

3-phase filters FN 258

Book-style EMC/RFI filter for three-phase inverters and power drive systems

SCHAFFNER

energy efficiency and reliability

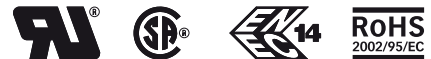


- Industry standard EMC solution for three-phase PDS filtering
- Slim space-saving book-style housing
- Solid safety connector blocks or optional wire output connections
- Excellent attenuation performance
- HV versions for up to 690VAC
- HVIT versions for IT distribution networks
- P/L versions with low leakage current

Approvals



UL / CSA: FN 258 up to 180A (ex. -180-07)



UL / CSA: HV and HVIT up to 600VAC

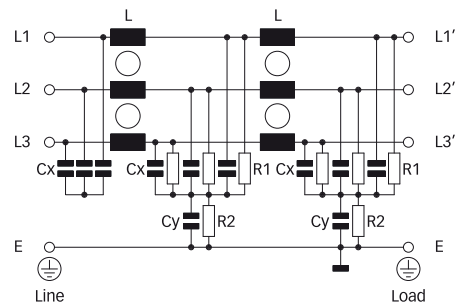
Technical specifications

| | |
|--|--|
| Maximum continuous operating voltage: | 3x 480/277VAC (FN 258, FN 258L, FN 258P) 3x 690/400VAC (FN 258HV, FN 258HVIT) |
| Operating frequency: | dc to 60Hz |
| Rated currents: | 7 to 250A @ 50° (480V filters) 7 to 130A @ 50° (690V filters) |
| High potential test voltage: | P → E 2650VDC for 2 sec (480V filters) P → P 2100VDC for 2 sec (480V filters) P → E 3100VDC for 2 sec (690V filters) P → P 3000VDC for 2 sec (690V filters) |
| 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): | 220,000 hours |

Features and benefits

- FN 258 range of filters provides state-of-the-art EMI attenuation based on an innovative multi-stage filter topology. They help to ensure compliance with Class A or even Class B limits.
- The slim book-style shape allows a convenient and space-saving installation next to inverters and motor drives.
- With 480VAC rating and filter modules from 7 to 250A, FN 258 are ready for the most diverse applications worldwide.
- FN 258HV filters up to 130A are designed for 690VAC distribution networks.
- FN 258HVIT filters up to 150A meet the special requirements for the application in industrial 690VAC IT distribution networks.
- FN 258L and FN 258P filters help to fulfill tough requirements in respect of leakage current limitation and provide an excellent solution to overcome problems with nuisance tripping of sensitive earth leakage detectors.

Typical electrical schematic





Note: HVIT versions without discharge resistor to ground.

Typical applications

- Three-phase variable speed drives and power drive systems (PDS)
- IT power distribution networks (FN 258HVIT)
- Applications comprising energy conversion devices (inverters, converters)
- Process automation equipment
- Three-phase power supplies and UPS
- Applications with low-leakage current requirements (FN 258L and FN 258P)

Filter selection table

| Filter* | Rated current @ 50°C (40°C) | Typical drive power rating** | Leakage current*** @ 440VAC/50Hz | Power loss @ 25°C/50Hz | Input connections | Output connections | Weight [kg] |
|-------------------|--------------------------------|---------------------------------|-------------------------------------|---------------------------|---|---|----------------|
| | [A] | [kW] | [mA] | [W] |  |  | |
| FN 258-7-.. | 7 (7.7) | 4 | 16.5 | 9 | -29 | -07 -29 | 1.0 |
| FN 258-16-.. | 16 (17.5) | 7.5 | 18.3 | 20 | -29 | -07 -29 | 1.4 |
| FN 258-30-.. | 30 (33) | 15 | 24.2 | 21 | -33 | -07 -33 | 1.7 |
| FN 258-42-.. | 42 (46) | 22 | 25.8 | 30 | -33 | -07 -33 | 2.5 |
| FN 258-55-.. | 55 (60) | 30 | 25.8 | 30 | -34 | -07 -34 | 2.9 |
| FN 258-75-34 | 75 (82) | 37 | 25.8 | 24 | -34 | -34 | 3.9 |
| FN 258-100-35 | 100 (110) | 55 | 25.8 | 51 | -35 | -35 | 5.5 |
| FN 258-130-35 | 130 (143) | 75 | 30.0 | 50 | -35 | -35 | 6.9 |
| FN 258-180-.. | 180 (197) | 90 | 30.0 | 73 | -40 | -07 -40 | 11.0 |
| FN 258-250-.. | 250 (275) | 132 | 30.0 | 79 | -40 | -07 -40 | 12.0 |
| FN 258HV-7-29 | 7 (7.7) | 5.5 | 13.0 | 9 | -29 | -29 | 1.0 |
| FN 258HV-16-29 | 16 (17.5) | 11 | 19.0 | 20 | -29 | -29 | 1.5 |
| FN 258HV-30-33 | 30 (33) | 22 | 19.0 | 21 | -33 | -33 | 1.8 |
| FN 258HV-42-33 | 42 (46) | 30 | 21.6 | 30 | -33 | -33 | 2.6 |
| FN 258HV-55-34 | 55 (60) | 45 | 21.6 | 30 | -34 | -34 | 3.0 |
| FN 258HV-75-34 | 75 (82) | 55 | 21.6 | 24 | -34 | -34 | 4.3 |
| FN 258HV-100-35 | 100 (110) | 90 | 21.6 | 51 | -35 | -35 | 5.6 |
| FN 258HV-130-35 | 130 (143) | 110 | 25.0 | 50 | -35 | -35 | 7.1 |
| FN 258HVIT-7-29 | 7 (7.7) | 5.5 | 13.0 | 9 | -29 | -29 | 1.0 |
| FN 258HVIT-16-29 | 16 (17.5) | 11 | 19.0 | 20 | -29 | -29 | 1.5 |
| FN 258HVIT-30-33 | 30 (33) | 22 | 19.0 | 21 | -33 | -33 | 1.8 |
| FN 258HVIT-42-33 | 42 (46) | 30 | 21.6 | 30 | -33 | -33 | 2.6 |
| FN 258HVIT-55-34 | 55 (60) | 45 | 21.6 | 30 | -34 | -34 | 3.0 |
| FN 258HVIT-75-34 | 75 (82) | 55 | 21.6 | 24 | -34 | -34 | 4.3 |
| FN 258HVIT-100-35 | 100 (110) | 90 | 21.6 | 51 | -35 | -35 | 5.6 |
| FN 258HVIT-130-35 | 130 (143) | 110 | 25.0 | 50 | -35 | -35 | 7.1 |
| FN 258L-7-.. | 7 (7.7) | 4 | 0.8 | 9 | -29 | -07 -29 | 1.0 |
| FN 258L-16-.. | 16 (17.5) | 7.5 | 0.8 | 20 | -29 | -07 -29 | 1.4 |
| FN 258L-30-.. | 30 (33) | 15 | 0.8 | 21 | -33 | -07 -33 | 1.7 |
| FN 258L-42-.. | 42 (46) | 22 | 0.7 | 30 | -33 | -07 -33 | 2.5 |
| FN 258L-55-.. | 55 (60) | 30 | 0.7 | 30 | -34 | -07 -34 | 2.9 |
| FN 258L-75-34 | 75 (82) | 37 | 0.7 | 24 | -34 | -34 | 3.9 |
| FN 258L-100-35 | 100 (110) | 55 | 0.7 | 51 | -35 | -35 | 5.5 |
| FN 258L-130-35 | 130 (143) | 75 | 0.7 | 50 | -35 | -35 | 6.9 |
| FN 258L-180-.. | 180 (197) | 90 | 0.7 | 73 | -40 | -07 -40 | 11.0 |
| FN 258L-250-07 | 250 (275) | 132 | 0.7 | 79 | -40 | -07 | 12.0 |
| FN 258P-7-.. | 7 (7.7) | 4 | 3.3 | 9 | -29 | -07 -29 | 1.0 |
| FN 258P-16-.. | 16 (17.5) | 7.5 | 3.3 | 20 | -29 | -07 -29 | 1.4 |
| FN 258P-30-.. | 30 (33) | 15 | 3.3 | 21 | -33 | -07 -33 | 1.7 |
| FN 258P-42-.. | 42 (46) | 22 | 3.5 | 30 | -33 | -07 -33 | 2.5 |
| FN 258P-55-.. | 55 (60) | 30 | 3.5 | 30 | -34 | -07 -34 | 2.9 |
| FN 258P-75-34 | 75 (82) | 37 | 3.5 | 24 | -34 | -34 | 3.9 |
| FN 258P-100-35 | 100 (110) | 55 | 3.5 | 51 | -35 | -35 | 5.5 |
| FN 258P-130-35 | 130 (143) | 75 | 3.5 | 50 | -35 | -35 | 6.9 |
| FN 258P-180-.. | 180 (197) | 90 | 3.5 | 73 | -40 | -07 -40 | 11.0 |
| FN 258P-250-07 | 250 (275) | 132 | 3.6 | 79 | -40 | -07 | 12.0 |

* To compile a complete part number, please replace the .. with the required output connection style.

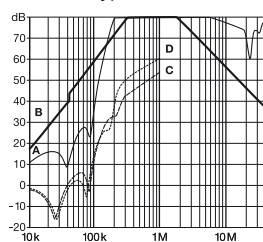
** Calculated at rated current, 440VAC (FN 258) / 690VAC (FN 258HV) and cos phi = 0.8. The exact value depends upon the efficiency of the drive, the motor and the entire application.

*** Maximum leakage under normal operating conditions (FN 258 at 440V, FN 258HV at 690V). Note: if two phases are interrupted, worst case leakage could reach 5.7 times higher levels.

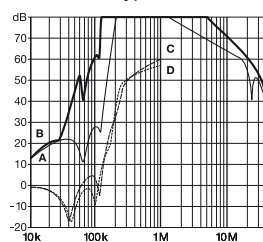
Typical filter attenuation

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

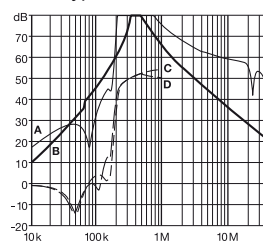
7 to 30A types



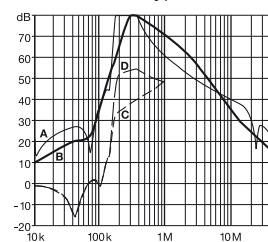
42 to 100A types



130A types



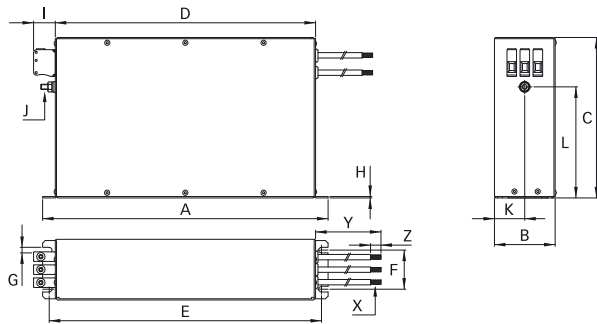
180 and 250A types



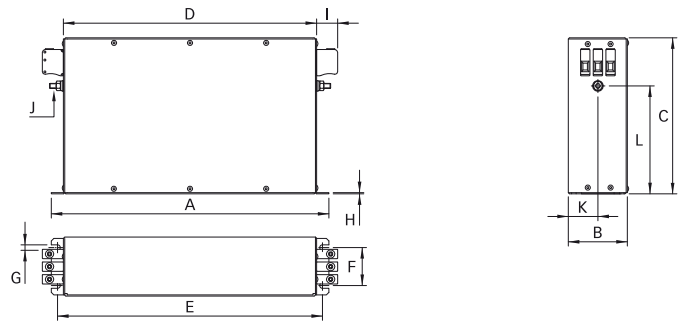
Note: typical attenuation performance of FN 258 standard filters. The behavior of FN 258HV, FN 258HVIT, FN 258P and FN 258L may be slightly different.

Mechanical data

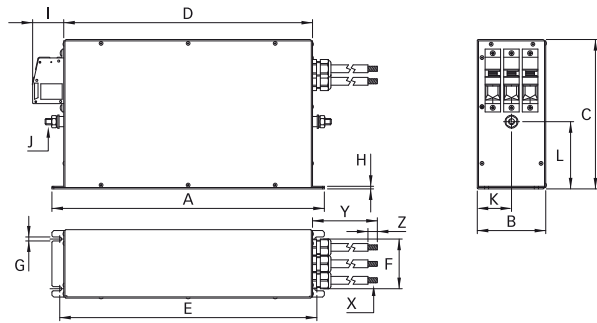
7 to 55A types (-07)



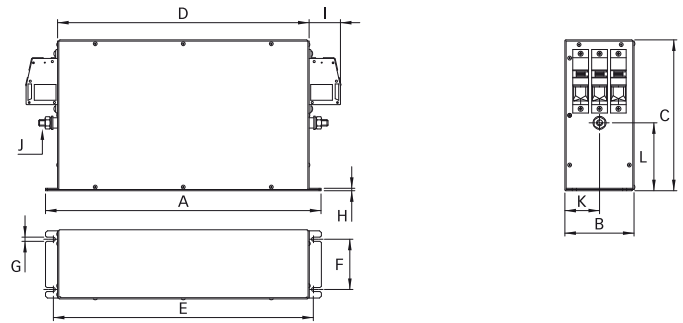
7 to 130A types (-29, -33, -34, -35)



180 and 250A types (-07)



180 and 250A types (-40)



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 | 250A |
|----|---------|---------|---------|---------|---------|-----|------|------|-------------------|-------------------|
| A | 255 | 305 | 335 | 329 | 329 | 329 | 379 | 439 | 438 | 478 |
| B | 50 | 55 | 60 | 70 | 80 | 80 | 90 | 110 | 110 | 110 |
| C | 126 | 142 | 150 | 185 | 185 | 220 | 220 | 240 | 240 | 240 |
| D | 225 | 275 | 305 | 300 | 300 | 300 | 350 | 400 | 400 | 440 |
| E | 240 | 290 | 320 | 314 | 314 | 314 | 364 | 414 | 413 | 453 |
| F | 25 | 30 | 35 | 45 | 55 | 55 | 65 | 80 | 80 | 80 |
| G | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 |
| H | 1 | 1 | 1 | 1.5 | 1.5 | 1.5 | 1.5 | 3 | 4 | 4 |
| I | 10.9 | 10.9 | 25 | 25 | 39 | 39 | 45 | 45 | 49.5 | 49.5 |
| J | M5 | M5 | M5 | M6 | M6 | M6 | M10 | M10 | M10 | M10 |
| K | 25 | 27.5 | 30 | 35 | 40 | 40 | 45 | 55 | 55 | 55 |
| L | 85 | 100 | 110 | 130 | 105 | 140 | 130 | 140 | 110 | 110 |
| X* | AWG 16 | AWG 14 | AWG 10 | AWG 8 | AWG 6 | | | | 50mm ² | 70mm ² |
| Y* | 300 ±10 | 300 ±10 | 400 ±10 | 500 ±10 | 500 ±10 | | | | 500 ±10 | 500 ±10 |
| Z* | 9 | 9 | 9 | 12 | 12 | | | | 15 | 15 |

* Filters with output wire connections (-07) only.

All dimensions in mm; 1 inch = 25.4mm

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

Filter input/output connector cross sections

| | -29 | -33 | -34 | -35 | -40 |
|---------------------------|------------------|-------------------|-------------------|-------------------|-------------------|
| | | | | | |
| Solid wire | 6mm ² | 16mm ² | 35mm ² | 50mm ² | 95mm ² |
| Flex wire | 4mm ² | 10mm ² | 25mm ² | 50mm ² | 95mm ² |
| AWG type wire | AWG 10 | AWG 6 | AWG 2 | AWG 1/0 | AWG 4/0 |
| Recommended torque | 0.6 - 0.8Nm | 1.5 - 1.8Nm | 4.0 - 4.5Nm | 7 - 8Nm | 17 - 20Nm |

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

Your local partner: To find your local partner within Schaffner's global network, please go to www.schaffner.com