



## Film Capacitors – Power Factor Correction

### PhaseCap Energy Capacitors - Gas-filled

**Series/Type:** MKK  
**Ordering code:** B25674A\*  
Date: December 2016  
Version: 2

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### Construction

- Dielectric: Polypropylene film
- Gas-impregnated, dry type, Non-PCB
- Wave cut
- Extruded round aluminum can with stud
- Provided with ceramic discharge module or discharge module block
- Over pressure disconnecter for **all 3** phases

### Features

- Three-phase, delta connected
- Self-healing technology
- Naturally air cooled (or forced air cooling)
- Indoor mounting

### Typical applications

- For Power Factor Correction

### Terminals

- Optimized capacitor safety terminals

### Mounting

- Threaded stud at bottom of can  
(max. torque for M12 = 10 Nm)



### Technical data and specifications

| Characteristics         | B25674A*   |       |
|-------------------------|--|-------|
| Rated capacitance $C_R$ | See table in page 7 to 10                              |       |
| Tolerance               | -5 / +5%   |       |
| Connection              | D (Delta)  |       |
| Rated voltage $V_R$     | Up to 690 V RMS (Details as per table in page 7 to 10) |       |
| Rated frequency $f_R$   | 50 Hz  | 60 Hz |
| Output                  | Up to 33.1 kvar (Details as per table in page 7 to 10) |       |
| Rated current $I_R$     | As per table in page 7 to 10                           |       |
| Dimensions (d x h)      | As per table in page 7 to 10                           |       |
| Weight (approx.)        | As per table in page 7 to 10                           |       |

| <b>Maximum ratings</b>                                    |   |
|---|---|
| Maximum permissible voltage ( $V_{max}$ )                 | $V_R + 10\%$ (up to 8 h daily)<br>$V_R + 15\%$ (up to 30 min. daily)<br>$V_R + 20\%$ (up to 5 min. daily)<br>$V_R + 30\%$ (up to 1 min. daily)  |
| Maximum permissible current ( $I_{max}$ )                 | Up to $1.6 \dots 2.0 \cdot I_R$ (A) (including combined effects of harmonics, overvoltages and capacitance tolerance) depending on the individual type  |
| Maximum inrush current ( $I_S$ )                          | $\leq 500 \cdot I_R$ (A) depending on the individual type<br>Max. 15000 switching's per year  |
| <b>Test data</b>  |   |
| Voltage test between terminals ( $V_{TT}$ )               | $2.15 \cdot V_R$ V AC / 50 Hz, 2s   |
| Voltage test between terminals and container ( $V_{TC}$ ) | 3600 V AC / 50 Hz, 2 s up to $V_R = 525$ V AC<br>6000 V AC / 50 Hz, 2 s above $V_R = 525$ V AC  |
| <b>Design data</b>  |   |
| Dielectric losses   | 0.2 W / kvar  |
| * Total losses  | 0.45 W / kvar   |
| Impregnation  | Non PCB, dry, inert gas   |
| * Without discharge resistor                              |   |
| <b>Climatic category</b>                                  |   |
| $\ominus$ Minimum   | -40 °C  |
| $\ominus$ Maximum   | +60 °C  |
| Ambient temperature                                       | Class -40/60: Max. short time: +60 °C max. mean 24 h: 45 °C; max mean 1 year: +35 °C; lowest temperature: -40 °C  |
| Storage temperature                                       | -40 °C .... +85 °C  |
| $\Theta_{Hotspot}$ max.                                   | +85 °C  |
| Humidity  | Average relative < 95%  |
| <b>Mean life expectancy</b>                               |   |
| $t_{LD}$  | Up to 180 000 hours (temperature class -40/D) ;<br>Up to 160 000 hours (temperature class -40/60) ;<br>$\Theta_{HS} \leq 70$ °C (Max. mean ambient temperature per year = +35 °C )<br>Failure rate < 3% |

**Terminals**

|                          |  |  |
|--------------------------|--|--|
| Protection degree        | Isolated terminals, IP20, indoor mounting (optionally with terminal cap for IP54), VDE 0106 part 100 |  |
| Terminal type            | Terminal type A & C  | Terminal type B & D                        |
| Max. torque              | 1.2 Nm   | 2.0 Nm                                     |
| Terminal cross section   | 16 mm <sup>2</sup> (without cable and lug)   | 25 mm <sup>2</sup> (without cable and lug) |
| Maximum terminal current | 50 A   | 80 A                                       |
| Creepage distance (min)  | 12.7 mm  |  |
| Clearance (min)          | 9.6 mm   |  |





**Mounting**

|                           |  |
|---------------------------|--|
| Fixing                    | Threaded bolt M12  |
| Max. torque (Al can stud) | 10 Nm  |
| Mounting position         | Upright/horizontal<br>See "Maintenance and Installation Manual" for further details. |
| Maximum altitude          | 4000 m   |

**Safety**

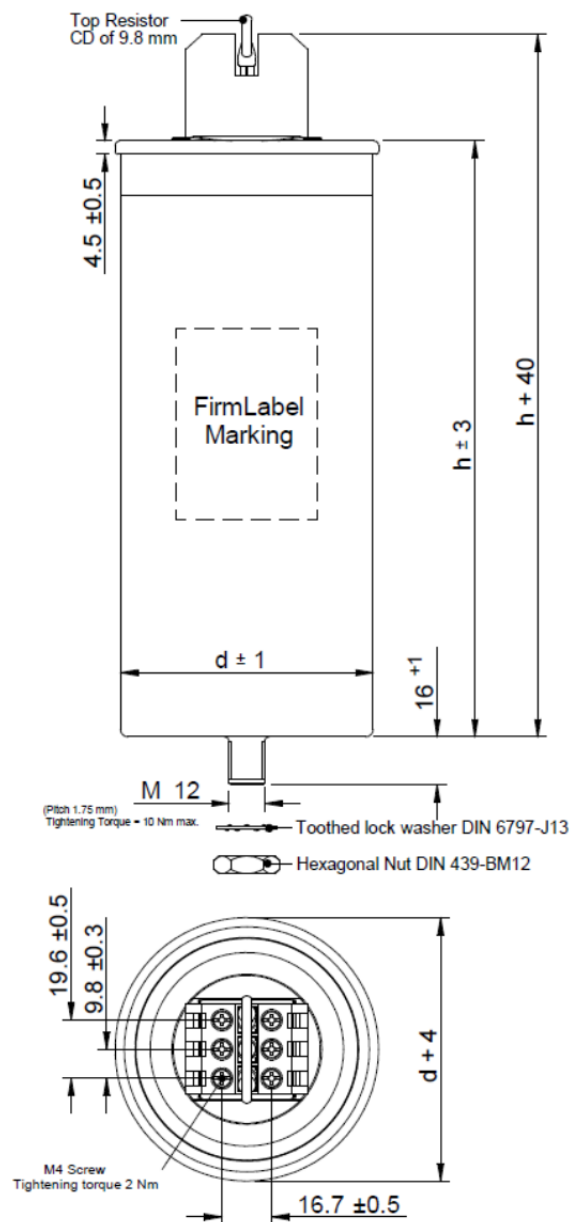
|                            |                           |
|----------------------------|---------------------------|
| Mechanical safety          | Overpressure disconnecter |
| Max. short circuit current | (AFC: 10 kA)              |
| Discharge resistor time    | ≤ 60 s to 50 V or less    |

**Approvals/Reference standards**

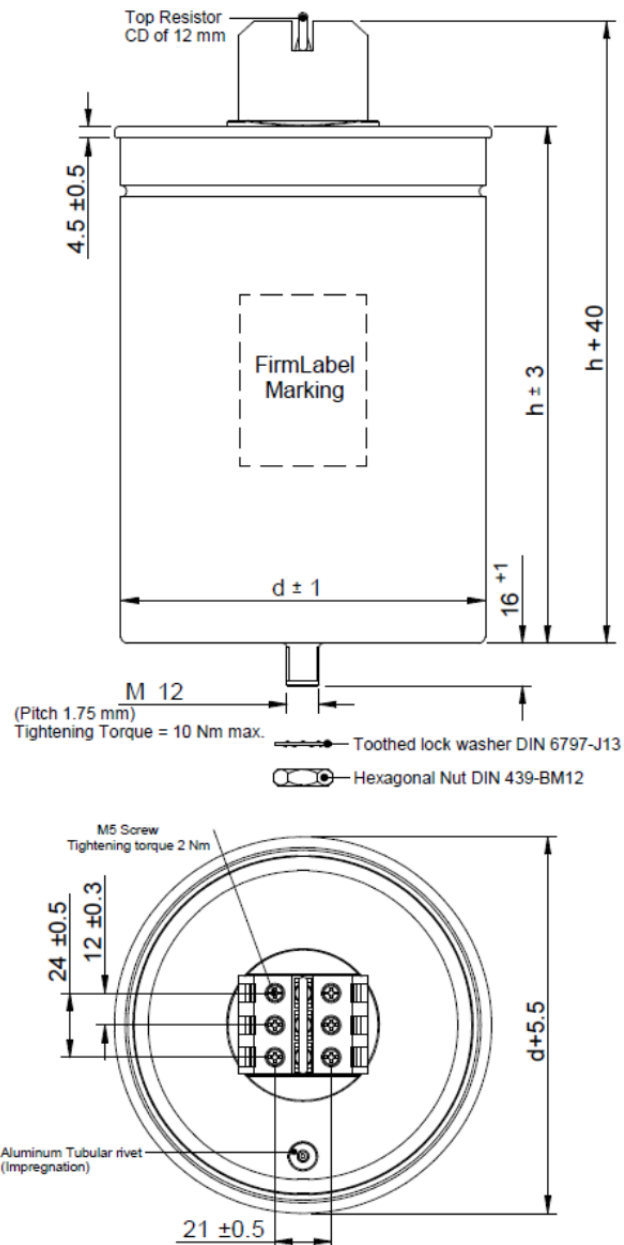
| Approval mark   | Standard of reference            | Certificate                    |
|---|----------------------------------|--------------------------------|
|                                | IEC 60831–1/2 Edition 3.0 (2014) | -                              |
|                                | UL 810-5th edition               | Available from 230 to 660 V AC |
| IS: 13340<br><br>CM/L: AAAAAAA | IS 13340–1/2 (1993, 2012)        | -                              |
|                                | IEC 60831–1/2 Edition 3.0 (2014) | In process                     |

Dimensional drawings

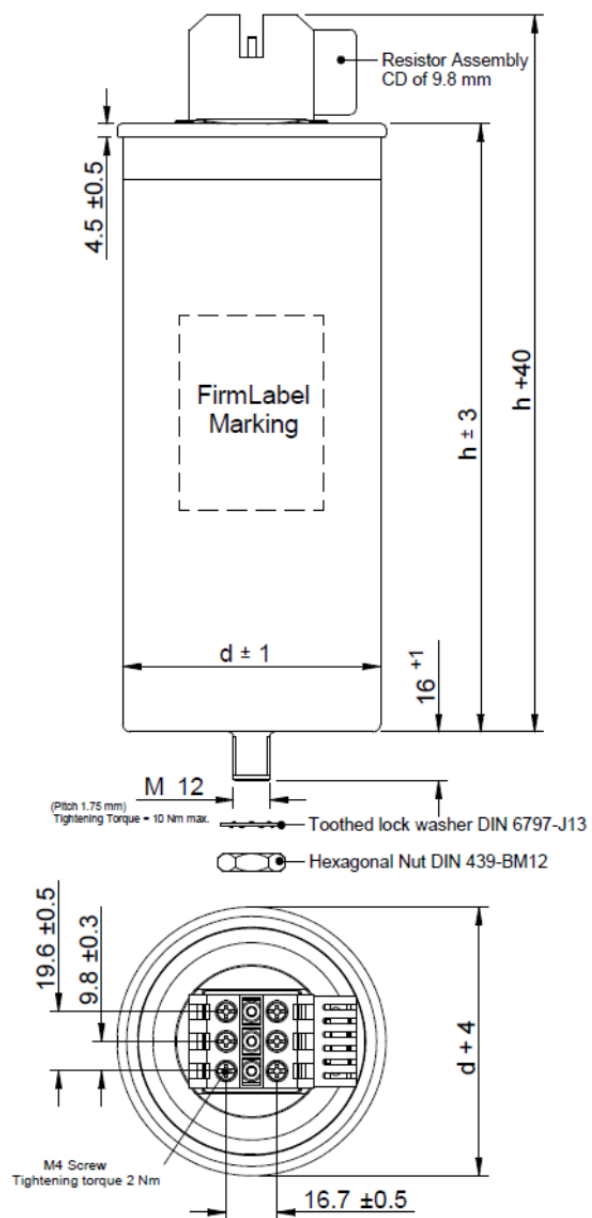
Terminal type A



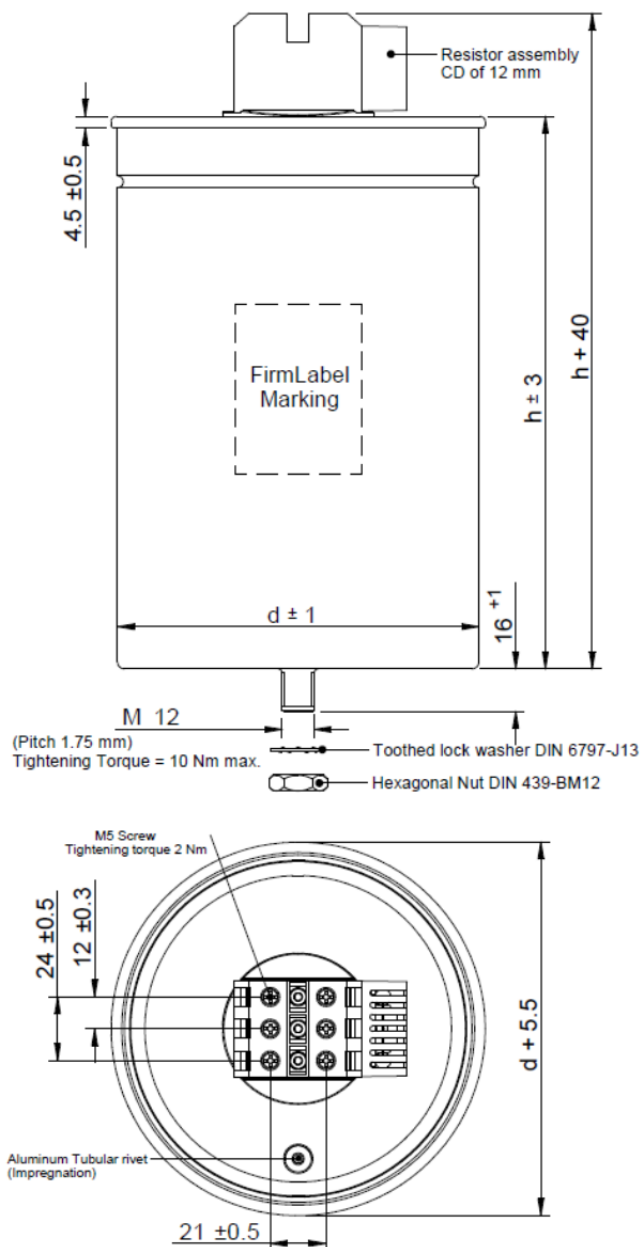
Terminal type B






Terminal type C



Terminal type D



**Label design**

|  |                   |   |             |
|--|-------------------|---|-------------|
| <br><b>EPCOS</b><br>Power Quality Solutions |                   | <b>PhaseCap<sup>®</sup></b><br><b>Energy</b>  |             |
|  |                   | <b>MKK440-D-25.0-03</b><br><b>B25674A4252J040</b>                                   |             |
| $C_N = 3 \times 137$   | $\mu\text{F}$     | $-5/+5 \%$  | $\Delta$ SH |
| $U_N$  | $Q_N/50\text{Hz}$ | $Q_N/60\text{Hz}$   |             |
| 440 V  | 25.0 kvar         | 30.0 kvar   |             |
| 415 V  | 22.2 kvar         | 26.7 kvar   |             |
| 400 V  | 20.7 kvar         | 24.8 kvar   |             |
| $U_i = 3/8\text{kV}$   | -40/60            |   |             |
| Overpressure disconnecter  |                   | Dry, Inert Gas  |             |
| IEC 60831 - 1/2 (2014)   |                   |   |             |
| AFC 10kA   | -40...+60°C       |   |             |
| Internally protected   |                   |  |             |
| CSA C22.2 No. 190  |                   | CSA Temp Amb 46°C   |             |
| Made by EPCOS  |                   | 11.16 N   |             |
| <b>Discharge Capacitor Before Handling.</b>  |                   |   |             |

**Ordering codes**

| Ordering code                                   | Series/type      | Rated capacitance<br>$C_R$<br>$\mu\text{F}$ | Rated voltage<br>$V_R$<br>V | Output & Rated current at 50 Hz, $I_R$ |      | Output & Rated current at 60 Hz, $I_R$ |      | Dimensions (d x h)<br>mm | Weight approx.<br>kg | Terminal type | PU*<br>pcs |
|---|------------------|---|-----------------------------|--|------|--|------|--------------------------|----------------------|---------------|------------|
|   |                  |   |                             | kvar                                   | A    | kvar                                   | A    |                          |                      |               |            |
| <b>Rated voltage 230 V AC, delta connection</b> |                  |   |                             |  |      |  |      |                          |                      |               |            |
| B25674A2052J030                                 | MKK230-D-5.0-03  | 3x 100.3                                    | 230                         | 5.0                                    | 12.6 | 6.0                                    | 15.1 | 75 x 218                 | 0.9                  | A             | 9          |
| B25674A2072J530                                 | MKK230-D-7.5-03  | 3x 150.4                                    | 230                         | 7.5                                    | 18.8 | 9.0                                    | 22.6 | 100 x 192                | 1.4                  | B             | 6          |
| B25674A2102J030                                 | MKK230-D-10.0-03 | 3x 200.5                                    | 230                         | 10.0                                   | 25.1 | 12.0                                   | 30.1 | 100 x 224                | 1.7                  | B             | 4          |
| B25674A2122J530                                 | MKK230-D-12.5-03 | 3x 250.7                                    | 230                         | 12.5                                   | 31.4 | 15.0                                   | 37.7 | 116 x 207                | 2.1                  | B             | 4          |
| B25674A2152J030                                 | MKK230-D-15.0-03 | 3x 300.8                                    | 230                         | 15.0                                   | 37.7 | -                                      | -    | 125 x 207                | 2.4                  | B             | 4          |
| <b>Rated voltage 400 V AC, delta connection</b> |                  |   |                             |  |      |  |      |                          |                      |               |            |
| B25674A4052J000                                 | MKK400-D-5.0-03  | 3x 33.2                                     | 400                         | 5.0                                    | 7.2  | 6.0                                    | 8.7  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4062J300                                 | MKK400-D-6.3-03  | 3x 41.8                                     | 400                         | 6.3                                    | 9.1  | 7.6                                    | 11.0 | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4072J500                                 | MKK400-D-7.5-03  | 3x 49.7                                     | 400                         | 7.5                                    | 10.8 | 9.0                                    | 13.0 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4082J300                                 | MKK400-D-8.3-03  | 3x 55.0                                     | 400                         | 8.3                                    | 12.0 | 10.0                                   | 14.4 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4102J400                                 | MKK400-D-10.4-03 | 3x 69.0                                     | 400                         | 10.4                                   | 15.0 | 12.5                                   | 18.0 | 75 x 218                 | 0.9                  | A             | 9          |
| B25674A4122J500                                 | MKK400-D-12.5-03 | 3x 82.9                                     | 400                         | 12.5                                   | 18.0 | 15.0                                   | 21.7 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4152J000                                 | MKK400-D-15.0-03 | 3x 99.5                                     | 400                         | 15.0                                   | 21.7 | 18.0                                   | 26.0 | 85 x 218                 | 1.2                  | A             | 4          |
| B25674A4162J700                                 | MKK400-D-16.7-03 | 3x 110.7                                    | 400                         | 16.7                                   | 24.1 | 20.0                                   | 28.9 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4202J000                                 | MKK400-D-20.0-03 | 3x 132.6                                    | 400                         | 20.0                                   | 28.9 | 24.0                                   | 34.6 | 100 x 224                | 1.7                  | B             | 4          |
| B25674A4252J000                                 | MKK400-D-25.0-03 | 3x 165.8                                    | 400                         | 25.0                                   | 36.1 | 30.0                                   | 43.3 | 116 x 192                | 1.9                  | B             | 4          |
| B25674A4282J100                                 | MKK400-D-28.1-03 | 3x 186.3                                    | 400                         | 28.1                                   | 40.6 | -                                      | -    | 125 x 192                | 2.3                  | B             | 4          |
| B25674A4302J000                                 | MKK400-D-30.0-03 | 3x 198.9                                    | 400                         | 30.0                                   | 43.3 | -                                      | -    | 116 x 224                | 2.3                  | B             | 4          |
| B25674A4332J000                                 | MKK400-D-33.0-03 | 3x 218.8                                    | 400                         | 33.0                                   | 47.6 | -                                      | -    | 125 x 207                | 2.4                  | B             | 4          |
| <b>Rated voltage 415 V AC, delta connection</b> |                  |   |                             |  |      |  |      |                          |                      |               |            |
| B25674A4052J015                                 | MKK415-D-5.0-03  | 3x 30.8                                     | 415                         | 5.0                                    | 7.0  | 6.0                                    | 8.3  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4062J315                                 | MKK415-D-6.3-03  | 3x 38.8                                     | 415                         | 6.3                                    | 8.8  | 7.6                                    | 10.6 | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4072J515                                 | MKK415-D-7.5-03  | 3x 46.2                                     | 415                         | 7.5                                    | 10.4 | 9.0                                    | 12.5 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4082J315                                 | MKK415-D-8.3-03  | 3x 51.1                                     | 415                         | 8.3                                    | 11.5 | 10.0                                   | 13.9 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4102J415                                 | MKK415-D-10.4-03 | 3x 64.1                                     | 415                         | 10.4                                   | 14.5 | 12.5                                   | 17.4 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4122J515                                 | MKK415-D-12.5-03 | 3x 77.0                                     | 415                         | 12.5                                   | 17.4 | 15.0                                   | 20.9 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4152J015                                 | MKK415-D-15.0-03 | 3x 92.4                                     | 415                         | 15.0                                   | 20.9 | 18.0                                   | 25.0 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4162J715                                 | MKK415-D-16.7-03 | 3x 102.9                                    | 415                         | 16.7                                   | 23.2 | 20.0                                   | 27.8 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4202J015                                 | MKK415-D-20.0-03 | 3x 123.2                                    | 415                         | 20.0                                   | 27.8 | 24.0                                   | 33.4 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4252J015                                 | MKK415-D-25.0-03 | 3x 154.0                                    | 415                         | 25.0                                   | 34.8 | 30.0                                   | 41.7 | 116 x 192                | 1.9                  | B             | 4          |
| B25674A4282J115                                 | MKK415-D-28.1-03 | 3x 173.1                                    | 415                         | 28.1                                   | 39.1 | -                                      | -    | 116 x 207                | 2.1                  | B             | 4          |
| B25674A4302J015                                 | MKK415-D-30.0-03 | 3x 184.8                                    | 415                         | 30.0                                   | 41.7 | -                                      | -    | 116 x 207                | 2.1                  | B             | 4          |
| B25674A4332J015                                 | MKK415-D-33.0-03 | 3x 203.3                                    | 415                         | 33.0                                   | 45.9 | -                                      | -    | 116 x 224                | 2.3                  | B             | 4          |

\* Packing units for capacitors equal minimum order quantity. Orders will be rounded up to packing unit or multiple thereof.



| Ordering code                                   | Series/type      | Rated capacitance<br>C <sub>R</sub><br>µF | Rated voltage<br>V <sub>R</sub><br>V | Output & Rated current at 50 Hz, I <sub>R</sub> |      | Output & Rated current at 60 Hz, I <sub>R</sub> |      | Dimensions (d x h)<br>mm | Weight approx.<br>kg | Terminal type | PU*<br>pcs |
|---|------------------|---|--------------------------------------|---|------|---|------|--------------------------|----------------------|---------------|------------|
|   |                  |   |                                      | kvar  | A    | kvar  | A    |                          |                      |               |            |
| <b>Rated voltage 440 V AC, delta connection</b> |                  |   |                                      |   |      |   |      |                          |                      |               |            |
| B25674A4052J040                                 | MKK440-D-5.0-03  | 3x 27.4                                   | 440                                  | 5.0   | 6.6  | 6.0   | 7.9  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4062J040                                 | MKK440-D-6.0-03  | 3x 32.9                                   | 440                                  | 6.0   | 7.9  | 7.2   | 9.4  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4062J340                                 | MKK440-D-6.3-03  | 3x 34.5                                   | 440                                  | 6.3   | 8.3  | 7.6   | 10.0 | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4072J040                                 | MKK440-D-7.0-03  | 3x 38.4                                   | 440                                  | 7.0   | 9.2  | 8.4   | 11.0 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4072J540                                 | MKK440-D-7.5-03  | 3x 41.1                                   | 440                                  | 7.5   | 9.8  | 9.0   | 11.8 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4082J040                                 | MKK440-D-8.0-03  | 3x 43.8                                   | 440                                  | 8.0   | 10.5 | 9.6   | 12.6 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4082J340                                 | MKK440-D-8.3-03  | 3x 45.5                                   | 440                                  | 8.3   | 10.9 | 10.0  | 13.1 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4092J040                                 | MKK440-D-9.0-03  | 3x 49.3                                   | 440                                  | 9.0   | 11.8 | 10.8  | 14.2 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4102J040                                 | MKK440-D-10.0-03 | 3x 54.8                                   | 440                                  | 10.0  | 13.1 | 12.0  | 15.7 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4102J440                                 | MKK440-D-10.4-03 | 3x 57.0                                   | 440                                  | 10.4  | 13.6 | 12.5  | 16.4 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4122J040                                 | MKK440-D-12.0-03 | 3x 65.8                                   | 440                                  | 12.0  | 15.7 | 14.4  | 18.9 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4122J540                                 | MKK440-D-12.5-03 | 3x 68.5                                   | 440                                  | 12.5  | 16.4 | 15.0  | 19.7 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4142J240                                 | MKK440-D-14.2-03 | 3x 77.8                                   | 440                                  | 14.2  | 18.6 | 17.0  | 22.3 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4152J040                                 | MKK440-D-15.0-03 | 3x 82.2                                   | 440                                  | 15.0  | 19.7 | 18.0  | 23.6 | 85 x 218                 | 1.2                  | A             | 4          |
| B25674A4162J740                                 | MKK440-D-16.7-03 | 3x 91.5                                   | 440                                  | 16.7  | 21.9 | 20.0  | 26.2 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4182J840                                 | MKK440-D-18.8-03 | 3x 103.0                                  | 440                                  | 18.8  | 24.7 | 22.6  | 29.7 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4202J040                                 | MKK440-D-20.0-03 | 3x 109.6                                  | 440                                  | 20.0  | 26.2 | 24.0  | 31.5 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4252J040                                 | MKK440-D-25.0-03 | 3x 137.0                                  | 440                                  | 25.0  | 32.8 | 30.0  | 39.4 | 116 x 192                | 1.9                  | B             | 4          |
| B25674A4282J140                                 | MKK440-D-28.1-03 | 3x 154.0                                  | 440                                  | 28.1  | 36.9 | -   | -    | 116 x 207                | 2.1                  | B             | 4          |
| B25674A4302J040                                 | MKK440-D-30.0-03 | 3x 164.4                                  | 440                                  | 30.0  | 39.4 | -   | -    | 125 x 192                | 2.3                  | B             | 4          |
| B25674A4332J140                                 | MKK440-D-33.1-03 | 3x 181.4                                  | 440                                  | 33.1  | 43.4 | -   | -    | 116 x 224                | 2.3                  | B             | 4          |
| <b>Rated voltage 480 V AC, delta connection</b> |                  |   |                                      |   |      |   |      |                          |                      |               |            |
| B25674A4052J080                                 | MKK480-D-5.0-03  | 3x 23.0                                   | 480                                  | 5.0   | 6.0  | 6.0   | 7.2  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4062J380                                 | MKK480-D-6.3-03  | 3x 29.0                                   | 480                                  | 6.3   | 7.6  | 7.6   | 9.1  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A4072J580                                 | MKK480-D-7.5-03  | 3x 34.5                                   | 480                                  | 7.5   | 9.0  | 9.0   | 10.8 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4082J380                                 | MKK480-D-8.3-03  | 3x 38.2                                   | 480                                  | 8.3   | 10.0 | 10.0  | 12.0 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4102J480                                 | MKK480-D-10.4-03 | 3x 47.9                                   | 480                                  | 10.4  | 12.5 | 12.5  | 15.0 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A4112J080                                 | MKK480-D-11.0-03 | 3x 50.7                                   | 480                                  | 11.0  | 13.2 | 13.2  | 15.9 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4122J580                                 | MKK480-D-12.5-03 | 3x 57.6                                   | 480                                  | 12.5  | 15.0 | 15.0  | 18.0 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4132J880                                 | MKK480-D-13.8-03 | 3x 63.5                                   | 480                                  | 13.8  | 16.6 | 16.6  | 20.0 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A4152J080                                 | MKK480-D-15.0-03 | 3x 69.1                                   | 480                                  | 15.0  | 18.0 | 18.0  | 21.7 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4162J780                                 | MKK480-D-16.7-03 | 3x 76.9                                   | 480                                  | 16.7  | 20.1 | 20.0  | 24.1 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4202J080                                 | MKK480-D-20.0-03 | 3x 92.1                                   | 480                                  | 20.0  | 24.1 | 24.0  | 28.9 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A4202J880                                 | MKK480-D-20.8-03 | 3x 95.8                                   | 480                                  | 20.8  | 25.0 | 25.0  | 30.1 | 116 x 207                | 2.1                  | B             | 4          |
| B25674A4222J080                                 | MKK480-D-22.0-03 | 3x 101.3                                  | 480                                  | 22.0  | 26.5 | 26.4  | 31.8 | 116 x 207                | 2.1                  | B             | 4          |
| B25674A4252J080                                 | MKK480-D-25.0-03 | 3x 115.1                                  | 480                                  | 25.0  | 30.1 | 30.0  | 36.1 | 116 x 192                | 1.9                  | B             | 4          |
| B25674A4282J180                                 | MKK480-D-28.1-03 | 3x 129.4                                  | 480                                  | 28.1  | 33.8 | -   | -    | 116 x 207                | 2.1                  | B             | 4          |
| B25674A4302J080                                 | MKK480-D-30.0-03 | 3x 138.1                                  | 480                                  | 30.0  | 36.1 | -   | -    | 125 x 192                | 2.3                  | B             | 4          |
| B25674A4312J080                                 | MKK480-D-31.0-03 | 3x 142.7                                  | 480                                  | 31.0  | 37.3 | -   | -    | 125 x 192                | 2.3                  | B             | 4          |
| B25674A4332J080                                 | MKK480-D-33.0-03 | 3x 152.0                                  | 480                                  | 33.0  | 39.7 | -   | -    | 116 x 224                | 2.3                  | B             | 4          |

\* Packing units for capacitors equal minimum order quantity. Orders will be rounded up to packing unit or multiple thereof.

| Ordering code                                   | Series/type      | Rated capacitance<br>C <sub>R</sub><br>μF | Rated voltage<br>V <sub>R</sub><br>V | Output & Rated current at 50 Hz, I <sub>R</sub> |      | Output & Rated current at 60 Hz, I <sub>R</sub> |      | Dimensions (d x h)<br>mm | Weight approx.<br>kg | Terminal type | PU*<br>pcs |
|---|------------------|---|--------------------------------------|---|------|---|------|--------------------------|----------------------|---------------|------------|
|   |                  |   |                                      | kvar  | A    | kvar  | A    |                          |                      |               |            |
| <b>Rated voltage 525 V AC, delta connection</b> |                  |   |                                      |   |      |   |      |                          |                      |               |            |
| B25674A5052J025                                 | MKK525-D-5.0-03  | 3x 19.2                                   | 525                                  | 5.0   | 5.5  | 6.0   | 6.6  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A5062J325                                 | MKK525-D-6.3-03  | 3x 24.2                                   | 525                                  | 6.3   | 6.9  | 7.6   | 8.4  | 75 x 164                 | 0.7                  | A             | 6          |
| B25674A5072J525                                 | MKK525-D-7.5-03  | 3x 28.9                                   | 525                                  | 7.5   | 8.2  | 9.0   | 9.9  | 75 x 185                 | 0.8                  | A             | 6          |
| B25674A5082J325                                 | MKK525-D-8.3-03  | 3x 31.9                                   | 525                                  | 8.3   | 9.1  | 10.0  | 11.0 | 75 x 200                 | 0.8                  | A             | 6          |
| B25674A5102J425                                 | MKK525-D-10.4-03 | 3x 40.0                                   | 525                                  | 10.4  | 11.4 | 12.5  | 13.7 | 85 x 185                 | 1.0                  | A             | 9          |
| B25674A5122J525                                 | MKK525-D-12.5-03 | 3x 48.1                                   | 525                                  | 12.5  | 13.7 | 15.0  | 16.5 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A5132J225                                 | MKK525-D-13.2-03 | 3x 50.8                                   | 525                                  | 13.2  | 14.5 | 15.8  | 17.4 | 85 x 200                 | 1.1                  | A             | 9          |
| B25674A5152J025                                 | MKK525-D-15.0-03 | 3x 57.7                                   | 525                                  | 15.0  | 16.5 | 18.0  | 19.8 | 85 x 218                 | 1.2                  | A             | 4          |
| B25674A5162J725                                 | MKK525-D-16.7-03 | 3x 64.3                                   | 525                                  | 16.7  | 18.4 | 20.0  | 22.0 | 100 x 207                | 1.6                  | B             | 6          |
| B25674A5202J025                                 | MKK525-D-20.0-03 | 3x 77.0                                   | 525                                  | 20.0  | 22.0 | 24.0  | 26.4 | 100 x 224                | 1.7                  | B             | 4          |
| B25674A5202J825                                 | MKK525-D-20.8-03 | 3x 80.1                                   | 525                                  | 20.8  | 22.9 | 25.0  | 27.5 | 100 x 224                | 1.7                  | B             | 4          |
| B25674A5252J025                                 | MKK525-D-25.0-03 | 3x 96.2                                   | 525                                  | 25.0  | 27.5 | 30.0  | 33.0 | 116 x 207                | 2.1                  | B             | 4          |
| B25674A5262J525                                 | MKK525-D-26.5-03 | 3x 102.0                                  | 525                                  | 26.5  | 29.1 | 31.8  | 35.0 | 116 x 207                | 2.1                  | B             | 4          |
| B25674A5282J125                                 | MKK525-D-28.1-03 | 3x 108.2                                  | 525                                  | 28.1  | 30.9 | -   | -    | 125 x 192                | 2.3                  | B             | 4          |
| B25674A5302J025                                 | MKK525-D-30.0-03 | 3x 115.5                                  | 525                                  | 30.0  | 33.0 | -   | -    | 125 x 207                | 2.4                  | B             | 4          |
| B25674A5332J125                                 | MKK525-D-33.1-03 | 3x 127.4                                  | 525                                  | 33.1  | 36.4 | -   | -    | 136 x 192                | 2.7                  | B             | 4          |
| <b>Rated voltage 600 V AC, delta connection</b> |                  |   |                                      |   |      |   |      |                          |                      |               |            |
| B25674A6052J300                                 | MKK600-D-5.3-03  | 3x 15.6                                   | 600                                  | 5.3   | 5.1  | 6.4   | 6.2  | 75 x 185                 | 0.8                  | C             | 6          |
| B25674A6062J200                                 | MKK600-D-6.2-03  | 3x 18.3                                   | 600                                  | 6.2   | 6.0  | 7.4   | 7.1  | 75 x 185                 | 0.8                  | C             | 6          |
| B25674A6062J900                                 | MKK600-D-6.9-03  | 3x 20.3                                   | 600                                  | 6.9   | 6.6  | 8.3   | 8.0  | 75 x 200                 | 0.8                  | C             | 6          |
| B25674A6082J300                                 | MKK600-D-8.3-03  | 3x 24.5                                   | 600                                  | 8.3   | 8.0  | 10.0  | 9.6  | 75 x 218                 | 0.9                  | C             | 9          |
| B25674A6102J400                                 | MKK600-D-10.4-03 | 3x 30.6                                   | 600                                  | 10.4  | 10.0 | 12.5  | 12.0 | 85 x 200                 | 1.1                  | C             | 9          |
| B25674A6122J500                                 | MKK600-D-12.5-03 | 3x 36.8                                   | 600                                  | 12.5  | 12.0 | 15.0  | 14.4 | 100 x 192                | 1.4                  | D             | 6          |
| B25674A6132J900                                 | MKK600-D-13.9-03 | 3x 41.0                                   | 600                                  | 13.9  | 13.4 | 16.7  | 16.1 | 100 x 207                | 1.6                  | D             | 6          |
| B25674A6142J600                                 | MKK600-D-14.6-03 | 3x 43.0                                   | 600                                  | 14.6  | 14.0 | 17.5  | 16.8 | 100 x 207                | 1.6                  | D             | 6          |
| B25674A6162J700                                 | MKK600-D-16.7-03 | 3x 49.2                                   | 600                                  | 16.7  | 16.1 | 20.0  | 19.2 | 100 x 224                | 1.7                  | D             | 4          |
| B25674A6202J000                                 | MKK600-D-20.0-03 | 3x 58.9                                   | 600                                  | 20.0  | 19.2 | 24.0  | 23.1 | 116 x 207                | 2.1                  | D             | 4          |
| B25674A6202J800                                 | MKK600-D-20.8-03 | 3x 61.3                                   | 600                                  | 20.8  | 20.0 | 25.0  | 24.1 | 116 x 207                | 2.1                  | D             | 4          |
| B25674A6252J000                                 | MKK600-D-25.0-03 | 3x 73.7                                   | 600                                  | 25.0  | 24.1 | 30.0  | 28.9 | 125 x 207                | 2.4                  | D             | 4          |
| B25674A6282J000                                 | MKK600-D-28.0-03 | 3x 82.5                                   | 600                                  | 28.0  | 26.9 | -   | -    | 136 x 192                | 2.7                  | D             | 4          |
| B25674A6302J000                                 | MKK600-D-30.0-03 | 3x 88.4                                   | 600                                  | 30.0  | 28.9 | -   | -    | 136 x 207                | 2.9                  | D             | 4          |

\* Packing units for capacitors equal minimum order quantity. Orders will be rounded up to packing unit or multiple thereof.

| Ordering code                                   | Series/type      | Rated capacitance<br>$C_R$<br>$\mu\text{F}$ | Rated voltage<br>$V_R$<br>V | Output & Rated current at 50 Hz, $I_R$ |      | Output & Rated current at 60 Hz, $I_R$ |      | Dimensions (d x h)<br>mm | Weight approx.<br>kg | Terminal type | PU*<br>pcs |
|---|------------------|---|-----------------------------|--|------|--|------|--------------------------|----------------------|---------------|------------|
|   |                  |   |                             | kvar                                   | A    | kvar                                   | A    |                          |                      |               |            |
| <b>Rated voltage 690 V AC, delta connection</b> |                  |   |                             |  |      |  |      |                          |                      |               |            |
| B25674A6052J390                                 | MKK690-D-5.3-03  | 3x 11.8                                     | 690                         | 5.3                                    | 4.4  | 6.4                                    | 5.4  | 75 x 185                 | 0.8                  | C             | 6          |
| B25674A6062J290                                 | MKK690-D-6.2-03  | 3x 13.8                                     | 690                         | 6.2                                    | 5.2  | 7.4                                    | 6.2  | 75 x 200                 | 0.8                  | C             | 6          |
| B25674A6062J990                                 | MKK690-D-6.9-03  | 3x 15.4                                     | 690                         | 6.9                                    | 5.8  | 8.3                                    | 6.9  | 75 x 200                 | 0.8                  | C             | 6          |
| B25674A6082J390                                 | MKK690-D-8.3-03  | 3x 18.5                                     | 690                         | 8.3                                    | 6.9  | 10.0                                   | 8.4  | 75 x 200                 | 0.8                  | C             | 6          |
| B25674A6102J490                                 | MKK690-D-10.4-03 | 3x 23.2                                     | 690                         | 10.4                                   | 8.7  | 12.5                                   | 10.5 | 75 x 200                 | 0.8                  | C             | 6          |
| B25674A6122J590                                 | MKK690-D-12.5-03 | 3x 27.9                                     | 690                         | 12.5                                   | 10.5 | 15.0                                   | 12.6 | 85 x 200                 | 1.1                  | C             | 9          |
| B25674A6132J990                                 | MKK690-D-13.9-03 | 3x 31.0                                     | 690                         | 13.9                                   | 11.6 | 16.7                                   | 14.0 | 85 x 200                 | 1.1                  | C             | 9          |
| B25674A6142J690                                 | MKK690-D-14.6-03 | 3x 32.5                                     | 690                         | 14.6                                   | 12.2 | 17.5                                   | 14.6 | 100 x 207                | 1.6                  | D             | 6          |
| B25674A6162J790                                 | MKK690-D-16.7-03 | 3x 37.2                                     | 690                         | 16.7                                   | 14.0 | 20.0                                   | 16.7 | 100 x 192                | 1.4                  | D             | 6          |
| B25674A6202J090                                 | MKK690-D-20.0-03 | 3x 44.6                                     | 690                         | 20.0                                   | 16.7 | 24.0                                   | 20.1 | 100 x 207                | 1.6                  | D             | 6          |
| B25674A6202J890                                 | MKK690-D-20.8-03 | 3x 46.3                                     | 690                         | 20.8                                   | 17.4 | 25.0                                   | 20.9 | 100 x 224                | 1.7                  | D             | 4          |
| B25674A6252J090                                 | MKK690-D-25.0-03 | 3x 55.7                                     | 690                         | 25.0                                   | 20.9 | 30.0                                   | 25.1 | 116 x 192                | 1.9                  | D             | 4          |
| B25674A6282J090                                 | MKK690-D-28.0-03 | 3x 62.4                                     | 690                         | 28.0                                   | 23.4 | -                                      | -    | 116 x 207                | 2.1                  | D             | 4          |
| B25674A6302J090                                 | MKK690-D-30.0-03 | 3x 66.8                                     | 690                         | 30.0                                   | 25.1 | -                                      | -    | 125 x 192                | 2.3                  | D             | 4          |

\* Packing units for capacitors equal minimum order quantity. Orders will be rounded up to packing unit or multiple thereof.

#### Display of ordering codes for EPCOS products

The ordering code for one and the same EPCOS product can be represented differently in data sheets, data books, other publications, on the EPCOS website, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under [www.epcos.com/orderingcodes](http://www.epcos.com/orderingcodes)

### Cautions and warnings

- In case of dents of more than 1 mm depth or any other mechanical damage, capacitors must not be used at all.
- This applies also in cases of oil leakages.
- To ensure the full functionality of the overpressure disconnecter, elastic elements must not be hindered and a minimum space of 12 mm has to be kept above each capacitor.
- Do not handle the capacitor before it is discharged.
- Resonance cases must be avoided by appropriate application design in any case.
- Handle capacitors carefully, because they may still be charged even after disconnection due to faulty discharging devices.
- Protect the capacitor properly against over current and short circuit.
- Failure to follow cautions may result, worst case, in premature failures, bursting and fire.

### Discharging

Capacitors must be discharged to a maximum of 10% of rated voltage before they are switched in again. This prevents an electric impulse discharge in the application, influences the capacitor's service life and protects against electric shock. The capacitor must be discharged to 50 V or less within 1 minute. There must be not any switch, fuse or any other disconnecting device in the circuit between the power capacitor and the discharging device. PhaseCap Energy-capacitors have a pre-mounted ceramic discharge module; alternatively discharge reactors are available from EPCOS. Discharge and short circuit capacitor before handling!

### Service life expectancy

Electrical components do not have an unlimited service life expectancy; this applies to self-healing capacitors too. The maximum service life expectancy may vary depending on the application the capacitor is used in.

### Safety

Electrical or mechanical misapplication of capacitors may be hazardous. Personal injury or property damage may result from bursting of the capacitor or from expulsion of oil or melted material due to mechanical disruption of the capacitor.

- Ensure good, effective grounding for capacitor enclosures.
- Provide means of disconnecting and insulating a faulty component/bank.
- The terminals of capacitors, connected bus bars and cables as well as other devices may also be energized.
- Follow good engineering practice.

### Thermal load/over-temperature

After installation of the capacitor it is necessary to verify that maximum hot-spot temperature is not exceeded at extreme service conditions.

### Overpressure disconnecter

To ensure full functionality of an overpressure disconnecter, the following must be observed:

1. The elastic elements must not be hindered, i.e.
  - Connecting lines must be flexible leads (cables).
  - There must be sufficient space (min. 12 mm) for expansion above the connections. This will enable a longitudinal extension of the can to secure the overpressure disconnecter work.
  - Folding beads must not be retained by clamps.
2. The maximum allowed fault current of 10000 A in accordance with UL 810 standard must be assured by the application.
3. Stress parameters of the capacitor must be within the IEC60831 specification.

### Overcurrent and short circuit protection

- Use HRC fuses or MCCBs for short circuit protection. Short circuit protection and connecting cables should be selected so that 1.5 times the maximum total RMS capacitor current can be permanently handled.
- HRC fuses do not protect a capacitor against overload – they are only for short circuit protection.
- The HRC fuse rating should be 1.6 to 1.8 times rated capacitor current.
- Do not use HRC fuses to switch capacitors (risk of arcing).
- Use thermal magnetic over current relays for overload protection.

### Resonance cases

Resonance cases must be avoided by appropriate application design in any case. Maximum total RMS capacitor current (incl. fundamental harmonic current) specified in technical data must not be exceeded.

### Re-switching vs. phase-opposition

In case of voltage interruption, a sufficient discharge time has to be ensured to avoid phase-opposition and resulting high inrush currents.

### Vibration resistance

The resistance to vibration of capacitors corresponds to IEC 68, part 2–6.

Max. test conditions:

|                        |               |
|------------------------|---------------|
| Test duration          | 6 h*          |
| Frequency range 1      | 10 ... 55 Hz* |
| Displacement amplitude | 0.75 mm*      |

\*corresponding to max. 98.1 m/s or 10 g

These figures apply to the capacitor alone. Because the fixing and the terminals may influence the vibration properties, it is necessary to check stability when a capacitor is built in and exposed to vibration. Irrespective of this, you are advised not to locate capacitors where vibration amplitude reaches the maximum in strongly vibrating equipment.

#### Mechanical protection

The capacitor has to be installed in a way that mechanical damages and dents in the aluminum can be avoided.

#### Grounding

The threaded bottom stud of the capacitor has to be used for grounding. In case grounding is done via metal chassis that the capacitor is mounted to, the layer of varnish beneath the washer and nut should be removed. The maximum tightening torque is 10 Nm for M12 stud.

#### Maintenance

- Check tightness of the connections/terminals periodically.
- Take current reading twice a year and compare with nominal current. Use a harmonic analyser or true effective RMS-meter.
- In case of current above the nominal current check your application for modifications.
- If a significant increase in the amount of non-linear loads has been detected, then a consultant has to be called in for a harmonic study.
- In case of the presence of harmonics installation of a de-tuned capacitor bank (reactors) must be considered.
- Check the temperature of capacitors directly after operation for a longer period, but make sure that the capacitors have been switched off. In case of excessive temperature of individual capacitors, it is recommended to replace these capacitors, as this should be an indication for loss factor increase, which is a sign for reaching end of life.

#### Storage and operating conditions

Do not use or store capacitors in corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. In dusty environments regular maintenance and cleaning especially of the terminals is required to avoid conductive path between phases and/or phases and ground.

#### Note

For detailed information about PFC capacitors and cautions, refer to the latest version of EPCOS PFC Product Profile.

## Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.tdk-electronics.tdk.com/material](http://www.tdk-electronics.tdk.com/material)). Should you have any more detailed questions, please contact our sales offices.
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We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
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