and E2 pulses. These filters have an enhanced circuit for use in TEMPEST applications that require improved insertion loss performance. All lines feature individual inductive input for the required transient handling performance and coupled inductors for superior continuous wave EMC performance, even on supplies with low source impedance. The filters are fitted with high-energy transient suppressors and are housed in an RF sealed enclosure. They provide 100dB attenuation against electromagnetic noise present on the power lines between a frequency range of 14kHz to 40GHz, and will achieve compliance with shielding effectiveness requirements of the HEMP shield.

Typical Applications

- Fixed ground-based C⁴I military facilities
- Transportable ground-based C⁴I military systems
- Proven to meet PCI and SE requirements of MIL-STD-188-125-1&2 and DEF STAN 59-188-1&2
- Combined HEMP and TEMPEST protection
- USACE 13.27.54.01
- UFGS 13.49.20.01
- UL 1283



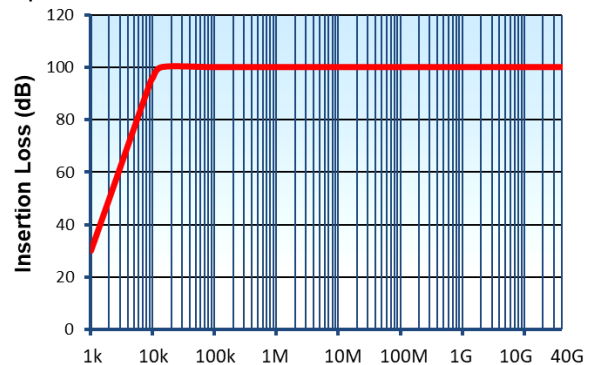
Features

- Coupled filter lines for HEMP & superior EMI performance
- High-energy transient suppressor for reliability against E2 pulse
- Very low residual pulse current – high safety margin
- Utilises self-healing feedthrough capacitors
- UL 94 V-0 insulating materials

Insertion Loss Performance

Asymmetric attenuation shown as measured in 50Ω system, at all loading conditions, in accordance with CISPR-17.

Extended Performance filters meet:
100dB attenuation from 14kHz to 40GHz



Shielding Effectiveness

Frequency	10kHz	100kHz	1MHz	10MHz	100MHz	1GHz
Minimum Shielding Effectiveness to meet MIL-STD-188-125	20dB	40dB	60dB	80dB	80dB	80dB
Typical Filter Shielding Effectiveness	100dB	100dB	100dB	100dB	100dB	100dB

Technical Specification

Rated Voltage	All Filters	250VAC 50/60Hz or 300VDC each line to case
	4 Line (TP&N) Filters	440/250VAC 50/60Hz
Note: 277VAC 50/60Hz and 480/277VAC 50/60Hz voltage ratings also available – see ordering codes		
Test Voltage		2250VDC each line to case (prior to fitting transient suppressors)
Rated Current		16A to 400A (each individual line, see range available)
Current Overload		10 x maximum rated current for 1 sec. 1.5 x max rated current for 10 minutes.
Bleeder/Discharge Resistors		Fitted internally from each line to case
Discharge time		30 seconds to below 34V
Max. Temperature Rise on Full Load		25°C
Temperature Range	Operating	-40°C to +50°C
	Storage	-40°C to +85°C
Peak Surge Current		70kA (8/20μs)
MTBF		>0.1 million hours (calculated using Mil Hdbk 217F)

Transient Suppression Performance

All the filters in this catalogue have passed acceptance pulse current injection (PCI) tests for the short (E1) and intermediate (E2) pulses by an independent test laboratory in accordance with MIL-STD-188-125 and DEF STAN 59-188.

MIL-STD-188-125-1&-2 acceptance test, short pulse current injection (E1), wave shape 20/500ns					
Input pulse amplitude	250A	500A	1kA	1.8kA	2.5kA
MIL-STD-188-125 residual current (let-through) requirement	<10A	<10A	<10A	<10A	<10A
Typical filter residual current (let-through)	<1.5A	<2A	<3A	<3.5A	<4.5A

MIL-STD-188-125-1&-2 acceptance test, intermediate pulse current injection (E2), 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

Range Available

Rated Current (A)	Part Number	DC Resistance (mΩ)	Earth Leakage* (A)	Major Dimensions			Terminal Size	Approx. Weight (kg)
				Length A (mm)	Width B (mm)	Height C (mm)		
2-Line (SP&N)								
16	DS33631	35	1.5	600	200	120	M5	15
32	DS33632	15	2.5	780	250	120	M8	25
63	DS33633	10	2.5	950	320	170	M8	45
100	DS33634	5	2.5	1100	350	230	M8	70
200	DS33635	2	5	1220	450	250	M12	110
400	DS33636	0.5	6	1900	480	250	M20	190

4-Line (TP&N)								
16	DS33641	38	3	600	400	120	M5	30
32	DS33642	18	5	780	500	120	M8	45
63	DS33643	10	5	950	640	170	M8	85
100	DS33644	5	7	1100	700	230	M8	120
200	DS33645	2	8	1220	900	250	M12	170
400	DS33646	0.5	10	1900	960	250	M20	300

Earth Leakage

*Measurement taken from phase line to earth at 250V 50Hz.

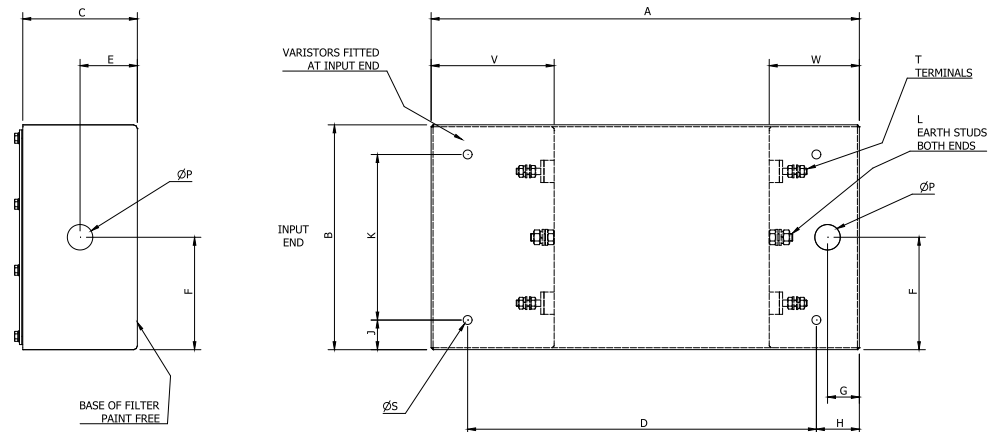
Important, all filters in this catalogue can NOT be protected by a standard 30mA residual circuit breaker (RCCB). However, a RCCB protection device can be placed down line / load side of filter (see application note).

Mechanical Details

Electrical Fixing	Brass spindles (electroless bright nickel plated)
Enclosure Material	Mild steel (electroplated dull tin plated)
Finish	Gloss epoxy paint to DEF-STAN 80-161
Colour	Light admiralty grey BS 381C 697
Enclosure Rating	IP 54
Potting Compound Flammability Rating	UL 94 V-0

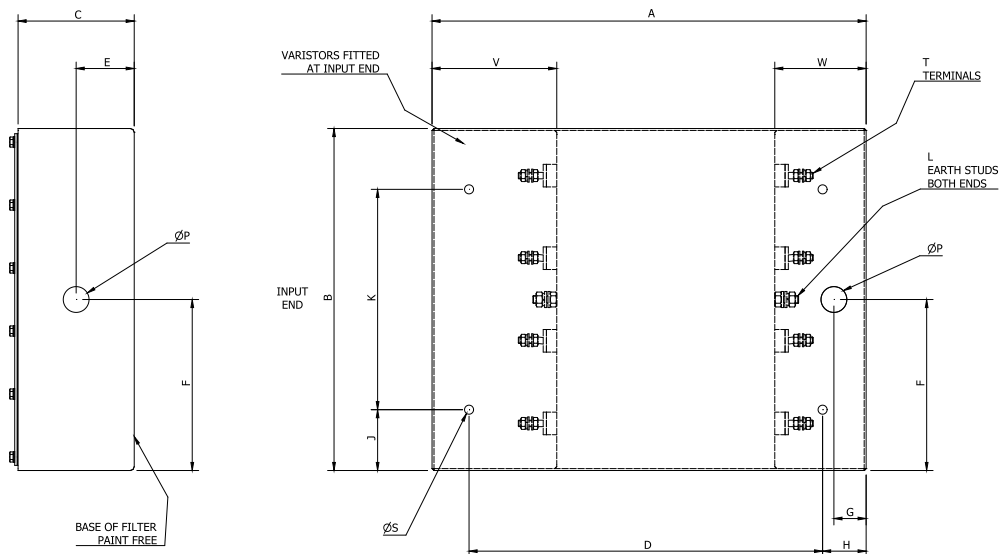
Full Dimensions

2 Line



Part No.	A	B	C	D	E	F	G	J	K	L	P	S	T	V	W
DS33631	600	200	120	520	60	100	40	45	110	M6	20	9	M5	140	80
DS33632	780	250	120	690	60	125	45	55	140	M10	25	9	M8	160	100
DS33633	950	320	170	860	85	160	45	55	210	M10	32	11	M8	160	100
DS33634	1100	350	230	990	115	175	55	55	240	M10	32	11	M8	160	120
DS33635	1220	450	250	1070	125	225	75	75	300	M16	50	17	M12	200	150
DS33636	1900	480	250	1440	125	240	230	70	340	M20	75	17	M20	300	300

4 Line



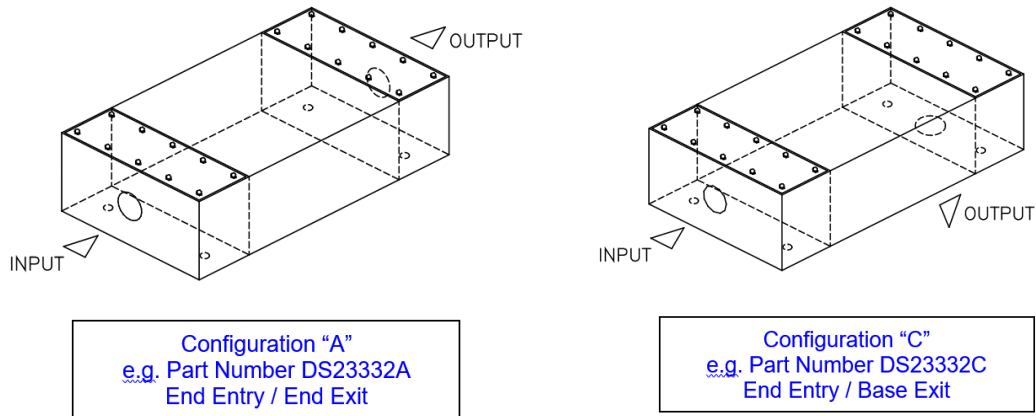
Part No.	A	B	C	D	E	F	G	J	K	L	P	S	T	V	W
DS33641	600	400	120	520	60	200	40	45	310	M6	20	9	M5	140	80
DS33642	780	500	120	690	60	250	45	55	390	M10	25	9	M8	160	100
DS33643	950	640	170	860	85	320	45	55	530	M10	32	11	M8	160	100
DS33644	1100	700	230	990	115	350	55	55	590	M10	32	11	M8	160	120
DS33645	1220	900	250	1070	125	450	75	75	750	M16	50	17	M12	200	150
DS33646	1900	960	250	1440	125	480	230	180	600	M20	75	17	M20	300	300

*Note: 400A filters DS33336 and DS33346 have additional lifting lugs protruding 65mm beyond each end of the filter and 8mm beyond each side to aid with mounting. Lug hole size 22mm. Please request drawings P828602 or P828362 respectively for full dimensions.

Cable Entry Options

Rectangular case style filters can be supplied with different cable entry hole positions to suit alternative mounting arrangements. The cable entry option can be identified by the suffix in the part number. See the illustrations below showing the standard cable entry positions.

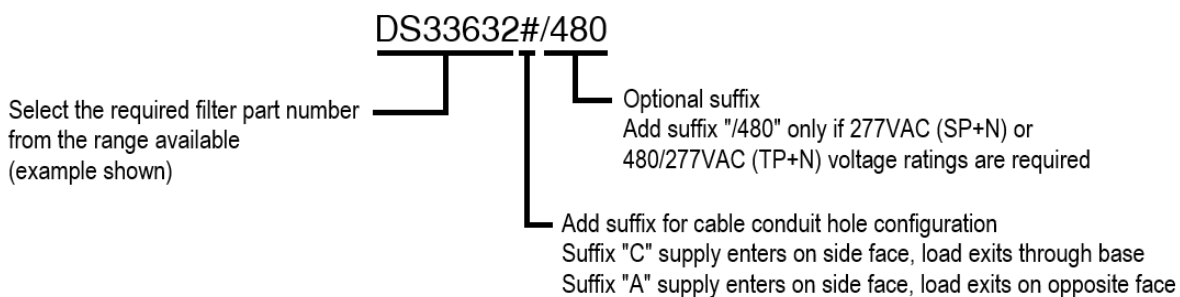
For alternative cable entry options as well as un-pierced boxes please contact sales@mpe.co.uk



Ordering Codes

The ordering code consists of the filter part number and the cable entry hole position suffix.

If 277VAC (SP+N) or 480/277VAC (TP+N) voltage ratings are required a secondary /480 suffix is added to the ordering code.





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BULKHEAD PENETRATION KITS

Optional bulkhead penetration kits can be provided for filters up to 400A. The tube thread size should be chosen to match the pre-pierced end compartment conduit holes.

These high quality bulkhead penetration kits have been designed to provide an RFI tight bulkhead penetration for cables to facilitate fixing of rectangular filters to bulkheads or walls of shielded enclosures. They make it easier to achieve a full RFI seal between filter case and bulkhead up to the highest frequencies, which is not usually achievable with standard electrical conduit fittings due to badly fitting threads.

The bulkhead penetration kits can be used with a bulkhead thickness up to 20mm. They comprise a penetration tube complete with nuts, heavy duty washers, RF gaskets, and end bushes for cable protection. The main components are made from electroplated steel and the RF gaskets are made from copper sheet.

Part Number (Kits for use with Bulkhead Thickness of up to 20mm)	Cable Entry Hole Diameter (mm)	Conduit Thread Size
30/807147	20	M20
30/807148	25	M25
30/807149	32	M32
30/807150	40	M40
30/807151	50	M50
30/807152	63	M63
30/807153	75	M75



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FIXING SCREW KITS

Optional fixing screw kits can be provided for filter sizes up to 400A. The screw thread size should be chosen to match the pre-pierced end compartment fixing holes.

Fixing screw kits enable the filter to be securely fastened to the mounting surface. They can be used with a mounting surface thickness up to 20mm. They comprise a set of four screws each with washers, spring washers, nuts and lock nuts and are all made from electroplated steel with the exception of the spring washers which are stainless steel.

Part Number (Kits for use with Mounting Surface Thickness of up to 20mm)	Fixing Hole Diameter (mm)	Screw Thread Size
30/806951	6	M5
30/806952	7	M6
30/806953	9	M8
30/806954	11	M10
30/806955	13	M12
30/806956	17	M16
30/806957	21	M20





RECOMMENDED TORQUE TIGHTENING FIGURES

Always use two spanners when tightening terminal, earth stud and mounting screw fasteners.

Fixing Type	Size	Recommended Tightening Torque (N-m)
Access Lid Screws	M5	1
Terminals, Earth Studs & Mounting Screws	M5	2
	M6	2.5
	M8	5
	M10	8
	M12	11
	M16	20
	M20	32



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MPE have designed and manufactured EMC solutions in the UK for over 95 years and have a proud reputation as one of the world's leading capacitor and filter specialists.

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MPE's unrivalled capability and experience of many defence, telecoms, industrial and commercial applications enables MPE to supply capacitors and filters to satisfy the most exacting customer requirements from military vehicles, IT servers and telecoms base stations to EMP, NEMP, LEMP, HEMP and TEMPEST commercial and military installations.

MPE's comprehensive standard product range includes high performance feedthrough capacitors to high current power, telephone, data and control line filters with wide frequency spectrum characteristics in a choice of enclosure styles:

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-  Control Line Filters
-  Data Line Filters
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-  Feedthrough Capacitors & Filters
-  High Voltage DC Power Line Filters – 1500VDC
-  HEMP Control Line Filters
-  HEMP Public Address Filters
-  HEMP Power Line Filters
-  HEMP Power Line Filters – Modular Option
-  HEMP Telephone Line Filters
-  Low Leakage TEMPEST EMI Filters
-  Military Vehicle Filters
-  Power Line Filters
-  Specialist EMI Power Line Filters
-  Telephone Line Filters
-  TEMPEST Pluggable EURO Filters
-  TEMPEST Pluggable UK Filters
-  Ultra Low Leakage Power Line Filters

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