MOTOR START & RUN CAPACITORS



Single-phase polypropylene and electrolytic Capacitors.

COMAR Condensatori

Save Your **Energy.**

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Motor Capacitors

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Introduction

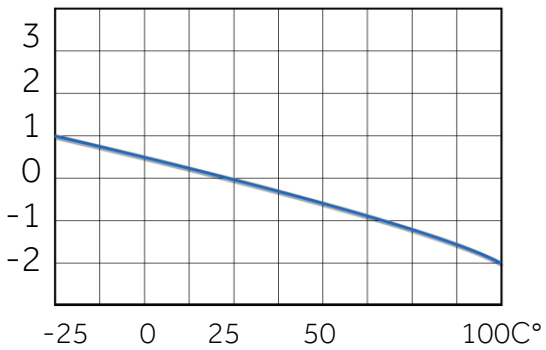
COMAR Condensatori S.p.A.

Since 1968 we provide standard products, as well as tailor-made solutions, depending on the needs of the Customer. We are leaders in the production of single-phase and three-phase **capacitors**, as well as power factor correction equipment.

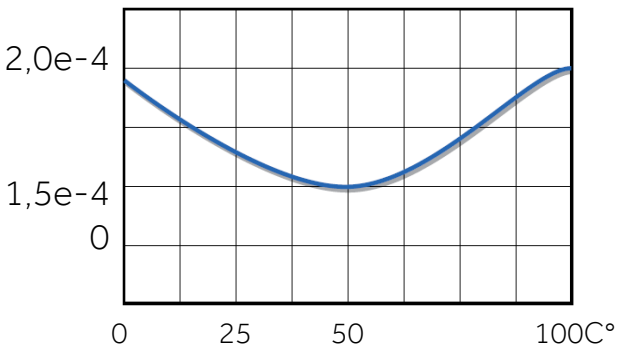
The production began with the oil-paper dielectric capacitors and has evolved into the current **metallized polypropylene** capacitors. Our **MKP** capacitors are made of a bi-oriented polypropylene dielectric with low shrinkage and high mechanical properties.

The most relevant feature of this type of film is the **self-healing of the dielectric** that allows the restoration of the electrical functionality, while the stability over time is guaranteed by the technological and methodological measures adopted during the construction of each capacitor. Below are summarized the key characteristics when temperature changes:

Delta C/C %



Tang. Delta



Thanks to the continual replacement and upgrading of production equipment, the quality and reliability levels are always improving and at the highest international standard. Indeed, several homologations have been achieved during the years, such as:

EN 60252

EN 60252

The excellence of COMAR Condensatori products is possible thanks to Italian supply chain, fully under control in our factory located near Bologna. The path to ensure the quality of the methods of design, procurement, production, testing and delivery sees the achievement of the **ISO 9001**, and **ISO 14001** certifications.
All COMAR capacitors, displayed in this catalog, are labelled with **CE marking**.

This catalogue includes standard single-phase capacitors currently provided by COMAR Condensatori. Capacitors for **motor applications**, thanks to a very wide choice of models and construction options, offer the ideal solution for any type of application with **single or three-phase motors** supplied as single-phase. Single and three-phase electrical motors need, for their starting, a capacitor which generates a displaced current creating a rotating magnetic field. The capacitor can be used also for permanent operation, it maintains the required magnetic field and it compensates the motor's inductive load.

There are two types of capacitors used for those applications:
- motor starting capacitors, they are electrolytic capacitors with high capacitance value (μF), able to provide an high starting torque to the motor. They are disconnected at the end of the starting in order to avoid overload to the motor winding;
- motor running capacitors, they are used to improve the value of the cos**φ** when motor is working at rated load conditions, they are permanently connected to the motor.

When using **single-phase** motors, the motor running capacitor also maintains the rotating magnetic field. For single-phase motors supplied at 230Vac 50Hz, the value of required motor running capacitors is 30 - 50 μF for kW of motor power.

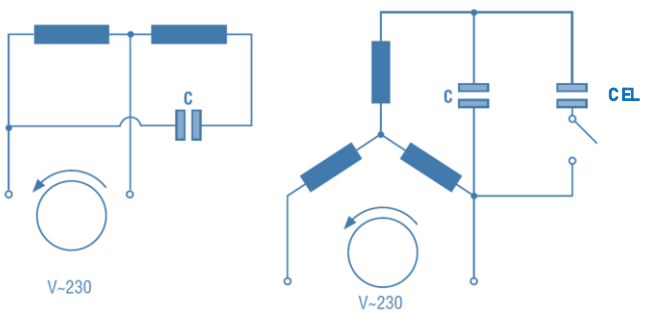
Typical values for Single-phase applications	*kW*	0,18	0,37	0,55	0,75	0,92	1,1	1,5
	HP	0,25	0,5	0,75	1	1,25	1,5	2
3000'/min 50 Hz – 2 Poles		10	16	20	25	30	32	40
1500'/min 50 Hz – 4 Poles		12,5	16	20	25	28	32	40
1000'/min 50 Hz – 6 Poles		10	20	25	25	30	36	50

When using **three-phase** motors with single-phase supply, the motor running capacitor ensures the presence of the third phase.

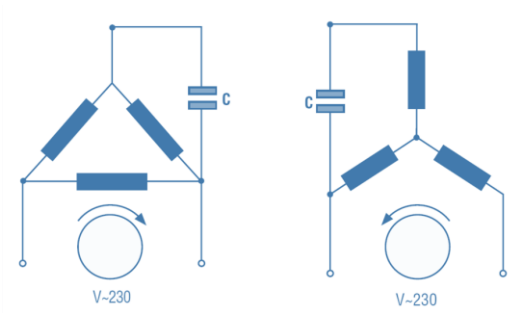
Typical values for Three-phase motor	*kW*	0,18	0,37	0,55	0,75	0,92	1,1	1,5
	HP	0,25	0,5	0,75	1	1,25	1,5	2
Full Load		12,5	25	38	50	60	75	100

The above data are obtained from the catalogue of motor manufacturers; they have indicative value and they are not binding for COMAR Condensatori.

Single-phase applications



Three-phase applications with single-phase supply



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MKA 450 • MK 450 • EL

Motor Capacitors

COMAR Condensatori

MKA 450

Motor Film Capacitors



The **MKA 450** capacitors are suitable for the **standard** motor applications.

PERFORMANCE DATA

Rated Voltage	450 Vac
Rated Frequency	50 / 60 Hz
Capacitance Tolerance	-/+ 5%
Operating class	400 V – B 10000 h (HPFNT) 450 V – C 3000 h (HPFPU)
Dielectric	Self-healing MKP
Safety class	S0

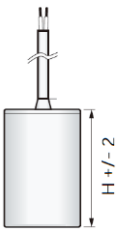
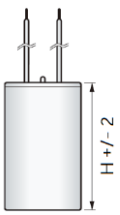
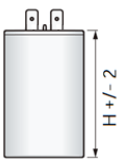
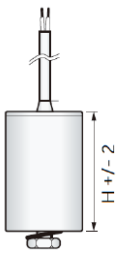
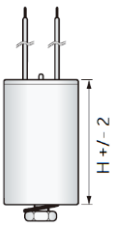
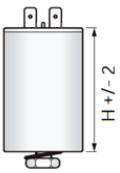
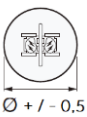
STANDARDS AND APPROVALS

Reference standards	CEI EN 60252-1; VDE560-8
Homologation	EN60252-1 (1.5 ÷ 45 µF) EN60252-1 (1.5 ÷ 45 µF) File E214047 (upon request)

TECHNICAL DATA

Climatic category	-25 °C / +85 °C
Protection degree	IP00
Loss Factor	≤ 5 x 10 ^-4 typical value
Test Voltage between terminals	1,75 Vn x 2 sec (min.)
Test Voltage between terminals and case	2 Vn x 2 sec (min.)

MECHANICAL CONFIGURATIONS

Case	Plain base self-extinguishing (V2) plastic case	Plain base self-extinguishing (V2) plastic case	Plain base self-extinguishing (V2) plastic case	Bottom M8 metal stud self-extinguishing (V2) plastic case	Bottom M8 metal stud self-extinguishing (V2) plastic case	Bottom M8 metal stud self-extinguishing (V2) plastic case
Finishing	Bipolar cable. Length = 250 mm (other length on request)	Two flexible leads. Length = 150 mm (other length on request)	Faston terminal. Single if Ø = 25 mm, otherwise double. Size = 6,3 x 0,8 mm	Bipolar cable. Length = 250 mm (other length on request)	Two flexible leads. Length = 150 mm (other length on request)	Faston terminal. Single if Ø = 25 mm, otherwise double. Size = 6,3 x 0,8 mm
Figure						
Top view						
Naming	Pla-PB CB250	Pla-PB CVF150	Pla-PB FS/FD	Pla-C8 CB250	Pla-C8 CVF150	Pla-C8 FS/FD

Optional item:

- Capacitors can be equipped with plastic **protective cap**

CONFIGURATION

Table

Type	Cn (µF)	Homologation	Dimension D x H (mm)	Pcs x bag*
MKA 450-1	1		25 x 57	50
MKA 450-1,25	1,25		25 x 57	50
MKA 450-1,5	1,5	VDE | IMQ	25 x 57	50
MKA 450-2	2	VDE | IMQ	25 x 57	50
MKA 450-2,5	2,5	VDE | IMQ	25 x 57	50
MKA 450-3	3	VDE | IMQ	25 x 57	50
MKA 450-3,15	3,15	VDE | IMQ	25 x 57	50
MKA 450-3,5	3,5	VDE | IMQ	25 x 57	50
MKA 450-3,75	3,75	VDE | IMQ	25 x 57	50
MKA 450-4	4	VDE | IMQ	25 x 57	50
MKA 450-4,5	4,5	VDE | IMQ	25 x 57	50
MKA 450-5	5	VDE | IMQ	30 x 57	50
MKA 450-5,5	5,5	VDE | IMQ	30 x 57	50
MKA 450-6	6	VDE | IMQ	30 x 57	50
MKA 450-6,3	6,3	VDE | IMQ	30 x 57	50
MKA 450-7	7	VDE | IMQ	30 x 57	50
MKA 450-8	8	VDE | IMQ	30 x 70	50
MKA 450-9	9	VDE | IMQ	30 x 70	50
MKA 450-10	10	VDE | IMQ	30 x 70	50
MKA 450-11	11	VDE | IMQ	35 x 70	50
MKA 450-12	12	VDE | IMQ	35 x 70	50
MKA 450-12,5	12,5	VDE | IMQ	35 x 70	50
MKA 450-13	13	VDE | IMQ	35 x 70	50
MKA 450-14	14	VDE | IMQ	35 x 70	50
MKA 450-15	15	VDE | IMQ	40 x 70	50
MKA 450-16	16	VDE | IMQ	40 x 70	50
MKA 450-18	18	VDE | IMQ	40 x 70	50
MKA 450-20	20	VDE | IMQ	40 x 70	50
MKA 450-22	22	VDE | IMQ	40 x 94	50
MKA 450-25	25	VDE | IMQ	40 x 94	50
MKA 450-30	30	VDE | IMQ	40 x 94	50
MKA 450-31,5	31,5	VDE | IMQ	40 x 94	50
MKA 450-35	35	VDE | IMQ	45 x 94	50
MKA 450-40	40	VDE | IMQ	45 x 94	50
MKA 450-45	45	VDE | IMQ	50 x 94	50
MKA 450-50	50		50 x 94	50
MKA 450-55	55		50 x 94	50
MKA 450-60	60		50 x 120	50
MKA 450-70	70		50 x 120	50
MKA 450-75	75		50 x 120	50
MKA 450-80	80		50 x 120	50
MKA 450-90	90		60 x 120	50
MKA 450-100	100		60 x 120	50

Other solutions are available on request.
* All capacitors are supplied inside polyethylene bag, in order to reduce cardboard boxes.

MK 450

Motor Film Capacitors



The **MK 450** capacitors are suitable for the **heavy duty** motor applications.

PERFORMANCE DATA

Rated Voltage	450 Vac
Rated Frequency	50 / 60 Hz
Capacitance Tolerance	-/+ 5%
Operating class	420 V – A 30000 h (HPFNS) 450 V – B 10000 h (HPFNT)
Dielectric	Self-healing MKP
Safety class	S0

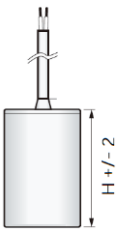
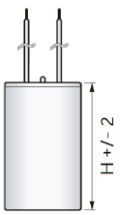
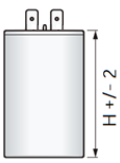
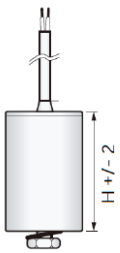
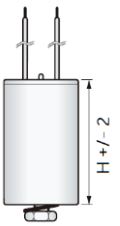
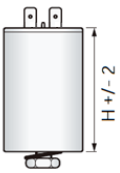
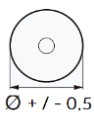
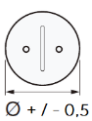
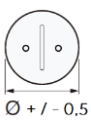
TECHNICAL DATA

Climatic category	-25 °C / +85 °C
Protection degree	IP00
Loss Factor	≤ 5 x 10 ^-4 typical value
Test Voltage between terminals	1,75 Vn x 2 sec (min.)
Test Voltage between terminals and case	2 Vn x 2 sec (min.)

STANDARDS AND APPROVALS

Reference standards	CEI EN 60252-1; VDE560-8
Homologation	EN60252-1 (1.5 ÷ 45 µF) EN60252-1 (1.5 ÷ 45 µF)

MECHANICAL CONFIGURATIONS

Case	Plain base self-extinguishing (V2) plastic case	Plain base self-extinguishing (V2) plastic case	Plain base self-extinguishing (V2) plastic case	Bottom M8 metal stud self-extinguishing (V2) plastic case	Bottom M8 metal stud self-extinguishing (V2) plastic case	Bottom M8 metal stud self-extinguishing (V2) plastic case
Finishing	Bipolar cable. Length = 250 mm (other length on request)	Two flexible leads. Length = 150 mm (other length on request)	Faston terminal. Single if Ø = 25 mm, otherwise double. Size = 6,3 x 0,8 mm	Bipolar cable. Length = 250 mm (other length on request)	Two flexible leads. Length = 150 mm (other length on request)	Faston terminal. Single if Ø = 25 mm, otherwise double. Size = 6,3 x 0,8 mm
Figure						
Top view						
Naming	Pla-PB CB250	Pla-PB CVF150	Pla-PB FS/FD	Pla-C8 CB250	Pla-C8 CVF150	Pla-C8 FS/FD

Optional item:

- Capacitors can be equipped with plastic **protective cap**

CONFIGURATION

Table

Type	Cn (µF)	Homologation	Dimension D x H (mm)	Pcs x bag*
MK 450-1	1	VDE | IMQ	30 x 57	50
MK 450-1,25	1,25	VDE | IMQ	30 x 57	50
MK 450-1,5	1,5	VDE | IMQ	30 x 57	50
MK 450-2	2	VDE | IMQ	30 x 57	50
MK 450-2,5	2,5	VDE | IMQ	30 x 57	50
MK 450-3	3	VDE | IMQ	30 x 57	50
MK 450-3,15	3,15	VDE | IMQ	30 x 57	50
MK 450-3,5	3,5	VDE | IMQ	30 x 57	50
MK 450-3,75	3,75	VDE | IMQ	30 x 57	50
MK 450-4	4	VDE | IMQ	30 x 57	50
MK 450-4,5	4,5	VDE | IMQ	30 x 57	50
MK 450-5	5	VDE | IMQ	30 x 57	50
MK 450-5,5	5,5	VDE | IMQ	30 x 70	50
MK 450-6	6	VDE | IMQ	30 x 70	50
MK 450-6,3	6,3	VDE | IMQ	30 x 70	50
MK 450-7	7	VDE | IMQ	30 x 70	50
MK 450-8	8	VDE | IMQ	30 x 70	50
MK 450-9	9	VDE | IMQ	35 x 70	50
MK 450-10	10	VDE | IMQ	35 x 70	50
MK 450-11	11	VDE | IMQ	40 x 70	50
MK 450-12	12	VDE | IMQ	40 x 70	50
MK 450-12,5	12,5	VDE | IMQ	40 x 70	50
MK 450-13	13	VDE | IMQ	40 x 70	50
MK 450-14	14	VDE | IMQ	40 x 70	50
MK 450-15	15	VDE | IMQ	40 x 70	50
MK 450-16	16	VDE | IMQ	40 x 70	50
MK 450-18	18	VDE | IMQ	40 x 94	50
MK 450-20	20	VDE | IMQ	40 x 94	50
MK 450-22	22	VDE | IMQ	40 x 94	50
MK 450-25	25	VDE | IMQ	45 x 94	50
MK 450-30	30	VDE | IMQ	45 x 94	50
MK 450-31,5	31,5	VDE | IMQ	45 x 94	50
MK 450-35	35	VDE | IMQ	50 x 94	50
MK 450-40	40	VDE | IMQ	50 x 94	50
MK 450-45	45	VDE | IMQ	50 x 120	50
MK 450-50	50		50 x 120	50
MK 450-55	55		55 x 120	50
MK 450-60	60		55 x 120	50
MK 450-70	70		60 x 120	50
MK 450-75	75		60 x 120	50
MK 450-80	80		60 x 120	50

Other solutions are available on request.
* All capacitors are supplied inside polyethylene bag, in order to reduce cardboard boxes.

EL

Motor Start Electrolytic Capacitors



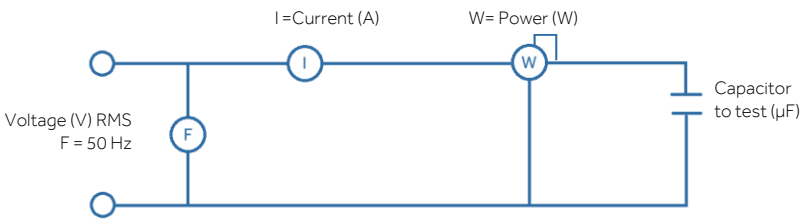
PERFORMANCE DATA

Rated Voltage	320 Vac (capacitance ≤ 315 µF) 250 Vac (capacitance ≥ 315 µF)
Rated Frequency	50 / 60 Hz
Capacitance Range	from 25 µF to 550 µF
Capacitance Tolerance	- 0% + 25% or -/+ 10%
Working Condition	The standard time rating defined of IEC 252 is 1,67% full time and corresponds to a duty cycle of 3 seconds on and 177 seconds off.

The **EL** electrolytic capacitor have **high capacitance** (µF value) able to provide an high starting torque to the motor. It is a non polarized capacitor especially designed for intermittent AC voltage applications for single-phase motors.

TECHNICAL DATA

Operating Temperature	-45 °C / +65 °C (higher temperatures on request)
Storage Temperature	-40 °C / +70 °C
Endurance test	500 h
Dissipation Loss Angle	Measurement frequency: 50 Hz, the typical value shall not exceed 0,10, calculated as follows: Tan d = W / (V x I) = (true watts / apparent watts)
Capacitance Measurement	Capacitance shall be determined by measuring the current – after 2/3 sec. of energizing – through the capacitor at rated voltage and frequency. The capacitance is defined as follows: C = (I x 10^6) / 2 π^2 x f x V



TYPICAL VALUES

For Single-phase Motor								
	kW	0,074	0,183	0,368	0,552	0,736	1,104	1,472
	HP	1/10	1/4	1/2	3/4	1	1,5	2
220 V		20 µF	50 µF	100 µF	150 µF	200 µF	300 µF	-
280 V		10 µF	25 µF	50 µF	80 µF	100 µF	150 µF	200 µF

Note: the indicated voltages are the working capacitor voltages

STANDARDS AND APPROVALS

Reference standards	CEI EN 60252-2 (capacitor); CEI EN 60695-11-10 (electrolyte).
Directives	It complies with the RoHs Directive

CONFIGURATION

Table

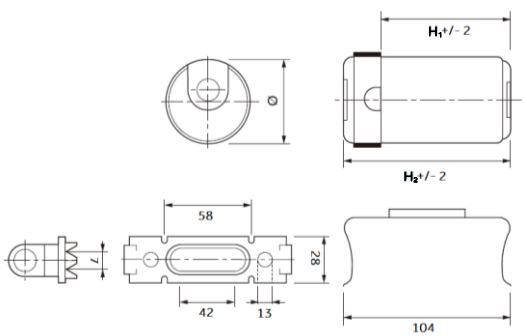
Type	Cn (μF)	Rated Voltage	Dimension D x H_1/H_2 (mm)
8140610	25 - 31,5	250/320	46 x 85/98
8140710	31,5 - 40	250/320	46 x 85/98
8140810	40 - 50	250/320	46 x 85/98
8140910	50 - 63	250/320	46 x 85/98
8141010	63 - 80	250/320	46 x 85/98
8141110	80 - 100	250/320	46 x 85/98
8141210	100 - 125	250/320	46 x 85/98
8141310	125 - 160	250/320	46 x 85/98
8141410	160 - 200	250/320	46 x 85/98
8141510	200 - 250	250/320	46 x 85/98
8141610	250 - 315	250/320	46 x 85/98
8141710	315 - 400	250	46 x 85/98
8141810	400 - 480	250	46 x 85/98
8141910	450 -550	250	46 x 85/98

Other solutions are available on request.

Optional requests:

- **Protective cap** , code 730050;
- **Mounting bracket** , code 565008;
- **Bipolar cable**, length 300 mm with Female Faston 6.35 mm, code 7850694;
- EL Capacitors can be equipped with **Resistors** (codes on request);
- EL Capacitors can be supplied in a more compact version, with a **diameter of 36.5 mm** (codes on request).

MECHANICAL CONFIGURATION

Case	Plane base self-extinguishing (V2) plastic case
Finishing	Double faston terminal. Size = 6,3 x 0,8 mm
Figure	

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