



# POWER CAPACITORS

## Vishay ESTA



Capacitors - Vishay ESTA Power Capacitors

### Vishay ESTA Power Capacitors Solutions



#### VISHAY ESTA

Vishay ESTA is the world's only manufacturer to offer a complete range of power capacitors. These cost-effective devices for harmonic control, energy savings, and voltage stabilization are highly reliable and environmentally safe, and can be used under the most rugged conditions. Vishay ESTA power capacitors address a wide range of energy-generation applications. Their "green" applications include energy generation in on- and off-shore wind turbines and solar power plants.

Vishay ESTA power capacitors are used in energy transmission and distribution in high, medium, and low-voltage networks to improve network quality. Their efficient operation helps promote CO<sub>2</sub> reduction as well as reducing losses in long-distance HVDC transmissions. The power capacitors are also used for RFI filters and voltage and frequency converters in traction and industrial drives.

Vishay ESTA capacitors are manufactured with the highest quality standards and come complete and ready to use for all applications.

#### RESOURCES

- For technical questions contact [esta@vishay.com](mailto:esta@vishay.com)



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**ES COMPONENTS**  
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## Furnace Capacitors

### Applications

- Static power capacitors for inductive heating plant compensation

### Standards

- EN 60110/1 and 2
- IEC 60110/1

### Ranges

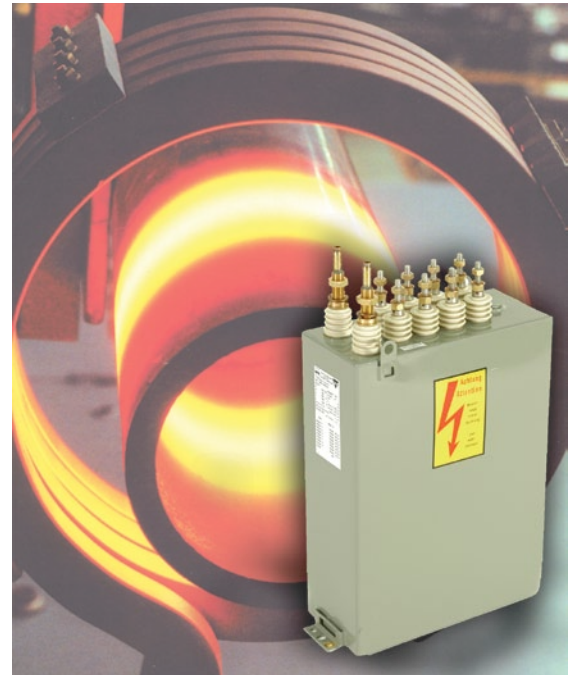
- Mains frequency: 230 V to 3000 V, 50/60 Hz up to 800 kvar per unit
- Medium frequency: 250 V to 4000 V, 150 Hz to 100 000 Hz, up to 10 000 kvar per unit

### Benefits

- Compact construction
- Each product designed to customer specifications
- Can operate in extreme environmental conditions
- Easy to integrate into overall system concepts
- Low inductivity

### Types of Cooling

- Natural cooling
- Forced cooling
- Water cooling



## Power Electronic Capacitors

### Applications

- Static converters for:
  - Heavy-haul locomotives
  - Light local trains
  - Trolley busses
  - Trams/streetcars
  - Industrial converters
- DC supply equipment
- High-voltage testing systems
- Impulse discharge energy

### Standards

- IEC 61071
- IEC 61881
- Customer specifications

### Ranges

- AC up to 24 kV per unit
- DC up to 125 kV and 15 kJ per unit
- Rectangular and tubular designs for casings

### Benefits

- All appropriate capacitor technologies available to ensure optimum suitability to specific applications
- Highest flexibility in mechanical designs, including designs for low quantities



## Low-Voltage Power Capacitors

### Applications

- Individual and group fixed compensation
- Controlled central compensation
- Filter circuits for mains systems with harmonics

### Standards

- EN 60831/1 and 2
- IEC 60831/1 and 2

### Ranges

- 230 V to 1000 V, 50/60 Hz
- 2.5 kvar to 56.2 kvar in cylindrical/triangular aluminum casing; up to 500 kvar in welded rectangular steel casing

### Benefits

- Low loss, self-healing MKP technology
- Compact design
- Excellent heat dissipation
- Biodegradable, vegetable-based, non-PCB, non-toxic filling agent, or dry version available
- Burst-proof as confirmed by independent international inspection centers such as UL/ULC
- Highest overcurrent and inrush current capabilities
- Life expectancy of > 150 000 operating hours with highly consistent capacitance values
- Custom designs available





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## Power Factor Controllers

### Applications

- Manual and automatic control of central power factor correction equipment in low-voltage plants and special types for medium-voltage applications

### Standards

- IEC 60664-1
- IEC/EN 61010-1
- IEC/EN 61326
- CE-Certification

### Ranges

- 6- or 12-step versions
- Operating voltage: 230 or 120 V; 50 or 60 Hz
- Maximum measuring voltage range: 90 to 690 V, stepless

### Benefits

- High contrast backlit display for good reading even in poor lighting conditions
- Over-temperature switch-off (model ESTAmat PFC-N)
- Easy mounting with small flat springs
- Automatic self-setting (model ESTAmat PFC-N)
- 4-quadrant operation means trouble-free service in generator mode
- Optimized switching performance
- Constant display of actual power factor and energized steps
- Display of  $\cos \varphi$ , active, reactive, and apparent power
- Additional step data (model ESTAmat PFC-N)
- Alarm functions





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### High-Voltage Power Capacitors

#### Applications

- Shunt capacitors
- Harmonic filters
- Series capacitors
- Capacitors for SVC (Static Var Compensator)
- AC-capacitors for HVDC transmission
- DC-capacitors for HVDC transmission
- Surge suppressors and RC circuits

#### Standards

- EN 60871
- IEC 60871
- IEC 60143
- Other standards upon request

#### Ranges

- Individual capacitors from 660 V to 24 kV, up to 900 kvar
- Capacitor banks up to 800 kV, any output

#### Benefits

- Voltage and output rating can be matched precisely to customer specifications
- Element fuses or fuseless technologies for high operating reliability
- Flexible plant design with specially designed racks
- Vishay ESTA unbalance protection





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### Unbalance Protection Relays

#### Applications

The microprocessor-based ESTAsym MD and CPR capacitor protection relays use a versatile integrated current measuring multifunction relay design to enable the protection of medium and high voltage capacitor banks. Using FFT techniques, the ESTAsym MD calculates the fundamental and harmonic currents from measured line and unbalance currents, and uses these values to implement individual protection functions.

#### Standards

- EN 50178, Class II
- EN 61010-1
- EN 50081-1
- EN 50082-2
- CE-Certification

#### Ranges

- 100 to 240 VAC, 50/60 Hz or 100 to 375 VDC
- 1 A to 5 A

#### Benefits

The ESTAsym capacitor protection relays are particularly appropriate for capacitor banks connected in double star and bridge circuit configurations.

The following protective functions are provided:

- Capacitor unbalance protection
- In addition for ESTAsym MD:
- Line current unbalance protection
- Overvoltage protection
- Overheating protection
- Ground fault protection
- Overcurrent protection
- Undercurrent protection
- Capacitor bank discharge timer

The ESTAsym MD stores all data, including date and time information, in a report file. The included PC software provides you with convenient access to this data.



**POWER CAPACITORS**

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**PRODUCTS**

Induction Heating Capacitors  
Power Electronic Capacitors  
Low Voltage Capacitors  
Power Factor Controllers  
High Voltage Capacitors

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