

# Aluminum electrolytic capacitors

## Capacitors with screw terminals – accessories

**Series/Type:** B44020, B44030

**Date:** December 2019




**Capacitors with screw terminals – accessories**
**Basic accessories**

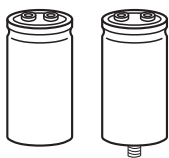
One packing unit contains accessories for 16 capacitors.

<b>For terminals</b>			Screw	Washer for screw
				KAL1712-L-E

Thread	d2 mm	Toothed washers	Screws	Maximum torque	Ordering code
M5	5.3	A 5.1 DIN 6797	DIN 7985 / ISO 7045-M5 x 10-5.6-Z l = 10 mm	2.5 Nm thread depth t ≥ 8 mm	B44020J0500B000
M6	6.4	A 6.4 DIN 6797	DIN 7985 / ISO 7045-M6 x 12-5.6-Z l = 12 mm	4.0 Nm thread depth t ≥ 9.5 mm	B44020J0600B000

<b>For threaded stud</b>			Nut	Washer for nut
				KAL1713-U-E

Thread	For terminal	Toothed washers	Nuts	Maximum torque	Ordering code
M12	M5	J 12.5 DIN 6797	Hex nut BM 12 DIN 439	10 Nm	B44020J0500B012
M12	M6	J 12.5 DIN 6797	Hex nut BM 12 DIN 439	10 Nm	B44020J0600B012



B44020, B44030

Capacitors with screw terminals – accessories

Additional 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>KAL1549-1</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
90.0 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

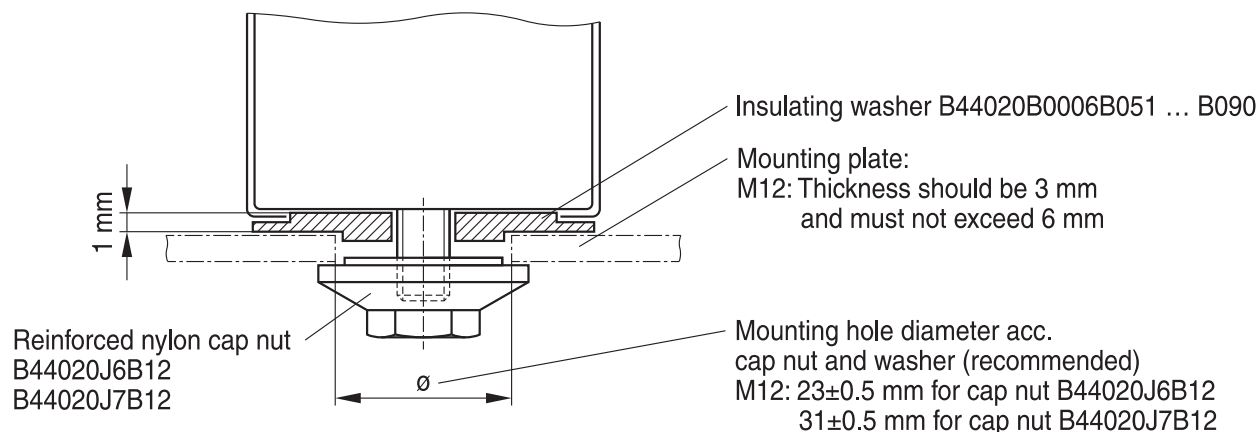
Capacitor diameter	Thread size	Dimensional drawing	Ordering code
> 40 mm	M12 <sup>1)</sup> width across flats 19 mm	<p>KAL0349-1</p>	B44020J0006B012
		<p>KAL1759-3</p>	B44020J0007B012

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):

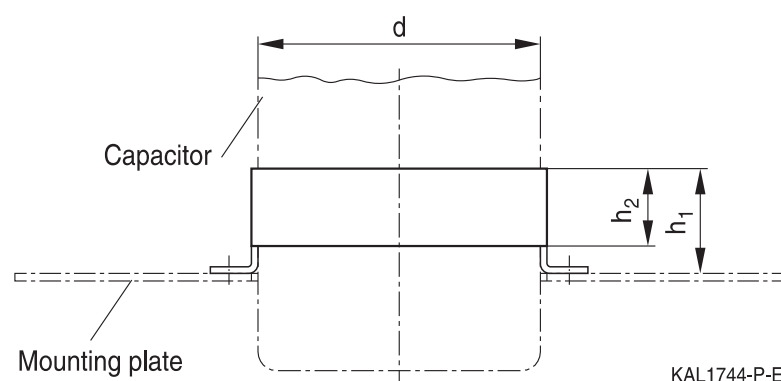


KAL1752-F-E

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

## 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.



KAL1744-P-E

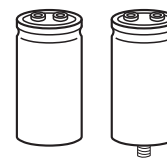
It is recommended to insert an additional insulating strip between capacitor and ring clip to avoid any risk of damage due to edges from the clip. The strip is included in delivery. For ordering code, see the following table. Attention must be paid to any relevant regulations (e.g. VDE, BSA or UL).



B44020, B44030

Capacitors with screw terminals – accessories

d	h <sub>1</sub> mm	h <sub>2</sub>	Ring clip version	Ordering code with insulating strip
51.6	22	15		<p>B44030J0051B000</p> <p>(insulating strip length: 325 mm)</p>
64.3	29	19		<p>B44030J0064B000</p> <p>(insulating strip length: 420 mm)</p>
76.9	29	19		<p>B44030J0075B000</p> <p>(insulating strip length: 495 mm)</p>



d	h <sub>1</sub> mm	h <sub>2</sub>	Ring clip version	Ordering code with insulating strip
90.0	29	19		<p>B44030J0090B000 (insulating strip length: 585 mm)</p>



B44020, B44030

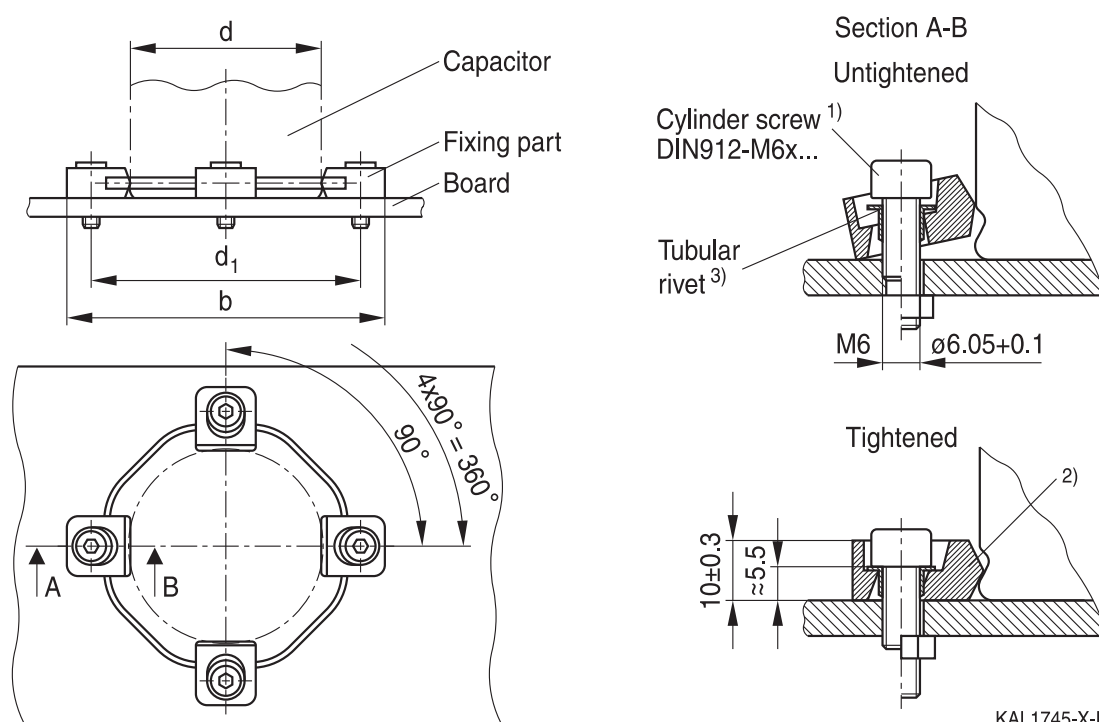
**Capacitors with screw terminals – accessories**

**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**



- 1) Length of screw depends on application.
- 2) The screws have to be tightened uniformly and crosswise until the fixing part rests flatly on the board.
- 3) Tubular rivets included in delivery package.

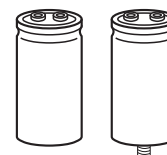
General hints for mounting: If required, the four fixation parts can be cut out from the common carrier ring and mounted separately.

**Dimensions and ordering codes**

Capacitor diameter d	$d_1 \pm 0.2$ mm	b mm	Ordering code
64.3 mm	87	104	B44030A0165B000
76.9 mm	99	116	B44030A0175B000
90.0 mm	112	130	B44030A0190B000

Screws are not included in the delivery package.

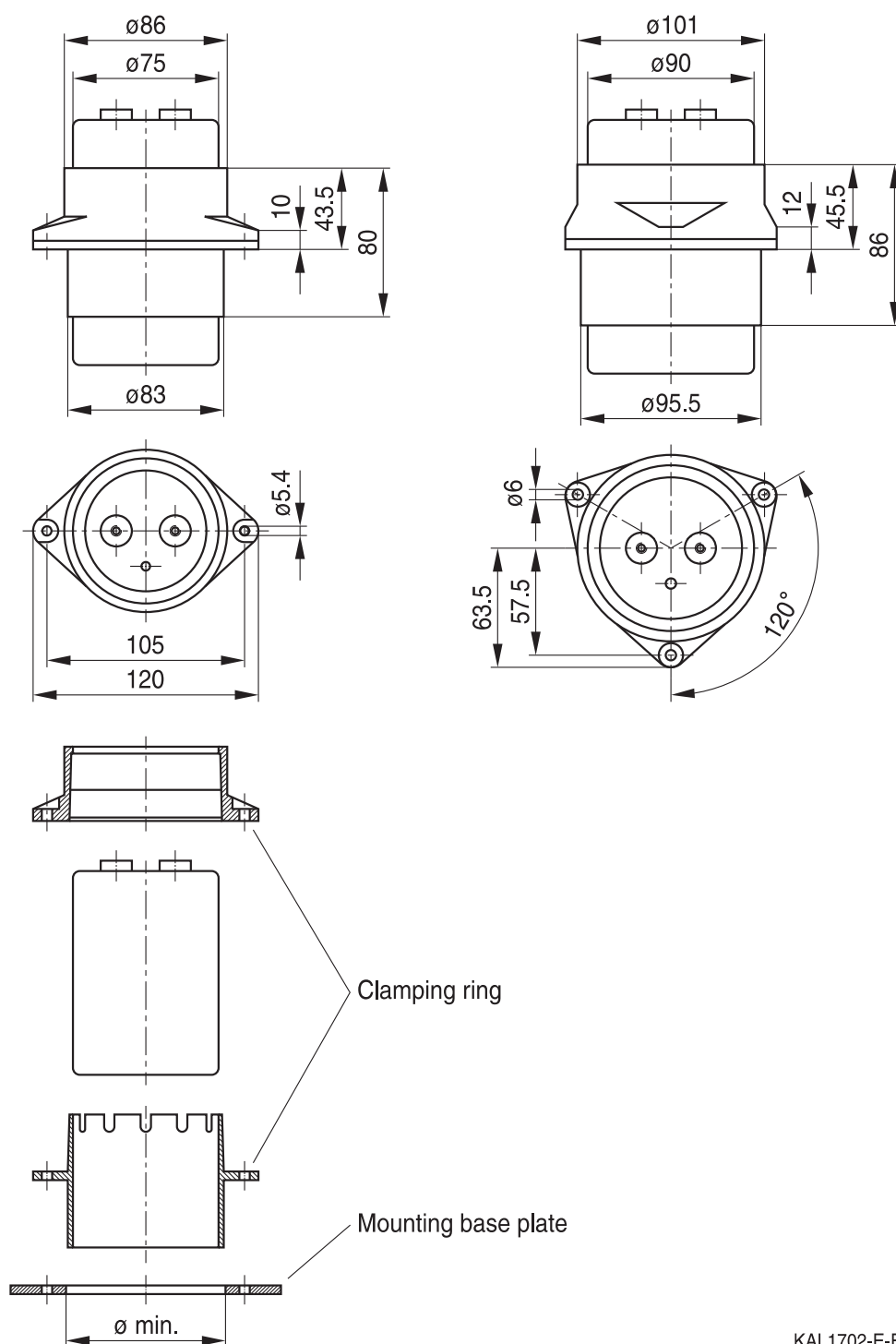



**Mounting set (ring clamps)**

- 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	$\varnothing_{\min}$	Ordering code
76.9 mm	84 mm	B44030A0375B000
90.0 mm	96.5 mm	B44030A0390B000

**Dimensional drawing**


KAL1702-E-E



B44020, B44030

Capacitors with screw terminals – accessories

## Cautions and warnings

### Personal safety

The electrolytes used 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 are self-extinguishing.

As far as possible, we do 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 our aluminum electrolytic capacitors are continuously adapted in compliance with the TDK Electronics 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 our 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 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"



**B44020, B44030**

**Capacitors with screw terminals – accessories**

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 TDK Electronics products**

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.

Detailed information can be found on the Internet under [www.tdk-electronics.tdk.com/orderingcodes](http://www.tdk-electronics.tdk.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
$I_{leak}$	Leakage current	Reststrom
$I_{leak,op}$	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
$R_{ins}$	Insulation resistance	Isolationswiderstand
$R_{symm}$	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)



B44020, B44030

Capacitors with screw terminals – accessories

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

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or lifesaving 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 circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
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6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.

## Important notes

7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard.** The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements (“CSR”) TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System.** For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.
8. The trade names EPCOS, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, ExoCore, FilterCap, FormFit, LeaXield, MiniBlue, MiniCell, MKD, MKK, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at [www.tdk-electronics.tdk.com/trademarks](http://www.tdk-electronics.tdk.com/trademarks).

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