

# PhaseCap HD PFC Capacitors

High density type • Up to 60 kvar • Gas-impregnated • Wavy cut • Triple safety system



## General

The PhaseCap HD series is a follow-on development of the MKK AC series, covering the power range above 40 through 60 kvar with just one capacitor in a cylindrical aluminum case.

The PhaseCap HD is especially intended for industrial applications with demands for long life, constant capacitance and high inrush current withstand capability up to  $300 \cdot I_R$ .

Such applications require typical power steps of 25 or 50 kvar switched by a PFC controller via each capacitor contactor.

This MKK AC series was developed to increase packing density per bank and cut component costs.



## Applications

- Automatic PFC equipment, capacitor banks
- Individual fixed PFC (e.g. motors, transformers, lighting)
- Group fixed PFC
- Tuned and detuned capacitor banks
- Dynamic PFC
- PFC systems with space constraints

## Features

- Compact design in cylindrical aluminum can with stud
- Stacked winding
- MKK-technology with wavy cut and heavy edge
- Voltage range 400 V ... 525 V
- Output range 40 kvar (50 Hz) ... 60 kvar (60 Hz)

## Electrical

- Low losses
- High pulse current withstand capability (up to  $300 \cdot I_R$ )

## Mechanical and maintenance

- Reduced mounting costs
- Maintenance-free

## Safety

- Self-healing
- Overpressure disconnecter
- Shock hazard protected terminals
- Long-term approved
- Pre-mounted discharge resistor module

## Environmental

- Dry design, inert gas
- No oil leakage

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Technical data and limit values		
Standards IEC 60831-1+2, EN 60831-1+2, UL 810 5 <sup>th</sup> edition		
Overvoltage	$V_{max}$	$V_R + 10\%$ (up to 8 h daily) / $V_R + 15\%$ (up to 30 min daily) / $V_R + 20\%$ (up to 5 min daily) / $V_R + 30\%$ (up to 1 min daily)
Overcurrent	$I_{max}$	up to $1.5 \cdot I_R$ including combined effects of harmonics, overvoltages and capacitance tolerance
Inrush current	$I_S$	up to $300 \cdot I_R$
Losses: – Dielectric – Total*		< 0.2 W/kvar < 0.45 W/kvar
Rated frequency	f	50/60 Hz
Capacitance tolerance		–5% / +10%
Test voltage, terminal/ terminal	$V_{TT}$	$2.15 \cdot V_{R1}$ , AC, 2 s
Test voltage, terminal/ case	$V_{TC}$	up to $V_R \leq 660$ V: 3000 V AC, 10 s
Mean life expectancy	$t_{LD(Co)}$	up to 180 000 h (temperature class –40/C) up to 130 000 h (temperature class –40/D)
Ambient temperature		–40/D; max. temp. +55 °C; max. mean 24 h = +45 °C; max. mean 1 year = +35 °C; lowest temperature = –40 °C
Cooling		natural or forced
Humidity	$H_{rel}$	max. 95%
Altitude		max. 4000 m above sea level
Mounting position		upright
Mounting and grounding		threaded M12 stud on bottom of case
Safety		dry technology, overpressure disconnecter, self-healing, maximum allowed fault current 10 000 A in accordance with UL 810 standard
Discharge device		pre-mounted discharge module
Case		extruded aluminum can
Enclosure		IP20, indoor mounting
Dielectric		polypropylene film
Impregnation		inert gas, Nitrogen (N <sub>2</sub> )
Terminals		optimized capacitor safety terminal with electric shock protection (IP20), (VDE 0106 part 100), max. 35 mm <sup>2</sup> cable cross section, max. current 130 A
Number of switching operations		max. 5000 switchings per year according to IEC 60831-1+2

\* Without discharge resistor

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## Three-phase capacitors

Type	50 Hz		60 Hz		C <sub>R</sub> μF	d x h mm	Weight kg	Ordering code	Packing unit <sup>2)</sup>
	Output kvar	I <sub>R</sub> A	Output kvar	I <sub>R</sub> A					
<b>Rated voltage 400 V AC, 50/60 Hz, delta connection</b>									
MKK400-D-40.0-21	40.0	58	48.0	69	3 · 265	136 x 317	4.4	B25669A3796J375	2
MKK400-D-50.0-21	50.0	72	60.0 <sup>1)</sup>	87 <sup>1)</sup>	3 · 332	136 x 355	4.7	B25669A3996J375	2
(Suitable also for 415 V with 7.6% higher output)									
<b>Rated voltage 440 V AC, 50/60 Hz, delta connection</b>									
MKK440-D-40.0-21	40.0	52	48.0	63	3 · 219	136 x 317	4.4	B25669A4657J375	2
MKK440-D-50.0-21	50.0	66	60.0 <sup>1)</sup>	79 <sup>1)</sup>	3 · 274	136 x 355	4.7	B25669A4827J375	2
MKK440-D-56.0-21	56.0	74	-	-	3 · 307	136 x 355	4.7	B25669B4927J375	2
<b>Rated voltage 525 V AC, 50/60 Hz, delta connection</b>									
MKK525-D-40.0-21	40.0	44	48.0	53	3 · 154	136 x 355	4.7	B25669A5467J375	2

Customized products available upon request.

<sup>1)</sup> Temperature class deviation -40/B max. +45 °C

<sup>2)</sup> Packing units for capacitors equal minimum order quantity. Orders will be rounded up to packing unit or multiple thereof.

## Dimensional drawings

Capacitor	Mounting
	<p>Toothed washer J 12.5 DIN 6797</p> <p>Hex nut BM12 DIN 439</p> <p>or</p> <p>nut C61010-A415-C15</p>
	<p><b>Discharge resistor</b></p>