

## LHM Series

### Features

- Snap-in terminal type
- Suitable for high freq. regenerative volt. for AC servomotor, general inverter
- Suitable for equipment used at volt. Fluctuating area & rectifier circuit of volt. doubler
- Application of charge-discharge DC volt. for 50 million times
- RoHS Compliance



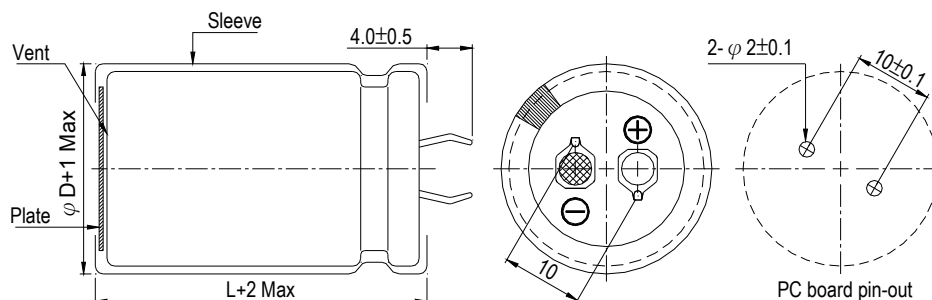
Sleeve & Marking Color: Black & White

### Specifications

Items	Performance												
Category Temperature Range	-25°C ~ +105°C												
Capacitance Tolerance	±20% (at 120Hz, 20°C)												
Leakage Current (at 20°C)	$I = 3\sqrt{CV}$ or 3.0 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in µF V = rated DC working voltage in V												
Tanδ (at 120Hz, 20°C)	<table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>350</th> <th>400</th> <th>420</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>Tanδ (max)</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> </tr> </tbody> </table>	Rated Voltage	350	400	420	450	Tanδ (max)	0.15	0.15	0.15	0.15		
Rated Voltage	350	400	420	450									
Tanδ (max)	0.15	0.15	0.15	0.15									
Low Temperature Characteristics (at 120Hz)	<p>Impedance ratio shall not exceed the values given in the table below.</p> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>350</th> <th>400</th> <th>420</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>Impedance Ratio Z(-25°C)/Z(+20°C)</td> <td>8</td> <td>8</td> <td>8</td> <td>8</td> </tr> </tbody> </table>	Rated Voltage	350	400	420	450	Impedance Ratio Z(-25°C)/Z(+20°C)	8	8	8	8		
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Endurance of Charge/ Discharge Behavior	<p>After an application of charge-discharge voltage for 50 million times, capacitor shall meet the characteristics requirement listed below:</p> <p>Charge discharge voltage(ΔV) = Rated voltage × 0.35 Frequency: 6 Hz Temperature: 15 ~ 35°C</p> <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Tanδ</td> <td>Less than 300% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> <tr> <td>Appearance</td> <td>There shall be found to remarkable abnormality on the capacitor</td> </tr> </tbody> </table>	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value	Appearance	There shall be found to remarkable abnormality on the capacitor				
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Endurance	<table border="1"> <tbody> <tr> <td>Test Time</td> <td>3,000 Hrs</td> </tr> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Tanδ</td> <td>Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </tbody> </table> <p>* The above Specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 3,000 hours at 105°C.</p>	Test Time	3,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value				
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Shelf Life Test	<table border="1"> <tbody> <tr> <td>Test Time</td> <td>1,000 Hrs</td> </tr> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Tanδ</td> <td>Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </tbody> </table> <p>* The above Specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).</p>	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value				
Test Time	1,000 Hrs												
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Ripple Current & Frequency Multipliers	<table border="1"> <thead> <tr> <th>Frequency (Hz)</th> <th>50 / 60</th> <th>100 / 120</th> <th>500</th> <th>1k</th> <th>10k up</th> </tr> </thead> <tbody> <tr> <td>Multiplier</td> <td>0.8</td> <td>1.0</td> <td>1.1</td> <td>1.3</td> <td>1.4</td> </tr> </tbody> </table>	Frequency (Hz)	50 / 60	100 / 120	500	1k	10k up	Multiplier	0.8	1.0	1.1	1.3	1.4
Frequency (Hz)	50 / 60	100 / 120	500	1k	10k up								
Multiplier	0.8	1.0	1.1	1.3	1.4								
Failure percentage	≤ 3 % (During useful life)												
Failure rate	≤ 70 fit (70 10 <sup>-9</sup> /h)												

### Diagram of Dimensions

Unit: mm





## Dimension & Permissible Ripple Current

Working Voltage V. DC	Capacitance 120Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120Hz, 20°C	ESR 120Hz, 20°C Ω	LC 5 minutes mA	Part Number
<b>350</b>	120	22 × 25	0.75	0.15	1.659	0.61	LHM121M2V--A2225
	150	22 × 30	0.82	0.15	1.327	0.69	LHM151M2V--A2230
	180	22 × 30	0.90	0.15	1.106	0.75	LHM181M2V--A2230
	180	25 × 25	0.90	0.15	1.106	0.75	LHM181M2V--A2525
	220	22 × 35	1.00	0.15	0.905	0.83	LHM221M2V--A2235
	220	25 × 30	1.00	0.15	0.905	0.83	LHM221M2V--A2530
	270	22 × 40	1.10	0.15	0.737	0.92	LHM271M2V--A2240
	270	25 × 35	1.10	0.15	0.737	0.92	LHM271M2V--A2535
	270	30 × 25	1.10	0.15	0.737	0.92	LHM271M2V--A3025
	330	22 × 45	1.20	0.15	0.603	1.02	LHM331M2V--A2245
	330	25 × 40	1.20	0.15	0.603	1.02	LHM331M2V--A2540
	330	30 × 30	1.20	0.15	0.603	1.02	LHM331M2V--A3030
	390	25 × 45	1.30	0.15	0.510	1.11	LHM391M2V--A2545
	390	30 × 35	1.30	0.15	0.510	1.11	LHM391M2V--A3035
	470	25 × 50	1.40	0.15	0.423	1.22	LHM471M2V--A2550
	470	30 × 40	1.40	0.15	0.423	1.22	LHM471M2V--A3040
	470	35 × 30	1.40	0.15	0.423	1.22	LHM471M2V--A3530
	560	30 × 45	1.50	0.15	0.355	1.33	LHM561M2V--A3045
	560	35 × 35	1.50	0.15	0.355	1.33	LHM561M2V--A3535
	680	30 × 50	1.70	0.15	0.293	1.46	LHM681M2V--A3050
680	35 × 40	1.70	0.15	0.293	1.46	LHM681M2V--A3540	
820	35 × 45	1.90	0.15	0.243	1.50	LHM821M2V--A3545	
<b>400</b>	100	22 × 25	0.68	0.15	1.990	0.60	LHM101M2G--A2225
	120	22 × 30	0.73	0.15	1.659	0.66	LHM121M2G--A2230
	150	22 × 35	0.85	0.15	1.327	0.73	LHM151M2G--A2235
	180	22 × 35	0.95	0.15	1.106	0.80	LHM181M2G--A2235
	180	25 × 30	0.95	0.15	1.106	0.80	LHM181M2G--A2530
	180	30 × 25	0.95	0.15	1.106	0.80	LHM181M2G--A3025
	220	22 × 45	1.10	0.15	0.905	0.89	LHM221M2G--A2245
	220	25 × 35	1.10	0.15	0.905	0.89	LHM221M2G--A2535
	220	30 × 25	1.10	0.15	0.905	0.89	LHM221M2G--A3025
	270	22 × 50	1.22	0.15	0.737	0.99	LHM271M2G--A2250
	270	25 × 40	1.22	0.15	0.737	0.99	LHM271M2G--A2540
	270	30 × 30	1.22	0.15	0.737	0.99	LHM271M2G--A3030
	270	35 × 25	1.22	0.15	0.737	0.99	LHM271M2G--A3525
	330	25 × 45	1.44	0.15	0.603	1.09	LHM331M2G--A2545
	330	30 × 35	1.44	0.15	0.603	1.09	LHM331M2G--A3035
	390	25 × 50	1.55	0.15	0.510	1.18	LHM391M2G--A2550
	390	30 × 40	1.55	0.15	0.510	1.18	LHM391M2G--A3040
	390	35 × 30	1.55	0.15	0.510	1.18	LHM391M2G--A3530
	470	30 × 45	1.68	0.15	0.423	1.30	LHM471M2G--A3045
	470	35 × 35	1.68	0.15	0.423	1.30	LHM471M2G--A3535
560	30 × 50	1.90	0.15	0.355	1.42	LHM561M2G--A3050	
560	35 × 40	1.90	0.15	0.355	1.42	LHM561M2G--A3540	
680	35 × 50	2.12	0.15	0.293	1.50	LHM681M2G--A3550	
<b>420</b>	100	22 × 25	0.66	0.15	1.990	0.61	LHM101M2P--A2225
	120	22 × 30	0.81	0.15	1.659	0.67	LHM121M2P--A2230
	120	25 × 25	0.81	0.15	1.659	0.67	LHM121M2P--A2525
	150	22 × 35	0.84	0.15	1.327	0.75	LHM151M2P--A2235
	150	25 × 30	0.84	0.15	1.327	0.75	LHM151M2P--A2530
	180	22 × 40	0.91	0.15	1.106	0.82	LHM181M2P--A2240
	180	25 × 30	0.91	0.15	1.106	0.82	LHM181M2P--A2530
	180	30 × 25	0.91	0.15	1.106	0.82	LHM181M2P--A3025
	220	22 × 45	1.05	0.15	0.905	0.91	LHM221M2P--A2245
	220	25 × 35	1.05	0.15	0.905	0.91	LHM221M2P--A2535
	220	30 × 30	1.05	0.15	0.905	0.91	LHM221M2P--A3030
	270	25 × 40	1.25	0.15	0.737	1.01	LHM271M2P--A2540
	270	30 × 30	1.25	0.15	0.737	1.01	LHM271M2P--A3030
	270	35 × 25	1.25	0.15	0.737	1.01	LHM271M2P--A3525
	330	25 × 50	1.42	0.15	0.603	1.12	LHM331M2P--A2550
	330	30 × 35	1.42	0.15	0.603	1.12	LHM331M2P--A3035
	330	35 × 30	1.42	0.15	0.603	1.12	LHM331M2P--A3530
	390	30 × 40	1.61	0.15	0.510	1.21	LHM391M2P--A3040
	390	35 × 35	1.61	0.15	0.510	1.21	LHM391M2P--A3535
	470	30 × 50	1.86	0.15	0.423	1.33	LHM471M2P--A3050



## Dimension & Permissible Ripple Current

Working Voltage V <sub>DC</sub>	Capacitance 120Hz, 20°C μF	φ D×L mm	Ripple Current 120 Hz, 105°C A/rms	Tan δ at 120Hz, 20°C	ESR 120Hz, 20°C Ω	LC 5 minutes mA	Part Number
420	470	35 × 40	1.86	0.15	0.423	1.33	LHM471M2P--A3540
	560	35 × 45	2.10	0.15	0.355	1.45	LHM561M2P--A3545
	680	35 × 50	2.20	0.15	0.293	1.50	LHM681M2P--A3550
450	82	22 × 25	0.64	0.15	2.427	0.58	LHM820M2W--A2225
	100	22 × 30	0.69	0.15	1.990	0.64	LHM101M2W--A2230
	100	25 × 25	0.69	0.15	1.990	0.64	LHM101M2W--A2525
	120	22 × 35	0.72	0.15	1.659	0.70	LHM121M2W--A2235
	120	25 × 30	0.72	0.15	1.659	0.70	LHM121M2W--A2530
	150	22 × 40	0.79	0.15	1.327	0.78	LHM151M2W--A2240
	150	25 × 30	0.79	0.15	1.327	0.78	LHM151M2W--A2530
	150	30 × 25	0.79	0.15	1.327	0.78	LHM151M2W--A3025
	180	22 × 45	0.87	0.15	1.106	0.85	LHM181M2W--A2245
	180	25 × 35	0.87	0.15	1.106	0.85	LHM181M2W--A2535
	180	30 × 30	0.87	0.15	1.106	0.85	LHM181M2W--A3030
	220	25 × 40	1.05	0.15	0.905	0.94	LHM221M2W--A2540
	220	30 × 30	1.05	0.15	0.905	0.94	LHM221M2W--A3030
	220	35 × 25	1.05	0.15	0.905	0.94	LHM221M2W--A3525
	270	25 × 50	1.23	0.15	0.737	1.05	LHM271M2W--A2550
	270	30 × 35	1.23	0.15	0.737	1.05	LHM271M2W--A3035
	270	35 × 30	1.23	0.15	0.737	1.05	LHM271M2W--A3530
	330	30 × 40	1.38	0.15	0.603	1.16	LHM331M2W--A3040
	330	35 × 35	1.38	0.15	0.603	1.16	LHM331M2W--A3535
	390	30 × 50	1.61	0.15	0.510	1.26	LHM391M2W--A3050
	390	35 × 40	1.61	0.15	0.510	1.26	LHM391M2W--A3540
470	35 × 45	1.78	0.15	0.423	1.38	LHM471M2W--A3545	
560	35 × 50	1.99	0.15	0.355	1.50	LHM561M2W--A3550	

## Part Numbering System

LHM series	100μF	±20%	400V		4.0±0.5mm	22 φ × 30L	Pb-free Terminal + PET Sleeve																								
<b>LHM</b>	<b>101</b>	<b>M</b>	<b>2G</b>	--	<b>A</b>	<b>2230</b>																									
Series name	Capacitance	Capacitance tolerance	Rated voltage	Terminal type	Terminal length	Case size	Terminal and Sleeve Type																								
Example:	Example:	Example:	Example:	Example:	Example:	Example:																									
<table border="1"> <tr><th>Cap.</th><th>Symbol</th></tr> <tr><td>56</td><td>560</td></tr> <tr><td>220</td><td>221</td></tr> <tr><td>470</td><td>471</td></tr> </table>	Cap.	Symbol	56	560	220	221	470	471	<table border="1"> <tr><th>WV</th><th>Symbol</th></tr> <tr><td>400</td><td>2G</td></tr> <tr><td>450</td><td>2W</td></tr> </table>	WV	Symbol	400	2G	450	2W	<table border="1"> <tr><th>Type</th><th>Symbol</th></tr> <tr><td>2 pins</td><td>--</td></tr> <tr><td>5 pins</td><td>L5</td></tr> </table>	Type	Symbol	2 pins	--	5 pins	L5	<table border="1"> <tr><th>φ D×L</th><th>Code</th></tr> <tr><td>22×30</td><td>2230</td></tr> <tr><td>25×25</td><td>2525</td></tr> <tr><td>30×40</td><td>3040</td></tr> </table>	φ D×L	Code	22×30	2230	25×25	2525	30×40	3040
Cap.	Symbol																														
56	560																														
220	221																														
470	471																														
WV	Symbol																														
400	2G																														
450	2W																														
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2 pins	--																														
5 pins	L5																														
φ D×L	Code																														
22×30	2230																														
25×25	2525																														
30×40	3040																														
	M = ±20% K = ±10%				“_”: 6.3±1.0 mm																										

Note: For more details, please refer to “Part Numbering System (Snap-in Type)” on page 13.

## Typical Endurance Curves

