Rasmi Electronics Ltd.
EMC / RFI Filters

General Purpose Filters
VFD Specific Footprint, Book and Block Style Filters
Harmonic and Power Factor Improvement Filters
Motor Protection Filters

Footprint
style filters

Book
style filters

Block
style filters

EFFICIENT EMC SOLUTIONS
www.rasmi.com

ISO 9001 Quality Management Systems CERTIFIED

RASMI 50 YEARS ELECTRONICS

ISO 14001 ENVIRONMENTAL MANAGEMENT

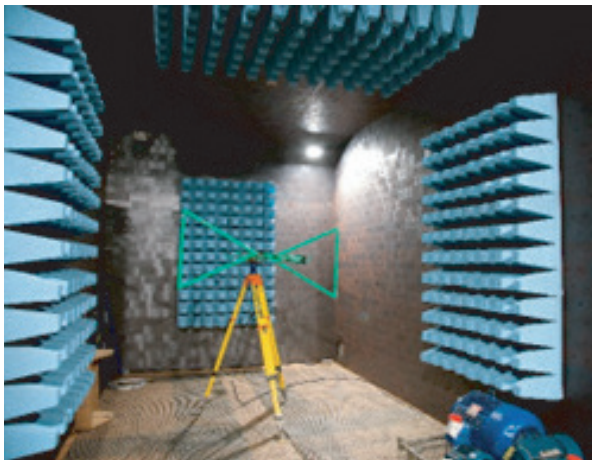
ISO 45001 HEALTH & SAFETY MANAGEMENT

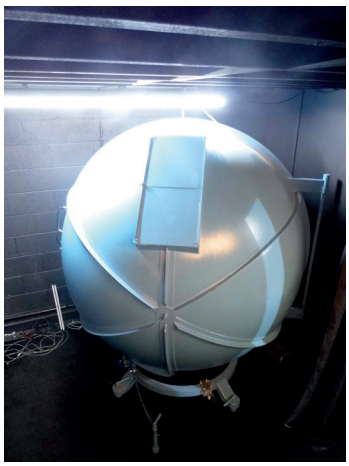
MADE IN THE UK

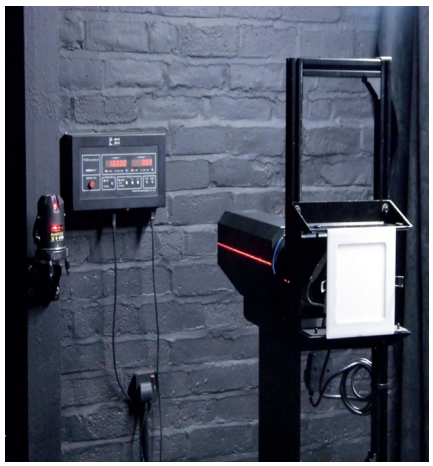
CONTENTS

Celebrating 50 years of British Manufacturing Excellence

In 2024 Rasmi proudly celebrates 50 years of quality British Manufacturing. The company was officially incorporated in July 1974 for the purpose of designing and manufacturing EMC and harmonic filters and other electronic components for the automation industry







Rasmi provides comprehensive in-house EMC (electromagnetic compatibility) solutions and serves as a reliable partner for global OEMs in several diverse industries.
To date Rasmi has manufactured more than 10 million EMC products and exported them to customers in over 90 countries around the world. Most of these high-quality items are still in good working order today.
Our customer base now includes some of the world's top automation companies such as Siemens, Telemechanique, ABB, Yaskawa, Schneider, Hitachi and Omron.

During our five decades in business, Rasmi has also been involved in the lighting business. Between 1985 and 1995, Rasmi was the largest European producer of toroidal halogen transformers for 12v lighting systems, producing over 10,000 pieces per month.
From 1995 to date, Rasmi LED lighting business started and has grown rapidly. Rasmi are now pround to be one of the leading LED lighting system designers and manufacturers in the world.

50
1974 - 2024

Company Milestones

1974: Established in Stanley, Co. Durham Rasmi Electronics Ltd started manufacturing EMC and harmonic filters.

1985: Manufacturing of low-voltage halogen lighting systems began.

2002: LED design and manufacture began.

2004: Opened LED lighting design and manufacturing factory in Shenzhen, China.

2010: Rasmi Global LLC opened in Dubai, UAE for project fulfilment in the Gulf region.

2021: OEM partnership started with LED driver company AGT in Shenzhen, China.

2022: OEM partnership with iShineLux company in Dongguan, China for street light and outdoor lighting products.

2023: Manufacturing factory opened in Dubai, UAE.

2024: The Rasmi Group celebrates 50 years of British manufacturing.

Introduction to EMC filters

Rasmi Electronics is a leading manufacturer in the field of EMC RFI filters, specializing in the design and production of high-quality filters that are essential for ensuring electromagnetic compatibility in electronic and electrical systems. With a proven track record in the industry, Rasmi has established itself as a trusted and innovative provider of EMC solutions.

An Electromagnetic Compatibility (EMC) filter, also known as a noise filter or a line filter, is an electrical component used to reduce electromagnetic interference (EMI) and radio frequency interference (RFI) in electronic devices and electrical systems. EMC filters are crucial for ensuring that electronic equipment complies with regulatory standards and functions properly without causing or suffering from electromagnetic interference.

Filter Construction Notes

Design of the internal circuit layout and consistency in manufacture thereafter are critical in an EMC filter.
The layout should be as linear as possible with little or no crossing of “clean” and “noisy” parts of the circuit.
Consistency is important to ensure matching attenuation performance for all filters of a type.
Alterations in conductor lengths or positions can add undesired capacitance or inductance, affecting the filter’s response.

Design and Test Criteria

Generally with motor drive systems, the emission levels are greatly affected by the length of the cable between the drive itself and the motor - longer cables will cause considerably higher conducted and radiated emissions. Without a filter, conducted emissions can exceed levels of 120dB which can easily disrupt nearby or neighbouring equipment. This is why correct filtering is very important.

The inverter / filter combinations here have been designed and tested to achieve compliance to EN 61800-3:1996 and 2004.
Category C1 for drives with <25A input current, when fitted with up to 25m motor output cable
Category C2 for drives with >25A input current or when fitted with up to 50m motor output cable.

Earth Leakage Measurements

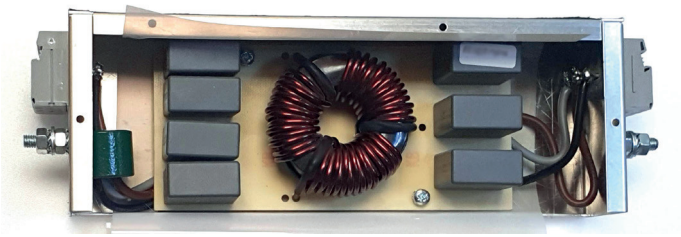
In single phase applications the earth leakage current is present all of the time.
For three phase applications under normal conditions with the three phases balanced, earth leakage currents are extremely small - the max values stated are worst possible values such as would occur momentarily during switch on or failure of one or two phases.

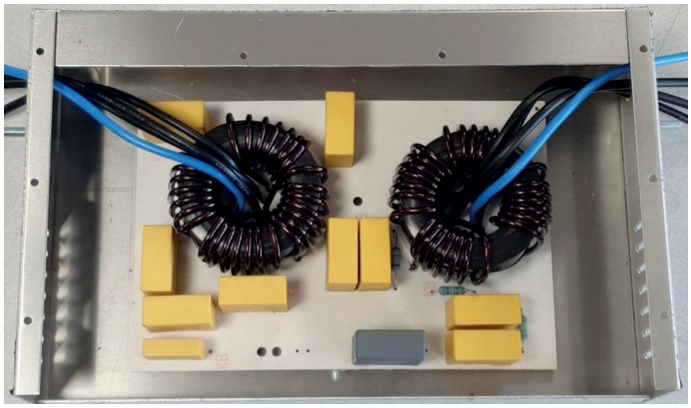
Use of Filters with 200V Three Phase Inverters

These filter ranges may also be used with 200V three phase inverters, but care should be taken in the filter selection. The equivalent 200V model of an inverter will require approximately twice the current of the 400V model. For example, the 3G3FV PFI 4012-E filter is suitable for the 3G3FV A2015 drive, but not the 3G3FV A2037, even though the latter will fit. Running a filter on under-voltage is perfectly acceptable, but running at over-current for any extended period is not advisable.

Rasmi Filter Construction

The use of a Printed Circuit Board to hold inductors and coils in controlled positions ensures consistent, predictable performance.
A single part metal case gives a low impedance earth path between line and load sides of the filter, so no internal earth conductor is needed.





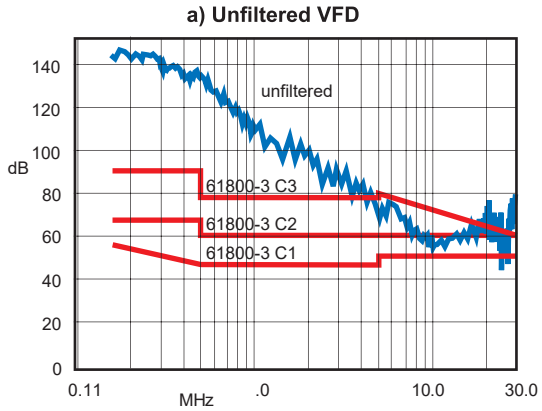
Filtering VFDs

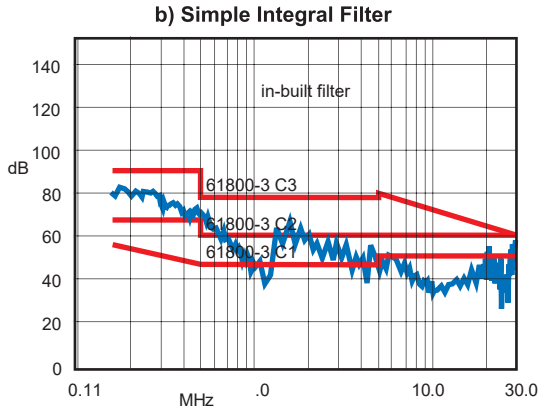
Variable Frequency Drives (VFDs) are known to cause extremely high levels of RF noise due to high frequency switching of IGBT semiconductors. These high-frequency noise components can radiate through power cables, motor windings, and the surrounding environment, leading to EMC issues. This RF noise can disrupt the operation of nearby sensitive electronic equipment, communication systems, and control circuits, necessitating robust EMC mitigation strategies, including shielding, filtering, and proper grounding techniques to ensure compliance with EMC standards.

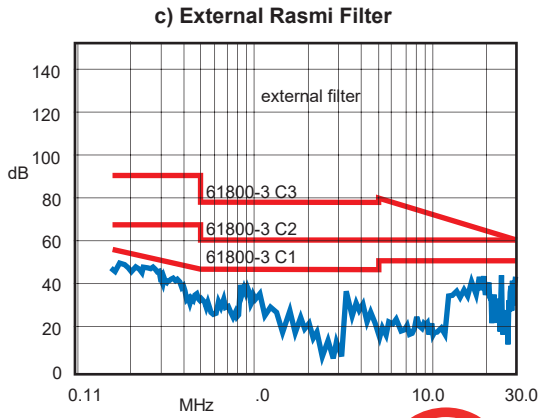
Today, many Variable Frequency Drive manufacturers include a very simple “filter” circut inside the drives, often switched in or out by a link terminal. These integral filters are generally capable of only industrial level performance and with very short motor cables, less than 10m.

Rasmi customer specific footprint and book style filters can meet domestic Class B limits with motor cables around 25m in length.

To the right are example trace graphs showing:-
a) Typical conducted RF noise from an unfiltered VFD.
b) Typical emissions from a VFD using only its integral filter.
c) Typical emissions using a matched, Rasmi drive specific filter, giving a much improved result of significantly reduced conducted noise.







AC, DC and servo motor and are now established as the most flexible means of controlling motors in virtually all mechanical equipment. However, they are a significant source of RF interference.

Recent European legislation on EMC imposes limits on RF emissions from such equipment. The DLC range of power line filters has been specifically developed for use with these drives, enabling systems incorporating them to meet the European RFI emissions standards for domestic or industrial use.

The example emission graphs in this brochure represent actual results measured by a competent body on drive equipment using Rasmi filters. These results ensured that Rasmi's customer gained the EMC certificate and was therefore able to mark the products.

The range comprises three types of filter in various sizes up to 170A current capacity. Although these filters are intended for use with motor drives, their high performance makes them effective in suppressing high RF emissions in virtually any installation.

- **RF 1xxx DLC Series - single phase power line filters**
- **RF 3xxx DLC Series - three phase power line filters**
- **RF 4xxx DLC Series - three phase plus neutral power line filters**

All filters are constructed with approved components:- self healing X and Y capacitors approved to VDE, SEMKO, NEMKO and UL are used and all assemblies are encapsulated in aluminium cases with resin approved to UL 94-V0 flammability class. Input and output connections are made by shrouded terminals.

APPLICABLE EMC STANDARDS

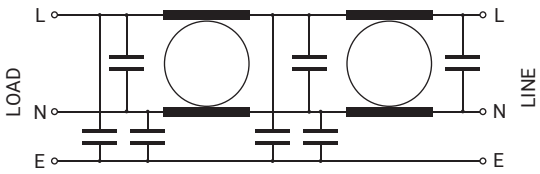
Generic Standard covered	Referenced or comparable basic/product standard	Aspects
EN50081-1	EN55022 class B EN55011 group1 class B EN55014 (conducted emission only) IEC555-2 (household apparatus only)	Conducted & radiated emission Power harmonics
EN50081-2	EN55022 class A EN55011 group 1 class A	Conducted and radiated emission
EN50082-1	IEC801-2 IEC801-3 IEC801-4	Electrostatic discharge immunity RF field immunity Fast transient burst immunity
EN50082-2	ENV50140 (similar to IEC801-3) ENV50204 EN61000-4-8 EN61000-4-2 (similar to IEC801-2) ENV50141 (similar to IEC801-6) EN61000-4-4 (similar to IEC801-4)	RF field immunity RF field immunity (pulse modulation) 50Hz field immunity Electrostatic field immunity Conducted RF immunity Fast transient burst immunity

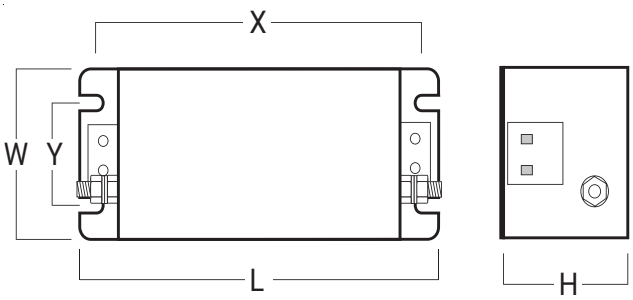
Single Phase - (Rated Voltage: Line - Line 440 - 520V, 50-60Hz @ 40°C)

Filter Part No.	Rated Current @ 40°C	Leakage Current @ 240V 50Hz	Power Loss (W)	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)			Weight (kg)
						L	W	H	X	Y	ØM	
RF 1010-DLC	10A	3.2mA	3.8	0-6	M5	150	55	45	140	36	M4	0.4
RF 1015-DLC	16A	3.2mA	6.5	0-6	M5	150	55	45	140	36	M4	0.5
RF 1020-DLC	20A	3.2mA	10	0-10	M5	170	80	55	160	46	M5	0.9
RF 1035-DLC	35A	3.2mA	15	0-10	M5	170	80	55	160	46	M5	1.0

SINGLE PHASE

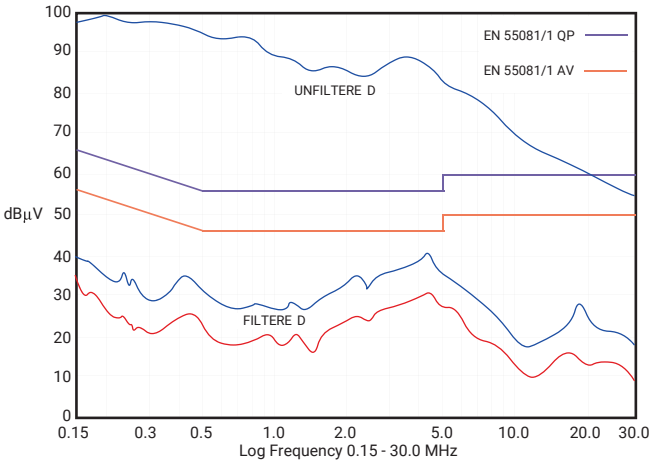
Circuit Schematic

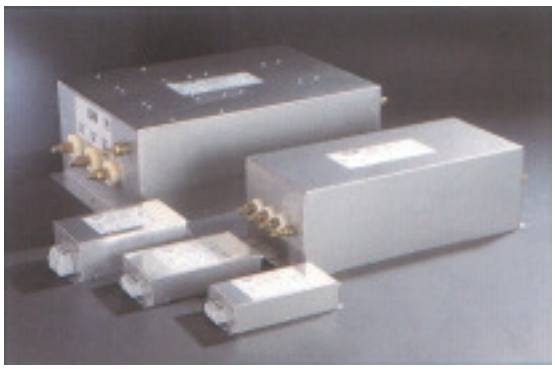




Performance

The graph opposite shows typical improvements in conducted emissions achieved from the fitting of an RF 1035-DLC filter to a 3.7kW, single phase AC Inverter running a 3.7kW motor with 25m screened motor cable.



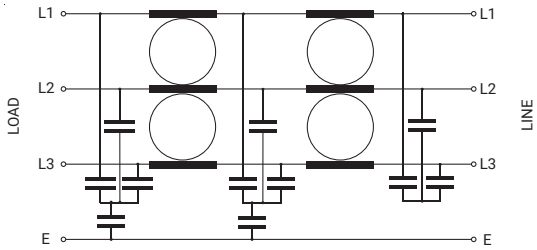


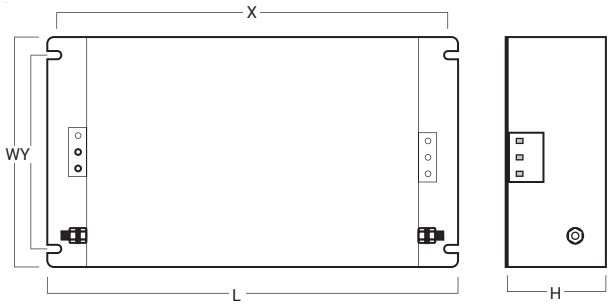
Three Phase (Rated Voltage: Line - Line 440 - 520V, 50-60Hz @ 40°C)

Filter Part No.	Rated Current @ 40°C	Leakage Current Nom - Max	Power Loss (W)	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)			Weight (kg)
						L	W	H	X	Y	ØM	
RF 3006-DLC	6A	0.5 - 27mA	8	0-6	M5	250	110	60	238	76	M6	1.5
RF 3012-DLC	12A	0.5 - 27mA	10	0-6	M5	250	110	60	238	76	M6	1.5
RF 3020-DLC	20A	0.5 - 27mA	15	0-10	M5	270	140	60	258	106	M6	1.7
RF 3040-DLC	40A	0.5 - 27mA	30	0-10	M5	270	140	60	258	106	M6	1.8
RF 3060-DLC	60A	0.5 - 27mA	51	0-25	M5	270	140	90	258	106	M6	3.2
RF 3070-DLC	70A	0.5 - 27mA	44	0-25	M8	365	180	90	338	146	M6	4.9
RF 3100-DLC	100A	0.75 - 130mA	69	6-35	M8	435	200	130	408	166	M6	6.8
RF 3120-DLC	120A	0.75 - 130mA	45	6-35	M8	435	200	130	408	166	M6	6.8
RF 3170-DLC	170A	0.75 - 130mA	80	25 - 120	M10	495	200	160	468	166	M6	9.2

THREE PHASE

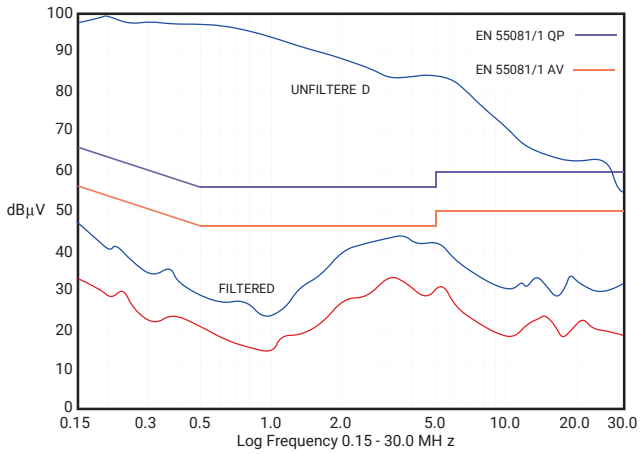
Circuit Schematic

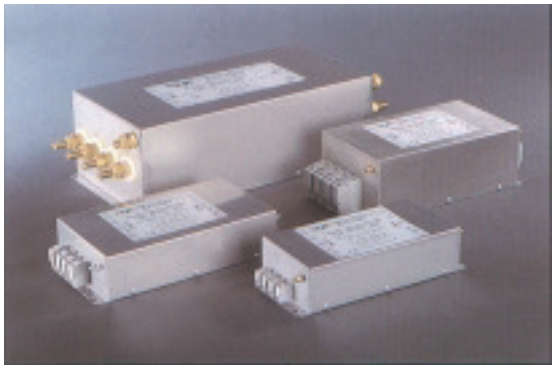




Performance

The graph opposite shows typical improvements in conducted emissions achieved from the fitting of an RF 3040-DLC filter to a 11kW, three phase AC Inverter running an 11kW motor with 25m screened motor cable.



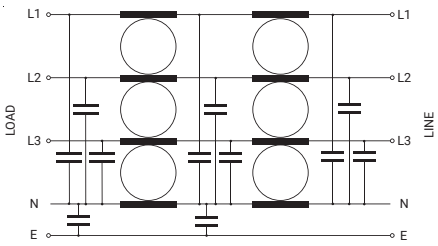


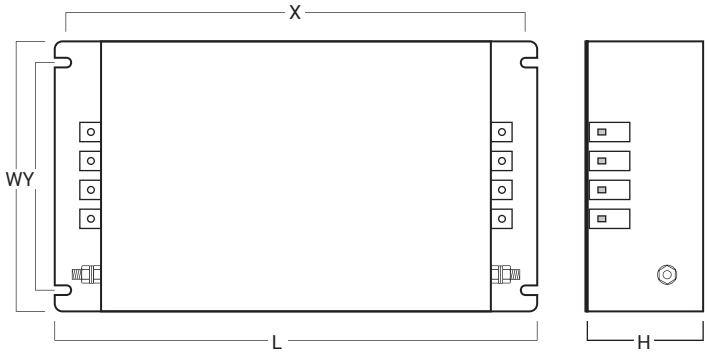
Three Phase + Neutral (Rated Voltage: Line - Line 440 - 520V, 50-60Hz @ 40°C)

Filter Part No.	Rated Current @ 40°C	Leakage Current Nom - Max	Power Loss (W)	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)			Weight (kg)
						L	W	H	X	Y	ØM	
RF 4006-DLC	6	0.1-27	8	0-6	M5	250	110	60	238	76	M6	1.7
RF 4012-DLC	12	0.1-27	10	0-6	M5	270	140	60	258	106	M6	1.9
RF 4020-DLC	20	0.1-27	13	0-6	M5	270	140	60	258	106	M6	1.9
RF 4040-DLC	40	0.1-27	28	0-10	M5	270	140	90	258	106	M6	2.6
RF 4060-DLC	60	0.1-27	47	0-25	M8	365	180	90	338	106	M6	5.1
RF 4070-DLC	70	0.1-27	44	0-25	M8	365	180	90	338	146	M6	5.1
RF 4100-DLC	100	0.5-130	53	6-35	M8	435	200	130	408	166	M6	6.8
RF 4120-DLC	120	0.5-130	55	6-35	M8	435	200	130	408	166	M6	6.8
RF 4170-DLC	170	0.5-130	71	25 - 120	M10	495	200	160	468	166	M6	10

THREE PHASE + NEUTRAL

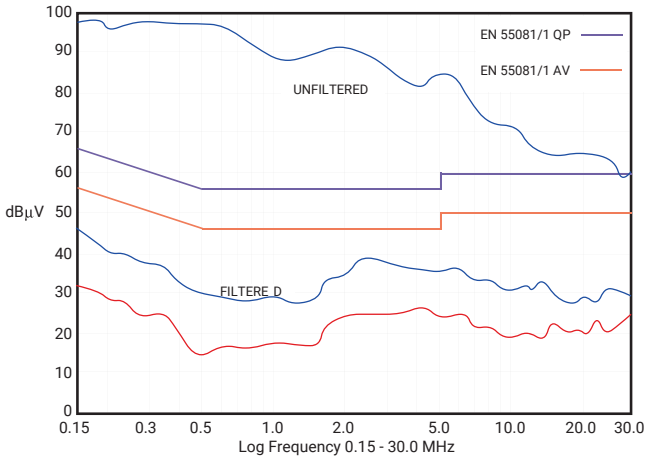
Circuit Schematic





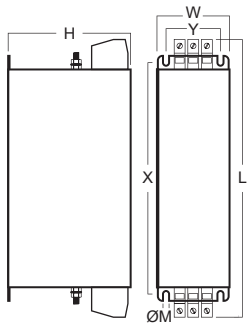
Performance

The graph opposite shows typical improvements in conducted emissions achieved from the fitting of an RF 4020-DLC filter to a 4kW three phase AC Inverter running a 4kW motor with 25m screened motor cable.



- The **MHU** range, for control panels.
- Help to ensure EMC compliance of machinery and installations using variable frequency drives.
- Book style filters take reduced panel space inside wiring cabinets.

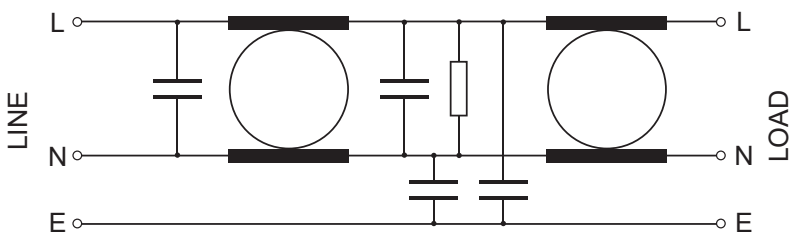
Book Type Dimensions



Max Rated Voltage 250 Vac, 50-60Hz

Filter Part No.	Rated Current	Leakage Current (mA) @ 250V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)			Weight
					L	W	H	X	Y	ØM	(kg)
RF 1010-MHU	10A	7.0	0 - 6	M5	160	50	109	146	30	M5	0.7
RF 1016-MHU	16A	7.0	0 - 6	M5	160	50	109	146	30	M5	0.8
RF 1025-MHU	25A	3.5	0 - 10	M5	239	60	122	225	40	M5	1.4
RF 1035-MHU	35A	3.5	0 - 10	M5	239	60	122	225	40	M5	1.7
RF 1052-MHU	52A	3.5	0 - 25	M6	306	60	152	272	40	M5	2.4

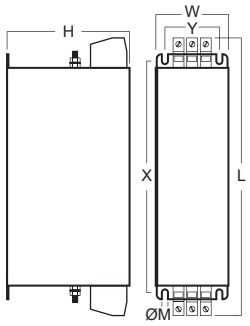
Typical Circuit Schematics



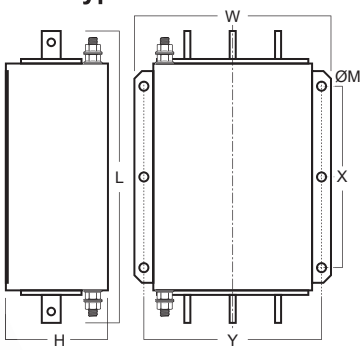
MHU - THREE PHASE AND NEUTRAL

- The **MHU** range, for panels with three phase and neutral supply.
- Help to ensure EMC compliance of machinery and installations.
- Book-style filters for reduced panel space, with shrouded terminals.
- Block-style filters for higher currents with busbar connections.

Book Type Dimensions



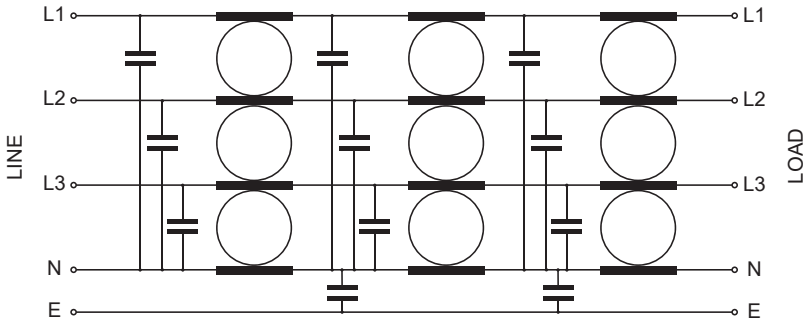
Block Type Dimensions



Max Rated Voltage 500(300) Vac, 50-60Hz

Filter Part No.	Rated Current	Leakage Current (mA)	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)			Weight
		Nom / Max			L	W	H	X	Y	ØM	(kg)
RF 4016-MHU	16A	0.01 - 16	0 - 6	M5	305	60	142	290	30	M6	2.0
RF 4030-MHU	30A	0.01 - 45	0 - 10	M5	311	70	172	290	40	M6	2.8
RF 4042-MHU	42A	0.01 - 45	0 - 10	M5	311	70	172	290	40	M6	2.8
RF 4055-MHU	55A	0.01 - 45	0 - 25	M6	385	80	172	330	50	M6	3.9
RF 4075-MHU	75A	0.01 - 50	6 - 35	M6	426	80	185	361	50	M6	5.3
RF 4100-MHU	100A	0.02 - 160	16 - 70	M8	436	90	220	363	65	M6	6.5
RF 4130-MHU	130A	0.02 - 160	25 - 120	M10	542	200	160	468	166	M6	9.0
RF 4180-MHU	180A	0.02 - 160	25 - 120	M10	542	200	160	468	166	M6	9.0
RF 4250-MHU	250A	0.02 - 160	25 x 5 Bar	M12	386	260	155	240	235	M10	17.0
RF 4400-MHU	400A	0.02 - 160	25 x 6 Bar	M12	386	260	155	240	235	M10	17.4
RF 4600-MHU	600A	0.02 - 160	30 x 8 Bar	M12	386	260	155	240	235	M10	18.2
RF 41K0-MHU	1000A	0.02 - 160	40 x 10 Bar	M12	486	280	180	290	255	M10	27.0

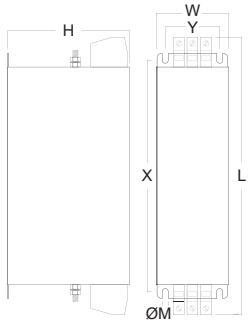
Typical Circuit Schematic



MHU - THREE PHASE

- The **MHU** range, for panels with three phase supply.
- Help to ensure EMC compliance of machinery and installations.
- Book-style filters with shrouded terminals.

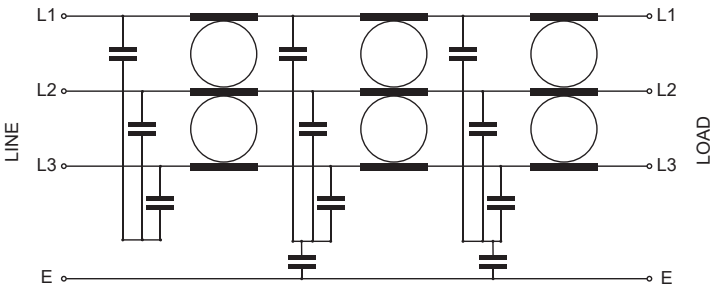
Book Type Dimensions



Max Rated Voltage 500(300) Vac, 50-60Hz

Filter Part No.	Rated Current	Leakage Current (mA) Nom / Max	Terminals (mm²)	Earth Stud	Case Dimensions (mm) L	W	H	Mounting (mm) X	Y	ØM	Weight (kg)
RF 3006-MHU	6A	0.2 - 14	0 - 6	M5	255	50	126	240	25	M6	0.7
RF 3010-MHU	10A	0.2 - 14	0 - 6	M5	255	50	126	240	25	M6	0.8
RF 3016-MHU	16A	0.2 - 14	0 - 10	M5	305	60	160	290	30	M6	1.4
RF 3025-MHU	25A	0.2 - 14	0 - 10	M5	305	60	160	290	30	M6	2.4
RF 3040-MHU	40A	0.3 - 40	0 - 25	M6	329	70	190	314	45	M6	3.2
RF 3050-MHU	50A	0.3 - 40	0 - 25	M6	329	70	190	314	45	M6	3.4
RF 3070-MHU	70A	0.7 - 70	6 - 35	M6	329	80	220	314	55	M6	5.3
RF 3100-MHU	100A	0.7 - 70	16 - 70	M8	379	90	220	364	65	M6	5.6
RF 3130-MHU	130A	1.3 - 130	25 - 120	M10	429	110	240	414	80	M6	7.1
RF 3180-MHU	180A	1.3 - 130	25 - 120	M10	426	110	240	414	90	M6	7.5

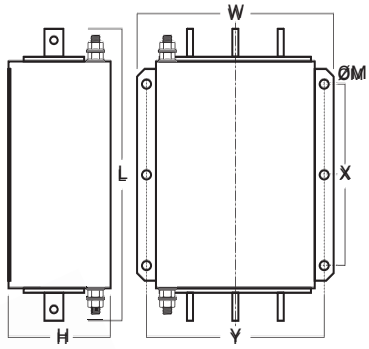
Typical Circuit Schematic



MHU - THREE PHASE

- The **MHU** range, for panels with three phase supply.
- Help to ensure EMC compliance of machinery and installations.
- Block-style filters with busbar connections.

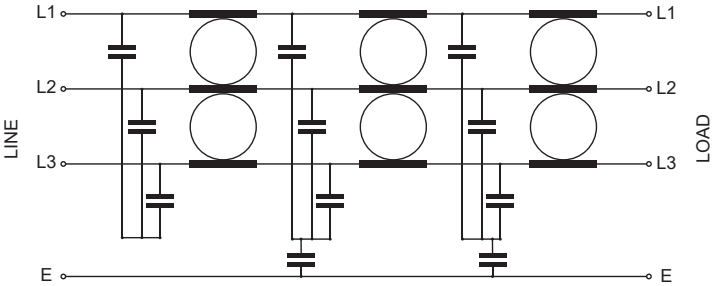
Block Type Dimensions



Max Rated Voltage 500(300) Vac, 50-60Hz

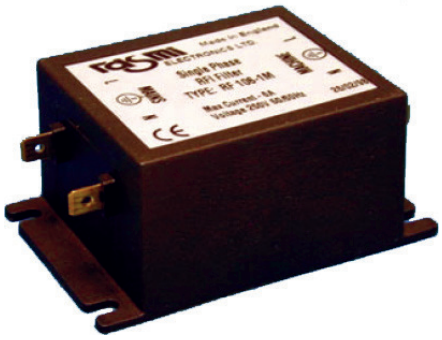
Filter Part No.	Rated Current	Leakage Current (mA) Nom / Max	Terminals (mm²)	Earth Stud	Case Dimensions (mm) L	W	H	Mounting (mm) X	Y	ØM	Weight (kg)
RF 3250-MHU	250A	20 - 160	25 x 5 Bar	M12	386	260	135	240	235	M12	12.7
RF 3320-MHU	320A	20 - 160	25 x 6 Bar	M12	386	260	135	240	235	M12	13.0
RF 3400-MHU	400A	20 - 160	25 x 6 Bar	M12	386	260	135	240	235	M12	13.0
RF 3600-MHU	600A	20 - 160	30 x 8 Bar	M12	386	260	135	240	235	M12	14.6
RF 3800-MHU	800A	20 - 160	40 x 8 Bar	M12	456	280	151	290	255	M12	19.0
RF 31K0-MHU	1000A	20 - 160	40 x 10 Bar	M12	456	280	151	290	255	M12	20.0
RF 31K6-MHU	1600A	20 - 160	60 x 10 Bar	M12	586	300	170	340	275	M12	36.0

Typical Circuit Schematic



RF-1M & RF-2M

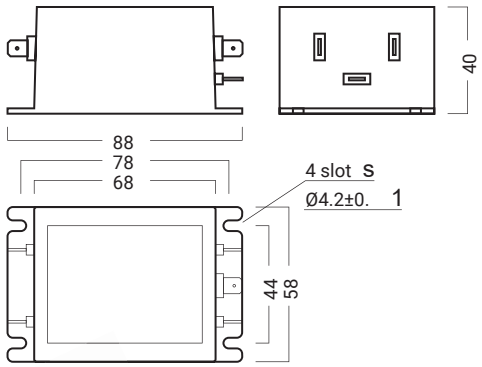
SINGLE PHASE MOULDED CASE



- General purpose, single phase RFI filters.
- Designed for effective performance and compact size.
- Moulded box type case with mounting via base fixing lugs.
- Termination by 0.25" fast-on terminals.
- All units carry CE and UL mark.

Dimensions Case Style M1

Connections:
6.35mm FASTON



RF-1M, 1 Stage Common Mode - Moulded Case Range

100-250Vac, 48-62Hz

Filter Part No.	Rated Current @ 50°C	Leakage Current (mA) @ 250V 60Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 101 - 1M	1A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5
RF 103 - 1M	3A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5
RF 106 - 1M	6A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5
RF 110 - 1M	10A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5

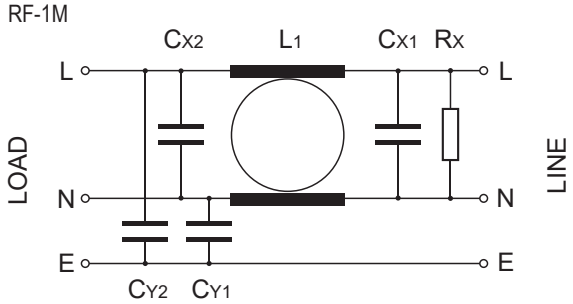
RF-2M, 2 Stage Common Mode + Differential Mode - Moulded Case Range

100-250Vac, 48-62Hz

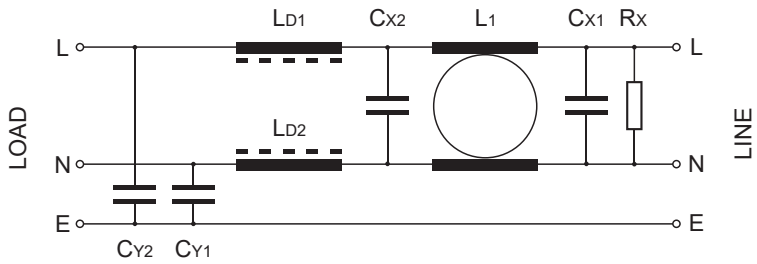
Filter Part No.	Rated Current @ 50°C	Leakage Current (mA) @ 250V 60Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 101 - 2M	1A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5
RF 103 - 2M	3A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5
RF 106 - 2M	6A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5
RF 110 - 2M	10A	0.4	Fast-on	Fast-on	88	58	40	78	44	M5

Circuit Schematics

RF-1M

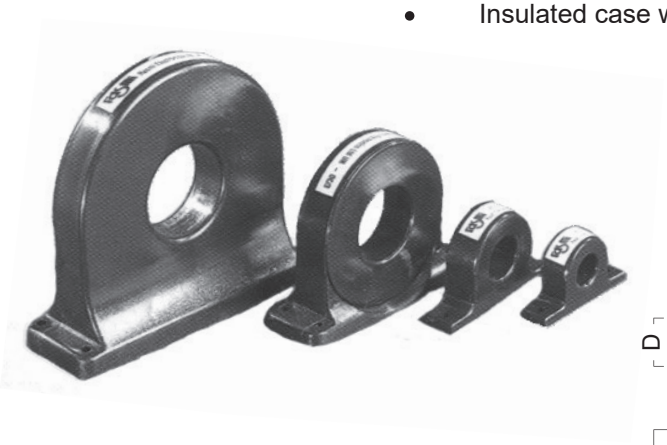


RF-2M

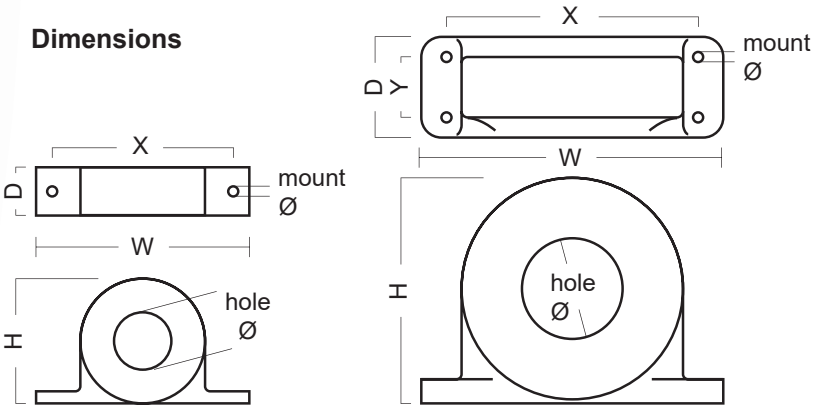


OUTPUT CHOKES

- A range of ferrite chokes with many uses in wiring panels.
- Recommended for use on long motor cables, to reduce radiated emissions.
- Also useful on other cables, where RF interference needs to be reduced.
- Insulated case with mounting feet, for tidy installation on panels.

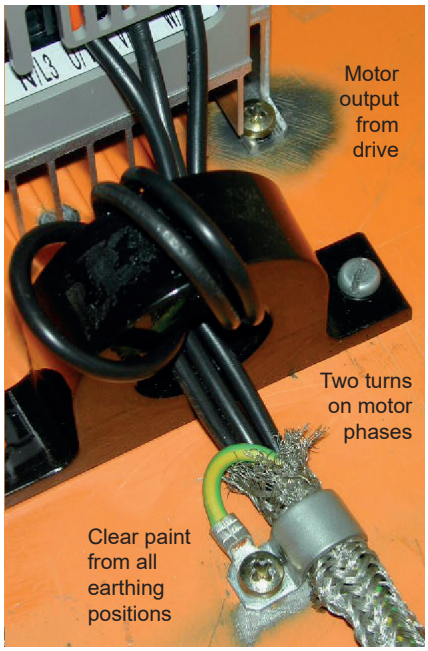


Dimensions



Part No.	Max Motor Rating (kW)	Cable Hole Ø (mm)	A_L (µH)	Dimensions W	H	D	Mounting (mm) X	Y	ØM	Weight (kg)
RS-OC/1	2.2	21	9	85	46	22	90	-	M5	0.1
RS-OC/2	15	28.5	12	106	62	24	70	-	M5	0.2
RS-OC/3	45	50	14	150	112	50	125	30	M5	0.7
RS-OC/4	>45	60	14	200	170	65	180	45	M6	1.7

Typical Installation



The picture shows typical installation of an OC/2 choke.

The phase wires only of the drive output cable are passed through the choke twice.

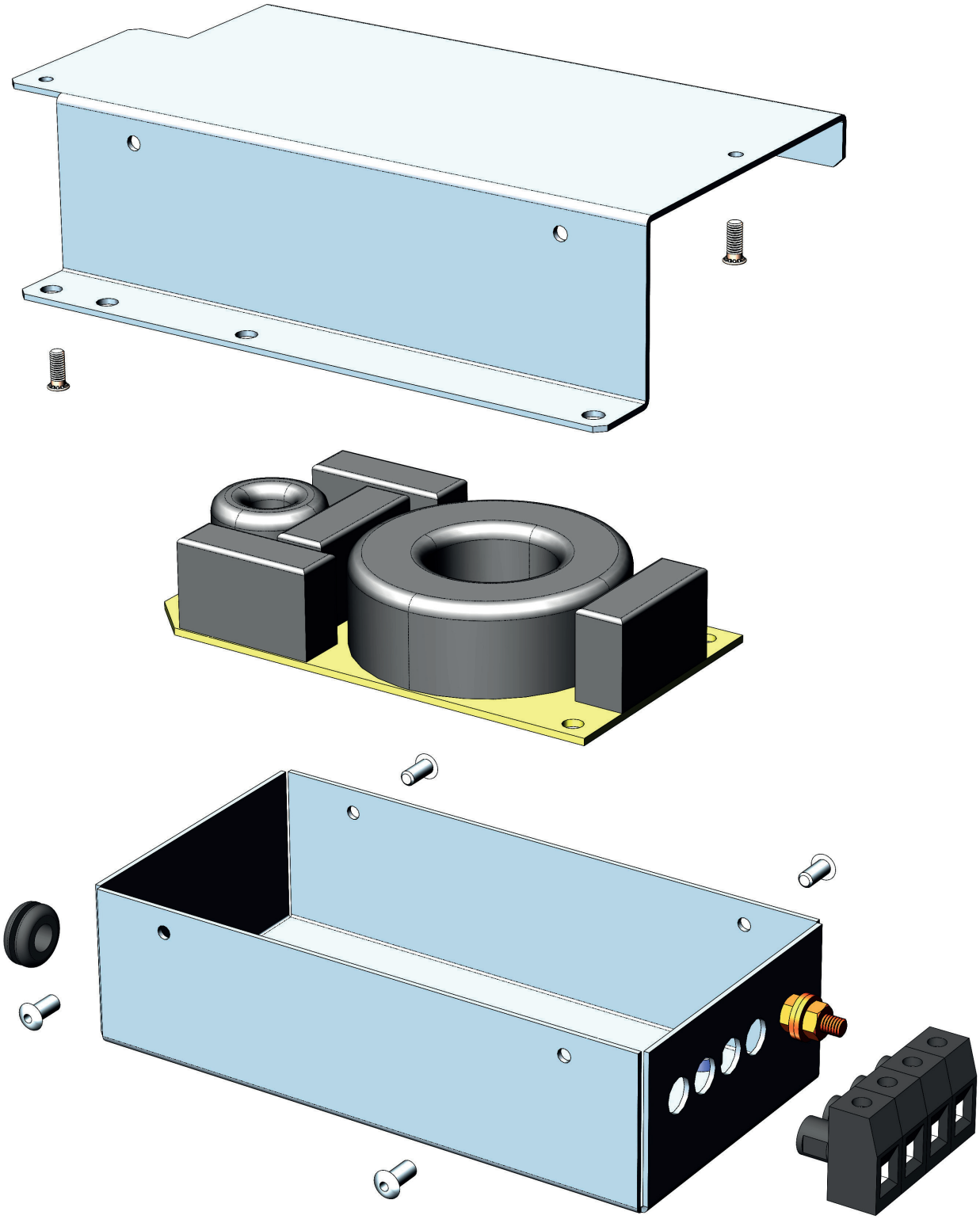
The cable screen/armour is not passed through the choke as it is earthed at both panel and motor ends.

The screen can be passed through the choke on control cables
ONLY IF it is not earthed at one end.

Attenuation @ 500kHz

Method
Signal from R&S SMY01 to produce 100dBmV into R&S ESHS10 (50W to 50W).
Insert ferrite with 10 turns of 22AWG 1015 style flex as a 'Line Filter'.
Measure new signal level and subtract 100 for attenuation figure.

Results
RS-OC/1 -19.8dB
RS-OC/2 -26.6dB
RS-OC/3 -18.5dB
RS-OC/4 -26.2dB



VFD Filter Body Styles

High performance filtering of VFDs is always recommended and advisable to prevent interference problems immediately or in the future.

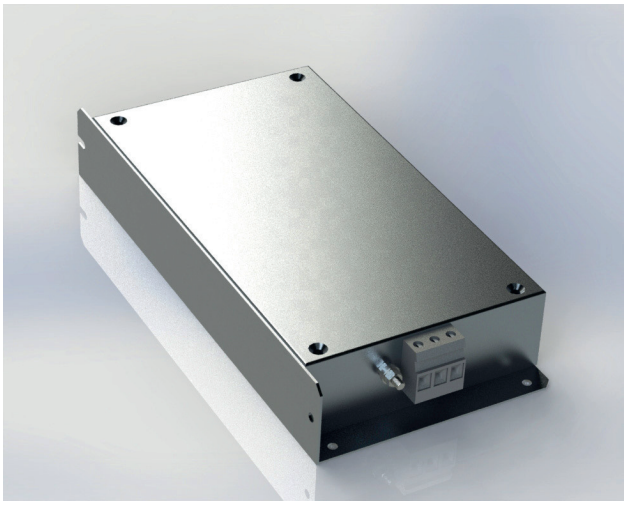
Control cabinet back-panel space can be conserved and optimised by use of an appropriate filter body style to suit the specific VFD.

For smaller wattages of VFD, a footprint style filter, mounted between the panel and the VFD, means that no extra panel space is needed. Many customer specific footprint filters come with integral output cables, with length and terminals optimised for connection directly into the drive supply terminals.

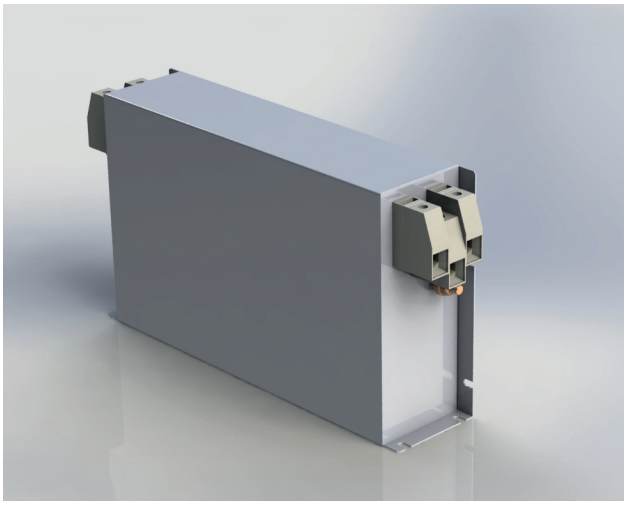
For medium-sized VFDs, book-style filters mount beside the drive with most of their volume horizontally outward from the panel, therefore requiring only a small area of panel.

For large VFDs, compact format block filters are used. These usually have either high current shrouded terminals or busbar construction and would typically be mounted under the drive or in the base of the wiring cabinet.

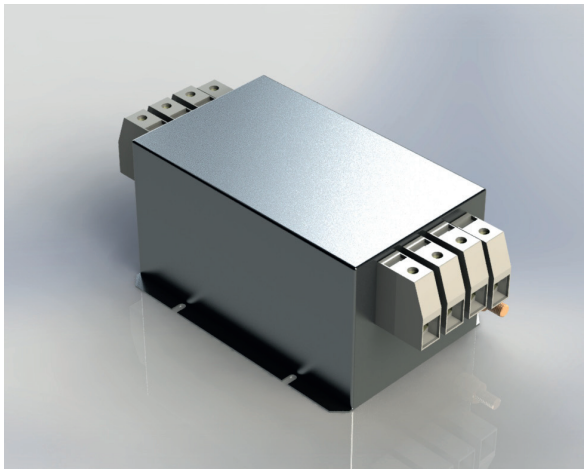
Footprint Style Filter



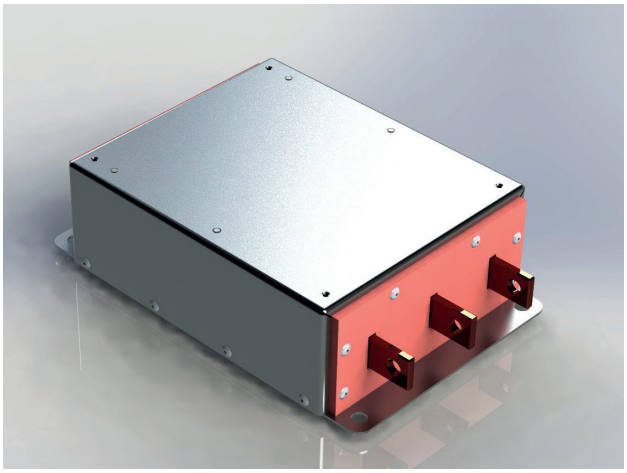
Book Style Filter



Block Style with Shrouded Terminal



Block Style with Busbar Terminal

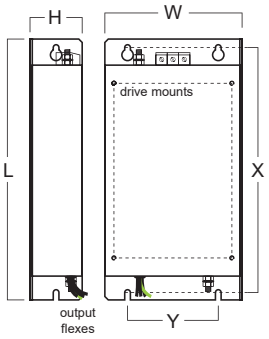


All filters designed to meet Class B

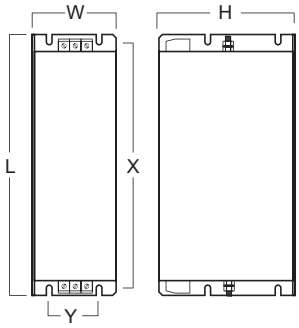
ABB- ACS480 FILTERS

- The **A48** range, for ABB ACS480 Series inverters.
- Help to ensure EMC compliance of machinery and installations using ACS480 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

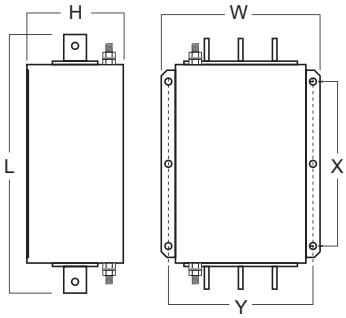
Footprint Dimensions



Book Type Dimensions



Block Type Dimensions



Applied Inverter ACS480-04-	STYLE	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE 250V									
02A4-1 - 07A8-1	FOOTPRINT	RF 1015-A48	14.7A	1ph, 250V	7mA	245 x 74 x 45	230 x 40	M4	0.6
09A8-1	FOOTPRINT	RF 1020-A48	19.8A	1ph, 250V	7mA	245 x 97 x 50	230 x 60	M4	1.0
THREE PHASE 480V									
02A7-4 - 09A5-4	FOOTPRINT	RF 3013-A48	12.9A	3ph, 480V	1.0 / 70mA	245 x 74 x 45	230 x 40	M4	1.1
12A7-4	FOOTPRINT	RF 3017-A48	16.5A	3ph, 480V	1.0 / 70mA	245 x 97 x 45	230 x 60	M4	1.2
018A-4 026A-4	FOOTPRINT	RF 3032-A48	31.8A	3ph, 480V	1.0 / 70mA	245 x 172 x 50	230 x 130	M5	2.0
THREE PHASE 520V									
033A-4 - 050-A4	BOOK	RF 3055-FTF	55A	3ph, 520V	1.3 / 130mA	284 x 85 x 90	235 x 60	-	1.9

Typical Circuit Schematic

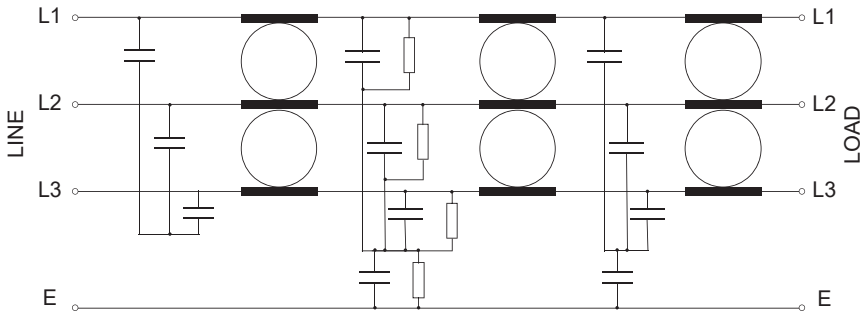
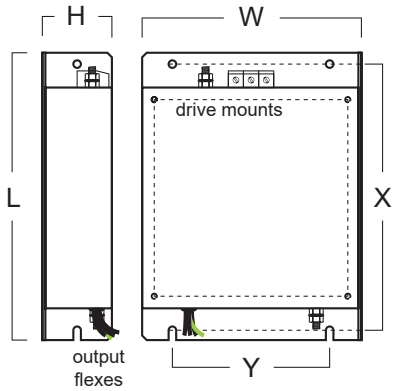


ABB - ACS55 FILTERS

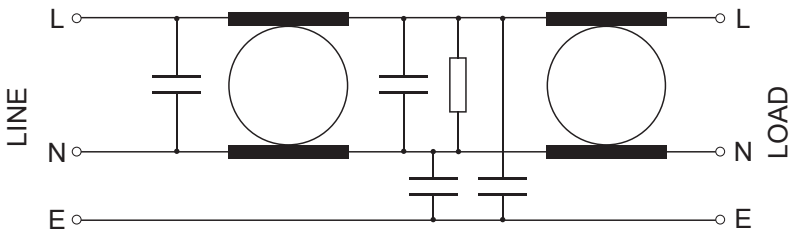
- The **A55** range, especially for ABB ACS55 series inverters.
- Help to ensure EMC compliance of machinery and installations using ACS55 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

Footprint Dimensions



Applied Inverter ACS55-01N-	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
01A4-2 02A2-2	RF 1007-A55	6.9A	1ph, 250V	7.0mA	205 x 50 x 40	192 x 25	M4	0.5
04A3-2	RF 1011-A55	10.8A	1ph, 250V	7.0mA	205 x 70 x 45	192 x 45	M4	0.6
07A6-2 09A8.2	RF 1022-A55	24A	1ph, 250V	7.0mA	230 x 70 x 50	217 x 45	M4	0.8

Typical Circuit Schematics



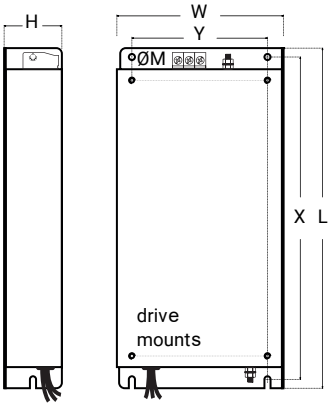
FUJI - C2S-7 FILTERS

- RFI Footprint filters for use with Fuji Electric FRENIC-MINI series single-phase inverters in applications up to 2.2kW.
- All filters are constructed with self-healing interference-suppression capacitors approved to EN60384-14 and UL1283.
- Input connections by shrouded-type terminals, output by flexes.
- All units carry the CE mark.

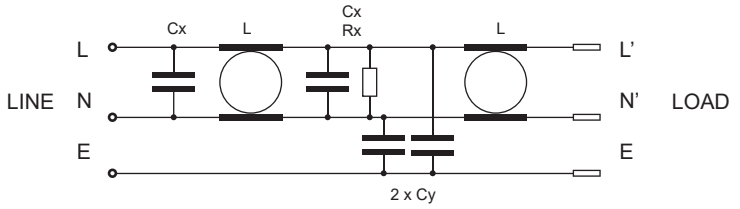
200-250Vac, 48-62Hz

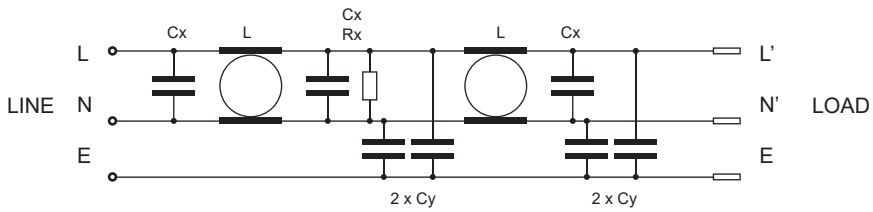
Applied Inverter FRENIC-MINI	Filter Part No	Rated Current @ 50°C	Max Rated Voltage	Leakage current	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing
FRN0001C2S-7E FRN0002C2S-7E FRN0004C2S-7E FRN0006C2S-7E	RF 1010-FMC2	10A	1ph, 250V	3.5mA	170 x 86 x 37	155 x 60	M4
FRN0010C2S-7E	RF 1016-FMC2	16.4	1ph, 250V	3.5mA	180 x 115 x 46	165 x 89	M4
FRN0012C2S-7E	RF 1024-FMC2	24	1ph, 250V	3.5mA	230 x 148 x 46	216 x 118	M4

Dimensions



Typical Circuit Schematics





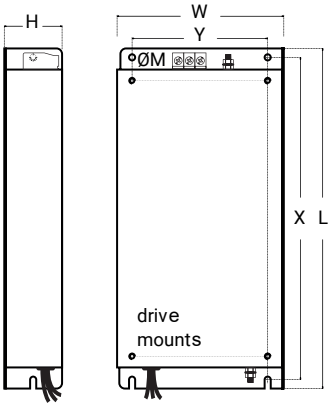
FUJI - F1S FILTERS

- RFI footprint filters for use with Fuji FRENIC-ECO series inverters in HVAC applications up to 75kW.
- All filters are constructed with self-healing interference suppression capacitors approved to EN132400 & UL1283.
- Input connections by shrouded type terminals, output by flexes.
- All units carry the CE mark.

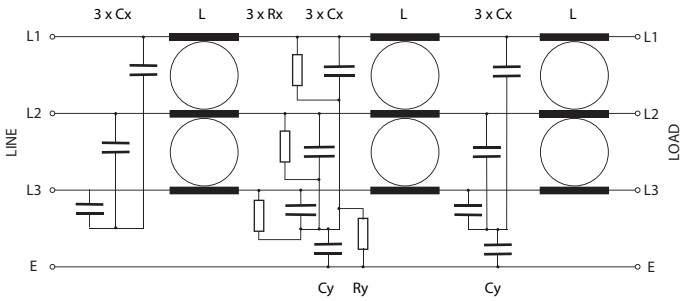
380-480Vac, 48-62Hz

Applied Inverter FRENIC-ECO	Filter Part No	Rated Current @ 50°C	Max Rated Voltage	Leakage current nom - max	Terminals (mm^2)	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing
FRN5.5F1S-4A	RF 3018-F1S	18	3ph, 480V	0.3 - 40	0 - 6	310 x 155 x 45	293 x 105	M5
FRN7.5F1S-4A	RF 3024-F1S	24	3ph, 480V	0.3 - 40	0 - 25	331 x 225 x 55	311 x 167	M8
FRN11F1S-4A FRN15F1S-4A	RF 3044-F1S	44	3ph, 480V	0.3 - 40	0 - 25	331 x 225 x 55	311 x 167	M8
FRN18.5F1S-4A FRN22F1S-4A	RF 3061-F1S	61	3ph, 480V	0.3 - 40	6 - 35	480 x 250 x 70	449 x 185	M8
FRN30F1S-4A	RF 3078-F1S	78	3ph, 480V	1.0 - 100	6 - 35	480 x 250 x 70	449 x 185	M8
FRN37F1S-4A FRN45F1S-4A	RF 3114-F1S	114	3ph, 480V	4.0 - 400	16 - 70	630 x 320 x 80	600 x 240	M8
FRN55F1S-4A FRN75F1S-4A	RF 3140-F1S	140	3ph, 480V	4.0 - 400	25 - 120	695 x 355 x 120	665 x 275	M8

Dimensions



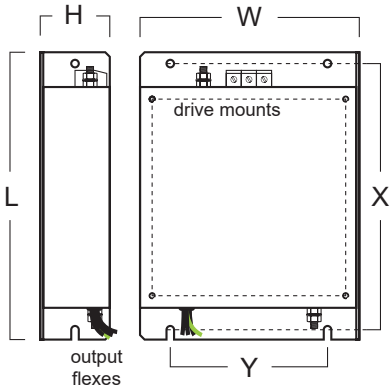
Typical Circuit Schematics



Hitachi - WJ-C1 / WJ200 FILTERS

- The **WJ** range, especially for Hitachi WJ-C1 and WJ200 Series inverters.
- Help to ensure EMC compliance of machinery and installations using WJ-C1 or WJ200 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

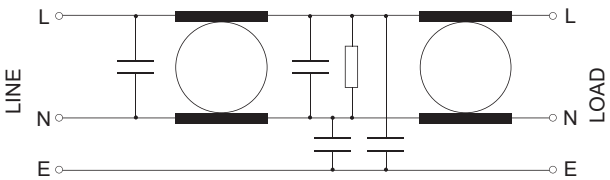
Footprint Dimensions



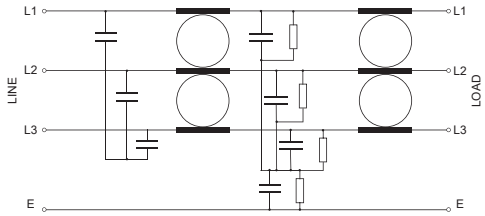
Applied Inverter WJC-	Applied Inverter WJ200-	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE 250V									
002SFE 004SFE	002SF 004SF	RF 1007-WJ	7.3A	1ph, 250V	7.0mA	169 x 71 x 45	156 x 51	M4	0.6
007SFE 015SFE 0022FE	007SF 015SF 0022F	RF 1024-WJ	24A	1ph, 250V	7.0mA	169 x 111 x 50	156 x 91	M4	0.8
THREE PHASE 480V									
004HFE - 030HFE	004HF - 030HF	RF 3009-WJ	9.4A	3ph, 480V	3.0 / 160mA	169 x 111 x 45	156 x 91	M4	1.0
040HFE	040HF	RF 3013-WJ	13.3A	3ph, 480V	3.0 / 160mA	174 x 144 x 50	161 x 120	M4	1.1
055HFE 075HFE	055HF 075HF	RF 3024-WJ	24A	3ph, 480V	1.0 / 70mA	306 x 150 x 52	290 x 122	M5	2.0
110HFE 150HFE	110HF 150HF	RF 3044-WJ	44A	3ph, 480V	0.5 / 32mA	357 x 182 x 62	330 x 160	M5	2.8

Typical Circuit Schematics

Single Phase



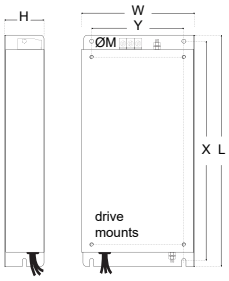
Three Phase



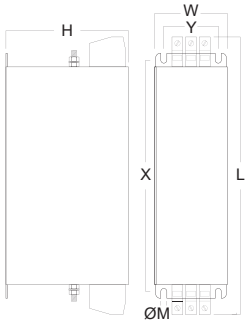
Hitachi - SJ-P1 FILTERS

- The **SJP1** range, for Hitachi SJ-P1 Series inverters.
- Help to ensure EMC compliance of machinery and installations using SJ-P1 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

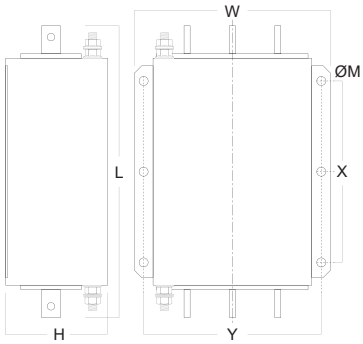
Footprint Dimensions



Book Type Dimensions

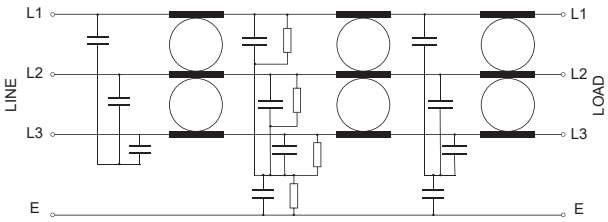


Block Type Dimensions



Applied Inverter P1-	STYLE	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
00041-H 00054-H 00083-H 00126-H	FOOTPRINT	RF 3015-SJP1	15A	3ph, 480V	0.8mA / 70mA	305 x 152 x 45	290 x 110	M5	1.4
00175-H 00250-H 00310-H		RF 3037-SJP1	37A	3ph, 480V	0.3mA / 40mA	313 x 213 x 53	300 x 170	M6	2.2
00400-H 00470-H	BOOK	RF 3055-FTF	55A	3ph, 520V	1.3 / 130mA	284 x 85 x 90	235 x 60	-	1.9
00620-H		RF 3075-FTF	75A	3ph, 520V	2 / 200mA	304 x 80 x 135	255 x 60	-	2.6
00770-H		RF 3100-FTF	100A	3ph, 520V	2 / 200mA	326 x 90 x 150	255 x 65	-	3.0
00930-H		RF 3130-FTF	130A	3ph, 520V	2 / 200mA	326 x 90 x 150	255 x 65	-	3.6
01160-H 01470-H		RF 3130-FTF	180A	3ph, 520V	2 / 200mA	486 x 110 x 240	414 x 80	-	6.2
01760-H 02130-H	BLOCK	RF 3250-MHU	250A	3ph, 520V	2 / 200mA	386 x 260 x 135	240 x 235	-	13.0
02520-H 03160-H		RF 3400-MHU	400A	3ph, 520V	2 / 200mA	386 x 260 x 135	240 x 235	-	13.2

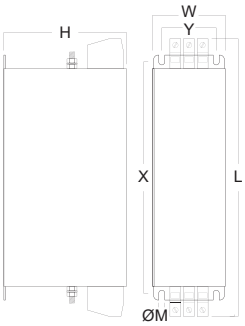
Typical Circuit Schematic



KEB - F6 FILTERS

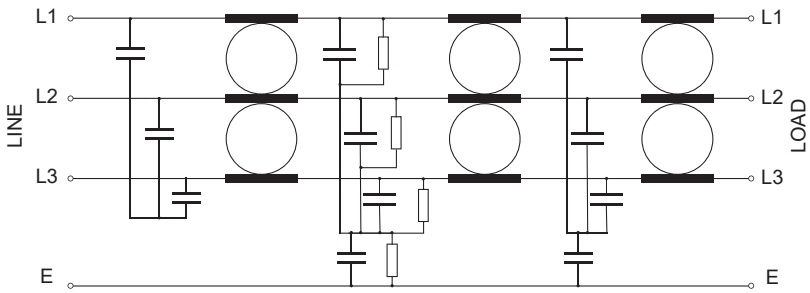
- The **F6** range, for KEB F6 series inverters.
- Help to ensure EMC compliance of machinery and installations using F6 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

Book Type Dimensions



Applied Inverter ATV340	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
U07N4 U11N4 U15N4 U22N4 U30N4 U40N4	RF 3016-FTF	16A	3ph, 480V	1.3 / 130mA	250 x 45 x 70	235 x 25	M5	0.9
U55N4 U75N4	RF 3030-FTF	30A	3ph, 480V	1.0 / 70mA	270 x 50 x 85	255 x 30	M5	1.1
D11N4	RF 3042-FTF	42A	3ph, 480V	1.3 / 130mA	310 x 50 x 85	295 x 30	M5	1.2
D15N4 D18N4	RF 3055-FTF	55A	3ph, 480V	1.3 / 130mA	270 x 80 x 135	235 x 60	M5	1.8
D22N4 D30N4E	RF 3075-FTF	75A	3ph, 480V	2 / 160mA	270 x 80 x 135	255 x 60	M6	2.2
D37N4E D45N4E	RF 3100-FTF	100A	3ph, 480V	2 / 160mA	270 x 90 x 150	255 x 65	M6	2.8
D55N4E D75N4E	RF 3180-FTF	180A	3ph, 480V	2.5 / 180mA	380 x 120 x 170	365 x 102	M6	5.7

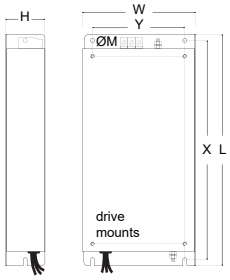
Typical Circuit Schematic



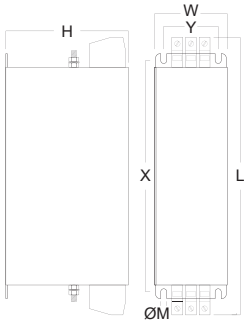
KEB - G6 FILTERS

- The G6 range, especially for KEB G6 series inverters.
- Help to ensure EMC compliance of machinery and installations using G6 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

Footprint Dimensions



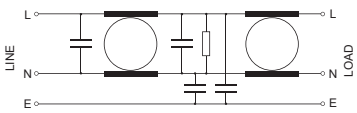
Book Type Dimensions



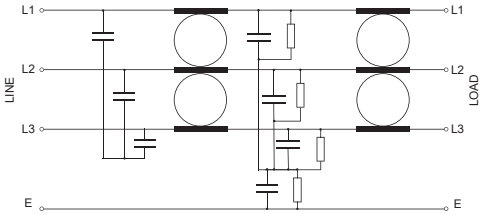
Applied Inverter	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE 250V								
07G6x0A0 09G6x0A0	RF 1014-G6	21.1A	1ph, 250V	7mA	225 x 90 x 46	213 x 60	M4	0.8
THREE PHASE 480V								
07G6x0A3 09G6x0A3 10G6x0A3	RF 3008-G6	8A	3ph, 480V	0.3 / 34mA	225 x 90 x 46	213 x 60	2 x M4	0.8
12G6x0B3 13G6x0B3	RF 3017-G6	17A	3ph, 480V	0.3 / 34mA	300 x 90 x 50	288 x 60	2 x M4	1.4
13G6x0C3 14G6x0C3 15G6x0C3	RF 3031-G6	31A	3ph, 480V	0.3 / 34mA	300 x 120 x 50	288 x 80	4 x M5	2.0
16G6x0E3 17G6x0E3	RF 3055-FTF	55A	3ph, 480V	1.3 / 130mA	286 x 85 x 90	235 x 60	M5	1.6
18G6x0E3 19G6x0E3	RF 3075-FTF	75A	3ph, 480V	2 / 230mA	316 x 80 x 135	255 x 60	M6	2.2

Typical Circuit Schematics

Single Phase



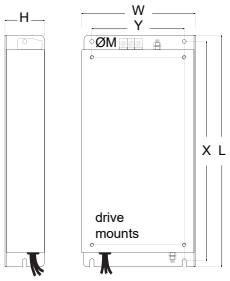
Three Phase



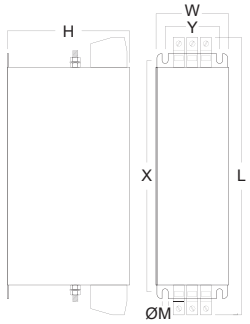
Lenze - i510 FILTERS

- The RF-i510 range, especially for Lenze i510 inverters.
- Help to ensure EMC compliance of machinery and installations using i510 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

Footprint Dimensions



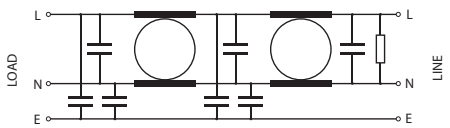
Book Type Dimensions



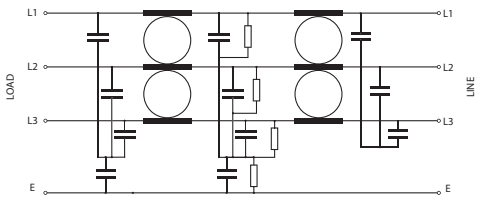
Applied Inverter i550-	Filter Part No	Rated Current	Max Rated Voltage	Leakage current	External H x W x D (mm)	Box length B (mm)	Mount Dims X x Y x M (mm)	Inverter Fixing C (mm)
SINGLE PHASE 200-250V								
C0.25 C0.37	RF 1006-i510	6A	1ph, 250V	3.5mA	227 x 62 x 30	165	210 x 40 x M5	165 2 x M5
C0.55 C0.75	RF 1010-i510	10A	1ph, 250V	3.5mA	252 x 62 x 30	212	235 x 40 x M5	190 2 x M5
C1.1 C1.5 C2.2	RF 1023-i510	22.5A	1ph, 250V	3.5mA	317 x 70 x 60	282	305 x 40 x M5	260 2 x M5
THREE PHASE 380-520V								
C0.37	RF 3003-i510	1.8A	3ph, 520V	..	252 x 62 x 40	212	235 x 40 x M5	165 2 x M5
C0.55 C0.75	RF 3003-i510	3.3A	3ph, 520V	.	252 x 62 x 40	212	235 x 40 x M5	190 2 x M5
C1.1 C1.5 C2.2 C3.0 C4.0	RF 3013-i510	12.5A	3ph, 520V	.	322 x 62 x 40	282	305 x 40 x M5	260 2 x M5
C5.5	RF 3017-i510	17.2A	3ph, 520V	.	322 x 90 x 50	282	305 x 60 x M5	260 x 30 4 x M5
C7.5 C11	RF 3029-i510	28.4A	3ph, 520V	.	347 x 120 x 50	307	330 x 90 x M5	285 x 60 4 x M5

Typical Circuit Schematics

single phase



three phase

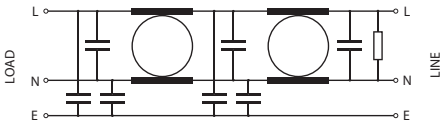


Lenze - i550 FILTERS

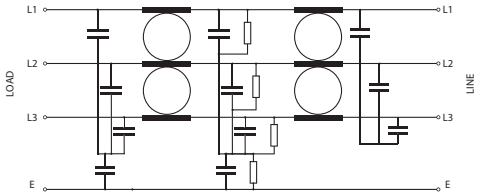
- The RF-i550 range, especially for Lenze i550 inverters.
- Help to ensure EMC compliance of machinery and installations using i550 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

Applied Inverter i510-	Filter Part No	Rated Current	Max Rated Voltage	Leakage current	External H x W x D (mm)	Box length B (mm)	Mount Dims X x Y x M (mm)	Inverter Fixing C (mm)
SINGLE PHASE 200-250V								
C0.25 C0.37	RF 1006-i510	6A	1ph, 250V	3.5mA	227 x 62 x 30	187	235 x 40 x M5	165 2 x M5
C0.55 C0.75	RF 1010-i510	10A	1ph, 250V	3.5mA	252 x 62 x 30	212	235 x 40 x M5	165 / 190 2 x M5
C1.1 C1.5 C2.2	RF 1023-i510	22.5A	1ph, 250V	3.5mA	317 x 70 x 60	282	295 x 45 x M5	260 2 x M5
THREE PHASE 380-520V								
C0.37	RF 3003-i550	1.8A	3ph, 520V	..	252 x 62 x 40	212	235 x 40 x M5	165 2 x M5
C0.55 C0.75	RF 3003-i550	3.3A	3ph, 520V	.	252 x 62 x 40	212	235 x 40 x M5	165 / 190 2 x M5
C1.1 C1.5 C2.2 C3.0 C4.0	RF 3013-i550	12.5A	3ph, 520V	.	322 x 62 x 40	282	305 x 40 x M5	260 2 x M5
C5.5	RF 3017-i550	17.2A	3ph, 520V	.	322 x 90 x 50	282	305 x 60 x M5	260 x 30 4 x M5
C7.5 C11	RF 3029-i550	28.4A	3ph, 520V	.	347 x 120 x 50	307	330 x 90 x M5	285 x 60 4 x M5
C15	RF 3042-FTF	42A	3ph, 520V		310 x 50 x 85	280	295 x 30 x M5	-
C18 C22 C30	RF 3055-FTF	55A	3ph, 520V		284 x 85 x 90	220	235 x 60 x M5	-
C37	RF 3075-FTF	75A	3ph, 520V		304 x 80 x 135	240	255 x 60 x M6	-
C45 C55	RF 3100-FTF	100A	3ph, 520V		326 x 90 x 150	240	255 x 65 x M6	-
C75	RF 3180-FTF	180A	3ph, 520V		450 x 120 x 170	350	365 x 102 x M6	-
C90 C110	RF 3250-MHU	250A	3ph, 520V		386 x 260 x 135		240 x 235 x M10	-

Typical Circuit Schematics
single phase

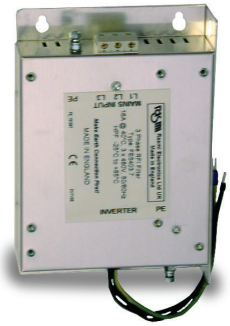


three phase



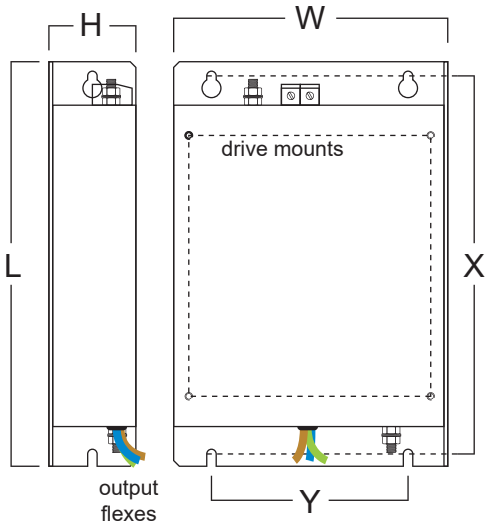
Mitsubishi - Serie FR

FR-D/E720S / FR-E820S / FR-CS82S FILTERS



- The FFR-CS range, especially for Mitsubishi FR-D720S, E720S, E820S and CS82S Series inverters.
- Help to ensure EMC compliance of machinery and installations using FR-D720S, FR-E720S, FR-E820S or FR-CS82S drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- All filters are designed and manufactured to UL requirements and are CE marked.

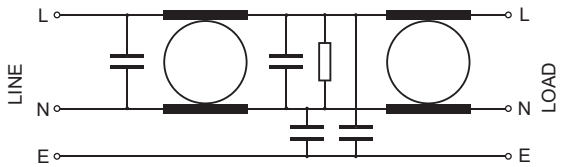
Footprint Dimensions



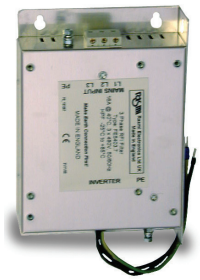
Max Rated Voltage 250V ac

Applied FR-D720S Inverter	Applied FR-E720S Inverter	Applied FR-E820S Inverter	Applied FR-CS82S Inverter	Filter Part No	Rated Current	Leakage current	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing
-008-EC -014-EC -025-EC -042-EC	-008-EC -015-EC -030-EC	-008-EC -015-EC -030-EC	-025-EC -042-EC	FFR-CS-050-14A-RF1	14A	7.0mA	168 x 72 x 38	158 x 56	3 x M4
-070-EC	-050-EC -080-EC	-050-EC -080-EC	-070-EC	FFR-CS-080-20A-RF1	20A	10mA	168 x 113 x 38	158 x 96	4 x M4
			-100-EC	RF 1026-CS82S	26A	10mA	168 x 113 x 38	158 x 96	4 x M4
-100-EC	-110-EC			FFR-CS-110-26A-RF1	26A	10mA	214 x 145 x 46	200 x 104	4 x M4
		-110-EC		RF 1025-E82S	25A	10mA	194 x 145 x 46	180 x 104	4 x M4

Typical Circuit Schematics

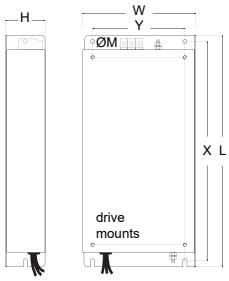


Mitsubishi - FR-E800 FILTERS

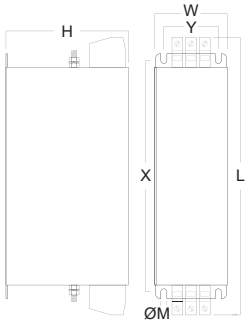


- The FFR-MSH range, especially for Mitsubishi FR-E800 Series inverters.
- Help to ensure EMC compliance of machinery and installations using FR-E800 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- All filters are designed and manufactured to UL requirements and are CE marked.

Footprint Dimensions



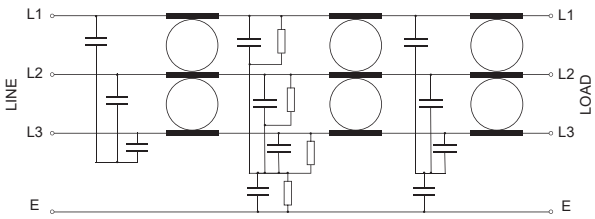
Book Type Dimensions



Max Rated Voltage 250 / 480V ac

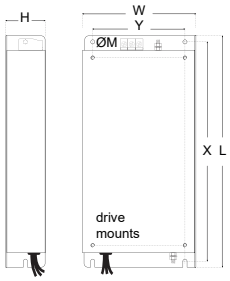
Applied FR-E800 Inverter	Style	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)
THREE PHASE 250V							
E820-0008 E820-0015 E820-0030 E820-0050	Book	FFR-CSH-036-8A-RF1	8A	3ph, 250V	1.0/58mA	168 x 45 x 114	158
E820-0080 E820-0110	Foot	FFR-CSH-080-16A-RF1	16A	3ph, 250V	1.0/58mA	168 x 114 x 45	158 x 96
E820-0175 E820-0240 E820-0330	Book	FFR-JS-7.5K-52A-RB1	52A	3ph, 250V	1.2/70mA	302 x 55 x 180	266 x 35
E820-0470 E820-0600		FFR-JS-15K-90A-RB1	90A	3ph, 250V	0.3/30mA	362 x 70 x 190	346 x 40
E820-0760 E820-0900		RF 3180-MHU	140A	3ph, 250V	?mA	500 x 110 x 240	414 x 80
THREE PHASE 480V							
E840-016 E840-026 E840-040	Footprint	FFR-CSH-036-8A-RF1	9A	3ph, 480V	2.0 / 110mA	168 x 114 x 45	158 x 96
E840-060 E840-095		RF 3016-E800	16A	3ph, 480V	1.5 / 80mA	210 x 145 x 46	198 x 128
E840-120 E840-170		FFR-MSH-170-30A-RF1	33A	3ph, 480V	1.1 / 43mA	210 x 225 x 55	198 x 208
E840-230 E840-300		FFR-MSH-300-50A-RF1	54A	3ph, 480V	1.5 / 80mA	318 x 216 x 56	302 x 195
E840-380	Book	RF 3075-FTF/C	75A	3ph, 480V	2.5 / 210mA	317 x 80 x 135	255 x 60
E840-440		RF 3100-FTF/C	100A	3ph, 480V	2.5 / 210mA	326 x 90 x 150	255 x 65

Typical Circuit Schematics



- The **CTS** range, especially for Control Techniques Commander S Series inverters.
- Help to ensure EMC compliance of machinery and installations using Commander S drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

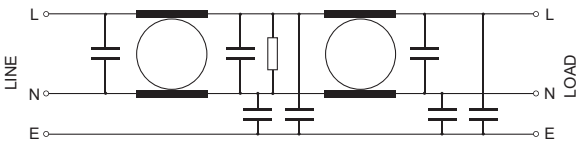
Dimensions



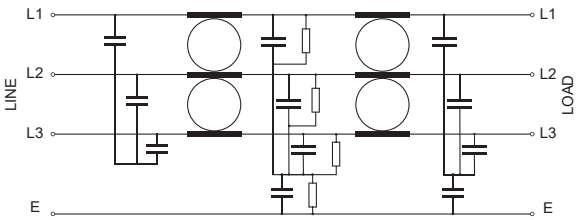
Applied Inverter	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing
SINGLE PHASE 250V							
S100-01S13 S100-01S23 S100-01S33 S100-01S43 S100-01S53 S100-01D63 S100-01D73	RF 1018-CTS	18.4A	1ph, 250V	7mA	189 x 68 x 40	177 x 64	4 x M4
S100-03D13	RF 1026-CTS	26.1A	1ph, 250V	24mA	229 x 90 x 50	217 x 64	4 x M4
THREE PHASE 480V							
S100-02413 - S100-02463	RF 3008-CTS	8.2A	3ph, 480V	0.8 / 65mA	229 x 68 x 45	217 x 64	4 x M4
S100-03413 S100-03423	RF 3016-CTS	16A	3ph, 480V	0.8 / 65mA	229 x 90 x 50	217 x 64	4 x M4

Typical Circuit Schematics

Single Phase



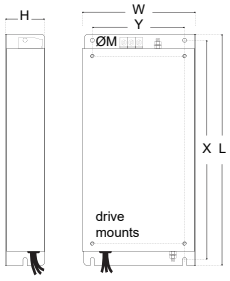
Three Phase



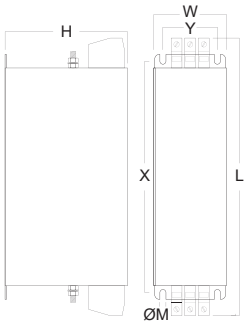
NIDEC - M700 FILTERS

- The **M7** range, especially for Control Techniques M600 and M700 Series inverters.
- Help to ensure EMC compliance of machinery and installations using M600 and M700 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets. Block type filters mount beside the inverter.

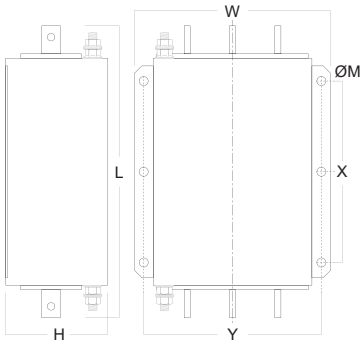
Footprint Dimensions



Book Type Dimensions



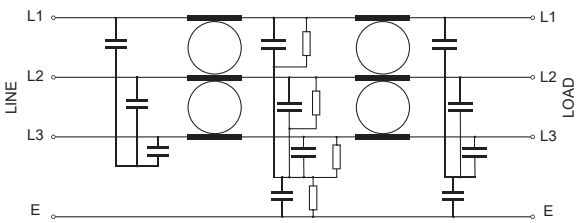
Block Type Dimensions



Three Phase 480Vac

Applied Inverter 200V	Applied Inverter 400V	Filter Part No	Rated Current	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Filter Fixing
03200050 03200066 03200080 03200106	03400025 03400031 03400045 03400062 03400078 03400100	RF 3016-M73	16A	2 / 130mA	450 x 83 x 45	430 x 60	M5
04200137 04200185	04400150 04400172	RF 3024-M74	24A	1 / 60mA	450 x 122 x 50	430 x 100	M6
05200250	05400270 05400300	RF 3030-M75	30A	3 / 160mA	450 x 142 x 50	430 x 106	M6
06200330 06200440	06400350 06400420 06400470	RF 3060-M76	60A	1.3 / 100mA	450 x 210 x 60	430 x 196	M6
07200610 07200750	07400660 07400770	RF 3100-MHU	100A	0.7 / 72mA	379 x 90 x 220	364 x 65	M6
07200830	07401000	RF 3130-MHU	130A	2 / 130mA	429 x 110 x 240	414 x 80	M6
08201160 08201320	08401340 08401570	RF 3180-MHU	180A	2 / 130mA	429 x 110 x 240	414 x 80	M6
09201760	09402000	RF 3250-MHU	250A	10 / 500mA	386 x 260 x 135	240 x 235	M10
09202190 10202830	09402240	RF 3320-MHU	320A	10 / 500mA	386 x 260 x 135	240 x 235	M10
10203000	10402700 10403200	RF 3400-MHU	400A	10 / 500mA	386 x 260 x 135	240 x 235	M10

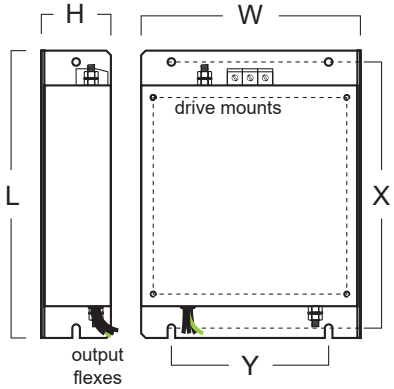
Typical Circuit Schematic



Omron - MX2 FILTERS

- The **AX-FIM** range, especially for Omron MX2 Series inverters.
- Help to ensure EMC compliance of machinery and installations using MX2 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- 200V 3-phase and Low Leakage versions also available.

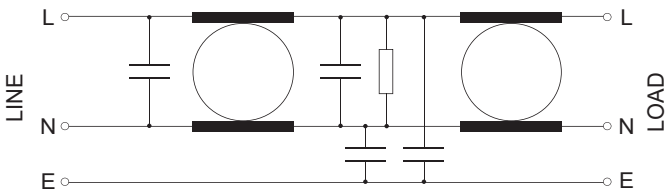
Footprint Dimensions



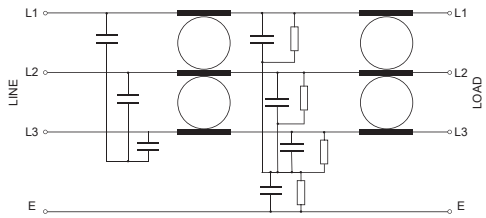
Applied Inverter	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE								
3G3MX2-AB001-E 3G3MX2-AB002-E 3G3MX2-AB004-E	AX-FIM1010-RE	10A	1ph, 250V	7.0mA	169 x 71 x 45	156 x 51	M4	0.6
3G3MX2-AB007-E	AX-FIM1014-RE	14A	1ph, 250V	7.0mA	169 x 111 x 50	156 x 91	M4	0.8
3G3MX2-AB015-E 3G3MX2-AB022-E	AX-FIM1024-RE	24A	1ph, 250V	7.0mA	169 x 111 x 50	156 x 91	M4	0.8
THREE PHASE								
3G3MX2-A4004-E 3G3MX2-A4007-E	AX-FIM3005-RE	5A	3ph, 480V	3.0 / 160mA	169 x 114 x 46	156 x 91	M4	1.0
3G3MX2-A4015-E 3G3MX2-A4022-E 3G3MX2-A4030-E	AX-FIM3010-RE	10A	3ph, 480V	3.0 / 160mA	169 x 114 x 46	156 x 91	M4	1.0
3G3MX2-A4040-E	AX-FIM3014-RE	14A	3ph, 480V	3.0 / 160mA	174 x 144 x 50	161 x 120	M4	1.1
3G3MX2-A4055-E 3G3MX2-A4075-E	AX-FIM3030-RE	30A	3ph, 480V	1.0 / 70mA	306 x 150 x 52	290 x 122	M5	2.0
3G3MX2-A4110-E 3G3MX2-A4150-E	AX-FIM3050-RE	50A	3ph, 480V	0.5 / 32mA	357 x 182 x 62	330 x 160	M5	2.8

Typical Circuit Schematics

Single Phase



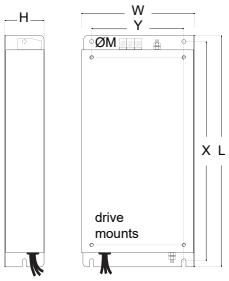
Three Phase



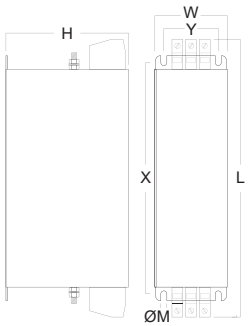
Omron - RX2 FILTERS

- The **AX-FIR2** range, especially for Omron RX2 Series inverters.
- Help to ensure EMC compliance of machinery and installations using RX2 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- 200V 3-phase and Low Leakage versions also available.

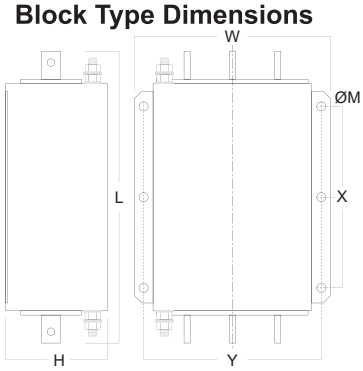
Footprint Dimensions



Book Type Dimensions

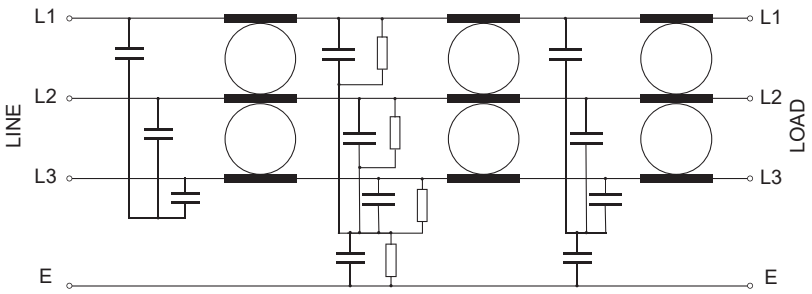


Block Type Dimensions



Applied Inverter	STYLE	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
3G3RX2 A4007 3G3RX2 A4015 3G3RX2 A4022 3G3RX2 A4037	FOOTPRINT	AX-FIR3010-RE	11A	3ph, 480V	0.8mA / 70mA	305 x 152 x 45	290 x 110	M5	1.4
3G3RX A4055 3G3RX A4075 3G3RX A4110	FOOTPRINT	AX-FIR3030-RE	30A	3ph, 480V	0.3mA / 40mA	312 x 212 x 50	296 x 189	M6	2.2
3G3RX A4150 3G3RX A4185 3G3RX A4220	FOOTPRINT	AX-FIR3053-RE	57A	3ph, 480V	0.8mA / 70mA	451 x 252 x 60	435 x 229	M6	4.5
3G3RX A4300	FOOTPRINT	AX-FIR3064-RE	73A	3ph, 480V	3mA / 160mA	598 x 310 x 70	578 x 265	M8	7.0
3G3RX A4370	BOOK	RF 3090-RX2	90A	3ph, 480V	3mA / 160mA	456 x 90 x 150	385 x 65	-	4.8
3G3RX A4450 3G3RX A4550	BOOK	RF 3134-RX2	134A	3ph, 480V	3mA / 160mA	456 x 90 x 150	385 x 65	-	5.2
3G3RX B4750 3G3RX B4900	BLOCK	AX-FIR3250-RE	250A	3ph, 480V	2mA/160mA	386 x 260 x 135	240 x 235	-	13.0
3G3RX B411K 3G3RX B413K	BLOCK	AX-FIR3320-RE	320A	3ph, 480V	2mA/160mA	386 x 260 x 135	240 x 235	-	13.2

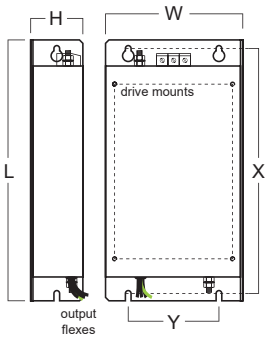
Typical Circuit Schematic



Schneider - Altivar 12 FILTERS

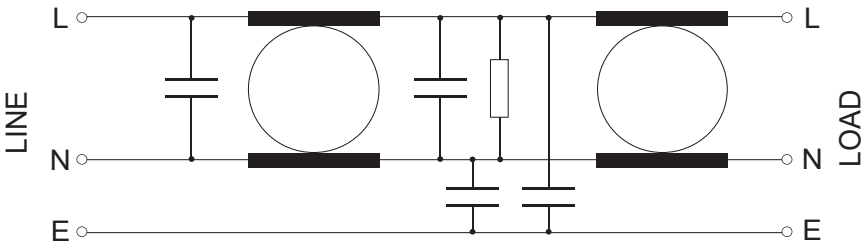
- The **ATV12** range, especially for Schneider Altivar 12 series inverters.
- Help to ensure EMC compliance of machinery and installations using Altivar 12 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

Footprint Dimensions



Applied Inverter ATV12	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
H018M2 H037M2 H055M2 H075M2	RF 1010-ATV	10.2A	1ph, 250V	7.0mA	190 x 75 x 45	180 x 52	M4	0.5
HU15M2 HU22M2	RF 1024-ATV	24A	1ph, 250V	7.0mA	190 x 108 x 50	180 x 85	M4	0.8

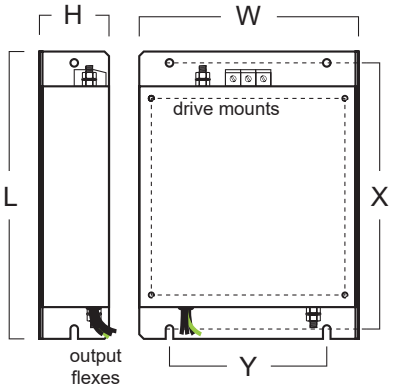
Typical Circuit Schematic



Schneider - ATV320 FILTERS

- The **ATV320** range, especially for Schneider ATV320 series inverters.
- Help to ensure EMC compliance of machinery and installations using ATV320 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- Low Leakage versions also available.

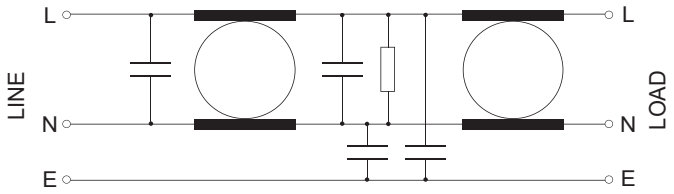
Footprint Dimensions



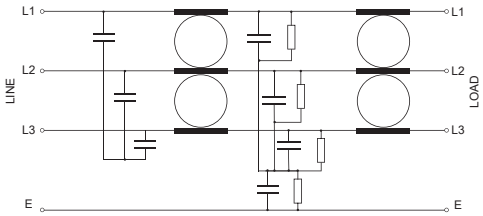
Applied Inverter ATV320	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE								
U02M2C U04M2C U06M2C U07M2C	RF 1010-ATV	10A	1ph, 250V	7.0mA	190 x 75 x 45	180 x 52	M4	0.5
U11M2C U15M2C U22M2C	RF 1024-ATV	24A	1ph, 250V	7.0mA	190 x 108 x 50	180 x 85	M4	0.8
THREE PHASE								
U04N4C U06N4C U07N4C U11N4C U15N4C	RF 3006-ATV320	6.4A	3ph, 480V	3.0 / 160mA	181 x 87 x 45	168 x 60	M4	1.0
U22N4C U30N4C U40N4C	RF 3014-ATV320	13.7A	3ph, 480V	3.0 / 160mA	181 x 87 x 45	168 x 60	M4	1.0
U55N4C U75N4C	RF 3027-ATV320	26.5A	3ph, 480V	3.0 / 160mA	181 x 87 x 45	168 x 60	M4	1.0
D11NC4 D15NC4	RF 3047-ATV320	47.3A	3ph, 480V	3.0 / 160mA	221 x 99 x 50	208 x 70	M4	1.0

Typical Circuit Schematics

Single Phase



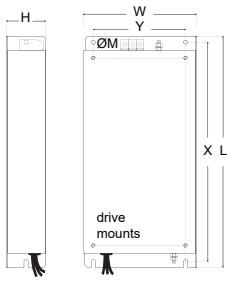
Three Phase



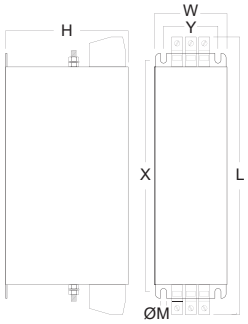
Siemens - V20 FILTERS

- The **V20** range, especially for Siemens V20 series inverters.
- Help to ensure EMC compliance of machinery and installations using V20 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.

Footprint Dimensions



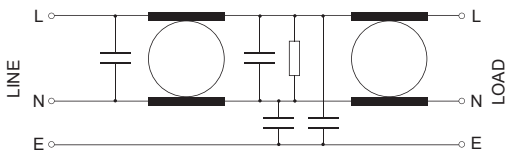
Book Type Dimensions



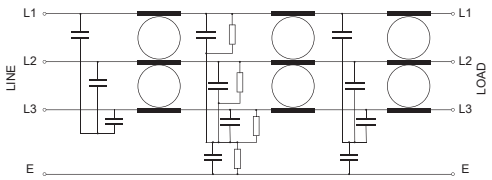
Applied Inverter 6SL3210-5BB	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE 250V								
11-2UV0 - 17-5UV0	RF 1010-V20	10A	1ph, 250V	7.0mA	181 x 72 x 45	168 x 50	M4	0.6
21-1UV0 21-5UV0	RF 1020-V20	19.7A	1ph, 250V	7.0mA	189 x 93 x 50	176 x 70	M4	1.0
22-2UV0 23-0UV0	RF 1032-V20	32A	1ph, 250V	7.0mA	208 x 137 x 55	195 x 110	M4	1.1
THREE PHASE 480V								
13-7UV0 - 22-2UV0	RF 3006-V20	6.4A	3ph, 480V	0.5 / 40mA	189 x 93 x 45	176 x 70	M4	1.0
23-0UV0 24-0UV0	RF 3011-V20	11.3A	3ph, 480V	0.5 / 40mA	184 x 141 x 45	171 x 110	M4	1.1
25-5UV0	RF 3015-V20	15.2A	3ph, 480V	0.5 / 40mA	190 x 186 x 50	176 x 150	M5	1.2
27-5UV0 31-1UV0 31-5UV0	RF 3038-V20	38.1A	3ph, 480V	0.7 / 70mA	216 x 240 x 56	200 x 200	M5	2.8
THREE PHASE 520V								
31-8UV0	RF 3055-FTF	55A	3ph, 520V	1.3 / 130mA	284 x 85 x 90	235 x 60	-	1.9
32-2UV0	RF 3075-FTF	75A	3ph, 520V	2 / 160mA	316 x 80 x 135	255 x 60	-	2.6

Typical Circuit Schematics

Single Phase



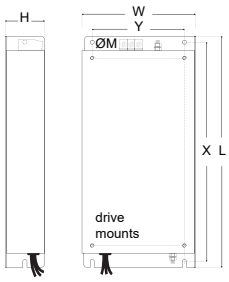
Three Phase



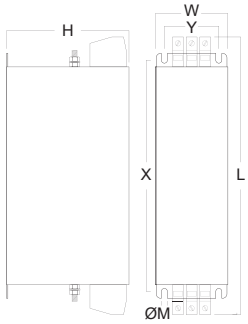
Siemens - G220 FILTERS

- The **G22** range, especially for Siemens G220 series inverters.
- Help to ensure EMC compliance of machinery and installations using G220 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- 200V 3-phase and Low Leakage versions also available.

Footprint Dimensions

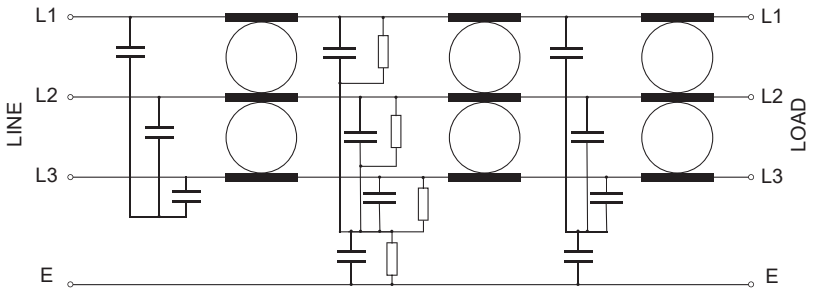


Book Type Dimensions



Applied Inverter 6SL4113-0CA	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
THREE PHASE 480V								
05-0xF0 - 13-0xF0	RF 3010-G22	9.6A	3ph, 480V	0.5 / 40mA	323 x 73 x 45	308 x 50	M4	1.1
15-0xF0 16-0xF0	RF 3017-G22	17.3A	3ph, 480V	0.5 / 40mA	426 x 85 x 50	410 x 50	M5	1.2
17-0xF0 18-0xF0	RF 3031-G22	31.3A	3ph, 480V	0.7 / 70mA	426 x 125 x 52	410 x 100	M5	2.2
THREE PHASE 520V								
20-0xF0	RF 3042-FTF	42A	3ph, 520V	1.3 / 130mA	312 x 50 x 85	295 x 30	-	1.2
21-0xF0	RF 3055-FTF	42A	3ph, 520V	1.3 / 130mA	284 x 85 x 90	235 x 60	-	1.9
23-0xF0 24-0xF0	RF 3075-FTF	75A	3ph, 520V	2 / 160mA	316 x 80 x 135	255 x 60	-	2.6
26-0xF0	RF 3100-FTF	100A	3ph, 520V	2 / 160mA	326 x 90 x 150	255 x 65	-	3.4
27-0xF0	RF 3130-FTF	130A	3ph, 520V	2 / 160mA	326 x 90 x 150	255 x 65	-	3.6

Typical Circuit Schematic



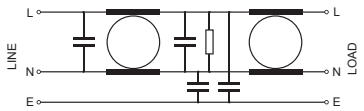
Yaskawa - GA500 FILTERS

- The **V1K** range also fits Yaskawa GA500 Series inverters.
- Help to ensure EMC compliance of machinery and installations using GA500 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- Filters are designed and manufactured to UL requirements.

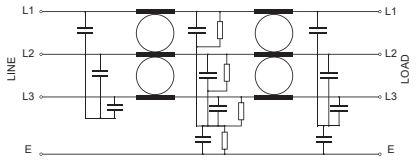
Applied Inverter GA50CxxxxEBAA	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE 250V								
B001 B002 B004	RF 1010-V1K	10A	1ph, 250V	7.0mA	169 x 71 x 45	156 x 51	M4	0.6
B006 B010	RF 1020-V1K	20A	1ph, 250V	7.0mA	169 x 111 x 50	156 x 91	M4	1.0
B012	RF 1030-V1K	30A	1ph, 250V	3.5mA	174 x 144 x 50	161 x 120	M4	1.1
B018	RF 1040-V1K	40A	1ph, 250V	3.5mA	174 x 174 x 50	161 x 150	M4	1.2
THREE PHASE 250V								
2001 2002 2004 2006	RF 2010-V1K	10A	3ph, 250V	0.3 / 26mA	194 x 82 x 50	181 x 62	M4	0.8
2008 2010 2012	RF 2020-V1K	16A	3ph, 250V	0.3 / 26mA	169 x 111 x 50	156 x 91	M4	1.0
2018 2021	RF2030-V1K	26A	3ph, 250V	1.0 / 45mA	174 x 144 x 50	161 x 120	M4	1.3
2030 2042	RF 2058-V1K	58A	3ph, 250V	1.0 / 45mA	320 x 150 x 52	290 x 122	M5	2.4
2056	RF 2078-V1K	78A	3ph, 250V	1.0 / 45mA	362 x 188 x 62	330 x 160	M5	4.2
2070 2082	RF 2096-V1K	96A	3ph, 250V	1.0 / 45mA	415 x 220 x 62	380 x 192	M6	4.4
THREE PHASE 480V								
4001 4002 4004	RF 3005-V1K	5A	3ph, 480V	0.5 / 29mA	169 x 111 x 45	156 x 91	M4	1.0
4005 4007	RF 3010-V1K	10A	3ph, 480V	0.5 / 29mA	169 x 111 x 45	156 x 91	M4	1.0
4009 4012	RF 3020-V1K	15A	3ph, 480V	1.0 / 70mA	174 x 144 x 50	161 x 120	M4	1.1
4018 4023	RF 3029-V1K	29A	3ph, 480V	1.0 / 70mA	306 x 150 x 52	290 x 122	M5	2.0
4031 4038	RF 3048-V1K	48A	3ph, 480V	0.5 / 32mA	357 x 182 x 62	330 x 160	M5	2.8

Typical Circuit Schematics

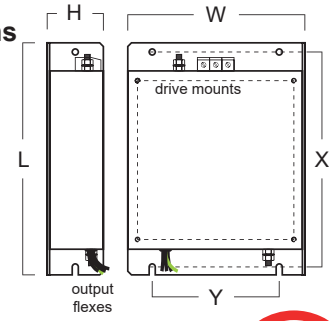
Single Phase



Three Phase



Dimensions



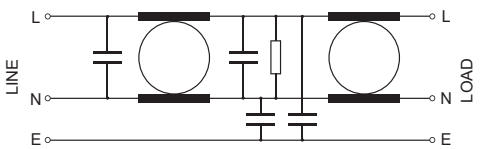
Yaskawa - V1000 / J1000 FILTERS

- The **V1K** range, especially for Yaskawa V1000 and J1000 Series inverters.
- Help to ensure EMC compliance of machinery and installations using V1000 or J1000 drives.
- Footprint filters mount between the inverter and the panel, saving valuable space inside wiring cabinets.
- Filters are designed and manufactured to UL requirements.

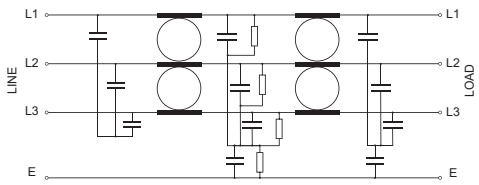
Applied Inverter CIMR-VC	Applied Inverter CIMR-JA	Filter Part No	Rated Current	Max Rated Voltage	Leakage current Nom / Max	External L x W x H (mm)	Mount Dims X x Y (mm)	Inverter Fixing	wt (kg)
SINGLE PHASE 250V									
BA0001B BA0002B BA0003B	BA0001B BA0002B BA0003B	RF 1010-V1K	10A	1ph, 250V	7.0mA	169 x 71 x 45	156 x 51	M4	0.6
BA0006B BA0010B	BA0006B BA0010B	RF 1020-V1K	20A	1ph, 250V	7.0mA	169 x 111 x 50	156 x 91	M4	1.0
BA0012B	-	RF 1030-V1K	30A	1ph, 250V	3.5mA	174 x 144 x 50	161 x 120	M4	1.1
BA0018B	-	RF 1040-V1K	40A	1ph, 250V	3.5mA	174 x 174 x 50	161 x 150	M4	1.2
THREE PHASE 250V									
2A0001B 2A0002B 2A0004B 2A0006B	2A0001B 2A0002B 2A0004B 2A0006B	RF 2010-V1K	10A	3ph, 250V	0.3 / 26mA	194 x 82 x 50	181 x 62	M4	0.8
2A0010B 2A0012B	2A0008B 2A0010B 2A0012B	RF 2020-V1K	16A	3ph, 250V	0.3 / 26mA	169 x 111 x 50	156 x 91	M4	1.0
2A0020B	2A0018B 2A0020B	RF2030-V1K	26A	3ph, 250V	1.0 / 45mA	174 x 144 x 50	161 x 120	M4	1.3
2A0030B 2A0040B	-	RF 2058-V1K	58A	3ph, 250V	1.0 / 45mA	320 x 150 x 52	290 x 122	M5	2.4
2A0056B	-	RF 2078-V1K	78A	3ph, 250V	1.0 / 45mA	362 x 188 x 62	330 x 160	M5	4.2
2A0069B	-	RF 2096-V1K	96A	3ph, 250V	1.0 / 45mA	415 x 220 x 62	380 x 192	M6	4.4
THREE PHASE 480V									
4A0001B 4A0002B 4A0004B	4A0001B 4A0002B 4A0004B	RF 3005-V1K	5A	3ph, 480V	0.5 / 29mA	169 x 111 x 45	156 x 91	M4	1.0
4A0005B 4A0007B 4A0009B	4A0005B 4A0007B 4A0009B	RF 3010-V1K	10A	3ph, 480V	0.5 / 29mA	169 x 111 x 45	156 x 91	M4	1.0
4A0011B	4A0011B	RF 3020-V1K	15A	3ph, 480V	1.0 / 70mA	174 x 144 x 50	161 x 120	M4	1.1
4A0018B 4A0023B	-	RF 3029-V1K	29A	3ph, 480V	1.0 / 70mA	306 x 150 x 52	290 x 122	M5	2.0
4A0031B 4A0038B	-	RF 3048-V1K	48A	3ph, 480V	0.5 / 32mA	357 x 182 x 62	330 x 160	M5	2.8

Typical Circuit Schematics

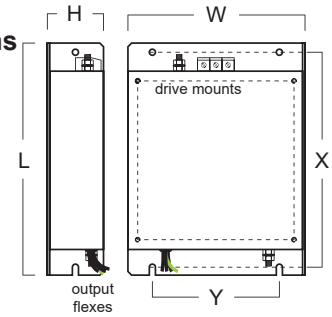
Single Phase



Three Phase



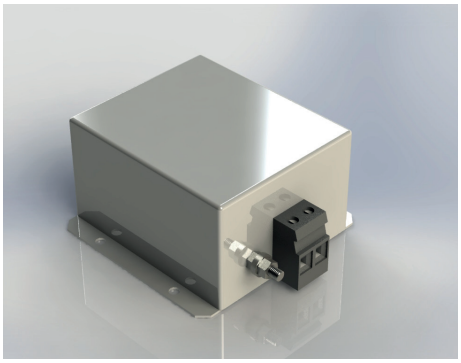
Dimensions



*** Data sheets available on request**

Rasmi Suffix	Equivalent to Series	Page in this Brochure
FSA	FN 350	42
FSB	FN 357	43
FSC	FN 2020	*
FSD	FN 2060	*
FSE	FN 2070	44
FSF	FN 2080	*
FSG	FN 251	*
FSH	FN 351	45
FSJ	FN 355	*
FSK	FN 356	46
FSL	FN 359	*
FSM	FN 358	*
FSN	FN 256	47
FSP	FN 354	*
FSR	FN 250	*
FSS	FN 680	*
FST	FN 685	48
FSV	FN 352Z	*
FSW	FN 9675	*
FSX	FN 3359	*
FSY	FN 343	*
RFB	FN 258	*
FTA	FN 660	*
FTB	FN 9246	*
FTC	FN 2110	*
FTD	FN 670	*
FTE	FN 610	*
FTF	FN 3258	49
FTG	FN 2010	*
FTH	FN 2110	*
FTJ	FN 3100	50
FTL	FS 5458	*
FTM	FN 612	*
FTN	FN 256	*
FTR	FN 3280	51
FTX	FN 327x	52
FTY	FN 3270H	*
FVA	FN3120H	*
FVC	FN 2030	*
FVG	FN2410	53
FPV	FN2200	*

FSA - SINGLE PHASE (*EQUIVALENT TO FN350*)

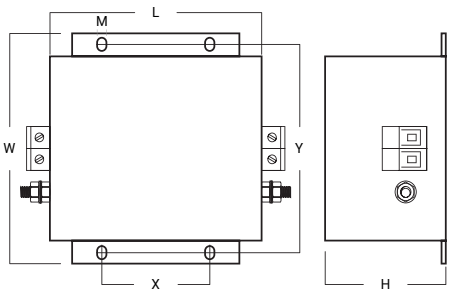


RFI filters for industrial applications up to 55A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400, CSA & UL. Input and output connections by shrouded terminals.
All units are manufactured to EN133200 specifications and carry the CE mark.

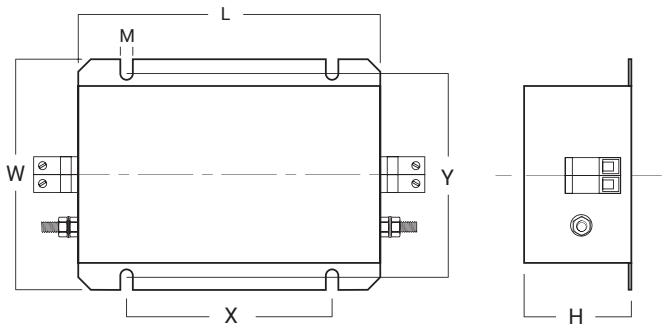
200-250Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current (mA) @ 250V 60Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 1008-FSA	8	4.9	0 - 6	M5	100	105	57	51	95	M4
RF 1012-FSA	12	4.9	0 - 6	M5	100	105	57	51	95	M4
RF 1020-FSA	20	4.9	0 - 6	M5	100	105	57	51	95	M4
RF 1030-FSA	30	5.3	0 - 10	M5	100	105	57	51	95	M4
RF 1055-FSA	55	11	0 - 25	M5	180	115	60	115	100	M6

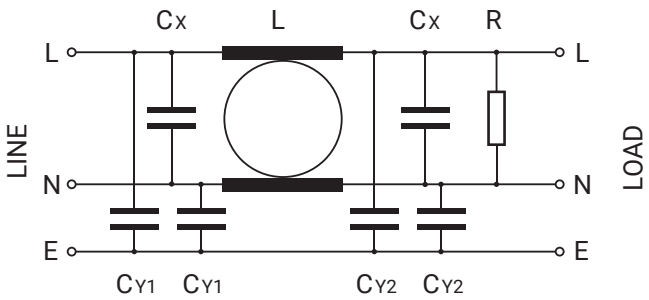
RF 1008 - 1030-FSA



RF 1055-FSA



Circuit Schematics



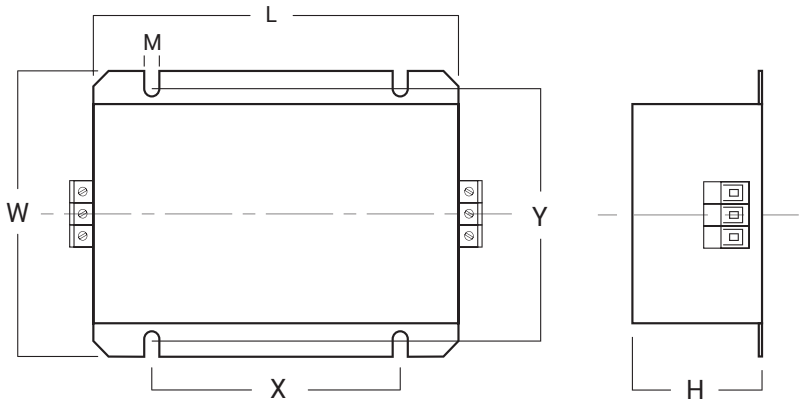
FSB - SINGLE PHASE *(EQUIVALENT TO FN357)*

RFI filters for industrial applications up to 16A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400,
CSA & UL. Input and output connections by shrouded terminals.
All units are manufactured to EN133200 specifications and carry the CE mark.

200-250Vac, 48-62Hz

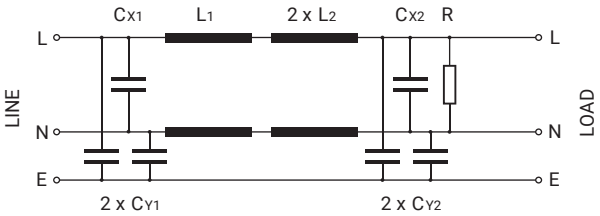
Filter Part No.	Rated Current @ 40°C	Leakage Current (mA) @ 250V 60Hz	Terminals (mm²)	Earth Terminal (mm²)	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 1006-FSB	6	3.8	0 - 6	0 - 6	150	105	50	85	90	M6
RF 1010-FSB	10	4.8	0 - 6	0 - 6	150	105	50	85	90	M6
RF 1016-FSB	16	8.1	0 - 6	0 - 6	175	130	65	90	115	M6

RF 1006 - 1016-FSB

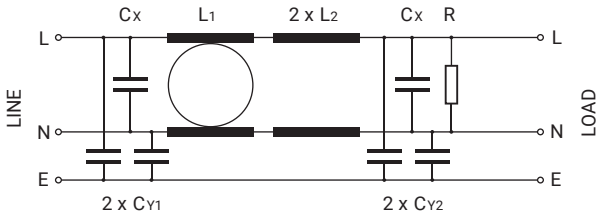


Circuit Schematics

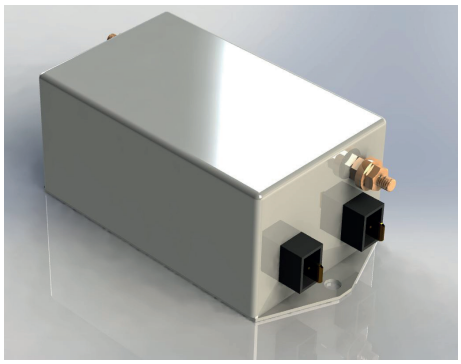
RF 1006 -FSB



RF 1010, 1016-FSB



FSE - SINGLE PHASE *(EQUIVALENT TO FN2070)*

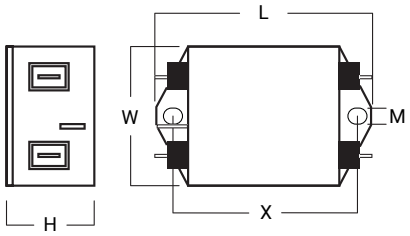


RFI filters for industrial applications up to 16A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400, CSA & UL. Input and output connections by fast-on terminals to 12A and shrouded terminals for 16A.
All units are manufactured to EN133200 specifications and carry the CE mark.

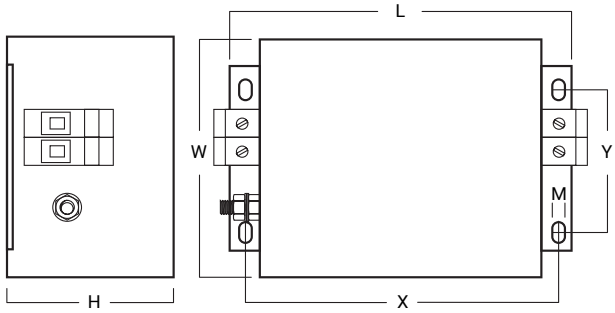
200-250Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current (mA) @ 250V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 1001-FSE	1	0.4	Fast-on	Fast-on	85	54	30	75	-	M5
RF 1003-FSE	3	0.4	Fast-on	Fast-on	85	54	40	75	-	M5
RF 1006-FSE	6	0.4	Fast-on	Fast-on	114	58	45	103	-	M4
RF 1010-FSE	10	0.4	Fast-on	Fast-on	156	58	45	143		M5
RF 1012-FSE	12	0.4	Fast-on	Fast-on	156	58	45	143		M5
RF 1016-FSE	16	0.4	0 - 6	M5	119	86	58	109	51	M4

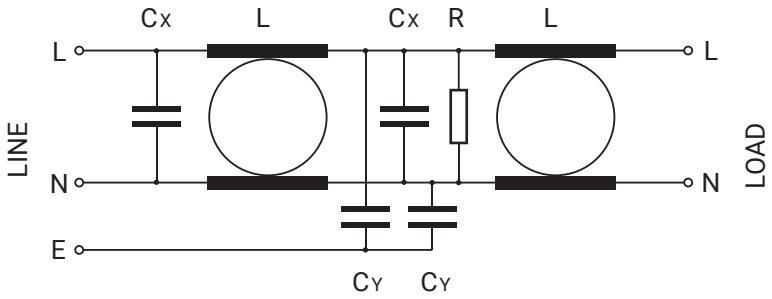
RF 1001 - 1012-FSE



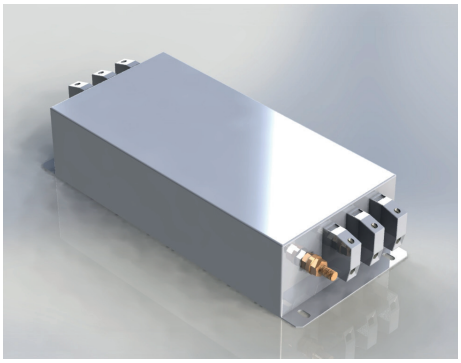
RF 1016-FSE



Circuit Schematics



FSH - THREE PHASE *(EQUIVALENT TO FN351)*

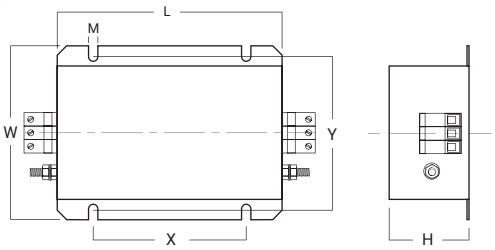


RFI filters for industrial applications up to 280A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400, CSA & UL. Input and output connections by shrouded terminals up to 180A and threaded stud type terminals for 280A .
All units are manufactured to EN133200 specifications and carry the CE mark.

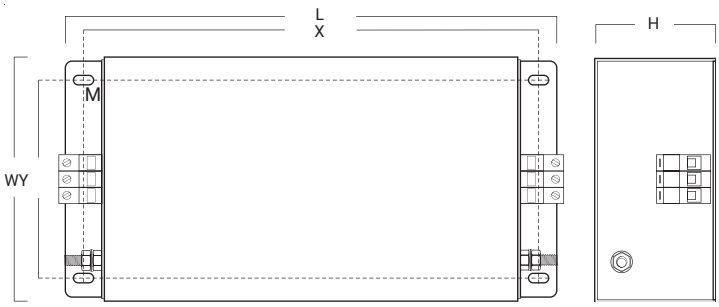
380-480Vac, 48-62Hz

Filter Part No.	Rated Current @ 50°C	Leakage Current nom - max (Ma) @ 440V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 3005-FSH	5A	0.5 - 14	0 - 6	M5	150	105	50	85	90	M6
RF 3008-FSH	8A	0.5 - 14	0 - 6	M5	180	115	60	115	100	M6
RF 3016-FSH	16A	0.5 - 14	0 - 6	M6	200	150	65	115	136	M6
RF 3025-FSH	25A	1.3 - 130	0 - 10	M6	200	150	65	115	136	M6
RF 3036-FSH	36A	1.3 - 130	0 - 10	M6	200	150	65	115	136	M6
RF 3050-FSH	50A	1.3 - 140	0 - 16	M6	200	150	65	115	136	M6
RF 3080-FSH	80A	1.3 - 140	6 - 35	M8	400	170	90	373	130	M6
RF 3110-FSH	110A	2 - 160	16 - 70	M8	400	170	90	373	130	M6
RF 3180-FSH	180A	2 - 160	25 - 120	M10	510	180	115	470	156	M8
RF 3280-FSH	280A	2.5 - 200	M12 Stud	M10	700	260	130	660	220	M8

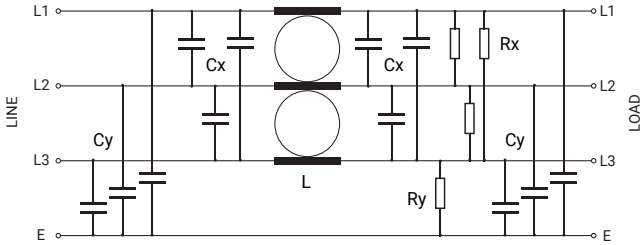
RF 3005 - 3050-FSH



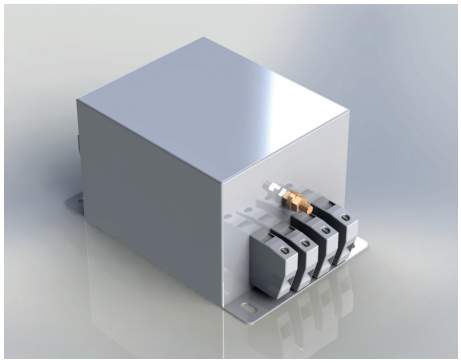
RF 3080 - 3280-FSH



Circuit Schematics



FSK - THREE PHASE *(EQUIVALENT TO FN356)*

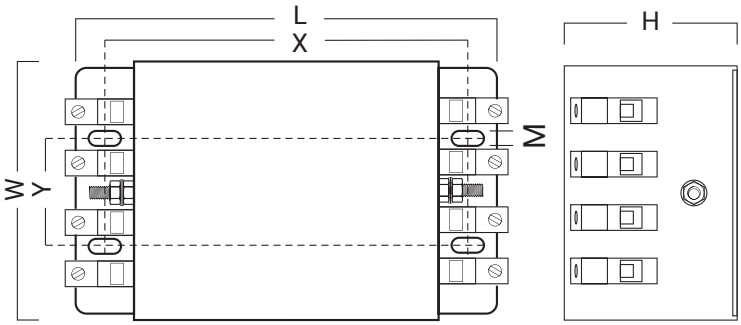


RFI filters for industrial applications up to 100A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400, CSA & UL. Input and output connections by shrouded terminals.
All units are manufactured to EN133200 specifications and carry the CE mark.

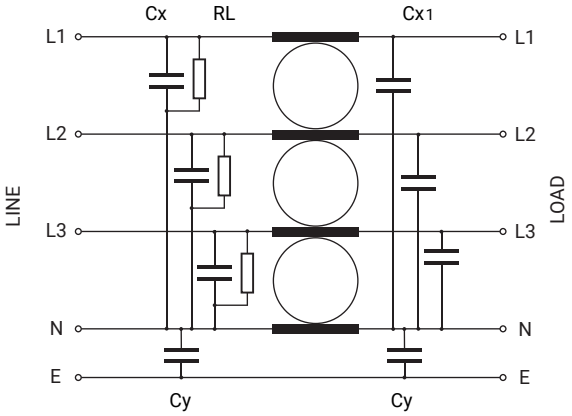
380-480Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current nom - max (Ma) @ 440V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 4016-FSK	16	0.05 - 2.1	0 - 6	M6	190	105	80	165	50	M6
RF 4025-FSK	25	0.05 - 2.1	0 - 10	M6	190	105	80	165	50	M6
RF 4036-FSK	36	0.05 - 2.1	0 - 16	M6	190	105	80	165	50	M6
RF 4050-FSK	50	0.05 - 2.1	0 - 25	M6	192	122	102	168	98	M6
RF 4100-FSK	100	0.05 - 6.6	16 - 70	M10	250	160	130	230	130	M6

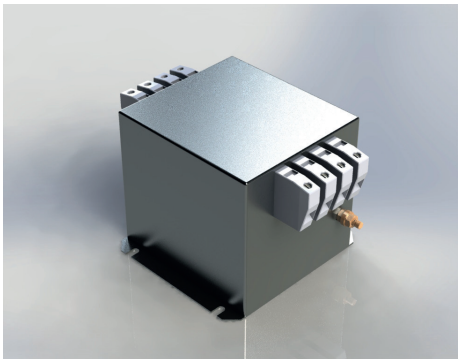
RF 4016 - 4100-FSK



Circuit Schematics



FSN - 3PH & NEUTRAL *(EQUIVALENT TO FN256)*

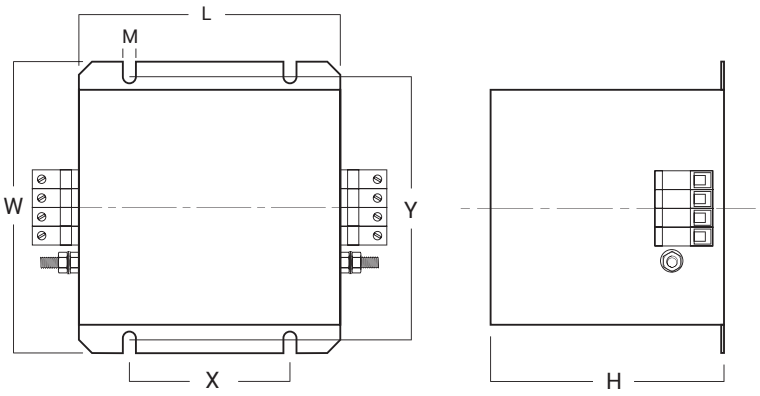


RFI filters for industrial applications up to 64A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400, CSA & UL. Input and output connections by shrouded terminals.
All units are manufactured to EN133200 specifications and carry the CE mark.

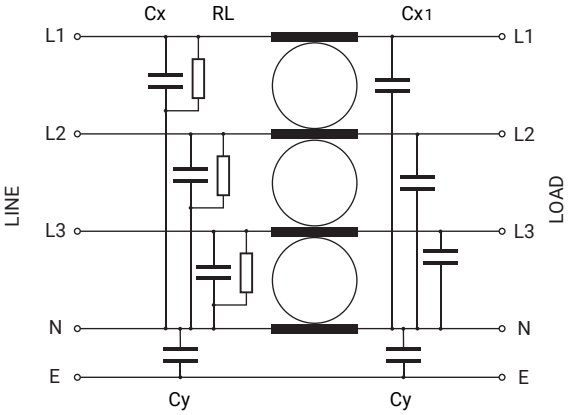
380-480Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current nom - max (Ma) @ 440V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 4008-FSN	8	0.05 - 14	0 - 6	M6	120	143	80	80	127.5	M6
RF 4016-FSN	16	0.05 - 14	0 - 6	M6	120	143	80	80	127.5	M6
RF 4025-FSN	25	0.05 - 14	0 - 10	M6	130	153	95	90	137.5	M6
RF 4036-FSN	36	0.05 - 14	0 - 10	M6	130	153	95	90	137.5	M6
RF 4064-FSN	64	0.05 - 14	6 - 35	M6	140	153	125	100	137/5	M6

RF 3005 - 3050-FSH



Circuit Schematics



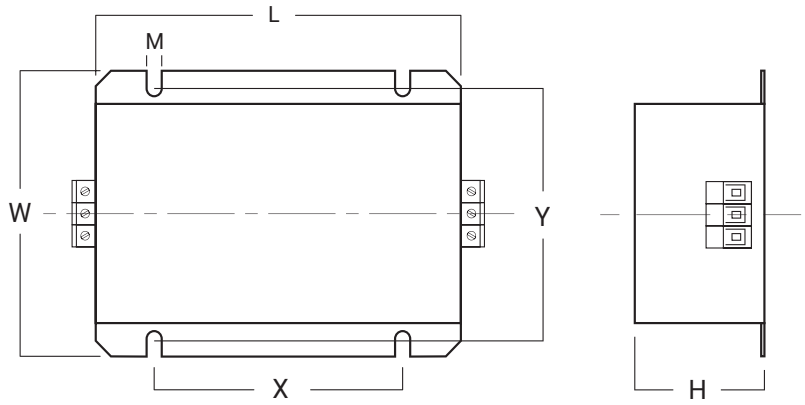
FST - SINGLE PHASE *(EQUIVALENT TO FN685)*

RFI filters for industrial applications up to 36A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400, CSA & UL. Input and output connections by shrouded terminals.
All units are manufactured to EN133200 specifications and carry the CE mark.

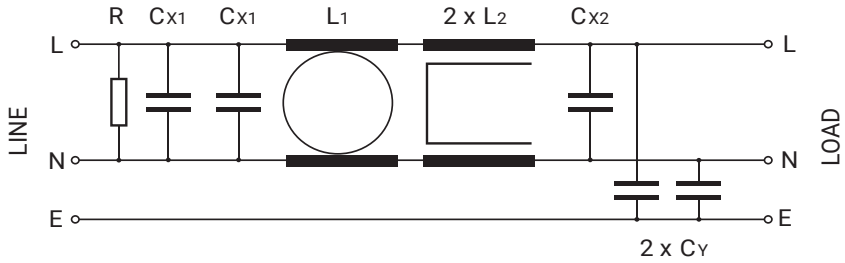
200-250Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current (mA) @ 250V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 1010-FST	10	0.4	0 - 6	-	150	105	50	85	90	M6
RF 1016-FST	16	0.4	0 - 6	-	150	105	50	85	90	M6
RF 1025-FST	25	1.7	0 - 10	-	170	129	60	115	113	M6
RF 1036-FST	36	1.7	0 - 10	-	170	129	60	115	113	M6

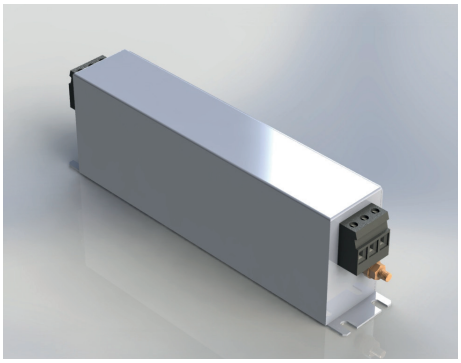
RF 1010 - 1036-FST



Circuit Schematics



FTF - THREE PHASE *(EQUIVALENT TO FN3258)*

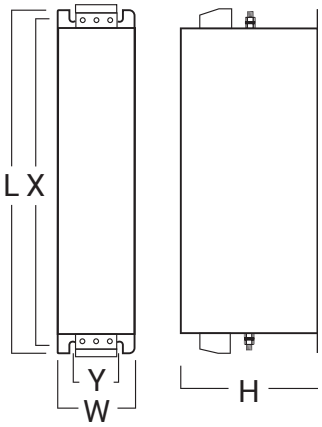


RFI filters for industrial applications up to 180A.
All filters are constructed with self-healing interference suppression capacitors approved to EN132400 & UL. Input and output connections by shrouded type terminals.
All units carry the CE mark.

380-480Vac, 48-62Hz

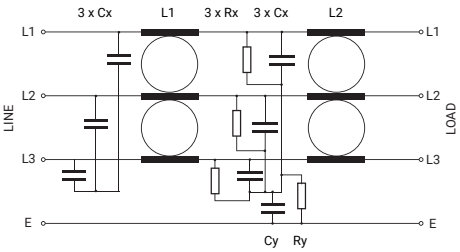
Filter Part No.	Rated Current @ 40°C	Leakage Current nom - max (Ma) @ 440V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 3007-FTF	7	0.7 - 68	0 - 6	M5	190	40	70	175	20	M5
RF 3016-FTF	16	1.3 - 130	0 - 6	M5	250	45	70	235	25	M5
RF 3030-FTF	30	0.7 - 68	0 - 10	M6	270	50	85	255	30	M5
RF 3042-FTF	42	1.3 - 130	0 - 10	M6	310	50	85	295	30	M5
RF 3055-FTF	55	1.3 - 130	0 - 25	M6	250	85	90	235	60	M5
RF 3075-FTF	75	2.0 - 160	0 - 25	M6	270	80	135	255	60	M6
RF 3100-FTF	100	2.0 - 160	16 - 70	M10	270	90	150	255	65	M6
RF 3130-FTF	130	2.0 - 160	16 - 70	M10	270	90	150	255	65	M6
RF 3180-FTF	180	2.5 - 180	25 - 120	M10	380	120	170	365	102	M6

RF 3007 - 3180-FTF

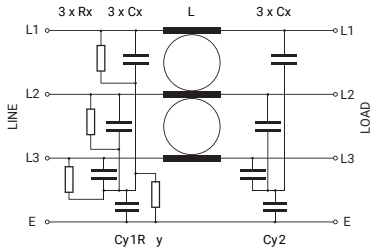


Circuit Schematics

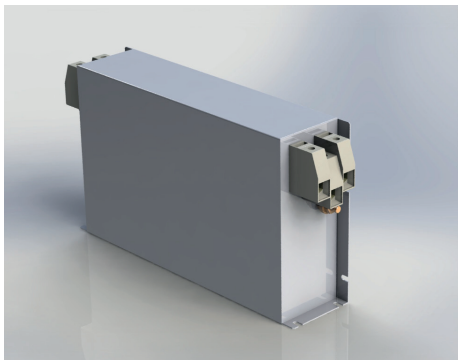
7 - 55A



75 - 180A



FTJ - THREE PHASE *(EQUIVALENT TO FN3100)*

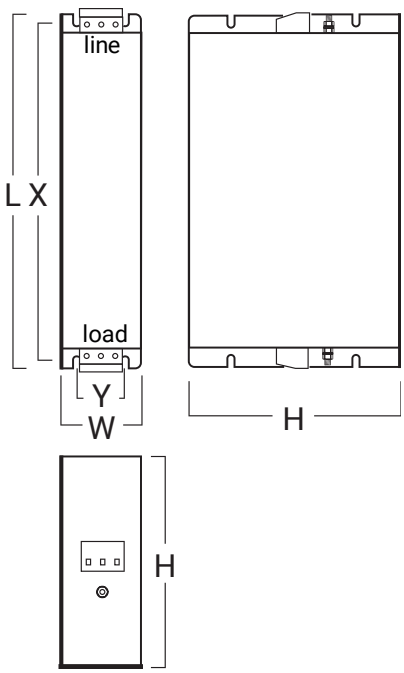


RFI filters for use in regenerative drive applications up to 230A.
All filters are constructed with X2 interference suppression capacitors approved to European and UL Standards.
Input and output connections by shrouded type terminals. All units are manufactured to EN133200 specifications and carry the CE mark.

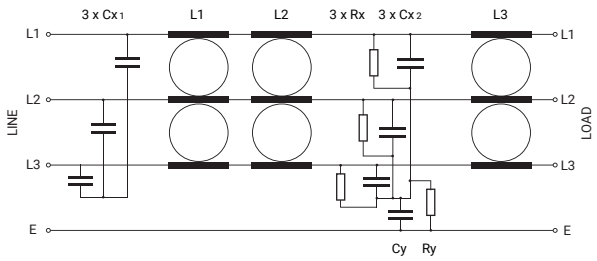
380-520Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current nom - max (Ma) @ 440V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 3035-FTJ	35	2 - 200	0 - 10	M5	335	60	160	320	35	M6
RF 3050-FTJ	50	2.5 - 250	6 - 35	M6	329	80	185	314	55	M6
RF 3080-FTJ	80	3 - 280	16 - 70	M8	379	90	220	364	65	M6
RF 3110-FTJ	110	3 - 280	16 - 70	M8	379	90	220	364	65	M6
RF 3150-FTJ	150	3 - 280	25 - 120	M10	429	110	240	414	80	M6
RF 3200-FTJ	200	3 - 280	25 - 120	M10	429	110	240	414	80	M6
RF 3230-FTJ	230	3 - 280	25 - 120	M10	429	110	240	414	80	M6

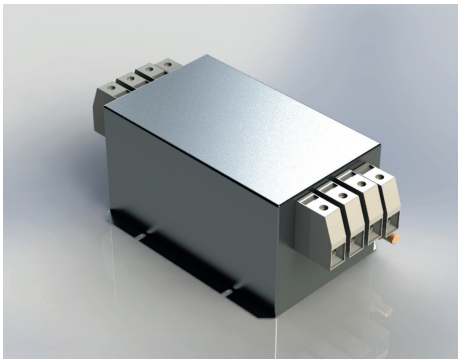
RF 3035 - 3230-FTJ



Circuit Schematics



FTR - THREE PHASE & NEUTRAL

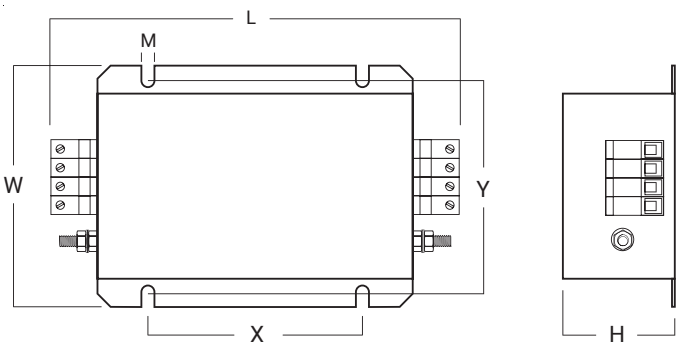


RFI filters for industrial applications up to 160A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400 & UL. Input and output connections by shrouded terminals.
All units are manufactured to EN133200 specifications and carry the CE mark.

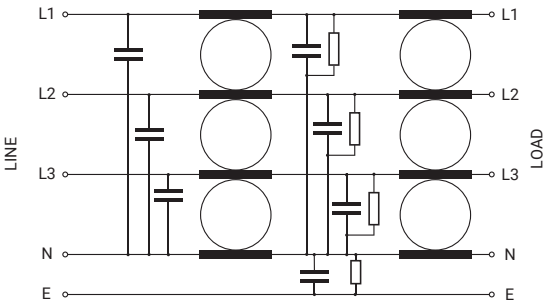
380-480Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current nom (Ma) @ 440V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 4008-FTR	8	0.05	0 - 6		144	143	80	80	128	M6
RF 4016-FTR	16	0.05	0 - 6		144	143	80	80	128	M6
RF 4025-FTR	25	0.05	0 - 10		162	153	115	90	138	M6
RF 4036-FTR	36	0.05	0 - 10		162	153	115	90	138	M6
RF 4064-FTR	64	0.05	6 - 35		238	153	125	100	138	M6
RF 4080-FTR	80	0.05	16 - 70		316	163	125	120	148	M6
RF 4120-FTR	120	0.05	16 - 70		336	170	140	200	154	M6
RF 4160-FTR	160	0.05	25 - 120		380	170	170	230	154	M6

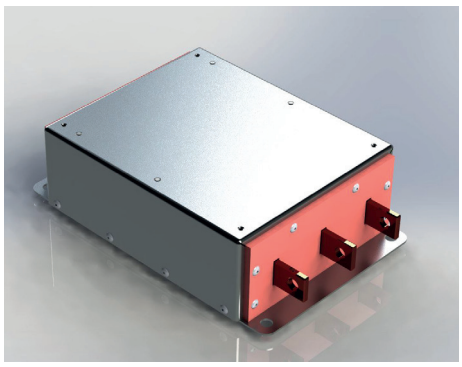
RF 4008 - 4160-FTR



Circuit Schematics



FTX - 3PH *(EQUIVALENT TO FN3275X)*

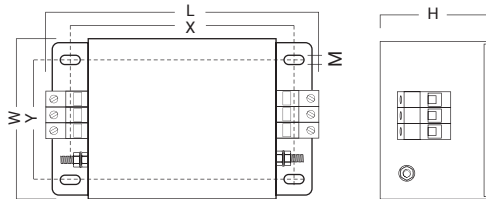


RFI filters for industrial applications up to 600A.
All filters are constructed with self-healing interference suppression capacitors approved to EN132400 & UL.
Input and output connections by shrouded terminals or Busbar.
All units are manufactured to EN133200 specifications and carry the CE mark.

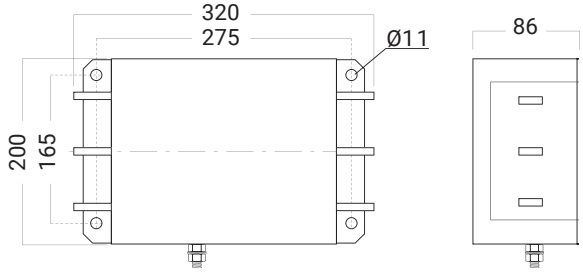
380-480Vac, 48-62Hz

Filter Part No.	Rated Current @ 40°C	Leakage Current nom - max (Ma) @ 440V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 3010-FTX	10	1.3 - 130	0 - 6	M4	178	140	65	70	125	M6
RF 3020-FTX	20	1.3 - 130	0 - 6	M4	178	140	65	70	125	M6
RF 3035-FTX	35	1.3 - 130	0 - 16	M5	280	158	65	115	145	M6
RF 3050-FTX	50	1.3 - 130	6 - 35	M6	280	158	65	115	145	M6
RF 3065-FTX	65	1.3 - 130	6 - 35	M6	280	158	65	115	145	M6
RF 3080-FTX	80	1.3 - 130	16 - 70	M8	306	168	120	115	155	M6
RF 3100-FTX	100	1.3 - 130	16 - 70	M8	306	168	120	115	155	M6
RF 3150-FTX	150	3 - 280	Bar 20 x 3	M10	320	200	86	275	165	M10
RF 3200-FTX	200	3 - 280	Bar 20 x 3	M10	320	200	86	275	165	M10
RF 3250-FTX	250	3 - 280	Bar 20 x 3	M10	320	200	86	275	165	M10
RF 3320-FTX	320	3 - 280	Bar 20 x 6	M10	320	200	86	275	165	M10
RF 3400-FTX	400	3 - 280	Bar 20 x 6	M10	320	200	86	275	165	M10
RF 3600-FTX	600	3 - 280	Bar 20 x 8	M10	320	200	86	275	165	M10

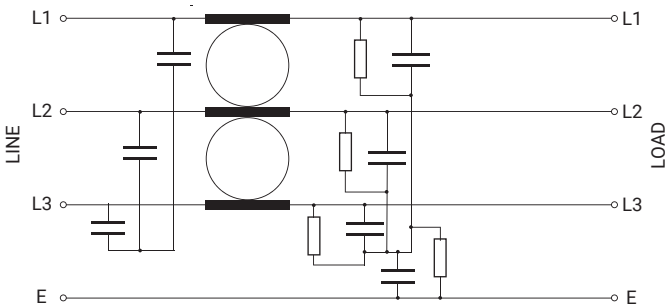
RF 3010 - 3100-FTX



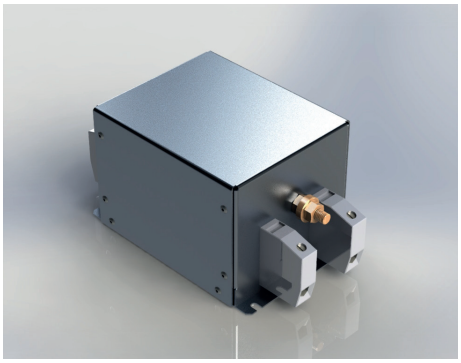
RF 3150 - 3600-FTX



Circuit Schematics



FVG- SINGLE PHASE *(EQUIVALENT TO FN2410)*

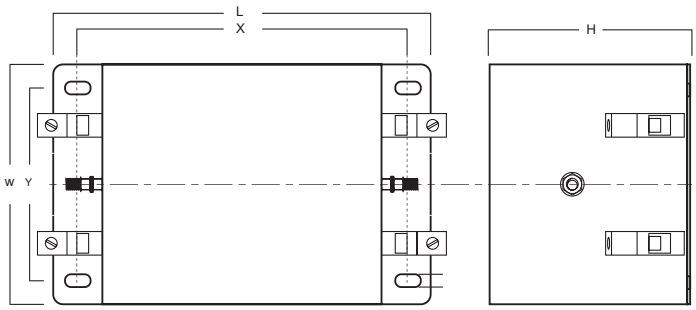


RFI filters for industrial applications up to 100A.
All filters are constructed with self-healing X and Y interference suppression capacitors approved to EN132400 & UL. Input and output connections by shrouded terminals.
All units are manufactured to EN133200 specifications and carry the CE mark.

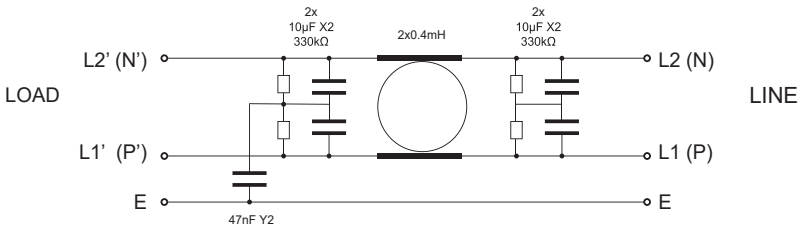
520Vac, 48-62Hz

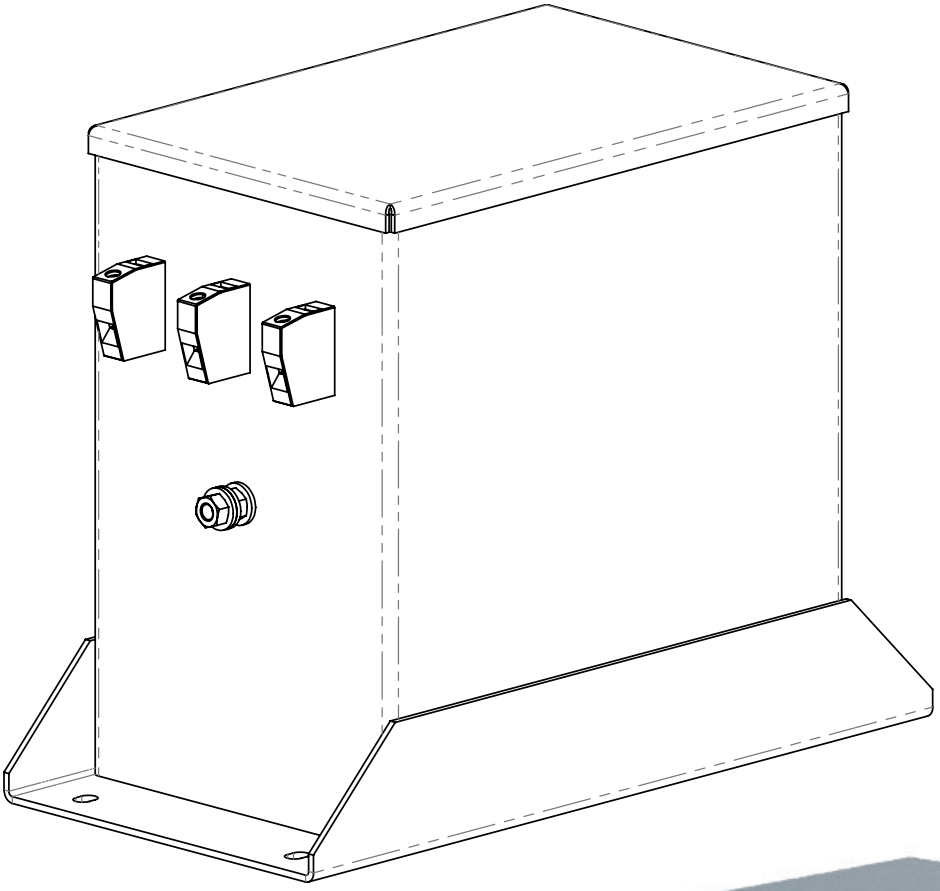
Filter Part No.	Rated Current @ 50°C	Leakage Current nom (Ma) @ 520V 50Hz	Terminals (mm²)	Earth Stud	Case Dimensions (mm)			Mounting (mm)		
					L	W	H	X	Y	ØM
RF 1008-FVG	8	5.4	0-10	M6	130	93	62	120	70	M5
RF 1016-FVG	16	5.4	0-10	M6	130	93	62	120	70	M5
RF 1025-FVG	25	5.4	0-25	M6	130	93	76	120	70	M5
RF 1032-FVG	32	5.4	0-25	M6	130	93	76	120	70	M5
RF 1045-FVG	45	5.4	0-25	M6	130	93	76	120	70	M5
RF 1060-FVG	60	5.4	6-35	M8	165	115	100	155	90	M5
RF 1080-FVG	80	5.4	6-35	M8	165	115	100	155	90	M5
RF 1100-FVG	100	5.4	6-35	M8	165	115	100	155	90	M5

RF 1008 - 1100-FVG



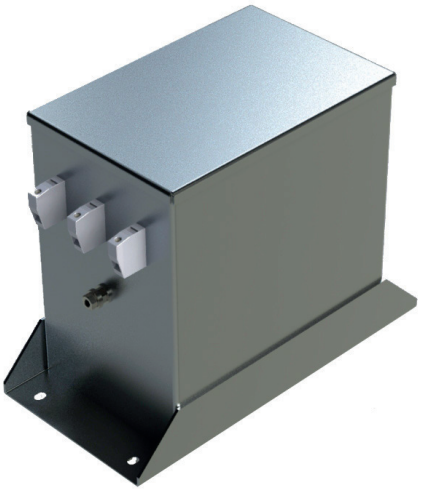
Circuit Schematics





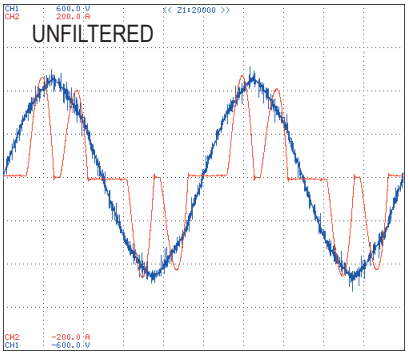
HPC Series Power Correction Filters

- Power Correction filters for applications up to 156A.
- Reduces harmonic content and improves Power Factor of system
- Significant energy saving (15-25% possible) by reduction of total kVA .
- Input and output connections by shrouded terminals.
- Manufactured to EN133200 specifications and carry the CE mark.

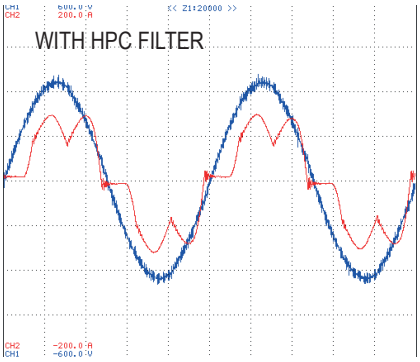


Nominal Voltage	**1Ø 250VAC, 3Ø 480VAC**
Nominal Current	**10-156A (see table)**
Overload	**200% at turn-on; 150% for 1 minute/hour**
Ambient Temp	**-25°C to +40°C (up to +85°C with de-rating)**
Residual Ripple	**approx 4-5%**
Power Connection	**Shrouded Terminals**

EXAMPLE SYSTEM INPUT CURRENT



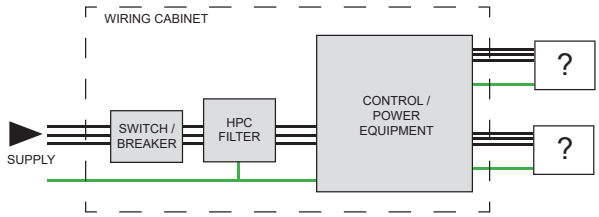
Typical voltage/current waveform of system containing motor drives.
Current is highly non-sinusoidal.



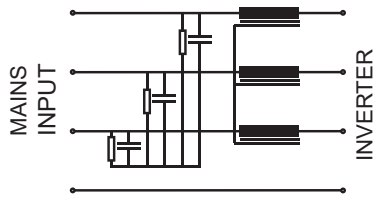
Filter has reduced current peaks and improved power factor.
Consumed kVA is reduced.

Filter Part No.	Current @ 40°C	Rated Voltage	Voltage Drop	Terminal (mm²)	Earth Stud	Case Dimensions (mm) L	W	H	A	Mounting (mm) X	Y	M	Weight (kg)
RF 1010-HPC	10	1Ø 250	4%	0-6	M5	216	75	140	155	185	50	M5	3
RF 1016-HPC	16	1Ø 250	4%	0-6	M5	216	75	140	155	185	50	M5	4
RF 3011-HPC	11	3Ø 480	4%	0-6	M5	180	80	140	140	160	50	5.2x12	5
RF 3016-HPC	16	3Ø 480	4%	0-6	M5	180	80	140	140	160	50	5.2x12	7
RF 3025-HPC	25	3Ø 480	4%	0-25	M5	260	110	185	180	230	70	6.7x15	8
RF 3035-HPC	35	3Ø 480	4%	0-25	M5	260	110	185	180	230	70	6.7x15	10
RF 3060-HPC	60	3Ø 480	4%	6-35	M5	310	120	230	230	280	80	6.7x15	14
RF 3075-HPC	75	3Ø 480	4%	16-70	M5	310	120	230	230	280	80	6.7x15	16
RF 3095-HPC	95	3Ø 480	4%	16-70	M8	340	130	265	260	310	90	8.4x12	20
RF 3124-HPC	124	3Ø 480	4%	25-120	M8	360	130	265	260	320	90	8.4x12	22
RF 3156-HPC	156	3Ø 480	4%	25-120	M8	380	190	295	280	340	130	8.4x12	27

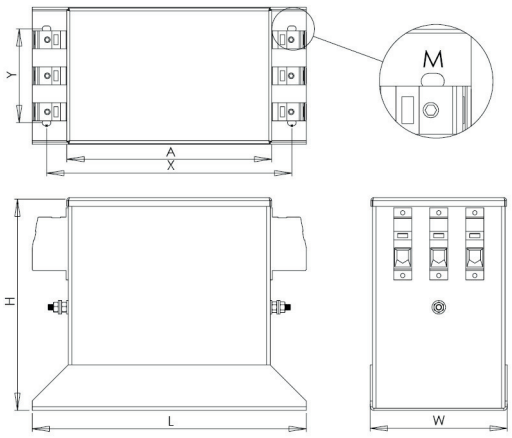
Simplified System Schematic



Circuit Schematic



Dimensions



HPC Filter Site Test

Location: Park Regis Hotel, Dubai

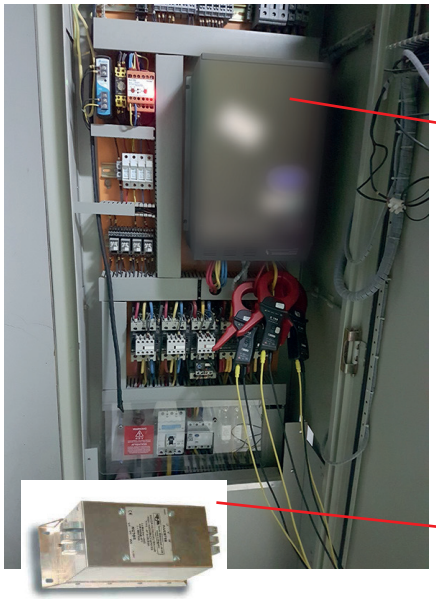
Equipment: Cold water circulation pump control cabinet running motor and impeller pump

Objective: REDUCTION OF CONSUMED POWER (kVA) by addition of Power Correction filter on motor inverter input to improve input current waveform and reduce kVA consumed

Motor inverters use a capacitor bank as a smooth DC power source for the switching IGBTs to form the PWM output waveform. This DC bus is "topped up" by a three-phase rectifier from the mains supply. As power is used from the DC bus, current is not drawn sinusoidally and in phase with the input voltage, but more in pulses from the points of maximum potential difference between the input phases - very little current is drawn at the crest of each ground to phase potential. Therefore the power factor is far from unity and a large difference between "useful" kW and the measured input kVA can be seen.

Test Configurations: Input power characteristics were measured using a 3-phase power analyser, monitoring the input voltage and current of all three phases.

Initially, measurements were taken without alteration to the cabinet, to give a reference reading.
The RF 3035-HPC Power Correction filter was then fitted in the bottom area of the cabinet and the input power characteristics measured again.



VFD running large water pump

Position of test RF 3035-HPC Power correction filter

Current clamps and voltage probes

CONCLUSIONS (REFER TO RESULT DATA ON NEXT PAGE)

Fitting of the Power Correction Filter improves power factor significantly and reduces consumed kVA by 25%

Multiplying these figures accordingly for a number of pumps of varying size in a complete installation clearly show huge savings in kVA consumed by the installation

The client was aware of the problems caused by poor power factor and high "watt-less currents" that cause cable overheating and require oversized power cables for the eventual kW power used by consumers.

At present the client is charged by kWh consumed, so there may be no immediate cost saving to the consumer by fitting the Power Correction Filter. However, it is very likely that electricity authorities will start to penalise consumers for poor power factor and could eventually charge for kVAh instead, meaning that installation of such filters could see savings of around 25% for such motor driven equipment.

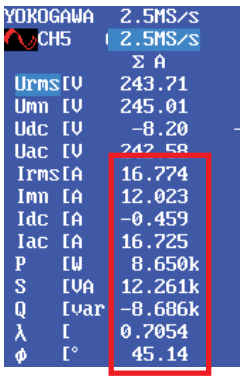
On new installation, there may be a cost saving on installation as the reduced RMS current may allow a lower cross-section of cable and lower values of protection breaker to be used.

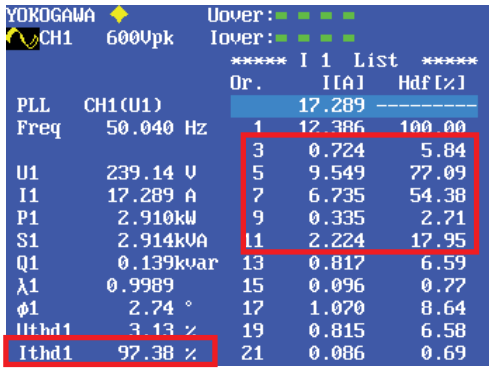
Unfiltered Measurement

Input Current (Irms)	16.77A
Power Factor	0.705
Input Power	8.65kW
Input VA	12.26kVA

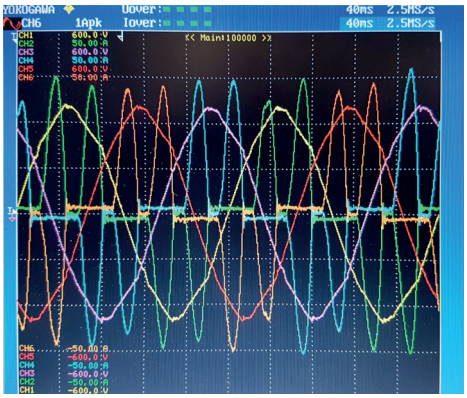
Input current harmonics are high

Ithd	97.38%
5th I harmonic	77.09%
7th I harmonic	54.38%

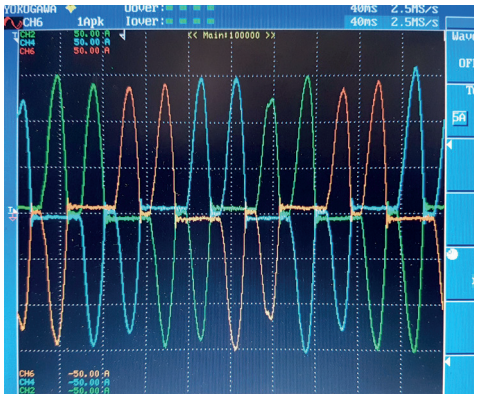




Phase voltages and currents



3-phase currents only



Current is drawn in sharp pulses - little current is drawn at the peak of the voltage cycle
Instantaneous current pulses are high.

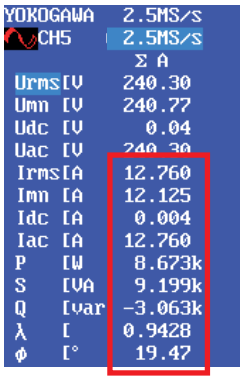
With RF 3035-HPC, 35A Power Correction Filter Measurement

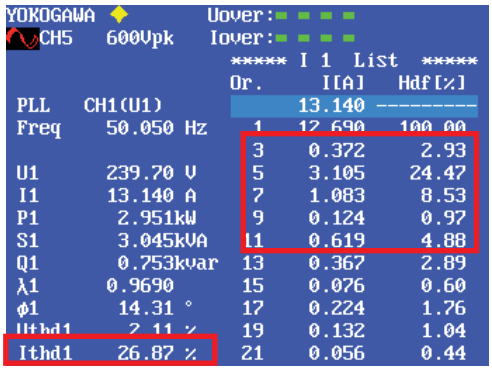
Input Current (Irms)	12.76A
Power Factor	0.94
Input Power	8.67kW
Input VA	9.2kVA

= 25% kVA REDUCTION

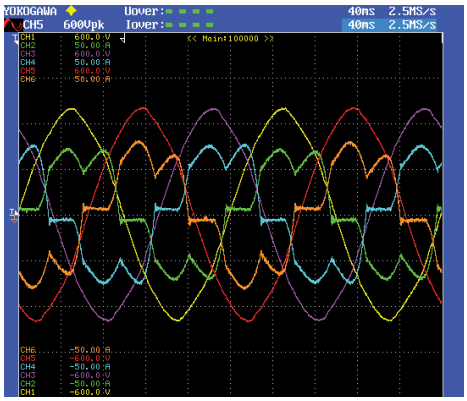
Input current harmonics reduced
= 72% THD REDUCTION

Ithd	26.87%
5th I harmonic	24.47%
7th I harmonic	8.53%

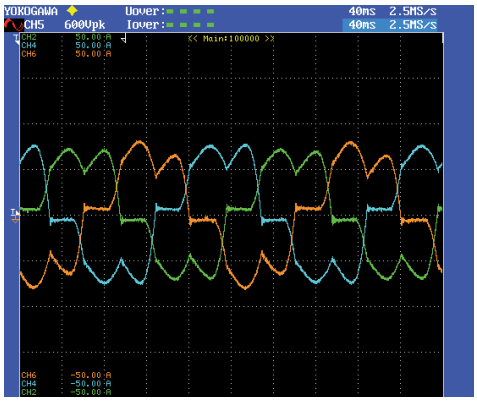




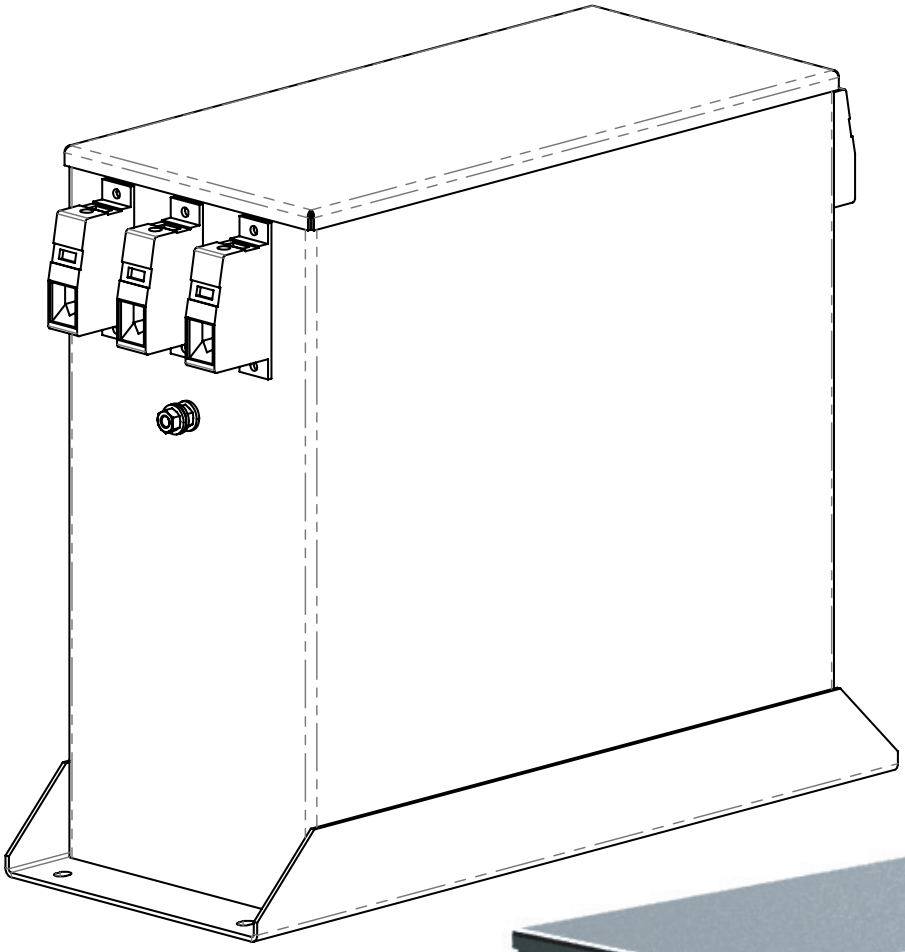
Phase voltages and currents



3-phase currents only



Power factor is significantly improved - Current is drawn much more evenly over the voltage cycle
Instantaneous current pulses are reduced

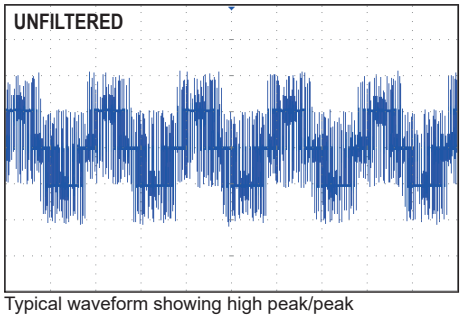


SOF Series Motor Output Filters

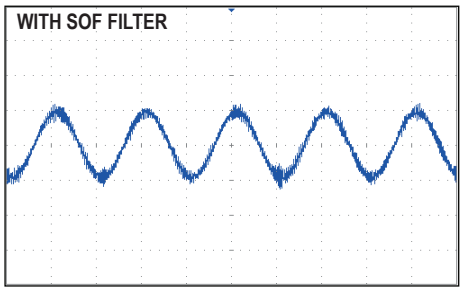
- Motor Output (Sinus) Filters for applications to 150A.
- Designed for use on the output of motor inverters.
- Forms PWM output waveform into sinusoidal voltage
- Helps to prevent damage to three-phase motor winding insulation by significant reduction of dV/dt and motor voltage overshoot.
- Input and output connections by shrouded-type terminals.
- All units carry the CE mark.

Nominal Voltage	**480VAC**
Nominal Current	**4-150A (see table)**
Overload	**200% at turn-on; 150% for 1 minute/hour**
Ambient Temp	**-25°C to +40°C (up to +85°C with de-rating)**
Frequency	**0-70Hz**
Switching Frequency	**4-16kHz**
Residual Ripple	**approx 4-5%**
Power Connection	**Shrouded Terminals**
Earth Connection	**Stud on case body**
For motor cables	**upto 400m shielded; upto 300m unshielded**

MOTOR TERMINAL VOLTAGE



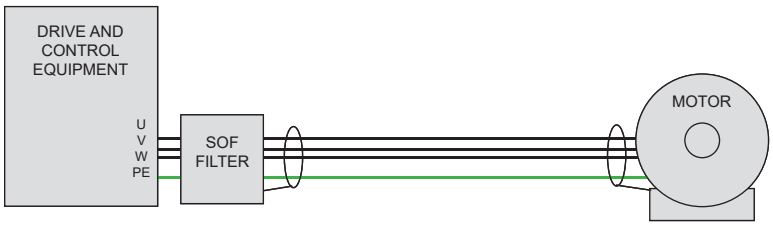
Typical waveform showing high peak/peak voltages and high dV/dt switching edges



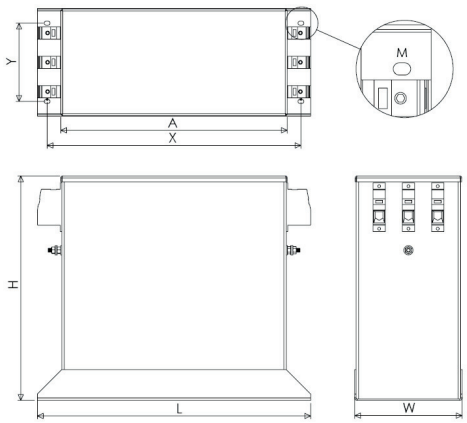
Filter has shaped output into sine wave and reduced dV/dt rise time

Filter Part No.	Current @ 40°C	Power Loss (W)	Voltage Drop	Terminal (mm²)	Earth Stud	Case Dimensions (mm) L	W	H	A	Mounting (mm) X	Y	M	Weight (kg)
RF 3004-SOF	4	45	4%	0-6	M5	180	80	150	140	160	50	5.2x12	4.5
RF 3012-SOF	12	90	5%	0-6	M5	250	110	220	210	230	70	5.2x12	10
RF 3018-SOF	18	115	5%	0-10	M5	250	110	220	210	230	70	5.2x12	16
RF 3024-SOF	24	130	5%	0-25	M6	310	130	230	230	280	90	6.7x15	20
RF 3032-SOF	32	140	5%	0-25	M6	310	130	230	230	280	90	6.7x15	23
RF 3048-SOF	48	230	5%	0-25	M6	340	200	270	260	310	140	6.7x15	38
RF 3060-SOF	60	250	5%	6-35	M6	340	200	270	260	310	140	6.7x15	45
RF 3075-SOF	75	290	6%	16-70	M8	410	190	320	320	370	130	8.4x12	51
RF 3090-SOF	90	360	6%	16-70	M8	410	190	320	320	370	130	8.4x12	58
RF 3110-SOF	110	430	6%	25-120	M8	420	220	350	320	380	160	8.4x12	70
RF 3150-SOF	150	750	6%	25-120	M8	560	220	460	460	520	160	8.4x12	85

Simplified System Schematic



Dimensions



SOF Motor Output Filter Site Test

Location: **Bur Juman Shopping Centre, Dubai.**

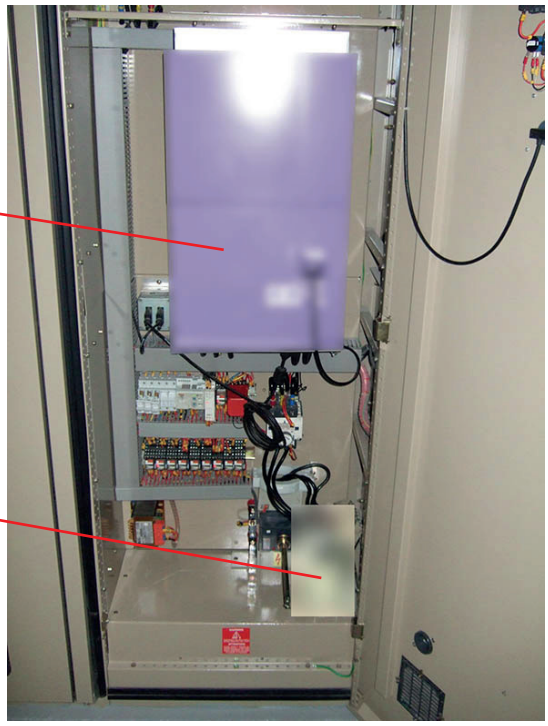
Equipment: Air conditioning, cold water circulation pump control cabinet running motor and impeller pump.

Objective: REDUCE RISK OF MOTOR DAMAGE by addition of Motor Protection filter to reduce high peak to peak currents and high dV/dt across motor terminals.

The PWM output from motor inverters typically uses a 2kHz - 16kHz carrier frequency, containing the modulated pulses. These high frequency pulses, combined with the motor cable and motor winding capacitances can cause undesired voltage overshoots and high frequency ringing. These high voltages and high rates of voltage change (dV/dt) cause deterioration of the motor winding insulation, leading to early motor failure. Use of a motor protection filter can prevent early motor failure by significantly reducing voltage overshoot and dV/dt, forming the output waveform into a much better sine wave simulation.

Test Configurations: Using an oscilloscope and high voltage differential probe, characteristics of the motor output waveform from the inverter were measured directly at the motor terminals on the motor itself. This method shows the voltage overshoot and high dV/dt problem created by motor cable capacitances.

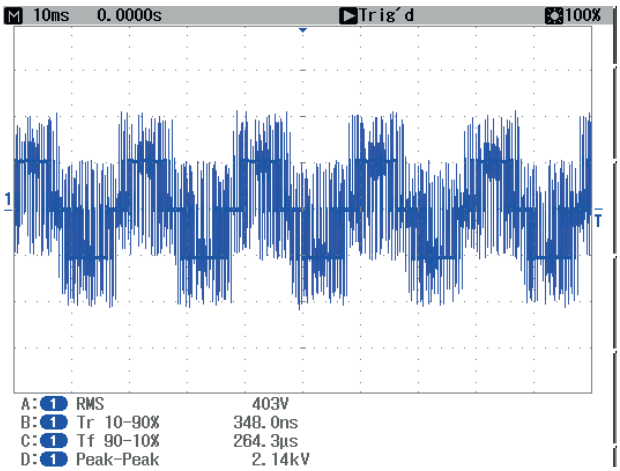
Initially measurements were taken without alteration to the cabinet to obtain a reference reading.
The RF 3095-SOF motor output filter was then fitted in the base of the cabinet into the three motor output cables and measurements taken again.

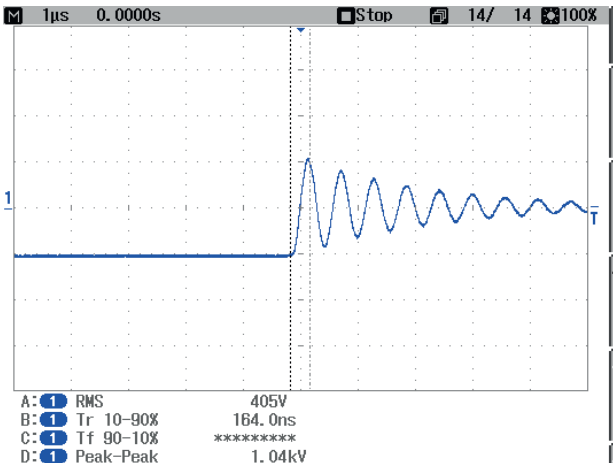


CONCLUSIONS (REFER TO RESULT DATA ON NEXT PAGE)

Fitting of the Motor Protection Filter greatly improves the shaping of the PWM output towards a sine wave. Voltage overshoot and dV/dt are lowered to within the recommended values, so reducing the risk of damage to motor winding insulation and early failure. Fitting of the Motor Protection filter can easily be justified by the potential cost of a replacement motor, plus the maintenance cost and down time inconvenience.

Unfiltered Measurement



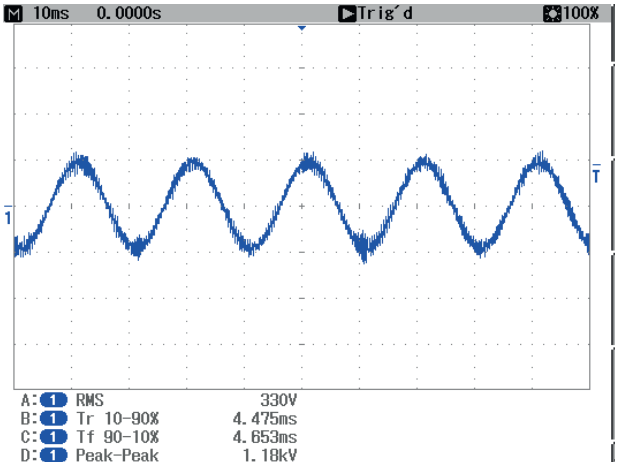


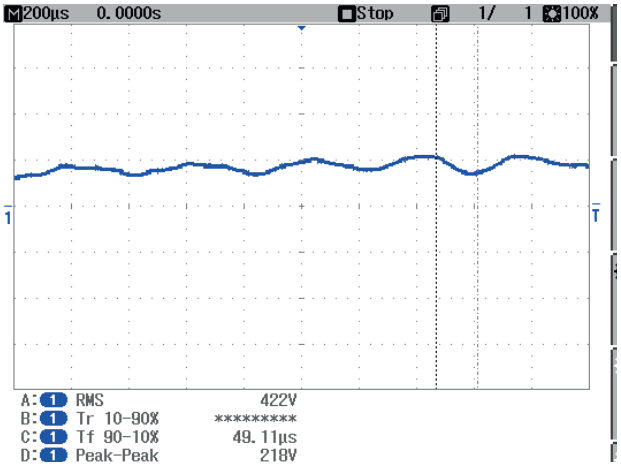
Phase to phase voltage at
motor terminals = 2.14kV

dV/dt = (1004 x 0.8) / 0.164
= 4897V/us
A very high reading, likely to cause premature damage to motor winding insulation

---

Filtered Measurement





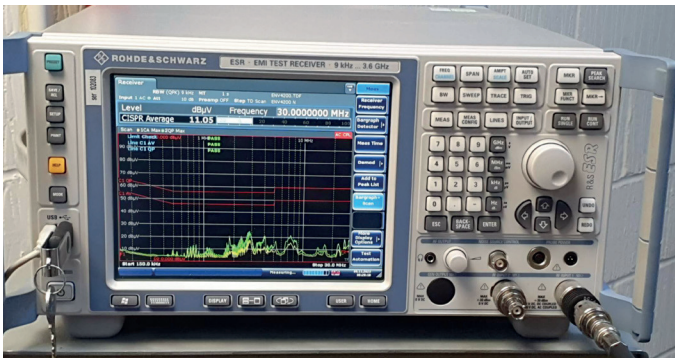
RF 3090-SOF
90A Motor Filter

Phase to phase voltage at
motor terminals = 1.18kV

dV/dt = (218 x 0.8) / 49.11
= 3.55V/us
A drastically reduced reading, well within the safe operating range of any motor.

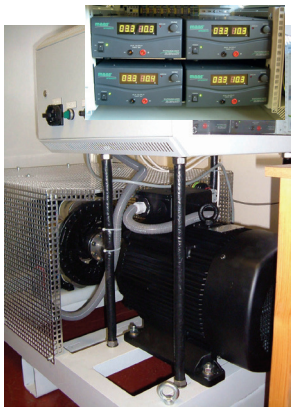
High Frequency Conducted and Radiated EMC Measurements

Fully lined anechoic chamber and radiated emission antennas



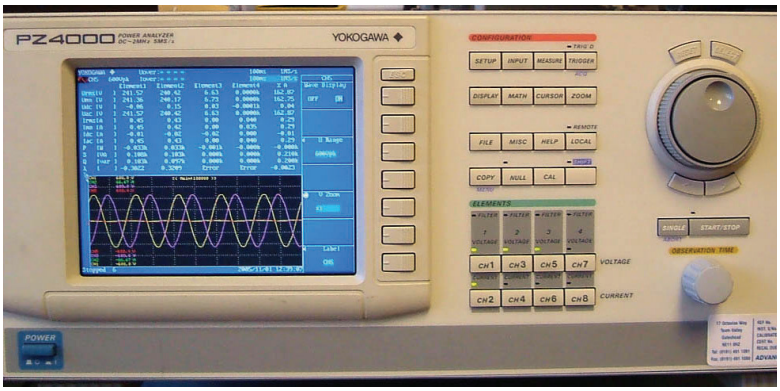
Rhode and Schwarz EMC test receivers covering conducted and radiated emission frequency ranges from 9kH to 3.6GHz

Low Frequency Harmonic and Power Measurements



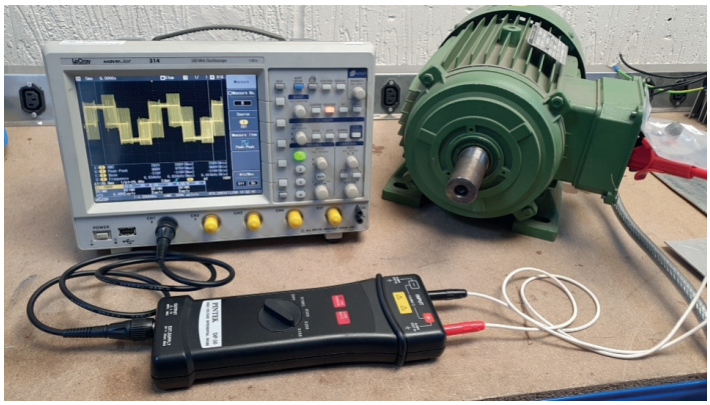
Custom built 50kW motor loading jig

Current test clamps and voltage probes

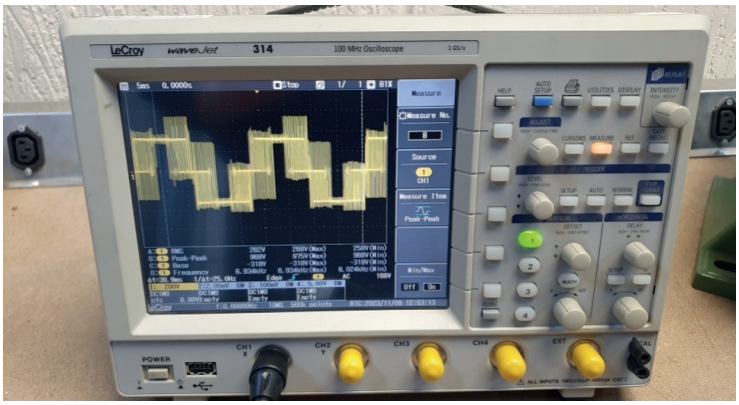


Yokogawa Power Analyser, measuring power quality, power factor, current and voltage harmonic distortions

Motor Terminal Waveform Measurements



Oscilloscope and high voltage differential probe used to measure waveform characteristics at motor terminals



LeCroy fast sampling storage oscilloscope showing voltage over shoot, spikes and dV/dt values

Environmental Testing in Climatic Chamber

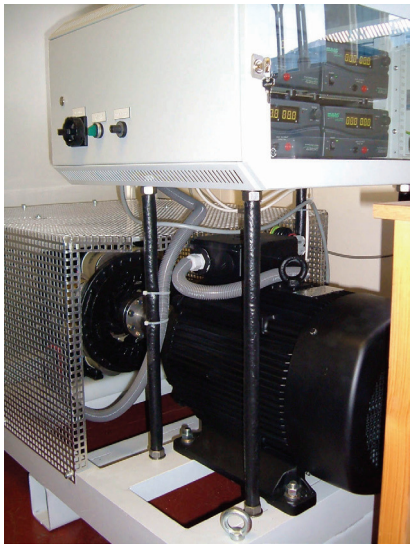
1m³ Climatic Chamber For testing of products in defined temperature and humidity ambient conditions. Upto 160°C and 100% RH

Sample filter mounted to panel inside climatic chamber. Loaded to capacity in set temperature and humidity conditions

Temperature Monitor and Recording During Load Testing

Multi thermocouple input logging thermometers

For logging of multiple components inside samples during loaded testing to verify design criteria of maximum temperature rise in requested ambient conditions



50kW motor loading jig for applying load during temperature and EMC testing

2m integrating sphere and goniometer equipment for design and evaluation of LED lighting products.

Beam pattern and spectrum outputs are analysed

TYPICAL INSTALLATION SHOWING USE OF AN AC INVERTER AND FILTERING WITH SUITABLE CABLE LAYOUT AND SEPARATION

BACKPLATE HAS PAINT CLEANED WHERE METAL CASED COMPONENTS ARE MOUNTED E.G. INVERTER AND FILTER

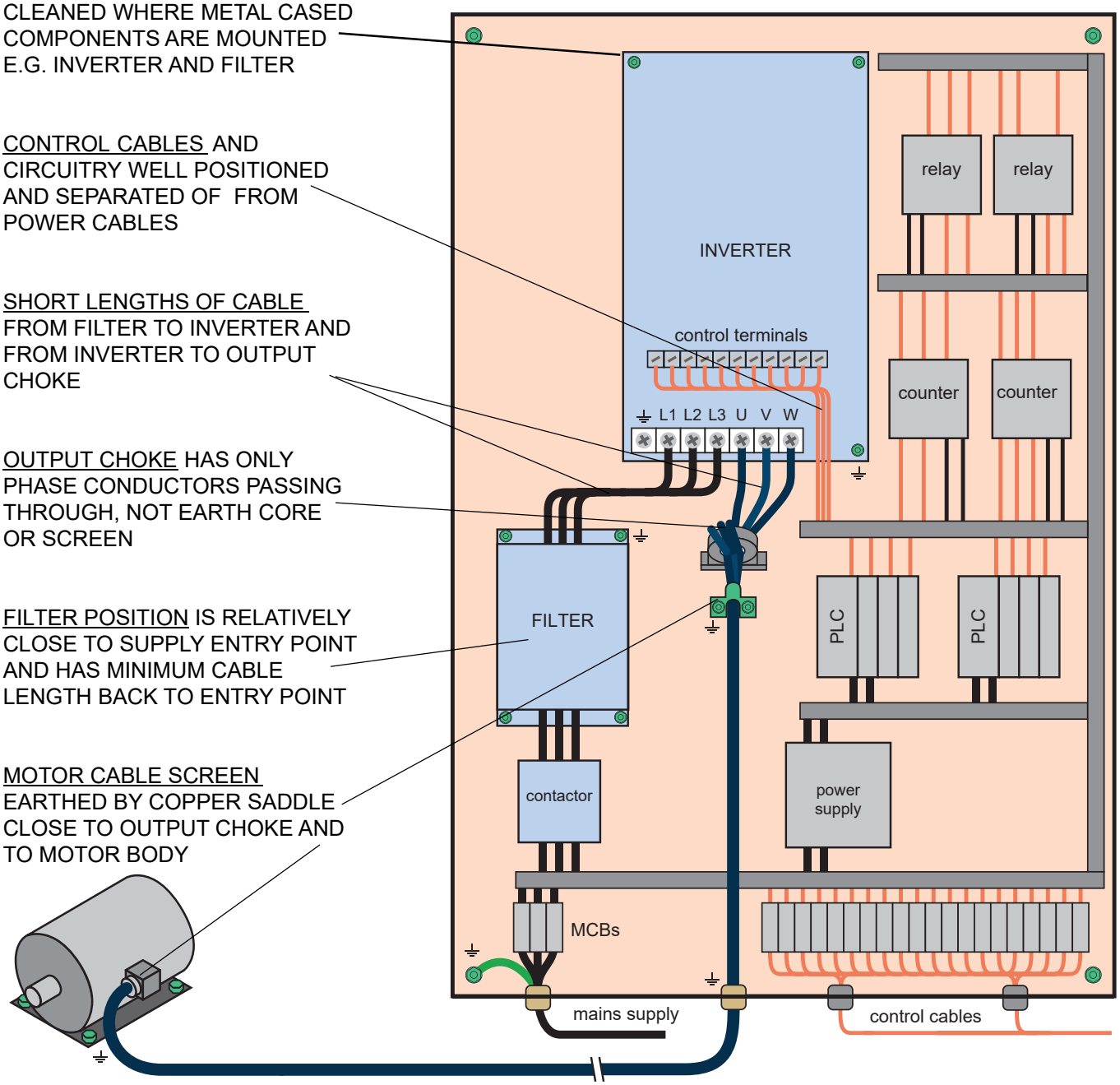
CONTROL CABLES AND CIRCUITRY WELL POSITIONED AND SEPARATED OF FROM POWER CABLES

SHORT LENGTHS OF CABLE FROM FILTER TO INVERTER AND FROM INVERTER TO OUTPUT CHOKE

OUTPUT CHOKE HAS ONLY PHASE CONDUCTORS PASSING THROUGH, NOT EARTH CORE OR SCREEN

FILTER POSITION IS RELATIVELY CLOSE TO SUPPLY ENTRY POINT AND HAS MINIMUM CABLE LENGTH BACK TO ENTRY POINT

MOTOR CABLE SCREEN EARTHED BY COPPER SADDLE CLOSE TO OUTPUT CHOKE AND TO MOTOR BODY



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