



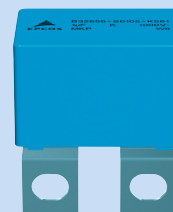
## Product Brief 2011

# Capacitors

## for Uninterruptible Power Supply Systems (UPS)

EPCOS is known as one of the world's leading manufacturer of electronic components. Hardly any other supplier offers one-stop-shopping for all key components. The growing sales of power-quality products has led EPCOS to develop a strategy for Power Quality Solutions. In conjunction with technical experts, the aim is to offer application know-how rather than just products. That means customized service packages put together by individual application experts and assembled by specialists. In view of the growing importance of power quality, EPCOS is focusing on UPS solutions. The wide range of different powers means that UPS products are split into various

segments: small single-phase UPS systems mostly with powers up to 12 kVA, followed by 3-phase mid and high-power ranges up to 50 kVA, 200 kVA and even above 200 kVA. When used as filters, power capacitors will smooth any irregularities in the power network and help to improve power quality and reliability. A typical UPS of the mid power range uses an average of ten power capacitors per system for filtering. Aluminum electrolytic capacitors operate as DC link capacitors. EPCOS offers these components in different variants. The appropriate film capacitors for the input and output filters of UPS systems are the PhaseCap MKK, MKP or MFP series.



# Capacitors for UPS Systems

**Capacitor overview**

**Power capacitors**  
MKP series  
B3236\*





**Film capacitors**  
MKP series  
B3265\*  
B3267\*  
B3277\*



**Three-phase AC power capacitors**  
PhaseCap MKK series  
B25667



**Film capacitors**  
Snubber series  
B3263\*  
B32656S\*  
B32686\*

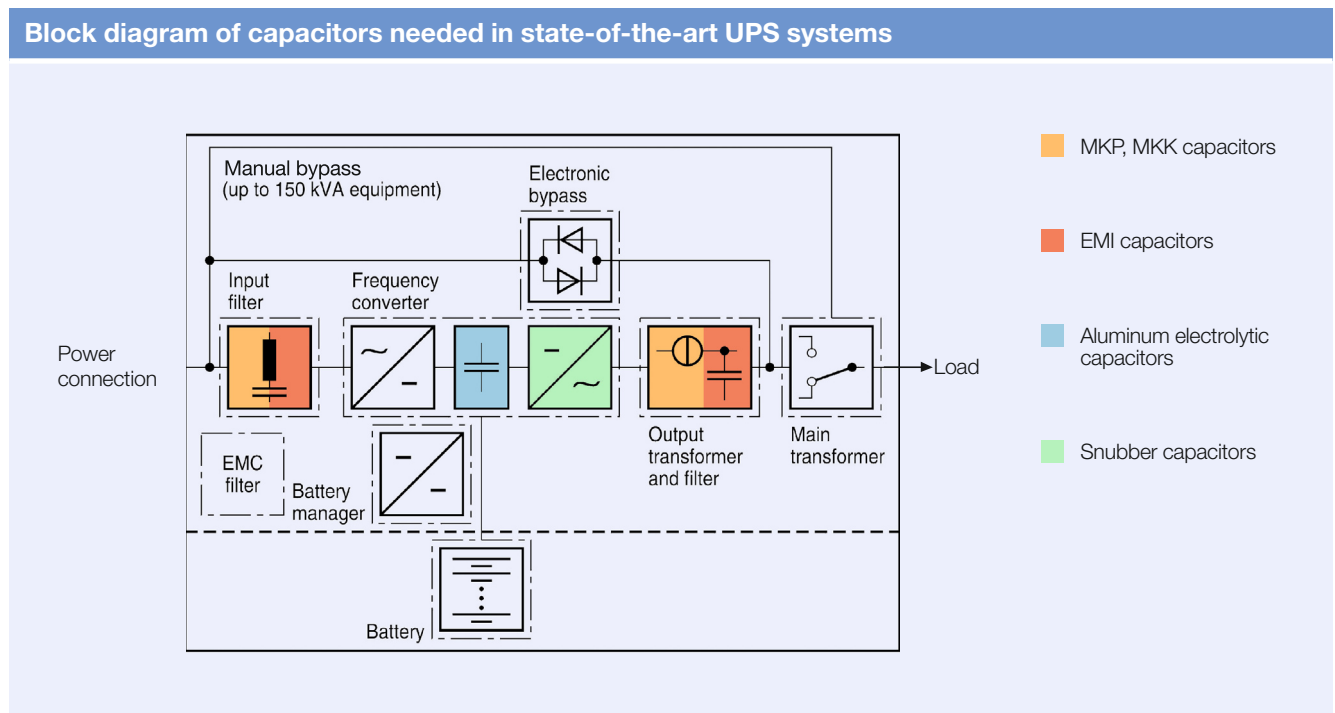


**Aluminum electrolytic capacitors**  
Screw, snap-in,  
4-pin snap-in terminals  
and solder-pins  
B433\*, B434\*, B435\*  
B436\*, B437\*



**EMI suppression capacitors**  
X and Y series  
B3292\*  
B3202\*





# Power Capacitors for UPS Systems

## General

### Features

- Very high reliability
- High peak-current capability
- Voltage series with 850 V
- Low-volume solutions
- Five different terminal styles
- Customized configurations

### Design

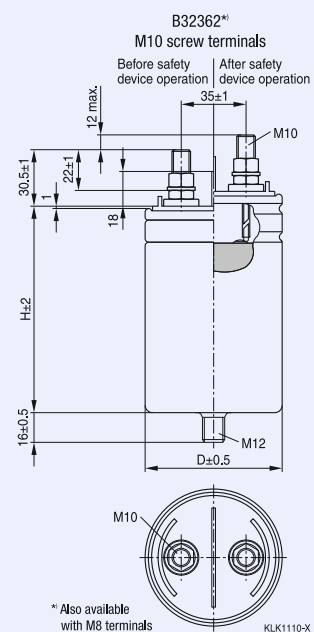
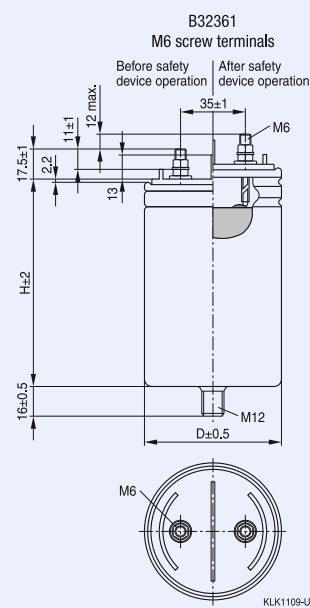
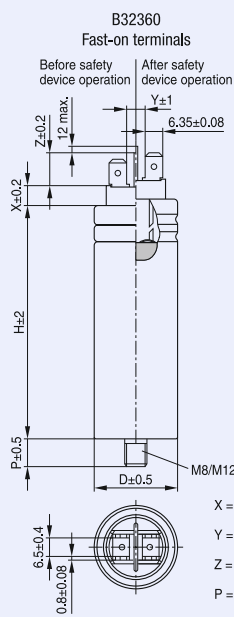
- Resin filling, non-PCB, soft polyurethane
- Safety device: overpressure disconnector, self-healing technology
- Mounting and grounding by stud on bottom of aluminum can
- Naturally air-cooled or forced air cooling
- Indoor mounting
- Reference standards IEC1071
- UL-approval file E106388



### Technical data

Type / series	B32360	B32361	B32362
$V_R$ V AC	$C_R$ $\mu F$	$C_R$ $\mu F$	$C_R$ $\mu F$
350	10 ... 150	50 ... 200	150 ... 600
460	10 ... 100	50 ... 100	100 ... 400
680	3 ... 70	20 ... 70	60 ... 250
850	—	—	60 ... 220

## Dimensional drawings



# Three-phase AC Power Capacitors for UPS Systems

## General

Major manufacturers of UPS equipment use an output transformer and PhaseCap filter capacitors, which together form the output filter. It generates a sinusoidal output voltage with a low distortion factor from the pulse sequence. The steep voltage edges also present the capacitor with a special challenge in terms of  $dv/dt$

### Features

- Long life expectancy
- High pulse-current withstand capability up to  $300 \cdot I_R$
- Maintenance-free
- Wavy cut
- Triple safety system

### Design

- Impregnation with inert gas, polypropylene film
- Safety system: overpressure disconnecter, self-healing and dry technology
- Mounting and grounding by stud on bottom of the cylindrical aluminum can
- Naturally air-cooled or forced air cooling
- Indoor mounting
- Reference standards IEC 60831-1+2, UL 810 5th edition
- UL-approval file E238746

strength. This is where the MKK-AC technology with a wavy cut and contact-edge reinforcement technique patented by EPCOS and used in the PhaseCap shows its worth. Its advantage lies in a large effective contact area which ensures high pulse strength and a very good current handling capability.



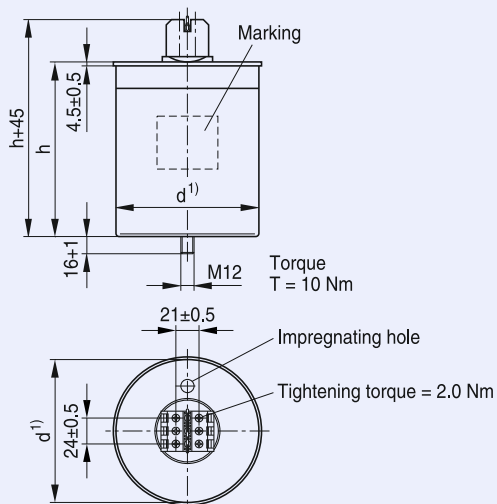
### Technical data

#### Series B25667

Rated voltage: 230 ... 800 V,  
three-phase, delta connection

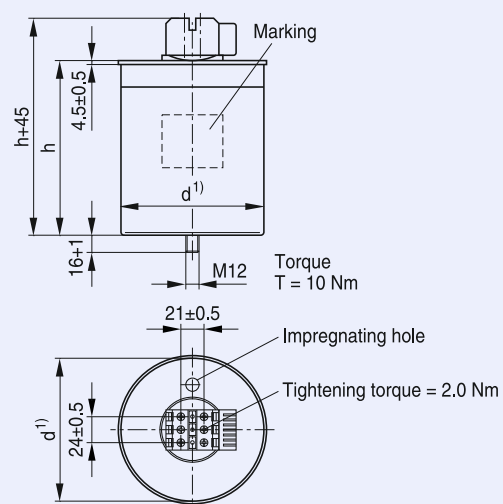
Output range: 5 ... 33 kvar  
 $3 \cdot 8 \dots 3 \cdot 251 \mu\text{F}$

## Dimensional drawings



<sup>1)</sup> Seaming adds 5.5 mm in diameter

KLK1841-1-E



<sup>1)</sup> Seaming adds 5.5 mm in diameter

KLK1834-1-E

# Aluminum Electrolytic Capacitors for UPS Systems

## General

### Capacitors with screw terminals

#### Features

- High CV product
- High reliability and high ripple-current capability

Optional:

- Low-inductance design (13 nH)
- Self-extinguishing electrolyte

#### Design

- All welded construction ensures reliable electrical contact

Optional:

- Optimized construction for base cooling (heat-sink mounting)



### Snap-in capacitors

#### Features

- High CV product
- Long useful life
- High reliability and very good current handling capability
- Low ESR
- Voltage derating enables 105 °C operation for all 85 °C series

#### Design

- Different case sizes available for each capacitance value

Optional:

- Two terminals: 6.3 or 4.5 mm length
- Three terminals: 4.5 mm length to ensure correct insertion
- PET insulation cap on terminal side for insulating the capacitor from PCB
- PET insulation sleeve for the aluminum case

### Capacitors with 4-pin snap-in terminals and solder-pins

#### Features

- Very high volumetric efficiency
- High ripple-current capability
- Voltage derating enables 105 °C operation for all 85 °C series

#### Design

- Pinning ensures correct insertion
- Many different case sizes

Optional:

- 4-pin snap-in terminals: 6.3 and 4.5 mm length
- Solder-pin mounting on circuit boards
- PET insulation cap on terminal side for insulating the capacitor from the PCB

## Technical data

Screw terminals	Snap-in capacitors	4-pin snap-in terminals and solder-pins
V <sub>R</sub> : 200 ... 550 V	V <sub>R</sub> : 160 ... 500 V	V <sub>R</sub> : 350 ... 500 V
C <sub>R</sub> : 560 ... 33000 µF	C <sub>R</sub> : 47 ... 3300 µF	C <sub>R</sub> : 390 ... 2700 µF
Dimensions: 51.6 x 80.7 mm up to 91.0 x 221.0 mm	Dimensions: 22 x 25 mm up to 35 x 55 mm	Dimensions: 35 x 45 mm up to 45 x 100 mm
<b>85 °C series:</b> B43464/B43484, B43455/B43457, B43456/B43458, B43564/B43584	<b>85 °C series:</b> B43305, B43501, B43601, B43540	<b>85 °C series:</b> B43510, B43520, B43511, B43521
<b>105 °C series:</b> B43740/B43760, B43750/B43770	<b>105 °C series:</b> B43504, B43508, B43505, B43543	<b>105 °C series:</b> B43515, B43525

# Film Capacitors for UPS Systems

## General features

### Snubber capacitors

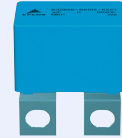
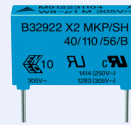
In order to block voltage peaks, snubber capacitors are typically connected in parallel with semiconductors. MKP capacitors of the B32652 ... B32656 series feature a high  $I_{RMS}$  current, a very good self-healing characteristic and a wide variety of terminals (throughhole and strap terminals for screw to IGBT). The B32671L ... B32672L series also offers an excellent AC voltage capability.

### DC link capacitors

Capacitors in the DC link module are designed to support the DC voltage after the AC/DC converter by supplying high current peaks when required. EPCOS offers MKP capacitors in various operating voltages, with its B32674 ... B32678 series (higher current capability) and B32774 ... B32778 series (high density of capacitance).

### Capacitors for output filtering

The basic purpose of an output filter is to protect the load connected to the output by filtering the RF components coming from the inverter and to withstand the current peaks caused by pulses of rapidly changing voltages. For higher pulse handling capability the B32632 ... B32634 and B32686S series can withstand  $dv/dt$  values up to 20 000 V/ $\mu$ s and very high  $I_{RMS}$  current with frequencies exceeding 100 kHz.



### EMI suppression capacitors

EMC filters are usually composed of approved X2 and Y2 EMI suppression capacitors for use in across-the-line and line-to-ground positions. The approvals are based on the corresponding international standards (IEC, UL, CSA). The B32921 ... B32928 series offers compact X2 capacitors up to 45  $\mu$ F (lead spacing 10 ... 52.5 mm), with a maximum operating voltage of 305 V AC (50/60 Hz) and a maximum operating temperature of 110 °C. In addition, the B32021 ... B32026 series covers the demand for Y2 capacitors up to 1.0  $\mu$ F and a rated voltage of 300 V AC. If reinforced insulation is demanded with higher voltage withstanding, X1 (B32911 ... B32916) and Y1 (B81123) are available.

### Design

- Dielectric polypropylene film (MKP)
- Plastic case (UL 94 V-0)
- Epoxy resin sealing, flame-retardant
- Lead free tinned terminals: Strap, 2-pin and 4-pin versions. Special lead lengths available on request.

## Technical data

EMI suppression		DC link		Snubbing		Output filtering		
C <sub>x</sub> (EMC)		C <sub>y</sub> (EMC)		C <sub>bus</sub> (DC filtering)		C <sub>s</sub> (Snubber)		C <sub>f</sub> (AC filtering)
X2	X1	Y2	Y1	MKP	MKP	MKP	MFP	MKP
B3292*	B3291*	B3202*	B81123	B3277*	B3267*	B3265*	B3263*	B3279*
						B3267xL	B32686*	
305 V AC	305 V AC	300 V AC	250 V AC	450 ... 1300 V DC		250 ... 3000 V DC		250 ... 400 V AC
10 nF ... 45 $\mu$ F	10 nF ... 6.8 $\mu$ F	1 nF ... 1 $\mu$ F	1 nF ... 22 nF	0.47 $\mu$ F ... 110 $\mu$ F		1 nF ... 8.2 $\mu$ F		0.82 $\mu$ F ... 75 $\mu$ F

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