

## ESTAdry D-Type, LVAC Power Capacitors



### FEATURES

- Self-healing technology
- Over pressure tear-off fuse
- Smallest available height for 50 kvar units: 210 mm (+ 68 mm for terminals)
- Excellent heat dissipation
- Screw-on terminal with M10 bolts
- Resin filling provides thermal conductivity similar to that of oil-filled capacitors
- Aluminum case is welded and hermetically sealed
- No paint required for OUTDOOR applications
- UL and cUL approved

### APPLICATIONS

- Areas with dust and moisture, which require a high degree of protection and high creepage distances. Also for OUTDOOR applications
- Pole-mounted PFC
- Industrial: power factor correction (fixed and automatic central PFC), harmonic filtering, industrial converter, thermal power station, solar, wind, UPS

### DESIGN SUPPORT TOOLS AVAILABLE



| QUICK REFERENCE DATA  |  |   |
|-----------------------|--|---|
| Series                | PhMKDg..., triangular  | PhMKDgF..., triangular  |
| Description           | ESTAdry D-type, LVAC power capacitors - dry - <b>INDOOR</b> , IP00 | ESTAdry D-type, LVAC power capacitors - dry - <b>OUTDOOR</b> , IP00 |
| Type                  | Capacitors, fixed, low voltage                                     | Capacitors, fixed, low voltage                                      |
| Technology            | MKP, metallized polypropylene film                                 | MKP, metallized polypropylene film                                  |
| Voltage max. (V)      | 1000   | 1000  |
| Capacitance min. (µF) | 3-phase D: 3 x 115.5, 3-phase Y: 3 x 140.1                         | 3-phase D: 3 x 115.5, 3-phase Y: 3 x 140.1                          |
| Capacitance max. (µF) | 3-phase D: 3 x 331.6, 3-phase Y: 3 x 334.3                         | 3-phase D: 3 x 331.6, 3-phase Y: 3 x 334.3                          |
| Output min. (kvar)    | 30   | 30  |
| Output max. (kvar)    | 56.2   | 56.2  |



## CAPACITORS IN TRIANGULAR CASING DESCRIPTION

The PhMKDg series capacitor in a triangular aluminum case with a standard rating of 50 kvar, augments Vishay ESTA broad line of reliable three-phase power capacitors. The PhMKDg series is preceded by our PhMKP and the ESTAdry PhMKPg series in aluminum tubular casings, with outputs up to 37 kvar, depending on their rated voltage.

The standard PhMKDg series capacitor is designed for indoor application, with externally arranged discharge resistors ( $U \leq 50 \text{ V}/60 \text{ s}$ ). For outdoor application, the discharge resistors can be incorporated internally ( $U \leq 75 \text{ V}/180 \text{ s}$ ). Also, the pure aluminum welded cases render these capacitors perfectly suitable for outdoor use.

The PhMKDg capacitor can be used for both controlled equipment and for stationary or mobile fixed compensation, e.g. for induction-motor-operated conveyor belts in the mining industry.

The indoor capacitor can be supplied with the option of a small protective cover for each individual connection or with an IP53-type overall protective cover.

The triangular case and corresponding triangular arrangement of the winding elements allows for simple connection in parallel of several units (IN-LINE). The joint insulation created by means of a solid ceramic terminal base with high surface-creepage resistance and very long tracking paths establishes an additionally superior mechanical stability for the three solid connector bolts.

With a resin filled pure aluminum case offering superior mechanical stability, low profile design, excellent thermal conductance, easy paralleling and a complete three-phase tear-off fuse system incorporated into the PhMKDg design, this series is the ideal first choice for new designs and applicable retrofit requirements.

## 3-PHASE CAPACITOR, INDOOR



Single bolt protection



IP53

## 3-PHASE CAPACITOR, OUTDOOR



**ESTAdry D-TYPE PhMKDg, INDOOR**

| <b>TECHNICAL DATA</b>                                    |   |
|--|---|
| <b>STANDARDS</b>   | <b>IEC 60831-1 + 2, EN 60831-1 + 2, UL810 LATEST EDITION<br/>UL / ULC FILE # E97723</b>   |
| Overvoltages<br>(in accordance with the above standards) | U <sub>cn</sub> + 10 % (up to 8 h daily)<br>U <sub>cn</sub> + 15 % (up to 30 min daily)<br>U <sub>cn</sub> + 20 % (up to 5 min, only 200 times in the life of the capacitor)<br>U <sub>cn</sub> + 30 % (up to 1 min, only 200 times in the life of the capacitor)<br><b>Please also refer to "Terms and Definitions".</b> |
| Overcurrent<br>(in accordance with the above standards)  | 1.3 x I <sub>n</sub> ,<br>1.43 x I <sub>n</sub> with 10 % overvoltages, 10 % over capacitance and harmonics included,<br>continuous operation<br><b>Please also refer to "Terms and Definitions".</b>   |
| Tolerance on capacitance                                 | - 5 % / + 10 % in accordance with the standards<br>± 5 % as Vishay ESTA standard  |
| Test voltage, terminal / terminal                        | 2.15 x U <sub>cn</sub> , VAC, 2 s (routine test)  |
| Test voltage, terminal / casing                          | 6000 VAC, 2 s (routine test)  |
| Inrush current   | 300 times rated current I <sub>n</sub>  |
| Losses   | ≤ 0.4 W/kvar to 0.5 W/kvar (without discharge resistors)  |
| Statistical life expectancy <sup>(2)</sup>               | > 130 000 operating h (ESTAdry)   |
| Degree of protection                                     | IP00 (terminal cover for higher protection class upon request), indoor  |
| Ambient temperature category                             | -25 / D (max. 55 °C), (-40 / D on request)  |
| 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, welded top  |
| Dielectric   | Polypropylene film, self-healing  |
| Filling agent  | Resin-filled (ESTAdry), non-PCB, non-toxic  |
| Terminals  | Threaded studs M10  |

**3-PHASE CAPACITORS IN TRIANGULAR CASING, INDOOR**

| TYPE                | ARTICLE NO. <sup>(1)</sup> | RATED VOLTAGE<br>V | RATED OUTPUT<br>kvar | CAPACITANCE<br>µF | CURRENT<br>A<br>(50 Hz) | WEIGHT<br>kg | HEIGHT<br>H<br>mm |
|---------------------|----------------------------|--------------------|----------------------|-------------------|-------------------------|--------------|-------------------|
| PhMKDg400.3.50,00-K | 5345-44814-xx              | 400                | 50                   | 3 x 331.6 Δ       | 72.2                    | 4.0          | 210               |
| PhMKDg440.3.50,00-K | 5345-44804-xx              | 440                | 50                   | 3 x 274.0 Δ       | 65.6                    | 4.0          | 210               |
| PhMKDg440.3.56,20-K | 5345-44805-xx              | 440 / 415          | 56.2 / 50            | 3 x 308.0 Δ       | 73.7 / 69.6             | 4.0          | 210               |
| PhMKDg460.3.50,00-K | 5345-44803-xx              | 460                | 50                   | 3 x 250.7 Δ       | 62.8                    | 4.0          | 210               |
| PhMKDg525.3.50,00-K | 5345-44824-xx              | 525                | 50                   | 3 x 192.5 Δ       | 55.0                    | 4.0          | 210               |
| PhMKDg690.2.50,00-K | 5345-44807-xx              | 690                | 50                   | 3 x 334.3 Y       | 41.8                    | 4.0          | 210               |
| PhMKDg760.2.50,00-K | 5345-44808-xx              | 760                | 50                   | 3 x 275.5 Y       | 38.0                    | 4.0          | 210               |

**ORDERING INFORMATION**

|               |                    |
|---------------|--------------------|
| Packing units | 1 piece per carton |
|---------------|--------------------|

**Notes**

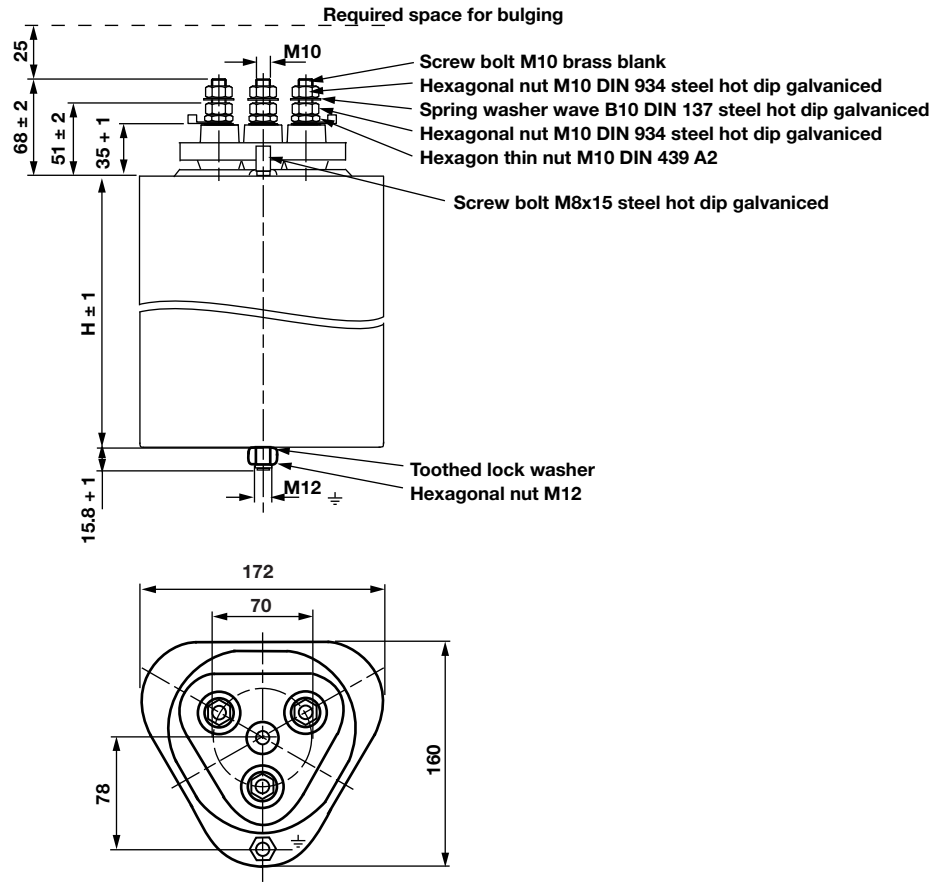
- Other voltage ratings, outputs, and frequencies on request.

<sup>(1)</sup> Version no. xx may differ as it respects small changes, e.g. on the label

<sup>(2)</sup> 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.

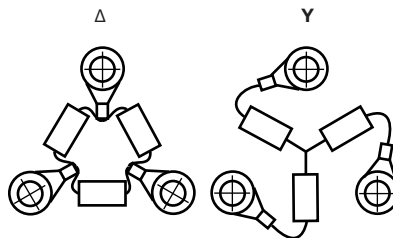


## DIMENSIONS, INDOOR



Drawing 6

## DISCHARGE RESISTORS



| RECOMMENDED TORQUES                    |                    |
|--|--------------------|
| STYLE                                  | RECOMMENDED TORQUE |
| Terminals M8                           | 6 Nm               |
| Terminals M10 (new K-type PhMKDg...-K) | 20 Nm              |
| M12 mounting stud                      | 10 Nm              |

**ESTAdry D-TYPE PhMKDgF, LVAC POWER CAPACITORS, OUTDOOR**

| <b>TECHNICAL DATA</b>                                    |   |
|--|---|
| <b>STANDARDS</b>   | <b>IEC 60831-1 + 2, EN 60831-1 + 2, LATEST EDITION</b>  |
| Overvoltages<br>(in accordance with the above standards) | U <sub>cn</sub> + 10 % (up to 8 h daily)<br>U <sub>cn</sub> + 15 % (up to 30 min daily)<br>U <sub>cn</sub> + 20 % (up to 5 min, only 200 times in the life of the capacitor)<br>U <sub>cn</sub> + 30 % (up to 1 min, only 200 times in the life of the capacitor)<br><b>Please also refer to "Terms and Definitions".</b> |
| Overcurrent<br>(in accordance with the above standards)  | 1.3 x I <sub>n</sub> ,<br>1.43 x I <sub>n</sub> with 10 % overvoltages, 10 % over capacitance and harmonics included, continuous operation<br><b>Please also refer to "Terms and Definitions".</b>  |
| Tolerance on capacitance                                 | - 5 % / + 10 % in accordance with the standards<br>± 5 % as Vishay ESTA standard  |
| Test voltage, terminal / terminal                        | 2.15 x U <sub>cn</sub> , VAC, 2 s (routine test)  |
| Test voltage, terminal / casing                          | 6000 VAC, 2 s (routine test)  |
| Inrush current   | 300 times rated current I <sub>n</sub>  |
| Losses   | ≤ 0.4 W/kvar to 0.5 W/kvar (without discharge resistors)  |
| Statistical life expectancy <sup>(1)</sup>               | > 130 000 operating h (ESTAdry)   |
| Degree of protection                                     | IP00 outdoor  |
| Ambient temperature category                             | -25 / D (max. 55 °C), (-40 / D on request)  |
| 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, welded top  |
| Dielectric   | Polypropylene film, self-healing  |
| Filling agent  | Resin-filled (ESTAdry), non-PCB, non-toxic  |
| Terminals  | Threaded studs M10  |

Available types same as for indoor use, different type designation "F".

For example:

| TYPE            | RATED VOLTAGE<br>V | RATED OUTPUT<br>kvar | CAPACITANCE<br>µF | CURRENT<br>A<br>(50 Hz) | WEIGHT<br>kg | HEIGHT<br>H<br>mm |
|-----------------|--------------------|----------------------|-------------------|-------------------------|--------------|-------------------|
| PhMKDgF460.3.50 | 460                | 50                   | 3 x 250.7 Δ       | 62.8                    | 4.0          | 210               |

| <b>ORDERING INFORMATION</b> |                    |
|-----------------------------|--------------------|
| Packing units               | 1 piece per carton |

| <b>RECOMMENDED TORQUES</b> |                    |
|----------------------------|--------------------|
| STYLE                      | RECOMMENDED TORQUE |
| Terminals M8               | 6 Nm               |
| Terminals M10              | 10 Nm              |
| M12 mounting stud          | 10 Nm              |

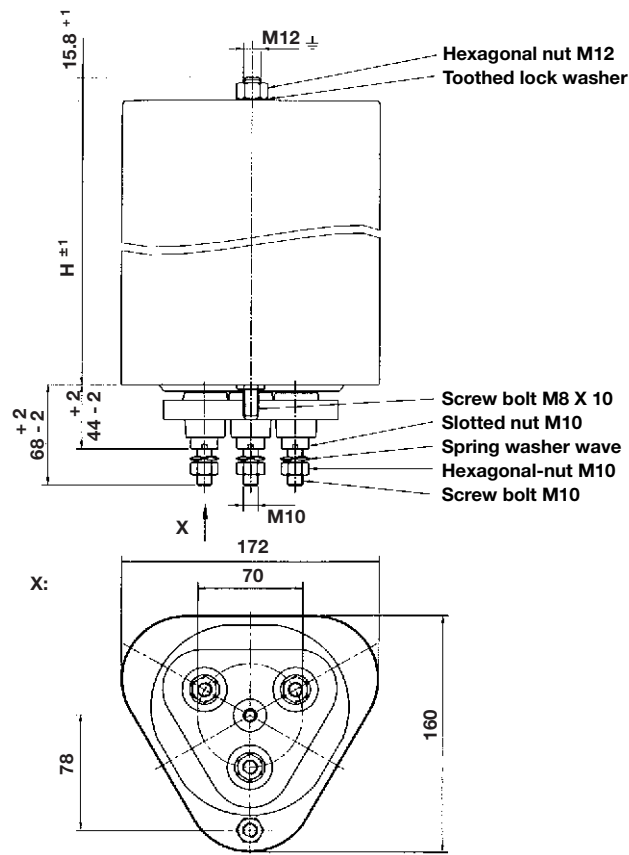
**Notes**

- Other voltage ratings, output, and frequencies upon request

<sup>(1)</sup> 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

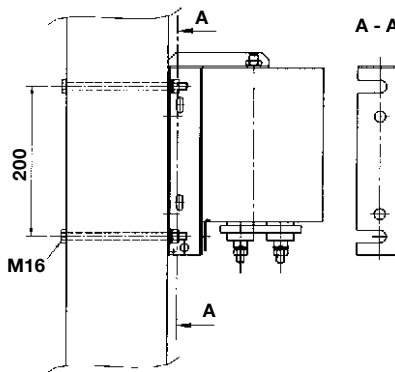


## DIMENSIONS, OUTDOOR



Drawing 7

## ACCESSORIES: SUPPORT FOR POLE AND WALL MOUNTING





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