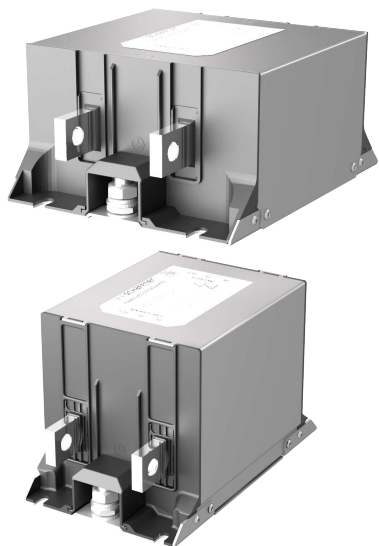


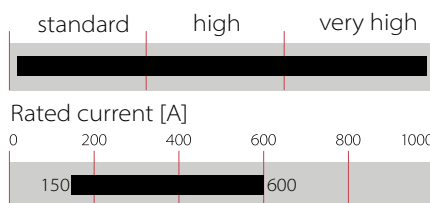
DC-Busbar EMC/RFI Filter for EV charging applications



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



Performance indicators



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

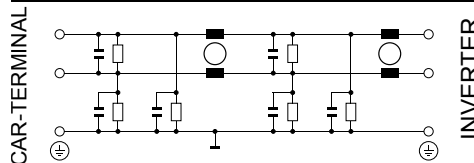
Technical specifications

Maximum continuous operating voltage	1000 VDC (FN222X, FN224X) 500 VDC (FN223X)
Operating frequency	DC
Rated currents	150 to 600 A @ 55 °C
Overload capability	6x rated current for 1 sec, once per hour 1.5x rated current for 1 minute, once per hour
Climatic class	40/100/21 acc. to IEC 60068-1
Temperature range (operation and storage)	-40 °C to +100 °C (with current derating >55 °C)
High potential test voltage	DC+ -> DC- 3600 VDC for 2 s (FN222X, FN224X)* DC+ -> DC- 2000 VDC for 2 s (FN223X)* DC+/DC- -> PE 5000 VDC for 2 s (FN222X, FN224X)* DC+/DC- -> PE 2500 VDC for 2 s (FN223X)*
Pollution degree	PD 3 acc. IEC 60664-1
Overvoltage category	II acc. IEC 60664-1
Surge withstand	DC+/DC- to PE: 4000 V (FN223X) / 6000 V (FN222X, FN224X); DC+ to DC-: 2000 V; acc. to IEC 61000-4-5
Altitude	up to 2000 m no derating applies. Above 2000 m derating acc. to IEC 60664-1 applies
Protection category	IP00 acc. to IEC 60529
Vibration and shock	3M12 (operation) acc. to IEC 60721-3-3
Flammability corresponding to	Plastics: UL 94 V-0
MTBF	> 300,000 hours
Cooling	Natural convection AN
Certified to	UL 60939-3, IEC 60939-3, CSA 22.2 No. 8-13
Output connections	Ni-plated busbars

Typical applications

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

Typical electrical schematic (please refer to page 3 for further details)



*High potential test voltage: Repetition with max. 80% of specified values

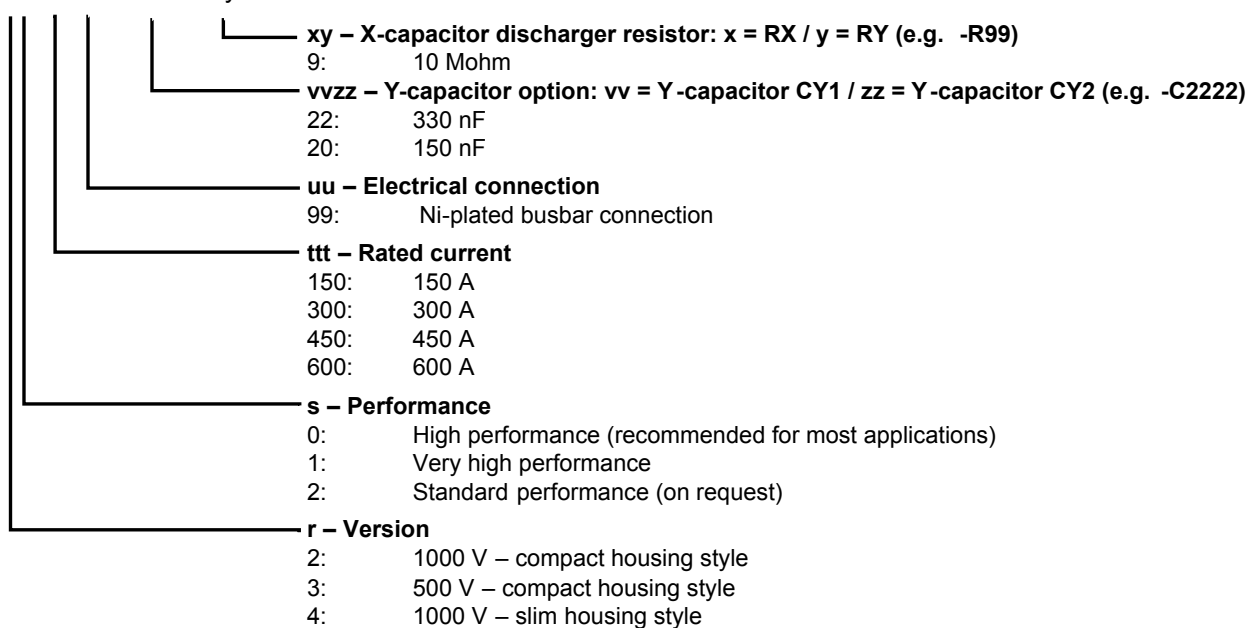
Filter selection table

Filter	Rated current @55°C [A]	Capacitance*		total equiv. capacitance to PE [nF]	Resistance*		Typical power dissipation @25°C/DC [W]	Weight approx. [kg]
		[nF]			[MOhm]			
		CY1	CY2		RX	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

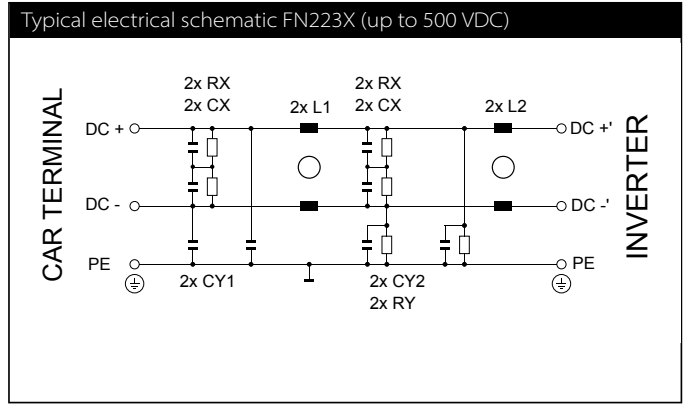
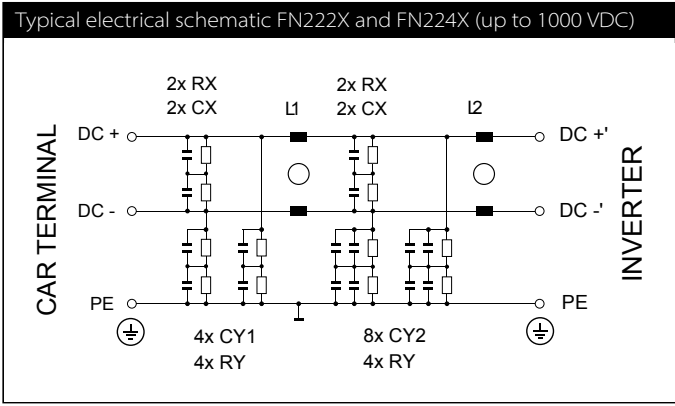
* Tolerances apply: Capacitance: ±20%, Resistance: ±10%

Product selector*

FN22rs-ttt-uu-Cvvzz-Rxy



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

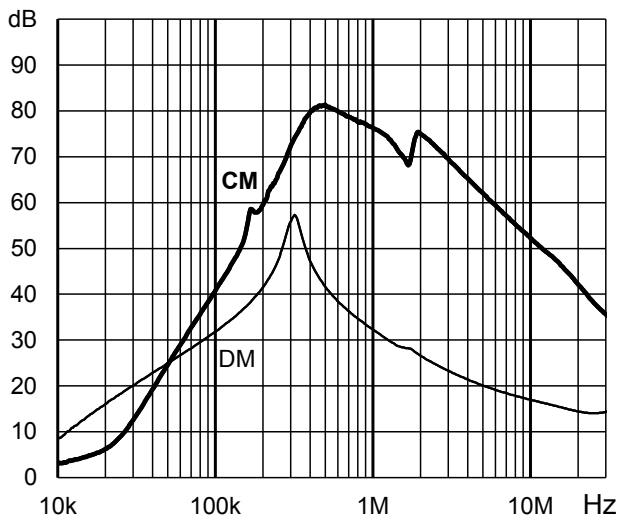


Typical filter attenuation

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

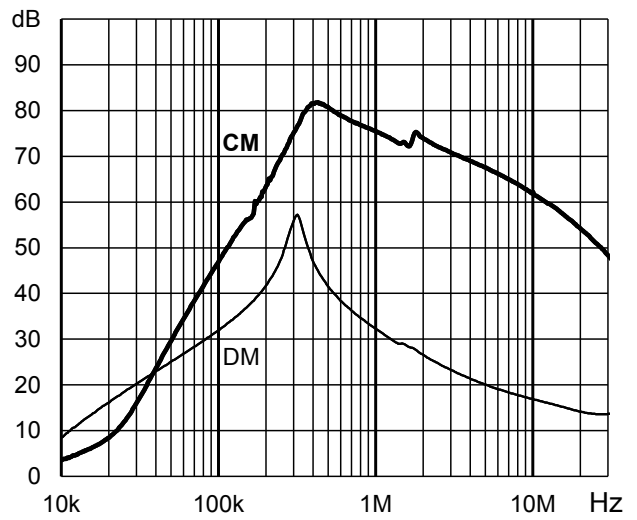
FN2220-ttt-uu-C2222-Rxy and FN2240-ttt-uu-C2222-Rxy

High Performance



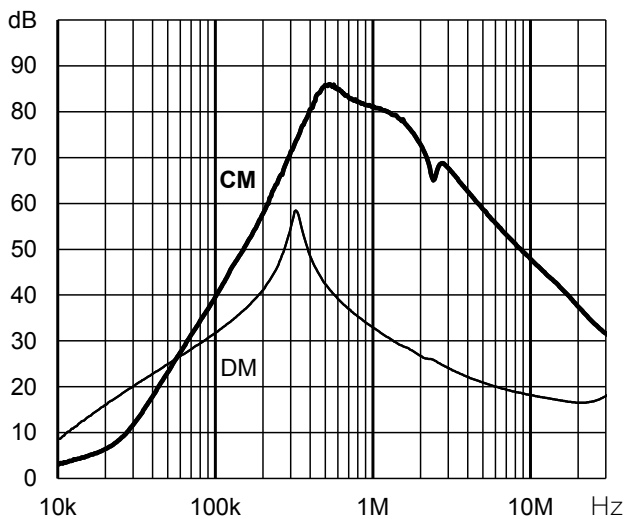
FN2221-ttt-uu-C2222-Rxy and FN2241-ttt-uu-C2222-Rxy

Very High Performance



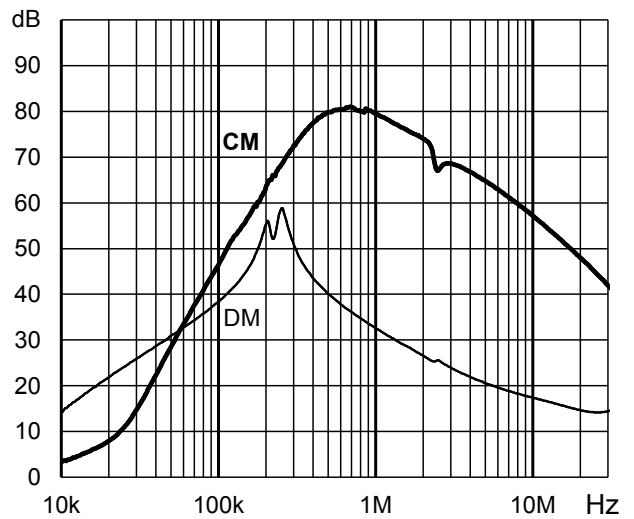
FN2230-ttt-uu-C2022-Rxy

High Performance

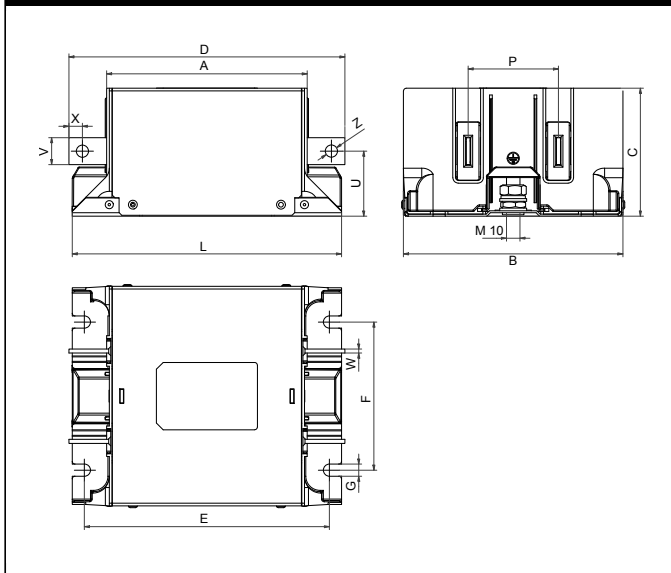


FN2231-ttt-uu-C2022-Rxy

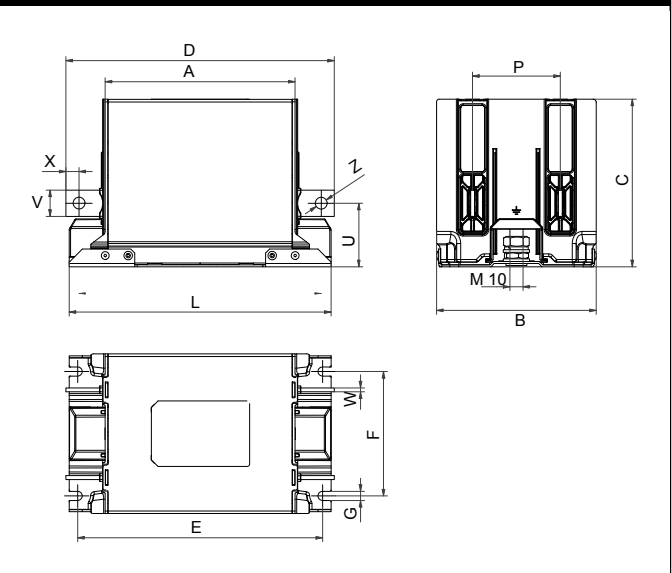
Very High Performance



FN222X and FN223X



FN224X



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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