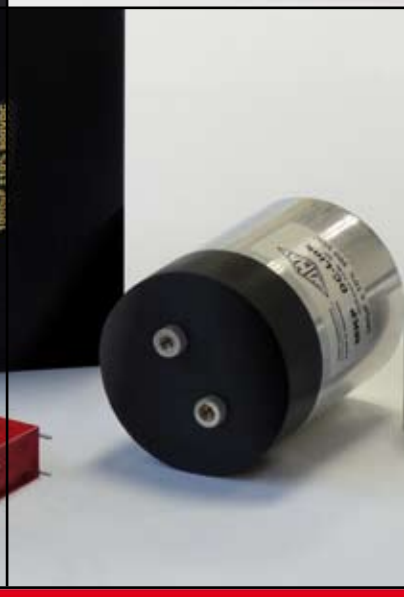
New Ranges

WIMA®

BEST CAPACITORS MADE IN GERMANY



DC-Link Capacitors

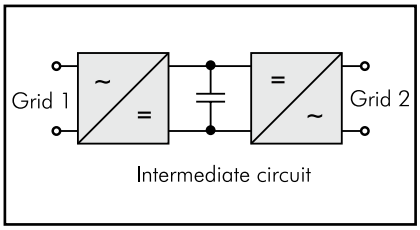
www.wima.com

WIMA DC-LINK Capacitors

The Alternative to Electrolytic Capacitors in Intermediate Circuit Applications

DC Link capacitors are used in intermediate circuit applications in power electronics, e. g. power conversion technique, replacing more and more the so far used electrolytic capacitors due to more stringent electrical requirement.

An intermediate circuit capacitor (DC-Link) is used in the intermediate circuit of converters of different kinds where it couples different electrical grids to one DC voltage level.



Schematic depiction of an intermediate circuit

Due to its high capacitance and its ability to supply power very quickly the DC voltage intermediate circuit is supported, and a constant DC voltage value can be realized even if high current peaks are generated by the system.

To comply with this field of application DC-Link capacitors must be designed for high DC voltages which occur permanently and which may be superimposed with high-frequency ripple voltages. Rated voltages of 500 VDC to 1500 VDC are typical for intermediate circuit capacitors.

Based on their industrial use it is, besides a high life time as well as a robust and safe terminating configuration, the temperature range of -55° C to +105° C which is of decisive importance.

In general aluminum electrolytic capacitors are used in power electronics due to their very high power density. However, in an increasing number of applications it is film capacitors with polypropylene film (PP) that are selected as they show some fundamental advantages towards electrolytic capacitors:

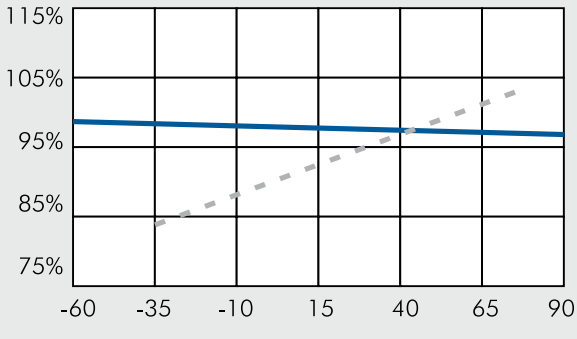
- 3 times higher dielectric voltage strength
- Very low dissipation factor (ESR)
- Very high insulation resistance
- Temperature resistance up to -55° C
- Considerably higher reliability by outstanding self-healing properties
- Long life expectancy
- Non-polarized construction
- High vibration and shock resistance
- Excellent mechanical stability

WIMA DC-LINK Capacitors

WIMA DC-LINK Capacitors are constructed of low-loss, metallized polypropylene films. They are available in several product ranges both in prismatic and cylindrical shape versions.

The rectangular box-type WIMA DC LINK MKP 4 range is available in capacitances of 2 µF up to 150 µF and at rated voltages of 600 VDC up to 1300 VDC. It is available in two-pin or four-pin version respectively.

The WIMA DC-LINK MKP 5 range is designed with a cylindrical plastic case available in capacitances of 16 µF to 260 µF and voltages of 500 VDC, 700 VDC, 900 VDC,

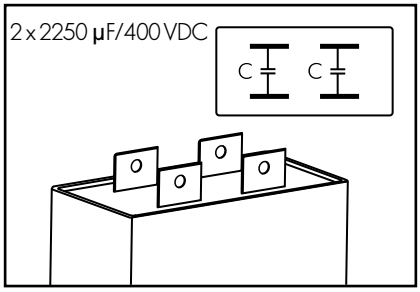


Comparison of capacitance drift over temperature between film an electrolytic capacitors

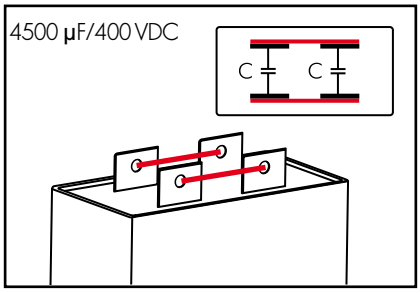
1100 VDC and 1300 VDC and exhibits tinned wire terminations for PCB mounting.

WIMA DC-LINK MKP 6 capacitors have a cylindrical aluminium housing and are available in capacitances of 165 µF to 1560 µF and in voltage ranges of 600 VDC, 700 VDC, 900 VDC, 1100 VDC, 1300 VDC and 1500 VDC. They are designed with M6 screw connections and M12 earth bolts for bus bar mounting.

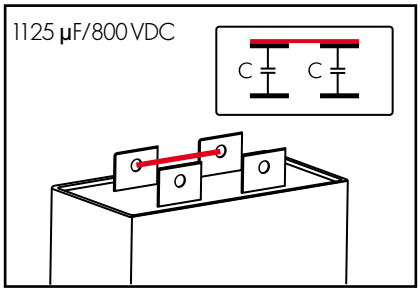
Due to their internal construction and their non-polarized termination design WIMA DC-LINK HC capacitors can be connected in three different wiring options. So for example an individual capacitor can be wired as 2 x 2250 µF/400 VDC, 4500 µF/400 VDC or also as 1125 µF/800 VDC. Depending on the dimensions and wiring options values between 85 µF/1600 VDC and 4500 µF/400 VDC are available.



Unwired component (on-delivery condition)

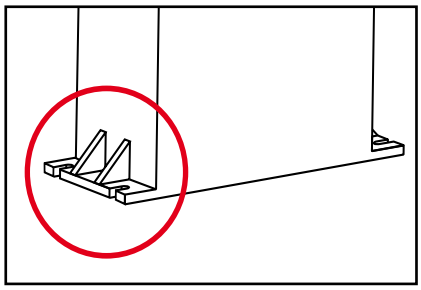


Wiring version "on capacitance"



Wiring version "on voltage"

DC-LINK HC capacitors can be selected both in moulded version and with solvent-resistant, flame-retardant plastic casing with or without screw fixing. Customized solutions can be realized on request.



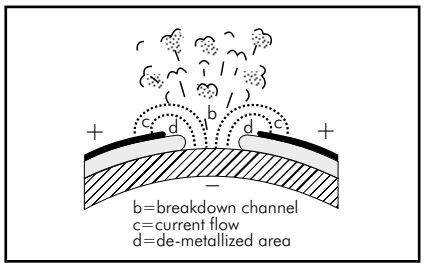
Optional screw fixing

Reliability and Life time of WIMA DC-LINK Capacitors

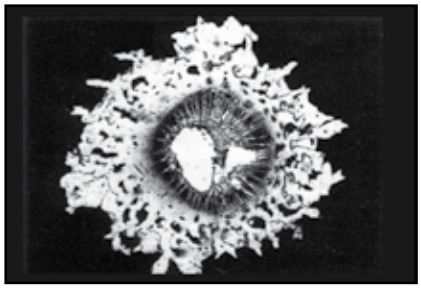
Plastic film capacitors offer two decisive advantages when compared to electrolytic capacitors:

1.) Self-healing properties

Compared to electrolytic capacitors, metallized plastic film capacitors self-heal in the event of an electrical breakdown of the dielectric. A breakdown always occurs at the weakest point of the dielectric and only takes nano-seconds. Temperatures of several 1000° K happen at one spot which cause the metal layer to evaporate and inside the breakdown channel transmute the dielectric into a highly compressed plasma. In the spreading plasma discharge is continuing via the metal electrodes. A metal-free zone (insulating halo) is formed around the breakdown channel. A proper self-healing process is depending on the metallization thickness, the chemical composition of the dielectric and the voltage level applied whereby - apart from the chemical composition - the manufacturing parameters have to provide the base for an optimum self-healing process.



Schematic depiction of a self-healing process



Insulating halo after the self-healing process

2.) Dry construction

Contrary to electrolytic capacitors WIMA DC-LINK capacitors have a dry construction. „Dry construction" means the absence of additives which for other types of capacitors are necessary in the form of impregnants or electrolytes. Hence, the phenomenon of continuing desiccation over a certain time which is generally known for electrolytic capacitors does not occur with WIMA plastic film capacitors. In general the mode of vacuum deposition of the metal electrodes provides corresponding self-securing measures to further improve the self-healing properties of the dielectric and thus to considerably increase the energy content of those capacitors. An additionally improved contact area between electrode and schoopage enables the application of highest pulse currents and voltage gradients. Those measures have a positive effect on the life expectancy and reliability of WIMA DC-LINK capacitors.

Application Examples for WIMA DC-LINK Capacitors

Railway technology

In an electric traction engine, e. g. a locomotive, DC-Link capacitors are used to feed energy from the traction power AC voltage grid into the intermediate circuit via an H-bridge where the AC grid voltage is converted into a DC voltage (intermediate circuit voltage). This energy can during traction operation again be converted into an AC voltage with variable frequency (typically 0 to 150 Hz) by means of a pulse inverter and again be placed at the disposal of the drive motor. Since the pulse inverter also acts as H-bridge the energy flow can also be effected vice versa, e. g. during braking operation.

Wind power units

DC-Link capacitors are used in the DC voltage intermediate circuit of wind power units, e. g. for voltage stabilization. The DC current intermediate circuit capacitor of a wind turbine requires a capacitance of about 3300 µF to 4700 µF and a high rated voltage of 600 V to 1000 V. Due to the self-healing effect after an electrical breakdown of the dielectric, their dry construction and their low sensitivity against high temperature variations film capacitors used in wind turbines offer a considerably higher reliability and a significantly longer life time than electrolytic capacitors.

Solar plants

In solar inverters, DC-Link capacitors are set in parallel to the source (either the

solar generator directly or the intermediate batteries) prior to the buck inverter module. The capacitor is subjected to a high-frequency ripple voltage being superimposed to the primary DC voltage. There is only one capacitor needed in a simple two-phase solar inverter.

Additional applications
Modern circuits and control devices of electric motors in today's drive engineering technology necessitate intermediate circuits in all kinds of applications, so for example in industrial and drive converters, frequency converters for pumps and ventilation, lifting and locomotion applications, and also for servo drives for example in machine tools and industrial robotics.

To answer the question which kind of capacitor is best for application in a given circuit position it is necessary to obtain excellent knowledge of the switching mechanism of the inverter and the parasitic shares of the circuit. The synthesis of a constant sinusoidal voltage for connection to the public or local mains requires high switching rates in different inverter valve combinations so that the output current can follow the sinusoidal current desired. The ripple depends on the DC voltage, the inductivity of the circuit and the switching duration. The switching frequency of a modern inverter based on IGBT technology is typically between 1 kHz and 20 kHz. The ripple current of a two-phase or three-phase track adds up and may cause severe damage to the generator and any other element switched on (e. g. batteries). The intermediate circuit capacitor is thus needed to absorb the switching ripples. That is why the DC-Link capacitor is the most important passive component in inverter circuits as it is the component decisive for the total life time of the device.

Conclusion

In modern drive engineering the intermediate circuit capacitor manufactured on the basis of metallized low-loss polypropylene film scores with its robustness, its insensitivity against high temperatures and its temperature adaptability. Above all, in cases where a high load transfer by an increasing intermediate circuit voltage occurs, reliable operation at high life time is permitted even without susceptible cascading of capacitances. Its tolerance towards highest ripple currents and the option of a low-inductive construction - values of approx. 10 nH at a capacitance of 1000 µF are possible - enable a low-resonance frequency response which is advantageous for the entire circuit.

Customized WIMA DC-LINK HC capacitors

WIMA DC-LINK MKP 4

Metallized Polypropylene (PP) Capacitors for DC-Link Applications

Special Features

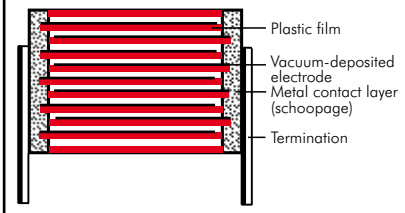
- **Capacitances up to 150 µF**
- **High volume/capacitance ratio**
- **Excellent self-healing properties**
- **Very low dissipation factor**
- **High reliability**
- **2-pin and 4-pin contact configuration (plate versions on request)**
- **According to RoHS 2002/95/EC**

Typical Applications

As intermediate circuit capacitor e. g. in high power converter technology, power supplies, solar inverters etc.

Construction

Dielectric:
Polypropylene (PP) film
Capacitor electrodes:
Vacuum-deposited
Internal construction:



Encapsulation:
Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0
Terminations:
Tinned wire (plate versions on request).
Marking:
Colour: Red. Marking: Black.
Epoxy resin seal: Red

Electrical Data

Capacitance range: 2 µF to 150 µF
Rated voltages: 600 VDC, 800 VDC, 900 VDC, 1100 VDC, 1300 VDC
Capacitance tolerances: ±20%, ±10%, ±5%
Operating temperature range:
–55° C to +105° C (hot spot including self-heating)
Climatic test category: 55/085/56 in accordance with IEC
Insulation resistance at +20° C:
⩾ 30 000 sec (MΩ x µF)
(mean value: 100 000 sec)
Measuring voltage: 100 V/1 min.
Dissipation factors at +20° C:
tan δ ⩽ 10 x 10^{-4} at 1 kHz (C ⩽ 50 µF)
tan δ ⩽ 15 x 10^{-4} at 1 kHz (C > 50 µF)
Test voltage: 1.2 U_r, 2sec
Dielectric absorption: 0.05 %
Voltage and current derating:
A derating factor of 1.35% per K must be applied from +85° C for DC voltages and from +70° C for AC currents (I_{rms}). Additionally a derating factor of 4.5% per K must be applied from +85° C for AC currents (I_{rms})

Reliability: Operational life > 100 000 hours (U_r and 70° C)
Failure rate λ_0 (0.5 x U_r and 40° C)

$\Pi = \lvert C_N$ [µF] x U_r [V]$\rvert$	λ_0
$\Pi \leqslant 10\,000$	< 2 fit
$10\,000 < \Pi \leqslant 25\,000$	< 5 fit
$25\,000 < \Pi \leqslant 50\,000$	< 10 fit
$50\,000 < \Pi \leqslant 100\,000$	< 20 fit
$\Pi > 100\,000$	< 30 fit

Specific dissipation:

Box size WxHxL in mm	Specific dissipation in Watts per K above the ambient temperature
19x32x41,5	0.054
20x39.5x41.5	0.065
24x45.5x41.5	0.080
31x46x41.5	0.092
35x50x41.5	0.106
40x55x41.5	0.123
35x50x57	0.132
45x55x57	0.164
45x65x57	0.184

* other box sizes see main catalogue.

Maximum pulse rise time for pulses equal to the rated voltage:

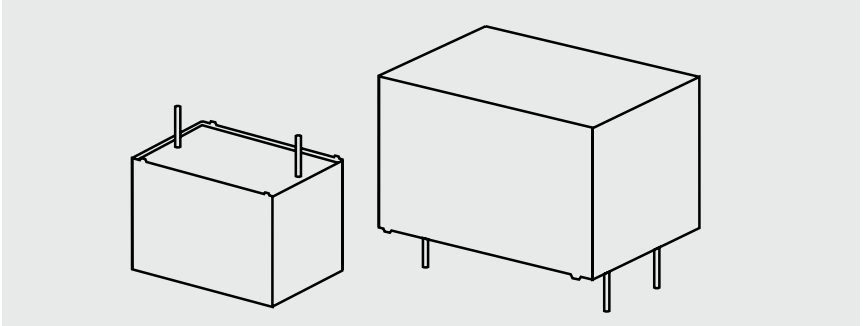
PCM	max. pulse rise time V/µsec at T_A < 40° C				
	600 VDC	800 VDC	900 VDC	1100 VDC	1300 VDC
27.5	19	21	25	31	36
37.5	14	15	16	21	25
52.5	10	12	13	15	18

Packing

Transportation-safe packing in cardboard boxes.
Packing units:

L	pcs. per packing unit
31.5	100
41.5	100
57	50

For further details and graphs please refer to Technical Information in the main catalogue.



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WIMA DC-LINK MKP 4

Continuation

General Data

Capacitance	600 VDC (70° C) / 450 VDC (85° C) W	H	L	PCM**	Pin	I_S A	I_{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	Part number
2 µF	9	19	31.5	27.5	2	38	2	56	DCP4I042006A_____
5 „	13	24	31.5	27.5	2	95	3.5	22	DCP4I045006D_____
7 „	15	26	31.5	27.5	2	133	4.5	16	DCP4I047006F_____
10 µF	17	29	31.5	27.5	2	190	6	11	DCP4I051006G_____
15 „	17	34,5	31.5	27.5	2	285	7.5	7.4	DCP4I051506I_____
20 „	20	39,5	31.5	27.5	2	380	9	6.2	DCP4I052006J_____
	20	39,5	41.5	37.5	2/4	280	10	6.2	DCP4I052007G_____
25 „	20	39,5	41.5	37.5	2/4	350	11.5	5	DCP4I052507G_____
30 „	24	45,5	41.5	37.5	2/4	420	14	4.1	DCP4I053007H_____
35 „	24	45,5	41.5	37.5	2/4	490	14.5	3.8	DCP4I053507H_____
40 „	31	46	41.5	37.5	2/4	560	16.5	3.3	DCP4I054007I_____
45 „	31	46	41.5	37.5	2/4	630	17	3.2	DCP4I054507I_____
50 „	35	50	41.5	37.5	2/4	700	19	2.9	DCP4I055007J_____
55 „	35	50	41.5	37.5	2/4	770	17	3.8	DCP4I055507J_____
60 „	35	50	41.5	37.5	2/4	840	17.5	3.4	DCP4I056007J_____
65 „	40	55	41.5	37.5	2/4	910	19.5	3.3	DCP4I056507K_____
	35	50	57	52.5	4	650	20	3.3	DCP4I056508A_____
70 „	40	55	41.5	37.5	2/4	980	20	3.1	DCP4I057007K_____
	35	50	57	52.5	4	700	20.5	3.1	DCP4I057008A_____
75 „	40	55	41.5	37.5	2/4	1050	20.5	3	DCP4I057507K_____
	35	50	57	52.5	4	750	21	3	DCP4I057508A_____
80 „	40	55	41.5	37.5	2/4	1120	22	2.6	DCP4I058007K_____
	35	50	57	52.5	4	800	22	2.6	DCP4I058008A_____
85 „	35	50	57	52.5	4	850	22.5	2.1	DCP4I058508A_____
90 „	35	50	57	52.5	4	900	23.5	1.9	DCP4I059008A_____
95 „	45	55	57	52.5	4	950	24	2.8	DCP4I059508B_____
100 µF	45	55	57	52.5	4	1000	25	2.6	DCP4I061008B_____
110 „	45	55	57	52.5	4	1100	26.5	2.3	DCP4I061108B_____
115 „	45	65	57	52.5	4	1150	27.5	2.5	DCP4I061158C_____
120 „	45	65	57	52.5	4	1200	28	2.3	DCP4I061208C_____
130 „	45	65	57	52.5	4	1300	29.5	2.1	DCP4I061308C_____
140 „	45	65	57	52.5	4	1400	31	1.9	DCP4I061408C_____
150 „	45	65	57	52.5	4	1500	33	1.7	DCP4I061508C_____

New box sizes, values and ranges.

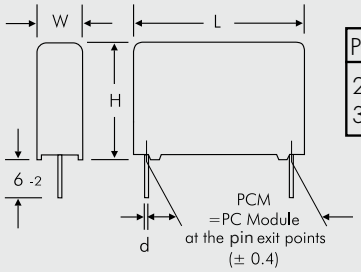
* General guide

** PCM = Printed circuit module = pin spacing

Dims. in mm.

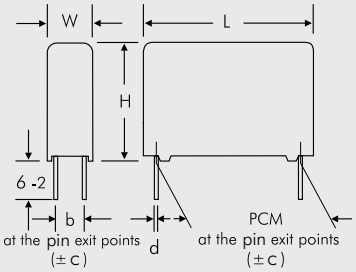
Part number completion:		
Version code:	2-pin	= D2
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

2-pin version



PCM	d
27.5	0.8
37.5	1

4-pin version



W	PCM	b	d	c
19	37.5	12.5	1	0.4
20	37.5	12.5	1	0.4
24	37.5	12.5	1	0.4
31	37.5	20	1	0.4
35	37.5	20	1	0.4
40	37.5	20	1	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

Continuation next page

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WIMA DC-LINK MKP 4

Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	I_S A	I_{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	Part number
						800 VDC (70° C) / 700 VDC (85° C)			
2 µF	9	19	31.5	27.5	2	42	2	52	DCP4L042006A_____
5 „	13	24	31.5	27.5	2	105	4	21	DCP4L045006D_____
7 „	17	29	31.5	27.5	2	147	5	15	DCP4L047006G_____
10 µF	17	34.5	31.5	27.5	2	210	6.5	10	DCP4L051006I_____
15 „	20	39.5	31.5	27.5	2	315	9	6.9	DCP4L051506J_____
	20	39.5	41.5	37.5	2/4	225	9.5	6.9	DCP4L051507G_____
20 „	20	39.5	41.5	37.5	2/4	300	10	6.2	DCP4L052007G_____
25 „	24	45.5	41.5	37.5	2/4	375	12.5	5	DCP4L052507H_____
30 „	24	45.5	41.5	37.5	2/4	450	14	4.1	DCP4L053007H_____
35 „	31	46	41.5	37.5	2/4	525	15.5	3.8	DCP4L053507I_____
40 „	31	46	41.5	37.5	2/4	600	16.5	3.3	DCP4L054007I_____
45 „	35	50	41.5	37.5	2/4	675	17.5	3.4	DCP4L054507J_____
50 „	35	50	41.5	37.5	2/4	750	19	3	DCP4L055007J_____
55 „	40	55	41.5	37.5	2/4	825	19.5	3.2	DCP4L055507K_____
60 „	40	55	41.5	37.5	2/4	900	20.5	2.9	DCP4L056007K_____
	35	50	57	52.5	4	720	21.5	2.9	DCP4L056008A_____
65 „	35	50	57	52.5	4	780	22.5	2.2	DCP4L056508A_____
70 „	45	55	57	52.5	4	840	23.5	3	DCP4L057008B_____
75 „	45	55	57	52.5	4	900	24	2.9	DCP4L057508B_____
80 „	45	55	57	52.5	4	960	24.5	3	DCP4L058008B_____
85 „	45	65	57	52.5	4	1020	25	2.6	DCP4L058508C_____
90 „	45	65	57	52.5	4	1080	25.5	2.5	DCP4L059008C_____
95 „	45	65	57	52.5	4	1140	26	2.4	DCP4L059508C_____
100 µF	45	65	57	52.5	4	1200	26.5	2.3	DCP4L061008C_____
110 „	45	65	57	52.5	4	1320	27.5	2.2	DCP4L061108C_____
115 „	45	65	57	52.5	4	1380	28	2.1	DCP4L061158C_____

Capacitance	W	H	L	PCM**	Pin	I_S A	I_{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	Part number
						900 VDC (70° C) / 760 VDC (85° C)			
2 µF	11	21	31.5	27.5	2	50	2.5	44	DCP4N042006B_____
5 „	17	29	31.5	27.5	2	125	4.5	18	DCP4N045006G_____
7 „	17	34.5	31.5	27.5	2	175	6	13	DCP4N047006I_____
10 µF	20	39.5	31.5	27.5	2	250	8	8.8	DCP4N051006J_____
	20	39.5	41.5	37.5	2/4	160	8.5	8.8	DCP4N051007G_____
15 „	20	39.5	41.5	37.5	2/4	240	10.5	5.8	DCP4N051507G_____
20 „	24	45.5	41.5	37.5	2/4	320	13	4.8	DCP4N052007H_____
25 „	31	46	41.5	37.5	2/4	400	15.5	3.8	DCP4N052507I_____
30 „	31	46	41.5	37.5	2/4	480	15.5	3.7	DCP4N053007I_____
35 „	35	50	41.5	37.5	2/4	560	18	3.2	DCP4N053507J_____
40 „	40	55	41.5	37.5	2/4	640	19.5	3.2	DCP4N054007K_____
	35	50	57	52.5	4	520	20.5	3.2	DCP4N054008A_____
45 „	35	50	57	52.5	4	585	21	2.8	DCP4N054508A_____
50 „	35	50	57	52.5	4	650	22	3.3	DCP4N055008A_____
55 „	45	55	57	52.5	4	715	22.5	3.2	DCP4N055508B_____
60 „	45	55	57	52.5	4	780	23	3	DCP4N056008B_____
65 „	45	55	57	52.5	4	845	24	2.9	DCP4N056508B_____
70 „	45	65	57	52.5	4	910	24.5	3.3	DCP4N057008C_____
75 „	45	65	57	52.5	4	975	25	2.9	DCP4N057508C_____
80 „	45	65	57	52.5	4	1040	25.5	2.8	DCP4N058008C_____

New box sizes, values and ranges. Dims. in mm.

* General guide

** PCM = Printed circuit module = pin spacing

Continuation next page

WIMA DC-LINK MKP 4

Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	I_S A	I_{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	Part number
						1100 VDC (70° C) / 920 VDC (85° C)			
2 µF	13	24	31.5	27.5	2	62	3	36	DCP4P042006D_____
5 „	17	34.5	31.5	27.5	2	155	5.5	14	DCP4P045006I_____
7 „	20	39.5	31.5	27.5	2	217	7.5	10	DCP4P047006J_____
	19	32	41.5	37.5	2/4	147	7.5	10	DCP4P047007F_____
10 µF	20	39.5	41.5	37.5	2/4	210	9.5	7.2	DCP4P051007G_____
15 „	31	46	41.5	37.5	2/4	315	13	5.4	DCP4P051507I_____
20 „	35	50	41.5	37.5	2/4	420	15	4.7	DCP4P052007J_____
25 „	40	55	41.5	37.5	2/4	525	16.5	4.6	DCP4P052507K_____
30 „	35	50	57	52.5	4	450	17.5	4.4	DCP4P053008A_____
35 „	35	50	57	52.5	4	525	18	4	DCP4P053508A_____
40 „	45	55	57	52.5	4	600	19	4.5	DCP4P054008B_____
45 „	45	55	57	52.5	4	675	20	4.1	DCP4P054508B_____
50 „	45	65	57	52.5	4	750	21	4.1	DCP4P055008C_____
55 „	45	65	57	52.5	4	825	22	3.8	DCP4P055508C_____
60 „	45	65	57	52.5	4	900	23	3.5	DCP4P056008C_____

Capacitance	W	H	L	PCM**	Pin	I_S A	I_{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	Part number
						1300 VDC (70° C) / 1100 VDC (85° C)			
2 µF	15	26	31.5	27.5	2	72	3	36	DCP4R242006F_____
5 „	20	39.5	31.5	27.5	2	180	6	14	DCP4R245006J_____
	20	39.5	41.5	37.5	2/4	125	7	14	DCP4R245007G_____
7 „	20	39.5	41.5	37.5	2/4	175	8	10	DCP4R247007G_____
10 µF	24	45.5	41.5	37.5	2/4	250	10.5	7.2	DCP4R251007H_____
15 „	31	46	41.5	37.5	2/4	375	14	4.8	DCP4R251507I_____
20 „	40	55	41.5	37.5	2/4	500	17.5	4	DCP4R252007K_____
	35	50	57	52.5	4	360	18	4	DCP4R252008A_____
25 „	35	50	57	52.5	4	450	19	3.6	DCP4R252508A_____
30 „	45	55	57	52.5	4	540	20	4	DCP4R253008B_____
35 „	45	65	57	52.5	4	630	21	4.1	DCP4R253508C_____
40 „	45	65	57	52.5	4	720	22	3.7	DCP4R254008C_____

New box sizes, values and ranges.

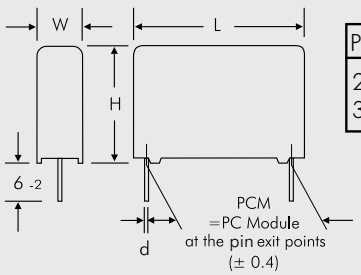
* General guide

** PCM = Printed circuit module = pin spacing

Dims. in mm.

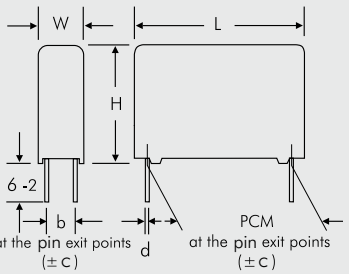
Part number completion:		
Version code:	2-pin	= D2
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

2-pin version



PCM	d
27.5	0.8
37.5	1

4-pin version



W	PCM	b	d	c
19	37.5	12.5	1	0.4
20	37.5	12.5	1	0.4
24	37.5	12.5	1	0.4
31	37.5	20	1	0.4
35	37.5	20	1	0.4
40	37.5	20	1	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

11.11

WIMA DC-LINK MKP 5 NEW

Metallized Polypropylene (PP) Capacitors for DC-Link Applications

Special Features

- **Very high volume/capacitance ratio**
- **Self-healing properties**
- **With cylindrical plastic case for PCB mounting**
- **Dry construction without electrolyte or oil**
- **No internal fuse required**
- **Negative capacitance change versus temperature**
- **Very low dielectric absorption**
- **According to RoHS 2002/95/EC**

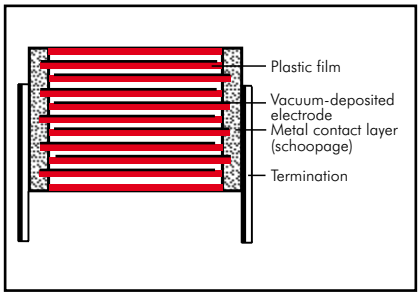
Typical Applications

DC capacitors with high capacitances for applications in power electronics also at non-sinusoidal voltages and currents e. g. in

- **Wind power systems**
- **Inverters**

Construction

Dielectric:
Polypropylene (PP) film
Capacitor electrodes:
Vacuum-deposited
Internal construction:



Encapsulation:
Solvent-resistant, flame-retardant plastic case with PU-sealing, UL 94 V-0
Terminations:
Tinned wire.
Marking:
Colour: Grey. Marking: Black on silver label.

Electrical Data

Capacitance range: 16 µF to 260 µF
Rated voltages: 500 VDC, 700 VDC, 900 VDC, 1100 VDC, 1300 VDC
Capacitance tolerances: ±20%, ±10%
Operating temperature range: –40° C to +85° C
Insulation resistance at +20° C:
⩾ 5 000 sec (MΩ x µF)
(mean value: 20 000 sec)
Measuring voltage: 100 V/1 min.

Dielectric loss factor tan δ_0:
2×10^{-4}
Test voltage: 1.5 U_r, 2sec
Dielectric absorption:
0.05 %
Reliability:
Operational life > 100 000 hours at 40° C

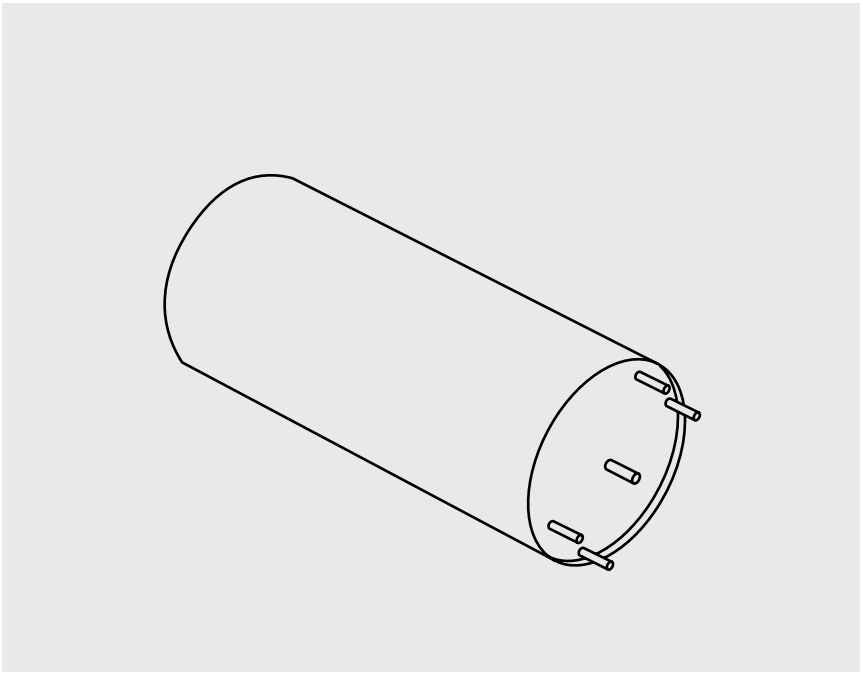
Mounting Recommendation

Excessive mechanical strain, e. g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors.

Packing

Transportation-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information in the main catalogue.



WIMA DC-LINK MKP 5

Continuation

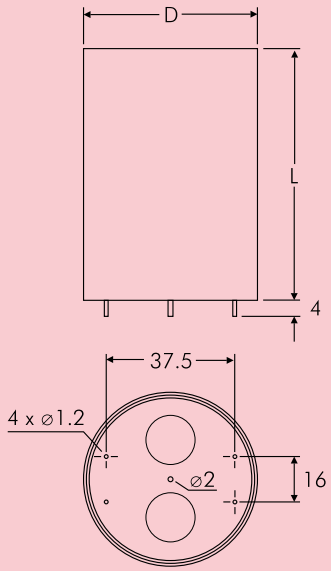
General Data

U_R	C_N	D x L mm	I_{rms} (1 kHz)** A	ESR (1 kHz)** mΩ	Approx. weight g	Part number
500 VDC	85 µF	50 x 57	35	2.0	120	DCP5H15850D000_ _ _ _
	195 „	50 x 95	32	3.4	190	DCP5H16195D100_ _ _ _
	260 „	50 x 120	30	5.2	220	DCP5H16260D200_ _ _ _
700 VDC	59 µF	50 x 57	30	1.9	120	DCP5K05590D000_ _ _ _
	143 „	50 x 95	32	3.5	190	DCP5K06143D100_ _ _ _
	190 „	50 x 120	25	4.7	220	DCP5K06190D200_ _ _ _
900 VDC	53 µF	50 x 57	35	2.3	120	DCP5N05530D000_ _ _ _
	114 „	50 x 95	32	4.2	190	DCP5N06114D100_ _ _ _
	158 „	50 x 120	30	6.0	220	DCP5N06158D200_ _ _ _
1100 VDC	30 µF	50 x 57	20	2.8	120	DCP5P05300D000_ _ _ _
	72 „	50 x 95	25	4.5	190	DCP5P05720D100_ _ _ _
	100 „	50 x 120	25	6.1	220	DCP5P06100D200_ _ _ _
1300 VDC	16 µF	50 x 57	20	3.0	120	DCP5R25160D000_ _ _ _
	40 „	50 x 95	25	5.7	190	DCP5R25400D100_ _ _ _
	55 „	50 x 120	25	7.7	220	DCP5R25550D200_ _ _ _

** General guide

Dims. in mm.

Part number completion:	
Tolerance:	20 % = M
	10 % = K
Packing:	bulk = S
Pin length:	none = 00



D	L
50	57
50	95
50	120

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WIMA DC-LINK MKP 6 NEW

Metallized Polypropylene (PP) Capacitors for DC-Link Applications

Special Features

- **Very high volume/capacitance ratio**
- **Self-healing properties**
- **With cylindrical aluminium case for bus bar mounting**
- **Dry construction without electrolyte or oil**
- **No internal fuse required**
- **Negative capacitance change versus temperature**
- **Very low dielectric absorption**
- **According to RoHS 2002/95/EC**

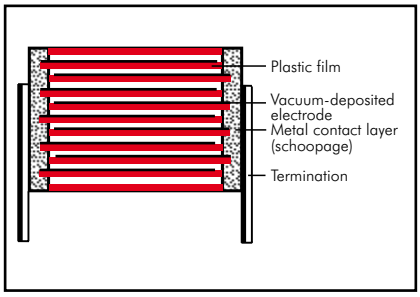
Typical Applications

DC capacitors with high capacitances for applications in power electronics also at non-sinusoidal voltages and currents e. g. in

- **Wind power systems**
- **Inverters**

Construction

Dielectric:
Polypropylene (PP) film
Capacitor electrodes:
Vacuum-deposited
Internal construction:



Encapsulation:
Aluminium case with PU-sealing, UL 94 V-0
Terminations:
Screw connection M6, screw bolt M12 x 16.
Marking:
Colour: Metallic. Marking: Black on silver label.

Electrical Data

Capacitance range: 165 µF to 1560 µF
Rated voltages: 600 VDC, 700 VDC, 900 VDC, 1100 VDC, 1300 VDC, 1500 VDC
Capacitance tolerances: ±20%, ±10%
Operating temperature range: –40° C to +85° C
Insulation resistance at +20° C:
⩾ 5 000 sec (MΩ x µF)
(mean value: 20 000 sec)
Measuring voltage: 100 V/1 min.

Dielectric loss factor tan δ_0:
2×10^{-4}
Test voltage: 1.5 U_r, 2sec
Dielectric absorption:
0.05 %
Reliability:
Operational life > 100 000 hours at 40° C

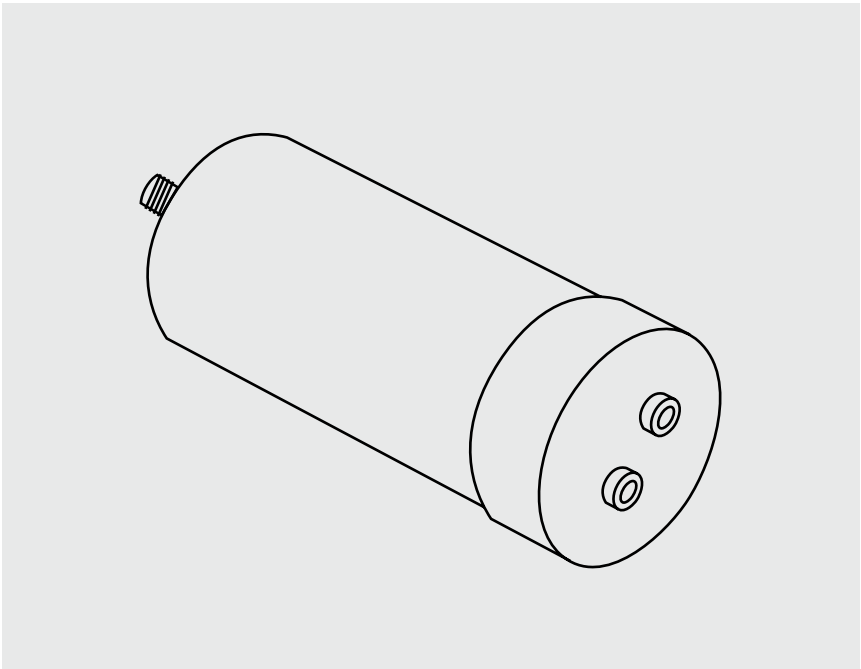
Mounting Recommendation

Excessive mechanical strain, e. g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors.

Packing

Transportation-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information in the main catalogue.



WIMA DC-LINK MKP 6

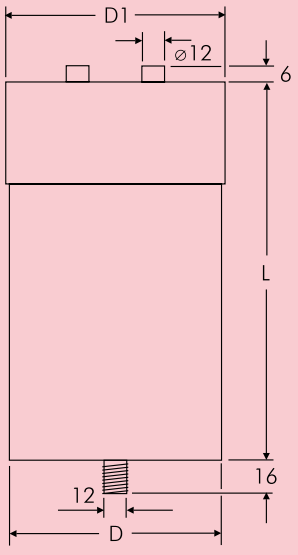
Continuation

General Data

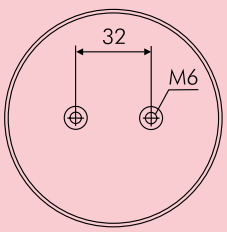
U_R	C_N	D x L mm	I_{rms} (max.)** A	ESR (1 kHz)** mΩ	Approx. weight g	Part number
600 VDC	780 µF	85 x 120	30	1.6	700	DCP6I06780E000_ _ _ _
	1000 „	85 x 132	35	1.7	850	DCP6I07100E100_ _ _ _
	1560 „	85 x 210	60	1.3	1400	DCP6I07156E200_ _ _ _
700 VDC	585 µF	85 x 120	30	1.7	700	DCP6K06585E000_ _ _ _
	750 „	85 x 132	35	1.9	850	DCP6K06750E100_ _ _ _
	1170 „	85 x 210	60	1.3	1400	DCP6K07117E200_ _ _ _
900 VDC	480 µF	85 x 120	30	1.7	700	DCP6N06480E000_ _ _ _
	550 „	85 x 132	36	1.8	850	DCP6N06550E100_ _ _ _
	900 „	85 x 210	60	1.5	1400	DCP6N06900E200_ _ _ _
1100 VDC	325 µF	85 x 120	30	1.8	700	DCP6P06325E000_ _ _ _
	420 „	85 x 132	40	1.9	850	DCP6P06420E100_ _ _ _
	650 „	85 x 210	60	1.3	1400	DCP6P06650E200_ _ _ _
1300 VDC	215 µF	85 x 120	30	1.8	700	DCP6R26215E000_ _ _ _
	270 „	85 x 132	40	2.4	850	DCP6R26270E100_ _ _ _
	430 „	85 x 210	60	1.5	1400	DCP6R26430E200_ _ _ _
1500 VDC	165 µF	85 x 120	30	2.2	700	DCP6S06165E000_ _ _ _
	210 „	85 x 132	40	2.5	850	DCP6S06210E100_ _ _ _
	330 „	85 x 210	60	1.7	1400	DCP6S06330E200_ _ _ _

** General guide

Dims. in mm.



D	D1	L
85	86	120
85	86	132
85	86	210



Part number completion:	
Tolerance:	20 % = M
	10 % = K
Packing:	bulk = S
Pin length:	none = 00

11.11

WIMA DC-LINK HC

Metallized Polypropylene (PP) Capacitors for DC-Link Applications

Special Features

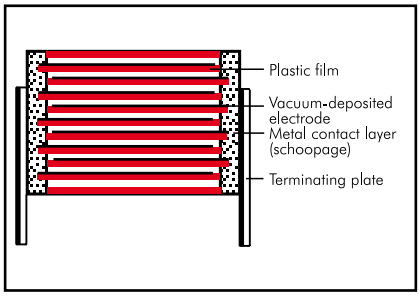
- **Very high volume/capacitance ratio**
- **Self-healing, internal safety disconnector**
- **Versatile and safe contact configurations by screwable plates**
- **Dry construction without electrolyte or oil**
- **Very low disipation factor**
- **Negative capacitance change versus temperature**
- **Very low dielectric absorption**
- **According to RoHS 2002/95/EC**

Typical Applications

As intermediate circuit capacitor e. g. in high power converter technology

Construction

Dielectric:
Polypropylene (PP) film
Capacitor electrodes:
Vacuum-deposited
Internal construction:



Encapsulation:
Solvent resistant, flame-retardant plastic case with resin seal (optional screw fixing) or moulded version (without screw fixing), UL 94 V-0.
Terminations:
Tinned plates, customized plate configurations are possible.
Marking:
Colour: Black. Marking: Gold.

Electrical Data

Capacitance range:
85 µF to 4500 µF
Rated voltages:
400 VDC, 800 VDC, 1600 VDC
Capacitance tolerances:
±20%, ±10%, (±5% available subject to special enquiry)
Operating temperature:
–55° C to +85° C
Insulation resistance at +20° C:
⩾ 30 000 sec (MΩ x µF)
(mean value: 100 000 sec)
Measuring voltage: 100 V/1 min.
Dissipation factors at +20° C:
See General Data.
Test voltage: 1.1 U_r, 2 sec
Dielectric absorption:
0.05 %
Voltage derating:
A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.
Reliability:
Operational life > 100 000 hours at 40° C
Failure rate < 36 fit (0.5 x U_r and 40° C)
Specific dissipation:
See General Data.

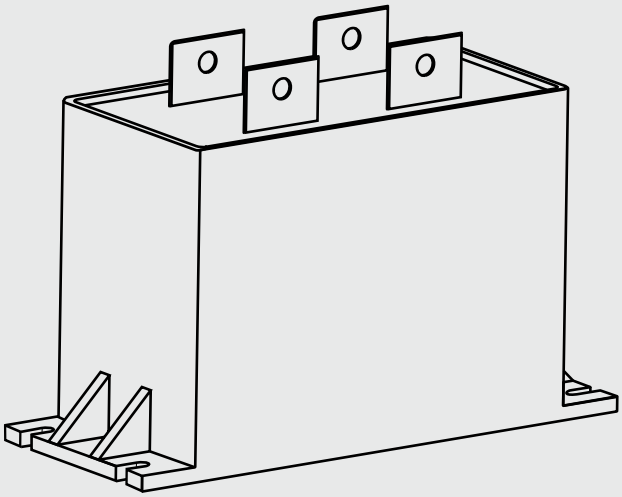
Mounting Recommendation

Excessive mechanical strain, e. g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the capacitor the screw torque is to be limited to max. 5 Nm.

Packing

Transportation-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information in the main catalogue.



WIMA DC-LINK HC

Continuation

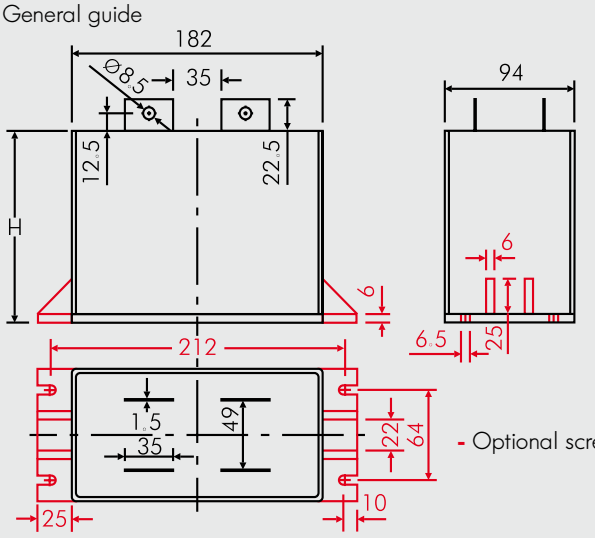
General Data

Capacitance			Size	Electrical parameters									Part number
400 VDC/ 180 VAC*	400 VDC/ 180 VAC* **V1**	800 VDC/ 360 VAC* **V2**	182 x 94 x H in mm	$I_{max.}$ A **V1**	$I_{max.}$ A **V2**	I_{rms} (1 kHz)** A **V1**	I_{rms} (1 kHz)** A **V2**	ESR (1 kHz)** mΩ **V1**	ESR (1 kHz)** mΩ **V2**	k_T W/K	tan δ** [x 10^{-4}] 100 Hz	tan δ** [x 10^{-4}] 1 kHz	
2 x 250 µF	500 µF	125 µF	49	5000	1250	65.4	32.7	1.43	5.73	0.613	8	45	DCH3G06250__00____
2 x 500 „	1000 „	250 „	77	10 000	2500	103.5	51.7	0.72	2.87	0.767	8	45	DCH3G06500__00____
2 x 750 „	1500 „	375 „	105	15 000	3750	139.0	69.5	0.48	1.91	0.922	8	45	DCH3G06750__00____
2 x 1000 „	2000 „	500 „	133	20 000	5000	173.3	86.7	0.36	1.43	1.076	8	45	DCH3G07100__00____
2 x 1250 „	2500 „	625 „	161	25 000	6250	196.7	98.3	0.32	1.27	1.231	11	50	DCH3G07125__00____
2 x 1500 „	3000 „	750 „	189	30 000	7500	228.5	114.3	0.27	1.06	1.385	11	50	DCH3G07150__00____
2 x 1750 „	3500 „	875 „	217	35 000	8750	248.1	124.1	0.25	1.00	1.540	11	55	DCH3G07175__00____
2 x 2000 „	4000 „	1000 „	245	40 000	10 000	278.3	139.2	0.22	0.88	1.695	14	55	DCH3G07200__00____
2 x 2250 „	4500 „	1125 „	285	45 000	11 250	298.7	157.4	0.21	0.76	1.893	14	60	DCH3G07225__00____

Capacitance			Size	Electrical parameters									Part number
800 VDC/ 240 VAC*	800 VDC/ 240 VAC* **V1**	1600 VDC/ 480 VAC* **V2**	182 x 94 x H in mm	$I_{max.}$ A **V1**	$I_{max.}$ A **V2**	I_{rms} (1 kHz)** A **V1**	I_{rms} (1 kHz)** A **V2**	ESR (1 kHz)** mΩ **V1**	ESR (1 kHz)** mΩ **V2**	k_T W/K	tan δ** [x 10^{-4}] 100 Hz	tan δ** [x 10^{-4}] 1 kHz	
2 x 170 µF	340 µF	85 µF	49	3740	935	61.2	30.6	1.64	6.55	0.613	7	35	DCH4L06170__00____
2 x 340 „	680 „	170 „	77	7480	1870	96.8	48.4	0.82	3.28	0.767	7	35	DCH4L06340__00____
2 x 510 „	1020 „	255 „	105	11 220	2805	129.9	65.0	0.55	2.18	0.922	7	35	DCH4L06510__00____
2 x 680 „	1360 „	340 „	133	14 960	3740	162.1	81.0	0.41	1.64	1.076	7	35	DCH4L06680__00____
2 x 850 „	1700 „	425 „	161	18 700	4675	181.3	90.7	0.37	1.50	1.231	10	40	DCH4L06850__00____
2 x 1020 „	2040 „	510 „	189	22 440	5610	210.7	105.3	0.31	1.25	1.385	10	40	DCH4L07102__00____
2 x 1190 „	2380 „	595 „	217	26 180	6545	226.2	113.1	0.30	1.20	1.540	10	45	DCH4L07119__00____
2 x 1360 „	2720 „	680 „	245	29 920	7480	253.7	126.9	0.26	1.05	1.695	12	45	DCH4L07136__00____
2 x 1530 „	3060 „	765 „	285	33 660	8415	269.8	134.9	0.26	1.04	1.893	12	50	DCH4L07153__00____

* AC voltages: f < 100 Hz

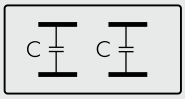
** General guide



- Optional screw fixing

Part number completion:					
Size W	H	L	Part number code for digit 11-12 moulded	boxed	box with screw fixing
94	49	182	**H0**	**I0**	**J0**
94	77	182	**H1**	**I1**	**J1**
94	105	182	**H2**	**I2**	**J2**
94	133	182	**H3**	**I3**	**J3**
94	161	182	**H4**	**I4**	**J4**
94	189	182	**H5**	**I5**	**J5**
94	217	182	**H6**	**I6**	**J6**
94	245	182	**H7**	**I7**	**J7**
94	285	182	**H8**	**I8**	**J8**
Tolerance: 20 % = M 10 % = K 5 % = J Packing: bulk = S Pin length: none = 00					

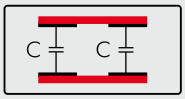
The capacitors will be delivered without interconnection.



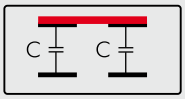
Insulated in the sense of a breakdown voltage of 2 x U_r between the individual capacitors..

External wiring versions (to be implemented by user):

V1



V2



Customized solutions can be realized on request.

11.11

WIMA Customized Capacitors for Intermediate Circuit Applications

We are gladly at your service to elaborate a custom-made solution for your intermediate circuit applications.

Please contact us with your technical requirements and ideas.

WIMA DC-LINK HC

- Size
- Capacitance
- Voltage
- Connection
- Casing

11.11

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Overview WIMA DC-LINK Capacitors

WIMA DC-LINK Intermediate Circuit Capacitors

	DC-LINK MKP 4		DC-LINK MKP 5		DC-LINK MKP 6		DC-LINK HC					
Dielectric film	Polypropylene		Polypropylene		Polypropylene		Polypropylene					
Temperature range	-55°C to +105°C (hot-spot)		-40°C to +85°C		-40°C to +85°C		-55°C to +85°C					
R_{is}* at +20°C	⩾ 30 000 sec		⩾ 5000 sec		⩾ 5000 sec		⩾ 30 000 sec					
Encapsulation	Rectangular plastic case		Cylindrical plastic case		Cylindrical aluminium case		External wiring version					
							none	V1	V2	none	V1	V2
Voltage ranges / Capacitance	600 VDC / 800 VDC / 900 VDC / 1100 VDC / 1300 VDC	Voltage ranges / Capacitance	500 VDC / 700 VDC / 900 VDC / 1100 VDC / 1300 VDC	Voltage ranges / Capacitance	600 VDC / 700 VDC / 900 VDC / 1100 VDC / 1300 VDC / 1500 VDC	Voltage ranges / Capacitance	400 VDC	400 VDC	800 VDC	800 VDC	800 VDC	1600 VDC
2 µF		16 µF		165 µF		The capacitors will be delivered without interconnection	2x 250	500	125	2x 170	340	85
5 µF	27.5	30 µF		210 µF			2x 500	1000	250	2x 340	680	170
7 µF	27.5	40 µF		215 µF			2x 750	1500	375	2x 510	1020	255
10 µF	27.5	53 µF		270 µF			2x1000	2000	500	2x 680	1360	340
15 µF	27.5	55 µF		325 µF			2x1250	2500	625	2x 850	1700	425
20 µF	27.5	59 µF		330 µF			2x1500	3000	750	2x1020	2040	510
25 µF	37.5	72 µF		420 µF			2x1750	3500	875	2x1190	2380	595
30 µF	37.5	85 µF		430 µF			2x2000	4000	1000	2x1360	2720	680
35 µF	37.5	100 µF		480 µF			2x2250	4500	1125	2x1530	3060	765
40 µF	37.5	114 µF		550 µF								
45 µF	37.5	143 µF		585 µF								
50 µF	37.5	158 µF		650 µF								
55 µF	37.5	190 µF		750 µF								
60 µF	37.5	195 µF		780 µF								
65 µF	52.5	260 µF		900 µF								
70 µF	52.5			1000 µF								
75 µF	52.5			1170 µF								
80 µF	52.5			1560 µF								
85 µF	52.5											
90 µF	52.5											
95 µF	52.5											
100 µF	52.5											
110 µF	52.5											
115 µF	52.5											
120 µF												
130 µF												
140 µF												
150 µF												
Capacitance tolerances	±20%, ±10%, ±5%		±20%, ±10%		±20%, ±10%		±20%, ±10%, (±5%*)					

External wiring versions (to be implemented by user)
V1
V2

WIMA DC-LINK HC capacitors are available in a multitude of capacitances and voltage ranges as well as different connection configurations and encapsulation options.

Customized solutions can be realized upon request.

New ranges, box sizes or values.

* The insulation resistance data refers to the lowest rated voltage of each range. Further details concerning higher rated voltages see respective data sheet.

* Closer tolerances are available subject to special enquiry.

The values in the DC-LINK MKP 4 tables refer to the smallest PCM of the respective capacitance value.
For larger PCMs please refer to the detailed data sheet of the particular series.

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