

**Power Factor Correction**

**Motor Running**

**Defibrilator**

**AC Filter**

**DC-Link**

**About us**

Hydra is the world-class manufacturer of capacitors for house-hold appliances, power electronics industry, medical and specialized applications. The high quality control level in production and customer oriented design & development approach allow us to offer the best-in-class capacitor solutions tailored to the customer needs.

# Power Factor Correction Capacitors

## Applications

- Individual fixed PFC of Motors, Transformers, etc.
- Automatic PFC equipment
- Tuned or detuned capacitor banks

## Features

- Metallized PP Self-Healing high quality film for 1-phase or 3-phase Y,  $\Delta$  capacitor, in indoor application.
- Safe disconnection thanks to overpressure expansion fuses on active leads in case of abnormal operation, self-overheating or frequent overvoltage stress.
- Low losses, optimal surge current performance and good heat dissipation.
- Gas (N<sub>2</sub>), oil or soft gel filled impregnant.



Parameters	PAB DPM(d)	PMB DPM(d)	PRB DPMg	PRB DPM(d)
	Oil / Soft Resin	Gas (N <sub>2</sub> ) filled	Gas (N <sub>2</sub> ) filled	Oil / Soft Resin
Connection type	1-phase only	1-3 phase $\Delta$	1-3 phase Y, $\Delta$	
Rated voltage Un	230 – 400 – 440 – 480 – 525Vac		230 – 400 – 440 – 480 – 525 - 690 Vac	
Rated kVAR	1 – 6.5kVAR		5 – 35 kVAR	5 – 56 kVAR
Rated frequency	50 / 60Hz		50 / 60Hz	
Capacitance tolerance	-5% /+10%		-5% /+10%	
Overcurrent	1.3 x In permanent		1.5 x In (incl. harmonics)	
Inrush current	Max 100 x Iin		Max 200 x Iin	
Over voltages	Un +10% up to 8h daily, Un +15% up to 30min daily, Un +20% up to 5min (200x during lifetime), Un +30% up to 1min 200x during lifetime			
Test voltages	UT/T 2.15 x Un AC (2s) UT/C 4.3kV AC (10s)		UT/T 2.15 x Un AC (2s) UT/C 3.6kV AC (10s)	
Capacitor Losses	Dielectric losses 0.2W/kVAR Total capacitor < 0.4W/kVAR		Dielectric losses 0.2W/kVAR Total capacitor < 0.4W/kVAR	
Lifetime expectancy	> 100 000 h 5000 switching per year		> 135 000 h 5000 switching per year	> 150 000 h 5000 switching per year
Operating temp. Range	-25°C /+55°C		-45°C /+55°C	-25°C /+60°C
Max ambient temp.	55°C		55°C	60°C
Over 24h / over 1 year	45°C / 35°C		45°C / 35°C	50°C / 40°C
Operating altitude	4500m			
Terminals	Tab or dual tab connector 6.3 x 0,8mm		Double 3-pole terminal block (IP20) 16/25/35mm <sup>2</sup>	
Fixation	Threaded bolt M12, max torque 12Nm			
Mounting position	Vertical or horizontal		Any position	Vertical or horizontal
Cooling	Natural or forced air cooling, indoor application			
Compliance	EN/IEC 60831-1/2, UL810, RoHS III (EU 2015/863), REACH (1907/2006) Annex XVII			

\* In case the customer's application requires the different capacitor parameters, our R&D expert engineers are ready to help and find the best capacitor solution.

# Motor Running Capacitors

## Applications

- AC 1-F Motors, fridges, dish washers, dryers, compressors
- Pumps, window shutters, blowers
- Air fans, Ventilators, driver, other electronic devices

## Features

- Metallized PP Self-Healing high quality film for 1-phase, AC-motor indoor application.
- Plastic or Aluminum case with/without stud
- Safety, realized by overpressure disconnecter
- Impulse resistance, low dissipation factor
- Environmentally friendly filler (vegetable oil, or recyclable dry resin)
- Tested safety by 100% routine test



Parameters	MKP type	MKP-SI type
	S0 safety class Recyclable PUR resin	S2 safety class Vegetable oil
Connection type	1-phase only	
Rated voltage Un	400-500Vac 50/60Hz	400-500Vac 50/60Hz
Rated capacitance	0,8-40uF	1-160uF
Capacitance tolerance	-5% /+5%	+5% /-0%
Max. allowable operating voltage	1.1 x Un	
Max. allowable operating current	1.3 x In	
Test voltages (100% in production)	U <sub>T/T</sub> 2.0 x Un; 50Hz (2s) U <sub>T/C</sub> 3.6 kV; 50Hz (2s)	
Operating temp. range	-25°C /+85°C	
Life time class	Class A – 30000 h 420V 1-100 μF; Class B – 10000 h 470V 1-100 μF; 420V 35-80 μF; Class C – 3000 h 470V 35-80 μF; Class D – 1000 h 500V 1.5-30 μF	
Installation	Indoor, altitude max 4500m	
Mounting position	Vertical or horizontal	
Connection type	Upon customer request: various terminals, solder tab, single/double tabs, cables	
Cooling	Natural or forced air cooling, indoor application	
Compliance	EN 60252-1/2, UL810, RoHS III (EU 2015/863), REACH (1907/2006) Annex XVII	

Hydra Motor Capacitors MKP types S0/S2 technology with/without overpressure disconnectors comply with international standard EN 60252.

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# Flat Motor Running Capacitors

## Applications

- Industrial electronics
- Window shutters
- Blowers
- Drives
- Fans

## Features

- Safety Class S0
- Compact design, plastic case on customer request
- Resin impregnation (PU or epoxy)
- Various connection options
- Low dissipation factor, low ESR, low inductance
- Tested safety by 100% routine test



## General characteristics

Dielectric	Metallized polypropylene film
Capacitance range	1,8 µF to 7,5 µF
Capacitance tolerance	± 5%, ± 10%
Rated voltage Un	400Vac, 450Vac
Operating temperature range	-25 °C to +85 °C
Max. allowable operating voltage	1,1 x Un
Max. allowable operating current	1,3 x In
Humidity class	F (75% annual means, 95%, 30 days/year)
Test voltage terminal/terminal (Vac)	2,0 x Un; 50Hz (2s)
Test voltage terminal/case (Vac)	3,6 kV; 50Hz (2s)
Life expectancy	Class C – 3000 h (400V); Class D – 1000 h (450V)
Case material	Plastic UL 94 (V-0)
Filling	Polyurethane or epoxy resin
Mounting	Indoor in any position
Compliance	EN 60252-1, UL 810

Flat Motor Capacitors are made of metallized polypropylene film in oval plastic case and sealed with resin. Comply with international standard EN 60252.

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# Defibrillator Capacitors

Hydra's defibrillator capacitors are custom designed for the use in public access external Defibrillators. They offer high reliability, long lifetime, and small size. The Company Quality Management System, continuous control and validation of processes with full traceability, enables to guarantee the high quality defibrillator capacitors.



## Applications

- Bi-Phasic and/or Mono-Phasic Waveforms
- Manual External Defibrillator (MED) or Automated External Defibrillator (AED)
- Highly reliable and High energy density and Ultra low leakage current for battery operated portable Defibrillators

## Features

- Metallized Polypropylene Self-Healing high quality film capacitor
- Dry polyurethane/epoxy filled impregnation
- Faston or customer defined terminal connection, AWG22 10kV insulated silicon stranded wire
- Round housing: Aluminum or Plastic
- RoHS III (EU 2015/863), REACH (1907/2006) Annex XVII compliant

## Specification A (MEDs for hospitals)

Capacitance Range Cn	68 to 200uF +5% /-5%
Rated Voltage Un	1800 to 2300Vdc
U surge	2500 Vdc
Rated Energy	180 to 515 Joules
Dissipation Factor @100Hz	< 160 x 10 <sup>-5</sup>
Test Voltages	UT/T=2500Vdc / 10s (terminal-to-terminal) UT/C=4000Vac / 10s (terminal-to-case)
Tested Operating Lifetime	10000 discharges into 50 Ohm load
Operating Temperature Range	-40°C to +65°C
Storage Temperature	-40°C to +65°C

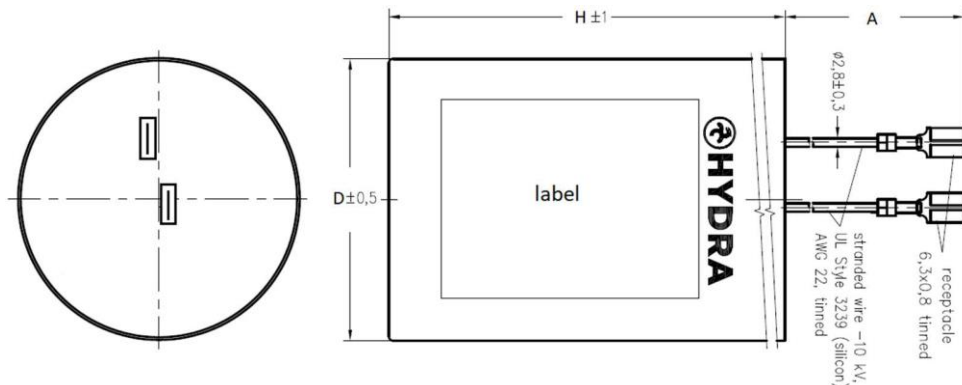
Description	Cn [uF]	Rated Voltage Un [Vdc]	U surge [Vdc]	TAND [x10 <sup>-5</sup> ]	Energy [J]	D x H* [mm]	A* [mm]
EL MKP 68/2300/E1	68	2300	2500	<70	180	40 x 125	100
EL MKP 90/2300/E1	90	2300	2500	<90	238	45 x 140	100
EL MKP 105/2300/E1	105	2300	2500	<100	277	60 x 100	100
EL MKP 195/2300/E1	195	2300	2500	<160	515	65 x 125	100

# Defibrillator Capacitors

## Specification B (MEDs for hospitals)

Capacitance Range Cn	60 to 200uF +5% /-5%
Rated Voltage Un	2000 to 2500Vdc
U surge	2300 to 2750 Vdc
Rated Energy	180 to 609 Joules
Dissipation Factor @100Hz	< 160 x 10 <sup>-5</sup>
Test Voltages	UT/T=2300Vdc or 2750Vdc / 10s (terminal-to-terminal) UT/C=4000Vac / 10s (terminal-to-case)
Tested Operating Lifetime	100 discharges from Un, max. load 100A
Operating Temperature Range	-20°C to +50°C
Storage Temperature	-20°C to +65°C

Description	Cn [uF]	Rated Voltage Un [Vdc]	U surge [Vdc]	TAND [x10 <sup>-5</sup> ]	Energy [J]	D x H* [mm]	A* [mm]
EL MKP 60/2500/E1	60	2500	2750	<70	188	40 x 109	105
EL MKP 90/2000/E1	90	2500	2300	<90	180	40 x 109	105
EL MKP 100/2500/E1	100	2500	2750	<100	313	50 x 109	105
EL MKP 195/2000/E1	195	2500	2300	<160	390	55 x 109	105
EL MKP 195/2500/E1	195	2500	2750	<160	609	65 x 125	105



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# AC Filter Capacitors

## Applications

- filter capacitors for damping of undesirable voltage spikes during the switching of power semiconductors
- quenching of conductive state of thyristor.
- UPS-Systems
- Wind Power



## Features

- Profile metallization of polypropylene film for better overvoltage reliability
- Wave-cut design of film guarantees high current performance (RMS, peak current)
- Environmentally friendly vegetable oil filling or soft resin for best thermal performance
- Build-in overpressure interrupter for a safe operation in case of any internal failure
- High reliability and life expectancy

Parameters	EAB MKP(d) Oil / Soft Resin	EBB MKP(d) Oil / Soft Resin	ERB DPM(d) Oil / Soft Resin	ECB DPM(d) Oil / Soft Resin
Connection type	1-phase	1-phase	1-3 phase Y, Δ	3 phase Δ
Terminals	Single tab 6.3 x 0.8mm (A1), Double tab 6.3 x 0.8mm (A2)	Terminal screw M6, M8, M10	Double 3-pole terminal block (IP20) 16/25/35mm <sup>2</sup>	Tab connector 6.3 x 0.8mm
Dielectric	Metallized polypropylene			
Rated voltage Un AC	420 V-1200 V	420 V-1350 V	640 V-1400 V	640 V-1400 V
Capacitance tolerance	-5% / +5%			
Rated current	6-10A (A1) 10-16A (A2)	40-80A	Max. 80 A	Max. 16 A
Operating temp. range	-25°C /+85°C	-25°C /+60°C	-25°C /+60°C	-25°C /+70°C
Storage temperature	-40°C / +85°C			
Lifetime expectancy	100 000h at <85°C hotspot	100 000h at <70°C hotspot	100 000h at <70°C hotspot	100 000h at <70°C hotspot
Case material	Aluminum			
Cover material	Plastic UL 94 (V-0)	Steel	Steel	Steel
Filling	Oil / Soft resin			
Mounting position	Indoor / Vertical or Horizontal			
Mounting torque	Threaded bolt: 5Nm for M8 12Nm for M12	Threaded bolt: 12Nm for M12	Terminals: M6=3Nm, M8=6Nm, M10=9Nm Threaded bolt: 12Nm for M12	Threaded bolt: 12Nm for M12
Operating altitude	4500m			
Cooling	Natural or forced air cooling, indoor application			
Compliance	IEC 61071 (2017-08) Ed.2.0, UL 810 (file E201956)			

Hydra produces Cylindrical Filter Capacitors manufactured to the exact requirements and needs of the clients with the highest quality.

# DC-Link Capacitors

## Applications

- DC-filter in industrial Inverters (Wind Turbines, Solar Power, Power Drives)
- Replacement of Aluminum Electrolytic Capacitors
- AC filter Capacitor Banks in UPS

## Features

- Terminals with internal thread (EGB) or stud (EBB)
- High RMS current rating (ripple)
- Low ESR resistance allows high currents
- Low self-inductance for high-speed IGBT converters (special low inductance design)
- Dry resin filling (no leakage of poisonous electrolytes)
- Self-Healing dielectric withstand over voltages 2 times rated voltage
- No series connections of capacitors necessary
- High reliability and life expectancy



Parameters	EGB DCL Cn/Un DC	EBB DCL Cn/Un DC
Dielectric	Metallized polypropylene film	
Dissipation factor (tan $\delta$ )	<2 x 10 <sup>-4</sup> (1 kHz)	
Capacitance range	120 $\mu$ F to 2800 $\mu$ F	
Capacitance tolerance	$\pm$ 10%, optionally $\pm$ 5%	
Voltage range	700 Vdc to 2000 Vdc	
Operating temperature (case)	-25°C...60°C (70°C max.)	
Storage temperature	-40°C ... 85°C	
Capacitor Size range	Ø 85 H min 70 – max. 255mm Ø 116 H min 70 – max. 315mm Ø 136 H min 120 – max. 370mm	
Operating altitude	4500m	
Humidity class	F (75% annual means, 95%, 30 days/year)	
Inductance	< 50nH	
Test voltage terminal/terminal (Vdc)	1.5 x Undc (10s)	
Test voltage terminal/case (Vac)	2 x Ui + 1000V; min. 3600V (10s)	
Life expectancy	200000h at Un and <70°C hotspot	
Case material	Aluminum	
Cover material	Plastic UL 94 (V-0)	
Filling	Polyurethane/epoxy resin	
Mounting	Indoor in any position	
Mounting torque	Max 15 Nm for M12 bottom stud Max 8Nm for M6 internal thread terminal (EGB DCL) Max 5Nm for M8 bolt terminal (EBB DCL)	
Compliance	IEC 61071; UL file E201956	

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# DC-Link Capacitors Box Type

## Applications

- Automotive
- Wind and solar power plants
- Filtering applications and UPS

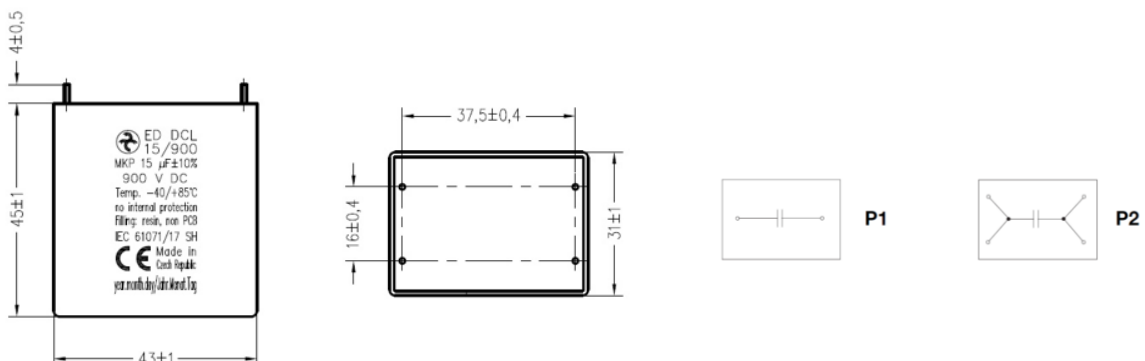
## Features

- Self-healing dielectric withstand overvoltages 2 times rated voltage
- 2 pins (P1) and 4 pins (P2) connection variants
- High ripple current
- Low self-inductance
- Low dissipation factor
- High reliability



## General characteristics

Dielectric	Metallized polypropylene film
Dissipation factor (tan $\delta$ )	$< 2 \times 10^{-4}$ (1 kHz)
Capacitance range	5 $\mu$ F to 40 $\mu$ F
Capacitance tolerance	$\pm 5\%$ , $\pm 10\%$
Voltage range	700 Vdc, 900 Vdc, 1100 Vdc, 1300 Vdc, 1500 Vdc
Operating temperature range	-40 °C to +85 °C
Humidity class	F (75% annual means, 95%, 30 days/year)
Self inductance	$< 35$ nH
Test voltage terminal/terminal (Vdc)	1,5 x Undc (10s)
Test voltage terminal/case (Vac)	2 x Ui + 1000V; min. 3600V (10s)
Life expectancy	100000h at Un and $< 70$ °C hotspot
Case material	Plastic UL 94 (V-0)
Filling	Polyurethane/epoxy resin
Mounting	Indoor in any position
Compliance	IEC 61071



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