

General purpose EMI filter

SCHAFFNER

energy efficiency and reliability



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

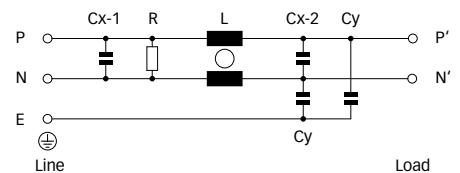
Approvals



Technical specifications

| | |
|--|--|
| Maximum continuous operating voltage: | 250VAC, 50/60Hz |
| Operating frequency: | dc to 400Hz |
| Rated currents: | 1 to 60A @ 40°C max. |
| High potential test voltage: | P → E 2000VAC for 2 sec |
| | P → E 2500VAC for 2 sec (B types) |
| | P → N 760VAC for 2 sec (1 to 20A types) |
| | P → N 1100VDC for 2 sec (30 and 60A types) |
| 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 @ 40°C/230V (Mil-HB-217F): | 1,250,000 hours |
| | 1,750,000 hours (B types) |

Typical electrical schematic



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/ampere 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

Filter selection table

| Filter* | Rated current @ 40°C (25°C) | Leakage current** @ 230VAC/50Hz | Inductance L | Capacitance Cx Cy | | Resistance R | Input/Output connections | | | Weight |
|----------------|--------------------------------|------------------------------------|-----------------|----------------------|------|-----------------|--------------------------|-----|-----|--------|
| | [A] | [mA] | [mH] | [μF] | [nF] | [kΩ] | | | | [g] |
| FN 2020-1-.. | 1 (1.15) | 0.74 | 12 | 0.15 | 4.7 | 1000 | -06 | -07 | | 80 |
| FN 2020-3-.. | 3 (3.45) | 0.74 | 2.5 | 0.15 | 4.7 | 1000 | -06 | -07 | | 80 |
| FN 2020-6-.. | 6 (6.9) | 0.74 | 1 | 0.15 | 4.7 | 1000 | -06 | -07 | | 80 |
| FN 2020-10-.. | 10 (11.5) | 0.74 | 0.8 | 0.15 | 4.7 | 1000 | -06 | -07 | | 85 |
| FN 2020-12-.. | 12 (13.8) | 0.74 | 0.7 | 0.15 | 4.7 | 1000 | -06 | -07 | | 85 |
| FN 2020-16-.. | 16 (18.4) | 0.74 | 0.65 | 0.15 | 4.7 | 1000 | -06 | -07 | | 140 |
| FN 2020-20-.. | 20 (23) | 0.74 | 0.6 | 0.15 | 4.7 | 1000 | -06 | | -08 | 210 |
| FN 2020-30-08 | 30 (34.5) | 0.87 | 0.67 | 0.47 | 10 | 470 | | | -08 | 470 |
| FN 2020-60-24 | 60 (69) | 0.87 | 1 | 1.5 | 10 | 220 | | | -24 | 1100 |
| | | | | | | | | | | |
| FN 2020A-1-.. | 1 (1.15) | 0.074 | 12 | 0.15 | 0.47 | 1000 | -06 | -07 | | 80 |
| FN 2020A-3-.. | 3 (3.45) | 0.074 | 2.5 | 0.15 | 0.47 | 1000 | -06 | -07 | | 80 |
| FN 2020A-6-.. | 6 (6.9) | 0.074 | 1 | 0.15 | 0.47 | 1000 | -06 | -07 | | 80 |
| FN 2020A-10-.. | 10 (11.5) | 0.074 | 0.8 | 0.15 | 0.47 | 1000 | -06 | -07 | | 85 |
| FN 2020A-12-.. | 12 (13.8) | 0.074 | 0.7 | 0.15 | 0.47 | 1000 | -06 | -07 | | 85 |
| FN 2020A-16-.. | 16 (18.4) | 0.074 | 0.65 | 0.15 | 0.47 | 1000 | -06 | -07 | | 140 |
| FN 2020A-20-.. | 20 (23) | 0.074 | 0.6 | 0.15 | 0.47 | 1000 | -06 | | -08 | 210 |
| FN 2020A-30-08 | 30 (34.5) | 0.074 | 0.67 | 0.47 | 0.47 | 470 | | | -08 | 470 |
| FN 2020A-60-24 | 60 (69) | 0.074 | 1 | 1.5 | 0.47 | 220 | | | -24 | 1100 |
| | | | | | | | | | | |
| FN 2020B-1-.. | 1 (1.15) | 0.002 | 12 | 0.15 | | 1000 | -06 | -07 | | 80 |
| FN 2020B-3-.. | 3 (3.45) | 0.002 | 2.5 | 0.15 | | 1000 | -06 | -07 | | 80 |
| FN 2020B-6-.. | 6 (6.9) | 0.002 | 1 | 0.15 | | 1000 | -06 | -07 | | 80 |
| FN 2020B-10-.. | 10 (11.5) | 0.002 | 0.8 | 0.15 | | 1000 | -06 | -07 | | 85 |
| FN 2020B-12-.. | 12 (13.8) | 0.002 | 0.7 | 0.15 | | 1000 | -06 | -07 | | 85 |
| FN 2020B-16-.. | 16 (18.4) | 0.002 | 0.65 | 0.15 | | 1000 | -06 | -07 | | 140 |
| FN 2020B-20-.. | 20 (23) | 0.002 | 0.6 | 0.15 | | 1000 | -06 | | -08 | 210 |
| FN 2020B-30-08 | 30 (34.5) | 0.002 | 0.67 | 0.47 | | 470 | | | -08 | 470 |
| FN 2020B-60-24 | 60 (69) | 0.002 | 1 | 1.5 | | 220 | | | -24 | 1100 |

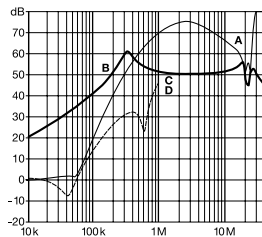
* To compile a complete part number, please replace the .. with the required I/O connection style (e.g. FN 2020-30-08, FN 2020B-10-06).

** Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

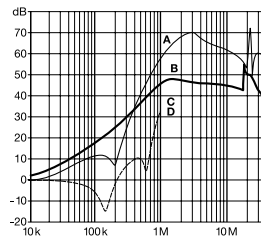
Typical filter attenuation

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

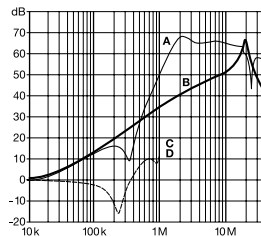
1 and 3A types



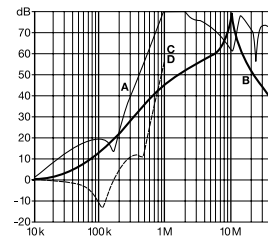
6 to 12A types



16 and 20A types

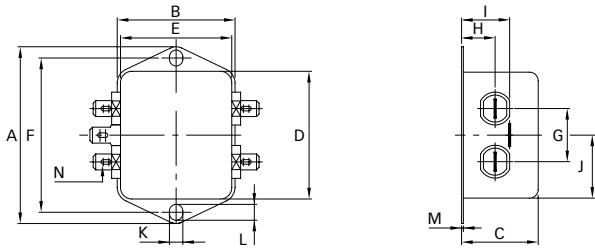


30 and 60A types

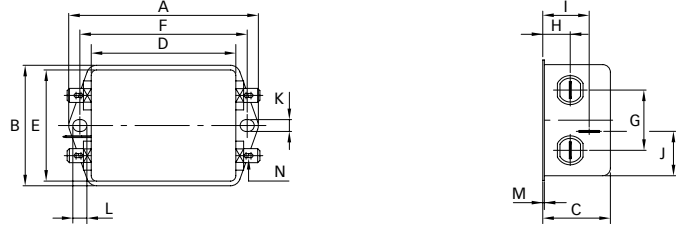


Mechanical data

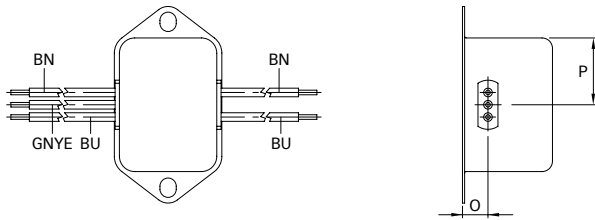
Connection style -06, 1 to 12A types



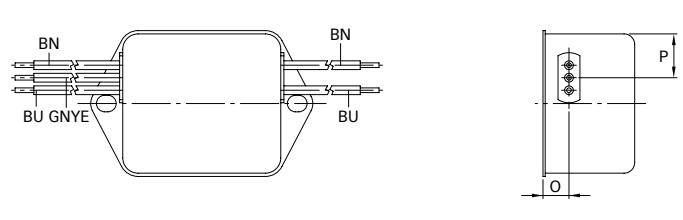
Connection style -06, 16 and 20A types



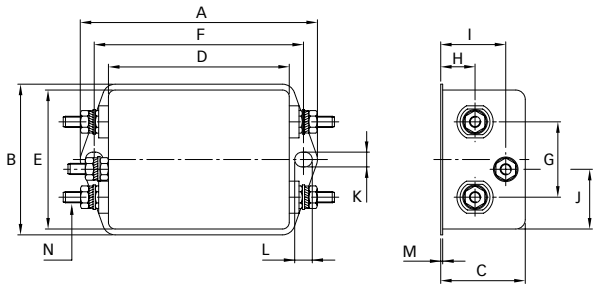
Connection style -07, 1 to 12A types (same dimensions as style -06)



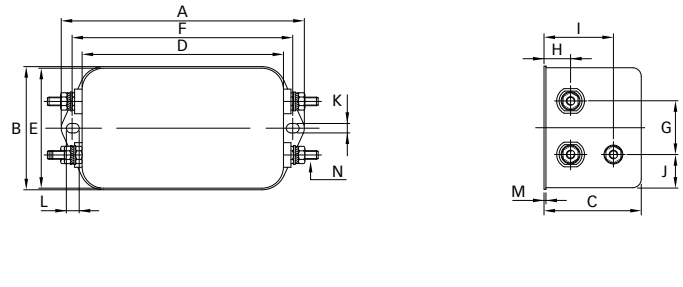
Connection style -07, 16A types (same dimensions as style -06)



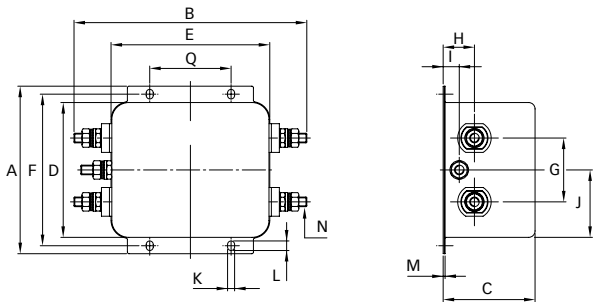
Connection style -08, 20A types



Connection style -08, 30A types



Connection style -24



Dimensions

| | 1A | 3A | 6A | 10A | 12A | 16A | 20A | 30A | 60A | 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 | | |
| Connection style -24 | | | | | | | | | | |
| N | | | | | | | | | M6 | |
| Q | | | | | | | | | 51 | ±0.2 |

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