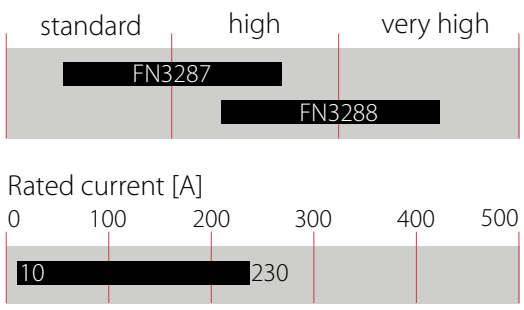
Smallest book-style EMC/RFI Filter for Inverter and Power Drive Systems

- Standard and high performance EMC solution
- Best in class performance at 9kHz and beyond
- Footprint space-saving book-style housing
- Solid safety connector blocks
- High attenuation performance FN3288, standard performance available FN3287
- HV versions for 690 VAC applications, HVIT- and IT versions for IT distribution networks
- SCCR 100 kA

Performance indicators



Technical Specifications

Maximum continuous operating voltage	3x530/305 VAC (FN3288) 3x530 VAC (FN3288IT) 3x760/440 VAC (FN3288HV) 3x760 VAC (FN3288HVIT)
Nominal operating voltage	480 VAC (FN3288, FN3288IT) 690 VAC (FN3288HV, FN3288HVIT)
Rated currents	10 to 230 A 10 to 230 A @ 50°C
Overload capability	6x rated current for 1 sec, once per hour 1.5x rated current for 1 minute, once per hour
Operating frequency	DC to 60 Hz
High potential test voltage	P -> E 2260 VDC for 2 s (FN3288) P -> E 2900 VDC for 2 s (FN3288IT) P -> P 2280 VDC for 2 s (FN3288, FN3288IT) P -> E 2650 VDC for 2 s (FN3288HV) P -> E 3530 VDC for 2 s (FN3288HVIT) P -> P 3270 VDC for 2 s (FN3288HV)
Overvoltage category	III acc. IEC 60664-1
Pollution degree	3 acc. IEC 60664-1
Temperature range (operation and storage)	-40°C to +100°C (with current derating >50°C)
Climatic category	40/100/21 acc. to IEC 60068-1
Protection category	IP 20 acc. to IEC 60529
Flammability corresponding to	UL 94 V-0
Vibration and shock	3M4 (operation) 2M2 (transport) acc. to IEC 60721-3-3 IEC 60721-3-2
Design corresponding to	UL 60939-3, IEC 60939-3
SCCR**	100 kA acc. to UL508 - high fault current
Compliance with insulation requirement	> 1MOhm acc. to IEC 60204-1
MTBF (Mil-HB-217F)	>200,000 h @ 50°C/480 V

** SCCR (High Fault Current acc UL508): 100 kA, with overcurrent protection of J-Type current limiting fuses. Fuse rating shall not exceed 150% of filter current rating.

Approvals & Compliances

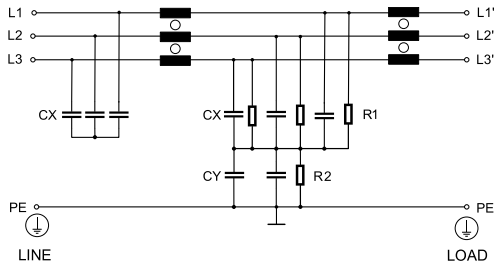
Features and Benefits

- FN3288 series of filters provides state-of-the-art EMI attenuation based on an innovative filter topology. They help to ensure compliance with Class C2 or even C1 limits.
- Differential mode roll off at low frequency, helping to ensure compliance at 9kHz for all applications, including power drive systems
- The slim book-style shape allows a convenient and space-saving installation next to inverters, converters or motor drives.
- The compact FN3288 filter from 10 to 230A are designed for the most diverse applications worldwide, including machinery and machine tools.
- FN3288HV filters up to 230 A are applicable for 690 VAC distribution networks.
- FN 3288IT and FN 3288HVIT filters up to 230 A meet the special requirements for IT distribution networks.
- Low leakage current filter versions help to fulfill tough requirements (e.g. 0.1 mA) in respect of leakage current limitation.

Typical Applications

- Three-phase variable speed drives and power drive systems (PDS)
- Machine tool and machinery equipment
- C1 and C2 class power drive systems, also covering the frequency range belwo 150kHz to 9kHz
- IT power distribution networks (FN3288IT and FN3288 HVIT)
- General energy conversion devices (inverters, converters)
- Process automation equipment
- Three-phase power supplies
- Low-leakage current requirements

Typical electrical schematic



Filter Selection Table

Filter	Buy	Rated current @ 50°C (40°C) [A]	Typical drive Power rating** [kW]	Leakage current*** @ 530 VAC/50 Hz [mA]							Power loss @ 25°C [W]	Terminal Type	Weight [kg]	Frame
Capacitor option *C..				**C35**	**C34**	**C27**	**C26**	**C21**	**C17**	**C13**				
FN3288-10-44-C..-R65		10 (11)	6		5.9		2.5	0.4	0.1		7.1	-44	0.8	A
FN3288-16-44-C..-R65		16 (17)	9	6.0			2.5	0.4	0.1		10.5	-44	1.0	B
FN3288-20-33-C..-R65		20 (22)	12	6.0			2.5	0.4	0.1		10.7	-33	1.2	C
FN3288-25-33-C..-R65		25 (27)	15	6.0			2.5	0.4	0.1		17.8	-33	1.2	C
FN3288-40-33-C..-R65		40 (44)	24	6.0		3.5		0.4	0.1		21.6	-33	1.8	D
FN3288-50-53-C..-R65		50 (55)	29	6.6			2.6	0.4	0.1		32.3	-53	2.5	E
FN3288-63-53-C..-R65		63 (69)	38	6.6			2.6	0.4	0.1		39.3	-53	2.7	E
FN3288-80-34-C..-R65		80 (88)	47	7.1			2.7	0.4	0.1		28.8	-34	4.3	F
FN3288-100-35-C..-R65		100 (110)	59	7.1			2.7	0.4	0.1		36.0	-35	5.1	G
FN3288-125-35-C..-R65		125 (137)	74	7.1			2.7	0.4	0.1		42.2	-35	5.0	G
FN3288-160-40-C..-R65		160 (175)	94	7.1			2.7	0.4	0.1		46.1	-40	6.6	H
FN3288-230-40-C..-R65		230 (230)	135	7.5			2.7	0.4	0.1		47.6	-40	9.3	V
HP for IT power networks**:**														
FN3288IT-10-44-C..-R60		10 (11)	6		5.9						6.2	-44	1.1	I
FN3288IT-16-44-C..-R60		16 (17)	9		5.9						9.7	-44	1.3	J
FN3288IT-20-33-C..-R60		20 (22)	12		5.9						13.2	-33	1.6	K
FN3288IT-25-33-C..-R60		25 (27)	15		5.9						15.6	-33	1.6	K
FN3288IT-40-33-C..-R60		40 (44)	24		5.9						18.7	-33	2.8	L
FN3288IT-50-53-C..-R60		50 (55)	29		6.5						27.0	-53	2.8	M
FN3288IT-63-53-C..-R60		63 (69)	37		6.5						34.5	-53	2.9	M
FN3288IT-80-34-C..-R60		80 (88)	47		7.0						28.8	-34	4.6	N
FN3288IT-100-35-C..-R60		100 (110)	59		7.0						33.0	-35	5.4	O
FN3288IT-125-35-C..-R60		125 (137)	74		7.0						42.2	-35	5.3	O
FN3288IT-160-40-C..-R60		160 (175)	94		7.0						46.1	-40	6.9	P
FN3288IT-230-40-C..-R60		230 (230)	135		7.0					0.02	47.6	-40	9.3	V

* Replace C.. with corresponding listed C35, C34, C27, C26, C21, C17 or C13.
** Typical power rating at 400 VAC for FN3288 with cos phi=0.85.The exact value depends upon the efficiency of the drive, the motor and the entire application.
*** Standardized calculated leakage current acc. IEC 60939 under normal operating conditions (FN3288 and FN3288 IT at 530 VAC).
****These filters may be operated in IT system as long as the operation conditions and possible short circuit/fault (earth connection of one conductor) occurs between the supply (line side) and the filter. The filters are not designed for short circuit/faults occurring between converter and motor.

Filter Selection Table

Filter	Buy	Rated current @ 50°C (40°C) [A]	Typical drive Power rating** [kW]	Leakage current*** @ 760 VAC/50 Hz [mA]									Power loss @ 25°C [W]	Terminal Type	Weight [kg]	Frame
Capacitor option * C..				C44	C43	C42	C36	C34	C26	C25	C24	C17				
High voltage versions:																
FN3288HV-10-44-C..-R65		10 (11)	10					8.4			1.8		7.0	-44	1.2	I
FN3288HV-16-44-C..-R65		16 (17)	16					8.4		2.5			10.8	-44	1.5	J
FN3288HV-20-33-C..-R65		20 (22)	20				10.9			2.5			12.6	-33	1.8	K
FN3288HV-25-33-C..-R65		25 (27)	25				10.9			2.5			14.6	-33	1.9	K
FN3288HV-40-33-C..-R65		40 (44)	41				12.4			2.6			19.2	-33	2.9	L
FN3288HV-50-53-C..-R65		50 (55)	51				12.4			2.6			29.3	-53	3.3	M
FN3288HV-63-53-C..-R65		63 (69)	64				12.4			2.6			38.1	-53	3.5	M
FN3288HV-80-34-C..-R65		80 (88)	81				12.4			2.6			28.8	-34	4.9	N
FN3288HV-100-35-C..-R65		100 (110)	101				12.4			2.6			33.0	-35	5.8	O
FN3288HV-125-35-C..-R65		125 (137)	127				12.4			2.6			42.0	-35	5.9	O
FN3288HV-160-40-C..-R65		160 (175)	162				12.4			2.6			46.1	-40	7.2	P
FN3288HV-230-40-C..-R65		230 (230)	233				12.4			2.6		0.1	47.6	-40	9.3	V
HV for IT power networks**:**																
FN3288HVIT-10-44-C..-R60		10 (11)	10			4.6			3.6				7.0	-44	1.2	I
FN3288HVIT-16-44-C..-R60		16 (17)	16		6.8				3.7				10.8	-44	1.5	J
FN3288HVIT-20-33-C..-R60		20 (22)	20		6.8				3.7				12.6	-33	1.8	K
FN3288HVIT-25-33-C..-R60		25 (27)	25		6.8				3.7				14.6	-33	1.9	K
FN3288HVIT-40-33-C..-R60		40 (44)	41		6.8				3.7				19.2	-33	2.9	L
FN3288HVIT-50-53-C..-R60		50 (55)	51		6.8				3.7				29.3	-53	3.3	M
FN3288HVIT-63-53-C..-R60		63 (69)	64		6.8				3.7				38.1	-53	3.5	M
FN3288HVIT-80-34-C..-R60		80 (88)	81		6.8				3.7				28.8	-34	4.9	N
FN3288HVIT-100-35-C..-R60		100 (110)	101		6.8				3.7				33.0	-35	5.8	O
FN3288HVIT-125-35-C..-R60		125 (137)	127	5.9					3.7				42.2	-35	5.9	O
FN3288HVIT-160-40-C..-R60		160 (175)	162		6.8				3.7				46.1	-40	7.2	P
FN3288HVIT-230-40-C..-R60		230 (230)	233					12.4	3.7				47.1	-40	9.3	V

* Replace C.. with corresponding listed C44, C43, C42, C36, C34, C26, C25, C24 or C17.
** Typical power rating (400 VAC for FN3288 / 690 VAC for FN3288 HV and FN3288 HVIT) with cos phi=0.85. The exact value depends upon the efficiency of the drive, the motor and the entire application.
*** Standardized calculated leakage current acc. IEC 60939 under normal operating conditions (FN3288 HV and FN3288 HVIT at 760 VAC).
**** These filters may be operated in IT system as long as the operation conditions and possible short circuit/fault (earth connection of one conductor) occurs between the supply (line side) and the filter. The filters are not designed for short circuit/faults occurring between converter and motor.

Distribution Inventory

Up-to-date inventory levels for global distributors is available at

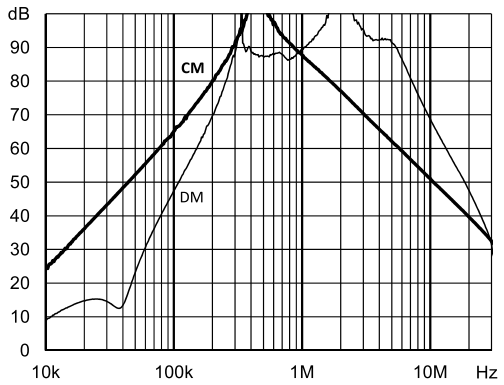
https://products.schaffner.com/stock

Typical Filter Attenuation – FN3288 High Performance

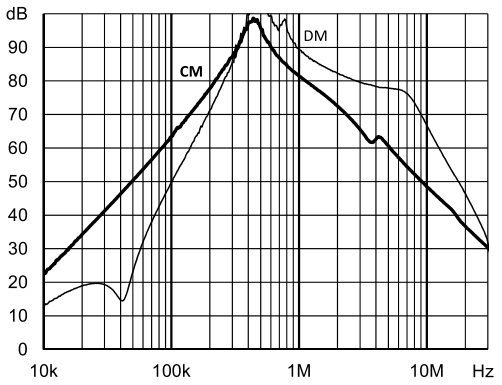
(FN3288 high performance version with standard leakage current)

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

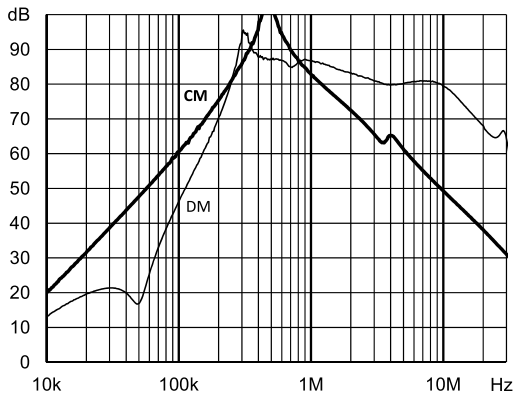
FN3288-10-44-C34-R65



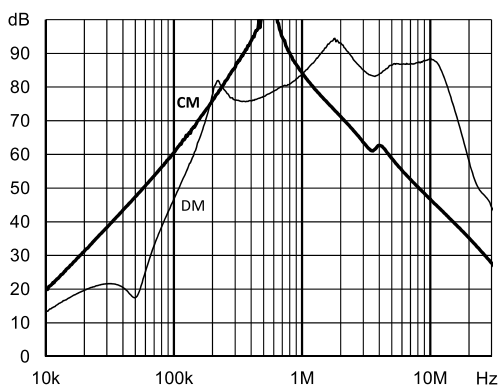
FN3288-16-44-C35-R65



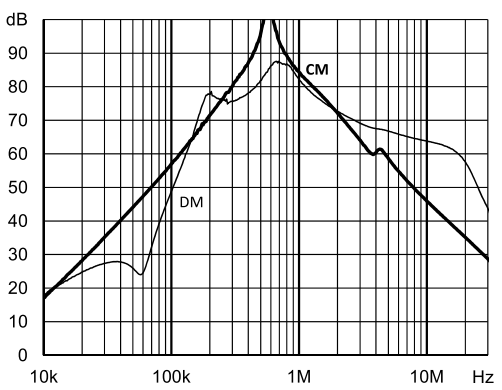
FN3288-20-33-C35-R65



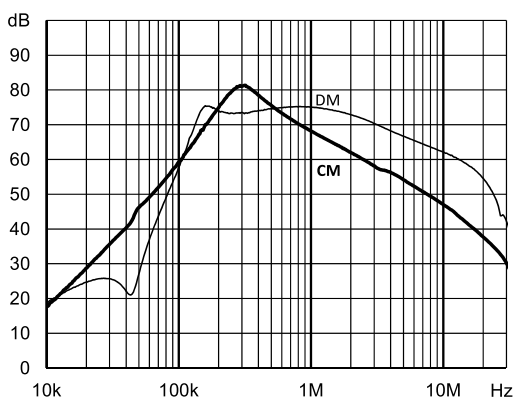
FN3288-25-33-C35-R65



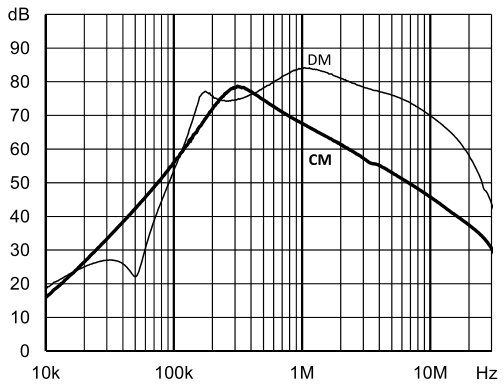
FN3288-40-33-C35-R65



FN3288-50-53-C35-R65



FN3288-63-53-C35-R65



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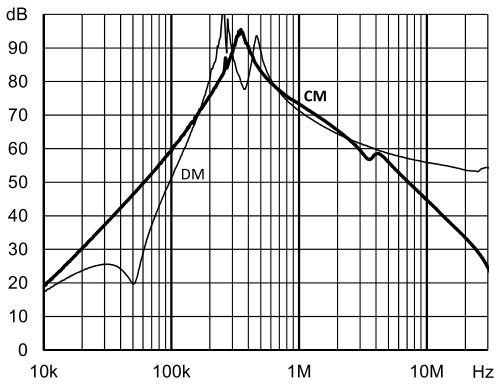

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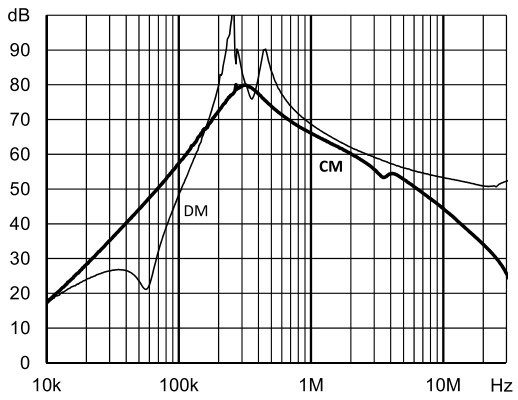

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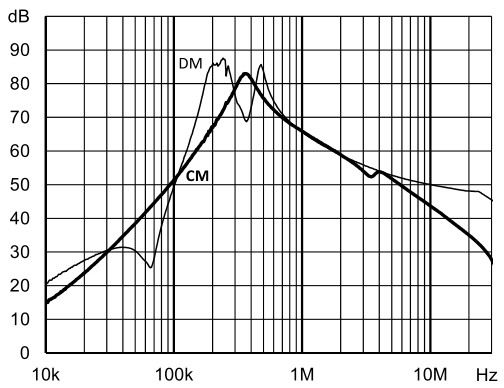
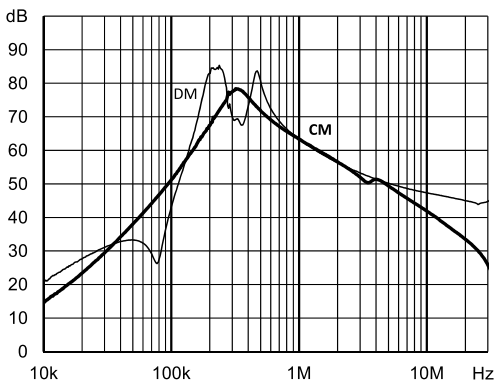
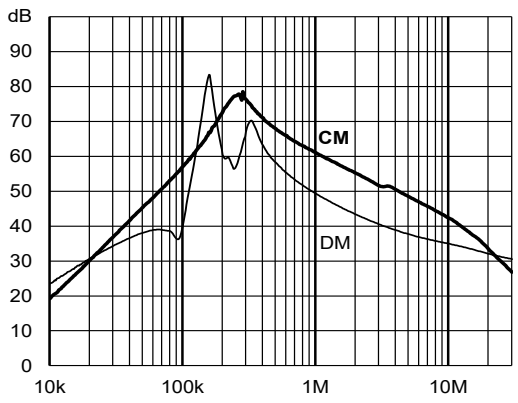


FN3288-160-40-C35-R65



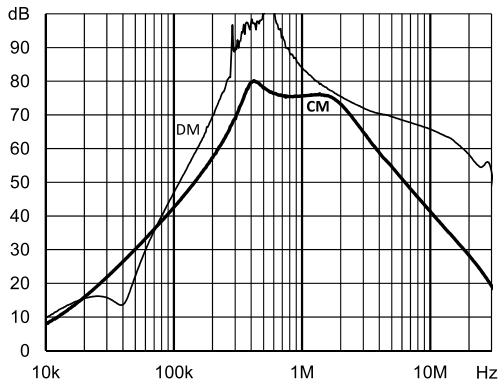
FN3288-230-40-C35-R65



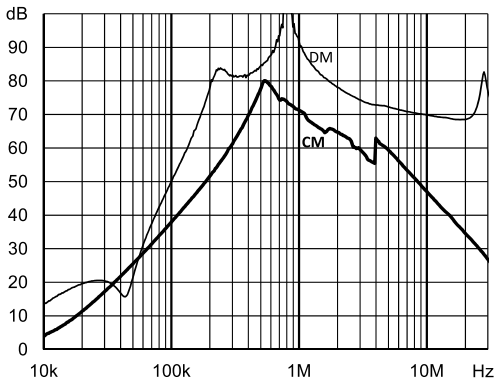
Typical Filter Attenuation – FN3288 Low Leakage Current Version

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

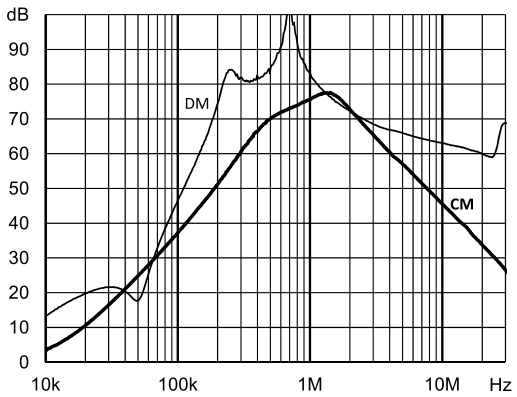
FN3288-10-44-C21-R65



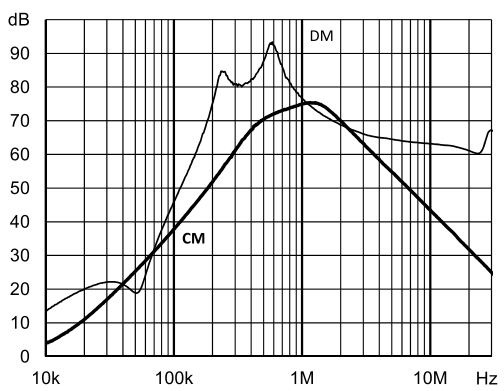
FN3288-16-44-C21-R65



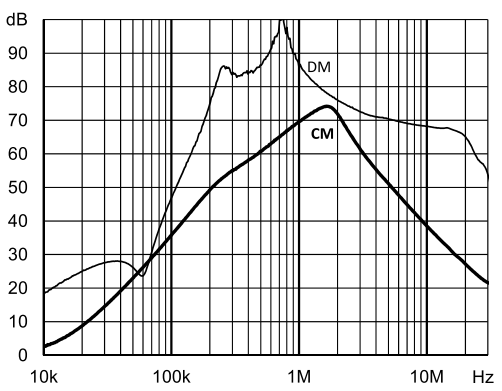
FN3288-20-33-C21-R65



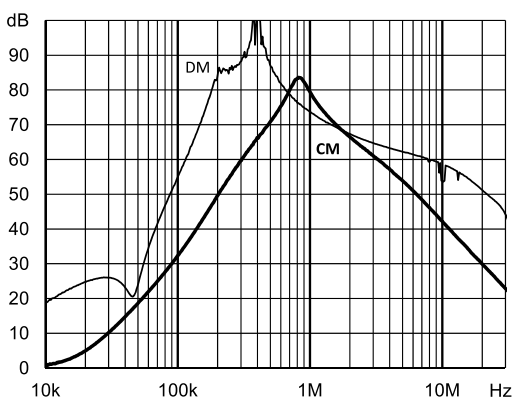
FN3288-25-33-C21-R65



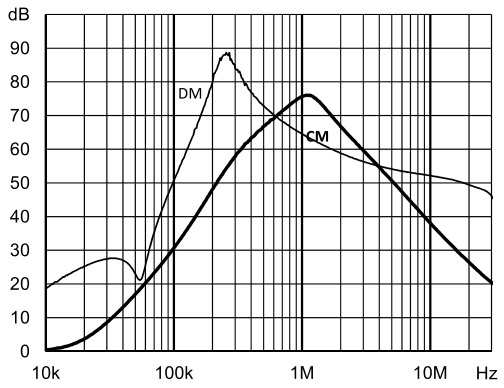
FN3288-40-33-C21-R65



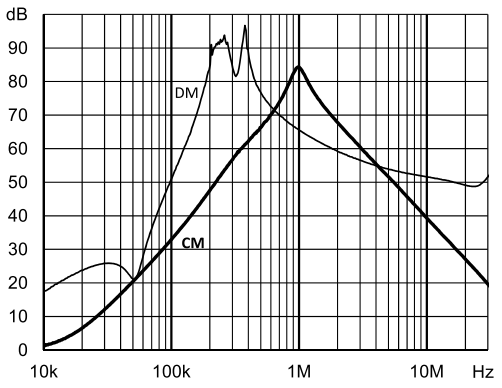
FN3288-50-53-C21-R65



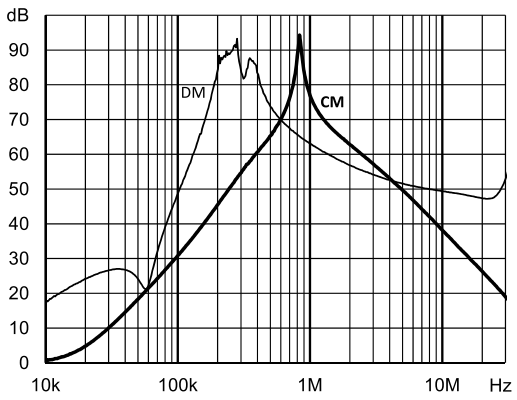
FN3288-63-53-C21-R65



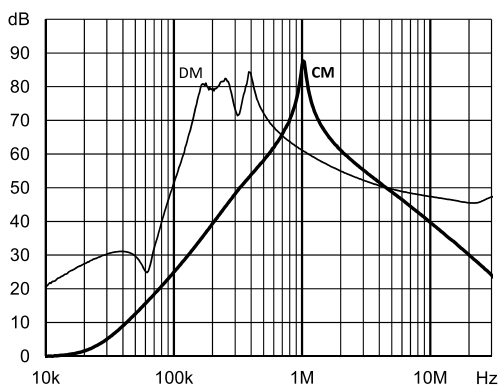
FN3288-80-34-C21-R65



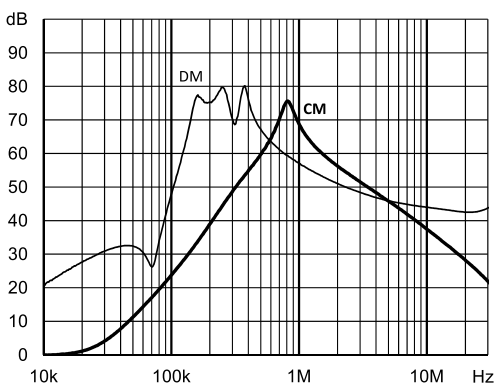
FN3288-100-35-C21-R65



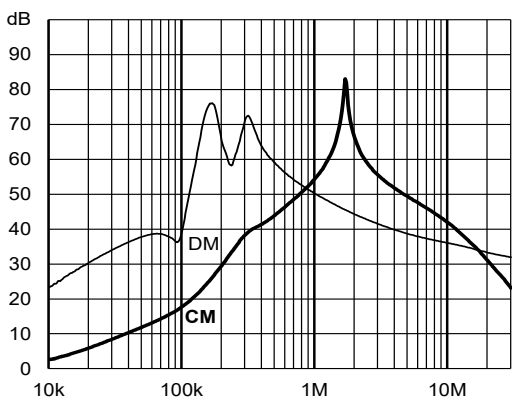
FN3288-125-35-C21-R65



FN3288-160-40-C21-R65

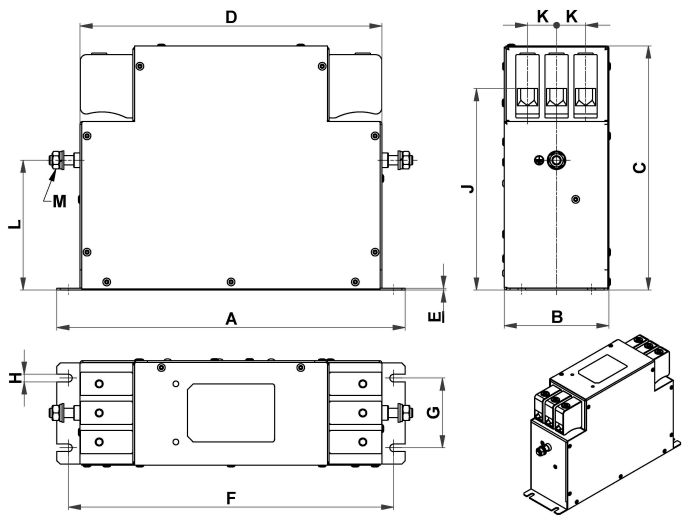


FN3288-230-40-C17-R65



Mechanical Data

Frame A to U



Dimensions*

Frame	A	B	C	D	E	F	G	H	J+/-2	K	L+/-1	M**
A	185	40	120	157	0.8	175	20	4.5	102	11	76	M5
B	195	45	140	164	0.8	180	25	5.4	122	11	93	M5
C	210	45	145	174	0.8	195	25	5.4	126	13	96	M5
D	235	50	168	207	1.0	220	30	5.4	149	13	115	M6
E	255	65	180	226	1.0	240	45	5.4	156	16	120	M6
F	290	80	205	250	1.2	270	50	6.5	172	22	110	M6
G	300	90	210	260	1.5	280	60	6.5	173	25	112	M8
H	310	100	225	270	1.5	290	70	6.5	183	28	110	M10
I	230	50	132	203	0.8	220	30	4.5	114	12.5	88	M5
J	230	55	159	198	0.8	215	35	5.4	141	13	112	M5
K	245	55	167	212	0.8	230	35	5.4	148	13	118	M5
L	265	60	191	237	1.0	250	40	5.4	172	13	135	M6
M	265	70	194	237	1.0	250	50	5.4	170	16	133	M6
N	310	95	220	270	1.2	290	65	6.5	187	22	125	M6
O	320	95	230	280	1.5	300	65	6.5	192	25	127	M8
P	330	100	240	290	1.5	310	70	6.5	198	30	127	M10
Q	180	40	112	153	0.8	170	20	4.5	94	11	68	M5
R	200	45	120	170	0.8	185	25	5.4	102	11	76	M5
S	205	45	132	173	0.8	190	25	5.4	113	13	83	M5
T	215	50	147	185	1.0	200	30	5.4	128	13	95	M6
U	220	65	180	186	1.0	205	45	5.4	156	16	120	M6
V	350	105	240	310	1.5	330	70	6.5	190	30.5	125	M10

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

** Earth screw torque:M5 2.0-2.2 Nm; M6 3.5-4.0 Nm; M8 8.0-9.0 Nm; M10 15-17 Nm

Filter Input/Output Connector Cross Sections

	-44	**-33**	**-53**	**-34**	**-35**	**-40**
Solid wire	0.5-10 mm^2	0.5-16 mm^2	0.5-16 mm^2	6-35 mm^2	10-50 mm^2	25-95 mm^2
Flex wire	0.5-6 mm^2	0.5-10 mm^2	0.5-16 mm^2	6-25 mm^2	16-50 mm^2	25-95 mm^2
Flex wire AWG	AWG 20-8	AWG 22-6	AWG 20-4	AWG 6-2	AWG 6-1/0	AWG 0-4/0
Recommended torque	1.0-1.2 Nm	1.5-1.8 Nm	2.0-2.3 Nm	4.0-4.5 Nm	7.0-8.0 Nm	17-20 Nm

Please visit www.schaffner.com to find more details on filter connectors.

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