

General Purpose AC/DC EMI Filter



- Rated currents from 1 to 60 A
- High differential-mode attenuation
- Optional medical version (B type)
- Optional safety version (A type)



Performance indicators

Attenuation performance



Rated current [A]



Technical specifications

| | |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated voltage* | 250 VAC, 50/60 Hz; 250 VDC |
| Operating frequency | DC to 400 Hz |
| Rated currents | 1 to 60 A @ 40°C max. |
| High potential test voltage | P → N 760 VAC for 2 sec (1 to 20 A types) P → PE 2500 VAC for 2 sec (B types) P → PE 2000 VAC for 2 sec P → N 1100 VDC for 2 sec (30 and 60 A types) |
| Temperature range (operation and storage) | -25°C to +100°C (25/100/21) |
| Certified to | UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications) |
| Flammability corresponding to | UL 94 V-2 or better |
| Design corresponding to | UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 |
| MTBF @ 40°C/230 V (Mil-HB-217F) | 1,250,000 hours 1,750,000 hours (B types) |

*maximum RMS operating voltage at rated frequency or the maximum DC operating voltage

Approvals



Features and benefits

- FN 2020 filters are designed for easy and fast chassis mounting
- FN 2020 filters are also available as B versions without Y-capacitors for medical applications as well as A version with low capacitance for safety critical applications with necessity for low leakage currents
- All filters provide a general purpose conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2020 filters can be used to cover a broad range of usage and they offer a good size/amperage ratio
- FN 2020 filters are also available as two-stage filters (FN 2060, FN 2070 series) for more noisy environment
- Various terminal options allow you to select the desired connection style

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Medical equipment
- Office automation equipment
- Datacom equipment

Typical electrical schematic



Filter selection table

| Filter* | Rated current | Leakage current** | Inductance | Capacitance | | Resistance | Input/Output connections | | | Weight |
|----------------|---------------|--------------------------------------|------------|-------------|------|------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
| | @ 40°C (25°C) | @ 250 VAC/50 Hz (@ 120 VAC/60 Hz) | L | Cx | Cy | R |  |  |  | [g] |
| | [A] | [mA] | [mH] | [µF] | [nF] | [kΩ] | | | | |
| FN 2020-1-.. | 1 (1.15) | 0.66 (0.38) | 12 | 0.15 | 4.7 | 1000 | -06 | -07 | | 80 |
| FN 2020-3-.. | 3 (3.45) | 0.66 (0.38) | 2.5 | 0.15 | 4.7 | 1000 | -06 | -07 | | 80 |
| FN 2020-6-.. | 6 (6.9) | 0.66 (0.38) | 1 | 0.15 | 4.7 | 1000 | -06 | -07 | | 80 |
| FN 2020-10-.. | 10 (11.5) | 0.66 (0.38) | 0.8 | 0.15 | 4.7 | 1000 | -06 | -07 | | 85 |
| FN 2020-12-.. | 12 (13.8) | 0.66 (0.38) | 0.7 | 0.15 | 4.7 | 1000 | -06 | -07 | | 85 |
| FN 2020-16-.. | 16 (18.4) | 0.66 (0.38) | 0.65 | 0.15 | 4.7 | 1000 | -06 | -07 | | 140 |
| FN 2020-20-.. | 20 (23) | 0.66 (0.38) | 0.6 | 0.15 | 4.7 | 1000 | -06 | | -08 | 210 |
| FN 2020-30-08 | 30 (34.5) | 0.79 (0.45) | 0.67 | 0.47 | 10 | 470 | | | -08 | 470 |
| FN 2020-60-24 | 60 (69) | 0.79 (0.45) | 1 | 1.5 | 10 | 220 | | | -24 | 1100 |
| FN 2020A-1-.. | 1 (1.15) | 0.07 (0.04) | 12 | 0.15 | 0.47 | 1000 | -06 | -07 | | 80 |
| FN 2020A-3-.. | 3 (3.45) | 0.07 (0.04) | 2.5 | 0.15 | 0.47 | 1000 | -06 | -07 | | 80 |
| FN 2020A-6-.. | 6 (6.9) | 0.07 (0.04) | 1 | 0.15 | 0.47 | 1000 | -06 | -07 | | 80 |
| FN 2020A-10-.. | 10 (11.5) | 0.07 (0.04) | 0.8 | 0.15 | 0.47 | 1000 | -06 | -07 | | 85 |
| FN 2020A-12-.. | 12 (13.8) | 0.07 (0.04) | 0.7 | 0.15 | 0.47 | 1000 | -06 | -07 | | 85 |
| FN 2020A-16-.. | 16 (18.4) | 0.07 (0.04) | 0.65 | 0.15 | 0.47 | 1000 | -06 | -07 | | 140 |
| FN 2020A-20-.. | 20 (23) | 0.07 (0.04) | 0.6 | 0.15 | 0.47 | 1000 | -06 | | -08 | 210 |
| FN 2020A-30-08 | 30 (34.5) | 0.07 (0.04) | 0.67 | 0.47 | 0.47 | 470 | | | -08 | 470 |
| FN 2020A-60-24 | 60 (69) | 0.07 (0.04) | 1 | 1.5 | 0.47 | 220 | | | -24 | 1100 |
| FN 2020B-1-.. | 1 (1.15) | 0.00 | 12 | 0.15 | | 1000 | -06 | -07 | | 80 |
| FN 2020B-3-.. | 3 (3.45) | 0.00 | 2.5 | 0.15 | | 1000 | -06 | -07 | | 80 |
| FN 2020B-6-.. | 6 (6.9) | 0.00 | 1 | 0.15 | | 1000 | -06 | -07 | | 80 |
| FN 2020B-10-.. | 10 (11.5) | 0.00 | 0.8 | 0.15 | | 1000 | -06 | -07 | | 85 |
| FN 2020B-12-.. | 12 (13.8) | 0.00 | 0.7 | 0.15 | | 1000 | -06 | -07 | | 85 |
| FN 2020B-16-.. | 16 (18.4) | 0.00 | 0.65 | 0.15 | | 1000 | -06 | -07 | | 140 |
| FN 2020B-20-.. | 20 (23) | 0.00 | 0.6 | 0.15 | | 1000 | -06 | | -08 | 210 |
| FN 2020B-30-08 | 30 (34.5) | 0.00 | 0.67 | 0.47 | | 470 | | | -08 | 470 |
| FN 2020B-60-24 | 60 (69) | 0.00 | 1 | 1.5 | | 220 | | | -24 | 1100 |

* To compile a complete part number, please replace the .. with the required I/O connection style (e.g. FN 2020-30-08, FN 2020B-10-06).

** Maximum leakage under usual AC operating conditions (acc. IEC 60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level. Leakage current for DC application is 0 mA;

Typical filter attenuation

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

1 and 3 A types



6 to 12 A types



16 and 20 A types



30 and 60 A types



Mechanical data



Dimensions

| | 1 A | 3 A | 6 A | 10 A | 12 A | 16 A | 20 A | 30 A | 60 A | Tolerances |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|------------|
| A | 64 | 64 | 64 | 64 | 64 | 71 | 85 | 113.5 ±1 | 105 ±1 | ±0.5 |
| B | 35 | 35 | 35 | 35 | 35 | 46.6 | 54 | 57.5 ±1 | 145.9 ±1 | ±0.5 |
| C | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 29.3 | 30.3 | 45.4 ±1 | 57.6 ±1 | ±0.5 |
| D | 43.5 | 43.5 | 43.5 | 43.5 | 43.5 | 50.5 | 64.8 | 94 ±1 | 84.5 ±1 | ±0.5 |
| E | 32.5 | 32.5 | 32.5 | 32.5 | 32.5 | 44.5 | 49.8 | 56 | 99.5 | ±0.5 |
| F | 54 | 54 | 54 | 54 | 54 | 61 | 75 | 103 | 95 | ±0.3 |
| G | 21 | 21 | 21 | 21 | 21 | 21 | 27 | 25 | 40 | ±0.2 |
| H | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 | 10.8 | 12.3 | 12.4 | 19.6 | ±0.5 |
| I | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 19.3 | 20.8 | 32.4 | 10.1 | ±0.5 |
| J | 21.8 | 21.8 | 21.8 | 21.8 | 21.8 | 20.1 | 19.9 | 15.5 | 42.25 | ±0.5 |
| K | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 5.3 | 4.4 | 4.4 | |
| L | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6 | 6 | |
| M | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.9 | 1.2 | |
| Connection style -06 | | | | | | | | | | |
| N | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | | | |
| Connection style -07 | | | | | | | | | | |
| O | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | | | | ±0.5 |
| P | 21.8 | 21.8 | 21.8 | 21.8 | 21.8 | 14 | | | | ±0.5 |
| AWG type wire | AWG 20 | AWG 20 | AWG 18 | AWG 18 | AWG 16 | AWG 16 | | | | |
| Wire length | 140 | 140 | 140 | 140 | 140 | 140 | | | | +5 |
| Connection style -08 | | | | | | | | | | |
| N | | | | | | | M4 | M4 | | |
| Recommended torque (Nm) | | | | | | | 1.2 - 1.3 | 1.2 - 1.3 | | |
| Connection style -24 | | | | | | | | | | |
| N | | | | | | | | | M6 | |
| Q | | | | | | | | | 51 | ±0.2 |
| Recommended torque (Nm) | | | | | | | | | 3.5 - 4 | |

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

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



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