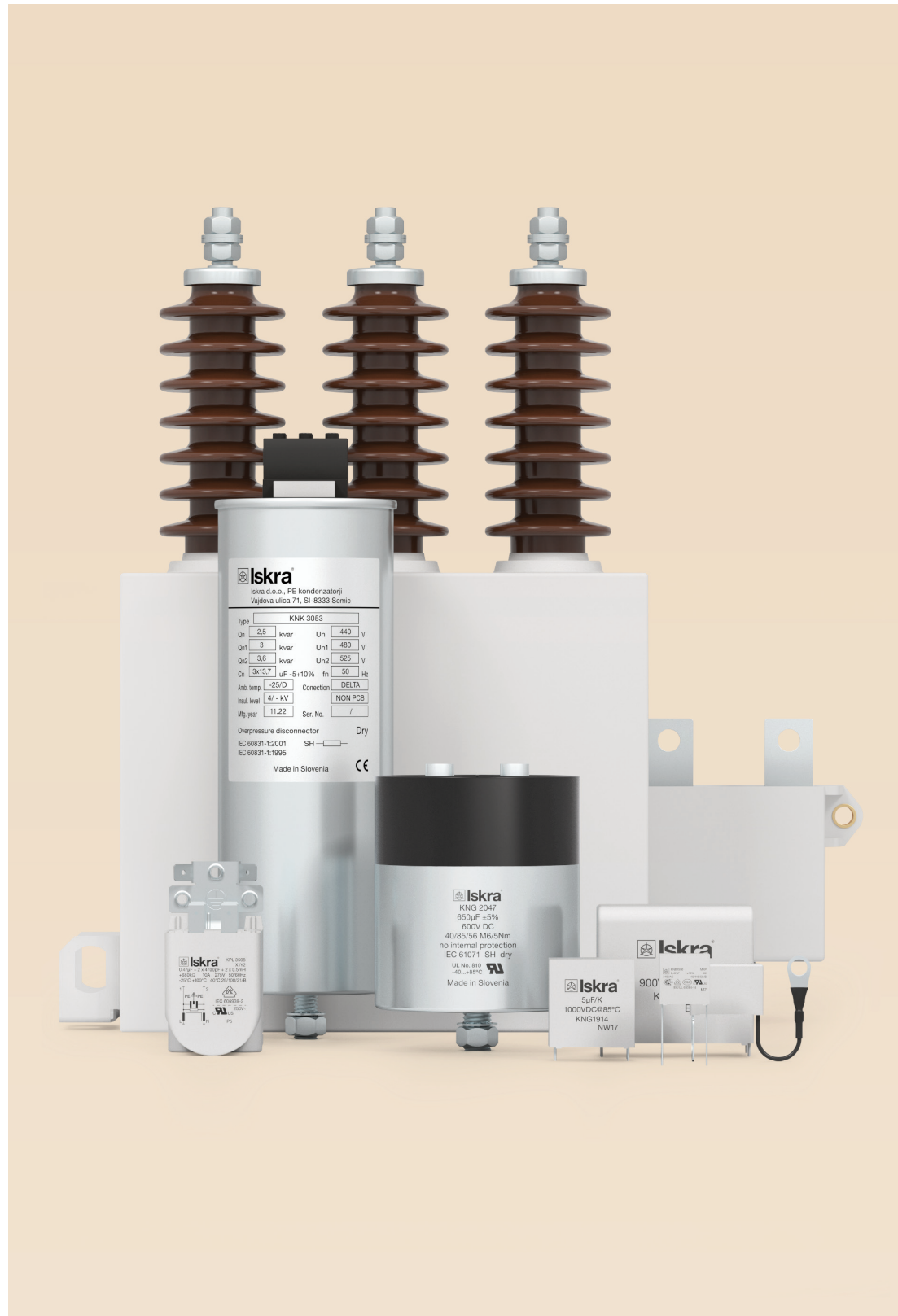


Capacitor selection guide



Power capacitors

| Application | Low voltage PFC | High voltage PFC | Induction heating | Radio frequency remote control | High voltage divider |
|----------------------------|--------------------|--|------------------------|--------------------------------|----------------------|
| Type | KNK | KLK | KLS | KLT | KID |
| Dielectric | Polypropylene film | All-film | All-film | All-film | Mixed |
| Electrodes | Metallized | Metal foil | Metal foil | Metal foil | Metal foil |
| Rated AC voltage | 230 - 690 V | 1 - 25 kV | 500 - 3.000 V | 1 - 35/ 3 kV | Up to 765 kV |
| Rated frequency | 50/60 Hz | 50/60 Hz | 50 - 10.000 Hz | 50 Hz (up to 1050 working) | 50/60 Hz |
| Rated power of capacitance | 1.67 - 100 kvar | Up to 720 kvar | Up to 4.000 kvar | 0.1 - 280 μF | 2000 pF - 22000 pF |
| Capacitance tolerance | ± 5%, ± 10% | - 5% ... + 10% | ± 5% ... ± 10% | ± 5% | - 5% ... + 10% |
| Climatic category | -25/D | -25/C -40/D on request | -25/45 AN +5/+45 WF | -25/C -40/D on request | -40/D |
| Standards | IEC 60831-1/2 | IEC 60871, NEMA CP1, IEEE Std 18, IEC 60358 | IEC 60110 | IEC 60871-1 | IEC 60358 |

Power factor correction equipment

| Type | Fixed PF banks with or without filter reactors | Automatic PFC banks | Automatic PFC banks with harmonics filter | Dynamic PFC banks | High voltage PFC (turnkey solutions) |
|--|--|--|--|--|--|
| Rated power | 10 - 100 kvar | 17.5 - 1000 kvar * | 50 - 1000 kvar * 7 % 189 Hz * | 50 - 1000 kvar * | 0.3 - 100 Mvar |
| Rated voltage | 400 V, 50 Hz other voltages on request | 400 V, 50 Hz other voltages on request | 400 V, 50 Hz other voltages on request | 400 V, 50 Hz other voltages on request | Up to 36 kV |
| Allowed overloading | 1.0 x U_n permanent 1.1 x U_n 8h/day 1.3 x I_n permanent | 1.0 x U_n permanent 1.1 x U_n 8h/day 1.3 x I_n permanent | 1.0 x U_n permanent 1.1 x U_n 8h/day 1.3 x I_n permanent | 1.0 x U_n permanent 1.1 x U_n 8h/day 1.3 x I_n permanent | 1.0 x U_n permanent 1.1 x U_n 8h/day 1.3 x I_n permanent |
| Temperature range | -25 ... +50 °C | -10 ... +50 °C | -10 ... +50 °C | -10 ... +50 °C | -25 ... +55 °C |
| Dielectric losses | ≤ 0.2 W/kvar | ≤ 0.2 W/kvar | ≤ 0.2 W/kvar | ≤ 0.2 W/kvar | ≤ 0.2 W/kvar |
| Total losses | < 1.5 W/kvar | < 1.5 W/kvar | < 5 W/kvar | ≤ 8 W/kvar | ≤ 5 W/kvar |
| Protection against excessive voltage contact | TN-C | TN-C or TN-S | TN-C or TN-S | TN-C or TN-S | Different versions available: - open rack - enclosed - one or multi steps |
| Standards | EN 60831/1-2 EN 60439 | EN 60831/1-2 EN 60439 | EN 60831/1-2 EN 60439 | EN 60831/1-2 EN 60439 | IEC 60871 2014, IEC 60071-1/2, IEC 60289, IEC 60529, IEC 62271-100 |




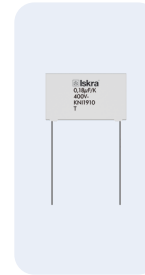
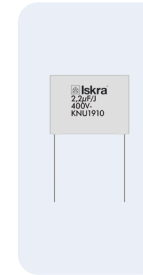

Note: * other types on request

Components for radio interference suppression

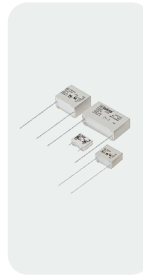







| Class | X1 | | X2 | | | | Y1 | Y2 | X2Y2 two-pole | X1Y2 two-pole | X1Y2 four-pole | X1Y2 | X1Y2 filters | | | |
|------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|---|--|---|--|
| Type | KNB154x * | KNB155x * | KNB156x * | KNB153x * | KNR153x - RC units | KNB158x | KNB253x | KNB252x | KNB753x | KPB73xx, KPB70xx | KPB7325 | KPB7077 | KNB7425 | KPL30xx | KPL35xx | KNL35xx |
| Dielectric | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Paper impregnated | Paper impregnated | Paper impregnated | Polypropylene film - metallized | Paper impregnated | Paper impregnated | Polypropylene film - metallized |
| Rated AC voltage | 440 V | 310 V | 275 V, 300 V | 300 V | 275 V | 310 V | 440 V | 250 V, 300 V | 275 V | 275 V | 275 V | 275 V | 275 V | 275 V | 275 V | 250 V |
| Capacitance range | 0.0022 - 0.68 µF | 0.01 - 2.2 µF | 0.01 - 6.8 µF | 0.01 - 10 µF | 0.01 - 0.47 µF R = 2.2 - 470 Ω | 0.01 - 15 µF | 470 - 22.000 pF | 1.000 - 0.15 µF | 0.1 - 0.25 µF X2 2×1.000 - 2×4.700 pF Y2 | 0.022 - 0.47 µF X1 2×2.500 - 2×27.000 pF Y2 | 0.01 - 0.27 µF X1 2×2.500 - 2×27.000 pF Y2 | 0.1 - 0.47 µF X1 2×5.000 - 2×27.000 pF Y2 | 0.1 µF - 2×2.500 pF 0.47 µF - 2×0.027 µF | 0.15 - 1 µF X1 2×2.000 - 2×27.000 pF Y2 | 0.25 - 1 µF X1 2×2.000 - 2×27.000 pF Y | 0.33 - 1 µF X1 2×2.000 - 2×27.000 pF Y2 |
| Capacitance tolerance | ± 10%, ± 20% | ± 10%, ± 20% | ± 10%, ± 20% | ± 10%, ± 20% | ± 10%, ± 20% | ± 10%, ± 20% | ± 10%, ± 20% | ± 10%, ± 20% | ± 20% | ± 20% | ± 20% | ± 20% | ± 20% | ± 20% | ± 20% | ± 20% |
| Inductance | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Rated current | - | - | - | - | - | - | - | - | - | - | 16 A | 16 A | 16 A | 3 - 16 A | 10 - 16 A | 10A/12.5A/16A |
| Temperature | - | - | - | - | θ _u 50 °C | - | - | - | - | - | θ _u 85 °C | WKG 85 °C | θ _u 85 °C | -40 to 100 °C | -25 to 100 °C | -25 to 100 °C |
| Climatic category | 40 / 100 / 56 | 40 / 110 / 56 | 40 / 110 / 56 40 / 125 / 56 | 40 / 100 / 56 | 40 / 85 / 56 | 40 / 110 / 56 | 40 / 100 / 56 | 40 / 100 / 56 | 40 / 100 / 56 | 25 / 100 / 21 | 25 / 100 / 21 | 25 / 100 / 21 | 25 / 100 / 21 | 40 / 100 / 561 | 25 / 100 / 21 | 25 / 100 / 21 |
| Standards / Approvals | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE IEC/UL 60384-14 CQC cURus | ENEC-10-VDE c CSA us IEC/UL/CSA 60384-14 | ENEC-10-VDE c CSA us IEC/UL/CSA 60384-14 | ENEC-10-VDE c CSA us IEC/UL/CSA 60384-14 | ENEC-10-VDE IEC/UL 60384-14 | ENEC-10-VDE IEC/UL 60939-2 cURus | ENEC-10-VDE IEC/UL 60939-2 cURus | ENEC-10-VDE IEC/UL 60939-2 |

Note: * Types KNB1530, KNB1540, KNB1550 and KNB1560 are available in CD version, which is recommended for serial connection with the mains

Capacitors for use in electronics

| Application | AC / DC general purpose | | | | | Motor running |
|---|---|---|---|--|---|--|
| Type | KEU1910 | KEU1012 | KLI1910 | KNI1910 | KNU1910 | KNM12xx, KNM22xx, KNM32xx |
|  |  |  |  |  |  | |
| Dielectric | Polyester film | Polyester film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film |
| Electrodes | Metallized | Metallized | Metallized | Metal foil and metallized | Double metallized and metallized | Metallized |
| Rated voltage | 63 - 1.000 V DC | 100 - 2.000 V DC | 100 - 2.000 V DC | 250 - 2.000 V DC | 250 - 1.600 V DC | 275 - 460 V AC |
| Capacitance range | 1.000 pF - 22 μF | 1.000 pF - 10 μF | 1.000 pF - 0.22 μF | 680 pF - 2.2 μF | 1.000 pF - 6.8 μF | 0.33 - 10 μF |
| Capacitance tolerance | ± 10%, ± 20% | ± 5%, ± 10%, ± 20% | ± 5%, ± 10%, ± 20% | ± 5%, ± 10%, ± 20% | ± 5%, ± 10%, ± 20% | ± 5%, ± 10% |
| Pulse loading | 2.5 - 90 V / μs | 2.5 - 90 V / μs | 2.200 - 20.500 V / μs | 300 - 7.000 V / μs | 45 - 450 V / μs | ≤ 1 μF: 100 V / μs > 1 μF: 50 V / μs |
| Climatic category | 55 / 100 / 56 | 55 / 100 / 56 | 55 / 100 / 56 | 55 / 100 / 56 | 55 / 100 / 56 | 25 / 85 / 21 40 / 85 / 56 |
| Pitch | 10 - 27.5 mm | Axial | 10 - 27.5 mm | 10 - 27.5 mm | 10 - 27.5 mm | 22.5 - 37.5 mm |
| Standards / Approvals | EN 60384-2 | EN 60384-2 | EN 60384-13, EN 60384-16 | EN 60384-16, EN 60384-17 | EN 60384-16 | EN 60252-1, UL 810 CSA C22.2 No. 190 |

Power electronic capacitors

| Application | AC / DC general purpose | DC link | Snubber | | | | | |
|---|---|---|---|---|---|---|---|---|
| Type | KNB191x | KNI5048 | KNG191x | KNG204x, KNG304x | HEV/EV | KNG491x | KNO19Ax, KNO19Bx | KNO191x |
|  |  |  |  |  |  |  |  | |
| Dielectric | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film | Polypropylene film |
| Electrodes | Metallized | Metallized | Metallized | Metal foil and metallized | Metallized | Metallized | Double metallized and metallized | Double metallized and metallized |
| Rated voltage | 250 - 440 V AC | 250 - 480 V AC | 450 - 1.300 V DC | 600 - 2.200 V DC | 480 - 800 V DC | 250 - 875 V DC | 630 - 3.000 V DC | 630 - 3.000 V DC |
| Rated capacitance | 0.1 - 80 μF | 10 - 600 μF | 0.1 - 480 μF | 75 - 1.740 μF | 300 - 1.100 μF | 0.22 - 100 μF | 0.047 - 8 μF | 0.047 - 8 μF |
| Capacitance tolerance | ± 5%, ± 10% | ± 5%, ± 10% | ± 5%, ± 10% | ± 5%, ± 10% | ± 5%, ± 10% | ± 5%, ± 10% | ± 5%, ± 10% | ± 5%, ± 10% |
| Climatic category | 40 / 85 / 56 | 40 / 85 / 56 | 40 / 85 / 56 | 40 / 85 / 56 | 40 °C ... 85 °C | 40 / 85 / 56 | 40 / 85 / 56 | 40 / 85 / 56 |
| Life expectancy | > 60.000 h at U _{rms} | > 60.000 h at U _{rms} | > 100.000 h at U _{NDC} | > 100.000 h at U _{NDC} | > 100.000 h at U _{NDC} | > 100.000 h at U _{NDC} | > 100.000 h at U _{NDC} | > 100.000 h at U _{NDC} |
| Terminal | Parallel tinned copper wire (2 or 4 pins) | Screw: M6, M10 | Parallel tinned copper wire (2, 4 or 12 pins) | Female: M6×10 male: M8×23 | Tinned copper | Parallel tinned copper wire (2 or 4 pins) | Fixing lugs for M6 or M8 screws | Parallel tinned copper wire (2 or 4 pins) |
| Standards | IEC 61071 | IEC 61071 cURus CSA C22.2 No. 190 10.000 AFC | IEC 61071 AECQ200 (on request) | IEC 61071 cURus UL 810 | IEC 61071 | IEC 61071 AECQ200 (on request) | IEC 61071 AECQ200 (on request) | IEC 61071 AECQ200 (on request) |