

Multi-stage EMI filter with excellent attenuation performance

SCHAFFNER

energy efficiency and reliability



- Rated currents from 1 to 30A
- Two-stage filter
- Very high differential and common-mode attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)
- Optional overvoltage protection (Z type)

Approvals

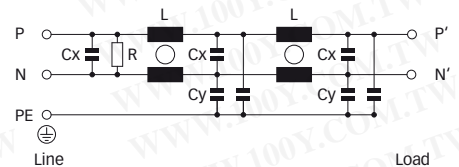


勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-34970699
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)

Technical specifications

| | |
|--|--|
| Maximum continuous operating voltage: | 250VAC, 50/60Hz |
| Operating frequency: | dc to 400Hz |
| Rated currents: | 1 to 30A @ 40°C max. |
| High potential test voltage: | P → E 2000VAC for 2 sec (standard types) P → E 2500VAC for 2 sec (B types) P → N 1100VDC for 2 sec |
| Temperature range (operation and storage): | -25°C to +100°C (25/100/21) |
| Design corresponding to: | UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 |
| Flammability corresponding to: | UL 94V-2 or better |
| Surge pulse protection (optional): | 2kV, IEC 61000-4-5 |
| MTBF @ 40°C/230V (Mil-HB-217F): | 1,300,000 hours (1 to 10A types) 1,100,000 hours (12A types) 517,000 hours (16 and 30A types) |

Typical electrical schematic



Features and benefits

- FN 2090 two-stage filters are designed for easy and fast chassis mounting.
- The FN 2090 filters are also available as B versions with no Y-capacitors for medical applications as well as A versions with low capacitance for safety critical applications with a requirement for low leakage currents.
- All filters provide an exceptional conducted attenuation performance, based on chokes with high permeable core material and excellent thermal behavior.
- FN 2090 two-stage filters are designed for noisy applications requiring excellent filter performance.

- The higher inductivity versus amperage offers increased attenuation performance with the same form factor compared to FN 2060 and FN 2080 filter series.
- All FN 2090 filters can be delivered with optional surge pulse protection.
- FN 2090 filters are also available as single-stage filters (FN 2050 series).
- Various terminal options allow you to select the desired connection style.

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Building automation
- Industrial applications
- Machinery
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiring high filter performance

Filter selection table

| Filter* | Rated current @ 40°C (25°C) [A] | Leakage current** @ 230VAC/50Hz [mA] | Inductance L [mH] | Cx [µF] | Capacitance Cy | | Resistance R [kΩ] | Input/Output connections | | | Weight [g] |
|----------------|---------------------------------------|--|-------------------------|------------|-------------------|------|-------------------------|--------------------------|-----|-----|---------------|
| | | | | | [nF] | [nF] | | | | | |
| FN 2090-1-.. | 1 (1.1) | 0.5 | 20 | 0.22 | 2.2 | 1.0 | 680 | -06 | -07 | | 73 |
| FN 2090-3-.. | 3 (3.4) | 0.5 | 14 | 0.33 | 2.2 | 1.0 | 470 | -06 | -07 | | 158 |
| FN 2090-4-.. | 4 (4.5) | 0.5 | 14 | 0.33 | 2.2 | 1.0 | 470 | -06 | -07 | | 176 |
| FN 2090-6-.. | 6 (6.7) | 0.67 | 8 | 0.47 | 3.3 | 1.0 | 330 | -06 | -07 | | 191 |
| FN 2090-8-.. | 8 (8.9) | 0.67 | 8 | 0.47 | 3.3 | 1.0 | 330 | -06 | -07 | | 330 |
| FN 2090-10-.. | 10 (11.2) | 0.67 | 8 | 0.47 | 3.3 | 1.0 | 330 | -06 | -07 | | 369 |
| FN 2090-12-.. | 12 (13.4) | 1.02 | 4 | 1 | 10 | 1.0 | 220 | -06 | -07 | | 391 |
| FN 2090-16-.. | 16 (17.9) | 1.02 | 4 | 1 | 10 | 1.0 | 220 | -06 | -07 | | 425 |
| FN 2090-20-.. | 20 (22.4) | 1.02 | 2.7 | 1 | 10 | 1.0 | 220 | -06 | | -08 | 530 |
| FN 2090-30-08 | 30 (33.5) | 1.02 | 1.5 | 1 | 10 | 1.0 | 220 | | | -08 | 548 |
| | | | | | | | | | | | |
| FN 2090A-1-.. | 1 (1.1) | 0.08 | 20 | 0.22 | 0.47 | 0.47 | 680 | -06 | -07 | | 73 |
| FN 2090A-3-.. | 3 (3.4) | 0.08 | 14 | 0.33 | 0.47 | 0.47 | 470 | -06 | -07 | | 158 |
| FN 2090A-4-.. | 4 (4.5) | 0.08 | 14 | 0.33 | 0.47 | 0.47 | 470 | -06 | -07 | | 176 |
| FN 2090A-6-.. | 6 (6.7) | 0.08 | 8 | 0.47 | 0.47 | 0.47 | 330 | -06 | -07 | | 191 |
| FN 2090A-8-.. | 8 (8.9) | 0.08 | 8 | 0.47 | 0.47 | 0.47 | 330 | -06 | -07 | | 330 |
| FN 2090A-10-.. | 10 (11.2) | 0.08 | 8 | 0.47 | 0.47 | 0.47 | 330 | -06 | -07 | | 369 |
| FN 2090A-12-.. | 12 (13.4) | 0.08 | 4 | 1 | 0.47 | 0.47 | 220 | -06 | -07 | | 391 |
| FN 2090A-16-.. | 16 (17.9) | 0.08 | 4 | 1 | 0.47 | 0.47 | 220 | -06 | -07 | | 425 |
| FN 2090A-20-.. | 20 (22.4) | 0.08 | 2.7 | 1 | 0.47 | 0.47 | 220 | -06 | | -08 | 530 |
| FN 2090A-30-08 | 30 (33.5) | 0.08 | 1.5 | 1 | 0.47 | 0.47 | 220 | | | -08 | 548 |
| | | | | | | | | | | | |
| FN 2090B-1-.. | 1 (1.1) | 0.002 | 20 | 0.22 | | | 680 | -06 | -07 | | 73 |
| FN 2090B-3-.. | 3 (3.4) | 0.002 | 14 | 0.33 | | | 470 | -06 | -07 | | 158 |
| FN 2090B-4-.. | 4 (4.5) | 0.002 | 14 | 0.33 | | | 470 | -06 | -07 | | 176 |
| FN 2090B-6-.. | 6 (6.7) | 0.002 | 8 | 0.47 | | | 330 | -06 | -07 | | 191 |
| FN 2090B-8-.. | 8 (8.9) | 0.002 | 8 | 0.47 | | | 330 | -06 | -07 | | 330 |
| FN 2090B-10-.. | 10 (11.2) | 0.002 | 8 | 0.47 | | | 330 | -06 | -07 | | 369 |
| FN 2090B-12-.. | 12 (13.4) | 0.002 | 4 | 1 | | | 220 | -06 | -07 | | 391 |
| FN 2090B-16-.. | 16 (17.9) | 0.002 | 4 | 1 | | | 220 | -06 | -07 | | 425 |
| FN 2090B-20-.. | 20 (22.4) | 0.002 | 2.7 | 1 | | | 220 | -06 | | -08 | 530 |
| FN 2090B-30-08 | 30 (33.5) | 0.002 | 1.5 | 1 | | | 220 | | | -08 | 548 |

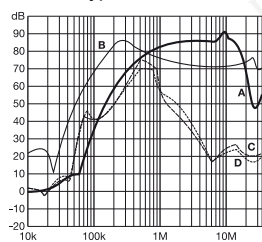
* To compile a complete part number, please replace the -.. with the required I/O connection style. For surge pulse protection, please add Z (e.g. FN 2090Z-10-06, FN 2090BZ-20-08).

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

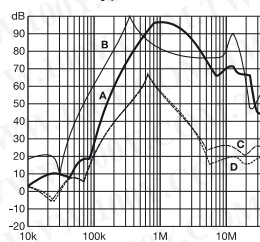
Typical filter attenuation

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

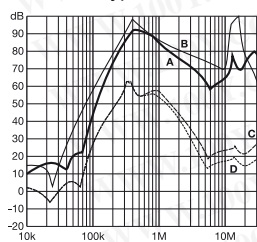
1 to 4A types



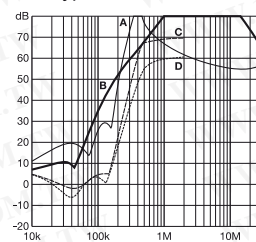
6 to 10A types



12 to 20A types

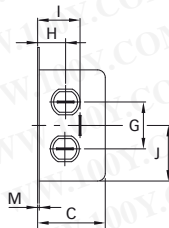
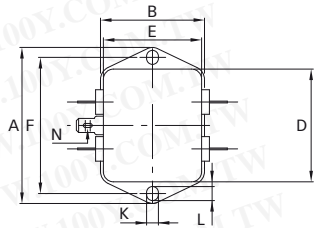


30A types

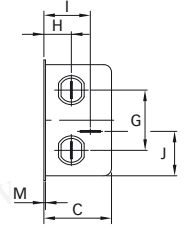
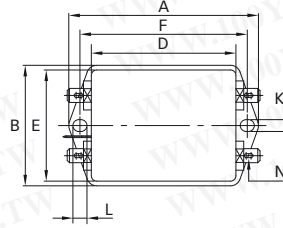


Mechanical data

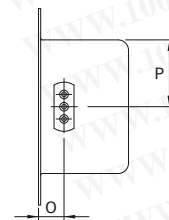
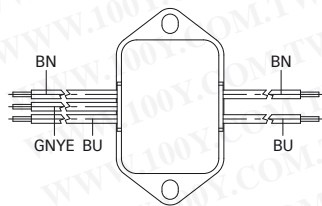
Connection style -06, 1A types



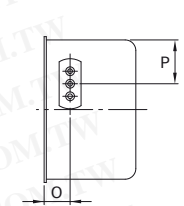
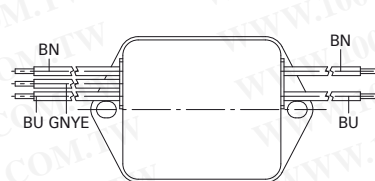
Connection style -06, 3 to 20A types



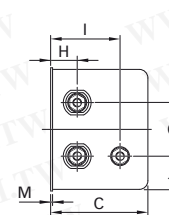
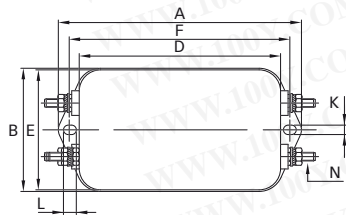
Connection style -07, 1A types (same dimensions as style -06)



Connection style -07, 3 to 20A types (same dimensions as style -06)



Connection style -08, 20 and 30A types



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Dimensions

| | 1A | 3A | 4A | 6A | 8A | 10A | 12A | 16A | 20A | 30A | Tolerances |
|---|-------|------|------|------|----------|----------|----------|----------|----------|----------|------------|
| A | 71 | 85 | 85 | 85 | 113.5 ±1 | 113.5 ±1 | 113.5 ±1 | 113.5 ±1 | 113.5 ±1 | 113.5 ±1 | ±0.5 |
| B | 46.6 | 54 | 54 | 54 | 57.5 ±1 | 57.5 ±1 | 57.5 ±1 | 57.5 ±1 | 57.5 ±1 | 57.5 ±1 | ±0.5 |
| C | 22.3 | 30.3 | 30.3 | 30.3 | 45.4 ±1 | 45.4 ±1 | 45.4 ±1 | 45.4 ±1 | 45.4 ±1 | 45.4 ±1 | ±0.5 |
| D | 50.5 | 64.8 | 64.8 | 64.8 | 94 ±1 | 94 ±1 | 94 ±1 | 94 ±1 | 94 ±1 | 94 ±1 | ±0.5 |
| E | 44.5 | 49.8 | 49.8 | 49.8 | 56 | 56 | 56 | 56 | 56 | 56 | ±0.5 |
| F | 61 | 75 | 75 | 75 | 103 | 103 | 103 | 103 | 103 | 103 | ±0.3 |
| G | 21 | 27 | 27 | 27 | 25 | 25 | 25 | 25 | 25 | 25 | ±0.2 |
| H | 10.8 | 12.3 | 12.3 | 12.3 | 12.4 | 12.4 | 12.4 | 12.4 | 12.4 | 12.4 | ±0.5 |
| I | 16.8 | 20.8 | 20.8 | 20.8 | 32.4 | 32.4 | 32.4 | 32.4 | 32.4 | 32.4 | ±0.5 |
| J | 25.25 | 19.9 | 19.9 | 19.9 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | ±0.5 |
| K | 5.3 | 5.3 | 5.3 | 5.3 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | |
| L | 6.3 | 6.3 | 6.3 | 6.3 | 6 | 6 | 6 | 6 | 6 | 6 | |
| M | 0.7 | 0.7 | 0.7 | 0.7 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | |

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 | 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 | 8.4 | 8.4 | 8.4 | 8.4 | | | ±0.5 |
| P | 14 | 14.9 | 14.9 | 14.9 | 18 | 18 | 18 | 18 | | | ±0.5 |

| | | | | | | | | | | | |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|--|
| AWG type wire | AWG 20 | AWG 20 | AWG 20 | AWG 18 | AWG 18 | AWG 18 | AWG 16 | AWG 16 | | | |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--|--|--|

| | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|
| Wire length* | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|

Connection style -08

| | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|----|----|
| N | | | | | | | | | M4 | M4 |
|---|--|--|--|--|--|--|--|--|----|----|

All dimensions in mm; 1 inch = 25.4mm

Tolerances according: ISO 2768-m / EN 22768-m

* Other cable length or additional wire connector on request.