

**Metallized Paper (MP) RFI-Capacitors Class X2**  
**in PCM 10 mm to 22.5 mm. Capacitances from 1000 pF to 0.33 µF.**  
**Rated Voltages 250 VAC and 275 VAC.**

## Special Features

- Particularly high reliability against active and passive flammability
- Excellent self-healing as well as high voltage strength
- High degree of interference suppression due to good attenuation and low ESR
- For temperatures up to +110° C
- According to RoHS 2011/65/EU

## Typical Applications

**Class X2 RFI applications to meet EMC regulations**

- Capacitors connected to the mains between phase and neutral or phase and phase conductors
- General requirements, pulse peak voltage  $\leq 2.5$  kV

## Construction

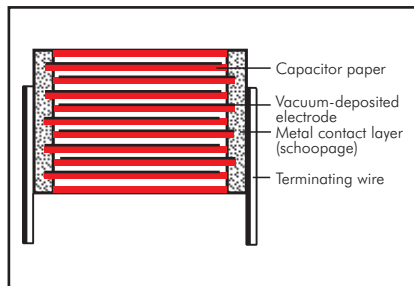
### Dielectric:

Paper, epoxy resin impregnated

### Capacitor electrodes:

Vacuum-deposited

### Internal construction:



### Encapsulation:

Self-extinguishing epoxy resin, UL 94 V-0, metal foil

### Terminations:

Tinned wire.

### Marking:

Marking: Black on Silver.

## Electrical Data

### Capacitance range:

1000 pF to 0.33 µF (E12-values on request)

**Rated voltages:** 250 VAC, 275 VAC

**Continuous DC voltage\*** (general guide):  $\leq 630$  V

**Capacitance tolerances:**  $\pm 20\%$

**Operating temperature range:**

$-40^{\circ}$  C to  $+110^{\circ}$  C

**Climatic test category:**

40/110/56/C in accordance with IEC

**Insulation resistance** at  $+20^{\circ}$  C:

$\geq 12 \times 10^3$  MΩ

Measuring voltage: 100 V/1 min.

**Dissipation factors:**

$\tan \delta \leq 13 \times 10^{-3}$  at 1 kHz and  $+20^{\circ}$  C

**Test specifications:**

In accordance with IEC 60384-14

**Approvals:**

| Authority | Specification                    | Symbol                                                                                | Approval-No. |
|-----------|----------------------------------|---------------------------------------------------------------------------------------|--------------|
| UL/Demko  | EN 60384-14                      |  | ENEC-02832   |
| UL        | UL 60384-14<br>CAN/CSA-E60384-14 |  | E 100438     |

### Maximum pulse rise time:

| Capacitance<br>pF/µF | Pulse rise time V/µsec<br>max. operation |
|----------------------|------------------------------------------|
| 1000 ... 0.068       | 1500                                     |
| 0.1 ... 0.33         | 750                                      |

for pulses equal to a voltage amplitude with  $\sqrt{2} \times U_{AC} = 390$  V

according to IEC 60384-14

**Test voltage:** 1300 VDC, 2 sec.

**Reliability:**

Operational life > 300 000 hours

Failure rate < 1 fit ( $0.5 \times U_r$  and  $40^{\circ}$  C)

## Mounting Recommendation

To minimize or avoid shock and/or vibration stresses to terminating wires and solder connections we recommend to fix voluminous resin-potted MP capacitors as from e.g. PCM 22.5 mm in an appropriate way since for constructional reasons they do not sit tight on the board.

\* If safety-approved EMI suppression capacitors are operated with a DC voltage being above the specified AC voltage rating the given approvals are no longer valid (IEC 60384-14).

Furthermore the permissible pulse rise time  $du/dt$  ( $F_{max.}$ ) will be subject to a reduction according to

$$F_{max.} = F_r \times \sqrt{2} \times U_{AC} / U_{DC}$$

if the DC operating voltage  $U_{DC}$  is higher than  $\sqrt{2} \times U_{AC}$

## Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

## Continuation

### General Data

| Capacitance | 250 VAC* |     |      |       |                     | 275 VAC* |     |      |       |                     |
|-------------|----------|-----|------|-------|---------------------|----------|-----|------|-------|---------------------|
|             | W        | H   | L    | PCM** | Part number         | W        | H   | L    | PCM** | Part number         |
| 1000 pF     | 4        | 8.5 | 13.5 | 10    | MPX20W1100FA00_____ | 4        | 8.5 | 13.5 | 10    | MPX21W1100FA00_____ |
| 1500 „      | 4        | 8.5 | 13.5 | 10    | MPX20W1150FA00_____ | 4        | 8.5 | 13.5 | 10    | MPX21W1150FA00_____ |
| 2200 „      | 4        | 8.5 | 13.5 | 10    | MPX20W1220FA00_____ | 4        | 8.5 | 13.5 | 10    | MPX21W1220FA00_____ |
| 3300 „      | 4        | 8.5 | 13.5 | 10    | MPX20W1330FA00_____ | 4        | 8.5 | 13.5 | 10    | MPX21W1330FA00_____ |
| 4700 „      | 5        | 10  | 13.5 | 10    | MPX20W1470FB00_____ | 5        | 10  | 13.5 | 10    | MPX21W1470FB00_____ |
| 6800 „      | 5        | 13  | 19   | 15    | MPX20W1680FC00_____ | 5        | 13  | 19   | 15    | MPX21W1680FC00_____ |
| 0.01 µF     | 5        | 13  | 19   | 15    | MPX20W2100FC00_____ | 5        | 13  | 19   | 15    | MPX21W2100FC00_____ |
| 0.015 „     | 5        | 13  | 19   | 15    | MPX20W2150FC00_____ | 5        | 13  | 19   | 15    | MPX21W2150FC00_____ |
| 0.022 „     | 5        | 13  | 19   | 15    | MPX20W2220FC00_____ | 5        | 13  | 19   | 15    | MPX21W2220FC00_____ |
| 0.033 „     | 6        | 14  | 19   | 15    | MPX20W2330FD00_____ | 6        | 14  | 19   | 15    | MPX21W2330FD00_____ |
| 0.047 „     | 7        | 15  | 19   | 15    | MPX20W2470FE00_____ | 7        | 15  | 19   | 15    | MPX21W2470FE00_____ |
| 0.068 „     | 8        | 17  | 19   | 15    | MPX20W2680FF00_____ | 8        | 17  | 19   | 15    | MPX21W2680FF00_____ |
| 0.1 µF      | 10       | 18  | 19   | 15    | MPX20W3100FG00_____ | 10       | 18  | 19   | 15    | MPX21W3100FG00_____ |
|             | 8        | 20  | 28   | 22.5  | MPX20W3100FH00_____ | 8        | 20  | 28   | 22.5  | MPX21W3100FH00_____ |
| 0.15 „      | 8        | 20  | 28   | 22.5  | MPX20W3150FH00_____ | 8        | 20  | 28   | 22.5  | MPX21W3150FH00_____ |
| 0.22 „      | 10       | 22  | 28   | 22.5  | MPX20W3220FI00_____ | 10       | 22  | 28   | 22.5  | MPX21W3220FI00_____ |
| 0.33 „      | 12       | 24  | 28   | 22.5  | MPX20W3330FJ00_____ | 12       | 24  | 28   | 22.5  | MPX21W3330FJ00_____ |

\* f = 50/60 Hz

\*\* PCM = Printed circuit module = pin spacing

Upon request with long pins 35-2 mm max.

Dims. in mm.

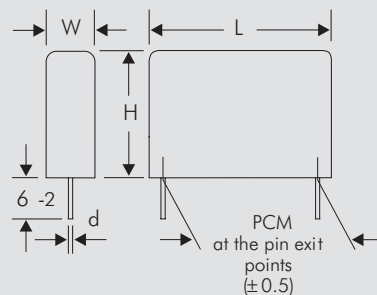
Part number completion:

Tolerance: 20 % = M

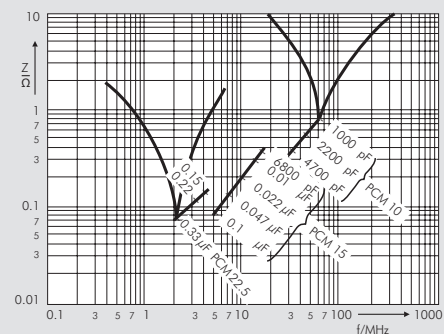
Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.



d = 0.6 Ø if PCM 10  
d = 0.8 Ø if PCM ≥ 15



Impedance change with frequency  
(general guide)

Rights reserved to amend design data without prior notification.

## Recommendation for Processing and Application of Through-Hole Capacitors

### Soldering Process

Internal temperature of the capacitor must be kept as follows:

Polyester: preheating:  $T_{\max.} \leq 125^{\circ}\text{C}$   
soldering:  $T_{\max.} \leq 135^{\circ}\text{C}$

Polypropylene: preheating:  $T_{\max.} \leq 100^{\circ}\text{C}$   
soldering:  $T_{\max.} \leq 110^{\circ}\text{C}$

#### Single wave soldering

Soldering bath temperature:  $T < 260^{\circ}\text{C}$

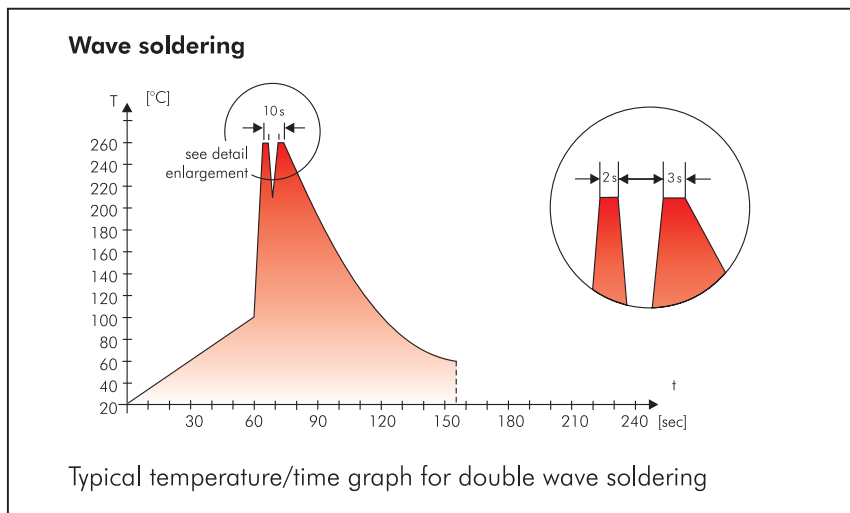
Dwell time:  $t < 5\text{ sec}$

#### Double wave soldering

Soldering bath temperature:  $T < 260^{\circ}\text{C}$

Dwell time:  $\Sigma t < 5\text{ sec}$

Due to different soldering processes and heat requirements the graphs are to be regarded as a recommendation only.



## WIMA Quality and Environmental Philosophy

### ISO 9001:2015 Certification

ISO 9001:2015 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2015 of our factories by the infaz (Institut für Auditierung und Zertifizierung) certifies that organisation, equipment and monitoring of quality assurance in our factories correspond to internationally recognized standards.

### WIMA WPCS

The WIMA Process Control System (WPCS) is a quality surveillance and optimization system developed by WIMA. WPCS is a major part of the quality-oriented WIMA production. Points of application during production process:

- incoming material inspection
- metallization
- film inspection
- schoopage
- pre-healing
- pin attachment
- cast resin preparation/encapsulation
- 100% final inspection
- Testing as per customer requirements

### WIMA Environmental Policy

All WIMA capacitors, irrespective of whether through-hole devices or SMD, are made of environmentally friendly materials. Neither during manufacture nor in the product itself any toxic substances are used, e.g.

- |                        |            |
|------------------------|------------|
| - Lead                 | - PBB/PBDE |
| - PCB                  | - Arsenic  |
| - CFC                  | - Cadmium  |
| - Hydrocarbon chloride | - Mercury  |
| - Chromium 6+          | - etc.     |

We merely use pure, recyclable materials for packing our components, such as:

- carton
- cardboard
- adhesive tape made of paper
- polystyrene

We almost completely refrain from using packing materials such as:

- adhesive tapes made of plastic
- metal clips

### RoHS Compliance

According to the RoHS Directive 2011/65/EU as amended from time to time certain hazardous substances like e.g. lead, cadmium, mercury must not be used any longer in electronic equipment as of July 1st, 2006. For the sake of the environment WIMA has refrained from using such substances since years already.



WIMA Kondensatoren sind bleifrei konform RoHS 2011/65/EU

WIMA capacitors are lead free in accordance with RoHS 2011/65/EU

Tape for lead-free WIMA capacitors

### DIN EN ISO 14001:2004

WIMA's environmental management has been established in accordance with the guidelines of DIN EN ISO 14001:2004 to optimize the production processes with regard to energy and resources.

## Typical Dimensions for Taping Configuration

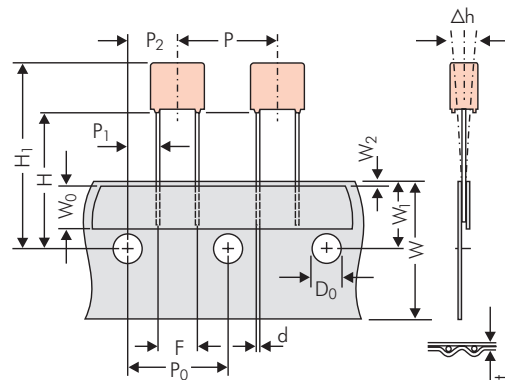


Diagram 1:  
PCM 2.5/5/7.5mm

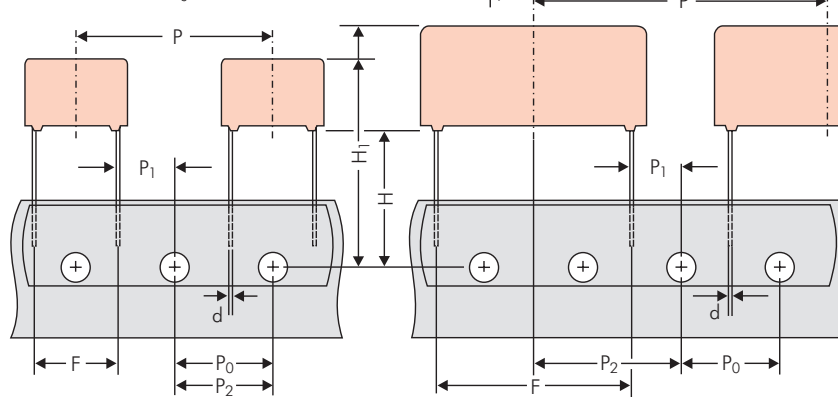


Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5\*mm

\*PCM 27.5 taping possible with two feed holes between components

| Designation                                      | Symbol         | Dimensions for Radial Taping                             |                                                          |                                                           |                                                           |                                                           |                                                           |                                                                     |
|--------------------------------------------------|----------------|----------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------|
|                                                  |                | PCM 2.5 taping                                           | PCM 5 taping                                             | PCM 7.5 taping                                            | PCM 10 taping*                                            | PCM 15 taping*                                            | PCM 22.5 taping                                           | PCM 27.5 taping                                                     |
| Carrier tape width                               | W              | 18.0 ±0.5                                                | 18.0 ±0.5                                                | 18.0 ±0.5                                                 | 18.0 ±0.5                                                 | 18.0 ±0.5                                                 | 18.0 ±0.5                                                 | 18.0 ±0.5                                                           |
| Hold-down tape width                             | W <sub>0</sub> | 6.0 for hot-sealing adhesive tape                        | 6.0 for hot-sealing adhesive tape                        | 12.0 for hot-sealing adhesive tape                        | 12.0 for hot-sealing adhesive tape                        | 12.0 for hot-sealing adhesive tape                        | 12.0 for hot-sealing adhesive tape                        | 12.0 for hot-sealing adhesive tape                                  |
| Hole position                                    | W <sub>1</sub> | 9.0 ±0.5                                                 | 9.0 ±0.5                                                 | 9.0 ±0.5                                                  | 9.0 ±0.5                                                  | 9.0 ±0.5                                                  | 9.0 ±0.5                                                  | 9.0 ±0.5                                                            |
| Hold-down tape position                          | W <sub>2</sub> | 0.5 to 3.0 max.                                          | 0.5 to 3.0 max.                                          | 0.5 to 3.0 max.                                           | 0.5 to 3.0 max.                                           | 0.5 to 3.0 max.                                           | 0.5 to 3.0 max.                                           | 0.5 to 3.0 max.                                                     |
| Feed hole diameter                               | D <sub>0</sub> | 4.0 ±0.2                                                 | 4.0 ±0.2                                                 | 4.0 ±0.2                                                  | 4.0 ±0.2                                                  | 4.0 ±0.2                                                  | 4.0 ±0.2                                                  | 4.0 ±0.2                                                            |
| Pitch of component                               | P              | 12.7 ±1.0                                                | 12.7 ±1.0                                                | 12.7 ±1.0                                                 | 25.4 ±1.0                                                 | 25.4 ±1.0                                                 | 38.1 ±1.5                                                 | 38.1 ±1.5 or 50.8 ±1.5                                              |
| Feed hole pitch                                  | P <sub>0</sub> | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch            |
| Feed hole centre to pin                          | P <sub>1</sub> | 5.1 ±0.5                                                 | 3.85 ±0.7                                                | 2.6 ±0.7                                                  | 7.7 ±0.7                                                  | 5.2 ±0.7                                                  | 7.8 ±0.7                                                  | 5.3 ±0.7                                                            |
| Hole centre to component centre                  | P <sub>2</sub> | 6.35 ±1.3                                                | 6.35 ±1.3                                                | 6.35 ±1.3                                                 | 12.7 ±1.3                                                 | 12.7 ±1.3                                                 | 19.05 ±1.3                                                | 19.05 ±1.3                                                          |
| Feed hole centre to bottom edge of the component | H              | 16.5 ±0.3<br>18.5 ±0.5                                   | 16.5 ±0.3<br>18.5 ±0.5                                   | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                              |
| Feed hole centre to top edge of the component    | H <sub>1</sub> | H+H <sub>component</sub> < H <sub>1</sub><br>32.25 max.  | H+H <sub>component</sub> < H <sub>1</sub><br>32.25 max.  | H+H <sub>component</sub> < H <sub>1</sub><br>24.5 to 31.5 | H+H <sub>component</sub> < H <sub>1</sub><br>25.0 to 31.5 | H+H <sub>component</sub> < H <sub>1</sub><br>26.0 to 37.0 | H+H <sub>component</sub> < H <sub>1</sub><br>30.0 to 43.0 | H+H <sub>component</sub> < H <sub>1</sub><br>35.0 to 45.0           |
| Pin spacing at upper edge of carrier tape        | F              | 2.5 ±0.5                                                 | 5.0 <sup>+0.8</sup> <sub>-0.2</sub>                      | 7.5 ±0.8                                                  | 10.0 ±0.8                                                 | 15 ±0.8                                                   | 22.5 ±0.8                                                 | 27.5 ±0.8                                                           |
| Pin diameter                                     | d              | 0.4 ±0.05                                                | 0.5 ±0.05                                                | 0.5 ±0.05 or 0.6 <sup>+0.06</sup> <sub>-0.05</sub>        | 0.5 ±0.05 or 0.6 <sup>+0.06</sup> <sub>-0.05</sub>        | 0.8 <sup>+0.08</sup> <sub>-0.05</sub>                     | 0.8 <sup>+0.08</sup> <sub>-0.05</sub>                     | 0.8 <sup>+0.08</sup> <sub>-0.05</sub>                               |
| Component alignment                              | Δh             | ± 2.0 max.                                               | ± 2.0 max.                                               | ± 3.0 max.                                                | ± 3.0 max.                                                | ± 3.0 max.                                                | ± 3.0 max.                                                | ± 3.0 max.                                                          |
| Total tape thickness                             | t              | 0.6 ±0.2                                                 | 0.6 ±0.2                                                 | 0.6 ±0.2                                                  | 0.6 ±0.2                                                  | 0.6 ±0.2                                                  | 0.6 ±0.2                                                  | 0.6 ±0.2                                                            |
| Package<br>(see also page 150)                   |                | ROLL/AMMO                                                |                                                          |                                                           | AMMO                                                      |                                                           |                                                           |                                                                     |
|                                                  |                | REEL ø 360 max.<br>ø 30 ±1                               | B 52 ±2<br>58 ±2 } depending on comp. dimensions         |                                                           | REEL ø 360 max.<br>ø 30 ±1                                | 52 ±2<br>58 ±2 or 66 ±2                                   | REEL ø 500 max.<br>ø 25 ±1                                | 54 ±2<br>60 ±2 or 68 ±2 } depending on PCM and component dimensions |
| Unit                                             |                | see details page 151.                                    |                                                          |                                                           |                                                           |                                                           |                                                           |                                                                     |

Dims in mm.

\* Diameter of pins see General Data.

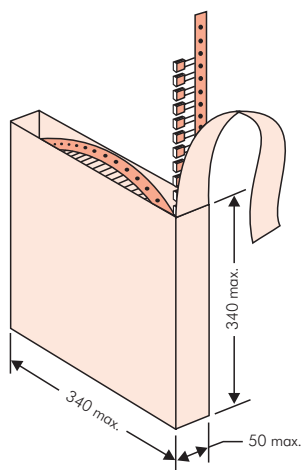
\* PCM 10 and PCM 15 can be crimped to PCM 7.5.

Position of components according to PCM 7.5 (sketch 11). P<sub>0</sub> = 12.7 or 15.0 is possible

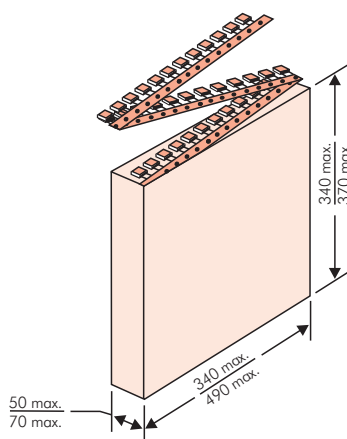
Please clarify customer-specific deviations with the manufacturer.

## Types of Tape Packaging of Capacitors for Automatic Radial Insertion

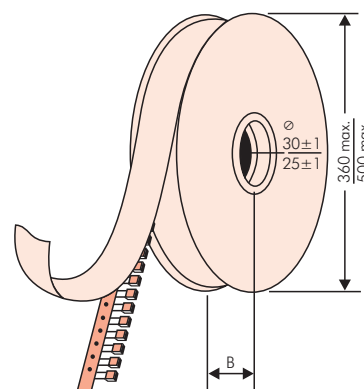
### ■ ROLL Packaging



### ■ AMMO Packaging



### ■ REEL Packaging



## BAR CODE (Labelling)

Labelling of package units in plain text and with alphanumerical Bar Code

Scanner decoding of

- WIMA supplier number
- Customer's P/O number
- Customer's part number
- WIMA confirmation number
- WIMA part number
- Lot number
- Date code
- Quantity

In addition part description of

- article
- capacitance value
- rated voltage
- dimensions
- capacitance tolerance
- packing

as well as gross weight and customer's name are indicated in plain text.

|                                             |                                           |                                   |              |
|---------------------------------------------|-------------------------------------------|-----------------------------------|--------------|
| <b>WIMA</b> Best Capacitors Made In Germany |                                           | Werk Unna                         |              |
| Supplier-ID: 123456789                      | <b>RoHS</b><br>2011/65/EU                 | Date Code: 08.10.10               |              |
| Purchase Order No. (P/O): Bestellung xyz    |                                           | Quantity: 5.000                   |              |
| Customer Part No.: KUNDETEILENUMMER         |                                           | Customer No.: 0000100002          |              |
|                                             |                                           | Gross Weight [g]: 1870            |              |
| WIMA Confirmation No.: 0001004053000100     |                                           | WIMA Part No.: MKS2C034701C00K88D |              |
| Handling Unit:                              | MKS 2                                     | QTY: 5.000                        | COO: DE      |
|                                             | MKS 2 0.47 $\mu$ F 63 VDC 3.5x8.5x7.2 RM5 |                                   |              |
|                                             | Standard 10% Loss - Standard              | Drühte 6-2                        | Week 03/2011 |
| 1000067326                                  | Vorlage Debitor Inland                    |                                   |              |

BARCODE „Code 39“

## Packing Quantities for Capacitors with Radial Pins in PCM 2.5 mm to 22.5 mm



| PCM     | Size |      |      |       | bulk | ROLL  |       | pcs. per packing unit |       |           |           | AMMO  |       |       |       |
|---------|------|------|------|-------|------|-------|-------|-----------------------|-------|-----------|-----------|-------|-------|-------|-------|
|         |      |      |      |       |      |       |       | REEL                  |       |           |           |       |       |       |       |
|         | W    | H    | L    | Codes |      | H16.5 | H18.5 | ø 360                 | ø 500 | 340 x 340 | 490 x 370 | H16.5 | H18.5 | H16.5 | H18.5 |
|         |      |      |      |       | S    | N     | O     | F                     | I     | H         | J         | A     | C     | B     | D     |
| 2.5 mm  | 2.5  | 7    | 4.6  | 0B    | 5000 | 2200  |       | 2500                  |       | –         |           | 2800  |       | –     |       |
|         | 3    | 7.5  | 4.6  | 0C    | 5000 | 2000  |       | 2300                  |       | –         |           | 2300  |       | –     |       |
|         | 3.8  | 8.5  | 4.6  | 0D    | 5000 | 1500  |       | 1800                  |       | –         |           | 1800  |       | –     |       |
|         | 4.6  | 9    | 4.6  | 0E    | 5000 | 1200  |       | 1500                  |       | –         |           | 1500  |       | –     |       |
|         | 5.5  | 10   | 4.6  | 0F    | 5000 | 900   |       | 1200                  |       | –         |           | 1200  |       | –     |       |
| 5 mm    | 2.5  | 6.5  | 7.2  | 1A    | 5000 | 2200  |       | 2500                  |       | –         |           | 2800  |       | –     |       |
|         | 3    | 7.5  | 7.2  | 1B    | 5000 | 2000  |       | 2300                  |       | –         |           | 2300  |       | –     |       |
|         | 3.5  | 8.5  | 7.2  | 1C    | 5000 | 1600  |       | 2000                  |       | –         |           | 2000  |       | –     |       |
|         | 4.5  | 6    | 7.2  | 1D    | 6000 | 1300  |       | 1500                  |       | –         |           | 1500  |       | –     |       |
|         | 4.5  | 9.5  | 7.2  | 1E    | 4000 | 1300  |       | 1500                  |       | –         |           | 1500  |       | –     |       |
|         | 5    | 10   | 7.2  | 1F    | 3500 | 1100  |       | 1400                  |       | –         |           | 1400  |       | –     |       |
|         | 5.5  | 7    | 7.2  | 1G    | 4000 | 1000  |       | 1200                  |       | –         |           | 1200  |       | –     |       |
|         | 5.5  | 11.5 | 7.2  | 1H    | 2500 | 1000  |       | 1200                  |       | –         |           | 1200  |       | –     |       |
|         | 6.5  | 8    | 7.2  | 1I    | 2500 | 800   |       | 1000                  |       | –         |           | 1000  |       | –     |       |
|         | 7.2  | 8.5  | 7.2  | 1J    | 2500 | 700   |       | 1000                  |       | –         |           | 1000  |       | –     |       |
|         | 7.2  | 13   | 7.2  | 1K    | 2000 | 700   |       | 950                   |       | –         |           | 1000  |       | –     |       |
|         | 8.5  | 10   | 7.2  | 1L    | 2000 | 600   |       | 800                   |       | –         |           | 800   |       | –     |       |
|         | 8.5  | 14   | 7.2  | 1M    | 1500 | 600   |       | 800                   |       | –         |           | 800   |       | –     |       |
|         | 11   | 16   | 7.2  | 1N    | 1000 | 500   |       | 600                   |       | –         |           | 640   |       | –     |       |
| 7.5 mm  | 2.5  | 7    | 10   | 2A    | 5000 | –     |       | 2500                  |       | 4400      |           | 2500  |       | –     |       |
|         | 3    | 8.5  | 10   | 2B    | 5000 | –     |       | 2200                  |       | 4300      |           | 2300  |       | 4150  |       |
|         | 4    | 9    | 10   | 2C    | 4000 | –     |       | 1700                  |       | 3200      |           | 1700  |       | 3100  |       |
|         | 4.5  | 9.5  | 10.3 | 2D    | 3500 | –     |       | 1500                  |       | 2900      |           | 1400  |       | 2700  |       |
|         | 5    | 10.5 | 10.3 | 2E    | 3000 | –     |       | 1300                  |       | 2500      |           | 1300  |       | –     |       |
|         | 5.7  | 12.5 | 10.3 | 2F    | 2000 | –     |       | 1000                  |       | 2200      |           | 1100  |       | –     |       |
|         | 7.2  | 12.5 | 10.3 | 2G    | 1500 | –     |       | 900                   |       | 1800      |           | 1000  |       | –     |       |
| 10 mm   | 3    | 9    | 13   | 3A    | 3000 | –     |       | 1100                  |       | 2200      |           | –     |       | 1900  |       |
|         | 4    | 8.5  | 13.5 | FA    | 3000 | –     |       | 900                   |       | 1600      |           | –     |       | 1450  |       |
|         | 4    | 9    | 13   | 3C    | 3000 | –     |       | 900                   |       | 1600      |           | –     |       | 1450  |       |
|         | 4    | 9.5  | 13   | 3D    | 3000 | –     |       | 900                   |       | 1600      |           | –     |       | 1400  |       |
|         | 5    | 10   | 13.5 | FB    | 2000 | –     |       | 700                   |       | 1300      |           | –     |       | 1200  |       |
|         | 5    | 11   | 13   | 3F    | 3000 | –     |       | 700                   |       | 1300      |           | –     |       | 1200  |       |
|         | 6    | 12   | 13   | 3G    | 2400 | –     |       | 550                   |       | 1100      |           | –     |       | 1000  |       |
|         | 6    | 12.5 | 13   | 3H    | 2400 | –     |       | 550                   |       | 1100      |           | –     |       | 1000  |       |
| 15 mm   | 8    | 12   | 13   | 3I    | 2000 | –     |       | 400                   |       | 800       |           | –     |       | 740   |       |
|         | 5    | 11   | 18   | 4B    | 2400 | –     |       | 600                   |       | 1200      |           | –     |       | 1150  |       |
|         | 5    | 13   | 19   | FC    | 1000 | –     |       | 600                   |       | 1200      |           | –     |       | 1200  |       |
|         | 6    | 12.5 | 18   | 4C    | 2000 | –     |       | 500                   |       | 1000      |           | –     |       | 1000  |       |
|         | 6    | 14   | 19   | FD    | 1000 | –     |       | 500                   |       | 1000      |           | –     |       | 1000  |       |
|         | 7    | 14   | 18   | 4D    | 1600 | –     |       | 450                   |       | 900       |           | –     |       | 850   |       |
|         | 7    | 15   | 19   | FE    | 1000 | –     |       | 450                   |       | 900       |           | –     |       | 850   |       |
|         | 8    | 15   | 18   | 4F    | 1200 | –     |       | 400                   |       | 800       |           | –     |       | 740   |       |
|         | 8    | 17   | 19   | FF    | 500  | –     |       | 400                   |       | 800       |           | –     |       | 740   |       |
|         | 9    | 14   | 18   | 4H    | 1200 | –     |       | 350                   |       | 700       |           | –     |       | 650   |       |
|         | 9    | 16   | 18   | 4J    | 900  | –     |       | 350                   |       | 700       |           | –     |       | 650   |       |
| 22.5 mm | 10   | 18   | 19   | FG    | 500  | –     |       | 300                   |       | 650       |           | –     |       | 590   |       |
|         | 11   | 14   | 18   | 4M    | 1000 | –     |       | 300                   |       | 600       |           | –     |       | 540   |       |
|         | 5    | 14   | 26.5 | 5A    | 1200 | –     |       | –                     |       | 800       |           | –     |       | 770   |       |
|         | 6    | 15   | 26.5 | 5B    | 1000 | –     |       | –                     |       | 700       |           | –     |       | 640   |       |
|         | 7    | 16.5 | 26.5 | 5D    | 760  | –     |       | –                     |       | 600       |           | –     |       | 550   |       |
|         | 8    | 20   | 28   | FH    | 500  | –     |       | –                     |       | 500       |           | –     |       | 480   |       |
|         | 8.5  | 18.5 | 26.5 | 5F    | 500  | –     |       | –                     |       | 480       |           | –     |       | 450   |       |
|         | 10   | 22   | 28   | FI    | 570* | –     |       | –                     |       | 420       |           | –     |       | 380   |       |
|         | 10.5 | 19   | 26.5 | 5G    | 594* | –     |       | –                     |       | 400       |           | –     |       | 360   |       |
|         | 10.5 | 20.5 | 26.5 | 5H    | 594* | –     |       | –                     |       | 400       |           | –     |       | 360   |       |
|         | 11   | 21   | 26.5 | 5I    | 561* | –     |       | –                     |       | 380       |           | –     |       | 350   |       |
|         | 12   | 24   | 28   | FJ    | 480* | –     |       | –                     |       | 350       |           | –     |       | 310   |       |

\* TPS (Tray-Packing-System). Plate versions may have different packing units.  
Samples and pre-production needs on request.

■ Moulded versions.

Rights reserved to amend design data without prior notification.

## Packing Quantities for Capacitors with Radial Pins in PCM 27.5 mm to 52.5 mm

| PCM            | Size |      |      |           | bulk     | ROLL     |          | pcs. per packing unit |          |           |           | AMMO     |          |          |          |
|----------------|------|------|------|-----------|----------|----------|----------|-----------------------|----------|-----------|-----------|----------|----------|----------|----------|
|                |      |      |      |           |          |          |          | REEL                  |          |           |           |          |          |          |          |
|                | W    | H    | L    | Codes     |          | H16.5    | H18.5    | ø 360                 | ø 500    | 340 × 340 | 490 × 370 |          |          |          |          |
|                |      |      |      |           | <b>S</b> | <b>N</b> | <b>O</b> | <b>F</b>              | <b>I</b> | <b>H</b>  | <b>J</b>  | <b>A</b> | <b>C</b> | <b>B</b> | <b>D</b> |
| <b>27.5 mm</b> | 9    | 19   | 31.5 | <b>6A</b> | 567*     | –        | –        | –                     | –        | 460/340*  | –         | –        | –        | 420      | –        |
|                | 11   | 21   | 31.5 | <b>6B</b> | 459*     | –        | –        | –                     | –        | 380/280*  | –         | –        | –        | 350      | –        |
|                | 13   | 24   | 31.5 | <b>6D</b> | 378*     | –        | –        | –                     | –        | 300       | –         | –        | –        | 290      | –        |
|                | 13   | 25   | 33   | <b>FK</b> | 405*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 15   | 26   | 31.5 | <b>6F</b> | 324*     | –        | –        | –                     | –        | 270       | –         | –        | –        | 250      | –        |
|                | 15   | 26   | 33   | <b>FL</b> | 324*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 17   | 29   | 31.5 | <b>6G</b> | 198*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 17   | 34.5 | 31.5 | <b>6I</b> | 198*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 20   | 32   | 33   | <b>FM</b> | 162*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 20   | 39.5 | 31.5 | <b>6J</b> | 162*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
| <b>37.5 mm</b> | 9    | 19   | 41.5 | <b>7A</b> | 441*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 11   | 22   | 41.5 | <b>7B</b> | 357*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 13   | 24   | 41.5 | <b>7C</b> | 294*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 15   | 26   | 41.5 | <b>7D</b> | 252*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 17   | 29   | 41.5 | <b>7E</b> | 154*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 19   | 32   | 41.5 | <b>7F</b> | 140*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 20   | 39.5 | 41.5 | <b>7G</b> | 126*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 24   | 45.5 | 41.5 | <b>7H</b> | 112*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 31   | 46   | 41.5 | <b>7I</b> | 84*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 35   | 50   | 41.5 | <b>7J</b> | 35*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 40   | 55   | 41.5 | <b>7K</b> | 28*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
| <b>48.5 mm</b> | 19   | 31   | 56   | <b>8D</b> | 120*     | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 23   | 34   | 56   | <b>8E</b> | 80*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 27   | 37.5 | 56   | <b>8H</b> | 84*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 33   | 48   | 56   | <b>8J</b> | 25*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 37   | 54   | 56   | <b>8L</b> | 25*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
| <b>52.5 mm</b> | 25   | 45   | 57   | <b>9D</b> | 70*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 30   | 45   | 57   | <b>9E</b> | 60*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 35   | 50   | 57   | <b>9F</b> | 25*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 45   | 55   | 57   | <b>9H</b> | 20*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |
|                | 45   | 65   | 57   | <b>9J</b> | 20*      | –        | –        | –                     | –        | –         | –         | –        | –        | –        | –        |

\* for 2-inch transport pitches.

\* TPS (Tray-Packing-System). Plate versions may have different packing units.  
Samples and pre-production needs on request.

■ Moulded versions.

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Updated data on [www.wima.com](http://www.wima.com)

A WIMA part number consists of 18 digits and is composed as follows:

Field 1 - 4: Type description  
 Field 5 - 6: Rated voltage  
 Field 7 - 10: Capacitance  
 Field 11 - 12: Size and PCM  
 Field 13 - 14: Version code (e.g. Snubber versions)  
 Field 15: Capacitance tolerance  
 Field 16: Packing  
 Field 17 - 18: Pin length (untaped)

| 1                        | 2 | 3 | 4 | 5                     | 6 | 7                   | 8 | 9 | 10 | 11                         | 12 | 13                | 14 | 15                     | 16   | 17   | 18 |
|--------------------------|---|---|---|-----------------------|---|---------------------|---|---|----|----------------------------|----|-------------------|----|------------------------|------|------|----|
| M                        | K | S | 2 | C                     | 0 | 2                   | 1 | 0 | 0  | 1                          | A  | 0                 | 0  | M                      | S    | S    | D  |
| MKS 2                    |   |   |   | 63 VDC                |   | 0.01 μF             |   |   |    | 2.5x6.5x7.2                |    | -                 |    | 20%                    | bulk | 6 -2 |    |
| <b>Type description:</b> |   |   |   | <b>Rated voltage:</b> |   | <b>Capacitance:</b> |   |   |    | <b>Size:</b>               |    | <b>Tolerance:</b> |    | <b>Packing:</b>        |      |      |    |
| SMD-PET = SMDT           |   |   |   | 50 VDC = B0           |   | 22 pF = 0022        |   |   |    | 4.8x3.3x3 Size 1812 = KA   |    | ±20% = M          |    | AMMO H16.5 340x340 = A |      |      |    |
| SMD-PEN = SMDN           |   |   |   | 63 VDC = C0           |   | 47 pF = 0047        |   |   |    | 4.8x3.3x4 Size 1812 = KB   |    | ±10% = K          |    | AMMO H16.5 490x370 = B |      |      |    |
| SMD-PPS = SMDI           |   |   |   | 100 VDC = D0          |   | 100 pF = 0100       |   |   |    | 5.7x5.1x3.5 Size 2220 = QA |    | ±5% = J           |    | AMMO H18.5 340x340 = C |      |      |    |
| FKP 02 = FKPO            |   |   |   | 250 VDC = F0          |   | 150 pF = 0150       |   |   |    | 5.7x5.1x4.5 Size 2220 = QB |    | ±2.5% = H         |    | AMMO H18.5 490x370 = D |      |      |    |
| MKS 02 = MKS0            |   |   |   | 400 VDC = G0          |   | 220 pF = 0220       |   |   |    | 7.2x6.1x3 Size 2824 = TA   |    | ±1% = E           |    | REEL H16.5 360 = F     |      |      |    |
| FKS 2 = FKS2             |   |   |   | 450 VDC = H0          |   | 330 pF = 0330       |   |   |    | 7.2x6.1x5 Size 2824 = TB   |    | ...               |    | REEL H16.5 500 = H     |      |      |    |
| FKP 2 = FKP2             |   |   |   | 520 VDC = H2          |   | 470 pF = 0470       |   |   |    | 10.2x7.6x5 Size 4030 = VA  |    |                   |    | REEL H18.5 360 = I     |      |      |    |
| FKS 3 = FKS3             |   |   |   | 600 VDC = I0          |   | 680 pF = 0680       |   |   |    | 12.7x10.2x6 Size 5040 = XA |    |                   |    | REEL H18.5 500 = J     |      |      |    |
| FKP 3 = FKP 3            |   |   |   | 630 VDC = J0          |   | 1000 pF = 1100      |   |   |    | 15.3x13.7x7 Size 6054 = YA |    |                   |    | ROLL H16.5 = N         |      |      |    |
| MKS 2 = MKS2             |   |   |   | 700 VDC = K0          |   | 1500 pF = 1150      |   |   |    | 2.5x7x4.6 PCM 2.5 = 0B     |    |                   |    | ROLL H18.5 = O         |      |      |    |
| MKP 2 = MKP2             |   |   |   | 800 VDC = L0          |   | 2200 pF = 1220      |   |   |    | 3x7.5x4.6 PCM 2.5 = 0C     |    |                   |    | BLISTER W12 180 = P    |      |      |    |
| MKS 4 = MKS4             |   |   |   | 850 VDC = M0          |   | 3300 pF = 1330      |   |   |    | 2.5x6.5x7.2 PCM 5 = 1A     |    |                   |    | BLISTER W12 330 = Q    |      |      |    |
| MKP 4C = MKPC            |   |   |   | 900 VDC = N0          |   | 4700 pF = 1470      |   |   |    | 3x7.5x7.2 PCM 5 = 1B       |    |                   |    | BLISTER W16 330 = R    |      |      |    |
| MKP 4 = MKP4             |   |   |   | 1000 VDC = O1         |   | 6800 pF = 1680      |   |   |    | 2.5x7x10 PCM 7.5 = 2A      |    |                   |    | BLISTER W24 330 = T    |      |      |    |
| MKP 10 = MKP1            |   |   |   | 1100 VDC = P0         |   | 0.01 μF = 2100      |   |   |    | 3x8.5x10 PCM 7.5 = 2B      |    |                   |    | Bulk/TPS Standard = S  |      |      |    |
| FKP 1 = FKP1             |   |   |   | 1200 VDC = Q0         |   | 0.022 μF = 2220     |   |   |    | 3x9x13 PCM 10 = 3A         |    |                   |    | ...                    |      |      |    |
| MKP-X2 = MKX2            |   |   |   | 1250 VDC = R0         |   | 0.047 μF = 2470     |   |   |    | 4x9x13 PCM 10 = 3C         |    |                   |    |                        |      |      |    |
| MKP-X1 R = MKX1          |   |   |   | 1500 VDC = S0         |   | 0.1 μF = 3100       |   |   |    | 5x11x18 PCM 15 = 4B        |    |                   |    |                        |      |      |    |
| MKP-Y2 = MKY2            |   |   |   | 1600 VDC = T0         |   | 0.22 μF = 3220      |   |   |    | 6x12.5x18 PCM 15 = 4C      |    |                   |    |                        |      |      |    |
| MP 3-X2 = MPX2           |   |   |   | 2000 VDC = U0         |   | 0.47 μF = 3470      |   |   |    | 5x14x26.5 PCM 22.5 = 5A    |    |                   |    |                        |      |      |    |
| MP 3-X1 = MPX1           |   |   |   | 2500 VDC = V0         |   | 1 μF = 4100         |   |   |    | 6x15x26.5 PCM 22.5 = 5B    |    |                   |    |                        |      |      |    |
| MP 3-Y2 = MPY2           |   |   |   | 3000 VDC = W0         |   | 2.2 μF = 4220       |   |   |    | 9x19x31.5 PCM 27.5 = 6A    |    |                   |    |                        |      |      |    |
| MP 3R-Y2 = MPRY          |   |   |   | 4000 VDC = X0         |   | 4.7 μF = 4470       |   |   |    | 11x21x31.5 PCM 27.5 = 6B   |    |                   |    |                        |      |      |    |
| MKP 4F = MKPF            |   |   |   | 6000 VDC = Y0         |   | 10 μF = 5100        |   |   |    | 9x19x41.5 PCM 37.5 = 7A    |    |                   |    |                        |      |      |    |
| Snubber MKP = SNMP       |   |   |   | 250 VAC = 0V          |   | 22 μF = 5220        |   |   |    | 11x22x41.5 PCM 37.5 = 7B   |    |                   |    |                        |      |      |    |
| Snubber FKP = SNFP       |   |   |   | 275 VAC = 1W          |   | 47 μF = 5470        |   |   |    | 19x31x56 PCM 48.5 = 8D     |    |                   |    |                        |      |      |    |
| GTO MKP = GTOM           |   |   |   | 300 VAC = 2W          |   | 100 μF = 6100       |   |   |    | 25x45x57 PCM 52.5 = 9D     |    |                   |    |                        |      |      |    |
| DC-LINK MKP 3 = DCP3     |   |   |   | 305 VAC = AV          |   | 220 μF = 6220       |   |   |    | ...                        |    |                   |    |                        |      |      |    |
| DC-LINK MKP 4 = DCP4     |   |   |   | 350 VAC = BV          |   | 1000 μF = 7100      |   |   |    |                            |    |                   |    |                        |      |      |    |
| DC-LINK MKP 4S = DCP5    |   |   |   | 440 VAC = 4W          |   | 1500 μF = 7150      |   |   |    |                            |    |                   |    |                        |      |      |    |
| DC-LINK MKP 5 = DCP5     |   |   |   | 500 VAC = 5W          |   | ...                 |   |   |    |                            |    |                   |    |                        |      |      |    |
| DC-LINK MKP 6 = DCP6     |   |   |   | ...                   |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
| DC-LINK HC = DCHC        |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
| DC-LINK HY = DCHY        |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |                   |    |                        |      |      |    |
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