

MOTOR & LIGHTING CAPACITORS



Single-phase polypropylene and
electrolytic Capacitors.

COMAR
Condensatori

Save Your **Energy.**

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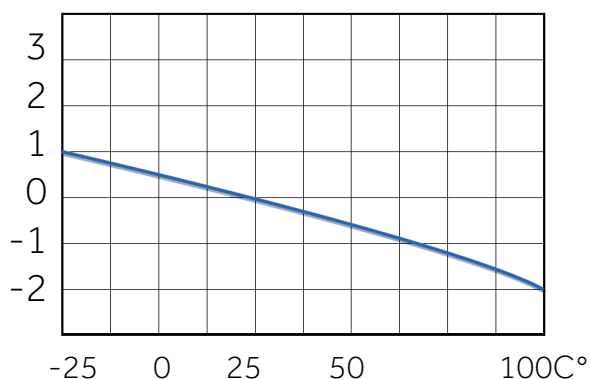
Introduction

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.

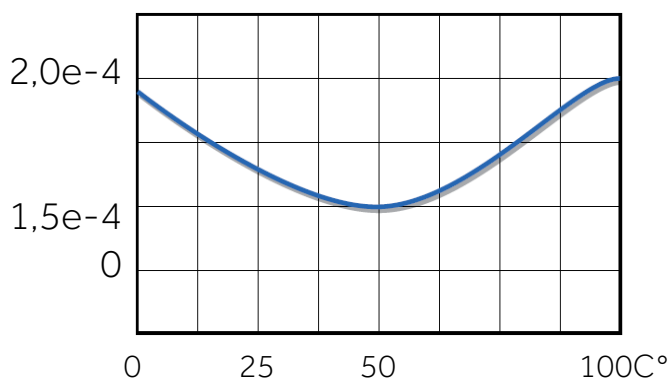
The production began with the oil-paper dielectric capacitors and has evolved into the current **metallized polypropylene** capacitors. Our **MKP** capacitors are made of a bi-oriented polypropylene dielectric with low shrinkage and high mechanical properties.

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:

Motor Capacitors



Lighting Capacitors



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**, **ISO 14001** and **OHSAS 18001** 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 $\cos\phi$ 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.

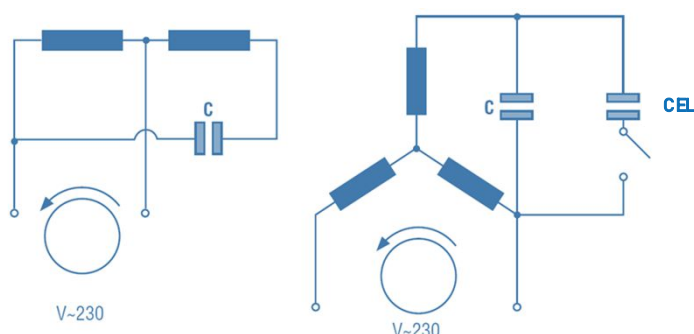
Typical values for Single-phase applications	kW	0,18	0,37	0,55	0,75	0,92	1,1	1,5
	HP	0,25	0,5	0,75	1	1,25	1,5	2
3000'/min 50 Hz – 2 Poles		10	16	20	25	30	32	40
1500'/min 50 Hz – 4 Poles		12,5	16	20	25	28	32	40
1000'/min 50 Hz – 6 Poles		10	20	25	25	30	36	50

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

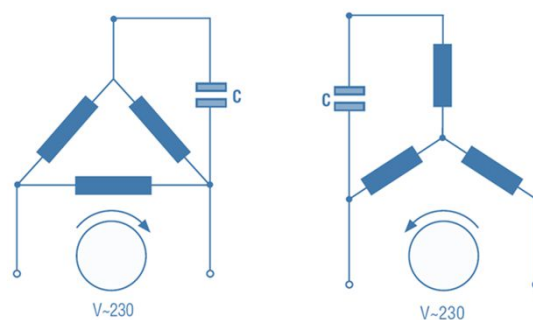
Typical values for Three-phase motor	kW	0,18	0,37	0,55	0,75	0,92	1,1	1,5
	HP	0,25	0,5	0,75	1	1,25	1,5	2
Full Load		12,5	25	38	50	60	75	100

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



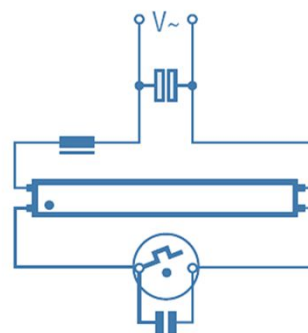
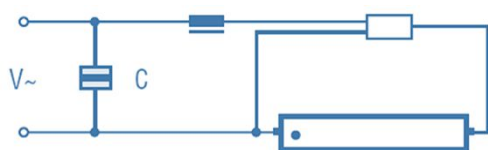
Three-phase applications with single-phase supply



Insights on Lighting Capacitors

The capacitors for **lighting applications**, thanks to a very wide choice of models and constructions options, offer the ideal solution to compensate **fluorescent and discharge lamps**. All fluorescent and discharge lamps need a reactor to switch and keep on the electric arc. This kind of load is very inductive ($\cos\phi \leq 0.5$) and it generates very high value of absorbed current. In order to decrease the absorbed current (optimizing the cable section of the supply cables) and to improve the value of the $\cos\phi$; it is necessary to add a capacitor in the circuit. The national regulation of many countries impose the use of the compensation capacitors in lighting installations.

COMAR provides capacitors to be used in **parallel** (see beside examples): one capacitor can compensate one or more lamps supplied in parallel;



Typical capacitors values used in lighting equipment are reported below.

Fluorescent Lamps

Electronic		Preheated				Rapid		Rapid Start		Slimline	
W	μF	W	μF	W	μF	W	μF	W	μF	W	μF
5	2	4	2	30	4,5	14	4	20	4	42" T6 25W	5
7	2	6	2	32	4,5	16	4	22	4	48" T12 25W	12,5
9	2,5	8	2	40	4,5	20	4	32	5	64" T6 38W	8
10	2,5	10	2	65	7	22	4	40	5	72" T8 37W	8
11	2,5	14	4	85	8	25	4	65	10	72" T12 57W	16
13	3	16	4	115	16	30	5	115	16	96" T8 50W	10
18	3	20	4	140	18	32	5	140	18	96" T12 75W	16
24	4	22	4			40	5	215	30		
26	4	25	4,5								
36	4,5										

Discharge Lamps

High Pressure Sodium		Low Pressure Sodium		Mercury		Metal Halide	
W	μF	W	μF	W	μF	W	μF
50	10	18	5	50	8	70	12
70	12,5	35	20	80	9	150	20
100	18,5	55	20	125	10	250	30
125	20	90	30	250	20	400	35
150	20	135	35	400	25	1000	70
250	30	180	40	700	40	2000	125
400	50			1000	60	2000/380	60
1000	100						
2000	125						

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



MKA 450 • MK 450 • EL

Motor Capacitors



MKA 450

Motor Film Capacitors



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

TECHNICAL DATA

Climatic category	-25 °C / +85 °C
Protection degree	IP00
Loss Factor	$\leq 5 \times 10^{-4}$ 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.)

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 $\pm$ 45 μ F)

EN60252-1 (1.5 $\pm$ 45 μ F)

File E214047 (upon request)



MECHANICAL CONFIGURATIONS

Case	Plane base self-extinguishing (V2) plastic case	Plane base self-extinguishing (V2) plastic case	Plane 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 $\varnothing = 25$ 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 $\varnothing = 25$ 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 **MKA 450** capacitors are suitable for the **heavy duty** motor applications.

TECHNICAL DATA

Climatic category	-25 °C / +85 °C
Protection degree	IP00
Loss Factor	$\leq 5 \times 10^{-4}$ 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.)

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

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	Plane base self-extinguishing (V2) plastic case	Plane base self-extinguishing (V2) plastic case	Plane 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 (μ F)	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.



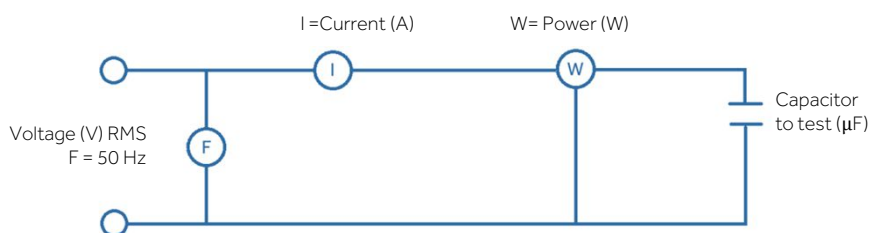
The **EL** electrolytic capacitor have **high capacitance** (μF value) able to provide an high starting torque to the motor. It is a non polarized capacitor especially designed for intermittent AC voltage applications for single-phase motors.

PERFORMANCE DATA

■ Rated Voltage	250 Vac
■ Rated Frequency	50 / 60 Hz
■ Capacitance Range	from 25 μF to 550 μF
■ Capacitance Tolerance	0% + 20% o -/+ 10% (0% + 22% for 8141910)
■ Operating class: 250 Vac	The standard time rating defined of IEC 60252 is 1,7% full time and corresponds to a duty cycle of 3 seconds on and 177 seconds off.
330 Vac	The standard time rating defined of IEC 60252 is 0,55% full time and corresponds to a duty cycle of 1 second.

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: $\tan d = W / (V \times I) = (\text{true watts} / \text{apparent watts})$
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: $C = (I \times 10^6) / 2 \pi^2 \times f \times V$



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); UL 810; CEI EN 60695-11-10 (electrolyte).
Homologation	JIS C 4905 IMQ CE 133-3; SEV 1029; EIA RS 463; CQC
Directives	It complies with the RoHs Directive

CONFIGURATION

Table

Type	Cn (μ F)	Rated Voltage	Dimension D x H (mm)
8140610	25 - 30	250 V	46 x 85
8140710	31,5 - 37	250 V	46 x 85
8140810	40 - 48	250 V	46 x 85
8140910	50 - 60	250 V	46 x 85
8141010	64 - 77	250 V	46 x 85
8141110	80 - 96	250 V	46 x 85
8141210	100 - 120	250 V	46 x 85
8141310	125 - 150	250 V	46 x 85
8141410	160 - 192	250 V	46 x 85
8141510	200 - 240	250 V	46 x 85
8141610	250 - 300	250 V	46 x 85
8141710	315 - 378	250 V	46 x 85
8141810	400 - 480	250 V	46 x 85
8141910	450 - 550	250 V	46 x 85

Other solutions are available on request.

Optional requests:

- **Protective cap**, code 730046;
- **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 plastic case
Finishing	Double faston terminal. Dimension = 6,3 x 0,8 mm
Figure	Mounting bracket: Closure Cap:

DR - DRC

Relay Disjuncteur



The electronic disjuncteur is a device that allows the starts up of electrical asynchronous single phase motor. The disjuncteur with Relay connects the motor start capacitor for the time necessary to reach the 80% of the rated motor speed, then it opens and discharges the capacitor by means of a resistance.

The **DR** comes alone, while **DRC** also includes the capacitor.

PERFORMANCE DATA

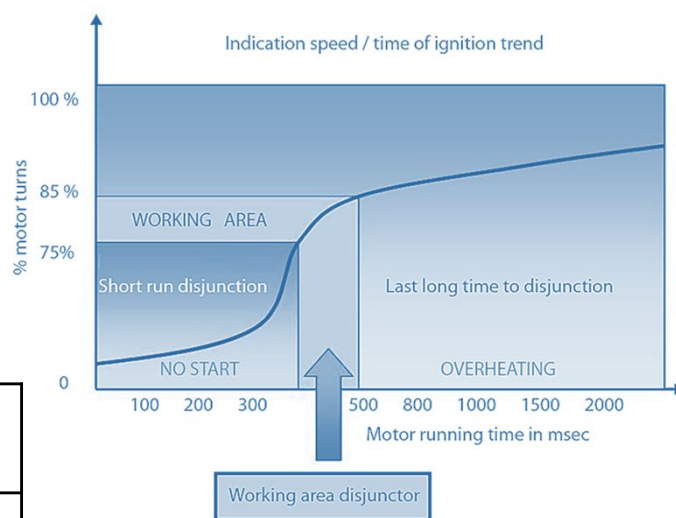
- Rated Voltage 250 / 450 Vac
- Rated Frequency 50 / 60 Hz
- Max. Capacitance 100 μ F - 450 Vac (50 Hz)
180 μ F - 250 Vac (50 Hz)
90 μ F - 450 Vac (60 Hz)
160 μ F - 250 Vac (60 Hz)

STANDARDS

Homologation UL E475575

TECHNICAL DATA

Disjuncteur Recovery Time (after one intervention)	1 sec (since the motor switches off)
Advisable repetition time	6 sec
Number of advisable max starts up	6 /min
Max current	15 A
Operation and Storage temperature	-20 °C / +80 °C



CONFIGURATION

DR Series: Relay without Capacitor

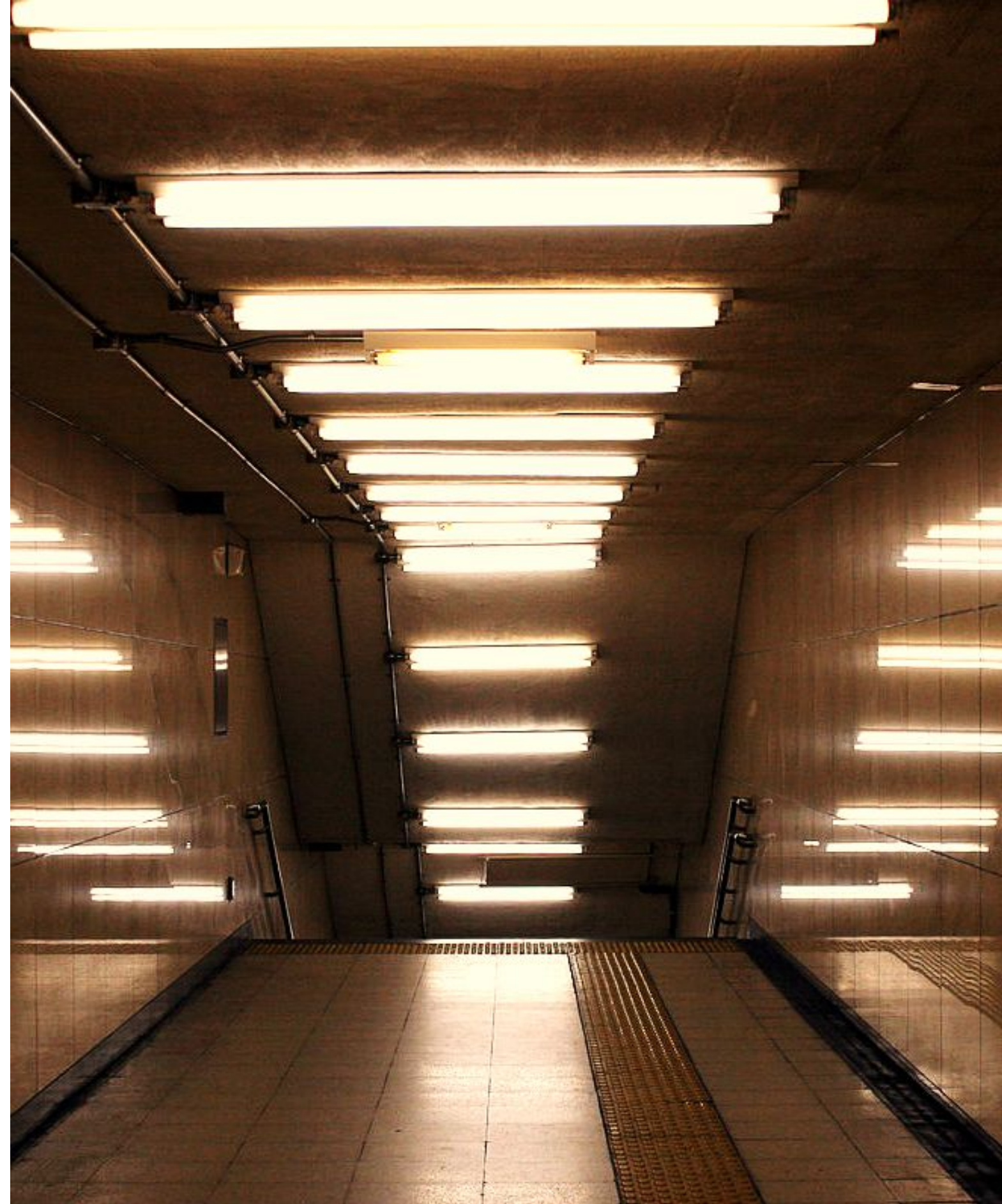
Type	Current (A)	Voltage (Vac)	Dimension D x H (mm)
DR R2 250	15	up to 250	42 x 70
DR R4 450	15	up to 250	42 x 70

DRC Series: Relay with Capacitor

Type	Cn (μ F)	Voltage (Vac)	Dimension D x H (mm)
DRC - 250 - 10	10	up to 250	45 x 94
DRC - 250 - 15	15	up to 250	45 x 94
DRC - 250 - 18	18	up to 250	45 x 94
DRC - 250 - 24	24	up to 250	45 x 94
DRC - 250 - 45	45	up to 250	55 x 94
DRC - 250 - 60	60	up to 250	50 x 120
DRC - 250 - 80	80	up to 250	60 x 120
DRC - 250 - 100	100	up to 250	65 x 120
DRC - 250 - 160	160	up to 250	65 x 120

Type	Cn (μ F)	Voltage (Vac)	Dimension D x H (mm)
DRC - 450 - 10	10	up to 250	45 x 94
DRC - 450 - 12	15	up to 250	45 x 94
DRC - 450 - 15	15	up to 250	45 x 94
DRC - 450 - 22,5	22,5	up to 250	45 x 94
DRC - 450 - 40	40	up to 250	55 x 94
DRC - 450 - 50	50	up to 250	50 x 120
DRC - 450 - 80	80	up to 250	60 x 120
DRC - 450 - 100	100	up to 250	65 x 120

Tailor made versions available on requests:



MFE 250 • MFE 450

Lighting Capacitors



MFE 250

Lighting Capacitors



The **MFE 250** capacitors are suitable for lighting applications such as **fluorescent** and **discharge lamps**.

PERFORMANCE DATA

- Rated Voltage 250 Vac
- Rated Frequency 50 Hz (optional 60 Hz)
- Capacitance Tolerance -/+ 10 (optional +/- 5%)
- Climatic Category 25 / 85 / 21

STANDARDS AND APPROVALS

Reference standards EN 61048 2/; EN61049

Homologation IMQ - EN61048 2/ EN61049
ENEC03
C599325V



TECHNICAL DATA

Climatic category	-25 °C / +85 °C. Upon request: max. temperature +100 °C.
Protection degree	IP00.
Loss Factor	$\leq 5 \times 10^{-4}$ typical value
Test Voltage between terminals	2 Vn x 10 sec
Test Voltage between terminals and case	2 kV x 10 sec

MECHANICAL CONFIGURATIONS

Case	Plane base self-extinguishing (V2) plastic case	Bottom M8 metal stud self-extinguishing (V2) plastic case
Finishing	Two flexible leads. Length = 150 mm (other length on request)	Two flexible leads. Length = 150 mm (other length on request)
Figure		
Top view		
Naming	Pla-PB CVF150	Pla-PB + Pla-C8 CVF150

Optional items:

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

CONFIGURATION

Table

Type	Cn (μ F)	Pcs x box	Dimension D x H (mm)
MFE 250-2	2	150	25 x 57
MFE 250-2,5	2,5	150	25 x 57
MFE 250-3	3	150	25 x 57
MFE 250-3,15	3,15	150	25 x 57
MFE 250-3,5	3,5	150	25 x 57
MFE 250-4	4	150	25 x 57
MFE 250-4,5	4,5	150	25 x 57
MFE 250-5	5	150	25 x 70
MFE 250-6	6	150	25 x 70
MFE 250-6,3	6,3	150	25 x 57
MFE 250-7	7	100	30 x 70
MFE 250-8	8	100	30 x 70
MFE 250-9	9	100	30 x 70
MFE 250-10	10	100	30 x 70
MFE 250-11	11	100	30 x 70
MFE 250-12	12	100	30 x 70
MFE 250-12,5	12,5	100	30 x 70
MFE 250-14	14	70	35 x 70
MFE 250-15	15	70	35 x 70
MFE 250-16	16	70	35 x 70
MFE 250-18	18	50	40 x 70
MFE 250-20	20	50	40 x 70
MFE 250-25	25	50	40 x 94
MFE 250-30	30	50	40 x 94
MFE 250-31,5	31,5	50	40 x 94
MFE 250-35	35	50	45 x 94
MFE 250-40	40	50	45 x 94
MFE 250-45	45	50	45 x 94
MFE 250-50	50	50	50 x 94
MFE 250-55	55	35	50 x 120

Other solutions are available on request.

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