High Voltage Power Capacitors Data Book

- Scope
- Standards
- Fields of Application
- General Data
## SEMICONDUCTORS

### MOSFETS SEGMENT
- MOSFETs
  - Low-Voltage TrenchFET® Power MOSFETs
  - Medium-Voltage Power MOSFETs
  - High-Voltage Planar MOSFETs
  - High-Voltage Super Junction MOSFETs
  - Automotive-Grade MOSFETs
- ICs
  - Power Management and Power Control ICs
  - Smart Load Switches
  - Analog Switches and Multiplexers

### DIODES SEGMENT
- Rectifiers
  - Schottky Rectifiers
  - Ultra-Fast Recovery Rectifiers
  - Standard and Fast Recovery Rectifiers
  - High-Power Rectifiers/Diodes
  - Bridge Rectifiers
- Small-Signal Diodes
  - Schottky and Switching Diodes
  - Zener Diodes
  - Tuner/Capacitance Diodes
  - Bandswitching Diodes
  - RF PIN Diodes
- Protection Diodes
  - TVS Diodes or TRANSZORB®
  - (uni-directional, bi-directional)
  - ESD Protection Diodes (including arrays)

## PASSIVE COMPONENTS

### RESISTORS AND INDUCTORS SEGMENT
- Film Resistors
  - Metal Film Resistors
  - Thick Film Resistors
  - Metal Oxide Film Resistors
  - Carbon Film Resistors
- Wirewound Resistors
  - Vitreous, Cemented, and Housed Resistors
  - Braking and Neutral Grounding Resistors
  - Custom Load Banks
- Power Metal Strip® Resistors
- Chip Fuses
- Variable Resistors
  - Cermet Variable Resistors
  - Wirewound Variable Resistors
  - Conductive Plastic Variable Resistors
  - Contactless Potentiometers
- Networks/Arrays
- Non-Linear Resistors
  - NTC Thermistors
  - PTC Thermistors
  - Varistors
- Magnetics
  - Inductors
  - Transformers
  - Coils
  - Connectors

### CAPACITORS SEGMENT
- Tantalum Capacitors
  - Molded Chip Tantalum Capacitors
  - Coated Chip Tantalum Capacitors
  - Solid Through-Hole Tantalum Capacitors
  - Wet Tantalum Capacitors
- Ceramic Capacitors
  - Multilayer Chip Capacitors
  - Disc Capacitors
- Film Capacitors
- Power Capacitors
- Heavy-Current Capacitors
- Aluminum Capacitors
High Voltage Power Capacitors
Vishay ESTA
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# High Voltage Power Capacitors

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</tbody>
</table>
**High Voltage Power Capacitors**

**SCOPE**
Single phase capacitor units from 1 kV up to maximum 24 kV, 50 Hz or 60 Hz, 20 kvar up to maximum 1000 kvar for indoor or outdoor use.
- With dead casing, open terminal IP00 (2 bushings)
- With dead casing, type of enclosure IP55 (2 bushings)
- With live casing, open terminal IP00 (1 bushing)

Three phase capacitor units from 1 kV up to maximum 12 kV, 50 Hz or 60 Hz, 20 kvar up to max. 800 kvar with pressure monitoring device.
- With dead casing (3 bushings), open terminal IP00 (indoor use only)
- With dead casing (3 bushings), protected terminals, type of enclosure IP55 (indoor or outdoor)

**STANDARDS**
- VDE 0560/4 Bestimmungen für Leistungskondensatoren
- IEC 60871 Shunt capacitors for AC power systems
- IEC 60143 Series capacitors for power systems

**QUALITY MANAGEMENT SYSTEM**
ISO 9001, ISO 14001, IRIS

**QUALIFICATIONS**
- EDF (HN 54-S-05)
- CSA std. C22.2 no. 190-M1985

**SAFETY REGULATIONS**
When installing the equipment, relevant IEC or VDE recommendations shall be observed, in particular VDE 0101 and 0111, as well as VDE 0560 part 4 section C.

**FIELDS OF APPLICATION**

**POWER FACTOR CORRECTION**
The active power produced by the active current can alone be turned into an effective use for the consumer; while the reactive power produced by the reactive current does not yield usable power, and consequently, is not registered on the active performance meter. The reactive power has, however, a negative effect on generators, transformers, and conductor lines, while causing voltage drops and financial losses due to additional electric heating.

The reactive power required for the creation of the magnetic field around motors, transformers, and conductor lines continuously oscillates between the current generators and the consumers. A more cost effective way to provide this reactive power is to produce it by placing capacitors close to the consumers of reactive power (motors, transformers), thus relieving the line between generator and consumer of the transport of the reactive current portion. This way, several more current consumers can be connected to an existing supply system without having to extend or amplify that system if the capacitors are suitably positioned.

**INDIVIDUAL POWER FACTOR CORRECTION**
The power factor correction capacitor is connected directly to the terminals of the consumer and will be switched together with it. The advantages of this method are: Relief of the conductor lines and switches, no capacitor switches or discharge resistors are needed, and the installation is simple and cheap. The individual compensation is the best solution for large consumers (e.g. motors), particularly if they are in continuous operation.

**INDIVIDUAL POWER FACTOR CORRECTION OF 3-PHASE MOTORS**
The motor and the capacitor are connected in parallel. They are both switched in and out by means of one and the same switchgear and also monitored by a common protective device. A discharge device is not required, because discharging takes place through the motor windings. The switchgear must be rated to be capable of withstanding the inrush current of the capacitor and the connection lines must be capable of withstanding the full load current of the motor. The capacitor, in this case, has to be installed in close proximity to the motor.

**INDIVIDUAL POWER FACTOR CORRECTION OF POWER TRANSFORMERS**
The direct connection of the capacitor to a power transformer, which is jointly switched in and out, is feasible and permissible both at the H.V. side and the L.V. side. In cases where harmonics exist in the line, the line should be checked to determine whether the capacitors and the power transformer are connected in series and create a resonance. Care should be taken not to overcompensate the power transformer during low load operation in order to avoid an unacceptable rise in voltage.

**INDIVIDUAL POWER FACTOR CORRECTION OF WELDING MACHINES**
The output of capacitors for welding transformers and resistance welding machines only needs to be in the range of 30 % to 50 % of the nominal transformer capacity. For welding rectifiers, a capacitor output of about 10 % of the nominal capacity of the transformer/rectifier is sufficient.

**GROUP POWER FACTOR CORRECTION**
The power factor correction capacitor is connected to the secondary distribution system which feeds a number of individual motors, operating either continuously or at intervals.

The motors and the capacitors are each switched in and out separately and are monitored by separate protective devices. The capacitors can be switched in or out individually or in groups.
CENTRAL POWER FACTOR CORRECTION

In large installations where many individual electrical appliances of various size (motors etc.) operate at different times and for different periods, the power factor correction capacitors are centrally connected to the main bus bar. The capacitors can be switched either manually or, by means of power factor control relays, automatically.

Advantage:
Automatic control and optimal matching of the capacitor output to the specified requirements for reactive power insures that the specified cos phi is maintained in the most cost effective way.

GENERAL DATA

DIELECTRIC

An all film dielectric is used and consists of polypropylene in the form of biaxially oriented film, hazy on both side, and in 2 or 3 layers with a laser cut aluminum foil for the electrodes.

IMPREGNATING AGENT

The capacitors are impregnated with a NON-PCB base fluid.

DIELECTRIC LOSSES AND TOTAL LOSSES

Dielectric losses in new state are approx. 0.1 W/kvar and reduce after 500 h operating to a stable state of approx. 0.02 W/kvar to 0.05 W/kvar (see curve 1 and curve 2).

The dielectric losses, depending on capacitor design, shall be added to the losses caused by:
- Discharge resistors
- Internal connections
- Internal fuses

Total losses will reach values from 0.07 W/kvar to approx. 0.15 W/kvar.

TESTING

Capacitors are tested in accordance with IEC-standard 60871.
Other standards upon request.

CURVE 1

Losses as a function of dielectric temperature

Losses = f (t)

CURVE 2

Losses as a function of dielectric temperature

Losses = f (t)

CURVE 3

Capacitance as a function dielectric temperature

Capacitance = f (T)
TEMPERATURE RANGE
Capacitors are classified in temperature categories, with each category being specified by a number followed by a letter.

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>AMBIENT AIR TEMPERATURE (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAXIMUM</td>
</tr>
<tr>
<td></td>
<td>24 h</td>
</tr>
<tr>
<td>A</td>
<td>40</td>
</tr>
<tr>
<td>B</td>
<td>45</td>
</tr>
<tr>
<td>C</td>
<td>50</td>
</tr>
<tr>
<td>D</td>
<td>55</td>
</tr>
</tbody>
</table>

The number represents the lowest ambient air temperature at which the capacitor may operate. - 50 °C, - 40 °C, - 25 °C, - 15 °C, - 5 °C
The letters represent upper limits of temperature variation ranges, having maximum values specified in above table.

OVERLOADS
a) Maximum permissible voltage (continuous)
Capacitor units shall be suitable for operation at voltage levels according to the following table.
The amplitudes of the over voltages that may be tolerated without significant deterioration of the capacitor depends on the duration, the total number and the capacitor temperature.

b) Maximum permissible current
Capacitor units shall be suitable for continuous operation at an rms current of 1.30 times the current that occurs at rated sinusoidal voltage and rated frequency, excluding transients.

DISCHARGING
Following may be used as discharge device:
- discharge resistors
- discharge coils
- discharge transformers
- windings of motors or transformers
Each capacitor unit shall be provided with means for discharging to 75 V or less in 10 minutes.

CORROSION PROTECTION
Case material:
- stainless steel
Pre-treatment:
- pickling with acid
- washing with water
- alkalinous degreasing
- washing with water
- washing with distilled water
Primer coating:
DEDELAN wash primer, two-component wash primer based on acrylic resin
Top coating:
2C-PUR HIGH-SOLID TOPCOAT low solvent two component topcoat based on acrylic resin
Total thickness:
CORO 1: 75 μm to 85 μm
CORO 2: 115 μm to 130 μm
PROTECTION DEVICES FOR POWER CAPACITORS

Detailed information is provided in IEC 60871-3 “Protection of shunt capacitors and shunt capacitor banks.”

a) INTERNAL FUSES

Detailed information is provided in IEC 60871-4 “Internal fuses.”

Internal fuses are designed to isolate faulty elements in order to allow further operation of the capacitor unit and the bank in which the capacitor is connected.

Complete protection is obtained when using internal fuses together with an unbalance protection device.

b) PRESSURE MONITORING DEVICE

The pressure inside the capacitor casing is monitored by means of an over pressure sensor. In the event that the setting (critical value) is exceeded, a change-over contact initiates disconnection of the capacitor. Such an early disconnection from the source of supply after an internal breakdown can stop gas evolution in the capacitor casing, avoiding the bursting of it.

Complete protection is obtained when using the pressure monitoring device together with H.R.C. fuses.

Important!
If the pressure monitoring device has operated, the capacitor must not be placed back into service, but returned together with the device to our factory for examination.

TECHNICAL DATA

Casing: Polycarbonat
Electrical connection: AMP-plug type lugs 6.35 mm
Contacts: 1 change-over contact 15 A/250 VAC
Insulation test voltage: 1500 V
Setting range: 0.2 bar to 0.9 bar
Standard setting: 0.6 bar to 0.8 bar
Pressure limit: 6.0 bar
Accessory: Rubber protective cap
Temperature range: - 40 °C up to + 85 °C
Dimension: See dimension
Fitting: R 1/4” and mechanical protection
Mounting position: Dependant on design of capacitor
Testing: Functional test and leakage test

EXAMPLES OF MOUNTING
High Voltage Power Capacitors

BUSHINGS
Porcelain bushings for indoor and outdoor use.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>IMPULSE WITHSTAND BIL (kV)</th>
<th>MIN. CREEPAGE (mm)</th>
<th>INSTALLATION</th>
<th>HEIGHT (mm)</th>
<th>THREAD</th>
<th>MAX. TORQUE N/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-197</td>
<td>0</td>
<td>90</td>
<td>Indoor</td>
<td>75</td>
<td>M12</td>
<td>16</td>
</tr>
<tr>
<td>D-199</td>
<td>75</td>
<td>189</td>
<td>Indoor</td>
<td>159</td>
<td>M12</td>
<td>20</td>
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<tr>
<td>D-401</td>
<td>95</td>
<td>317</td>
<td>In/outdoor</td>
<td>240</td>
<td>M16</td>
<td>40</td>
</tr>
<tr>
<td>D-404</td>
<td>125</td>
<td>472</td>
<td>In/outdoor</td>
<td>270</td>
<td>M16</td>
<td>40</td>
</tr>
<tr>
<td>D-406</td>
<td>150</td>
<td>658</td>
<td>In/outdoor</td>
<td>290</td>
<td>M16</td>
<td>40</td>
</tr>
<tr>
<td>D-341</td>
<td>170</td>
<td>810</td>
<td>In/outdoor</td>
<td>415</td>
<td>M16</td>
<td>40</td>
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</table>

DRAWINGS OF BUSHINGS

D-197

D-199

D-401

D-404

D-406

D-341
## High Voltage Power Capacitors

### REQUEST FOR QUOTATION

<table>
<thead>
<tr>
<th>PRODUCT GROUP</th>
<th>CAPACITOR UNIT</th>
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<tr>
<td>Request for quotation</td>
<td></td>
</tr>
<tr>
<td>Reference for inquiry</td>
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<td>Quotation number</td>
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### TECHNICAL SPECIFICATION

<table>
<thead>
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<th>Requested</th>
<th>Offered</th>
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<tbody>
<tr>
<td>Rated voltage (1)</td>
<td>kV</td>
</tr>
<tr>
<td>Frequency (1)</td>
<td>Hz</td>
</tr>
<tr>
<td>Rated output (1)</td>
<td>kvar</td>
</tr>
<tr>
<td>Connection</td>
<td>Single phase/three phase</td>
</tr>
<tr>
<td>Number of bushings (1)</td>
<td>1/2/3</td>
</tr>
<tr>
<td>Installation (1)</td>
<td>Indoor/outdoor</td>
</tr>
<tr>
<td>Capacitance</td>
<td>μF</td>
</tr>
<tr>
<td>Element fuse</td>
<td>Yes/no</td>
</tr>
<tr>
<td>Discharge resistor</td>
<td>Yes/no</td>
</tr>
<tr>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>Temperature class</td>
<td>-....../+.....°C</td>
</tr>
<tr>
<td>Insulation level</td>
<td>kV/kVp</td>
</tr>
<tr>
<td>Enclosure</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>IP...</td>
</tr>
<tr>
<td>Dimension L x W x H</td>
<td>(mm)</td>
</tr>
<tr>
<td>Replacement</td>
<td>Yes/no</td>
</tr>
<tr>
<td>If yes, what to replace</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>L x W x H (mm)</td>
</tr>
<tr>
<td>Pressure monitoring</td>
<td>Yes/no</td>
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</table>

### CONDITIONS

| Quantity | |
| Delivery | (Ex works/FOB/CIF...) |
| Terms of payment | |
| Requested validity | |
| Requested delivery | |

**Note**

(1) No quotation possible without this info
## REQUEST FOR QUOTATION

### PRODUCT GROUP
CAPACITOR BANK

#### Request for quotation

#### Reference for inquiry

#### Quotation number

### TECHNICAL SPECIFICATION

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<td>Rated voltage (1)</td>
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<td>Hz</td>
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<tr>
<td>Rated output (1)</td>
<td>Mvar</td>
<td></td>
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<tr>
<td>Installation (1)</td>
<td>Indoor/outdoor</td>
<td></td>
</tr>
<tr>
<td>Connection (1)</td>
<td>Single phase, star, delta</td>
<td></td>
</tr>
<tr>
<td>Capacitance</td>
<td>μF</td>
<td></td>
</tr>
<tr>
<td>Unbalance protection</td>
<td>Yes/no</td>
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<tr>
<td>Element fuse</td>
<td>Yes/no</td>
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<tr>
<td>Discharge resistor</td>
<td>Yes/no</td>
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<tr>
<td>Temperature class</td>
<td>-....../+......°C</td>
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<tr>
<td>Insulation level</td>
<td>kV/kVp</td>
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<tr>
<td>Replacement</td>
<td>Yes/no</td>
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<tr>
<td>If Yes, what to replace</td>
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### CONDITIONS

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<tr>
<td>Quantity</td>
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<td>Delivery</td>
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<td>Terms of payment</td>
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<tr>
<td>Requested delivery</td>
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</tbody>
</table>

**Note**

(1) No quotation possible without this info
High Voltage Power Capacitors

FORM OF CONSTRUCTION

In the case of single phase capacitor units with dead casings, both polarities are led out through the casing in an insulated condition by means of porcelain bushings (fig. 1).

In the case of single phase capacitor units with one bushing only, the second polarity is connected to the casing (fig. 2).

Three-phase capacitors are provided with three bushings for connection to the phases and have dead casings with grounding connection point (fig. 3). They are connected either in star or in delta.

In cases where protection against an accidental touch is required, the capacitors can be supplied as IP55 version (fig. 4).
### Capacitor - Dimension and Weight

**Three-phase capacitor up to 7.2 kV, 50 Hz, IP00**

<table>
<thead>
<tr>
<th>OUTPUT QN kvar</th>
<th>WEIGHT kg</th>
<th>CASING DIMENSIONS L x I x H</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>21</td>
<td>345 mm x 110 mm x 300 mm</td>
</tr>
<tr>
<td>75</td>
<td>21</td>
<td>345 mm x 110 mm x 300 mm</td>
</tr>
<tr>
<td>100</td>
<td>22</td>
<td>345 mm x 110 mm x 300 mm</td>
</tr>
<tr>
<td>133</td>
<td>24</td>
<td>345 mm x 110 mm x 350 mm</td>
</tr>
<tr>
<td>150</td>
<td>27</td>
<td>345 mm x 110 mm x 410 mm</td>
</tr>
<tr>
<td>167</td>
<td>29</td>
<td>345 mm x 110 mm x 430 mm</td>
</tr>
<tr>
<td>200</td>
<td>32</td>
<td>345 mm x 135 mm x 430 mm</td>
</tr>
<tr>
<td>250</td>
<td>37</td>
<td>345 mm x 135 mm x 500 mm</td>
</tr>
<tr>
<td>300</td>
<td>41</td>
<td>345 mm x 175 mm x 450 mm</td>
</tr>
<tr>
<td>350</td>
<td>47</td>
<td>345 mm x 175 mm x 520 mm</td>
</tr>
<tr>
<td>400</td>
<td>53</td>
<td>345 mm x 175 mm x 600 mm</td>
</tr>
<tr>
<td>450</td>
<td>56</td>
<td>345 mm x 175 mm x 640 mm</td>
</tr>
<tr>
<td>500</td>
<td>62</td>
<td>345 mm x 175 mm x 710 mm</td>
</tr>
<tr>
<td>550</td>
<td>67</td>
<td>345 mm x 175 mm x 770 mm</td>
</tr>
<tr>
<td>600</td>
<td>71</td>
<td>345 mm x 175 mm x 820 mm</td>
</tr>
<tr>
<td>650</td>
<td>78</td>
<td>345 mm x 175 mm x 910 mm</td>
</tr>
<tr>
<td>700</td>
<td>81</td>
<td>345 mm x 175 mm x 950 mm</td>
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<tr>
<td>750</td>
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<td>345 mm x 270 mm x 810 mm</td>
</tr>
<tr>
<td>800</td>
<td>106</td>
<td>345 mm x 270 mm x 850 mm</td>
</tr>
</tbody>
</table>

**Three-phase capacitor up to 12 kV, 50 Hz, IP55**

<table>
<thead>
<tr>
<th>OUTPUT QN kvar</th>
<th>WEIGHT kg</th>
<th>CASING DIMENSIONS L x I x H</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>24</td>
<td>345 mm x 135 mm x 300 mm</td>
</tr>
<tr>
<td>75</td>
<td>24</td>
<td>345 mm x 135 mm x 330 mm</td>
</tr>
<tr>
<td>100</td>
<td>24</td>
<td>345 mm x 135 mm x 360 mm</td>
</tr>
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<td>133</td>
<td>29</td>
<td>345 mm x 135 mm x 390 mm</td>
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<td>150</td>
<td>30</td>
<td>345 mm x 135 mm x 420 mm</td>
</tr>
<tr>
<td>167</td>
<td>29</td>
<td>345 mm x 135 mm x 380 mm</td>
</tr>
<tr>
<td>200</td>
<td>32</td>
<td>345 mm x 135 mm x 430 mm</td>
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<td>37</td>
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<td>300</td>
<td>43</td>
<td>345 mm x 175 mm x 480 mm</td>
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<tr>
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<td>48</td>
<td>345 mm x 175 mm x 540 mm</td>
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<td>400</td>
<td>52</td>
<td>345 mm x 175 mm x 590 mm</td>
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<td>450</td>
<td>57</td>
<td>345 mm x 175 mm x 650 mm</td>
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<tr>
<td>500</td>
<td>61</td>
<td>345 mm x 175 mm x 700 mm</td>
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<tr>
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<td>69</td>
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<tr>
<td>600</td>
<td>74</td>
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<tr>
<td>650</td>
<td>78</td>
<td>345 mm x 175 mm x 920 mm</td>
</tr>
<tr>
<td>700</td>
<td>83</td>
<td>345 mm x 175 mm x 980 mm</td>
</tr>
<tr>
<td>750</td>
<td>105</td>
<td>345 mm x 270 mm x 840 mm</td>
</tr>
<tr>
<td>800</td>
<td>109</td>
<td>345 mm x 270 mm x 880 mm</td>
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<tr>
<td>200</td>
<td>31</td>
<td>345 mm x 110 mm x 490 mm</td>
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<tr>
<td>300</td>
<td>41</td>
<td>345 mm x 175 mm x 550 mm</td>
</tr>
<tr>
<td>400</td>
<td>50</td>
<td>345 mm x 175 mm x 690 mm</td>
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<tr>
<td>500</td>
<td>60</td>
<td>345 mm x 175 mm x 698 mm</td>
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<tr>
<td>600</td>
<td>70</td>
<td>345 mm x 175 mm x 820 mm</td>
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<tr>
<td>700</td>
<td>80</td>
<td>345 mm x 175 mm x 950 mm</td>
</tr>
<tr>
<td>800</td>
<td>90</td>
<td>345 mm x 175 mm x 1090 mm</td>
</tr>
<tr>
<td>900</td>
<td>99</td>
<td>345 mm x 270 mm x 810 mm</td>
</tr>
<tr>
<td>1000</td>
<td>108</td>
<td>345 mm x 270 mm x 950 mm</td>
</tr>
</tbody>
</table>

**Single-phase capacitor up to 7.2 kV, 50 Hz**

<table>
<thead>
<tr>
<th>OUTPUT QN kvar</th>
<th>WEIGHT kg</th>
<th>CASING DIMENSIONS L x I x H</th>
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</thead>
<tbody>
<tr>
<td>50</td>
<td>24</td>
<td>450 mm x 110 mm x 300 mm</td>
</tr>
<tr>
<td>75</td>
<td>25</td>
<td>450 mm x 110 mm x 300 mm</td>
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<tr>
<td>100</td>
<td>27</td>
<td>450 mm x 110 mm x 320 mm</td>
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<tr>
<td>133</td>
<td>30</td>
<td>450 mm x 110 mm x 400 mm</td>
</tr>
<tr>
<td>150</td>
<td>35</td>
<td>450 mm x 110 mm x 430 mm</td>
</tr>
<tr>
<td>167</td>
<td>37</td>
<td>450 mm x 110 mm x 470 mm</td>
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<tr>
<td>200</td>
<td>43</td>
<td>450 mm x 110 mm x 540 mm</td>
</tr>
<tr>
<td>250</td>
<td>49</td>
<td>450 mm x 110 mm x 620 mm</td>
</tr>
<tr>
<td>300</td>
<td>58</td>
<td>450 mm x 110 mm x 750 mm</td>
</tr>
</tbody>
</table>

**Single-phase capacitor up to 12 kV, 50 Hz**

<table>
<thead>
<tr>
<th>OUTPUT QN kvar</th>
<th>WEIGHT kg</th>
<th>CASING DIMENSIONS L x I x H</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>31</td>
<td>345 mm x 175 mm x 325 mm</td>
</tr>
<tr>
<td>300</td>
<td>40</td>
<td>345 mm x 175 mm x 450 mm</td>
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<tr>
<td>400</td>
<td>50</td>
<td>345 mm x 175 mm x 570 mm</td>
</tr>
<tr>
<td>500</td>
<td>60</td>
<td>345 mm x 175 mm x 705 mm</td>
</tr>
<tr>
<td>600</td>
<td>70</td>
<td>345 mm x 175 mm x 830 mm</td>
</tr>
<tr>
<td>700</td>
<td>80</td>
<td>345 mm x 175 mm x 950 mm</td>
</tr>
<tr>
<td>800</td>
<td>90</td>
<td>345 mm x 175 mm x 1090 mm</td>
</tr>
<tr>
<td>900</td>
<td>99</td>
<td>345 mm x 270 mm x 810 mm</td>
</tr>
<tr>
<td>1000</td>
<td>109</td>
<td>345 mm x 270 mm x 895 mm</td>
</tr>
</tbody>
</table>
High Voltage Power Capacitors

TYPICAL ARRANGEMENTS

Type: G00S31
Maximum voltage: 24 kV
Installation: Indoor or outdoor
Connection: Double star with unbalance protection device
Protection level: IP00

Type: G00S12
Voltage: > 24 kV
Installation: Indoor or outdoor
Connection: Double star with unbalance protection device
Protection level: IP00
TYPICAL ARRANGEMENTS

**Type: G00L11**
- Voltage: > 24 kV
- Installation: Indoor or outdoor
- Connection: Double star
- Protection level: IP00

**Type: G00L12**
- Voltage: > 24 kV
- Installation: Indoor or outdoor
- Connection: Double star
- Protection level: IP00
TYPICAL ARRANGEMENTS

Type: H55S31-3/D/K1PG68
Maximum voltage: 7.2 kV
Installation: indoor or outdoor
Connection: star or delta with pressure monitoring device
Protection level: IP55

Type: H55S31-3/D/G1PG68
Maximum voltage: 12 kV
Installation: indoor or outdoor
Connection: star or delta with pressure monitoring device
Protection level: IP55

Type: H55S31-6/U/G1PG68
Maximum voltage: 12 kV
Installation: indoor or outdoor
Connection: double star with unbalance protection device
Protection level: IP55

Type: S43S31
Maximum voltage: 12 kV
Installation: indoor only
Protection level: IP43
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VISHAY AMERICAS
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UNITED STATES
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FAX: +1-704-663-1870

ASIA
SINGAPORE
VISHAY INTERTECHNOLOGY ASIA PTE LTD.
37A TAMPINES STREET 92 #07-00
SINGAPORE 528886
PH: +65-6788-6668
FAX: +65-6788-0988

P.R. CHINA
VISHAY CHINA CO., LTD.
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SHANGHAI 200030
P.R. CHINA
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JAPAN
VISHAY JAPAN CO., LTD.
SHIBUYA PRESTIGE BLDG. 4F
3-12-22, SHIBUYA
SHIBUYA-KU
TOKYO 150-0002
JAPAN
PH: +81-3-5466-7150
FAX: +81-3-5466-7160

EUROPE
GERMANY
VISHAY ELECTRONIC GMBH
ESTA CAPACITORS DIVISION
HOFMARK-AICH-STRASSE 36
84030 LANDSHUT
GERMANY
PH: +49-871-86-0
FAX: +49-871-86-25-06

FRANCE
VISHAY S.A.
199, BLVD DE LA MADELEINE
06003 NICE, CEDEX 1
FRANCE
PH: +33-4-9337-2727
FAX: +33-4-9337-2726

UNITED KINGDOM
VISHAY LTD.
SUITE 6C, TOWER HOUSE
ST. CATHERINE’S COURT
SUUNDERLAND ENTERPRISE PARK
SUUNDERLAND SR5 3XJ
UNITED KINGDOM
PH: +44-191-516-8584
FAX: +44-191-549-9556

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