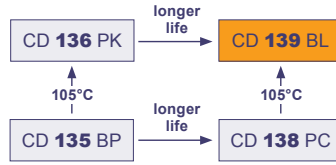


9000h at 105°C

- Longest Life at 105°C
- Highest Professional Power Application



Item	Characteristics
Operating Temperature Range (°C)	-40 ~ +105
Voltage Range (V)	350 ~ 450
Capacitance Range (µF)	1000 ~ 15000
Capacitance Tolerance (20°C, 120Hz)	± 20%
Leakage Current (µA)	After 5 minutes at 20°C application of rated voltage, leakage current is not more than 0,01CV or 5mA, whichever is smaller C: Nominal Capacitance (µF) V: Rated Voltage (V)
Dissipation Factor (20°C, 120Hz)	Less than 0,15

	Useful Life		Load Life	Endurance Test	Shelf Life
Lifetime	9000h	>200000h	5000h	5000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ± 30% of initial value		Within ± 20% of initial value	Within ± 10% of initial value	Within ± 20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:					
Applied Voltage	U_R	U_R	U_R	U_R	$U_R = 0$
Applied Current	I_R	$1,4 \times I_R$	I_R	$I_R = 0$	$I_R = 0$
Applied Temperature	105°C	50°C	105°C	105°C	105°C
Outlier Percentage	≤ 1%	≤ 1%	0%	IEC 60384	0%

After test:
 U_R to be applied for 60min
 >24h before measurement

Screw

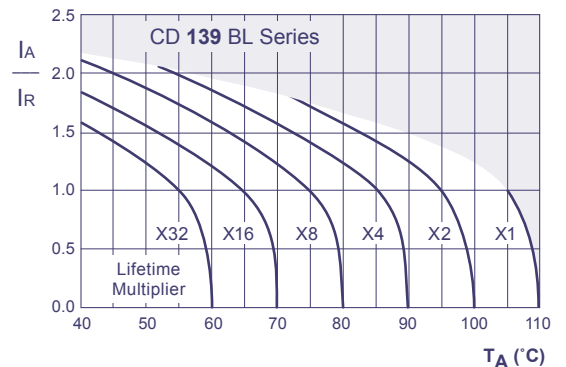
Multiplier for Ripple Current

Frequency Coefficient

Frequency	50Hz	120Hz	300Hz	1kHz	≥10kHz
Coefficient	0,80	1,00	1,10	1,30	1,40

Multiplier for Lifetime

Lifetime Diagram



I_A = actual ripple current at 120Hz, I_R = rated ripple current at 120Hz, 105°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load



Ratings for CD 139 BL Series

U _{R,DC} (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Typ ESR 20°C, 120Hz	Max Ripple Current 105°C, 120Hz	Size Ø D x L
(V)	(µF)	(mΩ)	(mΩ)	(Arms)	(mm)
350 (400) 2V	1000	259	69	3,9	51 x 75
	1200	215	65	4,2	51 x 75
	1500	172	55	5,2	51 x 96
	1800	143	43	5,7	51 x 96
	2200	117	30	7,1	51 x 130
	2700	96	27	7,7	64 x 96
	3300	78	23	9,1	64 x 115
	3900	66	19	10,4	64 x 130
	4700	55	16	12,2	64 x 155
		55	14	11,5	77 x 115
	5600	46	14	14,6	64 x 195
		46	12	13,1	77 x 130
	6800	38	13	15,5	77 x 155
	8200	31	11	18,1	90 x 157
	10000	26	10	19,9	90 x 157
12000	22	8	23,8	90 x 196	
15000	17	6	28,8	90 x 236	
400 (450) 2G	1000	215	70	3,9	51 x 75
	1200	179	64	4,6	51 x 96
	1500	143	54	5,6	51 x 115
	1800	119	43	6,4	51 x 130
	2200	98	41	6,9	64 x 96
	2700	80	38	8,2	64 x 115
	3300	65	29	9,5	64 x 130
	3900	55	28	11,1	64 x 155
		55	25	10,4	77 x 115
	4700	46	20	13,4	64 x 195
		46	22	12,0	77 x 130
	5600	39	19	14,6	64 x 195
		39	19	14,0	77 x 155
	6800	32	17	16,5	90 x 157
	8200	26	15	18,1	90 x 157
10000	22	12	21,7	90 x 196	
12000	18	8	25,8	90 x 236	
450 (500) 2W	1000	215	70	4,2	51 x 96
	1200	179	66	5,0	51 x 115
	1500	143	54	5,9	51 x 130
	1800	119	44	6,3	64 x 96
	2200	98	42	7,4	64 x 115
	2700	80	40	8,6	64 x 130
		80	42	8,7	77 x 115
	3300	65	31	10,2	64 x 155
		65	35	10,1	77 x 130
	3900	55	28	12,3	64 x 195
	4700	46	25	12,9	77 x 155
	5600	38	22	15,4	77 x 195
		38	24	14,9	90 x 157
	6800	32	21	18,0	90 x 196
	8200	27	18	19,8	90 x 196
10000	22	16	23,6	90 x 236	

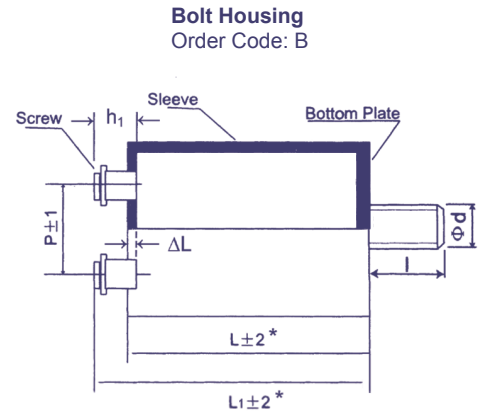
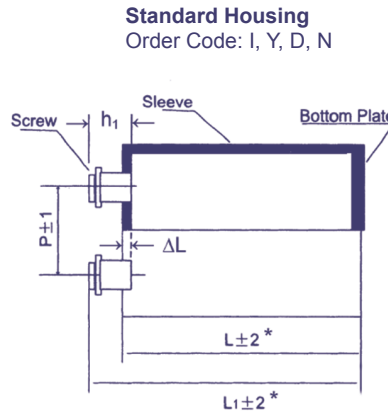
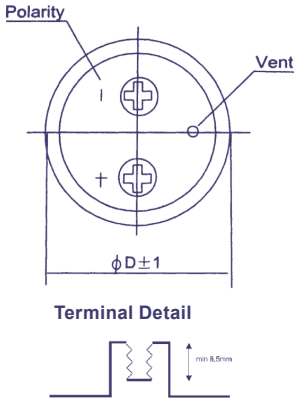
Screw

Customer specific products and adaptations on request.

Order Code **Screw Type**

EC	G	1C	BP	101	M	B	E	160	A361	JExxxxx	
Technology	Terminal Type	Rated Voltage Code	Series Code	Capacitance Code	Capacitance Tolerance	Mounting	Diameter	Length	For Terminal Code see tables below	Material Code	for Specials only
EC = Electrolytic Capacitor	Screw = G	For coding please refer to the pages of ratings	CD 135 = BP	100 = 101	±20% = M	Bolt = B	36 = A	53 = 053		-	
			CD 136 = PK	1000 = 102	±10% = K	No double sleeve = N	40 = B	65 = 065		V=PVC Sleeve	
			CD 137 = PX	10000 = 103	+30 / -10% = Q	2 stoppers bracket+double sleeve* = I	51 = C	96 = 096		E=PET Sleeve	
			CD 138 = PC		+20 / -0% = R	3 stoppers bracket+double sleeve* = Y	64 = D	100 = 100		O=Polyolefin	
			CD 139 = BL		+20 / -10% = V	No bracket, but double sleeve* = D	77 = E	115 = 115		Standard = V=PVC Sleeve	
			CD 13H = BH		+50 / -10% = T	* Double sleeve for diameter ≥ 51 only	90 = F	236 = 236			
			CD 138S = WP			preferred	101 = G				
			CD 838 = ZT								

Technical Specification **Screw Type**



Screw Definition	
Hexagon-Head	M5x10
Hexagon-Head	M6x12
Hexagon-Head	M8x16

Order Code	Mounting Style	Sleeving Style (typical design)	Total Length L1 in mm
I	I-Type Bracket	< 300V: Single Sleeve ≥ 300V: ½ length Double Sleeve Full Double Sleeve on request	L1 = L + h1 - 0,6mm L1 = L + h1 L1 = L + h1
Y	Y-Type Bracket	< 300V: Single Sleeve ≥ 300V: ½ length Double Sleeve Full Double Sleeve on request	L1 = L + h1 - 0,6mm L1 = L + h1 L1 = L + h1
D	No Bracket, no Bolt	½ length Double Sleeve Full Double Sleeve on request	L1 = L + h1
N	No Bracket, no Bolt	Single Sleeve	L1 = L + h1 - 0,6mm
B	Bolt	Single Sleeve	L1 = L + h1 - 0,6mm

Bolt:

∅ D	∅ d	l
∅ 36	M8	12
≥ ∅ 51	M12	16

in mm

Sleeving Style depending on Rated Voltage Ur ΔL = 0,6mm h1 see table below

Mounting

Position: Screw capacitors need to be mounted into an upright position. If a horizontal position is needed please ensure the safety vent is located on the highest position (12 o'clock).

Bolt: Maximum Torque M12: 12,5Nm

Terminal Screws: Maximum Torque M5: 3Nm M6: 6Nm

Terminal Code

Terminal Code	∅D	Screw	Pitch P	d1	d2	h1	h2
A361	36	M5	12,7	8	11	6,8	1,8
A511	51	M5	21,8	10	13,5	6,8	1,8
D511	51	M5	21,8	10	13	5,5	0
A512	51	M5	21,8	10	13	7,14	0
D513	51	M5	21,8	10	13	6,8	0
A641	64	M5	28,2	10	15,5	7,3	2,3
A642	64	M5	28,2	15	20	7,3	3,5
C641	64	M5	28,5	13	0	7,3	0
D641	64	M5	28,2	13	15	7,14	0
D642	64	M6	28,2	13	15	6,4	0
D643	64	M5	28,2	13	15	6,4	0
E641	64	M5	28,2	10	15,5	6,3	1,3
A771	77	M5	31,4	10	15,5	6,3	1,3
A772	77	M6	31,4	10	15,5	6,3	1,3
B771	77	M6	31,4	17,2	0	3,17	0
B772	77	M6	31,4	17,2	0	6,4	0
B773	77	M8	31,4	17,2	0	3,17	0
B774	77	M5	31,4	17,2	0	6,4	0
B778	77	M5	31,4	17,2	0	10,4/6,4	0
C771	77	M5	31,4	17,2	0	3,5	0
C772	77	M6	31,4	17,2	0	3,5	0
C773	77	M5	31,4	17,2	0	5,5	0
C774	77	M5	31,4	17,2	0	6,4	0
C775/C777	77	M6	31,4	17,2	0	6,4	0
C779	77	M6	31,4	13	0	5,5	0

Terminal Code	∅D	Screw	Pitch P	d1	d2	h1	h2
C77A	77	M5	31,4	13	0	5,5	0
D771	77	M5	31,4	13	15	6,4	0
D772	77	M5	31,4	13	15	7,14	0
D774	77	M5	31,4	13	14,2	6,4	0
D775	77	M5	31,4	13	15	6,4	0
E772	77	M5	31,4	10	15,5	6,3	1,3
F771	77	M6	31,4	13	15	6,4	0
F772	77	M5	31,4	13	15	6,4	0
A901	90	M5	31,4	10	15,5	6,3	1,3
A902	90	M6	31,4	10	15,5	6,3	1,3
B901	90	M6	31,4	17,2	0	6,4	0
B902	90	M5	31,4	17,2	0	6,4	0
B903	90	M5	31,4	17,2	0	10,4/6,4	0
C901	90	M5	31,4	17,2	0	6,4	0
C902	90	M6	31,4	17,2	0	6,4	0
D901	90	M5	31,4	10	13	5,5	0
D902	90	M5	31,4	13	15	6,4	0
D903	90	M6	31,4	13	15	6,4	0
E901	90	M6	31,4	15	17	8,6	2,4
F901	90	M6	31,4	13	15	6,4	0
A101	101	M8	41,5	17,2	21,5	11	6

preferred, other forms on request in mm

Terminal A101 = A991, B774 = B776

B778 and B903 have different lengths h1 of each terminal.

Terminal A, B and F include potting glue. Terminal C, D and E are without glue (middle pin).

Extended cathode design only with terminal C, D, E possible.

Jianghai Electrolytic Capacitors

Warning: JIANGHAI is not responsible for any extent of possible damages to persons or things, of any kind, caused by the improper application of and/or operating conditions harmful to electrolytic capacitors.

Misapplications which may cause failures include, but are not limited to: * Ripple current or peak current or voltage above specification, * Operating voltage above surge voltage specified, * Temperature exposure beyond specified operating temperature range.

Examples of harmful operating conditions comprise, but are not limited to: * unusual storage or transport temperatures, * excessive and/or rapid changes of ambient temperature or humidity, * heavy mechanical shock or vibration, * corrosive and abrasive particles in the ambient (cooling) air, * conducting dust in the ambient (cooling) air, * oil or water vapor or corrosive substances, * explosive gas or dust, * operation under extremely high or low ambient pressure conditions (below or above sea level), * superimposed radio frequency voltages, * radioactivity. In case of doubt about the impact of operating conditions on capacitor performance, please contact JIANGHAI.

Personal Safety: Electrical or mechanical misapplication of electrolytic capacitors may be hazardous. Personal injury or property damage may result from explosion of a capacitor or from the expulsion of electrolyte due to mechanical disruption or the release of a safety vent of a capacitor. In case of injury or skin or eye exposure to electrolyte, immediately seek professional medical advice. Before using electrolytic capacitors in any application, please read these Handling Precautions, familiarizing thoroughly with the information contained herein. Please check before using any of our electrolytic capacitors if these components fulfill the requirements of your application and warnings and instructions for use are followed.

Warranty: The information contained in this catalogue does not form part of any quotation or contract, is believed to be accurate, reliable and up to date. Quality data are based on the statistical evaluations of a large quantity of parts and do not constitute a guarantee in a legal sense. However, agreement on these specifications does mean that the customer may claim for replacement of individual defective capacitors within the terms of delivery. We will not assume any liability beyond the replacement of defective components. This applies in particular to any consequential damage caused by component failure. Furthermore it must be taken into consideration that the figures stated for lifetime, failure rates and outlier percentages refer to the average production status and are therefore to be understood as mean values (statistic expectations) for a large number of delivery lots of identical capacitors. These figures are based on application experience and data obtained from preceding tests under normal conditions, or – for purpose of accelerated aging – more severe conditions. JIANGHAI reserves the right to change these specifications without prior notice. Any application information given is advisory and does not form part of any specification. The products are not primarily designed for use in life support applications, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. JIANGHAI customers using or selling these products for use in such applications without prior written consent of JIANGHAI do so at their own risk and agree fully to indemnify JIANGHAI for any damage resulting from such improper use or sale. This version of the catalogue supersedes all previous versions. Latest versions of datasheets can be found on our homepage: www.jianghai-europe.com For more details on precautions and guidelines for aluminum electrolytic capacitors, please refer to CENELEC Technical Report CLC/TR 50454:2008 E, "Guide for the application of aluminum electrolytic capacitors".

Polarity: Electrolytic capacitors are polar and shall never be used with incorrect polarity, as there is a possible danger of shorting or destruction.

Rated Voltage Ur: The Rated Voltage is marked on the capacitor and defined in the datasheets as Ur. This voltage should never be exceeded and is the maximum peak voltage including any ripple voltages allowed to avoid a shortening of the lifetime or damage of the capacitor. When a ripple current is applied to the capacitor, the sum of the peak ripple voltage and bias DC voltage shall never exceed the Rated Voltage. It might be necessary to lower the maximum allowed bias DC voltage, when certain ripple currents are applied to the capacitor.

Surge Voltage: Maximum Voltage, which may be applied to the capacitor for short periods of time: max. 1000 cycles of 30 sec. per 6 min., max. 5 pulses per hour. Capacitance drift +/- 15% max.

Reverse Voltage: Reverse voltages or voltages < 0 V are not allowed.

Recovery Voltage: After charging and discharging a capacitor there might still be a voltage between the terminals, which is built up internally due to dielectric absorption. Please take action that this load does not damage other devices or scare the workers during production (sparks possible).

Temperature Range: Use electrolytic capacitors only within the specified operating temperature range.

Over-Current: Currents exceeding the rated ripple currents should be avoided.

Ripple Current/Voltage: The combined value of DC voltage and peak AC voltage (due to ripple current) shall not exceed the rated voltage and shall never be < 0 V. Use of aluminum electrolytic capacitors under ripple current with wide amplitudes is equivalent to quick charge-discharge operation.

Rapid Charging/Discharging: Rapid Charging/Discharging generates severe heat and gas may be emitted which may lead to explosion. Consult JIANGHAI about specially designed capacitors suitable for such kind of applications. Example: Servo Drive Application

Balancing resistors: Balancing resistors should be utilized if capacitors are used in serial connection. Please choose low-tolerance resistors to limit voltage drift.

Charge-Discharge Proof: JIANGHAI capacitors are charge-discharge proof, which means that 10⁶ switching cycles will cause capacitance reduction of less than 10%.

Lifetime: There are many different lifetime definitions known without any true standard definition. Take special care when capacitors are compared that the capacitors fulfill the needed requirements. JIANGHAI publishes all conditions to be as transparent as possible. In the case of lifetime tests with additional ripple currents, the bias DC voltage must be reduced, so that the sum of bias DC voltage and the peak of the ripple voltage does not exceed the Rated Voltage Ur.

• **Load Life:** Period of time, during which the technical parameters of all capacitors stay within the given limits. JIANGHAI defines this without allowing for outliers.

• **Useful Life:** defined like load life, but a given percentage of components may be outside the defined limits. Useful life data are usually calculated within a confidence level of 60%. See further details in specifications and data sheets. Outlier percentage: ≤ 1%.

• **Endurance Test:** IEC 60384-4 defines the acceptable drift criteria of electrical parameters after the endurance tests (continuous voltage test).

• **Shelf Life:** Definition of time with acceptable drift of capacitor parameters after storage at upper category temperature without load. JIS-C-5102-1994

Vibration and mechanical stress: Capacitors are sensitive to vibration and mechanical forces applied on the leads. Do not use capacitors, which have been dropped onto a rigid surface.

Insulation: If any defect of the sleeve is visible, the component should not be used – same for any kind of visible damage. A capacitor should be electrically isolated from the following parts: Aluminum case, cathode lead wire, anode lead wire and circuit pattern, and auxiliary terminal of snap-in type. The PVC sleeve is not recognized as an isolator and therefore the standard capacitor should not be used in a place where insulation function is needed. Please contact JIANGHAI if higher grade of insulation is required.

Environmental Conditions:

- Avoid direct contact with water, salt solution, oil, dewing conditions
- Halogens generally, especially fumigation treatment with bromides and flame retardant agents containing halogens must be avoided.
- Avoid exposing to direct sunshine, ozone, ultraviolet rays and x-ray radiation.
- Air Pressure: Max. 150kPa, min. 8kPa.
- No heavy air pressure changes are allowed.
- Do not use or store in an environment containing any hazardous gas (e.g., hydrogen sulphide, sulphurous acid, nitrous acid, chlorine, ammonia, bromine, methyl bromide, other halogens) or acidic or alkaline solutions.

Storage:

- Temperature 5 to 35°C, Relative Humidity below 75%.
- Electrolytic capacitors may accumulate charge naturally during storage. In this case discharge through a 1kOhm resistor before use (Recovery Voltage).
- Leakage current may be increased after long storage time. In this case the capacitor should be subjected to the rated voltage treatment through a 1kOhm resistor before use for 1 hour, then it should be discharged through a resistor of about 1 Ohm/Volt.
- Storage times above 1 year should be avoided or rated voltage treatment may be necessary.
- In accordance to IEC 60384-4 electrolytic capacitors are subject to a reforming process before acceptance testing. Rated voltage is applied via a series resistance (100Ω: Ur ≤ 100VDC, 1kΩ: Ur > 100VDC).

Soldering: Soldering conditions (temperature, times) should be within specified conditions, especially for SMD components. Avoid high soldering temperatures as this may reduce lifetime or damage the capacitor. Do never dip the capacitor body into molten solder. Flux should not be adhered to the capacitor's body but only to its terminals. For details and different methods please contact us.

Cleaning and Coating: Do not use fixing agents or cleaning substances containing halogens and the epoxy resin coating materials. Also never use solvents containing: Halogenated hydrocarbons, alkali, petroleum, trichloroethylene/ethane, xylene, acetones, trichlorotrifluoroethane, tetrachloroethylene, methylenechloride, chloroform, acetates, ketones, esters, chlorides and bromides. In case of questions see detailed instructions.

Mounting: Other devices, which are mounted near the capacitor, should not touch the capacitor. Additional heat coming from other components near the capacitor may reduce the lifetime of the capacitor. Do never bend or twist the capacitor after soldering to avoid stress on the leads. Radial capacitors are not protected against mechanical forces on the leads. Forces on the pins might damage the capacitor. No printed circuit board tracks are allowed between the lead pads of the capacitor. Screw Terminal capacitors should only be mounted in an upright position.

Transport: Avoid fumigation and spraying insecticides (especially with bromides) in the import or export procedures which can cause corrosion. This applies also to the finished devices.

Maintenance: Periodical inspection should be carried out for the capacitor: visual inspection to check pressure relief open or leakage of electrolyte, electrical characteristics as leakage current, capacitance, and dissipation factor.

Electrolyte and Separator paper: Electrolyte and separator paper used in Aluminum Capacitors may be flammable. Also electrolyte is electrically conductive. Therefore in case electrolyte gets in contact with PC board it may cause corrosion of circuit pattern or cause short circuit between patterns, and may lead to smoke generation or ignition in worst case.

Caution during Use of Capacitors: Do not touch the terminals of capacitors. Keep the capacitor free from conductive solution, such as acids, alkali and so on. Ensure that the operating environment of the equipment into which the capacitor has been built is within the specified conditions mentioned in the catalogue or specification sheets.

Safety Vent: The safety vent needs some free space to open properly. Allow for free headroom of at least 2mm for diameter ≤16mm, more than 3mm for diameter 18-35mm, more than 5mm for case diameter 40mm and larger.

Emergency Actions: When the pressure relief vent is open and some gas blows out from the capacitor, please turn the main switch of the equipment off or pull out the plug from the power outlet immediately. During safety vent operation, extremely hot gas (>100°C) may blow out of the capacitors. Do not stand close to the capacitors. In case of eye contact, rinse the open eye(s) with clean water immediately. In case of ingestion, gargle with water immediately, do not swallow. Do not touch electrolyte but wash skin with soap and water in case of skin contact.

Definition of electrical parameters: Separate documents as application notes, equivalent circuit diagrams and so on are available on request.

Packaging: Please refer to the data book for details. Further information is available on request.