Kendeil Indfarad™

ALUMINIUM ELECTROLYTIC CAPACITORS

ISO 9001:2008
TÜV NORD

CE

RoHS Compliant

Company Presentation

Kendeil Indfarad Electronics Pvt Ltd (KIEPL), an ISO 9001:2008 certified company is a joint venture between KENDEIL S.r.l., Italy and the MEHER Group, India for the Design and Manufacture of Aluminium Electrolytic capacitors. The joint venture will focus on addressing the Indian market needs and other targeted regions.

The state of art manufacturing plant is located at Bangalore. The products are made using advanced machinery, integrated technologies and production processes, which are regularly updated to meet the highest international performance and quality standards. Production range spreads over entire range of Screw type Aluminium Electrolyitc Capacitors-IKEN Series. Our reference standard is IEC.

Company's continuous effort in improvement in technology and usage of computer controlled automatic machines gives it a leading role in the market of electronic components. Flexibility of its structure enables it to meet needs of custom designed products. Entire range of products offered are of reliable performance and competitively priced.

R&D activities in Europe reinforce capabilities that are critical for evolving contemporary products & enhancing long term competitiveness. The unique vertically integrated business model of KENDEIL combined with the strengths of MEHER will offer a distinctly superior long-term value proposition to our customers across the geographies.

About Kendeil
Kendeil Group is the leading producer of power electronic components for all power inverter applications such as wind and solar power, industrial motor drives, UPS, battery chargers and aluminium foil for electrolytic capacitors with more than 32 years of experience.
www.kendeil.com

About MEHER
Headquartered in Bangalore, India, since 1977, the MEHER group has business interests in strategically selected areas in the energy domain such as passive components, thin film dielectrics, dynamic electrical braking systems.
www.meher.com

Visit our website: www.kendeil-indfarad.com

Joint Venture of

MEHER® GROUP

Kendeil™

TÜV NORD

CERTIFICATE

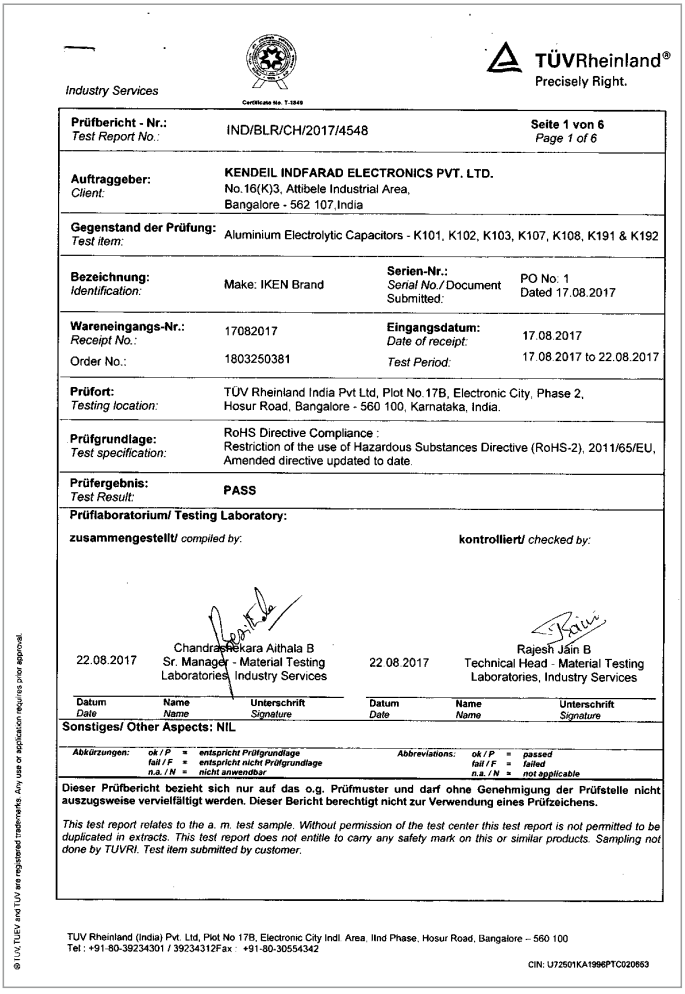
Management system as per
ISO 9001 : 2008

KENDEIL INDFARAD ELECTRONICS PVT. LTD.
16(K)3, Attibele Industrial Area, Neralur Post,
Bengaluru – 562 107, Karnataka,
India

Manufacture of Aluminium Electrolytic Capacitors

TÜV NORD CERT GmbH

IAF DAkkS



Industry Services

Certificate No. T-1949

TÜVRheinland®
Precisely Right.

Prüfbericht - Nr.: *Test Report No.:*	IND/BLR/CH/2017/4548	**Seite 1 von 6** *Page 1 of 6*
Auftraggeber: *Client:*	**KENDEIL INDFARAD ELECTRONICS PVT. LTD.** No.16(K)3, Attibele Industrial Area, Bangalore - 562 107,India	
Gegenstand der Prüfung: *Test item:*	Aluminium Electrolytic Capacitors - K101, K102, K103, K107, K108, K191 & K192	
Bezeichnung: *Identification:*	Make: IKEN Brand	**Serien-Nr.:** *Serial No./* Document Submitted: PO No. 1 Dated 17.08.2017
Wareneingangs-Nr.: *Receipt No.:*	17082017	**Eingangsdatum:** *Date of receipt:* 17.08.2017
Order No.:	1803250381	*Test Period:* 17.08.2017 to 22.08.2017
Prüfort: *Testing location:*	TÜV Rheinland India Pvt Ltd, Plot No.17B, Electronic City, Phase 2, Hosur Road, Bangalore - 560 100, Karnataka, India.	
Prüfgrundlage: *Test specification:*	RoHS Directive Compliance : Restriction of the use of Hazardous Substances Directive (RoHS-2), 2011/65/EU, Amended directive updated to date.	
Prüfergebnis: *Test Result:*	**PASS**	

Prüflaboratorium/ Testing Laboratory:

zusammengestellt/ *compiled by:*

Datum / Date	Name / Name	Unterschrift / Signature
22.08.2017	Chandrashekara Aithala B Sr. Manager - Material Testing Laboratories, Industry Services	

kontrolliert/ *checked by:*

Datum / Date	Name / Name	Unterschrift / Signature
22.08.2017	Rajesh Jain B Technical Head - Material Testing Laboratories, Industry Services	

Sonstiges/ Other Aspects: NIL

Abkürzungen:				Abbreviations:			
	ok / P	=	entspricht Prüfgrundlage	ok / P	=	passed
	fail / F	=	entspricht nicht Prüfgrundlage	fail / F	=	failed
	n.a. / N	=	nicht anwendbar	n.a. / N	=	not applicable

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products. Sampling not done by TUVRI. Test item submitted by customer.

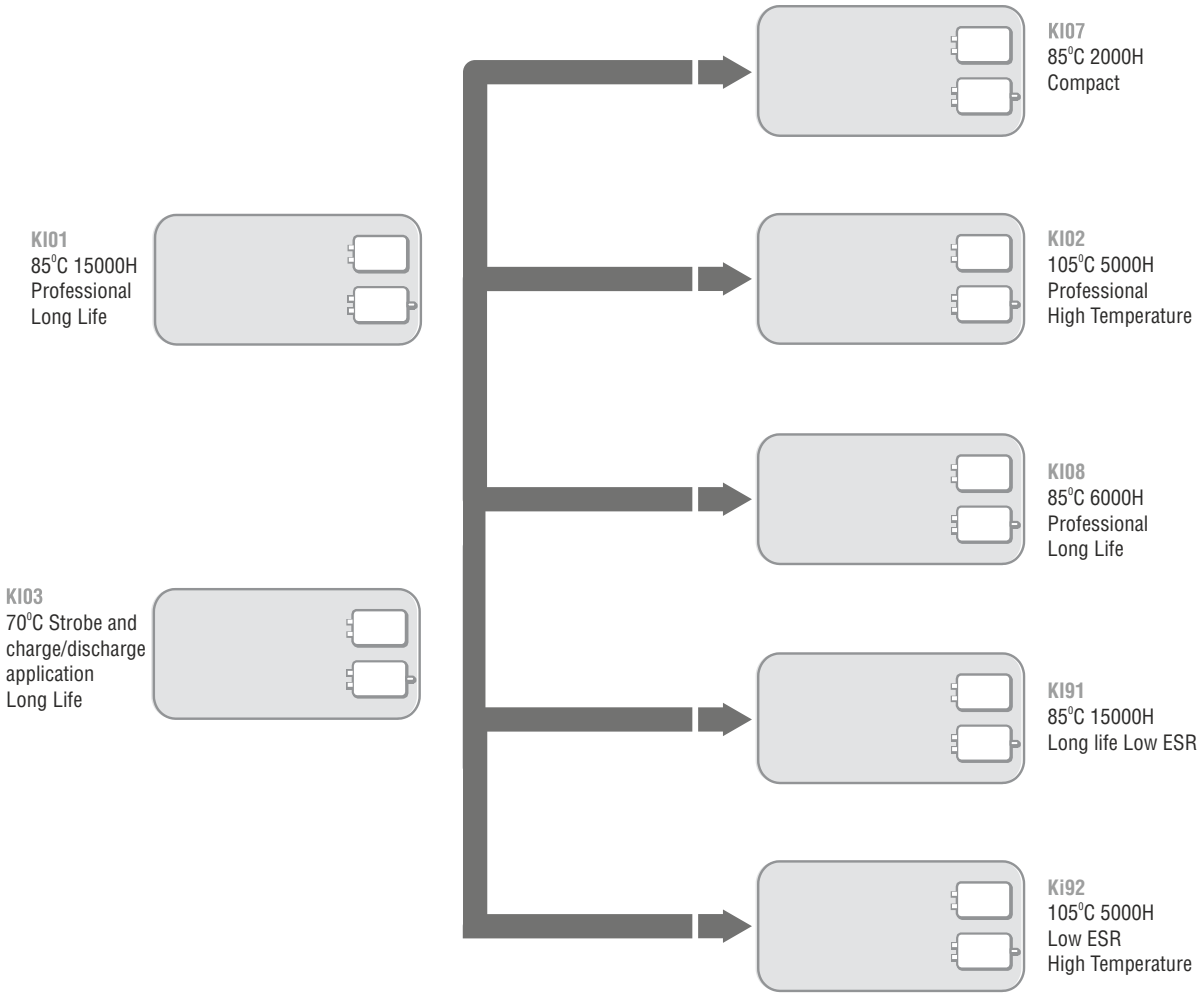
TUV Rheinland (India) Pvt. Ltd, Plot No 17B, Electronic City Indl. Area, IInd Phase, Hosur Road, Bangalore – 560 100
Tel : +91-80-39234301 / 39234312Fax : +91-80-30554342
CIN: U72501KA1996PTC020863

Index

Overview

Product Road Map

IKEN Series Screw Terminals



Kendeil series Snap-in capacitors also available.

Part Number System

Total length is 18 digits.
Please see examples below and have a reference code from the standard ratings capacitors pages.

SCREW CAPACITORS

K	I												Ø	n	n	n
Type		Voltage		Capacitance			Term	Insert	Tol	Res	Case Size					

Case Size
Ø=Diameter code:
A=20 B=22 C=25 D=30 E=35 F=40
N=45 G=51 H=63 J=76 L=90
nnn=Length in mm

Reserved
0 = standard ratings, 1= special

Tolerance
tolerance range as IEC62
M= ±20%, Q= -10% +30%, X= custom
T= -10% +50%, U= -10% +75%

Insert Style
insert type on decks
0= Dia 35 (small Dia M5)
H= Standard High Ripple
Dia 51-63-76(M5), Dia 90 (M6)
6= M6 Dia 76 Only,
L= M5 long insert style*

Termination
terminal as follows:
screw type: 0 = no stud/flat bottom,
M = M8 stud, S = M12 stud

Capacitance
[µF] - 2 significant digits plus
multiplying factor
1= x10, 2= x100, 3x1000, 4x10000

Voltage
DC rated voltage [V]

Series Type
IKEN Series Kendeil Indfarad
Aluminium Electrolytic
capacitor type.

Examples

KI01 100V 22000µF, High Ripple, -20%+20%, 63x105

K	I	0	1	1	0	0	2	2	3	0	H	M	0	H	1	0	5

KI02 40V 100000µF, High Ripple, -20%+20%,76x143

K	I	0	2	0	4	0	1	0	4	0	H	M	0	J	1	4	3

* Note for Insert Style
M5 long insert style dedicated to not insulated bus bar (+2mm height as against Standard High Ripple code).

SPQ Details (Cap weight table)

SIZE Dia X L(mm)	CODE	APPROX UNIT WEIGHT Grams	QTY PER BOX Pcs	BOX DIMENSIONS cm	Type
35x51	E051	80	60	36 X 25 X 6	SCREW TERMINAL
35x60	E060	70	60	36 X 25 X 8	
35x79	E079	110	60	36 X 25 X 8	
51x60	G060	110	42	38.5 X 38.5 X 14	
51x79	G079	200	42	38.5 X 38.5 X 14	
51x96	G096	252	42	38.5 X 38.5 X 14	
51x105	G105	260	42	38.5 X 38.5 X 14	
51x115	G115	270	42	38.5 X 38.5 X 20	
51x130	G130	352	42	38.5 X 38.5 X 20	
51x143	G143	370	42	38.5 X 38.5 X 20	
63x60	H060	240	25	38.5 X 38.5 X 14	
63x79	H079	280	25	38.5 X 38.5 X 14	
63x96	H096	366	25	38.5 X 38.5 X 14	
63x105	H105	420	25	38.5 X 38.5 X 14	
63x115	H115	488	25	38.5 X 38.5 X 20	
63x130	H130	527	25	38.5 X 38.5 X 20	
63x143	H143	540	25	38.5 X 38.5 X 20	
76x79	J079	450	16	38.5 X 38.5 X 14	
76x105	J105	600	16	38.5 X 38.5 X 20	
76x115	J115	616	16	38.5 X 38.5 X 20	
76x130	J130	720	16	38.5 X 38.5 X 20	
76x143	J143	940	16	38.5 X 38.5 X 20	
76x214	J214	1540	8	37 X 26 X 26	
90x145	L145	1250	6	37 X 26 X 26	
90x220	L220	1790	6	37 X 26 X 26	
90x240	L240	1880	6	37 X 26 X 26	
22x25	B025	15	160	36 X 25 X 6	SNAP - IN
22x30	B030	19	160	36 X 25 X 6	
22x40	B040	24	160	36 X 25 X 6	
25x25	C025	16	126	36 X 25 X 6	
25x30	C030	21	126	36 X 25 X 6	
25x40	C040	30	126	36 X 25 X 6	
25x50	C050	38	126	36 X 25 X 6	
30x25	D025	24	88	36 X 25 X 6	
30x30	D030	27	88	36 X 25 X 6	
30x40	D040	38	88	36 X 25 X 6	
30x50	D050	55	88	36 X 25 X 6	
35x25	E025	42	60	36 X 25 X 6	
35x30	E030	45	60	36 X 25 X 6	
35x35	E035	50	60	36 X 25 X 6	
35x40	E040	62	60	36 X 25 X 6	
35x50	E050	78	60	36 X 25 X 6	
35x60	E060	88	60	36 X 25 X 8	
40x50	F050	98	48	36 X 25 X 6	
40x60	F060	117	48	36 X 25 X 8	
40x77	F077	138	48	36 X 25 X 8	
40x97	F097	181	49	38.5 X 38.5 X 14	
45x77	N077	200	49	38.5 X 38.5 X 14	
45x97	N097	240	49	38.5 X 38.5 X 14	
45x105	N105	260	49	38.5 X 38.5 X 14	
50x60	V060	97	42	38.5 X 38.5 X 14	
50x77	V077	180	42	38.5 X 38.5 X 14	
50x105	V105	240	42	38.5 X 38.5 X 14	

Electrical Characteristics

Rated Capacitance

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

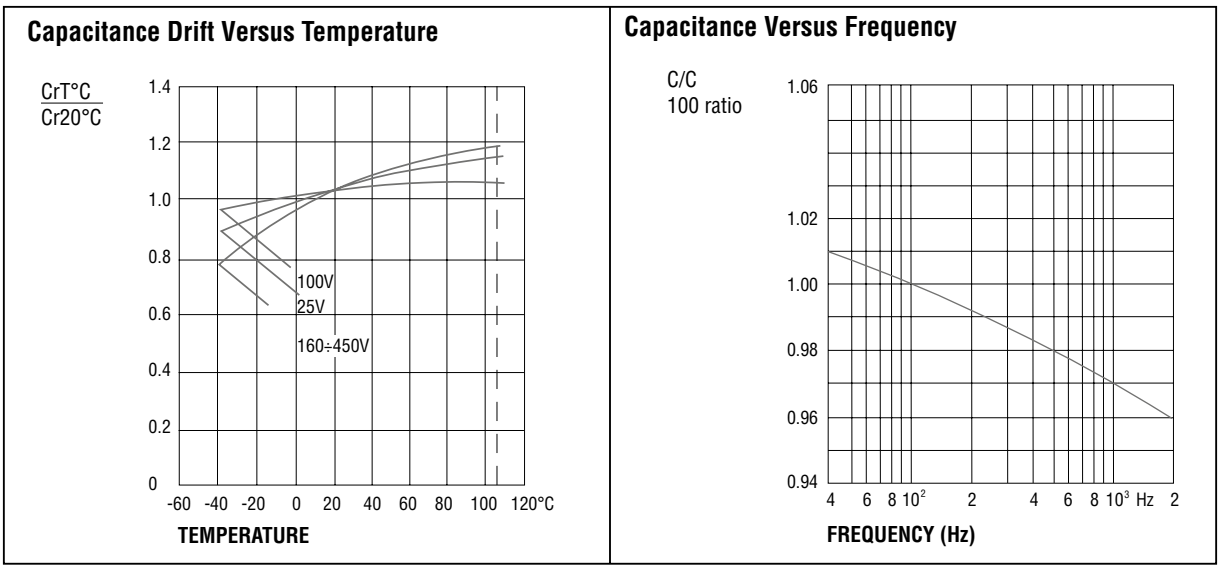


Fig. 1

Rated Voltage (V_r)

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.

Reverse polarization shall not exceed two times VDC value.
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 (V_p)

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 of 1000Ω should be used.

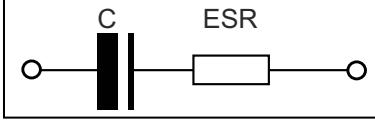
Charge is held for 30 seconds for 1000 cycles, then the capacitor is allowed to discharge without load for 5 minutes. Rated and surge voltage values for Kendeil Indfarad capacitors are listed in following table, where a different relation is applied depending on rated value (V_r).

	$V_p = 1.15\ V_r$										$V_p = 1.10\ V_r$			$V_p = 1.05\ V_r$		
RATED VOLTAGE [V_r]	16	25	40	50	63	75	100	160	200	250	350	400	450	500	550	600
SURGE VOLTAGE [V_p]	18	29	46	57	72	86	115	184	230	287	385	440	495	525	578	630

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 100Hz 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-Indfarad capacitors reduces significantly the ESR value.

Equivalent standard circuit



$ESR = R_1 + R_2 + R_3$
R_1 = Resistance of aluminium oxide thickness
R_2 = Resistance of electrolyte, spacer
R_3 = Resistance due to materials: foil lenght, tabs, terminations contact resistance

Leakage Current (I_L)

Measured at 20°C after 5 minutes under rated voltage.
It is the current flowing through the insulation resistance when a direct current is applied to the capacitor. After charging a capacitor to a set voltage we obtain, initially, a high current flow which decreases rapidly until a constant very small value is reached, the final leakage current. The leakage current value increases both with voltage and temperature. After a long storage period, the leakage current value can be exceeding the rated value and before the output measurement reanodization is necessary.

For typical leakage current versus time and temperature, see Fig. 2-3.

I_L Drift Versus Time

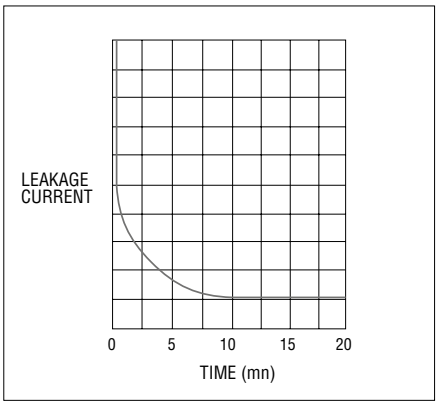


Fig. 2

I_L Drift Versus Temperature

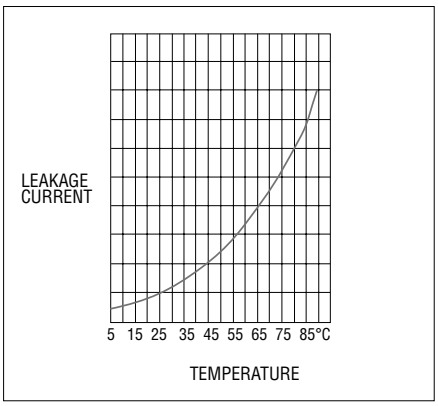


Fig. 3

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.

Relationship is included in the following formula:

$$Tan\,\delta = 2\pi f\,C\,ESR$$

where f = frequency, C= rated capacitance

Maximum values in the datasheets have been indicated at 100Hz and 20°C.
Drift versus frequency as Fig. 4-5.

tan δ Drift Versus Frequency
Low Voltage (≤ 100 Vr DC)

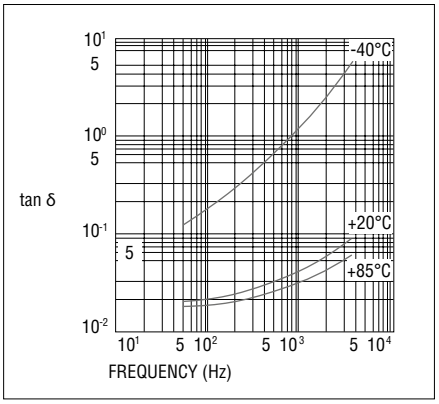


Fig. 4

tan δ Drift Versus Frequency
High Voltage (> 100 Vr DC)

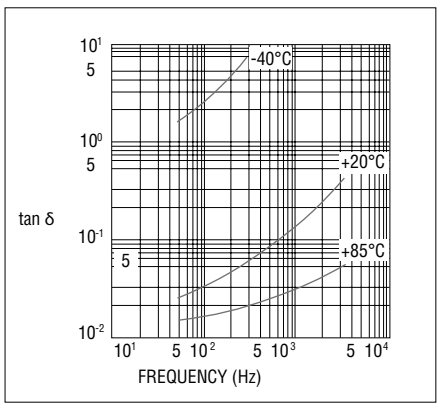


Fig. 5

INDUCTANCE

Some inductance is present in aluminium electrolytic capacitors, but values are usually less than few tens of nH.

Impedance (Z)

$$Z = \sqrt{ESR^2 + (X_L - X_C)^2}$$

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 resonace Z=ESR.

Typical impedance drift versus frequency, see Fig. 6-7.

Z Drift Versus Frequency
Low Voltage (≤ 100 V_r DC)

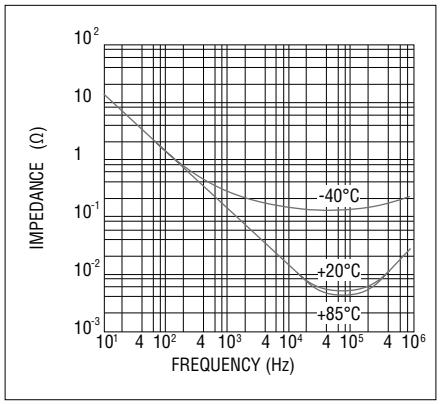


Fig. 6

Z Drift Versus Frequency
High Voltage (> 100 V_r DC)

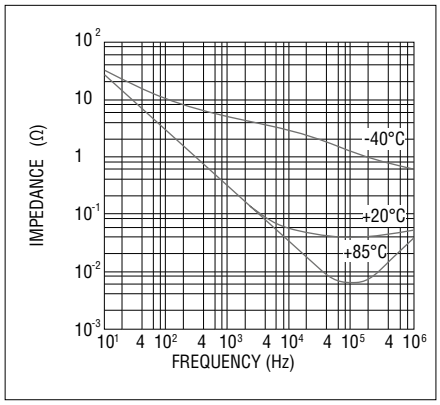


Fig. 7

Ripple Current (I_r)

It is defined as the superimposed alternated ripple current (sinusoidal alternating current at 100Hz). 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. The thermal gradient of an aluminium foil capacitor in an aluminium can is 10^{-3} Watt/cm^2/°C. 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 temperature values and ripple current values.

Shelf Life (Voltage free storage)

Capacitors generally can 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 experience the following scheme meaningful for voltage related classes of capacitors:

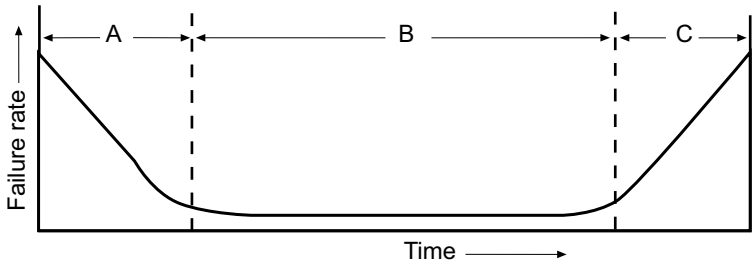
Three Years	Two Years
≤ 100 V DC	> 100 V DC

After an extended storage period, the leakage current value may exceed the rated value and, before the output measurement, a re-anodisation process is required.

It could be realised 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 typical value specified for each series.

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 deficiencies in design, structure, manufacturing processes or severe application. Such failures occur soon after the components are exposed to circuit conditions. 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 = 1 10^{-9}/hours (failure in time) also indicated as percentage of failures in 1000 hours.

λ ***= number of failures / (number of components tested x working time)***

MTBF (Mean Time Before Failure) could be calculated according to failure rate following the relationship:
MTBF= 1/λ
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 arised. 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 incidents (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 Current 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:
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.

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 the laboratory at Kendeil-Indfarad 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 life expectation 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 on 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:

$$\textit{Useful Lifetime} = L_{OPMAX} \times 2^{(Tmax+10-Tc)/10}$$

Where:
Useful Lifetime - expressed in hours
L_{OPMAX} = Lifetime at max rated operating temperature (eg.: 10000 hrs at 85°C)
T_{max} = Actual operating temperature of the capacitors (eg.: 85°C for KI01 type)
T_c = 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:
Userful Lifetime
$= 10000 \times 2^{(85+10-55.43)/10}$
$= 10000 \times 2^{3.956}$
= 155194 hours

Note
Applicable temperature range is the temperature depending 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.

FLAMMABILITY

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	No ignition non flammable
Sleeve	all screw type	PVC	No ignition
Vent Plug	for screw type terminal only	Silicone	Ignition non flammable
Electrolyte	all internal wound elements in each capacitor	Glycol based (*)	not self extinguishing non flammable (*1) flash point 110°C higher then rated 85° or 105° class

(*) NOTE FOR ELECTROLYTE
Kendeil-Indfarad 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

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

PRINTING ON CAPACITOR

The picture shows the print on the sleeve of an IKEN Electrolytic capacitor
4700 µfd , 450VDC

Where M indicates -20% to +20% tolerance on capacitance

The lines on the right shows the (-) polarity of the Capacitor (Cathode)

The next line 40 / 85 / 56represents Environmental Classification

The bottom line indicates the lot number,
Where ,
1319 means that it has been made in the year 2013 , week 19
1105 means production batch number

Screw Terminal Capacitors

IKEN Series KI01 TYPE -40°C +85°C 15000 H

RoHS Compliant

- 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.

Applications

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

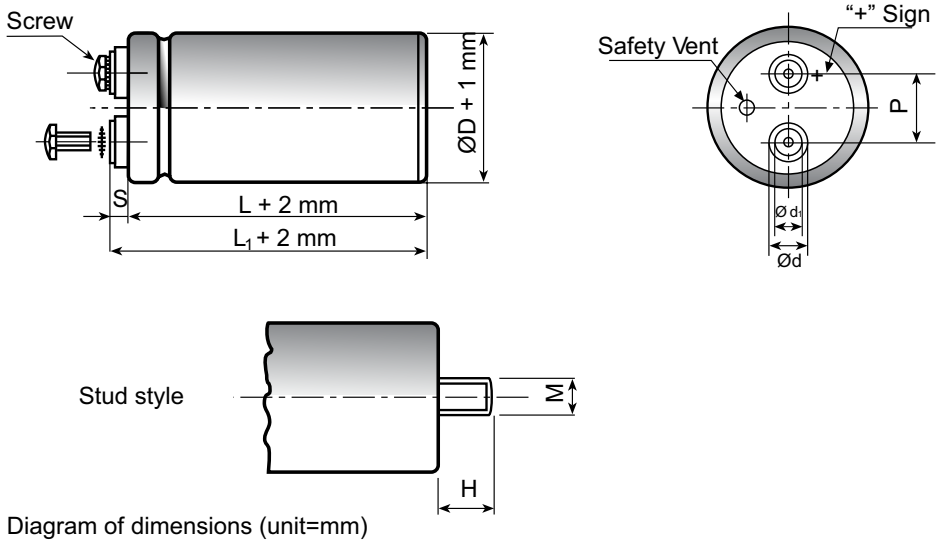


Diagram of dimensions (unit=mm)

ØD	d	d_1	P	M	H	Insert	Screw	$L_1 - L_{(-1+3)}$	$S_{(-1+1)}$
35	11	7.9	12.7	M 8	12	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5 Long	5MA x 9.5*	4.5	7
63	18.5	13	28.6	M 12	16	M5	5MA x 9.5	2.5	5
63	18.5	13	28.6	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	18.5	13	31.8	M 12	16	M5	5MA x 9.5	2.5	5
76	18.5	13	31.8	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7
90	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7

Note for M5 Long: (*) also available as 5MA x 12

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)	$V_P = 1.05\ V_r$ ($V_r > 450$V DC) $V_P = 1.15\ V_r$ ($V_r \leq 250$V DC) $V_P = 1.10\ V_r$ ($V_r > 250$V DC)
Rated Capacitance Range	from 220 uF to 1,500,000 µF
Capacitance Tolerance	±20% at 100Hz, 20°C (M class IEC-62) on request: -10% +30% at 100 Hz, 20°C (Q class IEC-62)
Leakage Current (I_L) **(mA, 5 min, 20°C)**	max $I_L = 0.006\ C_r\ V_r + 4$ µA 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 50Hz 100Hz 500Hz 1000Hz >10kHz 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 Maximum internal temperature 98°C Due to the current load capability of the contact elements, the following limits must not be exceeded: Capacitor Diameter 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: 10Hz to 55Hz, amplitude 0.75 mm Capacitor length ≤ 143 : max acceleration 10g for 3x2 h Capacitor length > 143 : max acceleration 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 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 (Vn, Temp rated, I ripple Current applied)	> 200,000 h at 40°C > 12,000 h at 85°C for $V_r \leq 100$V and for $V_r \geq 500$V > 15,000 h at 85°C for 100V < $V_r \geq$ 500V
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 25 fit (25 10^{-9}/h) ($V_r \leq 160$V DC) ≤ 33 fit (33 10^{-9}/h) ($V_r > 160$V DC)
Self inductance	Approx. 20 nH
Sectional Specifications / Reference	CECC 30.300 IEC 60384-4 Long Life Grade

ALUMINIUM ELECTROLYTIC CAPACITORS
KI01 Series with Screw Terminal
Standard Capacitor values and dimensions

Kendeil Indfarad™

*Other Voltages avaialble on request

Rated Voltage*	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	ESR TYP at 100 Hz, 20°C(milli Ohms)	Impedance TYP at 10 KHz, 20°C(milli Ohms)	Ripple current Max at 100 Hz85°C(Amps)	Can Size D x L mm
50	57	4,700	0.20	33.0	30.0	5.6	35x60
		6,800	0.20	25.0	24.0	7.0	35x60
		10,000	0.20	21.0	20.0	10.0	35x60
		15,000	0.25	17.0	15.0	11.3	35x79
		22,000	0.30	16.0	13.0	13.1	51x79
		33,000	0.35	15.0	13.0	16.0	51x105
		33,000	0.35	15.0	13.0	17.5	63x105
		47,000	0.40	12.0	10.0	16.2	51x105
		47,000	0.40	12.0	10.0	18.3	63x105
		68,000	0.60	12.0	9.0	18.0	63x105
		68,000	0.60	12.0	9.0	22.1	76x105
		1,00,000	0.90	8.0	8.0	23.8	76x105
		1,00,000	0.90	8.0	8.0	25.8	76x143
		1,50,000	1.00	6.0	6.0	31.5	76x143
63	72	4,700	0.15	29.0	25.0	6.2	35x60
		6,800	0.18	21.0	20.0	7.0	35x60
		6,800	0.18	21.0	20.0	8.2	35x79
		10,000	0.20	21.0	20.0	8.7	35x79
		10,000	0.20	18.0	16.0	10.1	51x79
		15,000	0.25	15.0	13.0	11.1	51x79
		22,000	0.30	13.0	11.0	12.4	51x79
		22,000	0.30	13.0	11.0	14.6	51x105
		33,000	0.35	11.0	10.0	15.6	51x105
		33,000	0.35	11.0	10.0	17.9	63x105
		47,000	0.45	10.0	9.0	15.8	51x105
		47,000	0.45	11.0	10.0	18.8	63x105
		68,000	0.50	11.0	10.0	25.7	76x105
		1,00,000	0.55	8.0	8.0	31.5	76x105
		1,00,000	0.55	8.0	8.0	34.5	76x143
		1,50,000	0.60	6.0	6.0	36.1	76x143
75	86	4,700	0.15	29.0	25.0	5.4	35x60
		6,800	0.18	20.0	20.0	8.5	35x79
		10,000	0.20	18.0	16.0	11.0	51x79
		15,000	0.25	15.0	13.0	12.7	51x105
		22,000	0.30	12.0	11.0	15.2	51x105
		22,000	0.30	12.0	11.0	16.2	63x105
		33,000	0.35	11.0	10.0	16.8	63x105
		33,000	0.35	11.0	10.0	18.5	76x105
		47,000	0.45	10.0	10.0	20.1	76x105
		47,000	0.45	10.0	10.0	22.1	76x143
		68,000	0.60	10.0	10.0	26.0	76x143
		1,00,000	0.60	8.0	8.0	34.9	76x143
100	115	1,500	0.15	84.0	65.0	4.0	35x60
		2,200	0.15	57.0	47.0	5.0	35x60
		3,300	0.15	48.0	39.0	5.3	35x60
		3,300	0.15	48.0	39.0	6.8	35x79
		4,700	0.15	30.0	26.0	7.5	35x79
		4,700	0.15	30.0	26.0	10.0	51x79
		6,800	0.20	23.0	20.0	11.1	51x79
		10,000	0.20	16.0	14.0	11.9	51x79
		10,000	0.20	16.0	14.0	13.9	51x105
		10,000	0.20	16.0	14.0	14.5	63x105
		15,000	0.25	13.0	12.0	14.8	51x105
		15,000	0.25	13.0	12.0	17.5	63x105
		22,000	0.25	12.0	12.0	18.2	63x105
		33,000	0.25	10.0	10.0	23.1	76x105
		47,000	0.30	10.0	9.0	30.2	76x143
		68,000	0.30	8.0	8.0	36.5	76x143
		68,000	0.40	6.0	5.0	39.5	76x214
160	184	1,000	0.10	98.0	90.0	4.0	35x79
		1,500	0.10	62.0	71.0	5.3	51x79
		2,200	0.10	50.0	43.0	7.0	51x79
		3,300	0.12	35.0	30.0	8.6	51x105
		4,700	0.12	25.0	25.0	10.9	51x105
		4,700	0.12	25.0	25.0	11.9	63x105
		6,800	0.12	21.0	22.0	11.4	51x105
		6,800	0.12	20.0	22.0	13.0	63x105
		10,000	0.15	13.0	12.0	17.4	76x105
		10,000	0.15	13.0	12.0	19.4	76x143
		15,000	0.15	11.0	10.0	20.9	76x143
		22,000	0.20	10.0	10.0	26.4	76x143
		33,000	0.20	8.0	8.0	34.1	76x214
200	230	680	0.10	124.0	119.0	3.4	35x60
		1,000	0.10	86.0	88.0	3.5	35x79
		1,500	0.10	60.0	63.0	5.8	51x79
		2,200	0.10	40.0	37.0	7.2	51x105
		3,300	0.12	32.0	30.0	9.0	51x105
		3,300	0.12	31.0	29.0	10.2	63x105
		4,700	0.12	28.0	26.0	10.4	51x105
		4,700	0.12	27.0	25.0	11.1	63x105
		5,600	0.12	21.0	18.0	12.1	63x105
		6,800	0.12	20.0	16.0	13.9	63x105
		6,800	0.12	19.0	15.0	14.3	76x105
		8,200	0.12	16.0	14.0	14.8	76x105
		10,000	0.15	13.0	12.0	15.8	76x105
		10,000	0.15	13.0	12.0	18.6	76x143
		15,000	0.18	12.0	12.0	21.4	76x143
		22,000	0.18	9.0	9.0	28.9	76x143
		33,000	0.22	8.0	8.0	36.1	76x214
250	287	470	0.10	211.0	200.0	2.8	35x60
		680	0.10	127.0	121.0	3.5	35x79
		1,000	0.10	86.0	88.0	4.1	35x79
		1,500	0.10	64.0	56.0	5.0	51x79
		2,200	0.10	40.0	36.0	7.5	51x105
		3,300	0.12	31.0	26.0	9.8	51x105
		3,300	0.12	30.0	25.0	11.0	63x105
		4,700	0.12	24.0	21.0	11.8	63x105
		4,700	0.12	24.0	21.0	11.8	63x120
		4,700	0.12	20.0	18.0	13.2	76x105
		5,600	0.12	17.0	16.0	13.8	76x105
		6,800	0.12	15.0	13.0	14.1	76x105
		8,200	0.12	14.0	13.0	16.0	76x143
		10,000	0.13	13.0	12.0	19.7	76x143
		15,000	0.13	11.0	11.0	21.9	76x143
		22,000	0.14	10.0	9.0	34.2	76x214
350	385	470	0.10	170.0	136.0	3.3	35x60
		680	0.10	108.0	95.0	4.0	35x79
		1,000	0.10	79.0	62.0	5.0	51x79
		1,000	0.10	79.0	62.0	5.5	51x105
		1,500	0.10	60.0	52.0	7.4	51x105
		2,200	0.10	44.0	40.0	9.0	51x105
		2,200	0.10	37.0	34.0	9.5	63x105
		3,300	0.12	26.0	22.0	10.1	63x105
		3,300	0.12	26.0	22.0	12.8	76x105
		4,700	0.12	17.0	16.0	14.5	76x105
		4,700	0.12	17.0	16.0	17.5	76x143
		5,600	0.12	17.0	16.0	18.5	76x143
		6,800	0.12	16.0	15.0	19.2	76x143
		8,200	0.12	16.0	15.0	20.7	76x143
		10,000	0.12	15.0	15.0	23.0	76x143
		10,000	0.14	15.0	14.0	26.6	76x214
		15,000	0.15	14.0	14.0	31.7	76x214
		22,000	0.20	13.0	13.0	35.4	90x220
400	440	220	0.10	350.0	288.0	2.1	35x60
		330	0.10	290.0	273.0	2.8	35x60

ALUMINIUM ELECTROLYTIC CAPACITORS
KI01 Series with Screw Terminal
Standard Capacitor values and dimensions

***Other Voltages avaialble on request**

Rated Voltage*	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	ESR TYP at 100 Hz, 20°C(milli Ohms)	Impedance TYP at 10 KHz, 20°C(milli Ohms)	Ripple current Max at 100 Hz85°C(Amps)	Can Size D x L mm
		470	0.10	160.0	149.0	3.0	35x60
		470	0.10	165.0	155.0	3.5	35x79
		680	0.10	120.0	115.0	4.7	51x79
		680	0.10	124.0	120.0	5.1	51x105
		1,000	0.10	105.0	95.0	5.8	51x79
		1,000	0.10	110.0	85.0	6.3	51x105
		1,500	0.10	65.0	55.0	7.0	51x105
		1,500	0.10	65.0	55.0	7.9	63x105
		2,200	0.10	50.0	47.0	8.3	51x105
		2,200	0.10	50.0	47.0	9.0	63x105
		2,200	0.10	50.0	47.0	10.7	76x105
		3,300	0.12	35.0	30.0	11.0	63x105
		3,300	0.12	35.0	30.0	13.1	76x105
		3,300	0.12	35.0	30.0	14.2	76x143
		4,700	0.15	30.0	29.0	14.9	76x105
		4,700	0.15	30.0	29.0	16.8	76x143
		5,600	0.15	26.0	25.0	19.0	76x143
		6,800	0.15	20.0	18.0	19.5	76x143
		8,200	0.15	22.0	20.0	19.0	76x143
		10,000	0.15	22.0	20.0	19.0	76x143
		10,000	0.15	20.0	19.0	26.0	76x214
		15,000	0.20	15.0	12.0	33.5	90x220
		19,000	0.25	11.0	11.0	36.0	90x220
450	495	220	0.10	360.0	300.0	2.0	35x60
		330	0.10	240.0	210.0	2.8	35x60
		470	0.10	200.0	179.0	4.0	51x79
		680	0.10	140.0	128.0	4.4	51x79
		680	0.10	140.0	128.0	5.0	51x105
		1,000	0.10	100.0	88.0	4.8	51x79
		1,000	0.10	100.0	88.0	6.4	51x105
		1,500	0.10	67.0	55.0	7.1	51x105
		1,500	0.10	67.0	55.0	8.0	63x105
		2,200	0.10	60.0	55.0	9.0	63x105
		2,200	0.10	60.0	47.0	11.2	76x105
		2,200	0.10	60.0	47.0	12.5	76x143
		3,300	0.12	35.0	30.0	11.2	76x105
		3,300	0.12	35.0	30.0	12.9	76x143
		4,700	0.15	32.0	30.0	15.0	76x143
		5,600	0.15	26.0	25.0	19.0	76x143
		6,800	0.15	23.0	22.0	19.0	76x143
		8,200	0.15	22.0	20.0	19.0	76x143
		10,000	0.20	22.0	20.0	19.0	76x143
		10,000	0.20	20.0	19.0	23.1	76x214
		12,000	0.20	15.0	12.0	29.8	76x214
		15,000	0.20	14.0	12.0	32.6	90x220
500	525	1,000	0.15	125.0	114.0	4.0	51x105
		1,500	0.15	100.0	91.0	5.2	63x105
		2,200	0.15	70.0	66.0	7.4	76x105
		2,200	0.15	70.0	66.0	8.2	76x143
		3,300	0.15	55.0	53.0	10.3	76x143
		4,700	0.15	35.0	32.0	11.6	76x143
		5,600	0.15	26.0	22.0	19.8	76x214
		6,800	0.15	24.0	22.0	20.2	76x214
		10,000	0.25	20.0	15.0	24.3	90x220

IKEN Series KI02 TYPE -40°C +105°C 5000H

RoHS Compliant

- 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 and impedance.
- High ripple current capability. Extended temperature range.
- High level reliability with outstanding high frequency characteristics.

Applications

High professional power supplies. Switch power supplies, power converters, filtering devices, motor drive.

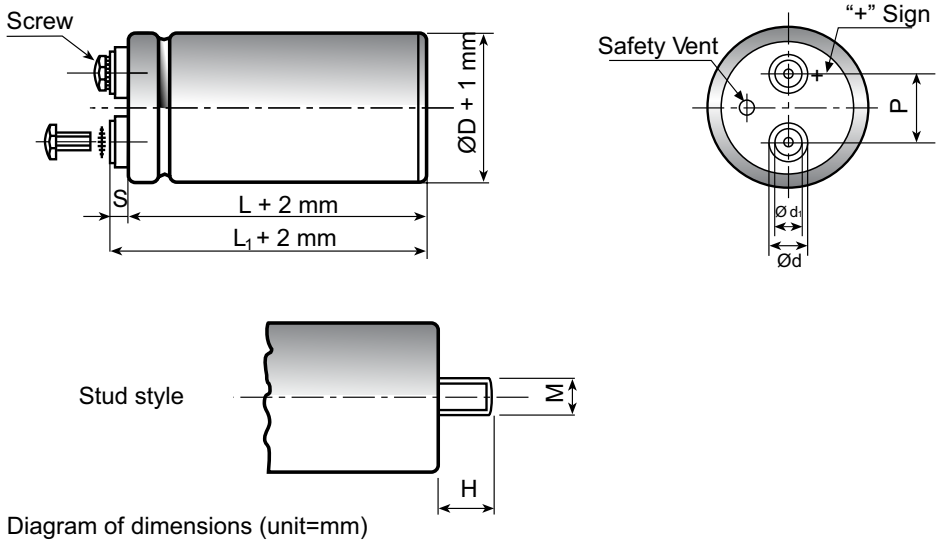


Diagram of dimensions (unit=mm)

ØD	d	d_1	P	M	H	Insert	Screw	$L_1 - L_{(-1+3)}$	$S_{(-1+1)}$
35	11	7.9	12.7	M 8	12	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5 Long	5MA x 9.5*	4.5	7
63	18.5	13	28.6	M 12	16	M5	5MA x 9.5	2.5	5
63	18.5	13	28.6	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	18.5	13	31.8	M 12	16	M5	5MA x 9.5	2.5	5
76	18.5	13	31.8	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7
90	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7

Note for M5 Long: (*) also available as 5MA x 12

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) **(mA, 5 min, 20°C)**	max $I_L = 0.003\ C_r\ V_r + 4$ µA At 85°C max $I_L = 0.02\ C_r\ V_r$ 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 50Hz 100Hz 500 Hz 1000Hz >10kHz 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 2.80 2.60 2.40 2.20 1.80 1.5 1.0 0.5 Maximum internal temperature 108°C Due to the current load capability of the contact elements, the following limits must not be exceeded: Capacitor Diameter 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, amplitude 0.75 mm Capacitor length ≤ 143 : max acceleration 10g for 3x2 h Capacitor length > 143 : max acceleration 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 (Vn, Temp rated, I ripple Current applied)	250,000 h at 40°C 15,000 h at 85°C 5,000 h at 105°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 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
Sectional Specifications / Reference	CECC 30.300 IEC 60384-4 Long Life Grade

ALUMINIUM ELECTROLYTIC CAPACITORS
KI02 Series with Screw Terminal
Standard Capacitor values and dimensions

***Other Voltages avaialble on request**

Rated Voltage*	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	ESR TYP at 100 Hz, 20°C(milli Ohms)	Impedance TYP at 10 KHz, 20°C(milli Ohms)	Ripple current Max at 100 Hz105°C(Amps)	Can Size D x L mm
63	72	2,200	0.15	72.0	60.0	2.5	35x60
		3,300	0.15	48.0	39.0	3.5	35x60
		4,700	0.15	33.0	28.0	4.2	35x60
		6,800	0.18	18.0	13.0	6.3	35x79
		10,000	0.20	15.0	11.0	8.2	51x79
		15,000	0.25	15.0	13.0	8.9	51x79
		15,000	0.25	13.0	10.0	8.9	51x105
		22,000	0.30	11.0	10.0	11.8	51x105
		22,000	0.30	11.0	10.0	13.5	63x105
		33,000	0.35	11.0	10.0	14.8	63x105
		33,000	0.35	11.0	8.0	16.6	76x105
		47,000	0.45	9.0	8.0	17.7	76x105
		47,000	0.45	9.0	8.0	19.0	76x143
		68,000	0.45	8.0	8.0	20.1	76x105
		68,000	0.70	8.0	8.0	22.8	76x143
		1,00,000	0.70	8.0	8.0	24.1	76x143
100	115	1,000	0.15	110.0	100.0	2.9	35x60
		1,500	0.15	80.0	73.0	3.2	35x60
		2,200	0.15	59.0	53.0	4.4	35x60
		3,300	0.15	33.0	31.0	5.8	35x79
		4,700	0.15	25.0	22.0	7.2	51x79
		6,800	0.15	19.0	17.0	8.9	51x79
		6,800	0.15	19.0	17.0	8.9	51x105
		10,000	0.15	17.0	15.0	11.0	51x105
		10,000	0.15	17.0	15.0	12.5	63x105
		15,000	0.15	12.0	12.0	15.1	63x105
		22,000	0.18	10.0	9.0	16.5	76x105
		33,000	0.22	8.0	8.0	20.9	76x143
160	184	1,000	0.11	105.0	90.0	3.3	35x79
		1,500	0.11	65.0	60.0	4.1	51x79
		2,200	0.11	46.0	43.0	4.8	51x105
		3,300	0.11	32.0	30.0	6.8	63x105
		4,700	0.11	27.0	25.0	8.5	63x105
		6,800	0.13	23.0	20.0	11.3	76x105
		10,000	0.14	22.0	20.0	14.2	76x105
		10,000	0.15	17.0	16.0	14.9	76x143
		15,000	0.20	16.0	12.0	17.2	76x143
		22,000	0.20	11.0	10.0	19.0	76x214
200	230	680	0.11	133.0	98.0	2.5	35x60
		1,000	0.11	85.0	64.0	4.6	51x79
		1,500	0.11	65.0	58.0	5.1	51x105
		2,200	0.11	60.0	53.0	6.1	51x105
		3,300	0.11	40.0	35.0	7.9	63x105
		4,700	0.11	25.0	23.0	8.7	63x105
		5,600	0.11	22.0	20.0	9.8	63x105
		6,800	0.11	18.0	16.0	11.8	76x105
		8,200	0.11	17.0	15.0	12.8	76x105
		10,000	0.13	15.0	13.0	14.5	76x105
		10,000	0.15	13.0	12.0	16.0	76x143
		15,000	0.20	12.0	11.0	17.3	76x143
		22,000	0.20	11.0	10.0	18.9	76x214
250	287	470	0.11	211.0	193.0	2.0	35x60
		680	0.11	130.0	98.0	2.2	35x79
		1,000	0.11	110.0	85.0	4.1	51x79
		1,500	0.11	74.0	65.0	5.4	51x105
		2,200	0.11	41.0	39.0	6.8	51x105
		3,300	0.11	30.0	26.0	8.2	63x105
		4,700	0.11	18.0	17.0	11.9	76x105
		5,600	0.11	17.0	16.0	13.2	76x105
		6,800	0.15	15.0	14.0	14.3	76x143
		8,200	0.15	14.0	14.0	15.2	76x143
		10,000	0.20	14.0	13.0	16.0	76x143
		15,000	0.20	12.0	10.0	17.4	76x214
350	385	330	0.11	255.0	196.0	1.8	35x60
		470	0.11	170.0	141.0	2.1	35x79
		680	0.11	128.0	96.0	3.8	51x79
		1,000	0.11	85.0	68.0	5.0	51x105
		1,500	0.11	59.0	52.0	6.4	63x105
		2,200	0.11	44.0	40.0	8.1	76x105
		3,300	0.11	26.0	23.0	10.2	76x105
		4,700	0.11	18.0	16.0	13.5	76x143
		5,600	0.12	18.0	17.0	14.3	76x143
		6,800	0.15	16.0	15.0	15.1	76x143
		8,200	0.15	16.0	15.0	17.8	76x143
		10,000	0.20	15.0	14.0	19.9	76x214
400	440	220	0.11	350.0	280.0	1.4	35x60
		330	0.11	250.0	210.0	2.2	35x60
		470	0.11	170.0	150.0	2.8	51x79
		680	0.11	110.0	100.0	3.2	51x79
		1,000	0.11	95.0	82.0	4.1	51x105
		1,500	0.11	64.0	53.0	5.8	63x105
		2,200	0.11	45.0	53.0	6.0	63x105
		2,200	0.11	45.0	39.0	7.3	76x105
		3,300	0.11	28.0	25.0	11.1	76x143
		4,700	0.11	24.0	23.0	12.8	76x143
		5,600	0.12	21.0	17.0	12.9	76x143
		6,800	0.15	19.0	15.0	15.5	76x214
		8,200	0.15	18.0	16.0	18.0	76x214
		10,000	0.20	16.0	14.0	22.5	90x220
450	495	100	0.11	800.0	650.0	1.2	35x60
		150	0.11	550.0	490.0	1.6	35x60
		220	0.11	370.0	310.0	1.8	35x60
		330	0.11	240.0	210.0	2.4	35x79
		470	0.11	200.0	179.0	3.0	51x79
		680	0.11	140.0	128.0	4.2	51x105
		1,000	0.11	100.0	88.0	4.4	51x105
		1,000	0.11	100.0	88.0	5.3	63x105
		1,500	0.11	63.0	57.0	5.7	63x105
		1,500	0.11	63.0	57.0	6.6	76x105
		2,200	0.11	60.0	47.0	8.8	76x143
		3,300	0.15	35.0	30.0	10.4	76x143
		4,700	0.15	28.0	25.0	10.9	76x143
		4,700	0.15	28.0	25.0	12.8	76x214
		5,600	0.15	21.0	17.0	11.2	76x143
		6,800	0.15	21.0	16.0	15.5	76x214
		8,200	0.15	18.0	16.0	19.2	76x214
		10,000	0.20	16.0	14.0	22.5	90x220

IKEN Series KI03 TYPE -20°C +70°C

RoHS Compliant

- Surge-proof capacitor in aluminium can with insulation sleeve.
- Heavy charge / discharge duty.
- To be mounted with ring clips or with threaded stud.

Applications

Extreme welding application. Strobe applications.

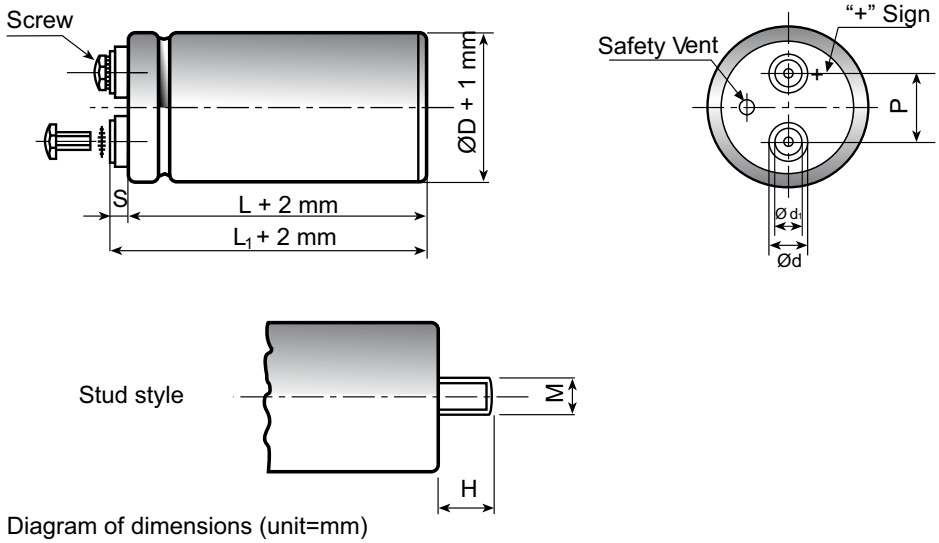


Diagram of dimensions (unit=mm)

ØD	d	d_1	P	M	H	Insert	Screw	$L_1 - L_{(-1+3)}$	$S_{(-1+1)}$
35	11	7.9	12.7	M 8	12	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5 Long	5MA x 9.5*	4.5	7
63	18.5	13	28.6	M 12	16	M5	5MA x 9.5	2.5	5
63	18.5	13	28.6	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	18.5	13	31.8	M 12	16	M5	5MA x 9.5	2.5	5
76	18.5	13	31.8	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7
90	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7

Note for M5 Long: (*) also available as 5MA x 12

Specifications

Temperature Range	Operating: -20°C +70°C Storage : Preferably below +25°C, not exceeding +40°C		
Rated Voltage Range (V_r)	from 400V to 500V DC		
Surge Voltage (V_p)	$V_P = 1.05\ V_r$ ($V_r \geq 475$V DC) - $V_P = 1.10\ V_r$ ($V_r > 250$V DC)		
Rated Capacitance Range	from 560 µF to 3300 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) (mA, 5 min, 20°C)	max $I_L = 0.006\ C_r\ V_r + 4$ µA		
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		
Discharge life	Test conditions: 10000 times at room temperatures (5-35°C) Charge and Discharge cycles: 30 sec	Cap change tan δ Leakage current(I_L) Impedance (Z)	≤ 10% ≤ 150% < 150% of initial limit ≤ 200%
Shelf life	After leaving capacitors under no load for 500 hours at 55°C, when restored at 20°C meet specifications aside	Cap change tan δ Leakage current(I_L)	≤ ±15% ≤ 150% < initial limit
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h) (V_r >160V DC)		
Self inductance	Approx. 20 nH		
Sectional Specifications / Reference	CECC 30.300 IEC 60384-4 Long Life Grade		

ALUMINIUM ELECTROLYTIC CAPACITORS
KI03 Series with Screw Terminal
Standard Capacitor values and dimensions

Rated Voltage	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	Can Size D x L mm
400	420	680	0.10	51x105
		820	0.10	51x105
		1000	0.10	63x105
		1200	0.10	63x105
		1500	0.10	76x105
		2200	0.10	76x143
		3300	0.10	90x145
450	472	680	0.10	51x105
		820	0.10	63x105
		1000	0.10	63x105
		1200	0.10	63x105
		1500	0.10	76x105
		2200	0.10	76x143
		3300	0.10	90x145
475	498	560	0.15	51x105
		680	0.15	51x105
		820	0.15	51x105
		1000	0.15	63x105
		1000	0.15	76x105
		1000	0.15	76x143
		1500	0.15	76x143
		2200	0.15	90x145
500	525	560	0.15	51x105
		680	0.15	63x105
		820	0.15	63x105
		1000	0.15	63x105
		1000	0.15	63x143
		1500	0.15	76x143
		2200	0.15	90x145

IKEN Series KI07 TYPE -40°C +85°C 2000H

RoHS Compliant

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

Applications
Industrial Market, UPS, Frequency Converters

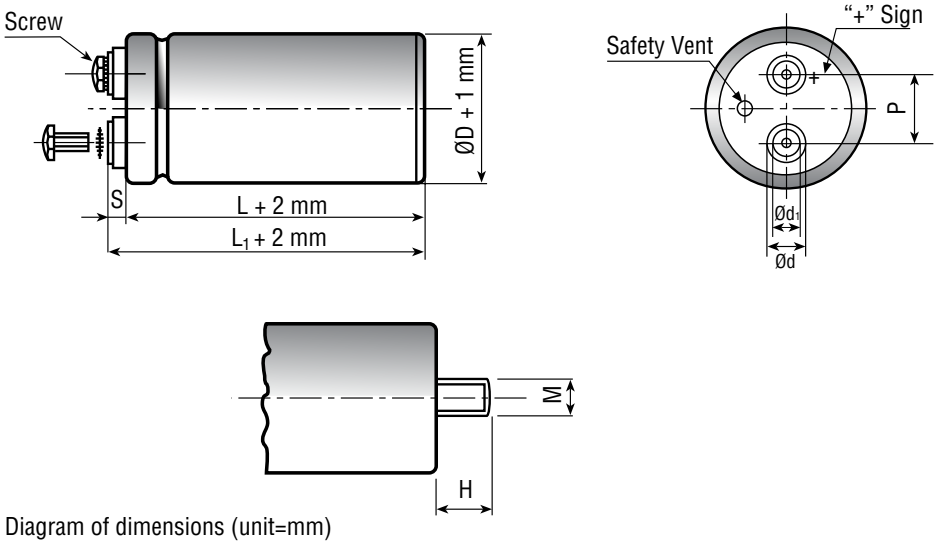


Diagram of dimensions (unit=mm)

ØD	d	d_1	P	M	H	Insert	Screw	$L_1 - L_{(-1+3)}$	$S_{(-1+1)}$
35	11	7.9	12.7	M 8	12	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5 Long	5MA x 9.5*	4.5	7
63	18.5	13	28.6	M 12	16	M5	5MA x 9.5	2.5	5
63	18.5	13	28.6	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	18.5	13	31.8	M 12	16	M5	5MA x 9.5	2.5	5
76	18.5	13	31.8	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7
90	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7

Note for M5 Long: (*) also available as 5MA x 12

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 350V DC from 400V to 450V DC
Surge Voltage (V_p)	$V_P = 1.15\ V_r$ ($V_r \leq 250$V DC) $V_P = 1.10\ V_r$ ($V_r \geq 250$V DC)
Rated Capacitance Range	from 1800 µF to 47000 µF
Capacitance Tolerance	±20% at 120 Hz, 20°C (M class IEC-62) on request: -10% +30% at 120 Hz, 20°C (Q class IEC-62)
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.008\ C_r\ V_r + 4$ µA
Ripple current (I_r)	Refer to table at 85°C and 120Hz. Frequency 50Hz 100Hz 500 Hz 1000Hz >10kHz Multiplier 0.88 1.0 1.45 1.5 1.55 Due to the current load capability of the contact elements, the following limits must not be exceeded: Capacitor Diameter 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, amplitude 0.75 mm Capacitor length ≤ 130 : max acceleration 10g for 3x2 h Capacitor length > 130 : max acceleration 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 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
Sectional Specifications / Reference	CECC 30.300 IEC 60384-4 Long Life Grade

ALUMINIUM ELECTROLYTIC CAPACITORS
KI07 Series with Screw Terminal
Standard Capacitor values and dimensions

*Other Voltages avaialble on request

Rated Voltage*	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 120 Hz, 20°C	ESR TYP at 120 Hz, 20°C(milli Ohms)	Ripple current Max at 120 Hz 40°C(Amps)	Ripple current Max at 120 Hz 85°C(Amps)	Can Size D x L mm
160	184	6800	0.15	21.0	23.40	10.90	51x96
		6800	0.15	21.0	23.44	10.90	51x105
		8200	0.15	18.0	27.50	12.80	51x105
		10000	0.15	13.0	29.00	13.50	51x115
		10000	0.15	13.0	26.60	12.40	63x96
		12000	0.15	13.0	34.10	15.80	51x130
		15000	0.15	13.0	31.30	14.60	63x105
		15000	0.15	13.0	32.40	15.10	63x115
		18000	0.15	12.0	38.10	17.70	63x130
		22000	0.20	10.0	48.10	22.40	63X143
		22000	0.20	10.0	48.10	22.40	76x105
		22000	0.20	10.0	49.70	23.10	76x115
		27000	0.20	10.0	54.40	25.30	76x130
		33000	0.20	8.0	65.70	30.60	76x143
		47000	0.25	7.0	81.50	37.60	76x214
		47000	0.25	7.0	81.50	37.60	76x220
200	230	4700	0.15	27.0	22.36	10.40	51x105
		4700	0.15	27.0	23.87	11.10	63x105
		5600	0.15	27.0	23.00	10.70	51x96
		6800	0.15	22.0	27.00	12.60	51x105
		6800	0.15	22.0	26.40	12.30	63x96
		8200	0.15	18.0	28.50	13.20	51x115
		10000	0.15	13.0	33.40	15.50	51x130
		10000	0.15	13.0	31.30	14.60	63x105
		12000	0.15	13.0	31.90	14.80	63x115
		14000	0.15	12.0	37.60	17.50	63x130
		15000	0.15	12.0	40.40	18.80	63X143
		15000	0.15	12.0	40.40	18.80	76x105
		18000	0.15	12.0	44.50	20.70	76x115
		22000	0.18	10.0	50.00	23.40	76x130
		27000	0.18	9.0	64.60	30.00	76x143
		33000	0.22	8.0	75.70	35.20	76x214
		33000	0.22	8.0	75.70	35.20	76x220
250	287	2,200	0.15	40.0	16.13	7.50	51x105
		3300	0.15	34.0	21.07	9.80	51x96
		3300	0.15	34.0	21.07	9.80	51x105
		3300	0.15	33.0	23.65	11.00	63x105
		3300	0.15	33.0	29.67	13.80	63x120
		3300	0.15	33.0	24.08	11.20	63x96
		3900	0.15	32.0	22.00	10.20	51x96
		4700	0.15	25.0	25.70	11.90	51x105
		4700	0.15	30.0	25.37	11.80	63x105
		4700	0.15	30.0	25.80	12.00	63x120
		4700	0.15	30.0	25.70	12.00	63x96
		5000	0.15	29.0	27.95	13.00	63x120
		5600	0.15	24.0	27.50	12.80	51x115
		5600	0.15	26.0	32.25	15.00	63x120
		6800	0.15	19.0	32.10	14.90	51x130
		6800	0.15	24.0	34.40	16.00	63x120
		8200	0.15	22.0	30.90	14.40	63x105
		10000	0.15	20.0	31.60	14.70	63x115
		10000	0.15	20.0	31.61	14.70	63x120
		10000	0.15	17.0	38.70	18.00	76x143
		12000	0.15	19.0	37.10	17.20	63x130
		12000	0.15	19.0	45.80	21.30	63X143
		12000	0.15	19.0	45.80	21.30	76x105
		12000	0.15	19.0	47.40	22.00	76x115
		15000	0.15	16.0	46.30	21.50	76x130
		18000	0.20	10.0	47.60	22.10	76x143
		27000	0.25	8.0	70.00	32.60	76x214
		27000	0.25	8.0	70.00	32.60	76x220
315	347	2200	0.15	31.0	19.40	9.00	51x96
		2700	0.15	24.0	22.60	10.50	51x105
		2700	0.15	24.0	23.40	10.90	51x115
		2700	0.15	24.0	23.20	10.80	63x96
		3300	0.15	20.0	27.30	12.70	51x130
		3300	0.15	27.0	32.90	15.30	76x120
		3900	0.15	20.0	28.10	13.10	63x105
		4700	0.15	20.0	29.80	13.90	63x115
		4700	0.15	22.0	36.77	17.10	76x120
		5000	0.15	21.0	37.41	17.40	76x120
		5600	0.15	17.0	34.70	16.10	63x130
		5600	0.15	14.0	39.00	18.10	76x105
		5600	0.15	14.0	39.00	18.10	76x120
		6800	0.15	14.0	39.80	18.50	63X143
		6800	0.15	12.0	42.50	19.80	76x115
		6800	0.15	12.0	42.50	19.80	76x120
		8200	0.15	10.0	49.20	22.90	76x130
		10000	0.15	8.0	49.40	23.00	76x143
		15000	0.20	8.0	67.60	31.40	76x214
		15000	0.25	8.0	67.60	31.40	76x220
350	385	1000	0.15	79.0	11.83	5.50	51x105
		1000	0.15	79.0	10.75	5.00	51x79
		1,500	0.15	60.0	15.91	7.40	51x105
		1800	0.15	33.0	18.80	8.70	51x96
		2200	0.15	26.0	21.80	9.00	51x105
		2700	0.15	23.0	23.90	11.10	51x115
		3300	0.15	19.0	27.90	13.00	51x130
		3300	0.15	27.0	23.65	11.00	63x105
		3300	0.15	27.0	23.65	11.00	63x120
		3300	0.15	27.0	23.50	10.90	63x96
		3300	0.15	27.0	27.52	12.80	76x105
		3300	0.15	27.0	27.95	13.00	76x120
		3900	0.15	20.0	27.80	12.90	63x105
		3900	0.15	20.0	28.80	13.40	63x115
		4700	0.15	17.0	33.60	15.60	63x130
		4700	0.15	18.0	31.18	14.50	76x105
		4700	0.15	18.0	37.63	17.50	76x120
		5600	0.15	13.0	39.80	18.50	63X143
		5600	0.15	13.0	39.80	18.50	76x105
		5600	0.15	13.0	41.10	19.20	76x115
		6800	0.15	12.0	41.10	19.20	76x130
		6800	0.15	12.0	41.28	19.20	76x143
		8200	0.15	12.0	45.20	20.70	76x143
		10000	0.15	12.0	46.30	21.50	76x143
		12000	0.20	8.0	66.10	30.70	76x214
		12000	0.25	8.0	66.10	30.70	76x220
400	440	2200	0.20	77.0	17.37	6.53	51x105
		2200	0.20	77.0	17.37	6.53	51x130
		2200	0.20	84.0	18.51	8.61	63x105
		2200	0.20	84.0	22.79	10.60	63x120
		2200	0.20	84.0	17.03	6.40	63x96
		2700	0.20	75.0	19.02	7.15	63x96
		3300	0.20	59.0	22.75	8.40	63x105
		3300	0.20	59.0	22.75	8.55	63x115
		3300	0.20	59.0	23.44	10.90	63x120
		3300	0.20	50.0	23.44	10.90	76x105
		3300	0.20	50.0	23.44	10.90	76x120
		3900	0.20	49.0	26.06	9.80	63x130
		4700	0.20	41.0	28.60	10.60	76x105
		4700	0.20	41.0	28.60	10.75	76x115
		5600	0.20	34.0	32.45	12.20	76x130
		5600	0.20	34.0	34.45	13.00	76x143
		6800	0.20	24.0	38.84	14.50	76x143
		6800	0.20	24.0	38.84	14.60	76x155

ALUMINIUM ELECTROLYTIC CAPACITORS
KI07 Series with Screw Terminal
Standard Capacitor values and dimensions

***Other Voltages avaialble on request**

Rated Voltage*	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 120 Hz, 20°C	ESR TYP at 120 Hz, 20°C(milli Ohms)	Ripple current Max at 120 Hz 40°C(Amps)	Ripple current Max at 120 Hz 85°C(Amps)	Can Size D x L mm
		8200	0.20	22.0	39.75	15.00	76x143
		8200	0.20	22.0	44.74	16.82	90x157
		10000	0.20	22.0	47.70	18.00	76x143
		10000	0.20	20.0	50.35	19.00	76x214
		10000	0.20	19.0	49.29	18.53	90x157
		12000	0.20	16.0	59.87	22.51	90x196
		15000	0.20	13.0	69.90	26.28	90x220
450	495	1800	0.20	84.0	16.25	6.11	51x130
		2200	0.20	80.0	16.34	7.60	63x105
		2200	0.20	80.0	17.35	6.52	63x96
		2700	0.20	62.0	20.74	7.60	63x105
		2700	0.20	62.0	20.74	7.80	63x115
		3300	0.20	51.0	24.22	9.11	63x130
		3300	0.20	50.0	25.44	9.60	76x105
		3900	0.20	44.0	26.25	9.70	76x105
		3900	0.20	44.0	26.25	9.87	76x115
		4700	0.20	36.0	30.90	11.62	76x130
		4700	0.20	36.0	30.90	11.62	76x143
		5600	0.20	30.0	35.69	13.22	76x143
		5600	0.20	30.0	35.69	13.42	76x155
		6800	0.20	23.0	39.75	15.00	76X143
		6800	0.20	25.0	41.36	15.55	90x157
		8200	0.20	22.0	42.40	16.00	76x143
		8200	0.20	22.0	45.09	16.95	90x157
		10000	0.20	22.0	50.35	19.00	76x143
		10000	0.20	18.0	54.75	20.60	90x196
		12000	0.20	15.0	63.15	23.75	90x220

IKEN Series KI08 TYPE -40°C +85°C 6000H

RoHS Compliant

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

Applications
Industrial Market, UPS, Frequency Converters

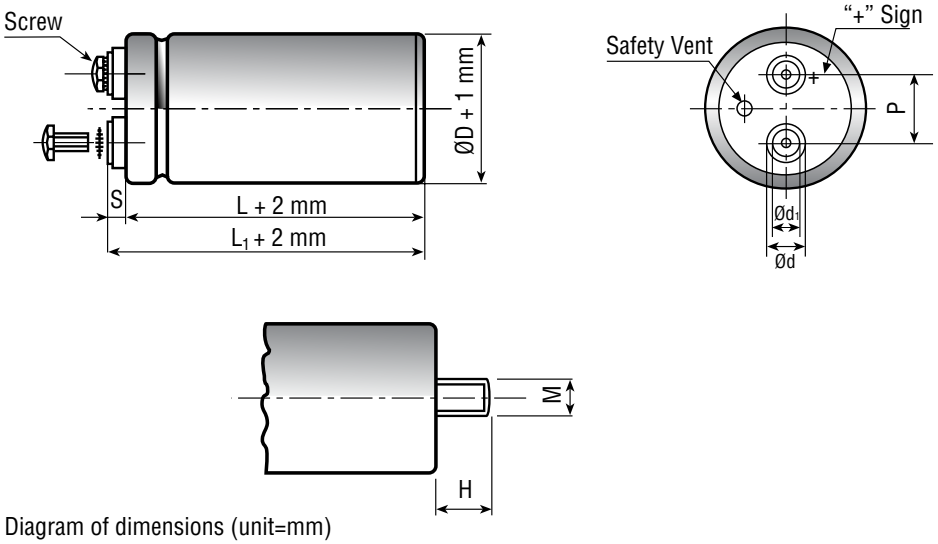


Diagram of dimensions (unit=mm)

ØD	d	d_1	P	M	H	Insert	Screw	$L_1 - L_{(-1+3)}$	$S_{(-1+1)}$
35	11	7.9	12.7	M 8	12	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5	5MA x 9.5	2.5	5
51	18.5	13	22.7	M 12	16	M5 Long	5MA x 9.5*	4.5	7
63	18.5	13	28.6	M 12	16	M5	5MA x 9.5	2.5	5
63	18.5	13	28.6	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	18.5	13	31.8	M 12	16	M5	5MA x 9.5	2.5	5
76	18.5	13	31.8	M 12	16	M5 Long	5MA x 9.5*	4.5	7
76	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7
90	23.2	17.7	31.8	M 12	16	M6	6MA x 10	4.5	7

Note for M5 Long: (*) also available as 5MA x 12

Specifications

Temperature Range	Operating: -40°C +85°C Storage: Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 63V to 100V DC from 160V to 350V DC from 400V to 450V DC
Surge Voltage (V_p)	$V_P = 1.15\ V_r$ ($V_r \leq 250V$ DC) $V_P = 1.10\ V_r$ ($V_r \geq 250V$ DC)
Rated Capacitance Range	from 220 µF to 150000 µF
Capacitance Tolerance	±20% at 120 Hz, 20°C (M class IEC-62) on request: -10% +30% at 120 Hz, 20°C (Q class IEC-62)
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.008\ C_r\ V_r + 4$ µA
Ripple current (I_r)	Refer to table at 85°C and 120Hz. Frequency 50Hz 100Hz 500 Hz 1000Hz >10kHz Multiplier 0.88 1.0 1.45 1.5 1.55 Due to the current load capability of the contact elements, the following limits must not be exceeded: Capacitor Diameter 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, amplitude 0.75 mm Capacitor length ≤ 130 : max acceleration 10g for 3x2 h Capacitor length > 130 : max acceleration 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 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
Useflife	Upto 6000 hours at 85°C
Self inductance	Approx. 20 nH
Sectional Specifications / Reference	CECC 30.300 IEC 60384-4 Long Life Grade

ALUMINIUM ELECTROLYTIC CAPACITORS
KI08 Series with Screw Terminal
Standard Capacitor values and dimensions

*Other Voltages avaialble on request

Rated Voltage*	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	ESR TYP at 100 Hz, 20°C(milli Ohms)	Ripple current Max at 100 Hz 85°C(Amps)	Can Size D x L mm
50	57	4,700	0.20	33.0	5.6	35x60
		6,800	0.20	25.0	7.0	35x60
		10,000	0.20	21.0	10.0	35x60
		15,000	0.25	17.0	11.3	35x79
		22,000	0.30	16.0	13.1	51x79
		33,000	0.35	15.0	16.0	51x105
		33,000	0.35	15.0	17.5	63x105
		47,000	0.40	12.0	16.2	51x105
		47,000	0.40	12.0	18.3	63x105
		68,000	0.60	12.0	18.0	63x105
		68,000	0.60	12.0	22.1	76x105
		1,00,000	0.90	8.0	23.8	76x105
		1,00,000	0.90	8.0	25.8	76x143
		1,50,000	1.00	6.0	31.5	76x143
63	72	4,700	0.15	29.0	6.2	35x60
		6,800	0.18	21.0	7.0	35x60
		6,800	0.18	21.0	8.2	35x79
		10,000	0.20	21.0	8.7	35x79
		10,000	0.20	18.0	10.1	51x79
		15,000	0.25	15.0	11.1	51x79
		22,000	0.30	13.0	12.4	51x79
		22,000	0.30	13.0	14.6	51x105
		33,000	0.35	11.0	15.6	51x105
		33,000	0.35	11.0	17.9	63x105
		47,000	0.45	10.0	15.8	51x105
		47,000	0.45	11.0	18.8	63x105
		68,000	0.50	11.0	25.7	76x105
		1,00,000	0.55	8.0	31.5	76x105
		1,00,000	0.55	8.0	34.5	76x143
		1,50,000	0.60	6.0	36.1	76x143
75	86	4,700	0.15	29.0	5.4	35x60
		6,800	0.18	20.0	8.5	35x79
		10,000	0.20	18.0	11.0	51x79
		15,000	0.25	15.0	12.7	51x105
		22,000	0.30	12.0	15.2	51x105
		22,000	0.30	12.0	16.2	63x105
		33,000	0.35	11.0	16.8	63x105
		33,000	0.35	11.0	18.5	76x105
		47,000	0.45	10.0	20.1	76x105
		47,000	0.45	10.0	22.1	76x143
		68,000	0.60	10.0	26.0	76x143
		1,00,000	0.60	8.0	34.9	76x143
100	115	1,500	0.15	84.0	4.0	35x60
		2,200	0.15	57.0	5.0	35x60
		3,300	0.15	48.0	5.3	35x60
		3,300	0.15	48.0	6.8	35x79
		4,700	0.15	30.0	7.5	35x79
		4,700	0.15	30.0	10.0	51x79
		6,800	0.20	23.0	11.1	51x79
		10,000	0.20	16.0	11.9	51x79
		10,000	0.20	16.0	13.9	51x105
		10,000	0.20	16.0	14.5	63x105
		15,000	0.25	13.0	14.8	51x105
		15,000	0.25	13.0	17.5	63x105
		22,000	0.25	12.0	18.2	63x105
		33,000	0.25	10.0	23.1	76x105
		47,000	0.30	10.0	30.2	76x143
		68,000	0.30	8.0	36.5	76x143
		68,000	0.40	6.0	39.5	76x214
160	184	4700	0.15	25.00	10.90	51x105
		4700	0.15	25.00	11.90	63x105
		6,800	0.15	21.00	10.90	51x96
		6800	0.15	21.00	10.90	51x105
		8,200	0.15	18.00	12.80	51x105
		10,000	0.15	13.00	13.50	51x115
		10,000	0.15	13.00	12.40	63x96
		12,000	0.15	13.00	15.80	51x130
		15,000	0.15	13.00	14.60	63x105
		15,000	0.15	13.00	15.10	63x115
		18,000	0.15	12.00	17.70	63x130
		22,000	0.20	10.00	22.40	63X143
		22,000	0.20	10.00	22.40	76x105
		22,000	0.20	10.00	23.10	76x115
		27,000	0.20	10.00	25.30	76x130
		33,000	0.20	8.00	30.60	76x143
		47,000	0.25	7.00	37.60	76x214
		47,000	0.25	7.00	37.60	76x220
200	230	4700	0.15	27.00	10.40	51x105
		4700	0.15	22.00	11.10	63x105
		5,600	0.15	27.00	10.70	51x96
		6,800	0.15	22.00	12.60	51x105
		6,800	0.15	22.00	12.30	63x96
		8,200	0.15	18.00	13.20	51x115
		10,000	0.15	13.00	15.50	51x130
		10,000	0.15	13.00	14.60	63x105
		12,000	0.15	13.00	14.80	63x115
		14,000	0.15	12.00	17.50	63x130
		15,000	0.15	12.00	18.80	63X143
		15,000	0.15	12.00	18.80	76x105
		18,000	0.15	12.00	20.70	76x115
		22,000	0.18	10.00	23.40	76x130
		27,000	0.18	9.00	30.00	76x143
		33,000	0.22	8.00	35.20	76x214
		33,000	0.22	8.00	35.20	76x220
250	287	2,200	0.15	40.00	7.50	51x105
		3,300	0.15	34.00	9.80	51x96
		3300	0.15	34.00	9.80	51x105
		3300	0.15	33.00	11.00	63x105
		3,300	0.15	33.00	13.80	63x120
		3,300	0.15	33.00	11.20	63x96
		3,900	0.15	32.00	10.20	51x96
		4,700	0.15	25.00	11.90	51x105
		4700	0.15	30.00	11.80	63x105
		4,700	0.15	30.00	12.00	63x120
		4,700	0.15	30.00	11.50	63x96
		5,000	0.15	29.00	13.00	63x120
		5,600	0.15	24.00	12.80	51x115
		5,600	0.15	26.00	15.00	63x120
		6,800	0.15	19.00	14.90	51x130
		6,800	0.15	24.00	16.00	63x120
		8,200	0.15	22.00	14.40	63x105
		10,000	0.15	20.00	14.70	63x115
		10,000	0.15	20.00	14.70	63x120
		10,000	0.15	17.00	21.40	76x143
		12,000	0.15	19.00	21.30	63x130
		12,000	0.15	19.00	21.30	63X143
		12,000	0.15	17.00	21.30	76x105
		12,000	0.15	17.00	22.00	76x115
		15,000	0.15	16.00	21.60	76x130
		18,000	0.20	10.00	22.10	76x143
		27,000	0.25	8.00	32.60	76x214
		27,000	0.25	8.00	32.60	76x220
315	347	2,200	0.15	31.00	9.00	51x96
		2,700	0.15	24.00	10.50	51x105
		2,700	0.15	24.00	10.90	51x115

ALUMINIUM ELECTROLYTIC CAPACITORS
KI08 Series with Screw Terminal
Standard Capacitor values and dimensions

***Other Voltages avaialble on request**

Rated Voltage*	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	ESR TYP at 100 Hz, 20°C(milli Ohms)	Ripple current Max at 100 Hz 85°C(Amps)	Can Size D x L mm
		2,700	0.15	24.00	10.80	63x96
		3,300	0.15	20.00	12.70	51x130
		3,300	0.15	27.00	15.30	76x120
		3,900	0.15	20.00	13.10	63x105
		4,700	0.15	20.00	13.90	63x115
		4,700	0.15	22.00	17.10	76x120
		5,000	0.15	21.00	17.40	76x120
		5,600	0.15	17.00	16.10	63x130
		5,600	0.15	14.00	18.10	76x105
		5,600	0.15	14.00	18.10	76x120
		6,800	0.15	14.00	18.50	63X143
		6,800	0.15	12.00	19.80	76x115
		6,800	0.15	12.00	19.80	76x120
		8,200	0.15	10.00	22.90	76x130
		10,000	0.15	8.00	23.00	76x143
		15,000	0.20	8.00	31.40	76x214
		15,000	0.25	8.00	31.40	76x220
350	385	1,800	0.15	33.00	8.70	51x96
		2,200	0.15	26.00	10.10	51x105
		2,700	0.15	23.00	11.10	51x115
		3,300	0.15	19.00	13.00	51x130
		3300	0.15	27.00	10.90	63x105
		3,300	0.15	27.00	12.90	63x120
		3,300	0.15	27.00	10.90	63x96
		3,300	0.15	27.00	12.80	76x105
		3,300	0.15	27.00	15.80	76x120
		3,900	0.15	20.00	12.90	63x105
		3,900	0.15	20.00	13.40	63x115
		4,700	0.15	17.00	15.60	63x130
		4,700	0.15	18.00	14.80	76x105
		4,700	0.15	18.00	17.50	76x120
		5,600	0.15	13.00	18.50	63X143
		5,600	0.15	13.00	18.50	76x105
		5,600	0.15	13.00	19.20	76x115
		6,800	0.15	13.00	19.20	76x130
		6,800	0.15	12.00	19.20	76x143
		8,200	0.15	12.00	21.00	76x143
		10,000	0.15	12.00	21.50	76x143
		12,000	0.20	8.00	30.70	76x214
		12,000	0.25	8.00	30.70	76x220
400	440	2200	0.20	77.0	6.53	51x105
		2200	0.20	77.0	6.53	51x130
		2200	0.20	84.0	8.61	63x105
		2200	0.20	84.0	10.60	63x120
		2200	0.20	84.0	6.40	63x96
		2700	0.20	75.0	7.15	63x96
		3300	0.20	59.0	8.40	63x105
		3300	0.20	59.0	8.55	63x115
		3300	0.20	59.0	10.90	63x120
		3300	0.20	50.0	10.90	76x105
		3300	0.20	50.0	10.90	76x120
		3900	0.20	49.0	9.80	63x130
		4700	0.20	41.0	10.60	76x105
		4700	0.20	41.0	10.75	76x115
		5600	0.20	34.0	12.20	76x130
		5600	0.20	34.0	13.00	76x143
		6800	0.20	24.0	14.50	76x143
		6800	0.20	24.0	14.60	76x155
		8200	0.20	22.0	15.00	76x143
		8200	0.20	22.0	16.82	90x157
		10000	0.20	22.0	18.00	76x143
		10000	0.20	20.0	19.00	76x214
		10000	0.20	19.0	18.53	90x157
		12000	0.20	16.0	22.51	90x196
		15000	0.20	13.0	26.28	90x220
450	495	1800	0.20	84.0	6.11	51x130
		2200	0.20	80.0	7.60	63x105
		2200	0.20	80.0	6.52	63x96
		2700	0.20	62.0	7.60	63x105
		2700	0.20	62.0	7.80	63x115
		3300	0.20	51.0	9.11	63x130
		3300	0.20	50.0	9.60	76x105
		3900	0.20	44.0	9.70	76x105
		3900	0.20	44.0	9.87	76x115
		4700	0.20	36.0	11.62	76x130
		4700	0.20	36.0	11.62	76x143
		5600	0.20	30.0	13.22	76x143
		5600	0.20	30.0	13.42	76x155
		6800	0.20	23.0	15.00	76X143
		6800	0.20	25.0	15.55	90x157
		8200	0.20	22.0	16.00	76x143
		8200	0.20	22.0	16.95	90x157
		10000	0.20	22.0	19.00	76x143
		10000	0.20	18.0	20.60	90x196
		12000	0.20	15.0	23.75	90x220
		10000	0.20	18.00	20.60	90x196
		12000	0.20	15.00	23.75	90x220

KI91 TYPE -40^0 +85^{0}C 15000H

RoHS Compliant

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

Applications

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

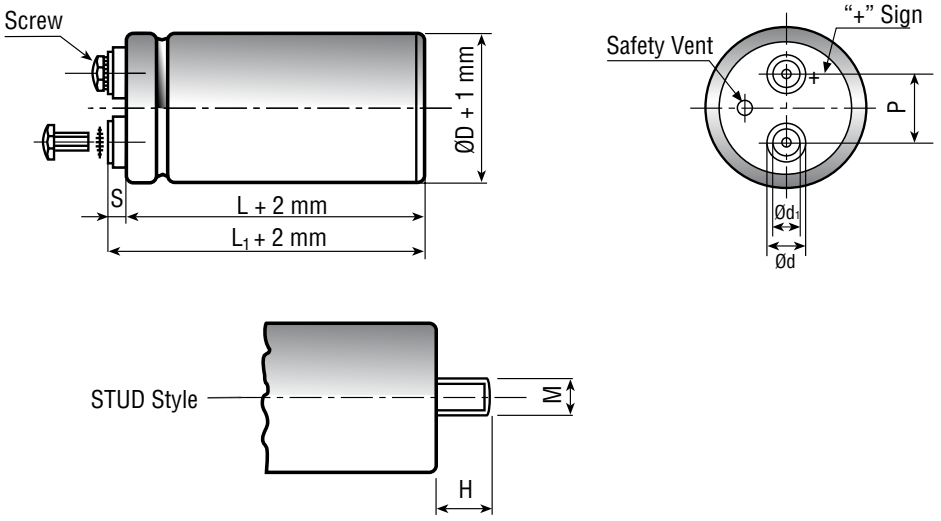


Diagram of dimensions (unit=mm)

Insert and screw threads: Metric (mm), UNF (inches)

ØD	d	d1	P	STUD		INSERT	SCREW	L1-L [-1+3]	S [-1+1]	INSERT STYLE
				M	H					
35	11	7.9	12.7	M8	12	M5	5MA x 9.5	2.5	5	0
51	18.5	13	22.7	M12	16	M5	5MA x 9.5	2.5	5	H
63	18.5	13	28.6	M12	16	M5	5MA x 9.5	2.5	5	H
63	17.3	17.3	28.6	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	3	4	W
63	17.3	17.3	28.6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	6	7	R
63	7.9	7.9	28.6	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	2	2.5	Z
63	12	7.9	28.6	M12	16	UNF 10-32 High Post	10-32 x 3/8"	6	7	U
76	18.5	13	31.8	M12	16	M5	5MA x 9.5	2.5	5	H
76	18.5	13	31.8	M12	16	M5	5MA x 9.5	2.5	7	L
76	23.2	17.7	31.8	M12	16	M6	6MA x 10	4.5	7	6
76	17.3	17.3	31.8	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	3	4	W
76	17.3	17.3	31.8	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	6	7	R
76	7.9	7.9	31.8	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	2	2.5	Z
76	12	7.9	31.8	M12	16	UNF 10-32 High Post	10-32 x 3/8"	6	7	U
90	23.2	17.7	31.8	M12	16	M6	6MA x 10	4.5	7	H

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 450V DC
Surge Voltage (V_p)	$V_P = 1.10\ V_r$
Rated Capacitance Range	from 470 µF to 150000 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) **(mA, 5 min, 20°C)**	max $I_L = 0.006\ C_r\ V_r + 4$ µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz. Frequency 50Hz 100Hz 500 Hz 1000Hz >10kHz 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 Diameter 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
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
Useflife (85°C, Vn, Ir applied) **Operation up to 105°C with voltage derating 0,88 x V rated**	< 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
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

ALUMINIUM ELECTROLYTIC CAPACITORS
KI91 Series with Screw Terminal
Standard Capacitor values and dimensions

Rated Voltage	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	ESR TYP at 100 Hz, 20°C(milli Ohms)	Ripple current Max at 100 Hz 85°C(Amps)	Can Size D x L mm
400	440	680	0.08	97	5.11	51X79
		680	0.08	97	5.74	51X105
		1,000	0.08	75	6.06	51X79
		1,000	0.08	75	6.87	51X105
		1,500	0.08	53	8.18	51X105
		1,500	0.08	53	9.29	63X105
		2,200	0.08	40	9.40	51X105
		2,200	0.08	40	10.70	63X105
		2,200	0.08	40	12.30	76X105
		3,300	0.08	25	13.60	63X105
		3,300	0.08	25	14.50	76X105
		3,300	0.08	25	16.80	76X143
		4,700	0.08	20	16.40	76X105
		4,700	0.08	20	19.50	76X143
		5,600	0.08	17	20.90	76X143
		6,800	0.08	15	22.20	76X143
		10,000	0.09	13	23.00	76X143
		10,000	0.09	13	28.70	76X214
		15,000	0.10	9	36.50	90X220
420	462	680	0.08	97	5.11	51X79
		680	0.08	97	5.74	51X105
		1,000	0.08	75	6.06	51X79
		1,000	0.08	75	6.87	51X105
		1,500	0.08	53	8.18	51X105
		1,500	0.08	53	9.29	63X105
		2,200	0.08	40	9.40	51X105
		2,200	0.08	40	10.70	63X105
		2,200	0.08	40	12.30	76X105
		3,300	0.08	25	13.60	63X105
		3,300	0.08	25	14.50	76X105
		3,300	0.08	25	16.80	76X143
		4,700	0.08	20	16.40	76X105
		4,700	0.08	20	19.50	76X143
		5,600	0.08	17	20.90	76X143
		6,800	0.08	15	22.20	76X143
		10,000	0.09	13	23.00	76X143
		10,000	0.09	13	28.70	76X214
		15,000	0.10	9	36.50	90X220
450	495	470	0.08	159	4.36	51X79
		680	0.08	114	4.94	51X79
		680	0.08	114	5.57	51X105
		1,000	0.08	83	5.84	51X79
		1,000	0.08	83	6.60	51X105
		1,500	0.08	57	7.89	51X105
		1,500	0.08	57	8.97	63X105
		2,200	0.08	44	10.20	63X105
		2,200	0.08	44	11.90	76X105
		2,200	0.08	44	13.60	76X143
		3,300	0.08	30	14.00	76X105
		3,300	0.08	30	16.30	76X143
		4,700	0.08	21	18.80	76X143
		5,600	0.08	18	20.20	76X143
		6,800	0.08	16	21.30	76X143
		8,200	0.08	14	23.00	76X143
		10,000	0.09	13	23.10	76X143
		10,000	0.09	13	26.20	76X214
		12,000	0.09	13	26.20	76X214
		15,000	0.10	11	35.00	90X220

KI92 TYPE -40°C +105°C 5000H

RoHS Compliant

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

Applications

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

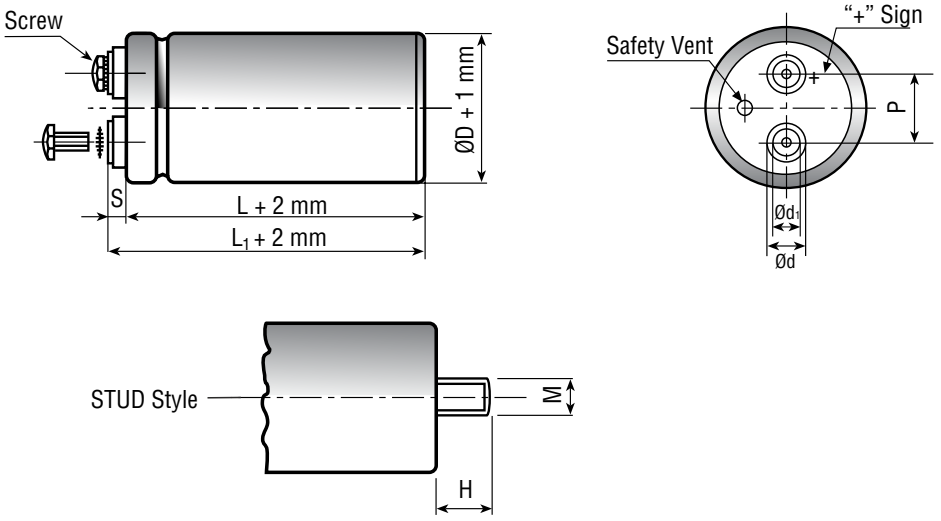


Diagram of dimensions (unit = mm)

Insert and screw threads: Metric (mm), UNF (inches)

ØD	d	d1	P	STUD		INSERT	SCREW	L1-L [-1+3]	S [-1+1]	INSERT STYLE
				M	H					
35	11	7.9	12.7	M8	12	M5	5MA x 9.5	2.5	5	0
51	18.5	13	22.7	M12	16	M5	5MA x 9.5	2.5	5	H
63	18.5	13	28.6	M12	16	M5	5MA x 9.5	2.5	5	H
63	17.3	17.3	28.6	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	3	4	W
63	17.3	17.3	28.6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	6	7	R
63	7.9	7.9	28.6	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	2	2.5	Z
63	12	7.9	28.6	M12	16	UNF 10-32 High Post	10-32 x 3/8"	6	7	U
76	18.5	13	31.8	M12	16	M5	5MA x 9.5	2.5	5	H
76	18.5	13	31.8	M12	16	M5	5MA x 9.5	2.5	7	L
76	23.2	17.7	31.8	M12	16	M6	6MA x 10	4.5	7	6
76	17.3	17.3	31.8	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	3	4	W
76	17.3	17.3	31.8	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	6	7	R
76	7.9	7.9	31.8	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	2	2.5	Z
76	12	7.9	31.8	M12	16	UNF 10-32 High Post	10-32 x 3/8"	6	7	U
90	23.2	17.7	31.8	M12	16	M6	6MA x 10	4.5	7	H

Specifications

Temperature Range	Operating: -40°C +105°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 450V DC		
Surge Voltage (V_p)	(V_p) = 1.10 Vr		
Rated Capacitance Range	from 1500 µF to 30000 µF ±20% at 100 Hz, 20°C [M class IEC-62]		
Capacitance Tolerance	on request : -10% +30% at 100 Hz, 20°C [Q class IEC-62]		
Leakage Current (I_L) (mA, 5 min, 20°C)	max IL= 0.006 Cr Vr + 4 µA		
Ripple current (I_r)	Refer to table at 105°C and 100Hz : Frequency 50Hz 100Hz 500Hz 1000Hz >10kHz 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 Diameter 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		
Life test (105°C, Vn, Ir applied)	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside	Cap change tan δ Leakage current(I_L) Impedance (Z)	≤ 10% ≤ 130% < initial limit ≤ 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 tan δ Leakage current(I_L)	≤ ±15% ≤ 150% < initial limit
Useful life (105°C, Vn, Ir applied)	> 5,000 hours 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		

ALUMINIUM ELECTROLYTIC CAPACITORS
KI92 Series with Screw Terminal
Standard Capacitor values and dimensions

Rated Voltage	Surge Voltage	Capacitance Nominal(MFD)	Max TAN D at 100 Hz, 20°C	ESR TYP at 100 Hz, 20°C(milli Ohms)	Ripple current Max at 100 Hz 85°C(Amps)	Can Size D x L mm
400	440	470	0.08	139	3.45	51X79
		680	0.08	107	3.90	51X79
		1,000	0.08	75	4.50	51X79
		1,000	0.08	75	4.90	51X105
		1,500	0.08	53	6.00	63X105
		2,200	0.08	40	7.50	63X105
		2,200	0.08	40	8.50	76X105
		3,300	0.08	25	11.30	76X143
		4,700	0.08	20	14.10	76X143
		5,600	0.08	17	14.30	76X143
		6,800	0.08	15	18.00	76X143
		8,200	0.08	14	20.10	76X214
		10,000	0.09	13	25.10	90X220
420	462	470	0.08	139	3.45	51X79
		680	0.08	107	3.90	51X79
		1,000	0.08	75	4.50	51X79
		1,000	0.08	75	4.90	51X105
		1,500	0.08	53	6.00	63X105
		2,200	0.08	40	7.50	63X105
		2,200	0.08	40	8.50	76X105
		3,300	0.08	25	11.30	76X143
		4,700	0.08	20	14.10	76X143
		5,600	0.08	17	14.30	76X143
		6,800	0.08	15	18.00	76X143
		8,200	0.08	14	20.10	76X214
		10,000	0.09	13	25.10	90X220
450	495	470	0.08	159	3.20	51X79
		680	0.08	114	4.40	51X105
		1,000	0.08	83	5.10	51X105
		1,000	0.08	83	5.40	63X105
		1,500	0.08	57	6.50	63X105
		1,500	0.08	57	7.20	76X105
		2,200	0.08	44	9.50	76X143
		3,300	0.08	30	12.30	76X143
		4,700	0.08	21	13.20	76X143
		5,600	0.08	18	14.10	76X143
		6,800	0.08	16	19.30	76X214
		8,200	0.08	15	20.10	76X214
		10,000	0.09	12	26.10	90X220

Snap-In Capacitors

KENDEIL Series K05 TYPE -40°C + 105°C 5000H

RoHS Compliant

- 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 volume with low ESR.
- High ripple current, in small dimensions case size.
- Extended temperature range with outstanding reliability.

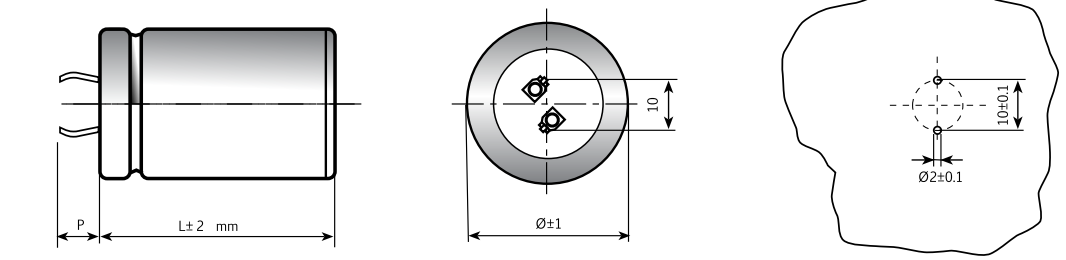
APPLICATIONS

Professional switch mode power supplies. Professional power electronics.

Dimensions in mm.

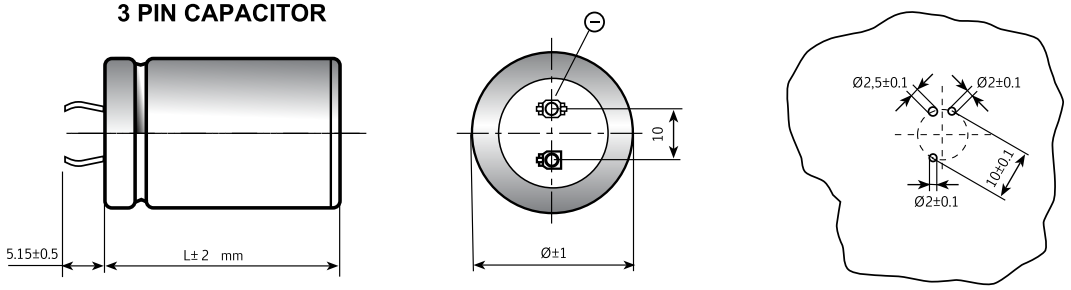
Circuit board hole dimensions

2 PIN CAPACITOR

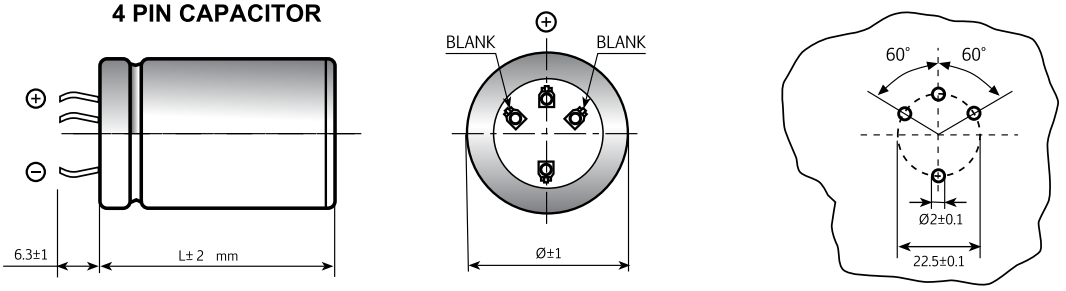


PIN LENGTH
P 4.5 short pin
P 6.3 long pin (standard)

3 PIN CAPACITOR



4 PIN CAPACITOR



Ø	22	25	30	35	40	45	50
2 PINS	●	●	●	●	●		
3 PINS		●	●	●			
4 PINS				●	●	●	●

On demand, only for caps with dia ≥ 35mm: octagonal can shape for long stress vibration applications

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 500V 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 68 µF to 47,000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]
Leakage Current (I_L) **(mA, 5 min, 20°C)**	max $I_L = 0.006\ C_r V_r + 4$ µA At 85°C max $I_L = 0.02\ C_r V_r$ µA Kendiel Product Limit : $I_L = 0.003$ CrVr
Ripple current (I_r)	Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50Hz	100Hz	500 Hz	1000Hz	>10kHz
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 (160-450V 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	2.80	2.60	2.40	2.20	1.80	1.50	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, amplitude 0.75 mm max acceleration 10g for 3x2h
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 20% tan δ ≤ 200% Leakage current (I_L) < initial limit Impedance (Z) ≤ 200%
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	250,000 h at 40°C 15,000 h at 85°C 5,000 h at 105°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 30 fit (30 10^{-9}/h) ($V_r \leq 160$V DC) ≤ 40 fit (40 10^{-9}/h) ($V_r \leq 160$V DC)
Self inductance	Approx. 20 nH
Reference standards	CECC 30.301 - IEC 60384-4 LONG LIFE GRADE

ALUMINIUM ELECTROLYTIC CAPACITORS
K05 Series with Snap-in type
Standard Capacitor values and dimensions

Rated Voltage	Surge Voltage	Capacitance Nominal(MFD)	Max ESR at 100 Hz, 20°C(mΩ)	Impedance at 10K Hz, 20°C(mΩ)	Ripple at 105°C(Amps)	Can Size D x L mm
16	18.4	6,800	55	40	1.9	25x30
		10,000	45	35	2	25x40
		10,000	40	35	2	30x30
		15,000	40	35	2.6	25x40
		15,000	40	35	2.8	30x40
		22,000	35	24	3.1	30x40
		22,000	35	24	3.3	35x40
		33,000	25	20	3.6	35x50
		47,000	22	20	4.9	35x50
25	28.7	4,700	53	45	1.8	25x30
		6,800	50	38	2	25x30
		6,800	50	38	2.2	30x30
		10,000	40	35	2.4	25x40
		10,000	40	35	2.3	30x30
		15,000	39	28	2.9	30x40
		15,000	39	38	3.2	35x40
		22,000	30	22	3.3	35x50
		33,000	22	18	4.3	35x50
40	46	3,300	72	58	1.5	25x30
		4,700	50	38	1.8	25x30
		4,700	50	38	1.8	30x25
		6,800	48	33	2.3	25x40
		6,800	48	33	2.4	30x30
		10,000	39	28	2.8	25x40
		10,000	39	28	2.9	30x40
		10,000	39	28	3.1	35x30
		15,000	32	22	2.8	30x40
		15,000	32	22	3.7	35x40
		22,000	28	20	5.1	35x40
		22,000	28	20	5.4	35x50
50	57.5	2,200	72	58	1.5	25x30
		3,300	48	38	1.6	22x30
		3,300	48	38	1.6	25x30
		4,700	50	35	2	25x30
		4,700	50	35	2	30x25
		4,700	50	35	2	30x30
		6,800	46	28	2.9	30x30
		6,800	56	28	3.2	30x40
		10,000	31	22	3.4	30x40
		10,000	31	22	3.2	35x30
		10,000	31	22	3.2	35x40
		15,000	26	18	4.7	35x50
		22,000	25	18	5.5	40x50
63	72.4	2,200	79	60	1.5	25x30
		3,300	50	40	2.3	25x40
		3,300	50	40	2.1	30x30
		4,700	40	29	2.4	30x30
		4,700	40	29	2.8	30x40
		6,800	35	25	3	30x40
		6,800	35	25	4.4	35x40
		10,000	30	23	5.3	35x40
		10,000	30	23	5.3	35x50
100	115	1,000	127	100	1.7	25x30
		1,000	127	100	1.7	30x25
		1,500	105	82	2	25x40
		1,500	105	82	1.8	30x30
		2,200	71	60	2.7	30x30
		2,200	71	60	2.7	30x40
		3,300	48	39	3	30x50
		3,300	48	39	3.3	35x40
		4,700	42	30	3.6	35x40
		4,700	33	26	4.4	35x50
		5,600	33	24	4.5	40x50
		6,800	32	23	4.5	35x50
		6,800	32	23	4.9	40x50
200	230	220	440	340	0.9	22x30
		220	440	340	1.9	25x30
		330	240	133	1.1	22x30
		330	240	133	0.7	25x25
		330	240	133	1.2	25x30
		470	169	98	1.6	25x30
		470	169	98	1.6	30x30
		680	145	87	1.7	25x40
		680	145	87	2	30x40
		1,000	95	63	2.1	30x40
		1,000	95	63	2.4	35x30
		1,500	70	41	2.4	30x50
		1,500	70	41	2.6	35x50
		2,200	45	33	2.8	35x50
250	287	100	950	730	0.7	25x30
		150	530	290	0.7	25x30
		220	370	240	0.9	25x30
		330	260	153	1.2	30x30
		470	180	110	1.5	25x40
		470	180	110	1.5	30x30
		680	145	95	1.8	25x50
		680	145	95	1.8	30x40
		680	145	95	1.8	35x40
		1,000	98	65	2.6	35x50
		1,500	75	43	2.8	35x50
400	440	68	1405	1050	0.47	25x30
		100	796	550	0.5	22x30
		100	796	550	0.5	25x30
		150	530	380	0.6	25x30
		150	530	380	0.8	30x30
		220	360	250	1	25x40
		220	360	250	1.1	30x30
		270	320	199	1.2	25x40
		330	249	170	1.4	25x45
		330	240	170	1.4	30x40
		330	240	170	1.4	35x30
		330	240	170	1.4	35x40
		470	170	125	1.9	30x50
		470	170	125	1.9	35x40
		470	170	125	2.2	35x50
		680	158	110	2.2	35x50
		680	158	110	2.4	40x50
		820	121	97	2.5	35x60
		1,000	110	90	3.1	40x60
		1,500	99	68	5.8	40X97
450	495	68	1405	1050	0.47	22x30
		68	1405	1050	0.47	25x30
		100	796	550	0.7	25x30
		100	796	550	0.8	30x25
		100	796	550	0.8	30x30
		150	660	490	0.9	22x40
		150	530	380	0.8	25x40
		150	530	380	1	30x30
		150	530	380	1	30x40
		220	380	310	0.9	25x50
		220	360	250	1.1	30x40
		220	360	250	1	35x30
		330	240	170	1.25	30x40
		330	240	170	1.25	30x50
		330	240	170	1.4	35x40

ALUMINIUM ELECTROLYTIC CAPACITORS
K05 Series with Snap-in type
Standard Capacitor values and dimensions

Rated Voltage	Surge Voltage	Capacitance Nominal(MFD)	Max ESR at 100 Hz, 20°C(mΩ)	Impedance at 10K Hz, 20°C(mΩ)	Ripple at 105°C(Amps)	Can Size D x L mm
		330	240	170	1.4	35x50
		470	170	125	1.8	35x50
		680	160	116	2.1	35x50
		680	158	110	2.2	35x60
		820	125	100	2.3	40x60
		1,000	110	90	3.2	40x60
		1,500	90	80	5.1	40X97
500	550	68	1490	1070	0.42	25x30
		100	935	620	0.55	30x30
		150	620	410	0.75	30x40
		180	512	340	0.9	30x50
		220	455	295	0.95	35x40
		270	320	214	1.6	35x50
		330	296	203	1.65	35x50
		330	296	203	1.78	35x60
		330	296	203	1.8	40x50
		470	211	156	2	40x60

KENDEIL Series K06 TYPE -40°C + 85°C 5000H

RoHS Compliant

- 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 volume with low ESR.
- High ripple current, in small dimensions case size.
- Operation up to 105°C permissible..

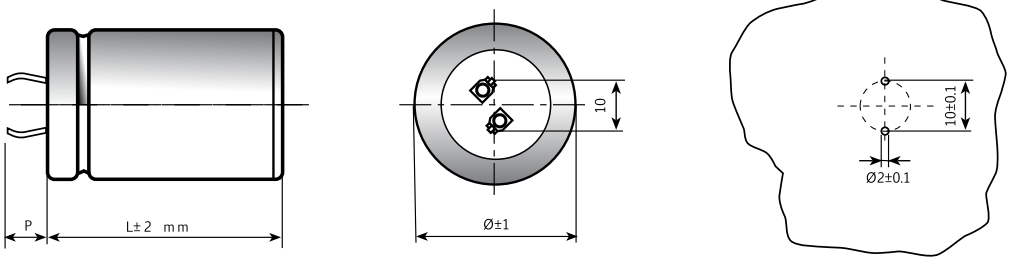
APPLICATIONS

Professional switch mode power supplies. Professional power electronics.

Dimensions in mm.

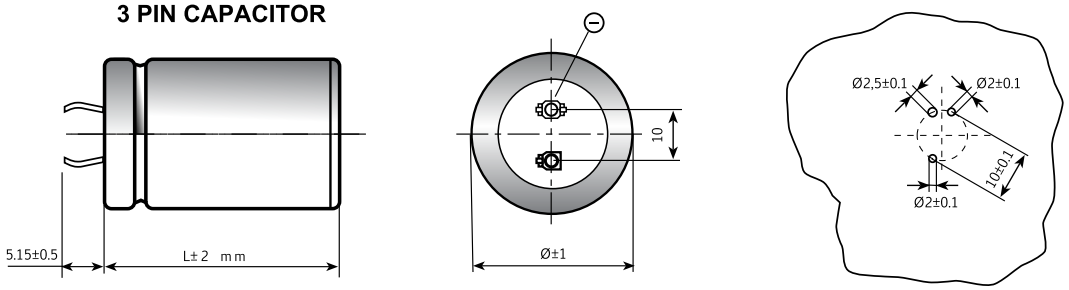
Circuit board hole dimensions

2 PIN CAPACITOR

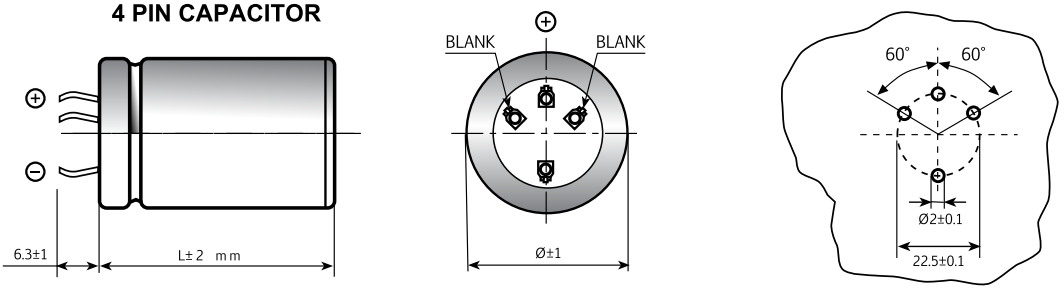


PIN LENGTH
P 4.5 short pin
P 6.3 long pin (standard)

3 PIN CAPACITOR



4 PIN CAPACITOR



Ø	22	25	30	35	40	45	50
2 PINS	●	●	●	●	●		
3 PINS		●	●	●			
4 PINS				●	●	●	●

On demand, only for caps with dia ≥ 35mm: octagonal can shape for long stress vibration applications

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 600V 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) **(mA, 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)	Refer to table at 85°C and 100 Hz For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50Hz	100Hz	500 Hz	1000Hz	>10kHz
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 (160-450V 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 0.75 mm max acceleration 10g for 3x2 h		
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside	Cap change tan δ Leakage current (I_L) Impedance (Z)	≤ 20% ≤ 200% < initial limit ≤ 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 tan δ Leakage current (I_L)	≤ ±15% ≤ 150% < initial limit
Useful life	>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		
Reference standards	CECC 30.301 - IEC 60384-4 LONG LIFE GRADE		

ALUMINIUM ELECTROLYTIC CAPACITORS
K06 Series with Snap-in type
Standard Capacitor values and dimensions

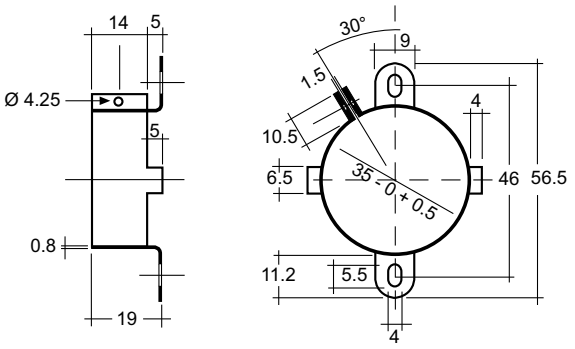
Rated Voltage	Surge Voltage	Capacitance Nominal(MFD)	Max ESR at 100 Hz, 20°C(mΩ)	Impedance at 10K Hz, 20°C(mΩ)	Ripple at 85°C(Amps)	Can Size D x L mm
16	18.4	4,700	55	40	1.5	22x30
		6,800	45	38	1.8	22x30
		10,000	40	35	2.4	25x30
		15,000	33	25	2.6	30x30
		22,000	27	22	3.5	30x40
		22,000	27	22	3.5	35x30
		22,000	27	22	3.5	35x40
		33,000	25	20	4.8	35x50
		47,000	22	20	5.8	35x50
25	28.75	4,700	53	45	1.8	22x30
		6,800	50	38	2.7	25X30
		10,000	40	35	3.3	25x40
		10,000	40	35	3.3	30x30
		15,000	39	28	4.1	30x40
		15,000	39	28	4.1	35x30
		22,000	30	22	5.0	35x40
		33,000	22	18	6.1	35x50
40	46	3,300	72	58	2.1	22x30
		4,700	50	38	2.8	25X30
		6,800	48	33	3.4	25x40
		6,800	48	33	3.4	30x30
		10,000	38	28	3.8	25x40
		10,000	39	28	4.3	30x40
		10,000	39	28	4.3	35x30
		15,000	32	22	4.0	30x40
		15,000	32	22	4.8	35x40
		22,000	28	20	5.4	35x50
50	57.5	2,200	72	58	1.9	22x30
		3,300	48	38	2.5	25X30
		4,700	50	35	2.8	25x30
		6,800	48	28	3.2	25x40
		6,800	48	28	3.2	30x30
		10,000	31	22	3.8	30x40
		10,000	31	28	3.8	35x30
		10,000	31	28	4.1	35x40
		15,000	26	18	4.9	35x50
		22,000	25	18	7.3	40x50
63	72.5	2,200	79	58	2.2	25x30
		3,300	50	38	2.6	25x40
		3,300	50	38	2.6	30x30
		4,700	41	29	2.8	25x40
		4,700	41	29	3.5	30x40
		4,700	41	29	3.5	35x30
		6,800	35	25	3.6	30x40
		6,800	35	25	4.0	35x40
		10,000	32	23	5.8	35x50
		15,000	30	20	6.8	40x50
100	115	1,000	150	100	1.3	22x30
		1,000	150	100	1.6	25x30
		1,000	150	100	1.6	30x25
		1,500	105	82	2.1	30x30
		2,200	71	60	2.4	30x30
		2,200	71	60	3.1	30x40
		2,200	71	60	2.4	35x30
		3,300	48	39	4.0	30x50
		3,300	48	39	4.0	35x40
		4,700	33	26	5.6	35x50
		6,800	33	25	5.8	35x50
200	230	220	440	340	0.9	22x30
		330	240	133	1.3	22x30
		470	169	98	1.5	25x30
		680	145	87	2.0	25x40
		680	145	87	2.0	30x30
		680	145	87	2.0	35x30
		1000	95	63	2.6	30x40
		1000	95	63	2.8	35x40
		1500	70	41	2.9	35x40
		1,500	70	41	3.7	35x50
		2,200	45	33	3.9	35x40
250	287	150	530	290	0.9	22x30
		220	370	240	1.3	25x30
		330	260	153	1.4	25x40
		330	260	153	1.4	30x30
		470	180	110	1.6	25x40
		470	180	110	1.6	30x30
		680	145	95	1.9	30x40
		680	145	95	2.2	35x40
		1000	98	65	2.6	35x40
		1,000	98	65	3.2	35x50
		1,500	75	43	4.0	35x50
		2,200	50	35	5.2	40x50
400	440	68	1405	1050	0.6	22x25
		68	1405	1050	0.6	22x30
		100	796	550	0.7	22x30
		100	796	550	0.7	25x25
		100	796	550	1.0	25x30
		150	530	380	1.0	25x30
		150	530	380	1.0	30x25
		220	360	250	1.2	25x40
		220	360	250	1.2	30x30
		330	240	170	1.7	30x40
		330	240	170	1.7	35x30
		470	170	125	2.2	35x40
		470	170	125	2.6	35x50
		560	165	122	2.6	35x50
		680	158	110	2.8	35x50
		680	158	110	3.2	40x50
		820	140	106	3.5	35x60
		1000	103	91	4.4	35x60
		1,500	65	50	5.8	40x97
450	495	68	1405	1050	0.60	22x25
		68	1405	1050	0.60	22x30
		100	800	560	0.70	25x30
		100	800	560	0.70	30x25
		150	550	400	1.10	30x25
		150	550	400	1.10	30x30
		220	380	265	1.30	30x40
		220	380	265	1.30	35x30
		330	255	175	1.70	30x50
		330	255	175	1.70	35x40
		470	175	125	2.40	35x50
		560	165	122	2.50	35x50
		680	158	110	2.60	35x50
		680	158	110	3.10	40x50
		820	110	95	4.00	40x60
		1000	110	95	4.90	40x77
		1500	110	95	5.56	40x97
500	525	68	1870	1380	0.60	25x30
		100	1050	790	0.70	30x30
		150	750	580	1.10	30x40
		220	579	440	1.40	30x50
		220	579	440	1.40	35x40
		330	386	290	2.10	35x50
		470	271	200	2.50	40x50
		560	230	190	3.00	40x60

ALUMINIUM ELECTROLYTIC CAPACITORS
K06 Series with Snap-in type
Standard Capacitor values and dimensions

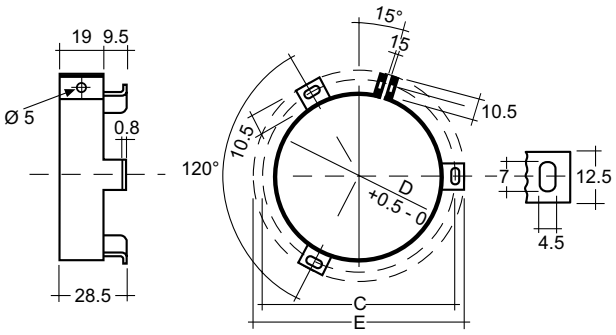
Rated Voltage	Surge Voltage	Capacitance Nominal(MFD)	Max ESR at 100 Hz, 20°C(mΩ)	Impedance at 10K Hz, 20°C(mΩ)	Ripple at 85°C(Amps)	Can Size D x L mm
		680	205	155	3.50	40x77
		820	141	119	3.90	40x97
		1000	135	112	4.00	40x77
		1200	125	105	4.90	40x97
		1500	115	98	5.14	45x97
550	577	68	1898	1443	0.75	25x30
		100	1271	970	0.95	30x30
		150	879	670	1.20	30x40
		180	722	550	1.40	30x50
		180	722	550	1.41	35x40
		220	584	445	1.55	35x40
		270	491	377	1.70	35x50
		330	400	306	2.45	35x60
		330	409	316	2.45	40x50
		470	290	223	2.62	40x60
		560	234	180	3.10	40x77
		680	192	147	3.70	40x97
600	630	82	1427	1020	0.88	30x30
		100	1152	902	1.07	30x40
		150	820	630	1.32	30x50
		150	820	630	1.34	35x40
		220	574	415	1,87	35x50
		270	474	353	2.25	35x60
		270	474	353	2.25	40x50
		330	387	280	2.42	40x60
		470	277	193	2.95	40x77
		560	229	179	3.50	40x97

Rings Clips

RING CLIPS Ø 35mm



RING CLIPS Ø 51-63-76 mm



D	C	E	Ordering Code
35	46	56.5	ARC1635000
51	63.5	73.4	ARC1650000
63	76.0	86.1	ARC1664000
76	89.0	98.6	ARC1676000

Insulated Hex Nuts, Washers

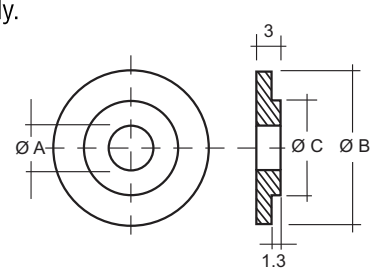
To be used with Screw Type Capacitors

Dimensions (mm)

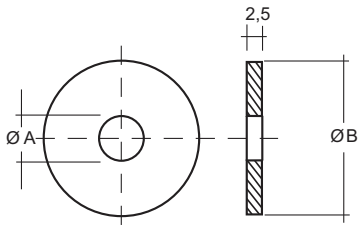
Thread	Description	Ø	h	H	D	Ordering Code
M12	NUT S17	17	1.3	18	28	AN1300010
M12	NUT S17 + Flat Washer					ANW1300011
M12	NUT S15	15	1.3	18	25	AN1300012
M12	NUT S15 + Flat Washer					ANW1300013
M12	NUT S22	22	1.3	18	28	AN1300014
M12	NUT S22 + Flat Washer					ANW1300015
M8	NUT M8	17	1.3	15	25	AN1300016
M8	NUT M8 + Flat Washer					ANW1300017
M12	Center Ring Washer					AW1300001

Insulated mounting with Hex Nut

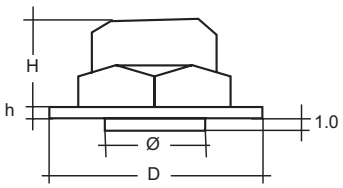
Hex Nuts and Spring Washers are delivered loosely with the capacitor. Insulation Washers shall be ordered separately.



Center Ring Washer



Flat Washer



M	A	B	C
8	8.4	25	18.5
12	12.5	35	18.5

Mounting Hardware

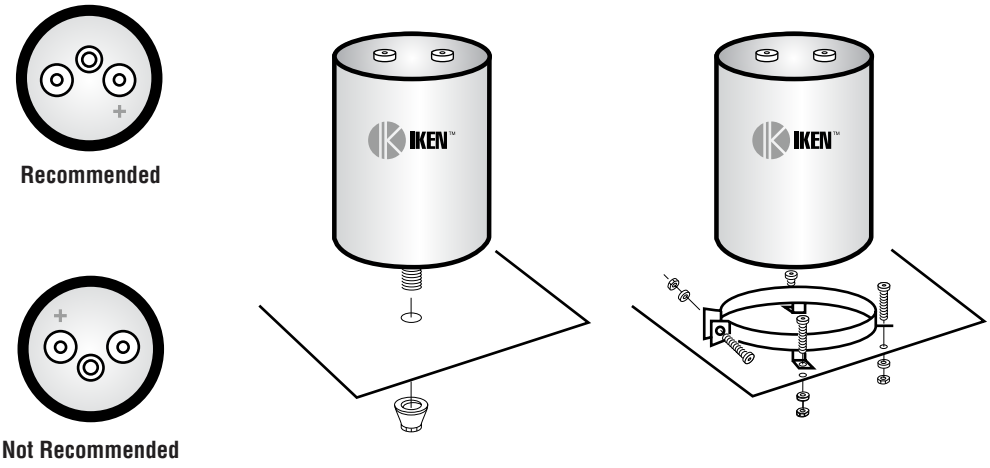
During normal operation electrolytic capacitors are subjected to an internal generation of gas due to heating combined with the inside pressure. Therefore a safety vent is provided to prevent catastrophic failure.

Kendeil-Indfarad IKEN Series aluminium electrolytic capacitors screw terminals 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.

When mounting the capacitor, it should be borne in mind that in the event of the vent being blown under failure conditions, a small quantity of hot conductive electrolyte and vapours 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.

In any case, screw terminal capacitors can be mounted in any position as long as the vent is free to operate. 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 importants parts of the circuit.

Lastly, 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.



Notes when mounting a screw type capacitor:
Special attention has to be applied during assembling in case of stud capacitors. The threaded stud termination (M8 or M12 diameter) is the bottom part of capacitor's can and it is in electrical contact with negative end termination of capacitor. Please use our plastic nut and plastic ring 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 coverd by sleeve, designed to prevent accident short circuit during maintanances or assembling operation. Air gap between capacitor and machinerie's electrical parts, active parts or machinerie's frame has to be taken into consideration for good insulation as defined to many standards of machines.

General Warning

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-Indfarad IKEN Series 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 modificatio and a decrease of their reliability and useful life. Products manufactured by Kendeil-Indfarad 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.

Disclaimer

Cooperation between Customers and Kendeil-Indfarad 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-Indfarad, 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 labelled 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-Indfarad 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-Indfarad 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 specifie 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

Kendeil-Indfarad liability shall be limited to only replacement or repairing of goods, free of charge, after acknowledge of received notification by customer.

Kendeil-Indfarad is not responsible for any possible damage to people or things, of any kind, derived from improper installation,use of application of its products.

Also, the producer 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-Indfarad.

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-savin 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.

Any warnings, cautions and product specific notes must be observed.

To the maximum extent permitted by above statements, in no event shall Kendeil-Indfarad 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-Indfarad products.

In the case of any product liability claim from third parties against Kendeil-Indfarad, not falling within Kendeil-Indfarad liability, customer or Buyer should hold Kendeil-Indfarad harmless.

Copyright Information

Distributor Network

Our Authorised Distributor:

Kendeil Indfarad™
ALUMINIUM ELECTROLYTIC CAPACITORS

RoHS compliant

Kendeil Indfarad Electronics Pvt. Ltd.
16(K)3, Attibele Industrial Area, Neralur Post, Bengaluru – 562107
Phone: +(91) 984410 5992 & +(91) 98805 76635

Please mail your enquiries to: **info@kendeil-indfarad.com**