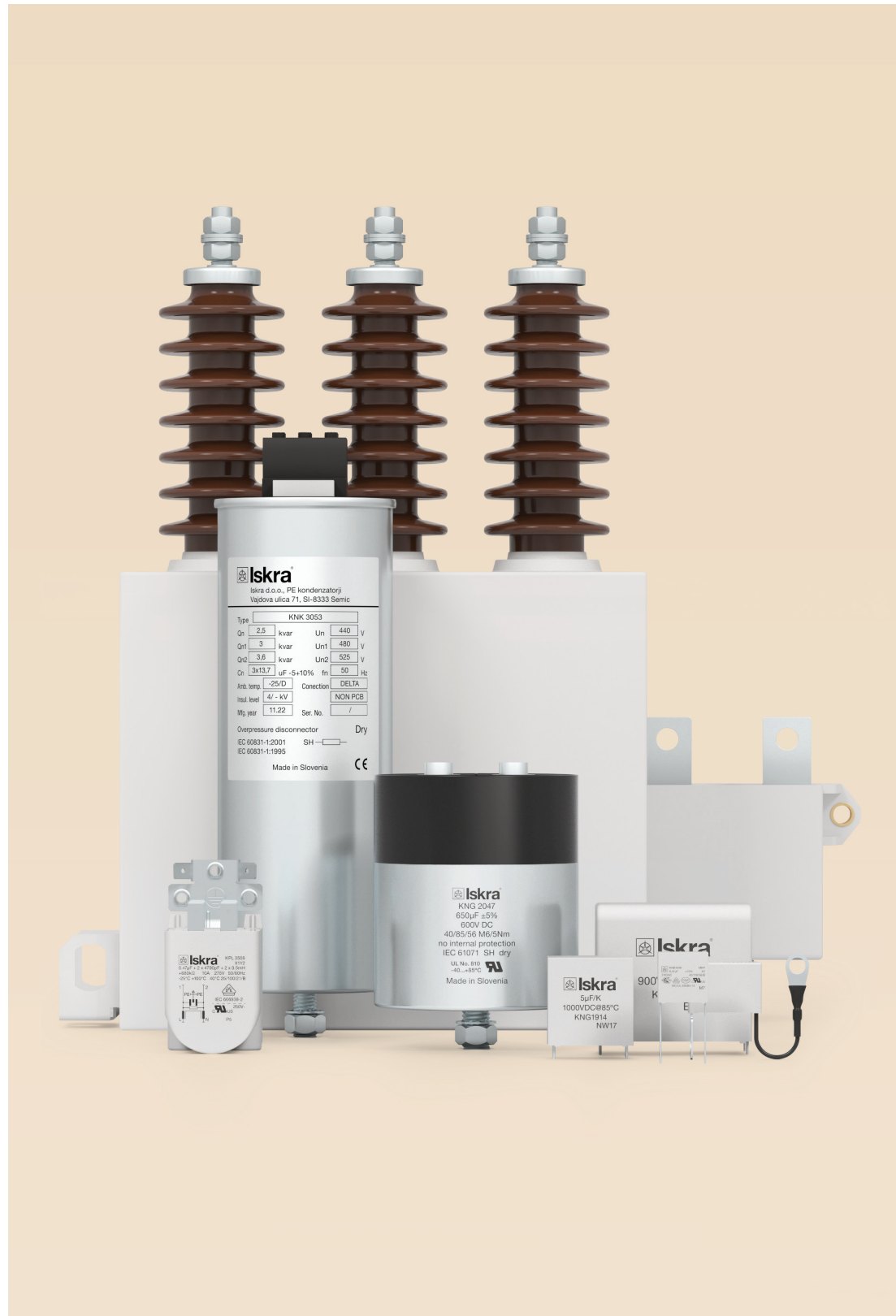


Capacitor selection guide



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





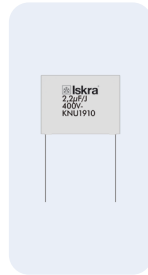

Note: * other types on request

Components for radio interference suppression

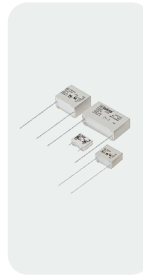







Class	X1		X2				Y1	Y2	X2Y2 two-pole	X1Y2 two-pole	X1Y2 four-pole	X1Y2	X1Y2 filters			
Type	KNB154x *	KNB155x *	KNB156x *	KNB153x *	KNR153x - RC units	KNB158x	KNB253x	KNB252x	KNB753x	KPB73xx, KPB70xx	KPB7325	KPB7077	KNB7425	KPL30xx	KPL35xx	KNL35xx
Dielectric	Polypropylene film	Polypropylene film	Polypropylene 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 μ F	0.01 - 2.2 μ F	0.01 - 6.8 μ F	0.01 - 10 μ F	0.01 - 0.47 μ F R = 2.2 - 470 Ω	0.01 - 15 μ F	470 - 22.000 pF	1.000 - 0.15 μ F	0.1 - 0.25 μ F X2 2x1.000 - 2x4.700 pF Y2	0.022 - 0.47 μ F X1 2x2.500 - 2x27.000 pF Y2	0.01 - 0.27 μ F X1 2x2.500 - 2x27.000 pF Y2	0.1 - 0.47 μ F X1 2x5.000 - 2x27.000 pF Y2	0.1 μ F - 2x2.500 pF 0.47 μ F - 2x0.027 μ F	0.15 - 1 μ F X1 2x2.000 - 2x27.000 pF Y2	0.25 - 1 μ F X1 2x2.000 - 2x27.000 pF Y	0.33 - 1 μ F X1 2x2.000 - 2x27.000 pF Y2
Capacitance tolerance	\pm 10%, \pm 20%	\pm 10%, \pm 20%	\pm 10%, \pm 20%	\pm 10%, \pm 20%	\pm 10%, \pm 20%	\pm 10%, \pm 20%	\pm 10%, \pm 20%	\pm 10%, \pm 20%	\pm 20%	\pm 20%	\pm 20%	\pm 20%	\pm 20%	\pm 20%	\pm 20%	\pm 20%
Inductance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rated current	-	-	-	-	-	-	-	-	-	-	16 A	16 A	16 A	3 - 16 A	10 - 16 A	10A/12.5A/16A
Temperature	-	-	-	-	θ_u 50 $^{\circ}$ C	-	-	-	-	-	θ_u 85 $^{\circ}$ C	WKG 85 $^{\circ}$ C	θ_u 85 $^{\circ}$ C	-40 to 100 $^{\circ}$ C	-25 to 100 $^{\circ}$ C	-25 to 100 $^{\circ}$ 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)