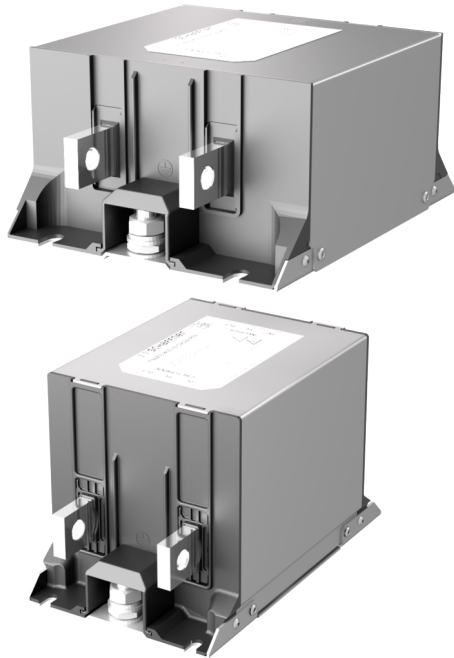
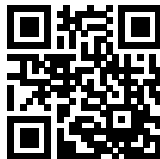


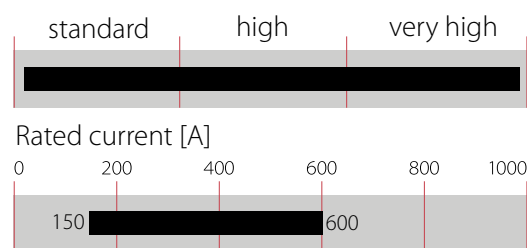
DC-Busbar EMC/RFI Filter for EV charging



- Designed for usage in EV charging applications
- Ultra-compact filter
- Multiple performance options
- Design acc. to EV charging safety standards



Performance indicators



Technical Specifications

Maximum continuous operating voltage	500 VDC (FN223X) 1000 VDC (FN222X, FN224X)
Rated currents	250 to 2300 A @ 50°C
Overload capability	4x rated current at switch on, max. 8 sec 1.5x rated current for 1 minute, once per hour
High potential test voltage	P -> E 4800 VDC for 2 sec P -> P 3600 VDC for 2 sec
Overvoltage category	III acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Surge withstand	2kV (P-P) / 4kV (3P - E) acc. to IEC 6100-4-5
Temperature range (operation and storage)	-40°C to +100°C
Climatic category	40/100/21 acc. to IEC 60068-1
Protection category	IP 00
Flammability corresponding to	UL 94V-0
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939, EN 60721-3, EN 62109
MTBF (Mil-HB-217F)	>300,000 h @ 50°C/500V

Approvals & Compliances



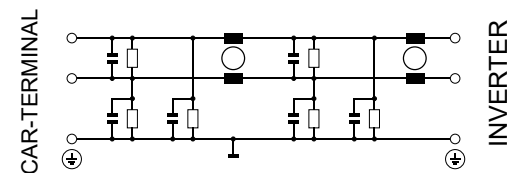
Features and Benefits

- FN222X, FN223X and FN224X series of filters provides state-of-the-art EMI attenuation with a choice of three performance levels
- The filters are built to fit perfectly to high power EV charging applications
- The shape allows a convenient and space-saving installation
- Fulfills the requirements in IEC/EN 61851-23 Electric vehicle conductive charging system
- Fulfills the requirements in UL 2202 Electric Vehicle (EV) Charging System Equipment
- FN224X offers voltage and performance ratings of FN222X on a smaller footprint

Typical Applications

- High Power EV DC charging beyond HPC350 (500 A @ 920 V)
- Two voltage levels 500 VDC and 1000 VDC
- Compatible to CHAdeMO and CCS

Typical electrical schematic



Filter Selection Table

Filter	Rated current @55°C [A]	Capacitance*		total equiv. capacitance to PE [nF]	Resistance*		Typical power dissipation @25°C/DC [W]	Weight approx. [kg]
		CY1	[nF] CY2		RX	[MOhm] RY		
1000 VDC - compact housing style								
High performance:								
FN2220-150-99-C2222-R99	150	330	330	990	10	10	6	3
FN2220-300-99-C2222-R99	300	330	330	990	10	10	14	3
FN2220-450-99-C2222-R99	450	330	330	990	10	10	14	3
FN2220-600-99-C2222-R99	600	330	330	990	10	10	25	3
Very high performance:								
FN2221-600-99-C2222-R99	600	330	330	990	10	10	25	3
500 VDC - compact housing style								
High performance:								
FN2230-150-99-C2022-R99	150	150	330	960	10	10	6	3
FN2230-300-99-C2022-R99	300	150	330	960	10	10	14	3
FN2230-450-99-C2022-R99	450	150	330	960	10	10	14	3
FN2230-600-99-C2022-R99	600	150	330	960	10	10	25	3
Very high performance:								
FN2231-600-99-C2022-R99	600	150	330	960	10	10	25	3
1000 VDC - slim housing style								
High performance:								
FN2240-150-99-C2222-R99	150	330	330	990	10	10	6	3
FN2240-300-99-C2222-R99	300	330	330	990	10	10	14	3
FN2240-450-99-C2222-R99	450	330	330	990	10	10	14	3
FN2240-600-99-C2222-R99	600	330	330	990	10	10	25	3
Very high performance:								
FN2241-600-99-C2222-R99	600	330	330	990	10	10	25	3

* Tolerances apply: Capacitance: ±20%, Resistance: ±10%

Product Selector*

FN22rs-ttt-uu-Cvvzz-Rxy

xy – X-capacitor discharger resistor: x = RX / y = RY (e.g. -R99)
9: 10 Mohm

vvzz – Y-capacitor option: vv = Y-capacitor CY1 / zz = Y-capacitor CY2 (e.g. -C2222)
22: 330 nF
20: 150 nF

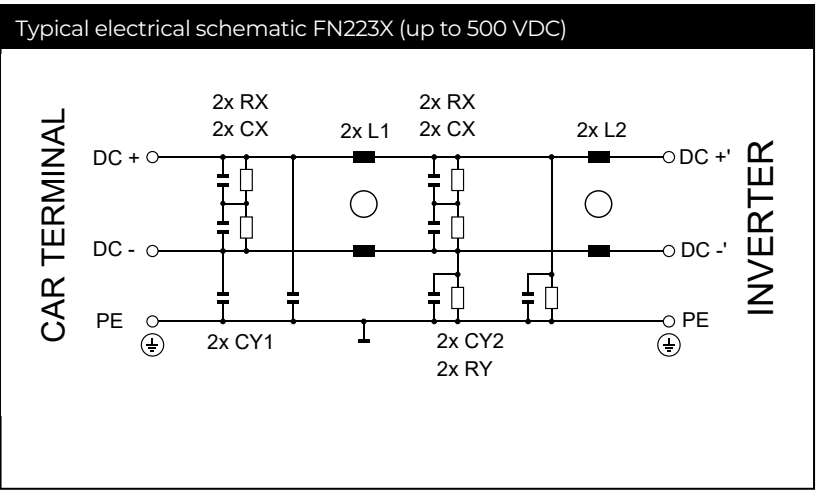
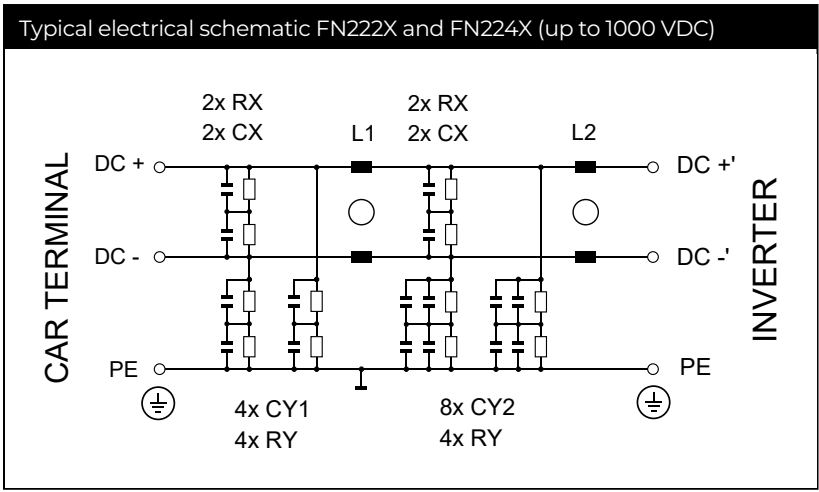
uu – Electrical connection
99: Ni-plated busbar connection

ttt – Rated current
150: 150 A
300: 300 A
450: 450 A
600: 600 A

s – Performance
0: High performance (recommended for most applications)
1: Very high performance
2: Standard performance (on request)

r – Version
2: 1000 V – compact housing style
3: 500 V – compact housing style
4: 1000 V – slim housing style

*Filter can be adapted to specific requirements. Variations of resistor and capacitor values available on request.

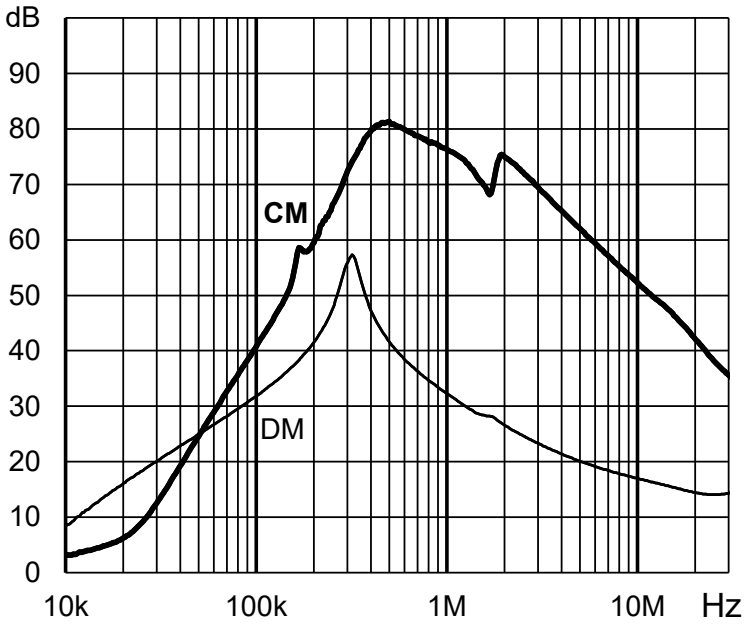


Typical Filter Attenuation

Per CISPR 17: symmetrical 50 Ω /50 Ω -> Differential Mode (DM); asymmetrical 50 Ω /50 Ω -> Common Mode (CM)

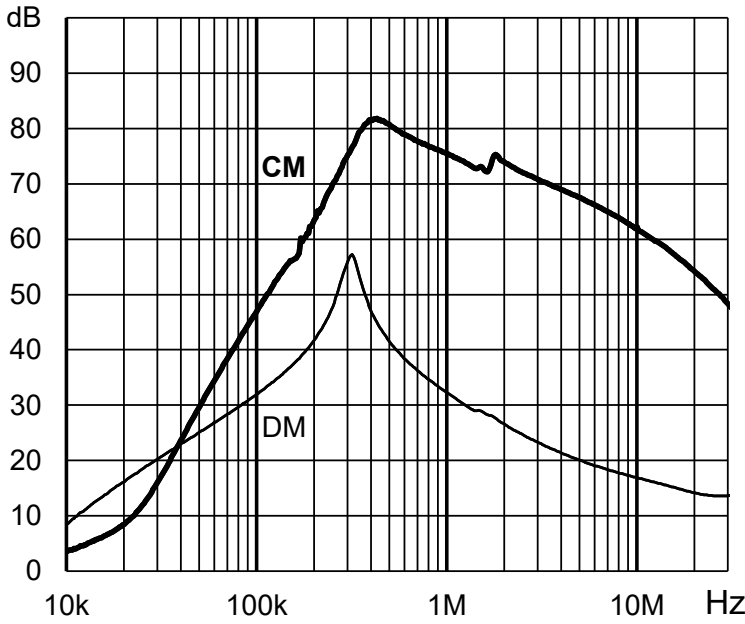
FN2220-ttt-uu-C2222-Rxy and FN2240-ttt-uu-C2222-Rxy

High Performance



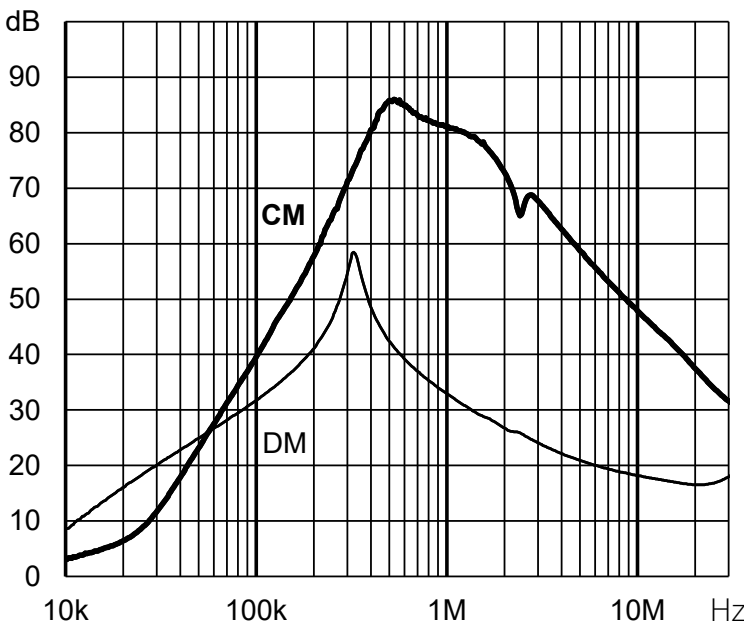
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Very High Performance



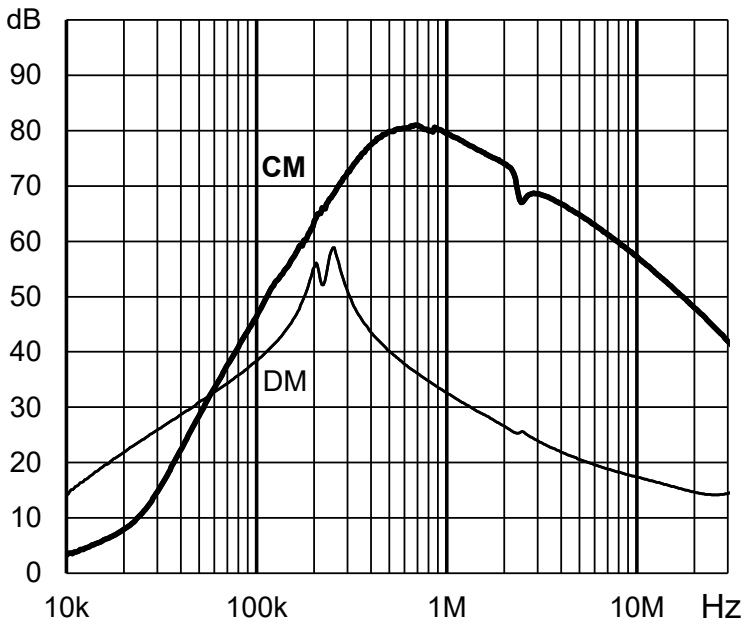
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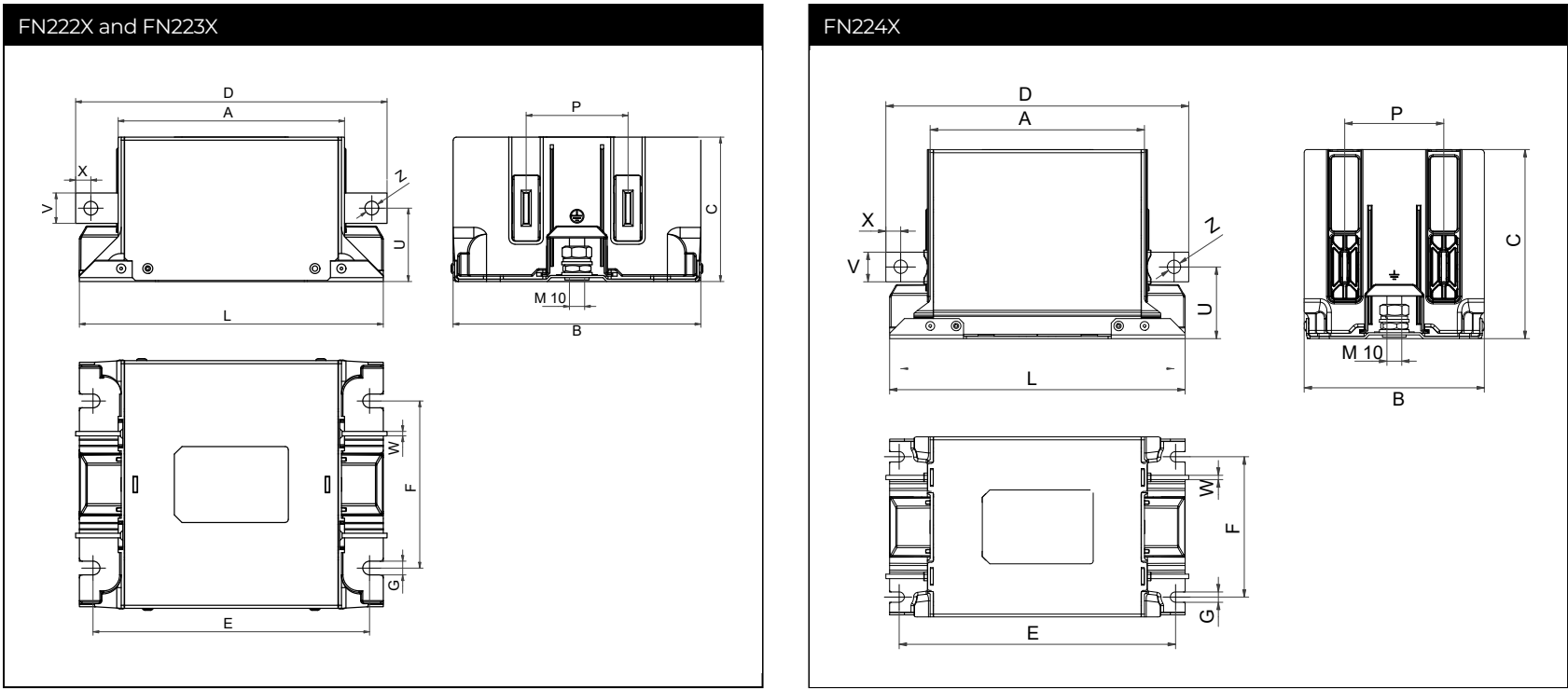
High Performance



FN2231-ttt-uu-C2022-Rxy

Very High Performance





Dimensions*

	FN222X and FN223X				FN224X				Tolerances
	150 A	300 A	450 A	600 A	150 A	300 A	450 A	600 A	
A	145	145	145	145	145	145	145	145	±1
B	163	163	163	163	122	122	122	122	
C	95	95	95	95	128	128	128	128	±1
D	205	210	210	210	205	210	210	210	±2
E	182	182	182	182	187	187	187	187	
F	110	110	110	110	95	95	95	95	
G	9	9	9	9	7	7	7	7	
L	200	200	200	200	200	200	200	200	
P	67	67	67	67	67	67	67	67	±1
U	48	48	48	48	48	48	48	48	±1
V	20	25	25	25	20	25	25	25	
W	3	4	8	8	3	4	8	8	
X	10	12.5	12.5	12.5	10	12.5	12.5	12.5	
Z	9	11	11	11	9	11	11	11	

* All dimensions in mm. For dimensions without stated tolerances: ISO 2768-m/EN 22768-m applies.

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