



HEMP & IEMI PROTECTION FILTERS FOR TELEPHONE LINES TO MIL-STD-188-125-1 & -2 & DEF STAN 59-188-1 & -2



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



FM00699



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Description

A range of multi-line HEMP protection filters for Telephone lines suitable for use in various HEMP protected installations. All lines are individually filtered and feature inductive input to offer both good continuous wave EMC performance and superior transient handling performance. All lines feature high-energy varistor transient suppressors at the input end. Rated at 95VAC 125mA, to meet the PCI requirements of MIL-STD -188-125-1 & -2 for Audio/Data lines for short pulse (E1) only.

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

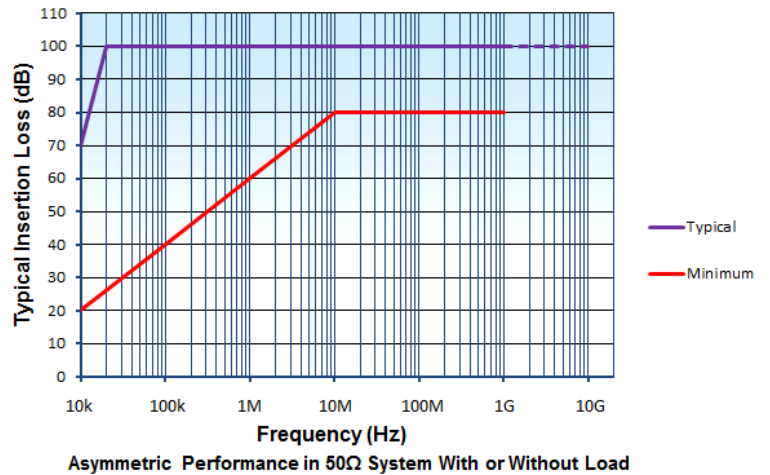


Features

- Range for low voltage telephone lines (95VAC @ 125mA)
- 2, 4, 8, 32 & 100 line versions available
- For 300Ω/600Ω analogue telephone circuits
- Circuits supplied as high symmetry matched pairs
- Individually filtered lines
- Utilises self-healing feedthrough capacitors
- UL 94 V-0 insulating materials
- RoHS compliant
- CE and UKCA compliant

Insertion Loss Performance

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



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	95VAC/125VDC
Rated Current	125mA
Test Voltage (each line to case)*	1250VDC (each line to case)
Insulation Resistance*	>100MΩ (Prior to fitting transient suppressors)
DC Resistance	9Ω
Impedance line-earth / line to line	300Ω/600Ω
Full Load Operating Temperature Range	-40°C to +50°C
Peak Surge Current	6.5kA 8/20μs
Insertion Loss in 50Ω system	See graph
Pass Band (300Ω)	0 – 4kHz

* test voltage and insulation resistance prior to fitting transient suppressors and discharge resistors

Transient Suppression Performance

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

MIL STD 188-125-1 acceptance test, E1 short pulse current injection, wave shape 20/500ns Input pulse current injections of 250A, 500A, 1000A, 1800A, 2500A and 3535A through a 50 ohm load. NB Peak applied current for N lines wire to ground is $5000/\sqrt{N}$ or 500A whichever is greater		
Norm	Limit	Typical Response
Peak Residual Current	100mA	<60mA
Peak Rate of Rise (di/dt)	1×10^7 A/s	< 7×10^2 A/s
Root Action	1.6×10^{-3} A/s	< 1.3×10^{-3} A/s

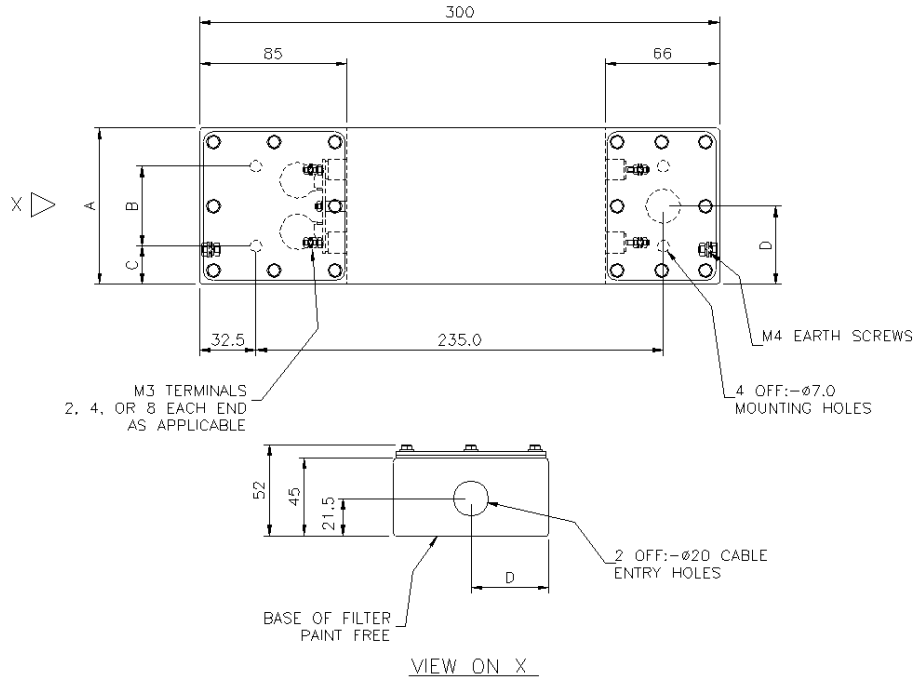
Product Range

Part Number	Number of Lines *	Major Dimensions (mm)			Weight Approx (kg)
		Length	Width	Depth	
DS33570	2	300	90	45	2
DS33571	4	300	175	45	4
DS33572	8	300	340	45	8
DS33573	32	547	200	143	17
DS33575	100	730	600	250	60

* Note: Lines are supplied as matched pairs, hence 1 telephone circuit = 1 matched pair = 2 lines



Dimensions and Mechanical Details (2 – 8 Line versions)



No of Lines	Dimensions (mm)			
	A	B	C	D
2	90	46	22	45
4	175	100	37.5	87.5
8	340	250	45	170

Case material

Finish

Colour

Terminals

Enclosure Rating

Potting Compound Flammability

Cable entry options

Fixing kit

Electroplated steel

Gloss epoxy paint to DEF-STAN 80-161 (except base)

Light admiralty grey BS 381C 697

M3 screw terminals

IP54

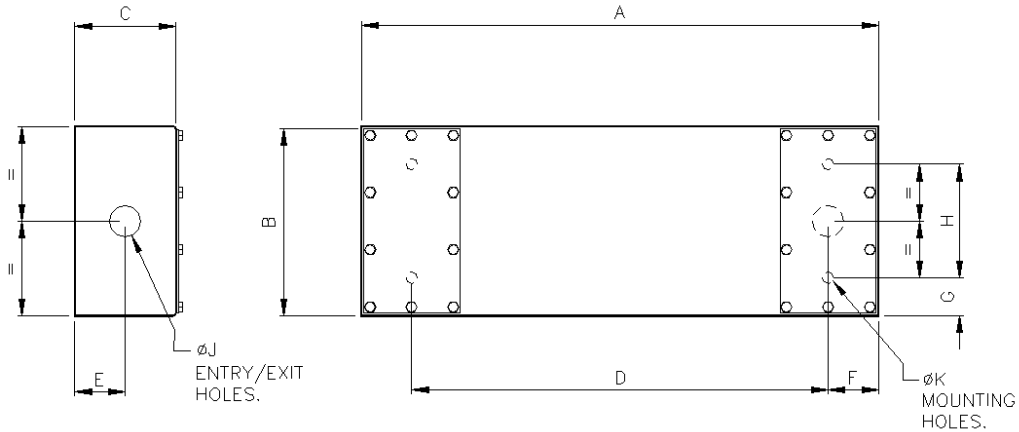
UL 94 V-0

See below

Penetration tube plus fixing screws - Optional extra – see below



Dimensions and Mechanical Details (32 line version)

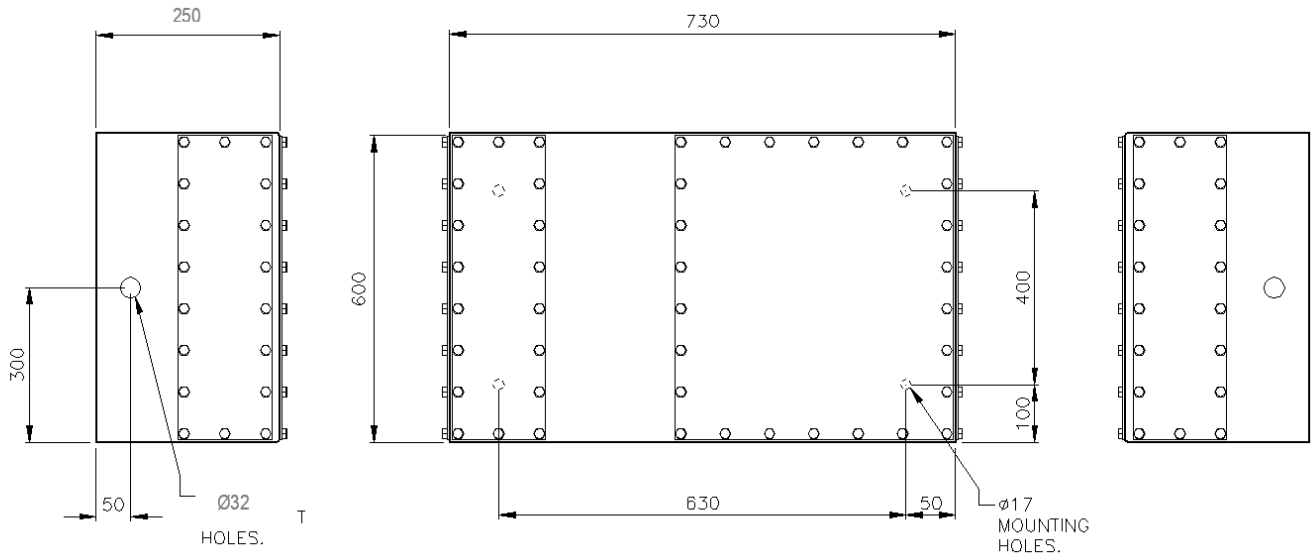


No of Lines	Dimensions (mm)									
	A	B	C	D	E	F	G	H	J	K
32	547	200	143	460	30	40	40	120	25.4	7

Case material	Electroplated steel
Finish	Gloss epoxy paint to DEF-STAN 80-161 (except base)
Colour	Light admiralty grey BS 381C 697
Terminals	M3 screw terminals
Enclosure Rating	IP54
Potting Compound Flammability	UL 94 V-0
Cable entry options	See below
Fixing kit	Penetration tube plus fixing screws - Optional extra – see below



Dimensions and Mechanical Details (100 line version)



Case material
Finish
Colour
Terminals
Enclosure Rating
Potting Compound Flammability
Cable entry options
Fixing kit

Electroplated steel
Gloss epoxy paint to DEF-STAN 80-161 (except base)
Light admiralty grey BS 381C 697
M3 screw terminals
IP54
UL 94 V-0
See below
Penetration tube plus fixing screws - Optional extra – see below



Installation Details

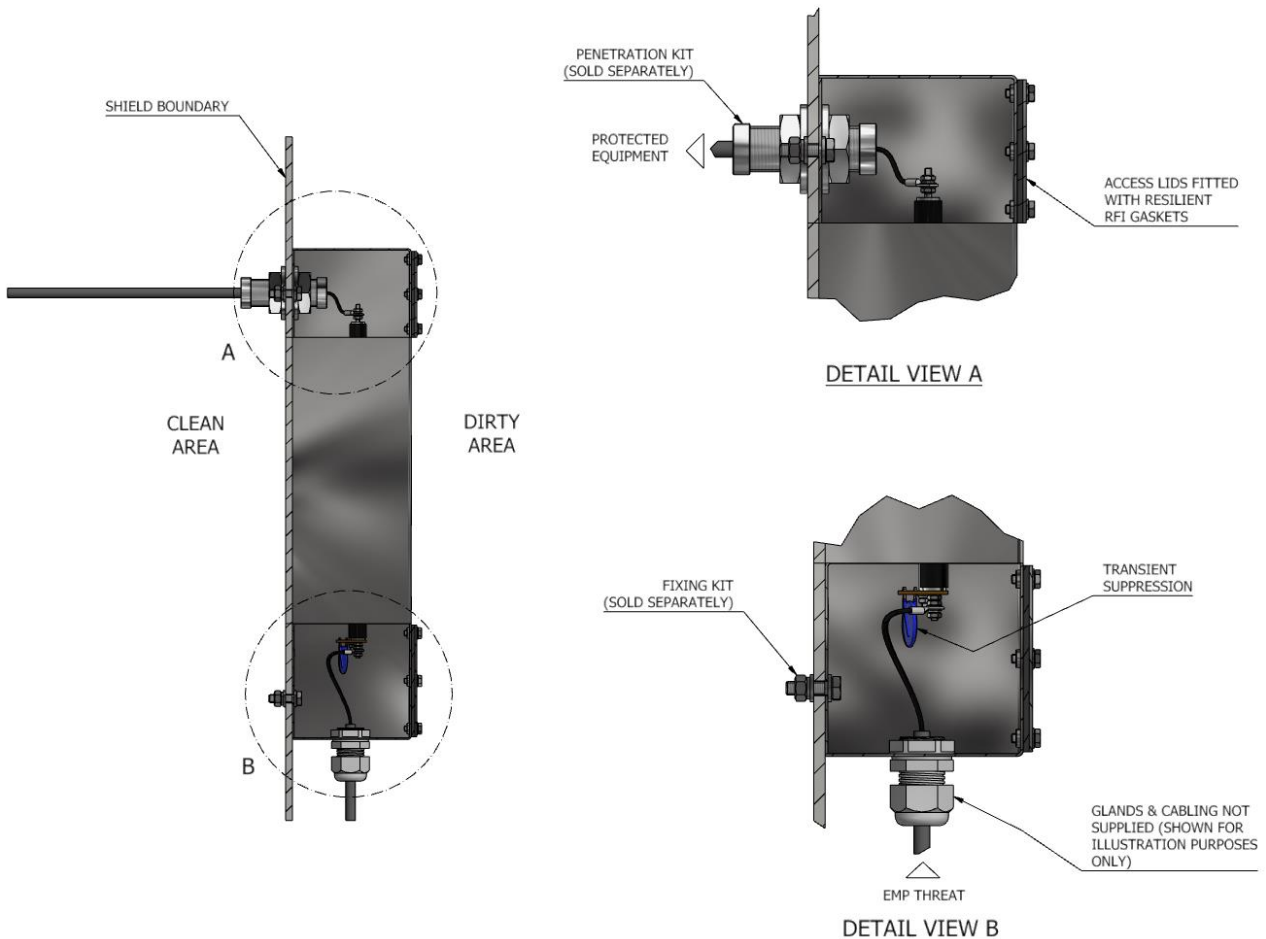
It is recommended that filters be mounted on a steel surface, which has been electroplated with tin or zinc. The mounting surface should be clean, flat and unpainted to ensure a low impedance bond to earth and good RF seal. This type of large area connection to the box ensures that at high frequencies, inductive and capacitive values are minimal, allowing a clear path to ground potential.

The filters are housed in a robust rectangular tin-plated steel case. To maintain shielding effectiveness, the enclosure is supplied complete with access lids, screws and EMI/environmental lid gaskets. The filters are not supplied with fixing hardware or bulkhead penetration tubes (can be purchased separately).

All HEMP & IEMI Telephone filters are supplied with integrated transient suppression at the EMP INPUT of the filter. Leaded style metal oxide varistors (MOVs) are installed between each line and earth (the case) in the input wiring compartment. The design ensures these protection devices do not interfere with the filter wiring or mounting as much as possible, whilst still being accessible for servicing and in the event of failure, replacement. A good electrical connection is made by mounting the varistors on PCBs with short connections between the varistor and each terminal or the case. It is imperative that the filter is installed with the transient suppressor at the EMP INPUT of the filter facing the incoming EMP threat.

Fixing Type	Recommended Tightening Torque (N-m)
M3 Terminals	0.5
M4 Access Lid Screws	1

Typical Installation





Earth Bonding for Safety

The installer must ensure the filter is permanently and solidly earthed both for safe operation and to achieve optimum EMC and pulse performance. 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.

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 the particular installation.

Discharging after Isolation

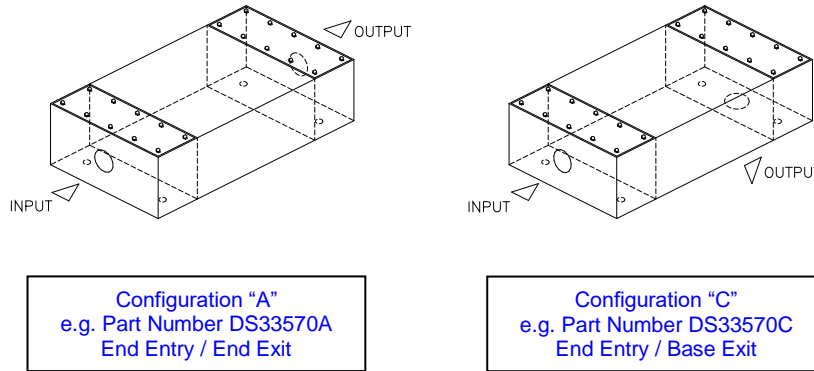
All filters in this catalogue contain large values of capacitance. These capacitors can store a hazardous electrical charge long after the power has been removed. Therefore as a safety measure, all filters need the stored voltage to become a safe level after removal of the power, terminals should always be shorted to earth prior to touching to ensure the capacitors are fully discharged.

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.



Cable Entry Options

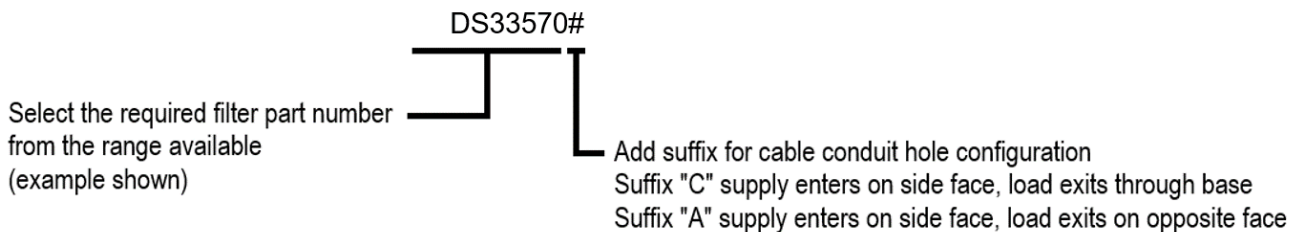
Two different cable entry options are available as shown below. The most common configuration for mounting on shielded rooms is "C" i.e. end entry and exit through the base.



Ordering Codes

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

- Step 1** Choose the number of lines required
- Step 2** Select part number from the product range tables
- Step 3** Add preferred cable entry suffix A or C





Bulkhead Penetration Kits

Optional bulkhead penetration kits can be provided for HEMP control line filters. Filter enclosures in this range have a pierced hole in the OUTPUT end compartment for passing cables through the bulkhead.

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	20.5	M20
30/807148	25.5	M25
30/807149	32.5	M32



Fixing Screw Kits

Optional fixing screw kits can be provided for HEMP control line filters. All filter enclosures in this range have 7mm diameter pierced holes in the base of the enclosure for mounting with M6 fasteners.

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
30/806952	7	M6
30/806956	17	M16





MPE
Quality, Reliability, Performance

OTHER PRODUCTS FROM MPE

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.

With a proven heritage of design, development and manufacture of high performance capacitors and filters, MPE are the first choice for companies who require the most cost effective EMC solution, quality products and technical support.

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:

- 🔍 Audio, Public Address & Building Management Services Filters
- 🔍 Control Line Filters
- 🔍 Data Line Filters
- 🔍 Equipment Filters
- 🔍 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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