

# **Aluminum electrolytic capacitors**

## **Capacitors with screw terminals – Accessories**

**Series/Type:**        **B44020, B44030**

**Date:**                February 2017

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## Accessories for capacitors with mounting stud on capacitor base

### Insulating washer made of hostalen

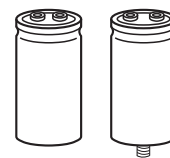
Capacitor diameter	Thread size	Dimensional drawing	Diameter d mm	Ordering code
51.6 mm	M12	<p>KAL1549-I</p>	$d_1 - 0.5 = 51$ $d_2 - 0.5 = 31$ $d_3 \pm 0.3 = 21.5$ $d_4 \pm 0.2 = 13$	B44020B0006B051
64.2 mm	M12		$d_1 - 0.5 = 63.5$ $d_2 - 0.5 = 43.5$ $d_3 \pm 0.3 = 21.5$ $d_4 \pm 0.2 = 13$	B44020B0006B064
76.9 mm	M12		$d_1 - 0.5 = 76$ $d_2 - 0.5 = 56$ $d_3 \pm 0.3 = 21.5$ $d_4 \pm 0.2 = 13$	B44020B0006B076
90 mm	M12		$d_1 - 0.5 = 89$ $d_2 - 0.5 = 69$ $d_3 \pm 0.3 = 21.5$ $d_4 \pm 0.2 = 13$	B44020B0006B090

Only for capacitors with threaded stud and without insulated base

### Reinforced nylon cap nut

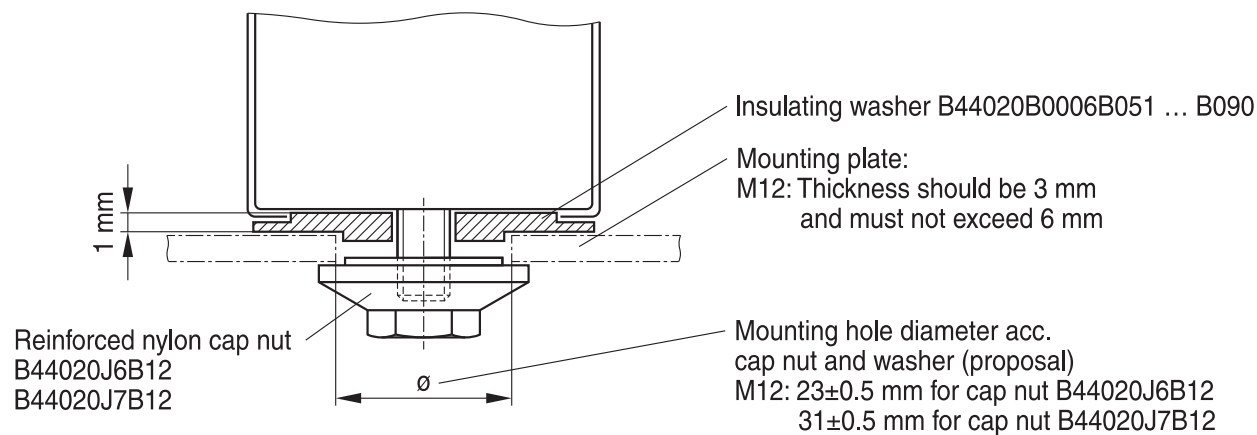
Capacitor diameter	Thread size	Dimensional drawing	Ordering code
> 40 mm	M12 <sup>1)</sup> width across flats 19 mm	<p>KAL0349-1</p>	B44020J0006B012
		<p>KAL0285-Q</p>	B44020J0007B012

1) Maximum torque M12: 7.0 Nm for mounting thread length  $\geq 13$  mm; 5.0 Nm for mounting thread length  $\geq 10$  mm



## Mounting instructions

Insulated mounting with washer and cap nut (for capacitors with threaded stud and without insulated base):



KAL1648-G-E

Mounting stud has the same potential as the negative terminal. Attention must be paid on any relevant regulations (e.g. VDE, BSA or UL).

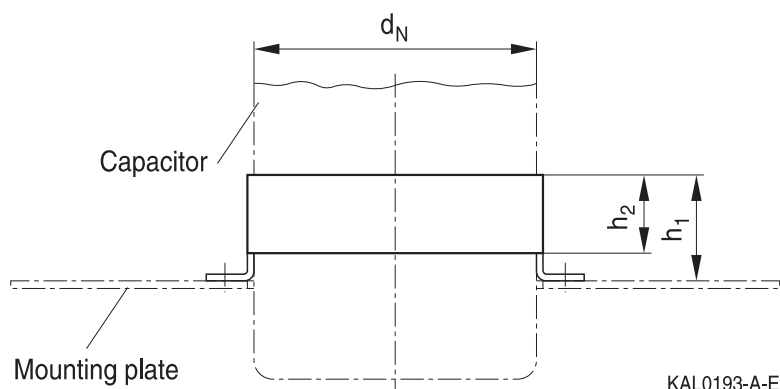


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**Screw terminals – Accessories**

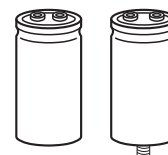
## Ring clip mounting

Ring clips are primarily used for upright mounting of screw terminal and photoflash capacitors. The ring clips are corrosion protected and are RoHS-compatible.



It is recommended to insert an additional insulating strip between capacitor and ring clip to avoid any risk of damage due to edges from the clip. The strip is included in delivery. For ordering code, see the following table. Attention must be paid to any relevant regulations (e.g. VDE, BSA or UL).

$d_N$	$h_1$ mm	$h_2$	Ring clip version	Ordering code with insulating strip
51.6	22	15	<p>KAL0345-3</p>	<p>B44030J0051B000</p> <p>(insulating strip length: 325 mm)</p>



$d_N$	$h_1$ mm	$h_2$	Ring clip version	Ordering code with insulating strip
64.3	29	19	<p>KAL0346-B</p>	B44030J0064B000  (insulating strip length: 420 mm)
76.9	29	19	<p>KAL0347-J</p>	B44030J0075B000  (insulating strip length: 495 mm)
90	29	19	<p>KAL1398-Y</p>	B44030J0090B000  (insulating strip length: 585 mm)



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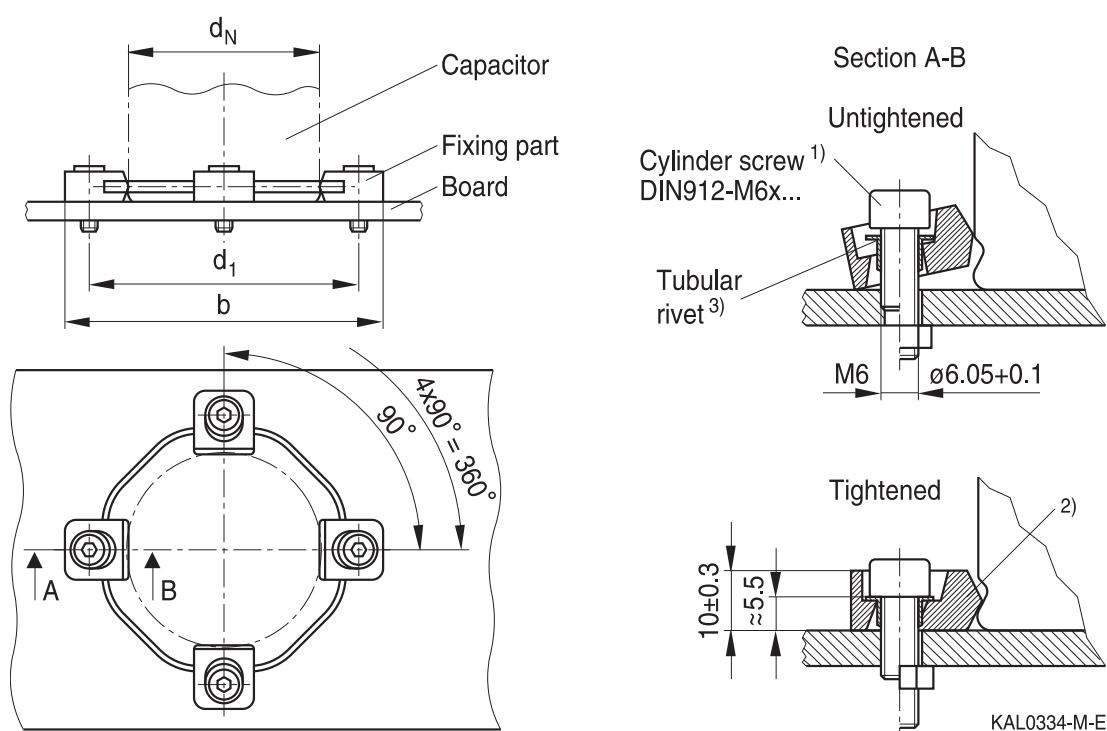
## Screw terminals – Accessories

### Clamp mounting

Screw terminal capacitors without threaded stud and with a diameter  $\geq 64.3$  mm can also be mounted with ring clamps. Clamp mounting offers the following advantages:

- Optimum heat transfer between capacitor base and board due to pressure contact
- High vibration resistance
- Electrically insulated material

### Dimensional drawing



<sup>1)</sup> Length of screw depends on application.

<sup>2)</sup> The screws have to be tightened uniformly and crosswise until the fixing part rests flatly on the board.

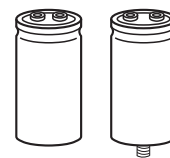
<sup>3)</sup> Tubular rivets included in delivery package.

General hints for mounting: If required, the four fixation parts can be cut out from the common carrier ring and mounted separately.

### Dimensions and ordering codes

Capacitor diameter $d_N$	$d_1 \pm 0.2$ mm	b mm	Ordering code
65 mm	87	104	B44030A0165B000
75 mm	99	116	B44030A0175B000
90 mm	112	130	B44030A0190B000

Screws are not included in the delivery package.



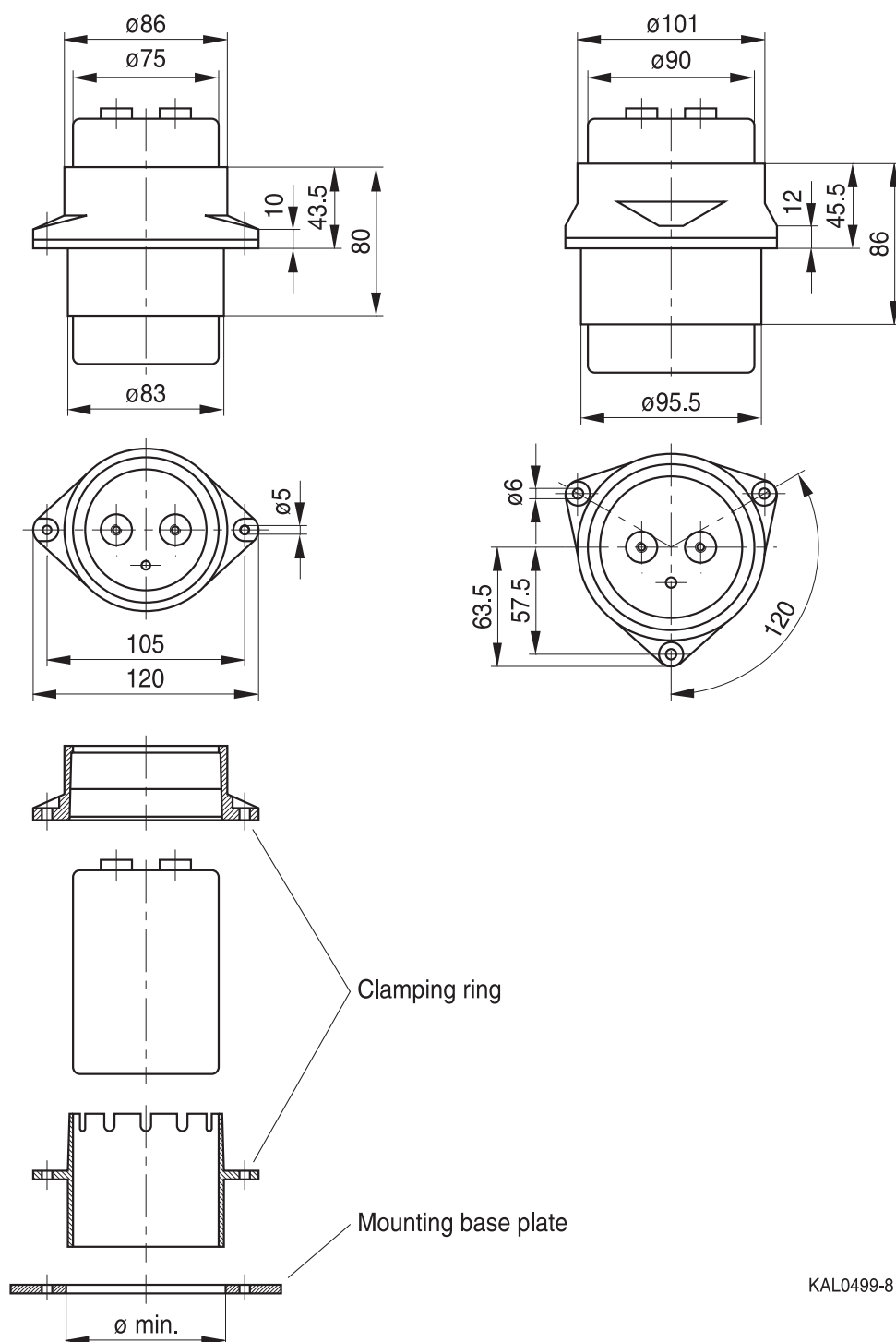
## Mounting set (ring clamps)

- Protects the capacitor against tilt and the terminals from mechanical stress
- Fits for different capacitor length
- Electrically insulated clamping material

## Dimensions and ordering codes

Capacitor diameter $d_N$	$\varnothing_{\min}$	Ordering code
75 mm	84 mm	B44030A0375B000
90 mm	96.5 mm	B44030A0390B000

## Dimensional drawing



KAL0499-8



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**Screw terminals – Accessories**

## Cautions and warnings

### Personal safety

The electrolytes used by EPCOS have been optimized both with a view to the intended application and with regard to health and environmental compatibility. They do not contain any solvents that are detrimental to health, e.g. dimethyl formamide (DMF) or dimethyl acetamide (DMAC).

Furthermore, some of the high-voltage electrolytes used by EPCOS are self-extinguishing.

As far as possible, EPCOS does not use any dangerous chemicals or compounds to produce operating electrolytes, although in exceptional cases, such materials must be used in order to achieve specific physical and electrical properties because no alternative materials are currently known. We do, however, restrict the amount of dangerous materials used in our products to an absolute minimum.

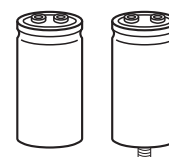
Materials and chemicals used in EPCOS aluminum electrolytic capacitors are continuously adapted in compliance with the EPCOS Corporate Environmental Policy and the latest EU regulations and guidelines such as RoHS, REACH/SVHC, GADSL, and ELV.

MDS (Material Data Sheets) are available on the EPCOS website for all types listed in the data book. MDS for customer specific capacitors are available upon request.

MSDS (Material Safety Data Sheets) are available for all of our electrolytes upon request.

Nevertheless, the following rules should be observed when handling aluminum electrolytic capacitors: No electrolyte should come into contact with eyes or skin. If electrolyte does come into contact with the skin, wash the affected areas immediately with running water. If the eyes are affected, rinse them for 10 minutes with plenty of water. If symptoms persist, seek medical treatment. Avoid inhaling electrolyte vapor or mists. Workplaces and other affected areas should be well ventilated. Clothing that has been contaminated by electrolyte must be changed and rinsed in water.

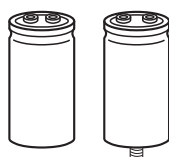




## Product safety

The table below summarizes the safety instructions that must be observed without fail. A detailed description can be found in the relevant sections of chapter "General technical information".

Topic	Safety information	Reference chapter "General technical information"
Polarity	Make sure that polar capacitors are connected with the right polarity.	1 "Basic construction of aluminum electrolytic capacitors"
Reverse voltage	Voltages of opposite polarity should be prevented by connecting a diode.	3.1.6 "Reverse voltage"
Mounting position of screw-terminal capacitors	Screw terminal capacitors must not be mounted with terminals facing down unless otherwise specified.	11.1. "Mounting positions of capacitors with screw terminals"
Robustness of terminals	The following maximum tightening torques must not be exceeded when connecting screw terminals: M5: 2.5 Nm M6: 4.0 Nm	11.3 "Mounting torques"
Mounting of single-ended capacitors	The internal structure of single-ended capacitors might be damaged if excessive force is applied to the lead wires. Avoid any compressive, tensile or flexural stress. Do not move the capacitor after soldering to PC board. Do not pick up the PC board by the soldered capacitor. Do not insert the capacitor on the PC board with a hole space different to the lead space specified.	11.4 "Mounting considerations for single-ended capacitors"
Soldering	Do not exceed the specified time or temperature limits during soldering.	11.5 "Soldering"
Soldering, cleaning agents	Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors.	11.6 "Cleaning agents"
Upper category temperature	Do not exceed the upper category temperature.	7.2 "Maximum permissible operating temperature"
Passive flammability	Avoid external energy, e.g. fire.	8.1 "Passive flammability"



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Topic	Safety information	Reference chapter "General technical information"
Active flammability	Avoid overload of the capacitors.	8.2 "Active flammability"
Maintenance	Make periodic inspections of the capacitors. Before the inspection, make sure that the power supply is turned off and carefully discharge the capacitors. Do not apply excessive mechanical stress to the capacitor terminals when mounting.	10 "Maintenance"
Storage	Do not store capacitors at high temperatures or high humidity. Capacitors should be stored at +5 to +35 °C and a relative humidity of ≤ 75%.	7.3 "Shelf life and storage conditions"
		Reference chapter "Capacitors with screw terminals"
Breakdown strength of insulating sleeves	Do not damage the insulating sleeve, especially when ring clips are used for mounting.	"Screw terminals – accessories"

### Display of ordering codes for EPCOS products

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Detailed information can be found on the Internet under [www.epcos.com/orderingcodes](http://www.epcos.com/orderingcodes).



## Symbols and terms

Symbol	English	German
$C$	Capacitance	Kapazität
$C_R$	Rated capacitance	Nennkapazität
$C_S$	Series capacitance	Serienkapazität
$C_{S,T}$	Series capacitance at temperature $T$	Serienkapazität bei Temperatur $T$
$C_f$	Capacitance at frequency $f$	Kapazität bei Frequenz $f$
$d$	Case diameter, nominal dimension	Gehäusedurchmesser, Nennmaß
$d_{\max}$	Maximum case diameter	Maximaler Gehäusedurchmesser
$ESL$	Self-inductance	Eigeninduktivität
$ESR$	Equivalent series resistance	Ersatzserienwiderstand
$ESR_f$	Equivalent series resistance at frequency $f$	Ersatzserienwiderstand bei Frequenz $f$
$ESR_T$	Equivalent series resistance at temperature $T$	Ersatzserienwiderstand bei Temperatur $T$
$f$	Frequency	Frequenz
$I$	Current	Strom
$I_{AC}$	Alternating current (ripple current)	Wechselstrom
$I_{AC,RMS}$	Root-mean-square value of alternating current	Wechselstrom, Effektivwert
$I_{AC,f}$	Ripple current at frequency $f$	Wechselstrom bei Frequenz $f$
$I_{AC,\max}$	Maximum permissible ripple current	Maximal zulässiger Wechselstrom
$I_{AC,R}$	Rated ripple current	Nennwechselstrom
$I_{\text{leak}}$	Leakage current	Reststrom
$I_{\text{leak,op}}$	Operating leakage current	Betriebsreststrom
$l$	Case length, nominal dimension	Gehäuselänge, Nennmaß
$l_{\max}$	Maximum case length (without terminals and mounting stud)	Maximale Gehäuselänge (ohne Anschlüsse und Gewindebolzen)
$R$	Resistance	Widerstand
$R_{\text{ins}}$	Insulation resistance	Isolationswiderstand
$R_{\text{symm}}$	Balancing resistance	Symmetrierwiderstand
$T$	Temperature	Temperatur
$\Delta T$	Temperature difference	Temperaturdifferenz
$T_A$	Ambient temperature	Umgebungstemperatur
$T_C$	Case temperature	Gehäusetemperatur
$T_B$	Capacitor base temperature	Temperatur des Gehäusebodens
$t$	Time	Zeit
$\Delta t$	Period	Zeitraum
$t_b$	Service life (operating hours)	Brauchbarkeitsdauer (Betriebszeit)



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Symbol	English	German
V	Voltage	Spannung
$V_F$	Forming voltage	Formierspannung
$V_{op}$	Operating voltage	Betriebsspannung
$V_R$	Rated voltage, DC voltage	Nennspannung, Gleichspannung
$V_S$	Surge voltage	Spitzenspannung
$X_C$	Capacitive reactance	Kapazitiver Blindwiderstand
$X_L$	Inductive reactance	Induktiver Blindwiderstand
Z	Impedance	Scheinwiderstand
$Z_T$	Impedance at temperature T	Scheinwiderstand bei Temperatur T
$\tan \delta$	Dissipation factor	Verlustfaktor
$\lambda$	Failure rate	Ausfallrate
$\epsilon_0$	Absolute permittivity	Elektrische Feldkonstante
$\epsilon_r$	Relative permittivity	Dielektrizitätszahl
$\omega$	Angular velocity; $2 \cdot \pi \cdot f$	Kreisfrequenz; $2 \cdot \pi \cdot f$

**Note**

All dimensions are given in mm.

## Important notes

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