

3-phase Filters FN 3268

Low-leakage Current EMC/EMI Filter for Installations with Residual Current Device RCD

SCHAFFNER
energy efficiency and reliability



- Full functionality with RCDs according to IEC 61008 and new VDE 0664-110*
- Compatible with 30mA RCDs up to 30m motor cable for electric shock protection according to IEC 61008
- Compatible with 300mA RCDs up to 100m motor cable for fire protection according to IEC 60364-4-42 (VDE 0100-482)

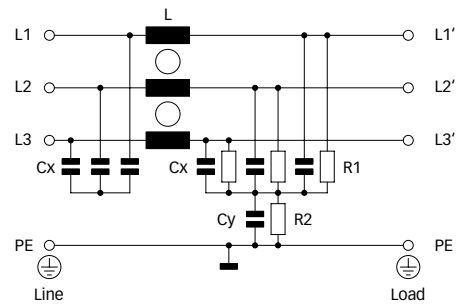
Approvals



Technical specifications

Maximum continuous operating voltage:	3x 520/300VAC
Operating frequency:	dc to 60Hz
Rated currents:	7 to 180A @ 50°C
High potential test voltage:	P → E 2650VDC for 2 sec P → P 2100VDC for 2 sec
Protection category:	IP20
Overload capability:	4x rated current at switch on, 1.5x rated current for 1 minute, once per hour
Temperature range (operation and storage):	-25°C to +100°C (25/100/21)
Flammability corresponding to:	UL 94V-2 or better
Design corresponding to:	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 50°C/400V (Mil-HB-217F):	>300,000 hours

Typical electrical schematic



Features and benefits

- Innovative low-leakage current filter with same smallest dimensions as FN 3258.
- Significant reduction of leakage and ground currents caused by long motor cables.
- Prevents unwanted fault shut-downs from RCDs in machines and process automation equipment.
- Patented filter design avoiding early saturation and ringing effects.
- Excellent attenuation compliant with:
 - C1 limits EN 61800-3 with 50 meter motor cable and 50mA RCD (electric shock protection)**.
 - C2 limits EN 61800-3 with 100 meter motor cable and 500mA RCD (fire protection).


Typical applications

- Three-phase variable speed drives (VSD), servo drives, and inverters
- Machinery and process automation equipment
- Building automation, HVAC equipment, pumps, ventilation, and elevators
- Conveyors, handling and storage systems, and cranes
- Machine tools, wood working machines, and printing machines

* If supply voltage is contaminated with harmonics according to IEC 61000-2-4, class 2, where odd-numbered multiples of three are limited to 30%.

** Filter types 7A up to 42A: C1, 30m, 30mA; 55A: C2, 30m, 30mA; 75A up to 180A: C2, 100m, 300mA

Filter selection table

Filter	Rated current @ 50°C (40°C)	Typical drive power rating*	Leakage current** @ 400VAC/50Hz	Power loss @ 25°C/50Hz	Input/Output connections	Weight
	[A]	[kW]	[mA]	[W]		[kg]
FN 3268-7-44	7 (7.7)	4	4.5	4.5	-44	0.5
FN 3268-16-44	16 (17.5)	7.5	4.7	6.1	-44	0.8
FN 3268-30-33	30 (32.9)	18.5	4.6	13.5	-33	1.2
FN 3268-42-33	42 (46.0)	22	4.6	17.4	-33	1.4
FN 3268-55-34	55 (60.2)	37	4.7	18.1	-34	2.2
FN 3268-75-34	75 (82.2)	45	7.8	25.3	-34	2.9
FN 3268-100-35	100 (109.5)	55	20.5	30.0	-35	4.1
FN 3268-130-35	130 (142.4)	75	30.4	38.0	-35	4.6
FN 3268-180-40	180 (197.1)	110	37.0	48.6	-40	6.0

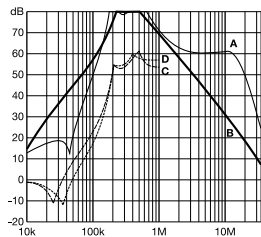
* Calculated at rated current, 440VAC and cos phi = 0.8. The exact value depends upon the efficiency of the drive, the motor and the entire application.

** Maximum leakage under normal operating conditions. Note: if two phases are interrupted, worst case leakage could reach 5.4 times higher levels.

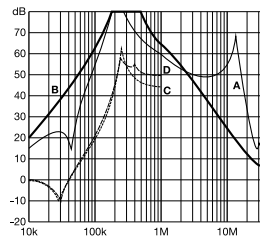
Typical filter attenuation

Per CISPR 17; A = 50Ω/50Ω sym; B = 50Ω/50Ω asym; C = 0.1Ω/100Ω sym; D = 100Ω/0.1Ω sym

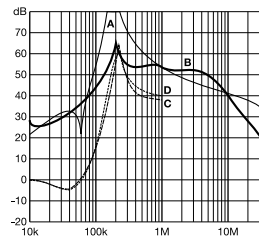
7 to 42A types



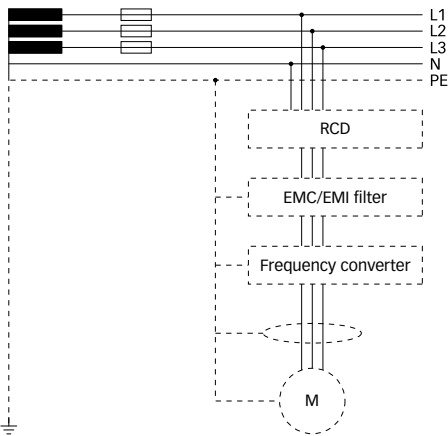
55 to 100A types



130 and 180A types



Installation



Typical installation with RCD, EMC/EMI filter and motor drive system

■ RCD

Please note that for electrical devices with 6-pulse rectifiers at line input, like three-phase motor drives, a RCD type B or B+ is required. RCD with time delay are needed to prevent unwanted fault trip at switch on or voltage spikes. These RCD types B with time delay have often an added letter “S”

or “K”, please ask the supplier for correct type. Caution: Please validate system with chosen RCD to guarantee functionality.

■ EMC/EMI filter FN 3268

Filter types from 7 to 55A are designed to be compatible with 30mA RCDs according to IEC 61008 and new VDE 0664-110 standards. Filters from 75 up to 180A are designed to be compatible with 500mA RCDs. Install the filter as close as possible at line side of the motor drive. Regarding correct EMC installation, please refer to the EMC installation guide in the manual from motor drive supplier.

■ Motor drive

Please set the PWM pulse pattern of the variable speed motor drive fixed to 4kHz. Other pulse patterns cause higher leakage currents. Filter designs with other pulse pattern than 4kHz are possible upon request.

■ Motor cable length

Motor cable length should not exceed 50 meters for 7 up to 55A filter types to fulfill class C1 of recommended standard EN 61800-5. For 75 up to 180A filters, cable length should not exceed 100 meters to fulfill class C2.

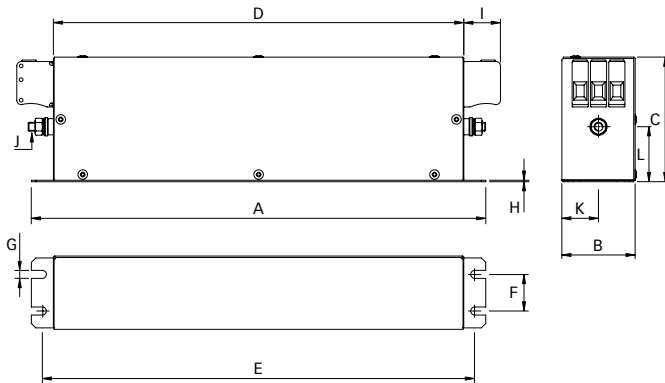
■ Internal EMC/EMI components

Please disconnect all internal Y-capacitors (internal EMC/EMI filters) in the motor drive, because these capacitors cause additional leakage currents.

■ Harmonics on line voltage

High voltage harmonics can create additional system leakage currents. FN 3268 filters are tested under following conditions: Supply voltage is contaminated with harmonics according to IEC 61000-2-4, class 2, where odd-numbered multiplies of three are limited to 30%.

Mechanical data



Note: in favour of a better readability, connectors and earth studs are not shown in the horizontal projection.

Dimensions

	7A	16A	30A	42A	55A	75A	100A	130A	180A
A	190	250	270	310	250	270	270	270	380
B	40	45	50	50	85	80	90	90	120
C	70	70	85	85	90	135	150	150	170
D	160	220	240	280	220	240	240	240	350
E	180	235	255	295	235	255	255	255	365
F	20	25	30	30	60	60	65	65	102
G	4.5	5.4	5.4	5.4	5.4	6.5	6.5	6.5	6.5
H	1	1	1	1	1	1.5	1.5	1.5	1.5
I	22	22	25	25	39	39	45	45	51
J	M5	M5	M5	M6	M6	M6	M10	M10	M10
K	20	22.5	25	25	42.5	40	45	45	60
L	29.5	29.5	39.5	37.5	26.5	70.5	64	64	47

All dimensions in mm; 1 inch = 25.4mm
Tolerances according: ISO 2768-m / EN 22768-m

Filter input/output connector cross sections

	-33	-34	-35	-40	-44
Solid wire	16mm ²	35mm ²	50mm ²	95mm ²	10mm ²
Flex wire	10mm ²	25mm ²	50mm ²	95mm ²	6mm ²
AWG type wire	AWG 6	AWG 2	AWG 1/0	AWG 4/0	AWG 8
Recommended torque	1.5 - 1.8Nm	4.0 - 4.5Nm	7 - 8Nm	17 - 20Nm	1.5 - 1.8Nm

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

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