

ALUMINUM ELECTROLYTIC CAPACITORS

HP3 Series (85°C, Standard Size) (Warranty of 2,000 hours at 85°C)

Features

- Rendered about 20% to 30% smaller than the preceding HPR and HFR type predecessor thanks to etching foil magnification increase.



Product Specifications

Items	Specifications
Temperature range	-40°C to +85°C
Rated voltage	16 to 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller. [C=Capacitance (µF), V=Rated voltage (V)]
Dissipation factor	16~100V.DC Less than the value as per table of standard ratings below. (20°C, 120Hz)
	160~450V.DC Less than 0.15
Permissible ripple current	As per table of standard ratings below. (85°C, 120Hz)
High temp. Load life test	After 85°C, 2000h, rated voltage (specified ripple current superposition) application Capacitance variation : Initial value ±15%
	Dissipation factor : 175% of less of specified initial value Leakage current : Not greater than the specified initial value
Others	JIS C 5101-4.

A continuous load should be avoided over 10 A at the terminal in accordance with the permissible current.

Ripple current correction coefficient

Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient 16~100V	0.8	1.0	1.1	1.2	1.2
coefficient 160~450V	0.8	1.0	1.1	1.3	1.4
Temperature (°C)	40	60	70	85	
Correction coefficient	1.8	1.4	1.2	1.0	

Standard value and case size for HP3 Series (16 to 80 V.DC)

Capacitance		Rated voltage V.DC (Code)																																																	
		16 (1C)				25 (1E)				35 (1V)				50 (1H)				63 (1J)				80 (1K)				100 (2A)																									
µF	Code	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35																						
1000	102	Case dia dimensions øD (mm)																				25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30				
1500	152	Upper : Case size L (mm)																				25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30				
		Middle : Dissipation factor																				0.25	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20			
		Lower : Max ripple current (Arms) / 85°C 120Hz																				1.08	1.15	1.13	1.22	1.22	1.22	1.47	1.46	1.56	1.56	1.56	1.80	1.72	1.65	1.65	1.88	1.83	1.75	1.47	1.41	1.35	1.35	1.47	1.41	1.35	1.35	1.47	1.41	1.35	1.35
2200	222									25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30																				
3300	332									0.35	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30																			
4700	472					25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30																				
6800	682	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30	25	30																				
		0.50	0.40	0.40	0.40	0.35	0.35	0.35	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30																			
		1.78	1.89	1.87	2.01	2.01	2.01	2.31	2.21	2.13	2.13	2.42	2.25	2.25	2.56	2.47	2.56	2.47	2.56	2.47	2.56	2.47	2.56	2.47	2.56	2.47	2.56	2.47	2.56	2.47	2.56																				
10000	103	30	30	25	35	30	25	45	35	30	25	50	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35																				
		0.50	0.40	0.40	0.40	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35																				
		1.94	1.92	2.06	2.06	2.27	2.18	2.18	2.18	2.48	2.30	2.30	2.52	2.53	2.65	2.52	2.52	2.78	2.67	2.67	2.67	3.03	2.82	2.82	3.21	3.10	3.36	3.21	3.10	3.36	3.21	3.10																			
15000	153	40	30	25	45	35	30	25	50	35	30	50	35	30	50	35	30	50	35	30	50	35	30	50	35	30	50	35	30	50	35																				
		0.50	0.40	0.40	0.40	0.40	0.40	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35																				
		2.65	2.52	2.52	2.78	2.67	2.67	2.67	3.03	2.82	2.82	3.21	3.10	3.36	3.21	3.10	3.36	3.21	3.10	3.36	3.21	3.10	3.36	3.21	3.10	3.36	3.21	3.10	3.36	3.21	3.10																				
22000	223	45	30	25	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35																					
		0.50	0.40	0.40	0.40	0.40	0.40	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35																				
		3.52	3.23	3.23	3.52	3.41	3.41	3.73	3.76	3.73	3.76	4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67																				
33000	333	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35	30	45	35																					
		0.50	0.40	0.40	0.40	0.40	0.40	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35																				
		4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67	4.28	4.12	4.45	4.31	4.67																				

Case dia code	
φ D	Code
22	X
25	Y
30	Z
35	A
40	B

Product symbol : (Example) HP3 Series 16V 10,000µF ±20%

HP3 1C 103 M R X

- HP3: Type of series
- 1C: Rated voltage code
- 103: Capacitance code
- M: Capacitance tolerance code
- R: Terminal symbol code
- X: Case dia code

ALUMINUM ELECTROLYTIC CAPACITORS

Standard value and case size for HP3 Series (160 to 250V.DC)

Capacitance		Rated voltage V.DC (Code)																																						
		160 (2C)				180 (2P)				200 (2D)				250 (2E)																										
μF	Code	22	25	30	35	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40																				
220	221	Case dia dimensions øD (mm)														25					25																			
270	271	Upper : Case size L (mm) Lower : Max Ripple current rms at 85°C 120Hz														1.36					1.36					1.36														
330	331					25					30	25				35	30				1.38					1.76	1.89				1.87	1.86								
390	391	25				30	25				30	25				35	30	25			1.86					1.60	1.58				1.92	1.90				2.04	2.04	2.04		
470	471	30	25			30	25				35	30	25			40	35	25			1.76	1.74				1.76	1.74				2.23	2.23	2.23			2.35	2.35	2.24	2.38	
560	561	35	30			35	30	25			40	35	25			50	40	30	25		2.03	2.02				2.03	2.03	2.03			2.57	2.57	2.44			2.81	2.69	2.59	2.59	
680	681	40	30	25		40	35	25			45	35	30	25			45	35	30		2.36	2.24	2.24			2.36	2.35	2.24			2.98	2.86	2.86	2.86		3.11	3.01	3.01		
820	821	45	35	30		45	40	30	25			40	30	25			50	40	30		2.72	2.61	2.61			2.72	2.72	2.61	2.61		3.26	3.13	3.13			3.55	3.47	3.31		
1000	102	50	40	30	25		45	35	25			50	35	30				45	35		3.13	3.00	2.88	2.88		3.14	3.04	2.88			3.92	3.64	3.66			4.00	3.88			
1200	122		45	35	30		50	40	30				40	35				50	40	36		3.44	3.34	3.34		3.59	3.49	3.34			4.19	4.25				4.55	4.40	4.46		
1500	152			40	35			45	35					40	36								3.91	3.96			4.08	3.96			4.93	4.99				5.34	5.29			
1800	182			45	35				40	36				50	41								4.47	4.34			4.50	4.56			5.84	5.66							6.11	

Standard value and case size for HP3 Series (350 to 450 V.DC)

Capacitance		Rated voltage V.DC (Code)																																																
		350 (2V)				400 (2G)				420 (420V)				450 (2W)																																				
μF	Code	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40																													
68	680											25										0.67																												
82	820						25					30					30	25				0.83					0.79					0.89	0.88																	
100	101	25					30	25				30	25				35	30	25			0.76					0.97	0.96				0.87	0.86				1.03	1.03	1.03											
120	121	30	25				30	25				35	30				40	30	25			0.89	0.88				1.07	1.06				1.00	1.00				1.19	1.13	1.13											
150	151	30	25				35	30	25			40	35	25			45	35	30			0.99	0.98				1.26	1.26	1.26			1.19	1.19	1.14			1.39	1.34	1.34											
180	181	35	30	25			40	35	25			45	40	30	25		50	40	30	25		1.15	1.15	1.15			1.46	1.45	1.38			1.36	1.37	1.32	1.32		1.60	1.52	1.46	1.46										
220	221	40	35	25			50	40	30	25			45	35	30			45	35	30		1.34	1.34	1.28			1.76	1.69	1.62	1.62		1.58	1.54	1.54			1.76	1.72	1.72											
270	271	50	40	30	25			45	35	30			50	35	30				40	35		1.63	1.56	1.50	1.50		1.96	1.90	1.90			1.83	1.71	1.71			1.99	2.02												
330	331		45	35	30			50	40	30				40	35				45	35			1.80	1.75	1.75		2.26	2.19	2.10			1.98	1.98				2.29	2.23												
390	391		50	40	30				45	35			50	40	36				50	40	36		2.04	1.99	1.90		2.50	2.42				2.34	2.25	2.29						40	36	2.51	2.54							
470	471			40	35					40	36				45	41							2.19	2.22				2.76	2.80				2.59	2.62							2.88	2.89								
560	561			50	40	36				45	41				50								2.59	2.54	2.54			3.13	3.16				2.93											51		3.41				
680	681				45	41					50												2.88	2.90				3.59																						

ALUMINUM ELECTROLYTIC CAPACITORS

HU3 Series (105°C, Standard Size) (Warranty of 2,000 hours at 105°C)

Features

- The size is reduced by 20 to 30% of conventional HUR and HVR through development of etched foil technology.



Product Specifications (HU3 Series)

Items	Specifications																								
Temperature range	-40°C to +105°C																								
Rated voltage	16 to 450V.DC																								
Capacitance tolerance	±20% (20°C, 120Hz)																								
Leakage current	0.02CV (μA) or 3mA, whichever is smaller. [C=Capacitance (μF), V=Rated voltage (V)]																								
Dissipation factor	16~100V.DC Less than the value as per table of standard ratings below. (20°C, 120Hz)																								
	160~450V.DC Less than 0.15																								
Permissible ripple current	As per table of standard ratings below. (105°C, 120Hz)																								
Permissible ripple current correction coefficient	Frequency correction coefficient																								
	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th colspan="5">Frequency (Hz)</th> </tr> <tr> <th></th> <th>50/60</th> <th>120</th> <th>300</th> <th>1K</th> <th>≥10K</th> </tr> </thead> <tbody> <tr> <td>16~100V</td> <td>0.8</td> <td>1.0</td> <td>1.1</td> <td>1.2</td> <td>1.2</td> </tr> <tr> <td>160~450V</td> <td>0.8</td> <td>1.0</td> <td>1.1</td> <td>1.3</td> <td>1.4</td> </tr> </tbody> </table>	Rated voltage (V)	Frequency (Hz)						50/60	120	300	1K	≥10K	16~100V	0.8	1.0	1.1	1.2	1.2	160~450V	0.8	1.0	1.1	1.3	1.4
	Rated voltage (V)	Frequency (Hz)																							
		50/60	120	300	1K	≥10K																			
16~100V	0.8	1.0	1.1	1.2	1.2																				
160~450V	0.8	1.0	1.1	1.3	1.4																				
Temperature correction coefficient																									
<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th colspan="5">Temperature (°C)</th> </tr> <tr> <th></th> <th>40</th> <th>60</th> <th>70</th> <th>85</th> <th>105</th> </tr> </thead> <tbody> <tr> <td>16~450V</td> <td>2.5</td> <td>2.2</td> <td>2.0</td> <td>1.8</td> <td>1.0</td> </tr> </tbody> </table>	Rated voltage (V)	Temperature (°C)						40	60	70	85	105	16~450V	2.5	2.2	2.0	1.8	1.0							
Rated voltage (V)	Temperature (°C)																								
	40	60	70	85	105																				
16~450V	2.5	2.2	2.0	1.8	1.0																				
High temp.	After 105°C, 2000h, rated voltage (specified ripple current superposition) application Capacitance variation : Initial value ±15%																								

Standard value and case size for HU3 Series (16 to 100 V.DC)

Capacitance	Rated voltage V.DC (Code)																												
	16 (1C)				25 (1E)				35 (1V)				50 (1H)				63 (1J)				80 (1K)				100 (2A)				
μF	Code	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
1000	102	Case dia dimensions øD (mm)																											
1500	152	Upper : Case size L (mm) Middle : Dissipation factor Lower : Max ripple current (Arms) / 105°C 120Hz																											
2200	222									25				30	25			35	30	25		50	40	30	25	45	35		
3300	332					25				30	25			35	30	25		45	40	30	25	50	40	30		45	35		
4700	472	25				30	25			35	30	25		45	35	30	25	50	35	30		50	40						45
6800	682	0.50				0.40	0.40			0.35	0.35	0.35		0.30	0.30	0.30	0.30	0.25	0.25	0.25		0.25	0.25	0.25		0.25	0.25		0.25
10000	103	0.93				1.00	0.98			1.05	1.05	1.05		1.16	1.11	1.12	1.12	1.27	1.18	1.18		1.34	1.30			1.35	1.30		1.35
15000	153	35	30			35	30	25		50	40	30	25	50	35	30		50	35	30		50	40			50	40		50
22000	223	0.50	0.50			0.40	0.40	0.40		0.35	0.35	0.35	0.35	0.30	0.30	0.30	0.30	0.25	0.25	0.25		0.25	0.25			0.25	0.25		0.25
33000	333	1.27	1.27			1.27	1.27	1.27		1.46	1.40	1.34	1.34	1.53	1.42	1.42		1.55	1.56			1.69				1.69			1.69
		45	35	25		45	35	30	25	50	35	30		45	40			50				50				50			50
		0.50	0.50	0.50		0.40	0.40	0.40	0.40	0.35	0.35	0.35		0.35	0.35			0.35				0.35				0.35			0.35
		1.43	1.36	1.30		1.43	1.38	1.38	1.38	1.57	1.46	1.46		1.59	1.60			1.74				1.74				1.74			1.74
			45	35	30		45	35	30		50	40					50												50
		0.50	0.50	0.50		0.40	0.40	0.40		0.35	0.35			0.35	0.35			0.35				0.35				0.35			0.35
		1.84	1.78	1.78		1.84	1.78	1.78		2.03	1.96			2.13				2.13				2.13				2.13			2.13
			45	35			45	40			50	40			50														50
		0.50	0.50			0.40	0.40			0.35	0.35			0.35				0.35				0.35				0.35			0.35
		2.36	2.27			2.36	2.38			2.95				2.95				2.95				2.95				2.95			2.95
				50				50				50				50				50				50				50	
				0.50				0.50				0.50				0.50				0.50				0.50				0.50	
				2.95				2.95				2.95				2.95				2.95				2.95				2.95	

Product symbol : (Example) HU3 Series 16V 10,000μF ±20%

HU3 1C 103 M R X

- Case dia code
- Terminal symbol code
- Capacitance tolerance code
- Capacitance code
- Rated voltage code
- Type of series

øD	Code
22	X
25	Y
30	Z
35	A
40	B

ALUMINUM ELECTROLYTIC CAPACITORS

Standard value and case size for HU3 Series (160 to 250 V.DC)

Capacitance		Rated voltage V.DC (Code)																								
μF	Code	160 (2C)					180 (2P)					200 (2D)					250 (2E)									
		22	25	30	35	40	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40					
150	151	Case dia dimensions øD (mm) Upper : Case size L (mm) Lower : Max ripple current (Arms) 105°C 120Hz																								
180	181																									
220	221											25					30	25								
270	271						25					25					35	25								
330	331	25					30	25				30	25				35	30	25							
390	391	1.10	1.09				1.10	1.09				1.39	1.31				1.48	1.46	1.39							
470	471	1.21	1.19				1.28	1.28	1.28				1.62	1.52	1.54				1.76	1.69	1.63	1.62				
560	561	1.40	1.40	1.40				1.47	1.40	1.40				1.85	1.75	1.78				1.93	1.87	1.78				
680	681	1.62	1.61	1.54				1.70	1.63	1.63	1.63				2.04	2.04	1.96	1.96				2.22	2.06	2.06		
820	821	1.86	1.86	1.79	1.79				1.94	1.87	1.79	1.79				2.34	2.27	2.27				2.48	2.41			
1000	102	2.15		2.09	1.98				2.15		2.09	2.09				2.70	2.63	2.51				2.76	2.80			
1200	122	2.46		2.29	2.29				2.39		2.29				3.00		2.92				3.14	3.17				
1500	152	2.80		2.72				2.91		2.72				3.38		3.43				3.66						
1800	182	3.09		3.13				3.09		3.13				4.01		3.89				4.20						

Standard value and case size for HU3 Series (350 to 450 V.DC)

Capacitance		Rated voltage V.DC (Code)																								
μF	Code	350 (2V)				400 (2G)					420				450 (2W)											
		22	25	30	35	40	22	25	30	35	40	22	25	30	35	22	25	30	35							
47	470	Case dia dimensions øD (mm) Upper : Case size L (mm) Lower : Max Ripple current (Arms) 105°C 120Hz																								
68	680	0.52					0.52					0.50				0.55	0.54									
82	820	0.47					0.60	0.60				0.54	0.54			0.64	0.64									
100	101	0.56	0.55				0.67	0.66				0.63	0.63			0.74	0.74	0.71								
120	121	0.61	0.60				0.78	0.77	0.78				0.73	0.70	0.70			0.85	0.80	0.82	0.82					
150	151	0.72	0.72	0.72				0.91	0.91	0.92				0.86	0.82	0.83			1.00	0.96	0.96					
180	181	0.83	0.83	0.84				1.04	1.04	1.01	1.01				0.94	0.91	0.90			1.14	1.06	1.06				
220	221	1.01	0.96	0.93	0.93				1.21		1.18	1.18				1.13		1.05	1.05				1.22	1.24		
270	271	1.12		1.09	1.09				1.40		1.37	1.31				1.22		1.23				1.48	1.43			
330	331	1.29		1.26	1.20				1.57		1.52				1.49		1.41				1.64					
390	391	1.43		1.38				1.73		1.74				1.61					1.86							
470	471	1.58		1.60				1.97		1.95				1.85					2.00							
560	561	1.79		1.80				2.23					2.00					2.20								