

# **ENERDOOR**

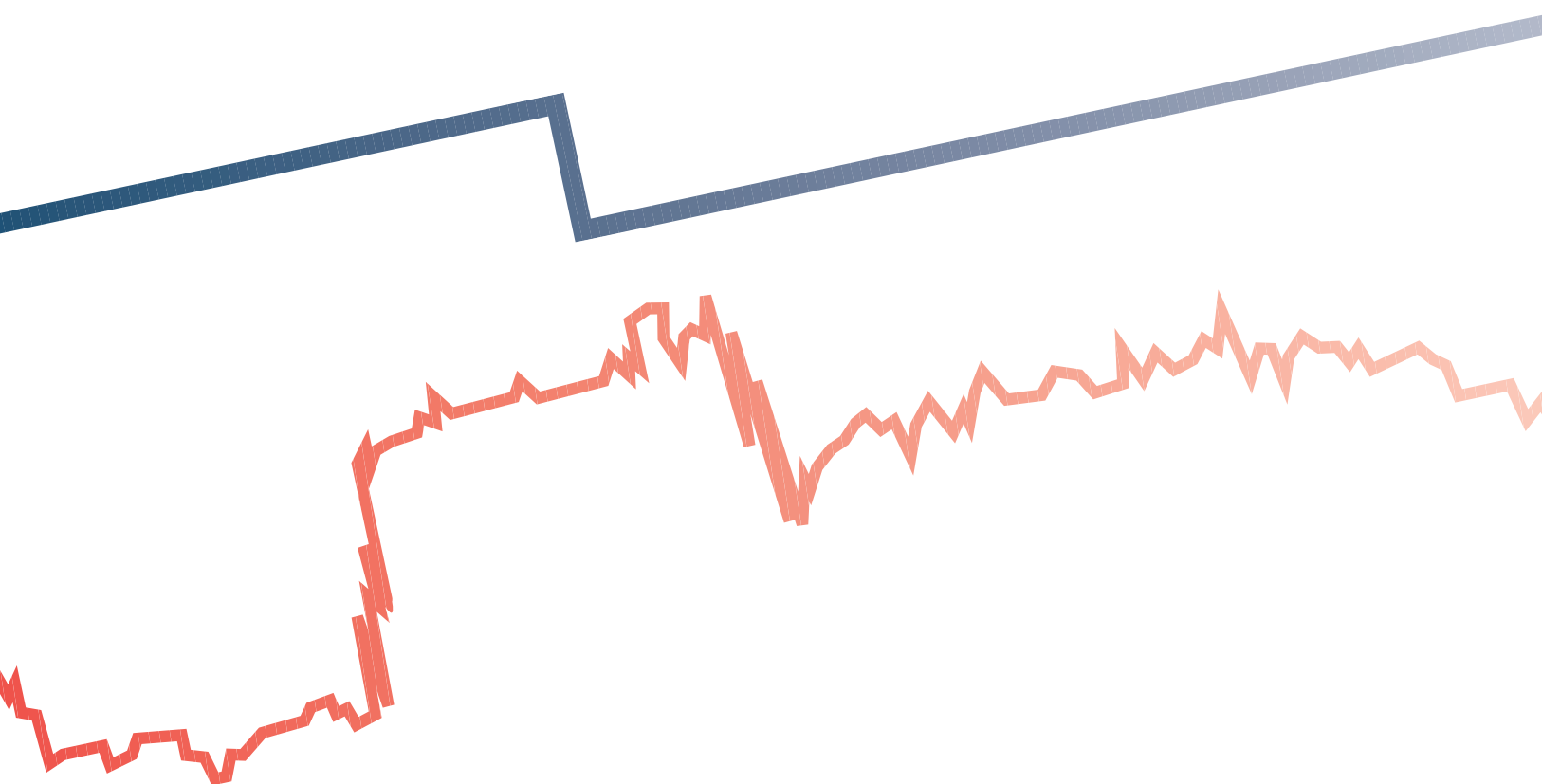
## THE EMC SOLUTION



RoHS

C  US

5  year warranty



**THE EMC SOLUTION**

**SINGLE PHASE FILTERS**

FIN21	6
FIN26	7
FIN27	8
FIN33	9
FIN35	10
FIN40	11
FIN50	12
FIN60	13
FIN70	14
FIN80	15

**THREE PHASE PARALLEL FILTERS**

FIN130SP	19
FIN230SP	19
FIN730	20
FIN735	20
FIN740	20

**THREE PHASE FILTERS**

FIN1351	24
FIN538	25
FIN538S	26
FIN538S1	27
FIN539S	29
FIN1200	30
FIN1200HV	30
FIN1500	32
FIN1500HV	32
FIN1200HHV	34
FIN1600	36
FIN1700	37
FIN1700G	37
FIN1700E	38
FIN1700EG	38
FIN1700IT	39
FIN1900	40
FIN1900G	40
FIN1900E	41
FIN1900EG	41
FIN1900S	42
FIN3755	43

**THREE PHASE + NEUTRAL FILTERS**

FIN15	46
FIN1240	47
FIN1740ESM	49
FIN1740	50
FIN1940	51

**DC FILTERS**

FIN1220	54
FIN1220.0V	56
FIN1520	58
FIN1520.0V	60

**PASSIVE HARMONIC FILTERS**

FINHRM5	64
FINHRM	64
FINFF	65

**MOTOR PROTECTION**

FIN900	68
FIN930	70
FIN950	71
FIN950U	72
FIN960F	73
FIN905SF	75
FIN915SFH	76
FINTR	77
FINFE	77

ASSEMBLY	80
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APPLICATION CRITERIA	84
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APPLICATION DIAGRAMS	92
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GENERAL APPLICATION	95
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**ORDERING CODE**
**FIN xxxx .yyy .z**

Model

Nominal Current

Connection

- B** = Bus Bar
- C** = Cable
- F** = Faston
- M** = Terminal Blocks
- V** = Screws
- BC** = Bus Bar Compact



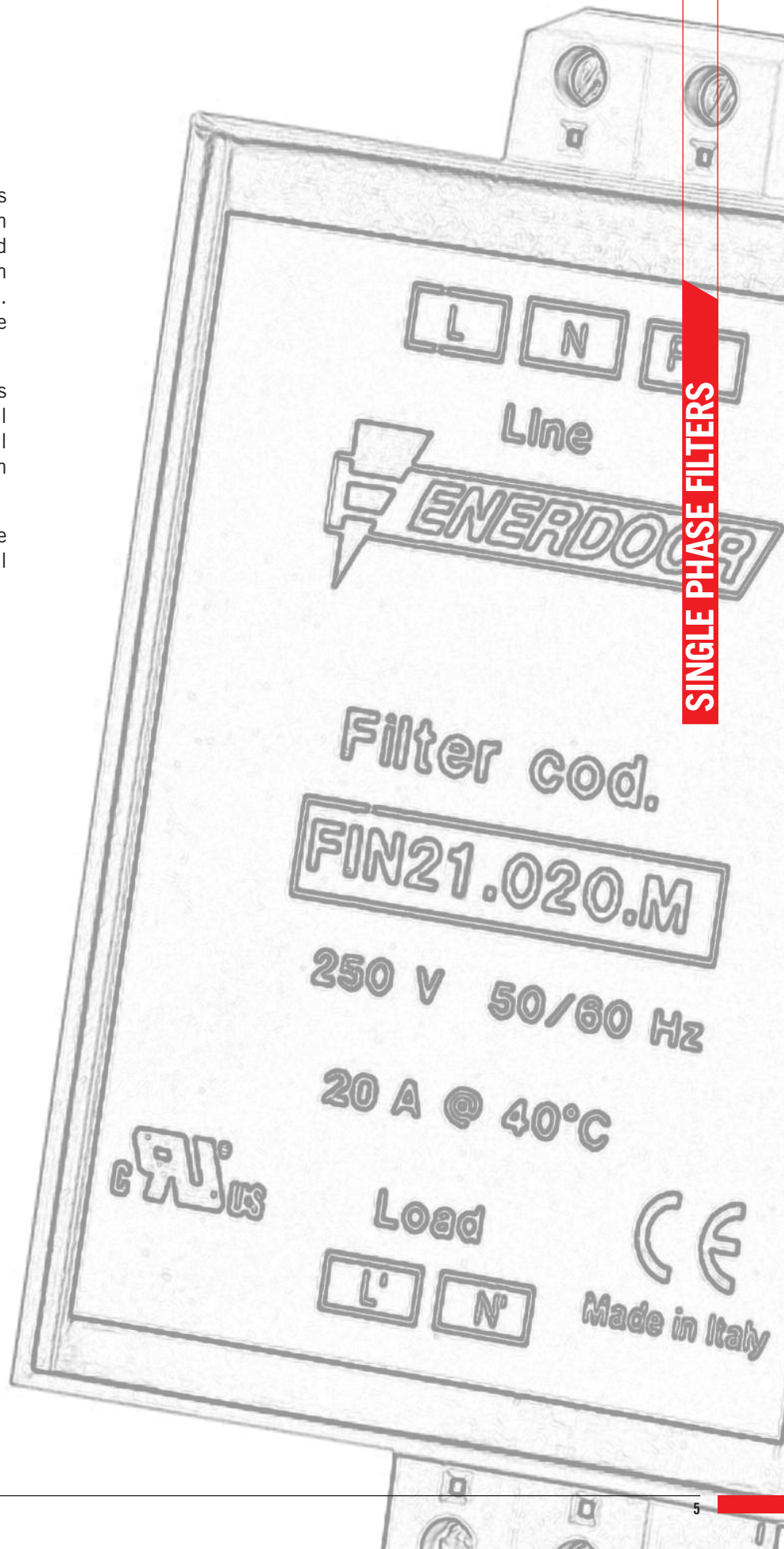
Filter Selection Guide	DESCRIPTION	CURRENT RANGE (A)	NOMINAL VOLTAGE (V)	CONNECTORS					FEATURES					APPLICATIONS				Approval	
				Faston	Terminal Blocks	Screws	Cables	IEC Connector/ Faston	Regenerative Systems	DIN Rail Mount	Long Cable Applications	Low Frequency Attenuation	Book Case Style	Very Low Leakage Current	Power Supply	Automation	Renewable Energy		Medical
Single Phase																			
FIN21	1 phase	3-20	0-250		•					•				•	•				UL US
FIN26	1 phase	3-20	0-250		•					•	•			•	•		•		UL US
FIN27	1 phase	3-20	0-250		•					•	•	•			•	•			UL US
FIN33	1 phase	3-75	0-250	•		•								•	•				UL US
FIN35	1 phase	5-24	0-250	•	•		•							•		•			
FIN40	1 phase	5-24	0-250	•	•		•				•			•		•			
FIN50	1 phase	5-24	0-250	•	•						•	•			•	•			
FIN60	1 phase	1-6	0-250					•						•	•				UL US
FIN70	1 phase	1-6	0-250					•						•	•				UL US
FIN80	1 phase	1-10	0-250					•						•	•				UL US



Enerdoor single phase filter series offers a current range from 1 to 75A with nominal voltage up to 250 Vac and guarantees high attenuation within compact mechanical dimensions. Additional select single phase lines are available up to 690 Vac.

This series features various connections such as: IEC plugs, faston tabs, terminal blocks, cables, screws, and DIN rail mounting for fast and easy installation into the enclosure.

For all models, a dedicated low leakage current solution is available for medical applications.



SINGLE PHASE FILTERS



### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1750 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

UL1283  
CSA C22.2  
E215863

FIN21	Rated Current 40°C	C <sub>x</sub> (nF) ± 5%	C <sub>y</sub> (nF) ± 5%	L <sub>1</sub> (mH) ± 10%	Power Loss (W)
.003.M	3	68	22	2.2	1.5
.006.M	6	68	22	2.2	2.1
.010.M	10	68	22	2.1	2.8
.016.M	16	68	22	2.1	3.2
.020.M	20	68	22	2.0	4

Leakage current at 230 V phase to ground 50 Hz / 40°C < 1mA

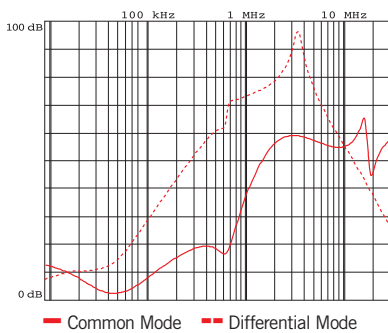
### MECHANICAL DIMENSIONS (mm)

FIN21	A	B	H	N	Weight Kg	Case
.003.M	65	85	39	11	0.316	1
.006.M	65	85	39	11	0.316	1
.010.M	65	85	39	11	0.316	1
.016.M	65	85	39	11	0.316	1
.020.M	65	85	39	11	0.316	1

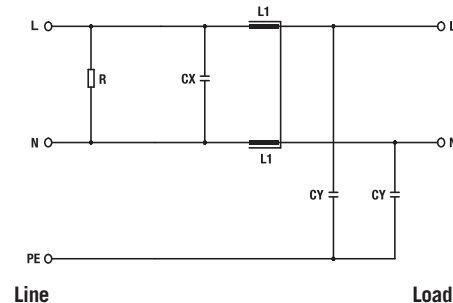
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.5 - 4	0.8
0.2 - 6	0.5 - 4	0.8

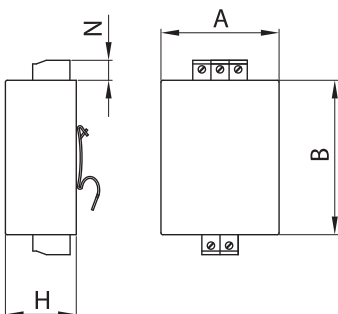
### TYPICAL ATTENUATION



### ELECTRIC DIAGRAM



### CASE 1









### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1750 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

UL1283  
CSA C22.2  
E215863

FIN27	Rated Current 40°C	ΣCx (nF) ± 5%	Cy1 (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.003.M	3	136	22	2.2	2.2	1.5
.006.M	6	136	22	2.2	2.2	2.1
.010.M	10	136	22	2.1	2.1	2.8
.016.M	16	136	22	2.1	2.1	3.2
.020.M	20	136	22	2.0	2.0	4

Leakage current at 230 V phase to ground- 50 Hz / 40°C < 1mA

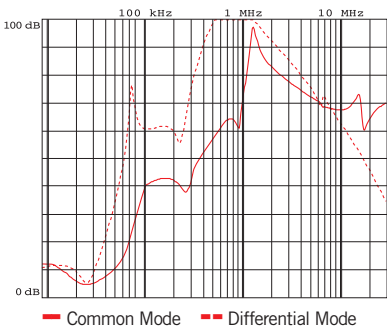
### MECHANICAL DIMENSIONS (mm)

FIN27	A	B	H	N	Weight Kg	Case
.003.M	65	85	39	11	0.320	1
.006.M	65	85	39	11	0.320	1
.010.M	65	85	39	11	0.320	1
.016.M	65	85	39	11	0.320	1
.020.M	65	85	39	11	0.320	1

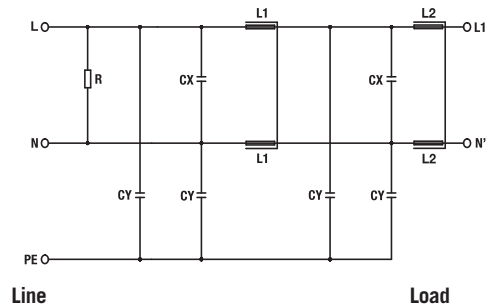
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.5 - 4	0.8
0.2 - 6	0.5 - 4	0.8

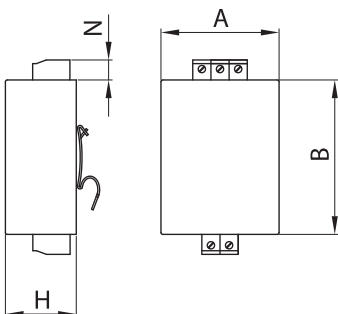
### TYPICAL ATTENUATION



### ELECTRIC DIAGRAM



### CASE 1





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1750 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS



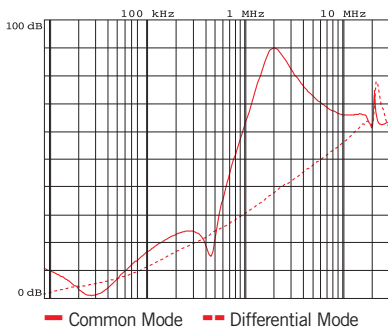
FIN33	Rated Current 40°C	$\Sigma Cx$ ( $\mu F$ ) $\pm 5\%$	$Cy$ (nF) $\pm 5\%$	L1 (mH) $\pm 10\%$	Power Loss (W)
.003.F	3	0.082	1.7	4.7	1.5
.006.F	6	0.082	1.7	4.7	2.1
.010.F	10	0.082	1.7	4.7	2.8
.020.F	20	0.2	0.8	3.5	3.8
.040.V	40	0.2	0.7	2.5	4.5
.050.V	50	0.2	0.6	2	5.5
.075.V	75	0.2	0.6	2.1	7

Leakage current at 230 V phase to ground- 50 Hz / 40°C < 1mA

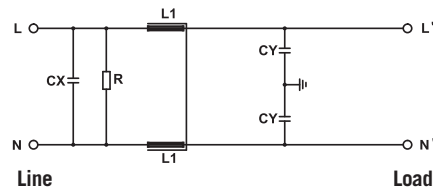
### MECHANICAL DIMENSIONS (mm)

FIN33	A	B	H	N	F	L	I	V	d	Weight Kg	Case
.003.F	20.5	33	66	—	5	56	45	14	6.5	0.13	1
.006.F	20.5	33	66	—	5	56	45	14	6.5	0.13	1
.010.F	20.5	33	66	—	5	56	45	14	6.5	0.2	1
.020.F	39	51.8	84	—	5	74	65	15	6.5	0.18	2
.040.V	40	86.6	107	96	6x4	50/55	100	20	M5	0.18	3
.050.V	50	100	125	115	6x4	120	180	50	M6	0.30	4
.075.V	72	120	152	135	8x4	120	182	30	M8	0.40	5

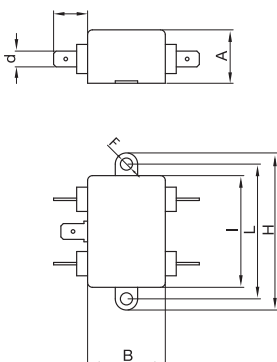
### TYPICAL ATTENUATION



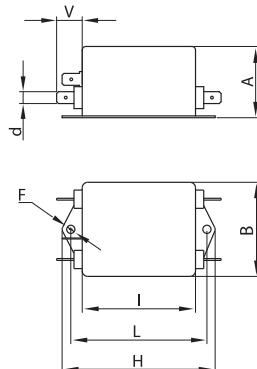
### ELECTRIC DIAGRAM



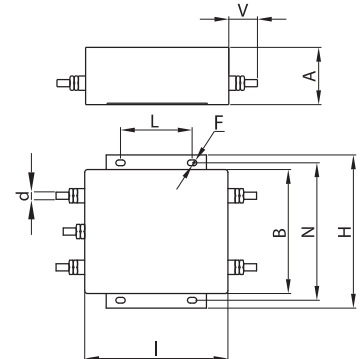
### CASE 1



### CASE 2



### CASE 3/4/5





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1750 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

FIN35	Rated Current 40°C	C <sub>x</sub> (μF)	R (kΩ)	L <sub>1</sub> (mH)	C <sub>y</sub> (nF)	L <sub>2</sub> (μH)	Power Loss (W)
.005.F	5	0.22	680	0.6	10	5	2
.010.F	10	0.22	680	0.6	10	5	2
.016.F	16	0.22	680	0.6	10	5	5
.024.M	24	0.22	680	0.6	10	5	5

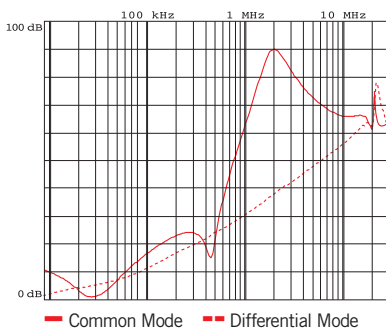
Leakage current at 230 V phase to ground- 50 Hz / 40°C < 1mA

### MECHANICAL DIMENSIONS (mm)

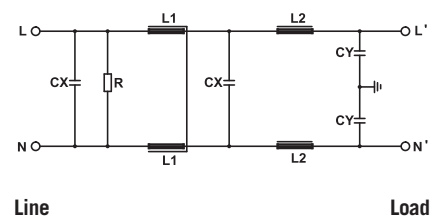
FIN35	A	B	H	N	F	L	I	V	d	Weight Kg	Case
.005.F	29	51	84.5	—	4.5	74.5	63.5	13.5	6.5	0.13	1
.010.F	33	51	84.5	—	4.5	74.5	63.5	13.5	6.5	0.18	2
.016.F	39.5	51	97	—	4.5	86.5	75.5	13.5	6.5	0.26	3
.024.M	49.5	51	70	60	4.5	51	93	13	22	0.46	4

The filter **FIN35.005** is also available with output on cable

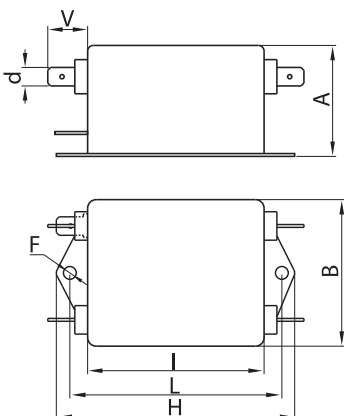
### TYPICAL ATTENUATION



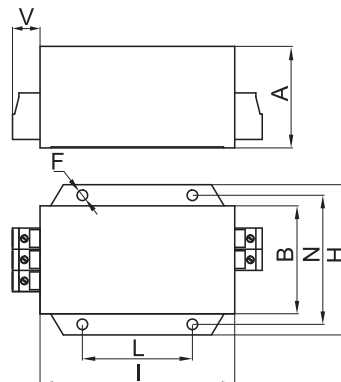
### ELECTRIC DIAGRAM



### CASE 1/2/3



### CASE 4









### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1750 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

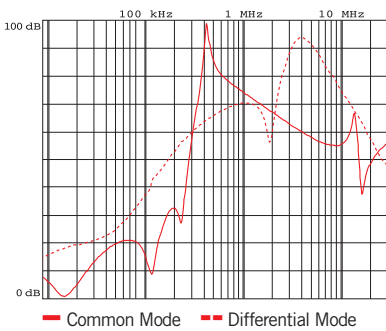
FIN50	Rated Current 40°C	C <sub>x</sub> (μF)	R (kΩ)	L1 (mH)	Cy1 (nF)	Cy1 (nF)	L2 (mH)	Power Loss (W)
.005.F	5	0.22	680	1.2	4.7	4.7	1	2
.010.F	10	0.22	680	1	4.7	4.7	0.8	2
.016.F	16	0.22	680	0.8	4.7	4.7	0.6	5
.024.M	24	0.22	680	0.8	4.7	4.7	0.6	5

Leakage current at 230 V phase to ground- 50 Hz / 40°C < 2.2mA

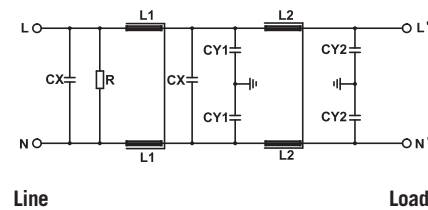
### MECHANICAL DIMENSIONS (mm)

FIN50	A	B	H	N	F	L	I	V	d	Weight Kg	Case
.005.F	39	51	84.5	—	4.5	74.5	63.5	13.5	6.5	0.2	1
.010.F	49.5	51	97	—	4.5	86.5	75.5	13.5	6.5	0.35	2
.016.F	45	84.5	105	95	6x4	51	99.5	13.5	6.5	0.7	3
.024.M	49.5	84.5	105	95	6x4	51	99.5	13	—	0.93	4

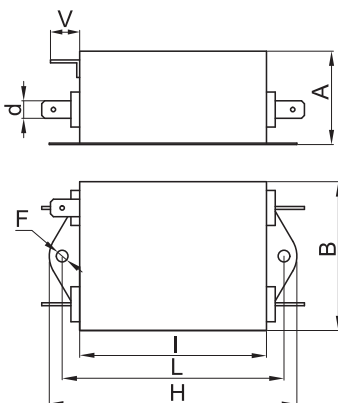
### TYPICAL ATTENUATION



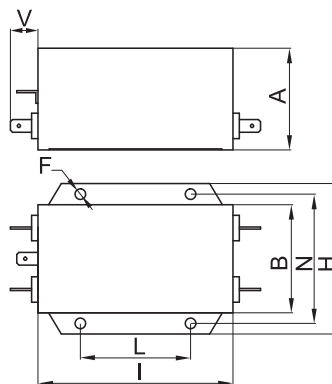
### ELECTRIC DIAGRAM



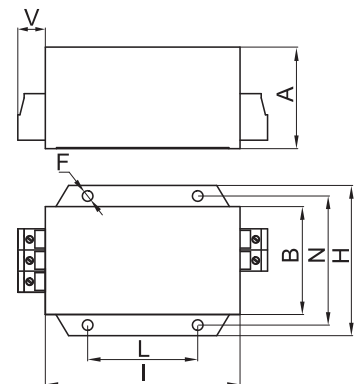
### CASE 1/2



### CASE 3



### CASE 4





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1450 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C



FIN60	Rated Current 40°C	C <sub>x</sub> (μF)	L1 (mH)	C <sub>y</sub> (nF)	Power Loss (W)
.001.VF	1	0.047	1	2.2	1
.003.VF	3	0.047	1	2.2	2
.006.VF	6	0.047	1	2.2	3

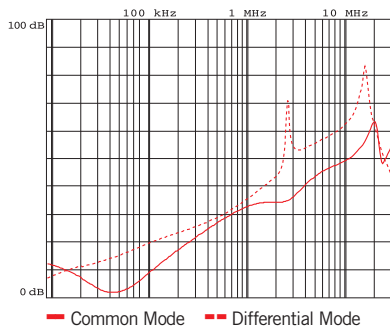
Leakage current at 230 V phase to ground- 50 Hz / 40°C < 1mA

Available on request for medical devices

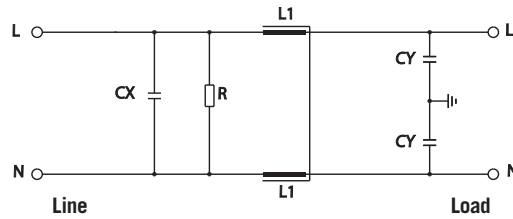
### MECHANICAL DIMENSIONS (mm)

FIN60	A	B	C	d	E	F	G	H	I	L	V	Weight Kg	Case
.001.VF	40	22	7	6.5	24	3.5	50	40	31	23	14	0.1	1
.003.VF	40	22	7	6.5	24	3.5	50	40	31	23	14	0.1	1
.006.VF	40	22	7	6.5	24	3.5	50	40	31	23	14	0.1	1

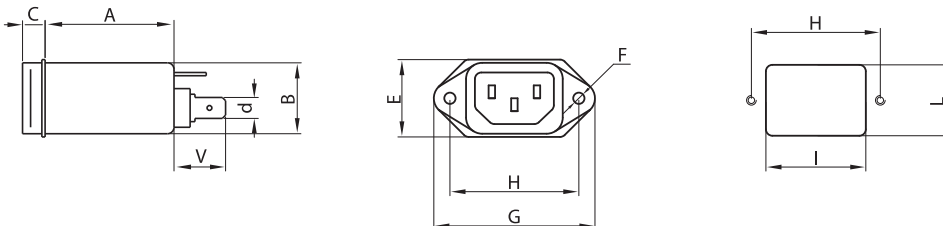
### TYPICAL ATTENUATION



### ELECTRIC DIAGRAM



### MECHANICAL DIMENSIONS (mm)







### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1450 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C



FIN70	Rated Current 40°C	C <sub>x</sub> (μF)	L <sub>1</sub> (mH)	C <sub>y</sub> (nF)	Power Loss (W)
.001.VF	1	0.047	1	2.2	1
.003.VF	3	0.047	1	2.2	2
.006.VF	6	0.047	1	2.2	3

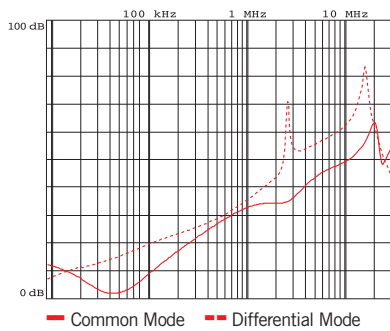
Leakage current at 230 V phase to ground- 50 Hz / 40°C < 1mA

Available on request for medical devices

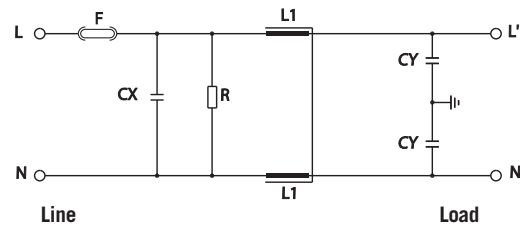
### MECHANICAL DIMENSIONS (mm)

FIN70	A	B	C	d	E	F	G	H	I	L	V	Weight Kg	Case
.001.VF	40	33	7	6.5	36	3.5	45	36	29.5	33.5	14	0.12	1
.003.VF	40	33	7	6.5	36	3.5	45	36	29.5	33.5	14	0.12	1
.006.VF	40	33	7	6.5	36	3.5	45	36	29.5	33.5	14	0.12	1

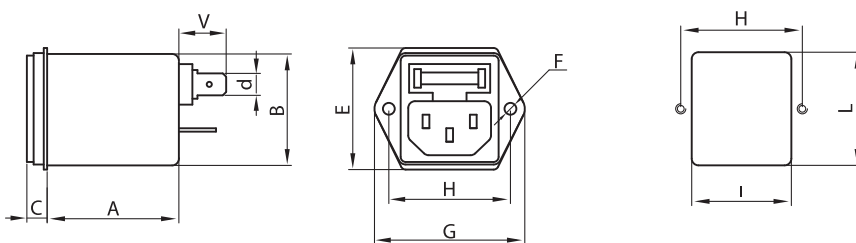
### TYPICAL ATTENUATION



### ELECTRIC DIAGRAM



### MECHANICAL DIMENSIONS (mm)





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/250 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	1450 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2150 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS



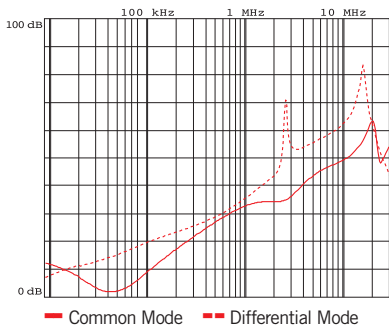
FIN80	Rated Current 40°C	C <sub>x</sub> (μF)	L <sub>1</sub> (mH)	C <sub>y</sub> (nF)	Power Loss (W)
.001.VFI	1	0.1	10	2.2	1
.003.VFI	3	0.1	3	2.2	2
.006.VFI	6	0.1	1	2.2	3
.010.VFI	10	0.22	0.5	2.2	5

Leakage current at 230 V phase to ground- 50 Hz / 40°C < 1mA

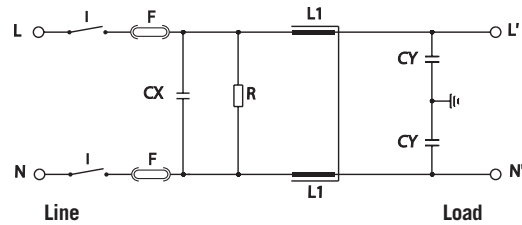
### MECHANICAL DIMENSIONS (mm)

FIN80	A	B	C	d	E	F	G	H	I	L	V	Weight Kg	Case
.001.VF	39	61	6	6.5	50	3.5	65	40	30	62	14	0.2	1
.003.VF	39	61	6	6.5	50	3.5	65	40	30	62	14	0.2	1
.006.VF	39	61	6	6.5	50	3.5	65	40	30	62	14	0.2	1
.010.VF	39	61	6	6.5	50	3.5	65	40	30	62	14	0.2	1

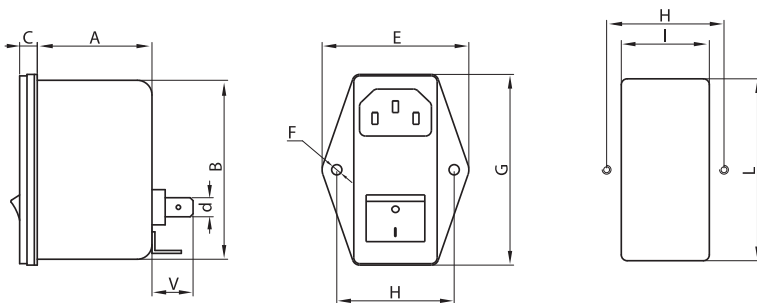
### TYPICAL ATTENUATION








### ELECTRIC DIAGRAM



### MECHANICAL DIMENSIONS (mm)

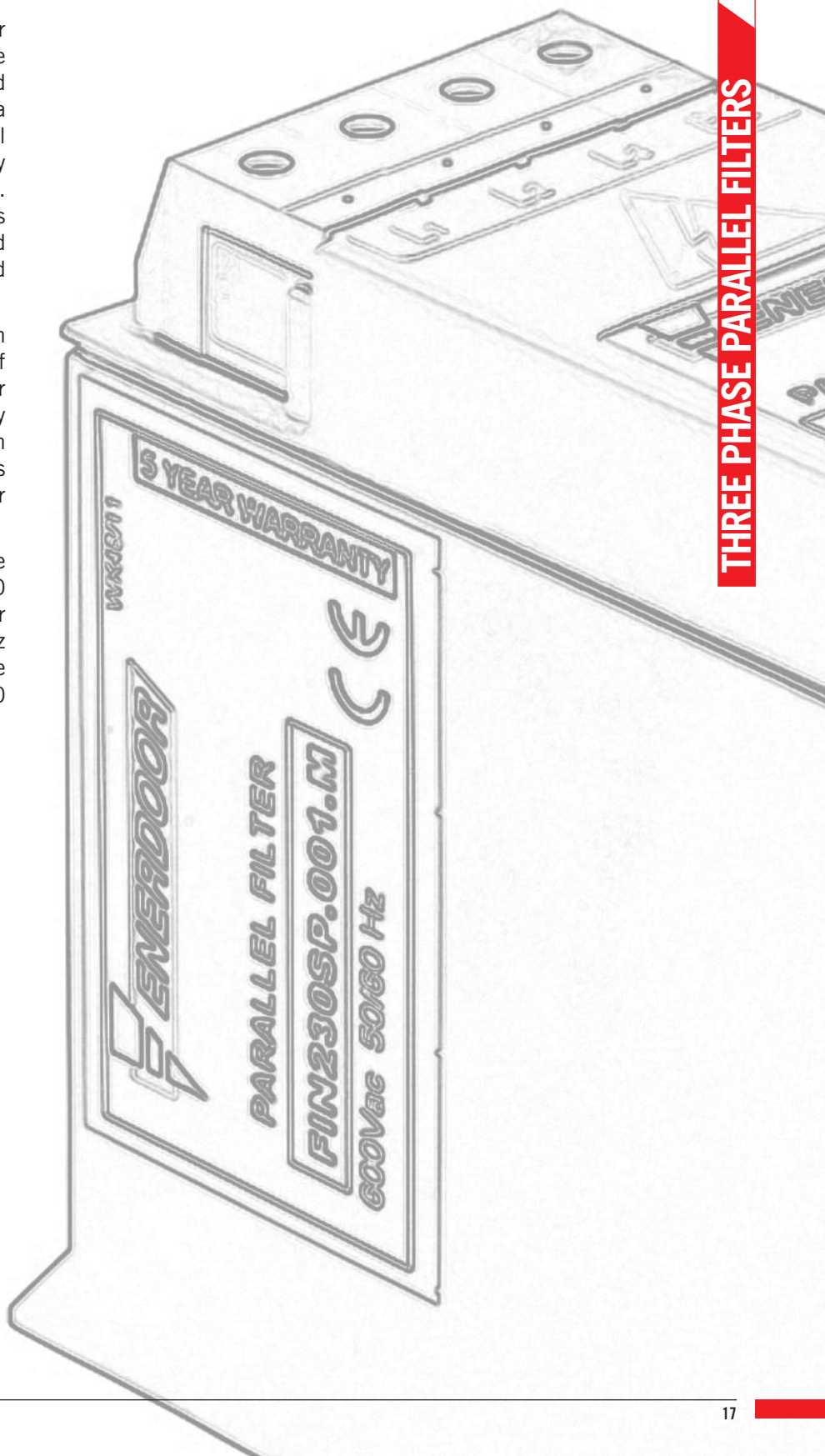


Filter Selection Guide	DESCRIPTION	NOMINAL VOLTAGE (V)	CONNECTORS					FEATURES					APPLICATIONS					Approval	
			Faston	Terminal Blocks	Screws	Bus Bar	Cables	DIN Rail Mount	Long Cable Applications	High Att. Low Frequency	Low Leakage Current	3-Phase + Neutral	Machine Tools	SCR	Renewable Energy	High Current System	Regenerative Systems		High Voltage
Three Phase Parallel																			
FIN130SP	3 phase	600		•				•	•	•	•			•					
FIN230SP	3 phase	600		•				•	•	•	•			•	•	•			
FIN730	3 phase	750		•				•		•				•	•		•		
FIN735	3 phase	650		•				•		•							•		
FIN740	3 phase plus neutral	480		•				•	•	•	•	•	•	•			•		

Enerdoor three phase parallel filter series provides protection for variable frequency drives, SCRs, controllers, and electric equipment. This series is a unique solution available with nominal voltage up to 750 Vac and with any current level due to the parallel nature. Available in 3 phase and 3 phase plus neutral this line is UL recognized and features DIN rail mounting for fast and easy installation.

Three phase parallel filters provide high attenuation in the frequency range of 10 KHz to 5 MHz offering a solution for applications with low frequency concerns. When used in conjunction with other Enerdoor filter series, this combination ensures RFI protection for equipment in any environment.

The FIN730 and FIN740 filters reduce EMI interference in the 30 kHz to 10 MHz frequency range. The FIN230 filter has a resonance frequency of 150 kHz and provides a significant interference reduction in the frequency range of 50 kHz to 5 MHz.



THREE PHASE PARALLEL FILTERS



## APPLICATION GUIDE

Enerdoor parallel filter series includes three phase and three phase plus neutral products designed to work in a frequency range between 50 kHz to 10 MHz. This series significantly reduces radio frequency interference to below the European Standard limit of 150 kHz.

The FIN130SP and 230SP filters have a resonance frequency of 150 kHz and provide a significant interference reduction in the frequency range of 50 kHz to 5 MHz.

The FIN730, 735 and 740 filters reduce interference in the frequency range of 30 kHz to 10 MHz.

This series offers terminal block connections with screw and DIN rail mounting installation.

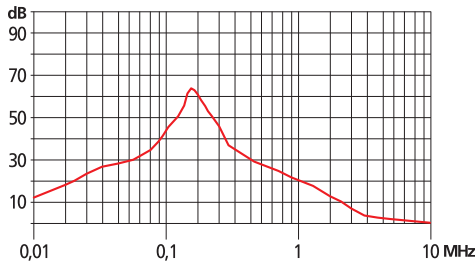
## ELECTRIC CHARACTERISTICS

Capacitor dielectric	<b>Film polypropylene</b>
Capacitor electrodes	<b>Vacuum deposited aluminium layers</b>
Capacitor construction	<b>Extended double side metallized carrier film with internal series connection and metallized film</b>
Resistor construction	<b>Metallic layer</b>
Coating	<b>Solvent resistant (UL94 V-I) plastic case with flame retardant (UL94 V-0) epoxy resin sealing</b>
Standard reference	<b>IEC 68</b>
Resistance power	<b>3 W</b>
Voltage category	<b>Nominal voltage at 85° C</b>
Max repetitive pulse rise time	<b>650 V/μs</b>
Max non repetitive pulse rise time	<b>1000 V/μs</b>
Capacitor dissipation factor	<b>&lt;5x10<sup>-4</sup> measured at 1 kHz / 25±5°C</b>
Insulation resistance	<b>&gt;30 GΩ between terminals after 1 minute of energisation at 100 V / 25 ± 5°C</b>
Climatic class	<b>- 40 / +85 °C</b>

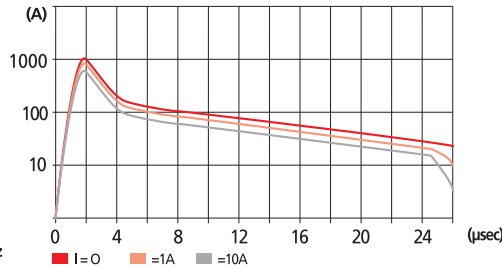
FIN130SP	Nominal Voltage 50/60 Hz	Nominal Voltage	Phase to Ground Test Voltage	Phase to Phase Test Voltage	C1 Rated Capacitance	Rated Resistance
.001.M	600 V <sub>AC</sub>	1000 V <sub>DC</sub>	3200 V <sub>DC</sub>	2400 V <sub>DC</sub>	7 $\mu$ F $\pm$ 10% at 1kHz	3.3M $\Omega$ $\pm$ 20% at 1kHz
Leakage current for phase at 230 V phase to ground 50 Hz / 40°C						< 25mA



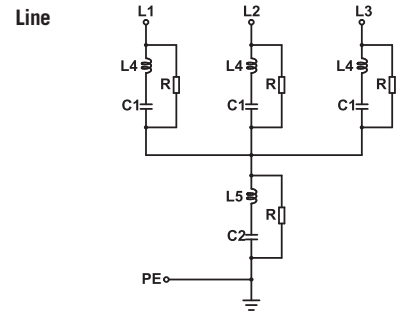
### RESONANCE CIRCUIT RESPONSE



### RESPONSE TO CURRENT PULSE



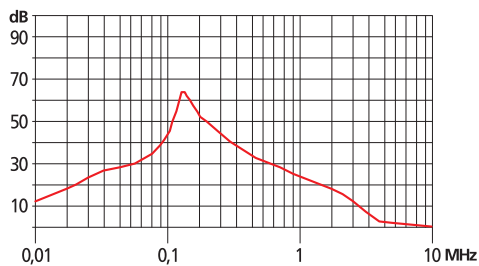
### ELECTRIC DIAGRAM



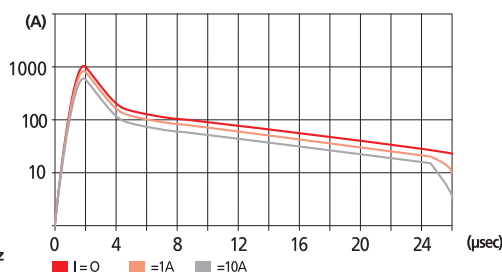
FIN230SP	Nominal Voltage 50/60 Hz	Nominal Voltage	Phase to Ground Test Voltage	Phase to Phase Test Voltage	C1 Rated Capacitance	Rated Resistance
.001.M	600 V <sub>AC</sub>	1000 V <sub>DC</sub>	3200 V <sub>DC</sub>	2400 V <sub>DC</sub>	10 $\mu$ F $\pm$ 10% at 1kHz	3.3M $\Omega$ $\pm$ 20% at 1kHz
Leakage current for phase at 230 V phase to ground 50 Hz / 40°C						< 25mA



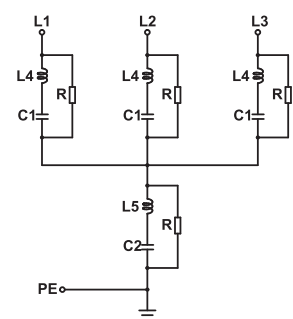
### RESONANCE CIRCUIT RESPONSE



### RESPONSE TO CURRENT PULSE



### ELECTRIC DIAGRAM

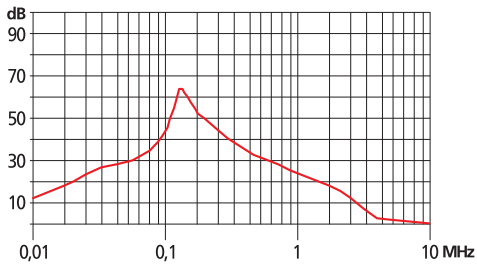
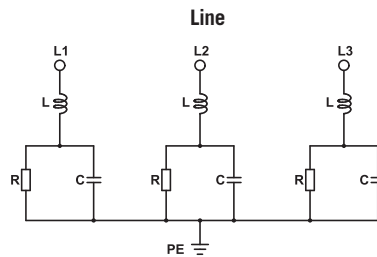
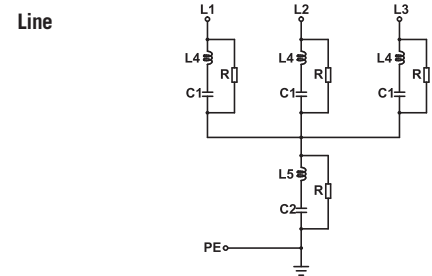




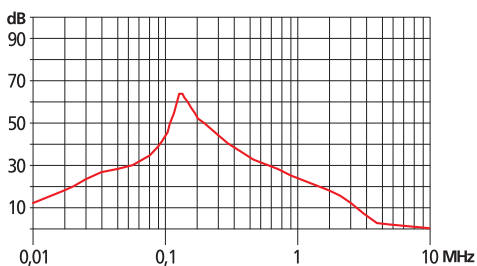
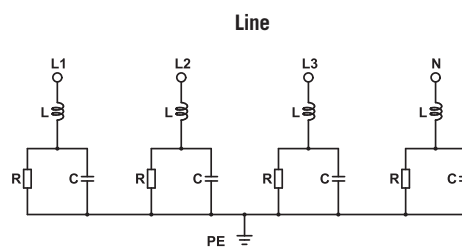
<b>FIN730</b>	Nominal Voltage 50/60 Hz	Nominal Voltage	Phase to Ground Test Voltage	Phase to Phase Test Voltage	C1 Rated Capacitance	Rated Resistance
<b>.001.M</b>	750 V <sub>AC</sub>	1200 V <sub>DC</sub>	3300 V <sub>DC</sub>	2500 V <sub>DC</sub>	1μF ±10% at 1kHz	3.3MΩ ±20% at 1kHz
<b>.002.MC</b>	600 V <sub>AC</sub>	1000 V <sub>DC</sub>	3200 V <sub>DC</sub>	2400 V <sub>DC</sub>	1μF ±10% at 1kHz	3.3MΩ ±20% at 1kHz
<b>.001.MLCP</b>	480 V <sub>AC</sub>	800 V <sub>DC</sub>	2900 V <sub>DC</sub>	2200 V <sub>DC</sub>	1μF ±10% at 1kHz	3.3MΩ ±20% at 1kHz
Leakage current for phase at 230 V phase to ground 50 Hz / 40°C						< 25mA



<b>FIN735</b>	Nominal Voltage 50/60 Hz	Nominal Voltage	Phase to Ground Test Voltage	Phase to Phase Test Voltage	C1 Rated Capacitance	Rated Resistance
<b>.001.M</b>	650 V <sub>AC</sub>	1100 V <sub>DC</sub>	3000 V	2250 V	10μF ±10% at 1kHz	3.3MΩ ±20% at 1kHz
Leakage current for phase at 230 V phase to ground 50 Hz / 40°C						< 25mA

**RESONANCE CIRCUIT RESPONSE**

**FIN730 ELECTRIC DIAGRAM**

**FIN735 ELECTRIC DIAGRAM**


<b>FIN740</b>	Nominal Voltage 50/60 Hz	Nominal Voltage	Phase to Ground Test Voltage	Phase to Phase Test Voltage	C1 Rated Capacitance	Rated Resistance
<b>.068.M</b>	480 V <sub>AC</sub>	800 V <sub>DC</sub>	2900 V <sub>DC</sub>	2200 V <sub>DC</sub>	0.68μF ±10% at 1kHz	3.3MΩ ±20% at 1kHz
Leakage current for phase at 230 V phase to ground 50 Hz / 40°C						< 25mA

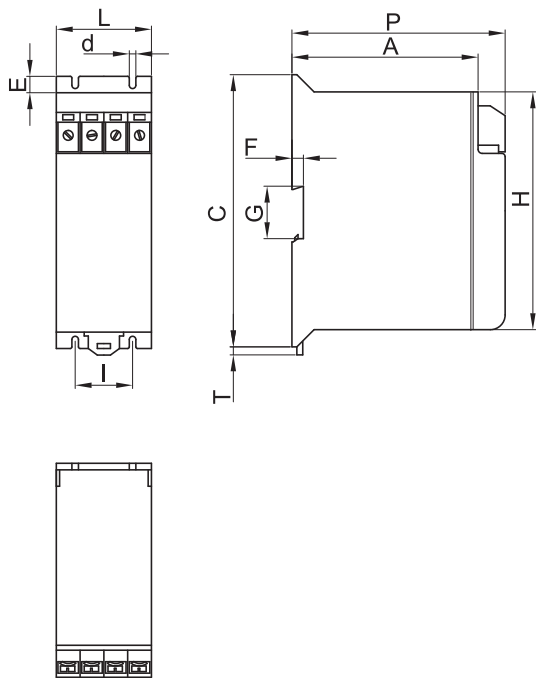
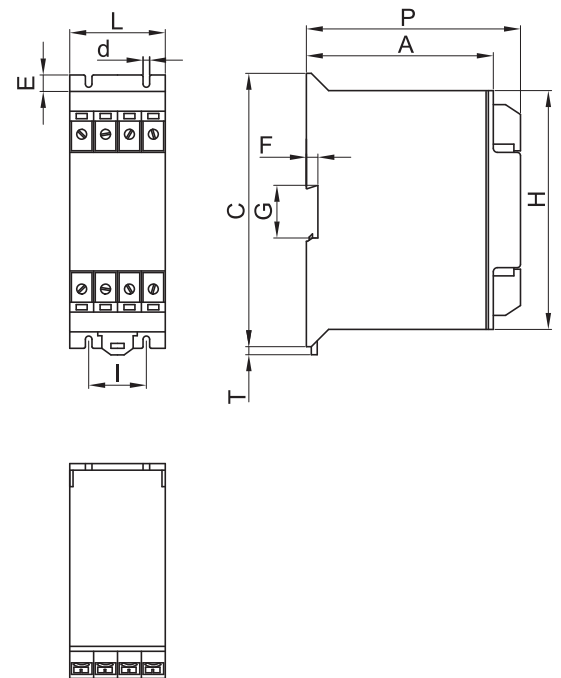

**RESONANCE CIRCUIT RESPONSE**

**ELECTRIC DIAGRAM**


**MECHANICAL DIMENSIONS (mm)**

Model	L	d	E	I	P	A	C	T	G	F	H	Weight Kg	Case
FIN130SP.001.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1.15	1
FIN230SP.001.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1.15	1
FIN730.001.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1	1
FIN730.002.MC	59	4.5	10	35	130	112	166	4	37.5	7	146	1	1
FIN730.001.MLCP	59	4.5	10	35	130	112	166	4	37.5	7	146	1	1
FIN735.001.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1	1
FIN740.068.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1	2

**CONNECTION**

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8

**CASE 1**

**CASE 2**


<b>FILTERS SELECTION GUIDE</b>	<b>DESCRIPTION</b>	<b>CURRENT RANGE (A)</b>	<b>NOMINAL VOLTAGE (V)</b>	<b>CONNECTORS</b>			<b>FEATURES</b>						<b>APPLICATIONS</b>					
				Terminal Blocks	Screws	Bus Bar	Regenerative Systems	DIN Rail Mount	Long Cable Applications	Low Frequency Attenuation	Book Case Style	Very Low Leakage Current	Machine Tools	Automation-General Purpose	Renewable Energy	IT Network	Medical	Approval
Three Phase																		
FIN1351	3 phase	6-16	0-480	•				•					•					
FIN538	3 phase	5-30	0-480	•				•				•		•				UL
FIN538S	3 phase	7-180	0-600	•	•	•			•			•		•				UL
FIN538S1	3 phase	7-3000	0-600	•	•	•	•		•			•		•				UL
FIN539S	3 phase	400-2500	0-600			•	•		•			•		•	•			
FIN1200	3 phase	5-3000	0-480		•	•							•		•			UL
FIN1200HV	3 phase	5-3000	0-600		•	•							•		•			UL
FIN1500	3 phase	5-3000	0-480		•	•	•		•	•			•	•	•			UL
FIN1500HV	3 phase	5-3000	0-600		•	•	•		•	•			•	•	•			UL
FIN1200HHV	3 phase	16-2500	0-750		•	•							•		•			
FIN1600	3 phase	7-200	0-480	•					•			•		•	•			
FIN1700	3 phase	6-200	0-600	•								•	•		•			UL
FIN1700G	3 phase	6-230	0-600	•					•			•	•		•			UL
FIN1900	3 phase	6-200	0-600	•			•					•	•	•				UL
FIN1900G	3 phase	6-230	0-600	•			•		•			•	•	•				UL
FIN1700E	3 phase	7-230	0-500	•								•	•		•			UL
FIN1700EG	3 phase	7-230	0-500	•								•	•		•			UL
FIN1900E	3 phase	7-230	0-500	•					•			•						UL
FIN1900EG	3 phase	6-230	0-500	•					•			•						UL
FIN1900S	3 phase	42-230	0-600	•			•		•	•		•	•	•				UL
FIN1700IT	3 phase	6-2500	0-600	•		•						•	•			•	•	
FIN3755	3 phase	7-100	0-480	•					•					•				UL



Enerdoor three phase filter series offers a current range from 5 to 3000A with nominal voltage up to 750 Vac and is one of the largest series for solutions in the industrial automation industry. These filters provide high attenuation in a compact case with low leakage currents and are suitable for several industries.

This line offers various connections such as: terminal blocks, cables, screws and bus bar options. Features include: finger safe protection for screw and bus bar connections, and DIN rail mounting for fast and easy installation into the enclosure.

Enerdoor offers solutions for traditional TN and TNS networks and for specific applications such as IT power line configurations. Customized voltage, current, connection, and attenuation solutions are available to satisfy various application requirements.



THREE PHASE FILTERS





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/480 V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	2200 V <sub>DC</sub> (2 s)
Phase to ground test voltage	2900 V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

FIN538	Rated Current 40°C (50°C)	$\Sigma C_x$ ( $\mu F$ ) $\pm 5\%$	$C_y$ (nF) $\pm 5\%$	L1 (mH) $\pm 5\%$	Power Loss (W)
.005.M	8 (6)	20	1000	1.5	8
.010.M	14 (12)	20	1000	1.5	10
.016.M	18 (16)	20	1000	1.4	12
.025.M	28 (25)	20	1000	1.3	15
.030.M	35 (32)	20	1000	1.2	23

Total leakage current at 230 V phase to ground 50 Hz / 40°C Nominal <10mA  
Worst condition <80mA

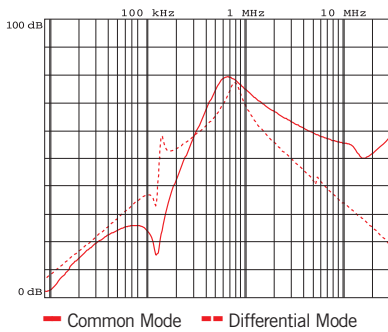
### MECHANICAL DIMENSIONS (mm)

FIN538	L	d	E	I	P	A	C	T	G	F	H	Weight Kg
.005.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1.15
.010.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1.15
.016.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1.15
.025.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1.15
.030.M	59	4.5	10	35	130	112	166	4	37.5	7	146	1.15

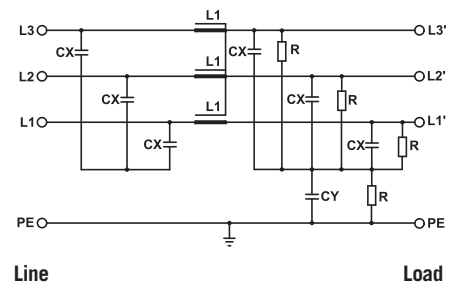
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8
1 - 4	1 - 4	1.8

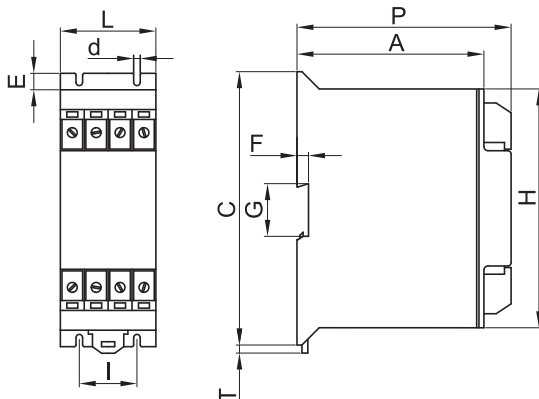
### TYPICAL ATTENUATION



### ELECTRIC DIAGRAM



### CASE







### ELECTRIC CHARACTERISTICS

Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

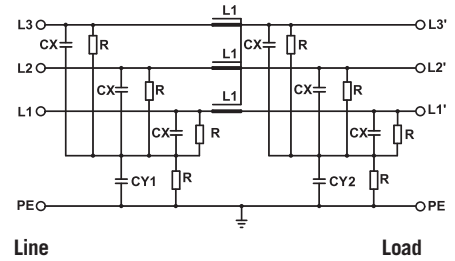
UL1283  
CSA C22.2  
E215863

FIN538S	Rated Current 40°C (50°C)	$\Sigma Cx$ (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	Power Loss (W)
.007.M	8 (7)	20	1000	100	1.5	3
.016.M	18 (16)	20	1000	100	1.5	4
.030.M	34 (30)	20	1000	100	1.4	10
.042.M	47 (42)	20	1000	100	1.3	18
.055.M	60 (55)	20	1000	100	1.2	23
.075.M	83 (75)	60	1000	100	1.1	37
.100.M	110 (100)	60	1000	100	1.1	52
.130.M	142 (130)	60	1000	100	1	65
.180.M	200 (180)	60	1000	100	1	77

Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <10mA  
Worst condition <80mA

### ELECTRIC DIAGRAM



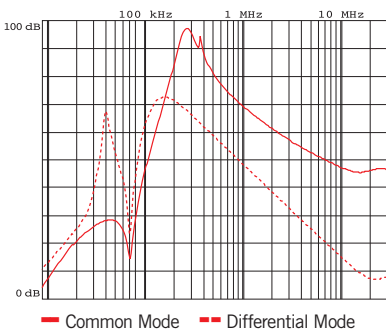
### MECHANICAL DIMENSIONS (mm)

FIN538S	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.007.M	100	90	22	16	5.4	250	220	7.5	60	M6	1.3
.016.M	100	90	22	16	5.4	250	220	7.5	60	M6	1.3
.030.M	100	90	22	16	5.4	250	220	7.5	60	M6	1.3
.042.M	100	90	22	35	5.4	250	220	7.5	60	M6	1.5
.055.M	100	90	22	35	5.4	250	220	7.5	60	M6	1.7
.075.M	135	85	22	39	6.5	270	240	7.5	60	M6	2.2
.100.M	155	90	24	43	6.5	270	240	7.5	65	M10	3.2
.130.M	155	90	24	43	6.5	270	240	7.5	65	M10	3.2
.180.M	170	125	26	51	6.5	380	350	7.5	102	M10	5.1

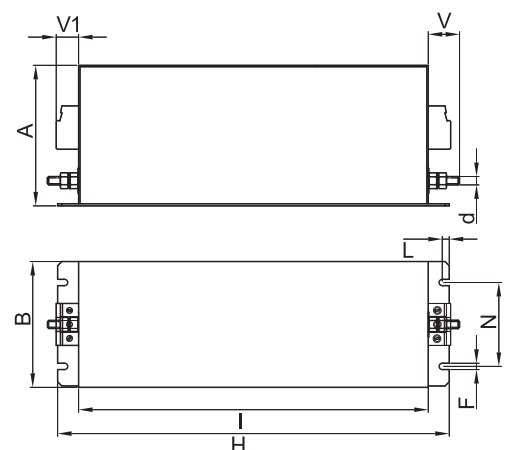
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

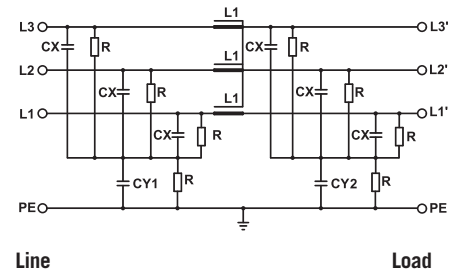
UL1283  
CSA C22.2  
E215863

FIN538S1	Rated Current 40°C (50°C)	ΣCx (µF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	Power Loss (W)
.007.M	8 (7)	20	1000	1000	1.5	3
.016.M	18 (16)	20	1000	1000	1.5	4
.030.M	34 (30)	20	1000	1000	1.4	10
.042.M	47 (42)	20	1000	1000	1.3	18
.055.M	60 (55)	20	1000	1000	1.2	23
.075.M	83 (75)	60	1000	1000	1.1	37
.100.M	110 (100)	60	1000	1000	1.1	52
.130.M	142 (130)	60	1000	1000	1	65
.180.M	200 (180)	60	1000	1000	1	77
.250.V	272 (250)	60	1000	1000	0.7	80
.280.V	290 (280)	60	1000	1000	0.7	80
.280.BC	297 (280)	60	1000	1000	0.7	80
.320.BC	330 (320)	60	1000	1000	0.7	80
.360.BC	390 (360)	60	1000	1000	0.6	105
.400.BC	435 (400)	60	1000	1000	0.6	110
.500.BC	545 (500)	60	1000	1000	0.55	102
.600.BC	654 (600)	60	1000	1000	0.55	108
.750.BC	800 (750)	60	1000	1000	0.5	96
.900.BC	940 (900)	60	1000	1000	0.5	80
.1000.BC	1050 (1000)	60	1000	1000	0.45	115
.1250.BC	1290 (1250)	60	1000	1000	0.45	101
.1500.BC	1550 (1500)	60	1000	1000	0.4	120
.1600.BC	1650 (1600)	60	1000	1000	0.4	130
.1750.BC	1800 (1750)	60	1000	1000	0.4	135
.2000.BC	2040 (2000)	60	1000	1000	0.38	138
.2250.BC	2290 (2250)	60	1000	1000	0.38	145
.2500.BC	2535 (2500)	60	1000	1000	0.38	170
.3000.BC	3050 (3000)	60	1000	1000	0.38	180

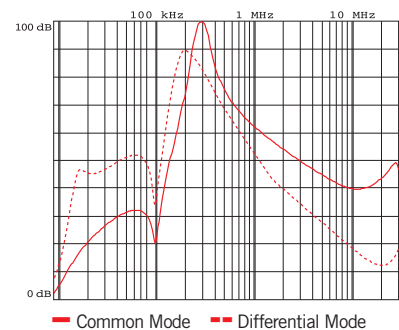
Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <10mA  
Worst condition <80mA

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



Vertical bus-bar connections available upon request

**MECHANICAL DIMENSIONS (mm)**

FIN538S 1	A	B	V	V1	F	H	I	L	N	d	Weight Kg	Case
.007.M/.016.M	100	90	22	16	5.4	250	220	7.5	60	M6	1.3	1
.030.M	100	90	22	16	5.4	250	220	7.5	60	M6	1.3	1
.042.M/.055.M	100	90	22	35	5.4	250	220	7.5	60	M6	1.5	2
.075.M	135	85	22	39	6.5	270	240	7.5	60	M6	2.2	3
.100.M	155	90	24	43	6.5	270	240	7.5	65	M10	3.2	4
.130.M	155	90	24	43	6.5	270	240	7.5	65	M10	3.2	4
.180.M	170	125	26	51	6.5	380	350	7.5	102	M10	5.1	5

**CONNECTION**

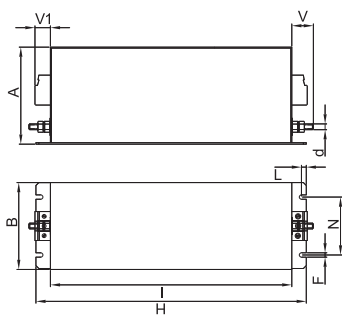
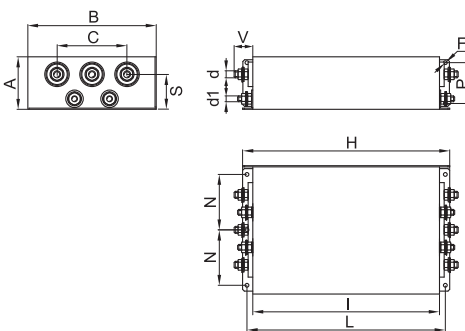
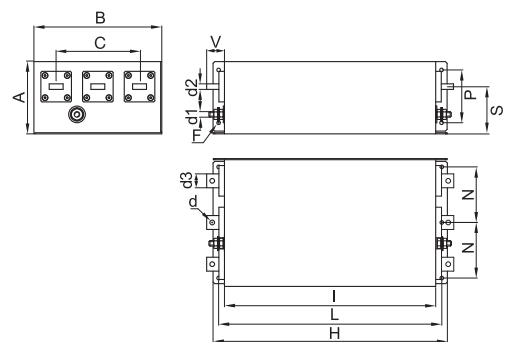
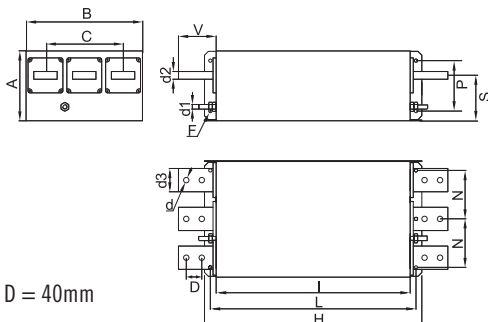
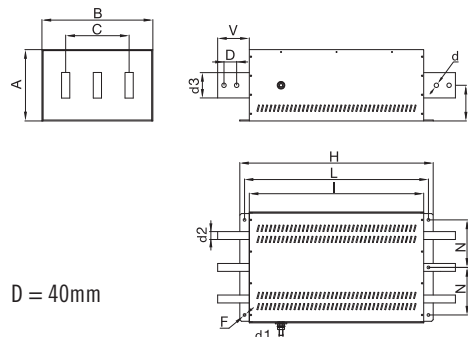
Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
6 - 35	4 - 25	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20

**MECHANICAL DIMENSIONS (mm)**

FIN538S 1	A	B	C	d2	d3	V	F	H	I	L	N	P	S	Weight Kg	Case
.250.V/.280.V	90	220	120	-	-	30	6.5	356	320	340	95	70	60	9	6
.280.BC/.320.BC	90	220	120	6	20	42	6.5	356	320	340	95	70	55	9	7
.360.BC/.400.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.500.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.600.BC/.750.BC	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	9
.900.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1000.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1250.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1500.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.1600.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.1750.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.2000.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.2250.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.2500.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.3000.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12

**CONNECTION**

d (mm)	Line Torque (Nm)	d1(mm)	Ground Torque (Nm)
M12	20	M10	18
M8	14	M10	18
M8	14	M10	18
M8	14	M10	18
M10	25	M10	18
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20

**CASE 1/2/3/4/5**

**CASE 6**

**CASE 7/8/9**

**CASE 10/11**

**CASE 12**

**Vertical bus-bar connections available upon request**



### ELECTRIC CHARACTERISTICS

Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

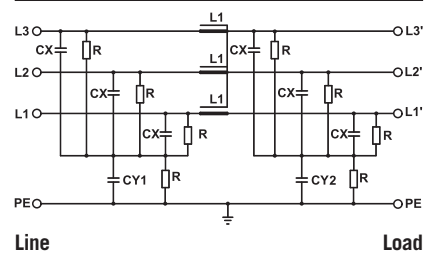
RoHS

FIN539S	Rated Current (A) 40°C (50°C)	Σ Cx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	Power Loss (W)
.400.B	420 (400)	60	1000	1000	0.6	92
.500.B	525 (500)	60	1000	1000	0.6	102
.600.B	630 (600)	60	1000	1000	0.55	82
.750.B	790 (750)	60	1000	1000	0.5	95
.900.B	945 (900)	60	1000	1000	0.5	105
.1000.B	1050 (1000)	60	1000	1000	0.45	92
.1250.B	1300 (1250)	60	1000	1000	0.43	98
.1500.B	1550 (1500)	60	1000	1000	0.43	108
.1750.B	1800 (1750)	60	1000	1000	0.4	105
.2000.B	2100 (2000)	60	1000	1000	0.4	92
.2250.B	2350 (2250)	60	1000	1000	0.4	98
.2500.B	2650 (2500)	60	1000	1000	0.4	108

Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <10mA  
Worst condition <80mA

### ELECTRIC DIAGRAM



Vertical bus-bar connections available upon request

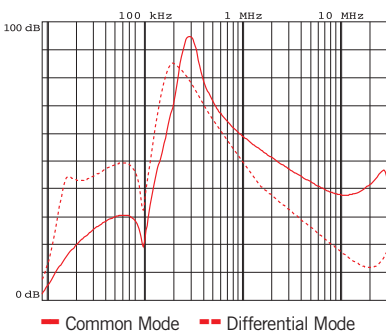
### MECHANICAL DIMENSIONS (mm)

FIN539S	A	B	C	d2	d3	V	F	H	I	L	N	P	S	Weight Kg	Case
.400.B	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	1
.500.B	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	1
.600.B	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	2
.750.B	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	2
.900.B	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	2
.1000.B	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	3
.1250.B	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	3
.1500.B	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	3
.1750.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	4
.2000.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	4
.2250.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	4
.2500.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	4

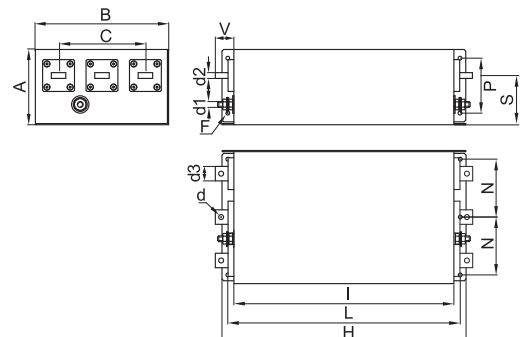
### CONNECTION

d (mm)	Line Torque (Nm)	Ground Torque (Nm)
M8	14	M10 18
M8	14	M10 18
M8	14	M10 18
M10	25	M10 18
M10	25	M10 18
M12	50	M12 20
M12	50	M12 20
M12	50	M12 20
M12	50	M12 20
M12	50	M12 20
M12	50	M12 20
M12	50	M12 20

### TYPICAL ATTENUATION



### CASE 1/2/3/4





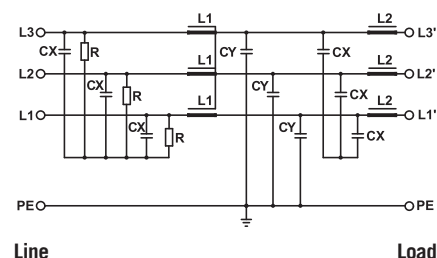
ELECTRIC CHARACTERISTICS	1200	1200 HV	
Nominal voltage	0/480	0/600	V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2200	2400	V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2900	3200	V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C		

RoHS

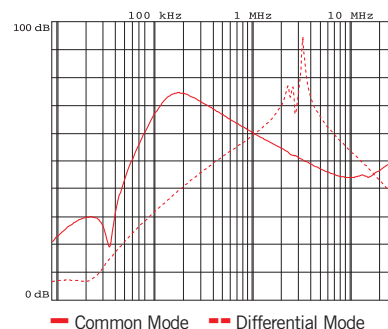
UL1283  
CSA C22.2  
E215863

FIN1200 FIN1200HV	Rated Current 40°C (50°C)	ΣCx (μF) ± 5%	Cy (nF) ± 5%	L1 (mH) ± 10%	L2 (μH) ± 10%	Power Loss (W)
.005.V	7 (5)	6.6	47	7	4	5
.010.V	12 (10)	6.6	47	5	4	7
.016.V	18 (16)	60	47	2	4	14
.030.V	34 (30)	60	47	2	4	11
.050.V	55 (50)	60	47	2	4	10
.080.V	85 (80)	60	47	1.8	4	35
.100.V	110 (100)	60	47	1.5	4	42
.150.V	160 (150)	60	47	1.3	2	74
.200.V	210 (200)	60	47	0.9	2	90
.250.V	272 (250)	60	47	0.7	2	90
.280.V	290 (280)	60	47	0.7	2	80
.280.BC	297 (280)	60	47	0.7	2	78
.320.BC	330 (320)	60	47	0.7	2	80
.360.BC	390 (360)	60	47	0.6	2	105
.400.BC	435 (400)	60	47	0.6	2	110
.500.BC	545 (500)	60	47	0.55	2	102
.600.BC	654 (600)	60	47	0.55	2	108
.750.BC	800 (750)	60	47	0.5	2	96
.900.BC	940 (900)	60	47	0.5	2	80
.1000.BC	1050 (1000)	60	47	0.45	2	115
.1250.BC	1290 (1250)	60	47	0.45	2	101
.1500.BC	1550 (1500)	60	47	0.4	2	120
.1600.BC	1650 (1600)	60	47	0.4	2	130
.1750.BC	1800 (1750)	60	47	0.4	2	135
.2000.BC	2040 (2000)	60	47	0.38	2	138
.2250.BC	2290 (2250)	60	47	0.38	2	145
.2500.BC	2535 (2500)	60	47	0.38	2	170
.3000.BC	3050 (3000)	60	47	0.38	2	180

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



— Common Mode    - - - Differential Mode

Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <3mA  
Worst condition <10mA

Vertical bus-bar connections available upon request

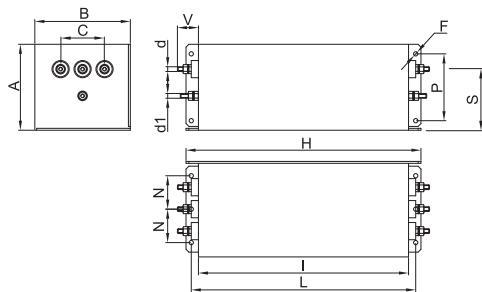
## MECHANICAL DIMENSIONS (mm)

FIN1200 FIN1200HV	A	B	C	d2	d3	V	F	H	I	L	N	P	S	Weight Kg	Case
.005.V	58	86	44	-	-	14	4.5	186	160	176	30	40	38	2	1
.010.V	58	86	44	-	-	14	4.5	186	160	176	30	40	38	2	1
.016.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	2
.030.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	2
.050.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	3
.080.V	90	185	84	-	-	25	6.5	356	320	340	77.5	70	69	5	4
.100.V	90	185	84	-	-	25	6.5	356	320	340	77.5	70	69	5	4
.150.V	90	220	120	-	-	29	6.5	356	320	340	95	70	60	7	5
.200.V	90	220	120	-	-	29	6.5	356	320	340	95	70	60	7	5
.250.V/.280.V	90	220	120	-	-	30	6.5	356	320	340	95	70	60	9	6
.280.BC/.320.BC	90	220	120	6	20	42	6.5	356	320	340	95	70	55	9	7
.360.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.400.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.500.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.600.BC/.750.BC	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	9
.900.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1000.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1250.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1500.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.1600.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.1750.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.2000.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.2250.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.2500.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.3000.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12

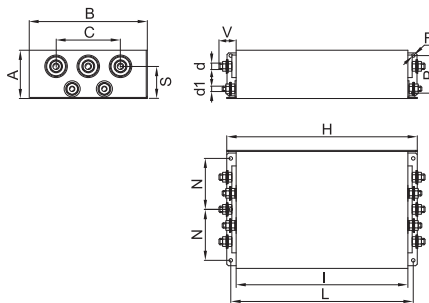
## CONNECTION

d (mm)	Line Torque (Nm)	d1(mm)	Ground Torque (Nm)
M4	1.2	M4	1.2
M4	1.2	M4	1.2
M5	4	M5	4
M5	4	M5	4
M6	6	M5	4
M8	14	M8	14
M8	14	M8	14
M10	18	M10	18
M10	18	M10	18
M12	20	M10	18
M8	14	M10	18
M8	14	M10	18
M8	14	M10	18
M10	25	M10	18
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20

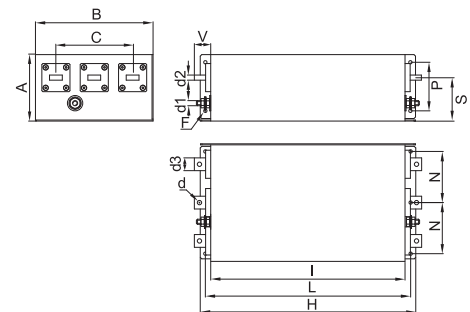
### CASE 1/2/3/4



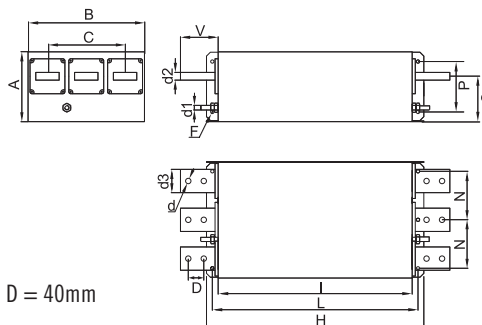
### CASE 5/6



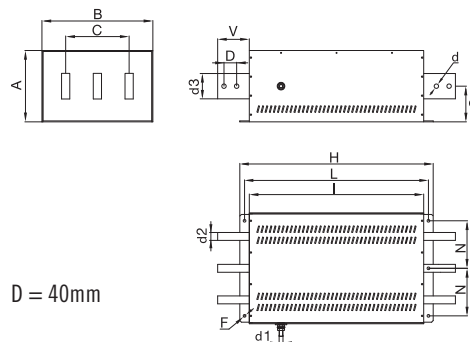
### CASE 7/8/9



### CASE 10/11



### CASE 12



Vertical bus-bar connections  
available upon request



ELECTRIC CHARACTERISTICS	1500	1500 HV	
Nominal voltage	0/480	0/600	V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	2200	2400	V <sub>DC</sub> (2 s)
Phase to ground test voltage	2900	3200	V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C		

RoHS

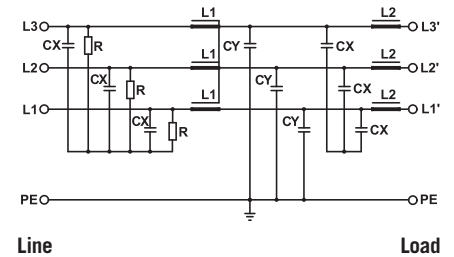
UL1283  
CSA C22.2  
E215863

FIN1500 FIN1500HV	Rated Current 40°C (50°C)	Σ Cx (μF) ± 5%	Cy (nF) ± 5%	L1 (mH) ± 10%	L2 (μH) ± 10%	Power Loss (W)
.005.V	7 (5)	6.6	470	7	4	5
.010.V	12 (10)	6.6	470	5	4	7
.016.V	18 (16)	60	470	2	4	14
.030.V	34 (30)	60	470	2	4	11
.050.V	55 (50)	60	470	2	4	10
.080.V	85 (80)	60	470	1.8	4	35
.100.V	110 (100)	60	470	1.5	4	42
.150.V	160 (150)	60	470	1.3	2	74
.200.V	210 (200)	60	470	0.9	2	90
.200.BC	210 (200)	60	470	0.9	2	90
.250.V	272 (250)	60	470	0.7	2	90
.280.V	290 (280)	60	470	0.7	2	80
.280.BC	297 (280)	60	470	0.7	2	78
.320.BC	330 (320)	60	470	0.7	2	80
.360.BC	390 (360)	60	470	0.6	2	105
.400.BC	435 (400)	60	470	0.6	2	110
.500.BC	545 (500)	60	470	0.55	2	102
.600.BC	654 (600)	60	470	0.55	2	108
.750.BC	800 (750)	60	470	0.5	2	96
.900.BC	940 (900)	60	470	0.5	2	80
.1000.BC	1050 (1000)	60	470	0.45	2	115
.1250.BC	1290 (1250)	60	470	0.45	2	101
.1500.BC	1550 (1500)	60	470	0.4	2	120
.1600.BC	1650 (1600)	60	470	0.4	2	130
.1750.BC	1800 (1750)	60	470	0.4	2	135
.2000.BC	2040 (2000)	60	470	0.38	2	138
.2250.BC	2290 (2250)	60	470	0.38	2	145
.2500.BC	2535 (2500)	60	470	0.38	2	170
.3000.BC	3050 (3000)	60	470	0.38	2	180

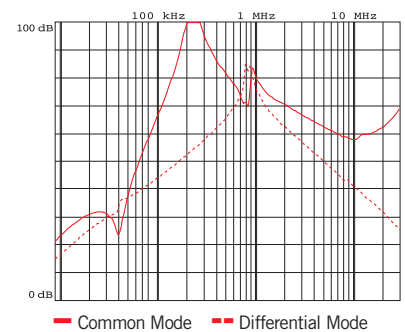
Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <35mA  
Worst condition <105mA

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



Vertical bus-bar connections available upon request



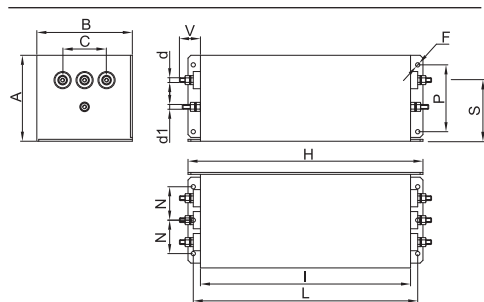
## MECHANICAL DIMENSIONS (mm)

FIN1500 FIN1500HV	A	B	C	d2	d3	V	F	H	I	L	N	P	S	Weight Kg	Case
.005.V	58	86	44	-	-	14	4.5	186	160	176	30	40	38	2	1
.010.V	58	86	44	-	-	14	4.5	186	160	176	30	40	38	2	1
.016.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	2
.030.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	2
.050.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	3
.080.V	90	185	84	-	-	25	6.5	356	320	340	77.5	70	69	5	4
.100.V	90	185	84	-	-	25	6.5	356	320	340	77.5	70	69	5	4
.150.V	90	220	120	-	-	29	6.5	356	320	340	95	70	60	7	5
.200.V	90	220	120	-	-	29	6.5	356	320	340	95	70	60	7	5
.200.BC	90	220	120	6	20	42	6.5	356	320	340	95	70	55	9	7
.250.V/.280.V	90	220	120	-	-	30	6.5	356	320	340	95	70	60	9	6
.280.BC/.320.BC	90	220	120	6	20	42	6.5	356	320	340	95	70	55	9	7
.360.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.400.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.500.BC	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	8
.600.BC/.750.BC	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	9
.900.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1000.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1250.BC	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	10
.1500.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.1600.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.1750.BC	180	300	200	20	60	97	8.5	560	500	530	125	130	117	30	11
.2000.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.2250.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.2500.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12
.3000.BC	225	350	200	25	80	100	8.5	610	550	580	150	-	112.5	68	12

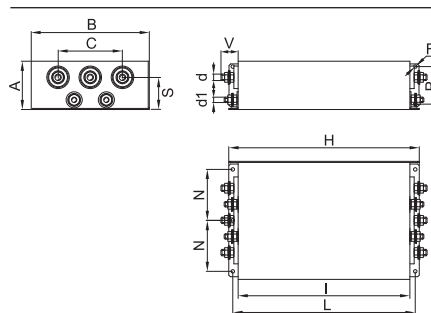
## CONNECTION

d (mm)	Line Torque (Nm)	d1(mm)	Ground Torque (Nm)
M4	1.2	M4	1.2
M4	1.2	M4	1.2
M5	4	M5	4
M5	4	M5	4
M6	6	M5	4
M8	14	M8	14
M8	14	M8	14
M10	18	M10	18
M10	18	M10	18
M8	14	M10	18
M12	20	M10	18
M8	14	M10	18
M8	14	M10	18
M8	14	M10	18
M10	25	M10	18
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20
M12	50	M12	20

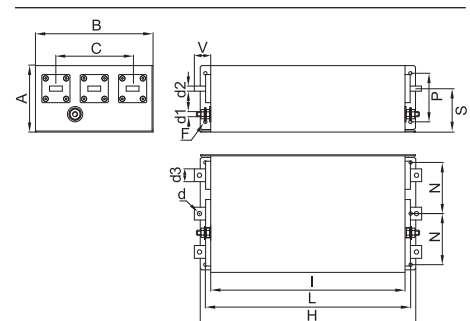
### CASE 1/2/3/4



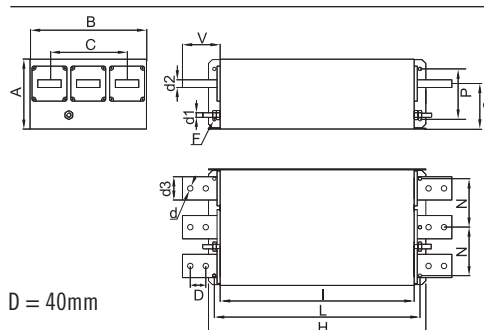
### CASE 5/6



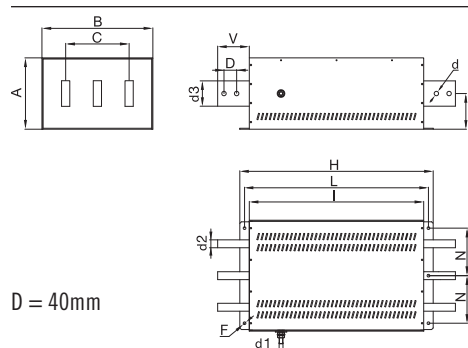
### CASE 7/8/9



### CASE 10/11



### CASE 12



Vertical bus-bar connections  
available upon request



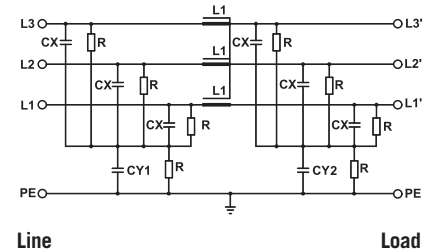
### ELECTRIC CHARACTERISTICS

Nominal voltage	0/750 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	3100 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3500 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

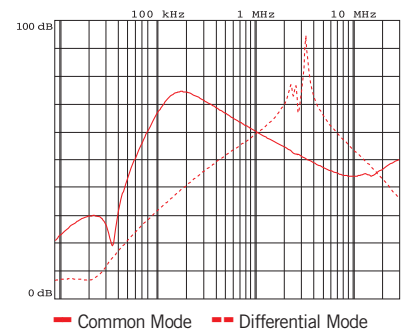
**RoHS**

FIN1200HV	Rated Current 40°C (50°C)	$\Sigma Cx$ ( $\mu F$ ) $\pm 5\%$	Cy1 (nF) $\pm 5\%$	Cy2 (nF) $\pm 5\%$	L1 (mH) $\pm 10\%$	Power Loss (W)
.016.V	18 (16)	60	100	100	2	14
.030.V	34 (30)	60	100	100	2	11
.050.V	55 (50)	60	100	100	2	10
.080.V	85 (80)	60	100	100	1.8	35
.100.V	110 (100)	60	100	100	1.5	42
.150.V	160 (150)	60	100	100	1.3	74
.200.V	210 (200)	60	100	100	0.9	90
.250.V	272 (250)	60	100	100	0.7	90
.280.V	290 (280)	60	100	100	0.7	80
.280.B	297 (280)	60	100	100	0.7	78
.320.B	330 (320)	60	100	100	0.7	80
.360.B	390 (360)	60	100	100	0.6	105
.400.B	435 (400)	60	100	100	0.6	110
.500.B	545 (500)	60	100	100	0.55	102
.600.B	654 (600)	60	100	100	0.55	108
.750.B	800 (750)	60	100	100	0.5	96
.900.B	940 (900)	60	100	100	0.5	80
.1000.B	1050 (1000)	60	100	100	0.45	115
.1250.B	1290 (1250)	60	100	100	0.45	101
.1500.B	1550 (1500)	60	100	100	0.4	120
.1600.B	1650 (1600)	60	100	100	0.4	130
.1750.B	1800 (1750)	60	100	100	0.4	135
.2000.B	2040 (2000)	60	100	100	0.38	138
.2250.B	2290 (2250)	60	100	100	0.38	145
.2500.B	2535 (2500)	60	100	100	0.38	170

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



— Common Mode    - - - Differential Mode

Vertical bus-bar connections available upon request

Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <3mA  
Worst condition <10mA

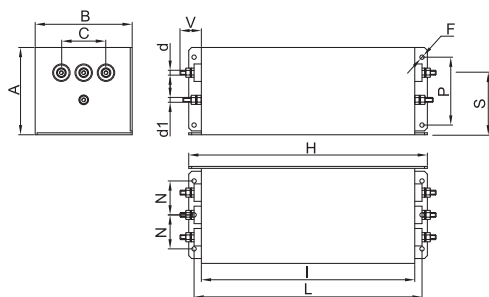
## MECHANICAL DIMENSIONS (mm)

FIN1200HHV	A	B	C	d2	d3	V	F	H	I	L	N	P	S	Weight Kg	Case
.016.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	1
.030.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	1
.050.V	90	100	46	-	-	28	4.5	246	220	235	35	70	64	3	2
.080.V	90	185	84	-	-	25	6.5	356	320	340	77.5	70	69	5	3
.100.V	90	185	84	-	-	25	6.5	356	320	340	77.5	70	69	5	3
.150.V	90	220	120	-	-	29	6.5	356	320	340	95	70	60	7	4
.200.V	90	220	120	-	-	29	6.5	356	320	340	95	70	60	7	4
.250.V	90	220	120	-	-	30	6.5	356	320	340	95	70	60	9	5
.280.V	90	220	120	-	-	30	6.5	356	320	340	95	70	60	9	5
.280.B	90	220	120	6	20	42	6.5	356	320	340	95	70	55	9	6
.320.B	90	220	120	6	20	42	6.5	356	320	340	95	70	55	9	6
.360.B	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	7
.400.B	130	230	150	10	25	42	6.5	420	380	400	100	100	85	13.5	7
.500.B	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	8
.600.B	130	230	150	15	30	48	6.5	510	450	480	100	100	85	19	8
.750.B	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	9
.900.B	160	250	140	20	40	94	8.5	510	450	480	100	110	110	27	9
.1000.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11
.1250.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11
.1500.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11
.1600.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11
.1750.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11
.2000.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11
.2250.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11
.2500.B	180	350	200	20	60	97	8.5	610	550	580	150	130	117	32	11

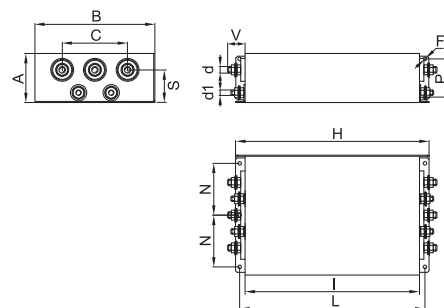
## CONNECTION

d (mm)	Line Torque (Nm)	d1(mm)	Ground Torque (Nm)
M5	4	M5	4
M5	4	M5	4
M6	6	M5	4
M8	14	M8	14
M8	14	M8	14
M10	18	M10	18
M10	18	M10	18
M12	20	M10	18
M12	20	M10	18
M8	14	M10	18
M8	14	M10	18
M8	14	M10	18
M10	25	M10	18
M10	25	M10	18
M12	50	M12	20
13.5	50	M12	20
13.5	50	M12	20
14	65	M12	20
14	65	M12	20
14	65	M12	20
14	65	M12	20
14	65	M12	20
14	65	M12	20

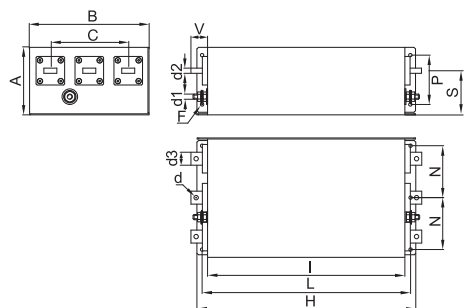
### CASE 1/2/3



### CASE 4/5



### CASE 6/7/8/9/10/11



Vertical bus-bar connections available upon request



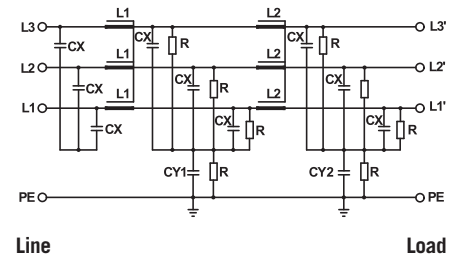
### ELECTRIC CHARACTERISTICS

Nominal voltage	0/480 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2200 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2900 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

FIN1600	Rated Current 40°C (50°C)	$\Sigma$ Cx ( $\mu$ F) $\pm$ 5%	Cy1 (nF) $\pm$ 5%	Cy2 (nF) $\pm$ 5%	L1 (mH) $\pm$ 10%	L2 (mH) $\pm$ 10%	Power Loss (W)
.007.M	7 (5)	15	1000	470	1.2	2.7	6
.013.M	13 (11)	15	1000	470	1.2	2.7	10
.018.M	18 (16)	15	1000	470	1.2	2.7	12
.034.M	34 (30)	15	1000	470	1.1	2.2	24
.055.M	55 (50)	15	1000	1000	1.1	2.2	27
.090.M	90 (80)	15	1000	1000	1	1.1	37
.110.M	110 (100)	15	1000	1000	0.9	1.1	67
.160.M	160 (150)	15	1000	1000	0.9	1	100
.200.M	200 (180)	15	1000	1000	0.8	1	93

### ELECTRIC DIAGRAM



Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <10mA  
Worst condition <130mA

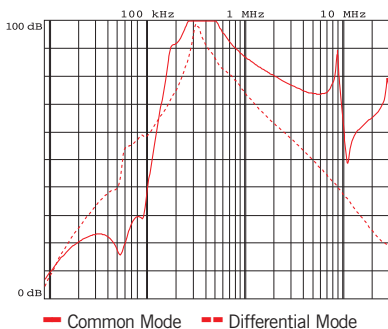
### MECHANICAL DIMENSIONS (mm)

FIN1600	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.007.M	126	50	19	11	6.5	255	225	7.5	25	M5	1.6
.013.M	126	50	19	11	6.5	255	225	7.5	25	M5	1.6
.018.M	143	55	19	11	6.5	305	276	7.5	30	M5	2.2
.034.M	150	60	19	16	6.5	335	305	7.5	35	M5	2.7
.055.M	185	70	18	33	6.5	329	300	7.5	45	M6	4.7
.090.M	220	80	18	39	6.5	329	300	7.5	55	M6	5.5
.110.M	220	90	28	43	6.5	379	350	7.5	65	M10	7.7
.160.M	240	110	28	43	6.5	439	400	12.5	65	M10	11
.200.M	240	110	28	50	6.5	439	400	12.5	65	M10	12

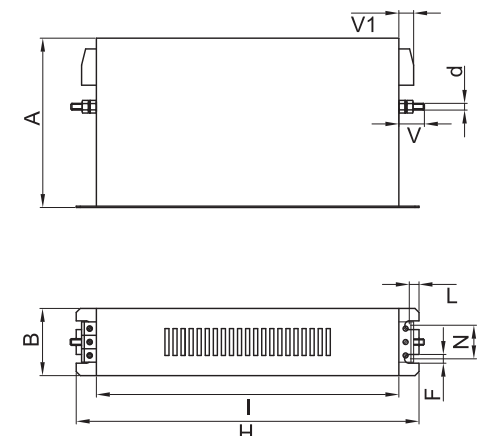
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 6	0.2 - 4	0.5
0.2 - 6	0.2 - 4	0.5
0.2 - 6	0.2 - 4	0.5
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





### ELECTRIC CHARACTERISTICS

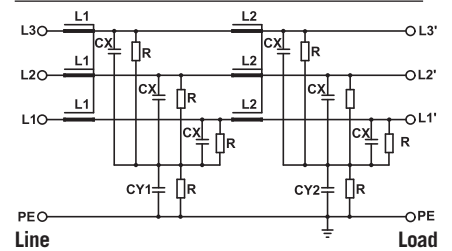
Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

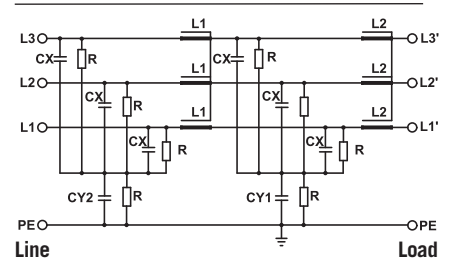
UL1283  
CSA C22.2  
E215863

FIN1700 FIN1700G	Rated Current 40°C (50°C)	ΣCx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.006.M	8 (6)	20	100	100	1.5	1.5	8
.012.M	14 (12)	20	100	100	1.5	1.5	10
.016.M	18 (16)	60	100	100	1.4	1.4	12
.025.M	28 (25)	60	100	100	1.3	1.3	15
.032.M	35 (32)	60	100	100	1.2	1.2	23
.042.M	50 (42)	60	100	100	1.1	1.1	32
.055.M	63 (55)	60	100	100	1.1	1.1	37
.070.M	80 (70)	60	100	100	1	1	52
.080.M	90 (80)	60	100	100	1	1	60
.100.M	110 (100)	60	100	100	0.9	0.9	92
.115.M	130 (115)	60	100	100	0.8	0.8	101
.150.M	175 (150)	60	100	100	0.7	0.7	115
.200.M	230 (200)	60	100	100	0.6	0.7	120

### FIN1700 ELECTRIC DIAGRAM



### FIN1700G ELECTRIC DIAGRAM



Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <3mA  
Worst condition <15mA

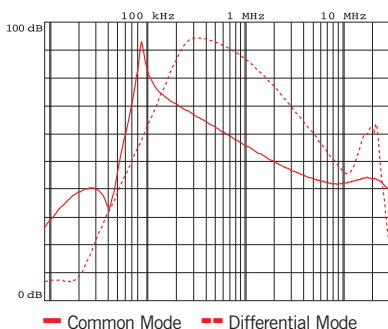
### MECHANICAL DIMENSIONS (mm)

FIN1700 FIN1700G	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.006.M	140	50	19	15	6	226	200	7	28	M6	1.7
.012.M	140	50	19	15	6	226	200	7	28	M6	1.7
.016.M	177	60	19	15	6	267	237	8	34	M6	1.7
.025.M	177	60	19	15	6	267	237	8	34	M6	2.3
.032.M	177	60	19	15	6	267	237	8	34	M6	2.3
.042.M	177	70	19	25	6	295	265	8	44	M6	3.4
.055.M	177	70	19	33	6	295	265	8	44	M6	3.5
.070.M	205	80	28	38	8	390	340	12	53	M10	6
.080.M	205	80	28	38	8	390	340	12	53	M10	6
.100.M	205	80	28	43	8	390	340	12	53	M10	7.1
.115.M	205	80	28	43	8	390	340	12	53	M10	7.1
.150.M	220	105	28	50	8	420	370	12	78	M10	8.5
.200.M	220	105	28	50	8	420	370	12	78	M10	8.5

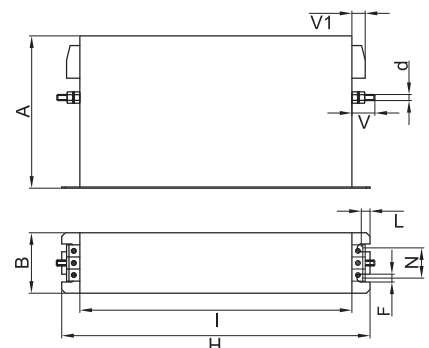
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





### ELECTRIC CHARACTERISTICS

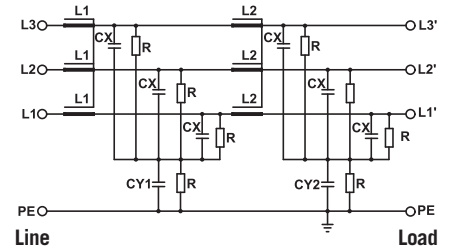
Nominal voltage	0/500 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2300 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3100 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

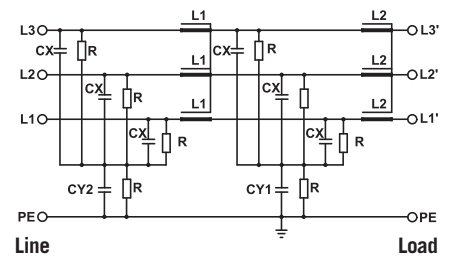
UL1283  
CSA C22.2  
E215863

FIN1700E FIN1700EG	Rated Current 40°C (50°C)	ΣCx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.007.M	7 (6)	20	100	100	1.5	1.5	8
.013.M	13 (12)	20	100	100	1.5	1.5	12
.018.M	18 (16)	20	100	100	1.4	1.4	15
.027.M	27 (25)	20	100	100	1.3	1.3	20
.034.M	34 (32)	20	100	100	1.2	1.2	32
.040.M	40 (36)	20	100	100	1.1	1.1	23
.055.M	55 (50)	20	100	100	1.1	1.1	42
.070.M	70 (64)	20	100	100	1	1	55
.100.M	100 (90)	20	100	100	1	1	60
.110.M	110 (100)	20	100	100	0.9	0.9	90
.130.M	130 (120)	20	100	100	0.8	0.8	98
.150.M	150 (135)	20	100	100	0.7	0.7	103
.200.M	200 (180)	20	100	100	0.7	0.7	115
.230.M	230 (210)	20	100	100	0.6	0.7	120

### FIN1700E ELECTRIC DIAGRAM



### FIN1700EG ELECTRIC DIAGRAM



Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <3mA  
Worst condition <15mA

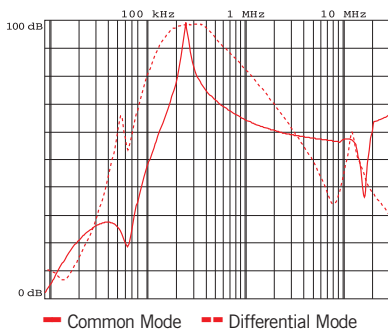
### MECHANICAL DIMENSIONS (mm)

FIN1700E FIN1700EG	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.007.M	140	50	19	15	6	226	200	7	28	M6	1.7
.013.M	140	50	19	15	6	226	200	7	28	M6	1.7
.018.M	140	50	19	15	6	226	200	7	28	M6	1.7
.027.M	140	50	19	15	6	226	200	7	28	M6	1.7
.034.M	140	50	19	15	6	226	200	7	28	M6	1.7
.040.M	140	50	19	15	6	226	200	7	28	M6	1.7
.055.M	177	70	19	25	6	295	265	8	44	M6	3.7
.070.M	177	70	19	33	6	295	265	8	44	M6	5.2
.100.M	205	80	28.5	38	8	390	340	12	53	M10	6.5
.110.M	205	80	28.5	38	8	390	340	12	53	M10	6.5
.130.M	205	80	28.5	43	8	390	340	12	53	M10	7.1
.150.M	205	80	28.5	43	8	390	340	12	53	M10	7.1
.200.M	220	105	28.5	50	8	420	370	12	78	M10	8
.230.M	220	105	28.5	50	8	420	370	12	78	M10	8

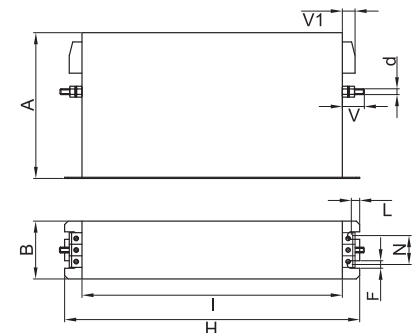
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





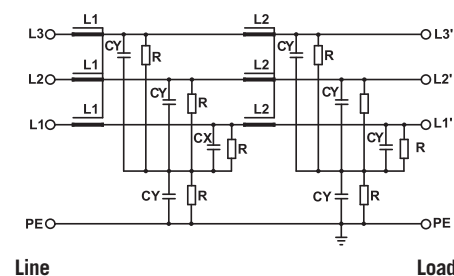
### ELECTRIC CHARACTERISTICS

Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2700 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

FIN1700IT	Rated Current 40°C (50°C)	Cy (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.006.M	8 (6)	100	1.5	1.5	8
.012.M	14 (12)	100	1.5	1.5	10
.016.M	18 (16)	100	1.4	1.4	12
.025.M	28 (25)	100	1.3	1.3	15
.032.M	35 (32)	100	1.2	1.2	23
.042.M	50 (42)	100	1.1	1.1	32
.055.M	63 (55)	100	1.1	1.1	37
.070.M	80 (70)	100	1	1	52
.080.M	90 (80)	100	1	1	60
.100.M	110 (100)	100	0.9	0.9	92
.115.M	130 (115)	100	0.8	0.8	101
.150.M	175 (150)	100	0.7	0.7	115
.200.M	230 (200)	100	0.6	0.6	120

### ELECTRIC DIAGRAM



Models available with current ratings up to 2500A

Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <1mA  
Worst condition <3mA

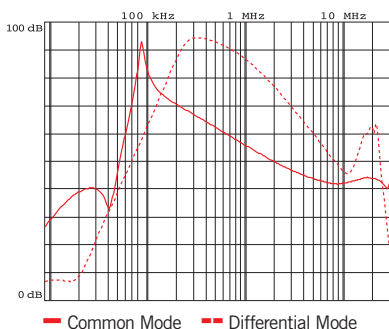
### MECHANICAL DIMENSIONS (mm)

FIN1700IT	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.006.M	140	50	19	15	6	226	200	7	28	M6	1.7
.012.M	140	50	19	15	6	226	200	7	28	M6	1.7
.016.M	177	60	19	15	6	267	237	8	34	M6	1.7
.025.M	177	60	19	15	6	267	237	8	34	M6	2.3
.032.M	177	60	19	15	6	267	237	8	34	M6	2.3
.042.M	177	70	19	25	6	295	265	8	44	M6	3.4
.055.M	177	70	19	33	6	295	265	8	44	M6	3.5
.070.M	205	80	28	38	8	390	340	12	53	M10	6
.080.M	205	80	28	38	8	390	340	12	53	M10	6
.100.M	205	80	28	43	8	390	340	12	53	M10	7.1
.115.M	205	80	28	43	8	390	340	12	53	M10	7.1
.150.M	220	105	28	50	8	420	370	12	78	M10	8.5
.200.M	220	105	28	50	8	420	370	12	78	M10	8.5

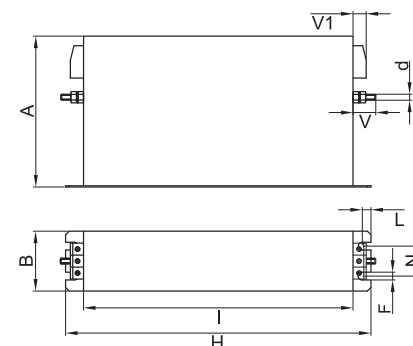
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE







### ELECTRIC CHARACTERISTICS

Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

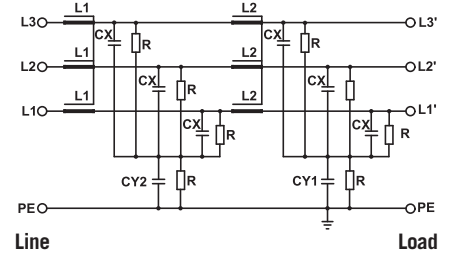
UL1283  
CSA C22.2  
E215863

FIN1900 FIN1900G	Rated Current 40°C (50°C)	ΣCx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.006.M	8 (6)	20	1000	100	1.5	1.5	8
.012.M	14 (12)	20	1000	100	1.5	1.5	10
.016.M	18 (16)	60	1000	100	1.4	1.4	12
.025.M	28 (25)	60	1000	100	1.3	1.3	15
.032.M	35 (32)	60	1000	100	1.2	1.2	23
.042.M	50 (42)	60	1000	100	1.1	1.1	32
.055.M	63 (55)	60	1000	100	1.1	1.1	37
.070.M	80 (70)	60	1000	100	1	1	52
.080.M	90 (80)	60	1000	100	1	1	60
.100.M	110 (100)	60	1000	100	0.9	0.9	92
.115.M	130 (115)	60	1000	100	0.8	0.8	101
.150.M	175 (150)	60	1000	100	0.7	0.7	115
.200.M	230 (200)	60	1000	100	0.6	0.6	120

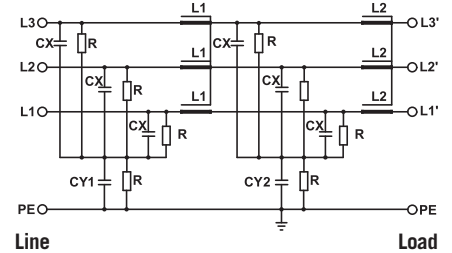
Nominal <10mA  
Worst condition <80mA

Total leakage current at 230 V phase to ground 50 Hz / 40°C

### FIN1900 ELECTRIC DIAGRAM



### FIN1900G ELECTRIC DIAGRAM



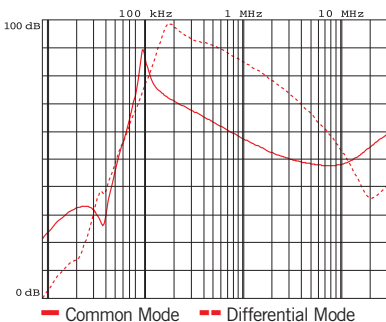
### MECHANICAL DIMENSIONS (mm)

FIN1900 FIN1900G	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.006.M	140	50	19	15	6	226	200	7	28	M6	1.7
.012.M	140	50	19	15	6	226	200	7	28	M6	1.7
.016.M	177	60	19	15	6	267	237	8	34	M6	1.7
.025.M	177	60	19	15	6	267	237	8	34	M6	2.3
.032.M	177	60	19	15	6	267	237	8	34	M6	2.3
.042.M	177	70	19	25	6	295	265	8	44	M6	3.4
.055.M	177	70	19	33	6	295	265	8	44	M6	3.5
.070.M	205	80	28	38	8	390	340	12	53	M10	6
.080.M	205	80	28	38	8	390	340	12	53	M10	6
.100.M	205	80	28	43	8	390	340	12	53	M10	7.1
.115.M	205	80	28	43	8	390	340	12	53	M10	7.1
.150.M	220	105	28	50	8	420	370	12	78	M10	8.5
.200.M	220	105	28	50	8	420	370	12	78	M10	8.5

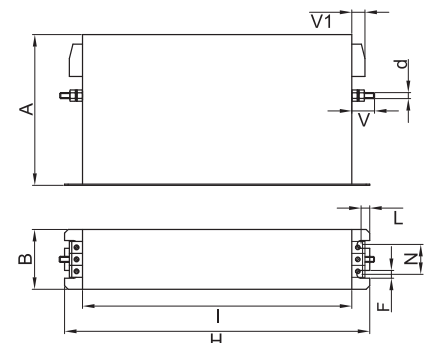
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





### ELECTRIC CHARACTERISTICS

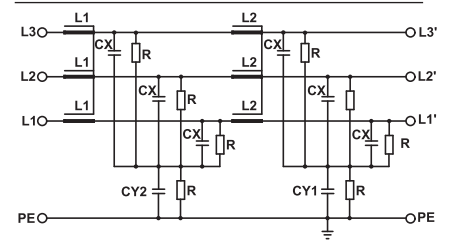
Nominal voltage	0/500 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2300 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3100 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

UL1283  
CSA C22.2  
E215863

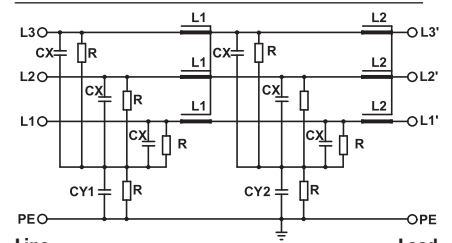
FIN1900E FIN1900EG	Rated Current 40°C (50°C)	ΣCx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.007.M	7 (6)	20	1000	100	1.5	1.5	8
.013.M	13 (12)	20	1000	100	1.5	1.5	12
.018.M	18 (16)	20	1000	100	1.4	1.4	15
.027.M	27 (25)	20	1000	100	1.3	1.3	20
.034.M	34 (32)	20	1000	100	1.2	1.2	32
.040.M	40 (36)	20	1000	100	1.1	1.1	23
.055.M	55 (50)	20	1000	100	1.1	1.1	42
.070.M	70 (64)	20	1000	100	1	1	55
.100.M	100 (90)	20	1000	100	1	1	60
.110.M	110 (100)	20	1000	100	0.9	0.9	90
.130.M	130 (120)	20	1000	100	0.8	0.8	98
.150.M	150 (135)	20	1000	100	0.7	0.7	103
.200.M	200 (180)	20	1000	100	0.7	0.7	115
.230.M	230 (210)	20	1000	100	0.6	0.6	120

### FIN1900E ELECTRIC DIAGRAM



Line Load

### FIN1900EG ELECTRIC DIAGRAM



Line Load

Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <10mA  
Worst condition <80mA

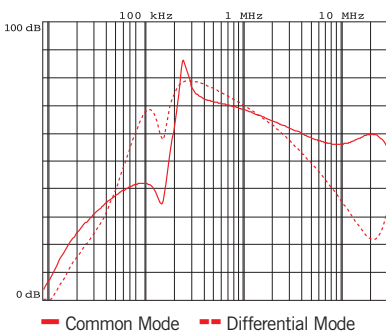
### MECHANICAL DIMENSIONS (mm)

FIN1900E FIN1900EG	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.007.M	140	50	19	15	6	226	200	7	28	M6	1.7
.013.M	140	50	19	15	6	226	200	7	28	M6	1.7
.018.M	140	50	19	15	6	226	200	7	28	M6	1.7
.027.M	140	50	19	15	6	226	200	7	28	M6	1.7
.034.M	140	50	19	15	6	226	200	7	28	M6	1.7
.040.M	140	50	19	15	6	226	200	7	28	M6	1.7
.055.M	177	70	19	25	6	295	265	8	44	M6	3.7
.070.M	177	70	19	33	6	295	265	8	44	M6	5.2
.100.M	205	80	28.5	38	8	390	340	12	53	M10	6.5
.110.M	205	80	28.5	38	8	390	340	12	53	M10	6.5
.130.M	205	80	28.5	43	8	390	340	12	53	M10	7.1
.150.M	205	80	28.5	43	8	390	340	12	53	M10	7.1
.200.M	220	105	28.5	50	8	420	370	12	78	M10	8
.230.M	220	105	28.5	50	8	420	370	12	78	M10	8

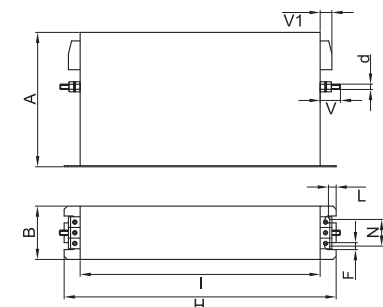
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/600 V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>DC</sub> (2 s)
Phase to ground test voltage	3200 V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

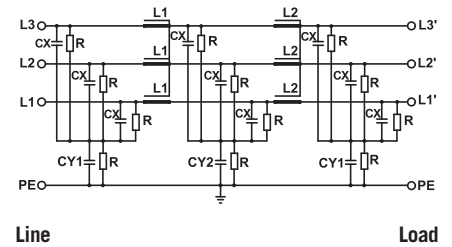
UL1283  
CSA C22.2  
E215863

FIN1900S	Rated Current 40°C (50°C)	Σ Cx (µF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.042.M	50 (42)	60	1000	100	1.1	1.1	32
.055.M	63 (55)	60	1000	100	1.1	1.1	37
.070.M	80 (70)	60	1000	100	1	1	52
.080.M	90 (80)	60	1000	100	1	1	60
.100.M	110 (100)	60	1000	100	0.9	0.9	92
.115.M	130 (115)	60	1000	100	0.8	0.8	101
.150.M	175 (150)	60	1000	100	0.7	0.7	115
.200.M	230 (200)	60	1000	100	0.6	0.6	120

Nominal <15mA  
Worst condition <150mA

Total leakage current at 230 V phase to ground 50 Hz / 40°C

### ELECTRIC DIAGRAM



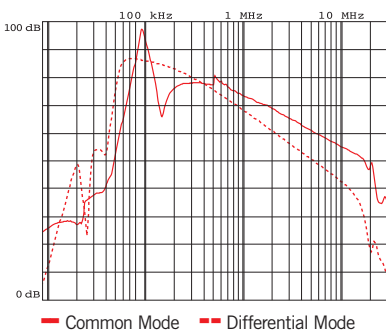
### MECHANICAL DIMENSIONS (mm)

FIN1900S	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.042.M	177	70	19	25	6	295	265	8	44	M6	3.4
.055.M	177	70	19	33	6	295	265	8	44	M6	3.5
.070.M	205	80	28	38	8	390	340	12	53	M10	6
.080.M	205	80	28	38	8	390	340	12	53	M10	6
.100.M	205	80	28	43	8	390	340	12	53	M10	7.1
.115.M	205	80	28	43	8	390	340	12	53	M10	7.1
.150.M	220	105	28	50	8	420	370	12	78	M10	8
.200.M	220	105	28	50	8	420	370	12	78	M10	8

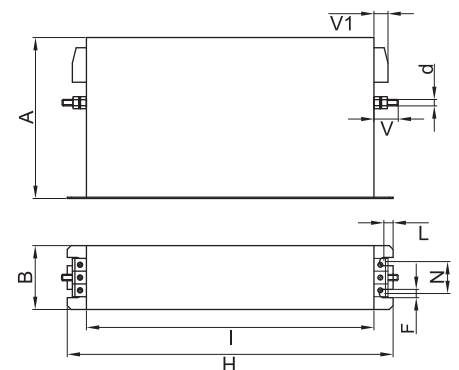
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/480 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2200 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2900 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

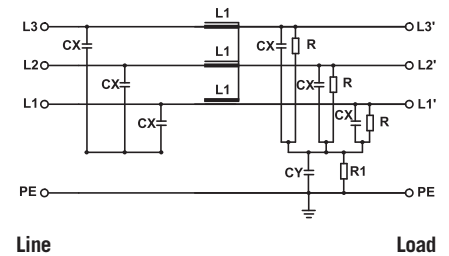
RoHS



FIN3755	Nominal Current (A)		$\Sigma C_x$ (μF) ±10%	C <sub>y</sub> (nF) ±10%	L (mH) ±10%	Power Loss (W)
	TA=40°C	TA=50°C				
.007.M	8	7	9	470	2.7	3
.016.M	18	16	9	470	2.1	4
.030.M	32	30	9	470	1.9	11
.042.M	45	42	9	470	1.6	15
.055.M	58	55	9	470	1.4	19
.075.M	80	75	9	470	1.2	25
.100.M	105	100	9	470	1.1	42

Total leakage current at 230 V phase to ground 50 Hz / 40°C  
 Nominal <10mA  
 Worst condition <80mA

### ELECTRIC DIAGRAM



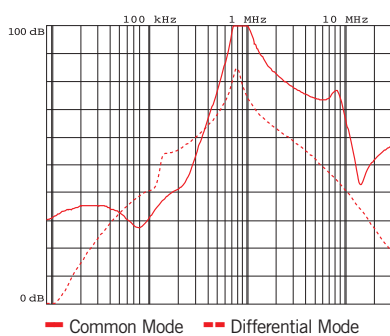
### MECHANICAL DIMENSIONS (mm)

FIN3755	A	B	C	D	E	F	G	H	I	Weight Kg
.007.M	160	180	190	78	48	20	4	M5	1	1.1
.016.M	220	235	250	85	48	25	5	M5	1	1.5
.030.M	240	255	270	85	50	30	5	M6	1	2.1
.042.M	280	295	310	85	50	30	5	M6	1	2.7
.055.M	220	235	250	100	90	60	5	M6	1	3.1
.075.M	240	255	270	135	85	60	5	M6	1.5	3.6
.100.M	240	255	270	155	90	65	6	M10	1.5	4.2

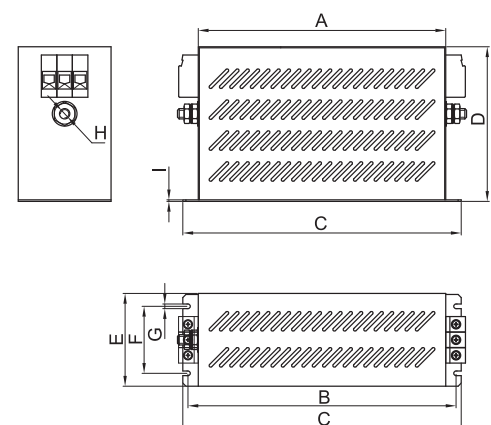
### CONNECTION






Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 4	0.2 - 4	0.5
0.2 - 4	0.2 - 4	0.5
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5

### TYPICAL ATTENUATION



### CASE



Filter Selection Guide	DESCRIPTION	CURRENT RANGE (A)	NOMINAL VOLTAGE (V)	CONNECTORS			FEATURES						APPLICATIONS					Approval	
				Terminal Blocks	Screws	Bus Bar	Regenerative Systems	DIN Rail Mount	Long Cable Applications	Low Frequency Attenuation	Book Case Style	Very Low Leakage Current	Machine Tools	Automation-General Purpose	Renewable Energy	IT Network	Medical		
Three Phase + Neutral																			
FIN15	3 phase+neutral	3-20	0-480	•				•				•		•				•	
FIN1240	3 phase+neutral	5-1000	0-480	•	•	•	•		•	•		•	•	•	•			•	
FIN1740ESM	3 phase+neutral	10-180	0-500	•					•			•		•				•	
FIN1740	3 phase+neutral	6-200	0-600	•			•		•		•	•	•					•	
FIN1940	3 phase+neutral	6-200	0-600	•			•		•	•	•	•		•					



Enerdoor three phase plus neutral filter series offers a current range from 3 to 2000A with nominal voltage up to 600 Vac. This series provides high attenuation in a compact case with low leakage current and is suitable for several industries.

This line offers various connections such as: terminal blocks, screws and bus bar connections.

Features include: finger safe protection for screw and bus bar connections, and DIN rail mounting for fast and easy installation into the enclosure.

Customized voltage, current, connection, and attenuation solutions are available to satisfy various application requirements.



THREE PHASE + NEUTRAL FILTERS



### ELECTRIC CHARACTERISTICS

Nominal voltage	0/480 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2200 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2900 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

UL1283  
CSA C22.2  
E215863

FIN15	Rated Current 40°C	Σ Cx (nF) ± 5%	Cy (nF) ± 5%	L1 (mH) ± 10%	Power Loss (W)
.003.M	3	136	22	2.2	1.5
.006.M	6	136	22	2.2	2.1
.010.M	10	136	22	2.1	2.8
.016.M	16	136	22	2.1	3.2
.020.M	20	136	22	2.0	4

Total leakage current at 230 V phase to ground 50 Hz / 40°C  
 Nominal <1mA  
 Worst condition <3mA

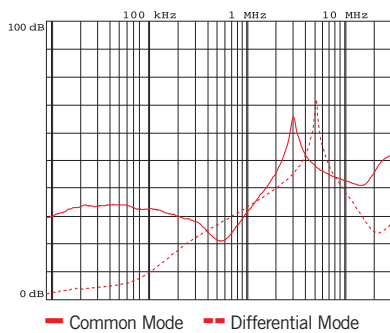
### MECHANICAL DIMENSIONS (mm)

FIN15	A	B	H	N	Weight Kg	Case
.003.M	65	85	39	11	0.320	1
.006.M	65	85	39	11	0.320	1
.010.M	65	85	39	11	0.320	1
.016.M	65	85	39	11	0.320	1
.020.M	65	85	39	11	0.320	1

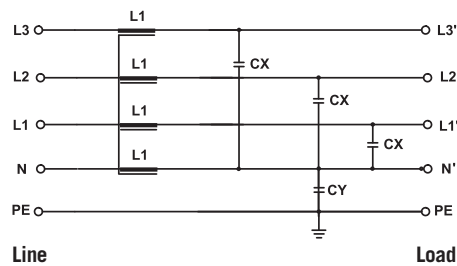
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.2 - 4	0.8
0.2 - 6	0.5 - 4	0.8
0.2 - 6	0.5 - 4	0.8

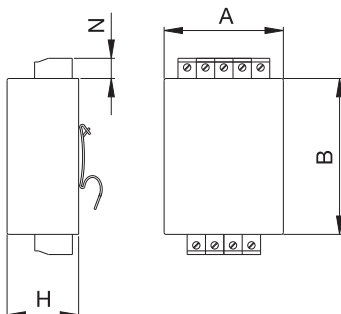
### TYPICAL ATTENUATION



### ELECTRIC DIAGRAM



### CASE 1







### ELECTRIC CHARACTERISTICS

Nominal voltage	0/480 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2200 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	2900 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

UL1283  
CSA C22.2  
E215863

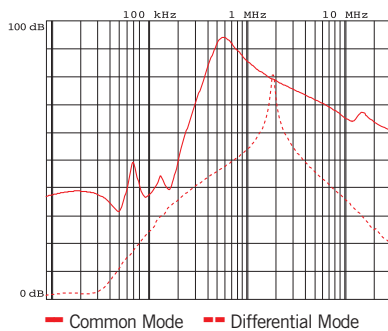
FIN1240	Rated Current 40°C (50°C)	$\Sigma Cx(\mu F)$ $\pm 10\%$	$Cy (nF)$ $\pm 10\%$	L1 (mH) $\pm 10\%$	L2 ( $\mu H$ ) $\pm 20\%$	Power Loss (W)
.005.M	6 (5)	14	47	7	4	5
.010.M	12 (10)	14	47	5	4	7
.016.M	18 (16)	60	47	2	4	14
.030.M	34 (30)	60	47	2	4	11
.050.M	54 (50)	60	47	2	4	10
.080.M	85 (80)	60	47	1.8	4	35
.100.M	106 (100)	60	47	1.5	4	42
.150.M	155 (150)	60	47	1.3	2	74
.200.V	206 (200)	60	47	0.65	2	75
.360.B	370 (360)	60	47	0.25	—	96
.500.B	515 (500)	60	47	0.2	—	101
.750.B	770 (750)	60	47	0.2	—	103
.1000.B	1050 (1000)	60	47	0.18	—	115

Total leakage current at 230 V phase to ground 50 Hz / 40°C

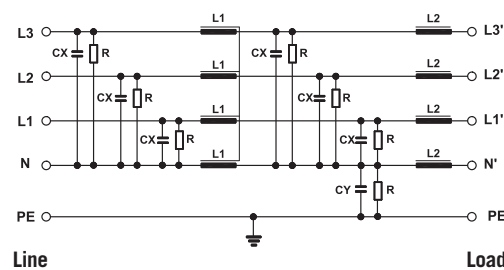
Nominal <3mA  
Worst condition <10mA

Models available with current ratings up to 2000A

### TYPICAL ATTENUATION



### ELECTRIC DIAGRAM



### MECHANICAL DIMENSIONS (mm)

FIN1240	A	B	V	V1	F	H	I	L	N	d1	P	Weight Kg	Case
.005.M	58	86	19	11	4.5	186	160	176	30	M4	40	1.5	1
.010.M	58	86	19	11	4.5	186	160	176	30	M4	40	1.5	1
.016.M	90	100	19	15	4.5	246	220	235	35	M5	70	2	2
.030.M	90	100	19	15	4.5	246	220	235	35	M5	70	2.5	2
.050.M	90	100	20	25	4.5	246	220	235	35	M6	70	3	3
.080.M	90	185	25	38	6.5	356	320	340	77.5	M8	70	12	4
.100.M	90	185	25	38	6.5	356	320	340	77.5	M8	70	13	4
.150.M	90	220	28	42	6.5	356	320	340	95	M10	70	15	5

### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
35 - 95	35 - 95	20

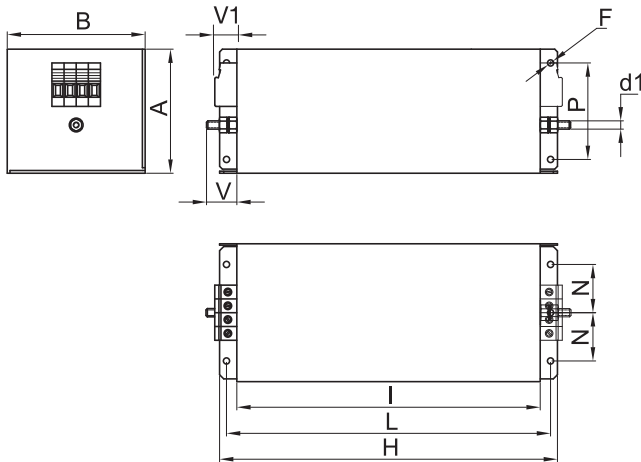
### MECHANICAL DIMENSIONS (mm)

FIN1240	A	B	C	d2	d3	V	F	H	I	L	N	P	S	Weight Kg	Case
.200.V	90	220	120	-	-	30	6.5	356	320	340	95	70	60	20	6
.360.B	130	230	150	10	25	42	6.5	420	380	400	100	100	90	27	7
.500.B	130	230	150	15	30	48	6.5	510	450	480	100	100	90	33.5	8
.750.B	160	250	140	20	40	94	8.5	510	450	480	100	110	110	37	9
.1000.B	210	350	200	20	60	97	8.5	610	550	580	150	160	147	55	10

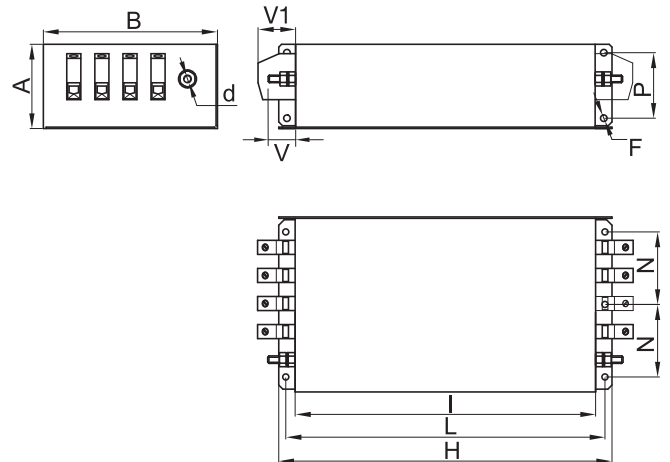
### CONNECTION

d (mm)	Line Torque (Nm)	d1(mm)	Ground Torque (Nm)
M10	18	M10	18
M8	14	M10	18
M10	25	M10	18
M12	50	M12	20
M12	50	M12	20

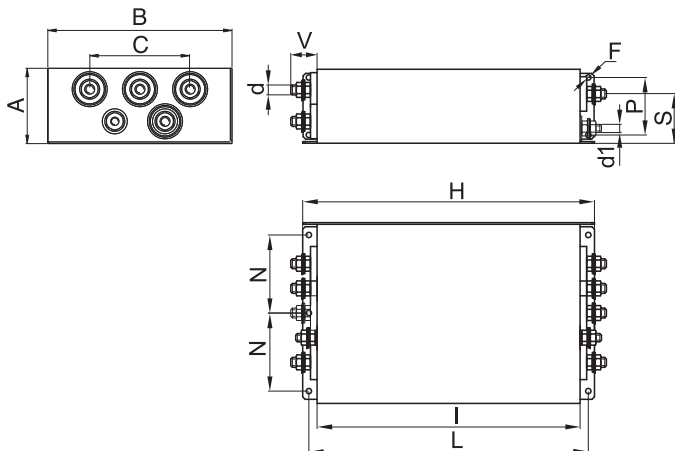
### CASE 1/2/3



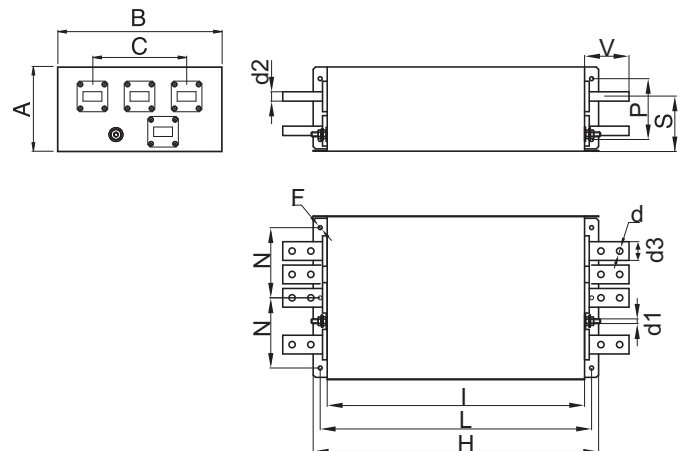
### CASE 4/5



### CASE 6



### CASE 7/8/9/10





### ELECTRIC CHARACTERISTICS

Nominal voltage	0/500 V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	2300 V <sub>DC</sub> (2 s)
Phase to ground test voltage	3100 V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

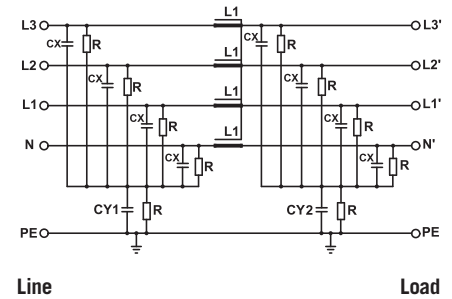
UL1283  
CSA C22.2  
E215863

FIN1740ESM	Rated Current 40°C (50°C)	$\Sigma Cx$ ( $\mu F$ ) $\pm 5\%$	Cy1 (nF) $\pm 5\%$	Cy2 (nF) $\pm 5\%$	L1 (mH) $\pm 10\%$	Power Loss (W)
.010.M	10 (9)	9.6	100	100	1.8	5
.018.M	18 (16)	9.6	100	100	1.2	5
.036.M	36 (32)	9.6	100	100	1.1	18
.072.M	72 (64)	9.6	100	100	1	40
.100.M	100 (90)	9.6	100	100	0.7	102
.135.M	135 (120)	9.6	100	100	0.7	96
.180.M	180 (160)	9.6	100	100	0.6	98

Nominal <3mA  
Worst condition <15mA

Total leakage current at 230 V phase to ground 50 Hz / 40°C

### ELECTRIC DIAGRAM



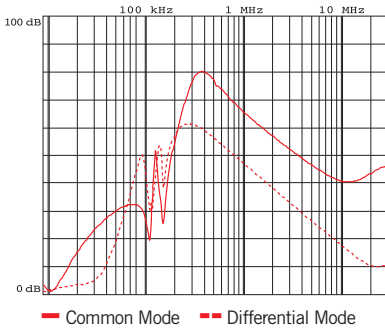
### MECHANICAL DIMENSIONS (mm)

FIN1740ESM	A	B	V	V1	F	H	I	L	N	d	Weight Kg	Case
.010.M	100	130	22.5	16	6.5	153	125	8.5	90	M6	1	1
.018.M	100	130	22.5	16	6.5	153	125	8.5	90	M6	1	1
.036.M	100	130	22.5	16	6.5	153	125	8.5	90	M6	1.1	1
.072.M	125	118	22.5	32.5	6.5	153	128	8.5	50	M6	1.6	2
.100.M	140	180	30	39	6.5	170	140	8.5	65	M10	3.4	3
.135.M	140	180	30	43	6.5	170	140	8.5	65	M10	4.5	3
.180.M	160	200	30	51.5	6.5	170	140	8.5	75	M10	4.8	4

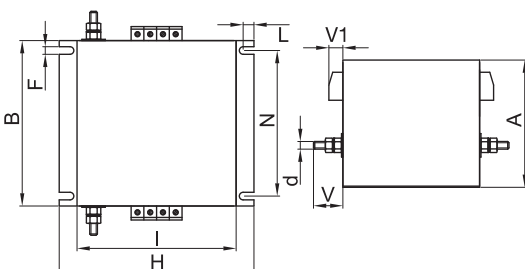
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
35 - 95	35 - 95	20

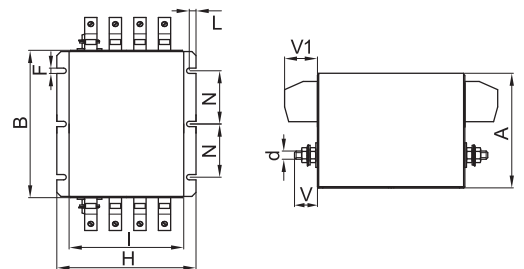
### TYPICAL ATTENUATION



### CASE 1



### CASE 2/3/4





### ELECTRIC CHARACTERISTICS

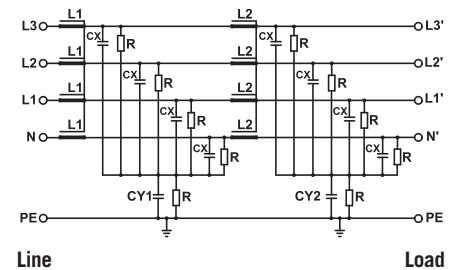
Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

UL1283  
CSA C22.2  
E215863

FIN1740	Rated Current 40°C (50°C)	Σ C <sub>x</sub> (μF) ± 5%	C <sub>y1</sub> (nF) ± 5%	C <sub>y2</sub> (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.006.M	8 (6)	24	100	100	1.5	1.5	8
.012.M	14 (12)	24	100	100	1.5	1.5	10
.016.M	18 (16)	80	100	100	1.4	1.4	12
.025.M	28 (25)	80	100	100	1.3	1.3	15
.032.M	35 (32)	80	100	100	1.2	1.2	23
.042.M	50 (42)	80	100	100	1.1	1.1	32
.055.M	63 (55)	80	100	100	1.1	1.1	37
.070.M	80 (70)	80	100	100	1	1	52
.080.M	90 (80)	80	100	100	1	1	60
.100.M	110 (100)	80	100	100	0.9	0.9	92
.115.M	130 (115)	80	100	100	0.8	0.8	101
.150.M	175 (150)	80	100	100	0.7	0.7	115
.200.M	230 (200)	80	100	100	0.6	0.6	120

### ELECTRIC DIAGRAM



Total leakage current at 230 V phase to ground 50 Hz / 40°C  
Nominal <3mA  
Worst condition <15mA

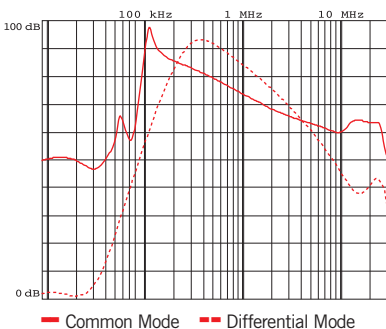
### MECHANICAL DIMENSIONS (mm)

FIN1740	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.006.M	140	60	19	16	6	226	200	7	38	M6	1.9
.012.M	140	60	19	16	6	226	200	7	38	M6	1.9
.016.M	177	70	19	16	6	267	237	8	44	M6	1.9
.025.M	177	70	19	16	6	267	237	8	44	M6	2.5
.032.M	177	70	19	16	6	267	237	8	44	M6	2.5
.042.M	177	80	19	34	6	295	265	8	54	M6	3.7
.055.M	177	80	19	33	6	295	265	8	54	M6	3.9
.070.M	205	100	28.5	38	8	390	340	12	73	M10	6.2
.080.M	205	100	28.5	38	8	390	340	12	73	M10	6.2
.100.M	205	100	28.5	43	8	390	340	12	73	M10	7.5
.115.M	205	100	28.5	43	8	390	340	12	73	M10	7.5
.150.M	220	130	28.5	50	8	420	370	12	103	M10	9.4
.200.M	220	130	28.5	50	8	420	370	12	103	M10	9.4

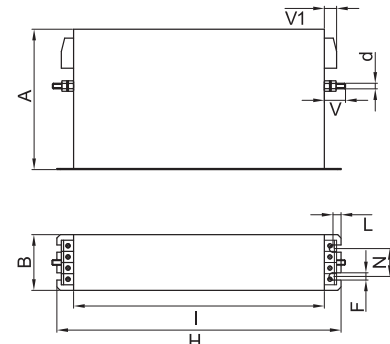
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE





### ELECTRIC CHARACTERISTICS

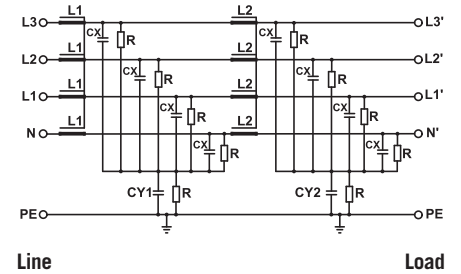
Nominal voltage	0/600 V <sub>Ac</sub> - 50/60 Hz
Phase to phase test voltage	2400 V <sub>Dc</sub> (2 s)
Phase to ground test voltage	3200 V <sub>Dc</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

UL1283  
CSA C22.2  
E215863

FIN1940	Rated Current 40°C (50°C)	ΣCx (µF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 5%	L1 (mH) ± 10%	L2 (mH) ± 10%	Power Loss (W)
.006.M	8 (6)	24	1000	100	1.5	1.5	8
.012.M	14 (12)	24	1000	100	1.5	1.5	10
.016.M	18 (16)	80	1000	100	1.4	1.4	12
.025.M	28 (25)	80	1000	100	1.3	1.3	15
.032.M	35 (32)	80	1000	100	1.2	1.2	23
.042.M	50 (42)	80	1000	100	1.1	1.1	32
.055.M	63 (55)	80	1000	100	1.1	1.1	37
.070.M	80 (70)	80	1000	100	1	1	52
.080.M	90 (80)	80	1000	100	1	1	60
.100.M	110 (100)	80	1000	100	0.9	0.9	92
.115.M	130 (115)	80	1000	100	0.8	0.8	101
.150.M	175 (150)	80	1000	100	0.7	0.7	115
.200.M	230 (200)	80	1000	100	0.6	0.6	120

### ELECTRIC DIAGRAM



Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <3mA  
Worst condition <15mA

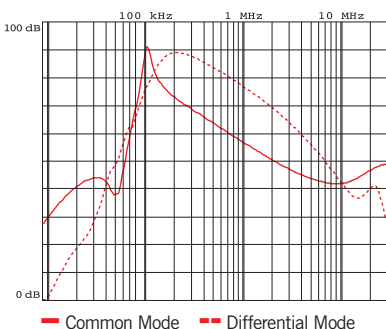
### MECHANICAL DIMENSIONS (mm)

FIN1940	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.006.M	140	60	19	16	6	226	200	7	38	M6	1.9
.012.M	140	60	19	16	6	226	200	7	38	M6	1.9
.016.M	177	70	19	16	6	267	237	8	44	M6	1.9
.025.M	177	70	19	16	6	267	237	8	44	M6	2.5
.032.M	177	70	19	16	6	267	237	8	44	M6	2.5
.042.M	177	80	19	34	6	295	265	8	54	M6	3.7
.055.M	177	80	19	33	6	295	265	8	54	M6	3.9
.070.M	205	100	28.5	38	8	390	340	12	73	M10	6.2
.080.M	205	100	28.5	38	8	390	340	12	73	M10	6.2
.100.M	205	100	28.5	43	8	390	340	12	73	M10	7.5
.115.M	205	100	28.5	43	8	390	340	12	73	M10	7.5
.150.M	220	130	28.5	50	8	420	370	12	103	M10	9.4
.200.M	220	130	28.5	50	8	420	370	12	103	M10	9.4

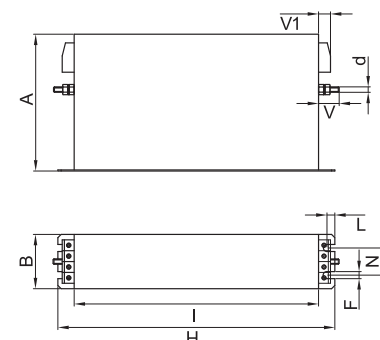
### CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

### TYPICAL ATTENUATION



### CASE



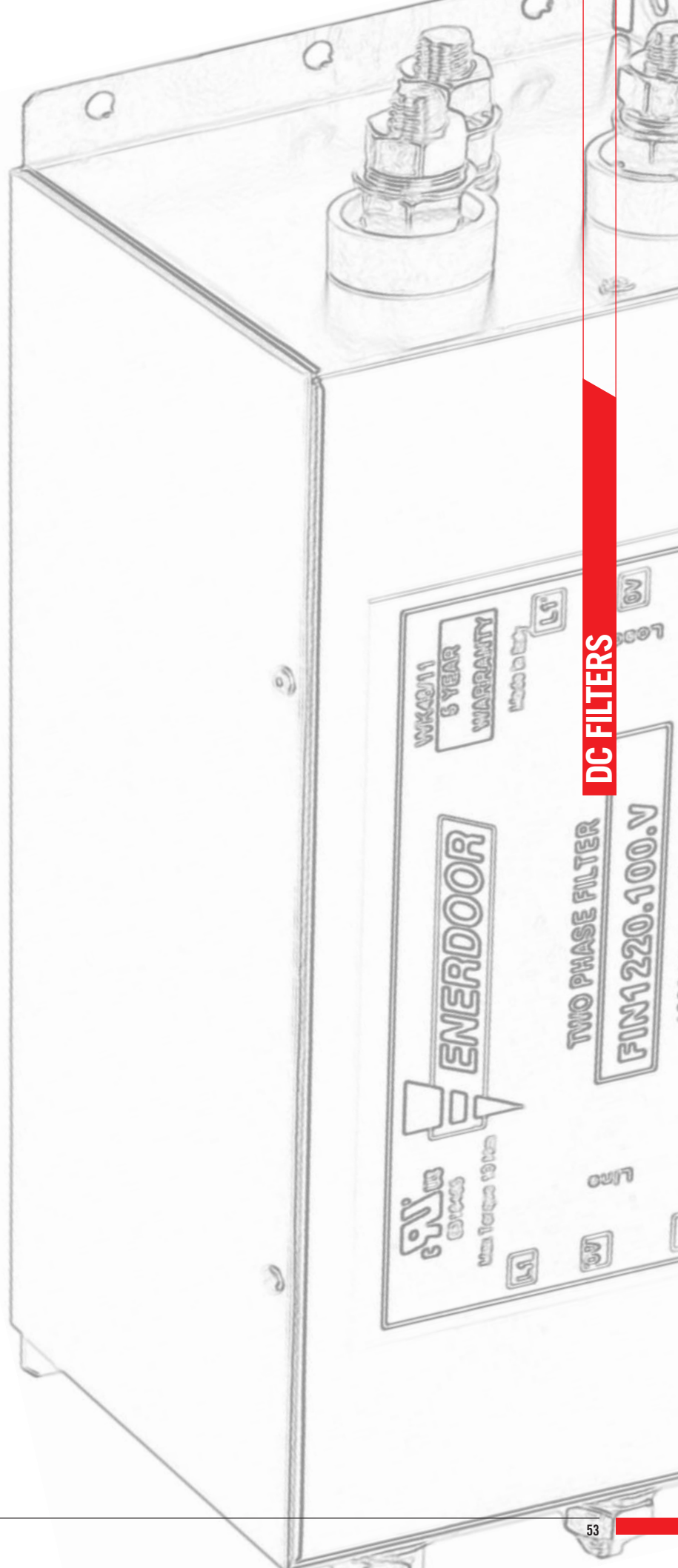




Enerdoor DC filter series was designed specifically for the photovoltaic industry and offers a current range from 5 to 3000A with nominal voltage up to 1000 Vdc. The FIN1220 and FIN1520 filters are installed between PV inverters and solar panels to reduce EMI interference in the DC power line.

The FIN1220.0V and FIN1520.0V filters offer the possibility of ground connection separated from the virtual zero point. This is particularly beneficial for critical networks on the protective earth conductor.

Custom DC filters are available upon request.



DC FILTERS





### ELECTRIC CHARACTERISTICS

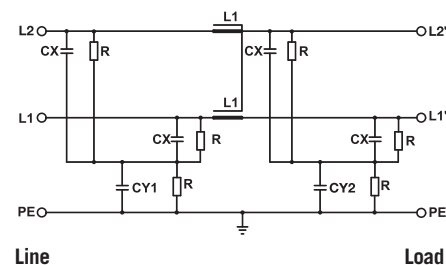
Nominal voltage	0/1000 V <sub>DC</sub> - 0/700 V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	3100 V <sub>DC</sub> (2 s)
Phase to ground test voltage	3400 V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

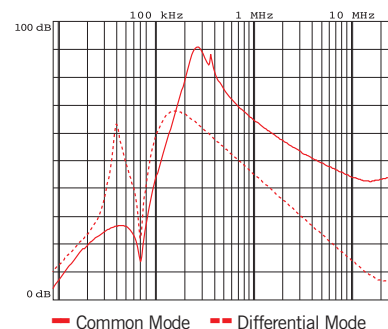
UL1283  
CSA C22.2  
E215863

FIN1220	Rated Current 40°C (50°C)	Σ Cx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 10%	L1 (mH) ± 10%	Power Loss (W)
.005.V	7 (5)	8.8	100	100	7	5
.010.V	12 (10)	8.8	100	100	5	7
.016.V	18 (16)	40	100	100	2	14
.030.V	34 (30)	40	100	100	2	11
.050.V	55 (50)	40	100	100	2	10
.080.V	85 (80)	40	100	100	1.8	39
.100.V	110 (100)	40	100	100	1.5	45
.130.V	134 (130)	40	100	100	1.3	49
.150.V	160 (150)	40	100	100	1.3	69
.180.V	185 (180)	40	100	100	0.9	77
.200.V	210 (200)	40	100	100	0.9	85
.250.V	272 (250)	40	100	100	0.7	87
.280.V	297 (280)	40	100	100	0.7	77
.280.B	330 (320)	40	100	100	0.7	76
.320.B	330 (320)	40	100	100	0.7	77
.360.B	390 (360)	40	100	100	0.6	98
.400.B	435 (400)	40	100	100	0.6	102
.500.B	545 (500)	40	100	100	0.55	96
.600.B	654 (600)	40	100	100	0.55	102
.750.B	800 (750)	40	100	100	0.5	88
.900.B	940 (900)	40	100	100	0.5	72
.1000.B	1050 (1000)	40	100	100	0.45	102
.1250.B	1290 (1250)	40	100	100	0.45	96
.1500.B	1550 (1500)	40	100	100	0.4	108
.1600.B	1650 (1600)	40	100	100	0.4	115
.1750.B	1800 (1750)	40	100	100	0.4	120
.2000.B	2040 (2000)	40	100	100	0.38	122
.2250.B	2290 (2250)	40	100	100	0.38	127
.2500.B	2535 (2500)	40	100	100	0.38	140
.3000.B	3050 (3000)	40	100	100	0.38	150

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



— Common Mode    - - - Differential Mode

Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <3mA  
Worst condition <10mA

Vertical bus-bar connections available upon request





### ELECTRIC CHARACTERISTICS

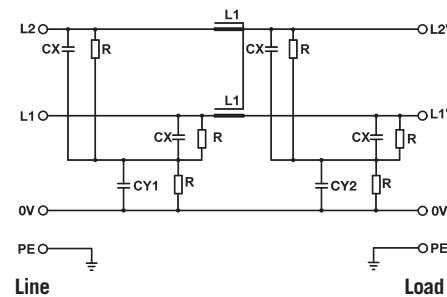
Nominal voltage	0/1000 V <sub>DC</sub> - 0/700 V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	3100 V <sub>DC</sub> (2 s)
Phase to ground test voltage	3400 V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

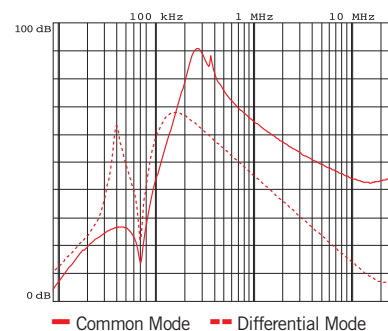
UL1283  
CSA C22.2  
E215863

FIN1220	Rated Current 40°C (50°C)	Σ Cx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 10%	L1 (mH) ± 10%	Power Loss (W)
.005.V.0V	7 (5)	8.8	100	100	7	5
.010.V.0V	12 (10)	8.8	100	100	5	7
.016.V.0V	18 (16)	40	100	100	2	14
.030.V.0V	34 (30)	40	100	100	2	11
.050.V.0V	55 (50)	40	100	100	2	10
.080.V.0V	85 (80)	40	100	100	1.8	39
.100.V.0V	110 (100)	40	100	100	1.5	45
.130.V.0V	134 (130)	40	100	100	1.3	49
.150.V.0V	160 (150)	40	100	100	1.3	69
.180.V.0V	185 (180)	40	100	100	0.9	77
.200.V.0V	210 (200)	40	100	100	0.9	85
.250.V.0V	272 (250)	40	100	100	0.7	87
.280.V.0V	297 (280)	40	100	100	0.7	77
.280.B.0V	330 (320)	40	100	100	0.7	76
.320.B.0V	330 (320)	40	100	100	0.7	77
.360.B.0V	390 (360)	40	100	100	0.6	98
.400.B.0V	435 (400)	40	100	100	0.6	102
.500.B.0V	545 (500)	40	100	100	0.55	96
.600.B.0V	654 (600)	40	100	100	0.55	102
.750.B.0V	800 (750)	40	100	100	0.5	88
.900.B.0V	940 (900)	40	100	100	0.5	72
.1000.B.0V	1050 (1000)	40	100	100	0.45	102
.1250.B.0V	1290 (1250)	40	100	100	0.45	96
.1500.B.0V	1550 (1500)	40	100	100	0.4	108
.1600.B.0V	1650 (1600)	40	100	100	0.4	115
.1750.B.0V	1800 (1750)	40	100	100	0.4	120
.2000.B.0V	2040 (2000)	40	100	100	0.38	122
.2250.B.0V	2290 (2250)	40	100	100	0.38	127
.2500.B.0V	2535 (2500)	40	100	100	0.38	140
.3000.B.0V	3050 (3000)	40	100	100	0.38	150

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <3mA  
Worst condition <10mA

Vertical bus-bar connections available upon request





### ELECTRIC CHARACTERISTICS

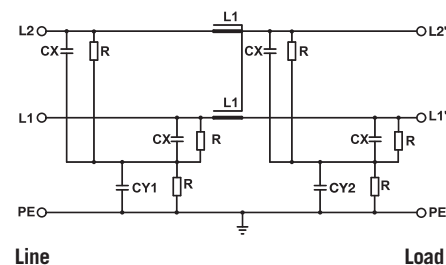
Nominal voltage	0/1000 V <sub>DC</sub> - 0/700 V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	3100 V <sub>DC</sub> (2 s)
Phase to ground test voltage	3400 V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

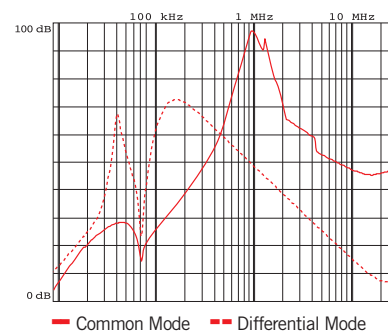
UL1283  
CSA C22.2  
E215863

FIN1520	Rated Current 40°C (50°C)	Σ Cx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 10%	L1 (mH) ± 10%	Power Loss (W)
.005.V	7 (5)	8.8	1000	1000	7	5
.010.V	12 (10)	8.8	1000	1000	5	7
.016.V	18 (16)	40	1000	1000	2	14
.030.V	34 (30)	40	1000	1000	2	11
.050.V	55 (50)	40	1000	1000	2	10
.080.V	85 (80)	40	1000	1000	1.8	39
.100.V	110 (100)	40	1000	1000	1.5	45
.130.V	134 (130)	40	1000	1000	1.3	49
.150.V	160 (150)	40	1000	1000	1.3	69
.180.V	185 (180)	40	1000	1000	0.9	77
.200.V	210 (200)	40	1000	1000	0.9	85
.250.V	272 (250)	40	1000	1000	0.7	87
.280.V	297 (280)	40	1000	1000	0.7	77
.280.B	330 (320)	40	1000	1000	0.7	76
.320.B	330 (320)	40	1000	1000	0.7	77
.360.B	390 (360)	40	1000	1000	0.6	98
.400.B	435 (400)	40	1000	1000	0.6	102
.500.B	545 (500)	40	1000	1000	0.55	96
.600.B	654 (600)	40	1000	1000	0.55	102
.750.B	800 (750)	40	1000	1000	0.5	88
.900.B	940 (900)	40	1000	1000	0.5	72
.1000.B	1050 (1000)	40	1000	1000	0.45	102
.1250.B	1290 (1250)	40	1000	1000	0.45	96
.1500.B	1550 (1500)	40	1000	1000	0.4	108
.1600.B	1650 (1600)	40	1000	1000	0.4	115
.1750.B	1800 (1750)	40	1000	1000	0.4	120
.2000.B	2040 (2000)	40	1000	1000	0.38	122
.2250.B	2290 (2250)	40	1000	1000	0.38	127
.2500.B	2535 (2500)	40	1000	1000	0.38	140
.3000.B	3050 (3000)	40	1000	1000	0.38	150

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <10mA  
Worst condition <80mA

Vertical bus-bar connections available upon request





### ELECTRIC CHARACTERISTICS

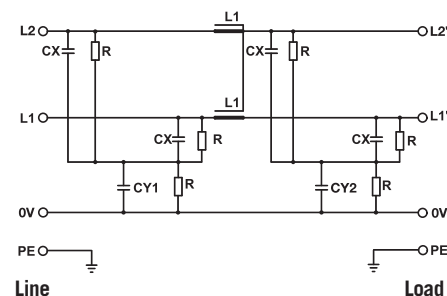
Nominal voltage	0/1000 V <sub>DC</sub> - 0/700 V <sub>AC</sub> - 50/60 Hz
Phase to phase test voltage	3100 V <sub>DC</sub> (2 s)
Phase to ground test voltage	3400 V <sub>DC</sub> (2 s)
Climatic class	- 40 / +85 °C

RoHS

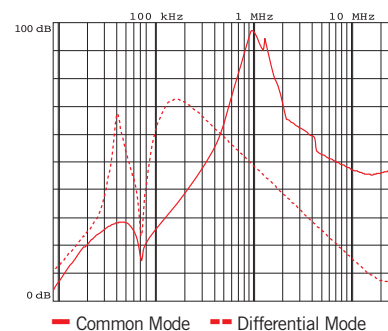
UL1283  
CSA C22.2  
E215863

FIN1520	Rated Current 40°C (50°C)	Σ Cx (μF) ± 5%	Cy1 (nF) ± 5%	Cy2 (nF) ± 10%	L1 (mH) ± 10%	Power Loss (W)
.005.V.0V	7 (5)	8.8	1000	1000	7	5
.010.V.0V	12 (10)	8.8	1000	1000	5	7
.016.V.0V	18 (16)	40	1000	1000	2	14
.030.V.0V	34 (30)	40	1000	1000	2	11
.050.V.0V	55 (50)	40	1000	1000	2	10
.080.V.0V	85 (80)	40	1000	1000	1.8	39
.100.V.0V	110 (100)	40	1000	1000	1.5	45
.130.V.0V	134 (130)	40	1000	1000	1.3	49
.150.V.0V	160 (150)	40	1000	1000	1.3	69
.180.V.0V	185 (180)	40	1000	1000	0.9	77
.200.V.0V	210 (200)	40	1000	1000	0.9	85
.250.V.0V	272 (250)	40	1000	1000	0.7	87
.280.V.0V	297 (280)	40	1000	1000	0.7	77
.280.B.0V	330 (320)	40	1000	1000	0.7	76
.320.B.0V	330 (320)	40	1000	1000	0.7	77
.360.B.0V	390 (360)	40	1000	1000	0.6	98
.400.B.0V	435 (400)	40	1000	1000	0.6	102
.500.B.0V	545 (500)	40	1000	1000	0.55	96
.600.B.0V	654 (600)	40	1000	1000	0.55	102
.750.B.0V	800 (750)	40	1000	1000	0.5	88
.900.B.0V	940 (900)	40	1000	1000	0.5	72
.1000.B.0V	1050 (1000)	40	1000	1000	0.45	102
.1250.B.0V	1290 (1250)	40	1000	1000	0.45	96
.1500.B.0V	1550 (1500)	40	1000	1000	0.4	108
.1600.B.0V	1650 (1600)	40	1000	1000	0.4	115
.1750.B.0V	1800 (1750)	40	1000	1000	0.4	120
.2000.B.0V	2040 (2000)	40	1000	1000	0.38	122
.2250.B.0V	2290 (2250)	40	1000	1000	0.38	127
.2500.B.0V	2535 (2500)	40	1000	1000	0.38	140
.3000.B.0V	3050 (3000)	40	1000	1000	0.38	150

### ELECTRIC DIAGRAM



### TYPICAL ATTENUATION



Total leakage current at 230 V phase to ground 50 Hz / 40°C

Nominal <10mA  
Worst condition <80mA

Vertical bus-bar connections available upon request

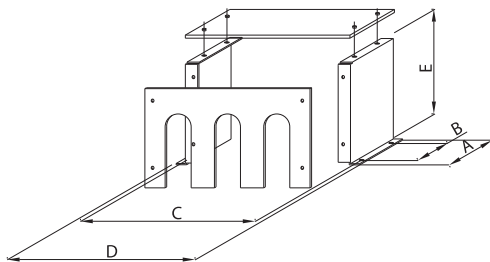
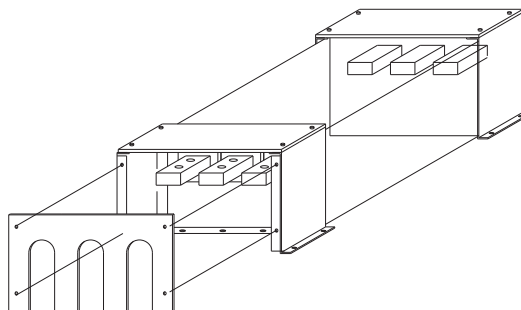




## Protection Covers for Filters with High Currents and Bus Bar Connections

**MECHANICAL DIMENSIONS (mm)**

<b>FINPRT</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>∅</b>
<b>.250.P</b>	135	115	250	270	110	M4
<b>.360.P</b>	135	115	260	280	150	M4
<b>.750.P</b>	165	145	280	300	180	M4
<b>.1000.P</b>	165	145	380	400	200	M4

**CASE**

**ASSEMBLY**

**REFERENCE TABLE**

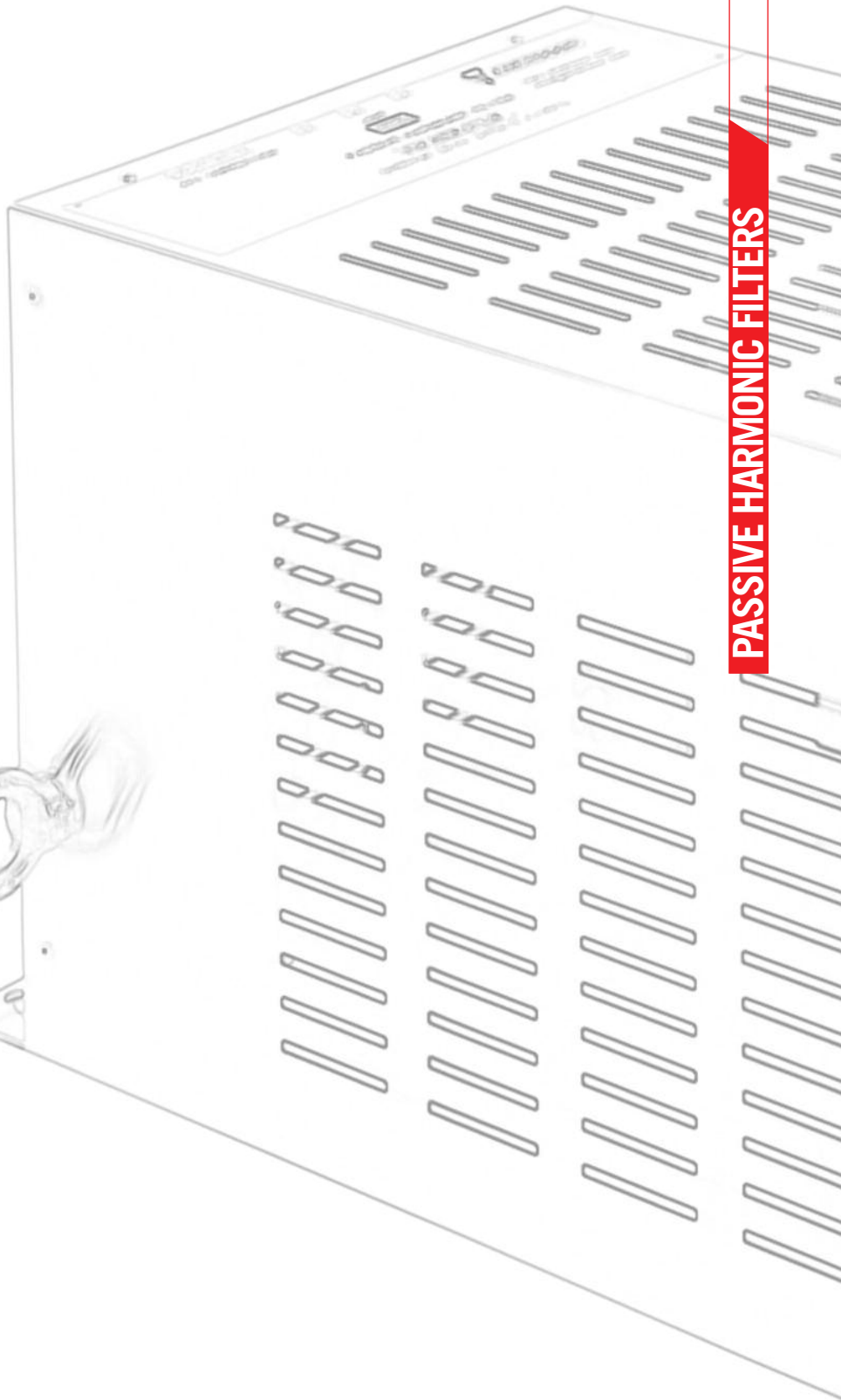
<b>FINPRT</b>	<b>FIN 1200 FIN 1200 HV</b>	<b>FIN 1500 FIN 1500 HV</b>	<b>FIN 538 S1</b>	<b>FIN 539 S</b>
<b>.250.P</b>	.150.V	.150.V	.150.V	-
	.200.V	.200.V	.200.V	
	.280.V	.280.V	.280.V	
	.280.BC	.280.BC	.280.BC	
	.320.BC	.320.BC	.320.BC	
<b>.360.P</b>	.360.BC	.360.BC	.360.BC	.400.B
	.400.BC	.400.BC	.400.BC	.500.B
	.500.BC	.500.BC	.500.BC	.600.B
	.600.BC	.600.BC	.600.BC	.750.B
	.750.BC	.750.BC	.750.BC	.900.B
<b>.750.P</b>	.900.BC	.900.BC	.900.BC	.1000.B
	.1000.BC	.1000.BC	.1000.BC	.1250.B
	.1250.BC	.1250.BC	.1250.BC	.1500.B
<b>.1000.P</b>	.1500.BC	.1500.BC	.1500.BC	.1750.B
	.1600.BC	.1600.BC	.1600.BC	.2000.B
	.1750.BC	.1750.BC	.1750.BC	.2250.B .2500.B

The introduction of power devices such as variable frequency drives has given rise to significant improvements in energy saving technologies. These devices however, have strong nonlinear loads generated by distorted current waveforms, which create various problems within a facility. For this reason, Enerdoor has developed the passive harmonic filter series available up to 750A with nominal voltage up to 480 Vac. Custom filters are available with voltage up to 690 Vac.

The passive harmonic series features different levels of attenuation offering the best solution to meet the EN61000-3-2, EN61000-3-12 and IEEE519 International Standard requirements.

As a standard, the FINHRM5 offers a current range up to 750A and the FINHRM up to 200A. The typical THDI reduction is <5% for the FINHRM5 and <15% for the FINHRM. Neither filter is affected by network impedance. This series is designed to guarantee a power factor more than 0.9 considering an initial value of 0.7; which benefits the end user's power quality network. There is the option to add an external capacitor to improve power factor correction.

This series reduces the effect of voltage dips less than 5 ms on the machine performance and reduces flicker emission. Both filters are available in an enclosure and the FINHRM5 additionally features open frame installation.



PASSIVE HARMONIC FILTERS

**FINHRM5**
**ELECTRIC CHARACTERISTICS**

Nominal voltage	Up to 480 Vac
Peak current @ 50°C	150% for 60 s every 10 minutes
Frequency	50 Hz (.6 for 60 Hz)
Case	Enclosure or open frame
THDI reduction	<5%
Overvoltage on no load condition	<5%
Reactive power on no load	25%

**RoHS**

<b>FINHRM5</b>	<b>Current (A) @ 50°C</b>	<b>Rated Power (KW) 400 Vac</b>	<b>Rated Power (KW) 480 Vac</b>	<b>Power Loss (W) 400 (480) Vac</b>	<b>Connection</b>
FINHRM5.010.M	10	4	5.5	55 (80)	Terminal blocks
FINHRM5.016.M	16	7,5	11	105 (160)	Terminal blocks
FINHRM5.032.M	32	15	18,5	210 (275)	Terminal blocks
FINHRM5.045.M	45	22	30	273 (370)	Terminal blocks
FINHRM5.080.M	80	40	48	398 (475)	Terminal blocks
FINHRM5.120.M	120	60	72	492 (672)	Terminal blocks
FINHRM5.160.M	160	80	96	590 (710)	Lugs
FINHRM5.210.M	210	105	126	610 (750)	Lugs
FINHRM5.260.B	260	130	160	780 (940)	Busbars
FINHRM5.320.B	320	160	200	940 (1150)	Busbars
FINHRM5.400.B	400	200	241	940 (1150)	Busbars
FINHRM5.460.B	460	230	277	1280 (1410)	Busbars
FINHRM5.600.B	600	280	360	1480 (1750)	Busbars
FINHRM5.750.B	750	360	440	1690 (1920)	Busbars

**FINHRM**
**ELECTRIC CHARACTERISTICS**

Nominal voltage	Up to 480 Vac (600 optional)
Peak current @ 50°C	150% for 60 s every 10 minutes
Frequency	50 Hz / 60 Hz
Case	Enclosure
THDI reduction	<15%
Overvoltage on no load condition	<5%

**RoHS**

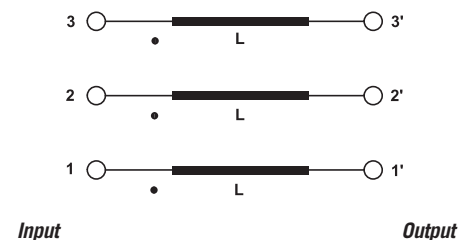
<b>FINHRM</b>	<b>Current (A) @ 40°C</b>	<b>Rated Power (KW) 400 Vac</b>	<b>Rated Power (KW) 480 Vac</b>	<b>Power Loss (W) 400 (480) Vac</b>	<b>Connection</b>
FINHRM.016.M	16	7,5	11	80 (116)	Terminal blocks
FINHRM.030.M	30	15	18,5	97 (145)	Terminal blocks
FINHRM.050.M	50	25	34	170 (250)	Terminal blocks
FINHRM.075.M	75	37	45	225 (335)	Terminal blocks
FINHRM.100.M	100	50	68	257 (380)	Terminal blocks
FINHRM.150.M	150	75	90	320 (480)	Terminal blocks
FINHRM.200.M	200	100	120	575 (850)	Terminal blocks


**GENERAL CHARACTERISTICS**

Impedance	<b>3% and 5%</b>
Reference voltage	<b>Up to 600 Vac</b>
Frequency	<b>50 Hz and 60 Hz</b>
Max ambient temperature	<b>+40°C</b>
Saturation current	<b>1,5 x In</b>
Execution	<b>Vacuum-pressure tropicalized</b>
Dielectric strength	<b>4 kV</b>



HP@480 Vac 60Hz	Current	FF 3% SERIES	Dimensions			Weight	FF 5% SERIES	Dimensions			Weight
			H	W	D			H	W	D	
0.5	1.1	FF020P101P10831	120	120	90	1.6	FF033P501P10978	120	120	90	2
0.75	1.6	FF013P901P60830	120	120	90	1.85	FF0002301P60979	120	120	90	2.1
1	2.1	FF010P602P10829	120	90	120	1.9	FF0001802P10980	120	90	120	2.5
2	3.4	FF006P503P40827	120	90	120	2	FF0001103P40981	120	90	120	2.8
3	4.8	FF004P604P80826	120	90	120	2.1	FF007P704P80982	160	160	120	4
5	7.6	FF02P9107P60832	165	160	120	4	FF04P8407P60983	160	160	120	4.5
7.5	11	FF02P0100110833	165	160	120	4	FF003P300110984	160	160	130	5.3
10	14	FF01P5800140834	165	160	130	4.7	FF002P600140985	160	160	130	5.5
15	21	FF01P0500210835	165	160	130	5	FF01P7600210986	180	180	130	8
20	27	FF00P8200270836	250	180	135	7.4	FF001P300270987	180	180	140	9
25	34	FF00P6400340837	250	180	135	7.6	FF001P200340988	300	240	145	12
30	40	FF00P5500400839	250	180	135	8	FF00P9800460989	300	240	145	12.5
40	52	FF00P4200520840	250	180	145	9	FF00P7500520990	300	240	145	13
50	65	FF00P3400650841	300	240	140	14	FF00P6300651290	300	240	180	23
60	83	FF0P26800831002	300	240	180	22	FF00P5100830991	350	300	190	28
75	105	FF0P26301050976	300	240	185	23	FF0P37501040992	350	300	190	28.5
100	130	FF00P1701301003	350	300	190	27	FF000P301300993	300	300	210	33
125	160	FF00P1501600954	300	300	210	29	FF00P2601600994	300	300	250	41
150	200	FF0P11102001004	300	220	300	33	FF000P202000995	300	300	200	47
200	250	FF0P08902501005	300	230	300	41	FF0P11403221249	330	390	290	65
250	322	FFP068703221006	375	395	265	56	FF0P11403221249	330	390	300	90
300	414	FFP053504141007	375	395	275	63	FF0P08904141250	395	285	275	80
400	515	FF0P04305151008	375	395	375	67	FF0P08904141250	395	285	275	80
475	600	FFP036906001009	375	395	300	80	FF0P06106001252	450	480	320	121
600	750	FFP029507501010	395	300	375	80	FF0P04907500960	480	320	450	121

**ELECTRIC DIAGRAM**


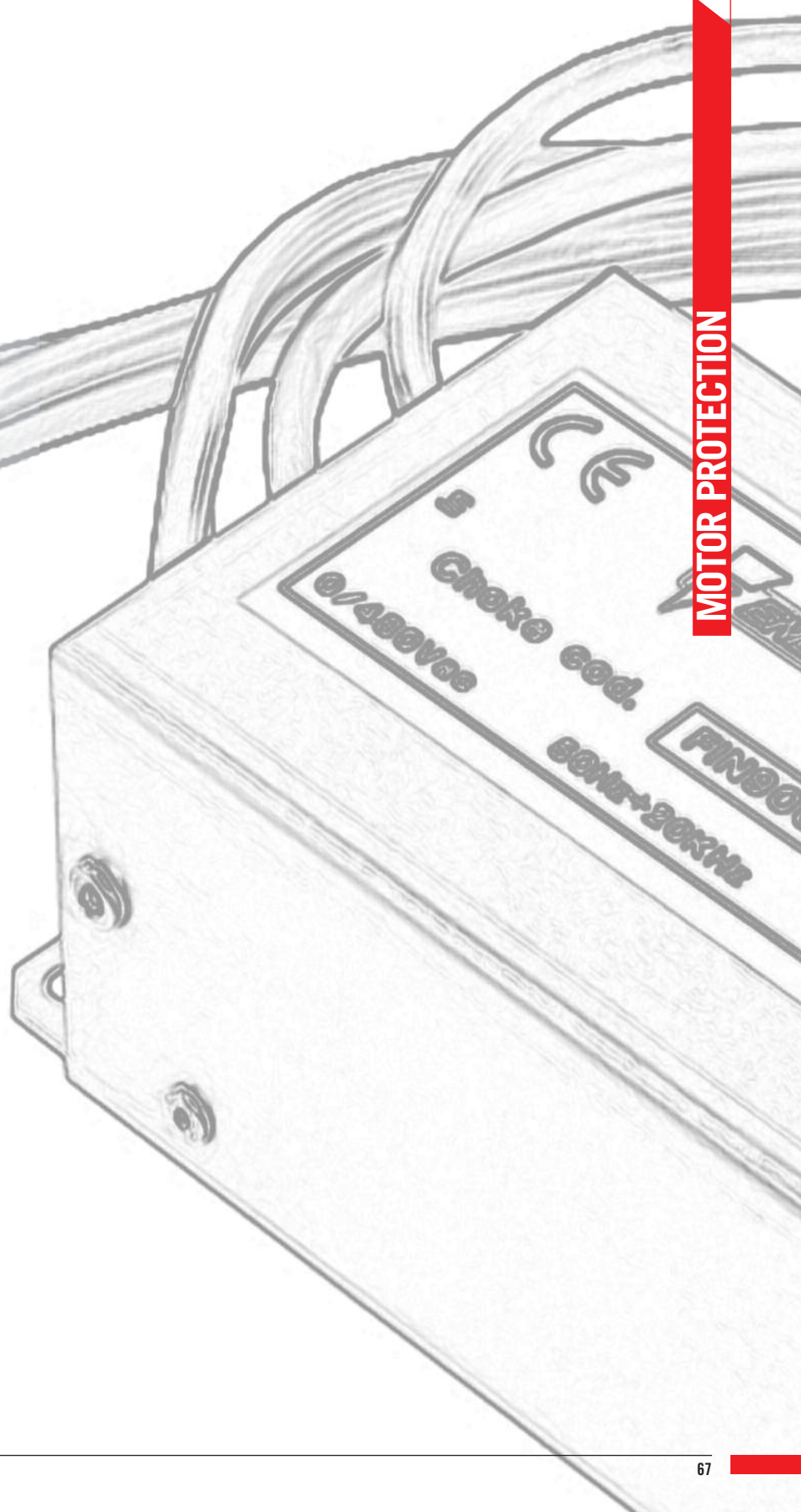


The Enerdoor motor protection series reduces harmful over voltage generated on the motor and is designed to work with various applications, switching frequencies and frequency outputs.

This series offers common mode and differential mode inductance, sine wave filters and snubbers. Unique features include: high linearity vs frequency and current, low temperatures, and compact dimensions.

The FIN960F high frequency inductance is a unique solution used for synchronous spindle motor applications. This line works with low temperatures and frequency output up to 2 KHz while benefiting the motor with low temperature.

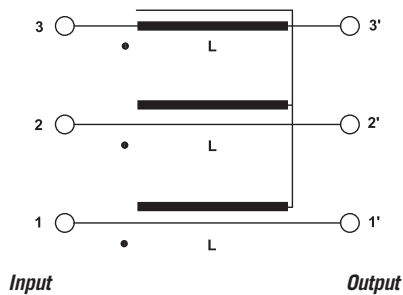
The FIN905SF and FIN915SFH sine wave filters reduce the pulse wave modulation (PWM) effect, convert the PWM to a sine wave and eliminate  $dV/dt$ . These lines work with applications in open loop or close loop feedback. The FIN905SF works with frequency output up to 70 Hz. The FIN915SFH line is used with fundamental frequencies up to 2 kHz while maintaining a very low application temperature.



MOTOR PROTECTION



### ELECTRIC DIAGRAM FIN 900



### APPLICATION GUIDE

The FIN900 and FIN930 common mode choke series are used to reduce high frequency interference caused by pulse wave modulation of power transistors. Chokes round out the fast voltage rise time and reduce high frequency (radio frequency) electromagnetic interference radiated into the environment without appreciable line voltage drops.

Chokes are usually connected between the inverter, or the controller, and the motor. It is recommended to run a shielded cable between the choke and the motor with the shield connected to ground at both ends. This configuration combines the effect of the inductance of the coil and the distributed capacity of the cable shield.

An advantage to using a choke installed between the controller and the motor is the reduction of conducted interference emitted from the device towards the main and characterized by frequencies between 1 and 3 MHz.

Enerdoor common mode choke series is recommended for servo drive applications and variable frequency drives with close loop systems.

### ELECTRIC CHARACTERISTICS

Nominal voltage **0/500 V<sub>ac</sub> - 50/60 Hz**

#### 3-Phase

Cylindrical Case / Cable Output

<b>FIN900</b>	Nominal Current at 40° C (A)	L1 (mH)	R (mΩ)	Pow Loss (W)
<b>.010.1C</b>	10	1.5	12	6
<b>.016.1C</b>	16	1.5	4.5	6
<b>.030.1C</b>	30	1.5	3	6

#### 3-Phase

Metallic Case / Cable Output

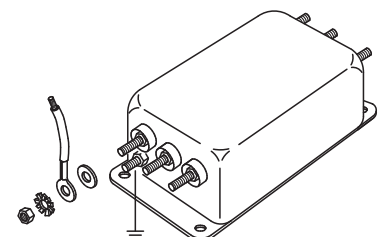
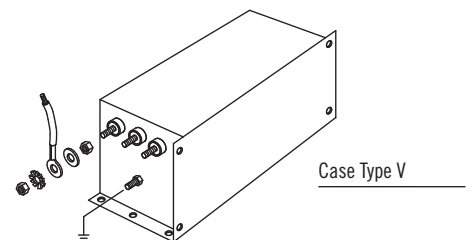
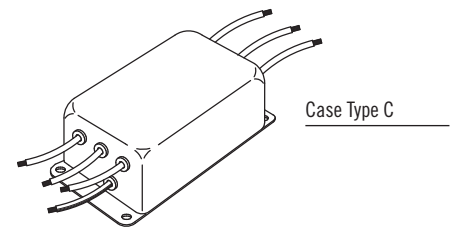
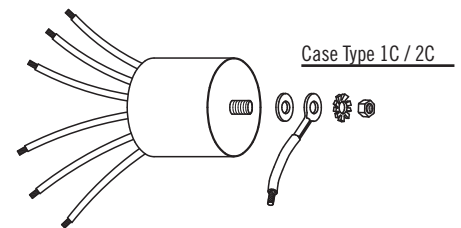
<b>FIN900</b>	Nominal Current at 40° C (A)	L1 (mH)	R (mΩ)	Pow Loss (W)
<b>.010.C</b>	10	1.5	12	6
<b>.016.C</b>	16	1.5	4.5	6
<b>.030.C</b>	30	1.5	3	6

#### 3-Phase

Metallic Case / Screw Output

<b>FIN900</b>	Nominal Current at 40° C (A)	L1 (mH)	R (mΩ)	Pow Loss (W)
<b>.010.V</b>	10	1.5	12	6
<b>.016.V</b>	16	1.5	4.5	10
<b>.030.V</b>	30	1.5	3	15
<b>.050.V</b>	50	1.5	2.6	23
<b>.080.V</b>	80	1.5	1.5	28
<b>.100.V</b>	100	1.5	1	45
<b>.150.V</b>	150	1.2	0.7	75
<b>.200.V</b>	200	1.2	0.4	83
<b>.280.V</b>	280	1.2	0.4	96

### Electric And Mechanical Assembly

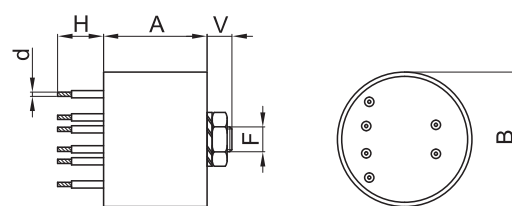




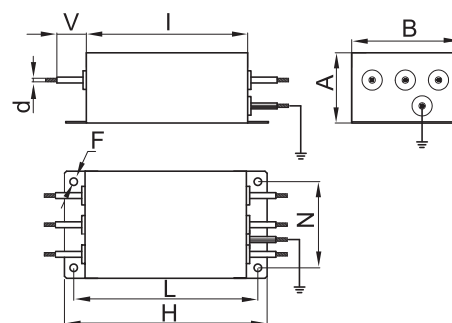
**MECHANICAL DIMENSIONS (mm)**
**CYLINDRICAL CASE**

<b>FIN900</b>	<b>A</b>	<b>B(φ)</b>	<b>d(φ)</b>	<b>V</b>	<b>F</b>	<b>H</b>	<b>Weight Kg</b>	<b>Case</b>
<b>.010.1C</b>	60	65	2	12	M12	200	0.5	1C
<b>.016.1C</b>	60	65	2.5	12	M12	200	0.5	1C
<b>.030.1C</b>	60	65	2.5	12	M12	200	0.5	1C

Available in 2C version with cable lengths (H) in 400 or 600 mm

**CASE 1C**

**METALLIC CASE**

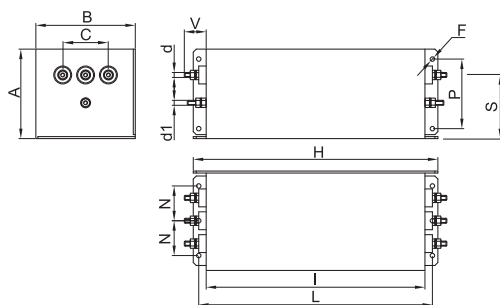
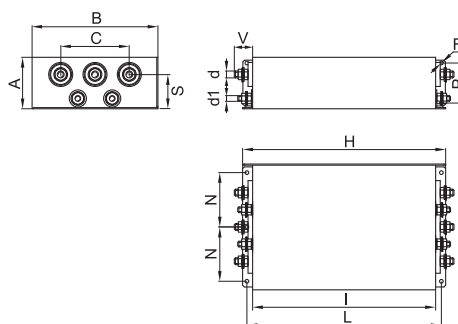
<b>FIN900</b>	<b>A</b>	<b>B</b>	<b>d(φ)</b>	<b>V</b>	<b>F(φ)</b>	<b>H</b>	<b>I</b>	<b>L</b>	<b>N</b>	<b>Weight Kg</b>	<b>Case</b>
<b>.010.C</b>	42	65	2	200	4.2	120	96	110	51	0.5	C
<b>.016.C</b>	42	65	2.5	200	4.2	120	96	110	51	0.5	C
<b>.030.C</b>	42	65	3	200	4.2	120	96	110	51	0.5	C

**CASE C**

**METALLIC CASE**

<b>FIN900</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>V</b>	<b>F</b>	<b>H</b>	<b>I</b>	<b>L</b>	<b>N</b>	<b>P</b>	<b>S</b>	<b>Weight Kg</b>	<b>Case</b>
<b>.010.V</b>	58	86	44	14	4.5	186	160	176	30	40	38	2	1
<b>.016.V</b>	58	86	44	14	4.5	186	160	176	30	40	38	2	1
<b>.030.V</b>	58	86	44	14	4.5	186	160	176	30	40	38	2	1
<b>.050.V</b>	58	86	44	14	4.5	186	160	176	30	40	38	2	1
<b>.080.V</b>	90	100	46	28	4.5	246	220	235	35	70	64	3	3
<b>.100.V</b>	90	185	84	25	6.5	356	320	340	77.5	70	69	5	4
<b>.150.V</b>	90	220	120	29	6.5	356	320	340	95	70	60	7	5
<b>.200.V</b>	90	220	120	29	6.5	356	320	340	95	70	60	7	5

**CONNECTION**

<b>d (mm)</b>	<b>Line Torque (Nm)</b>	<b>d1(mm)</b>	<b>Ground Torque (Nm)</b>
M4	1.2	M4	1.2
M5	4	M4	1.2
M5	4	M4	1.2
M6	6	M5	4
M6	6	M5	4
M8	14	M8	14
M8	14	M8	14
M10	18	M10	18

**CASE 1/2/3**

**CASE 4/5**


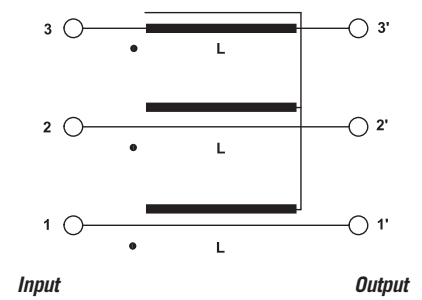


## ELECTRIC CHARACTERISTICS

Nominal Voltage **0/600 V<sub>AC</sub> - 50/60 Hz**

FIN930	Rated Current 40°C (50°C)	L1 (μH)	Pow Loss
.006.M	8 (6)	100	3
.012.M	14 (12)	100	3
.016.M	18 (16)	100	4
.025.M	28 (25)	100	4
.032.M	35 (32)	100	5
.042.M	50 (42)	100	7
.055.M	63 (55)	100	8
.070.M	80 (70)	100	13
.080.M	90 (80)	100	13
.100.M	110 (100)	100	15
.115.M	130 (115)	100	22
.150.M	175 (150)	100	25
.200.M	230 (200)	100	28

## ELECTRIC DIAGRAM FIN930



Available with currents up to 1000A

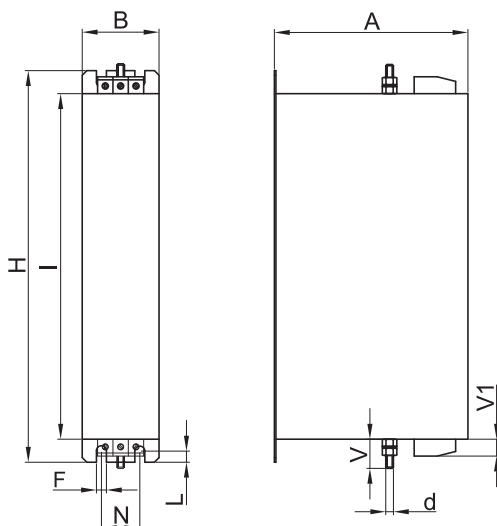
## MECHANICAL DIMENSIONS (mm)

FIN930	A	B	V	V1	F	H	I	L	N	d	Weight Kg
.006.M	140	50	19	15	6	226	200	7	28	M6	1.7
.012.M	140	50	19	15	6	226	200	7	28	M6	1.7
.016.M	177	60	19	15	6	267	237	8	34	M6	1.7
.025.M	177	60	19	15	6	267	237	8	34	M6	2.3
.032.M	177	60	19	15	6	267	237	8	34	M6	2.3
.042.M	177	70	19	25	6	295	265	8	44	M6	3.4
.055.M	177	70	19	33	6	295	265	8	44	M6	3.5
.070.M	205	80	28	38	8	390	340	12	53	M10	6
.080.M	205	80	28	38	8	390	340	12	53	M10	6
.100.M	205	80	28	43	8	390	340	12	53	M10	7.1
.115.M	205	80	28	43	8	390	340	12	53	M10	7.1
.150.M	220	105	28	50	8	420	370	12	78	M10	8.5
.200.M	220	105	28	50	8	420	370	12	78	M10	8.5

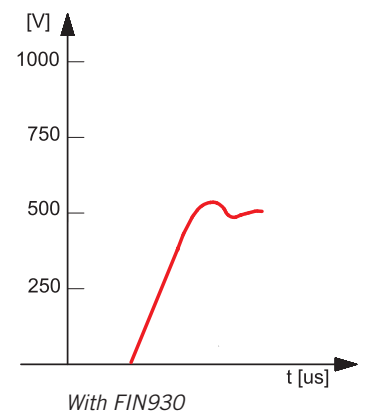
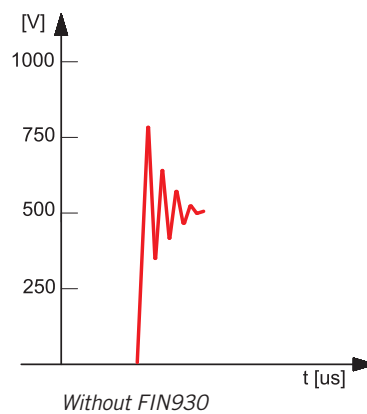
## CONNECTION

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.2 - 10	0.2 - 6	1.2
0.5 - 16	0.5 - 10	1.8
0.5 - 16	0.5 - 10	1.8
4 - 25	6 - 35	4.5
4 - 25	6 - 35	4.5
10 - 50	10 - 50	4
10 - 50	10 - 50	4
35 - 95	35 - 95	20
35 - 95	35 - 95	20

## CASE



## APPLICATION DIAGRAM



Example of measurement in a typical application using a servo drive

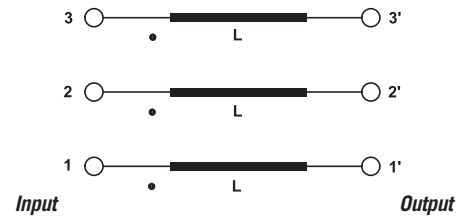

**APPLICATION GUIDE**
**Connection between the main line and the VFD**

Enerdoor line reactor series offers a current range from 10 to 300A with nominal voltage up to 480 Vac and is used to reduce harmonic distortion and low frequency electromagnetic interference.

Line reactors are selected according to the nominal voltage and current and are typically installed between the main line and the SCR controller or VFD. The 3% and 5% line reactors are the value of the drop voltage caused by differential inductance on the mains nominal voltage.

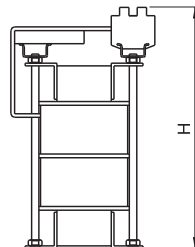
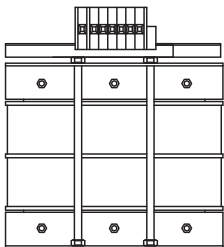
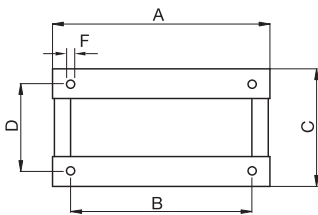
**ELECTRIC CHARACTERISTICS**

Nominal voltage	<b>480 Vac</b>
Frequency range	<b>50/60 Hz</b>
Insulation class	<b>H</b>
Drop voltage	<b>3%</b>

**ELECTRIC DIAGRAM**


Available with current up to 1000A and different drop voltage values

<b>FIN950</b>	<b>I Rated 40°C (A)</b>	<b>L (mH)</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>	<b>H</b>	<b>Power loss (W)</b>	<b>Weight (Kg)</b>
<b>.010.M29</b>	10	2.9	150	125	125	70	7	155	42	3
<b>.016.M18</b>	16	1.8	150	125	125	70	7	155	78	4
<b>.036.M084</b>	36	0.84	180	150	110	90	7	280	82	6.5
<b>.050.M058</b>	50	0.58	180	150	110	90	7	280	125	12.1
<b>.090.M032</b>	90	0.32	240	200	190	95	10	310	145	23
<b>.150.M019</b>	150	0.19	240	200	190	95	10	310	278	26.5
<b>.200.M00735</b>	200	0.0735	240	200	190	95	10	310	301	32.5
<b>.300.M0049</b>	300	0.049	240	200	190	95	10	310	379	58

**CASE**




### APPLICATION GUIDE

#### Connection between the VFD and the motor

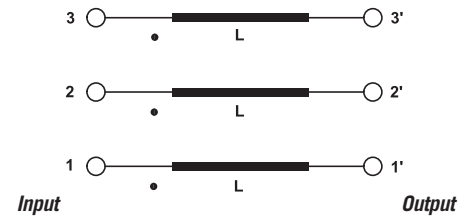
Enerdoor output load reactor series improves motor life and is commonly used for variable frequency drives with long motor cables and single VFDs with multiple motors.

The load reactor is installed between the VFD and the motor and is used to reduce dV/dt overvoltage spikes which damage the motor and motor insulation.

### ELECTRIC CHARACTERISTICS

Nominal voltage	480 V <sub>ac</sub>
Frequency range	50/60 Hz
Insulation class	H
Max current frequency	100 Hz

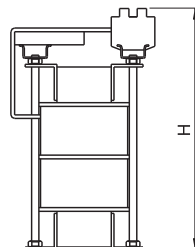
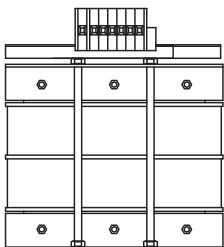
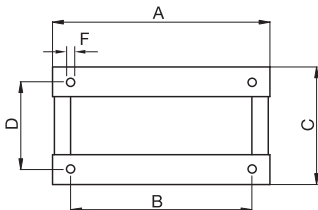
### ELECTRIC DIAGRAM



Available with currents up to 1000A and with different drop voltage values

FIN950U	I Rated 40°C (A)	L (mH)	A	B	C	D	F	H	Power Loss (W)	Weight (Kg)
.008.M20	8	2	150	125	100	55	7	250	23	2
.012.M12	12	1.2	150	125	100	55	7	250	30	3
.024.M070	24	0.7	150	125	100	55	7	250	36	4
.050.M038	50	0.38	180	150	110	90	7	280	61	5
.090.M019	90	0.19	180	150	110	90	7	280	73	18
.150.M013	150	0.13	240	200	190	95	10	310	120	20
.200.M0080	200	0.08	240	200	190	95	10	310	150	26
.300.M0053	300	0.053	300	260	170	110	10	310	225	40

### CASE



### APPLICATION GUIDE

#### Connection between the drive and spindle motor

Enerdoor high frequency inductance series offers a current range from 5 to 750A with nominal voltage up to 750 Vac. The FIN960F is a unique solution used with synchronous spindle motors requiring an inductance to protect against high voltage spikes for maintaining linearity of current and frequency levels.

The FIN960F inductance maintains low temperatures in the entire output frequency range up to 2 kHz and reduces temperature on the head of the spindle motor. The speed of the spindle motor is regulated through the output frequency of the drive which runs up to 2 kHz.

Custom nominal current and inductance value combinations are available to accommodate specific motor characteristics and working cycles.

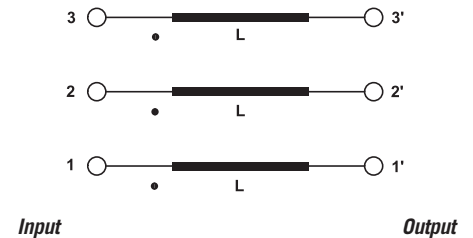


### ELECTRIC CHARACTERISTICS

Nominal voltage	<b>250/750 V<sub>AC</sub></b>
Nominal frequency	<b>&lt; 2 kHz</b>
Ripple frequency	<b>&lt; 20 kHz</b>

FIN960F	Nominal Current at 40° (A)	Peak current at 40° (A)	L (μH)	Power Loss (W)
.050.M010	50	75	100	70
.110.M010	110	150	100	110
.160.M010	160	200	100	150
.200.M010	200	240	100	170
.075.M020	75	100	200	85
.095.M020	95	130	200	90
.130.M025	130	160	250	115
.160.M025	160	180	250	170
.060.M030	60	90	300	55
.090.M030	90	120	300	60
.130.M030	130	160	300	130
.050.M040	50	75	400	80
.110.M040	110	150	400	280
.150.M040	150	190	400	370
.200.M040	200	240	400	580
.085.M060	85	120	600	280
.135.M060	135	165	600	300
.170.M060	170	205	600	520
.070.M100	70	95	1000	200
.120.M100	120	145	1000	305
.165.M100	165	205	1000	780
N.200.M100	200	240	1000	820

### ELECTRIC DIAGRAM FIN 960

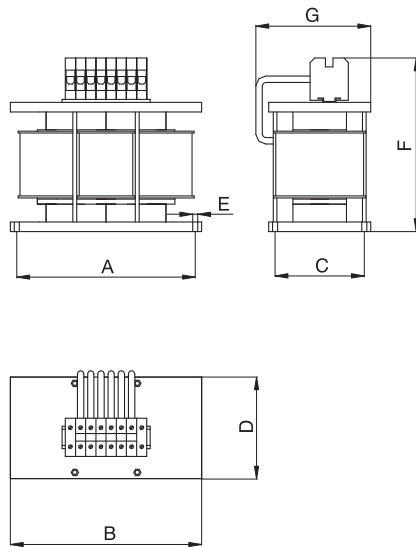
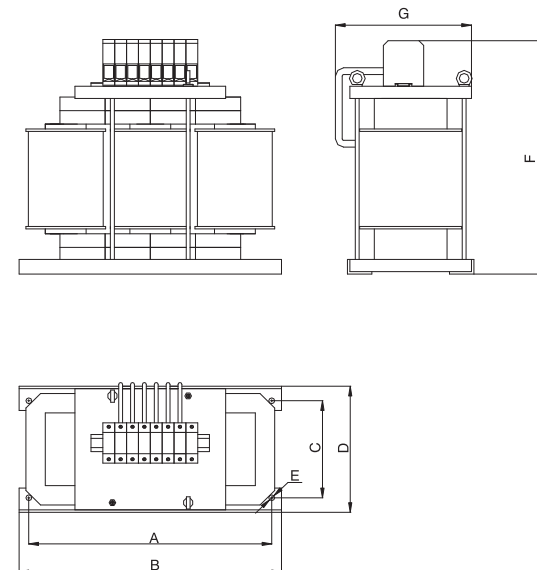


**MECHANICAL DIMENSIONS (mm)**

FIN960F	A	B	C	D	E	F	G	Weight Kg	Case
.050.M010	230	250	80	100	7	270	120	6	1
.110.M010	240	260	110	140	7	270	150	18	2
.160.M010	370	400	170	230	12	350	250	37	3
.200.M010	500	540	200	260	12	500	300	55	4
.075.M020	240	260	110	140	7	270	150	17	2
.095.M020	240	260	110	140	7	270	150	20	2
.130.M025	500	540	200	260	12	500	300	70	5
.160.M025	500	540	200	260	12	500	300	75	5
.060.M030	500	540	200	260	12	500	300	19	5
.090.M030	500	540	200	260	12	500	300	35	5
.130.M030	500	540	200	260	12	500	300	65	5
.050.M040	280	300	140	160	8	280	180	19	6
.110.M040	500	540	200	260	12	500	300	65	5
.150.M040	500	540	200	260	12	500	300	100	5
.200.M040	500	540	200	260	12	500	300	120	5
.085.M060	500	540	200	260	12	500	300	65	5
.135.M060	500	540	200	260	12	500	300	88	5
.170.M060	500	540	200	260	12	500	300	105	5
.070.M100	500	540	200	260	12	500	300	55	5
.120.M100	500	540	200	260	12	500	300	95	5
.165.M100	500	540	200	260	12	500	300	120	5
N.200.M100	660	700	320	390	12	600	410	200	7

**CONNECTION**

Rigid Cable (mm <sup>2</sup> )	Flexible Cable (mm <sup>2</sup> )	Torque (Nm)
2.5 - 50	2.5 - 35	5
10 - 70	10 - 50	6
10 - 95	10 - 70	10
16 - 150	16 - 95	20
2.5 - 50	2.5 - 35	5
10 - 70	10 - 50	6
10 - 95	10 - 70	10
10 - 95	10 - 70	10
2.5 - 50	2.5 - 35	5
10 - 70	10 - 50	6
10 - 95	10 - 70	10
2.5 - 50	2.5 - 35	5
10 - 70	10 - 50	6
10 - 95	10 - 70	10
16 - 150	16 - 95	20
10 - 70	10 - 50	6
10 - 95	10 - 70	10
10 - 95	10 - 70	10
10 - 70	10 - 50	6
10 - 70	10 - 50	6
10 - 95	10 - 70	10
16 - 150	16 - 95	20

**CASE 1/2/6**

**CASE 3/4/5/7**




Converts the PWM output signal into a sinusoidal wave with residual <5%

DV/DT reduction

Motor loss reduction

Increases motor life

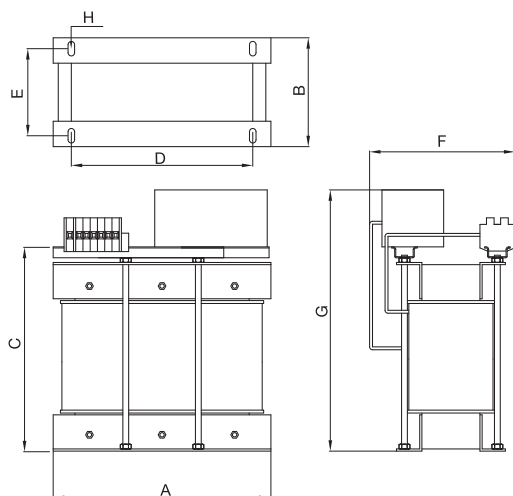
Compact style

### ELECTRIC CHARACTERISTICS

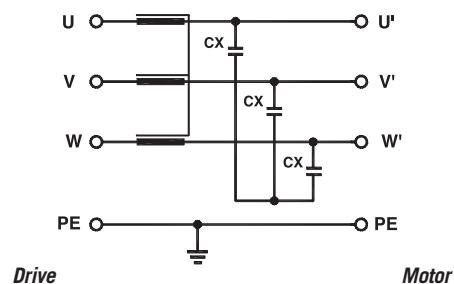
Nominal voltage	<b>480 VAC</b>
Nominal current at ambient temperature of 40°C	<b>See table</b>
Frequency	<b>&lt; 70 Hz</b>

FIN905SF	Nominal Current at 40° (A)	L (mH)	CX (µF)	Min Switch Frequency (kHz)	Power Loss (W)	A	B	C	D	E	F	G	H
.005.M	5	13	2.2 (Y)	4	67	150	115	145	125	70	150	250	Ø 7
.008.M	8	6.9	4.7 (Y)	4	79	150	115	145	125	70	150	250	Ø 7
.010.M	10	5.2	6.8 (Y)	4	88	150	115	145	125	70	150	250	Ø 7
.016.M	16	3.1	10 (Y)	4	116	180	190	180	150	60	225	280	Ø 7
.025.M	25	2.4	10 (Y)	4	151	180	110	180	150	80	145	280	Ø 7
.036.M	36	1.6	10 (Y)	4	175	240	190	240	200	95	225	340	Ø 10
.048.M	48	1.1	15 (Y)	4	250	240	190	240	200	95	225	340	Ø 10
.060.M	60	0.85	30 (Y)	3	282	240	190	240	200	95	225	340	Ø 10
.075.M	75	0.75	30 (Y)	3	340	300	170	310	260	110	205	410	Ø 10
.115.M	115	0.5	20 (Δ)	3	575	300	190	310	260	130	225	-	Ø 10
.180.M	180	0.3	33 (Δ)	3	695	480	320	420	360	170	355	-	Ø 12
.260.M	260	0.2	47 (Δ)	3	895	520	320	340	380	200	355	-	Ø 14
.410.B	410	0.13	66 (Δ)	3	1170	520	320	340	380	200	355	-	Ø 14
.480.B	480	0.11	94 (Δ)	3	1390	520	320	340	380	200	355	-	Ø 14
.660.B	660	0.08	140 (Δ)	2	2050	520	360	460	380	240	395	-	Ø 14
.750.B	750	0.07	165 (Δ)	2	2900	530	400	520	380	280	435	-	Ø 14
.880.B	880	0.05	188 (Δ)	2	3450	650	400	630	380	270	475	-	Ø 14

### CASE



### ELECTRIC DIAGRAM





Converts the PWM output signal into a sinusoidal wave with residual <5%

Motor loss reduction

High speed motor application (FIN915SFH series)

Low heating for high frequency applications

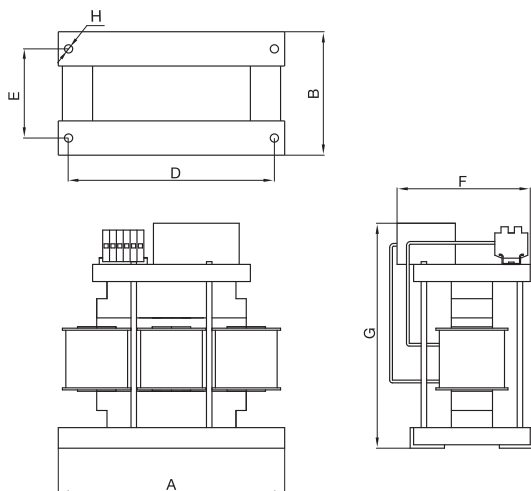
No ventilation for high speed applications

### ELECTRIC CHARACTERISTICS

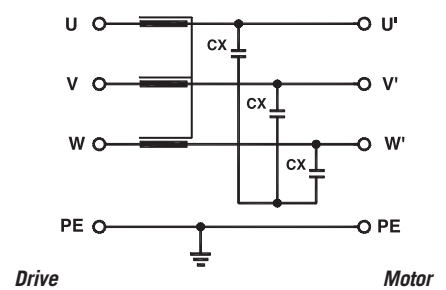
Nominal voltage	<b>480 VAC</b>
Nominal current at ambient temperature of 40°C	<b>See table</b>
Frequency	<b>&lt; 1 kHz</b>

FIN915SFH	Nominal Current at 40° (A)	L (mH)	CX (μF)	Min Switch Frequency (kHz)	Power Loss (W)	A	B	D	E	F	G	H
.008.M	8	2	2	3	60	280	180	250	110	200	280	Ø 12
.016.M	16	1.5	2	3	98	280	180	250	110	200	280	Ø 12
.032.M	32	0.7	3.3	3	110	280	180	250	110	200	350	Ø 12
.050.M	50	0.5	5.3	3	195	330	180	300	110	200	360	Ø 12
.075.M	75	0.4	8	3	255	390	180	360	110	200	360	Ø 12
.100.M	100	0.3	10	3	320	400	230	370	170	250	360	Ø 12
.150.M	150	0.2	13.2	3	540	540	260	500	200	300	375	Ø 12
.200.M	200	0.17	16.5	3	602	540	260	500	200	300	460	Ø 12
.250.M	250	0,15	20	3	701	540	260	500	200	300	460	Ø 12

### CASE



### ELECTRIC DIAGRAM



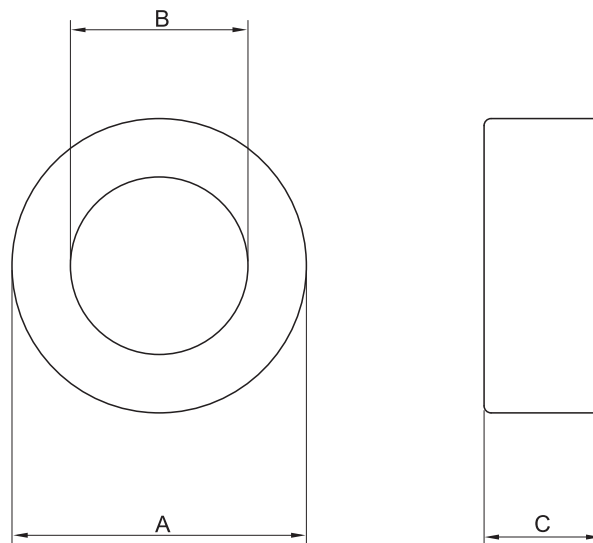
**TOROIDS**

**TECHNICAL CHARACTERISTICS**

<b>FINTR</b>	Permeability $\mu$
.3600	5000
.4900	10000
.6300	10000
.10000	5500
.140000	5500

**MECHANICAL DIMENSIONS (mm)**

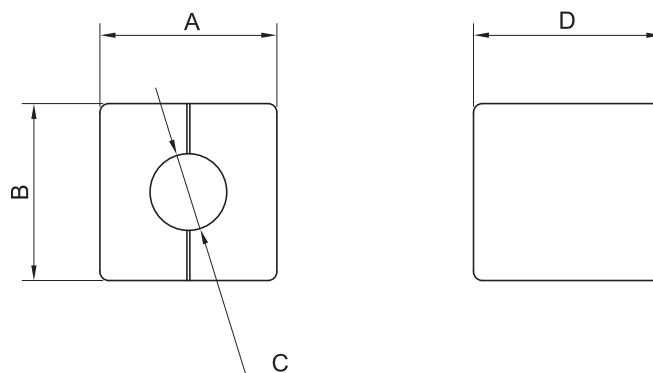
<b>FINTR</b>	A	B	C
.3600	37	22	16
.4900	49	34	16
.6300	63	38	25
.10000	102	66	15
.140000	140	106	25

**CASE**

**FERRITE**
**TECHNICAL CHARACTERISTICS**

<b>FINFE</b>	Permeability $\mu$
.13	1000 $\pm$ 25%

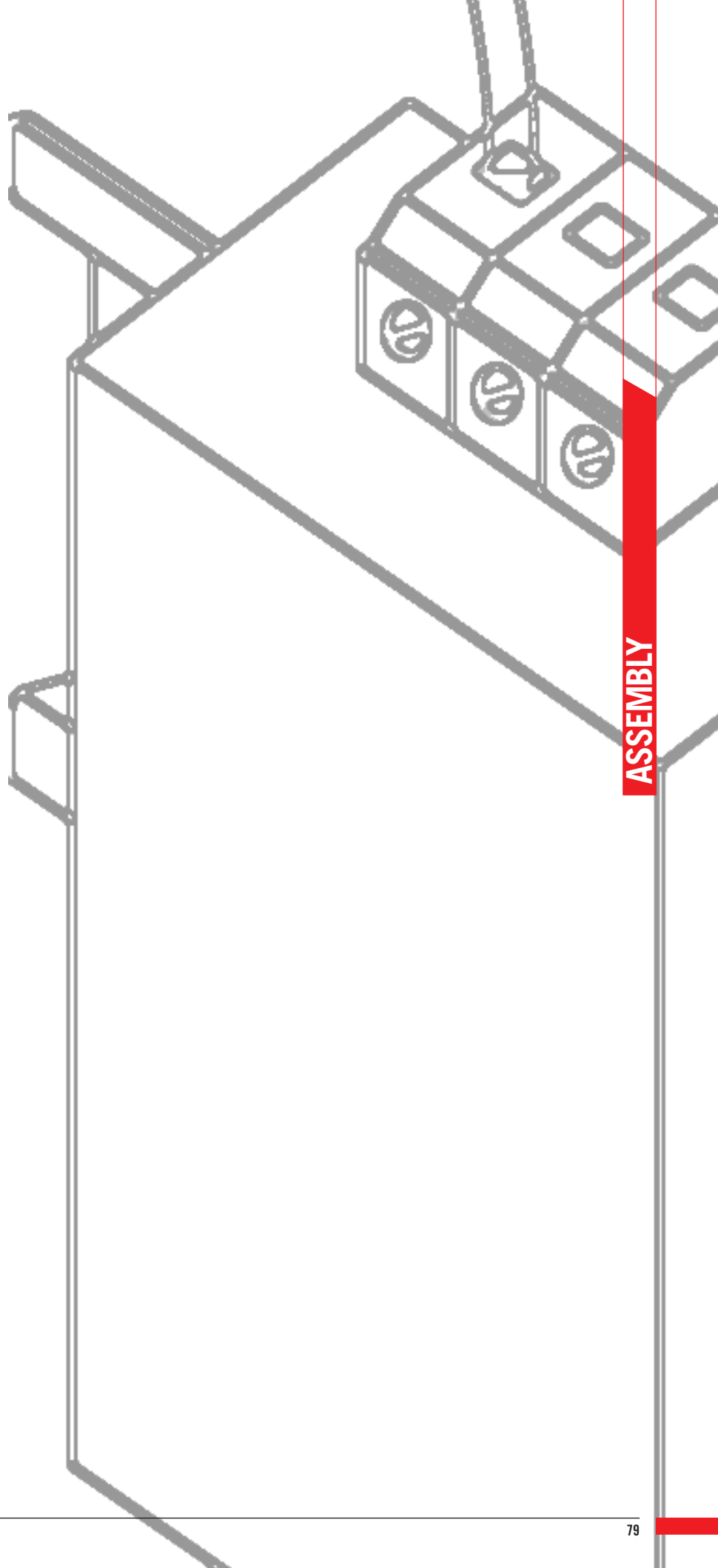
**MECHANICAL DIMENSIONS (mm)**

<b>FINFE</b>	A	B	C	D
.13	31	32	13	33

**CASE**


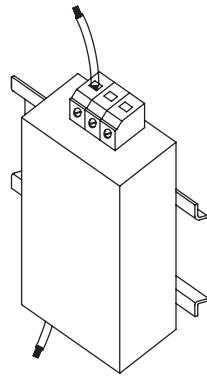




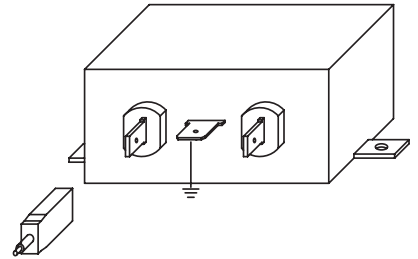


**1. Single Phase**

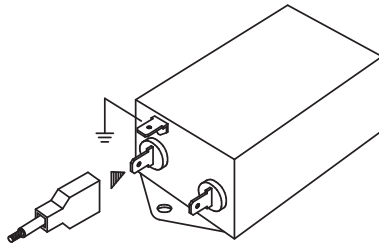
**FIN21**  
**FIN26**  
**FIN27**



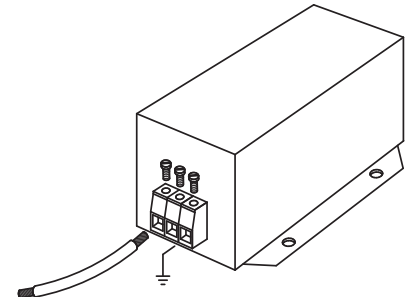
**FIN33** (case 1)



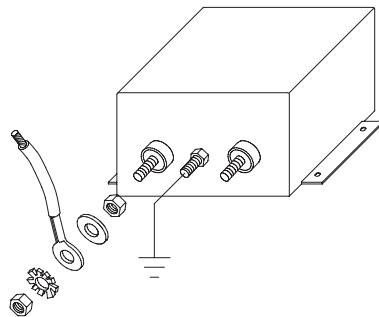
**FIN33** (case 2)  
**FIN35** (case 1.2.3)  
**FIN40** (case 1.2.3)  
**FIN50** (case 1.2.3)



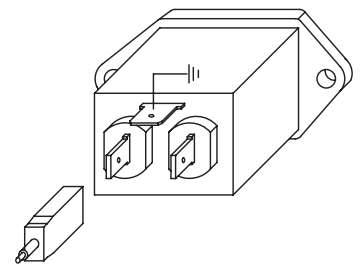
**FIN35** (case 4)  
**FIN40** (case 4)  
**FIN50** (case 4)



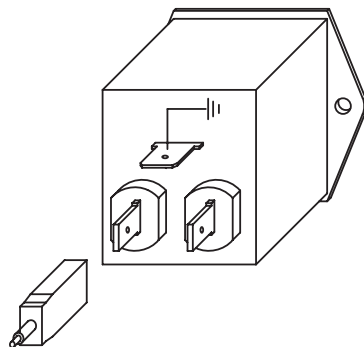
**FIN33** (case 3.4.5)



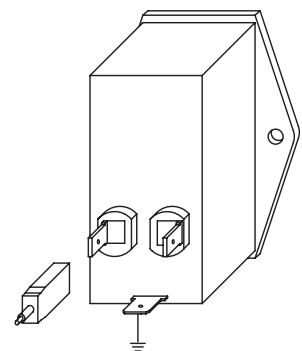
**FIN60**



**FIN70**

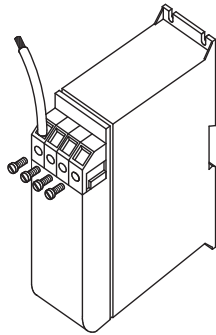


**FIN80**

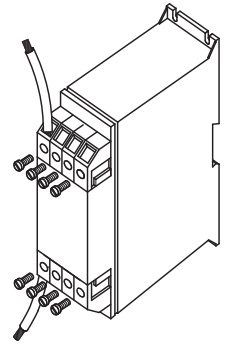


## 2. Three Phase Parallel

**FIN130SP**  
**FIN230**  
**FIN730**  
**FIN735**

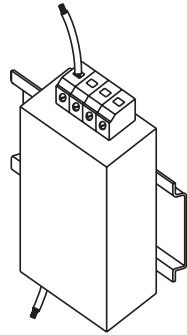


**FIN740**

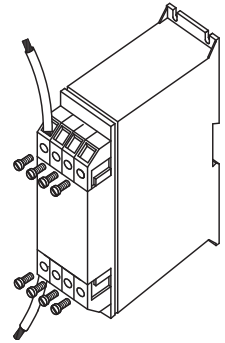


## 3. Three Phase

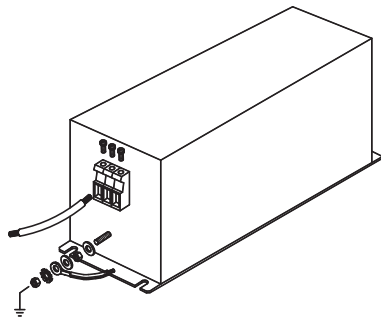
**FIN1351**



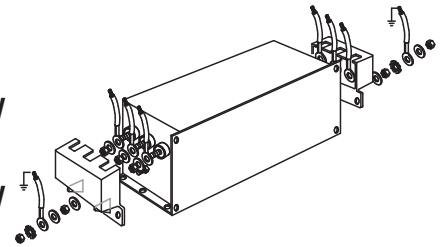
**FIN538**



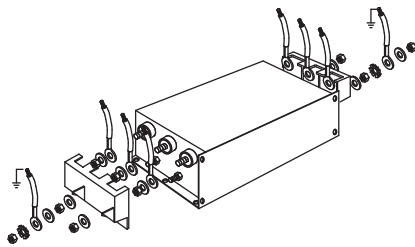
**FIN538S**  
**FIN538S1**  
 (case 1.2.3.4.5)



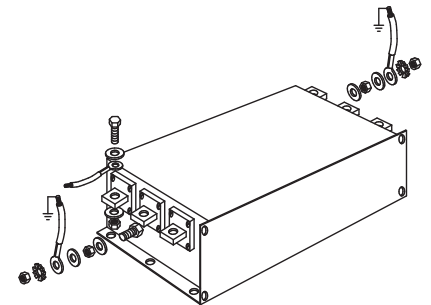
**FIN1200/1200HV**  
 (case 1.2.3.4)  
**FIN1500/1500HV**  
 (case 1.2.3.4)



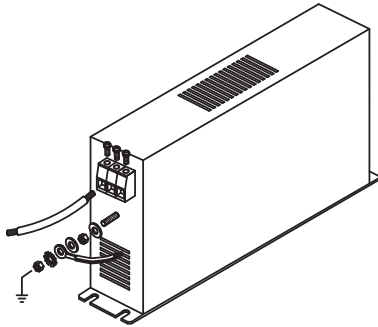
**FIN538S1**  
 (case 6)  
**FIN1200/1200HV**  
 (case 5.6)  
**FIN1500/1500HV**  
 (case 5.6)



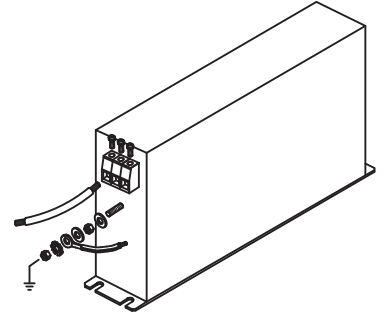
**FIN539S**  
 (case 1.2.3.4)  
**FIN1200/1200HV**  
 (case 7.8.9.10.11.12)  
**FIN1500/1500HV**  
 (case 7.8.9.10.11.12)  
**FIN538S1**  
 (case 7.8.9.10.11.12)  
**FIN1200HV**  
 (case 7.8.9.10.11.12)



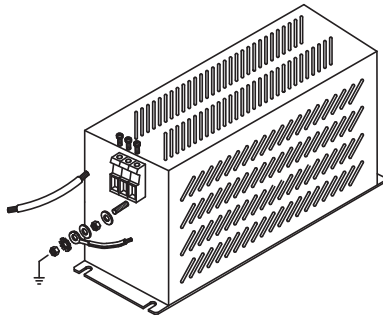
**FIN1600**



**FIN1700/1700G  
FIN1700E/1700EG  
FIN1900/1900G  
FIN1900E/1900EG  
FIN1700IT  
FIN1900S**

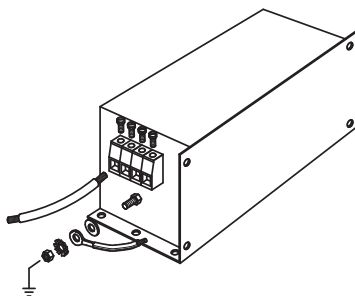


**FIN3755**

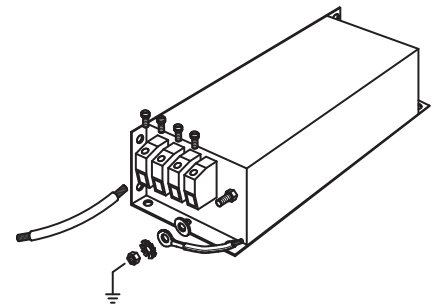


**4. Three Phase + Neutral**

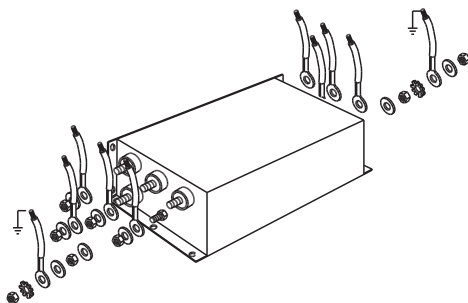
**FIN1240**  
(case 1.2)



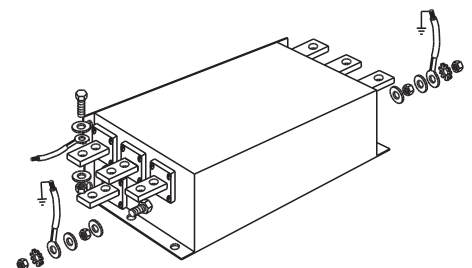
**FIN1240**  
(case 3.4)



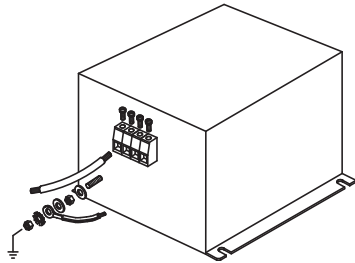
**FIN1240**  
(case 5)



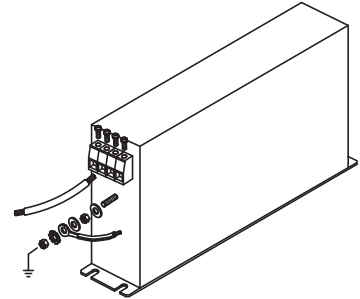
**FIN1240**  
(case 6.7.8.9)



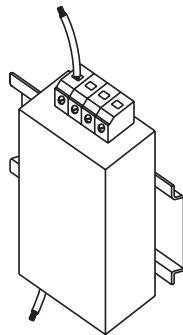
**FIN1740ESM**



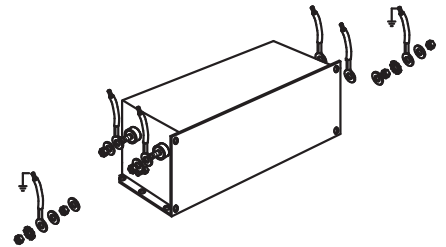
**FIN1740**  
**FIN1940**



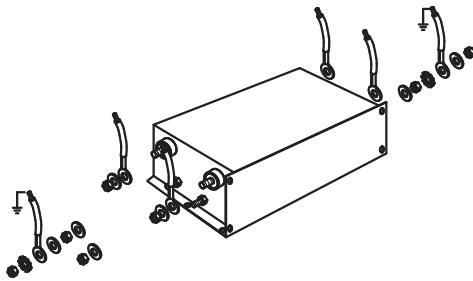
**FIN15**



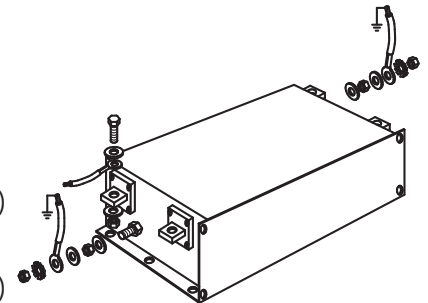
**FIN1220**  
(case 1.2.3.4)  
**FIN1520**  
(case 1.2.3.4)



**FIN1220**  
(case 5)  
**FIN1520**  
(case 5)



**FIN1220**  
(case 6.7.8.9.10.11)  
**FIN1520**  
(case 6.7.8.9.10.11)



## Application Criteria Relevant to RFI (EMC) Disturbance Suppressing Electric Filters for Low Voltage Machines and Installations

The European Directive 2004/108/EC requires that manufacturers of industrial machine tools and electric and electronic equipment comply with the Standard Electromagnetic Compatibility (EMC) emission and immunity levels.

This application criteria refers to definitions and classifications relevant to electromagnetic disturbance and the basic application criteria of RFI (EMC) low voltage (< 1000 V) disturbance suppressing filters.

### 1. Definitions

#### 1.1 Electromagnetic Interference

EMI, also called radio-frequency interference or RFI, is a disturbance that affects an electrical circuit due to either electromagnetic induction or electromagnetic radiation emitted from an external source.

#### 1.2 Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC) refers to the ability of equipment or systems to operate in an electromagnetic environment without introducing intolerable electromagnetic interference (EMI) to anything in the environment. Electromagnetic Compatibility includes two important aspects (emission and immunity) described below.

##### 1.2.1 Emission

The phenomenon by which the electromagnetic energy is emitted from a source such as a device, machine or system and shall not emit undesirable electromagnetic interference of a higher level than those allowed by the European EMC Framework 2004/108/EC (See Figure 1).

##### 1.2.2 Immunity (To Interferences)

The capability of a machine, equipment or system to correctly operate without degrading functional characteristics when affected by electromagnetic interference.

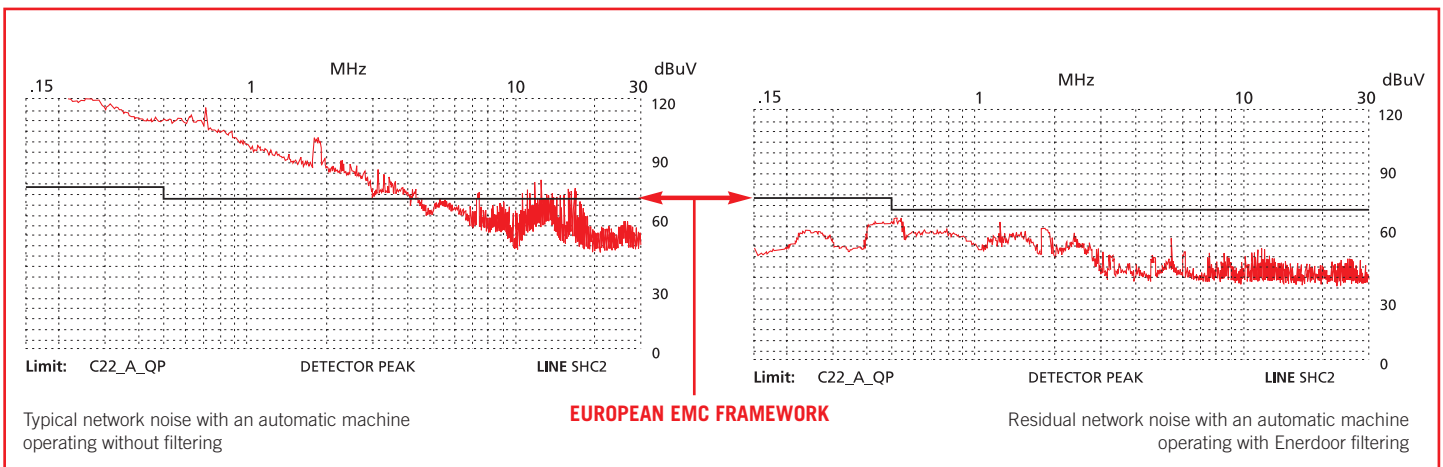


Figure 1: Example of typical disturbances generated by an automatic machine operating without and with filtering necessary to comply with the European EMC Framework 2004/108/EC limits.

## 2. General Classification Of Interference

### 2.1 Conducted and radiated interference

Interference is classified as follows:

- a) Conducted interference is caused by the physical contact of undesirable voltage or current signals that enter or exit from a specific device through its own signaling or energizing electric conductors.
- b) Radiated interference is caused without physical contact of conductors. Every electric circuit acts as an aerial and when dipped in an electromagnetic field may induce voltage interference. Every variable current flowing in an electric conductor creates an electromagnetic field in its surrounding environment and similarly each electromagnetic field induces an electric signal in a close conductor. As such, the distinction between radiated and conducted interference is due to practical motivations. The above distinction classifies undesirable signals, which at lower frequencies are conducted disturbances, and at higher frequencies are detected by using aerials and are radiated disturbances.

### 2.2 Common mode and differential mode interference

#### 2.2.1 Common mode interference

Common mode interference is an undesirable signal as measured between all conductors of an electric circuit connected together and a common reference, usually the earth (See Figure 2).

#### 2.2.2 Differential mode interference

Differential mode interference is an undesirable signal as measured between two independent conductors of the same electrical circuit (See Figure 3).

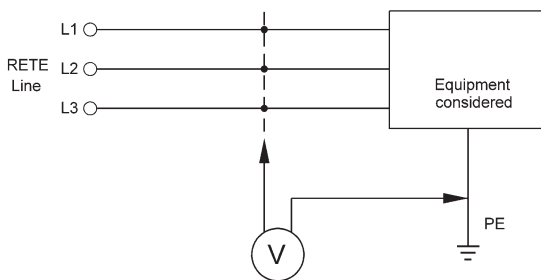


Fig. 2: Common Mode Interference

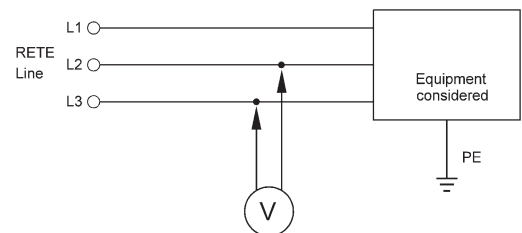


Fig. 3: Differential Mode Interference



## 2.3 Interference recognizable in nature

### 2.3.1 Classification of electromagnetic phenomena

Electromagnetic phenomena is classified considering the following specific characteristics:

- a) Frequency range: the most significant interference is characterized by a frequency range from a few kHz to hundreds of MHz but the upper limit of the frequency range of interference is about 400 GHz.
- b) Interference physical characteristics: type of sources, effects, measuring methods and tests. Interference is usually classified as:
  - Low frequency disturbances ( $f \leq 150$  kHz)
  - High frequency disturbances ( $f > 150$  kHz)
- c) Origin of interference – conducted or radiated origins, electrostatic discharge, etc.

### 2.3.2 Interference classification

- a) Conducted interference due to low frequency phenomena
  - Mains 50/60 Hz harmonics and sub-harmonics
  - Signaling systems
  - Voltage variations, interruptions and dips
  - Voltage unbalances
  - Mains 50/60 Hz frequency variations
  - Low frequency induced voltages
  - DC components in AC
- b) Conducted interference due to high frequency phenomena
  - Inducted voltages or currents (continuous or modulated waves)
  - Voltage transients (burst)
  - Oscillatory transients (single or repetitive)
- c) Radiated interference due to low frequency phenomena
  - Magnetic fields (transients or continuous)
  - Electric fields
- d) Radiated interference due to high frequency phenomena
  - Magnetic fields
  - Electric fields
  - Electromagnetic fields (transients, continuous or modulated wave)
- e) Interference due to electrostatic discharges
  - Electrostatic discharge

### 3. Reduction Of Interference Levels RFI (EMC) Filters:

RFI (EMC) filters reduce electromagnetic conducted and/or radiated interference. For a typical representation of an RFI filter, please see **Figure 4**.

These filters are bi-directional devices and reduce undesirable signals measured on output terminals in comparison with those that appear on input terminals or vice versa. Due to bi-directional characteristics, RFI filters are able to reduce levels of emitted disturbances and also increase the immunity level of filtered equipment or systems.

#### 3.1 Active and passive filters

- a) Active filters are devices in which mainly active components are used
- b) Passive filters are devices in which only passive components as resistances, inductances and capacitors are used

#### 3.2 Single phase and three phase filters

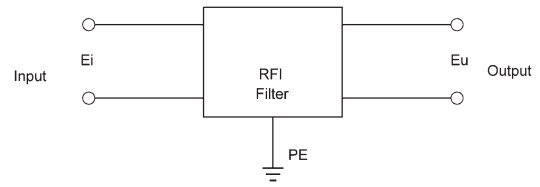
- a) Single phase filters are suitable for application on single phase equipment or electric installations (See **Figure 5**)
- b) Three phase filters are suitable for application on three phase equipment or electric installations (See **Figure 6**)

#### 3.3 Single and double function filters

- a) Single function filters are RFI devices able to efficiently attenuate common mode interference. The schematic diagram of the Enerdoor single function filter type FIN538 is shown in **Figure 7**. This type of filter typically allows a maximum attenuation level of common mode interference of 70-80 dB.
- b) Double function filters efficiently attenuate both common mode and differential mode interference. The schematic diagram of the Enerdoor double function filter type FIN1500 is shown in **Figure 8**. This type of filter allows a maximum attenuation level of interference higher than 80 dB.

The following three phase filters are double function filters: FIN538S, FIN538S1, FIN1200, FIN1500, FIN1600, FIN1700, FIN1900, FIN1740, and FIN1940.

The following single phase filters are double function filters: FIN33, FIN35, FIN40 and FIN50.



$$Eu < Ei = \text{Attenuation}$$

Fig. 4: Typical representation of an RFI filter

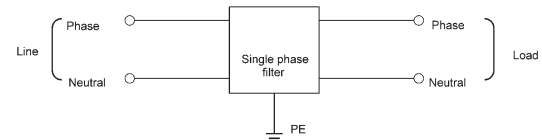


Fig. 5: Schematic diagram of a single phase filter

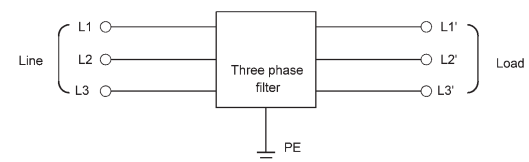


Fig. 6: Schematic diagram of a three phase filter

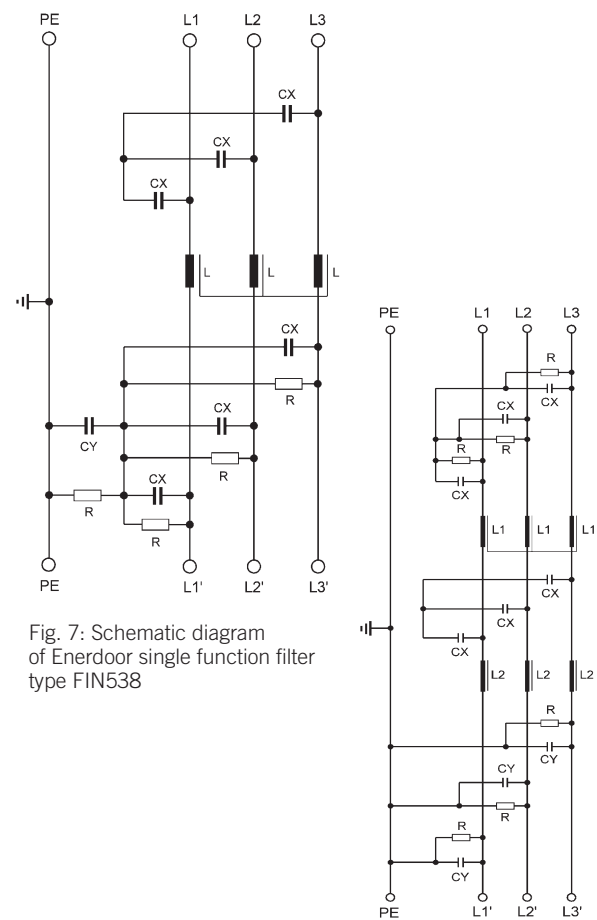


Fig. 7: Schematic diagram of Enerdoor single function filter type FIN538

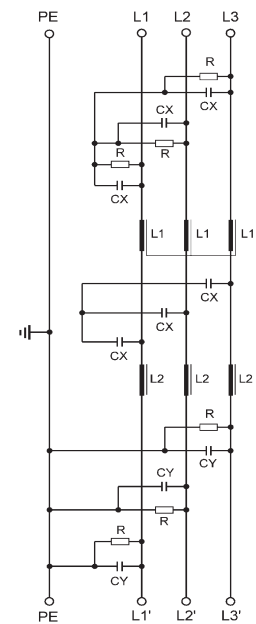


Fig. 8: Schematic diagram of Enerdoor double function filter type FIN1500

### 3.4 Series and parallel filters

a) Series filters represent the most widespread RFI filters and are typically connected in series between the energized electric point and the load. The total load current flows through the inductive components of a series filter and therefore must be suitable to support the load (See **Figure 9**). Capacitive and resistive components of this filter are connected in parallel and absorb a very low current from the main.

The following three phase filters are RFI filters: FIN538, FIN538S, FIN538S1, FIN539S, FIN1200, FIN1500, FIN1600, FIN1700, FIN1900, FIN3755, FIN1240, FIN1740, FIN1740ESM, and FIN1940.

The following single phase filters are RFI filters: FIN21, FIN26, FIN27, FIN33, FIN35, FIN40, FIN50, FIN60, FIN70 and FIN80.

b) Parallel filters are connected in parallel to the main; therefore their inductive, resistive and capacitive components absorb only a small current independent of the level of load current. The typical application of single function FIN130SP, 230SP, 730, 735, and 740 parallel filters are shown in **Figure 10**.

The FIN130SP, 230SP, 730, 735, and 740 parallel filters have been developed by Enerdoor to increase the attenuation level for lower frequency interference. In particular those included in the range between a few kHz and a few MHz, and protect electronic control devices of industrial automatic machines from short duration high voltage surges.

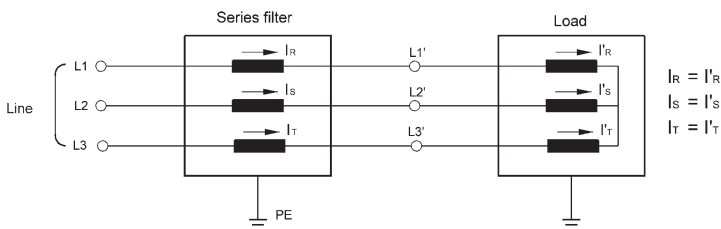


Fig. 9: Example of connection of a series filter: the total load current flows through the inductive components of the filter.

Note: An example of a simple series filter is represented by a common mode choke (for example a Enerdoor choke series FIN900) to be connected between the inverter and the load.

The above choke application allows an important reduction of radiated interference and a lower attenuation of the conducted interference present on the mains.

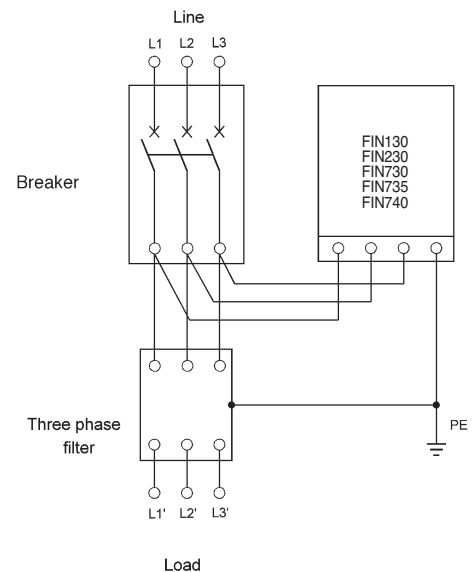


Fig. 10: Application diagram of single function Enerdoor FIN730 and FIN230SP parallel filters

## 4. Normative References

### 4.1 European EMC Framework I Directive 2004/108/EC

In accordance with the European Framework 2004/108/EC relevant to Electromagnetic Compatibility (EMC), each device, machine or installation containing electric components which emit interference or disturbed by them shall:

- a) Not generate electromagnetic disturbance levels higher than that established by the above Directive, in order to allow the correct operation of all equipment installed in the surrounding environment.
- b) Comply with the Standard level of immunity, in order to avoid electromagnetic disturbance influencing behavior in service.

### 4.2 Normative references for emission and immunity tests

In order to certify that a device, machine or installation complies with the European Directive EMC 2004/108/EC, it is necessary to carry out a complete series of electromagnetic compatibility tests.

#### a) Emission Test

STANDARD REFERENCE	TYPE OF EMC TEST
EN 55014	Conducted emissions
EN 55014	Radiated power
EN 55014	Intermitted interference (click)
EN 55011	Conducted emissions
EN 55011	Radiated emissions
EN 55022	Conducted emissions
EN 55022	Radiated emissions

#### b) Immunity Test

STANDARD REFERENCE	TYPE OF EMC TEST
EN 61000-4-2	Electrostatic discharges immunity
EN 61000-4-3	Rf radiated immunity
EN 61000-4-4	Immunity to fast transients (burst)
EN 61000-4-5	Immunity to high energy transients (surge)
EN 61000-4-6	Conducted immunity
EN 61000-4-8	Power frequency magnetic field immunity
EN 61000-4-11	Immunity to voltage dips and variations

## 5. Classification Of Industrial Environments In Accordance With The EMC Level

### 5.1 General

Electromagnetic interference may originate inside or outside a device, machine or installation.

The interference of internal origin mainly causes electromagnetic emission problems, while those of external origin involve immunity problems. RFI (EMC) filters must be capable to adequately reduce both internal and external origin disturbances in order to solve the entire electromagnetic compatibility problem on the device, machine or installation.

### 5.2 EMC environment classifications

In order to determine the most adequate RFI (EMC) filter relevant to a specific application, environments are classified in accordance with the EMC interference levels and are as follow:

- Normal (low EMC interference levels)
- Severe (medium EMC interference levels)
- Very severe (high EMC interference levels)

Emission and immunity tests (See Clause 4.2) verify that a device, machine or installation is adequate for a specific EMC environment.

## 6. Enerdoor RFI (EMC) Filters In Accordance With EMC Environments

### 6.1 Residential, commercial and light industrial environment

Enerdoor filters used for:

- Single phase circuits: FIN21, FIN26, FIN27, FIN 40, FIN50
- Three phase circuits: FIN538, FIN538S, FIN538S1, FIN1200, FIN1700, FIN1700E, FIN1700G, FIN1700EG, FIN3755 double function filters

### 6.2 Industrial environments (Severe environment)

Enerdoor filters used for:

- Single phase circuits: FIN27, FIN 35, FIN40, FIN50
- Three phase circuits: FIN538, FIN538S, FIN538S1, FIN1200 (o HV\*), FIN1500 (o HV\*), FIN1600, FIN1700, FIN1700E, FIN1700EG, FIN1900, FIN1900E, FIN1900G, FIN1900EG, FIN1900S, FIN3755, FIN1240, FIN1740, FIN1740ESM, FIN1940 double function filters

(\*) The FIN1200 and FIN1500.HV filters offer the same attenuation characteristics as the FIN1200 and FIN1500 but have nominal voltage of 600V – 50Hz instead of 480V – 50Hz.

### 6.3 Industrial environment (Very severe environment)

Enerdoor filters used for:

- Single phase circuits: FIN27, FIN35, FIN40, FIN50
- Three phase circuits: FIN538, FIN538S, FIN538S1, FIN539S, FIN1200 (o HV\*), FIN1500 (o HV\*), FIN1600, FIN1700, FIN1700E, FIN1700EG, FIN1900, FIN1900E, FIN1900G, FIN1900EG, FIN1900S, FIN3755, FIN1240, FIN1740, FIN1740ESM, FIN1940 double function filters; FIN130SP, FIN230SP, FIN730, FIN735, FIN740

### 6.4 Filters for a specific application

The information referenced above is a general suggestion relevant to the application of Enerdoor filters. A more precise match between a device, machine or installation and an RFI filter may be determined only after having carried out the complete series of emission and immunity EMC tests.

## 7. Application Example For Enerdoor Filters And Chokes

In the schematic diagram Figure 11 the choice of the better filter(s) for the specific application may vary using the below criteria.

### 7.1 Filter parameters

a) The power reference of the filter:

$$P = \sqrt{3} V \cdot I \cos \varphi$$

- P** Is the total power of device and motor of the considered system
- V** Is the phase to phase nominal voltage of the installation (for example 400V-50 Hz)
- cos φ** Is the average power factor

b) The nominal current (I) of the filter derives from the previous formula, as follows:

$$I = \frac{P}{\sqrt{3} \cdot V \cdot \cos \varphi}$$

### 7.2 Calculation example (See Figure 11)

What is the best Enerdoor filter for an installation with total power P of 85 kW and phase to phase voltage of 400 Volts?

a) It is assumed the power factor cos φ value is 0.7

Knowing the power **P**, the voltage **V**, and the **cos φ**, the current value is calculated as follows:

$$I = \frac{P}{\sqrt{3} \cdot V \cdot \cos \varphi} = \frac{85.000}{\sqrt{3} \cdot 400 \cdot 0,7} \approx 175 \text{ A}$$

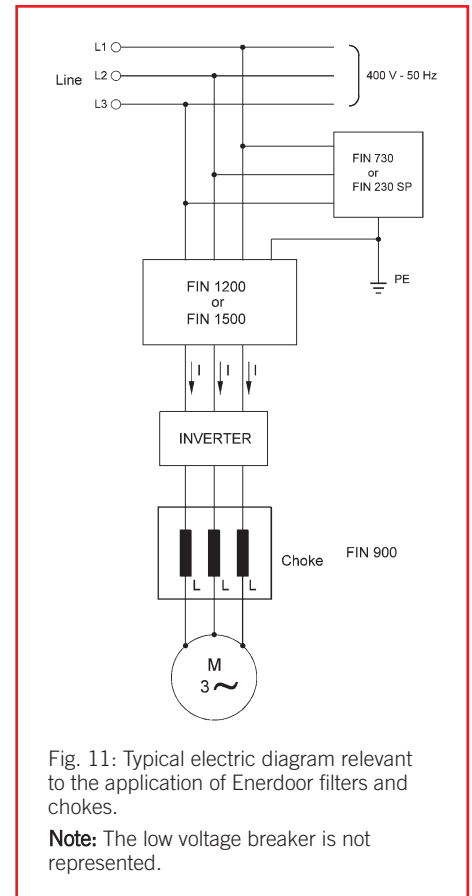
Therefore the best Enerdoor filter for this specific application is one with the nominal current of 200A.

In accordance with the EMC environment (typically severe or very severe), the double function filter, and eventually with one single function parallel filter, is recommended.

b) The choke installed between the inverter and the motor shall have a nominal current higher than that calculated for the filter. This is due to the following effects:

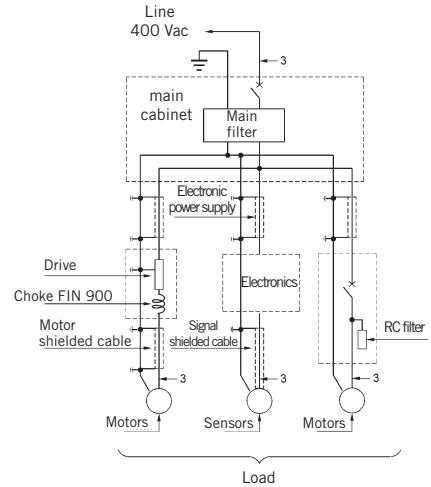
- The working frequency PWM of the inverter is included between 5 and 20 kHz. This causes an augmentation of choke loss and consequently increases temperature.
- During the motor acceleration and deceleration the output current of the inverter may double its nominal current for about one minute.

Practical experience suggests using a choke about 50% larger compared to the corresponding RFI filter nominal current. Therefore, for this application a Enerdoor choke with nominal current equal to 280A is recommended.



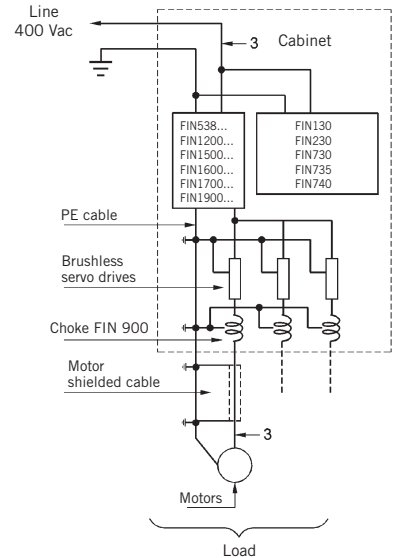
**Example of a filter application on a system with one master cubicle and several auxiliary cubicles**

In this case a single mains filter is installed on the master cubicle only. Note: Power cables leaving a filtered cubicle are always screened with the screen earthed at both ends. Screened signal cables, however, have screens earthed at the electronic board end only.



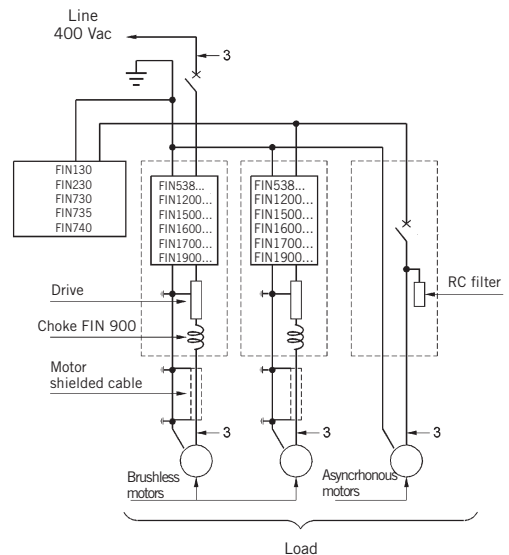
**Example of filter application with brushless drives**

Note: Presence of the mains filter in series with the power supply at the panel input; cell in parallel with the filter on the mains side; chokes on the drive output; screened motor cable with the cable screen connected to earth at both ends (if possible with the earth conductor external to the screen).



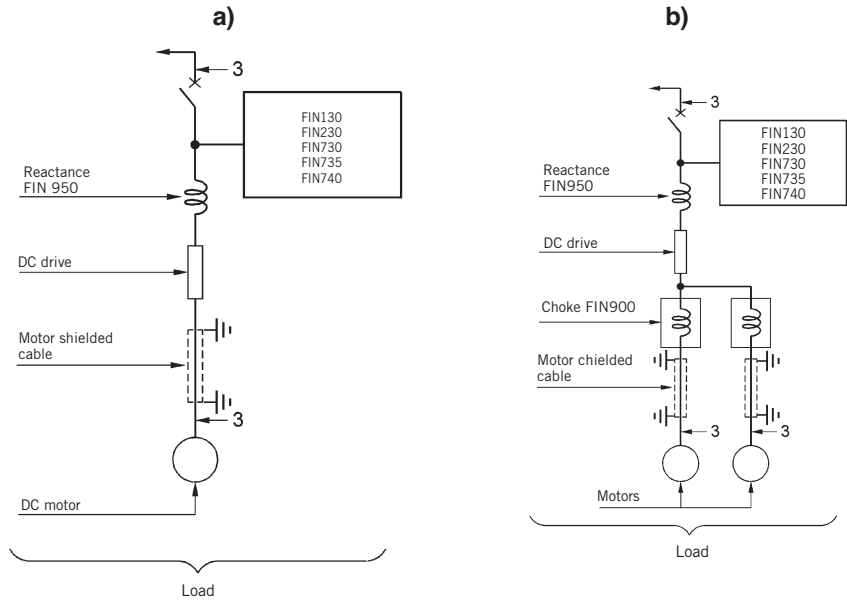
**Example of filter application in a plant using more cubicles**

A single cell covers the entire plant. Each cabinet is equipped with its own filter. The filter may be omitted on panels which do not contain components generating high disturbance levels (such as asynchronous motors). Note: The RC filter on the asynchronous motor remote control breaker is necessary to eliminate the disturbance on the motor cable generated by contact opening.

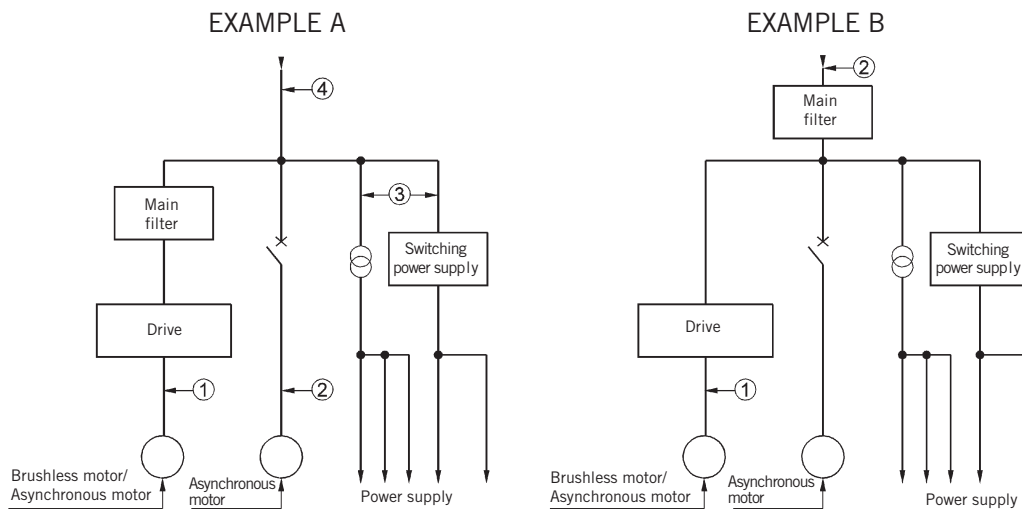


**Reactance application example:**

- a) with one generic driver system
- b) with one SCR driver system which pilots two motors


**Fig. 1**

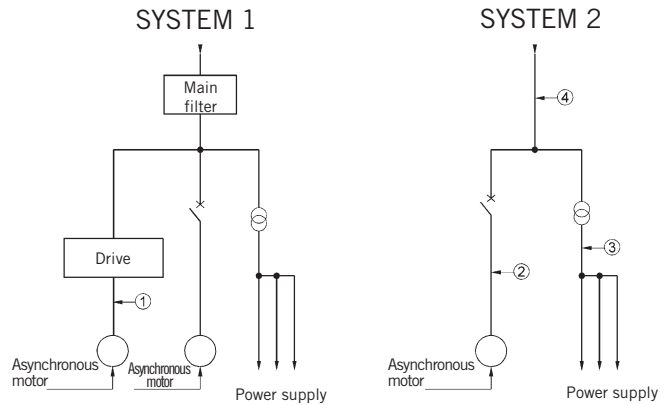
In **Example A** the application of the filter feeding only the driver/ inverter is technically correct. However, there exists a risk that inside the cableform cable **1** may run parallel to and nearby cable **2** and **3**. In this case, cable **1** becomes coupled to cable **2** and **3**, inducing in the latter disturbances which are transmitted to the mains network and reduces the effectiveness of the filter. It is therefore better to use the solution shown in **Example B**. The only precaution needed is to avoid the close and parallel run of cables **1** and **2**, which would induce in the latter the phenomenon previously explained.





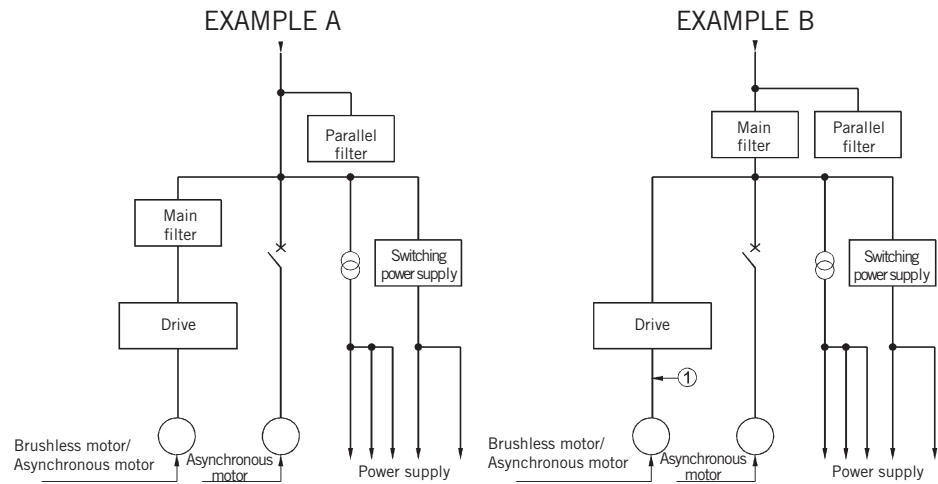
**Figure 2**

In this example the application of the filter is correct. **System 2** which does not incorporate disturbing components is not filtered. However, for the reason stated in connection with **Figure 1**, it is necessary to avoid that outside the system cable 1 runs parallel and close to cables 2, 3 and 4. The coupling would induce disturbance in the latter which, transmitted to the mains network, would reduce the filters effectiveness.



**Figure 3**

In **Example A** in which the mains filter filters a part of the machine only, the cell filter must be connected immediately after the main breaker of the panel and as close as possible to the main grounding collector. In **Example B** the cell filter is connected in parallel to the input of the mains filter. In both cases the cables connecting the cell filter must be as short as possible.



The present General Application Instructions are intended as a general guide for the correct use of interference suppressing filters and chokes under safe conditions.

**F**ilters must be installed, protected and used correctly in order to avoid dangers. Filters must be employed satisfying the conditions of use for which they were designed and guaranteed. Filters must not be exposed to chemical substance damage, unless specifically designed to withstand such substances. Examples of damaging substances are as follow but not limited to: solvents, oils, grease, base or acid solutions, and chemical products. Filters must be adequately protected against the risk of mechanical damage both during installation and under normal working conditions. Filters must not be installed in places subject to rainfall or in contact with water, unless expressly declared to be suitable for withstanding such conditions. Particular attention should be paid to not exposing filters to polluted atmospheres or harmful substances. Filters are designed for use in closed spaces, usually inside electrical cubicles. They may be used outside stated enclosures but only when the necessary protection is supplied.

## **GENERAL INSTALLATION REQUIREMENTS**

In the absence of specific installation instructions, the following rules are to be applied: Connections must scrupulously follow the technical information and must be carried out using suitable tools / fixtures. Metallic containers must be suitably grounded. Filters must not be installed in contact with, or close to, hot surfaces. If employed in such conditions they must be suitably prepared, allowing a 10% degrading for each 20°C, up to a maximum of 30% at 100°C. The Enerdoor Service Center must be contacted if such a non-standard application is used. Filters must be adequately supported and must not be damaged by mechanical supporting devices. The contact terminals of filters must have suitable clamps at the cable-to-filter contact terminals in order to ensure terminals will not become disconnected as a result of vibrations. Clamping must be precise and periodically inspected. When filters are installed on mobile structures they must be placed in protective housing which guarantee the mechanical and electrical protection of the filter connecting terminals. If filters and coils are connected using screened cables, the length of the unscreened portion of the cable must be kept to the minimum. Filters and coils must not be subjected to the following mechanical stresses: pulling, twisting, compression, squashing and scraping.

## **GENERAL USE REQUIREMENTS**

As for the limiting conditions of a filters use: the nominal voltage, current capacity, working temperature and thermal effect references must be made to defined technical specifications. Current and voltage specifications assume an ambient temperature of 40°C. Characteristics quoted in product specifications must always be consulted and it is recommended that stated specifications be scrupulously respected particularly concerning specified parameters.

## **PERIODIC CHECKS BY THE PURCHASERS**

Filters must be periodically examined. Examination is required whenever there is a fear there might be damage by electrical stress (overvoltage, overload) or mechanical stress (squashing, twisting, scraping, etc.). If a filter shows visible changes in appearance or signs of damage or wear, it must be repaired by skilled and qualified personnel using suitable facilities, or it must be replaced. Filters mounted on mobile or portable structures should be examined after each spell of duty. A period of 2 years between routine inspections is suggested.

## **STORAGE CONDITIONS**

All filters, not specifically designed for external use, must be stocked in closed dry storage space.

**SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

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