



Low Voltage Capacitors in Power Factor Correction

By Michael Kopp

CAPACITORS IN CYLINDRICAL CASINGS

APPLICATION

The Vishay ESTA PhMKP / PhMKPg series of power factor correction capacitors in cylindrical aluminum casings is available in 64 mm, 84 mm, 116 mm, and 136 mm diameter designs.

The 116 mm and 136 mm start where the output of the 84 mm design ends. At the point of change, the customer has two options: the lower height profile of the 116 mm and 136 mm or the slimmer diameter of the 84.4 mm design.

The Vishay ESTA LVAC capacitors are suitable for use in both standard PFC applications and in heavy-duty applications such as wind turbines:

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

1-PHASE / 3-PHASE CAPACITOR, ESTAspring IP20 TERMINAL BLOCK 64 mm / 84.4 mm DIAMETER

ESTAspring



DESIGN

The Vishay ESTA LVAC MKP capacitors are metallized polypropylene film capacitors with self-healing properties. The current-carrying metal layer of an MKP capacitor is vaporized 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 capacitor is housed in a tubular aluminum container with a aluminum lid press-rolled onto it. The current is supplied via a ESTAspring IP20 block-type safety terminal. A threaded stud (M12) at the bottom of the container serves for both grounding and mounting.

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

The entire range of Vishay ESTA LVAC products are offered in both natural oil-filled ESTAprop PhMKP and gas-filled ESTAdry PhMKPg versions.

3-PHASE CAPACITOR, ESTAspring IP20 TERMINAL BLOCK 116 mm DIAMETER

ESTAspring



Low Voltage Capacitors in Power Factor Correction

3-PHASE CAPACITOR, ESTAspring IP20 TERMINAL BLOCK 136 mm DIAMETER

ESTAspring


TECHNICAL DATA	
STANDARDS	IEC 60831-1 + 2, EN 60831- 1 + 2, UL 810 LATEST EDITIONS, UL / ULC - FILE E97723
Overvoltages (in accordance with the above standards)	$U_{cn} + 10\%$ (up to 8 h daily) $U_{cn} + 15\%$ (up to 30 min daily) $U_{cn} + 20\%$ (up to 5 min, only 200 times in the life of the capacitor) $U_{cn} + 30\%$ (up to 1 min, only 200 times in the life of the capacitor) Please also refer to "Terms and Definitions"
Overcurrent (in accordance with the above standards)	$1.3 \times I_n$ $1.43 \times I_n$ with 10 % overvoltages, 10 % 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	$2.15 \times U_{cn}$, VAC, 2 s (routine test)
Test voltage, terminal / casing	4800 VAC, 2 s (routine test)
Inrush current	300 times rated current I_n
Losses	≤ 0.25 W/kvar to 0.45 W/kvar (without discharge resistors)
Statistical life expectancy ⁽¹⁾	> 150 000 operating h (ESTAprop) > 130 000 operating h (ESTAdry)
Degree of protection	ESTAspring IP20 terminal, indoor
Ambient temperature category	-40 / D (max. 55 °C) ESTAprop, -40 / D (max. 55 °C) ESTAdry
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 m 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	Aluminum can
Dielectric	Polypropylene film, self-healing
Filling agent	Natural oil, non-PCB, biodegradable (ESTAprop) or dry / gas - filled (ESTAdry)

Note

⁽¹⁾ Statements about product lifetime are based on calculations and internal testing. They should only be interpreted as estimations. Also due to external factors, the lifetime in the field application may deviate from the calculated lifetime. In general, nothing stated herein shall be construed as a guarantee of quality or durability.