

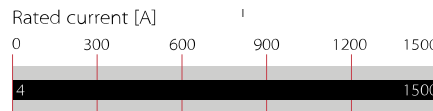
3-phase Line Reactor for Motor Drive & Power Quality Applications



- ▮ Provision of 4% impedance
- ▮ Reduction of mains harmonics
- ▮ Reduction of commutation notches
- ▮ Protection of motor drive electronics
- ▮ Limitation of inrush currents
- ▮ Improvement of true power factor



Performance indicators



Approvals



UL 508C up to 400 A. For use with AC or DC drives (power conversion equipment) only

Features and benefits

- ▮ Ensure reliability, performance and a long service life of electrical consumers
- ▮ Reduction of mains harmonics and commutation notches
- ▮ Help to meet international power quality standards such as IEEE-519 or EN 61000-3-2
- ▮ Protection of motor drive electronics and dc link capacitors against mains transients
- ▮ Reduction of inrush and peak currents
- ▮ Reduction of conducted LF emission
- ▮ Improvement of conducted LF immunity
- ▮ Prevention from nuisance tripping caused by power line voltage spikes
- ▮ Improvement of true power factor

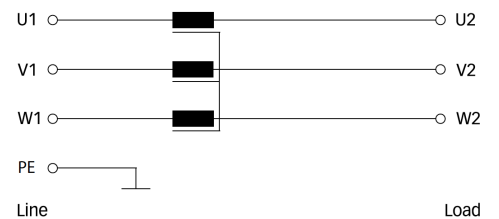
Technical specifications

| | |
|--|--|
| Maximum continuous operating voltage | 3 x 500/288 VAC |
| Design corresponding to | EN 61558-2-20 (VDE 0570-2-20), UL 508C, CSA C22.2 NO.14 |
| Impedance | 4% @ 400 VAC, 50 Hz & rated current |
| Typical harmonics reduction | See table on next page |
| High potential test voltage | P → E 3000 VAC for 3 sec P → P 3000 VAC for 3 sec |
| Insulation class | T40/N (200°C) for ≤400 A types T40/F (155°C) for ≥500 A types T40/H (180°C) for 1500 A types |
| Protection category | IP 00 (KL types according to VBG 4) |
| Rated currents | 4 to 1500 A @ 40°C |
| Overload capability | 2 x rated current at switch on for 30 seconds 1.5 x rated current for 1 minute, once per hour |
| Flammability corresponding to | UL 94 V-2 or better |
| Temperature range (operation and storage) | -25°C to +100°C (25/100/21) |
| MTBF @ 40°C/400 V (Mil-HB-217F) | >500,000 hours |

Typical applications

- ▮ Motor drives and various adjustable speed drive systems, such as:
- ▮ Elevators
- ▮ Robots
- ▮ Machinery
- ▮ Process automation equipment

Typical electrical schematic



Reactor selection table

| Reactor | Rated current | Typical drive | Nominal | Typical | Input/Output | | Weight | Earthing bolt |
|----------------|---------------|-----------------------|--------------------|---------------------|--------------|----|---------------|---------------|
| | @ 40°C [A] | power rating* [kW] | inductance [mH] | power loss** [W] | connections | | Total [kg] | |
| RWK 212-4-KL | 4 | 1.5 | 7.3 | 23 | KL | | 2.1 | AMP 6,3 x 0,8 |
| RWK 212-7-KL | 7 | 3 | 4.2 | 36 | KL | | 2.5 | M4 |
| RWK 212-11-KL | 11 | 4 | 2.6 | 37 | KL | | 2.5 | M4 |
| RWK 212-16-KL | 16 | 7.5 | 1.8 | 59 | KL | | 3.9 | M5 |
| RWK 212-21-KL | 21 | 11 | 1.4 | 66 | KL | | 5.4 | M5 |
| RWK 212-29-KL | 29 | 15 | 1 | 69 | KL | | 5.4 | M5 |
| RWK 212-35-KL | 35 | 18.5 | 0.84 | 70 | KL | | 5.9 | M5 |
| RWK 212-46-KL | 46 | 22 | 0.64 | 99 | KL | | 11 | M6 |
| RWK 212-60-KL | 60 | 30 | 0.49 | 138 | KL | | 15 | M6 |
| RWK 212-75-KL | 75 | 37 | 0.39 | 133 | KL | | 15 | M6 |
| RWK 212-95-KL | 95 | 45 | 0.3 | 166 | KL | | 22 | M8 |
| RWK 212-124-KS | 124 | 55 | 0.23 | 172 | | KS | 25 | M8 |
| RWK 212-156-KS | 156 | 75 | 0.19 | 249 | | KS | 25 | M8 |
| RWK 212-182-KS | 182 | 90 | 0.16 | 245 | | KS | 32 | M10 |
| RWK 212-230-KS | 230 | 110/132 | 0.13 | 301 | | KS | 35 | M10 |
| RWK 212-280-KS | 280 | 160 | 0.1 | 335 | | KS | 41 | M10 |
| RWK 212-330-KS | 330 | 160 | 0.09 | 386 | | KS | 56 | M10 |
| RWK 212-400-S | 400 | 200 | 0.073 | 692 | | S | 57 | M10 |
| RWK 212-500-S | 500 | 250 | 0.058 | 761 | | S | 67 | M10 |
| RWK 212-600-S | 600 | 315 | 0.049 | 825 | | S | 76 | M10 |
| RWK 212-680-S | 680 | 355 | 0.043 | 876 | | S | 80 | M10 |
| RWK 212-790-S | 790 | 400 | 0.037 | 956 | | S | 90 | M10 |
| RWK 212-910-S | 910 | 450 | 0.032 | 1022 | | S | 107 | M10 |
| RWK 212-1100-S | 1100 | 630 | 0.026 | 1036 | | S | 135 | M10 |
| RWK 212-1310-S | 1310 | 725 | 0.023 | 1050 | | S | 100 | M10 |
| RWK 212-1500-S | 1500 | 830 | 0.020 | 1000 | | S | 225 | M10 |

Customized line reactors with different electrical and mechanical specifications are available on request.

* Calculated at rated current, 400 VAC and $\cos \phi=0.8$. The exact value depends upon the efficiency of the drive, the motor and the entire application.

** Power loss at 25°C/50 Hz, considering a typical harmonic spectrum of a motor drive with B6U rectifier bridge.

Harmonics reduction

Line reactors are a cost-effective way for the limitation of mains harmonics. The harmonics reduction capability is related to the reactor impedance. A higher impedance translates directly into lower harmonic currents, but of course also into a larger component with a higher voltage drop – and vice versa.

4% impedance reactors like RWK 212 provide an excellent cost/benefit ratio and are particularly beneficiary in the most diverse motor drive applications.

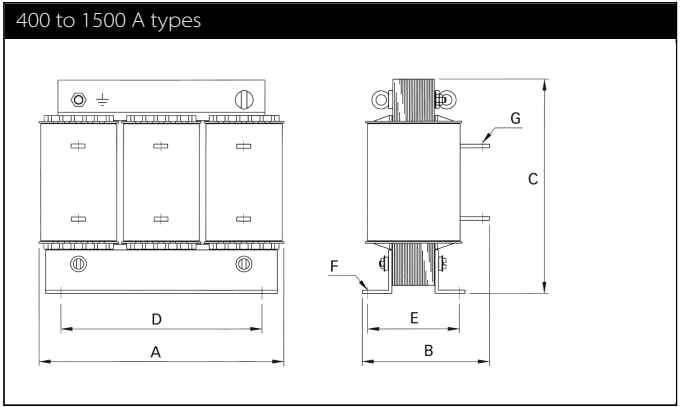
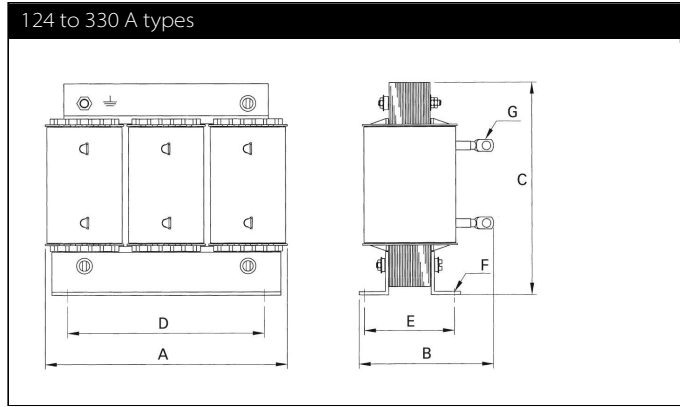
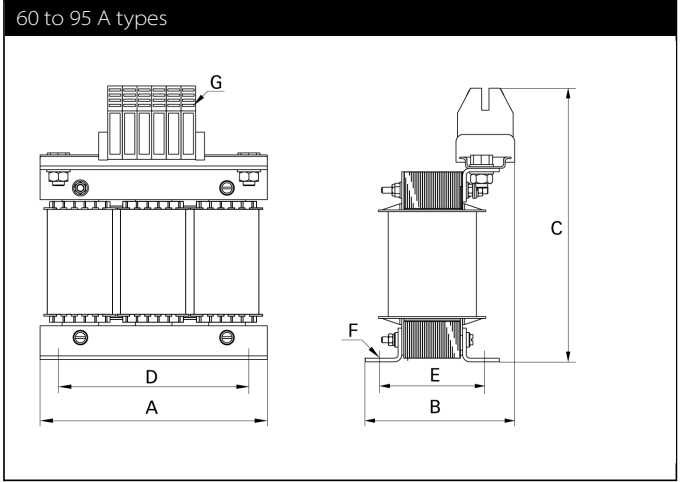
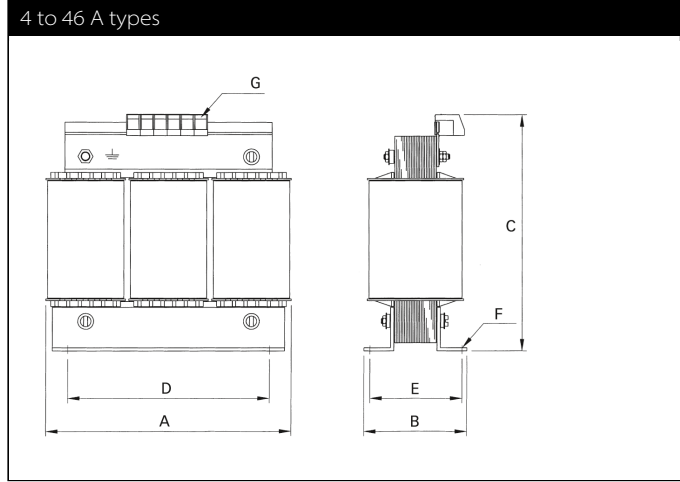
The table below shows various reactor impedance values and their calculated effect in terms of harmonics reduction.

Harmonic number/Input impedance (uk) vs. remaining harmonics [%]

| | 0.5% | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% |
|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 5th | 80 | 60 | 46 | 40 | 34 | 32 | 30 | 28 | 26 | 24 | 23 |
| 7th | 60 | 37 | 22 | 16 | 13 | 12 | 11 | 10 | 9 | 8.3 | 7.5 |
| 11th | 18 | 12 | 9 | 7.3 | 6.3 | 5.8 | 5.2 | 5 | 4.3 | 4.2 | 4 |
| 13th | 10 | 7.5 | 5.8 | 4.9 | 4.2 | 3.9 | 3.6 | 3.3 | 3.15 | 3 | 2.8 |
| 17th | 7.3 | 5.2 | 3.6 | 3 | 2.4 | 2.2 | 2.1 | 0.9 | 0.7 | 0.5 | 0.4 |
| 19th | 6 | 4.2 | 2.8 | 2.2 | 2 | 0.8 | 0.7 | 0.4 | 0.3 | 0.25 | 0.2 |
| %THID | 102.5 | 72.2 | 52.3 | 44.13 | 37.31 | 34.96 | 32.65 | 30.35 | 28.04 | 25.92 | 24.68 |

Reading example: a 4% impedance reactor typically reduces the THID to ~37% of the fundamental.

Mechanical data



Dimensions

| | A | B | C | D | E | F | G |
|----------------------|-----|----------|----------|-----|------|---------|---------------------|
| 4 A | 100 | max. 70 | max. 115 | 56 | 43 | 4.8 x 9 | 2.5 mm ² |
| 7 and 11 A | 125 | max. 80 | max. 130 | 100 | 55 | 5 x 8 | 2.5 mm ² |
| 16 A | 155 | max. 80 | max. 155 | 130 | 56.5 | 8 x 12 | 4 mm ² |
| 21 A | 155 | max. 95 | max. 155 | 130 | 70.5 | 8 x 12 | 4 mm ² |
| 29 A | 155 | max. 95 | max. 155 | 130 | 71.5 | 8 x 12 | 4 mm ² |
| 35 A | 155 | max. 105 | max. 170 | 130 | 70 | 8 x 12 | 10 mm ² |
| 46 A | 190 | max. 120 | max. 195 | 170 | 77.5 | 8 x 12 | 10 mm ² |
| 60 A | 210 | max. 155 | max. 240 | 175 | 97 | 8 x 12 | 16 mm ² |
| 75 A | 210 | max. 160 | max. 249 | 175 | 97 | 8 x 12 | 35 mm ² |
| 95 A | 230 | max. 185 | max. 275 | 180 | 122 | 8 x 12 | 35 mm ² |
| 124 and 156 A | 240 | max. 210 | max. 210 | 190 | 129 | 11 x 15 | Ø10 |
| 182 A | 265 | max. 210 | max. 230 | 215 | 114 | 11 x 15 | Ø10 |
| 230 A | 300 | 210 | 270 | 240 | 131 | 11 x 15 | Ø12 |
| 280 A | 300 | 218 | 270 | 240 | 139 | 11 x 15 | Ø12 |
| 330 A | 300 | 255 | 270 | 240 | 166 | 11 x 15 | Ø12 |
| 400 A | 420 | 205 | 390 | 370 | 133 | 11 x 15 | Ø11 |
| 500 A | 420 | 215 | 390 | 370 | 140 | 11 x 15 | Ø14 |
| 600 A | 420 | 225 | 390 | 370 | 149 | 11 x 15 | Ø14 |
| 680 A | 420 | 225 | 390 | 370 | 150 | 11 x 15 | Ø14 |
| 790 A | 420 | 240 | 390 | 370 | 162 | 11 x 15 | Ø18 |
| 910 A | 420 | 255 | 390 | 370 | 177 | 11 x 15 | 2 x Ø11 |
| 1100 A | 420 | 290 | 390 | 370 | 200 | 11 x 15 | 2 x Ø11 |
| 1310 A | 420 | 255 | 490 | 370 | 172 | 11 x 15 | 2 x Ø14 |
| 1500 A | 551 | 400 | 613 | 490 | 266 | 13 x 18 | 4 x Ø13 |

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

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