Types of Capacitors
and their use

Capacitors for use in motor-driven applications

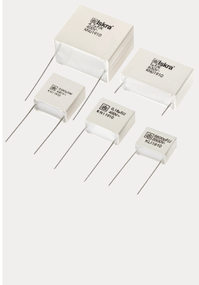
KEA, KPA

Capacitors KEA are used for radio interference suppression in motor vehicles, which are caused by: devices for startup, electromotors, pumps for fuel, siren, control instruments, etc.

Devices for start-up of:
- Electromotors
- Fuel pumps
- Sirens
- Control instruments
- Lawn mowers
- Motorbikes
- Sawing machines
- Chainsaws

Capacitors for use in automotive electronics

MKP



Radio interference suppression, elimination of voltage spikes.

Automotive electronics:
- Fuel pump
- Electric windows
- Electric seats
- Windscreen wipers
- Power steering
- Braking system
- Keyless entry
- Tire pressure monitoring

Filters for radio interference suppression

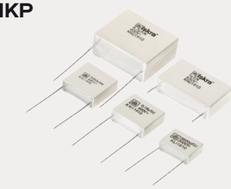
KPB, KNB, KNR, KPR, KPL. KNL

EMI RFI Capacitors and Filters for radio-interference suppression class X1, X2, X1Y2, Y1 are used in home appliances, electrical hand tools and DC electromotors.

- Household appliances,
- Electrical hand tools
- DC electromotors in electronic, audio and video devices
- Chargers
- Measurement instruments

Capacitors for use in EV charging stations

MKP



X2 Y2

Y1 capacitors are used in special applications with a higher peak voltage requirements and also power supplies / SMPS, industrial applications, household equipment with a fixed mains connection (EN 60065-1). The main area of application for the newly defined Y1 class is as a ratio interference suppression capacitor between the primary and secondary ground of SMPS.

Charging station electronics:
- Energy conversion

Power factor correction

KNK, KLV

Power factor correction (PFC) aims to improve power factor, and therefore power quality. It reduces the load on the electrical distribution system, increases energy efficiency and reduces electricity costs. It also decreases the likelihood of instability and failure of equipment.

Widely used in many industries such as oil and chemical industry, metallurgy, coal mine, power grid, hospitals, sewage plants, railway, subway, airport, seaport, telecommunication, solar and wind power plants, etc.

Types of Capacitors
and their use

Snubber, switching capacitors

KNO

KNP

Snubber capacitors are used in applications where high pulse loadings and high frequencies are presented. Their purpose is to eliminate voltage spikes, which are caused by semiconductors or other devices.

DC/AC inverters for:
- Wind, solar power plants
- Welding equipment
- UPS systems
- Hybrid vehicles
- IGBT modules
- Frequency inverters

DC link capacitors

KNG

DC link capacitors are suitable for Automotive (HEV/EV/EV charging stations), industrial inverter/converters, wind and solar power plants.

DC/AC inverters for:
- Wind, solar power plants
- Welding equipment
- UPS systems
- Hybrid vehicles
- IGBT modules
- Frequency inverters

Power capacitors, Surge protection capacitors

KLV

Reactive power compensation in electrical networks, industrial plants and filter circuit installations. Surge protection for large motors and generators, MV switchgear, motor control centers and large transformers.

- High voltage AC Power capacitors
- High voltage surge protection capacitors

Low voltage power capacitors

KNK

Used for power factor correction in industrial networks for voltages up to 690 V. Low voltage power factor correction capacitors can achieve savings by lowering the power factor.

Low voltage AC Power capacitors for:
- Transformers
- Electric motors
- Rectifiers

Capacitors for audio-frequency remote control

KLT

Audio frequency data transfer through power lines.

- Electrical power stations
- Different control centres

Induction heating capacitors

KLS

KLS capacitors can be used in oscillatory circuits of devices for inductive heating, which are very frequently used in forging, tempering and melting of metals.

- Smelting
- Forging
- Tempering ovens

Capacitors for power electronics

KNI

Used as impulsive, filtering, and smoothing capacitors in power electronic devices (usually in commutators and lasers) and as dumping capacitors in AC applications.

AC single and three phase filtering for:
- Commutators
- Lasers

Motor starting and motor running capacitors

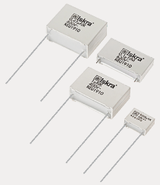
KNM

Used for obtaining an auxiliary phase in single-phase motors and in three-phase motors connected to a single-phase. They can also be used in industrial electronic circuits where capacitors are lower pulse loaded (Class P0).

Household appliances:
- Window blinds
- Sewing machines
- Mixers

Capacitors for use in electronics

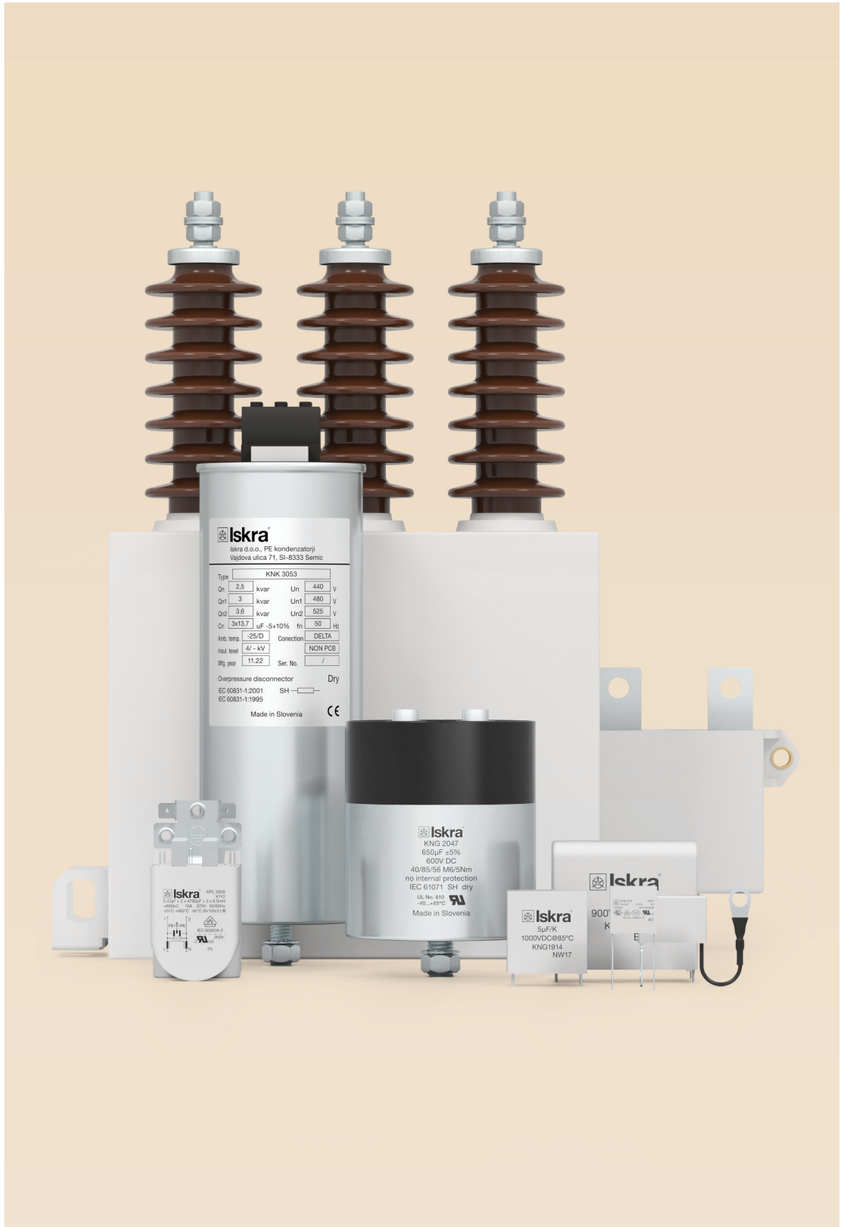
KEU, KNI, KNU



Used in electronic devices as audio, video and measurement devices, medical and electrical equipment and devices in industrial electronics.

- Audio, video and measurement devices
- Medical and electrical equipment and devices in industrial electronics

Capacitor
selection guide



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Power capacitors

Application	Low voltage PFC	High voltage PFC	Induction heating	Radio frequency remote control	High voltage divider
Type	**KNK**	**KLV**	**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

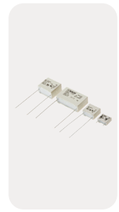
Power factor correction equipment

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 excesive 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

Capacitors
selection guide

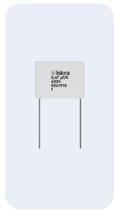
Components for radio interference suppresion

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	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 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
selection guide

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)

Capacitors
for automotive applications

About Iskra Capacitors

Iskra capacitor plant is located in Semič, Slovenia.
With a history going back almost 75 years, ISKRA develops cutting edge products and system solutions. We have a proven global track record in designing, engineering, and manufacturing a wide range of capacitors compliant with the strictest regulations and safety standards.

With our expertise we offer full product customization and make your idea work. Iskra supports your business by producing fully customized capacitors for automotive applications based on your specific requirements while contributing to the increased safety, low energy consumption, and comfort of automobiles.

Our commitment is clear – with utmost precision and dedication to detail, we support our partners all the way.

Long-term trust and quality that will fulfill all your needs.

Certificates

ENEC
ENEC is the high quality European mark for electrical products that demonstrates compliance with European safety standards.

VDE
Standards for innovation and safety

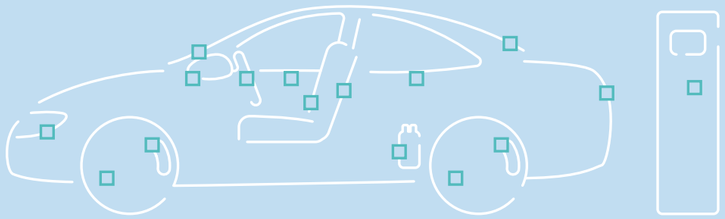
RU
Recognized Component Mark.

RU
Recognized Component Mark for United States and Canada

CQC
China Quality Certification Center

Capacitors
for automotive applications

Application	Electric drivers	MKP	MKT	X2, Y2	Power
Power train	Fuel pump		■		
	EV charging station	■		■	■
	DC/DC converter, inverter	■		■	■
Safety	HID lamps	■			
	Tire pressure monitoring		■		
	Breaking system		■		
Comfort	Electric mirrors	■	■		
	Keyless entry	■			
	Electric seats	■	■	■	
	Electric windows	■	■		
	Windscreen wipers	■	■		
	Power steering	■	■		



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Capacitors
for automotive applications

Power capacitors
DC link

Type	KNG191x	KNG204x, KNG304x	HEV/EV	KNA96D6
				
Dielectric	Polypropylene film	Polypropylene film	Polypropylene film	Self healing metallized polypropylene
Electrodes	Metallized	Metal foil and metallized	Metallized	
Rated voltage	450 - 1.300 V DC	600 - 2.200 V DC	480 - 800 V DC	600 VDC at 85 °C
Rated capacitance	0.1 - 480 µF	75 - 1.740 µF	300 - 1.100 µF	480 µF
Capacitance tolerance	± 5%, ± 10%	± 5%, ± 10%	± 5%, ± 10%	±10 % (code K)
Climatic category	40 / 85 / 56	40 / 85 / 56	40 °C ... 85 °C	40 / 85 / 56
Life expectancy	> 100.000 h at U_{NDC}	> 100.000 h at U_{NDC}	> 100.000 h at U_{NDC}	> 100.000 h at U_{NDC}
Terminals	Parallel tinned copper wire (2, 4 or 12 pins)	Female: M6×10 Male: M8×23	Tinned copper	Tinned copper lugs for screw fixing M8
Standards	IEC 61071 AECQ200 (on request)	IEC 61071 cURus UL 810	IEC 61071	IEC 61071

Snubber

Type	KNG491x	KNO19Ax, KNO19Bx	KNO191x
			
Dielectric	Polypropylene film	Polypropylene film	Polypropylene film
Electrodes	Metallized	Double metallized and metallized	Double metallized and metallized
Rated voltage	250 - 875 V DC	630 - 3.000 V DC	630 - 3.000 V DC
Rated capacitance	0.22 - 100 µF	0.047 - 8 µF	0.047 - 8 µF
Capacitance tolerance	± 5%, ± 10%	± 5%, ± 10%	± 5%, ± 10%
Climatic category	40 / 85 / 56	40 / 85 / 56	40 / 85 / 56
Life expectancy	> 100.000 h at U_{NDC}	> 100.000 h at U_{NDC}	> 100.000 h at U_{NDC}
Terminals	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 AECQ200 (on request)	IEC 61071 AECQ200 (on request)	IEC 61071 AECQ200 (on request)

Capacitors
for automotive applications

MKP capacitors

Type	KLI1910	KNI1910	KNU1910
			
Dielectric	Polypropylene film	Polypropylene film	Polypropylene film
Electrodes	Metal foil and metallized	Metal foil and metallized	Metallized
Rated DC voltage	100 - 2.000 V	2500 - 2.000 V	250 - 1.600 V
Capacitance range	1.000 pF - 0.22 µF	680 pF - 2.2 µF	1.000 pF – 6.8 µF
Capacitance tolerance	± 5%, ± 10%, ± 20%	± 5%, ± 10%, ± 20%	± 5%, ± 10%, ± 20%
Pulse loading	2.200 - 20.500 V / µs	300 - 7.000 V / µs	45 - 4.500 V / µs
Climatic category	55 / 100 / 56	55 / 100 / 56	55 / 100 / 56
Pitch	10 - 27.5 mm	10 - 27.5 mm	10 - 27.5 mm
Standards / Approvals	EN 60384-13, EN 60384-16	EN 60384-16, EN 60384-17	EN 60384-16

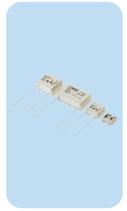
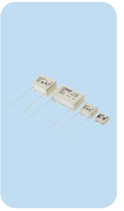
MKT capacitors

Type	KEU1910	KEA1xxx
		
Dielectric	Polyester film	Polyester film
Electrodes	Metallized	Metallized
Rated DC voltage	63 - 2.000 V	100 V
Capacitance range	1.000 pF - 22 µF	0.47 pF – 2.2 µF
Capacitance tolerance	± 5%, ± 10%, ± 20%	± 20%
Pulse loading	2.5 - 90 V / µs	5 V / µs
Climatic category	55 / 100 / 56	-40 °C ... 100 °C
Pitch	10 - 27.5 mm	
Standards / Approvals	IEC 60384-2 AEC-Q200 (on request)	

Y2 capacitors

Type	KNB252x
	
Dielectric	Polypropylene film
Rated AC voltage	250 V, 300 V
Capacitance range	1.000 pF - 0.15 µF
Capacitance tolerance	± 10%, ± 20%
Climatic category	40 / 100 / 56
Standards / Approvals	ENEC 10 VDE IEC/UL 60384-14 CQC cURus AEC-Q200 (on request)

X2 capacitors

Type	KNB156x	KNB153x	KNR153x RC-units	KNB158x
				
Dielectric	Polypropylene film	Polypropylene film	Polypropylene film	Polypropylene film
Rated AC voltage	275 V, 300 V	275 V, 300 V	275 V	305 V, 310 V
Capacitance range	0.01 - 6.8 µF	0.01 - 10 µF	0.01 - 0.47 µF R = 2.2 - 470 Ω	0.01 - 15 µF
Capacitance tolerance	± 10%, ± 20%	± 10%, ± 20%	± 10%, ± 20%	± 10%, ± 20%
Climatic category	40 / 100 / 56 40 / 125 / 56	40 / 100 / 56	40 / 100 / 56	40 / 110 / 56
Standards / Approvals	ENEC-10-VDE IEC/UL 60384-14 CQC cURus AEC-Q200 (on request)	ENEC-10-VDE IEC/UL 60384-14 CQC cURus AEC-Q200 (on request)	ENEC-10-VDE IEC/UL 60384-14 AEC-Q200 (on request)	ENEC-10-VDE IEC/UL 60384-14 CQC cURus AEC-Q200 (on request)