Kendeil™

ALUMINIUM ELECTROLYTIC CAPACITORS

PRODUCTS CATALOGUE

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COMPANY PRESENTATION

Kendeil is an italian company with **40 years of experience** in manufacturing high quality aluminium electrolytic capacitors.

Actual production range spreads from large can screw terminal type capacitors with high end performances to snap in terminal type capacitors mainly used on pcb boards, and to the motor start type for alternate current applications.

A continuous improvement in building technology and automatic computerized machines gives the company a leading role in the market of electronics components, along with competitive priced products and reliability performances.
Also the flexibility of its structure is able to meet any custom design requirement.

All capacitors are international standards compliants CECC, DIN, IEC, and the company are certified under the ISO 9001.

Visit our website
www.kendeil.com

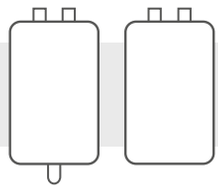
IMQ CERTIFIED
QUALITY MANAGEMENT SYSTEM
ISO 9001:2015

IQNET
RECOGNIZED CERTIFICATION

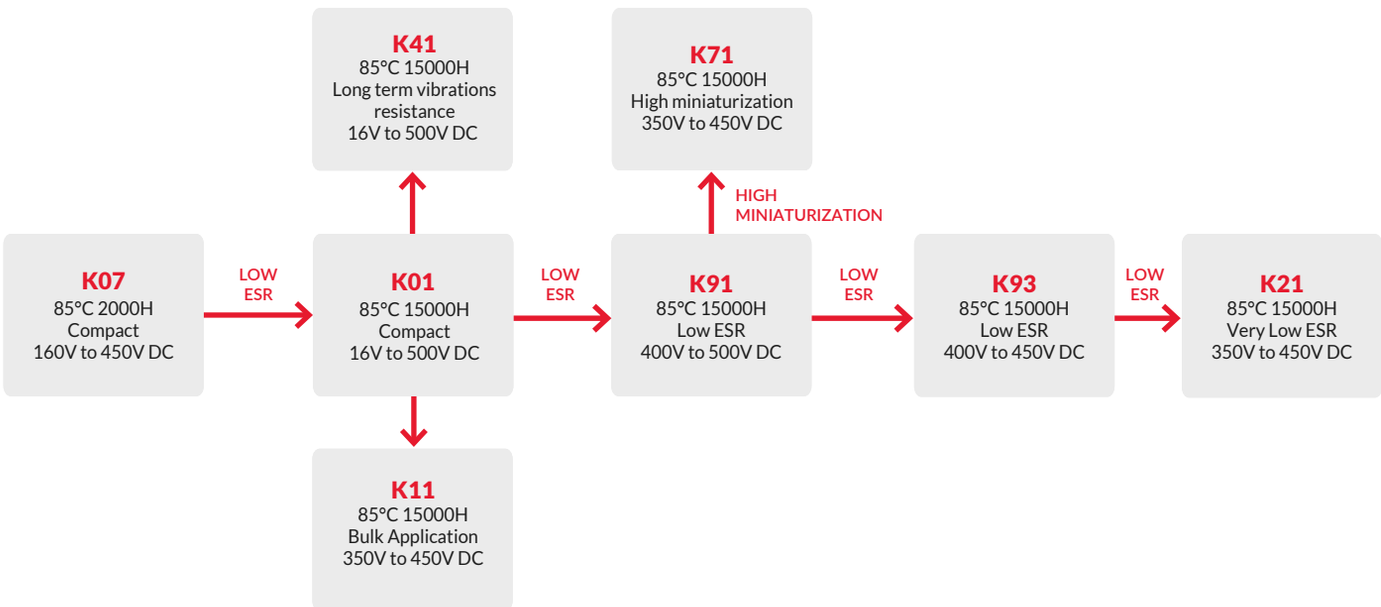
RoHS Compliant

PRODUCT ROAD MAP
FOR SCREW TYPE CAPACITORS

Screw Terminals Type

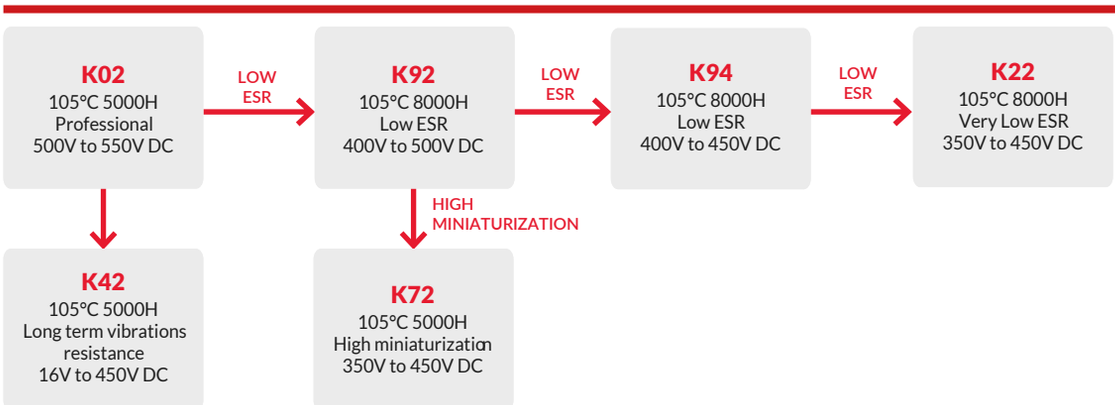


GENERAL



EXTENDED LIFE

EXTENDED TEMPERATURE



LOWER TEMPERATURE -55°C

PART NUMBER SYSTEM
FOR SCREW TYPE CAPACITORS

New PART-NUMBER CODE in use since Sep 2010. Total length is 17 digits.
Please see examples below and have a reference code from the standard ratings capacitors pages.

EXAMPLE

	TYPE	VOLTAGE	CAPACITANCE CODE	TERM	INSERT	TOL	RES	CASE SIZE
EXAMPLE	K01	100	223	0	H	M	0	H105
DIGIT	1-2-3	4-5-6	7-8-9	10	11	12	13	14-15-16-17

			DIGIT NUMBER
TYPE	Screw Aluminium Electrolytic Capacitor Type		*1-2-3*
VOLTAGE	Rated Voltage [VDC]		*4-5-6*
CAPACITANCE CODE [µF]	2 Significant Digits Plus Third Digit Specifies Number Of Zeros		*7-8-9*
TERM	Terminal As Follow:	0= No Stud M= M8x12 Stud Only Ø 35 Mm S= M12x16 Stud For Ø 51-63-72-76-90-100 mm	*10*
INSERT	Decks Insert Type	H = STD High Ripple: diam 51-63-76 (M5), diam.90 (M6) 0 = small diameter M5 L = M5 long insert style (*) 6 = M6 diam 76 ONLY K = M5 PARP (Protection Against Reversal Polarity) B = M5 PARP 76 ONLY Q = M6 PARP (Protection Against Reversal Polarity) U = thread size 10-32 UNF High Post R = 1/4 28 UNF High Post Z = thread size 10-32 UNF Low Post W = 1/4 28 UNF Low Post	*11*
TOL	Tolerance Range	M= ±20% Q= -10% +30% X= Custom T= -10% +50% U= -10% +75%	*12*
RES	0= Standard Ratings		*13*
CASE SIZE	Digit 14 = Diameter Code: E= 35 mm G = 51 mm H = 63 mm M = 72 mm J = 76 mm L = 90 mm P = 100mm Digits 15, 16 and 17 = Length (In mm)		*14-15-16-17*

Specifications subject to change without notice

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CAP WEIGHT TABLE
FOR SCREW TYPE CAPACITORS

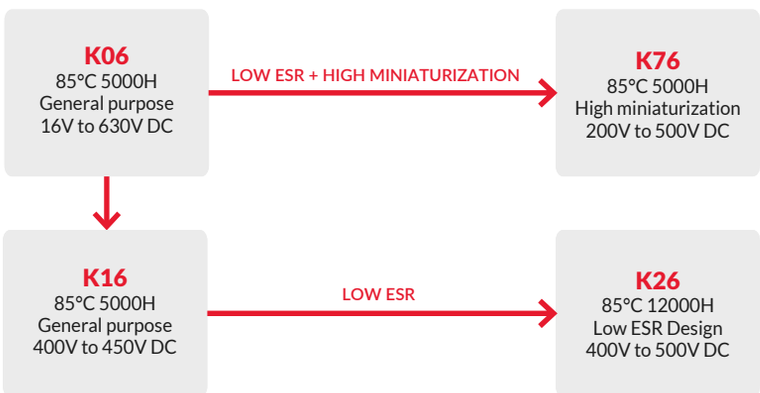
SIZE Ø x L mm	SIZE Ø x L in	CASE CODE	APPROX UNIT WEIGHT grams	QTY/BOX pcs	BOX DIMENSIONS cm
35x51	1,38x2,01	E051	80	60	36 x 25 x 6
35x60	1,38x2,36	E060	90	60	36 x 25 x 8
35x79	1,38x3,11	E079	110	60	36 x 25 x 8
35x100	1,38x3,94	E100	121	50	38.5 x 38.5 x 14
35x120	1,38x4,72	E120	133	50	38.5 x 38.5 x 14
51x60	2,01x2,36	G060	110	42	38.5 x 38.5 x 14
51x79	2,01x3,11	G079	200	42	38.5 x 38.5 x 14
51x96	2,01x3,78	G096	252	42	38.5 x 38.5 x 14
51x105	2,01x4,13	G105	260	42	38.5 x 38.5 x 14
51x115	2,01x4,53	G115	270	42	38.5 x 38.5 x 20
51x130	2,01x5,12	G130	352	42	38.5 x 38.5 x 20
51x143	2,01x5,63	G143	370	42	38.5 x 38.5 x 20
63x60	2,48x2,36	H060	240	25	38.5 x 38.5 x 14
63x79	2,48x3,11	H079	280	25	38.5 x 38.5 x 14
63x96	2,48x3,78	H096	366	25	38.5 x 38.5 x 14
63x105	2,48x4,13	H105	420	25	38.5 x 38.5 x 14
63x115	2,48x4,53	H115	488	25	38.5 x 38.5 x 20
63x130	2,48x5,12	H130	527	25	38.5 x 38.5 x 20
63x143	2,48x5,63	H143	540	25	38.5 x 38.5 x 20
72x116	2,83x4,57	M116	576	16	38.5 x 38.5 x 20
76x79	2,99x3,11	J079	450	16	38.5 x 38.5 x 14
76x93	2,99x3,66	J093	540	16	38.5 x 38.5 x 14
76x105	2,99x4,13	J105	600	16	38.5 x 38.5 x 20
76x115	2,99x4,53	J115	616	16	38.5 x 38.5 x 20
76x130	2,99x5,12	J130	720	16	38.5 x 38.5 x 20
76x143	2,99x5,63	J143	940	16	38.5 x 38.5 x 20
76x150	2,99x5,91	J150	960	8	37 x 26 x 26
76x155	2,99x6,10	J155	980	8	37 x 26 x 26
76x170	2,99x6,69	J170	1070	8	37 x 26 x 26
76x194	2,99x7,64	J194	1210	8	37 x 26 x 26
76x214	2,99x8,43	J214	1540	8	37 x 26 x 26
76x220	2,99x8,66	J220	1560	8	37 x 26 x 26
76x240	2,99x9,45	J240	1640	8	37 x 26 x 26
90x98	3,54x3,86	L098	870	6	37 x 26 x 26
90x145	3,54x5,71	L145	1250	6	37 x 26 x 26
90x190	3,54x7,48	L190	1680	6	37 x 26 x 26
90x196	3,54x7,72	L196	1690	6	37 x 26 x 26
90x200	3,54x7,87	L200	1710	6	37 x 26 x 26
90x220	3,54x8,66	L220	1790	6	37 x 26 x 26
90x230	3,54x9,06	L230	1840	6	37 x 26 x 26
90x240	3,54x9,45	L240	1880	6	37 x 26 x 26
100x145	3,94x5,71	P145	1510	5	37 x 26 x 26
100x190	3,94x7,48	P190	2010	5	37 x 26 x 26
100x196	3,94x7,72	P196	2070	5	37 x 26 x 26
100x200	3,94x7,87	P200	2120	5	37 x 26 x 26
100x220	3,94x8,66	P220	2230	5	37 x 26 x 26
100X230	3,94x9,06	P230	2440	5	37 x 26 x 26
100x240	3,94x9,45	P240	2540	5	37 x 26 x 26

NOTE: Only main products listed

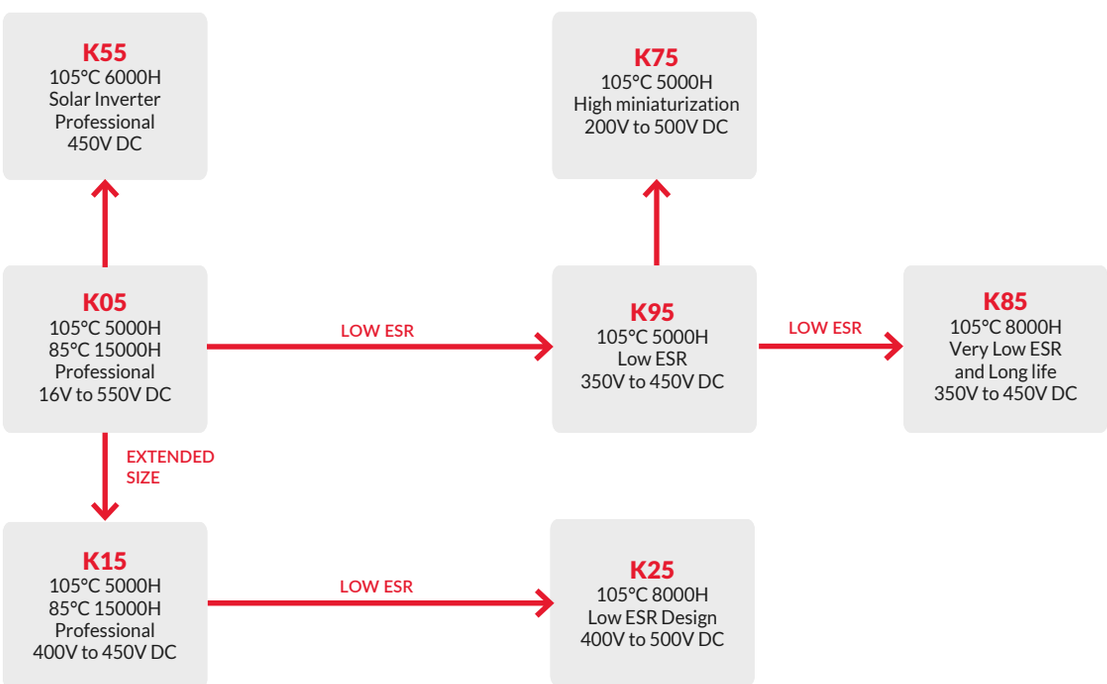
PRODUCT ROAD MAP
FOR SNAP-IN TYPE CAPACITORS

Snap In Type

85°C



105°C



PART NUMBER SYSTEM
FOR SNAP-IN TYPE CAPACITORS

New PART-NUMBER CODE in use since Sep 2010. Total length is 17 digits.
Please see examples below and have a reference code from the standard ratings capacitors pages.

EXAMPLE
K05 450V, 470µF, Standard pin, ±20%, 35x50

	TYPE	VOLTAGE	CAPACITANCE CODE	TERM	INSERT	TOL	RES	CASE SIZE
EXAMPLE	K05	450	471	0	P	M	0	E050
DIGIT	1-2-3	4-5-6	7-8-9	10	11	12	13	14-15-16-17

		DIGIT NUMBER
TYPE	Kendeil Aluminium Electrolytic Capacitor Type	*1-2-3*
VOLTAGE	DC Rated Voltage [V]	*4-5-6*
CAPACITANCE CODE [µF]	2 Significant Digits Plus Multiplying Factor 1=x10, 2=x100, 3=x1000, 4=x10000	*7-8-9*
TERM	Terminal As Follow: 0 = STD 2 pin 6.3mm 1 = 2 pin 4.5mm 3 = 3 pin 4 = 4 pin 5 = 5pin 6 = 4pin 4.5mm	*10*
INSERT	Insert Type on decks P = (pin type)	*11*
TOL	Tolerance Range M = ±20% Q = -10% +30% X = Custom	*12*
RES	0 = Standard Ratings, 1 = special, n = others	*13*
CASE SIZE	Digit 14 = Diameter Code: A = 20 mm B = 22 mm C = 25 mm D = 30 mm E = 35 mm F = 40 mm N = 45mm V = 50mm Digits 15,16 and 17 = Length (in mm)	*14-15-16-17*

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CAP WEIGHT TABLE
FOR SNAP-IN TYPE CAPACITORS

SIZE Ø x L mm	SIZE Ø x L in	CASE CODE	APPROX UNIT WEIGHT grams	QTY/BOX pcs	BOX DIMENSIONS cm
22x25	0,87x0,98	B025	15	160	36 x 25 x 4
22x30	0,87x1,18	B030	19	160	36 x 25 x 4
22x40	0,87x1,57	B040	24	160	36 x 25 x 6
25x25	0,98x0,98	C025	16	126	36 x 25 x 4
25x30	0,98x1,18	C030	21	126	36 x 25 x 4
25x35	0,98x1,38	C035	27	126	36 x 25 x 6
25x40	0,98x1,57	C040	30	126	36 x 25 x 6
25x50	0,98x1,97	C050	38	126	36 x 25 x 6
30x25	1,18x0,98	D025	24	88	36 x 25 x 4
30x30	1,18x1,18	D030	27	88	36 x 25 x 4
30x35	1,18x1,38	D035	32	88	36 x 25 x 6
30x40	1,18x1,57	D040	43	88	36 x 25 x 6
30x45	1,18x1,77	D045	49	88	36 x 25 x 6
30x50	1,18x1,97	D050	55	88	36 x 25 x 6
30x60	1,18x2,36	D060	67	88	36 x 25 x 8
35x25	1,38x0,98	E025	42	60	36 x 25 x 4
35x30	1,38x1,18	E030	45	60	36 x 25 x 4
35x35	1,38x1,38	E035	50	60	36 x 25 x 6
35x40	1,38x1,57	E040	53	60	36 x 25 x 6
35x45	1,38x1,77	E045	70	60	36 x 25 x 6
35x50	1,38x1,97	E050	78	60	36 x 25 x 6
35x55	1,38x2,17	E055	83	60	36 x 25 x 8
35x60	1,38x2,36	E060	88	60	36 x 25 x 8
35x77	1,38x3,03	E077	114	60	36 x 25 x 9
40x50	1,57x1,97	F050	98	48	36 x 25 x 6
40x60	1,57x2,36	F060	117	48	36 x 25 x 8
40x77	1,57x3,03	F077	138	40	36 x 25 x 9
40x97	1,57x3,82	F097	181	50	38.5 x 38.5 x 14
40x105	1,57x4,13	F105	204	50	38.5 x 38.5 x 14
45x60	1,77x2,36	N060	170	35	36 x 25 x 8
45x77	1,77x3,03	N077	200	35	36 x 25 x 9
45x97	1,77x3,82	N097	240	49	38.5 x 38.5 x 14
45x105	1,77x4,13	N105	260	49	38.5 x 38.5 x 14
50x60	1,97x2,36	V060	97	42	38.5 x 38.5 x 14
50x77	1,97x3,03	V077	180	42	38.5 x 38.5 x 14
50x105	1,97x4,13	V105	240	42	38.5 x 38.5 x 14

BUILDING AN ELECTROLYTIC CAPACITOR

APPLICATIONS

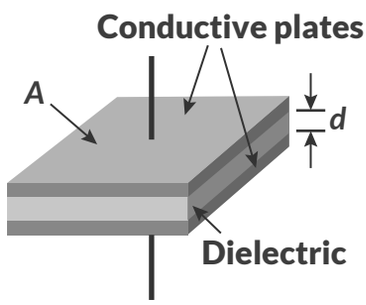
A capacitor is an electrical component that stores electrical energy through an electrical field accumulating a quantity of electrical charge defined with a linear relationship as:

$$Q = C \cdot V$$

where: **Q** = electrical charge [Coulomb] **C** = Capacitance [Farad] **V** = Voltage [Volt]

Usually values are indicated in a smaller unit called micro Farad [μF] that is one million times smaller.

The simplest ideal capacitor is constituted by two conductive materials, close one to each other, called plates with an interposed insulating material, called dielectric.



The relationship between the capacitance "C", the plates area "A", the dielectric thickness "d" and the insulating material relative dielectric constant " ε_r " is:

$$C = \varepsilon_0 \varepsilon_r \cdot \frac{A}{d}$$

Though this simple relation is valid only for parallel plates capacitor under ideal condition (so considering negligible the electric field lines near the edges of the plates) it is useful also for real world capacitors especially because its proportionality has a general validity.

An electrolytic capacitor is composed of one aluminium foil called "anode" that collects positive charges, having a dielectric oxidation on its surface, with semiconductor characteristics to prevent the current flow in one direction, and another aluminium foil called "cathode" that instead collects negative charges. There is also an electrolyte impregnated paper layer positioned between the anode and the cathode in order to avoid short circuits. The real mean that allows the charges exchange between anode and cathode is the electrolyte itself that has a good electrical conductivity and can be seen as one of the two equivalent conductive "plates" of the ideal parallel plates capacitor, the other one being the anode aluminium foils has been subjected to the "etching" process, described later, to obtain active surfaces, increasing their effective area. Aluminium tabs are then connected to the two foils to act as terminals.
When in use the impregnated section is then closed inside a suitable case and sealed with a deck. The matching of thin dielectric and a large surface area allows to create capacitors with exceptional high capacitance per volume. This is the main characteristic of an electrolytic capacitor, but it represents at same time the major limit. Their voltage range is lower than other types of capacitors, for example Film ones.

European (CECC) and International standards (IEC) have classified the capacitors in two categories. Electrolytic capacitors for high reliability applications (Long Life Grade): in addition of the possible over anodization (the difference between forming voltage and operating voltage) must generally satisfy high endurance requirements and a careful selection on materials is needed, such efforts are not required for capacitors standard version used for less severe reliability (General Purpose Grade).

BUILDING AN ELECTROLYTIC CAPACITOR

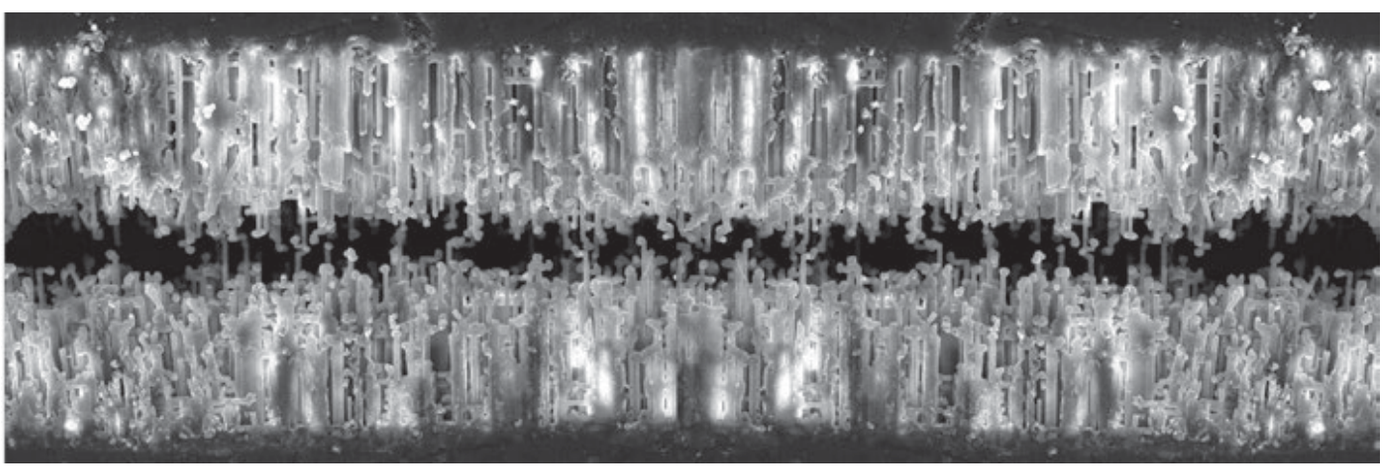
The whole manufacturing process requested to build a Kendeil electrolytic capacitor could be reasonably split into the following phases:

- Etching / Forming
- Winding
- Impregnation
- Sealing
- Ageing
- Production Inspections

ETCHING / FORMING

Plates of electrodes are made of high purity, very thin aluminium foil (0.08 to 0.13 mm thickness). To get the maximum capacitance for a given electrode surface area, an electrochemical process called “etching” is used to dissolve metal and increase the surface area of the foil in the form of a dense network of microscopic channels.

The etching process consists of continuously running aluminium foil through a chloride solution with an AC, DC or AC/DC voltage applied between the etch solution and aluminium foil.
The increase in surface area is referred to as foil gain and can be increased as much as 100 times for foil being used in low voltage capacitor applications and 20 to 25 times for higher voltage applications.



Micrographs view of etched aluminium foil

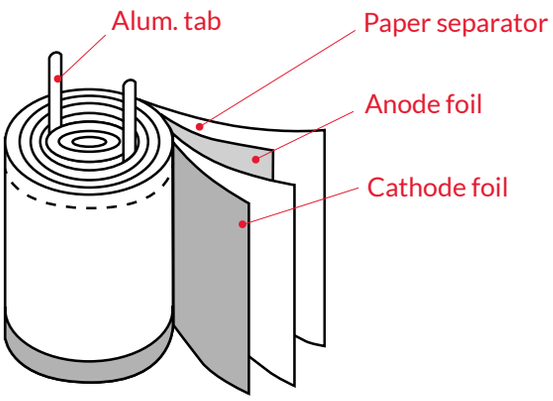
The dielectric of the aluminium electrolytic capacitor is composed of a thin layer of aluminium oxide (Al2O3) which “forms” on the surface of the etched aluminium foil during a process called “formation.”
Since capacitance is inversely proportional to the dielectric thickness and the dielectric thickness itself is proportional to the forming voltage, the following relation is appliable:

Capacitance · Forming Voltage = Constant

This is true for high voltage foils with a relatively coarse etch structure. However, for foils with extremely fine structures, the process to convert aluminium to aluminium oxide has a significant smoothing effect on the structure that might be described by a non-linear relationship.

BUILDING AN ELECTROLYTIC CAPACITOR

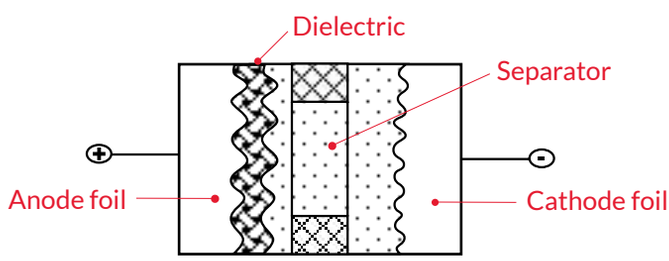
WINDING



Each capacitor contains two foils, the positive one is the ANODE and the negative is the CATHODE. Both foils, along with a separator paper are rolled into a cylinder.
The paper serves various purposes, one is to prevent anode and cathode foils from coming into contact with each other and shorting, another is to serve as a container for the electrolyte, in fact during capacitor's life, the electrolyte liquid is consumed by the reforming reactions and also ensure the dielectric strength and mechanical stretch. As part of a highly automated winding process, aluminium tabs are attached to the anode and cathode foils. This completed assembly of etched and formed foil, together with separator paper and attached tabs is called the capacitor ELEMENT.

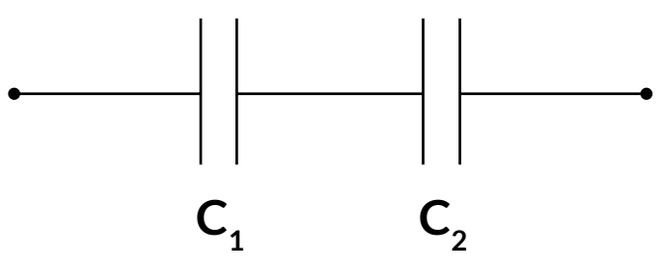
IMPREGNATION

The method of impregnation requires the winding element to be immersed into the electrolyte by either a vacuum/ pressure cycle with or without applied heat or by simple absorption.
The electrolyte contains a solvent such as ethylene glycol and a solute such as ammonium borate.
Should the dielectric film be damaged, the presence of the electrolyte will allow the capacitor to heal itself by forming more oxide. By selecting different electrolytes, the capacitor characteristics such as operating temperature range, frequency response, shelf life and load life could be improved.



The cross section for a typical element

It should be now clear that due to the physical construction of an aluminum electrolytic capacitor, the cathode also could contribute to the total capacitance. In fact, also the cathode foil has a natural very thin oxide layer on its surfaces and since it is in contact with the electrolyte can exchange charge with it in the same way the anode does. The equivalent capacitor can be expressed with a series of two capacitors, one being the anode-electrolyte and the other one being the cathode-electrolyte:



The equivalent capacitance will be:

$$C_{eq} = \frac{C_1 \cdot C_2}{C_1 + C_2}$$

Usually the anode specific capacitance, expressed in μF/cm^2, is lower than the cathode one, so in the series the dominant term will be the capacitor corresponding to the anode contribute. In some specific situation may happen that the two values are in the same order of magnitude so we should take account for both terms.

SEALING

After impregnation phase, the element is sealed into an aluminium can. Sealing deck materials may be rubber/bakelite or phenolic plastic.

AGEING

Before being sleeved and packed the capacitor is aged and tested, this being the final process of the production chain, usually called “ageing”. A voltage greater than the rated voltage is then applied at high temperatures. The purpose is to reform or to repair any oxide film which may have been damaged during the slitting, winding and assembly processes, thus reducing the leakage current to an acceptable low level.

PRODUCTION INSPECTIONS

After ageing, capacitors are 100% tested. All electrical requirements such that C, ESR, tan(**δ**) and LC are checked using highly advanced automated test equipment and any rejects are removed. Capacitors are also visually inspected, and only capacitors passing both tests are accepted for packaging.

TECHNICAL SPECIFICATIONS

Aluminum electrolytic capacitors produced by Kendeil are in line with the IEC 68-1 detail specifications and as presented in the next table, our series can roughly be grouped in these abbreviations:

CAPACITOR	TYPE	IEC 68-1 code
K01-K04-K07-K11-K21-K24-K61-K71-K91-K93	Screw	GP
K18	Screw	GP
K02-K22-K42-K72-K92-K94	Screw	GM
K19	Screw	GM
K05-K15-K25-K55-K75-K85-K95	Snap-in	GM
K06-K16-K26-K76	Snap-in	GP
K13	Fast-on (lug)	HS

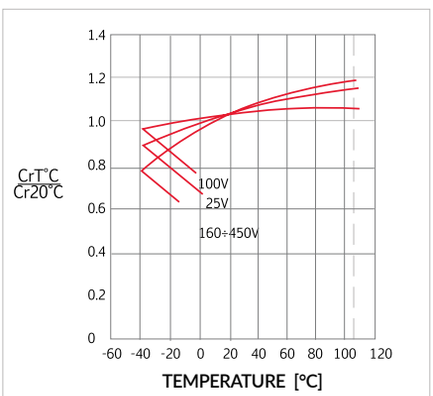
ELECTRICAL CHARACTERISTICS

RATED CAPACITANCE

The rated capacitance, defined at 100 Hz and 20°C, is the capacitance of an equivalent circuit having capacitance and resistance series connected. The value is indicated on the external sleeve, specified in micro Farads [µF]. Typical curves for capacitance drift versus temperature and frequency, are shown in **Fig.1** and **Fig.2**

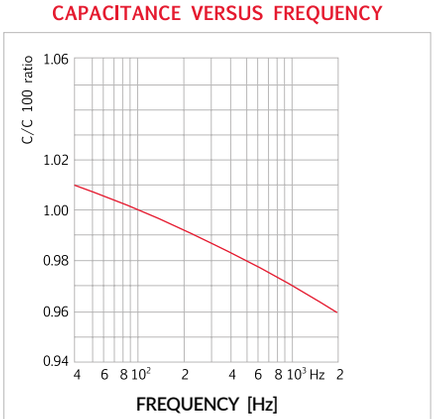
CAPACITANCE DRIFT VERSUS TEMPERATURE

Fig. 1



CAPACITANCE VERSUS FREQUENCY

Fig. 2



CAPACITANCE TOLLERANCE

Kendeil produces capacitors with various tolerance standard ranges, summarized in the next table.

CODE	TOLERANCE
M	±20%
Q	-10 / +30%
T	-10 / +50%
U	-10 / +75%
X	CUSTOM

RATED VOLTAGE (Vr)

The rated voltage is the value of voltage that could be applied continuously within the operating temperature range of capacitors. When using a capacitor with AC voltage superimposed on a DC voltage, care should be taken such that the peak value of AC voltage plus the DC voltage does not exceed the rated voltage.
When capacitors are series connected, the voltage distribution across the series may not be the same.
This is due to normal DC leakage distribution and should be considered in the design process either using a higher rated voltage capacitor or using balancing resistors in parallel with each series capacitor.

SURGE VOLTAGE (Vp)

The surge voltage is the maximum overvoltage including DC, peak AC and transients to which the capacitor could be subjected for short periods of time (not more then 30 seconds in any 5 minute period).
Depending on applicable specifications, this test is usually performed at maximum operative temperature. A current limiting resistor should be used.
Charge is held for 30 seconds for 1000 cycles, then the capacitor is allowed to discharge without load for 5 minutes.
Rated and surge voltage values for Kendeil capacitors are listed in following table, where a different relation is applied depending on rated value (Vr).

	Vp = 1.15 Vr											Vp = 1.10 Vr				Vp = 1.05 Vr		
RATED VOLTAGE [V]	16	25	40	50	63	75	80	100	160	200	250	350	400	420	450	500	550	600
SURGE VOLTAGE [V]	18	29	46	57	72	86	92	115	184	230	287	385	440	462	495	525	578	630

TRANSIENT VOLTAGE

Some capacitor's uses could require the application of voltage pulses exceeding the surge voltage Vs. Despite the fact that there is no general rule to match the overvoltage capability, Kendeil can satisfy customers requirements depending on the individual applications.
Please contact us to discuss the best capacitor for the application.

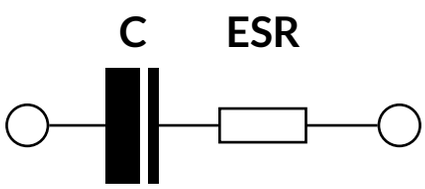
REVERSE VOLTAGE

Electrolytic capacitors are polarized components so they risk serious damages with inversed voltage application. Then always be sure to check polarity during and after assembly. Negative terminal is marked on the capacitor. For short periods of time capacitors can endure a low continuous reverse voltage (1.5V max). Where necessary, voltages of opposite polarity have to be prevented by connecting a diode.

EQUIVALENT SERIES RESISTANCE (ESR)

The equivalent series resistance is the resistance that a capacitor has to the alternating current flow.
Various resistive components such as: electrolyte, paper foil, aluminium foil, tabs, and others determine the total ESR value.
It is measured at 100 Hz and 20°C. It is related and dependant on temperature and frequency and generally when either these factors increase, a reduction in ESR results.

The construction technology of Kendeil capacitors reduces significantly the ESR value.



Equivalent Standard Circuit

ESR = R1 + R2 + R3
R1 = Resistance of aluminium oxide thickness
R2 = Resistance of electrolyte, spacer
R3 = Resistance due to materials: foil lenght, tabs, terminations contact resistance

ELECTRICAL CHARACTERISTICS

LEAKAGE CURRENT (LC)

The leakage current (LC) of an electrolytic capacitor represents the loss of electrical charge through the internal parasitic resistance of the oxide that is not a perfect insulator. In other term the leakage current is the responsible of the self-discharge of a charged capacitor during time.
After the complete charge of the capacitor, once steady-state voltage and temperature conditions are reached, the leakage current decreases over long periods of time. Leakage current is a function of:

- Capacitor Design
- Voltage
- Temperature
- Time of voltage application
- Storage Conditions

Note that LC, decreasing with time, will reach a steady-state value (operating leakage current). Therefore, the specifications of LC are defined as a value measured 5 minutes after the beginning of the application of the rated voltage at 20°C.
For typical leakage current versus time, temperature and voltage, see **Fig. 3-4-5**.

Fig. 3

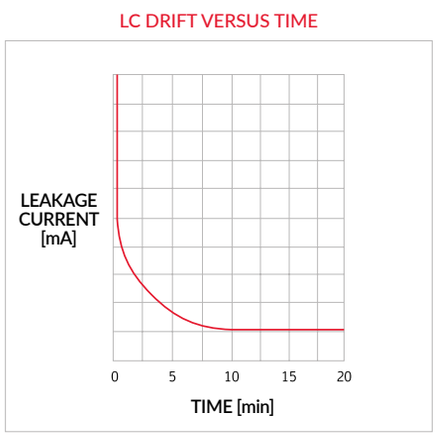
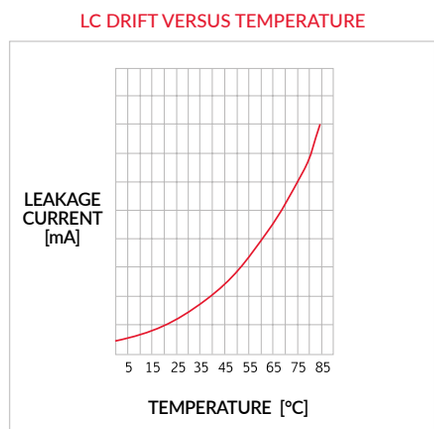
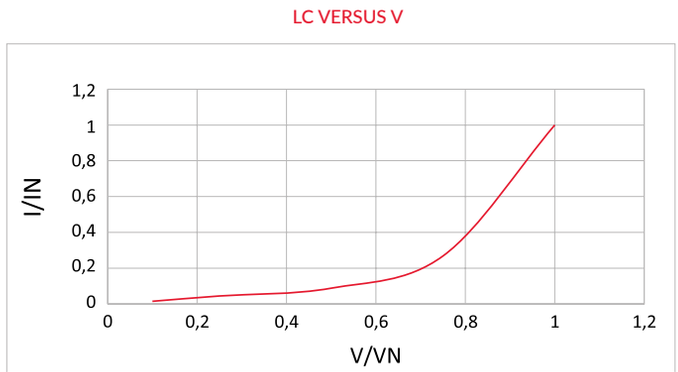


Fig. 4



LC is an increasing function of the applied voltage V, and rises quite strongly when V exceeds the rated value Vr.

Fig. 5



REFORMING

All aluminum electrolytic capacitors need to be reformed before acceptance test. The purpose of this preconditioning is to ensure that the same initial conditions are maintained when comparing and assessing different products.
For this purpose, the rated voltage is applied to the capacitors with a current limiting a series resistance for a period of some hours.

SHELF LIFE (Voltage free storage)

Capacitors can generally be stored at temperatures up to 50°C without any reduction of their reliability.
Overall characteristics such as capacitance, ESR and impedance should show good performance with no sensitive changes while the leakage current will exhibit a slow drift upwords.

In practical use, we experienced the following scheme meaningful for voltage rated classes of capacitors:

SHELF LIFE	NOMINAL VOLTAGE	DIAMETER
3 years	≤ 100V DC	Ø < 76mm
2 years	≤ 100V DC	Ø ≥ 76mm
2 years	> 100V DC	All Ø
18 months	≥ 550V DC	All Ø

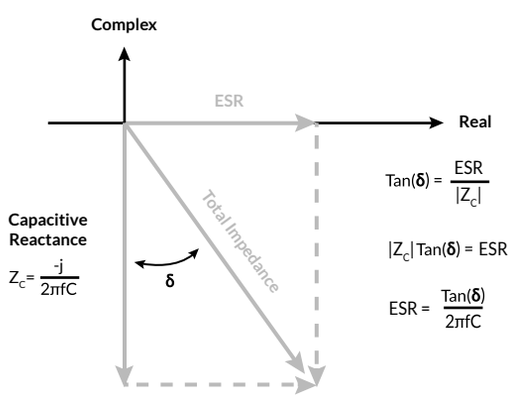
When designing application circuits, attention must be paid to the fact that after storage the leakage current may be up to 100 times higher than normal during the first few minutes following the application of power. This particular leakage current level increases with temperature and duration of storage.
After an extended storage period, the leakage current value may exceed the rated value and, before the output measurement, a reanodization process is required.
It could be realized by applying the rated voltage at room temperature for one hour.
In any case it is advisable to use a maximum charging current of 5mA or twice Ic typical value specified for each series.
Before assembling a capacitor bank, it is always recommended to:

- Use items from the same batch to have similar values of electrical parameters (capacitance, ESR, leakage current)
- Ensure equal conditions (current, voltage, temperature) are applied to all items

This will ensure balanced stresses and will reduce the risk of reduced lifetime and failures.

DISSIPATION FACTOR (tan δ)

Dissipation factor or loss angle tangent (tan **δ**) is a main electrical characteristic of an electrolyte capacitor, a measure of the deviation from an ideal capacitance value. It's represented by the tangent of the angle between the impedance and reactance phasors:



An ideal capacitor should have an ESR as low as possible and in consequence also a very small tan(**δ**).

Relationship is included in the following formula:

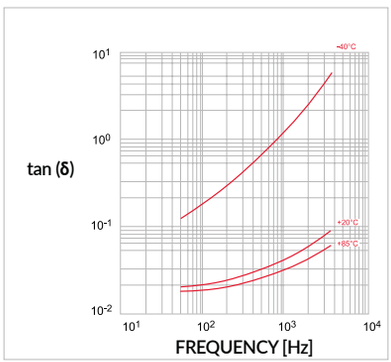
$$Tan(\delta) = 2\pi f \cdot C \cdot ESR$$

where: **F** = frequency **C** = rated capacitance

Maximum values in the datasheets have been indicated at 100Hz and 20°C.
Drift versus frequency as **Fig. 6-7**.

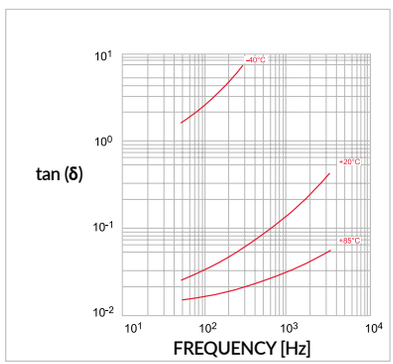
Tan(δ) DRIFT VERSUS FREQUENCY
LOW VOLTAGE (≤ 100 Vr DC)

Fig. 6



Tan(δ) DRIFT VERSUS FREQUENCY
HIGH VOLTAGE (> 100 Vr DC)

Fig. 7

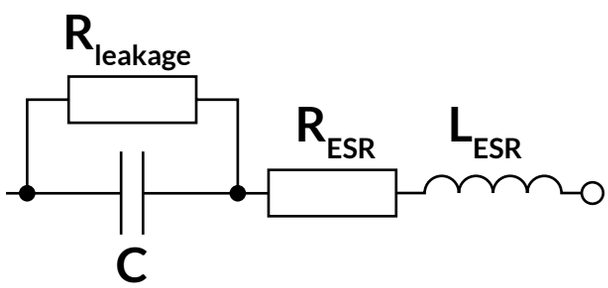


INDUCTANCE

Some inductance, mainly due to their conductive leads (tabs, terminals…) that connect the capacitor element to the circuit where it will be placed, is present in aluminium electrolytic capacitors, but values are usually less then few tens of nH.

IMPEDANCE (Z)

Due to all these unwanted parasitic (ESR, inductance, LC) the equivalent model of the real aluminum electrolytic capacitor has this electrical scheme:



the impedance of this two-pole will be:

$$Z(j\omega) = \left(\frac{1}{j\omega C} // R_{leak} \right) + R_{ESR} + j\omega L_{ESL}$$

If we ignore R_{leak}, usually in the order of MΩ, we get:

$$|Z(j\omega)| = \sqrt{ESR^2 + \left(\omega L - \frac{1}{\omega C} \right)^2} = \sqrt{ESR^2 + (X_L - X_C)^2}$$

Impedance is dominated by the capacitive reactance (X_C) at low frequencies and by the inductive reactance (X_L) at high frequencies. At the point of series resonance Z=ESR.
The variation with frequency of individual resistive and reactive values determines the total impedance characteristic of the capacitor. Capacitive reactance predominates at low frequencies.
Fr is the self-resonant frequency. Defined as the frequency where XL and XC are equal.

$$f_r = \frac{1}{2\pi \cdot \sqrt{LC}}$$

- When frequency goes from 0 up to the resonance Fr, the capacitive reactance (XC = 1/ϖCS) decreases until it reaches the order of magnitude of the electrolyte resistance
- At even higher the resistance of the electrolyte is the predominant term
- Resonance frequency is reached when capacitive and inductive reactance mutually cancel each other.
- Above the self-resonant frequency the inductive component is dominant and the capacitor behaves more like an inductor
- The resistance of the electrolyte increases strongly with decreasing temperature.

Specific impedance values are given in the individual data sheets. Typical impedance drift versus frequency, see **Fig. 8-9**.

Fig. 8

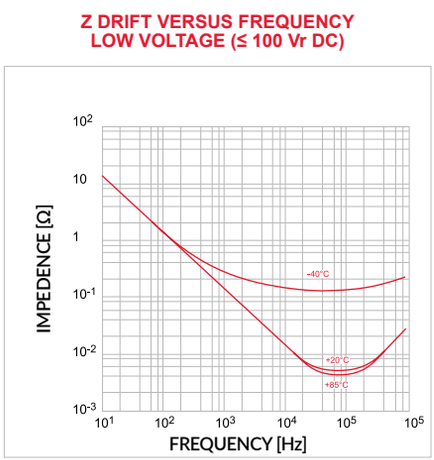
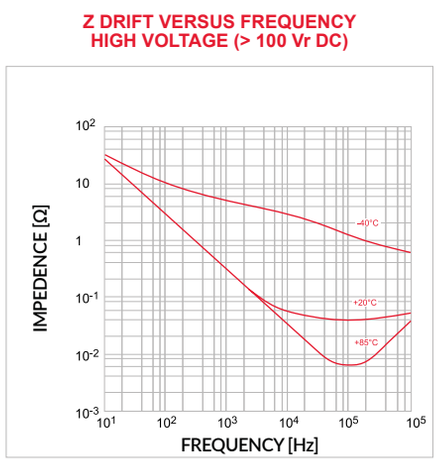


Fig. 9

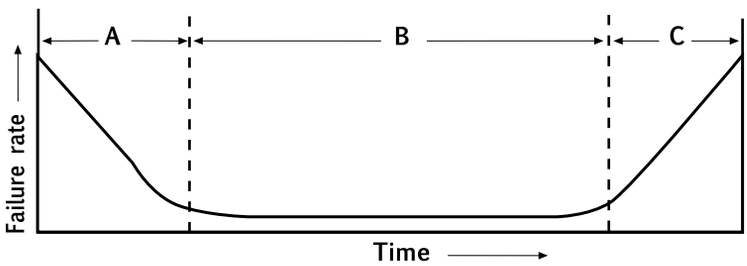


RIPPLE CURRENT (RC)

It is defined as the superimposed alternated ripple current (sinusoidal alternating current at 100 Hz).
It depends mostly on an allowable temperature rise within a capacitor section due to the power relation formula: I^2 x R. Heating occurs, due to an alternating current flowing through the equivalent series resistance of capacitor. Actual power must be considered when defining ripple current capability. Since the ripple current raises the temperature of the capacitor it has a significant effect on the operational life of the component. A diagram of useful life specifies life under given operating conditions of different temperatures values and ripple current values.

RELIABILITY

With the advancements in aluminium electrolytic capacitor technology, the capacitors used in equipments must have a very long life characteristics and must operate even under severe conditions. A careful choice of a capacitor for a particular application and an adequate installation in the circuit will assure a good service life. In any case any component will eventually fail, usually this occurs due to a slow, steady drift of parameters called wear-out; sometimes there is a sharp change in capacitor properties also called catastrophic failure. In general terms the failure rate of aluminium electrolytic capacitors follows a bathtub curve with time as shown here..



The bathtub curve:
Three different areas are defined where capacitor life could be observed: A, B, C.

A | Initial Failure Period

This is the period during which failures are caused by latent defects in design, structure, manufacturing processes or severe applications. Such failures occur soon after the components are powered on. In aluminium electrolytic capacitors, these failures are either corrected through ageing or found during the 100% inspection processes and do not reach the field.
Initial failures due to a bad application of the capacitor such as inappropriate ambient conditions, over voltage, reverse voltage or excessive ripple current can be avoided with an adequate circuit design and careful installation.

B | Random Failure Period (USEFUL LIFE)

Here the failure rate is low. During this period a constant failure rate is shown. These failures are not related to operating time but to application conditions. This period of useful life is normally calculated with a confidence level of 60%.

C | Wear-Out Failure Period

In this period the properties of a component gradually deteriorate and the failure rate increases with time. Aluminium electrolytic capacitors end their useful life during this period.
Criteria for judging failures varies with application design factors.
Reliability represents this measure of the expected failure rate during the useful life of the capacitor.
Failure rate is defined as the number of components failing during a unit working time. It is expressed by following formula:
1 fit = 10^{-9}/hours (failure in time) also indicated as percentage of failures in 1000 hours.

$$\lambda = \frac{\text{number of failures}}{\text{number of tested components} \cdot \text{working time}}$$

MTBF = 1/λ

MTBF (Mean Time Before Failure) could be calculated according to failure rate following the relationship:
This value defines the failure frequency occurring on a large number of components inside an equipment, therefore is not suitable to predict failure on one single capacitor. Statistical calculations should be used instead. It is helpful as a design tool to determinate reliability features for components and complex systems.

EXAMPLE

A batch of 10000 capacitor tested, for 40000 operating hours, finding 4 failures.
λ= 4/10000 x 1/40000 h = 10 fit = 0.001% /1000 hours
The failure rate calculation is derived from endurance tests at specified temperatures, taking into account all measurable and non-measurable defects arisen. Kind of measurable defects are meant for each type of capacitor endurance test point. While non-measurable defects are meant to be open and short circuit, safety valve break or electrolyte leakage.
Ripple current and ambient temperature contribute to the internal temperature rise of the capacitor, so affecting its useful life. In general, every 10°C reduction in temperature carries a multiplier factor of two times the life value.

USEFUL LIFE

The typical useful life represents a period of time until the end of life of the capacitor. The end is caused by different accidents (or different failure modes) such as the following:

MECHANICAL FAILURES

Operation of safety vent due to overpressure, splitting of PVC sleeve and damaged insulation, unusable terminals, external short circuiting of terminals due to spilling of electrolyte.

OVER FAILURES

When a short or open circuit occurs.

ELECTRICAL CHARACTERISTICS FAILURES

In a group of capacitors considered to have reached the end when 3% of them have failed, useful life is influenced by following failure criteria:

END OF LIFE CRITERIA (for V ≤ 100V DC; all voltage capacitors with diameter ≤ 35 mm)

a. ESR > 3 times initial value
b. Impedance > 3 times initial value
c. Capacitance value change of greater than 30%
d. Leakage current over initial limit

END OF LIFE CRITERIA (for V ≥ 160V DC and for capacitors with diameter ≥ 40 mm)

a. ESR > 1.75 times initial value
b. Impedance > 1.75 times initial value
c. Capacitance value change of greater than 15%
d. Leakage current over initial limit

In some cases, it is possible that even larger values of the above indicated could be applied without leading to failure, but generally capacitors tested in Kendeil's laboratories show standard behaviour around these limits.
Obviously, when operating at lower voltages together with moderate temperature as well as lower values of current, the final expected lifetime should be better.
When an adequate cooling system has been provided, the overall performance is substantially better and the life of the capacitor is improved.
In normal conditions, statistics are produced after extensive endurance tests compliant to standard specifications.
Depending of the type of capacitor, endurance tests have been undertaken over different lengths of time using capacitors coming from production batches. Data is collected and results summarized, so we have generated wide information displayed graphically for each model, which can be seen on each product datasheet. The useful lifetime regarding the ambient temperature is given by following practical formula:

$$Useful_{Lifetime} = L_{OPMAX} \cdot 2^{(Tmax + 10 - Tc) / 10}$$

Where:
Useful Lifetime expressed in hours
L_{OPMAX} = Lifetime at max rated operating temperature (eg.: 10000 hs at 85°C)
Tmax = Actual operating temperature of the capacitors (eg.: 85°C for K01 type)
Tc = Temperature of the core = internal hot spot of the capacitor (°C)

EXAMPLE

For a capacitor that has an internal core temperature of 55.43 °C, at ambient temperature of 45 °C, the life, expected calculation gives the following:
Useful Lifetime
$= 10000 \times 2^{(85+10-55.43)/10}$
$= 10000 \times 2^{3.956}$
= 155194 hours

NOTE

Applicable temperature range depends temperature on the capacitor type characteristics, usually situated in the operating range of -40°C to +85°C or 105°C . Typically, each 10°C step carries a reduction factor of 2 times the lifetime value.
Useful life is also determined by ripple current.
It is advisable not to apply a ripple current exceeding the max ripple current allowed as this will shorten capacitor life and may result in opening of the vent or catastrophic failure.
It often happens that heating due to ripple current is even more severe than ambient temperature stress.

GENERAL GUIDELINES

SAFETY

Handling Terminals

Always be sure that a capacitor is totally discharged before handling it. To avoid any damage, don't overstress terminations during cutting, soldering or bending. If gas is detected while the product is in use, turn off the main power supply and unplug it.

Liquid Leakage

In case of activation of the safety vent, hot gas exceeding 100 °C will escape. Do not place your face in close proximity to the vent and avoid proximity to areas exposed to the gas. When an escape of electrolyte has occurred, wash the affected area with hot water. Use rubber gloves to avoid skin contact. Any contact with eyes should be immediately irrigated with water and medical advice is sought.
Kendeil electrolyte blends do not contain materials currently listed as carcinogenic or mutagenic such as polychlorinated biphenyls (PCB) or dimethylformamide (DMF). No Butyrolactone used as solvent.
Under exposure to electrolyte skin could become dry. Other irritations or effects may be caused to the mucous membranes particularly eyes, where conjunctivitis may result.

FUMIGATION

In any case fumigation should not be done using halide compounds such as methyl bromide. Even when covered in plastic, chemicals may penetrate through small gaps, causing internal corrosion. Also, when sterilizing against infectious diseases, do not spray it directly on or close to capacitors and equipment incorporating capacitors.

STORAGE

It is highly recommended to store capacitors at room temperature, in a dry place, out of direct sunlight.
Long-term storage atmosphere requires these parameters: it should be free from halogen gases (like chlorine and fluorine) which presence could lead to internal corrosion, temperature range should stay between 5 °C and 40 °C at up to 75% relative humidity (non-condensing).
In case of having a capacitor exposed to high temperatures such as direct sunlight or heating elements, the capacitor life may be adversely affected. Also, when capacitors have been stored under humid conditions for a long period of time, humidity will cause terminals to oxidize.
Note that in case of storage below the minimum temperatures, the electrolyte may has changed from liquid to solid and will need extra time to recover.
When capacitors have been stored above room temperature, the anode foil may react with the electrolyte causing increased leakage current values. Application of normal voltages to these capacitors may result in higher leakage current values, but in most cases, they will return to normal levels in short time.
However, on occasion it is possible that a certain amount of gas will be generated which might cause the safety vent to open. Capacitors that have been stored for long time should be subjected to a voltage reforming process which will regenerate internal dielectric layers.

CLIMATIC CONDITIONS

All Kendeil capacitors maintain good behavior under any climatic conditions when operating conditions are within the design specifications limits of each product type.
Since each capacitor is hermetically sealed, the wet element inside impregnated with electrolyte will not be exposed to external conditions such as high pressure or vacuum.
Furthermore, all electrical parameters such as impedance, leakage current, ESR and capacitance, will not be significantly changed by these external conditions.

Temperature range of Kendeil electrolytic capacitors (IEC 68-1):

CAPACITOR	TYPE	IEC 68-1 code	TEMPERATURE RANGE	
K01-K04-K07-K11-K21-K24-K41-K61-K71-K91-K93	Screw	GP	-40°C	85°C
K18	Screw	GP	-55°C	85°C
K02-K22-K42-K72-K92-K94	Screw	GM	-40°C	105°C
K19	Screw	GM	-55°C	105°C
K05-K15-K25-K55-K75-K85-K95	Snap-in	GM	-40°C	105°C
K06-K16-K26-K76	Snap-in	GP	-40°C	85°C
K13	Fast-on (lug)	HS	-25°C	75°C

Air Pressure

When operating at low values of external air pressure, there could also be an increase in the pressure inside the case.
In case of an external vacuum, the pressure inside the capacitor could rise up to 1 bar, in these circumstances the internal vapor loss becomes greater resulting in an overall reduction in expected life.

Altitude

When in extreme altitude situations, consideration must be given to the shortening of capacitor life due to the reduced air density, preventing heat from being adequately dissipated from the external surfaces of the capacitor leading to an increase in internal temperatures. If the final application request to use capacitors at high altitude, the test based on the IEC 60384-4 subclause 4.11.4 it's necessary. This test can make at 8kPa with 15-35°C for 5 minutes.

CLEANING

Aluminium can be aggressively attacked by halide ions, particularly by chloride ions. Even small amounts of chloride ions inside the capacitor will cause corrosion which contributes to rapid capacitance drop and venting. Therefore, the prevention of chloride contamination is the most important check point for quality control in production. Solvent proof capacitors are required when halogenated hydrocarbons are used for cleaning. If aluminium electrolytic capacitors without the solvent-proof construction are present on the circuit board, alcohol-based solvents are recommended for cleaning.
In this case, solvents such as methanol, ethanol, propanol and isopropanol, isobutanol, propyleneglycolether, diethyleneglycol should be used. Normal tests show that any detrimental effect is eliminated. An alkaline detergent may damage the aluminium metal and marking.
Aqueous cleaning methods in conjunction with saponification are commonly used. However, it is advisable to dry immediately with hot air, which is best achieved at 85°C for few minutes.

MAINTENANCE AND SERVICING

Periodical checkups should be conducted on capacitors. Before each examination, turn off the equipment and completely discharge the capacitor, then verify these checkpoints:

- Appearance: condition of the vent (open, notably swollen), liquid leaks or other considerable abnormality.
- Electrical parameters: capacity, dissipation factor, leakage current, and other terms specified in the datasheets
- Standard temperature for measuring electrical performance is 20 °C, reach this value before taking measurements.
- When finding a damaged capacitor or one that has reached the end of life, remember that mixing old and new capacitors may cause an imbalance in the ripple current or voltage sharing, risking failures such as activation of the vent or short circuit, so change them all.

INSULATION

The underlying notion is that our capacitors are projected with extended cathode, therefore current flow should be prevented through the can to either terminal and other surrounding circuit elements.
All capacitors are covered with a PVC sleeve that is used for marking, even if the sleeve present good accidental insulating properties, it degrades by oxidation over 65°C and after long period of time.
Kendeil's recommendations for stud mounted capacitors are to use our approved plastic nut and washer, for snap in capacitors with non-electrified dummy pins, it is best not to ground them but rather to let them float.
We suggest you to provide an additional level of more durable insulation if permanent high voltage is applied. For further information contact our technical department.

FLAMMABILITY OF CAPACITOR

Some component parts of a capacitor are suitable to burn depending on ambient temperature and adjacent elements, being made of plastic, PVC or other, even when classified as non-flammable material.
In the table you find the main materials with self-extinguish capability under normal circumstances:

PART	USE	MATERIAL	
DECK	for screw type terminal	Phenolic/Silica epoxy resin	No ignition non flammable
	for snap-in type terminal	Rubber bakelite coupled	No ignition non flammable
CAN	for Motor Start type K13 ONLY	Polycarbonate (plastic)	Ignition not self extinguishing
SLEEVE	all screw snap-in type	PVC or PET	No ignition
VENT PLUG	for screw type terminal only	Silicon	Ignition non flammable
ELECTROLYTE	all internal wound elements in each capacitor	Glycol based (*)	Not flammable

(*) NOTE FOR ELECTROLYTE
Kendeil uses glycol-based electrolyte through all ranges of products.
The impregnation process is computer controlled with supervisor agent software to assure the correct time and level of electrolyte needed by each single capacitor.
Different kinds of electrolyte blends are being used, especially designed for low voltage, medium voltage and high voltage range.
Each production batch is controlled in the internal laboratory to test the specifications of recipes.

<120V	120V - 400V	>400V
LOW VOLTAGE	MEDIUM VOLTAGE	HIGH VOLTAGE

Flash point is defined as the lowest temperature at which a flame is ignited.
In our case, no flammable behavior is possible as the rated class of capacitors are under that value.

FLAMMABILITY OF ELECTROLYTES

According to the European Directive 67/548/CEE, its annexes, its amendments and its supplements, flammability characteristics is defined as follows:

FLASH POINT	FLAMMABILITY CHARACTERISTICS
21-55°C	Flammable
0-21°C	Highly flammable
<0°C	Extremely flammable

All electrolytes used are Glycol based and have Flash Point > 55°C.
Therefore they can be considered as Non Flammable Electrolytes and Self-extinguishing capacitors in accordance to below standards.
Kendeil is compliant to the followings IEC norms:
IEC 60695-2-2 and recent updates IEC 60695-11-5, IEC 60695-11-10 Fire hazard testing.

ACTIVE & PASSIVE FLAMMABILITY

Active: Although unlikely, there can be cases in which a capacitor auto ignites, some applications can produce high hydrogen quantities, in this condition there could be the eventuality of fire generation. Other types of overloads, faulty capacitor or exceptional situations can generate a fire.

Passive: Our screw terminal and snap in capacitor (all with PVC insulation) fulfil the rigid A-category parameters from IEC-60384- 1 standard. Of course, when subjected to external hazard element (fire, electricity…) some part of capacitor could ignite, so we referee to clause 4.38 of IEC-60384-1 standard and also to IEC 60695-11-5 in passive flammability section.

POLARITY

In DC applications polarity is required; if polarity is reversed, the circuit life will be shortened or the capacitor may be damaged. Generally, an intermittent reverse voltage of 1V DC is allowed.
If during operation, it is possible that polarity could be reversed or unknown, extensive use of a bipolar capacitor is required.

CHARGE - DISCHARGE APPLICATIONS

Charge - Discharge Duty and High Peak-to-Peak Voltage

Charge - Discharge application can generate overheating or overpressure effects on electrolytic capacitors and reduce performances and life. Custom capacitor solutions designed for these specific uses are required, contact us to select the most appropriate item.

TRANSIENT

Ripple Current Transients and High Inrush Current

Transient current, not detected by thermal transient parameters, can cause deterioration of Aluminium electrolytic capacitors resulting in failure. Please contact us to discuss the best capacitor for the application.
High inrush current, especially applied to snap-ins during the first charge cycle after soldering, can increase the leakage current of aluminium electrolytic capacitors causing circuital voltage and current unbalancing. Please contact us to discuss the best solution for the application.

Transient Overvoltage

Transient spikes over nominal voltage can generate a degradation of electrical performances of aluminium electrolytic capacitors with a high possibility of failure. Please contact us to discuss the best capacitor for the application.

BALANCING RESISTORS

In Series, Parallel and Group Connections.
The following explanation is given for a typical connection scheme, when two capacitors have been connected in series, this is a brief approach answering to the question “How much could be the maximum voltage applied to a capacitor?”
If we have two capacitors of 400V rated with ±20% tolerance range each.
Total voltage applied is 800V (VBUS), in the best situation each capacitor is well balanced. Anyway, the maximum and minimum values due to the tolerance range is then put in the formula.
It is easy to calculate the maximum exposing voltage to whom the minimum capacitor could be applied.

$$V_{minCAP} = V_{BUS} \cdot \frac{1 + 20\%}{MIN_{tolerance} + MAX_{tolerance}}$$

Using the values from example, we have: VMINCAP= 800 x 1.2 / (0.8 + 1.2) = 480V
This is the real maximum voltage value applied to the capacitor in a serial connection. It is strongly recommended to use a resistor that would share the over-voltage.
In the practical field of designing these kinds of circuits, we have found that a good balancing system could be obtained using the following formula in which only the capacitor value is required.
We assume that a current from 15 to 20 times the leakage current value would be flowing in the resistor, therefore a simple relationship could be applied:

$$\text{Balancing Resistor [K}\Omega\text{]} = \frac{60000}{\text{Capacitance [}\mu\text{F]}}$$

The resistor should have very good characteristic, usually with tolerance range of ±5% but better tolerance range is preferred when dealing with high transients and a top-level performance is required. When designing high current applications, a parallel configuration should be preferred.

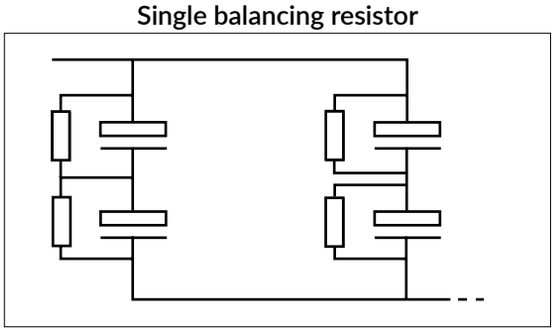
CONFIGURATION SCHEMES

CAPACITOR	BALANCING RESISTOR
470 µF	127 kΩ
680 µF	88 kΩ
1000 µF	60 kΩ
2200 µF	27 kΩ
4700 µF	13 kΩ
6800 µF	9 kΩ
10000 µF	6 kΩ

Practical table

Three ways of connecting balancing resistors are implemented in the industry, depending on design and experience. They have important features that must be borne in mind for the appropriate performances required.

Single balancing resistor



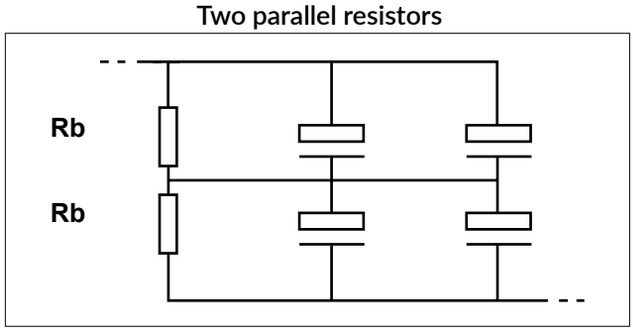
(+) ADVANTAGES

When one capacitor fails, the adjacent capacitor will probably fail too, but the other capacitor will remain undamaged.

(-) DISADVANTAGES

There are many resistors to be placed in the circuit.

Two parallel resistors



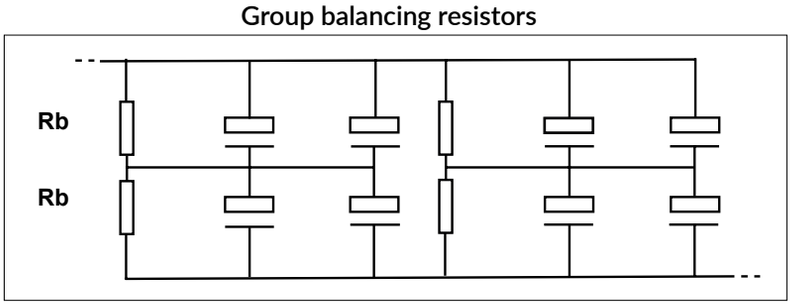
(+) ADVANTAGES

A better balancing system is achieved with “the most parallel capacitors used”. The total leakage current as the sum of the single branches components gives a very good balancing system.This configuration needs only two resistors and since the delta LC would be a very small value, it could be realized also without any resistor.

(-) DISADVANTAGES

When one capacitor fails, the parallel branch in which it is operating will also fail as the total voltage will be applied under operating voltage conditions.

Group balancing resistors



This topology combines the advantages and disadvantages
Of the individual variants.

Before assembling a capacitor bank, it is always recommended to:

- Use items from the same batch to have similar values of electrical parameters (capacitance, ESR, leakage current)
- Ensure equal conditions (current, voltage, temperature) are applied to all items

This will ensure balanced stresses and will reduce the risk of reduced lifetime and failures.

MOUNTING HARDWARE GUIDELINES

BEFORE CAPACITORS INSTALLATION

Kendeil recommends to follow below steps, please read the following information carefully:

- Prior to handling a capacitor be sure it is totally discharged.
- Check the specifications of the capacitors and compare them with the project's specifications.
- Do not reverse the polarity.
- Do not use a capacitor where reverse voltage is applied.
- Do not drop or otherwise impact a capacitor to avoid decline in its electric performances.
- Do not use any capacitor whose packaging has a noticeable abnormality on delivery.
- Do not deform the shape of the capacitor, this could lead major failures such as liquid leakage or short circuit.

Not taking these precautions could lead to a major failure.

INSTALLATION METHOD

Soldering Snap-In

Please read the following information carefully.

- When soldering a on PCB, the temperature should not be excessive while time taken should be short. Otherwise, it could have adverse effects on the electrical characteristics and insulating sleeves.
- During the soldering process, the sleeve may melt or break if it gets in contact with circuit board traces. Try to avoid this problem and do not locate circuit board traces under capacitor body.
- The sleeves may be melted by solder which migrates up through terminations holes in the circuit board.
- Do not exert any mechanical force like bending, straightening, twisting or tilting of capacitors during and after soldering into a printed circuit board.
- When soldering adjacent components to the capacitor, preheated lead wires or terminals may tear the capacitor sleeve if they come in contact with it. Therefore, capacitors are to be mounted carefully so that adjacent components terminations do not come into contact, particularly when mounting on through-hole circuit boards. For snap-in type capacitors: our products are in line with IEC standard and it means a resistance to soldering heat defined for solder bath method 260°C 10 s.

Mounting Screw Type Capacitors:

To fix our flat bottom capacitor use clamping rings coupled with an insulating layer between capacitor's can and the ring. Special attention has to be applied in assembling case of stud capacitors.
The threaded stud termination (M8 or M12) is the bottom part of capacitor's can and it's in electrical contact with negative end termination of capacitor.
Please use our plastic nut and plastic washer or other well protected system in order to avoid short circuit between stud and assembling frame.
Can and stud are in electrical contact with negative end termination. Can is covered by sleeve, designed to prevent accidental short circuit during maintenances or assembling operation.
Air gap between capacitors and machinery's electrical parts, active parts or machinery's frame has to be taken into consideration for good insulation as defined to many standards of machines.

MECHANICAL STRESS

Snap-In

Improper insertion into the circuit boards may break the terminals or impair their electrical connections with the internal elements. When provided, blank terminals of a multi-terminal capacitor should be considered to be at the same potential as the electrolyte, or cathode, and should therefore be isolated from the circuit. The distance between terminations holes on the circuit board should be the same as the spacing between terminations on the capacitor, if the termination cannot be mounted easily don't use extra force to insert capacitors.

Screw Type

Excessive torque force applied in tightening the screws into terminals will result in stripping the threads and possibly increasing the contact resistance. On the other hand, if screws are not enough tightened enough, the high contact resistance will cause localized heating at terminals plus an early failure of the capacitor.

TERMINAL	RECOMMENDED TORQUE [N·m]
M5 Insert	2
M6 Insert	4
UNF 10-32 Insert	2
UNF ¼ 4-28 Insert	4
M8 Stud	4
M12 Stud	8

POSITION OF THE PRESSURE-RELIEF VENT

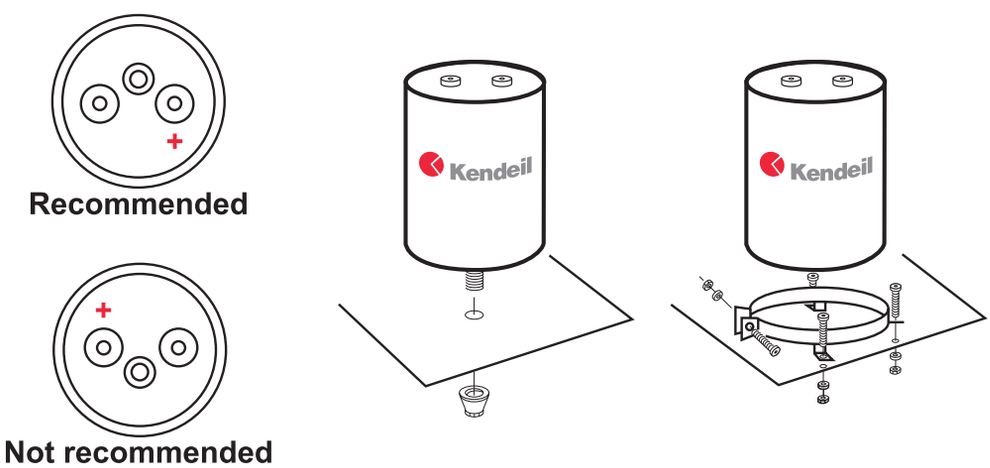
During normal operation electrolytic capacitors are subjected to an internal generation of gas due to heating combined with the inside pressure. Therefore, a safety vent is provided to prevent catastrophic failure.
Place the capacitors so that anyone working on the equipment would be protected from the hot vapor in the event that a vent was to operate.
Do not install wiring or a circuit pattern near the vent. When the vent is activated, electrolyte may spurt out resulting in short circuit followed by fire or others secondary hazard.
Do not hinder the activation of the vent. Assure that there is enough clearance above the vent. If dissipation of gas is inhibited while the vent is in operation, the inner pressure will rise, with possibility of explosion, fire or other major failure.
The overall characteristic parameters such as capacitance, ESR, currents, etc. remain the same whatever is the orientation, but once the vent has been blown, an eventual overflow of electrolyte could damage important parts of the circuit.
Furthermore, a good cooling system must be designed. Consideration must be given as to where to place the circuits especially when dealing with high ripple currents; the area around electrolytic capacitors should be well aired with enough distance between the radiant elements, both for maintenance and for security reasons.

Snap-In

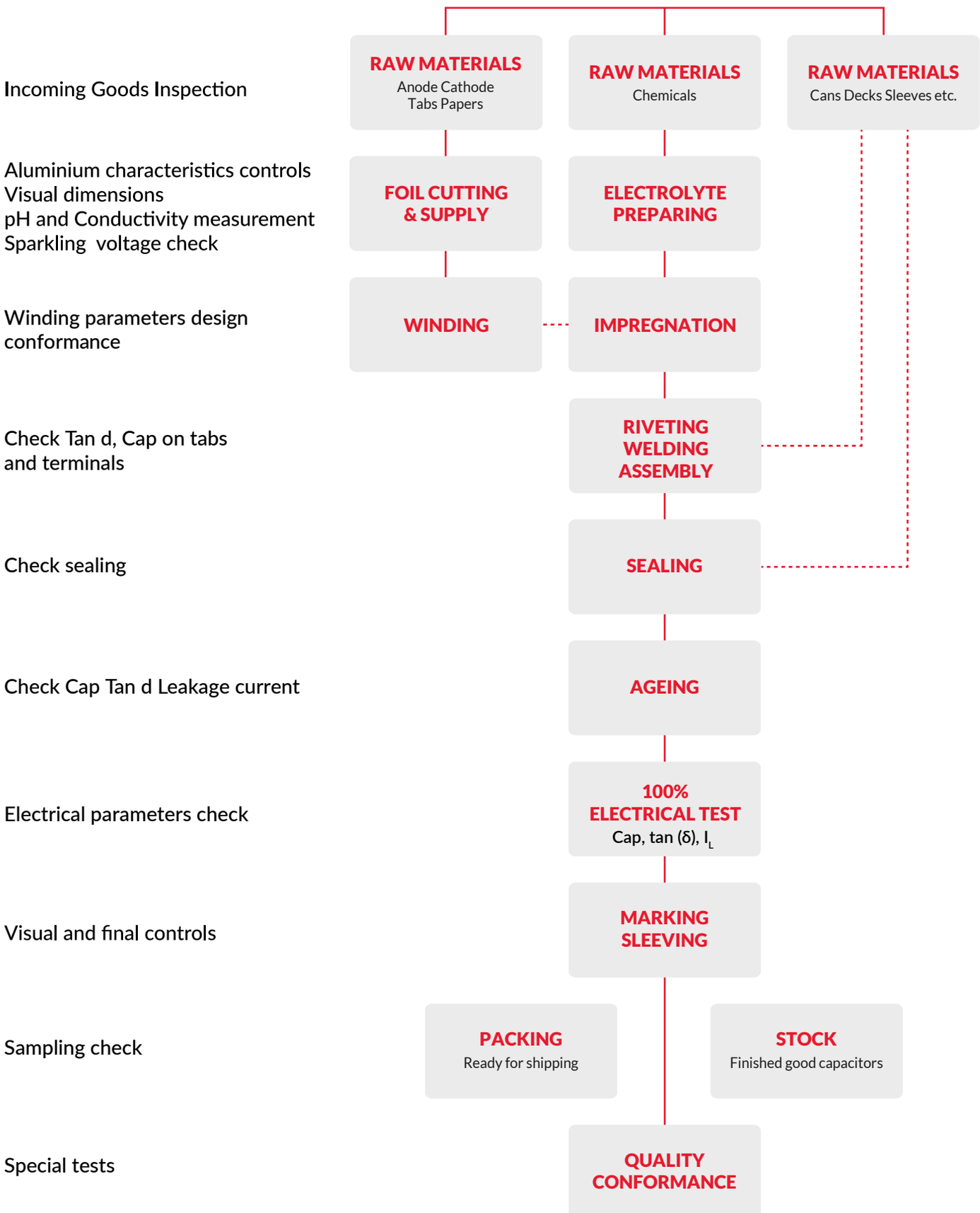
Have a built-in safety vent, realized as a weakened area of the aluminium can base, or at their side, that will release the possible growth of excess pressure. Usually, board mounted types are easily fixed by their own terminals, and no special mounting hardware is then required.
When mounting the capacitor, it should be borne in mind that in the event of the vent blowing under failure conditions, a small quantity of hot conductive electrolyte and vapors can, in some cases, flow out from the vent, so the position is important and the can should be carefully located. If possible, we recommend that capacitors are mounted with the safety vent uppermost. M minimum air gap between capacitor's top and machinery's parts of 4 mm are needed due to safety vent position.

Screw Type

Have been provided with a safety vent plug on the deck, a tiny rubber capsule designed to support a critical bursting pressure up to 8 bar. To fix these capacitors use the appropriate mounting clamps furnished in different diameter size.
The best orientation is upright with terminals up. If mounted horizontally, orient the pressure-relief vent plug at the 12-o'clock position so that least amount of electrolyte will be expelled if the vent operates. Do not mount with terminals down as this may reduce the operating life and could impair the operation of the pressure-relief vent.
In any case, screws terminal capacitors can be mounted in any position so long as the safety vent is free to operate.



MANUFACTURING CONTROL FLOW



K01 TYPE
-40°C +85°C 15000H

APPLICATIONS

Designed for professional power electronics
Switch mode power supplies, converters, filtering devices.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Poles brought out to heavy duty screw terminals
- To be mounted with ring clips or with threaded stud
- Very high CV for unit volume with low ESR.
- High ripple current
- Excellent electrical data in small dimensions case size
- External materials approved UL94-V0

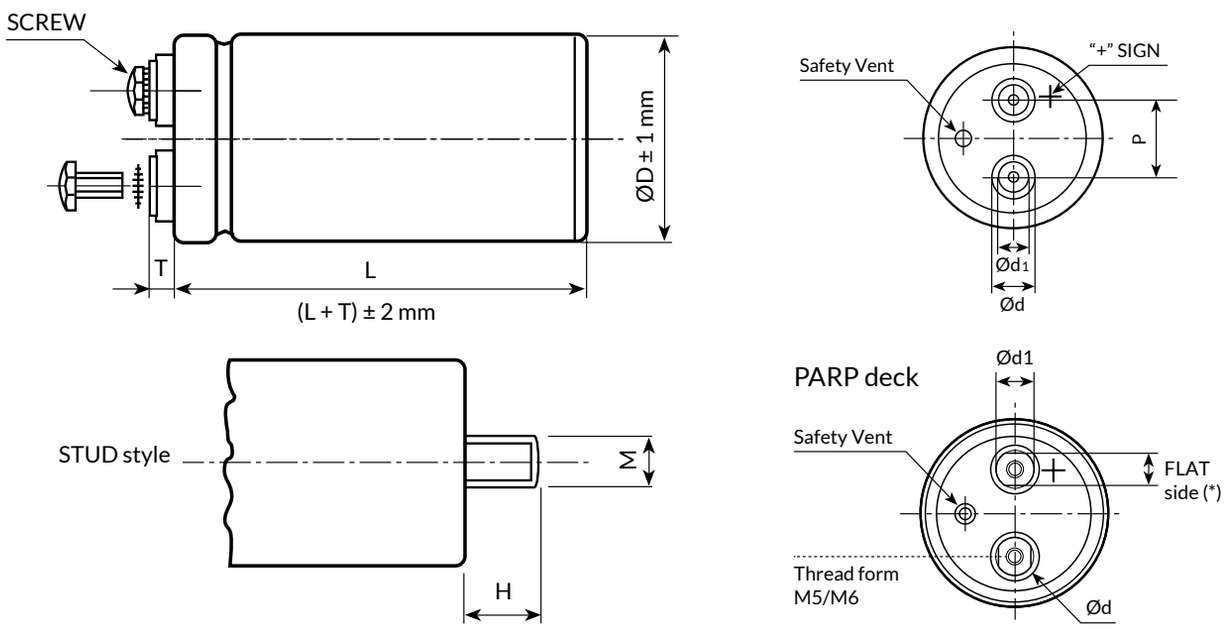


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K01 TYPE
-40°C +85°C 15000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 16V to 500V DC

Surge Voltage (V_p)

$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.15\ V_r$ ($V_r \leq$ 250V DC) $V_p = 1.10\ V_r$ (V_r > 250V DC)

Rated Capacitance Range

from 220 µF to 1.500.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

max internal temperature 108°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	35mm	51mm	63mm	76mm	90mm
Maximum current	20A	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 200000 h at 40°C
> 12000 h at 85°C for $V_r \leq$ 100V and for $V_r \geq$ 500V
> 15000 h at 85°C for 100V < V_r < 500V

Failure percentage Failure rate

≤ 1% (during useful life)
≤ 25 fit (25 10^{-9}/h) ($V_r \leq$ 160V DC)
≤ 33 fit (33 10^{-9}/h) (V_r > 160V DC)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K01 TYPE
-40°C +85°C 15000H

Rated Voltage VDC **16V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
33000	35x79	0,40	15	13	10,2	K01016333_M0E079
47000	35x79	0,55	13	12	10,8	K01016473_M0E079
47000	51x79	0,55	13	12	12,5	K01016473_M0G079
68000	51x79	0,60	12	11	15,7	K01016683_M0G079
100000	51x79	0,80	10	11	16,5	K01016104_M0G079
100000	51x105	0,80	10	10	18,7	K01016104_M0G105
150000	51x105	1,10	10	9	19,5	K01016154_M0G105
150000	63x105	1,10	10	9	21,5	K01016154_M0H105
220000	63x105	1,50	8	8	22,4	K01016224_M0H105
330000	63x105	1,90	8	8	23,3	K01016334_M0H105
330000	76x105	1,90	8	8	25,0	K01016334_M0J105
470000	76x105	1,90	5	5	28,5	K01016474_M0J105
470000	76x143	1,90	5	5	32,0	K01016474_M0J143
680000	76x143	2,50	4	4	32,5	K01016684_M0J143
1000000	76x143	2,50	3	3	34,5	K01016105_M0J143
1500000	90x220	3,00	3	3	48,7	K01016155_M0L220

Rated Voltage VDC **25V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
10000	35x60	0,25	27	21	5,9	K01025103_M0E060
15000	35x60	0,28	16	12	9,3	K01025153_M0E060
22000	35x60	0,30	17	15	10,2	K01025223_M0E060
22000	35x79	0,35	18	16	11,8	K01025223_M0E079
33000	35x60	0,38	16	15	12,5	K01025333_M0E060
33000	35x79	0,40	15	14	12,1	K01025333_M0E079
33000	51x79	0,40	15	14	13,3	K01025333_M0G079
47000	35x79	0,47	14	15	13,0	K01025473_M0E079
47000	51x79	0,50	12	10	15,7	K01025473_M0G079
56000	35x79	0,55	11	10	17,1	K01025563_M0E079
68000	51x79	0,60	10	9	16,4	K01025683_M0G079
68000	51x105	0,60	10	9	18,7	K01025683_M0G105
100000	51x79	0,70	10	9	18,5	K01025104_M0G079
100000	51x105	0,70	10	9	19,5	K01025104_M0G105
100000	63x105	0,70	10	9	21,5	K01025104_M0H105
120000	51x79	0,75	10	9	19,2	K01025124_M0G079
150000	51x105	0,80	10	9	20,9	K01025154_M0G105
150000	63x105	1,00	9	9	22,0	K01025154_M0H105
150000	76x105	1,00	9	9	23,5	K01025154_M0J105
220000	63x105	0,85	9	9	23,5	K01025224_M0H105
220000	76x105	1,50	9	9	24,2	K01025224_M0J105
220000	76x143	1,50	9	9	28,5	K01025224_M0J143
330000	76x105	1,50	9	9	27,8	K01025334_M0J105
330000	76x143	2,00	9	9	30,5	K01025334_M0J143
470000	76x143	2,00	9	9	33,4	K01025474_M0J143
470000	76x214	2,00	5	5	35,6	K01025474_M0J214
680000	76x214	2,20	5	5	35,8	K01025684_M0J214
1000000	90x220	2,50	5	4	38,3	K01025105_M0L220

K01 TYPE
-40°C +85°C 15000H

Kendeil™

Rated Voltage VDC

40V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
10000	35x60	0,20	18	12	6,5	K01040103__M0E060
15000	35x60	0,25	13	10	7,4	K01040153__M0E060
15000	35x79	0,25	13	10	8,6	K01040153__M0E079
22000	35x79	0,30	16	14	8,9	K01040223__M0E079
22000	51x79	0,30	16	14	10,4	K01040223__M0G079
33000	35x79	0,30	15	14	10,6	K01040333__M0E079
33000	51x79	0,35	15	13	13,5	K01040333__M0G079
47000	51x79	0,40	10	9	14,2	K01040473__M0G079
47000	51x105	0,40	10	9	15,1	K01040473__M0G105
47000	63x105	0,40	10	9	17,6	K01040473__M0H105
68000	51x79	0,40	14	13	14,4	K01040683__M0G079
68000	51x105	0,50	10	8	18,2	K01040683__M0G105
68000	63x105	0,50	10	8	19,5	K01040683__M0H105
82000	51x105	0,55	9	8	18,4	K01040823__M0G105
100000	63x105	0,60	9	8	21,2	K01040104__M0H105
150000	63x105	0,80	9	8	19,1	K01040154__M0H105
150000	76x105	0,90	9	8	25,7	K01040154__M0J105
220000	76x105	1,00	8	7	26,8	K01040224__M0J105
220000	76x143	1,00	6	6	31,5	K01040224__M0J143
330000	76x143	1,10	5	5	35,5	K01040334__M0J143
330000	76x214	1,20	5	5	38,5	K01040334__M0J214
470000	76x214	1,30	3	3	42,0	K01040474__M0J214
680000	90x220	1,30	3	3	45,6	K01040684__M0L220

Rated Voltage VDC

50V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	35x60	0,20	33	30	5,6	K01050472__M0E060
6800	35x60	0,20	25	24	7,0	K01050682__M0E060
10000	35x60	0,20	21	20	10,0	K01050103__M0E060
12000	35x60	0,25	15	15	10,6	K01050123__M0E060
15000	35x79	0,25	17	15	11,3	K01050153__M0E079
22000	35x79	0,30	16	15	11,5	K01050223__M0E079
22000	51x79	0,30	16	13	13,1	K01050223__M0G079
33000	51x79	0,35	14	14	14,2	K01050333__M0G079
33000	51x105	0,35	15	13	16,0	K01050333__M0G105
47000	51x79	0,40	14	14	14,2	K01050473__M0G079
47000	51x105	0,40	12	10	16,2	K01050473__M0G105
47000	63x105	0,40	12	10	18,3	K01050473__M0H105
68000	51x105	0,50	12	10	18,2	K01050683__M0G105
68000	63x105	0,60	12	9	18,0	K01050683__M0H105
68000	76x105	0,60	12	9	22,1	K01050683__M0J105
100000	63x105	0,60	12	10	19,1	K01050104__M0H105
100000	76x105	0,90	8	8	23,8	K01050104__M0J105
100000	76x143	0,90	8	8	25,8	K01050104__M0J143
150000	76x105	1,00	6	6	30,5	K01050154__M0J105
150000	76x143	1,00	6	6	31,5	K01050154__M0J143
220000	76x143	1,20	5	5	40,3	K01050224__M0J143
330000	76x214	1,30	3	3	50,8	K01050334__M0J214
470000	90x220	1,30	2	3	70,8	K01050474__M0L220

K01 TYPE
-40°C +85°C 15000H

Rated Voltage VDC
63V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	35x60	0,15	29	25	6,2	K01063472__M0E060
6800	35x60	0,18	21	20	7,0	K01063682__M0E060
10000	35x60	0,20	19	18	8,5	K01063103__M0E060
10000	35x79	0,20	21	20	8,7	K01063103__M0E079
10000	51x79	0,20	18	16	10,1	K01063103__M0G079
15000	35x79	0,25	18	16	10,0	K01063153__M0E079
15000	51x79	0,25	15	13	11,1	K01063153__M0G079
22000	51x79	0,30	13	11	12,4	K01063223__M0G079
22000	51x105	0,30	13	11	14,6	K01063223__M0G105
33000	51x105	0,35	11	10	15,6	K01063333__M0G105
33000	51x79	0,35	14	14	14,2	K01063333__M0G079
33000	63x105	0,35	11	10	17,9	K01063333__M0H105
47000	51x105	0,45	10	9	15,8	K01063473__M0G105
47000	63x105	0,45	11	10	18,8	K01063473__M0H105
68000	76x105	0,50	11	10	25,7	K01063683__M0J105
100000	76x105	0,55	8	8	31,5	K01063104__M0J105
100000	76x143	0,55	8	8	34,5	K01063104__M0J143
150000	76x143	0,60	6	6	36,1	K01063154__M0J143
220000	76x214	0,70	5	5	38,2	K01063224__M0J214
330000	90x220	0,90	2	3	56,3	K01063334__M0L220

Rated Voltage VDC
75V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	35x60	0,15	29	25	5,4	K01075472__M0E060
6800	35x60	0,20	22	21	6,7	K01075682__M0E060
6800	35x79	0,20	20	20	8,5	K01075682__M0E079
10000	35x79	0,25	19	18	9,2	K01075103__M0E079
10000	51x79	0,25	18	16	11,0	K01075103__M0G079
12000	35x79	0,25	19	18	9,7	K01075123__M0E079
15000	51x105	0,25	15	13	12,7	K01075153__M0G105
15000	51x79	0,25	12	11	15,0	K01075153__M0G079
22000	51x79	0,30	12	11	13,9	K01075223__M0G079
22000	51x105	0,30	12	11	15,2	K01075223__M0G105
22000	63x105	0,30	12	11	16,2	K01075223__M0H105
33000	63x105	0,35	11	10	16,8	K01075333__M0H105
33000	51x105	0,35	11	10	18,0	K01075333__M0G105
33000	76x105	0,35	11	10	18,5	K01075333__M0J105
47000	63x105	0,40	10	10	20,0	K01075473__M0H105
47000	76x105	0,45	10	10	20,1	K01075473__M0J105
47000	76x143	0,45	10	10	22,1	K01075473__M0J143
68000	63x105	0,60	10	10	18,7	K01075683__M0H105
68000	76x143	0,60	10	10	26,0	K01075683__M0J143
100000	76x105	0,60	8	8	24,8	K01075104__M0J105
100000	76x143	0,60	8	8	34,9	K01075104__M0J143
150000	76x214	0,70	5	5	38,8	K01075154__M0J214
220000	90x220	0,75	3	2	40,1	K01075224__M0L220
270000	90x240	0,76	3	3	48,6	K01075274__M0L240

K01 TYPE
-40°C +85°C 15000H

Kendeil™

Rated Voltage VDC

100V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	35x60	0,15	84	65	4,0	K01100152__M0E060
2200	35x60	0,15	57	47	5,0	K01100222__M0E060
3300	35x60	0,15	48	39	5,3	K01100332__M0E060
3300	35x79	0,15	48	39	6,8	K01100332__M0E079
4700	35x79	0,15	30	26	7,5	K01100472__M0E079
4700	51x79	0,15	30	26	10,0	K01100472__M0G079
4700	35x60	0,15	30	26	6,6	K01100472__M0E060
6800	35x79	0,18	24	21	9,3	K01100682__M0E079
6800	51x79	0,20	23	20	11,1	K01100682__M0G079
10000	51x79	0,20	16	14	11,9	K01100103__M0G079
10000	51x105	0,20	16	14	13,9	K01100103__M0G105
10000	63x105	0,20	16	14	14,5	K01100103__M0H105
15000	51x79	0,25	15	14	13,5	K01100153__M0G079
15000	51x105	0,25	13	12	14,8	K01100153__M0G105
15000	63x105	0,25	13	12	17,5	K01100153__M0H105
22000	51x105	0,30	13	12	17,2	K01100223__M0G105
22000	63x105	0,30	12	12	18,2	K01100223__M0H105
33000	63x105	0,30	13	13	18,6	K01100333__M0H105
33000	76x105	0,25	10	10	23,1	K01100333__M0J105
47000	76x105	0,40	9	9	29,8	K01100473__M0J105
47000	76x143	0,30	10	9	30,2	K01100473__M0J143
68000	76x143	0,30	8	8	36,5	K01100683__M0J143
68000	76x214	0,40	6	5	39,5	K01100683__M0J214
100000	76x214	0,40	5	5	46,4	K01100104__M0J214
150000	90x220	0,45	3	3	62,4	K01100154__M0L220

Rated Voltage VDC

160V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
680	35x60	0,10	128	102	3,2	K01160681__M0E060
820	35x60	0,12	113	88	3,5	K01160821__M0E060
1000	35x60	0,12	94	76	3,9	K01160102__M0E060
1000	35x79	0,12	98	90	4,0	K01160102__M0E079
1500	35x60	0,12	107	86	3,9	K01160152__M0E060
1500	35x79	0,12	72	70	5,3	K01160152__M0E079
1500	51x79	0,12	62	71	5,3	K01160152__M0G079
2200	35x79	0,12	70	66	5,1	K01160222__M0E079
2200	51x79	0,12	50	43	7,0	K01160222__M0G079
3300	51x79	0,14	41	36	6,6	K01160332__M0G079
3300	51x105	0,14	35	30	8,6	K01160332__M0G105
4700	51x79	0,14	40	35	8,3	K01160472__M0G079
4700	51x105	0,14	25	25	10,9	K01160472__M0G105
4700	63x105	0,14	25	25	11,9	K01160472__M0H105
6800	51x105	0,14	21	22	11,4	K01160682__M0G105
6800	63x105	0,14	20	22	13,0	K01160682__M0H105
10000	63x105	0,14	27	25	12,9	K01160103__M0H105
10000	76x105	0,15	13	12	17,4	K01160103__M0J105
10000	76x143	0,15	13	12	19,4	K01160103__M0J143
15000	76x105	0,15	16	14	16,9	K01160153__M0J105
15000	76x143	0,15	11	10	20,9	K01160153__M0J143
22000	76x143	0,20	10	10	26,4	K01160223__M0J143
33000	76x214	0,20	8	8	34,1	K01160333__M0J214
47000	90x220	0,30	5	5	30,0	K01160473__M0L220

Kendeil™

K01 TYPE
-40°C +85°C 15000H

Rated Voltage VDC
200V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
680	35X60	0,10	124	119	3,4	K01200681_M0E060
820	35x60	0,10	113	77	3,4	K01200821_M0E060
1000	35x79	0,11	86	88	3,5	K01200102_M0E079
1000	35x60	0,12	65	66	3,9	K01200102_M0E060
1500	35x60	0,12	106	85	3,7	K01200152_M0E060
1500	35x79	0,12	62	44	5,4	K01200152_M0E079
1500	51x79	0,12	60	63	5,8	K01200152_M0G079
2200	35x79	0,12	69	55	5,1	K01200222_M0E079
2200	51x105	0,12	40	37	7,2	K01200222_M0G105
2200	51x79	0,12	46	33	7,8	K01200222_M0G079
3300	51x105	0,12	32	30	9,0	K01200332_M0G105
3300	63x105	0,12	31	29	10,2	K01200332_M0H105
4700	51x79	0,12	41	35	8,3	K01200472_M0G079
4700	51x105	0,12	28	26	10,4	K01200472_M0G105
4700	63x105	0,12	27	25	11,1	K01200472_M0H105
5600	63x105	0,12	21	18	12,1	K01200562_M0H105
6800	63x105	0,12	20	16	13,9	K01200682_M0H105
6800	76x105	0,12	19	15	14,3	K01200682_M0J105
8200	76x105	0,12	16	14	14,8	K01200822_M0J105
10000	63x105	0,15	23	20	14,4	K01200103_M0H105
10000	76x105	0,15	13	12	15,8	K01200103_M0J105
10000	76x143	0,15	13	12	18,6	K01200103_M0J143
15000	76x105	0,18	16	14	19,0	K01200153_M0J105
15000	76x143	0,18	12	12	21,4	K01200153_M0J143
22000	76x143	0,18	9	9	28,9	K01200223_M0J143
33000	76x214	0,22	8	8	36,1	K01200333_M0J214
47000	90x220	0,29	5	5	35,4	K01200473_M0L220

Rated Voltage VDC
250V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	35x60	0,10	211	200	2,8	K01250471_M0E060
680	35x60	0,10	125	94	3,4	K01250681_M0E060
680	35x79	0,10	127	121	3,5	K01250681_M0E079
1000	35x60	0,11	120	91	3,5	K01250102_M0E060
1000	35x79	0,11	86	88	4,1	K01250102_M0E079
1500	35x79	0,11	79	70	4,0	K01250152_M0E079
1500	51x79	0,11	64	56	5,0	K01250152_M0G079
2200	51x105	0,11	40	36	7,5	K01250222_M0G105
3300	51x105	0,12	31	26	9,8	K01250332_M0G105
3300	63x105	0,12	30	25	11,0	K01250332_M0H105
4700	51x105	0,12	30	26	10,5	K01250472_M0G105
4700	63x105	0,12	24	21	11,8	K01250472_M0H105
4700	76x105	0,12	20	18	13,2	K01250472_M0J105
5600	76x105	0,12	17	16	13,8	K01250562_M0J105
6800	63x105	0,15	20	19	14,1	K01250682_M0H105
6800	76x105	0,15	15	13	14,7	K01250682_M0J105
8200	76x105	0,15	14	13	16,0	K01250822_M0J105
10000	76x105	0,17	14	10	15,8	K01250103_M0J105
10000	76x143	0,17	13	12	19,7	K01250103_M0J143
15000	76x143	0,17	11	11	21,9	K01250153_M0J143
22000	76x214	0,17	10	9	34,2	K01250223_M0J214
27000	90x220	0,22	6	6	38,9	K01250273_M0L220

K01 TYPE

-40°C +85°C 15000H

Kendeil™

Rated Voltage VDC

350V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	35X60	0,10	170	136	3,3	K01350471__M0E060
680	35X79	0,10	108	95	4,0	K01350681__M0E079
1000	35x79	0,11	85	68	4,8	K01350102__M0E079
1000	51x79	0,11	79	62	5,0	K01350102__M0G079
1000	51x105	0,11	79	62	5,5	K01350102__M0G105
1500	51x79	0,11	60	53	6,3	K01350152__M0G079
1500	51x105	0,11	60	52	7,4	K01350152__M0G105
2200	51x79	0,11	46	42	8,0	K01350222__M0G079
2200	51x105	0,11	44	40	9,0	K01350222__M0G105
2200	63x105	0,11	37	34	9,5	K01350222__M0H105
3300	63x105	0,12	26	22	10,1	K01350332__M0H105
3300	76x105	0,12	26	22	12,8	K01350332__M0J105
4700	63x105	0,12	27	21	13,1	K01350472__M0H105
4700	76x105	0,12	17	16	14,5	K01350472__M0J105
4700	76x143	0,12	17	16	17,5	K01350472__M0J143
5600	76x105	0,12	18	18	13,3	K01350562__M0J105
5600	76x143	0,12	17	16	18,5	K01350562__M0J143
6800	76x105	0,12	16	11	14,0	K01350682__M0J105
6800	76x143	0,12	16	15	19,2	K01350682__M0J143
8200	76x143	0,12	16	15	20,7	K01350822__M0J143
10000	76x143	0,12	15	15	23,0	K01350103__M0J143
10000	76x214	0,14	15	14	26,6	K01350103__M0J214
15000	76x214	0,15	14	14	31,7	K01350153__M0J214
22000	90x220	0,20	13	13	35,4	K01350223__M0L220

Rated Voltage VDC

400V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
220	35x60	0,10	350	288	2,1	K01400221__M0E060
330	35x60	0,10	290	273	2,8	K01400331__M0E060
470	35x60	0,10	160	149	3,0	K01400471__M0E060
470	35x79	0,10	165	155	3,5	K01400471__M0E079
680	35x79	0,10	142	104	3,0	K01400681__M0E079
680	51x79	0,10	120	115	4,7	K01400681__M0G079
680	51x105	0,10	124	120	5,1	K01400681__M0G105
1000	51x79	0,10	105	95	5,8	K01400102__M0G079
1000	51x105	0,10	110	85	6,3	K01400102__M0G105
1500	51x79	0,10	72	53	6,2	K01400152__M0G079
1500	51x105	0,10	65	55	7,0	K01400152__M0G105
1500	63x105	0,10	65	55	7,9	K01400152__M0H105
2200	51x105	0,10	50	47	8,3	K01400222__M0G105
2200	63x105	0,10	50	47	9,0	K01400222__M0H105
2200	76x105	0,10	50	47	10,7	K01400222__M0J105
3300	63x105	0,12	35	30	11,0	K01400332__M0H105
3300	76x105	0,12	35	30	13,1	K01400332__M0J105
3300	76x143	0,12	35	30	14,2	K01400332__M0J143
4700	76x105	0,15	30	29	14,9	K01400472__M0J105
4700	76x143	0,15	30	29	16,8	K01400472__M0J143
5600	76x143	0,15	26	25	19,0	K01400562__M0J143
6800	76x143	0,15	20	18	19,5	K01400682__M0J143
8200	76x143	0,15	22	20	19,0	K01400822__M0J143
10000	76x143	0,15	22	20	19,0	K01400103__M0J143
10000	76x214	0,15	20	19	26,0	K01400103__M0J214
15000	90x220	0,20	15	12	33,5	K01400153__M0L220

K01 TYPE
-40°C +85°C 15000H

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
220	35X60	0,10	360	300	2,0	K01450221_M0E060
330	35X60	0,10	240	210	2,8	K01450331_M0E060
470	51x79	0,10	200	179	4,0	K01450471_M0G079
680	51X79	0,10	140	128	4,4	K01450681_M0G079
680	51x105	0,10	140	128	5,0	K01450681_M0G105
1000	51x79	0,10	100	88	4,8	K01450102_M0G079
1000	51x105	0,10	100	88	6,4	K01450102_M0G105
1500	51x79	0,10	70	57	5,5	K01450152_M0G079
1500	51X105	0,10	67	55	7,1	K01450152_M0G105
1500	63x105	0,10	67	55	8,0	K01450152_M0H105
2200	63x105	0,10	60	55	9,0	K01450222_M0H105
2200	76x105	0,10	60	47	11,2	K01450222_M0J105
2200	76x143	0,10	60	47	12,5	K01450222_M0J143
3300	76x105	0,12	35	30	11,2	K01450332_M0J105
3300	76x143	0,12	35	30	12,9	K01450332_M0J143
4700	76x105	0,15	28	25	10,1	K01450472_M0J105
4700	76x143	0,15	32	30	15,0	K01450472_M0J143
5600	76x143	0,15	26	25	19,0	K01450562_M0J143
6800	76x143	0,15	23	22	19,0	K01450682_M0J143
8200	76x143	0,15	22	20	19,0	K01450822_M0J143
10000	76x143	0,20	22	20	19,0	K01450103_M0J143
10000	76x214	0,20	20	19	23,1	K01450103_M0J214
12000	76x214	0,20	15	12	23,8	K01450123_M0J214
15000	90x220	0,20	14	12	32,6	K01450153_M0L220

Rated Voltage VDC **500V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	51x105	0,15	125	114	4,0	K01500102_M0G105
1500	51x105	0,15	64	58	5,2	K01500152_M0G105
1500	63x105	0,15	81	67	5,2	K01500152_M0H105
2200	76x105	0,15	62	61	7,4	K01500222_M0J105
2200	76x143	0,15	55	54	8,2	K01500222_M0J143
3300	76x105	0,15	31	28	9,1	K01500332_M0J105
3300	76x143	0,15	39	37	10,3	K01500332_M0J143
4700	76x143	0,15	30	29	11,6	K01500472_M0J143
5600	76x214	0,15	26	22	19,8	K01500562_M0J214
6800	76x214	0,15	24	22	20,2	K01500682_M0J214

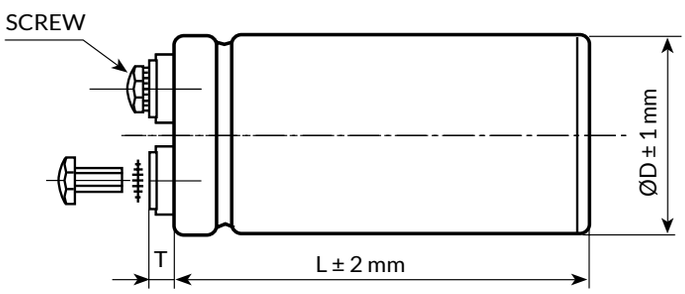
Please, contact our technical service for more information or spec-in analysis.

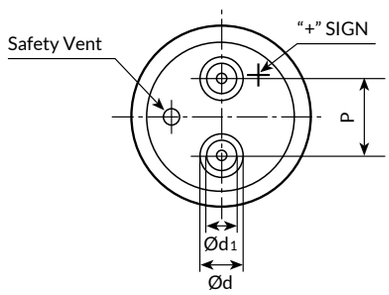
K02 TYPE
-40°C +105°C 5000H

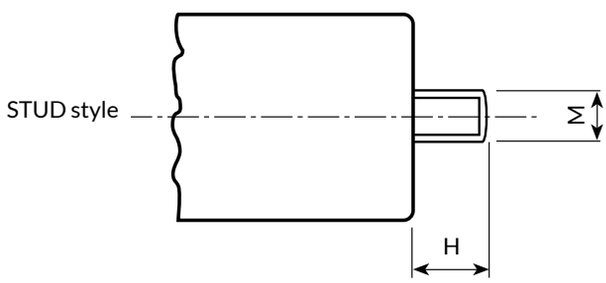
APPLICATIONS

Designed for professional power electronics
Switch mode power supplies, converters, filtering devices.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Poles brought out to heavy duty screw terminals
- To be mounted with ring clips or with threaded stud
- Very high CV for unit volume with low ESR.
- High ripple current
- Excellent electrical data in small dimensions case size







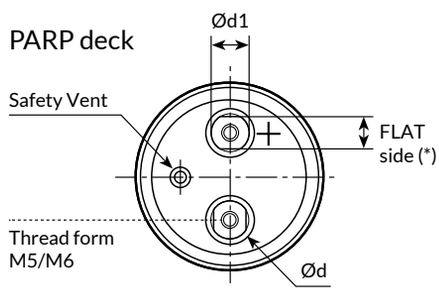


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K02 TYPE
-40°C +105°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C +105°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 16V to 550V DC

Surge Voltage (V_p)

$V_p = 1.15\ V_r$ ($V_r \leq 250$V DC) $V_p = 1.10\ V_r$ ($V_r > 250$V DC)

Rated Capacitance Range

from 100 µF to 470.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

max internal temperature 108°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	35mm	51mm	63mm	76mm	90mm
Maximum current	20A	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 250000 h at 40°C
> 5000 h at 105°C for V≤500V
> 3000 h at 105°C for V=550V

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 30 fit (30 10^{-9}/h) ($V_r \leq 160$V DC)
≤ 40 fit (40 10^{-9}/h) ($V_r > 160$V DC)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K02 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **16V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
10000	35x60	0,25	25	24	3,3	K02016103_M0E060
15000	35x60	0,30	16	16	3,5	K02016153_M0E060
22000	35x60	0,35	12	12	4,4	K02016223_M0E060
33000	35x60	0,40	12	12	4,6	K02016333_M0E060
47000	35x79	0,55	9	10	7,5	K02016473_M0E079
68000	51x79	0,60	8	8	11,9	K02016683_M0G079
82000	51x79	0,70	8	8	12,1	K02016823_M0G079
100000	51x79	0,80	8	8	12,2	K02016104_M0G079
100000	51x105	0,80	8	8	12,3	K02016104_M0G105
150000	63x105	1,10	7	7	15,4	K02016154_M0H105
220000	76x105	1,50	7	7	18,8	K02016224_M0J105
330000	76x105	1,90	7	7	19,7	K02016334_M0J105
470000	76x143	2,00	6	6	22,5	K02016474_M0J143
1000000	90x220	2,60	3	3	29,4	K02016105_M0L220

Rated Voltage VDC **25V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
10000	35x60	0,20	23	18	3,8	K02025103_M0E060
15000	35x60	0,25	16	12	4,8	K02025153_M0E060
22000	35x60	0,30	12	12	7,0	K02025223_M0E060
33000	51x79	0,35	10	10	8,9	K02025333_M0G079
47000	51x79	0,40	9	9	11,6	K02025473_M0G079
68000	51x79	0,50	8	8	12,0	K02025683_M0G079
68000	51x105	0,50	8	8	13,0	K02025683_M0G105
100000	63x105	0,60	8	8	15,8	K02025104_M0H105
150000	76x105	0,90	7	7	18,3	K02025154_M0J105
220000	76x143	1,30	7	7	21,6	K02025224_M0J143
330000	76x143	2,00	7	7	23,8	K02025334_M0J143
680000	90x220	3,00	3	3	38,1	K02025684_M0L220

Rated Voltage VDC **40V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
4700	35x60	0,20	31	29	3,3	K02040472_M0E060
6800	35x60	0,20	23	20	3,9	K02040682_M0E060
10000	35x60	0,20	16	12	4,4	K02040103_M0E060
10000	35x79	0,20	16	12	4,8	K02040103_M0E079
15000	35x79	0,20	12	10	5,4	K02040153_M0E079
22000	35x79	0,25	10	10	6,6	K02040223_M0E079
22000	51x79	0,25	10	10	8,9	K02040223_M0G079
33000	51x79	0,35	10	10	9,9	K02040333_M0G079
33000	51x105	0,35	10	10	11,2	K02040333_M0G105
47000	51x105	0,45	9	9	13,8	K02040473_M0G105
47000	63x105	0,45	9	9	14,5	K02040473_M0H105
68000	63x105	0,60	7	7	15,0	K02040683_M0H105
68000	76x105	0,60	7	7	15,9	K02040683_M0J105
100000	63x105	0,90	7	7	17,2	K02040104_M0H105
100000	76x105	0,90	7	7	19,1	K02040104_M0J105
100000	76x143	0,90	7	7	21,0	K02040104_M0J143
150000	76x105	1,30	7	7	18,9	K02040154_M0J105
150000	76x143	1,30	7	7	25,9	K02040154_M0J143
220000	76x143	1,50	5	5	25,7	K02040224_M0J143
470000	90x220	2,00	3	3	36,3	K02040474_M0L220

K02 TYPE
-40°C +105°C 5000H

Kendeil™

Rated Voltage VDC

63V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
2200	35x60	0,15	72	60	2,5	K02063222__M0E060
3300	35x60	0,15	48	39	3,5	K02063332__M0E060
4700	35x60	0,15	33	28	4,2	K02063472__M0E060
6800	35x60	0,18	18	13	5,2	K02063682__M0E060
6800	35x79	0,18	18	13	6,3	K02063682__M0E079
10000	35x79	0,20	15	11	7,6	K02063103__M0E079
10000	51x79	0,20	15	11	8,2	K02063103__M0G079
15000	51x79	0,25	15	13	8,9	K02063153__M0G079
15000	51x105	0,25	13	10	18,0	K02063153__M0G105
22000	51x79	0,30	11	10	9,5	K02063223__M0G079
22000	51x105	0,30	11	10	11,8	K02063223__M0G105
22000	63x105	0,30	11	10	13,5	K02063223__M0H105
33000	51x105	0,35	11	10	11,1	K02063333__M0G105
33000	63x105	0,35	11	10	14,8	K02063333__M0H105
33000	76x105	0,35	11	8	16,6	K02063333__M0J105
47000	63x105	0,45	9	8	12,4	K02063473__M0H105
47000	76x105	0,45	9	8	17,7	K02063473__M0J105
47000	76x143	0,45	9	8	19,0	K02063473__M0J143
68000	63x105	0,70	8	8	18,6	K02063683__M0H105
68000	76x105	0,45	8	8	20,1	K02063683__M0J105
68000	76x143	0,70	8	8	22,8	K02063683__M0J143
100000	76x143	0,70	8	8	24,1	K02063104__M0J143
150000	76x143	0,70	5	5	25,2	K02063154__M0J143
220000	90x220	0,80	5	5	30,0	K02063224__M0L220

Rated Voltage VDC

100V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1000	35x60	0,15	110	100	2,9	K02100102__M0E060
1500	35x60	0,15	80	73	3,2	K02100152__M0E060
2200	35x60	0,15	59	53	4,4	K02100222__M0E060
3300	35x60	0,15	33	32	3,9	K02100332__M0E060
3300	35x79	0,15	33	31	5,8	K02100332__M0E079
4700	51x79	0,15	25	22	7,2	K02100472__M0G079
6800	51x79	0,15	19	17	8,9	K02100682__M0G079
6800	51x105	0,15	19	17	8,9	K02100682__M0G105
8200	51x79	0,15	18	15	9,7	K02100822__M0G079
10000	51x79	0,15	17	15	10,1	K02100103__M0G079
10000	51x105	0,15	17	15	11,0	K02100103__M0G105
10000	63x105	0,15	17	15	12,5	K02100103__M0H105
15000	51x105	0,15	12	12	13,2	K02100153__M0G105
15000	63x105	0,15	12	12	15,1	K02100153__M0H105
22000	63x105	0,18	10	9	15,3	K02100223__M0H105
22000	76x105	0,18	10	9	16,5	K02100223__M0J105
33000	76x105	0,22	8	8	18,7	K02100333__M0J105
33000	76x143	0,22	8	8	20,9	K02100333__M0J143
47000	76x143	0,25	5	5	23,4	K02100473__M0J143
68000	90x220	0,25	3	3	32,8	K02100683__M0L220

K02 TYPE
-40°C +105°C 5000H

Rated Voltage VDC
160V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1000	35x79	0,11	105	90	3,3	K02160102_M0E079
1500	35x79	0,11	65	60	3,1	K02160152_M0E079
1500	51x79	0,11	65	60	4,1	K02160152_M0G079
2200	51x79	0,11	46	43	4,6	K02160222_M0G079
2200	51X105	0,11	46	43	4,8	K02160222_M0G105
3300	51x79	0,11	32	30	5,5	K02160332_M0G079
3300	63x105	0,11	32	30	6,8	K02160332_M0H105
4700	63x105	0,11	27	25	8,5	K02160472_M0H105
6800	63x105	0,13	23	20	8,8	K02160682_M0H105
6800	76x105	0,13	23	20	11,3	K02160682_M0J105
10000	76x105	0,14	22	20	14,2	K02160103_M0J105
10000	76x143	0,15	17	16	14,9	K02160103_M0J143
15000	76x143	0,20	16	12	17,2	K02160153_M0J143
22000	76X214	0,20	11	10	19,0	K02160223_M0J214
47000	90x220	0,30	6	5	24,9	K02160473_M0L220

Rated Voltage VDC
200V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
680	35X60	0,11	133	98	2,5	K02200681_M0E060
820	35x60	0,11	97	72	3,2	K02200821_M0E060
1000	51x79	0,11	85	64	4,6	K02200102_M0G079
1500	51x79	0,11	65	58	4,4	K02200152_M0G079
1500	51x105	0,11	65	58	5,1	K02200152_M0G105
2200	51x79	0,11	60	53	5,1	K02200222_M0G079
2200	51x105	0,11	60	53	6,1	K02200222_M0G105
3300	51x105	0,11	40	35	6,8	K02200332_M0G105
3300	63x105	0,11	40	35	7,9	K02200332_M0H105
4700	63x105	0,11	25	23	8,7	K02200472_M0H105
5600	63x105	0,11	22	20	9,8	K02200562_M0H105
6800	63x105	0,11	18	16	8,7	K02200682_M0H105
6800	76X105	0,11	18	16	11,8	K02200682_M0J105
8200	76X105	0,11	17	15	12,8	K02200822_M0J105
10000	76x105	0,13	15	13	14,5	K02200103_M0J105
10000	76x143	0,15	13	12	16,0	K02200103_M0J143
15000	76x143	0,20	12	11	17,3	K02200153_M0J143
22000	76x214	0,20	11	10	18,9	K02200223_M0J214
33000	90x220	0,25	6	5	28,8	K02200333_M0L220

K02 TYPE
-40°C +105°C 5000H

Kendeil™

Rated Voltage VDC

250V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
470	35x60	0,11	211	193	2,0	K02250471__M0E060
680	35x60	0,11	130	98	2,1	K02250681__M0E060
680	35x79	0,11	130	98	2,2	K02250681__M0E079
820	35x60	0,11	120	90	2,4	K02250821__M0E060
820	35x79	0,11	120	91	2,8	K02250821__M0E079
1000	51x79	0,11	110	85	4,1	K02250102__M0G079
1500	51x79	0,11	74	65	4,5	K02250152__M0G079
1500	51x105	0,11	74	65	5,4	K02250152__M0G105
2200	51x105	0,11	41	39	6,8	K02250222__M0G105
3300	51x105	0,11	30	26	7,0	K02250332__M0G105
3300	63x105	0,11	30	26	8,2	K02250332__M0H105
4700	63x105	0,11	18	17	9,5	K02250472__M0H105
4700	76x105	0,11	18	17	11,9	K02250472__M0J105
5600	63x105	0,11	24	19	10,2	K02250562__M0H105
5600	76x105	0,11	17	16	13,2	K02250562__M0J105
6800	76x105	0,15	16	14	13,3	K02250682__M0J105
6800	76x143	0,15	15	14	14,3	K02250682__M0J143
8200	76x143	0,15	14	14	15,2	K02250822__M0J143
10000	76x143	0,20	14	13	16,0	K02250103__M0J143
15000	76x214	0,20	12	10	17,4	K02250153__M0J214
22000	76x214	0,22	11	10	20,2	K02250223__M0J214
33000	90x220	0,24	6	5	27,1	K02250333__M0L220

Rated Voltage VDC

350V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
330	35x60	0,11	255	196	1,8	K02350331__M0E060
470	35x79	0,11	170	141	2,1	K02350471__M0E079
680	35x79	0,11	128	97	2,8	K02350681__M0E079
680	51x79	0,11	128	96	3,8	K02350681__M0G079
1000	51x79	0,11	110	85	4,0	K02350102__M0G079
1000	51x105	0,11	85	68	5,0	K02350102__M0G105
1500	51x79	0,11	74	66	5,0	K02350152__M0G079
1500	51x105	0,11	59	52	5,6	K02350152__M0G105
1500	63x105	0,11	59	52	6,4	K02350152__M0H105
2200	63x105	0,11	44	40	7,2	K02350222__M0H105
2200	76x105	0,11	44	40	8,1	K02350222__M0J105
3300	76x105	0,11	26	23	10,2	K02350332__M0J105
4700	76x105	0,11	18	17	11,1	K02350472__M0J105
4700	76x143	0,11	18	16	13,5	K02350472__M0J143
5600	76x105	0,12	18	16	11,5	K02350562__M0J105
5600	76x143	0,12	18	17	14,3	K02350562__M0J143
6800	76x143	0,15	16	15	15,1	K02350682__M0J143
8200	76x143	0,15	16	15	16,5	K02350822__M0J143
10000	76x214	0,20	15	14	19,9	K02350103__M0J214
20000	90x220	0,20	10	10	26,0	K02350203__M0L220
20000	90x220	0,20	10	10	26	K02350203__M0L220

K02 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	35x60	0,11	350	280	1,4	K02400221_M0E060
330	35x60	0,11	250	210	2,2	K02400331_M0E060
470	51x79	0,11	170	150	2,8	K02400471_M0G079
680	51x79	0,11	110	100	3,2	K02400681_M0G079
820	51x79	0,11	108	82	3,2	K02400821_M0G079
1000	51x79	0,11	95	82	3,4	K02400102_M0G079
1000	51x105	0,11	95	82	4,1	K02400102_M0G105
1500	51x105	0,11	64	53	4,7	K02400152_M0G105
1500	63x105	0,11	64	53	5,8	K02400152_M0H105
2200	63x105	0,11	45	53	6,0	K02400222_M0H105
2200	76x105	0,11	45	39	7,3	K02400222_M0J105
3300	76x105	0,11	28	25	8,3	K02400332_M0J105
3300	76x143	0,11	28	25	11,1	K02400332_M0J143
4700	76x143	0,11	24	23	12,8	K02400472_M0J143
5600	76x143	0,12	21	17	12,9	K02400562_M0J143
6800	76x214	0,15	19	15	15,5	K02400682_M0J214
8200	76x214	0,15	18	16	18,0	K02400822_M0J214
10000	90x220	0,20	16	14	22,5	K02400103_M0L220
15000	90x220	0,22	12	10	23,0	K02400153_M0L220

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
100	35x60	0,11	800	650	1,2	K02450101_M0E060
150	35x60	0,11	550	490	1,6	K02450151_M0E060
220	35x60	0,11	370	310	1,8	K02450221_M0E060
330	35x79	0,11	240	210	2,4	K02450331_M0E079
470	51x79	0,11	200	179	3,0	K02450471_M0G079
680	51x79	0,11	140	128	3,1	K02450681_M0G079
680	51x105	0,11	140	128	4,2	K02450681_M0G105
1000	51x105	0,11	100	88	4,4	K02450102_M0G105
1000	63x105	0,11	100	88	5,3	K02450102_M0H105
1500	63x105	0,11	63	57	5,7	K02450152_M0H105
1500	76x105	0,11	63	57	6,6	K02450152_M0J105
2200	76x105	0,11	48	38	7,6	K02450222_M0J105
2200	76x143	0,11	48	38	8,8	K02450222_M0J143
3300	76x143	0,15	35	30	10,4	K02450332_M0J143
4700	76x143	0,15	28	25	10,9	K02450472_M0J143
5600	76x143	0,15	21	17	11,2	K02450562_M0J143
6800	76x214	0,15	21	16	15,5	K02450682_M0J214
8200	76x214	0,15	18	16	19,2	K02450822_M0J214
10000	90x220	0,20	16	14	22,5	K02450103_M0L220
12000	90x220	0,20	15	13	23,0	K02450123_M0L220

K02 TYPE
-40°C +105°C 5000H

Rated Voltage VDC
500V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1000	51x105	0,11	100	88	4,0	K02500102__M0G105
1500	63x105	0,11	64	58	5,4	K02500152__M0H105
1500	63x105	0,11	64	58	5,4	K02500152__M0H105
1800	63x105	0,11	61	53	5,7	K02500182__M0H105
2200	76x105	0,11	60	47	6,9	K02500222__M0J105
2700	76x143	0,13	40	32	8,7	K02500272__M0J143
3300	76x143	0,15	37	31	9,4	K02500332__M0J143
3900	76x143	0,15	31	28	10,1	K02500392__M0J143
4700	76x143	0,15	29	26	10,3	K02500472__M0J143
5600	76x214	0,15	23	19	14,3	K02500562__M0J214
6800	76x214	0,15	21	16	14,8	K02500682__M0J214
6800	90x145	0,15	21	16	13,3	K02500682__M0L145
8200	90x220	0,15	19	15	18,6	K02500822__M0L220
10000	90x220	0,20	17	15	20,0	K02500103__M0L220

Rated Voltage VDC
550V

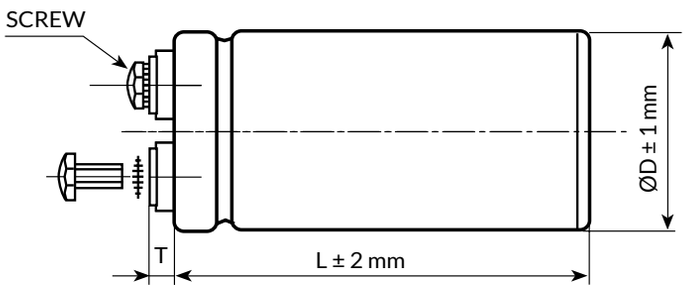
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1500	63x105	0,19	109	88	3,6	K02550152__M0H105
1800	76x105	0,19	99	80	4,2	K02550182__M0J143
2200	76x105	0,19	85	85	4,4	K02550222__M0J105
2200	76x143	0,19	81	70	5,3	K02550222__M0J143
2200	76x220	0,20	78	60	5,5	K02550222__M0J220
3300	76x143	0,20	59	49	5,7	K02550332__M0J143
4000	76x143	0,20	52	45	7,4	K02550402__M0J143
4700	76x214	0,20	48	41	8,9	K02550472__M0J214
5600	76x214	0,20	42	38	9,5	K02550562__M0J214
5600	76x220	0,20	40	37	9,7	K02550562__M0J220
5600	90x145	0,20	37	37	9,9	K02550562__M0L145
6800	90x220	0,21	34	28	10,0	K02550682__M0L220
9200	90x220	0,21	30	20	10,7	K02550922__M0L220
10000	90x240	0,21	27	18	12,4	K02550103__M0L240

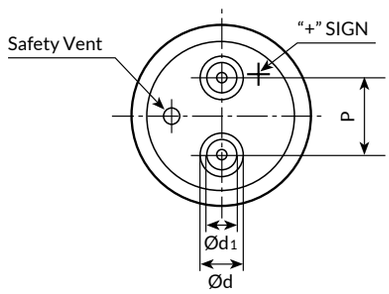
K04 TYPE
-40°C +85°C 20000H

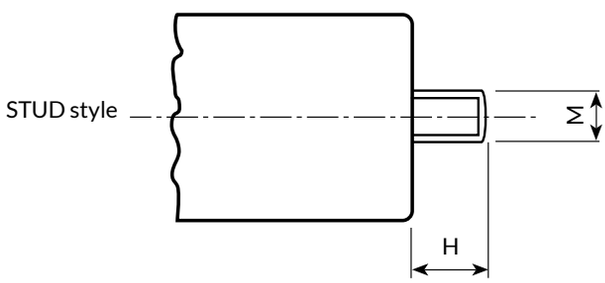
APPLICATIONS

Designed for professional power electronics
Switch mode power supplies, converters, filtering devices.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Poles brought out to heavy duty screw terminals
- To be mounted with ring clips or with threaded stud
- Very high CV for unit volume with low ESR.
- High ripple current
- Excellent electrical data in small dimensions case size







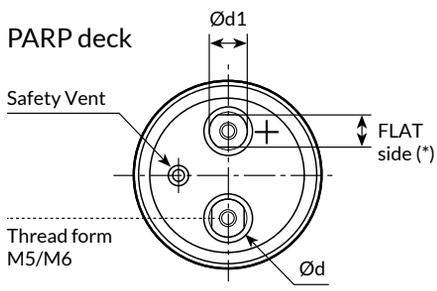


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K04 TYPE
-40°C +85°C 20000H

SPECIFICATIONS

Temperature Range
Operating -40°C +85°C [Environmental classification 40/105/56 IEC-68]
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)
from 350V to 630V DC

Surge Voltage (V_p)
$V_p = 1.10\ V_r$ ($V_r \leq 500$V DC) $V_p = 1.05\ V_r$ ($V_r \geq 500$V DC)

Rated Capacitance Range
from 1500 µF to 15.000 µF

Capacitance Tolerance
±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)
max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)
Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	53mm	75mm	90mm
Maximum current	40A	50A	70A

Insulation Resistance
At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance
Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage
2500 VAC for 1 min

Life test
After 4,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life
After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 20000	h at 85°C	for $V_r \leq 450$V	Cap change	≤ ±25%
> 15000	h	for $V_r \leq 500$V	tan (δ)	≤ 300%
> 12000	h	for $V_r = 550$V	Leakage current (I_L)	< initial limit
> 6000	h	for $V_r = 600$V and 630V		

Failure percentage
≤ 1% (during working life)
Failure rate
≤ 33 fit (33 10^{-9}/h)

Self inductance
Approx. 20 nH

Damp heat test
Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte
All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards
CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K04 TYPE
-40°C +85°C 20000H

Rated Voltage VDC **350V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
2200	63x105	0,13	42	30	11,0	K04350222_M0H105
3300	63x105	0,13	30	22	12,6	K04350332_M0H105
3300	76x105	0,13	30	22	13,8	K04350332_M0J105
4700	76x105	0,13	23	15	16,1	K04350472_M0J105
4700	76x143	0,13	23	15	18,5	K04350472_M0J143
5600	76x143	0,15	19	14	20,0	K04350562_M0J143
6800	76x143	0,15	15	11	21,8	K04350682_M0J143
8200	76x143	0,15	13	9	23,6	K04350822_M0J143
10000	76x214	0,17	11	8	31,7	K04350103_M0J214
15000	90x220	0,18	7	5	42,0	K04350153_M0L220
22000	90x240	0,20	4	3	47,8	K04350223_M0L240

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	63x105	0,15	105	85	7,5	K04400152_M0H105
2200	63x105	0,15	80	63	8,8	K04400222_M0H105
2200	76x105	0,15	80	63	10,2	K04400222_M0J105
3300	63x105	0,15	50	40	10,7	K04400332_M0H105
3300	76x143	0,15	50	40	14,1	K04400332_M0J143
4700	76x105	0,17	40	32	14,7	K04400472_M0J105
4700	76x143	0,17	40	32	17,7	K04400472_M0J143
6800	76x143	0,17	27	22	18,0	K04400682_M0J143
10000	76x214	0,20	20	17	27,8	K04400103_M0J214
12000	90x220	0,20	17	15	32,3	K04400123_M0L220
15000	90x240	0,23	13	11	35,1	K04400153_M0L240

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	63x105	0,15	105	85	7,5	K04420152_M0H105
2200	63x105	0,15	80	63	8,8	K04420222_M0H105
2200	76x105	0,15	80	63	10,2	K04420222_M0J105
3300	63x105	0,15	50	40	10,7	K04420332_M0H105
3300	76x143	0,15	50	40	14,1	K04420332_M0J143
4700	76x105	0,17	40	32	14,7	K04420472_M0J105
4700	76x143	0,17	40	32	17,7	K04420472_M0J143
6800	76x143	0,17	27	22	18,0	K04420682_M0J143
10000	76x214	0,20	20	17	27,8	K04420103_M0J214
12000	90x220	0,20	16	15	32,5	K04420123_M0L220
13000	90x240	0,21	14	12	34,7	K04420133_M0L240

K04 TYPE
-40°C +85°C 20000H

Kendeil™

Rated Voltage VDC

450V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	63x105	0,15	105	85	7,5	K04450152__M0H105
2200	63x105	0,15	80	63	8,8	K04450222__M0H105
2200	76x105	0,15	80	63	10,2	K04450222__M0J105
3300	63x105	0,15	50	40	10,7	K04450332__M0H105
3300	76x143	0,15	50	40	14,1	K04450332__M0J143
4700	76x105	0,17	40	32	14,7	K04450472__M0J105
4700	76x143	0,17	40	32	17,7	K04450472__M0J143
6800	76x143	0,17	27	22	18,0	K04450682__M0J143
10000	76x214	0,20	20	17	27,8	K04450103__M0J214
12000	90x220	0,20	15	11	34,5	K04450123__M0L220
16000	90x240	0,24	10	8	37,9	K04450163__M0L240

Rated Voltage VDC

500V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	63x105	0,15	95	76	7,7	K04500152__M0H105
2200	63x105	0,15	65	55	8,9	K04500222__M0H105
2200	76x105	0,15	65	55	10,0	K04500222__M0J105
2200	76x143	0,15	65	55	11,4	K04500222__M0J143
3300	76x143	0,15	40	39	13,9	K04500332__M0J143
3900	76x143	0,17	38	34	14,7	K04500392__M0J143
4700	76x143	0,17	33	33	16,1	K04500472__M0J143
5600	76x143	0,17	30	26	17,5	K04500562__M0J143
6800	76x214	0,17	27	22	23,0	K04500682__M0J214
10000	90x220	0,20	20	17	30,4	K04500103__M0L220
13000	90x240	0,22	16	15	34,6	K04500133__M0L240

Rated Voltage VDC

550V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	63x105	0,19	109	88	6,5	K04550152__M0H105
1800	76x105	0,19	99	80	7,6	K04550182__M0J143
2200	76x105	0,19	85	85	8,0	K04550222__M0J105
2200	76x143	0,19	81	70	9,5	K04550222__M0J143
2200	76x220	0,20	78	60	10,0	K04550222__M0J220
3300	76x143	0,20	59	49	10,2	K04550332__M0J143
4000	76x143	0,20	52	45	13,3	K04550402__M0J143
4700	76x214	0,20	48	41	16,0	K04550472__M0J214
5600	76x214	0,20	42	38	17,1	K04550562__M0J214
5600	76x220	0,20	40	37	17,5	K04550562__M0J220
5600	90x145	0,20	37	37	17,8	K04550562__M0L145
6800	90x220	0,21	34	28	18,1	K04550682__M0L220
9200	90x220	0,21	30	20	19,2	K04550922__M0L220
10000	90x240	0,21	27	18	22,3	K04550103__M0L240

K04 TYPE
-40°C +85°C 20000H

Rated Voltage VDC **600V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	63x105	0,15	71	54	7,9	K04600152_M0H105
1800	76x105	0,15	61	47	9,5	K04600182_M0J105
3000	76x105	0,15	55	41	10,2	K04600332_M0J105
2200	76x143	0,15	48	37	11,9	K04600222_M0J143
3300	76x143	0,15	36	27	14,1	K04600332_M0J143
3900	76x143	0,15	32	25	15,2	K04600392_M0J143
3900	90x145	0,15	28	22	17,3	K04600392_M0L145
4200	76x143	0,15	25	20	17,6	K04600422_M0J143
4700	76x214	0,15	21	17	18,7	K04600472_M0J214
4700	90x145	0,15	23	19	20,1	K04600472_M0L145
5600	90x145	0,15	21	20	22,1	K04600562_M0L145
6200	90x145	0,15	18	15	23,5	K04600622_M0L145
6800	90x220	0,15	16	13	26,9	K04600682_M0L220
8200	90x220	0,15	14	11	27,7	K04600822_M0L220
9200	90x220	0,15	12	10	28,5	K04600922_M0L220
10000	90x220	0,18	10	11	29,1	K04600103_M0L220
11000	90x240	0,18	8	8	30,4	K04600113_M0L240

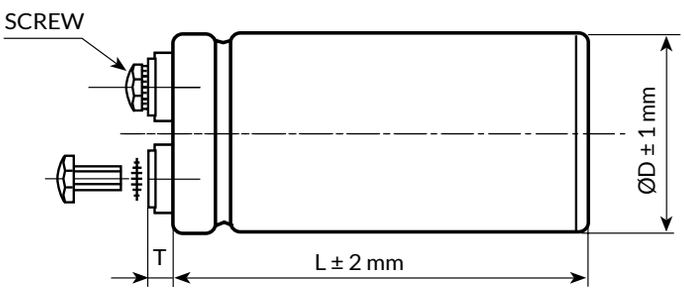
Rated Voltage VDC **630V**

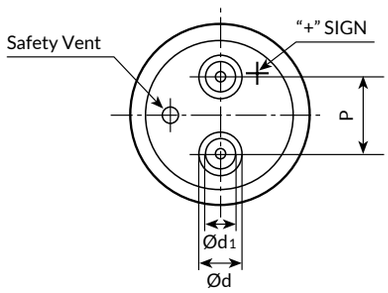
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	63x105	0,15	73	50	7,5	K04630152_M0H105
1800	76x105	0,15	65	45	9,0	K04630182_M0J105
2200	76x143	0,15	52	32	11,5	K04630222_M0J143
3300	76x143	0,15	40	25	13,8	K04630332_M0J143
3900	76x143	0,15	33	17	16,3	K04630392_M0J143
4900	76x214	0,15	22	10	20,0	K04630492_M0J214
6800	90x220	0,15	20	10	25,4	K04630682_M0L220
9500	90x240	0,18	10	8	29,0	K04630952_M0L240

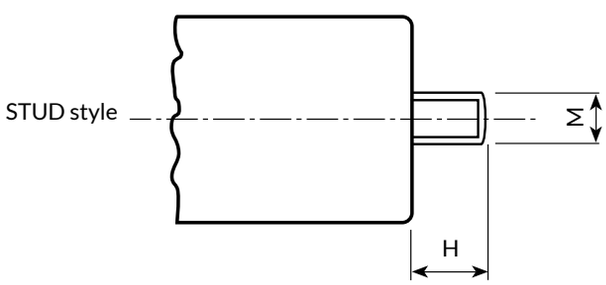
K07 TYPE
-40°C +85°C 2000H

APPLICATIONS | Industrial Market, UPS, Frequency Converters.

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Case size optimized for Asian Market







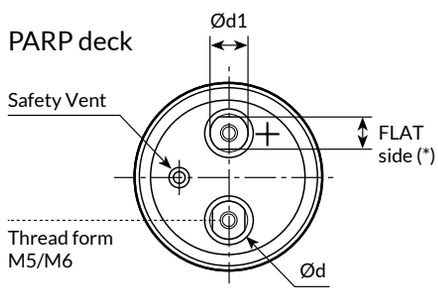


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K07 TYPE
-40°C +85°C 2000H

SPECIFICATIONS

Temperature Range
Operating -40°C +85°C
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)
from 160V to 450V DC

Surge Voltage (V_p)
$V_p = 1.15\ V_r$ ($V_r \leq 250$V DC) $V_p = 1.10\ V_r$ ($V_r > 500$V DC)

Rated Capacitance Range
from 1800 µF to 47.000 µF

Capacitance Tolerance
±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)
max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)
Refer to table at 85°C and 120Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.4	1.5	1.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	35mm	51mm	63mm	76mm	90mm
Maximum current	20A	30A	40A	50A	70A

Insulation Resistance
At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance
Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage
2500 VAC for 1 min

Life test
After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life
After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Self inductance
Approx. 20 nH

Damp heat test
Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte
All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards
CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K07 TYPE
-40°C +85°C 2000H

Rated Voltage VDC **160V**

Cap µF	Ø x L mm	Tan δ max 120 Hz 20°C	ESR TYP mΩ 120 Hz 20°	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
10000	51x115	0,15	13	29,0	13,5	K07160103_M0G115
10000	63x96	0,15	13	26,6	12,4	K07160103_M0H096
12000	51x130	0,15	13	34,1	15,8	K07160123_M0G130
15000	63x105	0,15	13	31,3	14,6	K07160153_M0H105
15000	63x115	0,15	13	32,4	15,1	K07160153_M0H115
18000	63x130	0,15	12	38,1	17,7	K07160183_M0H130
22000	63x143	0,20	10	48,1	22,4	K07160223_M0H143
22000	76x105	0,20	10	48,1	22,4	K07160223_M0J105
22000	76x115	0,20	10	49,7	23,1	K07160223_M0J115
27000	76x130	0,20	10	54,4	25,3	K07160273_M0J130
33000	76x143	0,20	8	65,7	30,6	K07160333_M0J143
47000	76x214	0,25	7	81,5	37,6	K07160473_M0J214
47000	76x220	0,25	7	81,5	37,6	K07160473_M0J220

Rated Voltage VDC **200V**

Cap µF	Ø x L mm	Tan δ max 120 Hz 20°C	ESR TYP mΩ 120 Hz 20°	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
5600	51x96	0,15	27	23,0	10,7	K07200562_M0G096
6800	51x105	0,15	22	27,0	12,6	K07200682_M0G105
6800	63x96	0,15	22	26,4	12,3	K07200682_M0H096
8200	51x115	0,15	18	28,5	13,2	K07200822_M0G115
10000	51x130	0,15	13	33,4	15,5	K07200103_M0G130
10000	63x105	0,15	13	31,3	14,6	K07200103_M0H105
12000	63x115	0,15	13	31,9	14,8	K07200123_M0H115
14000	63x130	0,15	12	37,6	17,5	K07200143_M0H130
15000	63x143	0,15	12	40,4	18,8	K07200153_M0H143
15000	76x105	0,15	12	40,4	18,8	K07200153_M0J105
18000	76x115	0,15	12	44,5	20,7	K07200183_M0J115
22000	76x130	0,18	10	50,0	23,4	K07200223_M0J130
27000	76x143	0,18	9	64,6	30,0	K07200273_M0J143
33000	76x214	0,22	8	75,7	35,2	K07200333_M0J214
33000	76x220	0,22	8	75,7	35,2	K07200333_M0J220

Rated Voltage VDC **250V**

Cap µF	Ø x L mm	Tan δ max 120 Hz 20°C	ESR TYP mΩ 120 Hz 20°	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
3900	51x96	0,15	32	22,0	10,2	K07250392_M0G096
4700	51x105	0,15	25	25,7	11,9	K07250472_M0G105
4700	63x96	0,15	30	25,7	12,0	K07250472_M0H096
5600	51x115	0,15	24	27,5	12,8	K07250562_M0G115
6800	51x130	0,15	19	32,1	14,9	K07250682_M0G130
8200	63x105	0,15	22	30,9	14,4	K07250822_M0H105
10000	63x115	0,15	20	31,6	14,7	K07250103_M0H115
12000	63x130	0,15	19	37,1	17,2	K07250123_M0H130
12000	63x143	0,15	19	45,8	21,3	K07250123_M0H143
12000	76x105	0,15	19	45,8	21,3	K07250123_M0J105
12000	76x115	0,15	19	47,4	22,0	K07250123_M0J115
15000	76x130	0,15	16	46,3	21,5	K07250153_M0J130
18000	76x143	0,20	10	47,6	22,1	K07250183_M0J143
27000	76x214	0,25	8	70,0	32,6	K07250273_M0J214
27000	76x220	0,25	8	70,0	32,6	K07250273_M0J220

K07 TYPE
-40°C +85°C 2000H

Rated Voltage VDC
315V

Cap µF	Ø x L mm	Tan δ max 120 Hz 20°C	ESR TYP mΩ 120 Hz 20°	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
2200	51x96	0,15	31	19,4	9,0	K07315222__M0G096
2700	51x105	0,15	24	22,6	10,5	K07315272__M0G105
2700	51x115	0,15	24	23,4	10,9	K07315272__M0G115
2700	63x96	0,15	24	23,2	10,8	K07315272__M0H096
3300	51x130	0,15	20	27,3	12,7	K07315332__M0G130
3900	63x105	0,15	20	28,1	13,1	K07315392__M0H105
4700	63x115	0,15	20	29,8	13,9	K07315472__M0H115
5600	63x130	0,15	17	34,7	16,1	K07315562__M0H130
5600	76x105	0,15	14	39,0	18,1	K07315562__M0J105
6800	63x143	0,15	14	39,8	18,5	K07315682__M0H143
6800	76x115	0,15	12	42,5	19,8	K07315682__M0J115
8200	76x130	0,15	10	49,2	22,9	K07315822__M0J130
10000	76x143	0,15	8	49,4	23,0	K07315103__M0J143
15000	76x214	0,20	8	67,6	31,4	K07315153__M0J214
15000	76x220	0,25	8	67,6	31,4	K07315153__M0J220

Rated Voltage VDC
350V

Cap µF	Ø x L mm	Tan δ max 120 Hz 20°C	ESR TYP mΩ 120 Hz 20°	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
1800	51x96	0,15	33	18,8	8,7	K07350182__M0G096
2200	51x105	0,15	26	21,8	10,1	K07350222__M0G105
2700	51x115	0,15	23	23,9	11,1	K07350272__M0G115
3300	51x130	0,15	19	27,9	13,0	K07350332__M0G130
3300	63x96	0,15	27	23,5	10,9	K07350332__M0H096
3900	63x105	0,15	20	27,8	12,9	K07350392__M0H105
3900	63x115	0,15	20	28,8	13,4	K07350392__M0H115
4700	63x130	0,15	17	33,6	15,6	K07350472__M0H130
5600	63x143	0,15	13	39,8	18,5	K07350562__M0H143
5600	76x105	0,15	13	39,8	18,5	K07350562__M0J105
5600	76x115	0,15	13	41,1	19,2	K07350562__M0J115
6800	76x130	0,15	12	41,1	19,2	K07350682__M0J130
8200	76x143	0,15	12	45,2	21,0	K07350822__M0J143
10000	76x143	0,15	12	46,3	21,5	K07350103__M0J143
12000	76x214	0,20	8	66,1	30,7	K07350123__M0J214
12000	76x220	0,25	8	66,1	30,7	K07350123__M0J220

K07 TYPE
-40°C +85°C 2000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 120 Hz 20°C	ESR TYP mΩ 120 Hz 20°	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
2200	51x130	0,20	77	17,4	6,5	K07400222__M0G130
2200	63x96	0,20	84	17,0	6,4	K07400222__M0H096
2700	63x96	0,20	75	19,0	7,2	K07400272__M0H096
3300	63x105	0,20	59	22,8	8,4	K07400332__M0H105
3300	63x115	0,20	59	22,8	8,6	K07400332__M0H115
3900	63x130	0,20	49	26,1	9,8	K07400392__M0H130
4700	76x105	0,20	41	28,6	10,6	K07400472__M0J105
4700	76x115	0,20	41	28,6	10,8	K07400472__M0J115
5600	76x130	0,20	34	32,5	12,2	K07400562__M0J130
6800	76x143	0,20	24	38,8	14,5	K07400682__M0J143
6800	76x155	0,20	24	38,8	14,6	K07400682__M0J155
8200	90x157	0,20	22	44,7	16,8	K07400822__M0L157
10000	90x157	0,20	19	49,3	18,5	K07400103__M0L157
12000	90x196	0,20	16	59,9	22,5	K07400123__M0L196
15000	90x220	0,20	13	69,9	26,3	K07400153__M0L220

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 120 Hz 20°C	ESR TYP mΩ 120 Hz 20°	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
1800	51x130	0,20	84	16,3	6,1	K07450182__M0G130
2200	63x96	0,20	80	17,4	6,5	K07450222__M0H096
2700	63x105	0,20	62	20,7	7,6	K07450272__M0H105
2700	63x115	0,20	62	20,7	7,8	K07450272__M0H115
3300	63x130	0,20	51	24,2	9,1	K07450332__M0H130
3900	76x105	0,20	44	26,3	9,7	K07450392__M0J105
3900	76x115	0,20	44	26,3	9,9	K07450392__M0J115
4700	76x130	0,20	36	30,9	11,6	K07450472__M0J130
5600	76x143	0,20	30	35,7	13,2	K07450562__M0J143
5600	76x155	0,20	30	35,7	13,4	K07450562__M0J155
6800	90x157	0,20	25	41,4	15,6	K07450682__M0L157
8200	90x157	0,20	22	45,1	17,0	K07450822__M0L157
10000	90x196	0,20	18	54,8	20,6	K07450103__M0L196
12000	90x220	0,20	15	63,2	23,8	K07450123__M0L220

K11 TYPE
-40°C +85°C 15000H

APPLICATIONS | Energy Storage, Bulk

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Design optimized for parallel connection and high density of energy

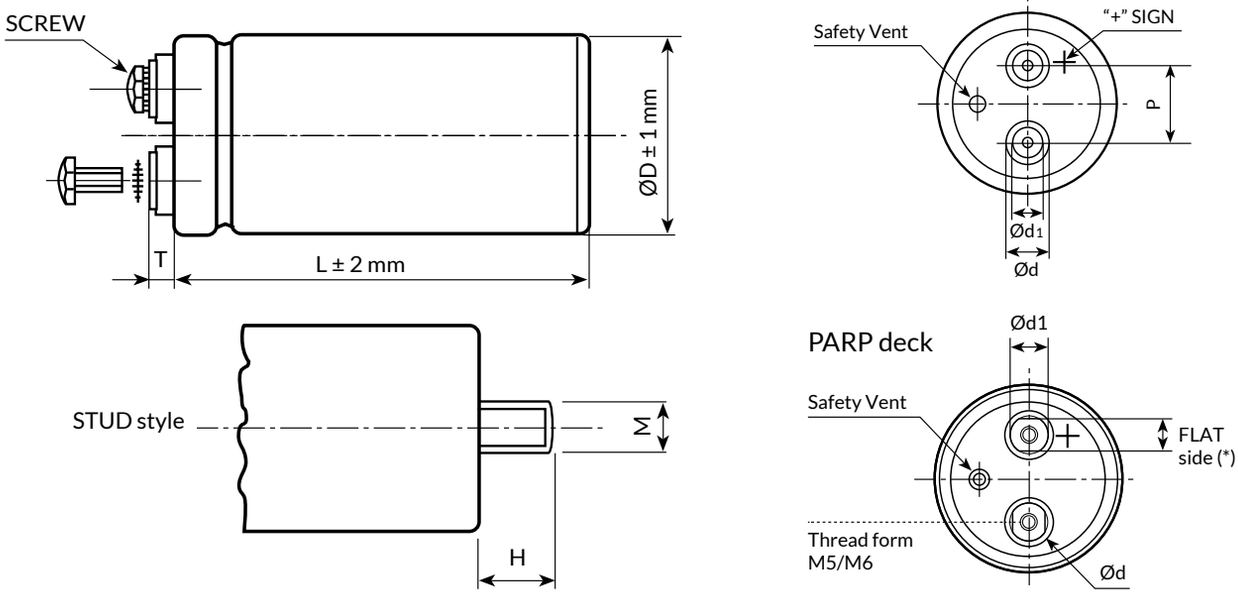


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K11 TYPE
-40°C +85°C 15000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 350V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$ ($V_r \geq 250$V DC)

Rated Capacitance Range

from 12000 µF to 34.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	76mm	90mm
Maximum current	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
max acceleration 0.75mm or 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 15000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K11 TYPE
-40°C +85°C 15000H

Rated Voltage VDC **350V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
19000	76x214	0,25	18,0	K11350193__M0J214
20000	76x240	0,25	18,0	K11350203__M0J240
22000	76x214	0,25	18,4	K11350223__M0J214
22000	100x145	0,25	20,0	K11350223__M0P145
24000	76x240	0,25	18,5	K11350243__M0J240
27000	90x220	0,25	21,0	K11350273__M0L220
27000	100x145	0,25	23,0	K11350273__M0P145
30000	90x220	0,25	21,4	K11350303__M0L220
30000	90x240	0,25	22,0	K11350303__M0L240
33000	100x220	0,25	25,0	K11350333__M0P220
34000	90x240	0,25	22,5	K11350343__M0L240
40000	100x220	0,25	29,0	K11350403__M0P220
36000	100x240	0,25	26,0	K11350363__M0P240
45000	100x240	0,25	30,0	K11350453__M0P240

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
15000	76x214	0,25	16,0	K11400153__M0J214
16000	76x240	0,25	17,7	K11400163__M0J240
18000	76x214	0,25	16,3	K11400183__M0J214
19000	100x145	0,25	23,0	K11400193__M0P145
20000	76x240	0,25	18,1	K11400203__M0J240
21000	90x220	0,25	21,5	K11400213__M0L220
22000	100x145	0,25	21,5	K11400223__M0P145
23000	90x240	0,25	23,2	K11400233__M0L240
25000	90x220	0,25	21,9	K11400253__M0L220
28000	100x220	0,25	24,0	K11400283__M0P220
29000	90x240	0,25	23,7	K11400293__M0L240
31000	100x240	0,25	25,0	K11400313__M0P240
32000	100x220	0,25	25,0	K11400323__M0P220
37000	100x240	0,25	28,0	K11400373__M0P240

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
12000	76x214	0,20	16,0	K11450123__M0J214
13000	76x240	0,20	17,5	K11450133__M0J240
14000	100x145	0,20	18,0	K11450143__M0P145
15000	76x214	0,20	16,4	K11450153__M0J214
16000	76x240	0,20	18,0	K11450163__M0J240
17000	90x220	0,20	20,9	K11450173__M0L220
17000	100x145	0,20	19,3	K11450173__M0P145
18000	90x240	0,20	22,5	K11450183__M0L240
20000	90x220	0,20	21,6	K11450203__M0L220
21000	100x220	0,20	24,0	K11450213__M0P220
23000	90x240	0,20	23,1	K11450233__M0L240
24000	100x240	0,20	26,0	K11450243__M0P240
26000	100x220	0,20	24,9	K11450263__M0P220
29000	100x240	0,20	28,0	K11450293__M0P240

K18 TYPE
-55°C +85°C 10000H

APPLICATIONS

Designed for professional application.
Switch mode power supplies, high ripple, current converters, motor drives.

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Design optimized for low equivalent series resistance and high ripple current.

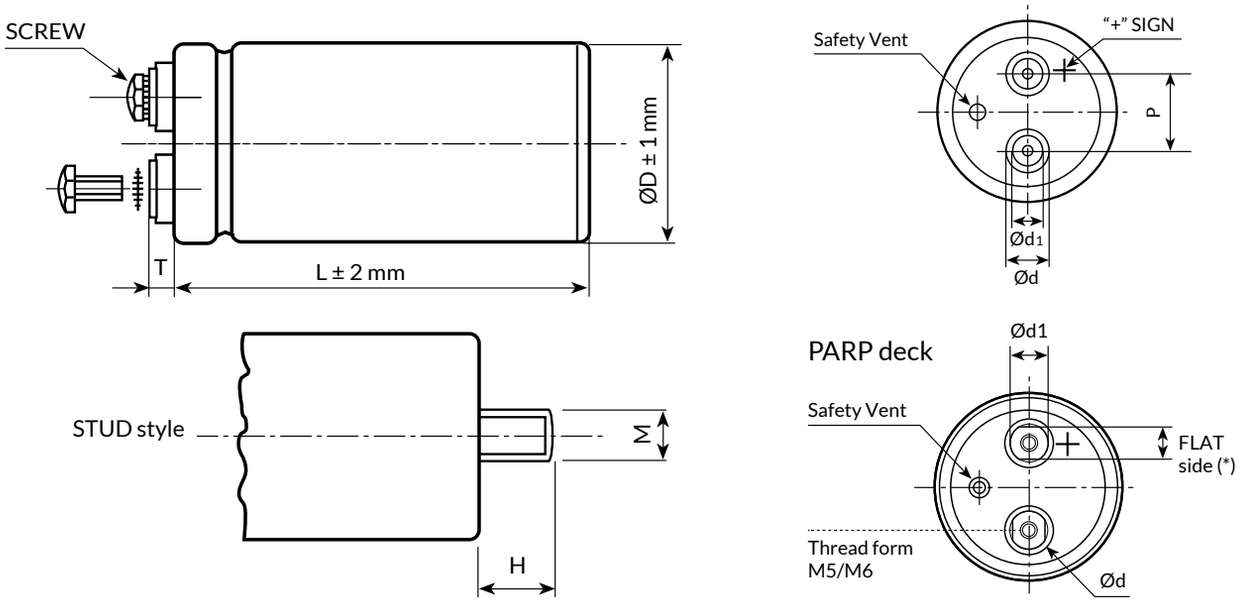


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K18 TYPE
-55°C +85°C 10000H

SPECIFICATIONS

Temperature Range

Operating -55°C +85°C [Environmental classification 55/85/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 330 µF to 15.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 2,000 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 10000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 20 nH

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K18 TYPE
-55°C +85°C 10000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
330	35x60	0,10	290	273	2,8	K18400331__M0E060
470	35x60	0,10	160	150	3,0	K18400471__M0E060
560	35x79	0,10	145	125	3,3	K18400561__M0E079
680	35x79	0,10	120	115	3,8	K18400681__M0E079
1000	51x79	0,10	105	95	5,8	K18400102__M0G079
1500	51x79	0,10	65	55	6,3	K18400152__M0G079
2200	51x105	0,10	50	47	8,3	K18400222__M0G105
3300	63x105	0,12	35	30	11,0	K18400332__M0H105
4700	76x105	0,15	30	29	14,9	K18400472__M0J105
4700	76x143	0,15	30	29	16,8	K18400472__M0J143
5600	76x143	0,15	26	25	19,0	K18400562__M0J143
6800	76x143	0,15	22	18	19,5	K18400682__M0J143
8200	76x143	0,15	22	18	19,5	K18400822__M0J143
10000	76x143	0,15	21	17	19,6	K18400103__M0J143
15000	76x214	0,20	15	12	26,0	K18400153__M0J214
15000	90x220	0,20	15	12	33,5	K18400153__M0L220

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
330	35x60	0,10	240	210	2,8	K18450331__M0E060
470	35x79	0,10	200	179	3,1	K18450471__M0E079
680	35x79	0,10	140	128	3,2	K18450681__M0E079
820	51x79	0,10	120	102	4,8	K18450821__M0G079
1000	51x79	0,10	100	88	4,9	K18450102__M0G079
1500	51x79	0,10	67	55	5,4	K18450152__M0G079
2200	51x105	0,10	60	55	7,2	K18450222__M0G105
3300	63x105	0,12	35	30	9,3	K18450332__M0H105
4700	76x105	0,15	32	30	14,0	K18450472__M0J105
4700	76x143	0,15	32	30	15,0	K18450472__M0J143
5600	76x143	0,15	26	25	18,0	K18450562__M0J143
6800	76x143	0,15	23	22	19,2	K18450682__M0J143
8200	76x143	0,15	22	20	19,5	K18450822__M0J143
10000	76x214	0,15	20	19	23,1	K18450103__M0J214
12000	76x214	0,15	15	12	23,8	K18450123__M0J214
15000	90x220	0,20	14	12	32,6	K18450153__M0L220

K19 TYPE
-55°C +105°C 4000H

APPLICATIONS

Designed for professional application.
Switch mode power supplies, high ripple, current converters, motor drives.

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Design optimized for low equivalent series resistance and high ripple current.

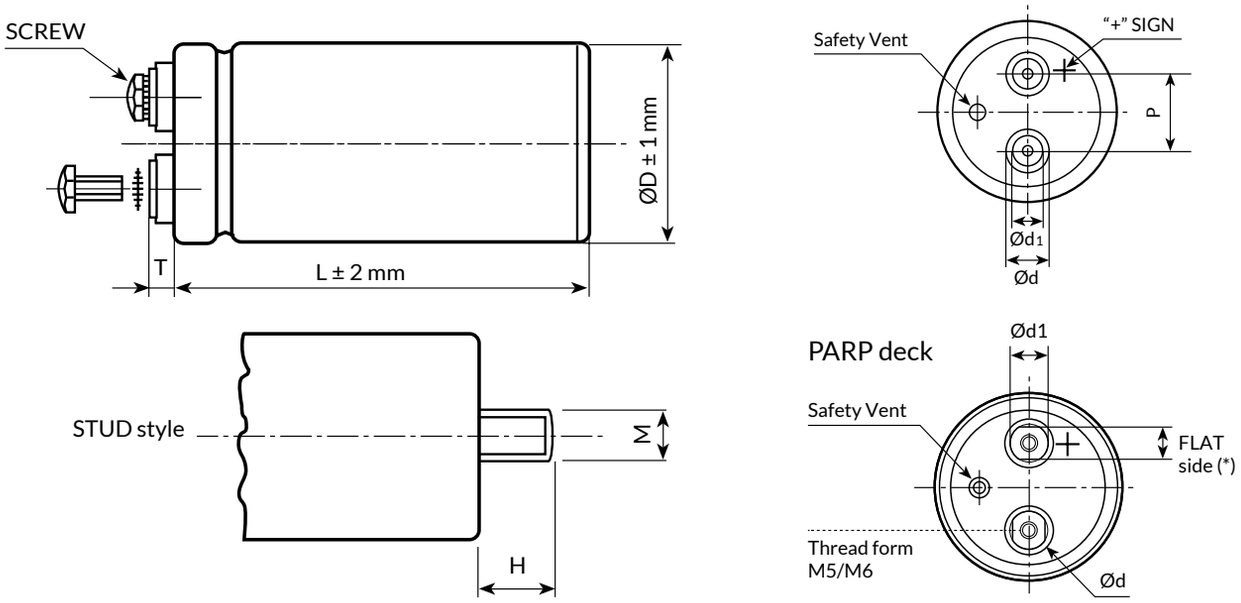


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K19 TYPE
-55°C +105°C 4000H

SPECIFICATIONS

Temperature Range

Operating -55°C +105°C [Environmental classification 55/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 330 µF to 15.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (105°C, V_n, I_r applied)

> 4000 h at 105°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K19 TYPE
-55°C +105°C 4000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
330	35x60	0,11	250	210	2,1	K19400331__M0E060
470	35x79	0,11	170	150	2,2	K19400471__M0E079
680	51x79	0,11	110	100	3,2	K19400681__M0G079
1000	51x79	0,11	95	82	3,4	K19400102__M0G079
1500	51x79	0,11	64	53	3,8	K19400152__M0G079
2200	51x105	0,11	45	39	4,5	K19400222__M0G105
3300	63x105	0,11	28	25	6,6	K19400332__M0H105
4700	76x105	0,11	24	23	9,5	K19400472__M0J105
4700	76x143	0,11	24	23	10,9	K19400472__M0J143
5600	76x143	0,12	21	17	11,2	K19400562__M0J143
6800	76x143	0,15	19	15	15,5	K19400682__M0J143
10000	76x214	0,15	16	14	19,2	K19400103__M0J214
15000	90x220	0,20	15	12	23,0	K19400153__M0L220

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
330	35x60	0,11	240	210	1,5	K19450331__M0E060
470	35x79	0,11	200	179	2,1	K19450471__M0E079
680	51x79	0,11	140	128	3,1	K19450681__M0G079
1000	51x105	0,11	100	88	4,4	K19450102__M0G105
1500	51x105	0,11	63	57	4,8	K19450152__M0G105
2200	63x105	0,11	48	38	6,3	K19450222__M0H105
3300	76x105	0,11	35	30	10,4	K19450332__M0J105
4700	76x143	0,11	28	25	10,9	K19450472__M0J143
5600	76x143	0,12	21	17	11,2	K19450562__M0J143
6800	76x214	0,15	21	16	15,5	K19450682__M0J214
8200	76x214	0,15	18	16	19,2	K19450822__M0J214
10000	90x220	0,15	16	14	22,5	K19450103__M0L220

K21 TYPE
-40°C +85°C 15000H

APPLICATIONS

Designed for professional application.
Switch mode power supplies, high ripple, current converters, motor drives.

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Design optimized for low equivalent series resistance and high ripple current.

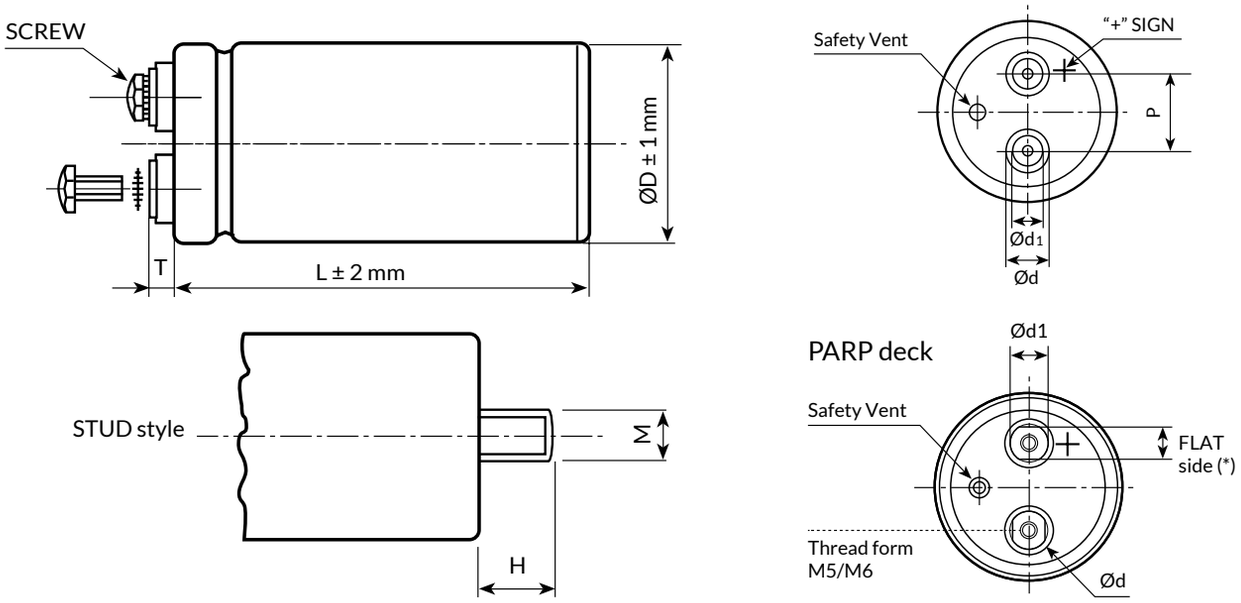


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K21 TYPE
-40°C +85°C 15000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C [Environmental classification 40/85/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 350V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 1200 µF to 15.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

max internal temperature 98°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 200000 h at 40°C
> 15000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K21 TYPE
-40°C +85°C 15000H

Rated Voltage VDC
350V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	51x79	0,08	40	24	9,3	K21350152_M0G079
1500	51x105	0,08	40	24	10,1	K21350152_M0G105
2200	51x105	0,08	29	20	11,9	K21350222_M0G105
2200	63x105	0,08	29	20	14,5	K21350222_M0H105
2200	76x79	0,08	29	20	14,2	K21350222_M0J079
2200	76x98	0,08	29	20	15,3	K21350222_M0J098
3300	63x105	0,08	17	13	17,7	K21350332_M0H105
3300	76x79	0,08	21	16	16,0	K21350332_M0J079
3300	76x105	0,08	20	13	18,8	K21350332_M0J105
4700	76x105	0,09	13	10	22,1	K21350472_M0J105
4700	76x143	0,09	13	10	25,8	K21350472_M0J143
4700	90x98	0,09	14	11	22,5	K21350472_M0L098
5600	76x143	0,09	10	8	27,4	K21350562_M0J143
6800	76x143	0,09	9,5	7	30,0	K21350682_M0J143
6800	90x145	0,09	9,5	7	32,2	K21350682_M0L145
8200	90x145	0,09	8,5	6	35,3	K21350822_M0L145
10000	76x214	0,09	7	5	41,8	K21350103_M0J214
10000	90x145	0,10	7	5	36,7	K21350103_M0L145
12000	76x214	0,10	7	5	41,9	K21350123_M0J214
15000	90x220	0,10	5,5	4	52,5	K21350153_M0L220

Rated Voltage VDC
400V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	51x79	0,08	40	24	9,3	K21400152_M0G079
1500	51x105	0,08	40	24	10,1	K21400152_M0G105
2200	51x105	0,08	29	20	11,9	K21400222_M0G105
2200	76x79	0,08	29	20	14,2	K21400222_M0J079
2200	76x98	0,08	29	20	15,3	K21400222_M0J098
3300	63x105	0,08	17	13	17,7	K21400332_M0H105
3300	76x79	0,08	21	16	16,0	K21400332_M0J079
3300	76x98	0,08	21	16	17,2	K21400332_M0J098
3300	76x105	0,08	20	13	18,8	K21400332_M0J105
3900	76x105	0,08	16	11	20,9	K21400392_M0J105
4400	90x98	0,08	14	11	22,2	K21400442_M0L098
4700	76x105	0,09	13	10	22,1	K21400472_M0J105
4700	76x143	0,09	13	10	25,8	K21400472_M0J143
4700	90x98	0,09	13	11	22,5	K21400472_M0L098
5600	76x143	0,09	10	8	27,4	K21400562_M0J143
6800	76x143	0,09	9,5	7	30,0	K21400682_M0J143
6800	90x145	0,09	9,5	7	32,2	K21400682_M0L145
8200	90x145	0,09	8,5	6	35,3	K21400822_M0L145
10000	76x214	0,09	7	5	41,8	K21400103_M0J214
10000	90x145	0,10	7	5	36,7	K21400103_M0L145
14000	90x220	0,10	6	5	50,1	K21400143_M0L220
15000	90x220	0,10	5,5	4	52,5	K21400153_M0L220

K21 TYPE

-40°C +85°C 15000H

Kendeil™

Rated Voltage VDC

420V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	51x79	0,08	40	24	9,3	K21420152__M0G079
1500	51x105	0,08	40	24	10,1	K21420152__M0G105
2200	51x105	0,08	29	20	11,9	K21420222__M0G105
2200	76x79	0,08	29	20	14,2	K21420222__M0J079
2200	76x98	0,08	29	20	15,3	K21420222__M0J098
3300	63x105	0,08	17	13	17,7	K21420332__M0H105
3300	76x79	0,08	21	16	16,0	K21420332__M0J079
3300	76x98	0,08	21	16	17,2	K21420332__M0J098
3300	76x105	0,08	20	13	18,8	K21420332__M0J105
3900	76x105	0,08	16	11	20,9	K21420392__M0J105
4400	90x98	0,08	16	12	22,2	K21420442__M0L098
4700	76x105	0,09	13	10	22,1	K21420472__M0J105
4700	76x143	0,09	13	10	25,8	K21420472__M0J143
4700	90x98	0,09	13	11	22,5	K21420472__M0L098
5600	76x143	0,09	10	8	27,4	K21420562__M0J143
6800	76x143	0,09	9,5	7	30,0	K21420682__M0J143
6800	90x145	0,09	9,5	7	32,2	K21420682__M0L145
8200	90x145	0,09	8,5	6	35,3	K21420822__M0L145
10000	76x214	0,09	7	5	41,8	K21420103__M0J214
10000	90x145	0,10	7	5	36,7	K21420103__M0L145
14000	90x220	0,10	6	5	50,1	K21420143__M0L220
15000	90x220	0,10	5,5	4	52,5	K21420153__M0L220

Rated Voltage VDC

450V

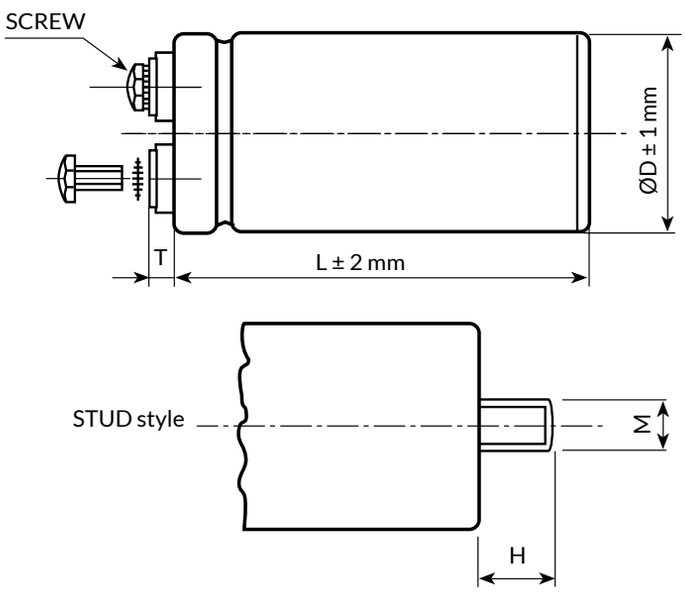
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1200	51x79	0,08	60	36	8,9	K21450122__M0G079
1200	51x105	0,08	60	36	9,5	K21450122__M0G105
1500	51x105	0,08	49	29	10,7	K21450152__M0G105
2200	63x105	0,08	30	17	15,4	K21450222__M0H105
2200	76x79	0,08	32	20	14,3	K21450222__M0J079
2200	76x98	0,08	32	20	15,4	K21450222__M0J098
3300	76x105	0,08	26	16	18,8	K21450332__M0J105
3300	90x98	0,08	26	16	20,5	K21450332__M0L098
3900	76x105	0,08	21	13	21,1	K21450392__M0J105
4700	76x143	0,09	17	10	26,0	K21450472__M0J143
4700	90x98	0,09	19	13	22,1	K21450472__M0L098
5600	76x143	0,09	15	10	28,3	K21450562__M0J143
6800	76x214	0,09	11	8	37,2	K21450682__M0J214
6800	90x145	0,09	13	10	31,9	K21450682__M0L145
8200	90x145	0,09	11	8	34,9	K21450822__M0L145
10000	90x220	0,10	9	6	46,5	K21450103__M0L220
12000	90x220	0,10	8	6	49,8	K21450123__M0L220

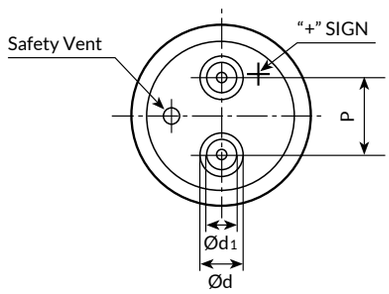
K22 TYPE
-40°C +105°C 8000H

APPLICATIONS

Designed for professional applications.
Switch mode power supplies, high ripple, current converters, motor drives.

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Design optimized for low equivalent series resistance and high ripple current.





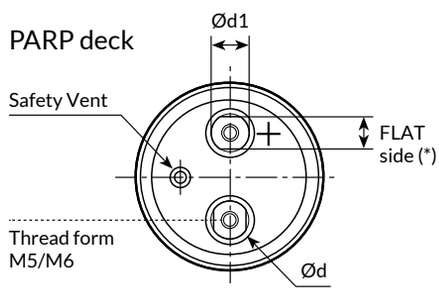


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K22 TYPE
-40°C +105°C 8000H

SPECIFICATIONS

Temperature Range

Operating -40°C +105°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 350V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 1000 µF to 12.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

max internal temperature 110°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 250000 h at 40°C
> 8000 h at 105°C

Failure percentage Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K22 TYPE
-40°C +105°C 8000H

Rated Voltage VDC
350V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1200	51x79	0,08	44	26	5,4	K22350122_M0G079
1200	51x105	0,08	44	26	6,1	K22350122_M0G105
1500	51x105	0,08	40	24	6,8	K22350152_M0G105
1800	51x105	0,08	40	24	6,8	K22350182_M0G105
2200	63x105	0,08	24	15	9,9	K22350222_M0H105
2200	76x79	0,08	24	15	9,2	K22350222_M0J079
2200	76x98	0,08	24	15	9,9	K22350222_M0J098
2800	63x105	0,08	22	14	10,9	K22350282_M0H105
3300	76x79	0,08	20	13	10,2	K22350332_M0J079
3300	76x105	0,08	20	13	12,0	K22350332_M0J105
3900	76x105	0,08	16	11	13,4	K22350392_M0J105
3900	90x98	0,08	16	11	13,5	K22350392_M0L098
4700	76x143	0,09	13	10	16,7	K22350472_M0J143
5600	76x143	0,09	10	8	18,2	K22350562_M0J143
6800	76x214	0,09	9	6	23,0	K22350682_M0J214
6800	90x145	0,09	9	6	20,4	K22350682_M0L145
8200	76x214	0,09	8	6	23,3	K22350822_M0J214
8200	90x145	0,09	9	6	22,3	K22350822_M0L145
10000	76x214	0,09	7	5	24,7	K22350103_M0J214
10000	90x145	0,09	7	5	22,7	K22350103_M0L145
12000	90x220	0,10	7	4	31,8	K22350123_M0L220

Rated Voltage VDC
400V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1200	51x79	0,08	44	26	5,4	K22400122_M0G079
1200	51x105	0,08	44	26	6,1	K22400122_M0G105
1500	51x105	0,08	40	24	6,8	K22400152_M0G105
2200	63x105	0,08	24	15	9,9	K22400222_M0H105
2200	76x79	0,08	24	15	9,2	K22400222_M0J079
2200	76x98	0,08	24	15	9,9	K22400222_M0J098
3300	76x105	0,08	20	13	12,0	K22400332_M0J105
3900	76x105	0,08	16	11	13,4	K22400392_M0J105
4400	90x98	0,08	15	10	14,0	K22400442_M0L098
4700	76x143	0,09	13	10	16,7	K22400472_M0J143
5600	76x143	0,09	10	8	18,2	K22400562_M0J143
6800	76x214	0,09	9	6	23,0	K22400682_M0J214
6800	90x145	0,09	9	6	20,4	K22400682_M0L145
8200	90x145	0,09	9	6	22,3	K22400822_M0L145
10000	90x220	0,09	7	5	29,7	K22400103_M0L220
12000	90x220	0,10	7	4	31,8	K22400123_M0L220

K22 TYPE
-40°C +105°C 8000H

Kendeil™

Rated Voltage VDC

420V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1200	51x79	0,08	44	26	5,4	K22420122__M0G079
1200	51x105	0,08	44	26	6,1	K22420122__M0G105
1500	51x105	0,08	40	24	6,8	K22420152__M0G105
2200	63x105	0,08	24	15	9,9	K22420222__M0H105
2200	76x79	0,08	24	15	9,2	K22420222__M0J079
2200	76x98	0,08	24	15	9,9	K22420222__M0J098
3300	76x105	0,08	20	13	12,0	K22420332__M0J105
3900	76x105	0,08	16	11	13,4	K22420392__M0J105
4400	90x98	0,08	15	10	14,0	K22420442__M0L098
4700	76x143	0,09	13	10	16,7	K22420472__M0J143
5600	76x143	0,09	10	8	18,2	K22420562__M0J143
6800	76x214	0,09	9	6	23,0	K22420682__M0J214
6800	90x145	0,09	9	6	20,4	K22420682__M0L145
8200	90x145	0,09	9	6	22,3	K22420822__M0L145
10000	90x220	0,09	7	5	29,7	K22420103__M0L220
12000	90x220	0,10	7	4	31,8	K22420123__M0L220

Rated Voltage VDC

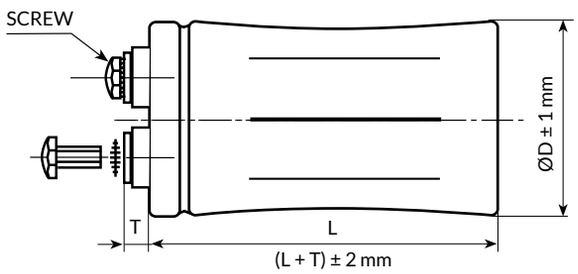
450V

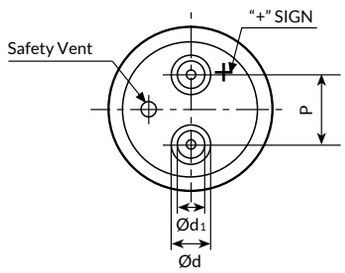
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1000	51x79	0,08	67	40	5,2	K22450102__M0G079
1000	51x105	0,08	67	40	5,6	K22450102__M0G105
1200	51x105	0,08	56	32	6,2	K22450122__M0G105
2200	63x105	0,08	30	18	9,8	K22450222__M0H105
2200	76x79	0,08	36	20	8,9	K22450222__M0J079
2200	76x98	0,08	36	20	8,9	K22450222__M0J098
2800	90x98	0,08	28	16	12,2	K22450282__M0L098
3300	76x105	0,08	26	16	11,6	K22450332__M0J105
3900	76x143	0,08	19	14	15,3	K22450392__M0J143
4700	76x143	0,09	16	9	16,7	K22450472__M0J143
5600	90x145	0,09	15	9	18,8	K22450562__M0L145
6800	76x214	0,09	11	6	23,7	K22450682__M0J214
6800	90x145	0,09	11	7	20,6	K22450682__M0L145
8200	90x220	0,09	10	6	27,4	K22450822__M0L220
10000	90x220	0,10	9	6	29,6	K22450103__M0L220

K41 TYPE
-40°C +85°C 15000H

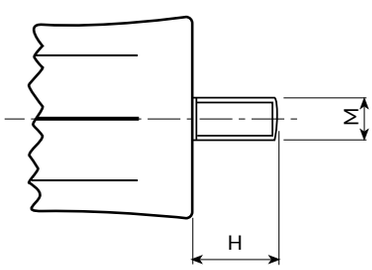
APPLICATIONS | Designed for professional application under high mechanical stress.

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Design optimized for long term vibration stress, traction market.
- Octagonal shape.





STUD style



PARP Deck

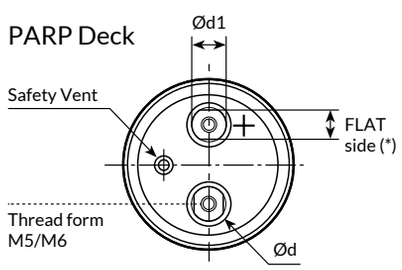


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K41 TYPE
-40°C +85°C 15000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C [Environmental classification 40/85/56 IEC-68]
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 16V to 500V DC

Surge Voltage (V_p)

$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.15\ V_r$ ($V_r \leq$ 250V DC) $V_p = 1.10\ V_r$ (V_r > 250V DC)

Rated Capacitance Range

from 220 µF to 1.500.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

max internal temperature 98°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	35mm	51mm	63mm	76mm	90mm
Maximum current	20A	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min'

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 200000 h at 40°C
> 12000 h at 85°C for $V_r \leq$ 100V and for $V_r \geq$ 500V
> 15000 h at 85°C for 100V < V_r < 500V

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 25 fit (25 10^{-9}/h) ($V_r \leq$ 160V DC)
≤ 33 fit (33 10^{-9}/h) (V_r > 160V DC)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K41 TYPE
-40°C +85°C 15000H

Rated Voltage VDC **16V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
22000	35x60	0,35	18	16	6,6	K41016223_M0E060
33000	35x79	0,40	15	13	10,2	K41016333_M0E079
47000	51x79	0,55	13	12	12,5	K41016473_M0G079
68000	51x79	0,60	12	11	15,7	K41016683_M0G079
100000	51x79	0,80	10	11	16,5	K41016104_M0G079
100000	51x105	0,80	10	10	18,7	K41016104_M0G105
150000	51x105	1,10	10	9	19,5	K41016154_M0G105
150000	63x105	1,10	10	9	21,5	K41016154_M0H105
220000	63x105	1,50	8	8	22,4	K41016224_M0H105
330000	63x105	1,90	8	8	23,3	K41016334_M0H105
330000	76x105	1,90	8	8	25,0	K41016334_M0J105
470000	76x105	1,90	5	5	28,5	K41016474_M0J105
470000	76x143	1,90	5	5	32,0	K41016474_M0J143
680000	76x143	2,50	4	4	32,5	K41016684_M0J143
1000000	76x214	2,50	3	3	44,5	K41016105_M0J214
1500000	90x220	3,00	3	3	48,7	K41016155_M0L220

Rated Voltage VDC **25V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
10000	35x60	0,25	27	21	5,9	K41025103_M0E060
15000	35x60	0,28	16	12	9,3	K41025153_M0E060
22000	35x79	0,35	18	16	11,8	K41025223_M0E079
33000	35x79	0,40	15	14	12,1	K41025333_M0E079
33000	51x79	0,40	15	14	13,3	K41025333_M0G079
47000	51x79	0,50	12	10	15,7	K41025473_M0G079
68000	51x79	0,60	10	9	16,4	K41025683_M0G079
68000	51x105	0,60	10	9	18,7	K41025683_M0G105
100000	51x105	0,70	10	9	19,5	K41025104_M0G105
100000	63x105	0,70	10	9	21,5	K41025104_M0H105
150000	63x105	1,00	9	9	22,0	K41025154_M0H105
150000	76x105	1,00	9	9	23,5	K41025154_M0J105
220000	76x105	1,50	9	9	24,2	K41025224_M0J105
220000	76x143	1,50	9	9	28,5	K41025224_M0J143
330000	76x143	2,00	9	9	30,5	K41025334_M0J143
470000	76x214	2,00	5	5	35,6	K41025474_M0J214

Rated Voltage VDC **40V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
10000	35x60	0,20	18	12	6,5	K41040103_M0E060
15000	35x60	0,25	13	10	7,4	K41040153_M0E060
15000	35x79	0,25	13	10	8,6	K41040153_M0E079
22000	35x79	0,30	16	14	8,9	K41040223_M0E079
22000	51x79	0,30	16	14	10,4	K41040223_M0G079
33000	51x79	0,35	15	13	13,5	K41040333_M0G079
47000	51x79	0,40	10	9	14,2	K41040473_M0G079
47000	51x105	0,40	10	9	15,1	K41040473_M0G105
47000	63x105	0,40	10	9	17,6	K41040473_M0H105
68000	51x105	0,50	10	8	18,2	K41040683_M0G105
68000	63x105	0,50	10	8	19,5	K41040683_M0H105
100000	63x105	0,60	9	8	21,2	K41040104_M0H105
150000	76x105	0,90	9	8	25,7	K41040154_M0J105
220000	76x143	1,00	6	6	31,5	K41040224_M0J143
330000	76x214	1,20	5	5	38,5	K41040334_M0J214

K41 TYPE
-40°C +85°C 15000H

Kendeil™

Rated Voltage VDC

50V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	35x60	0,20	33	30	5,6	K41050472__M0E060
6800	35x60	0,20	25	24	7,0	K41050682__M0E060
10000	35x60	0,20	21	20	10,0	K41050103__M0E060
15000	35x79	0,25	17	15	11,3	K41050153__M0E079
22000	51x79	0,30	16	13	13,1	K41050223__M0G079
33000	51x105	0,35	15	13	16,0	K41050333__M0G105
33000	63x105	0,35	15	13	17,5	K41050333__M0H105
47000	51x105	0,40	12	10	16,2	K41050473__M0G105
47000	63x105	0,40	12	10	18,3	K41050473__M0H105
68000	63x105	0,60	12	9	18,0	K41050683__M0H105
68000	76x105	0,60	12	9	22,1	K41050683__M0J105
100000	76x105	0,90	8	8	23,8	K41050104__M0J105
100000	76x143	0,90	8	8	25,8	K41050104__M0J143
150000	76x143	1,00	6	6	31,5	K41050154__M0J143

Rated Voltage VDC

63V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	35x60	0,15	29	25	6,2	K41063472__M0E060
6800	35x60	0,18	21	20	7,0	K41063682__M0E060
6800	35x79	0,18	21	20	8,2	K41063682__M0E079
10000	35x79	0,20	21	20	8,7	K41063103__M0E079
10000	51x79	0,20	18	16	10,1	K41063103__M0G079
15000	51x79	0,25	15	13	11,1	K41063153__M0G079
22000	51x79	0,30	13	11	12,4	K41063223__M0G079
22000	51x105	0,30	13	11	14,6	K41063223__M0G105
33000	51x105	0,35	11	10	15,6	K41063333__M0G105
33000	63x105	0,35	11	10	17,9	K41063333__M0H105
47000	63x105	0,45	11	10	18,8	K41063473__M0H105
68000	76x105	0,50	11	10	25,7	K41063683__M0J105
100000	76x105	0,55	8	8	31,5	K41063104__M0J105
100000	76x143	0,55	8	8	34,5	K41063104__M0J143
150000	76x143	0,60	6	6	36,1	K41063154__M0J143

Rated Voltage VDC

75V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	35x60	0,15	29	25	5,4	K41075472__M0E060
6800	35x79	0,18	20	20	8,5	K41075682__M0E079
10000	51x79	0,20	18	16	11,0	K41075103__M0G079
15000	51x105	0,25	15	13	12,7	K41075153__M0G105
22000	51x105	0,30	12	11	15,2	K41075223__M0G105
22000	63x105	0,30	12	11	16,2	K41075223__M0H105
33000	63x105	0,35	11	10	16,8	K41075333__M0H105
33000	76x105	0,35	11	10	18,5	K41075333__M0J105
47000	76x105	0,45	10	10	20,1	K41075473__M0J105
47000	76x143	0,45	10	10	22,1	K41075473__M0J143
68000	76x143	0,60	10	10	26,0	K41075683__M0J143
100000	76x143	0,60	8	8	34,9	K41075104__M0J143

K41 TYPE
-40°C +85°C 15000H

Rated Voltage VDC
100V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	35x60	0,15	84	65	4,0	K41100152_M0E060
2200	35x60	0,15	57	47	5,0	K41100222_M0E060
3300	35x60	0,15	48	39	5,3	K41100332_M0E060
3300	35x79	0,15	48	39	6,8	K41100332_M0E079
4700	35x79	0,15	30	26	7,5	K41100472_M0E079
4700	51x79	0,15	30	26	10,0	K41100472_M0G079
6800	51x79	0,20	23	20	11,1	K41100682_M0G079
10000	51x79	0,20	16	14	11,9	K41100103_M0G079
10000	51x105	0,20	16	14	13,9	K41100103_M0G105
10000	63x105	0,20	16	14	14,5	K41100103_M0H105
15000	51x105	0,25	13	12	14,8	K41100153_M0G105
15000	63x105	0,25	13	12	17,5	K41100153_M0H105
22000	63x105	0,25	12	12	18,2	K41100223_M0H105
33000	76x105	0,25	10	10	23,1	K41100333_M0J105
47000	76x143	0,30	10	9	30,2	K41100473_M0J143
68000	76x143	0,30	8	8	36,5	K41100683_M0J143
68000	76x214	0,40	6	5	39,5	K41100683_M0J214

Rated Voltage VDC
160V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	35x79	0,10	98	90	4,0	K41160102_M0E079
1500	51x79	0,10	62	71	5,3	K41160152_M0G079
2200	51x79	0,10	50	43	7,0	K41160222_M0G079
3300	51x105	0,12	35	30	8,6	K41160332_M0G105
4700	51x105	0,12	25	25	10,9	K41160472_M0G105
4700	63x105	0,12	25	25	11,9	K41160472_M0H105
6800	63x105	0,12	20	22	13,0	K41160682_M0H105
10000	76x105	0,15	13	12	17,4	K41160103_M0J105
10000	76x143	0,15	13	12	19,4	K41160103_M0J143
15000	76x143	0,15	11	10	20,9	K41160153_M0J143
22000	76x143	0,20	10	10	26,4	K41160223_M0J143
33000	76x214	0,20	8	8	34,1	K41160333_M0J214

Rated Voltage VDC
200V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
680	35X60	0,10	124	119	3,4	K41200681_M0E060
1000	51x79	0,10	86	88	4,2	K41200102_M0G079
1500	51x79	0,10	60	63	5,8	K41200152_M0G079
2200	51x105	0,10	40	37	7,2	K41200222_M0G105
3300	51x105	0,12	32	30	9,0	K41200332_M0G105
3300	63x105	0,12	31	29	10,2	K41200332_M0H105
4700	51x105	0,12	28	26	10,4	K41200472_M0G105
4700	63x105	0,12	27	25	11,1	K41200472_M0H105
5600	63x105	0,12	21	18	12,1	K41200562_M0H105
6800	63x105	0,12	20	16	13,9	K41200682_M0H105
6800	76x105	0,12	19	15	14,3	K41200682_M0J105
8200	76x105	0,12	16	14	14,8	K41200822_M0J105
10000	76x105	0,15	13	12	15,8	K41200103_M0J105
10000	76x143	0,15	13	12	18,6	K41200103_M0J143
15000	76x143	0,18	12	12	21,4	K41200153_M0J143
22000	76x143	0,18	9	9	28,9	K41200223_M0J143
33000	76x214	0,22	8	8	36,1	K41200333_M0J214

K41 TYPE
-40°C +85°C 15000H

Kendeil™

Rated Voltage VDC

250V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	35x60	0,10	211	200	2,8	K41250471__M0E060
680	35x79	0,10	127	121	3,5	K41250681__M0E079
1000	51x79	0,10	110	95	4,5	K41250102__M0G079
1500	51x79	0,10	64	56	5,0	K41250152__M0G079
2200	51x105	0,10	40	36	7,5	K41250222__M0G105
3300	51x105	0,12	31	26	9,8	K41250332__M0G105
3300	63x105	0,12	30	25	11,0	K41250332__M0H105
4700	63x105	0,12	24	21	11,8	K41250472__M0H105
4700	76x105	0,12	20	18	13,2	K41250472__M0J105
5600	76x105	0,12	17	16	13,8	K41250562__M0J105
6800	76x105	0,12	15	13	14,1	K41250682__M0J105
8200	76x143	0,12	14	13	16,0	K41250822__M0J143
10000	76x143	0,13	13	12	19,7	K41250103__M0J143
15000	76x143	0,13	11	11	21,9	K41250153__M0J143
22000	76x214	0,14	10	9	34,2	K41250223__M0J214

Rated Voltage VDC

350V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	35x79	0,10	108	95	4,0	K41350471__M0E079
680	35x79	0,10	108	95	4,0	K41350681__M0E079
1000	51x79	0,10	79	62	5,0	K41350102__M0G079
1000	51x105	0,10	79	62	5,5	K41350102__M0G105
1500	51x105	0,10	60	52	7,4	K41350152__M0G105
2200	51x105	0,10	44	40	9,0	K41350222__M0G105
2200	63x105	0,10	37	34	9,5	K41350222__M0H105
3300	63x105	0,12	26	22	10,1	K41350332__M0H105
3300	76x105	0,12	26	22	12,8	K41350332__M0J105
4700	76x105	0,12	17	16	14,5	K41350472__M0J105
4700	76x143	0,12	17	16	17,5	K41350472__M0J143
5600	76x143	0,12	17	16	18,5	K41350562__M0J143
6800	76x143	0,12	16	15	19,2	K41350682__M0J143
8200	76x143	0,12	16	15	20,7	K41350822__M0J143
10000	76x214	0,14	15	14	26,6	K41350103__M0J214
15000	76x214	0,15	14	14	31,7	K41350153__M0J214
22000	90x220	0,20	13	13	35,4	K41350223__M0L220

Kendeil™

K41 TYPE

-40°C +85°C 15000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
220	35x60	0,10	350	288	2,1	K41400221_M0E060
330	35x60	0,10	290	273	2,8	K41400331_M0E060
470	35x79	0,10	165	155	3,5	K41400471_M0E079
680	51x79	0,10	120	115	4,7	K41400681_M0G079
680	51x105	0,10	124	120	5,1	K41400681_M0G105
1000	51x79	0,10	105	95	5,8	K41400102_M0G079
1000	51x105	0,10	110	85	6,3	K41400102_M0G105
1500	51x105	0,10	65	55	7,0	K41400152_M0G105
1500	63x105	0,10	65	55	7,9	K41400152_M0H105
2200	63x105	0,10	50	47	9,0	K41400222_M0H105
2200	76x105	0,10	50	47	10,7	K41400222_M0J105
3300	63x105	0,12	35	30	11,0	K41400332_M0H105
3300	76x105	0,12	35	30	13,1	K41400332_M0J105
3300	76x143	0,12	35	30	14,2	K41400332_M0J143
4700	76x105	0,15	30	29	14,9	K41400472_M0J105
4700	76x143	0,15	30	29	18,8	K41400472_M0J143
5600	76x143	0,15	26	25	19,0	K41400562_M0J143
6800	76x143	0,15	20	18	19,5	K41400682_M0J143
10000	76x214	0,15	20	19	26,0	K41400103_M0J214
15000	90x220	0,20	15	12	33,5	K41400153_M0L220

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	51x79	0,10	200	179	4,0	K41450471_M0G079
680	51x79	0,10	140	128	4,4	K41450681_M0G079
680	51x105	0,10	140	128	5,0	K41450681_M0G105
1000	51x79	0,10	100	88	4,8	K41450102_M0G079
1000	51x105	0,10	100	88	6,4	K41450102_M0G105
1500	51x105	0,10	67	55	7,1	K41450152_M0G105
1500	63x105	0,10	67	55	8,0	K41450152_M0H105
2200	63x105	0,10	60	55	9,0	K41450222_M0H105
2200	76x105	0,10	60	47	11,2	K41450222_M0J105
2200	76x143	0,10	60	47	12,5	K41450222_M0J143
3300	76x105	0,12	35	30	11,2	K41450332_M0J105
3300	76x143	0,12	35	30	12,9	K41450332_M0J143
4700	76x143	0,15	32	30	15,0	K41450472_M0J143
5600	76x143	0,15	26	25	19,0	K41450562_M0J143
6800	76x214	0,15	23	22	19,0	K41450682_M0J214
8200	76x214	0,15	22	20	19,0	K41450822_M0J214
10000	76x143	0,20	22	20	19,0	K41450103_M0J143
10000	76x214	0,20	20	19	23,1	K41450103_M0J214
12000	76x214	0,20	15	12	29,8	K41450123_M0J214
15000	90x220	0,20	14	12	32,6	K41450153_M0L220

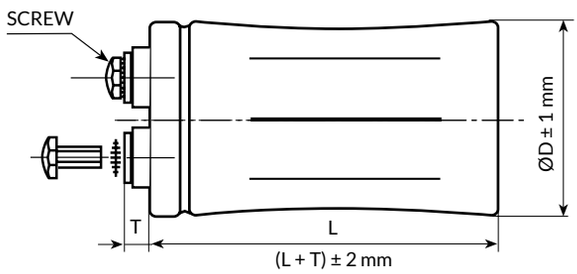
Rated Voltage VDC **500V**

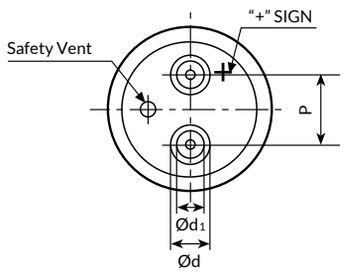
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	51x105	0,15	125	114	4,0	K41500102_M0G105
1500	63x105	0,15	100	91	5,2	K41500152_M0H105
2200	76x105	0,15	70	66	7,4	K41500222_M0J105
2200	76x143	0,15	70	66	8,2	K41500222_M0J143
3300	76x143	0,15	55	53	10,3	K41500332_M0J143
4700	76x214	0,20	40	37	18,5	K41500472_M0J214
5600	76x214	0,15	26	22	19,8	K41500562_M0J214
6800	76x214	0,15	24	22	20,2	K41500682_M0J214

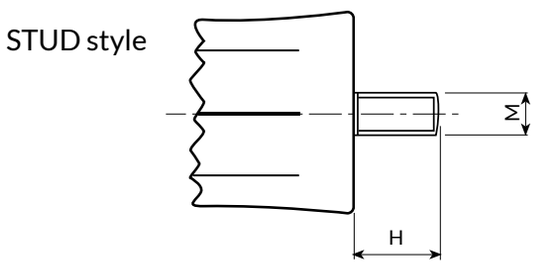
K42 TYPE
-40°C +105°C 5000H

APPLICATIONS | Designed for professional application under high mechanical stress.

- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud
- Design optimized for long term vibration stress, traction market.
- Octagonal shape.







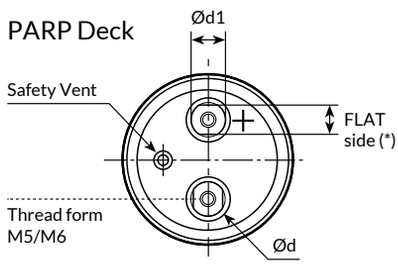


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K42 TYPE
-40°C +105°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C +105°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 16V to 450V DC

Surge Voltage (V_p)

$V_p = 1.15\ V_r$ ($V_r \leq 250$V DC) $V_p = 1.10\ V_r$ ($V_r > 250$V DC)

Rated Capacitance Range

from 100 µF to 470.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

max internal temperature 108°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	35mm	51mm	63mm	76mm	90mm
Maximum current	20A	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Centrifugal acceleration 20g for 48 hours

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 250000 h at 40°C
> 5000 h at 105°C

Failure percentage Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K42 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **16V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
10000	35x60	0,25	25	24	3,3	K42016103__M0E060
15000	35x60	0,30	16	16	3,5	K42016153__M0E060
22000	35x60	0,35	12	12	4,4	K42016223__M0E060
33000	35x79	0,40	12	12	5,9	K42016333__M0E079
47000	35x79	0,55	9	10	7,5	K42016473__M0E079
68000	51x79	0,60	8	8	11,9	K42016683__M0G079
100000	51x105	0,80	8	8	12,3	K42016104__M0G105
150000	63x105	1,10	7	7	15,4	K42016154__M0H105
220000	76x105	1,50	7	7	18,8	K42016224__M0J105
330000	76x105	1,90	7	7	19,7	K42016334__M0J105
470000	76x143	2,00	6	6	22,5	K42016474__M0J143

Rated Voltage VDC **25V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
10000	35x60	0,20	23	18	3,8	K42025103__M0E060
15000	35x60	0,25	16	12	4,8	K42025153__M0E060
22000	35x79	0,30	12	12	7,2	K42025223__M0E079
33000	51x79	0,35	10	10	8,9	K42025333__M0G079
47000	51x79	0,40	9	9	11,6	K42025473__M0G079
68000	51x105	0,50	8	8	13,0	K42025683__M0G105
100000	63x105	0,60	8	8	15,8	K42025104__M0H105
150000	76x105	0,90	7	7	18,3	K42025154__M0J105
220000	76x143	1,30	7	7	21,6	K42025224__M0J143
330000	76x143	2,00	7	7	23,8	K42025334__M0J143

Rated Voltage VDC **40V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
4700	35x60	0,20	31	29	3,3	K42040472__M0E060
6800	35x60	0,20	23	20	3,9	K42040682__M0E060
10000	35x79	0,20	16	12	4,8	K42040103__M0E079
15000	35x79	0,20	12	10	5,4	K42040153__M0E079
22000	51x79	0,25	10	10	8,9	K42040223__M0G079
33000	51x105	0,35	10	10	11,2	K42040333__M0G105
47000	51x105	0,45	9	9	13,8	K42040473__M0G105
47000	63x105	0,45	9	9	14,5	K42040473__M0H105
68000	63x105	0,60	7	7	15,0	K42040683__M0H105
68000	76x105	0,60	7	7	15,9	K42040683__M0J105
100000	76x105	0,90	7	7	19,1	K42040104__M0J105
100000	76x143	0,90	7	7	21,0	K42040104__M0J143
150000	76x143	1,30	7	7	25,9	K42040154__M0J143

K42 TYPE
-40°C +105°C 5000H

Kendeil™

Rated Voltage VDC

63V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
2200	35x60	0,15	72	60	2,5	K42063222__M0E060
3300	35x60	0,15	48	39	3,5	K42063332__M0E060
4700	35x60	0,15	33	28	4,2	K42063472__M0E060
6800	35x79	0,18	18	13	6,3	K42063682__M0E079
10000	51x79	0,20	15	11	8,2	K42063103__M0G079
15000	51x79	0,25	15	13	8,9	K42063153__M0G079
15000	51x105	0,25	13	10	18,0	K42063153__M0G105
22000	51x105	0,30	11	10	11,8	K42063223__M0G105
22000	63x105	0,30	11	10	13,5	K42063223__M0H105
33000	63x105	0,35	11	10	14,8	K42063333__M0H105
33000	76x105	0,35	11	8	16,6	K42063333__M0J105
47000	76x105	0,45	9	8	17,7	K42063473__M0J105
47000	76x143	0,45	9	8	19,0	K42063473__M0J143
68000	76x105	0,45	8	8	20,1	K42063683__M0J105
68000	76x143	0,70	8	8	22,8	K42063683__M0J143
100000	76x143	0,70	8	8	24,1	K42063104__M0J143

Rated Voltage VDC

100V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1000	35x60	0,15	110	100	2,9	K42100102__M0E060
1500	35x60	0,15	80	73	3,2	K42100152__M0E060
2200	35x60	0,15	59	53	4,4	K42100222__M0E060
3300	35x79	0,15	33	31	5,8	K42100332__M0E079
4700	51x79	0,15	25	22	7,2	K42100472__M0G079
6800	51x79	0,15	19	17	8,9	K42100682__M0G079
6800	51x105	0,15	19	17	8,9	K42100682__M0G105
10000	51x105	0,15	17	15	11,0	K42100103__M0G105
10000	63x105	0,15	17	15	12,5	K42100103__M0H105
15000	63x105	0,15	12	12	15,1	K42100153__M0H105
22000	76x105	0,18	10	9	16,5	K42100223__M0J105
33000	76x143	0,22	8	8	20,9	K42100333__M0J143

Rated Voltage VDC

160V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1000	35x79	0,11	105	90	3,3	K42160102__M0E079
1500	51x79	0,11	65	60	4,1	K42160152__M0G079
2200	51x105	0,11	46	43	4,8	K42160222__M0G105
3300	63x105	0,11	32	30	6,8	K42160332__M0H105
4700	63x105	0,11	27	25	8,5	K42160472__M0H105
6800	76x105	0,13	23	20	11,3	K42160682__M0J105
10000	76x105	0,14	22	20	14,2	K42160103__M0J105
10000	76x143	0,15	17	16	14,9	K42160103__M0J143
15000	76x143	0,20	16	12	17,2	K42160153__M0J143
22000	76x214	0,20	11	10	19,0	K42160223__M0J214

Kendeil™

K42 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **200V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
680	35x60	0,11	133	98	2,5	K42200681__M0E060
1000	51x79	0,11	85	64	4,6	K42200102__M0G079
1500	51x105	0,11	65	58	5,1	K42200152__M0G105
2200	51x105	0,11	60	53	6,1	K42200222__M0G105
3300	63x105	0,11	40	35	7,9	K42200332__M0H105
4700	63x105	0,11	25	23	8,7	K42200472__M0H105
6800	76x105	0,11	18	16	11,8	K42200682__M0J105
8200	76x105	0,11	17	15	12,8	K42200822__M0J105
10000	76x105	0,13	15	13	14,5	K42200103__M0J105
10000	76x143	0,15	13	12	16,0	K42200103__M0J143
15000	76x143	0,20	12	11	17,3	K42200153__M0J143
22000	76x214	0,20	11	10	18,9	K42200223__M0J214

Rated Voltage VDC **250V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
470	35x60	0,11	211	193	2,0	K42250471__M0E060
680	35x79	0,11	130	98	2,2	K42250681__M0E079
1000	51x79	0,11	110	85	4,1	K42250102__M0G079
1500	51x105	0,11	74	65	5,4	K42250152__M0G105
2200	51x105	0,11	41	39	6,8	K42250222__M0G105
3300	63x105	0,11	30	26	8,2	K42250332__M0H105
4700	76x105	0,11	18	17	11,9	K42250472__M0J105
6800	76x143	0,15	15	14	14,3	K42250682__M0J143
8200	76x143	0,15	14	14	15,2	K42250822__M0J143
10000	76x143	0,20	14	13	16,0	K42250103__M0J143
15000	76x214	0,20	12	10	17,4	K42250153__M0J214

Rated Voltage VDC **350V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
330	35x60	0,11	255	196	1,8	K42350331__M0E060
470	35x79	0,11	170	141	2,1	K42350471__M0E079
680	51x79	0,11	128	96	3,8	K42350681__M0G079
1000	51x105	0,11	85	68	5,0	K42350102__M0G105
1500	63x105	0,11	59	52	6,4	K42350152__M0H105
2200	76x105	0,11	44	40	8,1	K42350222__M0J105
3300	76x105	0,11	26	23	10,2	K42350332__M0J105
4700	76x143	0,11	18	16	13,5	K42350472__M0J143
5600	76x143	0,12	18	17	14,3	K42350562__M0J143
6800	76x143	0,15	16	15	15,1	K42350682__M0J143
10000	76x214	0,20	15	14	19,9	K42350103__M0J214

K42 TYPE
-40°C +105°C 5000H

Kendeil™

Rated Voltage VDC

400V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	35x60	0,11	350	280	1,4	K42400221__M0E060
330	35x60	0,11	250	210	2,2	K42400331__M0E060
470	51x79	0,11	170	150	2,8	K42400471__M0G079
680	51x79	0,11	110	100	3,2	K42400681__M0G079
1000	51x105	0,11	95	82	4,1	K42400102__M0G105
1500	63x105	0,11	64	53	5,8	K42400152__M0H105
2200	63x105	0,11	45	53	6,0	K42400222__M0H105
2200	76x105	0,11	45	39	7,3	K42400222__M0J105
3300	76x143	0,11	28	25	11,1	K42400332__M0J143
4700	76x143	0,11	24	23	12,8	K42400472__M0J143
6800	76x214	0,15	19	15	15,0	K42400682__M0J214
10000	90x220	0,20	16	14	22,5	K42400103__M0L220

Rated Voltage VDC

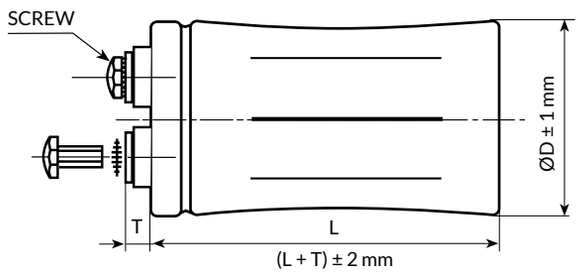
450V

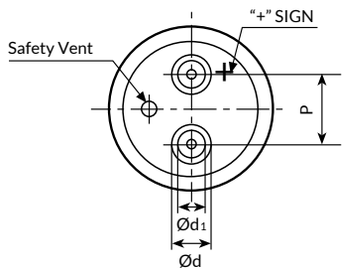
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
100	35x60	0,11	800	650	1,2	K42450101__M0E060
150	35x60	0,11	550	490	1,6	K42450151__M0E060
220	35x60	0,11	370	310	1,8	K42450221__M0E060
330	35x79	0,11	240	210	2,4	K42450331__M0E079
470	51x79	0,11	200	179	3,0	K42450471__M0G079
680	51x105	0,11	140	128	4,2	K42450681__M0G105
1000	51x105	0,11	100	88	4,4	K42450102__M0G105
1000	63x105	0,11	100	88	5,3	K42450102__M0H105
1500	63x105	0,11	63	57	5,7	K42450152__M0H105
1500	76x105	0,11	63	57	6,6	K42450152__M0J105
2200	76x105	0,11	48	38	7,6	K42450222__M0J105
2200	76x143	0,11	48	38	8,8	K42450222__M0J143
3300	76x143	0,15	35	30	10,4	K42450332__M0J143
4700	76x143	0,15	28	25	10,9	K42450472__M0J143
6800	76x214	0,15	21	16	23,7	K42450682__M0J214
10000	90x220	0,20	16	14	22,5	K42450103__M0L220

K61 TYPE
-40°C +85°C 25000H

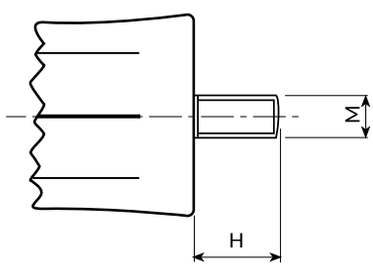
APPLICATIONS | Designed for professional application.
Linear amplifiers, audio filtering.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Extremely linear characteristic between 20Hz to 22Hz
- Design optimized for Audio application
- No effects of sound compression
- Precisely and realistic dynamic of sound





STUD style



PARP Deck

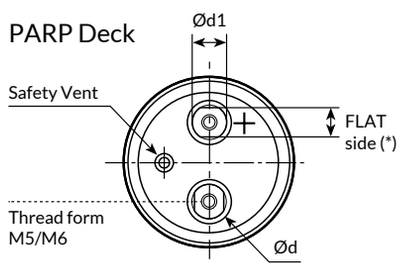


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K61 TYPE
-40°C +85°C 25000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C [Environmental classification 40/85/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 63V to 100V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 6800 µF to 47.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.2	1.3

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

max internal temperature 98°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 4,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 2,000 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 250000 h at 40°C
> 25000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 25 fit (25 10^{-9}/h) (V_r ≤ 160V DC)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K61 TYPE
-40°C +85°C 25000H

Rated Voltage VDC **63V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
10000	51x79	0,10	11	9	14,6	K61063103__M0G079
14000	51x105	0,10	9	8	18,7	K61063143__M0G105
22000	63x105	0,11	6	6	28,7	K61063223__M0H105
33000	76x105	0,12	5,5	5,5	31,2	K61063333__M0J105
47000	76x143	0,17	4	4	41,3	K61063473__M0J143

Rated Voltage VDC **80V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
8200	51x79	0,10	12	8	14,4	K61080822__M0G079
10000	51x105	0,10	10	8	17,9	K61080103__M0G105
18000	63x105	0,11	6	6	28,9	K61080183__M0H105
28000	76x105	0,15	6	6	30,2	K61080283__M0J105
42000	76x143	0,17	4	4	41,3	K61080423__M0J143

Rated Voltage VDC **100V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
6800	51x79	0,10	14	12	14,1	K61100682__M0G079
8200	51x105	0,10	11	8	17,9	K61100822__M0G105
10000	51x105	0,10	10	8	17,9	K61100103__M0G105
12000	63x105	0,10	7	7	28,0	K61100123__M0H105
15000	63x105	0,10	6	6	28,7	K61100153__M0H105
22000	76x105	0,11	6	6	30,2	K61100223__M0J105
33000	76x143	0,15	5	5	41,0	K61100333__M0J143

K71 TYPE
-40°C +85°C 15000H

APPLICATIONS

Designed for professional application.
Switch mode power supplies, high ripple current converters, motor drives.

- Design optimized for extremely high miniaturization
- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud

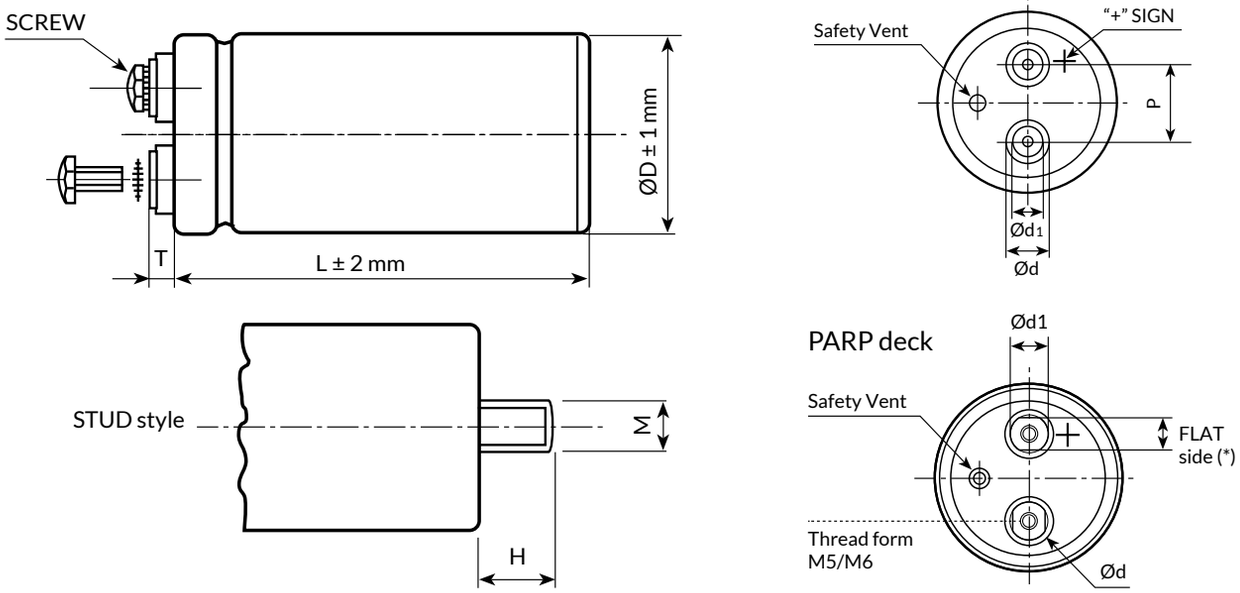


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K71 TYPE
-40°C +85°C 15000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C [Environmental classification 40/85/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 350V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 2200 µF to 36.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 15.000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K71 TYPE
-40°C +85°C 15000H

Rated Voltage VDC **350V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
3300	51x79	0,09	25	20	9,0	K71350332__M0G079
3500	51x79	0,09	24	17	9,1	K71350352__M0G079
4700	51x105	0,09	17	13	11,6	K71350472__M0G105
6800	63x105	0,09	15	11	17,6	K71350682__M0H105
7600	63x105	0,09	14	10	18,0	K71350762__M0H105
10000	76x105	0,10	12	11	22,2	K71350103__M0J105
11000	76x105	0,10	12	11	22,3	K71350113__M0J105
16000	90x105	0,11	10	8	26,1	K71350163__M0L105
17000	76x143	0,11	9	8	30,8	K71350173__M0J143
24000	76x214	0,11	7	5	44,0	K71350243__M0J214
24000	90x145	0,11	7	5	35,9	K71350243__M0L145
36000	90x220	0,13	5	4	51,3	K71350363__M0L220

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
2200	51x79	0,09	42	33	8,2	K71400222__M0G079
2900	51x79	0,09	38	30	8,6	K71400292__M0G079
3300	51x105	0,09	29	22	10,8	K71400332__M0G105
3900	51x105	0,09	28	19	11,1	K71400392__M0G105
4700	63x79	0,09	21	17	10,0	K71400472__M0H079
5600	63x105	0,09	19	15	16,6	K71400562__M0H105
6200	63x105	0,09	18	14	17,1	K71400622__M0H105
6800	76x105	0,09	17	13	18,6	K71400682__M0J105
8200	76x105	0,09	16	12	19,0	K71400822__M0J105
9200	76x105	0,09	14	11	21,2	K71400922__M0J105
13000	76x143	0,10	9	8	29,3	K71400133__M0J143
13000	90x105	0,10	10	9	25,2	K71400133__M0L105
20000	76x214	0,11	8	7	41,9	K71400203__M0J214
20000	90x145	0,11	8	7	34,5	K71400203__M0L145
30000	90x220	0,13	6	5	49,5	K71400303__M0L220

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
2200	51x79	0,09	42	33	8,2	K71420222__M0G079
2500	51x79	0,09	40	22	8,4	K71420252__M0G079
3300	51x105	0,09	29	22	10,8	K71420332__M0G105
4700	63x79	0,09	21	17	10,0	K71420472__M0H079
5600	63x105	0,09	19	15	16,6	K71420562__M0H105
6800	76x105	0,09	17	13	18,6	K71420682__M0J105
8200	76x105	0,09	16	12	19,0	K71420822__M0J105
12000	76x143	0,09	9	8	28,6	K71420123__M0J143
12000	90x105	0,09	9	8	24,5	K71420123__M0L105
15000	90x145	0,09	9	7	32,6	K71420153__M0L145
18000	76x214	0,10	8	7	40,9	K71420183__M0J214
23000	90x220	0,13	7	6	46,8	K71420233__M0L220

K71 TYPE
-40°C +85°C 15000H

Rated Voltage VDC

450V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
2200	51x79	0,09	43	34	8,1	K71450222__M0G079
3100	51x105	0,09	32	24	10,4	K71450312__M0G105
4700	63x105	0,09	23	19	15,8	K71450472__M0H105
5600	76x105	0,09	21	18	17,6	K71450562__M0J105
6800	76x105	0,09	18	12	17,7	K71450682__M0J105
10000	90x105	0,09	14	11	22,9	K71450103__M0L105
11000	76x143	0,09	12	10	27,3	K71450113__M0J143
15000	90x145	0,09	9	8	32,6	K71450153__M0L145
16000	76x214	0,09	11	9	39,1	K71450163__M0J214
23000	90x220	0,13	7	6	46,8	K71450233__M0L220

K72 TYPE
-40°C +105°C 5000H

APPLICATIONS

Designed for professional application.
Switch mode power supplies, high ripple current converters, motor drives.

- Design optimized for extremely high miniaturization
- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring clips or with threaded stud

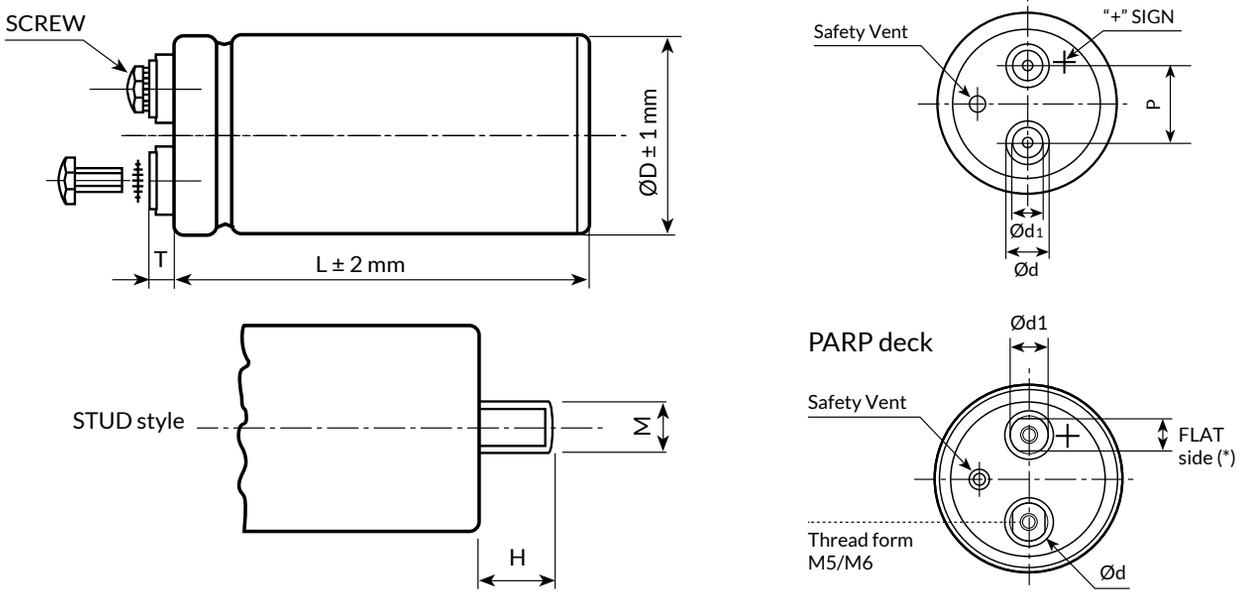


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K72 TYPE
-40°C +105°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C +105°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 350V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 1500 µF to 30.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (105°C, V_n, I_r applied)

> 5.000 h at 105°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K72 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **350V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
2200	51x79	0,09	42	33	5,1	K72350222__M0G079
2900	51x79	0,09	38	29	5,4	K72350292__M0G079
3300	51x105	0,09	25	20	6,8	K72350332__M0G105
3900	51x105	0,09	23	17	6,9	K72350392__M0G105
4700	63x79	0,09	17	13	8,3	K72350472__M0H079
5600	63x105	0,09	16	12	10,4	K72350562__M0H105
6200	63x105	0,09	15	11	10,6	K72350622__M0H105
6800	76x105	0,09	15	11	12,5	K72350682__M0J105
8200	76x105	0,09	13	12	13,1	K72350822__M0J105
9200	76x105	0,09	12	11	13,3	K72350922__M0J105
10000	76x143	0,09	12	11	17,1	K72350103__M0J143
13000	76x143	0,09	9	8	18,2	K72350133__M0J143
13000	90x105	0,09	9	8	15,6	K72350133__M0L105
19000	90x145	0,11	8	7	21,4	K72350193__M0L145
20000	76x214	0,13	8	7	26,0	K72350203__M0J214
30000	90x220	0,13	6	5	30,7	K72350303__M0L220

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
2200	51x79	0,09	42	33	5,1	K72400222__M0G079
3100	51x105	0,09	29	22	6,5	K72400312__M0G105
3300	63x79	0,09	29	22	7,7	K72400332__M0H079
4700	63x105	0,09	21	17	9,9	K72400472__M0H105
5600	76x105	0,09	19	15	11,7	K72400562__M0J105
6800	76x105	0,09	18	14	12,5	K72400682__M0J105
8200	76x143	0,09	16	12	16,0	K72400822__M0J143
10000	76x143	0,09	14	11	17,1	K72400103__M0J143
10000	90x145	0,09	14	11	15,0	K72400103__M0L145
11000	76x143	0,09	12	10	17,2	K72400113__M0J143
16000	76x214	0,09	9	8	24,6	K72400163__M0J214
16000	90x145	0,09	9	8	20,5	K72400163__M0L145
23000	90x220	0,11	8	7	29,4	K72400233__M0L220

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
2200	51x79	0,09	42	33	5,1	K72420222__M0G079
2700	51x105	0,09	40	29	6,4	K72420272__M0G105
3300	63x79	0,09	29	22	7,7	K72420332__M0H079
4700	63x105	0,09	21	17	9,9	K72420472__M0H105
5600	76x105	0,09	16	8	11,7	K72420562__M0J105
6800	76x105	0,09	19	15	12,5	K72420682__M0J105
10000	76x143	0,09	14	11	17,1	K72420103__M0J143
10000	90x105	0,09	14	11	15,0	K72420103__M0L105
12000	90x145	0,09	11	9	18,3	K72420123__M0L145
15000	76x214	0,09	9	8	24,0	K72420153__M0J214
19000	90x220	0,09	9	8	27,2	K72420193__M0L220

K72 TYPE
-40°C +105°C 5000H

Rated Voltage VDC

450V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1500	51x79	0,09	53	42	4,5	K72450152__M0G079
1700	51x79	0,09	50	38	4,7	K72450172__M0G079
2200	51x105	0,09	43	34	5,9	K72450222__M0G105
2400	51x105	0,09	39	31	6,0	K72450242__M0G105
2900	63x79	0,09	35	29	7,1	K72450292__M0H079
3300	63x105	0,09	32	24	8,8	K72450332__M0H105
3900	63x105	0,09	30	22	9,1	K72450392__M0H105
4700	76x105	0,09	23	19	11,1	K72450472__M0J105
5600	76x105	0,09	21	18	11,5	K72450562__M0J105
6800	76x143	0,09	19	12	15,0	K72450682__M0J143
8200	76x143	0,09	17	13	15,7	K72450822__M0J143
8200	90x105	0,09	17	13	13,9	K72450822__M0L105
10000	76x214	0,09	15	12	21,4	K72450103__M0J214
12000	76x214	0,09	11	9	22,5	K72450123__M0J214
12000	90x145	0,09	11	9	19,0	K72450123__M0L145
18000	90x220	0,09	9	8	27,4	K72450183__M0L220

K91 TYPE
-40°C +85°C 15000H

APPLICATIONS

Designed for professional applications
Switch mode power supplies, high ripple current converters, motor drives.

- Design optimized for low equivalent series resistance and high ripple current
- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring dips or with threaded stud

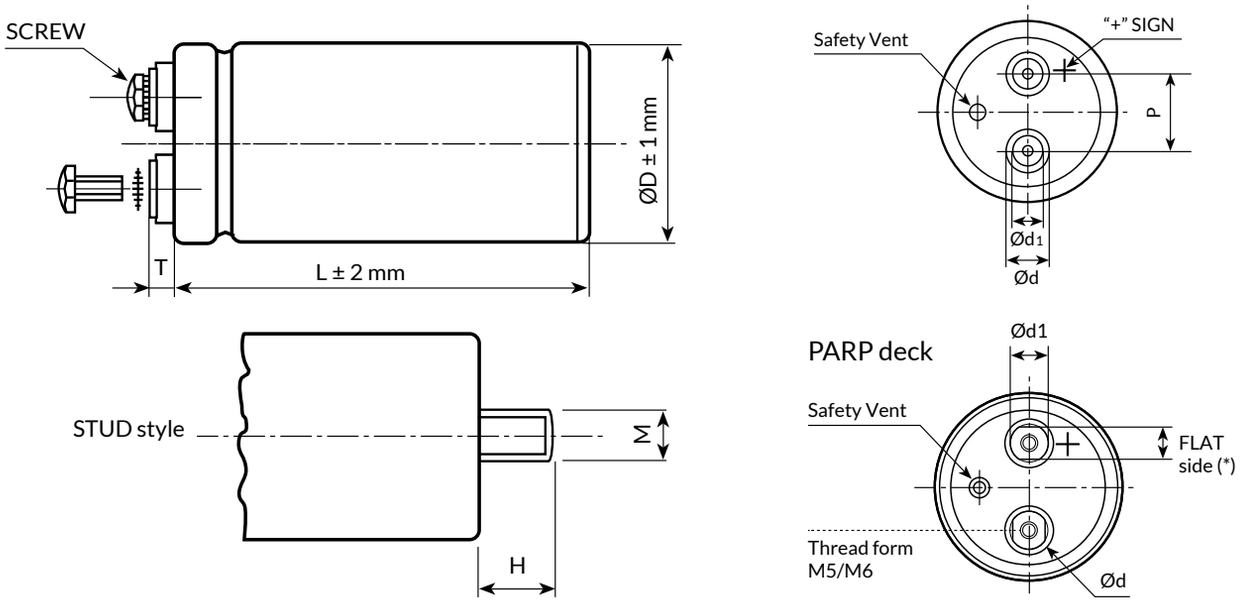


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K91 TYPE
-40°C +85°C 15000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C [Environmental classification 40/85/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 500V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 470 µF to 15.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (85°C, V_n, I_r applied)

> 15.000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K91 TYPE
-40°C +85°C 15000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
680	51x79	0,08	97	75	5,1	K91400681__M0G079
680	51x105	0,08	97	75	5,7	K91400681__M0G105
1000	51x79	0,08	75	67	6,1	K91400102__M0G079
1000	51x105	0,08	75	67	6,9	K91400102__M0G105
1500	51x105	0,08	53	40	8,2	K91400152__M0G105
1500	63x105	0,08	53	40	9,3	K91400152__M0H105
2200	51x105	0,08	40	31	9,4	K91400222__M0G105
2200	63x105	0,08	40	31	10,7	K91400222__M0H105
2200	76x105	0,08	40	31	12,3	K91400222__M0J105
3300	63x105	0,08	25	16	13,6	K91400332__M0H105
3300	76x105	0,08	25	16	14,5	K91400332__M0J105
3300	76x143	0,08	25	16	16,8	K91400332__M0J143
4700	76x105	0,08	20	15	16,4	K91400472__M0J105
4700	76x143	0,08	20	15	19,5	K91400472__M0J143
5600	76x143	0,08	17	11	20,9	K91400562__M0J143
6800	76x143	0,08	15	10	22,2	K91400682__M0J143
10000	76x143	0,09	13	10	23,0	K91400103__M0J143
10000	76x214	0,09	13	10	28,7	K91400103__M0J214
15000	90x220	0,10	9	8	36,5	K91400153__M0L220

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
680	51x79	0,08	97	75	5,1	K91420681__M0G079
680	51x105	0,08	97	75	5,7	K91420681__M0G105
1000	51x79	0,08	75	67	6,1	K91420102__M0G079
1000	51x105	0,08	75	67	6,9	K91420102__M0G105
1500	51x105	0,08	53	40	8,2	K91420152__M0G105
1500	63x105	0,08	53	40	9,3	K91420152__M0H105
2200	51x105	0,08	40	31	9,4	K91420222__M0G105
2200	63x105	0,08	40	31	10,7	K91420222__M0H105
2200	76x105	0,08	40	31	12,3	K91420222__M0J105
3300	63x105	0,08	25	16	13,6	K91420332__M0H105
3300	76x105	0,08	25	16	14,5	K91420332__M0J105
3300	76x143	0,08	25	16	16,8	K91420332__M0J143
4700	76x105	0,08	20	15	16,4	K91420472__M0J105
4700	76x143	0,08	20	15	19,5	K91420472__M0J143
5600	76x143	0,08	17	11	20,9	K91420562__M0J143
6800	76x143	0,08	15	10	22,2	K91420682__M0J143
10000	76x143	0,09	13	10	23,0	K91420103__M0J143
10000	76x214	0,09	13	10	28,7	K91420103__M0J214
15000	90x220	0,10	9	8	36,5	K91420153__M0L220

K91 TYPE
-40°C +85°C 15000H

Kendeil™

Rated Voltage VDC

450V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	51x79	0,08	159	120	4,4	K91450471__M0G079
680	51x79	0,08	114	105	4,9	K91450681__M0G079
680	51x105	0,08	114	105	5,6	K91450681__M0G105
1000	51x79	0,08	83	70	5,8	K91450102__M0G079
1000	51x105	0,08	83	70	6,6	K91450102__M0G105
1500	51x105	0,08	57	42	7,9	K91450152__M0G105
1500	63x105	0,08	57	42	9,0	K91450152__M0H105
2200	63x105	0,08	44	33	10,2	K91450222__M0H105
2200	76x105	0,08	44	33	11,9	K91450222__M0J105
2200	76x143	0,08	44	33	13,6	K91450222__M0J143
3300	76x105	0,08	30	18	14,0	K91450332__M0J105
3300	76x143	0,08	30	18	16,3	K91450332__M0J143
4700	76x143	0,08	21	15	18,8	K91450472__M0J143
5600	76x143	0,08	18	12	20,2	K91450562__M0J143
6800	76x143	0,08	16	11	21,3	K91450682__M0J143
8200	76x143	0,08	14	10	23,0	K91450822__M0J143
10000	76x143	0,09	13	10	23,1	K91450103__M0J143
10000	76x214	0,09	13	10	26,2	K91450103__M0J214
12000	76x214	0,09	13	10	26,2	K91450123__M0J214
15000	90x220	0,10	11	9	35,0	K91450153__M0L220

Rated Voltage VDC

500V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	51x105	0,12	59	44	8,0	K91500152__M0G105
2200	63x105	0,12	47	37	10,2	K91500222__M0H105
2900	63x105	0,12	45	35	10,5	K91500292__M0H105
3300	76x105	0,12	33	22	14,0	K91500332__M0J105
3900	76x105	0,12	26	18	15,0	K91500392__M0J105
4700	76x143	0,12	23	17	19,2	K91500472__M0J143
5600	76x143	0,12	20	14	20,3	K91500562__M0J143
6800	76x143	0,12	17	12	21,1	K91500682__M0J143
8200	76x214	0,12	16	11	28,5	K91500822__M0J214
10000	90x220	0,12	13	10	34,1	K91500103__M0L220
12000	90x220	0,12	12	9	34,3	K91500123__M0L220
15000	90x220	0,12	12	9	34,3	K91500153__M0L220

K92 TYPE
-40°C +105°C 8000H

APPLICATIONS

Designed for professional applications
Switch mode power supplies, high ripple current converters, motor drives.

- Design optimized for low equivalent series resistance and high ripple current
- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring dips or with threaded stud

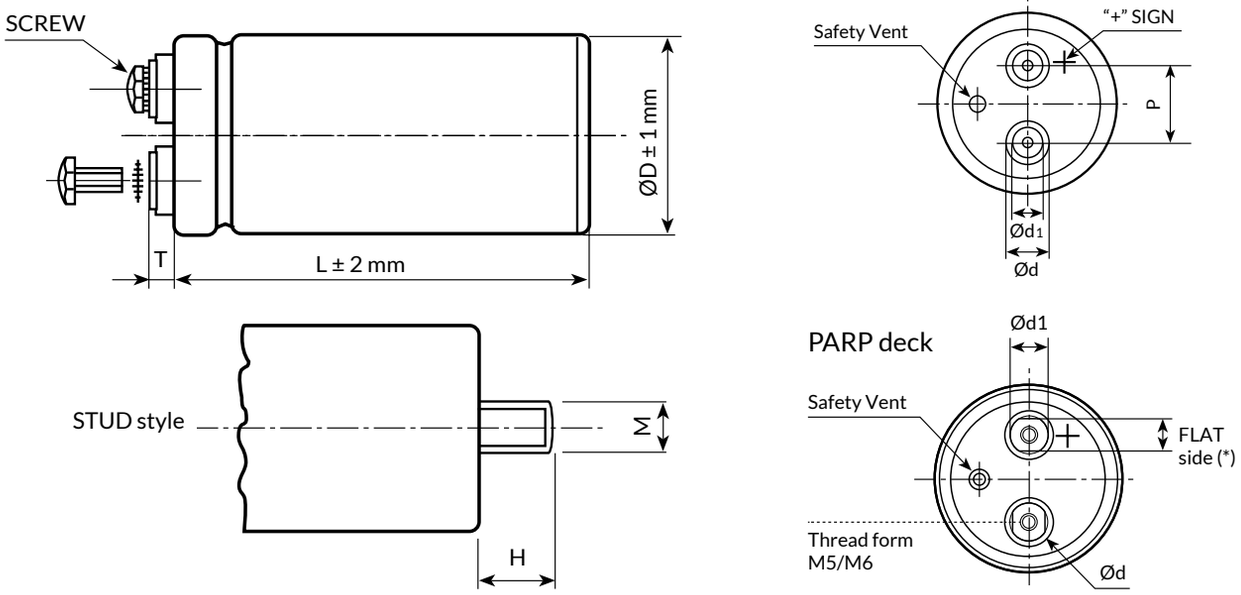


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K92 TYPE
-40°C +105°C 8000H

SPECIFICATIONS

Temperature Range

Operating -40°C +105°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 500V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 470 µF to 10.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (105°C, V_n, I_r applied)

> 8.000 h at 105°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K92 TYPE
-40°C +105°C 8000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
470	51x79	0,08	139	112	3,5	K92400471__M0G079
680	51x79	0,08	107	100	3,9	K92400681__M0G079
1000	51x79	0,08	75	67	4,5	K92400102__M0G079
1000	51x105	0,08	75	67	4,9	K92400102__M0G105
1500	63x105	0,08	53	40	6,0	K92400152__M0H105
2200	63x105	0,08	40	31	7,5	K92400222__M0H105
2200	76x105	0,08	40	31	8,5	K92400222__M0J105
3300	76x143	0,08	25	16	11,3	K92400332__M0J143
4700	76x143	0,08	20	15	14,1	K92400472__M0J143
5600	76x143	0,08	17	11	14,3	K92400562__M0J143
6800	76x143	0,08	15	10	18,0	K92400682__M0J143
8200	76x214	0,08	14	10	20,1	K92400822__M0J214
10000	90x220	0,09	13	9	25,1	K92400103__M0L220

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
470	51x79	0,08	139	112	3,5	K92420471__M0G079
680	51x79	0,08	107	100	3,9	K92420681__M0G079
1000	51x79	0,08	75	67	4,5	K92420102__M0G079
1000	51x105	0,08	75	67	4,9	K92420102__M0G105
1500	63x105	0,08	53	40	6,0	K92420152__M0H105
2200	63x105	0,08	40	31	7,5	K92420222__M0H105
2200	76x105	0,08	40	31	8,5	K92420222__M0J105
3300	76x143	0,08	25	16	11,3	K92420332__M0J143
4700	76x143	0,08	20	15	14,1	K92420472__M0J143
5600	76x143	0,08	17	11	14,3	K92420562__M0J143
6800	76x143	0,08	15	10	18,0	K92420682__M0J143
8200	76x214	0,08	14	10	20,1	K92420822__M0J214
10000	90x220	0,09	13	9	25,1	K92420103__M0L220

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
470	51x79	0,08	159	120	3,2	K92450471__M0G079
680	51x105	0,08	114	105	4,4	K92450681__M0G105
1000	51x105	0,08	83	70	5,1	K92450102__M0G105
1000	63x105	0,08	83	70	5,4	K92450102__M0H105
1500	63x105	0,08	57	42	6,5	K92450152__M0H105
1500	76x105	0,08	57	42	7,2	K92450152__M0J105
2200	76x143	0,08	44	33	9,5	K92450222__M0J143
3300	76x143	0,08	30	18	12,3	K92450332__M0J143
4700	76x143	0,08	21	15	13,2	K92450472__M0J143
5600	76x143	0,08	18	12	14,1	K92450562__M0J143
6800	76x214	0,08	16	11	19,3	K92450682__M0J214
8200	76x214	0,08	15	11	20,1	K92450822__M0J214
10000	90x220	0,09	12	10	26,1	K92450103__M0L220

K92 TYPE

-40°C +105°C 8000H

Kendeil™

Rated Voltage VDC

500V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1500	51x105	0,12	59	44	5,1	K92500152__M0G105
2200	63x105	0,12	47	37	6,4	K92500222__M0H105
3300	76x105	0,12	33	22	9,0	K92500332__M0J105
4700	76x143	0,12	22	16	12,0	K92500472__M0J143
5600	76x143	0,12	20	14	12,4	K92500562__M0J143
6800	76x214	0,12	17	12	17,3	K92500682__M0J214
8200	76x214	0,12	16	11	20,1	K92500822__M0J214
10000	90x220	0,12	13	10	21,2	K92500103__M0L220

K93 TYPE
-40°C +85°C 15000H

APPLICATIONS

Designed for professional applications
Switch mode power supplies, high ripple current converters, motor drives.

- Design optimized for low equivalent series resistance and high ripple current
- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring dips or with threaded stud

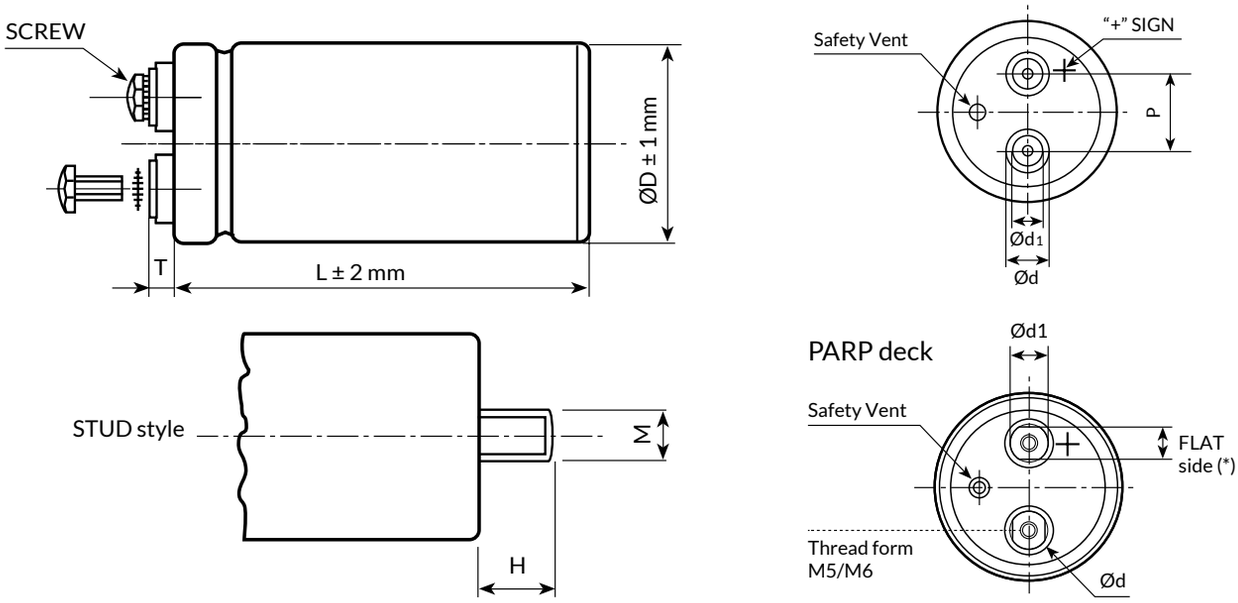


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K93 TYPE
-40°C +85°C 15000H

SPECIFICATIONS

Temperature Range

Operating -40°C +85°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 470 µF to 15.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz, amplitude 0.75 mm
Capacitor length ≤ 143 : max acceleration 10g for 3x2 h
Capacitor length > 143 : max acceleration 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (105°C, V_n, I_r applied)

> 15.000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K93 TYPE
-40°C +85°C 15000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	51x105	0,07	50	32	8,4	K93400152__M0G105
1500	63x105	0,07	50	32	9,6	K93400152__M0H105
2200	51x105	0,07	33	21	10,4	K93400222__M0G105
2200	63x105	0,07	33	21	11,8	K93400222__M0H105
2200	76x105	0,07	36	22	12,7	K93400222__M0J105
3300	63x105	0,07	21	14	14,7	K93400332__M0H105
3300	76x105	0,07	24	15	15,6	K93400332__M0J105
4700	76x105	0,07	17	11	18,5	K93400472__M0J105
4700	76x143	0,07	17	11	20,8	K93400472__M0J143
5600	76x143	0,07	14	9	22,7	K93400562__M0J143
6800	76x143	0,07	12	8	25,0	K93400682__M0J143
8200	76x143	0,07	13	9	24,1	K93400822__M0J143
10000	76x143	0,08	11	8	26,2	K93400103__M0J143
10000	76x214	0,08	10	7	31,5	K93400103__M0J214
15000	90x220	0,09	7	5	42,1	K93400153__M0L220

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	51x79	0,07	70	44	6,3	K93420102__M0G079
1500	51x105	0,06	44	27	8,9	K93420152__M0G105
1500	63x105	0,06	44	27	10,2	K93420152__M0H105
2200	51x105	0,06	31	20	10,6	K93420222__M0G105
2200	63x105	0,06	31	20	12,1	K93420222__M0H105
2200	76x105	0,07	35	21	12,9	K93420222__M0J105
3300	63x105	0,06	21	13	14,9	K93420332__M0H105
3300	76x105	0,07	23	14	16,0	K93420332__M0J105
3300	76x143	0,07	23	14	17,9	K93420332__M0J143
4700	76x105	0,07	16	10	18,9	K93420472__M0J105
4700	76x143	0,07	16	10	21,3	K93420472__M0J143
5600	76x143	0,07	14	9	23,2	K93420562__M0J143
6800	76x143	0,07	11	7	25,6	K93420682__M0J143
8200	76x143	0,07	13	9	23,9	K93420822__M0J143
10000	76x143	0,08	11	8	25,7	K93420103__M0J143
10000	76x214	0,08	10	7	32,4	K93420103__M0J214
15000	90x220	0,09	7	5	43,2	K93420153__M0L220

K93 TYPE

-40°C +85°C 15000H

Rated Voltage VDC

450V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	51x79	0,06	138	79	4,5	K93450471__M0G079
680	51x79	0,06	98	56	5,4	K93450681__M0G079
680	51x105	0,06	96	55	6,1	K93450681__M0G105
1000	51x79	0,06	65	37	6,6	K93450102__M0G079
1000	51x105	0,06	68	39	7,2	K93450102__M0G105
1500	51x105	0,06	44	25	9,0	K93450152__M0G105
1500	63x105	0,06	44	35	10,2	K93450152__M0H105
2200	63x105	0,06	30	18	12,3	K93450222__M0H105
2200	76x105	0,07	34	19	13,1	K93450222__M0J105
2200	76x143	0,07	34	19	14,8	K93450222__M0J143
3300	76x105	0,07	22	13	16,0	K93450332__M0J105
3300	76x143	0,07	23	13	18,0	K93450332__M0J143
4700	76x143	0,07	16	9	21,5	K93450472__M0J143
5600	76x143	0,07	13	8	23,5	K93450562__M0J143
6800	76x143	0,07	11	7	25,6	K93450682__M0J143
8200	76x143	0,07	11	8	25,3	K93450822__M0J143
10000	76x143	0,08	11	7	27,0	K93450103__M0J143
10000	76x214	0,08	9	6	33,3	K93450103__M0J214
12000	76x214	0,08	8	5	36,1	K93450123__M0J214
15000	90x220	0,09	6	5	44,2	K93450153__M0L220

K94 TYPE
-40°C +105°C 8000H

APPLICATIONS

Designed for professional applications
Switch mode power supplies, high ripple current converters, motor drives.

- Design optimized for low equivalent series resistance and high ripple current
- Surge-proof capacitor in aluminium can with insulation sleeve
- To be mounted with ring dips or with threaded stud

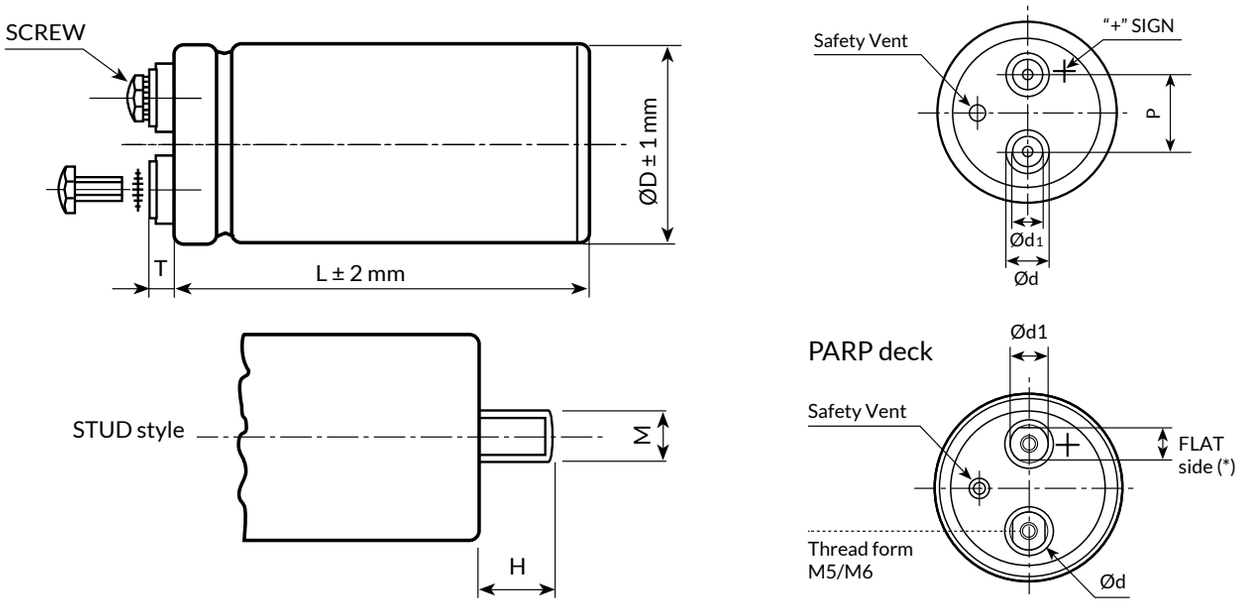


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±0.5	STUD M	STUD H	INSERT	SCREW	CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
76	17.2	17.2	31.4	6.4	M12	16	M6 NO COLLAR	6MA x 11	F
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
100	23	17,3	41,5	11	M12	16	M8	8MA x 15,5	8
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 low post	1/4-28 x 3/8''	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 high post	1/4-28 x 1/2''	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 low post	10-32 x 1/4''	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 high post	10-32 x 3/8''	U

Note (*) quote on the flat side of PARP deck (PARP = Protection Against Reverse Polarity)

K94 TYPE
-40°C +105°C 8000H

SPECIFICATIONS

Temperature Range

Operating -40°C +105°C [Environmental classification 40/105/56 IEC-68]

Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 470 µF to 10.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]
on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.8	1.0	1.2	1.3	1.5

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

max internal temperature 108°C

Due to the current load capability of the contact elements, the following limits must not be exceeded:

CAPACITOR DIAMENTER	51mm	63mm	76mm	90mm
Maximum current	30A	40A	50A	70A

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz
Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h
Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

> 8.000 h at 105°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C. V_n applied, 2000 hours. 85% RH

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K94 TYPE
-40°C +105°C 8000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
680	51x105	0,06	95	57	3,8	K94400681__M0G105
680	51x79	0,06	93	56	3,4	K94400681__M0G079
1000	51x79	0,06	62	37	4,2	K94400102__M0G079
1000	51x105	0,06	64	39	4,6	K94400102__M0G105
1500	51x105	0,06	42	25	5,7	K94400152__M0G105
2200	63x105	0,06	29	18	7,8	K94400222__M0H105
2200	76x105	0,07	32	19	8,3	K94400222__M0J105
3300	76x143	0,07	21	13	11,4	K94400332__M0J143
4700	76x143	0,07	15	9	13,7	K94400472__M0J143
5600	76x143	0,07	13	8	14,9	K94400562__M0J143
6800	76x143	0,07	11	7	16,3	K94400682__M0J143
8200	76x214	0,07	11	7	19,0	K94400822__M0J214
10000	90x220	0,08	9	6	23,2	K94400103__M0L220

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
680	51x79	0,06	90	53	3,5	K94420681__M0G079
1000	51x79	0,06	60	35	4,3	K94420102__M0G079
1000	51x105	0,06	62	37	4,7	K94420102__M0G105
1500	51x105	0,06	40	24	5,8	K94420152__M0G105
2200	63x105	0,06	28	17	8,0	K94420222__M0H105
2200	76x105	0,06	31	18	8,5	K94420222__M0J105
3300	76x143	0,06	21	12	11,7	K94420332__M0J143
4700	76x143	0,06	14	9	14,0	K94420472__M0J143
5600	76x143	0,06	12	7	15,2	K94420562__M0J143
6800	76x143	0,07	13	8	14,9	K94420682__M0J143
8200	76x214	0,07	10	7	19,4	K94420822__M0J214
10000	90x220	0,07	9	6	23,7	K94420103__M0L220

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	51x79	0,06	131	73	2,9	K94450471__M0G079
680	51x105	0,06	88	48	3,9	K94450681__M0G105
1000	51x105	0,06	62	35	4,7	K94450102__M0G105
1000	63x105	0,06	62	35	5,3	K94450102__M0H105
1500	63x105	0,06	40	22	6,6	K94450152__M0H105
1500	76x105	0,06	45	24	7,0	K94450152__M0J105
2200	76x143	0,06	31	17	9,6	K94450222__M0J143
3300	76x143	0,06	20	11	11,8	K94450332__M0J143
4700	76x143	0,06	14	8	14,0	K94450472__M0J143
5600	76x143	0,06	12	7	15,2	K94450562__M0J143
6800	76x214	0,07	12	7	18,3	K94450682__M0J214
8200	76x214	0,07	10	6	19,9	K94450822__M0J214
10000	90x220	0,08	8	5	24,3	K94450103__M0L220

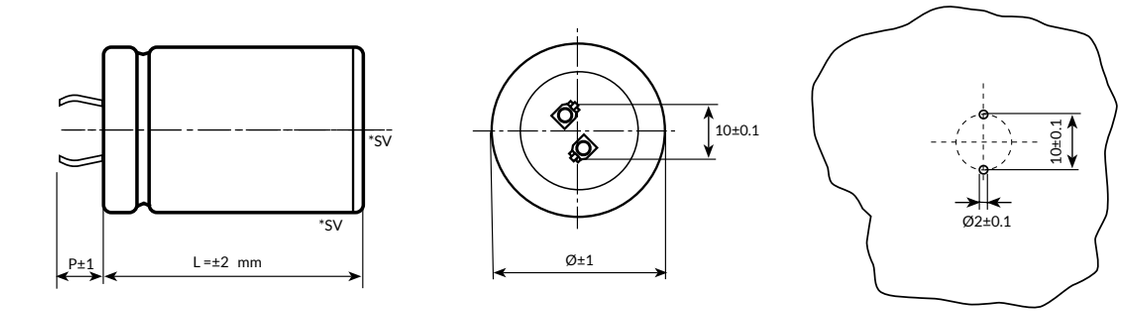
K05 TYPE
-40°C +105°C 5000H

APPLICATIONS

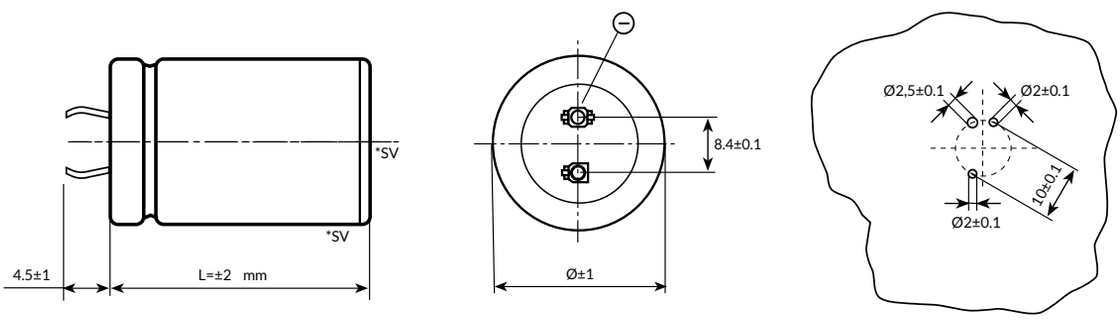
Professional switch mode power supplies.
Professional power electronics.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Safety vent at bottom case or aside case
- Snap in terminals for PCB mounting
- Very high CV for unit volum with low ESR
- High ripple current, in small dimensions case size
- Extended temperature range with outstanding reliability

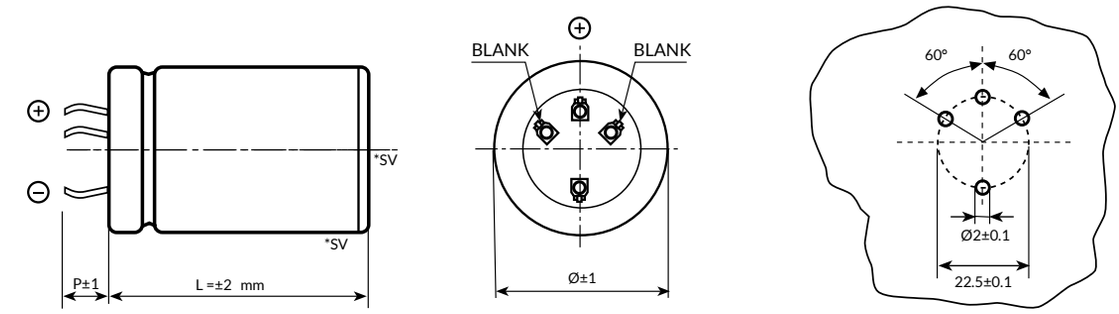
2 PIN CAPACITOR



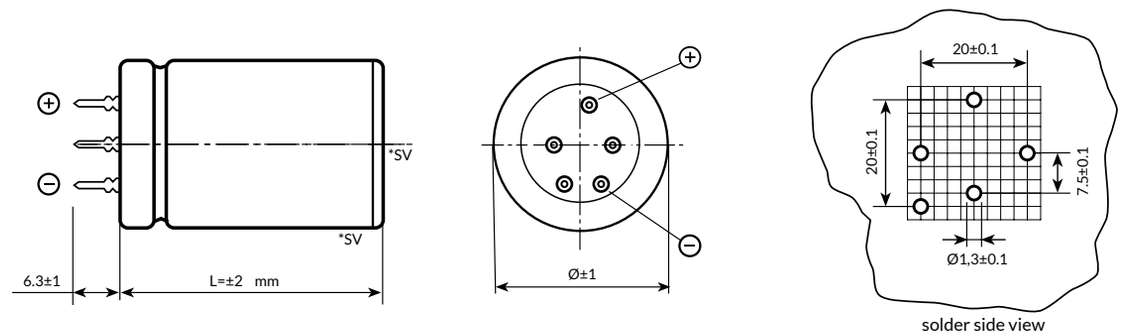
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



solder side view

*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K05 TYPE
-40°C +105°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C 105°C [Environmental classification 40/105/56 IEC-68]
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 16V to 550V DC

Surge Voltage (V_p)

$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.15\ V_r$ ($V_r \leq$ 250V DC) $V_p = 1.10\ V_r$ (V_r > 250V DC)

Rated Capacitance Range

from 68 µF to 47.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER (0-25V V_r DC)	0.91	1.0	1.15	1.15	1.2
MULTIPLIER (40-100V V_r DC)	0.88	1.0	1.35	1.40	1.45
MULTIPLIER (160-550V V_r DC)	0.88	1.0	1.45	1.50	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

Maximum internal temperature 108°C

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz
Max acceleration 0.75mm or 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

for all sizes with V 100V all voltage capacitors with diameter 35mm	Cap change	≤ ±20%
	tan (δ)	≤ 200%
	Leakage current (I_L)	< initial limit
	Impedance (Z)	≤ 200%
for all sizes with V 160V and for capacitors with diameter 40mm	Cap change	≤ ±10%
	tan (δ)	≤ 130%
	Leakage current (I_L)	< initial limit
	Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

250.000 h at 40°C
15.000 h at 85°C
5.000 h at 105°C for V≤500V
3.000 h at 105°C for V=550V

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 30 fit (30 10^{-9}/h) ($V_r \leq$ 160V DC)
≤ 40 fit (40 10^{-9}/h) (V_r > 160V DC)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K05 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **16V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
6800	25x30	0,30	55	40	1,90	K05016682_PM0C030
10000	25x40	0,40	45	35	2,00	K05016103_PM0C040
10000	30x30	0,40	40	35	2,00	K05016103_PM0D030
15000	25x40	0,45	40	35	2,60	K05016153_PM0C040
15000	30x40	0,45	40	35	2,80	K05016153_PM0D040
22000	30x40	0,60	35	24	3,10	K05016223_PM0D040
22000	35x40	0,60	35	24	3,30	K05016223_PM0E040
33000	35x50	0,70	25	20	3,60	K05016333_PM0E050
47000	35x50	0,90	22	20	4,90	K05016473_PM0E050

Rated Voltage VDC **25V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
4700	25x30	0,25	53	45	1,80	K05025472_PM0C030
6800	25x30	0,25	50	38	2,00	K05025682_PM0C030
6800	30x30	0,30	50	38	2,20	K05025682_PM0D030
10000	25x40	0,40	40	35	2,40	K05025103_PM0C040
10000	30x30	0,40	40	35	2,30	K05025103_PM0D030
15000	30x40	0,45	39	28	2,90	K05025153_PM0D040
15000	35x40	0,45	39	28	3,20	K05025153_PM0E040
22000	35x50	0,60	30	22	3,30	K05025223_PM0E050
33000	35x50	0,70	22	18	4,30	K05025333_PM0E050

Rated Voltage VDC **40V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
3300	25x30	0,20	72	58	1,50	K05040332_PM0C030
4700	25x30	0,20	50	38	1,80	K05040472_PM0C030
4700	30x25	0,20	50	38	1,80	K05040472_PM0D025
6800	25x40	0,30	48	33	2,30	K05040682_PM0C040
6800	30x30	0,30	48	33	2,40	K05040682_PM0D030
10000	30x40	0,40	39	28	2,80	K05040103_PM0D040
10000	35x30	0,40	39	28	2,90	K05040103_PM0E030
10000	35x40	0,40	39	28	3,10	K05040103_PM0E040
15000	30x40	0,45	32	22	2,80	K05040153_PM0D040
15000	35x40	0,45	32	22	3,70	K05040153_PM0E040
22000	35x40	0,55	28	20	5,10	K05040223_PM0E040
22000	35x50	0,55	28	20	5,40	K05040223_PM0E050

Rated Voltage VDC **50V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
2200	25x30	0,20	72	58	1,50	K05050222_PM0C030
3300	25x30	0,20	48	38	1,60	K05050332_PM0C030
4700	25x30	0,20	50	35	2,00	K05050472_PM0C030
4700	30x25	0,20	50	35	2,00	K05050472_PM0D025
6800	30x30	0,30	46	28	2,90	K05050682_PM0D030
6800	30x40	0,30	46	28	3,20	K05050682_PM0D040
10000	30x40	0,35	31	22	3,40	K05050103_PM0D040
10000	35x30	0,35	31	22	3,20	K05050103_PM0E030
15000	35x50	0,45	26	18	4,70	K05050153_PM0E050
22000	40x50	0,50	25	18	5,50	K05050223_PM0F050

K05 TYPE

-40°C +105°C 5000H

Kendeil™

Rated Voltage VDC

63V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
2200	25x30	0,15	79	60	1,50	K05063222_PM0C030
3300	25x40	0,15	50	40	2,30	K05063332_PM0C040
3300	30x30	0,15	50	40	2,10	K05063332_PM0D030
4700	25x40	0,20	40	29	2,20	K05063472_PM0C040
4700	30x30	0,20	40	29	2,40	K05063472_PM0D030
4700	30x40	0,20	40	29	2,80	K05063472_PM0D040
6800	30x40	0,30	35	25	3,00	K05063682_PM0D040
6800	35x40	0,30	35	25	4,40	K05063682_PM0E040
10000	35x40	0,35	35	25	4,40	K05063103_PM0E040
10000	35x50	0,35	30	23	5,30	K05063103_PM0E050

Rated Voltage VDC

100V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1000	22x30	0,10	127	100	1,30	K05100102_PM0B030
1000	25x30	0,10	127	100	1,70	K05100102_PM0C030
1000	30x25	0,10	127	100	1,70	K05100102_PM0D025
1500	25x40	0,12	105	82	2,00	K05100152_PM0C040
1500	30x30	0,12	105	82	1,80	K05100152_PM0D030
2200	30x30	0,15	71	60	2,70	K05100222_PM0D030
2200	30x40	0,15	71	60	2,70	K05100222_PM0D040
3300	30x50	0,15	48	39	3,00	K05100332_PM0D050
3300	35x40	0,15	48	39	3,30	K05100332_PM0E040
4700	35x40	0,15	42	30	3,60	K05100472_PM0E040
4700	35x50	0,20	33	26	4,40	K05100472_PM0E050
5600	35x50	0,20	33	24	4,50	K05100562_PM0E050
5600	40x50	0,20	33	24	4,80	K05100562_PM0F050
6800	35x50	0,20	32	23	4,50	K05100682_PM0E050
6800	40x50	0,20	33	24	4,90	K05100682_PM0F050

Rated Voltage VDC

200V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	22x30	0,10	440	340	0,90	K05200221_PM0B030
220	25x30	0,10	440	340	1,10	K05200221_PM0C030
330	22x30	0,10	240	133	1,10	K05200331_PM0B030
330	25x25	0,10	240	133	0,70	K05200331_PM0C025
330	25x30	0,10	240	133	1,20	K05200331_PM0C030
470	25x30	0,10	169	98	1,60	K05200471_PM0C030
680	25x40	0,10	145	87	1,70	K05200681_PM0C040
680	30x40	0,10	145	87	2,00	K05200681_PM0D040
1000	30x40	0,10	95	63	2,10	K05200102_PM0D040
1000	35x30	0,10	95	63	2,40	K05200102_PM0E030
1500	30x50	0,10	70	41	2,40	K05200152_PM0D050
1500	35x50	0,10	70	41	2,60	K05200152_PM0E050
2200	35x50	0,12	45	33	2,80	K05200222_PM0E050

K05 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **250V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
100	25x30	0,10	950	730	0,70	K05250101_PM0C030
150	25x30	0,10	530	290	0,70	K05250151_PM0C030
220	25x30	0,10	370	240	0,90	K05250221_PM0C030
330	30x30	0,10	260	153	1,20	K05250331_PM0D030
470	25x40	0,10	180	110	1,50	K05250471_PM0C040
470	30x30	0,10	180	110	1,50	K05250471_PM0D030
680	35x40	0,10	145	95	1,80	K05250681_PM0E040
1000	35x40	0,10	98	65	2,00	K05250102_PM0E040
1000	35x50	0,10	98	65	2,60	K05250102_PM0E050
1500	35x50	0,12	75	43	2,80	K05250152_PM0E050

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
68	22x30	0,10	1405	1050	0,47	K05400680_PM0B030
100	22x30	0,10	796	550	0,50	K05400101_PM0B030
100	25x30	0,10	796	550	0,50	K05400101_PM0C030
150	25x30	0,10	530	380	0,60	K05400151_PM0C030
150	30x30	0,10	530	380	0,80	K05400151_PM0D030
220	25x40	0,10	360	250	1,00	K05400221_PM0C040
220	30x30	0,10	360	250	1,10	K05400221_PM0D030
270	25x40	0,10	320	199	1,20	K05400271_PM0C040
330	25x50	0,10	249	170	1,30	K05400331_PM0C050
330	30x40	0,10	240	170	1,40	K05400331_PM0D040
330	35x30	0,10	240	170	1,40	K05400331_PM0E030
470	30x50	0,10	170	125	1,90	K05400471_PM0D050
470	35x40	0,10	170	125	1,90	K05400471_PM0E040
470	35x50	0,10	170	125	2,20	K05400471_PM0E050
680	35x50	0,10	158	110	2,20	K05400681_PM0E050
680	40x50	0,10	158	110	2,40	K05400681_PM0F050
820	35x60	0,10	121	97	2,50	K05400821_PM0E060
1000	40x60	0,10	110	90	3,10	K05400102_PM0F060
1500	40x97	0,10	99	68	5,80	K05400152_PM0F097

K05 TYPE
-40°C +105°C 5000H

Kendeil™

Rated Voltage VDC

450V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
68	22x30	0,10	1405	1050	0,47	K05450680_PM0B030
100	25x30	0,10	796	710	0,50	K05450101_PM0C030
100	30x25	0,10	796	550	0,70	K05450101_PM0D025
100	30x30	0,10	796	550	0,80	K05450101_PM0D030
150	25x40	0,10	660	490	0,90	K05450151_PM0C040
150	30x30	0,10	530	380	0,80	K05450151_PM0D030
150	30x40	0,10	530	380	1,00	K05450151_PM0D040
220	25x50	0,10	380	310	0,90	K05450221_PM0C050
220	30x40	0,10	360	250	1,10	K05450221_PM0D040
220	35x30	0,10	360	250	1,00	K05450221_PM0E030
330	30x50	0,10	240	170	1,25	K05450331_PM0D050
330	35x40	0,10	240	170	1,30	K05450331_PM0E040
330	35x50	0,10	240	170	1,40	K05450331_PM0E050
470	35x50	0,10	170	125	1,80	K05450471_PM0E050
680	35x50	0,15	160	116	2,10	K05450681_PM0E050
680	35x60	0,12	158	110	2,20	K05450681_PM0E060
820	40x60	0,13	125	100	2,30	K05450821_PM0F060
1000	40x60	0,13	110	90	3,20	K05450102_PM0F060
1500	40x97	0,15	90	80	5,10	K05450152_PM0F097

Rated Voltage VDC

500V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
68	25x30	0,10	1490	1070	0,42	K05500680_PM0C030
100	30x30	0,10	935	620	0,55	K05500101_PM0D030
150	30x40	0,10	620	410	0,75	K05500151_PM0D040
180	30x50	0,10	512	340	0,90	K05500181_PM0D050
220	35x40	0,10	455	295	0,95	K05500221_PM0E040
270	35x50	0,11	320	214	1,60	K05500271_PM0E050
330	35x50	0,11	296	203	1,65	K05500331_PM0E050
330	35x60	0,11	296	203	1,78	K05500331_PM0E060
330	40x50	0,11	296	203	1,80	K05500331_PM0F050
470	40x60	0,13	211	156	2,00	K05500471_PM0F060

Rated Voltage VDC

550V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
150	25x50	0,15	1040	611	0,90	K05550151_PM0C050
150	30x40	0,15	841	503	1,00	K05550151_PM0D040
180	30x40	0,15	841	503	1,05	K05550181_PM0D040
220	30x50	0,15	690	412	1,30	K05550221_PM0D050
270	35x40	0,15	565	370	1,40	K05550271_PM0E040
330	35x50	0,15	399	304	1,70	K05550331_PM0E050
390	35x60	0,15	385	280	1,80	K05550391_PM0E060
390	40x50	0,15	385	280	1,80	K05550391_PM0F050
470	40x60	0,15	277	270	1,90	K05550471_PM0F060

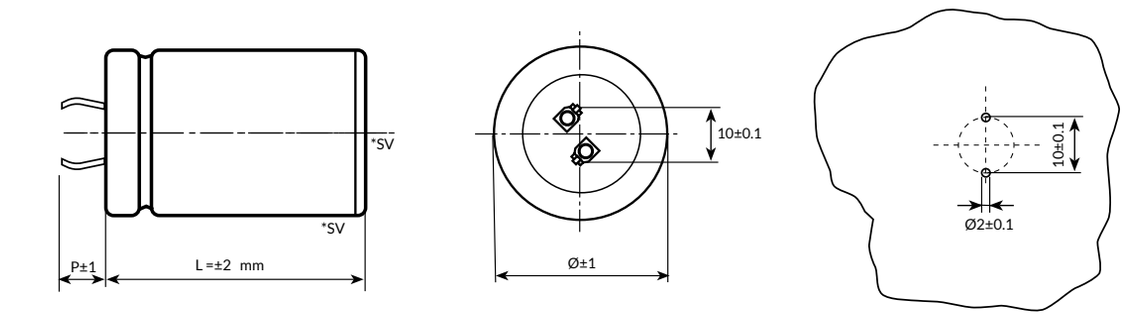
K06 TYPE
-40°C +85°C 5000H

APPLICATIONS

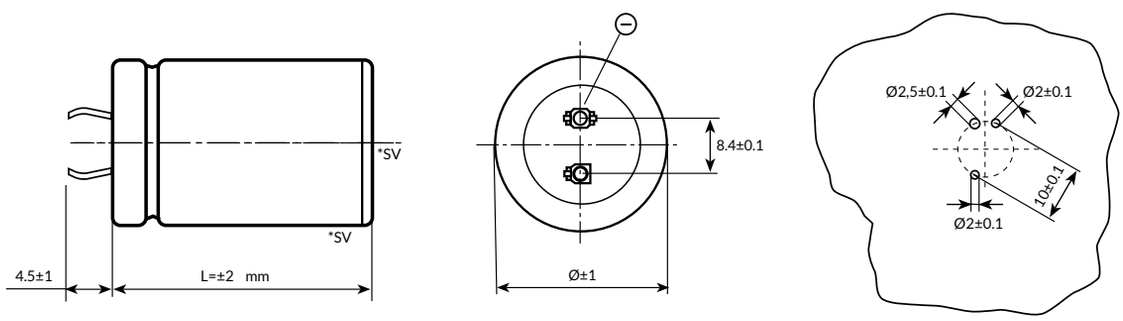
Professional switch mode power supplies.
Professional power electronics.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Safety vent at bottom case or aside case
- Snap in terminals for PCB mounting
- Very high CV for unit volum with low ESR
- High ripple current, in small dimensions case size
- Operation up to 105°C permissible

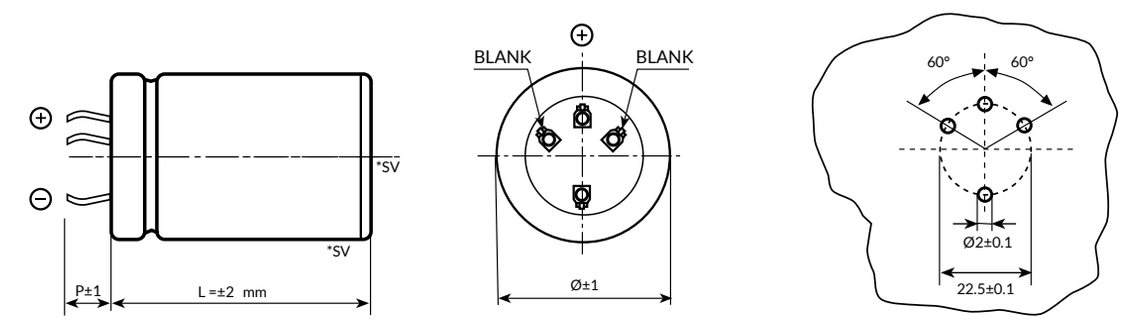
2 PIN CAPACITOR



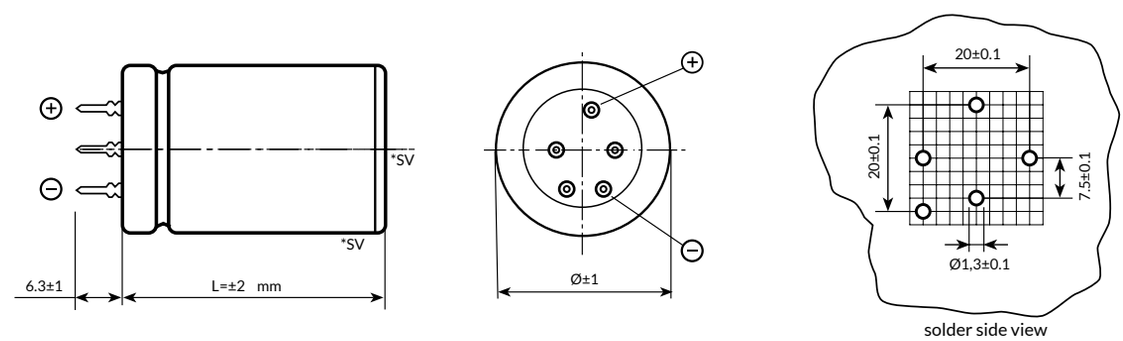
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K06 TYPE
-40°C +85°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C 85°C [Environmental classification 40/105/56 IEC-68]
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 16V to 630V DC

Surge Voltage (V_p)

$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.15\ V_r$ ($V_r \leq$ 250V DC) $V_p = 1.10\ V_r$ (V_r > 250V DC)

Rated Capacitance Range

from 68 µF to 47.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER (0-25V V_r DC)	0.91	1.0	1.15	1.15	1.2
MULTIPLIER (40-100V V_r DC)	0.88	1.0	1.35	1.40	1.45
MULTIPLIER (160-630V V_r DC)	0.88	1.0	1.45	1.50	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Maximum internal temperature 98°C

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz, amplitude 0.75mm
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

for all sizes with V 100V all voltage capacitors with diameter 35mm	Cap change ≤ ±20% tan (δ) ≤ 200% Leakage current (I_L) < initial limit Impedance (Z) ≤ 200%
for all sizes with V 160V and for capacitors with diameter 40mm	Cap change ≤ ±10% tan (δ) ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

200.000 h at 40°C
5.000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 25 fit (25 10^{-9}/h) ($V_r \leq$ 160V DC)
≤ 33 fit (33 10^{-9}/h) (V_r > 160V DC)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K06 TYPE
-40°C +85°C 5000H

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	22x30	0,30	55	40	1,50	K06016472_PM0B030
6800	22x30	0,30	45	38	1,80	K06016682_PM0B030
10000	25x30	0,40	40	35	2,40	K06016103_PM0C030
15000	30x30	0,45	33	25	2,60	K06016153_PM0D030
22000	30x40	0,60	27	22	3,50	K06016223_PM0D040
22000	35x30	0,60	27	22	3,50	K06016223_PM0E030
22000	35x40	0,60	27	22	3,50	K06016223_PM0E040
33000	35x50	0,70	25	20	4,80	K06016333_PM0E050
47000	35x50	0,90	22	20	5,80	K06016473_PM0E050

Rated Voltage VDC

16V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
4700	22x30	0,20	53	45	1,80	K06025472_PM0B030
6800	25x30	0,25	50	38	2,70	K06025682_PM0C030
10000	25x40	0,40	40	35	3,30	K06025103_PM0C040
10000	30x30	0,40	40	35	3,30	K06025103_PM0D030
15000	30x40	0,45	39	28	4,10	K06025153_PM0D040
15000	35x30	0,45	39	28	4,10	K06025153_PM0E030
22000	35x40	0,60	30	22	5,00	K06025223_PM0E040
33000	35x50	0,70	22	18	6,10	K06025333_PM0E050

Rated Voltage VDC

25V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
3300	22x30	0,15	72	58	2,10	K06040332_PM0B030
4700	25x30	0,20	50	38	2,80	K06040472_PM0C030
6800	25x40	0,30	48	33	3,40	K06040682_PM0C040
6800	30x30	0,30	48	33	3,40	K06040682_PM0D030
10000	25x40	0,40	38	28	3,80	K06040103_PM0C040
10000	30x40	0,40	39	28	4,30	K06040103_PM0D040
10000	35x30	0,40	39	28	4,30	K06040103_PM0E030
15000	30x40	0,45	32	22	4,00	K06040153_PM0D040
15000	35x40	0,45	32	22	4,80	K06040153_PM0E040
22000	35x50	0,60	28	20	5,40	K06040223_PM0E050

Rated Voltage VDC

40V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
2200	22x30	0,20	72	58	1,90	K06050222_PM0B030
3300	25x30	0,20	48	38	2,50	K06050332_PM0C030
4700	25x30	0,20	50	35	2,80	K06050472_PM0C030
6800	25x40	0,30	48	28	3,20	K06050682_PM0C040
6800	30x30	0,30	48	28	3,20	K06050682_PM0D030
10000	30x40	0,35	31	22	3,80	K06050103_PM0D040
10000	35x30	0,35	31	28	3,80	K06050103_PM0E030
10000	35x40	0,35	31	28	4,10	K06050103_PM0E040
15000	35x50	0,45	26	18	4,90	K06050153_PM0E050
22000	40x50	0,50	25	18	7,30	K06050223_PM0F050

Rated Voltage VDC

50V

K06 TYPE
-40°C +85°C 5000H

Kendeil™

Rated Voltage VDC

63V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
2200	25x30	0,20	79	58	2,20	K06063222_PM0C030
3300	25x40	0,20	50	38	2,60	K06063332_PM0C040
3300	30x30	0,20	50	38	2,60	K06063332_PM0D030
4700	25x40	0,20	41	29	2,80	K06063472_PM0C040
4700	30x40	0,20	41	29	3,50	K06063472_PM0D040
4700	35x30	0,20	41	29	3,50	K06063472_PM0E030
6800	30x40	0,30	35	25	3,60	K06063682_PM0D040
6800	35x40	0,30	35	25	4,00	K06063682_PM0E040
10000	35x50	0,35	32	23	5,80	K06063103_PM0E050
15000	40x50	0,45	30	20	6,80	K06063153_PM0F050

Rated Voltage VDC

100V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	22x30	0,12	150	100	1,30	K06100102_PM0B030
1000	25x30	0,12	150	100	1,60	K06100102_PM0C030
1000	30x25	0,12	150	100	1,60	K06100102_PM0D025
1500	30x30	0,12	105	82	2,10	K06100152_PM0D030
2200	30x30	0,15	71	60	2,40	K06100222_PM0D030
2200	30x40	0,15	71	60	3,10	K06100222_PM0D040
2200	35x30	0,15	71	60	2,40	K06100222_PM0E030
3300	30x50	0,20	48	39	4,00	K06100332_PM0D050
3300	35x40	0,20	48	39	4,00	K06100332_PM0E040
4700	35x50	0,20	33	26	5,60	K06100472_PM0E050
6800	35x50	0,25	33	25	5,80	K06100682_PM0E050

Rated Voltage VDC

200V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
220	22x30	0,10	440	340	0,90	K06200221_PM0B030
330	22x30	0,10	240	133	1,30	K06200331_PM0B030
470	25x30	0,10	169	98	1,50	K06200471_PM0C030
680	25x40	0,10	145	87	2,00	K06200681_PM0C040
680	30x30	0,10	145	87	2,00	K06200681_PM0D030
680	35x30	0,10	145	87	2,00	K06200681_PM0E030
1000	30x40	0,10	95	63	2,60	K06200102_PM0D040
1000	35x40	0,10	95	63	2,80	K06200102_PM0E040
1500	35x40	0,10	70	41	2,90	K06200152_PM0E040
1500	35x50	0,10	70	41	3,70	K06200152_PM0E050
2200	35x50	0,10	45	33	3,90	K06200222_PM0E050

Rated Voltage VDC

250V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
150	22x30	0,12	530	290	0,90	K06250151_PM0B030
220	25x30	0,12	370	240	1,30	K06250221_PM0C030
330	25x40	0,12	260	153	1,40	K06250331_PM0C040
330	30x30	0,12	260	153	1,40	K06250331_PM0D030
470	25x40	0,12	180	110	1,60	K06250471_PM0C040
470	30x30	0,12	180	110	1,60	K06250471_PM0D030
680	30x40	0,12	145	95	1,90	K06250681_PM0D040
680	35x40	0,12	145	95	2,20	K06250681_PM0E040
1000	35x40	0,12	98	65	2,60	K06250102_PM0E040
1000	35x50	0,12	98	65	3,20	K06250102_PM0E050
1500	35x50	0,15	75	43	4,00	K06250152_PM0E050
2200	40x50	0,15	50	35	5,20	K06250222_PM0F050

K06 TYPE
-40°C +85°C 5000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
68	22x25	0,10	1405	1050	0,60	K06400680_PM0B025
68	22x30	0,10	1405	1050	0,60	K06400680_PM0B030
100	22x30	0,10	796	550	0,70	K06400101_PM0B030
100	25x25	0,10	796	550	0,70	K06400101_PM0C025
100	25x30	0,10	796	550	1,00	K06400101_PM0C030
150	25x30	0,10	530	380	1,00	K06400151_PM0C030
150	30x25	0,10	530	380	1,00	K06400151_PM0D025
220	25x40	0,10	360	250	1,20	K06400221_PM0C040
220	30x30	0,10	360	250	1,20	K06400221_PM0D030
330	30x40	0,10	240	170	1,70	K06400331_PM0D040
330	35x30	0,10	240	170	1,70	K06400331_PM0E030
470	35x40	0,10	170	125	2,20	K06400471_PM0E040
470	35x50	0,10	170	125	2,60	K06400471_PM0E050
560	35x50	0,10	165	122	2,60	K06400561_PM0E050
680	35x50	0,10	158	110	2,80	K06400681_PM0E050
680	40x50	0,10	158	110	3,20	K06400681_PM0F050
820	35x60	0,10	140	106	3,50	K06400821_PM0E060
1000	35x60	0,12	103	91	4,40	K06400102_PM0E060
1500	40x97	0,12	65	50	5,79	K06400152_PM0F097

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
68	22x25	0,12	1405	1050	0,60	K06450680_PM0B025
68	22x30	0,12	1405	1050	0,60	K06450680_PM0B030
100	25x30	0,12	800	560	0,70	K06450101_PM0C030
100	30x25	0,12	800	560	0,70	K06450101_PM0D025
150	30x25	0,12	550	400	1,10	K06450151_PM0D025
150	30x30	0,12	550	400	1,10	K06450151_PM0D030
220	30x40	0,12	380	265	1,30	K06450221_PM0D040
220	35x30	0,12	380	265	1,30	K06450221_PM0E030
330	30x50	0,12	255	175	1,70	K06450331_PM0D050
330	35x40	0,12	255	175	1,70	K06450331_PM0E040
470	35x50	0,12	175	125	2,40	K06450471_PM0E050
560	35x50	0,12	165	122	2,50	K06450561_PM0E050
680	35x50	0,12	158	110	2,60	K06450681_PM0E050
680	40x50	0,12	158	110	3,10	K06450681_PM0F050
820	40x60	0,12	110	95	4,00	K06450821_PM0F060
1000	40x77	0,12	110	95	4,90	K06450102_PM0F077
1500	40x97	0,12	110	95	5,56	K06450152_PM0F097

K06 TYPE
-40°C +85°C 5000H

Kendeil™

Rated Voltage VDC

500V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
68	25x30	0,15	1870	1380	0,60	K06500680_PM0C030
100	30x30	0,15	1050	790	0,70	K06500101_PM0D030
150	30x40	0,15	750	580	1,10	K06500151_PM0D040
220	30x50	0,15	579	440	1,40	K06500221_PM0D050
220	35x40	0,15	579	440	1,40	K06500221_PM0E040
330	35x50	0,15	386	290	2,10	K06500331_PM0E050
470	40x50	0,15	271	200	2,50	K06500471_PM0F050
560	40x60	0,15	230	190	3,00	K06500561_PM0F060
680	40x77	0,15	205	155	3,50	K06500681_PM0F077
820	40x97	0,15	141	119	3,90	K06500821_PM0F097
1000	40x77	0,15	135	112	4,00	K06500102_PM0F077
1200	40x97	0,15	125	105	4,90	K06500122_PM0F097
1500	45x97	0,15	115	98	5,14	K06500152_PM0N097

Rated Voltage VDC

550V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
68	25x30	0,15	1898	1443	0,75	K06550680_PM0C030
100	30x30	0,15	1271	970	0,95	K06550101_PM0D030
150	30x40	0,15	879	670	1,20	K06550151_PM0D040
180	30x50	0,15	722	550	1,40	K06550181_PM0D050
180	35x40	0,15	722	550	1,41	K06550181_PM0E040
220	35x40	0,15	584	445	1,55	K06550221_PM0E040
270	35x50	0,15	491	377	1,70	K06550271_PM0E050
330	35x60	0,15	400	306	2,45	K06550331_PM0E060
330	40x50	0,15	409	316	2,45	K06550331_PM0F050
470	40x60	0,15	290	223	2,62	K06550471_PM0F060
560	40x77	0,15	234	180	3,10	K06550561_PM0F077
680	40x97	0,15	192	147	3,70	K06550681_PM0F097

Rated Voltage VDC

600V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
82	30x30	0,15	1427	1020	0,88	K06600820_PM0D030
100	30x40	0,15	1152	902	1,07	K06600101_PM0D040
150	30x50	0,15	820	630	1,32	K06600151_PM0D050
150	35x40	0,15	820	630	1,34	K06600151_PM0E040
220	35x50	0,15	574	415	1,87	K06600221_PM0E050
270	35x60	0,15	474	353	2,25	K06600271_PM0E060
270	40x50	0,15	474	353	2,25	K06600271_PM0F050
330	40x60	0,15	387	280	2,42	K06600331_PM0F060
470	40x77	0,15	277	193	2,95	K06600471_PM0F077
560	40x97	0,15	229	179	3,50	K06600561_PM0F097

K06 TYPE
-40°C +85°C 5000H

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
82	30x30	0,15	1480	1000	1,00	K06630820_PM0D030
150	30x50	0,15	850	600	1,40	K06630151_PM0D050
150	35x40	0,15	850	600	1,40	K06630151_PM0E040
220	35x50	0,15	580	400	2,00	K06630221_PM0E050
270	35x60	0,15	490	340	2,50	K06630271_PM0E060
270	40x50	0,15	490	340	2,50	K06630271_PM0F050
330	40x60	0,15	400	250	2,60	K06630331_PM0F060
470	40x77	0,15	300	160	3,10	K06630471_PM0F077
560	40x97	0,15	250	150	3,60	K06630561_PM0F097
680	40x97	0,15	235	130	3,90	K06630681_PM0F097

Rated Voltage VDC

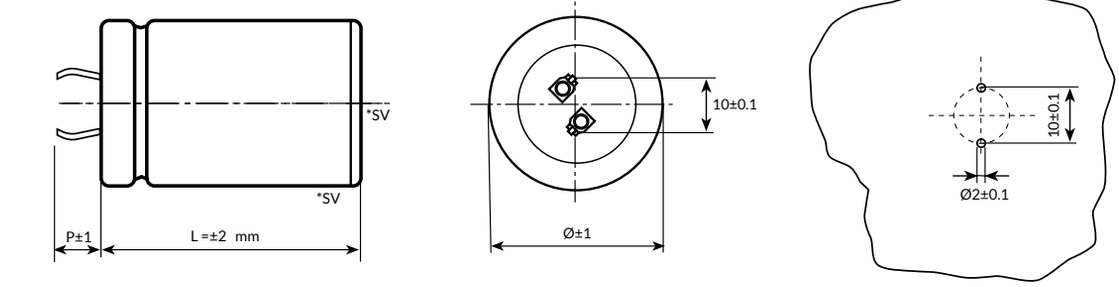
630V

K15 TYPE
-40°C +105°C 5000H

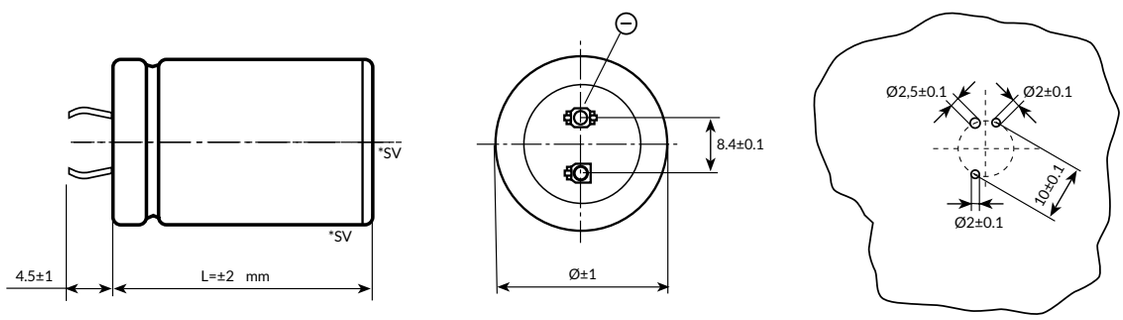
APPLICATIONS | Professional switch mode power supplies.
Professional power electronics.

- High temperature 105°C
- Surge-proof capacitor in aluminium can with insulation sleeve
- Safety vent at bottom case or aside case
- Snap in terminals for PCB mounting
- 2-4 pins available (d=45mm: 4 pins only)
- Large size snap in

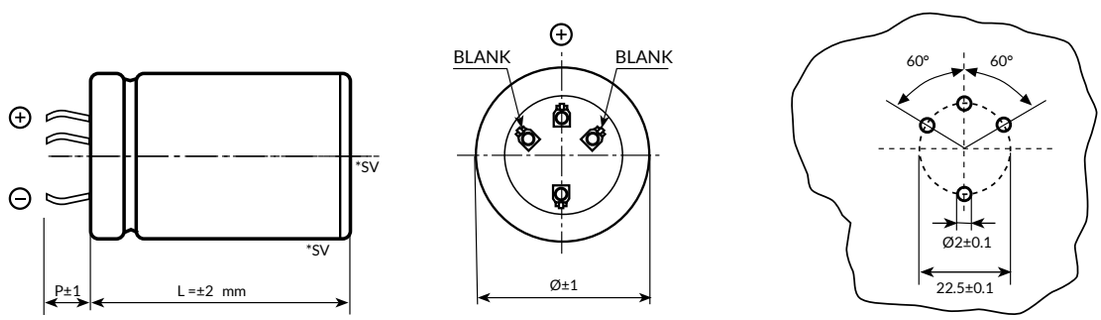
2 PIN CAPACITOR



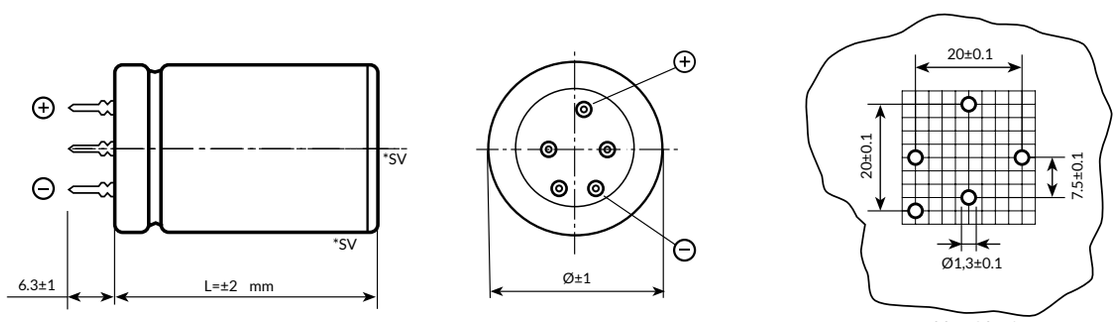
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



solder side view

*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K15 TYPE
-40°C +105°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C 105°C [Environmental classification 40/105/56 IEC-68]
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 820 µF to 2.200 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0

Maximum internal temperature 110°C

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz, amplitude 0.75mm
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ ±10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

>200.000 h at 40°C
> 15.000 h at 85°C
> 5.000 h at 105°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K15 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1200	40x77	0,10	89	80	3,58	K15400122_PM0F077
1200	45x60	0,10	89	80	3,40	K15400122_PM0N060
1500	40x97	0,10	80	71	4,76	K15400152_PM0F097
1500	45x77	0,10	85	76	4,70	K15400152_PM0N077
1500	50x60	0,10	85	76	4,20	K15400152_PM0V060
1800	45x97	0,10	69	60	5,55	K15400182_PM0N097
1800	50x77	0,10	69	60	4,90	K15400182_PM0V077
2200	45x105	0,10	59	49	6,00	K15400222_PM0N105
2700	50x105	0,10	45	35	6,20	K15400272_PM0V105

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
820	35x77	0,15	215	195	3,00	K15420821_PM0E077
1000	40x60	0,15	195	165	3,60	K15420102_PM0F060
1200	40x77	0,15	183	142	3,70	K15420122_PM0F077
1200	45x60	0,15	180	140	3,60	K15420122_PM0N060
1500	40x97	0,15	140	110	4,60	K15420152_PM0F097
1500	45x77	0,15	150	120	4,43	K15420152_PM0N077
1500	50x60	0,10	140	110	4,10	K15420152_PM0V060
1800	45x97	0,15	118	98	5,55	K15420182_PM0N097
1800	50x77	0,10	118	98	4,50	K15420182_PM0V077
2200	45x105	0,15	112	94	6,03	K15420222_PM0N105
2700	50x105	0,10	101	89	6,20	K15420272_PM0V105

Rated Voltage VDC **450V**

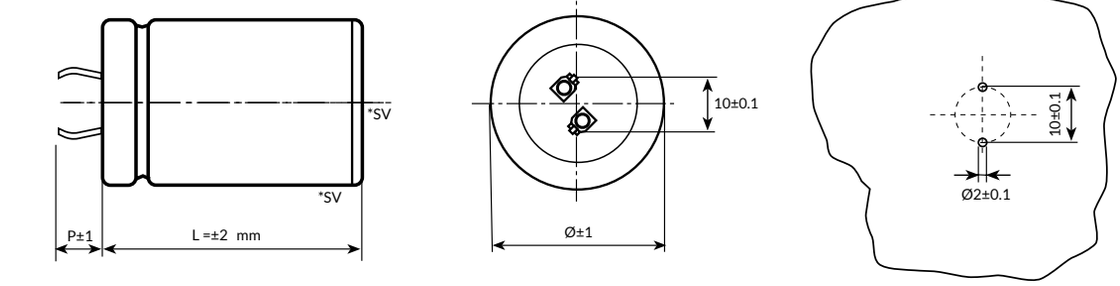
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
820	40x60	0,15	216	195	3,25	K15450821_PM0F060
1000	40x77	0,15	195	165	3,76	K15450102_PM0F077
1000	45x60	0,15	195	165	3,56	K15450102_PM0N060
1200	40x97	0,15	180	140	4,54	K15450122_PM0F097
1200	45x77	0,15	184	145	4,24	K15450122_PM0N077
1200	50x60	0,10	180	145	4,00	K15450122_PM0V060
1500	45x97	0,15	140	110	5,06	K15450152_PM0N097
1500	50x77	0,10	140	110	4,90	K15450152_PM0V077
1800	45x105	0,15	126	106	5,10	K15450182_PM0N105
2200	50x105	0,10	114	95	5,90	K15450222_PM0V105

K16 TYPE
-40°C +85°C 5000H

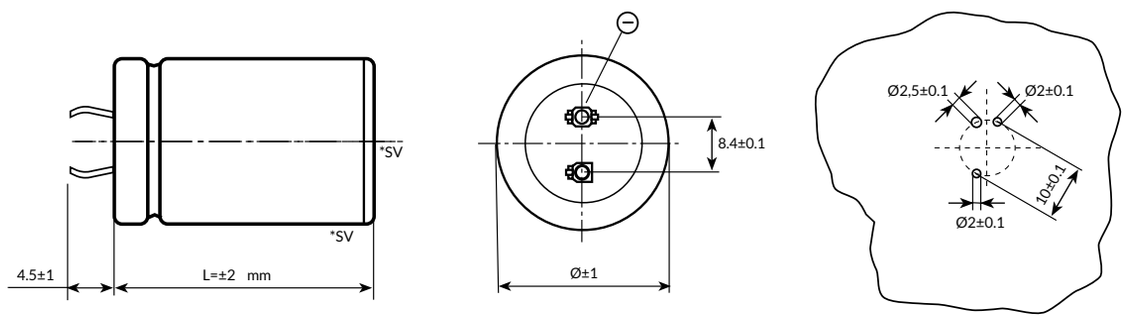
APPLICATIONS | Professional switch mode power supplies.
Professional power electronics.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Safety vent at bottom case or aside case
- Snap in terminals for PCB mounting
- 2-4 pins available (d=45mm: 4 pins only)
- Large size snap in

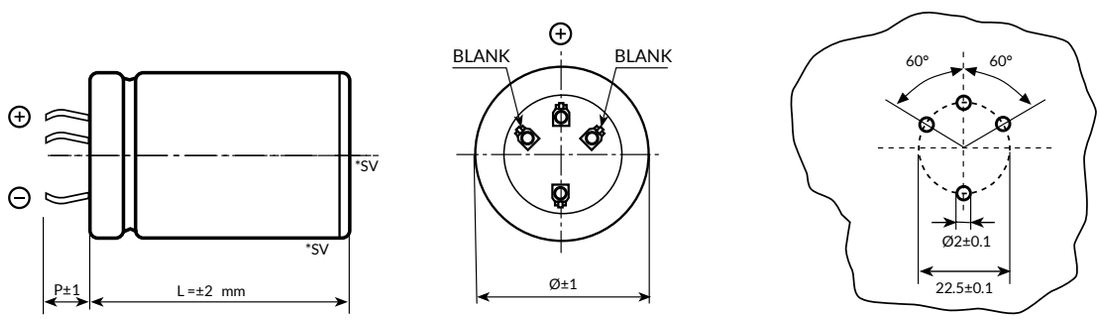
2 PIN CAPACITOR



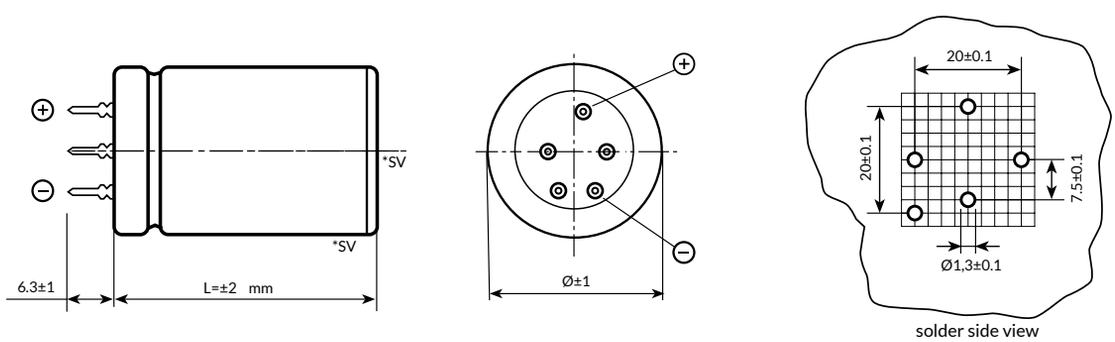
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



solder side view

*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K16 TYPE
-40°C +85°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C 85°C
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 820 µF to 2.700 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Maximum internal temperature 98°C

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 55 Hz, amplitude 0.75mm
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ ±10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

>200.000 h at 40°C
> 5.000 h at 85°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K16 TYPE
-40°C +85°C 5000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	35x77	0,10	90	80	4,50	K16400102_PM0E077
1200	40x60	0,10	89	79	4,50	K16400122_PM0F060
1500	40x77	0,10	75	64	5,80	K16400152_PM0F077
1500	45x60	0,10	80	70	4,90	K16400152_PM0N060
1800	40x97	0,10	60	50	6,60	K16400182_PM0F097
1800	45x77	0,10	70	60	6,00	K16400182_PM0N077
1800	50x60	0,10	70	60	6,30	K16400182_PM0V060
2000	40x105	0,10	45	35	7,60	K16400202_PM0F105
2200	45x97	0,10	55	45	7,30	K16400222_PM0N097
2200	50x77	0,10	55	45	7,40	K16400222_PM0V077
2700	45x105	0,10	39	27	9,00	K16400272_PM0N105
3300	50x105	0,10	37	25	10,00	K16400332_PM0V105

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
820	35x77	0,15	220	200	3,65	K16420821_PM0E077
1000	40x60	0,15	200	170	4,90	K16420102_PM0F060
1200	40x77	0,15	190	150	4,90	K16420122_PM0F077
1200	45x60	0,15	180	140	4,90	K16420122_PM0N060
1500	40x97	0,15	140	110	5,56	K16420152_PM0F097
1500	45x77	0,15	150	120	5,36	K16420152_PM0N077
1500	50x60	0,10	150	110	4,70	K16420152_PM0V060
1800	40x105	0,15	120	100	6,40	K16420182_PM0F105
1800	50x77	0,10	120	106	5,60	K16420182_PM0V077
2200	45x97	0,15	112	102	6,70	K16420222_PM0N097
2200	50x105	0,10	112	100	7,00	K16420222_PM0V105
2700	50x105	0,10	101	102	7,40	K16420272_PM0V105

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
820	35x77	0,15	215	195	3,65	K16450821_PM0E077
1000	40x60	0,15	195	165	4,90	K16450102_PM0F060
1200	40x77	0,15	183	142	4,90	K16450122_PM0F077
1200	45x60	0,15	180	140	4,90	K16450122_PM0N060
1500	40x97	0,15	140	110	5,56	K16450152_PM0F097
1500	45x77	0,15	150	120	5,36	K16450152_PM0N077
1500	50x60	0,10	140	110	4,70	K16450152_PM0V060
1800	45x97	0,15	128	110	6,50	K16450182_PM0N097
1800	50x77	0,10	128	108	5,60	K16450182_PM0V077
2200	45x105	0,15	112	102	6,80	K16450222_PM0N105
2700	50x105	0,10	112	102	7,40	K16450272_PM0V105

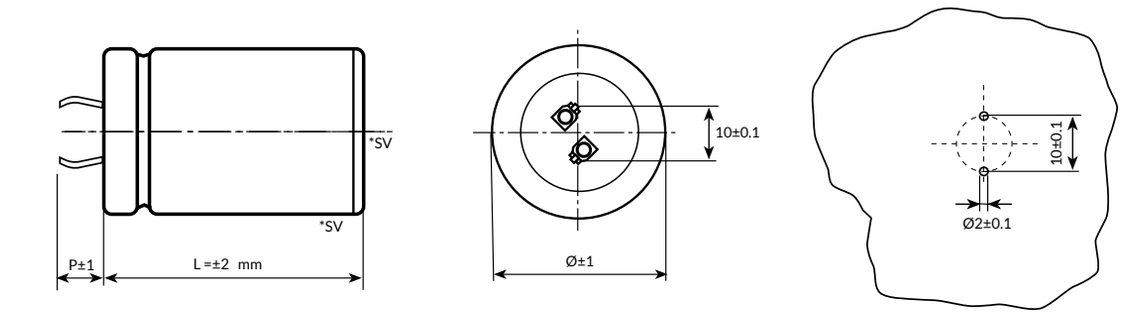
K25 TYPE
-40°C +105°C 8000H

APPLICATIONS

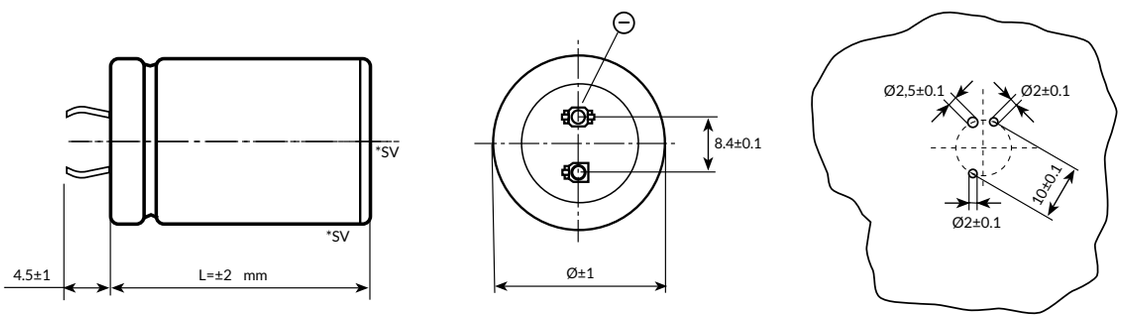
Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Snap in terminals for PCB mounting
- Design optimized for high ripple current applications

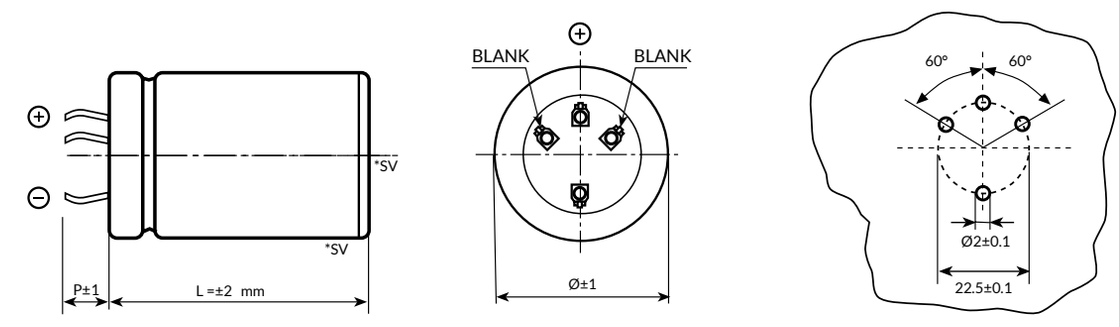
2 PIN CAPACITOR



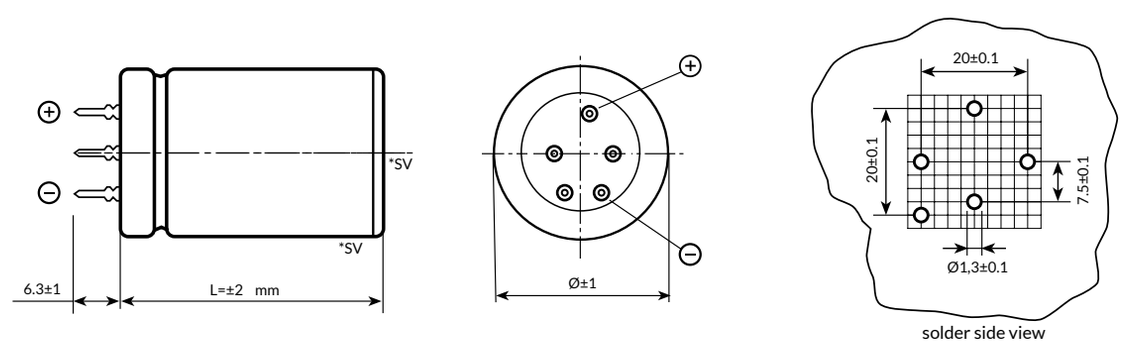
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K25 TYPE
-40°C +105°C 8000H

SPECIFICATIONS

Temperature Range

Operating -40°C 105°C [Environmental classification 40/105/56 IEC-68]
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 400V to 500V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$ ($V_r \leq 450$V DC) $V_p = 1.05\ V_r$ ($V_r \geq 450$V DC)

Rated Capacitance Range

from 820 µF to 2.200 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0	0.5

Maximum internal temperature 110°C

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

>250.000 h at 40°C
> 8.000 h at 105°C

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 20 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K25 TYPE
-40°C +105°C 8000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
1200	40x77	0,10	89	64	3,60	K25400122_PM0F077
1200	45x60	0,10	89	64	3,60	K25400122_PM0N060
1500	40x97	0,10	75	55	4,80	K25400152_PM0F097
1500	45x77	0,10	75	55	4,70	K25400152_PM0N077
1500	50x60	0,10	75	55	4,40	K25400152_PM0V060
1800	45x97	0,10	69	60	5,60	K25400182_PM0N097
1800	50x77	0,10	69	60	5,50	K25400182_PM0V077
2200	45x105	0,10	47	40	6,10	K25400222_PM0N105
2700	50x105	0,10	37	30	6,50	K25400272_PM0V105

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
820	35x77	0,10	104	85	3,00	K25420821_PM0E077
1000	40x60	0,10	99	74	3,60	K25420102_PM0F060
1200	40x77	0,10	94	64	3,70	K25420122_PM0F077
1200	45x60	0,10	94	64	3,60	K25420122_PM0N060
1500	40x97	0,10	75	55	4,60	K25420152_PM0F097
1500	45x77	0,11	75	55	4,50	K25420152_PM0N077
1500	50x60	0,10	75	55	4,40	K25420152_PM0V060
1800	45x97	0,11	69	51	5,60	K25420182_PM0N097
1800	50x77	0,10	69	51	5,50	K25420182_PM0V077
2200	45x105	0,12	47	40	6,10	K25420222_PM0N105
2700	50x105	0,10	37	30	6,50	K25420272_PM0V105

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
820	40x60	0,10	104	85	3,30	K25450821_PM0F060
1000	40x77	0,10	99	74	3,80	K25450102_PM0F077
1000	45x60	0,10	99	74	3,60	K25450102_PM0N060
1200	40x97	0,10	94	64	4,60	K25450122_PM0F097
1200	45x77	0,10	94	64	4,30	K25450122_PM0N077
1200	50x60	0,10	94	64	4,20	K25450122_PM0V060
1500	45x97	0,11	75	55	5,10	K25450152_PM0N097
1500	50x77	0,10	75	55	5,30	K25450152_PM0V077
1800	45x105	0,11	69	51	5,10	K25450182_PM0N105
2200	50x105	0,10	47	40	6,20	K25450222_PM0V105

Rated Voltage VDC **500V**

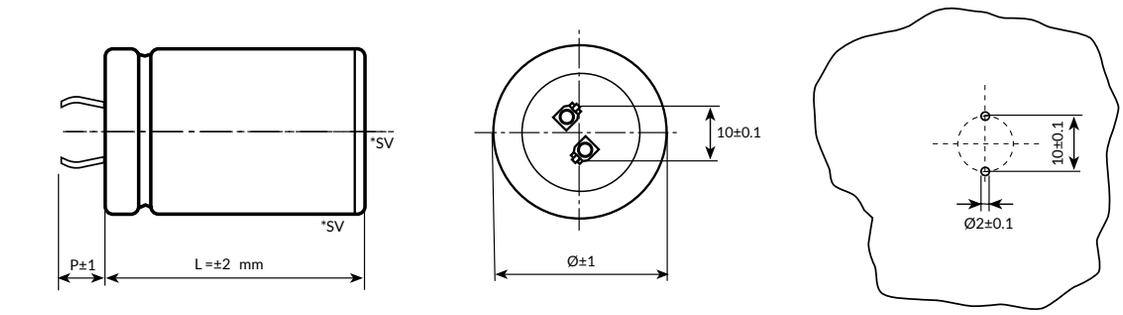
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	35x40	0,12	390	280	1,20	K25500221_PM0E040
330	35x50	0,12	280	180	1,90	K25500331_PM0E050
470	40x50	0,12	187	153	2,10	K25500471_PM0F050
470	35x60	0,12	187	153	2,10	K25500471_PM0E060
560	35x77	0,12	176	134	2,40	K25500561_PM0E077
560	40x60	0,12	176	134	2,40	K25500561_PM0F060
680	40x77	0,12	165	120	2,80	K25500681_PM0F077
820	40x97	0,12	138	108	3,50	K25500821_PM0F097
1000	45x97	0,12	115	95	4,10	K25500102_PM0N097
1200	45x105	0,12	96	64	4,50	K25500122_PM0N105

K26 TYPE
-40°C +85°C 12000H

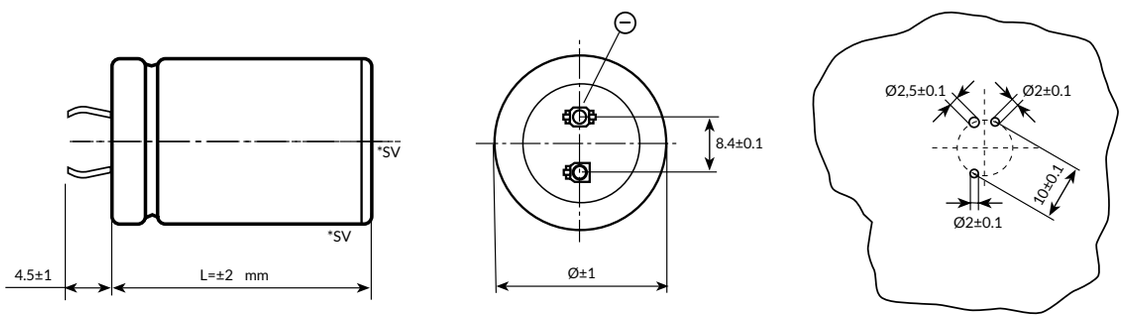
APPLICATIONS | Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Snap in terminals for PCB mounting
- Design optimized for high ripple current applications

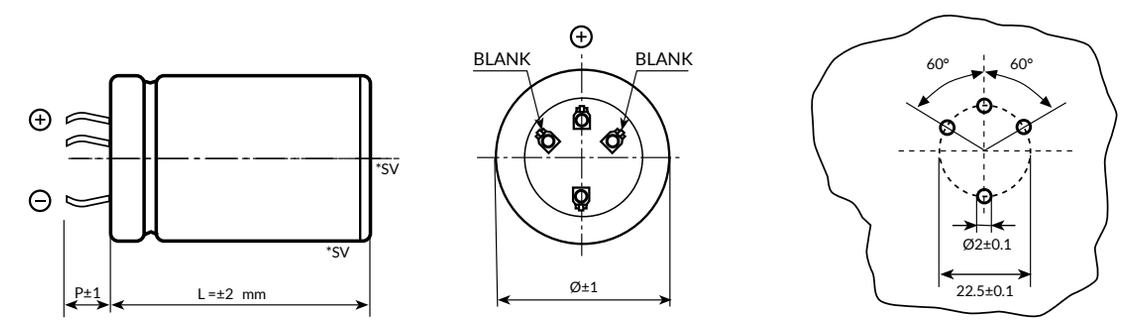
2 PIN CAPACITOR



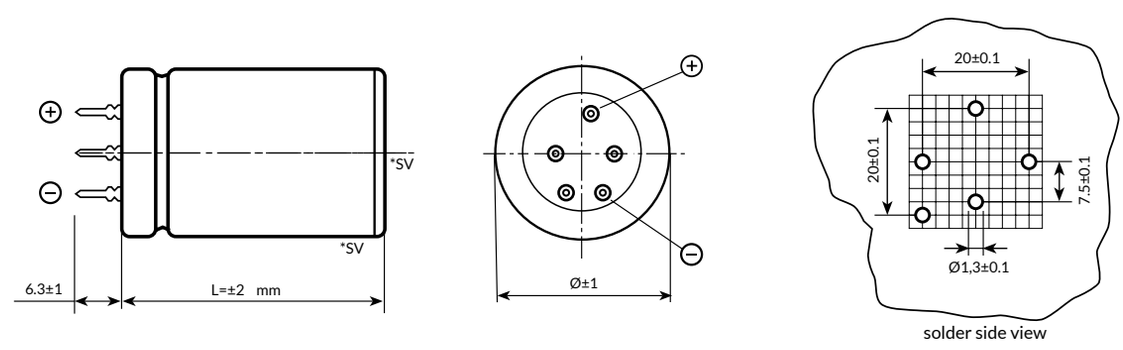
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



solder side view

*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K26 TYPE
-40°C +85°C 12000H

SPECIFICATIONS

Temperature Range	Operating -40°C 85°C [Environmental classification 40/105/56 IEC-68] Storage: Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 500V DC
Surge Voltage (V_p)	$V_p = 1.10\ V_r$ ($V_r \leq 450$V DC) $V_p = 1.05\ V_r$ ($V_r \geq 450$V DC)
Rated Capacitance Range	from 1.000 µF to 2.700 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (µA, 5 min, 20°C)	max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$ at 85°C max $I_L = 0.04\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Maximum internal temperature 98°C

Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 500 Hz, amplitude 0.75mm Max acceleration 10g for 3x2 h
Withstand voltage	2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 200%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)	>200.000 h at 40°C > 12.000 h at 85°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Marking information	Minus pole band aside within an angle of 41° ± 25°
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K26 TYPE
-40°C +85°C 12000H

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	40x60	0,12	99	74	5,10	K26400102_PM0F060
1200	40x77	0,12	94	64	5,20	K26400122_PM0F077
1500	45x60	0,12	84	61	5,40	K26400152_PM0N060
1800	45x77	0,12	70	51	6,20	K26400182_PM0N077
1800	50x60	0,10	70	51	6,50	K26400182_PM0V060
2000	40x105	0,12	61	44	7,60	K26400202_PM0F105
2200	45x105	0,13	47	40	7,80	K26400222_PM0N105
2200	50x77	0,10	47	40	7,60	K26400222_PM0V077
2700	45x105	0,13	46	39	9,20	K26400272_PM0N105
3300	50x105	0,10	37	30	10,20	K26400332_PM0V105

Rated Voltage VDC **420V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	40x60	0,11	99	74	5,10	K26420102_PM0F060
1200	40x77	0,11	94	64	5,20	K26420122_PM0F077
1200	45x60	0,11	94	64	5,20	K26420122_PM0N060
1500	40x105	0,12	75	55	6,30	K26420152_PM0F105
1500	45x77	0,12	75	55	5,60	K26420152_PM0N077
1500	50x60	0,10	75	55	5,70	K26420152_PM0V060
1800	50x77	0,10	67	50	6,90	K26420182_PM0V077
2200	45x105	0,13	47	40	7,80	K26420222_PM0N105
2700	50x105	0,10	37	30	9,50	K26420272_PM0V105

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	40x60	0,11	99	74	5,10	K26450102_PM0F060
1200	40x77	0,11	94	64	5,20	K26450122_PM0F077
1200	45x60	0,11	94	64	5,20	K26450122_PM0N060
1500	40x105	0,12	75	55	6,30	K26450152_PM0F105
1500	45x77	0,12	75	55	5,60	K26450152_PM0N077
1500	50x60	0,10	75	55	5,70	K26450152_PM0V060
1800	50x77	0,10	67	50	6,90	K26450182_PM0V077
2200	45x105	0,13	47	40	7,80	K26450222_PM0N105
2700	50x105	0,10	37	30	9,50	K26450272_PM0V105

Rated Voltage VDC **500V**

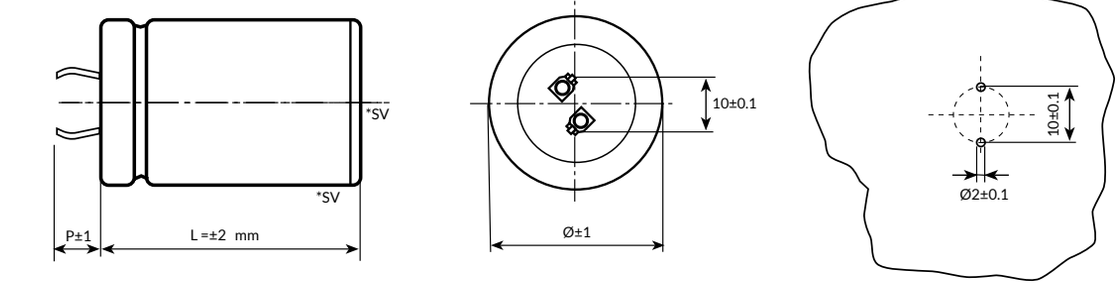
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
330	35x40	0,12	250	180	2,20	K26500331_PM0E040
470	35x50	0,12	187	153	2,60	K26500471_PM0E050
560	40x50	0,12	176	134	3,10	K26500561_PM0F050
560	35x60	0,12	176	134	3,20	K26500561_PM0E060
680	35x77	0,12	165	120	3,80	K26500681_PM0E077
680	40x60	0,12	165	120	3,80	K26500681_PM0F060
820	40x77	0,12	138	108	4,70	K26500821_PM0F077
1000	40x97	0,12	115	95	6,00	K26500102_PM0F097
1500	45x97	0,12	90	80	7,10	K26500152_PM0N097
1700	45x105	0,12	77	72	7,30	K26500172_PM0N105

K55 TYPE
-40°C +105°C 6000H

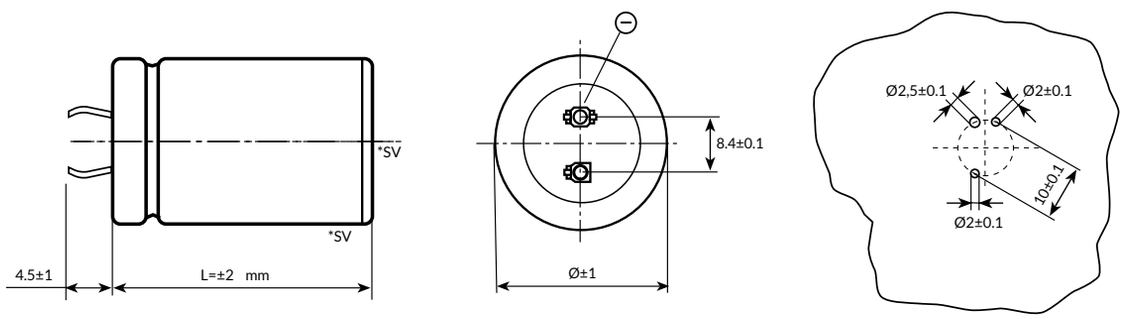
APPLICATIONS | Designed for Solar inverters and professional power supplies.

- Design optimized for Solar inverter
- Very high CV for unit volume
- Low ESR, High ripple current and long file
- Safety vent at bottom case or aside case

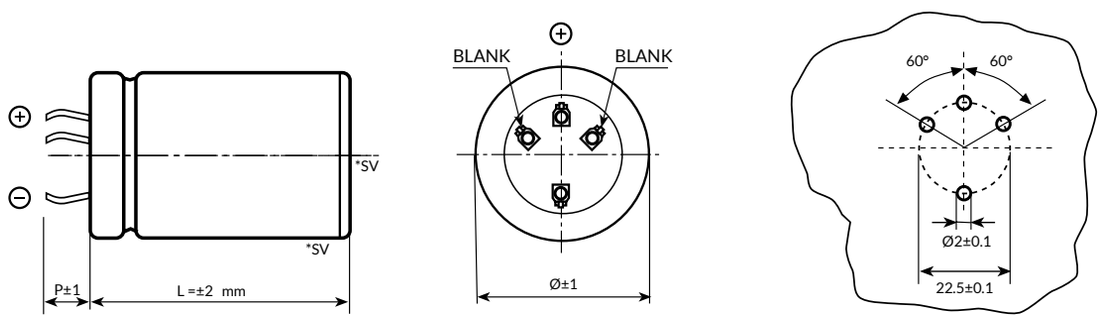
2 PIN CAPACITOR



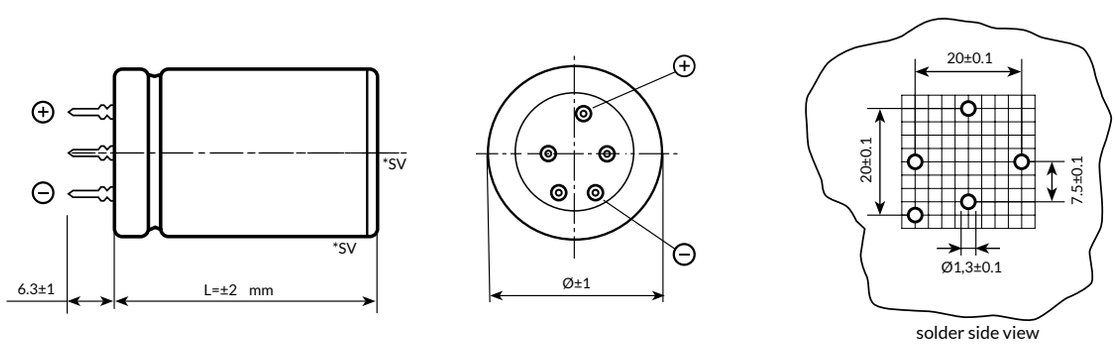
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K55 TYPE
-40°C +105°C 6000H

SPECIFICATIONS

Temperature Range

Operating -40°C 105°C
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

400V DC at 105°C, 500V DC at 50°C

Surge Voltage (V_p)

500V

Rated Capacitance Range

from 330 µF to 820 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0

Maximum internal temperature 110°C

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz
Max acceleration 0.75mm or 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

for all sizes with V 100V; all voltage capacitors with diameter 35mm	Cap change	≤ ±20%
	tan (δ)	≤ 200%
	Leakage current (I_L)	< initial limit
	Impedance (Z)	≤ 200%
for V 160V and for capacitors with diameter 40mm	Cap change	≤ ±10%
	tan (δ)	≤ 130%
	Leakage current (I_L)	< initial limit
	Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

>250.000 h at 40°C - 450V with ripple current applied
> 6.000 h at 105°C - 450V with ripple current applied
> 5.000 h at 50°C - 500V without ripple current applied

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 15 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K55 TYPE

-40°C +105°C 6000H

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
330	30x40	0,09	240	170	1,80	K55450331_PM0D040
330	35x40	0,09	240	170	2,10	K55450331_PM0E040
390	30x50	0,09	197	149	2,20	K55450391_PM0D050
470	30x50	0,09	195	147	2,25	K55450471_PM0D050
470	35x50	0,09	195	147	2,67	K55450471_PM0E050
560	35x50	0,09	150	103	2,80	K55450561_PM0E050
560	35x60	0,09	150	103	3,10	K55450561_PM0E060
680	35x50	0,09	149	115	2,85	K55450681_PM0E050
680	35x60	0,09	149	115	3,25	K55450681_PM0E060
820	40x60	0,09	120	92	3,60	K55450821_PM0F060

Rated Voltage VDC

450V

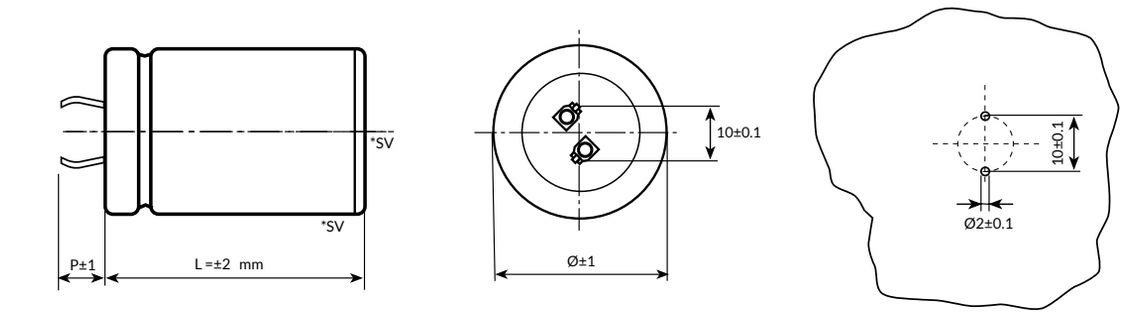
K75 TYPE
-40°C +105°C 5000H

APPLICATIONS

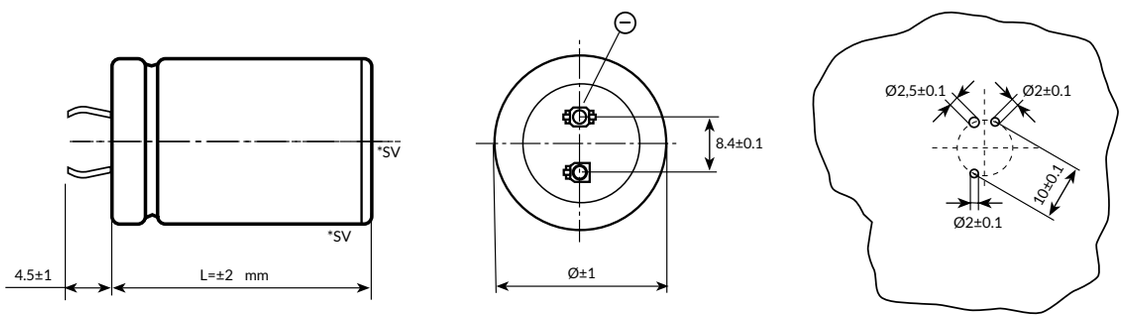
Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

- Surge-proof capacitor in aluminium can with insulation sleeve
- Snap in terminals for PCB mounting
- Design optimized for extremely high miniaturization

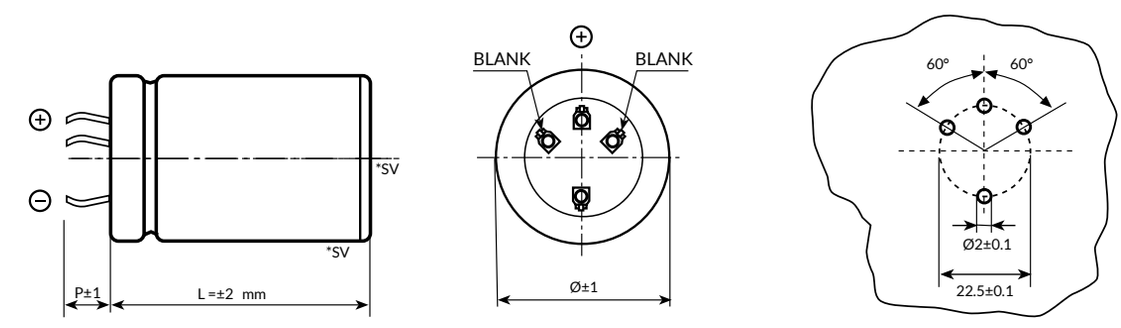
2 PIN CAPACITOR



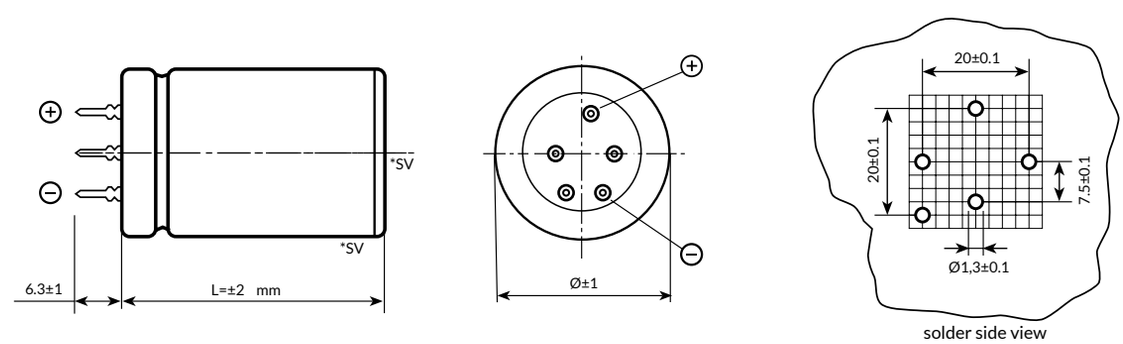
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



solder side view

*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K75 TYPE
-40°C +105°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C 105°C
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 200V to 500V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$ ($V_r \leq 450$V DC) $V_p = 1.05\ V_r$ ($V_r \geq 450$V DC)

Rated Capacitance Range

from 220 µF to 5.600 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

≥ 5.000 h at 105°C

Cap change	≤ 20%
tan (δ)	≤ 200%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 200%

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 15 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K75 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **200V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
560	25x30	0,09	106	39	1,90	K75200561_PM0C030
680	25x35	0,09	85	32	2,25	K75200681_PM0C035
680	25x40	0,09	75	28	2,25	K75200681_PM0C040
820	25x40	0,09	67	25	2,52	K75200821_PM0C040
820	30x30	0,09	84	34	2,40	K75200821_PM0D030
1000	25x45	0,10	61	23	2,93	K75200102_PM0C045
1000	30x35	0,10	68	30	2,83	K75200102_PM0D035
1000	35x30	0,10	75	37	2,75	K75200102_PM0E030
1000	25x50	0,10	58	23	2,93	K75200102_PM0C050
1000	30x40	0,10	63	28	2,83	K75200102_PM0D040
1000	35x40	0,10	72	35	2,75	K75200102_PM0E040
1200	25x50	0,10	53	22	3,27	K75200122_PM0C050
1200	30x40	0,10	58	25	3,19	K75200122_PM0D040
1200	35x30	0,10	69	33	2,86	K75200122_PM0E030
1500	30x45	0,10	50	22	3,64	K75200152_PM0D045
1500	35x35	0,10	58	26	3,24	K75200152_PM0E035
1500	30x50	0,10	48	21	3,64	K75200152_PM0D050
1500	35x40	0,10	55	24	3,24	K75200152_PM0E040
1800	35x40	0,10	53	27	3,70	K75200182_PM0E040
2200	35x45	0,10	46	24	4,17	K75200222_PM0E045
2200	35x50	0,10	46	24	4,61	K75200222_PM0E050
2700	35x60	0,10	33	17	5,51	K75200272_PM0E060
3300	40x60	0,10	32	18	6,00	K75200332_PM0F060

Rated Voltage VDC **250V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
390	25x30	0,09	141	52	1,65	K75250391_PM0C030
470	25x35	0,09	111	42	1,96	K75250471_PM0C035
470	25x40	0,09	110	40	1,96	K75250471_PM0C040
560	30x30	0,09	106	44	2,14	K75250561_PM0D030
680	25x45	0,09	80	33	2,54	K75250681_PM0C045
680	25x50	0,09	81	34	2,54	K75250681_PM0C050
760	30x35	0,09	82	35	2,51	K75250761_PM0D035
760	30x40	0,09	79	33	2,51	K75250761_PM0D040
820	30x40	0,09	75	30	2,84	K75250821_PM0D040
820	35x30	0,09	84	36	2,53	K75250821_PM0E030
1000	30x45	0,10	60	26	3,30	K75250102_PM0D045
1000	35x35	0,10	66	32	3,04	K75250102_PM0E035
1000	30x50	0,10	58	24	3,30	K75250102_PM0D050
1000	35x40	0,10	61	28	3,04	K75250102_PM0E040
1200	30x50	0,10	55	22	3,60	K75250122_PM0D050
1200	35x40	0,10	55	22	3,50	K75250122_PM0E040
1500	35x50	0,10	48	22	4,22	K75250152_PM0E050
2200	35x60	0,10	39	18	5,03	K75250222_PM0E060
2500	40x60	0,10	31	18	5,98	K75250252_PM0F060

K75 TYPE
-40°C +105°C 5000H

Rated Voltage VDC

350V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
330	25x35	0,09	238	117	1,34	K75350331_PM0C035
330	25x40	0,09	238	116	1,34	K75350331_PM0C040
370	25x35	0,09	238	115	1,34	K75350371_PM0C035
370	25x40	0,09	228	115	1,34	K75350371_PM0C040
390	30x30	0,09	225	114	1,47	K75350391_PM0D030
470	30x30	0,09	208	107	1,53	K75350471_PM0D030
470	30x40	0,09	186	97	1,53	K75350471_PM0D040
560	30x35	0,09	169	87	1,79	K75350561_PM0D035
560	30x40	0,09	163	82	1,79	K75350561_PM0D040
620	30x40	0,09	149	76	2,00	K75350621_PM0D040
620	35x30	0,09	161	86	2,00	K75350621_PM0E030
680	30x45	0,09	127	66	2,26	K75350681_PM0D045
680	35x35	0,09	142	79	2,16	K75350681_PM0E035
680	30x50	0,09	125	64	2,26	K75350681_PM0D050
680	35x40	0,09	140	78	2,16	K75350681_PM0E040
780	30x45	0,09	123	63	2,30	K75350781_PM0D045
780	35x35	0,09	139	77	2,19	K75350781_PM0E035
780	30x50	0,09	118	60	2,30	K75350781_PM0D050
780	35x40	0,09	131	70	2,19	K75350781_PM0E040
820	30x50	0,09	111	57	2,51	K75350821_PM0D050
900	35x40	0,09	118	65	2,48	K75350901_PM0E040
1000	35x45	0,10	102	56	2,78	K75350102_PM0E045
1000	35x50	0,10	95	52	2,78	K75350102_PM0E050
1200	35x50	0,10	88	49	3,12	K75350122_PM0E050
1500	35x60	0,10	72	40	3,71	K75350152_PM0E060
2000	40x60	0,10	68	38	4,29	K75350202_PM0F060
2200	45x60	0,10	48	26	4,80	K75350222_PM0N060
2700	45x77	0,10	39	22	6,22	K75350272_PM0N077
2700	50x60	0,10	43	26	5,40	K75350272_PM0V060
2900	40x97	0,10	42	25	6,22	K75350292_PM0F097
3300	50x77	0,10	36	22	6,00	K75350332_PM0V077
3700	45x105	0,10	27	15	7,60	K75350372_PM0N105
4700	50x105	0,10	25	15	8,30	K75350472_PM0V105

Kendeil™

K75 TYPE
-40°C +105°C 5000H

Rated Voltage VDC
400V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	25x35	0,09	328	148	1,15	K75400221_PM0C035
220	25x40	0,09	298	127	1,15	K75400221_PM0C040
270	25x35	0,09	270	125	1,26	K75400271_PM0C035
270	25x40	0,09	255	119	1,26	K75400271_PM0C040
330	25x40	0,09	240	110	1,39	K75400331_PM0C040
330	30x30	0,09	240	110	1,43	K75400331_PM0D030
370	30x30	0,09	238	108	1,44	K75400371_PM0D030
370	30x40	0,09	215	99	1,44	K75400371_PM0D040
470	30x35	0,09	190	91	1,69	K75400471_PM0D035
470	30x40	0,09	168	81	1,88	K75400471_PM0D040
510	30x40	0,09	166	80	1,89	K75400511_PM0D040
510	35x30	0,09	189	89	1,78	K75400511_PM0E030
560	30x45	0,09	140	68	2,15	K75400561_PM0D045
560	35x35	0,09	156	81	2,06	K75400561_PM0E035
560	30x50	0,09	140	67	2,15	K75400561_PM0D050
560	35x40	0,09	155	81	2,06	K75400561_PM0E040
630	30x45	0,09	139	66	2,17	K75400631_PM0D045
630	35x35	0,09	154	80	2,07	K75400631_PM0E035
630	30x50	0,09	132	63	2,17	K75400631_PM0D050
630	35x40	0,09	146	76	2,07	K75400631_PM0E040
680	30x50	0,09	126	60	2,37	K75400681_PM0D050
680	35x40	0,09	132	68	2,35	K75400681_PM0E040
820	30x60	0,09	102	49	2,82	K75400821_PM0D060
820	35x45	0,09	114	59	2,64	K75400821_PM0E045
820	35x50	0,09	110	55	2,64	K75400821_PM0E050
1000	35x50	0,10	97	51	2,96	K75400102_PM0E050
1000	35x60	0,10	90	45	2,96	K75400102_PM0E060
1200	35x60	0,10	79	41	3,54	K75400122_PM0E060
1500	40x60	0,10	68	39	4,10	K75400152_PM0F060
1800	45x60	0,10	53	27	5,03	K75400182_PM0N060
2000	45x77	0,10	44	23	5,10	K75400202_PM0N077
2200	40x97	0,10	46	26	5,10	K75400222_PM0F097
2200	50x60	0,10	48	27	4,80	K75400222_PM0V060
2700	50x77	0,10	39	22	5,70	K75400272_PM0V077
2900	45x105	0,10	31	16	7,90	K75400292_PM0N105
3900	50x105	0,10	27	16	8,20	K75400392_PM0V105

K75 TYPE
-40°C +105°C 5000H

Rated Voltage VDC

420V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	25x35	0,09	329	144	1,14	K75420221_PM0C035
220	25x40	0,09	315	136	1,14	K75420221_PM0C040
250	25x35	0,09	292	129	1,21	K75420251_PM0C035
250	25x40	0,09	274	124	1,21	K75420251_PM0C040
330	30x30	0,09	256	118	1,38	K75420331_PM0D030
330	30x40	0,09	223	107	1,38	K75420331_PM0D040
390	30x35	0,09	206	96	1,62	K75420391_PM0D035
390	30x40	0,09	192	89	1,62	K75420391_PM0D040
470	30x40	0,09	178	81	1,83	K75420471_PM0D040
470	35x30	0,09	198	98	1,73	K75420471_PM0E030
560	30x45	0,09	149	69	2,09	K75420561_PM0D045
560	35x35	0,09	165	82	2,01	K75420561_PM0E035
560	30x50	0,09	138	66	2,09	K75420561_PM0D050
560	35x40	0,09	152	70	2,01	K75420561_PM0E040
620	30x50	0,09	135	62	2,28	K75420621_PM0D050
650	35x40	0,09	140	66	2,28	K75420651_PM0E040
680	35x45	0,09	121	60	2,55	K75420681_PM0E045
680	35x50	0,09	110	57	2,55	K75420681_PM0E050
820	35x50	0,09	105	53	2,85	K75420821_PM0E050
1000	35x60	0,10	84	44	3,41	K75420102_PM0E060
1300	40x60	0,10	73	40	4,00	K75420132_PM0F060
1500	45x60	0,10	56	28	4,50	K75420152_PM0N060
1800	45x77	0,10	47	24	5,30	K75420182_PM0N077
2000	40x97	0,10	48	26	5,50	K75420202_PM0F097
2000	50x60	0,10	50	27	4,80	K75420202_PM0V060
2400	50x77	0,10	42	23	5,70	K75420242_PM0V077
2700	45x105	0,10	32	16	7,05	K75420272_PM0N105
3500	50x105	0,10	28	16	7,90	K75420352_PM0V105

K75 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	25x35	0,09	325	145	1,10	K75450221_PM0C035
220	25x40	0,09	308	138	1,10	K75450221_PM0C040
270	30x30	0,09	283	132	1,28	K75450271_PM0D030
330	30x35	0,09	228	107	1,50	K75450331_PM0D035
330	30x40	0,09	217	99	1,50	K75450331_PM0D040
390	30x40	0,09	200	92	1,70	K75450391_PM0D040
470	30x45	0,09	165	80	1,94	K75450471_PM0D045
470	35x35	0,09	180	90	1,88	K75450471_PM0E035
470	30x50	0,09	154	75	1,94	K75450471_PM0D050
470	35x40	0,09	167	82	1,88	K75450471_PM0E040
560	30x50	0,09	150	70	2,12	K75450561_PM0D050
560	35x40	0,09	154	76	2,12	K75450561_PM0E040
680	35x45	0,09	133	65	2,38	K75450681_PM0E045
680	35x50	0,09	122	62	2,38	K75450681_PM0E050
820	35x50	0,09	115	57	2,66	K75450821_PM0E050
820	35x60	0,09	102	51	2,66	K75450821_PM0E060
1000	35x60	0,10	91	45	3,31	K75450102_PM0E060
1200	40x60	0,10	79	43	3,74	K75450122_PM0F060
1500	45x60	0,10	59	32	4,30	K75450152_PM0N060
1800	40x97	0,10	52	30	5,10	K75450182_PM0F097
1800	45x77	0,10	50	25	5,20	K75450182_PM0N077
1800	50x60	0,10	53	29	4,60	K75450182_PM0V060
2200	50x77	0,10	44	24	5,60	K75450222_PM0V077
2700	45x105	0,10	34	17	6,50	K75450272_PM0N105
3300	50x105	0,10	30	17	7,50	K75450332_PM0V105

Rated Voltage VDC **500V**

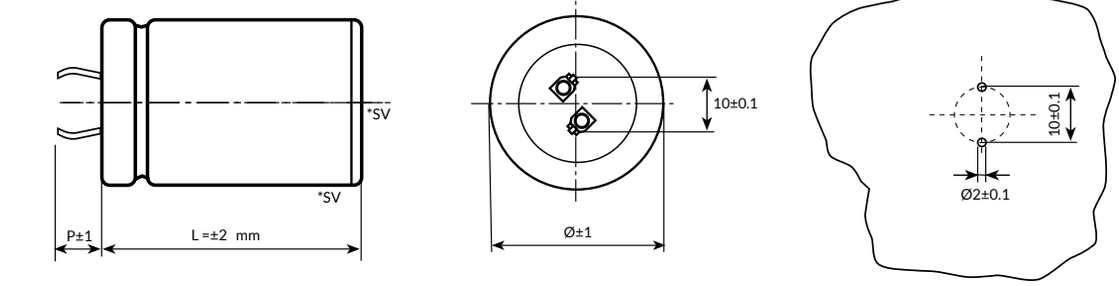
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
150	25x30	0,12	550	395	1,00	K75500151_PM0C030
150	30x30	0,12	475	295	1,00	K75500151_PM0D030
220	25x40	0,12	399	253	1,20	K75500221_PM0C040
220	30x30	0,12	399	253	1,30	K75500221_PM0D030
220	30x40	0,12	375	240	1,20	K75500221_PM0D040
220	35x30	0,12	357	250	1,30	K75500221_PM0E030
270	25x50	0,12	355	235	1,50	K75500271_PM0C050
270	30x40	0,12	355	235	1,40	K75500271_PM0D040
270	30x50	0,12	326	227	1,50	K75500271_PM0D050
270	35x40	0,12	326	227	1,60	K75500271_PM0E040
330	30x40	0,12	305	210	1,60	K75500331_PM0D040
330	35x40	0,12	280	200	1,70	K75500331_PM0E040
390	30x50	0,12	260	190	1,85	K75500391_PM0D050
390	35x40	0,12	260	190	1,80	K75500391_PM0E040
470	35x50	0,12	200	180	2,05	K75500471_PM0E050
560	35x50	0,12	183	150	2,10	K75500561_PM0E050
560	35x60	0,12	183	150	2,20	K75500561_PM0E060
680	35x60	0,12	155	115	2,35	K75500681_PM0E060
680	40x60	0,12	148	112	2,60	K75500681_PM0F060
820	40x60	0,12	142	110	2,60	K75500821_PM0F060
1000	40x77	0,15	125	105	3,30	K75500102_PM0F077
1200	40x97	0,15	107	90	3,70	K75500122_PM0F097
1500	45x97	0,15	75	55	4,40	K75500152_PM0N097
1800	45x105	0,15	73	52	4,60	K75500182_PM0N105

K76 TYPE
-40°C +85°C 5000H

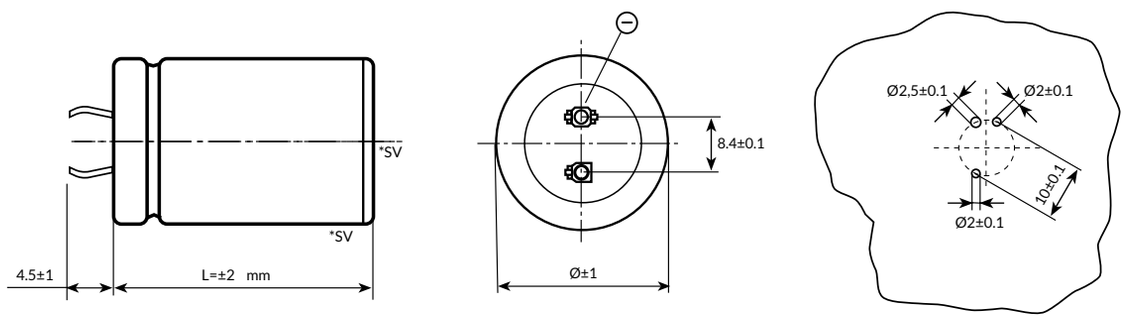
APPLICATIONS | Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

- Design optimized forextremely high miniaturization
- Surge-proof capacitor in aluminium can with insulation sleeve
- Snap in terminals for PCB mounting

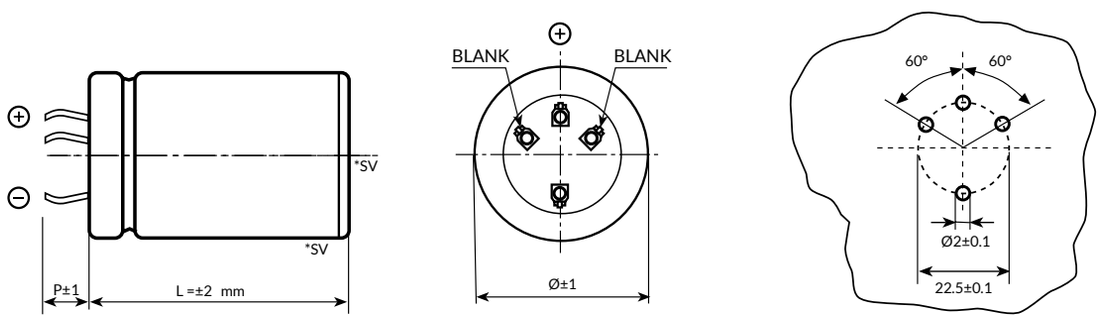
2 PIN CAPACITOR



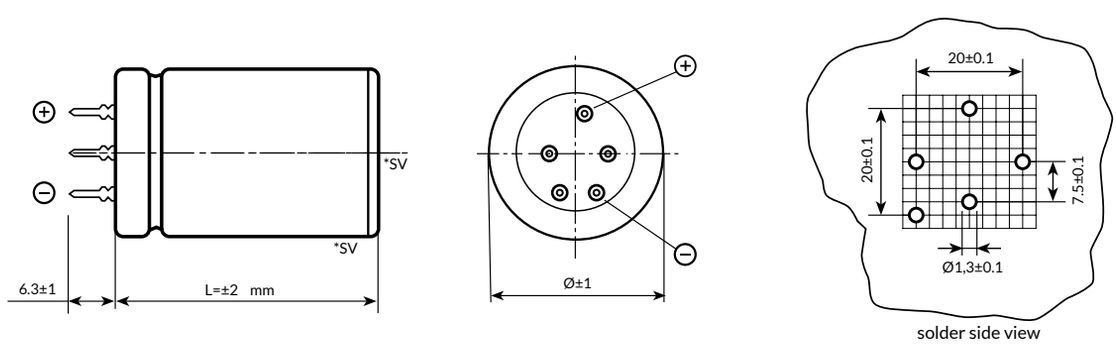
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



solder side view

*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K76 TYPE
-40°C +85°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C 85°C [Environmental classification 40/105/56 IEC-68]
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 200V to 500V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$ ($V_r \leq 450$V DC) $V_p = 1.05\ V_r$ ($V_r \geq 450$V DC)

Rated Capacitance Range

from 220 µF to 5.600 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 85°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

≥ 12.000 h at 85°C D>40mm
≥ 5.000 h at 85°C D≤35mm

Cap change	≤ 20%
tan (δ)	≤ 200%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 200%

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 33 fit (33 10^{-9}/h)

Self inductance

Approx. 15 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

Kendeil™

K76 TYPE
-40°C +85°C 5000H

Rated Voltage VDC **200V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
560	25x30	0,09	106	39	3,05	K76200561_PM0C030
680	25x35	0,09	85	32	3,63	K76200681_PM0C035
680	25x40	0,09	80	30	3,63	K76200681_PM0C040
820	25x40	0,09	67	25	4,04	K76200821_PM0C040
820	30x30	0,09	84	34	3,87	K76200821_PM0D030
1000	25x45	0,10	61	23	4,72	K76200102_PM0C045
1000	30x35	0,10	68	30	4,56	K76200102_PM0D035
1000	35x30	0,10	75	37	4,43	K76200102_PM0E030
1000	25x50	0,10	55	20	4,72	K76200102_PM0C050
1000	30x40	0,11	62	25	4,56	K76200102_PM0D040
1200	25x50	0,10	53	22	5,23	K76200122_PM0C050
1200	30x40	0,10	58	25	5,15	K76200122_PM0D040
1200	35x30	0,10	69	33	4,45	K76200122_PM0E030
1200	35x40	0,10	62	27	4,85	K76200122_PM0E040
1500	30x45	0,10	50	22	5,86	K76200152_PM0D045
1500	35x35	0,10	58	26	5,22	K76200152_PM0E035
1500	30x50	0,10	42	19	5,86	K76200152_PM0D050
1500	35x40	0,10	51	22	5,22	K76200152_PM0E040
1800	35x40	0,10	53	27	5,97	K76200182_PM0E040
2200	35x45	0,10	46	24	6,72	K76200222_PM0E045
2200	35x50	0,10	46	24	7,43	K76200222_PM0E050
2700	35x60	0,10	33	17	8,89	K76200272_PM0E060
3300	40x60	0,10	32	18	9,64	K76200332_PM0F060

Rated Voltage VDC **250V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
390	25x30	0,09	141	52	2,68	K76250391_PM0C030
470	25x35	0,09	111	42	3,17	K76250471_PM0C035
470	25x40	0,09	105	38	3,17	K76250471_PM0C040
560	30x30	0,09	106	44	3,45	K76250561_PM0D030
680	25x45	0,09	80	33	4,09	K76250681_PM0C045
680	25x50	0,09	71	25	4,09	K76250681_PM0C050
760	30x35	0,09	82	35	4,05	K76250761_PM0D035
760	30x40	0,09	74	30	4,05	K76250761_PM0D040
820	30x40	0,09	75	30	4,50	K76250821_PM0D040
820	35x30	0,09	84	36	4,07	K76250821_PM0E030
1000	30x45	0,10	60	26	5,25	K76250102_PM0D045
1000	35x35	0,10	66	32	4,80	K76250102_PM0E035
1000	30x50	0,10	54	21	5,25	K76250102_PM0D050
1000	35x40	0,10	62	25	4,80	K76250102_PM0E040
1200	30x50	0,10	55	22	5,75	K76250122_PM0D050
1200	35x40	0,10	55	22	5,44	K76250122_PM0E040
1500	35x50	0,10	48	22	6,80	K76250152_PM0E050
2200	35x60	0,10	39	18	8,12	K76250222_PM0E060
2500	40x60	0,10	31	18	9,50	K76250252_PM0F060

K76 TYPE
-40°C +85°C 5000H

Rated Voltage VDC

350V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
330	25x30	0,09	238	117	1,91	K76350331_PM0C030
330	25x40	0,09	227	100	1,91	K76350331_PM0C040
390	25x35	0,09	225	114	2,25	K76350391_PM0C035
390	25x40	0,09	214	107	2,25	K76350391_PM0C040
470	30x30	0,09	208	107	2,53	K76350471_PM0D030
470	30x40	0,09	198	100	2,53	K76350471_PM0D040
520	30x30	0,09	195	105	2,55	K76350521_PM0D030
560	30x35	0,09	169	87	2,93	K76350561_PM0D035
560	30x40	0,09	169	87	3,14	K76350561_PM0D040
620	30x35	0,09	149	76	3,00	K76350621_PM0D035
680	30x40	0,09	127	66	3,34	K76350681_PM0D040
680	35x40	0,09	142	79	3,11	K76350681_PM0E040
680	30x50	0,09	121	61	3,34	K76350681_PM0D050
820	30x45	0,09	111	57	3,77	K76350821_PM0D045
820	35x35	0,09	134	77	3,59	K76350821_PM0E035
820	30x50	0,09	102	49	3,77	K76350821_PM0D050
820	35x40	0,09	130	70	3,59	K76350821_PM0E040
880	30x45	0,09	110	57	3,78	K76350881_PM0D045
920	30x50	0,09	104	56	4,19	K76350921_PM0D050
1000	35x40	0,10	102	56	4,12	K76350102_PM0E040
1000	35x50	0,10	98	50	4,12	K76350102_PM0E050
1200	35x45	0,10	88	49	4,63	K76350122_PM0E045
1200	40x50	0,10	80	42	4,63	K76350122_PM0F050
1400	35x50	0,10	83	46	5,18	K76350142_PM0E050
1500	40x50	0,10	77	39	5,18	K76350152_PM0F050
1700	35x60	0,10	68	40	6,17	K76350172_PM0E060
1800	40x60	0,10	64	35	6,17	K76350182_PM0F060
2200	40x60	0,10	60	38	7,10	K76350222_PM0F060
2200	40x77	0,11	55	31	7,10	K76350222_PM0F077
2400	45x60	0,10	45	26	7,60	K76350242_PM0N060
2700	40x97	0,10	31	20	7,60	K76350272_PM0F097
2900	45x77	0,10	42	25	9,50	K76350292_PM0N077
2900	50x60	0,10	41	26	8,85	K76350292_PM0V060
3100	40x97	0,10	40	24	9,00	K76350312_PM0F097
3300	50x77	0,10	36	25	9,20	K76350332_PM0V077
3700	50x77	0,10	34	22	9,80	K76350372_PM0V077
4400	45x105	0,10	26	15	12,50	K76350442_PM0N105
4700	50x105	0,10	25	15	13,60	K76350472_PM0V105
5600	50x105	0,10	23	15	14,00	K76350562_PM0V105

Kendeil™

K76 TYPE
-40°C +85°C 5000H

Rated Voltage VDC
400V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
220	25x30	0,09	328	148	1,70	K76400221_PM0C030
330	25x35	0,09	240	115	2,10	K76400331_PM0C035
330	25x40	0,09	235	111	2,10	K76400331_PM0C040
390	30x30	0,09	230	112	2,35	K76400391_PM0D030
390	30x40	0,09	204	102	2,35	K76400391_PM0D040
470	30x35	0,09	190	91	2,75	K76400471_PM0D035
470	30x40	0,09	176	85	2,75	K76400471_PM0D040
560	30x40	0,09	160	78	3,11	K76400561_PM0D040
560	35x30	0,09	183	97	2,92	K76400561_PM0E030
560	35x40	0,09	156	75	2,92	K76400561_PM0E040
680	30x45	0,09	126	60	3,55	K76400681_PM0D045
680	35x35	0,09	140	64	3,44	K76400681_PM0E035
680	30x50	0,09	131	60	3,44	K76400681_PM0D050
680	35x40	0,09	135	61	3,44	K76400681_PM0E040
720	30x50	0,09	121	59	3,89	K76400721_PM0D050
720	35x50	0,09	120	55	3,89	K76400721_PM0E050
780	35x40	0,09	128	67	3,85	K76400781_PM0E040
820	35x45	0,09	114	59	4,32	K76400821_PM0E045
820	35x50	0,09	110	55	4,32	K76400821_PM0E050
1000	35x50	0,10	97	51	4,85	K76400102_PM0E050
1000	35x60	0,10	89	46	4,85	K76400102_PM0E060
1200	35x60	0,10	79	41	5,77	K76400122_PM0E060
1500	40x60	0,10	73	40	5,77	K76400152_PM0F060
1700	40x60	0,10	67	39	6,70	K76400172_PM0F060
2000	45x60	0,10	49	28	8,36	K76400202_PM0N060
2200	45x77	0,10	46	26	8,80	K76400222_PM0N077
2200	50x60	0,10	45	26	8,10	K76400222_PM0V060
2400	40x97	0,10	43	25	8,80	K76400242_PM0F097
2400	45x77	0,10	42	23	8,80	K76400242_PM0N077
2400	50x60	0,10	45	26	8,80	K76400242_PM0V060
2900	50x77	0,10	38	22	10,00	K76400292_PM0V077
3300	45x105	0,10	30	18	11,80	K76400332_PM0N105
3300	50x105	0,10	28	16	12,80	K76400332_PM0V105
4400	50x105	0,10	26	15	13,40	K76400442_PM0V105

K76 TYPE
-40°C +85°C 5000H

Rated Voltage VDC

420V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
290	25x35	0,09	273	123	2,02	K76420291_PM0C035
290	25x40	0,09	263	121	2,02	K76420291_PM0C040
330	30x30	0,09	256	118	2,30	K76420331_PM0D030
380	35x40	0,09	220	113	2,30	K76420381_PM0E040
470	30x35	0,09	178	81	2,76	K76420471_PM0D035
470	35x40	0,09	176	80	2,76	K76420471_PM0E040
520	30x40	0,09	170	80	3,02	K76420521_PM0D040
520	35x30	0,09	180	87	2,86	K76420521_PM0E030
560	30x45	0,09	149	69	3,48	K76420561_PM0D045
560	35x35	0,09	165	82	3,33	K76420561_PM0E035
560	30x50	0,09	144	75	3,48	K76420561_PM0D050
560	35x40	0,09	160	77	3,33	K76420561_PM0E040
620	30x45	0,09	150	72	3,50	K76420621_PM0D045
620	35x35	0,09	150	72	3,40	K76420621_PM0E035
620	30x50	0,09	144	70	3,50	K76420621_PM0D050
620	35x40	0,09	142	69	3,40	K76420621_PM0E040
680	30x50	0,09	127	60	3,80	K76420681_PM0D050
680	35x45	0,09	127	60	3,80	K76420681_PM0E045
820	35x45	0,09	115	55	4,23	K76420821_PM0E045
820	35x50	0,09	110	52	4,23	K76420821_PM0E050
920	35x50	0,09	100	51	4,73	K76420921_PM0E050
1000	35x60	0,10	84	44	5,51	K76420102_PM0E060
1200	35x60	0,10	80	42	5,65	K76420122_PM0E060
1500	40x60	0,10	69	38	6,58	K76420152_PM0F060
1700	45x60	0,10	53	28	7,50	K76420172_PM0N060
2000	45x77	0,10	44	23	8,20	K76420202_PM0N077
2200	40x97	0,10	45	26	8,30	K76420222_PM0F097
2200	50x60	0,10	47	27	8,00	K76420222_PM0V060
2700	50x77	0,10	40	22	9,50	K76420272_PM0V077
3100	45x105	0,10	31	16	11,40	K76420312_PM0N105
3300	50x105	0,10	28	16	12,80	K76420332_PM0V105
3900	50x105	0,10	27	16	13,00	K76420392_PM0V105

Kendeil™

K76 TYPE
-40°C +85°C 5000H

Rated Voltage VDC **450V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
220	25x35	0,09	325	145	1,87	K76450221_PM0C035
220	25x40	0,09	319	139	1,87	K76450221_PM0C040
270	25x35	0,09	283	132	1,89	K76450271_PM0C035
270	25x40	0,09	252	115	1,89	K76450271_PM0C040
330	30x30	0,09	228	107	2,13	K76450331_PM0D030
330	30x40	0,09	210	99	2,13	K76450331_PM0D040
390	30x35	0,09	200	92	2,51	K76450391_PM0D035
390	30x40	0,09	182	87	2,51	K76450391_PM0D040
470	30x40	0,09	165	80	2,85	K76450471_PM0D040
560	30x45	0,09	150	70	3,24	K76450561_PM0D045
560	35x35	0,09	154	76	3,12	K76450561_PM0E035
560	30x50	0,09	145	68	3,24	K76450561_PM0D050
560	35x40	0,09	145	68	3,12	K76450561_PM0E040
620	30x50	0,09	140	66	3,53	K76450621_PM0D050
680	35x40	0,09	133	65	3,56	K76450681_PM0E040
680	35x50	0,09	129	65	3,56	K76450681_PM0E050
750	35x45	0,09	126	64	3,95	K76450751_PM0E045
750	35x50	0,09	113	60	3,95	K76450751_PM0E050
820	35x50	0,09	109	56	4,41	K76450821_PM0E050
1000	35x60	0,10	91	45	5,33	K76450102_PM0E060
1500	40x60	0,10	74	32	6,22	K76450152_PM0F060
1500	45x60	0,10	66	31	6,22	K76450152_PM0N060
1600	45x60	0,10	58	30	6,50	K76450162_PM0N060
2000	40x97	0,10	50	27	7,20	K76450202_PM0F097
2000	45x77	0,10	48	25	7,60	K76450202_PM0N077
2000	50x60	0,10	52	29	7,30	K76450202_PM0V060
2400	50x77	0,10	43	24	9,70	K76450242_PM0V077
2700	45x105	0,10	33	17	10,50	K76450272_PM0N105
3300	50x105	0,10	30	17	12,10	K76450332_PM0V105
3600	50x105	0,10	29	16	12,20	K76450362_PM0V105

Rated Voltage VDC **500V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
180	25x30	0,12	560	398	1,10	K76500181_PM0C030
180	25x40	0,12	467	303	1,10	K76500181_PM0C040
220	25x40	0,12	399	253	1,40	K76500221_PM0C040
220	30x30	0,12	399	253	1,45	K76500221_PM0D030
330	25x50	0,12	305	210	1,80	K76500331_PM0C050
330	30x40	0,12	305	210	1,80	K76500331_PM0D040
470	30x50	0,12	200	180	2,30	K76500471_PM0D050
470	35x40	0,12	200	180	2,25	K76500471_PM0E040
560	35x50	0,12	183	150	2,70	K76500561_PM0E050
680	35x55	0,12	170	125	2,90	K76500681_PM0E055
680	35x60	0,12	170	125	2,92	K76500681_PM0E060
820	35x60	0,12	142	110	3,30	K76500821_PM0E060
1000	40x60	0,15	125	105	3,84	K76500102_PM0F060
1200	40x77	0,15	107	90	4,90	K76500122_PM0F077
1500	40x97	0,15	94	85	6,10	K76500152_PM0F097
1800	45x97	0,15	80	72	7,20	K76500182_PM0N097
2200	45x105	0,15	69	65	7,60	K76500222_PM0N105

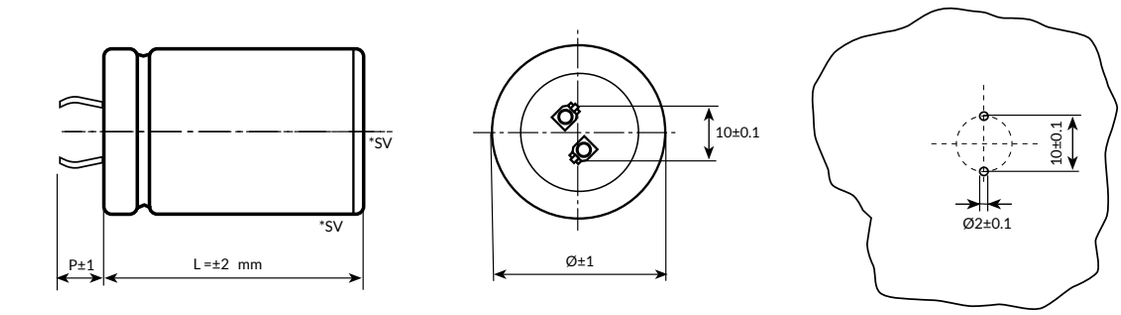
K85 TYPE
-40°C +105°C 8000H

APPLICATIONS

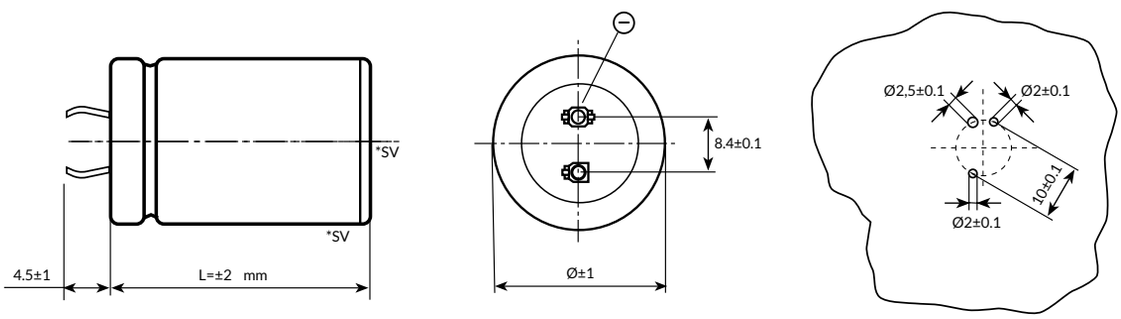
Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

- Design optimized for high ripple current and very long life application
- Surge-proof capacitor in aluminium can with insulation sleeve
- Snap in terminals for PCB mounting

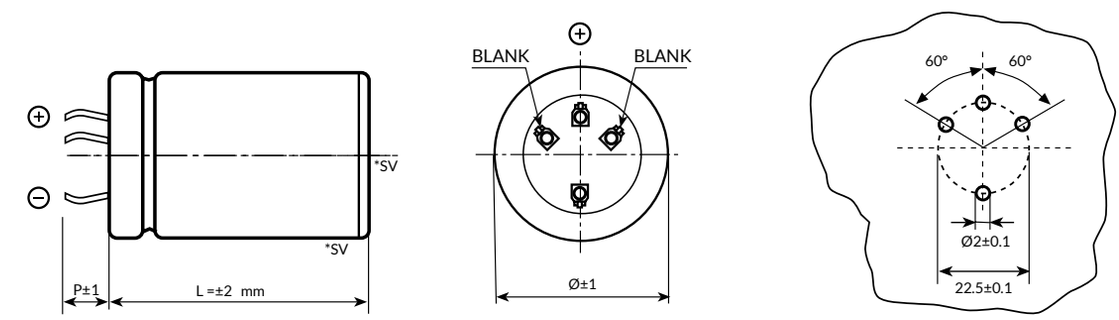
2 PIN CAPACITOR



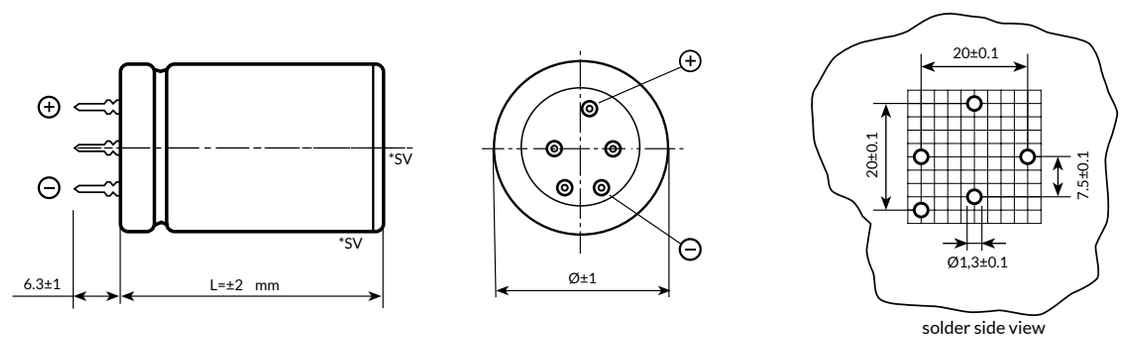
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K85 TYPE
-40°C +105°C 8000H

SPECIFICATIONS

Temperature Range

Operating -40°C 105°C
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 350V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 100 µF to 1.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 3,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

≥ 8.000 h at 105°C

Cap change	≤ 20%
tan (δ)	≤ 200%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 200%

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 15 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K85 TYPE
-40°C +105°C 8000H

Rated Voltage VDC **350V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
180	25X30	0,06	240	136	1,35	K85350181_PM0C030
220	25x35	0,06	199	121	1,57	K85350221_PM0C035
220	30x30	0,06	209	128	1,64	K85350221_PM0D030
330	25x45	0,06	136	83	2,10	K85350331_PM0C045
330	30x35	0,06	144	86	2,07	K85350331_PM0D035
390	25x50	0,06	134	83	2,29	K85350391_PM0C050
390	30x35	0,06	140	86	2,11	K85350391_PM0D035
390	30x40	0,06	140	86	2,46	K85350391_PM0D040
390	35x30	0,06	138	85	2,33	K85350391_PM0E030
470	25x55	0,07	96	77	2,59	K85350471_PM0C055
470	35x35	0,07	96	78	2,51	K85350471_PM0E035
560	30x55	0,07	78	48	3,10	K85350561_PM0D055
560	35x40	0,07	88	54	2,98	K85350561_PM0E040
680	35x45	0,07	75	45	3,20	K85350681_PM0E045
680	35x50	0,07	74	44	3,32	K85350681_PM0E050
720	35x50	0,07	67	42	3,45	K85350721_PM0E050
820	35x55	0,07	63	39	3,78	K85350821_PM0E055
1000	35x60	0,08	60	39	4,00	K85350102_PM0E060

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
150	25x30	0,06	291	160	1,23	K85400151_PM0C030
180	25x35	0,06	240	136	1,44	K85400181_PM0C035
180	30x30	0,06	240	136	1,53	K85400181_PM0D030
220	25x45	0,06	184	102	1,81	K85400221_PM0C045
220	30x35	0,06	196	110	1,79	K85400221_PM0D035
270	25x50	0,06	185	95	1,88	K85400271_PM0C050
270	30x35	0,06	170	98	1,91	K85400271_PM0D035
270	35x30	0,06	162	92	2,07	K85400271_PM0E030
330	25x55	0,06	121	67	2,41	K85400331_PM0C055
330	30x40	0,06	152	84	2,12	K85400331_PM0D040
330	35x35	0,06	153	89	2,24	K85400331_PM0E035
390	30x50	0,06	103	55	2,71	K85400391_PM0D050
390	35x40	0,06	114	63	2,73	K85400391_PM0E040
470	30x55	0,07	97	52	3,01	K85400471_PM0D055
470	35x45	0,07	95	52	3,07	K85400471_PM0E045
560	35x50	0,07	85	45	3,20	K85400561_PM0E050
680	35x55	0,07	75	45	3,51	K85400681_PM0E055

K85 TYPE
-40°C +105°C 8000H

Kendeil™

Rated Voltage VDC

420V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
120	25x30	0,06	312	181	1,19	K85420121_PM0C030
150	25x35	0,06	253	146	1,40	K85420151_PM0C035
180	30x30	0,06	240	136	1,53	K85420181_PM0D030
220	25x45	0,06	184	102	1,81	K85420221_PM0C045
220	30x35	0,06	196	110	1,79	K85420221_PM0D035
250	25x50	0,06	170	92	1,96	K85420251_PM0C050
250	30x35	0,06	185	103	1,83	K85420251_PM0D035
250	35x30	0,06	172	96	2,00	K85420251_PM0E030
270	30x40	0,06	152	84	2,12	K85420271_PM0D040
330	25x55	0,06	121	67	2,41	K85420331_PM0C055
330	35x35	0,06	153	89	2,24	K85420331_PM0E035
390	30x55	0,06	103	55	2,91	K85420391_PM0D055
390	35x40	0,06	114	63	2,71	K85420391_PM0E040
470	35x50	0,07	97	45	3,15	K85420471_PM0E050
560	35x55	0,07	85	45	3,30	K85420561_PM0E055
680	35x60	0,07	75	45	3,54	K85420681_PM0E060

Rated Voltage VDC

450V

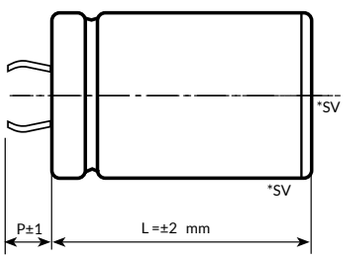
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
100	25x30	0,06	388	214	1,07	K85450101_PM0C030
120	25x35	0,06	324	178	1,24	K85450121_PM0C035
150	25x40	0,06	250	142	1,48	K85450151_PM0C040
150	30x30	0,06	260	144	1,45	K85450151_PM0D030
150	30x40	0,06	250	142	1,66	K85450151_PM0D040
180	25x45	0,06	212	119	1,68	K85450181_PM0C045
180	30x35	0,06	223	126	1,67	K85450181_PM0D035
220	25x50	0,06	183	101	1,89	K85450221_PM0C050
220	30x40	0,06	197	110	1,97	K85450221_PM0D040
220	35x30	0,06	185	104	1,92	K85450221_PM0E030
270	30x45	0,06	159	86	2,21	K85450271_PM0D045
270	35x35	0,06	166	95	2,12	K85450271_PM0E035
330	30x50	0,06	127	68	2,53	K85450331_PM0D050
330	35x40	0,06	127	68	2,57	K85450331_PM0E040
390	30x55	0,06	110	59	2,82	K85450391_PM0D055
390	35x45	0,06	119	63	2,77	K85450391_PM0E045
470	35x50	0,06	106	58	3,06	K85450471_PM0E050
560	35x55	0,07	91	54	3,30	K85450561_PM0E055
560	35x60	0,07	91	54	3,42	K85450561_PM0E060
680	35x77	0,07	81	41	4,07	K85450681_PM0E077

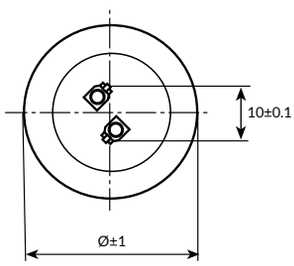
K95 TYPE
-40°C +105°C 5000H

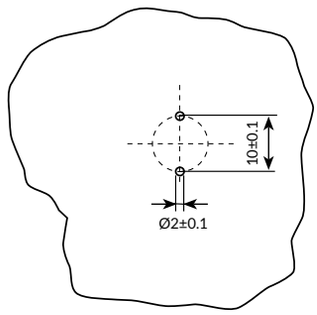
APPLICATIONS | Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

- Design optimized for high ripple current and very long life application
- Miniaturized design
- Surge-proof capacitor in aluminium can with insulation sleeve
- Snap in terminals for PCB mounting

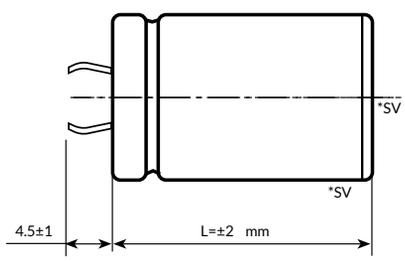
2 PIN CAPACITOR

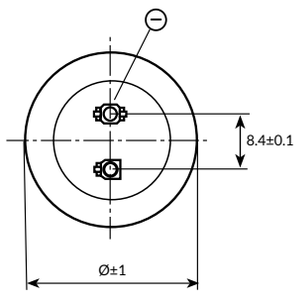


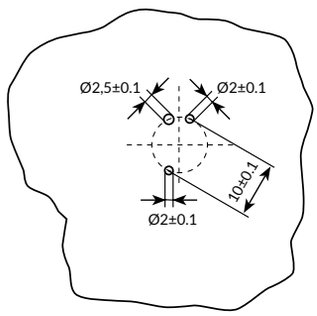




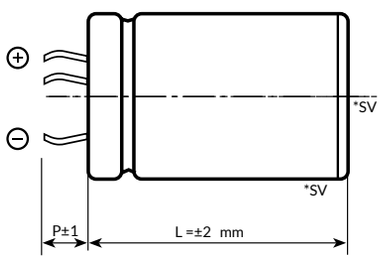
3 PIN CAPACITOR

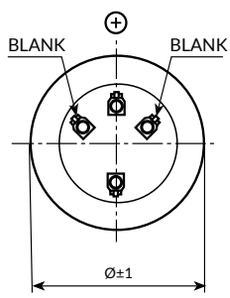


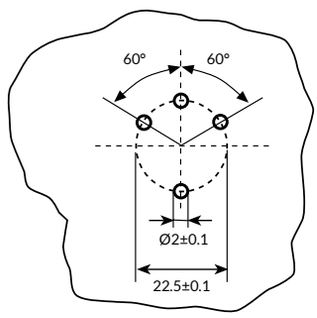




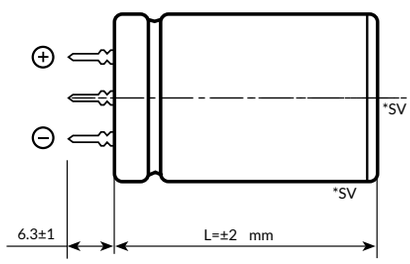
4 PIN CAPACITOR

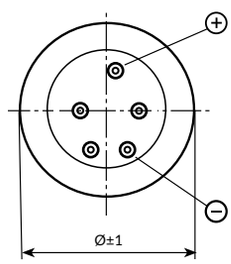


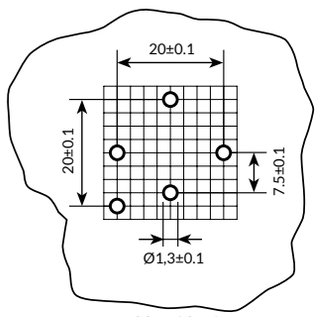




5 PIN CAPACITOR







solder side view

*SV = aluminium can with bottom or side Safety Vent

Ø	22	25	30	35	40	45	50
2 PIN	•	•	•	•	•		
3 PIN		•	•	•			
4 PIN				•	•	•	•
5 PIN					•		

On demand, only for capacitors with diam ≥35mm: octagonal can shape for long stress vibration applications.

K95 TYPE
-40°C +105°C 5000H

SPECIFICATIONS

Temperature Range

Operating -40°C 105°C
Storage: Preferably below +25°C, not exceeding +40°C

Rated Voltage Range (V_r)

from 350V to 450V DC

Surge Voltage (V_p)

$V_p = 1.10\ V_r$

Rated Capacitance Range

from 150 µF to 1.000 µF

Capacitance Tolerance

±20% at 100 Hz, 20°C [M class IEC-62]

Leakage Current (I_L) (µA, 5 min, 20°C)

max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$
at 85°C max $I_L = 0.04\ C_r\ V_r$ µA

Ripple current (I_r)

Refer to table at 105°C and 100Hz:

FREQUENCY	50 Hz	100 Hz	500 Hz	1000 Hz	>10 KHz
MULTIPLIER	0.88	1.0	1.45	1.5	1.55

AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C
MULTIPLIER	3.0	2.8	2.6	2.4	2.2	1.8	1.5	1.0

Insulation Resistance

At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.

Vibration Resistance

Frequency range: 10 Hz to 500 Hz
Max acceleration 10g for 3x2 h

Withstand voltage

2500 VAC for 1 min between terminals bundled and plate

Life test

After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside

Cap change	≤ 10%
tan (δ)	≤ 130%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 130%

Shelf life

After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside

Cap change	≤ ±15%
tan (δ)	≤ 150%
Leakage current (I_L)	< initial limit

Useful life (V_n, Temp rated I ripple applied)

≥ 5.000 h at 105°C

Cap change	≤ 20%
tan (δ)	≤ 200%
Leakage current (I_L)	< initial limit
Impedance (Z)	≤ 200%

Failure percentage
Failure rate

≤ 1% (during useful life)
≤ 40 fit (40 10^{-9}/h)

Self inductance

Approx. 15 nH

Damp heat test

Stable electrical parameters in humidity ambient condition 85°C

Electrolyte

All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10

Marking information

Minus pole band aside within an angle of 41° ± 25°

Reference standards

CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K95 TYPE
-40°C +105°C 5000H

Rated Voltage VDC **350V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
220	25X30	0,10	247	136	1,20	K95350221_PM0C030
270	25x35	0,10	223	111	1,39	K95350271_PM0C035
330	25x35	0,10	165	91	1,50	K95350331_PM0C035
330	30x30	0,10	165	91	1,53	K95350331_PM0D030
390	25x40	0,10	135	75	1,75	K95350391_PM0C040
390	30x35	0,10	135	75	1,80	K95350391_PM0D035
470	25x50	0,10	131	70	2,11	K95350471_PM0C050
470	35x30	0,10	131	70	2,11	K95350471_PM0E030
560	25x55	0,11	115	60	2,45	K95350561_PM0C055
560	30x40	0,11	120	60	2,23	K95350561_PM0D040
560	35x35	0,11	120	70	2,26	K95350561_PM0E035
680	30x55	0,11	108	65	2,85	K95350681_PM0D055
680	35x40	0,11	108	68	2,59	K95350681_PM0E040
820	35x50	0,11	85	46	3,15	K95350821_PM0E050
1000	35x60	0,11	63	40	3,82	K95350102_PM0E060

Rated Voltage VDC **400V**

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
150	25x30	0,10	351	186	1,05	K95400151_PM0C030
180	25x30	0,10	297	159	1,14	K95400181_PM0C030
220	25x35	0,10	240	130	1,34	K95400221_PM0C035
220	30x30	0,10	247	136	1,41	K95400221_PM0D030
270	25x40	0,10	199	107	1,55	K95400271_PM0C040
270	30x35	0,10	201	111	1,60	K95400271_PM0D035
330	25x50	0,10	165	90	1,86	K95400331_PM0C050
330	30x35	0,10	167	91	1,80	K95400331_PM0D035
330	35x30	0,10	167	91	1,90	K95400331_PM0E030
390	25x55	0,10	141	68	2,20	K95400391_PM0C055
390	30x40	0,10	145	70	2,10	K95400391_PM0D040
390	35x35	0,10	148	75	2,10	K95400391_PM0E035
470	30x50	0,10	138	69	2,51	K95400471_PM0D050
470	35x40	0,10	138	69	2,53	K95400471_PM0E040
560	30x55	0,11	115	60	2,79	K95400561_PM0D055
560	35x40	0,11	115	60	2,65	K95400561_PM0E040
680	35x50	0,11	108	59	3,18	K95400681_PM0E050
820	35x55	0,11	85	46	3,65	K95400821_PM0E055
920	35x60	0,11	63	40	3,95	K95400921_PM0E060

K95 TYPE

-40°C +105°C 5000H

Kendeil™

Rated Voltage VDC

420V

Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
150	25x30	0,10	351	186	1,05	K95420151_PM0C030
180	25x30	0,10	297	159	1,14	K95420181_PM0C030
220	25x35	0,10	240	133	1,34	K95420221_PM0C035
220	30x30	0,10	247	136	1,41	K95420221_PM0D030
270	25x40	0,10	199	107	1,55	K95420271_PM0C040
270	30x35	0,10	201	111	1,64	K95420271_PM0D035
330	25x50	0,10	165	90	1,86	K95420331_PM0C050
330	30x35	0,10	167	91	1,80	K95420331_PM0D035
330	35x30	0,10	167	91	1,90	K95420331_PM0E030
390	25x55	0,10	141	68	2,20	K95420391_PM0C055
390	30x40	0,10	145	70	2,10	K95420391_PM0D040
390	35x35	0,10	148	75	2,10	K95420391_PM0E035
470	30x50	0,10	138	69	2,51	K95420471_PM0D050
470	35x40	0,10	138	69	2,53	K95420471_PM0E040
560	30x55	0,11	115	60	2,79	K95420561_PM0D055
560	35x45	0,11	115	60	2,85	K95420561_PM0E045
680	35x50	0,11	108	59	3,18	K95420681_PM0E050
820	35x60	0,11	85	46	3,85	K95420821_PM0E060

Rated Voltage VDC

450V

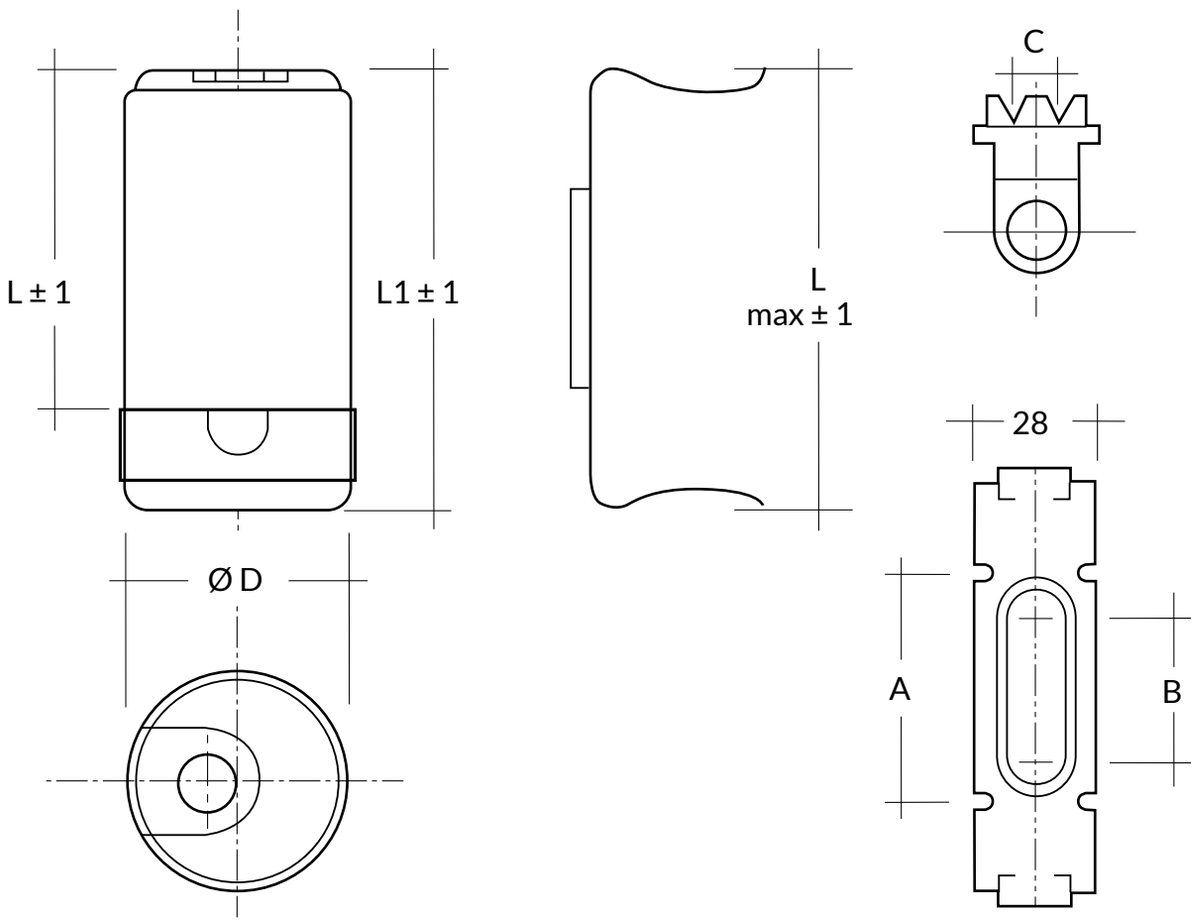
Cap µF	Ø x L mm	Tan δ max 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
150	25x30	0,10	367	186	1,02	K95450151_PM0C030
150	30x30	0,10	367	186	1,15	K95450151_PM0D030
180	25x40	0,10	287	146	1,30	K95450181_PM0C040
180	30x30	0,10	293	152	1,28	K95450181_PM0D030
220	25x40	0,10	255	136	1,38	K95450221_PM0C040
220	30x30	0,10	255	136	1,36	K95450221_PM0D030
220	35x30	0,10	255	136	1,57	K95450221_PM0E030
270	30x40	0,10	204	106	1,71	K95450271_PM0D040
270	35x30	0,10	204	106	1,71	K95450271_PM0E030
330	30x50	0,10	173	90	2,11	K95450331_PM0D050
330	35x40	0,10	173	90	2,12	K95450331_PM0E040
390	30x50	0,10	155	75	2,26	K95450391_PM0D050
390	35x40	0,10	155	75	2,26	K95450391_PM0E040
470	35x50	0,10	142	71	2,73	K95450471_PM0E050
560	35x55	0,11	120	60	3,10	K95450561_PM0E055
680	35x60	0,11	110	59	3,40	K95450681_PM0E060

K13 TYPE
MOTOR START

APPLICATIONS

Non polarized capacitor especially designed forintermittent A.C. voltage applications at 50-60 Hz for single phase motor starting.

- Surge-proof electrolytic capacitor in plastic case
- Poles brought out to single or double fast-on terminals
- Normally supplied with end cup
- On request: bipolar cable, discharge resistance, metal mounting bracket, with or without cover



	Case				Bracket	
	Ø est. mm	L mm	L1 mm	Lmax mm	A mm	B x C mm
A2	38	85.7	98.4	104	53	37 x 6.1
B2	46	85.7	98.4	104	53	37 x 6.1

K13 TYPE
MOTOR START

SPECIFICATIONS

Temperature Range	Operating -25°C +75°C Storage: -40°C +85°C
Working Voltage Range	from 125V to 320V DC
Capacitance Range	from 25 µF to 800 µF
Capacitance Tolerance	-0% +25% or ±10%
Tan δ (Dissipation loss angle)	Measurement frequency: 100 Hz, temperature 20°C Value shall not exceed 0.10 and shall be calculated as follows: tan d = W / (V x I) = (true watts / apparent watts)
Capacitance Measurement	Capacitance shall be determined by measuring the current (after 2÷3 seconds of energising) through the capacitors at rated voltage and frequency. The capacitance is defined from the following formula: $C = (I \times 10^6) / 2 p p x f V$ C = capacitance in µF I = current in Amperes π =3.14 constant f = frequency in Hz V = applied AC voltage in Volt
Working condition	The standard time rating defined of the IEC 252 is 1.67% or 1/60th full time and corresponds to a duty cycle of 3 seconds on 177 seconds off. Alternative customer duty is available on request.
Endurance test	500 hours
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	IEC EN 60252-2

Voltage
125 VAC

Cap µF	PART NUMBER digit_15=0 no cover	PART NUMBER digit_15=1 with cover	PART NUMBER digit_15=2 with cover+bracket	PART NUMBER digit_15=3 with bipolar cable no cover
100-125	K13125100000000B2	K13125100000001B2	K13125100000002B2	K13125100000003B2
125-160	K13125125000000B2	K13125125000001B2	K13125125000002B2	K13125125000003B2
160-200	K13125160000000B2	K13125160000001B2	K13125160000002B2	K13125160000003B2
200-250	K13125200000000B2	K13125200000001B2	K13125200000002B2	K13125200000003B2
250-315	K13125250000000B2	K13125250000001B2	K13125250000002B2	K13125250000003B2
315-400	K13125315000000B2	K13125315000001B2	K13125315000002B2	K13125315000003B2
600	K13125600000000B2	K13125600000001B2	K13125600000002B2	K13125600000003B2
800	K13125800000000B2	K13125800000001B2	K13125800000002B2	K13125800000003B2

Voltage
250 VAC

Cap µF	PART NUMBER digit_15=0 no cover	PART NUMBER digit_15=1 with cover	PART NUMBER digit_15=2 with cover+bracket	PART NUMBER digit_15=3 with bipolar cable no cover
25-31	K13250025000000B2	K13250025000001B2	K13250025000002B2	K13250025000003B2
31-40	K13250031000000B2	K13250031000001B2	K13250031000002B2	K13250031000003B2
40-50	K13250040000000B2	K13250040000001B2	K13250040000002B2	K13250040000003B2
50-63	K13250050000000B2	K13250050000001B2	K13250050000002B2	K13250050000003B2
63-80	K13250063000000B2	K13250063000001B2	K13250063000002B2	K13250063000003B2
80-100	K13250080000000B2	K13250080000001B2	K13250080000002B2	K13250080000003B2
100-125	K13250100000000B2	K13250100000001B2	K13250100000002B2	K13250100000003B2
125-160	K13250125000000B2	K13250125000001B2	K13250125000002B2	K13250125000003B2
160-200	K13250160000000B2	K13250160000001B2	K13250160000002B2	K13250160000003B2
200-250	K13250200000000B2	K13250200000001B2	K13250200000002B2	K13250200000003B2
250-315	K13250250000000B2	K13250250000001B2	K13250250000002B2	K13250250000003B2
315-400	K13250315000000B2	K13250315000001B2	K13250315000002B2	K13250315000003B2
400	K13250400000000B2	K13250400000001B2	K13250400000002B2	K13250400000003B2
500	K13250500000000B2	K13250500000001B2	K13250500000002B2	K13250500000003B2

Voltage
320 VAC

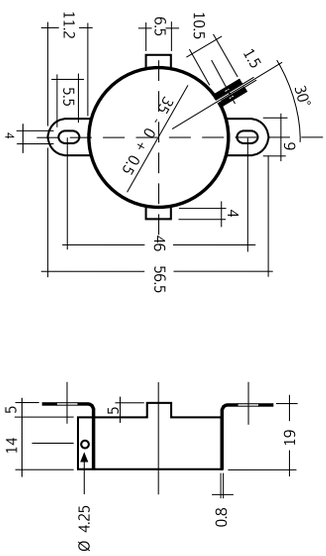
Cap µF	PART NUMBER digit_15=0 no cover	PART NUMBER digit_15=1 with cover	PART NUMBER digit_15=2 with cover+bracket	PART NUMBER digit_15=3 with bipolar cable no cover
25-31	K13320025000000B2	K13320025000001B2	K13320025000002B2	K13320025000003B2
31-40	K13320031000000B2	K13320031000001B2	K13320031000002B2	K13320031000003B2
40-50	K13320040000000B2	K13320040000001B2	K13320040000002B2	K13320040000003B2
50-63	K13320050000000B2	K13320050000001B2	K13320050000002B2	K13320050000003B2
63-80	K13320063000000B2	K13320063000001B2	K13320063000002B2	K13320063000003B2
80-100	K13320080000000B2	K13320080000001B2	K13320080000002B2	K13320080000003B2
100-125	K13320100000000B2	K13320100000001B2	K13320100000002B2	K13320100000003B2
125-160	K13320125000000B2	K13320125000001B2	K13320125000002B2	K13320125000003B2
160-200	K13320160000000B2	K13320160000001B2	K13320160000002B2	K13320160000003B2
200-250	K13320200000000B2	K13320200000001B2	K13320200000002B2	K13320200000003B2
250-315	K13320250000000B2	K13320250000001B2	K13320250000002B2	K13320250000003B2

METAL RING CLIPS

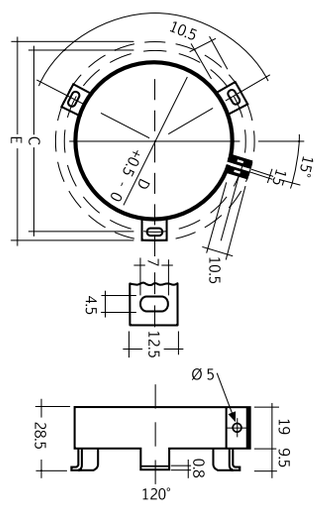
MOUNTING ACCESSORIES FOR THE SCREW TYPE CAPACITORS

Cap diameter Ø mm	C (±0.5) mm hole distance	E (±0.5) mm max width	ORDERING CODE	unit WEIGTH grams (±0.5)
35	46.0	56.5	160350000000000000	11.0
51	63.5	73.4	160500000000000000	22.0
63	76.0	86.1	160640000000000000	26.0
76	89.0	98.6	160760000000000000	27.0
90	101.6	111.1	160900000000000000	62.0

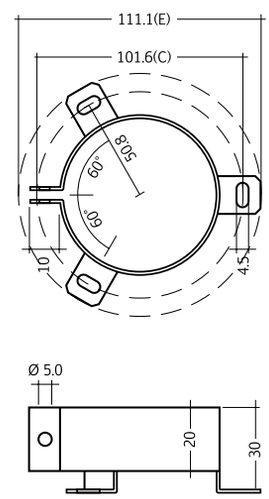
RING CLIPS Ø 35 mm



RING CLIPS Ø 51-63-76 mm



RING CLIPS Ø 90 mm



FEATURES

The mounting clips are mainly used for upright mountings of screw terminal capacitors.
The ring clips are RoHS-compatible.

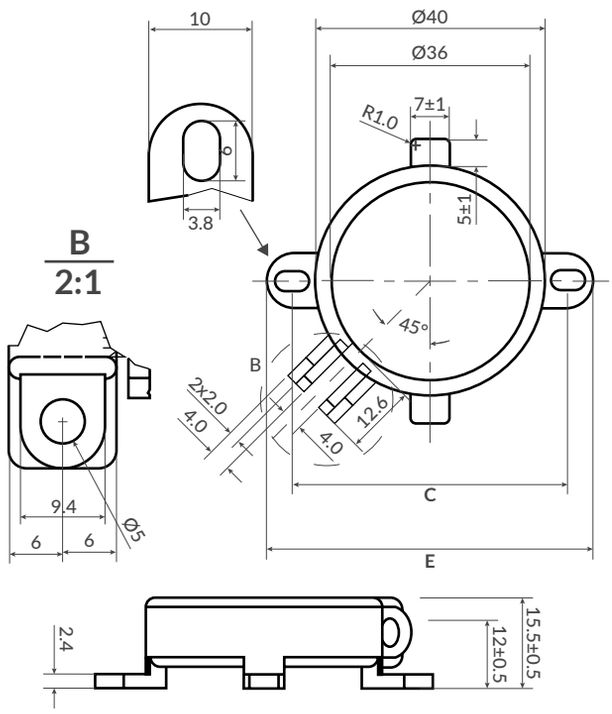
MOUNTING GUIDE

It is strongly recommended to insert an additional insulating layer between capacitor and mounting clip in order to avoid any potential risk of damage due to edges from the counting clips.
Pay attention to any relevant regulations (e.g. VDE, BSA or UL).

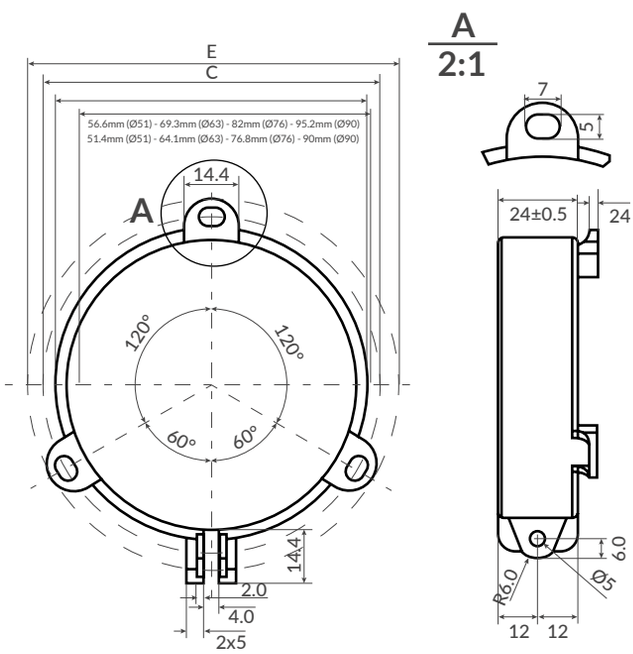
PET MOUNTING ACCESSORIES FOR THE SCREW TYPE CAPACITORS

Cap diameter Ø mm	C (±0.5) mm hole distance	E (±0.5) mm max width	ORDERING CODE	unit WEIGTH grams (±0.5)
35	48.0	89.2	160350100000000000	5.0
51	65.4	77.0	160500200000000000	15.0
63	78.1	89.8	160640200000000000	19.0
76	92.0	102.5	160760200000000000	21.0
90	104.0	116.0	160900200000000000	23.0

PET RING CLIPS Ø 35 mm



PET RING CLIPS Ø 51-63-76-90 mm



FEATURES

The PET mounting clips are mainly used for upright mountings of screw terminal capacitors.
The ring clips are RoHS-compatible.

INSULATED HEX NUTS, WASHERS

TO BE USED WITH SCREW TYPE CAPACITORS

THREAD	DESCRIPTION	Ø	h	H	D	ORDERING CODE
M12	NUT S17 STANDARD	17	1.3	18	28	24000000000000001
M12	NUT S22	22	1.3	18	28	24000000000000003
M8	NUT M8	18	1.3	18	28	24000000000000004
M8	FLAT WASHER					24000000000000005
M12	FLAT WASHER					24000000000000006

INSULATED MOUNTING WITH HEX NUT

Hex nuts and spring washers are delivered loosely with the capacitor.
Insulation washers shall be ordered separately.

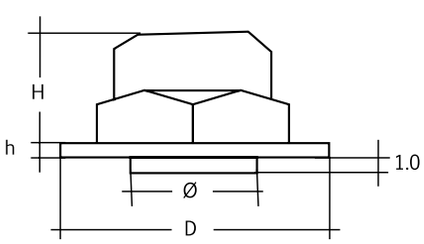
FEATURES

Insulated nylon hex nut and nylon washer and cap nut to be mounted on capacitor with M8 and M12 mounting stud.

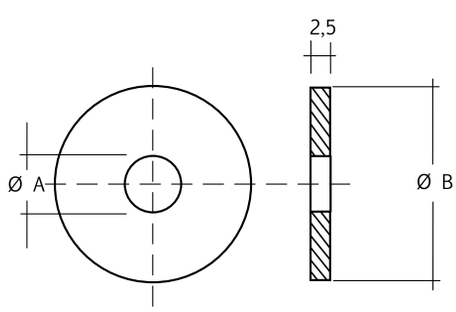
MOUNTING GUIDE

Mounting stud has the same potential as the negative terminal.
Pay attention to any relevant regulations (e.g. VDE, BSA or UL).

M	A	B
M8	8.4	24
M12	12.5	34



HEX NUT



FLAT WASHER

GENERAL WARNING

DISCLAIMER

The following points are applied to all Kendeil's products:

1. Information and data contained in the section "Technical Information" must be considered as a completing part of each family type of capacitor. Before using a Kendeil capacitor in any application, please read carefully the related specifications included in the catalogue. An improper installation or not respecting parameters limits might cause damage to the components, their characteristics modification and a decrease of their reliability and useful life. Products manufactured by Kendeil are made with maximum care, in order to result free of defects in design, materials and workmanship, according with adequate specifications and international standard requirements.
2. All drawings, descriptons, characteristic, materials and performance data given by Kendeil are as accurate as possible but should be considered as a general information, so they are not binding on Kendeil, unless specifically agreed in writing. Unless otherwise stated, dimensions and materials may be subjected to reasonable variations due to available raw materials or normal manufacturing process tolerances.
3. The data and information given in the Technical Information chapter must be considered a part of the single types and capacitors series specifications contained in the general catalogues of Kendeil.
4. Data and characteristics shown in the Kendeil's catalogues could be subjected to modifications without notice. Customers or Buyers have always to refer to Kendeil official web site (www.kendeil.com) for products updated characteristics, last revision specifications, general data and information, products certifications and news.
5. Cooperation between Customers and Kendeil is basically precious in order to solve problems or when a failure occurs. In case of complaint you might have, please forward the following information along with an immediate communication of the failure. Only upon previous agreement with Kendeil, you could send a detailed description of failure, indicating operative condition and type of application, number of defective pieces, eventually expressed in percent on whole quantity used. It is mandatory to know the original batch of goods as printed on the capacitor sleeve or labeled on the box, also let us know the delivery date and others relevant data from the billing documents. Samples of defective products should be sent to Kendeil for analysis, packed in order to prevent additional damages different from the ones detected. Data sheets specifications are referred to a fairly large number of components and do not constitute a guarantee of characteristics or properties in the legal sense. However, agreement on these specifications does not mean that the Customer may not claim for replacement of individual defective capacitors within the terms of delivery; Kendeil will not assume any further liability beyond the replacement of defective capacitors. This applies in particular to any further consequences of component failure as better specified further in this section. A single failure among a delivered batch of capacitors should not be meaningful of poor reliability of the whole production batch, but should be understood to have reached incidentally the end of life within the failure rate defined for each series type.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES

The following points are applied to all Kendeil's products:

1. Kendeil liability shall be limited to only replacement or repairing of goods, free of charge, after aknowledge of received notification by customer and after the returning conditions have been agreed with Customer or Buyer and Kendeil has analysed the defective products and authorized the returning of the good by written communication. Any component rejection of samples delivery must be packed and adequately protected in order to avoid any additional damage different from the original detected failure or problem, anyway ensuring the material integrity and protection against environmental conditions.V
2. Kendeil is not responsible for any possible damage to persons or things, of any kind, derived from improper installation, use of application of its products.
3. Kendeil shall not be liable for any defect due to accident, fair wear and tear, negligent use, tampering, improper handling and shipment, operation and storage or any other default on the parts of any person other then Kendeil.
4. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention of life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuity or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component. All warnings, cautions and product guidelines must be observed.
5. To the maximum extent permitted by above statements, in no event shall Kendeil or its referred dealers be liable for any damages whatsoever (including without limitation, special, incidental, consequential, or indirect damages for personal injury, loss of business profits, business interruption or any pecuniary loss) arising out of the use or inability to use Kendeil products. In the case of any product liability claim from third parties against Kendeil, not falling within Kendeil liability, Customer or Buyer should hold Kendeil harmless

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