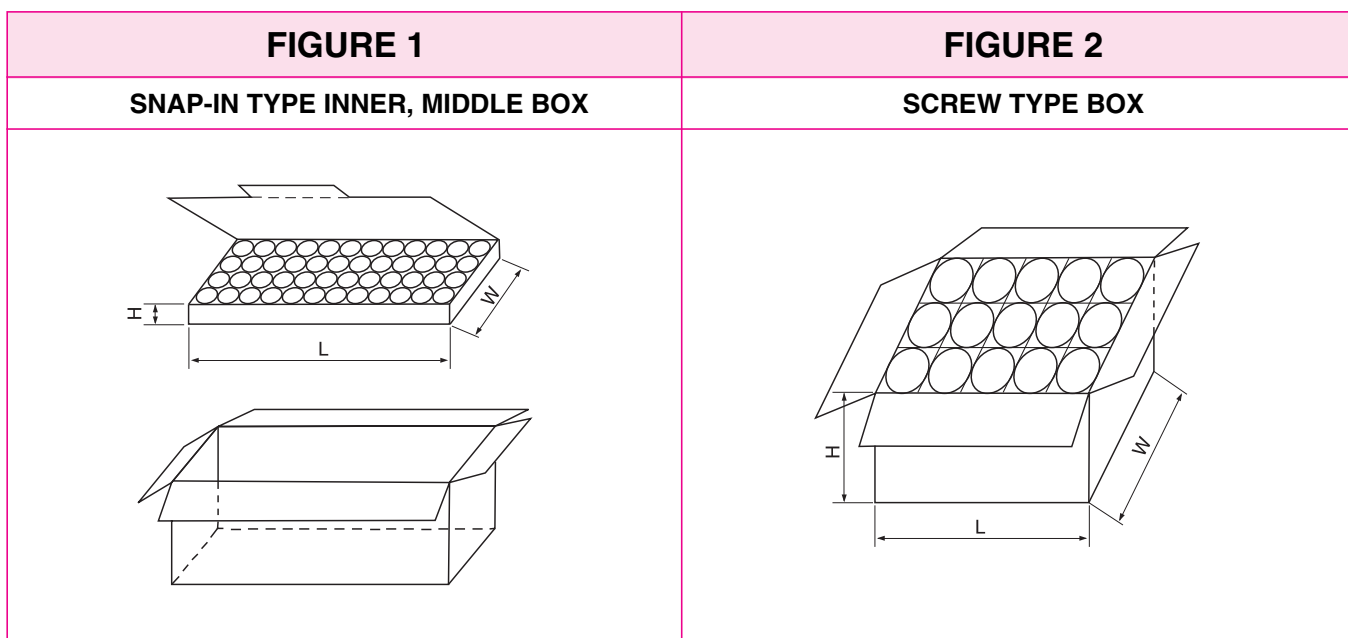


# 5 LARGE ALUMINUM ELECTROLYTIC CAPACITORS

---



# PACKING



● SNAP-IN TYPE PACKAGING Quantity (pcs) / BOX (FIGURE 1)

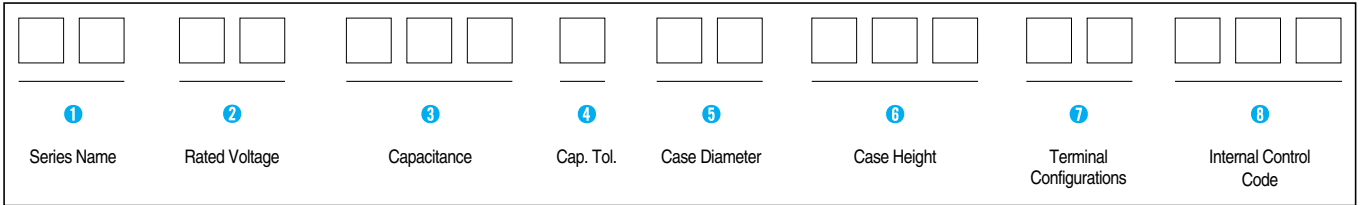
SIZE		SNAP-IN(QUANTITY)	
∅D	L	INNER BOX	MIDDLE BOX
20, 22	20 ~ 40	200	600
	45 ~ 50		
25	20 ~ 40	150	450
	45 ~ 50		
	60		
30	20 ~ 40	100	300
	45 ~ 55		
	60 ~ 80		
35	20 ~ 40	50	200
	45 ~ 55		150
	60 ~ 80		
	100 ~ 120		
40	30 ~ 40	50	150
	50		
	60 ~ 80		
	90 ~ 110		

● SCREW TYPE PACKAGING Quantity (pcs) / BOX & BOX SIZE (FIGURE 2)

SIZE		SCREW
∅D	L	QUANTITY
35	50 ~ 100	60
	105 ~ 120	60
51	50 ~ 100	30
	105 ~ 125	30
	130 ~ 140	30
64	60 ~ 100	25
	105 ~ 125	25
	130 ~ 160	25
76	80 ~ 100	16
	105 ~ 125	16
	130 ~ 160	16
89	100 ~ 160	9

## PART NUMBER SYSTEM

### ● Part Number System



**1 Series Name**  
See page 5.

**6 Case Height**  
ex) 30mm 030  
105mm 105

**2 Rated Working Voltage**

<b>WV</b>	<b>6.3</b>	<b>10</b>	<b>16</b>	<b>25</b>	<b>35</b>
<b>Code</b>	0J	1A	1C	1E	1V
<b>WV</b>	<b>40</b>	<b>50</b>	<b>63</b>	<b>100</b>	<b>160</b>
<b>Code</b>	1G	1H	1J	2A	2C
<b>WV</b>	<b>200</b>	<b>250</b>	<b>315</b>	<b>330</b>	<b>350</b>
<b>Code</b>	2D	2E	2F	2L	2V
<b>WV</b>	<b>360</b>	<b>400</b>	<b>450</b>	<b>500</b>	<b>550</b>
<b>Code</b>	2Z	2G	2W	2H	7H

**3 Capacitance**  
ex) 47 $\mu$ F 476  
470 $\mu$ F 477  
4700 $\mu$ F 478  
47000 $\mu$ F 479

**7 Terminal Configurations**

Terminal Configurations		Code
Snap-in Terminal for PC board mounting	Terminal Length 6mm	HA
	Terminal Length 4mm	HC
Lug Terminal for Soldering	$\varnothing D \leq 35$	LC
	$\varnothing D = 40$	LA
	$\varnothing D = 51$	LD
	$\varnothing D \geq 63.5$	LE
Photo Flash	$\varnothing D \leq 20$	PJ
	$\varnothing D = 22$	PK
	$\varnothing D = 25.4, 30$	LC
	$\varnothing D = 35$	LF
Screw Terminal Type		SB
Screw Terminal Type (Stud Type)		TB

**4 Capacitance Tolerance**

<b>Tolerance (%)</b>	$\pm 10$	$\pm 20$	0 +20	-10 +20	-10 +30	-10 +50
<b>Code</b>	K	M	W	V	Q	T

**5 Case Diameter**  
ex)  $\varnothing 14$  14  
 $\varnothing 25.4$  25  
 $\varnothing 30$  30  
 $\varnothing 63.5$  64  
 $\varnothing 76.2$  76

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## HC Snap-in Terminal Type, Standard Series

- Standard snap-in terminal type
- Including height 20mm products, low profile sized (Voltage range of 160 ~ 450V)
- Complied to the RoHS directive



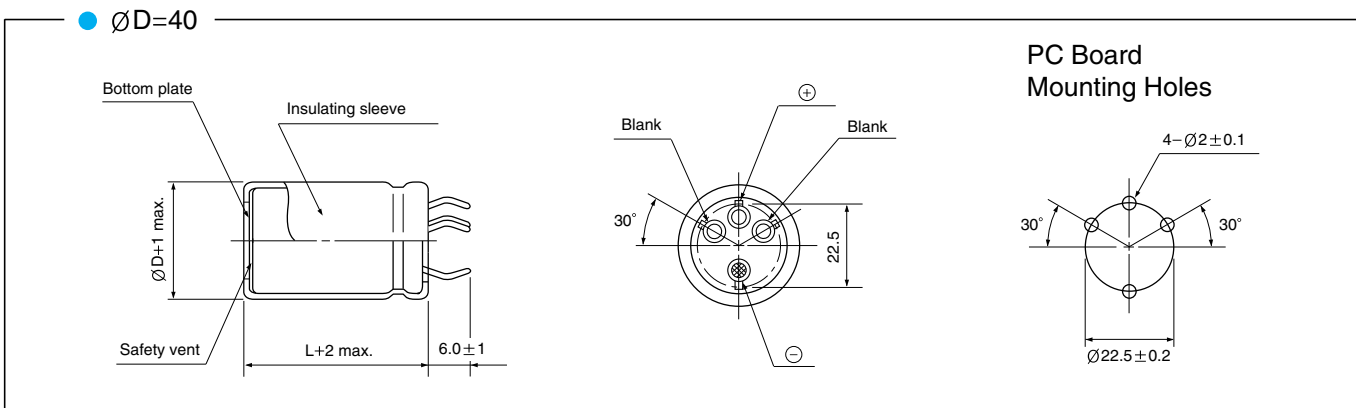
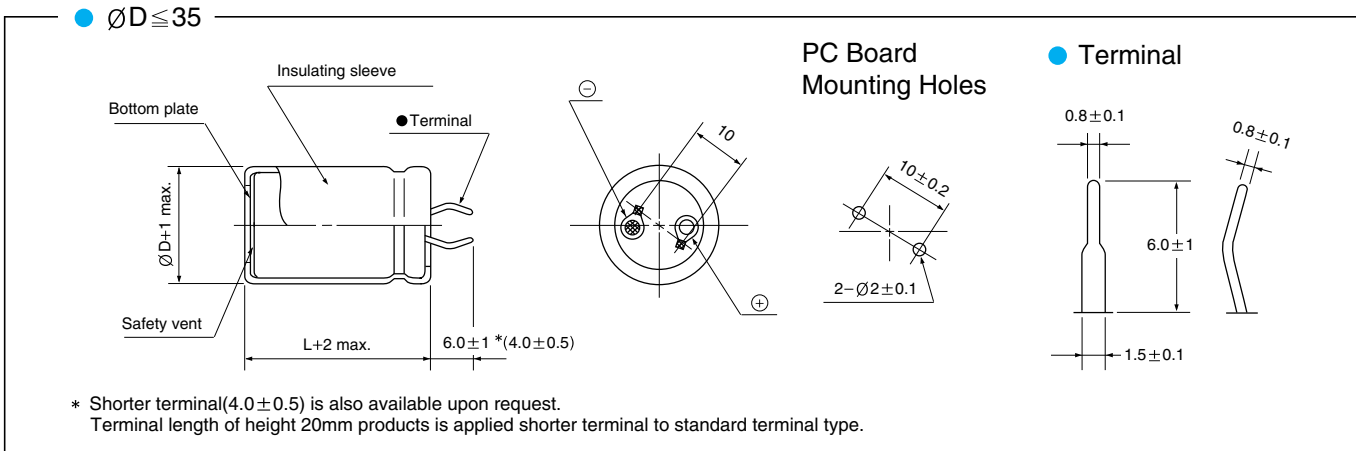
Solvent Proof  
WV ≤ 100V



Item	Characteristics																	
Operating temperature range	WV < 350 : -40 ~ +85°C, WV ≥ 350 : -25 ~ +85°C																	
Capacitance tolerance	±20% at 120Hz, 20°C																	
Leakage current max.	$I = 3 \sqrt{CV}$ (µA) (after 5 minutes)																	
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000µF : tanδ increases by 0.01 for each 1000µF from below value.																	
	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16, 25</td> <td>35</td> <td>50, 63</td> <td>80, 100</td> <td>160 ~ 400</td> <td>450, 500</td> </tr> <tr> <td>tanδ</td> <td>0.45</td> <td>0.40</td> <td>0.35</td> <td>0.30</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.20</td> </tr> </table>	WV	6.3	10	16, 25	35	50, 63	80, 100	160 ~ 400	450, 500	tanδ	0.45	0.40	0.35	0.30	0.25	0.20	0.15
WV	6.3	10	16, 25	35	50, 63	80, 100	160 ~ 400	450, 500										
tanδ	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.20										
Load life (after application of the rated voltage for 2000 hours at 85°C)	Leakage current	Less than specified value																
	Capacitance change	Within ±20% of initial value																
	tanδ	Less than 200% of specified value																
Shelf life (after leaving capacitors under no load at 85°C for 1000 hours)	Leakage current	Less than specified value																
	Capacitance change	Within ±15% of initial value																
	tanδ	Less than 150% of specified value																

### DRAWING

Unit : mm



### FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

µF \ Frequency(Hz)	50Hz	120Hz	300Hz	1kHz	10kHz~
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~	0.85	1.00	1.15	1.20	1.40

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS



## HC series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	6.3					10					16				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
10000											22 × 25 3.32				
12000						22 × 25 3.31					22 × 30 3.55	25.4 × 25 3.89			
15000	22 × 25 3.39					22 × 30 3.82	25.4 × 25 3.39				22 × 35 4.29	25.4 × 30 4.45	30 × 25 4.56		
18000	22 × 30 3.85	25.4 × 25 3.96				22 × 35 4.28	25.4 × 25 4.17				22 × 40 4.77	25.4 × 35 4.96	30 × 30 5.10		
22000	22 × 35 4.34	25.4 × 25 4.22				22 × 40 4.79	25.4 × 30 4.71	30 × 25 4.83			22 × 50 5.51	25.4 × 40 5.51	30 × 30 5.39		
27000	22 × 40 4.85	25.4 × 30 4.77	30 × 25 4.89			22 × 45 5.30	25.4 × 35 5.26	30 × 30 5.41				25.4 × 45 6.06	30 × 35 5.98	35 × 25 5.80	
33000	22 × 45 5.36	25.4 × 35 5.32	30 × 30 5.47			22 × 50 5.82	25.4 × 40 5.81	30 × 30 5.69	35 × 25 5.81				30 × 40 6.56	35 × 30 6.41	
39000	22 × 50 5.83	25.4 × 40 5.82	30 × 30 5.70	35 × 25 5.82			25.4 × 45 6.31	30 × 35 6.22	35 × 30 6.38				30 × 45 7.08	35 × 35 6.96	
47000		25.4 × 45 6.35	30 × 35 6.26	35 × 30 6.41			25.4 × 50 6.83	30 × 40 6.78	35 × 30 6.62				30 × 50 7.62	35 × 40 7.54	
56000		25.4 × 50 6.85	30 × 40 6.80	35 × 30 6.64				30 × 45 7.31	35 × 35 7.18					35 × 45 8.08	40 × 40 8.23
68000			30 × 45 7.35	35 × 35 7.23					35 × 40 7.76					35 × 50 8.63	40 × 50 9.13
100000				35 × 45 8.34	40 × 40 8.49										40 × 60 10.2

WV μF / ØD	25					35					50				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
3300											22 × 30 2.97	25.4 × 25 3.06			
4700						22 × 30 3.06	25.4 × 25 2.98				22 × 40 3.83	25.4 × 35 3.98	30 × 25 3.86	35 × 25 4.19	
5600	22 × 25 2.65					22 × 35 3.28	25.4 × 30 3.39				22 × 45 4.26	25.4 × 40 4.44	30 × 30 4.35	35 × 25 4.44	
6800	22 × 30 3.06	25.4 × 25 3.15				22 × 40 3.73	25.4 × 30 3.67	30 × 25 3.76			22 × 50 4.77	25.4 × 40 4.76	30 × 35 4.92	35 × 30 5.04	
8200	22 × 35 3.45	25.4 × 30 3.57				22 × 45 4.13	25.4 × 35 4.10	30 × 30 4.22				25.4 × 50 5.43	30 × 40 5.38	35 × 30 5.26	
10000	22 × 40 3.95	25.4 × 30 3.89	30 × 25 3.99			22 × 50 4.68	25.4 × 40 4.68	30 × 30 4.58					30 × 45 6.07	35 × 35 5.97	
12000	22 × 45 4.41	25.4 × 35 4.37	30 × 30 4.50				25.4 × 45 5.18	30 × 35 5.11	35 × 30 5.24				30 × 50 6.62	35 × 40 6.55	
15000	22 × 50 4.94	25.4 × 40 4.94	30 × 35 5.10					30 × 40 5.72	35 × 35 5.88					35 × 45 7.20	
18000		25.4 × 45 5.45	30 × 35 5.38	35 × 30 5.51				30 × 45 6.28	35 × 40 6.46					35 × 50 7.74	40 × 40 7.62
22000			30 × 45 6.22	35 × 35 6.12					35 × 45 7.07	40 × 40 7.20					40 × 50 8.54
27000			30 × 50 6.82	35 × 40 6.74						40 × 50 8.14					40 × 60 9.45
33000				35 × 45 7.35	40 × 40 7.48					40 × 50 8.46					

WV μF / ØD	63					80					100				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
1200						22 × 25 2.24					22 × 30 2.39	25.4 × 25 2.46			
1500						22 × 30 2.67					22 × 35 2.83	25.4 × 30 2.93	30 × 25 3.00		
1800	22 × 25 2.20					22 × 30 2.92	25.4 × 25 3.01				22 × 40 3.26	25.4 × 35 3.39	30 × 30 3.49		
2200	22 × 30 2.50	25.4 × 25 2.58				22 × 35 3.25	25.4 × 30 3.36	30 × 25 3.45			22 × 45 3.58	25.4 × 40 3.74	30 × 30 3.66		
2700	22 × 35 2.94	25.4 × 30 3.04				22 × 40 3.79	25.4 × 35 3.94	30 × 30 4.05				25.4 × 45 4.33	30 × 35 4.27	35 × 30 4.37	
3300	22 × 35 3.14	25.4 × 30 3.26	30 × 25 3.34			22 × 45 4.18	25.4 × 40 4.36	30 × 30 4.27				25.4 × 50 4.76	30 × 40 4.72	35 × 35 4.85	
3900	22 × 40 3.60	25.4 × 35 3.74	30 × 30 3.85			22 × 50 4.75	25.4 × 45 4.96	30 × 35 4.89					30 × 45 5.36	35 × 35 5.27	
4700	22 × 50 4.19	25.4 × 40 4.19	30 × 35 4.10	35 × 30 4.19			25.4 × 50 5.44	30 × 40 5.39	35 × 30 5.27				30 × 50 5.86	35 × 40 5.80	
5600		25.4 × 45 4.65	30 × 35 4.58	35 × 30 4.70				30 × 45 5.91	35 × 35 5.81					35 × 45 6.34	40 × 40 6.45
6800		25.4 × 50 5.20	30 × 40 5.16	35 × 30 5.04					35 × 40 6.45						40 × 50 7.40
8200			30 × 45 5.62	35 × 35 5.53					35 × 45 6.91	40 × 40 7.04					40 × 50 7.60
10000			30 × 50 6.32	35 × 40 6.25						40 × 50 8.14	← Case size ØD × L (mm) ← Ripple current (Arms) at 85°C, 120Hz				
12000				35 × 45 6.83	40 × 40 6.95										

\* Note: Case diameter (Ø20) is available upon request.

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## HC series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	160					200					250				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
150											22×25 0.90	25.4×20 0.92			
180						22×20 0.91					22×25 0.90	25.4×20 1.01			
220	22×20 1.01					22×25 1.09	25.4×20 1.11				22×25 1.09	25.4×25 1.19	30×20 1.22		
270	22×25 1.20	25.4×20 1.32				22×25 1.20	25.4×25 1.32	30×20 1.35			22×30 1.28	25.4×25 1.32	30×20 1.35		
330	22×25 1.33	25.4×20 1.36				22×30 1.42	25.4×25 1.46	30×20 1.49			22×35 1.50	25.4×30 1.56	30×25 1.60	35×20 1.62	
390	22×25 1.45	25.4×25 1.59	30×20 1.62			22×30 1.54	25.4×25 1.59	30×25 1.74	35×20 1.77		22×40 1.72	25.4×30 1.69	30×25 1.73	35×20 1.77	
470	22×30 1.69	25.4×25 1.75	30×20 1.78			22×35 1.79	25.4×30 1.86	30×25 1.90	35×20 1.94		22×45 1.98	25.4×35 2.02	30×30 2.02	35×25 2.06	
560	22×35 1.96	25.4×30 2.03	30×25 2.08	35×20 2.12		22×40 2.06	25.4×35 2.14	30×25 2.08	35×25 2.25		22×50 2.26	25.4×40 2.25	30×30 2.20	35×25 2.25	
680	22×40 2.27	25.4×30 2.23	30×25 2.29	35×20 2.33		22×45 2.38	25.4×40 2.48	30×30 2.43	35×25 2.48			25.4×45 2.60	30×35 2.56	35×30 2.62	
820	22×45 2.61	25.4×35 2.59	30×30 2.67	35×25 2.73		22×50 2.73	25.4×45 2.85	30×35 2.81	35×30 2.88				30×40 2.95	35×35 3.03	
1000	22×50 3.01	25.4×40 3.01	30×30 2.95	35×25 3.01				30×40 3.26	35×30 3.18				30×45 3.40	35×40 3.50	
1200		25.4×45 3.23	30×35 3.18	35×30 3.26				30×45 3.49	35×35 3.43					35×45 3.74	40×40 3.81
1500			30×40 3.73	35×35 3.83				30×50 4.06	35×40 4.01					35×50 4.35	40×50 4.60
1800				35×40 4.39	40×40 4.66				35×45 4.58	40×40 4.66					40×60 5.39

WV μF / ØD	315					350					400				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
68											22×20 0.56				
82						22×20 0.62					22×25 0.66	25.4×20 0.68			
100	22×20 0.68					22×25 0.73	25.4×20 0.75				22×30 0.78	25.4×25 0.81	30×20 0.82		
120	22×25 0.80	25.4×20 0.82				22×30 0.86	25.4×25 0.88	30×20 0.90			22×30 0.86	25.4×25 0.88	30×20 0.90		
150	22×30 0.96	25.4×25 0.99	30×20 1.01			22×35 1.01	25.4×30 1.05	30×20 1.01			22×35 1.01	25.4×30 1.05	30×25 1.08	35×20 1.09	
180	22×35 1.11	25.4×30 1.15	30×25 1.18	35×20 1.20		22×40 1.17	25.4×35 1.21	30×25 1.18	35×20 1.20		22×40 1.17	25.4×35 1.21	30×25 1.18	35×25 1.28	
220	22×40 1.29	25.4×30 1.27	30×25 1.30	35×20 1.33		22×45 1.35	25.4×35 1.34	30×30 1.38	35×25 1.41		22×45 1.35	25.4×40 1.41	30×30 1.38	35×25 1.41	
270	22×45 1.50	25.4×35 1.49	30×30 1.53	35×25 1.56			25.4×45 1.64	30×35 1.61	35×25 1.65			25.4×45 1.64	30×35 1.61	35×30 1.65	
330	22×50 1.73	25.4×40 1.73	30×35 1.78	35×30 1.83			25.4×50 1.89	30×40 1.87	35×30 1.83			25.4×50 1.89	30×40 1.87	35×30 1.83	
390		25.4×45 1.97	30×35 1.94	35×30 1.99				30×45 2.12	35×35 2.09				30×45 2.12	35×35 2.09	
470			30×40 2.23	35×35 2.29				30×50 2.43	35×40 2.40				30×50 2.43	35×40 2.40	
560				35×40 2.62					35×45 2.73					35×45 2.73	40×40 2.78
680				35×45 3.01					35×50 3.13	40×40 3.06					40×50 3.31
820				35×50 3.44	40×40 3.37					40×50 3.63					40×60 3.89

WV μF / ØD	450					500				
	22	25.4	30	35	40	22	25.4	30	35	40
56	22×20 0.51									
68	22×25 0.60	25.4×20 0.62				22×30 0.49				
82	22×30 0.71	25.4×25 0.73	30×20 0.74			22×35 0.57	25.4×30 0.59			
100	22×35 0.83	25.4×30 0.86	30×25 0.88	35×20 0.89		22×40 0.67	25.4×35 0.69			
120	22×40 0.95	25.4×35 0.99	30×25 0.96	35×20 0.98			25.4×40 0.80			
150	22×50 1.17	25.4×40 1.17	30×30 1.14	35×25 1.17				30×35 0.92		
180		25.4×45 1.34	30×35 1.32	35×25 1.28				30×40 1.06		
220		25.4×50 1.54	30×40 1.53	35×30 1.49				30×45 1.22		
270			30×45 1.77	35×35 1.74					35×45 1.45	
330			30×50 2.03	35×40 2.01					35×50 1.66	
390				35×45 2.28						
470				35×50 2.60	40×40 2.55					40×50 2.10
560					40×50 3.00					40×60 2.45
680					40×60 3.54					40×60 2.70

← Case size ØD×L (mm)  
 ← Ripple current (Arms) at 85°C, 120Hz

## HJ Snap-in Terminal Type, Miniaturized Series

**M**  
Miniaturized



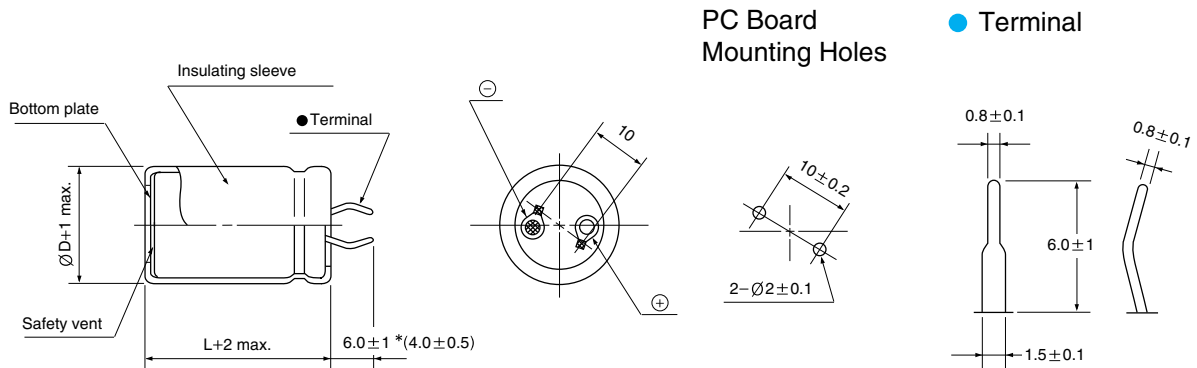
- Smaller case sizes than HC series
- High CV series
- Load life of 3000 hours at 85°C
- Voltage range of 160 ~ 450V
- Complied to the RoHS directive



Item	Characteristics													
<b>Operating temperature range</b>	WV < 350 : -40 ~ +85°C, WV $\geq$ 350 : -25 ~ +85°C													
<b>Capacitance tolerance</b>	$\pm 20\%$ at 120Hz, 20°C													
<b>Leakage current max.</b>	$I = 3\sqrt{CV}$ ( $\mu A$ ) (after 5 minutes)													
<b>Dissipation factor max. (at 120Hz, 20°C)</b>	Capacitance > 1000 $\mu F$ : $\tan\delta$ increases by 0.01 for each 1000 $\mu F$ from below value.													
	<table border="1"> <thead> <tr> <th>WV</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td><math>\tan\delta</math></td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.20</td> </tr> </tbody> </table>	WV	160	200	250	350	400	450	$\tan\delta$	0.15	0.15	0.15	0.15	0.15
WV	160	200	250	350	400	450								
$\tan\delta$	0.15	0.15	0.15	0.15	0.15	0.20								
<b>Load life (after application of the rated voltage for 3000 hours at 85°C)</b>	Leakage current	Less than specified value												
	Capacitance change	Within $\pm 20\%$ of initial value												
	$\tan\delta$	Less than 200% of specified value												
<b>Shelf life (at 85°C)</b>	After 1000 hours no load test, leakage current, capacitance and $\tan\delta$ are same as load life value.													

### ● DRAWING

Unit : mm



\* Shorter terminal(4.0 $\pm$ 0.5) is also available upon request.  
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

### ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

$\mu F$ \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~	0.85	1.00	1.15	1.20	1.40

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**HJ** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
150									22 × 20 0.83			
180					22 × 20 0.91				22 × 20 0.91			
220					22 × 20 1.01				22 × 25 1.09	25.4 × 20 1.11		
270	22 × 20 1.12				22 × 25 1.20	25.4 × 20 1.23			22 × 25 1.20	25.4 × 25 1.32		
330	22 × 25 1.33	25.4 × 20 1.36			22 × 25 1.33	25.4 × 20 1.36			22 × 30 1.42	25.4 × 25 1.46	30 × 20 1.49	
390	22 × 25 1.45	25.4 × 20 1.48			22 × 25 1.45	25.4 × 25 1.59	30 × 20 1.62		22 × 35 1.63	25.4 × 30 1.69	30 × 25 1.73	35 × 20 1.77
470	22 × 30 1.69	25.4 × 25 1.75			22 × 30 1.69	25.4 × 25 1.75	30 × 20 1.78		22 × 35 1.79	25.4 × 35 1.96	30 × 25 1.90	35 × 20 1.94
560	22 × 30 1.85	25.4 × 25 1.91	30 × 20 1.94		22 × 35 1.96	25.4 × 30 2.03	30 × 25 2.08	35 × 20 2.12	22 × 40 2.06	25.4 × 35 2.14	30 × 25 2.08	35 × 25 2.25
680	22 × 35 2.16	25.4 × 30 2.23	30 × 25 2.29	35 × 20 2.33	22 × 40 2.27	25.4 × 30 2.23	30 × 25 2.29	35 × 25 2.33	22 × 50 2.49	25.4 × 40 2.48	30 × 30 2.43	35 × 25 2.48
820	22 × 40 2.50	25.4 × 30 2.45	30 × 25 2.52	35 × 20 2.56	22 × 45 2.61	25.4 × 35 2.59	30 × 30 2.67	35 × 25 2.73		25.4 × 45 2.85	30 × 35 2.81	35 × 30 2.88
1000	22 × 45 2.89	25.4 × 35 2.86	30 × 30 2.95	35 × 25 3.01	22 × 50 3.01	25.4 × 40 3.01	30 × 35 3.11	35 × 30 3.18			30 × 40 3.26	35 × 35 3.35
1200	22 × 50 3.09	25.4 × 40 3.08	30 × 30 3.02	35 × 25 3.08		25.4 × 45 3.23	30 × 35 3.18	35 × 30 3.26			30 × 45 3.49	35 × 35 3.43
1500		25.4 × 45 3.61	30 × 35 3.56	35 × 30 3.65			30 × 45 3.90	35 × 35 3.83				35 × 40 4.01
1800			30 × 40 4.09	35 × 35 4.20			30 × 50 4.44	35 × 40 4.39				35 × 50 4.76
2200			30 × 50 4.63	35 × 40 4.58				35 × 45 4.77				
2700				35 × 45 5.29								
3300				35 × 50 5.77								

WV μF / ØD	350				400				450			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
56									22 × 20 0.51			
68					22 × 20 0.56				22 × 20 0.56			
82					22 × 20 0.62				22 × 25 0.66	25.4 × 20 0.68		
100	22 × 20 0.68				22 × 25 0.73	25.4 × 20 0.75			22 × 25 0.73	25.4 × 25 0.81		
120	22 × 25 0.80	25.4 × 20 0.82			22 × 25 0.80	25.4 × 20 0.82			22 × 30 0.86	25.4 × 25 0.88	30 × 20 0.90	
150	22 × 25 0.90	25.4 × 25 0.92			22 × 30 0.90	25.4 × 25 0.99	30 × 20 1.01		22 × 35 1.01	25.4 × 30 1.05	30 × 25 1.08	35 × 20 1.10
180	22 × 30 1.05	25.4 × 25 1.08			22 × 30 1.05	25.4 × 25 1.08	30 × 25 1.10		22 × 35 1.11	25.4 × 35 1.21	30 × 25 1.18	35 × 20 1.20
220	22 × 30 1.16	25.4 × 30 1.19	30 × 25 1.22		22 × 35 1.23	25.4 × 30 1.27	30 × 25 1.30	35 × 20 1.33	22 × 40 1.29	25.4 × 35 1.34	30 × 25 1.30	35 × 25 1.41
270	22 × 35 1.36	25.4 × 30 1.41	30 × 25 1.44	35 × 20 1.47	22 × 40 1.43	25.4 × 35 1.49	30 × 30 1.44	35 × 25 1.47	22 × 50 1.57	25.4 × 40 1.56	30 × 30 1.53	35 × 25 1.56
330	22 × 45 1.58	25.4 × 35 1.56	30 × 30 1.60	35 × 25 1.62	22 × 50 1.66	25.4 × 40 1.64	30 × 30 1.69	35 × 25 1.73		25.4 × 45 1.81	30 × 35 1.78	35 × 30 1.83
390	22 × 50 1.80	25.4 × 40 1.79	30 × 30 1.84	35 × 25 1.88		25.4 × 45 1.88	30 × 35 1.94	35 × 30 1.99			30 × 40 2.03	35 × 35 2.09
470		25.4 × 45 2.06	30 × 35 2.02	35 × 30 2.06		25.4 × 50 2.16	30 × 40 2.23	35 × 30 2.18			30 × 45 2.33	35 × 35 2.29
560		25.4 × 50 2.46	30 × 40 2.32	35 × 35 2.38			30 × 45 2.55	35 × 35 2.50				35 × 40 2.62
680			30 × 45 2.69	35 × 35 2.76			30 × 50 2.92	35 × 40 2.89				35 × 50 3.13
820				35 × 40 3.17				35 × 50 3.31	← Case size ØD × L (mm) ← Ripple current (Arms) at 85°C, 120Hz			
1000				35 × 45 3.65								

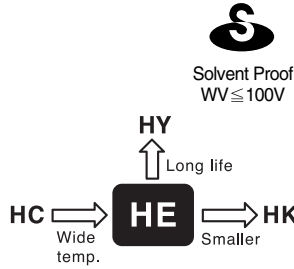
# LARGE ALUMINUM ELECTROLYTIC CAPACITORS



**Upgrade**  
**HE**

Wide Temperature Range, Standard Series

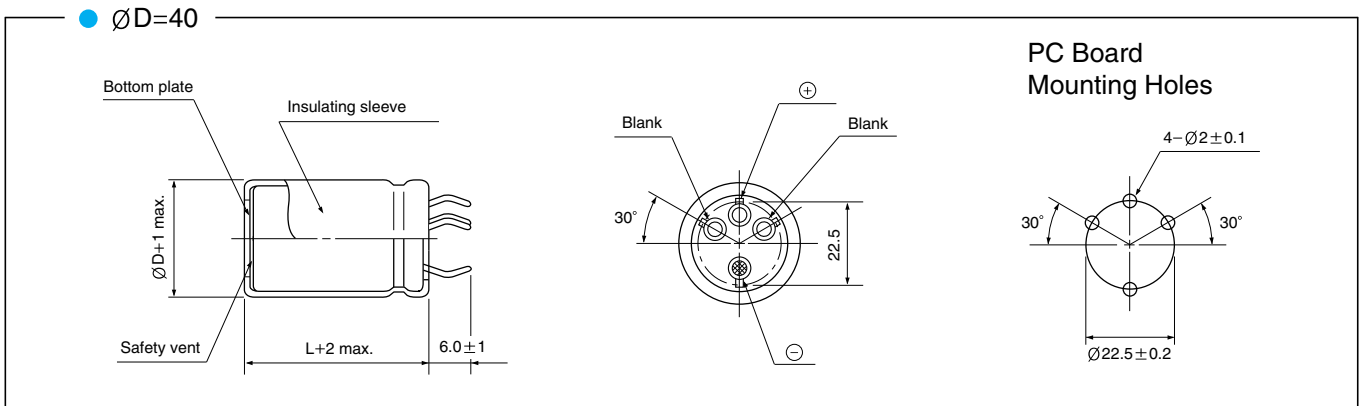
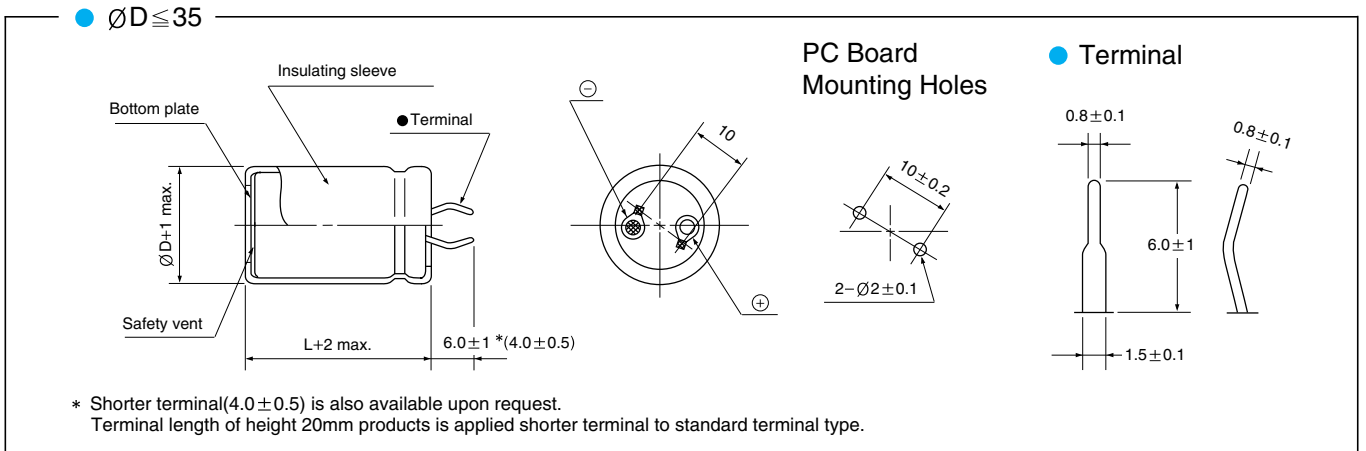
- Wide temperature range of -40(-25) ~ +105°C
- Standard snap-in terminal type
- Including height 20mm products, low profile sized (Voltage range of 160 ~ 500V)
- Complied to the RoHS directive



Item	Characteristics															
Operating temperature range	WV < 350 : -40 ~ +105°C, WV ≥ 350 : -25 ~ +105°C															
Capacitance tolerance	±20% at 120Hz, 20°C															
Leakage current max.	$I = 3\sqrt{CV}$ (µA) (after 5 minutes)															
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000µF : tanδ increases by 0.01 for each 1000µF from below value.															
	<table border="1"> <thead> <tr> <th>WV</th> <th>6.3, 10</th> <th>16</th> <th>25, 35</th> <th>50, 63</th> <th>80, 100</th> <th>160~400</th> <th>450, 500</th> </tr> </thead> <tbody> <tr> <td>tanδ</td> <td>0.50</td> <td>0.40</td> <td>0.35</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.20</td> </tr> </tbody> </table>	WV	6.3, 10	16	25, 35	50, 63	80, 100	160~400	450, 500	tanδ	0.50	0.40	0.35	0.25	0.20	0.15
WV	6.3, 10	16	25, 35	50, 63	80, 100	160~400	450, 500									
tanδ	0.50	0.40	0.35	0.25	0.20	0.15	0.20									
Load life (after application of the rated voltage for 3000 hours at 105°C)	Leakage current	Less than specified value														
	Capacitance change	Within ±20% of initial value														
	tanδ	Less than 200% of specified value														
Shelf life (at 105°C)	160 ~ 500WV products are for 2000 hours After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.															

## ● DRAWING

Unit : mm



## ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

µF	Frequency(Hz)	50Hz	120Hz	300Hz	1kHz	10kHz~
~ 100	~ 100	0.85	1.00	1.06	1.15	1.20
	160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~		0.85	1.00	1.15	1.20	1.40

LARGE TYPES

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**HE** series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	6.3					10					16				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
8200											22 × 25 2.14				
10000						22 × 25 2.17					22 × 30 2.48	25.4 × 25 2.56			
12000	22 × 25 2.19					22 × 30 2.48					22 × 35 2.80	25.4 × 30 2.90	30 × 25 2.97		
15000	22 × 30 2.53					22 × 35 2.83	25.4 × 25 2.75				22 × 40 3.17	25.4 × 35 3.29	30 × 30 3.38		
18000	22 × 35 2.85	25.4 × 25 2.77				22 × 35 3.00	25.4 × 30 3.11				22 × 45 3.50	25.4 × 40 3.65	30 × 30 3.57		
22000	22 × 35 3.04	25.4 × 30 3.15				22 × 40 3.35	25.4 × 35 3.48	30 × 25 3.38				25.4 × 45 4.03	30 × 35 3.98		
27000	22 × 40 3.40	25.4 × 35 3.53	30 × 25 3.42			22 × 50 3.88	25.4 × 40 3.87	30 × 30 3.79				25.4 × 50 4.42	30 × 40 4.39	35 × 30 4.29	
33000	22 × 50 3.92	25.4 × 40 3.91	30 × 30 3.83				25.4 × 45 4.26	30 × 35 4.20					30 × 45 4.79	35 × 35 4.71	
39000		25.4 × 45 4.26	30 × 35 4.20				25.4 × 50 4.60	30 × 40 4.57	35 × 30 4.46				30 × 50 5.16	35 × 40 5.10	
47000		25.4 × 50 4.63	30 × 40 4.60	35 × 30 4.50				30 × 45 4.95	35 × 35 4.87					35 × 45 5.50	40 × 40 5.60
56000			30 × 50 5.17	35 × 40 5.12					35 × 45 5.49	40 × 40 5.59					40 × 50 6.22
68000				35 × 45 5.52	40 × 40 5.62					40 × 50 6.22					40 × 60 6.83

WV μF / ØD	25					35					50				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
2700											22 × 30 1.94				
3300						22 × 25 1.62					22 × 35 2.20				
3900						22 × 30 1.88					22 × 40 2.52	25.4 × 35 2.62	30 × 25 2.54		
4700	22 × 25 1.73					22 × 35 2.14	25.4 × 25 2.09				22 × 45 2.81	25.4 × 40 2.93	30 × 30 2.87		
5600	22 × 30 1.98					22 × 35 2.29	25.4 × 30 2.37	30 × 25 2.43			22 × 50 3.11	25.4 × 40 3.11	30 × 35 3.21		
6800	22 × 30 2.14					22 × 40 2.61	25.4 × 35 2.71	30 × 30 2.79				25.4 × 50 3.64	30 × 40 3.61	35 × 30 3.53	
8200	22 × 35 2.42	25.4 × 30 2.50				22 × 50 3.02	25.4 × 40 3.02	30 × 30 2.95					30 × 45 3.94	35 × 35 3.87	
10000	22 × 40 2.77	25.4 × 35 2.88					25.4 × 45 3.43	30 × 35 3.38					30 × 50 4.42	35 × 40 4.37	
12000	22 × 45 3.09	25.4 × 40 3.22	30 × 30 3.15				25.4 × 50 3.78	30 × 40 3.75	35 × 30 3.67					35 × 45 4.78	
15000		25.4 × 45 3.62	30 × 35 3.57	35 × 30 3.65				30 × 45 4.19	35 × 35 4.12					35 × 50 5.24	40 × 40 5.13
18000		25.4 × 50 3.98	30 × 40 3.95	35 × 35 4.06					35 × 40 4.52						40 × 50 5.76
22000			30 × 45 4.36	35 × 35 4.28					35 × 45 4.95	40 × 40 5.04					40 × 50 5.98
27000				35 × 45 4.92	40 × 40 5.01					40 × 50 5.92					40 × 60 6.61

WV μF / ØD	63					80					100				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
820						22 × 25 1.37					22 × 30 1.46	25.4 × 25 1.51			
1000						22 × 30 1.62	25.4 × 25 1.67				22 × 35 1.71	25.4 × 30 1.77			
1200	22 × 25 1.37					22 × 30 1.67	25.4 × 25 1.72				22 × 40 1.86	25.4 × 35 1.94	30 × 25 1.88		
1500	22 × 30 1.50	25.4 × 25 1.54				22 × 35 1.98	25.4 × 30 2.05				22 × 45 2.18	25.4 × 40 2.28	30 × 30 2.23		
1800	22 × 30 1.64	25.4 × 25 1.69				22 × 40 2.28	25.4 × 35 2.37	30 × 25 2.30				25.4 × 45 2.61	30 × 35 2.57		
2200	22 × 35 1.86	25.4 × 30 1.92				22 × 45 2.51	25.4 × 35 2.49	30 × 30 2.56				25.4 × 50 2.85	30 × 40 2.83	35 × 30 2.76	
2700	22 × 40 2.17	25.4 × 30 2.13	30 × 25 2.18				25.4 × 45 3.03	30 × 35 2.99					30 × 45 3.27	35 × 35 3.22	
3300	22 × 50 2.53	25.4 × 40 2.53	30 × 30 2.48				25.4 × 50 3.33	30 × 40 3.30	35 × 30 3.23				30 × 50 3.59	35 × 40 3.55	
3900		25.4 × 45 2.88	30 × 35 2.84					30 × 45 3.75	35 × 35 3.69					35 × 45 4.03	
4700		25.4 × 50 3.20	30 × 40 3.17	35 × 30 3.10				30 × 50 4.10	35 × 40 4.06					35 × 50 4.40	40 × 40 4.31
5600			30 × 45 3.51	35 × 35 3.46					35 × 45 4.44						40 × 50 4.88
6800			30 × 50 3.92	35 × 40 3.88					35 × 50 4.90	40 × 40 4.80					40 × 50 5.18
8200				35 × 45 4.22						40 × 50 5.32	← Case size ØD × L (mm)				
10000				35 × 50 4.74	40 × 40 4.64						← Ripple current (Arms) at 105°C, 120Hz				

## HE series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF ØD	160					200					250				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
150						22×20 0.63					22×25 0.68	25.4×20 0.69			
180	22×20 0.69					22×20 0.69					22×25 0.74	25.4×20 0.76	30×20 0.83		
220	22×20 0.76					22×25 0.82	25.4×20 0.84				22×30 0.88	25.4×25 0.90	30×20 0.92		
270	22×25 0.91	25.4×20 0.93				22×30 0.91	25.4×25 1.00	30×20 1.02			22×35 1.03	25.4×30 1.06	30×25 1.09	35×20 1.11	
330	22×25 1.01	25.4×25 1.10	30×20 1.13			22×30 1.07	25.4×25 1.11	30×20 1.13			22×40 1.20	25.4×30 1.18	30×25 1.21	35×20 1.23	
390	22×30 1.17	25.4×25 1.20	30×20 1.23			22×35 1.24	25.4×30 1.28	30×25 1.31	35×20 1.34		22×45 1.36	25.4×40 1.42	30×30 1.39	35×25 1.42	
470	22×35 1.36	25.4×25 1.32	30×25 1.44	35×20 1.47		22×40 1.43	25.4×35 1.40	30×25 1.44	35×25 1.56		22×50 1.56	25.4×40 1.56	30×30 1.53	35×25 1.56	
560	22×40 1.56	25.4×30 1.53	30×25 1.57	35×25 1.70		22×45 1.63	25.4×40 1.62	30×30 1.67	35×25 1.70			25.4×50 1.86	30×35 1.76	35×30 1.80	
680	22×45 1.80	25.4×35 1.79	30×25 1.73	35×25 1.88		22×50 1.88	25.4×45 1.96	30×30 1.84	35×25 1.88				30×45 2.12	35×35 2.09	
820	22×50 2.06	25.4×40 2.02	30×30 2.02	35×25 2.06			25.4×50 2.25	30×35 2.13	35×30 2.18					35×40 2.40	
1000		25.4×45 2.38	30×35 2.35	35×30 2.41				30×45 2.57	35×35 2.53					35×45 2.76	40×40 2.81
1200		25.4×50 2.52	30×40 2.50	35×30 2.44				30×50 2.72	35×35 2.57	40×40 2.85				35×50 2.91	40×50 3.08
1500				35×40 3.00	40×40 3.19				35×45 3.13	40×50 3.44					40×60 3.68

WV μF ØD	315					350					400				
	22	25.4	30	35	40	22	25.4	30	35	40	22	25.4	30	35	40
56											22×20 0.37				
68						22×20 0.41					22×25 0.44	25.4×20 0.45			
82	22×20 0.45					22×25 0.48	25.4×20 0.49				22×30 0.51	25.4×25 0.53	30×20 0.54		
100	22×25 0.53	25.4×20 0.55				22×25 0.53	25.4×25 0.59	30×20 0.60			22×35 0.60	25.4×30 0.62	30×20 0.60		
120	22×30 0.62	25.4×25 0.64	30×20 0.65			22×30 0.62	25.4×30 0.64	30×20 0.65			22×40 0.69	25.4×30 0.68	30×25 0.70	35×20 0.71	
150	22×35 0.74	25.4×35 0.76	30×20 0.73			22×40 0.78	25.4×30 0.76	30×25 0.78	35×20 0.80		22×45 0.81	25.4×35 0.81	30×30 0.83	35×20 0.80	
180	22×40 0.85	25.4×35 0.88	30×25 0.86	35×20 0.87		22×45 0.89	25.4×35 0.88	30×30 0.91	35×20 0.87		22×50 0.93	25.4×40 0.93	30×30 0.91	35×25 0.93	
220	22×45 0.98	25.4×35 0.98	30×30 1.00	35×20 0.96		22×50 1.03	25.4×40 1.03	30×30 1.00	35×25 1.03			25.4×45 1.07	30×35 1.06	35×30 1.08	
270		25.4×45 1.19	30×35 1.17	35×25 1.14			25.4×45 1.19	30×35 1.17	35×30 1.20			25.4×50 1.24	30×40 1.23	35×30 1.20	
330		25.4×50 1.37	30×40 1.36	35×30 1.33				30×40 1.36	35×35 1.40				30×45 1.42	35×35 1.40	
390			30×45 1.54	35×35 1.52				30×45 1.54	35×40 1.59				30×50 1.61	35×40 1.59	
470			30×50 1.76	35×40 1.74					35×45 1.82					35×45 1.82	40×40 1.85
560				35×40 1.90					35×50 2.06	40×40 2.02				35×50 2.06	40×50 2.18
680				35×50 2.27	40×40 2.23					40×50 2.40					40×60 2.57

WV μF ØD	450					500				
	22	25.4	30	35	40	22	25.4	30	35	40
47	22×20 0.34					22×25 0.27	25.4×20 0.27			
56	22×25 0.40	25.4×20 0.41				22×30 0.31	25.4×25 0.32	30×20 0.33		
68	22×30 0.47	25.4×25 0.48	30×20 0.49			22×35 0.36	25.4×30 0.38	30×25 0.39	35×20 0.39	
82	22×35 0.54	25.4×30 0.56	30×20 0.54			22×40 0.42	25.4×35 0.44	30×25 0.43	35×20 0.43	
100	22×40 0.63	25.4×30 0.62	30×25 0.64	35×20 0.65		22×45 0.49	25.4×40 0.51	30×30 0.50	35×25 0.51	
120	22×45 0.73	25.4×35 0.72	30×30 0.74	35×25 0.76		22×50 0.56	25.4×45 0.58	30×35 0.58	35×30 0.59	
150	22×50 0.85	25.4×40 0.85	30×30 0.83	35×25 0.85			25.4×50 0.68	30×40 0.67	35×35 0.69	
180		25.4×45 0.97	30×35 0.96	35×30 0.98				30×45 0.77	35×40 0.79	
220		25.4×50 1.12	30×40 1.11	35×30 1.08				30×50 0.89	35×45 0.92	
270			30×45 1.28	35×35 1.26					35×45 1.01	40×40 1.03
330			30×50 1.48	35×40 1.46					35×50 1.17	40×50 1.23
390				35×45 1.66						40×50 1.34
470				35×50 1.89	40×40 1.85					
560				40×50 2.18						

← Case size ØD×L (mm)  
← Ripple current (Arms) at 105°C, 120Hz

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## HK Wide Temperature Range, Miniaturized Series

- Smaller case sizes than HE series
- High CV series
- Load life of 3000 hours at 105°C
- Complied to the RoHS directive



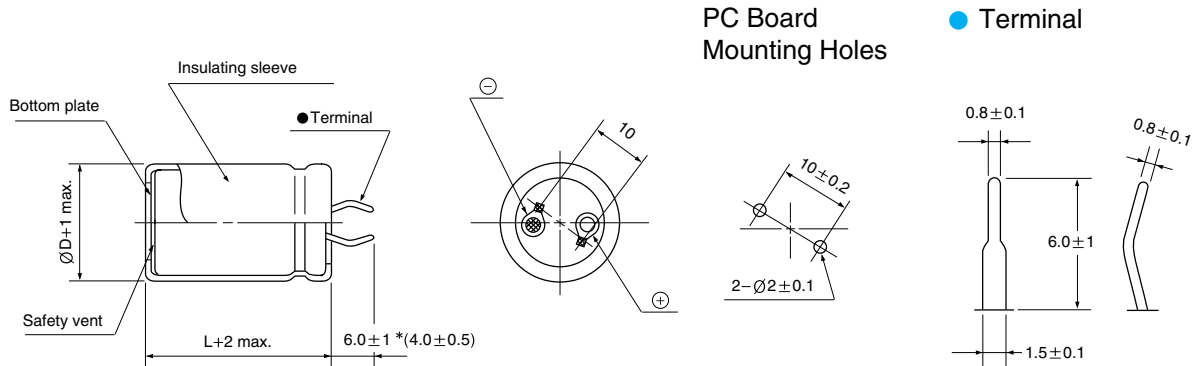
Miniaturized



Item	Characteristics													
Operating temperature range	WV < 350 : -40 ~ +105°C, WV ≥ 350 : -25 ~ +105°C													
Capacitance tolerance	±20% at 120Hz, 20°C													
Leakage current max.	$I = 3\sqrt{CV}$ (µA) (after 5 minutes)													
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000µF : tanδ increases by 0.01 for each 1000µF from below value.													
	<table border="1"> <tr> <td>WV</td> <td>160</td> <td>200</td> <td>250</td> <td>350</td> <td>400</td> <td>450</td> </tr> <tr> <td>tanδ</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.20</td> </tr> </table>	WV	160	200	250	350	400	450	tanδ	0.15	0.15	0.15	0.15	0.15
WV	160	200	250	350	400	450								
tanδ	0.15	0.15	0.15	0.15	0.15	0.20								
Load life (after application of the rated voltage for 3000 hours at 105°C)	Leakage current	Less than specified value												
	Capacitance change	Within ±20% of initial value												
	tanδ	Less than 200% of specified value												
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.													

### DRAWING

Unit : mm



\* Shorter terminal(4.0±0.5) is also available upon request.  
Terminal length of height 20mm products is applied shorter terminal to standard terminal type.

### FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

µF \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~	0.85	1.00	1.15	1.20	1.40

## HK series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
120									22 × 20 0.56			
150					22 × 20 0.63				22 × 25 0.68	25.4 × 20 0.69		
180					22 × 20 0.69	25.4 × 20 0.76			22 × 25 0.74	25.4 × 20 0.76		
220	22 × 20 0.76				22 × 25 0.82	25.4 × 20 0.84			22 × 25 0.82	25.4 × 25 0.90	30 × 20 0.92	
270	22 × 25 0.91	25.4 × 20 0.93			22 × 25 0.91	25.4 × 25 1.00	30 × 20 1.02		22 × 30 0.97	25.4 × 25 1.00	30 × 20 1.02	
330	22 × 25 1.01	25.4 × 20 1.03			22 × 30 1.07	25.4 × 25 1.11	30 × 20 1.13		22 × 35 1.14	25.4 × 30 1.18	30 × 25 1.21	35 × 20 1.23
390	22 × 25 1.09	25.4 × 25 1.20	30 × 20 1.23		22 × 30 1.17	25.4 × 25 1.20	30 × 25 1.31	35 × 20 1.34	22 × 40 1.30	25.4 × 35 1.35	30 × 25 1.31	35 × 25 1.42
470	22 × 30 1.28	25.4 × 25 1.32	30 × 20 1.35		22 × 35 1.36	25.4 × 30 1.40	30 × 25 1.44	35 × 20 1.47	22 × 45 1.50	25.4 × 35 1.48	30 × 30 1.53	35 × 25 1.56
560	22 × 35 1.48	25.4 × 30 1.53	30 × 25 1.57	35 × 20 1.60	22 × 40 1.56	25.4 × 30 1.53	30 × 25 1.57	35 × 25 1.70	22 × 50 1.71	25.4 × 40 1.70	30 × 30 1.67	35 × 25 1.70
680	22 × 40 1.72	25.4 × 30 1.69	30 × 25 1.73	35 × 20 1.76	22 × 45 1.80	25.4 × 35 1.79	30 × 30 1.84	35 × 25 1.88		25.4 × 50 2.05	30 × 35 1.94	35 × 30 1.98
820	22 × 45 1.98	25.4 × 35 1.96	30 × 30 2.02	35 × 25 2.06		25.4 × 45 2.16	30 × 30 2.02	35 × 25 2.06			30 × 40 2.23	35 × 35 2.29
1000	22 × 50 2.28	25.4 × 40 2.28	30 × 30 2.23	35 × 25 2.28		25.4 × 50 2.48	30 × 35 2.35	35 × 30 2.41			30 × 50 2.68	35 × 40 2.65
1200		25.4 × 45 2.41	30 × 35 2.38	35 × 30 2.44			30 × 40 2.50	35 × 35 2.57			30 × 60 2.92	35 × 45 2.80
1500		25.4 × 50 2.81	30 × 40 2.79	35 × 30 2.73			30 × 50 3.04	35 × 40 3.00				35 × 50 3.25
1800			30 × 45 3.19	35 × 35 3.14				35 × 45 3.43				
2200			30 × 50 3.44	35 × 45 3.55				35 × 50 3.68				
2700				35 × 50 4.08								

WV μF / ØD	350				400				450			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
47					22 × 20 0.34							
56	22 × 20 0.37				22 × 20 0.37	25.4 × 20 0.41			22 × 25 0.40			
68	22 × 20 0.41	25.4 × 20 0.45			22 × 25 0.44	25.4 × 20 0.45			22 × 30 0.47	25.4 × 25 0.48		
82	22 × 25 0.48	25.4 × 20 0.49			22 × 25 0.48	25.4 × 25 0.53	30 × 20 0.54		22 × 30 0.51	25.4 × 25 0.53		
100	22 × 25 0.53	25.4 × 25 0.58	30 × 20 0.60		22 × 30 0.57	25.4 × 25 0.58	30 × 20 0.60		22 × 35 0.60	25.4 × 30 0.62	30 × 25 0.64	
120	22 × 30 0.62	25.4 × 25 0.64	30 × 20 0.65		22 × 35 0.66	25.4 × 25 0.64	30 × 25 0.70	35 × 20 0.71	22 × 40 0.69	25.4 × 30 0.68	30 × 25 0.70	35 × 25 0.76
150	22 × 35 0.74	25.4 × 30 0.76	30 × 25 0.78	35 × 20 0.80	22 × 40 0.78	25.4 × 30 0.76	30 × 25 0.78	35 × 20 0.80	22 × 45 0.81	25.4 × 40 0.85	30 × 30 0.83	35 × 25 0.85
180	22 × 40 0.85	25.4 × 30 0.83	30 × 25 0.86	35 × 20 0.87	22 × 45 0.89	25.4 × 35 0.88	30 × 30 0.91	35 × 25 0.93	22 × 50 0.93	25.4 × 40 0.93	30 × 30 0.91	35 × 25 0.93
220	22 × 45 0.98	25.4 × 35 0.98	30 × 30 1.00	35 × 25 1.03	22 × 50 1.03	25.4 × 40 1.03	30 × 30 1.00	35 × 25 1.03		25.4 × 45 1.07	30 × 35 1.06	35 × 25 1.03
270	22 × 50 1.14	25.4 × 40 1.14	30 × 30 1.11	35 × 25 1.14		25.4 × 45 1.19	30 × 35 1.17	35 × 30 1.20			30 × 40 1.23	35 × 30 1.20
330		25.4 × 45 1.31	30 × 35 1.30	35 × 30 1.33		25.4 × 50 1.37	30 × 40 1.36	35 × 30 1.33			30 × 45 1.42	35 × 35 1.40
390		25.4 × 50 1.49	30 × 40 1.48	35 × 35 1.52			30 × 45 1.54	35 × 35 1.52			30 × 50 1.61	35 × 40 1.59
470			30 × 45 1.69	35 × 35 1.67			30 × 50 1.76	35 × 40 1.74				35 × 45 1.82
560			30 × 50 1.92	35 × 40 1.90				35 × 45 1.98				35 × 50 2.06
680				35 × 50 2.27				35 × 50 2.27				

← Case size ØD × L (mm)  
← Ripple current (Arms) at 105°C, 120Hz

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS



Wide Temperature Range, Miniaturized, Long Life Series



Long Life

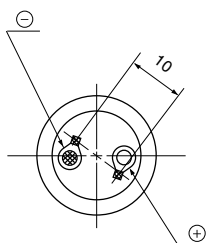
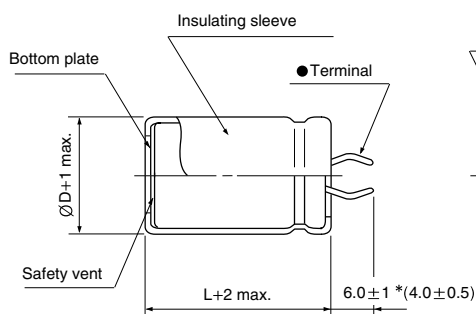
- Long life than HK series
- Load life of 5000 hours at 105°C
- Complied to the RoHS directive



Item	Characteristics													
Operating temperature range	WV < 350 : -40 ~ +105°C, WV ≥ 350 : -25 ~ +105°C													
Capacitance tolerance	±20% (20°C, 120Hz)													
Leakage current max.	$I = 3\sqrt{CV}$ (µA) (after 5 minutes)													
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000µF : tanδ increases by 0.01 for each 1000µF from below value.													
	<table border="1"> <thead> <tr> <th>Rated Voltage(V)</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>tanδ</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.2</td> </tr> </tbody> </table>	Rated Voltage(V)	160	200	250	350	400	450	tanδ	0.15	0.15	0.15	0.15	0.15
Rated Voltage(V)	160	200	250	350	400	450								
tanδ	0.15	0.15	0.15	0.15	0.15	0.2								
Load life (after application of the rated voltage for 5000 hours at 105°C)	Capacitance change	Within ±25% of initial value												
	tanδ	Less than 250% of specified value												
	Leakage current	Less than specified value												
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.													

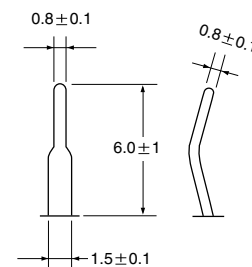
## ● DRAWING

Unit : mm



## PC Board Mounting Holes

## ● Terminal



## ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

µF \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~	0.85	1.00	1.15	1.20	1.40

## HL series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
120									22 × 20 0.56			
150					22 × 20 0.63				22 × 25 0.68	25.4 × 20 0.69		
180					22 × 20 0.69	25.4 × 20 0.76			22 × 25 0.74	25.4 × 20 0.76		
220	22 × 20 0.76				22 × 25 0.82	25.4 × 20 0.84			22 × 25 0.82	25.4 × 25 0.90	30 × 20 0.92	
270	22 × 25 0.91	25.4 × 20 0.93			22 × 25 0.91	25.4 × 25 1.00	30 × 20 1.02		22 × 30 0.97	25.4 × 25 1.00	30 × 20 1.02	
330	22 × 25 1.01	25.4 × 20 1.03			22 × 30 1.07	25.4 × 25 1.11	30 × 20 1.13		22 × 35 1.14	25.4 × 30 1.18	30 × 25 1.21	35 × 20 1.23
390	22 × 25 1.09	25.4 × 25 1.20	30 × 20 1.23		22 × 30 1.17	25.4 × 25 1.20	30 × 25 1.31	35 × 20 1.34	22 × 40 1.30	25.4 × 35 1.35	30 × 25 1.31	35 × 25 1.42
470	22 × 30 1.28	25.4 × 25 1.32	30 × 20 1.35		22 × 35 1.36	25.4 × 30 1.40	30 × 25 1.44	35 × 20 1.47	22 × 45 1.50	25.4 × 35 1.48	30 × 30 1.53	35 × 25 1.56
560	22 × 35 1.48	25.4 × 30 1.53	30 × 25 1.57	35 × 20 1.60	22 × 40 1.56	25.4 × 30 1.53	30 × 25 1.57	35 × 25 1.70	22 × 50 1.71	25.4 × 40 1.70	30 × 30 1.67	35 × 25 1.70
680	22 × 40 1.72	25.4 × 30 1.69	30 × 25 1.73	35 × 20 1.76	22 × 45 1.80	25.4 × 35 1.79	30 × 30 1.84	35 × 25 1.88		25.4 × 50 2.05	30 × 35 1.94	35 × 30 1.98
820	22 × 45 1.98	25.4 × 35 1.96	30 × 30 2.02	35 × 25 2.06		25.4 × 45 2.16	30 × 30 2.02	35 × 25 2.06			30 × 40 2.23	35 × 35 2.29
1000	22 × 50 2.28	25.4 × 40 2.28	30 × 30 2.23	35 × 25 2.28		25.4 × 50 2.48	30 × 35 2.35	35 × 30 2.41			30 × 50 2.68	35 × 40 2.65
1200		25.4 × 45 2.41	30 × 35 2.38	35 × 30 2.44			30 × 40 2.50	35 × 35 2.57				35 × 45 2.80
1500		25.4 × 50 2.81	30 × 40 2.79	35 × 35 2.73			30 × 50 3.04	35 × 40 3.00				35 × 50 3.25

WV μF / ØD	350				400				450			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
47					22 × 20 0.34							
56	22 × 20 0.37				22 × 20 0.37	25.4 × 20 0.41			22 × 25 0.40			
68	22 × 20 0.41	25.4 × 20 0.45			22 × 25 0.44	25.4 × 20 0.45			22 × 30 0.47	25.4 × 25 0.48		
82	22 × 25 0.48	25.4 × 20 0.49			22 × 25 0.48	25.4 × 25 0.53	30 × 20 0.54		22 × 30 0.51	25.4 × 25 0.53		
100	22 × 25 0.53	25.4 × 25 0.58	30 × 20 0.60		22 × 30 0.57	25.4 × 25 0.58	30 × 20 0.60		22 × 35 0.60	25.4 × 30 0.62	30 × 25 0.64	
120	22 × 30 0.62	25.4 × 25 0.64	30 × 20 0.65		22 × 35 0.66	25.4 × 25 0.64	30 × 25 0.70	35 × 20 0.71	22 × 40 0.69	25.4 × 30 0.68	30 × 25 0.70	35 × 25 0.76
150	22 × 35 0.74	25.4 × 30 0.76	30 × 25 0.78	35 × 20 0.80	22 × 40 0.78	25.4 × 30 0.76	30 × 25 0.78	35 × 20 0.80	22 × 45 0.81	25.4 × 40 0.85	30 × 30 0.83	35 × 25 0.85
180	22 × 40 0.85	25.4 × 30 0.83	30 × 25 0.86	35 × 20 0.87	22 × 45 0.89	25.4 × 35 0.88	30 × 30 0.91	35 × 25 0.93	22 × 50 0.93	25.4 × 40 0.93	30 × 30 0.91	35 × 25 0.93
220	22 × 45 0.98	25.4 × 35 0.98	30 × 30 1.00	35 × 25 1.03	22 × 50 1.03	25.4 × 40 1.03	30 × 30 1.00	35 × 25 1.03		25.4 × 45 1.07	30 × 35 1.06	35 × 25 1.03
270	22 × 50 1.14	25.4 × 40 1.14	30 × 30 1.11	35 × 25 1.14		25.4 × 45 1.19	30 × 35 1.17	35 × 30 1.20			30 × 40 1.23	35 × 30 1.20
330		25.4 × 45 1.31	30 × 35 1.30	35 × 30 1.33		25.4 × 50 1.37	30 × 40 1.36	35 × 30 1.33			30 × 45 1.42	35 × 35 1.40
390		25.4 × 50 1.49	30 × 40 1.48	35 × 35 1.52			30 × 45 1.54	35 × 35 1.52			30 × 50 1.61	35 × 40 1.59
470			30 × 45 1.69	35 × 35 1.67			30 × 50 1.76	35 × 40 1.74	← Case size ØD × L (mm)			
560			30 × 50 1.92	35 × 40 1.90					↑ Ripple current (Arms) at 105°C, 120Hz			

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## HY Snap-in Terminal Type, Long Life Series



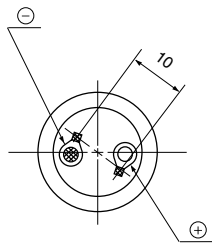
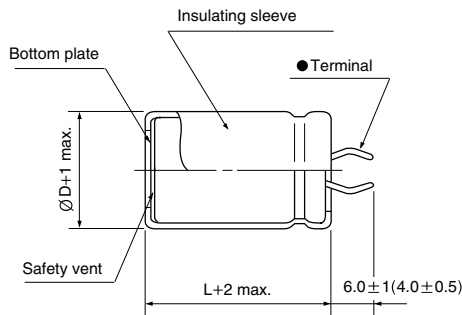
- Load life of 7000 hours at 105°C
- Voltage range of 160 ~ 450V
- Suited for use in industrial power supplies where high reliability
- Complied to the RoHS directive



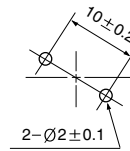
Item	Characteristics													
Operating temperature range	WV < 350: -40 ~ +105°C, WV ≥ 350: -25 ~ +105°C													
Capacitance tolerance	±20% at 120Hz, 20°C													
Leakage current max.	$I = 3\sqrt{CV}$ (µA) (after 5 minutes)													
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000µF : tanδ increases by 0.01 for each 1000µF from below value.													
	<table border="1"> <thead> <tr> <th>WV</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>tanδ</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.20</td> </tr> </tbody> </table>	WV	160	200	250	350	400	450	tanδ	0.15	0.15	0.15	0.15	0.15
WV	160	200	250	350	400	450								
tanδ	0.15	0.15	0.15	0.15	0.15	0.20								
Load life (after application of the rated voltage for 7000 hours at 105°C)	Leakage current	Less than specified value												
	Capacitance change	Within ±25% of initial value												
	tanδ	Less than 250% of specified value												
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.													

### DRAWING

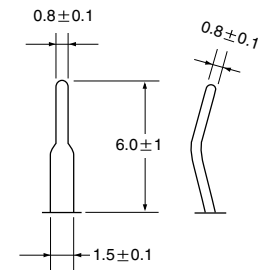
Unit : mm



### PC Board Mounting Holes



### Terminal



### FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

µF \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~	0.85	1.00	1.15	1.20	1.40

## HY series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
270	22×25 0.91				22×30 0.97	25.4×25 1.00			22×35 1.02	25.4×30 1.06	30×25 1.09	
330	22×30 1.07				22×30 1.07	25.4×25 1.10			22×40 1.19	25.4×35 1.24	30×25 1.20	
390	22×30 1.23	25.4×25 1.35			22×35 1.23	25.4×30 1.27	30×25 1.31		22×45 1.36	25.4×35 1.35	30×30 1.39	
470	22×35 1.35	25.4×30 1.40			22×40 1.42	25.4×35 1.48	30×30 1.52			25.4×45 1.63	30×35 1.61	35×30 1.64
560	22×40 1.55	25.4×30 1.53	30×25 1.57		22×45 1.63	25.4×35 1.62	30×30 1.67			25.4×50 1.85	30×35 1.75	35×30 1.80
680	22×45 1.80	25.4×35 1.78	30×30 1.93			25.4×40 1.87	30×35 1.93				30×45 2.12	35×35 2.08
820		25.4×40 2.06	30×30 2.01			25.4×50 2.24	30×40 2.23	35×30 2.17			30×50 2.42	35×40 2.39
1000		25.4×45 2.38	30×35 2.34				30×45 2.57	35×35 2.52				35×45 2.76
1200		25.4×50 2.51	30×40 2.49	35×35 2.56			30×50 2.71	35×40 2.68				35×50 2.90
1500			30×45 2.91	35×35 2.86				35×50 3.25				
1800			30×50 3.32	35×40 3.28								

WV μF / ØD	350				400				450			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
47									22×30 0.38			
56					22×25 0.39				22×35 0.45	25.4×25 0.43		
68					22×30 0.46	25.4×25 0.48			22×35 0.52	25.4×30 0.51		
82	22×25 0.48				22×35 0.54	25.4×25 0.53			22×45 0.60	25.4×35 0.59	30×25 0.57	
100	22×30 0.56	25.4×25 0.58			22×35 0.60	25.4×30 0.62			22×50 0.69	25.4×40 0.69	30×30 0.67	
120	22×35 0.65	25.4×30 0.68			22×40 0.69	25.4×35 0.72	30×25 0.69			25.4×45 0.79	30×30 0.74	
150	22×40 0.77	25.4×30 0.76			22×50 0.84	25.4×40 0.84	30×30 0.82			25.4×50 0.92	30×40 0.91	35×30 0.89
180	22×45 0.89	25.4×35 0.88				25.4×45 0.97	30×35 0.95	35×25 0.92			30×45 1.04	35×35 1.03
220	22×50 1.02	25.4×40 1.02	30×30 1.00			25.4×50 1.11	30×40 1.11	35×30 1.08			30×50 1.20	35×40 1.19
270		25.4×50 1.23	30×35 1.17	35×30 1.20			30×45 1.28	35×35 1.26				35×45 1.37
330			30×45 1.42	35×35 1.37			30×50 1.47	35×40 1.46				35×50 1.58
390			30×50 1.60	35×40 1.58				35×45 1.65				
470				35×40 1.74				35×50 1.88				
560				35×50 2.06								

← Case size ØD×L (mm)  
← Ripple current (A rms) at 105°C, 120Hz

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## HB High Temperature Range, For 125°C Use Series

- Wide operating temperature range of -40 ~ +125°C
- With a guaranteed useful life of 10 years at 60°C
- Ideal for industrial applications requiring continuous operation
- Complied to the RoHS directive



Solvent Proof  
WV ≤ 100V

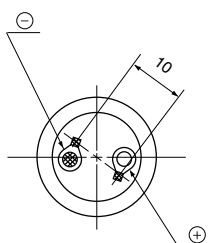
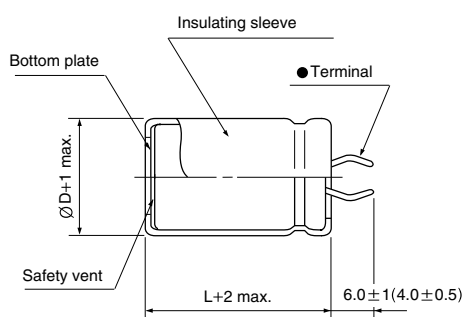


HE  $\rightleftarrows$  HB  
High temp.

Item	Characteristics															
Operating temperature range	-40 ~ +125°C															
Capacitance tolerance	±20% at 120Hz, 20°C															
Leakage current max.	$I=3\sqrt{CV}$ (µA) (after 5 minutes)															
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000µF : tanδ increases by 0.01 for each 1000µF from below value.															
	<table border="1"> <thead> <tr> <th>WV</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50, 63</th> <th>80 ~ 160</th> <th>200, 250</th> </tr> </thead> <tbody> <tr> <td>tanδ</td> <td>0.50</td> <td>0.40</td> <td>0.30</td> <td>0.25</td> <td>0.20</td> <td>0.17</td> <td>0.15</td> </tr> </tbody> </table>	WV	10	16	25	35	50, 63	80 ~ 160	200, 250	tanδ	0.50	0.40	0.30	0.25	0.20	0.17
WV	10	16	25	35	50, 63	80 ~ 160	200, 250									
tanδ	0.50	0.40	0.30	0.25	0.20	0.17	0.15									
Load life (after application of the rated voltage for 1000 hours at 125°C)	Leakage current	Less than specified value														
	Capacitance change	Within ±15% of initial value														
	tanδ	Less than 150% of specified value														
Shelf life (at 125°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.															

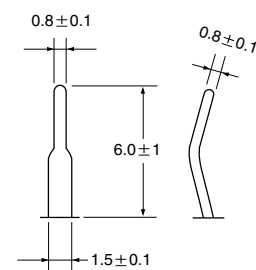
### ● DRAWING

Unit : mm



### PC Board Mounting Holes

### ● Terminal



### ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

µF \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45

## HB series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF / ØD	10				16				25			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
1500									22×30 0.95			
2200					22×30 1.00				22×40 1.28	25.4×30 1.26		
3300	22×30 1.09				22×40 1.36	25.4×35 1.41			22×50 1.72	25.4×40 1.72	30×30 1.68	
4700	22×40 1.45	25.4×35 1.51			22×50 1.78	25.4×40 1.77	30×30 1.74			25.4×50 2.23	30×40 2.22	35×30 2.17
6800	22×50 1.91	25.4×40 1.91	30×35 1.97				30×40 2.31	35×30 2.26			30×50 2.90	35×40 2.87
10000			30×45 2.62	35×35 2.57				35×45 3.14				
15000				35×45 3.44								

WV μF / ØD	35				50				63			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
470									22×35 0.69	25.4×30 0.71		
680					22×30 0.78				22×40 0.87	25.4×35 0.91	30×30 0.93	
1000	22×30 0.85				22×40 1.06	25.4×30 1.04				25.4×45 1.21	30×35 1.19	35×30 1.22
1500	22×40 1.16	25.4×30 1.14			22×50 1.42	25.4×40 1.42	30×30 1.39				30×45 1.60	35×40 1.65
2200	22×50 1.54	25.4×40 1.54	30×30 1.50				30×40 1.86	35×35 1.91				35×50 2.16
3300			30×40 2.04	35×35 2.09				35×40 2.45				
4700				35×40 2.61								

WV μF / ØD	80				100				160			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
150									22×30 0.37			
220					22×30 0.48				22×40 0.50	25.4×30 0.49		
330	22×30 0.59				22×40 0.66	25.4×30 0.65			22×50 0.67	25.4×40 0.67	30×30 0.65	
470	22×40 0.79	25.4×35 0.82			22×50 0.86	25.4×40 0.86	30×35 0.89			25.4×50 0.87	30×40 0.86	35×30 0.84
680		25.4×40 1.04	30×35 1.07				30×40 1.12	35×30 1.09			30×50 1.12	35×40 1.11
1000			30×45 1.42	35×35 1.40				35×40 1.46				35×50 1.46
1500				35×45 1.86								

WV μF / ØD	200				250			
	22	25.4	30	35	22	25.4	30	35
100					22×30 0.32			
150	22×35 0.42				22×40 0.44	25.4×30 0.43		
220	22×45 0.56	25.4×40 0.58	30×30 0.57		22×50 0.58	25.4×40 0.58	30×35 0.60	35×30 0.61
330		25.4×50 0.77	30×40 0.77	35×30 0.75			30×45 0.80	35×35 0.79
470			30×50 0.99	35×40 0.98				35×45 1.03
680				35×50 1.28				

← Case size ØD×L (mm)  
← Ripple current (A rms) at 125°C, 120Hz

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## QA Permissible Abnormal Voltage, Wide Temperature Range Series

- Improved safety features for abnormally excessive voltage
- Ideally suited for the equipment used at voltage fluctuating area
- No sparks with overvoltage
- Complied to the RoHS directive



Item	Characteristics																				
Operating temperature range	-25 ~ +105°C																				
Capacitance tolerance	±20% at 120Hz, 20°C																				
Leakage current max.	$I=3\sqrt{CV}$ (µA) (after 5 minutes)																				
Dissipation factor max.	0.15 max. at 120Hz, 20°C																				
Load life	After an application of DC bias voltage plus the rated AC ripple current for 2000 hours at 105°C The measurement shall meet the following limits.																				
	Leakage current	Less than specified value																			
	Capacitance change	Within ±20% of initial value																			
	tanδ	Less than 200% of specified value																			
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.																				
Safety Performance	The pressure relief vent will operate in normal conditions, with no dangerous conditions such as flames, ignitions or dispersion of peaces of the capacitor and/or case																				
	<table border="1"> <thead> <tr> <th>WV</th> <th>µF</th> <th>Limited DC current</th> <th>Test voltage (VDC)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">200</td> <td>C &lt; 300</td> <td>4A</td> <td rowspan="3">300 &amp; 375</td> </tr> <tr> <td>330 ≤ C &lt; 470</td> <td>5A</td> </tr> <tr> <td>470 ≤ C</td> <td>7A</td> </tr> <tr> <td rowspan="3">400</td> <td>C &lt; 100</td> <td>2A</td> <td rowspan="3">500 &amp; 600</td> </tr> <tr> <td>100 ≤ C &lt; 220</td> <td>4A</td> </tr> <tr> <td>220 ≤ C</td> <td>7A</td> </tr> </tbody> </table>	WV	µF	Limited DC current	Test voltage (VDC)	200	C < 300	4A	300 & 375	330 ≤ C < 470	5A	470 ≤ C	7A	400	C < 100	2A	500 & 600	100 ≤ C < 220	4A	220 ≤ C	7A
	WV	µF	Limited DC current	Test voltage (VDC)																	
	200	C < 300	4A	300 & 375																	
		330 ≤ C < 470	5A																		
470 ≤ C		7A																			
400	C < 100	2A	500 & 600																		
	100 ≤ C < 220	4A																			
	220 ≤ C	7A																			

● DRAWING (See Page 160)

Unit : mm

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV µF	200				400					
	22	25.4	30	35	22	25.4	30	35		
47					22×25	0.42				
56					22×25	0.45				
68					22×25	0.50	25.4×25	0.55		
82					22×30	0.59	25.4×25	0.60	30×25	0.73
100					22×35	0.69	25.4×30	0.71	30×25	0.80
120					22×40	0.79	25.4×30	0.78	30×30	0.95
150					22×45	0.93	25.4×35	0.92	30×30	1.04
180	22×25	0.74			22×50	1.06	25.4×40	1.06	30×35	1.21
220	22×25	0.82					25.4×45	1.22	30×40	1.40
270	22×30	0.97	25.4×25	1.00					30×50	1.68
330	22×30	1.07	25.4×30	1.18	30×25	1.21				
390	22×35	1.24	25.4×30	1.28	30×25	1.31				
470	22×40	1.43	25.4×35	1.48	30×25	1.44				
560	22×40	1.63	25.4×40	1.70	30×35	1.76	35×25	1.70		
680			25.4×50	2.05	30×40	2.03	35×30	1.98		
820					30×45	2.33	35×35	2.29		
1000					30×50	2.68	35×40	2.65		
1200							35×45	2.80		
1500							35×50	3.25		

Case size ØD×L (mm) \_\_\_\_\_  
Ripple current (A rms) at 105°C, 120Hz \_\_\_\_\_

### ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

µF	Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
160 ~ 250		0.85	1.00	1.20	1.25	1.45
300 ~		0.85	1.00	1.15	1.20	1.40

## LM Lug Terminal Type Series

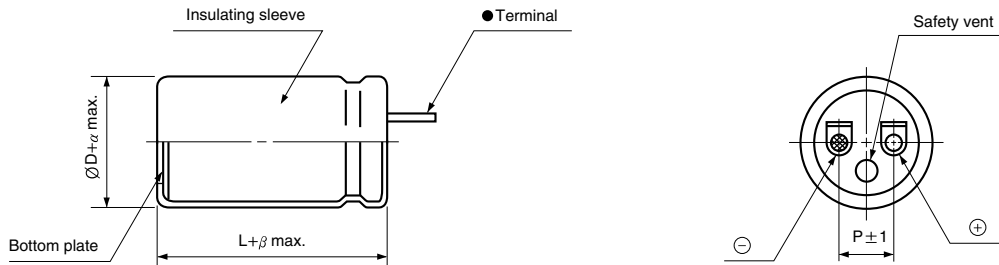
- Lug terminal series
- Suited for use in power supplies and industrial controls
- Complied to the RoHS directive



Item	Characteristics											
Operating temperature range	WV < 350 : -40 ~ +85°C, WV ≥ 350 : -25 ~ +85°C											
Capacitance tolerance	±20% at 120Hz, 20°C											
Leakage current max.	$I = 3 \sqrt{CV}$ (μA) (after 5 minutes)											
Dissipation factor max. (at 120Hz, 20°C)	Capacitance > 1000μF : tanδ increases by 0.01 for each 1000μF from below value.											
	<table border="1"> <thead> <tr> <th>WV</th> <th>16</th> <th>25</th> <th>35~63</th> <th>80~350</th> <th>400~450</th> </tr> </thead> <tbody> <tr> <td>tanδ</td> <td>0.35</td> <td>0.30</td> <td>0.25</td> <td>0.20</td> <td>0.25</td> </tr> </tbody> </table>	WV	16	25	35~63	80~350	400~450	tanδ	0.35	0.30	0.25	0.20
WV	16	25	35~63	80~350	400~450							
tanδ	0.35	0.30	0.25	0.20	0.25							
Load life (after application of the rated voltage for 2000 hours at 85°C)	Leakage current	Less than specified value										
	Capacitance change	Within ±20% of initial value										
	tanδ	Less than 200% of specified value										
Shelf life (at 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.											

### ● DRAWING

Unit : mm



### ● TERMINAL

For solder tag

ØD	≤ 35	40	51
Dimensions			
Code	LC	LA	LD

ØD	25.4	30	35	40	51
P	10	10	14	18	18
α	1				2
β	2				3

### ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency(Hz)	50Hz	120Hz	300Hz	1kHz	10kHz~
~ 100	0.85	1.00	1.06	1.15	1.20
160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~	0.85	1.00	1.15	1.20	1.40

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**LM** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV μF	16		25		35		40		50	
3300							25.4×30	2.46	25.4×30	2.46
4700					25.4×30	2.89	25.4×40	3.21	25.4×40	3.21
6800			25.4×30	3.12	25.4×40	3.73	25.4×50	4.07	25.4×50	4.07
10000	25.4×30	3.42	25.4×40	4.03	25.4×50	4.71	25.4×60	5.07	30×50	5.08
15000	25.4×40	4.41	25.4×50	5.07	30×50	5.81	30×60	6.24	35×60	6.67
22000	25.4×50	5.44	30×50	6.15	35×60	7.44	35×60	7.44	35×80	8.34
33000	30×50	6.57	35×60	7.85	35×80	9.18	35×80	9.18	40×100	10.6
47000	35×60	8.19	35×80	9.49	40×100	11.3	51×105	12.5	51×105	12.5
68000	35×80	9.85	40×100	11.6	51×105	13.2				
100000	40×100	12.0	51×105	13.5						
150000	51×105	13.9								

WV μF	63		80		100		160		200	
330							25.4×30	0.92	25.4×30	0.92
470							25.4×40	1.22	25.4×40	1.22
680							25.4×50	1.60	25.4×50	1.60
1000					25.4×30	1.60	25.4×60	2.09	30×50	2.09
1500			25.4×30	1.92	25.4×40	2.13	30×60	2.69	35×60	2.87
2200	25.4×30	2.05	25.4×40	2.52	25.4×50	2.75	35×60	3.40	35×80	3.81
3300	25.4×40	2.73	25.4×50	3.29	30×50	3.55	35×100	5.02	40×100	5.27
4700	25.4×50	3.50	25.4×60	4.14	35×60	4.76	40×100	6.15	51×105	6.80
6800	25.4×60	4.38	30×60	5.15	35×80	6.17	51×105	7.86		
10000	30×60	5.46	35×80	7.08	40×100	8.16				
15000	35×80	7.48	40×80	8.43	51×105	10.2				
22000	35×100	9.16	51×105	11.3						
33000	51×105	11.7								

WV μF	250		315		350		400		450	
68									25.4×30	0.37
100					25.4×30	0.51	25.4×30	0.45	25.4×40	0.50
150			25.4×30	0.62	25.4×40	0.69	25.4×40	0.62	25.4×50	0.67
220	25.4×30	0.75	25.4×40	0.84	25.4×50	0.91	25.4×50	0.81	30×50	0.88
330	25.4×40	1.02	25.4×50	1.12	25.4×60	1.20	30×60	1.16	35×60	1.24
470	25.4×50	1.33	25.4×60	1.43	30×60	1.54	35×60	1.47	35×80	1.65
680	30×50	1.73	30×60	1.86	35×60	1.98	35×80	1.99	35×100	2.18
1000	30×60	2.25	35×70	2.56	35×100	2.96	40×100	2.78	51×80	2.77
1500	35×80	3.22	35×100	3.54	40×100	3.72	51×105	3.69		
2200	35×100	4.19	40×100	4.40	51×105	4.86				
3300	51×80	5.24	51×105	5.82						

← Ripple current (A rms) at 85°C, 120Hz  
— Case size ØD×L (mm)

## LW,SW For Welding Machine Series

- For welding machine applications
- Charge and discharge characteristic : 100000 times at 5 ~ 35°C
- LW series with lug terminal type, SW series with screw terminal type
- Complied to the RoHS directive

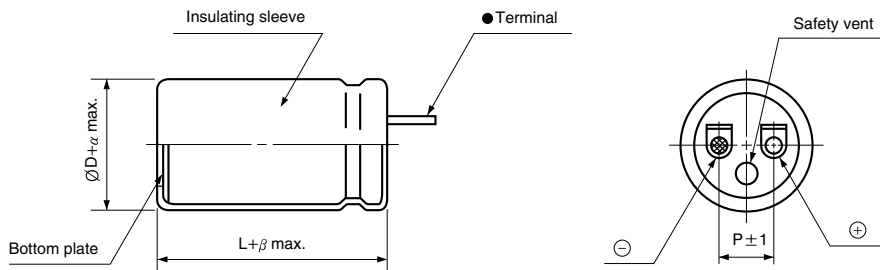


Item	Characteristics	
<b>Operating temperature range</b>	-25 ~ +85°C	
<b>Capacitance tolerance</b>	-10 ~ +50% at 120Hz, 20°C	
<b>Leakage current max.</b>	$I=3\sqrt{CV}$ ( $\mu A$ ) (after 5 minutes)	
<b>Dissipation factor max.</b>	0.20 max.at 120Hz, 20°C	
<b>Charge and discharge characteristics</b>	After charge and discharge for 100000 cycles at 5~35°C with application of the rate voltage, the capacitors shall be satisfied the following specifications.	
	Leakage current	Less than 150% of specified value
	Capacitance change	Within $\pm 15\%$ of initial value
	$\tan\delta$	Less than 150% of specified value
Conditions :		
Charge resistance	: 4 $\Omega$ Charge time : 1 sec	
Discharge resistance	: 0.12 $\Omega$ Discharge time : 0.5sec	

### DRAWING

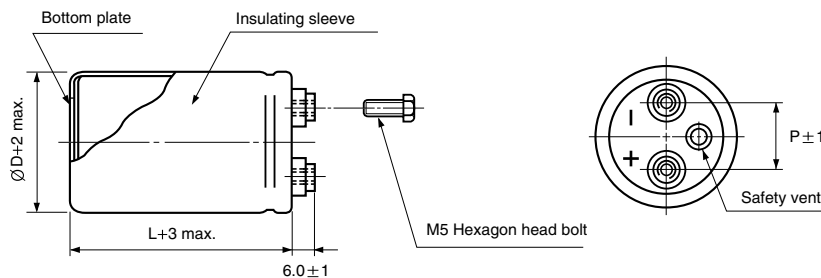
Unit : mm

#### LW series



ØD	35	40	51
P	14	18	18
$\alpha$		1	2
$\beta$		2	3

#### SW series



ØD	51	63.5	76.2
P	22	28.6	31.8

### DIMENSIONS

ØD×L (mm)

WV SERIES µF	315		475	
	LW	SW	LW	SW
225			51 × 100	51 × 100
330	35 × 100			
470	51 × 100			76.2 × 120
1000		63.5 × 140		76.2 × 160
1500		76.2 × 120		
2200		76.2 × 160		

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## GT Screw Terminal Type, Standard Series

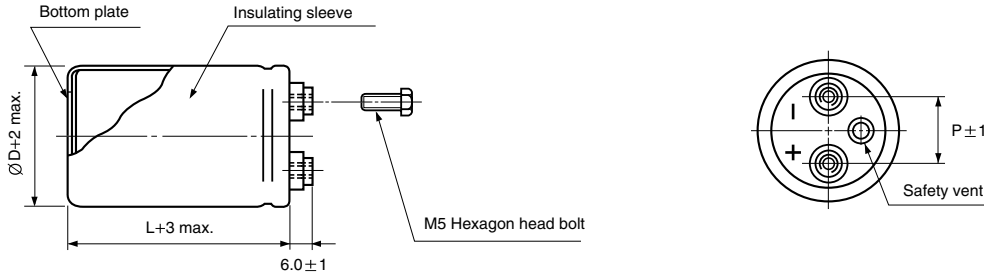
- Ideally suited for use as input and output filter capacitors in power supplies
- Suited for smoothing circuits for general purpose inverters and control circuits for F.A. machines
- Designed for use as input filter capacitor for current U.P.S.
- Complied to the RoHS directive



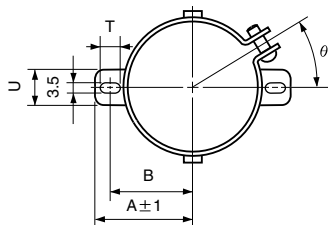
Item	Characteristics																																																																		
Operating temperature range	WV < 350 : -40 ~ 85°C, WV ≥ 350 : -25 ~ +85°C																																																																		
Capacitance tolerance	±20% at 120Hz, 20°C																																																																		
Leakage current max.	$I = 3\sqrt{CV}$ (µA) (after 5 minutes)																																																																		
Dissipation factor max. (at 120Hz, 20°C)	<table border="1"> <thead> <tr> <th>∅D</th> <th>WV</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>80</th> <th>100</th> <th>160 ~250</th> <th>350 ~450</th> </tr> </thead> <tbody> <tr> <td>35</td> <td></td> <td>0.70</td> <td>0.45</td> <td>0.45</td> <td>0.30</td> <td>0.25</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.25</td> </tr> <tr> <td>51</td> <td></td> <td>1.00</td> <td>0.60</td> <td>0.60</td> <td>0.45</td> <td>0.35</td> <td>0.30</td> <td>0.20</td> <td>0.15</td> <td>0.25</td> </tr> <tr> <td>63.5</td> <td></td> <td>1.30</td> <td>0.80</td> <td>0.70</td> <td>0.50</td> <td>0.40</td> <td>0.35</td> <td>0.25</td> <td>0.20</td> <td>0.25</td> </tr> <tr> <td>76.2</td> <td></td> <td>2.00</td> <td>1.20</td> <td>0.90</td> <td>0.70</td> <td>0.50</td> <td>0.45</td> <td>0.35</td> <td>0.25</td> <td>0.25</td> </tr> <tr> <td>89</td> <td></td> <td>2.50</td> <td>1.40</td> <td>1.00</td> <td>0.80</td> <td>0.60</td> <td>0.50</td> <td>0.40</td> <td>0.30</td> <td>0.25</td> </tr> </tbody> </table>	∅D	WV	16	25	35	50	63	80	100	160 ~250	350 ~450	35		0.70	0.45	0.45	0.30	0.25	0.25	0.20	0.15	0.25	51		1.00	0.60	0.60	0.45	0.35	0.30	0.20	0.15	0.25	63.5		1.30	0.80	0.70	0.50	0.40	0.35	0.25	0.20	0.25	76.2		2.00	1.20	0.90	0.70	0.50	0.45	0.35	0.25	0.25	89		2.50	1.40	1.00	0.80	0.60	0.50	0.40	0.30	0.25
	∅D	WV	16	25	35	50	63	80	100	160 ~250	350 ~450																																																								
	35		0.70	0.45	0.45	0.30	0.25	0.25	0.20	0.15	0.25																																																								
	51		1.00	0.60	0.60	0.45	0.35	0.30	0.20	0.15	0.25																																																								
	63.5		1.30	0.80	0.70	0.50	0.40	0.35	0.25	0.20	0.25																																																								
76.2		2.00	1.20	0.90	0.70	0.50	0.45	0.35	0.25	0.25																																																									
89		2.50	1.40	1.00	0.80	0.60	0.50	0.40	0.30	0.25																																																									
Load life (after application of the rated voltage for 2000 hours at 85°C)	Leakage current	Less than specified value																																																																	
	Capacitance change	WV ≤ 250 : Within ±15% of the initial value WV ≥ 350 : Within ±20% of the initial value																																																																	
	tanδ	WV ≤ 250 : Less than 175% of the specified value WV ≥ 350 : Less than 300% of the specified value																																																																	
Shelf life (at 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.																																																																		

### ● DRAWING

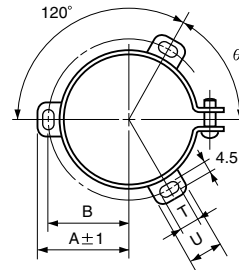
Unit : mm



### ● TWO LEGS ANGLE



### ● THREE LEGS ANGLE



### ● TWO LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
35	24	29	7	10	30	12.7
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

### ● THREE LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

## GT series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$ \diagdown WV	16		25		35		50	
10000							35×60	6.2
15000					35×50	5.8	35×80	8.5
22000			35×60	7.5	35×68	7.9	35×100	11.3
33000	35×60	7.4	35×80	10.3	35×100	11.3	35×120	15.0
47000	35×80	9.9	35×100	13.5	35×120	14.6	51×100	15.2
68000	35×100	13.1	51×80	14.5	51×100	15.9	51×120	19.7
100000	51×80	13.7	51×100	19.2	51×120	20.7	63.5×120	24.2
150000	51×100	18.3	51×140	27.1	63.5×120	25.1	76.2×120	25.9
220000	51×140	25.4	63.5×120	28.4	76.2×120	27.7	76.2×160	35.1
330000	63.5×120	27.3	76.2×120	29.3	76.2×160	37.9		
470000	76.2×120	27.1	76.2×160	39.2				
680000	76.2×160	36.5						

$\mu\text{F}$ \diagdown WV	63		80		100		160	
1500							35×60	3.4
2200							35×80	4.6
3300							35×100	6.2
4700					35×60	5.2	51×80	7.7
6800	35×50	5.2	35×60	5.6	35×80	7.0	51×100	10.0
10000	35×60	6.8	35×80	7.6	35×100	9.4	51×140	14.1
15000	35×80	9.3	35×120	11.1	51×80	11.8	63.5×140	16.5
22000	35×120	13.4	51×80	11.7	51×100	15.6	76.2×140	17.6
33000	51×100	14.5	51×120	16.8	51×140	22.0		
47000	51×120	18.6	63.5×100	18.5	63.5×140	25.0		
68000	63.5×100	20.8	63.5×140	25.4	76.2×140	26.2		
100000	76.2×120	25.0	76.2×140	29.7				
150000	76.2×140	32.5						

$\mu\text{F}$ \diagdown WV	200		250	
330				
470				
680			35×50	2.1
1000	35×60	2.8	35×68	2.9
1500	35×68	3.6	35×80	3.8
2200	35×100	5.1	35×120	5.5
3300	35×120	6.7	51×100	7.0
4700	51×100	8.3	51×140	9.6
6800	51×140	11.5	63.5×120	10.0
10000	63.5×120	12.1	76.2×120	11.2
15000	76.2×120	13.7	76.2×160	15.3
22000	76.2×160	18.6		

← Ripple current (A rms) at 85°C, 120Hz  
 ← Case size  $\varnothing D \times L$  (mm)

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**GT** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV Item μF	350			400			450		
	∅D×L (mm)	Ripple current (A rms)		∅D×L (mm)	Ripple current (A rms)		∅D×L (mm)	Ripple current (A rms)	
		40°C 120Hz	85°C 120Hz		40°C 120Hz	85°C 120Hz		40°C 120Hz	85°C 120Hz
180							35×60	2.9	1.0
220				35×50	3.0	1.1	35×60	3.2	1.1
270	35×50	3.3	1.2	35×50	3.3	1.2	35×60	3.6	1.2
330	35×50	3.7	1.3	35×60	3.9	1.4	35×80	4.4	1.5
390	35×60	4.3	1.5	35×60	4.3	1.5	35×80	4.8	1.7
470	35×60	4.7	1.6	35×80	5.3	1.8	35×100	5.8	2.0
560	35×80	5.8	2.0	35×100	6.3	2.2	35×100	6.3	2.2
680	35×80	6.4	2.2	35×100	7.0	2.4	35×120	7.5	2.6
820	35×100	7.7	2.7	35×120	8.3	2.9	51×80	8.0	2.8
1000	35×120	9.2	3.2	51×80	8.8	3.1	51×100	9.6	3.4
1200	51×80	9.7	3.4	51×80	9.7	3.4	51×100	10.6	3.7
1500	51×80	10.8	3.8	51×100	11.8	4.1	51×120	12.7	4.4
1800	51×100	12.9	4.5	51×120	13.9	4.9	63.5×100	13.8	4.8
2200	51×120	15.4	5.4	51×140	16.4	5.7	63.5×120	16.3	5.7
2700	51×140	18.2	6.4	63.5×120	18.1	6.3	63.5×140	19.2	6.7
3300	63.5×120	20.0	7.0	63.5×140	21.3	7.4	76.2×120	20.6	7.2
3900	63.5×140	23.1	8.1	63.5×160	24.4	8.6	76.2×140	23.7	8.3
4700	63.5×160	26.8	9.4	76.2×140	26.0	9.1	76.2×160	27.5	9.6
5600	76.2×140	28.4	10.0	76.2×160	30.0	10.5	89×140	31.3	10.9
6800	76.2×160	33.0	11.6	89×140	34.5	12.1	89×160	36.3	12.7
8200	89×140	37.8	13.2	89×160	39.8	13.9			
10000	89×160	44.0	15.4	89×160	44.0	15.4			

WV Item μF	500		
	∅D×L (mm)	Ripple current (A rms)	
		40°C 120Hz	85°C 120Hz
1000	51×120	12.2	4.2
1200	63.5×100	13.1	4.5
1500	63.5×100	14.8	5.1
1800	63.5×120	17.4	6.0
2200	63.5×140	20.3	7.0
2700	76.2×120	22.3	7.5
3300	76.2×140	26.1	8.8

## ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

WV	Frequency	50Hz	120Hz	300Hz	1kHz	10kHz≤
~ 100		0.8	1	1.1	1.15	1.2
160 ~ 250		0.8	1	1.1	1.15	1.3
315 ~		0.8	1	1.2	1.35	1.4

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS



**NEW**  
**GK**

Screw Terminal Type, High Ripple Series

- Ideally suited for use as input and output filter capacitors in power supplies
- High ripple current capability
- Suited for smoothing circuits for general purpose inverters and control circuits for F.A. machines
- Designed for use as input filter capacitor for current U.P.S.
- Complied to the RoHS directive

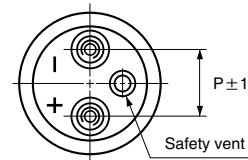
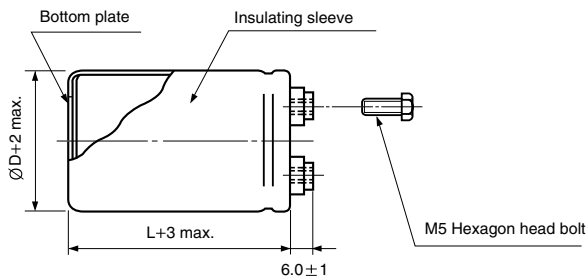
GT  $\rightarrow$  **GK**  
High Ripple



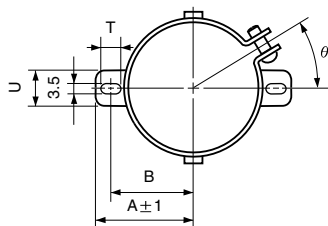
Item	Characteristics	
Operating temperature range	-25 ~ +85°C	
Capacitance tolerance	±20% at 120Hz, 20°C	
Leakage current max.	$I=3\sqrt{CV}$ (μA) (after 5 minutes)	
Dissipation factor max. (at 120Hz, 20°C)	0.25 max. at 120Hz, 20°C	
Load life (after application of the rated voltage for 2000 hours at 85°C)	Leakage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	tanδ	Less than 300% of specified value
Shelf life (at 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

## ● DRAWING

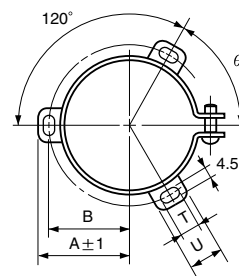
Unit : mm



## ● TWO LEGS ANGLE



## ● THREE LEGS ANGLE



## ● TWO LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
35	24	29	7	10	30	12.7
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

## ● THREE LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

LARGE TYPES

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**GK** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV Item μF	350			400			450		
	∅D×L (mm)	Ripple current (A rms)		∅D×L (mm)	Ripple current (A rms)		∅D×L (mm)	Ripple current (A rms)	
		40°C 120Hz	85°C 120Hz		40°C 120Hz	85°C 120Hz		40°C 120Hz	85°C 120Hz
180							35×60	4.4	1.5
220				35×50	4.5	1.7	35×60	4.8	1.7
270	35×50	5.0	1.8	35×50	5.0	1.8	35×60	5.4	1.8
330	35×50	5.6	2.0	35×60	5.9	2.1	35×80	6.6	2.3
390	35×60	6.5	2.3	35×60	6.5	2.3	35×80	7.2	2.6
470	35×60	7.1	2.4	35×80	8.0	2.7	35×100	8.7	3.0
560	35×80	8.7	3.0	35×100	9.5	3.3	35×100	9.5	3.3
680	35×80	9.6	3.3	35×100	10.5	3.6	35×120	11.3	3.9
820	35×100	11.6	4.1	35×120	12.5	4.4	51×80	12.0	4.2
1000	35×120	13.8	4.8	51×80	13.2	4.7	51×100	14.4	5.1
1200	51×80	14.6	5.1	51×80	14.6	5.1	51×100	15.9	5.6
1500	51×80	16.2	5.7	51×100	17.7	6.2	51×120	19.1	6.6
1800	51×100	19.4	6.8	51×120	20.9	7.4	63.5×100	20.7	7.2
2200	51×120	23.1	8.1	51×140	24.6	8.6	63.5×120	24.5	8.6
2700	51×140	27.3	9.6	63.5×120	27.2	9.5	63.5×140	28.8	10.1
3300	63.5×120	30.0	10.5	63.5×140	32.0	11.1	76.2×120	30.9	10.8
3900	63.5×140	34.7	12.2	63.5×160	36.6	12.9	76.2×140	35.6	12.5
4700	63.5×160	40.2	14.1	76.2×140	39.0	13.7	76.2×160	41.3	14.4
5600	76.2×140	42.6	15.0	76.2×160	45.0	15.8	89×140	47.0	16.4
6800	76.2×160	49.5	17.4	89×140	51.8	18.2	89×160	54.5	19.1
8200	89×140	56.7	19.8	89×160	59.7	20.9			
10000	89×160	66.0	23.1	89×160	66.0	23.1			

## ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

## CU Screw Terminal Type, Wide Temperature Range Series

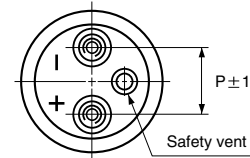
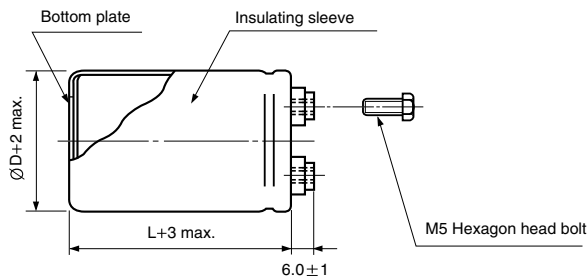
- Screw terminal series for high temperature up to 105°C
- High ripple current capability
- Ideally suited for use as input and output filter capacitors in power supplies
- Complied to the RoHS directive



Item	Characteristics																																																							
Operating temperature range	WV < 350 : -40~105°C, WV ≥ 350 : -25~105°C																																																							
Capacitance tolerance	±20% at 120Hz, 20°C																																																							
Leakage current max.	$I=3\sqrt{CV}$ (μA) (after 5 minutes)																																																							
Dissipation factor max. (at 120Hz, 20°C)	<table border="1"> <thead> <tr> <th>∅D \ WV</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>80</th> <th>100</th> <th>160</th> <th>200,250</th> <th>350,400</th> </tr> </thead> <tbody> <tr> <td>35</td> <td>0.45</td> <td>0.45</td> <td>0.40</td> <td>0.30</td> <td>0.25</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.15</td> <td>0.25</td> </tr> <tr> <td>51</td> <td>0.60</td> <td>0.60</td> <td>0.45</td> <td>0.45</td> <td>0.35</td> <td>0.30</td> <td>0.20</td> <td>0.15</td> <td>0.15</td> <td>0.25</td> </tr> <tr> <td>63.5</td> <td>0.80</td> <td>0.70</td> <td>0.50</td> <td>0.50</td> <td>0.40</td> <td>0.35</td> <td>0.25</td> <td>0.20</td> <td>0.20</td> <td>0.25</td> </tr> <tr> <td>76.2</td> <td>1.20</td> <td>0.90</td> <td>0.70</td> <td>0.70</td> <td>0.70</td> <td>0.50</td> <td>0.40</td> <td>0.35</td> <td>0.25</td> <td>0.25</td> </tr> </tbody> </table>	∅D \ WV	16	25	35	50	63	80	100	160	200,250	350,400	35	0.45	0.45	0.40	0.30	0.25	0.25	0.20	0.15	0.15	0.25	51	0.60	0.60	0.45	0.45	0.35	0.30	0.20	0.15	0.15	0.25	63.5	0.80	0.70	0.50	0.50	0.40	0.35	0.25	0.20	0.20	0.25	76.2	1.20	0.90	0.70	0.70	0.70	0.50	0.40	0.35	0.25	0.25
	∅D \ WV	16	25	35	50	63	80	100	160	200,250	350,400																																													
	35	0.45	0.45	0.40	0.30	0.25	0.25	0.20	0.15	0.15	0.25																																													
	51	0.60	0.60	0.45	0.45	0.35	0.30	0.20	0.15	0.15	0.25																																													
	63.5	0.80	0.70	0.50	0.50	0.40	0.35	0.25	0.20	0.20	0.25																																													
76.2	1.20	0.90	0.70	0.70	0.70	0.50	0.40	0.35	0.25	0.25																																														
Load life (after application of the rated voltage for 2000 hours at 105°C)	Leakage current	Less than specified value																																																						
	Capacitance change	Within ±20% of initial value																																																						
	tanδ	Less than 200% of specified value																																																						
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.																																																							

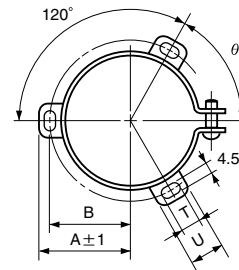
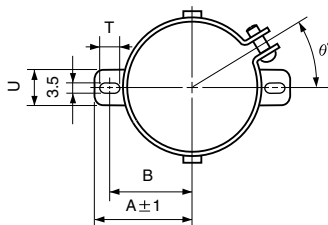
### DRAWING

Unit : mm



### TWO LEGS ANGLE

### THREE LEGS ANGLE



### TWO LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
35	24	29	7	10	30	12.7
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

### THREE LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**CU** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	16		25		35		50	
	6800							35×50
10000					35×60	3.5	35×60	4.0
15000			35×50	3.8	35×80	4.8	35×80	5.5
22000	35×60	4.9	35×68	5.1	35×100	6.4	35×120	8.0
33000	35×80	6.7	35×100	7.4	35×120	8.5	51×100	8.3
47000	35×100	8.8	35×120	9.5	51×100	9.9	51×120	10.7
68000	51×80	9.5	51×100	10.3	51×120	12.8	63.5×100	12.6
100000	51×100	12.5	51×120	13.5	63.5×120	16.4	76.2×120	13.7
150000	51×140	17.6	63.5×120	16.9	76.2×120	16.8	76.2×140	17.9
220000	63.5×120	18.4	76.2×120	18.0	76.2×160	22.8		
330000	76.2×120	19.1	76.2×160	24.6				
470000	76.2×160	25.5						

μF \ WV	63		80		100		160	
	1000							35×60
1500					35×60	1.9	35×68	2.1
2200					35×80	2.6	35×100	3.0
3300					35×100	3.5	35×120	4.0
4700			35×60	3.0	51×80	4.3	51×100	5.0
6800	35×60	3.7	35×80	4.1	51×100	5.7	51×140	7.0
10000	35×80	5.0	35×100	5.4	51×140	7.9	63.5×120	7.3
15000	35×120	7.2	51×80	6.3	63.5×140	9.2	76.2×120	7.0
22000	51×80	7.0	51×100	8.3	76.2×140	9.1	76.2×160	9.4
33000	51×120	10.1	51×140	11.7				
47000	63.5×100	11.7	63.5×140	14.3				
68000	63.5×140	16.0	76.2×140	14.2				
100000	76.2×140	14.6						

μF \ WV	200		250		350		400	
	220							35×50
330					35×60	0.7	35×60	0.7
470			35×60	1.1	35×80	1.0	35×80	1.0
680	35×50	1.3	35×80	1.5	35×100	1.3	35×120	1.4
1000	35×68	1.8	35×100	2.1	35×120	1.7	51×80	1.6
1500	35×80	2.3	51×80	2.6	51×100	2.2	51×120	2.4
2200	35×120	3.3	51×100	3.4	51×140	3.1	63.5×120	3.2
3300	51×100	4.2	51×140	4.8	63.5×120	3.9	76.2×120	3.9
4700	51×140	5.8	63.5×120	5.2	76.2×120	4.6	76.2×160	5.2
6800	63.5×120	6.2	76.2×120	5.5	76.2×160	6.2		
10000	76.2×120	6.7	76.2×160	7.5				
15000	76.2×160	9.2						

Ripple current (A rms) at 105°C, 120Hz  
Case size ØD×L (mm)

μF \ WV	450	
	2200	63.5×115
2700	63.5×130	14.3
3300	76.2×130	16.9
3900	76.2×140	20.5
4700	76.2×150	22.6
5600	76.2×150	25.2
6800	89×150	26.0

## ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

WV \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz ≤
	~ 100	0.8	1	1.1	1.15
160 ~ 250	0.8	1	1.1	1.15	1.3
315 ~	0.8	1	1.2	1.35	1.4

## GF For Inverter Circuits Series



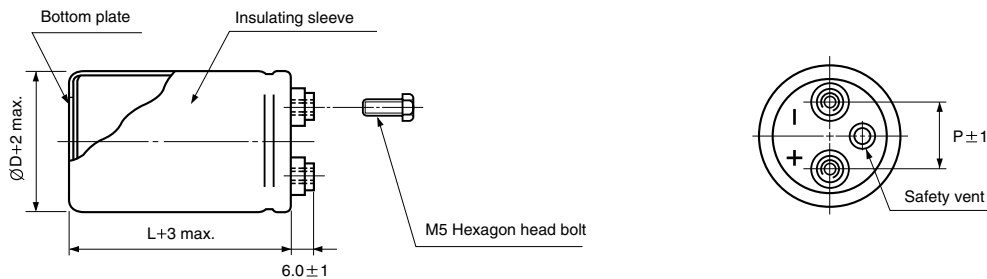
- Screw terminal series in compact case sizes
- High reliability, long life guaranteed for 5000 hours load life at 85°C (500 ~ 600WV is assured 2000 hours at 85°C)
- Suited for use in industrial power supplies for inverters
- Complied to the RoHS directive



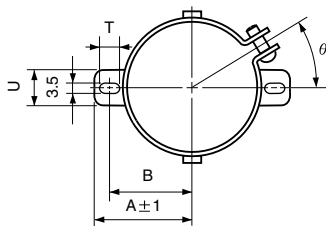
Item	Characteristics	
Operating temperature range	-25~105°C	
Capacitance tolerance	±20% at 120Hz, 20°C	
Leakage current max.	$I=3\sqrt{CV}$ (μA) (after 5 minutes)	
Dissipation factor max.	0.20 max. at 120Hz, 20°C	
Load life (after application of the rated voltage for 5000 hours at 85°C)	Leakage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	tanδ	Less than 300% of specified value
	500~600WV products are for 2000 hours.	
Shelf life (at 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

### DRAWING

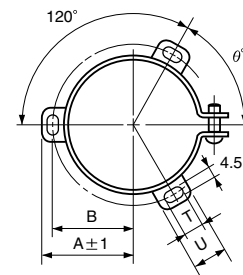
Unit : mm



### TWO LEGS ANGLE



### THREE LEGS ANGLE



### TWO LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

### THREE LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**GF** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$ \diagdown WV	350		400		450	
2200	51 × 110	6.0	51 × 130	6.4	63.5 × 110	6.4
2700	51 × 130	7.1	63.5 × 110	7.1	63.5 × 130	7.5
3300	63.5 × 100	7.5	63.5 × 130	8.3	76.2 × 110	8.0
3900	63.5 × 100	8.2	76.2 × 100	8.4	76.2 × 130	9.3
4700	76.2 × 100	9.3	76.2 × 130	10.2	76.2 × 150	10.8
5600	76.2 × 110	10.5	76.2 × 150	11.8	76.2 × 160	12.1
6800	76.2 × 130	12.3	76.2 × 160	13.4	89 × 150	14.3
8200	76.2 × 160	14.7	89 × 150	15.7	89 × 160	16.1
10000	89 × 150	17.3	89 × 160	17.8		
12000	89 × 160	19.5				

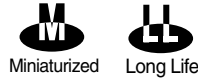
$\mu\text{F}$ \diagdown WV	500		550		600	
1000	51 × 120	4.2	51 × 130	4.2	63.5 × 130	5.9
1200	63.5 × 100	4.5	63.5 × 110	5.0	76.2 × 120	6.7
1500	63.5 × 100	5.1	63.5 × 130	6.0	76.2 × 140	8.1
1800	63.5 × 120	6.0	76.2 × 110	6.7	76.2 × 160	9.6
2200	63.5 × 140	7.0	76.2 × 130	8.0	76.2 × 160	10.7
2700	76.2 × 120	7.5	76.2 × 150	9.4	89 × 160	12.6
3300	76.2 × 140	8.8	76.2 × 160	11.0		
3900			89 × 160	12.5		

↑  
 ↑  
 — Ripple current (A rms) at 85°C, 120Hz  
 — Case size  $\varnothing D \times L$  (mm)

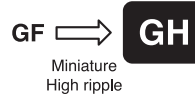
## ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

## GH For inverter Circuits Series



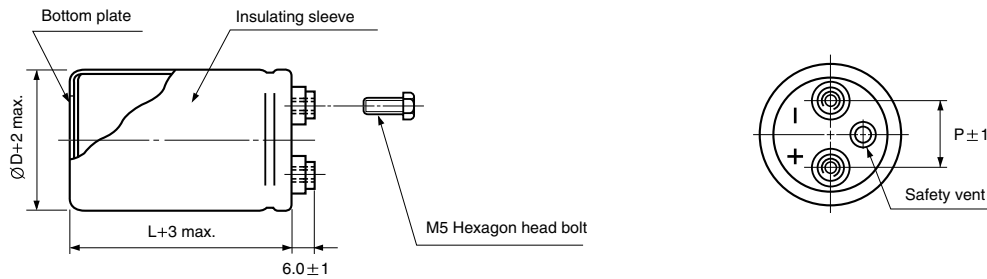
- Screw terminal series in compact case sizes
- Miniature size, High ripple current compared with GF series
- High reliability, long life guaranteed for 5000 hours load life at 85°C (500WV is assured 2000 hours at 85°C)
- Suited for use in industrial power supplies for inverters
- Complied to the RoHS directive



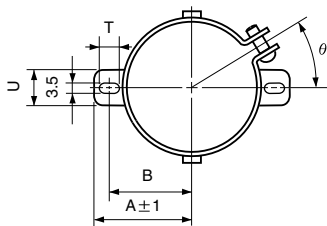
Item	Characteristics	
<b>Operating temperature range</b>	-25 ~ +85°C	
<b>Capacitance tolerance</b>	±20% at 120Hz, 20°C	
<b>Leakage current max.</b>	$I=3 \sqrt{CV}$ (µA) (after 5 minutes)	
<b>Dissipation factor max.</b>	0.20 max. at 120Hz, 20°C	
<b>Load life (after application of the rated voltage for 5000 hours at 85°C)</b>	Leakage current	Less than the specified value
	Capacitance change	Within ±20% of the initial value
	tanδ	Less than 300% of specified value
	500WV products are for 2000 hours	
<b>Shelf life (at 85°C)</b>	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

### ● DRAWING

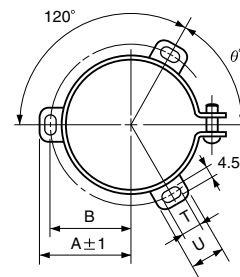
Unit : mm



### ● TWO LEGS ANGLE



### ● THREE LEGS ANGLE



### ● TWO LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

### ● THREE LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**GH** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$ \ WV	400		450		500	
1800					63.5 × 110	6.5
2200	51 × 100	8.4	51 × 130	8.6	63.5 × 130	7.7
2700	51 × 130	10.5	63.5 × 110	10.5	76.2 × 110	8.8
3300	63.5 × 100	11.6	63.5 × 120	11.9	76.2 × 130	10.4
3900	63.5 × 110	12.3	76.2 × 110	13.9	76.2 × 150	12.1
4700	63.5 × 130	14.5	76.2 × 120	15.5	89 × 130	13.7
5600	76.2 × 120	16.5	76.2 × 140	15.9	89 × 150	17.8
6800	76.2 × 130	17.5	76.2 × 160	18.4		
8200	76.2 × 150	18.7	89 × 150	19.7		
10000	89 × 150	20.5				
12000	89 × 160	21.0				

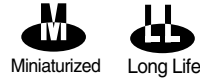
Ripple current (A rms) at 85°C, 120Hz  
 Case size  $\varnothing D \times L$  (mm)

## ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

## GN For Inverter, Miniature, High Ripple Series

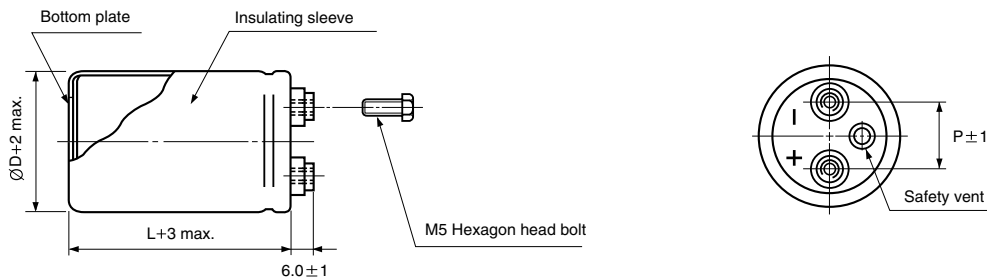
- Miniature size, High ripple current compared with GH series
- High reliability, long life guaranteed for 5000 hours load life at 85°C
- Suited for use in industrial power supplies for inverters
- Complied to the RoHS directive



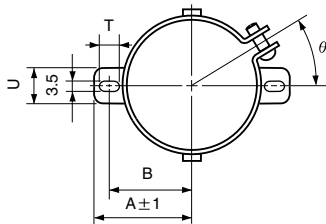
Item	Characteristics	
Operating temperature range	-25 ~ +85°C	
Capacitance tolerance	±20% at 120Hz, 20°C	
Leakage current max.	$I=3\sqrt{CV}$ (μA) (after 5 minutes)	
Dissipation factor max.	0.20 max. at 120Hz, 20°C	
Load life (after application of the rated voltage for 5000 hours at 85°C)	Leakage current	Less than specified value
	Capacitance change	Within ±20% of the initial value
	tanδ	Less than 300% of specified value
	500WV products are for 2000 hours.	
Shelf life (at 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

### DRAWING

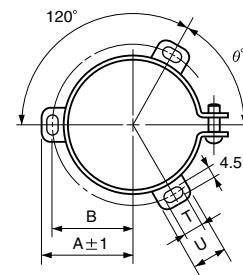
Unit : mm



### TWO LEGS ANGLE



### THREE LEGS ANGLE



### TWO LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

### THREE LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**GN** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$ \diagdown WV	400		450		500	
1800					63.5 × 100	6.5
2200	51 × 100	8.4	51 × 120	8.6	63.5 × 120	7.7
2700	51 × 110	10.0	63.5 × 100	10.5	76.2 × 100	8.8
3300	63.5 × 100	11.6	63.5 × 110	11.9	76.2 × 120	10.4
3900	63.5 × 100	12.3	76.2 × 100	13.9	76.2 × 140	12.1
4700	63.5 × 120	14.5	76.2 × 110	15.5	89 × 120	13.7
5600	76.2 × 110	16.5	76.2 × 130	15.9	89 × 140	17.8
6800	76.2 × 120	17.5	76.2 × 150	18.4		
8200	76.2 × 140	18.7	89 × 140	19.7		
10000	89 × 140	20.5				
12000	89 × 150	21.0				

Ripple current (A rms) at 85°C, 120Hz  
 Case size  $\varnothing D \times L$  (mm)

## ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

## GL Screw Terminal Type, Long Life Series



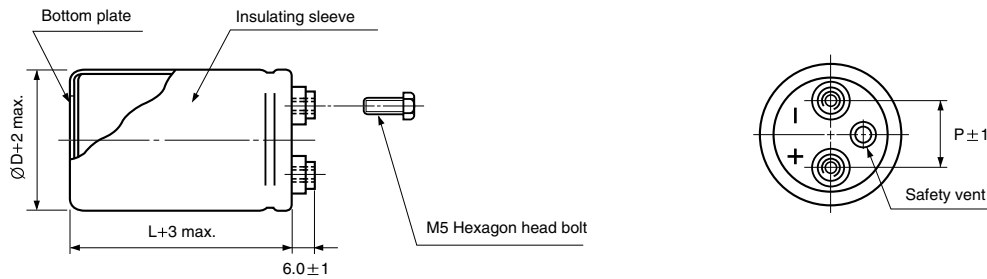
- Screw terminal series in compact case sizes
- High reliability, long life guaranteed for 20000 hours load life at 85°C
- Suited for use in industrial power supplies for inverters
- Complied to the RoHS directive



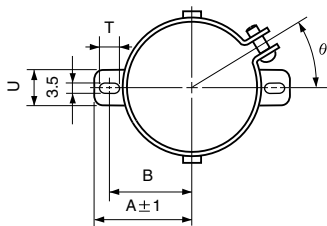
Item	Characteristics	
Operating temperature range	-25 ~ +85°C	
Capacitance tolerance	±20% at 120Hz, 20°C	
Leakage current max.	$I=3\sqrt{CV}$ (µA) (after 5 minutes)	
Dissipation factor max.	0.20 max. at 120Hz, 20°C	
Load life (after application of the rated voltage for 20000 hours at 85°C)	Leakage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	tanδ	Less than 300% of specified value
Shelf life (at 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

### DRAWING

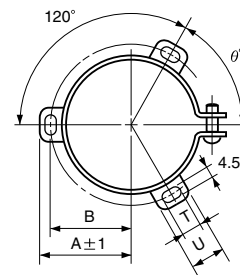
Unit : mm



### TWO LEGS ANGLE



### THREE LEGS ANGLE



### TWO LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

### THREE LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**GL** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

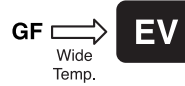
WV Item $\mu$ F	350			400			450		
	$\varnothing$ D×L (mm)	Ripple current (A rms)		$\varnothing$ D×L (mm)	Ripple current (A rms)		$\varnothing$ D×L (mm)	Ripple current (A rms)	
		40°C 120Hz	85°C 120Hz		40°C 120Hz	85°C 120Hz		40°C 120Hz	85°C 120Hz
1500							51×110	13.4	6.1
1800				51×110	14.6	6.6	51×130	15.7	7.1
2200	51×110	16.2	7.3	51×130	17.3	7.9	63.5×110	17.2	7.8
2700	51×130	19.2	8.7	63.5×110	19.0	8.7	63.5×130	20.3	9.2
3300	63.5×100	20.3	9.2	63.5×130	22.5	10.2	76.2×110	21.7	9.9
3900	63.5×110	22.9	10.4	76.2×100	22.7	10.3	76.2×130	25.1	11.4
4700	76.2×100	25.0	11.4	76.2×130	27.6	12.5	76.2×150	29.1	13.2
5600	76.2×110	28.2	12.8	76.2×150	31.8	14.5	76.2×160	32.7	14.8
6800	76.2×130	33.1	15.1	76.2×160	36.0	16.4	89×150	38.5	17.5
8200	76.2×150	39.5	18.0	89×150	42.3	19.2	89×160	43.4	19.7
10000	89×150	46.7	21.2	89×160	47.9	21.8			
12000	89×160	52.5	23.9						

## ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

## EV High ripple Current, High Reliability Series

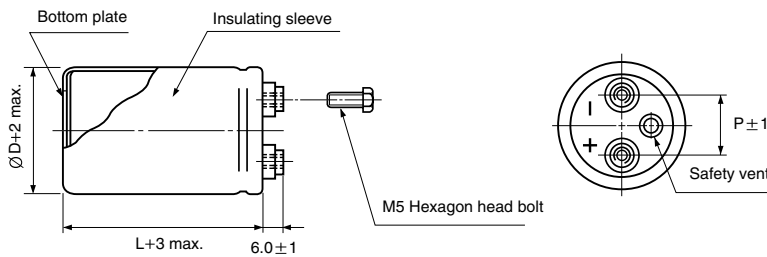
- High ripple current compared with GF series
- Newly improved long life guaranteed for 5000 hours load life at 105°C
- Suited for the general-purpose inverter
- Complied to the RoHS directive



Item	Characteristics	
Operating temperature range	-25 ~ +105°C	
Capacitance tolerance	±20% at 120Hz, 20°C	
Leakage current max.	$I = 3\sqrt{CV}$ (μA) (after 5 minutes)	
Dissipation factor max.	0.2 max. at 120Hz, 20°C	
Load life (after application of the rated voltage for 5000 hours at 105°C)	Leakage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	tanδ	Less than 200% of specified value
500WV products are for 2000hours		
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

### DRAWING

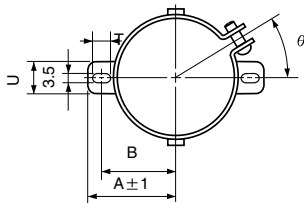
Unit : mm



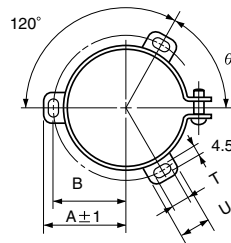
### TWO LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

### TWO LEGS ANGLE



### THREE LEGS ANGLE



### THREE LEGS ANGLE SIZE TABLE

ØD	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

### DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV Item μF	400		450		500	
	ØD×L (mm)	Ripple Current (A rms) 105°C 120Hz	ØD×L (mm)	Ripple Current (A rms) 105°C 120Hz	ØD×L (mm)	Ripple Current (A rms) 105°C 120Hz
1000					51 × 130	6.3
1500					63.5 × 110	7.5
2200	63.5 × 110	11.6	63.5 × 115	12.1	76.2 × 130	10.1
2700	63.5 × 115	13.7	63.5 × 130	14.3	76.2 × 140	12.3
3300	63.5 × 130	16.1	76.2 × 130	16.9	76.2 × 150	13.0
3900	63.5 × 140	18.1	76.2 × 140	20.5	89 × 160	15.0
4700	76.2 × 130	21.2	76.2 × 150	22.6	89 × 160	16.5
5600	76.2 × 150	24.3	76.2 × 150	25.2		
6800	89 × 150	27.1	89 × 150	26.0		

### PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**EY** High Ripple, High Reliability Long Life Series



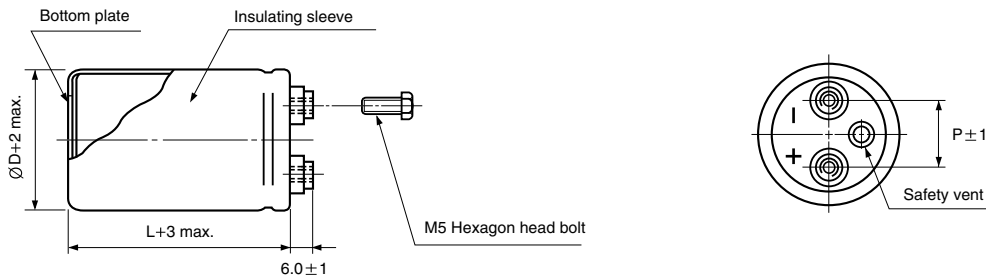
- High ripple current compared with GF Series
- High reliability, long life guaranteed for 7000 hours load life at 105°C
- Suited for use in industrial power supplies for inverter
- Complied to the RoHS directive



Item	Characteristics	
Operating temperature range	-25 ~ +105°C	
Capacitance tolerance	±20% at 120Hz, 20°C	
Leakage current max.	$I=3\sqrt{CV}$ (μA) (after 5 minutes)	
Dissipation factor max.	0.20 max. at 120Hz, 20°C	
Load life (after application of the rated voltage for 7000 hours at 105°C)	Leakage current	Less than specified value
	Capacitance change	Within ±20% of initial value
	tanδ	Less than 300% of specified value
Shelf life (at 105°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.	

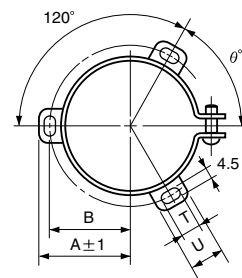
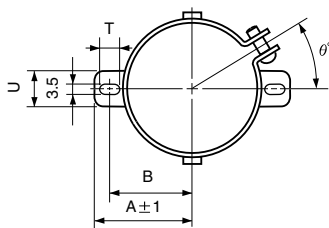
● DRAWING

Unit : mm



● TWO LEGS ANGLE

● THREE LEGS ANGLE



● TWO LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
51	33.6	39.9	6	14	30	22
63.5	40.8	46.8	6	14	30	28.6

● THREE LEGS ANGLE SIZE TABLE

∅D	B	A	T	U	θ°	P
51	32.9	38.9	7	12	60	22
63.5	38.4	45.3	7	14	60	28.6
76.2	44.5	51.5	8	16	60	31.8
89	50.8	61	8	16	60	31.8

## EY series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT


WV Item $\mu\text{F}$	350			400			450		
	$\varnothing\text{D}\times\text{L}$ (mm)	Ripple current (A rms)		$\varnothing\text{D}\times\text{L}$ (mm)	Ripple current (A rms)		$\varnothing\text{D}\times\text{L}$ (mm)	Ripple current (A rms)	
		40°C 120Hz	105°C 120Hz		40°C 120Hz	105°C 120Hz		40°C 120Hz	105°C
1500							51×110	13.4	6.1
1800				51×110	16.4	7.4	51×130	15.7	7.1
2200	51×110	18.1	8.2	51×130	19.4	8.8	63.5×110	17.2	7.8
2700	51×130	21.5	9.8	63.5×110	21.3	9.7	63.5×130	20.3	9.2
3300	63.5×100	22.7	10.3	63.5×130	25.1	11.4	76.2×110	21.7	9.9
3900	63.5×110	25.6	11.6	76.2×100	25.4	11.6	76.2×130	25.1	11.4
4700	76.2×100	27.9	12.7	76.2×130	30.8	14.0	76.2×150	29.1	13.2
5600	76.2×110	31.6	14.3	76.2×150	35.6	16.2	76.2×160	32.7	14.8
6800	76.2×130	37.1	16.8	76.2×160	40.2	18.3	89×150	38.5	17.5
8200	76.2×150	44.2	20.1	89×150	47.3	21.5	89×160	43.4	19.7
10000	89×150	52.2	23.7	89×160	53.6	24.3			
12000	89×160	58.7	26.7						

### ● PERMISSIBLE RIPPLE CURRENT MULTIPLIERS

Frequency	50Hz	120Hz	300Hz	1kHz	3kHz
Coefficient	0.8	1.0	1.1	1.3	1.4

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**AM** For Hi-Fi Component System Series

For Audio Use  Solvent Proof 

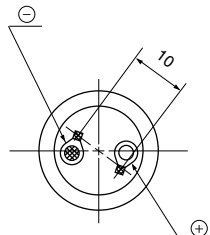
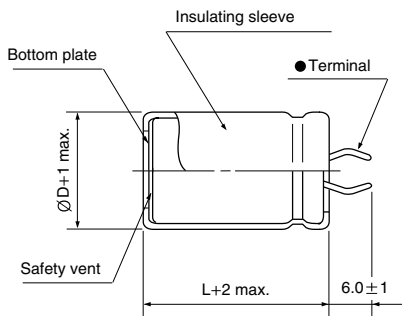


- For high grade audio equipment
- High resonance frequency, low ESR and low impedance
- Ideally suited for Hi-Fi VTR and CD players
- Snap-in terminal type
- Voltage range of 16~100V
- Complied to the RoHS directive

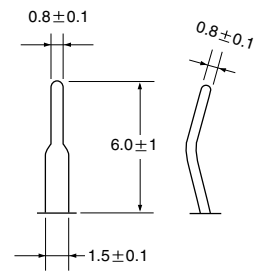
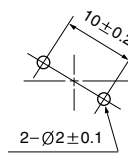
Item	Characteristics				
Operating temperature range	-40 ~ +85°C				
Capacitance tolerance	±20% at 120Hz, 20°C				
Leakage current max.	$I = 3\sqrt{CV}$ (μA) (after 5 minutes)				
Dissipation factor max. (at 120Hz, 20°C)	WV	16	25 ~ 35	50 ~ 63	80 ~ 100
	tanδ	0.25	0.22	0.20	0.15
Charge and discharge characteristics	After charge and discharge for 5000 cycles at 70°C with application of the rated voltage, the capacitors shall be satisfied the following specifications.				
	Appearance	No visible damage and no leakage electrolyte			
	Leakage current	Less than specified value			
	Capacitance change	Within ±15% of initial value			
	tanδ	Less than 150% of specified value			
Conditions :					
Charge resistance : 4Ω		Applied current : 1A			
Discharge resistance : 100Ω		Charge and discharge time : 60sec. (each)			
Load life (after application of the rated voltage for 2000 hours at 85°C)	Leakage current	Less than specified value			
	Capacitance change	Within ±20% of initial value			
	tanδ	Less than 200% of specified value			
Shelf life (at 85°C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.				

● DRAWING

Unit : mm



● Terminal



## AM series

### ● DIMENSIONS

∅D×L(mm)

$\mu\text{F}$ \ WV	16	25	35	50	63	80	100
470							22×40
680						22×40	25.4×40
1000					22×40	25.4×40	25.4×50
1500				22×40	25.4×40	25.4×50	30×50
2200			22×40	25.4×40	25.4×50	30×50	35×50
3300		22×40	25.4×40	25.4×50	30×50	30×60	35×60
4700		25.4×40	25.4×50	30×50	30×60	35×60	
6800	22×40	25.4×50	30×50	30×60	35×60		
8200	25.4×40	30×50	35×50	35×60	35×60		
10000	25.4×50	35×50	35×60	35×60			
12000	30×50	35×50	35×60				
15000	35×50	35×60					
22000	35×60						
33000	35×60						

\* Lug terminal type : Applicable to case sizes larger than ∅25.4. Screw terminal type : Applicable to case sizes larger than ∅35.

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## DF For Photo Flash Series

- For photo flash applications with lug terminal
- Low dissipation factor, low leakage current and high stability during the repetition of charge and discharge
- Complied to the RoHS directive

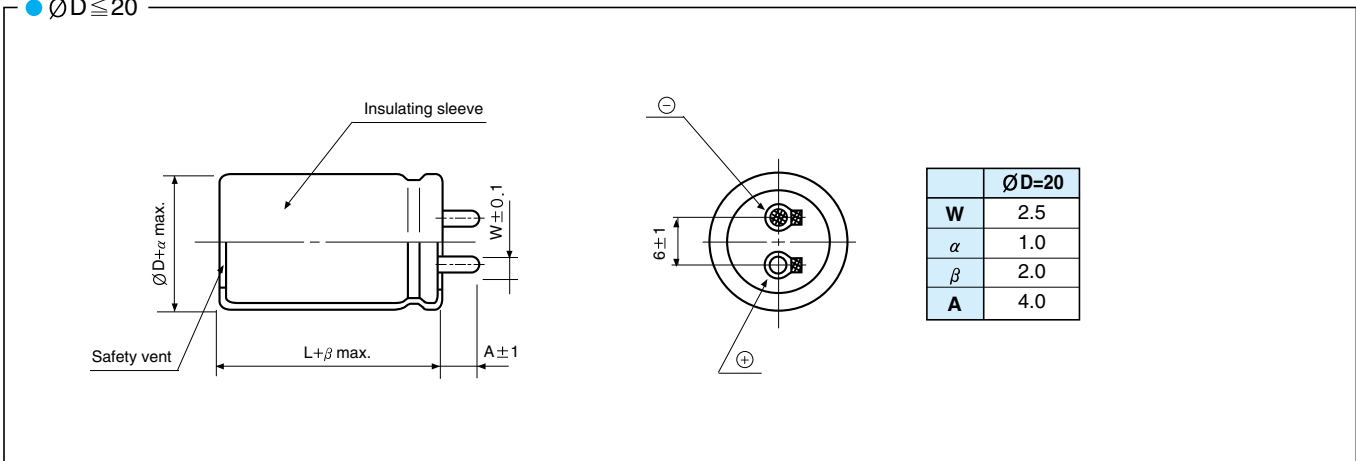


Item	Characteristics		
Operating temperature range	-20 ~ +55°C		
Capacitance tolerance	-10 ~ +20% at 120Hz, 20°C		
Leakage current max.	I=1 × C (µA) (after 5 minutes), where C=Nominal capacitance (µF)		
Dissipation factor max. (at 120Hz, 20°C)	Capacitance range(µF)	150 ~ 600	700 ~ 1500
	tanδ	0.10	0.15
Charge and discharge characteristics	Charge and discharge at rated voltage at 5~35°C with a switch sequence of 30 seconds for 5000 times via xenon flash tube with discharge resistance of 0.7~1.0Ω		
	Leakage current	Less than 150% of specified value	
	Capacitance change	Within ±10% of initial value	
Shelf life	This following specifications shall be satisfied when capacitors are restored to 20°C after exposing them for 1000 hours at 55°C without voltage applied.		
	Leakage current	Less than 300% of specified value	
	Capacitance change	Within ±10% of initial value	
	tanδ	Less than 150% of specified value	

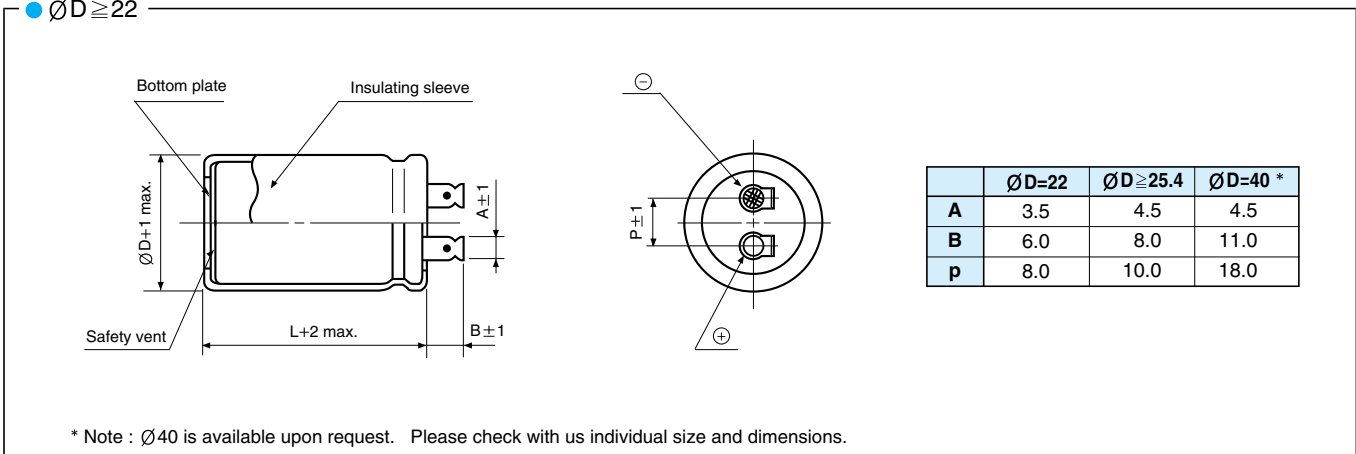
### ● DRAWING

Unit : mm

#### ● ØD ≤ 20



#### ● ØD ≥ 22



## DF series

### ● DIMENSIONS

∅D×L(mm)

WV (SV)	∅D μF	20	22	25.4	30	35
		<b>330 (350)</b>				
200		20×27				
250		20×30	22×27			
300		20×36	22×30			
350		20×39	22×33			
400		20×44	22×36	25.4×30		
450			22×42	25.4×33		
500			22×44	25.4×37		
600				25.4×42	30×33	
700				25.4×47	30×38	
800				25.4×54	30×42	
900				25.4×57	30×45	
1000					30×48	35×40
1200					30×58	35×45
1300					30×63	35×50
1500					30×70	35×55
<b>360 (390)</b>						
200		20×30	22×27			
250		20×36	22×30			
300		20×39	22×36	25.4×30		
350		20×44	22×40	25.4×33		
400			22×42	25.4×35		
450			22×48	25.4×40		
500				25.4×44	30×35	
600				25.4×54	30×38	
700				25.4×57	30×45	
800					30×50	35×40
900					30×55	35×45
1000					30×58	35×55
1200					30×70	35×55
1300						35×60
1500						35×70

LARGE TYPES

# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

## AR For Inverter Air-conditioning System Series

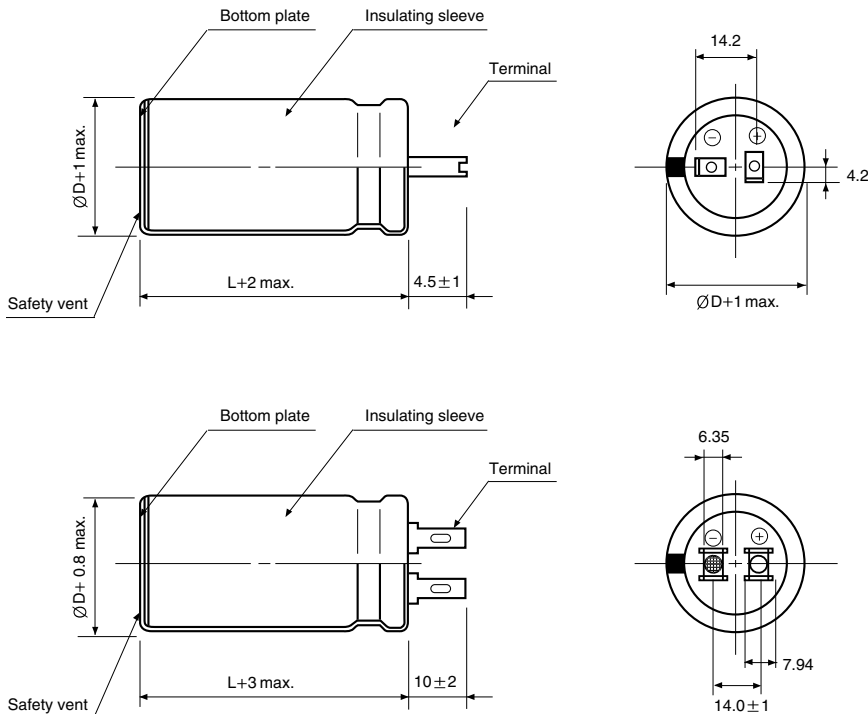
- For high ripple current application such as air conditioning system
- Load life of 3000 hours at 85°C
- Complied to the RoHS directive



Item	Characteristics			
Operating temperature range	-25 ~ +85°C			
Capacitance tolerance	± 10% at 120Hz, 20°C			
Leakage current max.	$I=3 \sqrt{CV}$ (μA) (after 5 minutes)			
Dissipation factor max. (120Hz, 20°C)	WV	220	330	400
	tanδ	0.02	0.03	0.05
Low temperature characteristics (120Hz)	Z-25°C/ Z+20°C ≤ 4			
Load life	After an application of DC bias voltage plus the rated AC ripple current for 3000 hours at 85°C. The measurement shall meet the following limits.			
	Leakage current	Less than specified value		
	Capacitance change	Within ±20% of initial value		
Shelf life (at 85°C)	tanδ	Less than 200% of specified value		
	This following specifications shall be satisfied when capacitors are restored to 20°C after exposing them for 1000 hours at 85°C without voltage applied.			
	Leakage current	Less than specified value		
	Capacitance change	Within ± 15% of initial value		
Shelf life (at 85°C)	tanδ	Less than 150% of specified value		

### DRAWING

Unit : mm



\* Note : If you want to use the 'AR' series in your circuit, Please consult our technical department.

## HP Horizontal Mount Type Series

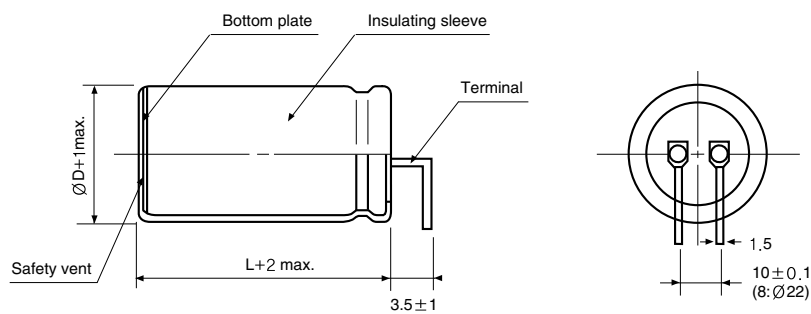
- Layout mounting
- Suited for use in flat electronic device where height space is limited (adapter, etc.)
- Complied to the RoHS directive



Item	Characteristics		
<b>Operating temperature range</b>	WV200 : -40 ~ +105°C, WV400 : -25 ~ +105°C		
<b>Leakage current max.</b>	$I=3\sqrt{CV}$ (µA) (after 5 minutes)		
<b>Capacitance tolerance</b>	±20% at 120Hz, 20°C		
<b>Dissipation factor max. (at 120Hz, 20°C)</b>	WV	200	400
	tanδ	0.15	0.15
<b>Low temperature characteristics (impedance ratio at 120Hz)</b>	WV	200	400
	Z-25°C/Z+20°C	3	3
	Z-40°C/Z+20°C	10	10
<b>Load life (after application of the rated voltage for 2000 hours at 105°C)</b>	After an application of DC bias voltage plus the rated AC ripple current for 2000 hours at 105°C the peak voltage shall not exceed the rated DC voltage. The measurement shall meet the following limits. Measurement shall be performed after 2 hours exposure at room temperature.		
	Leakage current	Less than specified value	
	Capacitance change	Within ±25% of initial value	
	tanδ	Less than 200% of specified value	
<b>Shelf life (at 105°C)</b>	After 1000 hours at 105°C without voltage application measurement shall meet the following limits. Measurement shall be performed after exposure for 24 hours at room temperature after application of DC rated voltage to the capacitors for 30 minutes.		
	Leakage current	Less than specified value	
	Capacitance change	Within ±25% of initial value	
	tanδ	Less than 200% of specified value	

### ● DRAWING

Unit : mm



# LARGE ALUMINUM ELECTROLYTIC CAPACITORS

**HP** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$ \diagdown WV $\varnothing\text{D}$	200				400			
	22		25.4		22		25.4	
68					22 × 25	0.46		
82					22 × 30	0.57		
100					22 × 35	0.65	25.4 × 30	0.67
120					22 × 40	0.74	25.4 × 30	0.72
150					22 × 45	0.88	25.4 × 35	0.84
180					22 × 50	0.95	25.4 × 40	0.93
220					22 × 50	1.10	25.4 × 45	1.09
270	22 × 30	0.93					25.4 × 50	1.25
330	22 × 35	1.09						
390	22 × 40	1.26	25.4 × 30	1.30				
470	22 × 45	1.42	25.4 × 35	1.39				
560	22 × 50	1.56	25.4 × 35	1.55				
680			25.4 × 45	1.85				
820			25.4 × 50	2.18				
1000			25.4 × 60	2.30				

Ripple current (A rms) at 105°C, 120Hz  
Case size  $\varnothing\text{D} \times \text{L}$  (mm)

## ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$ \diagdown Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
160 ~ 250	0.85	1.00	1.20	1.25	1.45
300 ~	0.85	1.00	1.15	1.20	1.40