

## ESTAprop/ESTAdry Power Factor Correction Capacitors Low Voltage

### CAPACITORS IN CYLINDRICAL ALUMINUM CASING

#### APPLICATION

ESTAprop PhMKP-type capacitors in cylindrical aluminum casing have been designed for **Power Factor Correction** in low voltage plants. Loads as motors and transformers consume real power as well as reactive power. Generators, supply cables, and other electrical distribution equipment should be relieved from reactive power.

#### ESTAprop capacitors may be used for:

- automatic PFC-equipment
- individual fixed PFC (e.g. motors, transformers, lighting)
- group fixed PFC
- tuned and detuned capacitor banks
- harmonic trap (e.g. UPS, frequency drives, converter)

#### DESIGN

The ESTAprop MKP capacitor is a metallized polypropylene film capacitor with self-healing properties. The current carrying metal layer of an MKP capacitor is vaporised onto one side of the polypropylene film. The front surface of tubular winding elements are joined by means of the metal spray method (schooping). Three winding elements are encapsulated in one aluminum casing and connected to form a true 3-phase capacitor. The overpressure tear-off fuse prevents the capacitor from bursting at the end of service life, or due to inadmissible electrical or thermal overloads.

The assembly is impregnated with a natural oil (fire point > 300 °C) under vacuum and hermetically sealed. This construction method ensures excellent heat dissipation and constant capacitance over an extended period of time.

The capacitor is housed in a tubular aluminum container with a metal lid press-rolled onto it. The current is supplied via screw-on (M5) or push-on (6.3 x 0.8 mm) connectors. A threaded stud (M12) at the bottom of the container serves for both grounding and mounting.

ESTAprop and ESTAdry capacitors will be delivered together with discharge resistors and hardware for mounting and connection.

Vishay ESTA standard capacitors of 84.4 mm diameter will come with a THICK FILM DISCHARGE RESISTOR UNIT, forked terminals for easy mounting and IN-LINE connection of the capacitors to the supply.

Capacitors are in accordance with protection class IP00. For all types, plastic covers for a higher degree of protection are available.

#### 3-PHASE CAPACITOR, SCREW-TYPE TERMINALS



#### 3-PHASE CAPACITOR, PUSH-ON TYPE TERMINALS



#### 1-PHASE CAPACITOR, PUSH-ON TYPE TERMINALS



#### THICK FILM DISCHARGE RESISTOR UNIT



# PhMKP...Cylindrical Aluminum



Vishay ESTA

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## CAPACITORS IN CYLINDRICAL ALUMINUM CASING

TECHNICAL DATA	
STANDARDS:	IEC 60831-1+2, EN 60831-1+2, VDE 0560-46+47
Overvoltages: (in accordance with the above standards)	Ucn + 10 % (up to 8 hours daily) Ucn + 15 % (up to 30 minutes daily) Ucn + 20 % (up to 5 minutes, only 200 times in the life of the capacitor) Ucn + 30 % (up to 1 minute, only 200 times in the life of the capacitor) <b>Please also refer to Terms and Definitions.</b>
Overcurrent: (in accordance with the above standards)	1.3 x In, 1.5 x In with 10 % overvoltages, 15 % over capacitance and harmonics included, continuous operation Please also refer to Terms and Definitions.
Tolerance on capacitance:	- 5/+ 10 % in accordance with the standards ± 5 % as Vishay ESTA standard
Test voltage, terminal/terminal:	2.15 x Ucn, AC, 2 seconds
Test voltage, terminal/casing:	4800 VAC, 2 seconds
Inrush current:	300 times rated current In
Losses:	< 0.25 to 0.45 W/kvar
Statistical life expectancy:	> 150 000 operating hours (ESTAprop) > 130 000 operating hours (ESTAdry)
Degree of protection:	IP00 (terminal cover for higher protection class, for instance IP54 upon request), indoor mounting
Ambient temperature category:	- 25/D (max. 55 °C), (- 40/D on request)
Permitted casing temperature:	max. 65 °C (measured on top of the can)
Cooling:	naturally air-cooled
Permissible relative humidity:	maximum 95 %
Maximum allowed altitude:	2000 meters above sea level
Mounting position:	vertical and horizontal
Mounting and grounding:	threaded M12 stud at the bottom of the container
Safety features:	all-phase overpressure tear-off fuse, self-healing
Casing:	deep-drawn aluminum can
Dielectric:	polypropylene film, self-healing
Impregnant:	natural oil, non-PCB, biodegradable (ESTAprop) or dry/gas - filled (ESTAdry)
Terminals:	casing Ø 84 mm: M5 screw terminals casing Ø 64 mm: double push-on (6.3 x 0.8 mm) connectors



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## THREE PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING

RATED VOLTAGE 230 V, 50 Hz, 3-PHASE, DELTA CONNECTION							
TYPE	ARTICLE No.**	OUTPUT kvar	CAPACITANCE $\mu$ F	CURRENT A	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP230.3.02,5	5341-44322-xx	2.5	3 x 50.1	6.3	64 x 190	0.8	1
PhMKP230.3.05	5341-44316-xx	5	3 x 100.3	12.6	64 x 265	1.0	1
PhMKP230.3.10	5341-44606-xx	10	3 x 200.6	25.1	84.4 x 265	1.7	2
PhMKP230.3.12,5	5341-44628-xx	12.5	3 x 250.7	31.4	84.4 x 340	2.0	2
PhMKP230.3.15	5341-44629-xx	15	3 x 300.9	37.7	84.4 x 340	2.1	2

RATED VOLTAGE 400 V*, 50 Hz, 3-PHASE, DELTA CONNECTION							
TYPE	ARTICLE No.**	OUTPUT kvar	CAPACITANCE $\mu$ F	CURRENT A	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP400.3.02,5	5341-44319-xx	2.5	3 x 16.6	3.6	64 x 190	0.8	1
PhMKP400.3.05	5341-44309-xx	5	3 x 33.2	7.2	64 x 190	0.8	1
PhMKP400.3.06,67	5341-44321-xx	6.67	3 x 44.2	9.6	64 x 190	0.8	1
PhMKP400.3.07,50	5341-44362-xx	7.5	3 x 49.5	10.8	64 x 190	0.8	1
PhMKP400.3.08,33	5341-44363-xx	8.33	3 x 55.2	12	64 x 190	0.8	1
• PhMKP400.3.10	5341-44313-xx	10	3 x 66.3	14.4	64 x 265	1.0	1
• PhMKP400.3.12,5	5341-44359-xx	12.5	3 x 82.9	18	64 x 265	1.0	1
PhMKP401.3.10	5341-44630-xx	10	3 x 66.3	14.4	84.4 x 190	1.3	2
• PhMKP401.3.12,5	5341-44631-xx	12.5	3 x 82.9	18	84.4 x 190	1.3	2
PhMKP400.3.15	5341-44675-xx	15	3 x 99.5	21.6	84.4 x 190	1.3	2
PhMKP400.3.16,7	5341-44633-xx	16.7	3 x 110.7	24.1	84.4 x 265	1.7	2
• PhMKP400.3.20	5341-44607-xx	20	3 x 132.6	28.8	84.4 x 265	1.7	2
• PhMKP400.3.25	5341-44646-xx	25	3 x 165.8	36.1	84.4 x 265	1.7	2

\* Can be used also for 415 V, full overvoltage range.

RATED VOLTAGE 440 V, 50 Hz, 3-PHASE, DELTA CONNECTION can be used also for 415 V								
TYPE	ARTICLE No.**	OUTPUT kvar 440 V	OUTPUT kvar 415 V	CAPACITANCE $\mu$ F	CURRENT A 415/440 V	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP440.3.05	5341-44317-xx	5	4.4	3 x 27.4	6.1/6.6	64 x 190	0.8	1
PMKP440.3.08,33	5341-44364-xx	8.33	7.4	3 x 45.7	10.3/10.9	64 x 190	0.8	1
PhMKP440.3.10	5341-44348-xx	10	8.9	3 x 54.8	12.4/13.1	64 x 265	1.0	1
PhMKP440.3.11,2	5341-44324-xx	11.2	10	3 x 61.4	13.9/14.7	64 x 265	1.0	1
PhMKP440.3.12,5	5341-44360-xx	12.5	11.1	3 x 68.5	15.4/16.4	64 x 265	1.0	1
PhMKP440.3.14,0	5341-44361-xx	14.05	12.5	3 x 76.7	17.4/18.4	64 x 265	1.0	1
PhMKP440.3.12,5	5341-44635-xx	12.5	11.1	3 x 68.5	15.4/16.4	84.4 x 190	1.3	2
PhMKP440.3.14,0	5341-44636-xx	14.05	12.5	3 x 76.7	17.4/18.4	84.4 x 190	1.3	2
PhMKP440.3.15	5341-44673-xx	15	13.3	3 x 82.2	18.5/19.7	84.4 x 190	1.3	2
PhMKP440.3.16,9	5341-44659-xx	16.9	15	3 x 92.6	20.9/22.2	84.4 x 190	1.3	2
PhMKP440.3.18,8	5341-44638-xx	18.8	16.67	3 x 103.0	23.2/24.7	84.4 x 265	1.7	2
• PhMKP440.3.20	5341-44634-xx	20	17.8	3 x 109.6	24.8/26.2	84.4 x 265	1.7	2
• PhMKP440.3.22,5	5341-44668-xx	22.5	20	3 x 123.3	27.8/29.5	84.4 x 265	1.7	2
• PhMKP440.3.25	5341-44669-xx	25	22.2	3 x 137.0	30.9/32.8	84.4 x 265	1.7	2
• PhMKP440.3.28,1	5341-44670-xx	28.1	25	3 x 154	34.7/36.9	84.4 x 265	1.7	2
PhMKP440.3.30	5341-44640-xx	30	26.7	3 x 164.4	37.1/39.4	84.4 x 340	2.1	2

• Main types available from stock

Drawings at end of data sheet.

\*\* Version no. xx may differ as it respects small changes, e.g. on the label.

Other voltage ratings, outputs, and frequencies upon request. All PhMKP-type capacitors may be used for 60 Hz, the output will be 1.2 times higher.

All oil-impregnated part types can also be produced in a PhMKPg dry version. Dimensions and ratings are unchanged. Dry types are not standard stock items, with production upon request.

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## THREE PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING

RATED VOLTAGE 525 V, 50 Hz, 3-PHASE, DELTA CONNECTION can be used also for 480 V								
TYPE	ARTICLE No.**	OUTPUT kvar 525 V	OUTPUT kvar 480 V	CAPACITANCE $\mu$ F	CURRENT A 480/525 V	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP525.3.03	5341-44314-xx	3	2.5	3 x 11.5	3.0/3.3	64 x 190	0.8	1
PhMKP525.3.05	5341-44326-xx	5	4.2	3 x 19.2	5.0/5.5	64 x 190	0.8	1
PhMKP525.3.8,33	5341-44327-xx	8.33	7	3 x 32.1	8.4/9.2	64 x 190	0.8	1
PhMKP525.3.10	5341-44328-xx	10	8.33	3 x 38.5	10.1/11.0	64 x 265	1.0	1
PhMKP525.3.10	5341-44611-xx	10	8.33	3 x 38.5	10.1/11.0	84.4 x 190	1.3	2
PhMKP525.3.12,5	5341-44612-xx	12.5	10.4	3 x 48.1	12.6/13.7	84.4 x 190	1.3	2
PhMKP525.3.13,8	5341-44643-xx	13.8	11.5	3 x 53.1	13.8/15.2	84.4 x 190	1.3	2
• PhMKP525.3.15	5341-44613-xx	15	12.5	3 x 57.7	15.0/16.5	84.4 x 190	1.3	2
• PhMKP525.3.20	5341-44614-xx	20	16.7	3 x 77.0	20.1/22.0	84.4 x 265	1.7	2
• PhMKP525.3.25	5341-44671-xx	25	20	3 x 96.2	24.6/27.5	84.4 x 265	1.7	2

RATED VOLTAGE 660 V*, 50 Hz, 3-PHASE, DELTA CONNECTION							
TYPE	ARTICLE No.**	OUTPUT kvar	CAPACITANCE $\mu$ F	CURRENT A	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP660.3.05	5341-44351-xx	5	3 x 12.2	4.4	64 x 190	0.8	1
PhMKP660.3.08,33	5341-44352-xx	8.33	3 x 20.3	7.3	64 x 265	1.0	1
PhMKP660.3.08,33	5341-44653-xx	8.33	3 x 20.3	7.3	84.4 x 190	1.3	2
PhMKP660.3.10	5341-44654-xx	10	3 x 24.4	8.7	84.4 x 190	1.3	2
PhMKP660.3.12,5	5341-44655-xx	12.5	3 x 30.4	10.9	84.4 x 265	1.7	2
PhMKP660.3.15	5341-44656-xx	15	3 x 36.5	13.1	84.4 x 265	1.7	2
PhMKP660.3.16,7	5341-44657-xx	16.7	3 x 40.7	14.6	84.4 x 265	1.7	2
• PhMKP660.3.20	5341-44658-xx	20	3 x 48.7	17.5	84.4 x 340	2.1	2
• PhMKP660.3.22,9	5341-44642-xx	22.9	3 x 55.8	20.0	84.4 x 340	2.1	2

\* Can be used also for 690 V, full overvoltage range.

Drawings at end of data sheet.

\*\* Version No. xx may differ as it respects small changes, e.g. on the label.

Rated voltages > 660 < 1000 V/50/60 Hz upon request.

Preferred voltage ratings are according to delta-connected types times  $\sqrt{3}$ .

• Main types available from stock

Other voltage ratings, outputs, and frequencies upon request. All PhMKP-type capacitors may be used for 60 Hz, the output will be 1.2 times higher.

All oil-impregnated part types can also be produced in a PhMKPg dry version. Dimensions and ratings are unchanged. Dry types are not standard stock items, with production upon request.



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## SINGLE PHASE CAPACITORS IN CYLINDRICAL ALUMINUM CASING

RATED VOLTAGE 230 V, 50 Hz, 1-PHASE							
TYPE	ARTICLE No.**	OUTPUT kvar	CAPACITANCE $\mu$ F	CURRENT A	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP230.1.02,5	5341-44339-xx	2.5	150.0	10.9	64 x 140	0.5	3
• PhMKP230.1.03,33	5341-44310-xx	3.33	200.4	14.5	64 x 190	0.7	3
PhMKP230.1.04,17	5341-44330-xx	4.17	251.0	18.1	64 x 190	0.7	3
PhMKP230.1.05	5341-44621-xx	5	300.0	21.7	84.4 x 140	0.8	2

RATED VOLTAGE 400 V*, 50 Hz, 1-PHASE							
TYPE	ARTICLE No.**	OUTPUT kvar	CAPACITANCE $\mu$ F	CURRENT A	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP400.1.02,50	5341-44365-xx	2.50	49.7	6.3	64 x 82	0.3	3
• PhMKP400.1.03,33	5341-44357-xx	3.33	66.2	8.3	64 x 109	0.4	3
• PhMKP400.1.05	5341-44334-xx	5	99.5	12.5	64 x 140	0.5	3
PhMKP400.1.06,67	5341-44335-xx	6.67	132.7	16.7	64 x 190	0.7	3
• PhMKP400.1.08,33	5341-44366-xx	8.33	165.7	20.8	64 x 190	0.7	3
• PhMKP400.1.10	5341-44367-xx	10	198.9	25.0	64 x 240	0.9	3
• PhMKP400.1.08,33	5341-44622-xx	8.33	165.7	20.8	84.4 x 140	0.8	2
PhMKP400.1.10	5341-44674-xx	10	198.9	25.0	84.4 x 140	0.8	2
PhMKP400.1.16,7	5341-44624-xx	16.7	332.2	41.7	84.4 x 240	1.3	2

\* Can be used also for 415 V, full overvoltage range.

RATED VOLTAGE 525 V, 50 Hz, 1-PHASE								
TYPE	ARTICLE No.**	OUTPUT kvar 525 V	OUTPUT kvar 480 V	CAPACITANCE $\mu$ F	CURRENT A 480/525 V	DIMENSIONS $\varnothing$ x H (mm)	WEIGHT kg	DRAWING No.
PhMKP525.1.05	5341-44336-xx	5	4.2	57.7	8.8/9.5	64 x 140	0.5	3
• PhMKP525.1.08,33	5341-44337-xx	8.33	7.0	96.2	14.6/15.9	64 x 190	0.7	3
• PhMKP525.1.10	5341-44338-xx	10	8.4	115.5	17.5/19.0	64 x 240	0.9	3
PhMKP525.1.16,7	5341-44625-xx	16.7	14.0	192.9	29.2/31.6	84.4 x 240	1.3	2
PhMKP525.1.20	5341-44626-xx	20	16.7	231.0	34.8/38.0	84.4 x 240	1.3	2

• Main types available from stock

Drawings at end of data sheet.

\*\* Version No. xx may differ as it respects small changes, e.g. on the label.

Other voltage ratings, outputs, and frequencies upon request. All PhMKP-type capacitors may be used for 60 Hz, the output will be 1.2 times higher.

All oil-impregnated part types can also be produced in a PhMKPg dry version. Dimensions and ratings are unchanged. Dry types are not standard stock items, with production upon request.

## ACCESSORIES FOR CAPACITORS IN CYLINDRICAL ALUMINUM CASING

<b>TERMINAL COVER (MAX. IP 54, COMPLETED WITH CABLE GLAND AND CONNECTION CABLE)</b>			
TYPE	ARTICLE No.	DRILLING Ø in mm (FOR CABLE GLAND)	CAPACITOR Ø in mm
CAP64_18.5x14	5341-COV-64-18	18.5 (SR-30-1)	64
CAP64_20.4	5341-COV-64-20	20.4 (PG 13.5)	64
CAP64_22.5	5341-COV-64-22	22.5 (PG 16)	64
CAP84_22.5	5341-COV-84-22	22.5 (PG 16)	84.4
CAP84_28.5	5341-COV-84-28	28.5 (PG 21)	84.4

<b>TERMINAL COVER (IP20), AVAILABLE FOR 84.4 MM AND 64 MM DIAMETER TUBULAR CAN CAPACITORS*</b>		
TYPE	ARTICLE No.	CAPACITOR Ø in mm
CAP64_IP20	5341-COV-64-IP20-6	64
CAP84_IN_LINE	5341-COV-84-IP20-7	84.4

\* Cable gland not available for use with these covers

### TYPE CAP84\_IN\_LINE

- Protection class IP20
- Protective cover prevents unintentional touching of live terminals
- Proper ventilation is provided by use of additional holes in the protective cover's top
- Six slots located on the cover, three on each side, allow easy IN-LINE connection between two capacitors

### TYPE CAP64\_IP20

- Protection class IP20
- Protective cover prevents unintentional touching of live terminals
- Proper ventilation is provided by use of six slots around and additional holes in the protective cover's top
- Both, slots and holes allow easy entry and connection of cables

### TERMINAL COVER IP20 CAP84\_IN\_LINE



### IN-LINE CONNECTION BETWEEN TWO CAPACITORS, IP20



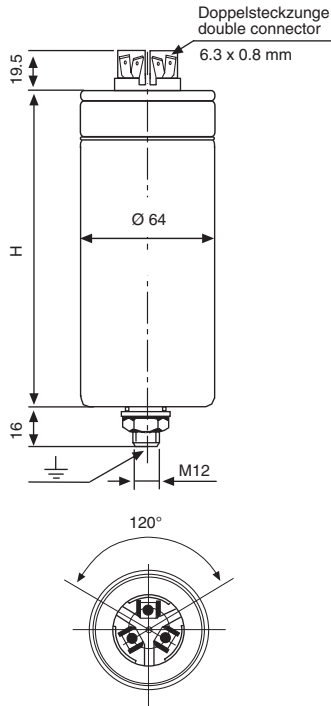
### TERMINAL COVER IP20: CAP64\_IP20



## DIMENSIONS

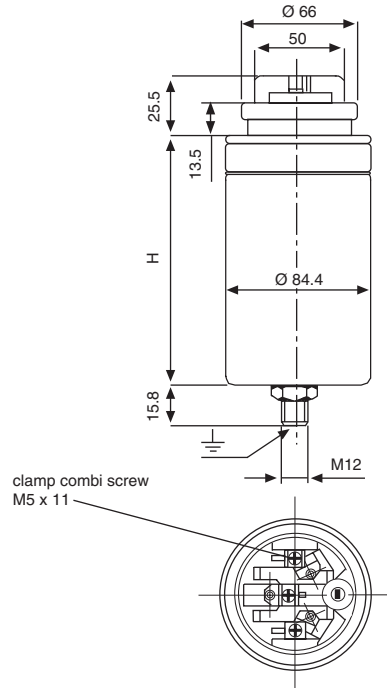
### Drawing 1

cylindrical-type capacitor,  
three phase, 64 mm diameter



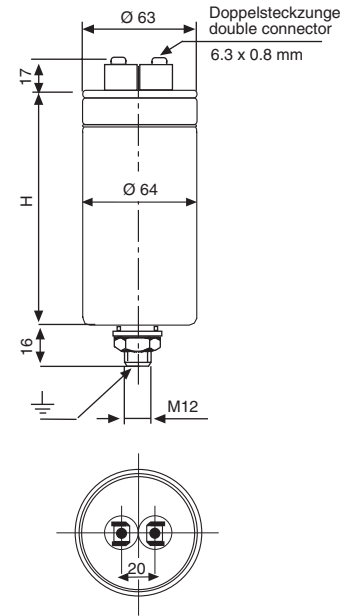
### Drawing 2

cylindrical-type capacitor, single and  
three phase, 84.4 mm diameter



### Drawing 3

cylindrical-type capacitor,  
single phase



## RECOMMENDED TORQUES:

CYLINDRICAL TYPE CAPACITORS	RECOMMENDED TORQUE
M12 mounting stud	10 Nm
M5 screw terminals (cross-head screws PH2)	2.0 Nm

## ORDERING INFORMATION

### Minimum order quantity per type and order:

Full cardboard boxes: Ø 64 mm - 9 pcs per carton  
Full cardboard boxes: Ø 84.4 mm - 4 pcs per carton

### Delivery time

Most types are normally available within 2 weeks. This may be extended during busy periods



## Disclaimer

All product specifications and data are subject to change without notice.

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