

NO.: JSB190916041

TO: Ozdisan

APPROVAL SHEET No. : B-7516C

Series No.: KRM

Specification No.:

RoHS

APPROVAL SHEET

FOR AL. ELECTROLYTIC CAPACITORS

No.	(Customer No.)	(Koshin Part No.)	Description	Φ D x L
1		PKRM-400V221MN400	400V220UF	25X40

APPROVED BY:

PLEASE SIGN RETURN US ONE COPY OF THE APPROVAL SHEET

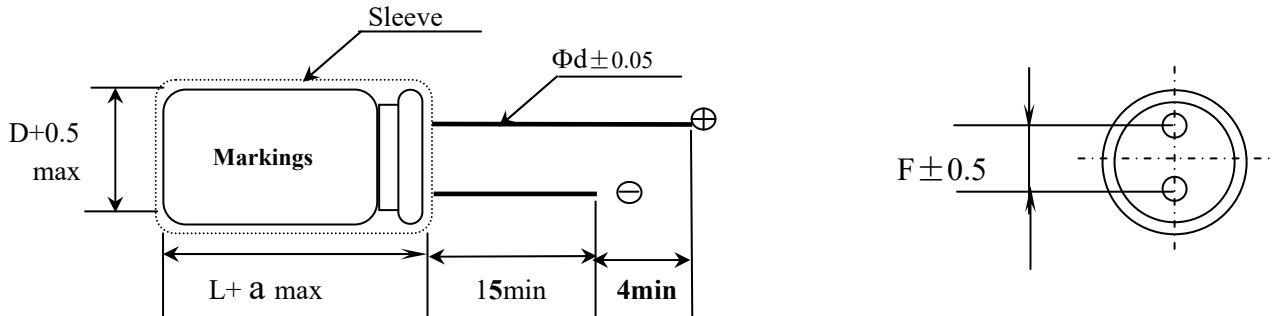
DESIGNED BY: LUOLI CHECKED BY: CAOGUIHUA APPROVED BY: SHENZHIHONG

DATE: 2019-9-16

KOSHIN

DJS-DS-0013

Standard Size map:



ΦD	5	6.3	8	10	12.5	16	18	22	25
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0
Φd	0.5	0.5	0.6/0.5	0.6	0.6	0.8	0.8	0.8/1.0	1.0
a	1.5		1.5 for L16max 2.0 for L20min						

Coefficient of Frequency for Ripple Current

Rated voltage (v)	Frequency (Hz) CV($\mu F \times V$)	Frequency (Hz)				
		50 • 60	120	1K	10K	100K
6.3 to 100	CAP ≤ 10	0.80	1.00	1.30	1.65	1.70
	10 < CAP ≤ 100	0.80	1.00	1.23	1.48	1.53
	100 < CAP ≤ 1000	0.80	1.00	1.16	1.35	1.38
	1000 < CAP	0.80	1.00	1.11	1.25	1.28
160 to 500	0.47 to 330	0.80	1.00	1.30	1.40	1.60

Coefficient of Temperature for Ripple Current

Rated voltage (V)	Temperature (°C)	Temperature (°C)		
		70 or less	85	105
6.3 to 100		2.00	1.70	1.00
160 to 500		1.80	1.40	1.00



KOSHIN INTERNATIONAL LIMITED

ELECTROLYTIC CAPACITORS

ADDR. : SHANGXUE TECHNOLOGY INDUSTRIAL CITY, BANTIAN, SHENZHEN

TEL: 86-755-89501998

FAX: 86-755-89500378

Web Site: <http://www.koshin.com.hk>

Email: szkoshin@koshin.com.hk

TEST REPORT OF ELECTROLYTIC CAPACITORS SAMPLE

DATE :	2019/9/16	Quantity :	10	PCS
Customer:	Ozdisan	Customer'S part No.:		
Ratings :	400V220	Part No.:	PKRM-400V221MN400	
Series :	PKRM	Case Size:	D25XL40(+2.0max mm)	
Lead space:	10±0.5 mm	Lead Dia.:	1.0±0.05	mm
Terminal Length:	+19min-15min mm	Load Life:	2000	hrs
Sleeve Color:	Black (PET)	Marking Color:	White	

Capacitance Tolerance at 120Hz/20°C	Max.TAN δ at 120 Hz 20°C	Max.Leakage Current(μ A) Afte 1 min.	Max.Impedance (Ω) At 100KHz/20°C	Max. Ripple Current(mArms) At120Hz/105°C	WORKING TEMP (°C)	SURGE VOLT. (V)
±20%	0.15	2640	/	860	-40+105	440

NO.	CAPACITANCE (μ F)	TAN δ	Leakage Current (μ A)	Impedance (Ω)	Remarks
1	202	0.049	93.5		
2	203	0.051	89.2		
3	202	0.047	91.4		
4	203	0.050	93.7		
5	202	0.048	88.5		
6	202	0.051	89.7		
7	202	0.047	87.8		
8	203	0.049	90.6		
9	201	0.050	91.5		
10	202	0.048	92.8		
AVE.	202.20	0.0490	90.87		
MAX.	203	0.051	93.7		
MIN.	201	0.047	87.8		

TESTED BY:Liuchunyan

CHECKED BY: LuoLi

APPROVED BY:Shenzhihong



Series KRM Capacitor

1. Our part No. : For example :

<u>PKRM</u>	<u>400 V</u>	<u>221</u>	<u>M</u>	<u>N400</u>
Series code	rated voltage	capacitance	tolerance	case size symbol
PKRM	400 v	220 μ F	\pm 20%	Φ 25X40

2 Marking:

Include company's brand "Koshin", series code, rated voltage, capacitance ,rated temperature range, polarity and tolerance of capacitance.

3. Specifications:

3.1 Temperature range : - 40 ~+105 $^{\circ}$ C

3.2 Electrical characteristics

3.2.1 Capacitance tolerance: \pm 20%

3.2.2 Tangent of loss angle ($\tan \delta$) :

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160-250	350-500
$\tan \delta$ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.15

Note: 0.02 is added to each 1000 μ F increase over 1000 μ F

3.2.3 Leakage current (μ A) :

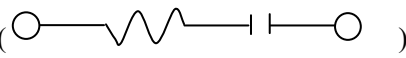
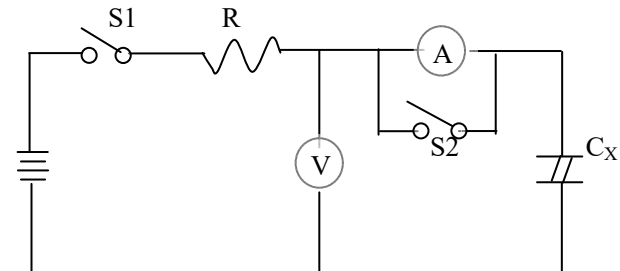
Rated voltage (V)	6.3 ~ 100	160 ~ 500
Leakage current (μ A)	Less than 0.01CV or 3 μ A Whichever is larger . (after 1 minutes)	Less than 0.03CV(after 1 minutes)

Note: I : Leakage current (μ A) , C : Capacitance (μ F) , V : Rated DC working voltage (V)

1. Scope:

This specification applies to aluminum electrolytic capacitor, used in electronic equipment.

2. Electrical characteristics:

NO.	ITEM	TEST METHOD	SPECIFICATION 规格															
2.1	Rated voltage		Voltage range、capacitance range ,see specification of this series															
2.2	Capacitance	1.Measuring frequency:120Hz \pm 12Hz																
2.3	Dissipation factor	2.Measuring voltage: \leq 0.5Vrms+0.5VDC~2.0VDC 3.Measuring circuit: ()																
2.4	Leakage current	DC leakage current shall be measured after 1~2minutes application of the DC rated working voltage through the 1000 Ω resistor at 20 $^{\circ}$ C  R: 1000 Ω 100 Ω S1:Switch 开关 A: DC current meter S2:Switch for protect of current meter V: DC voltage meter Cx: Testing capacitor	Dissipation factors, leakage current, see specification of this series.															
2.5	Temperature characteristics	<table border="1" data-bbox="335 1512 1141 1724"> <thead> <tr> <th>STEP</th> <th>TEMPERATURE</th> <th>STORAGE TIME</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20$^{\circ}$C \pm 2$^{\circ}$C</td> <td>30minutes</td> </tr> <tr> <td>2</td> <td>-40$^{\circ}$C \pm 3$^{\circ}$C</td> <td>2hours</td> </tr> <tr> <td>3</td> <td>20$^{\circ}$C \pm 2$^{\circ}$C</td> <td>4hours</td> </tr> <tr> <td>4</td> <td>105$^{\circ}$C \pm 2$^{\circ}$C</td> <td>2hours</td> </tr> </tbody> </table> <p>Step1.Measure the impedance. (Z , 20$^{\circ}$C, 120Hz\pm2HZ) Step2. Measure the impedance at thermal balance after 2 hours. (Z , -40$^{\circ}$C 120Hz\pm2HZ) Step4.Measure the leakage current at thermal balance after 2 hours.</p>	STEP	TEMPERATURE	STORAGE TIME	1	20 $^{\circ}$ C \pm 2 $^{\circ}$ C	30minutes	2	-40 $^{\circ}$ C \pm 3 $^{\circ}$ C	2hours	3	20 $^{\circ}$ C \pm 2 $^{\circ}$ C	4hours	4	105 $^{\circ}$ C \pm 2 $^{\circ}$ C	2hours	<p>Step2. Low temperature impedance stability Less than specified value.</p> <p>Step4. Capacitance change: within \pm10% of the initial measured value.</p> <p>Dissipation factor: Less than specified value.</p>
STEP	TEMPERATURE	STORAGE TIME																
1	20 $^{\circ}$ C \pm 2 $^{\circ}$ C	30minutes																
2	-40 $^{\circ}$ C \pm 3 $^{\circ}$ C	2hours																
3	20 $^{\circ}$ C \pm 2 $^{\circ}$ C	4hours																
4	105 $^{\circ}$ C \pm 2 $^{\circ}$ C	2hours																

NO	ITEM	TEST METHOD	SPECIFICATION
2.6	Surge test	Rated surge voltage shall be applied (switch on)for 30±5 second and then shall be applied (switch off) with discharge for 5.5min at room temperature. This cycle shall be repeated for 1000 cycles. Duration of one cycle is 6±0.5 minutes	<p>Capacitance change: within±15% of the initial specified value.</p> <p>Dissipation factor: Less than specified value.</p> <p>Leakage current: Within initial specified value.</p>

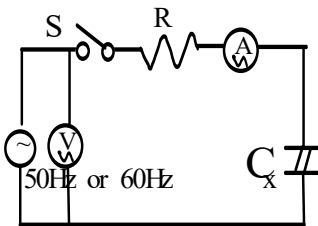
3.Mechanical characteristics:

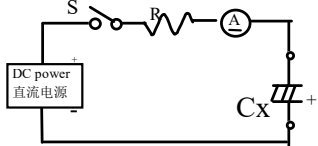
NO	ITEM	TEST METHOD	SPECIFICATION																
3.1	Lead strength	<p>(A)Tensile strength: wire lead terminal:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">d(mm)</td> <td style="width: 25%;">≤0.5</td> <td style="width: 25%;">0.5 < d ≤ 0.8</td> <td style="width: 25%;">0.8 < d ≤ 1.25</td> </tr> <tr> <td>load(kg)</td> <td>0.5</td> <td>1.0</td> <td>2.0</td> </tr> </table> <p>The capacitor shall withstand the constant tensile force specified between the body and each lead for 10seconds without damage either mechanical or electrical.</p> <p>(B) Bending strength: wire lead terminal:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">d(mm)</td> <td style="width: 25%;">≤0.5</td> <td style="width: 25%;">0.5 < d ≤ 0.8</td> <td style="width: 25%;">0.8 < d ≤ 1.25</td> </tr> <tr> <td>load(kg)</td> <td>0.5</td> <td>0.5</td> <td>1.0</td> </tr> </table> <p>With the capacitor in a vertical position apply the load specified axially to each lead. The capacitor shall be rotated slowly from the vertical to the horizontal position, back to the vertical position. The 90° in the opposite direction and back the original position. Performance of capacitor shall not have change and leads shall be undamaged.</p>	d(mm)	≤0.5	0.5 < d ≤ 0.8	0.8 < d ≤ 1.25	load(kg)	0.5	1.0	2.0	d(mm)	≤0.5	0.5 < d ≤ 0.8	0.8 < d ≤ 1.25	load(kg)	0.5	0.5	1.0	<p>When the capacitance is measured, there shall be no intermittent contacts, or open-or short-circuiting.</p> <p>There shall be no such mechanical damage as terminal damage etc. Capacitance change: within ± 5% of the initial specified value.</p>
d(mm)	≤0.5	0.5 < d ≤ 0.8	0.8 < d ≤ 1.25																
load(kg)	0.5	1.0	2.0																
d(mm)	≤0.5	0.5 < d ≤ 0.8	0.8 < d ≤ 1.25																
load(kg)	0.5	0.5	1.0																

NO.	ITEM	TEST METHOD	SPECIFICATION
3.2	Vibration resistance	The frequency of the vibration shall vary uniformly within the range 10 to 55 Hz with the amplitude of 0.75mm, completing the cycle in the internal of one minute. The capacitor shall be securely mounted by its leads with hold the body of capacitor. The capacitor shall be vibrated in three mutually perpendicular directions for a period of 2 hours in each direction.	Appearance: no abnormal. Capacitance change: within $\pm 5\%$ of initial measured value.
3.3	Solder ability	The leads are dipped in the solder bath of Sn at $245^{\circ}\text{C}\pm 5^{\circ}\text{C}$ for 2 ± 0.5 seconds. The dipping depth should be set at 1.5~2.0 mm.	The solder alloy shall cover the 95% or more of dipped lead's area.

4. Reliability:

NO.	ITEM	TEST METHOD	SPECIFICATION
4.1	Soldering heat resistance	The leads immerse in the solder bath of Sn at $260^{\circ}\text{C}\pm 5^{\circ}\text{C}$ for 10 ± 1 seconds until a distance of 1.5~2.0mm from the case.	No visible damage or leakage of electrolyte. Capacitance change: Within $\pm 5\%$ of the initial measured value Tan δ : Less than specified value. Leakage current: Less than specified value
4.2	Damp head (steady state)	Subject the capacitor to $40^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and 90% to 95% relative humidity for 504 hours.	Capacitance change: Within $\pm 20\%$ of the initial measured value Tan δ : Less than 1.2 specified value. Leakage current: Less than specified value Impedance: Less than 1.2 specified value.

NO	ITEM	TEST METHOD	SPECIFICATION														
4.3	Load life	After 2000 hours continuous application of max allowable ripple current and DC rated voltage at $105^{\circ}\text{C} \pm 2^{\circ}\text{C}$, Measurements shall be performed after 16 hours exposed at room temperature.	<p>Capacitance change: Within $\pm 20\%$ of the initial value.</p> <p>Tan δ :less than 200% specified value</p>														
4.4	Shelf life	After storage for 1000 hours at $105^{\circ}\text{C} \pm 2^{\circ}\text{C}$ without voltage application, Measurements shall be performed after exposed for 16 hrs at room temperature after application of Testing	<p>Leakage current: Less than initial specified value.</p> <p>Appearance :no Abnormal</p>														
4.5	Storage at low temperature	The capacitor shall be stored at temperature of $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 16 hours, during which time be subjected to standard atmospheric conditions for 16 hours or more. After which measurements shall be made.	<p>Capacitance change: Within $\pm 10\%$ of the initial value.</p> <p>Tan δ :less than specified value</p> <p>Leakage current: Less than specified value.</p> <p>Appearance: no Abnormal.</p>														
4.6	Pressure relief	<p>AC test: Applied voltage: AC voltage not exceeding 0.7 times of the rated direct voltage or 250V AC whichever is the lower.</p> <p>Frequency : 50Hz or 60Hz. Series resistor :refer to the table below</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Capacitance(C)</th> <th style="width: 50%;">Series resistor</th> </tr> </thead> <tbody> <tr> <td>$C < 1\mu\text{F}$</td> <td>1000 Ω</td> </tr> <tr> <td>$1\mu\text{F} < C \leq 10\mu\text{F}$</td> <td>100 Ω</td> </tr> <tr> <td>$10\mu\text{F} < C \leq 100\mu\text{F}$</td> <td>10 Ω</td> </tr> <tr> <td>$100\mu\text{F} < C \leq 1000\mu\text{F}$</td> <td>1 Ω</td> </tr> <tr> <td>$1000\mu\text{F} < C \leq 10000\mu\text{F}$</td> <td>0.1 Ω</td> </tr> <tr> <td>$10000\mu\text{F} < C$</td> <td>*</td> </tr> </tbody> </table> <p>* Resistance is equivalent to a half impedance by test frequency.</p>	Capacitance(C)	Series resistor	$C < 1\mu\text{F}$	1000 Ω	$1\mu\text{F} < C \leq 10\mu\text{F}$	100 Ω	$10\mu\text{F} < C \leq 100\mu\text{F}$	10 Ω	$100\mu\text{F} < C \leq 1000\mu\text{F}$	1 Ω	$1000\mu\text{F} < C \leq 10000\mu\text{F}$	0.1 Ω	$10000\mu\text{F} < C$	*	<p>AC test circuit</p>  <p> \ominus : AC power S : Switch V : AC voltage meter A : AC current meter R : protection resistor C_x : testing capacitor </p>
Capacitance(C)	Series resistor																
$C < 1\mu\text{F}$	1000 Ω																
$1\mu\text{F} < C \leq 10\mu\text{F}$	100 Ω																
$10\mu\text{F} < C \leq 100\mu\text{F}$	10 Ω																
$100\mu\text{F} < C \leq 1000\mu\text{F}$	1 Ω																
$1000\mu\text{F} < C \leq 10000\mu\text{F}$	0.1 Ω																
$10000\mu\text{F} < C$	*																

NO.	ITEM	TEST METHOD	SPECIFICATION
4.6	Pressure relief	<p>DC test Send the following electricity while applying the inverse voltage.</p> <p>Where case size $D \leq 22.4\text{mm}$: 1 A d.c.max $D > 22.4\text{mm}$: 10 A d.c.max</p> <p>Note: 1. This requirement applies to capacitors with a diameter of 6 mm or more. 2. When the pressure relief device does not open even 30 minutes after commencement of test, the test may be ended.</p>	<p>DC test circuit</p>  <p>S : Switch Ⓐ : DC current meter C x: testing capacitor</p> <p>The pressure relief device shall open in such a way as to avoid any damage of fire or explosion of capacitor elements (terminal and metal foil etc.) or cover.</p>
4.7	Temp cycle	<p>LSL temperature(°C): -40 ± 3 time(H): 0.5H/timeX5 times USL temperature(°C): 105 ± 2 time(H): 0.5H/timeX5 times Judgment: CAP: $\Delta C/C \leq \pm 10\%$, Appearance no Abnormal. No electrolyte leakage.</p>	
4.8	Thermal shock	<p>dry heat temperature (°C): 105 ± 2 time(H): 16 moist heat temperature(°C): 55 time(H): 24/ cold temperature(°C): -40 ± 2 time(H): 2/ moist heat temperature(°C): 55 time(H): 24 : Judgment: CAP, $\Delta C/C \leq \pm 10\%$, $\text{Tan } \delta$: Less than 1.2 specified value, Leakage current: Less than specified value. Appearance no Abnormal. No electrolyte leakage.</p>	

5. Marking

Marking on capacitors include:

Koshin trade-mark

Koshin
Working voltage

Normal capacitance

Tolerance

Polarity

Operating temperature range

Sleeving pipe basic: Black PET

Printing color: White

Required space above the valve (mm): 2.0mm

Detergent needing attention

Hydrogen carbide liquid and halogen liquid can cause Aluminium Electrolytic Capacitor to corrode. Some of Safe and Unsafe detergent are as follows

Safe	Unsafe
Dimethylbenzene	1,1,2-trichloroethane
Ethanol	1,2,2- trichloroethane
Butanol	Tetrachloroethylene
Methanol	Chloroform(colorless volatilizable liquid)
Propanol	Dichloromethane
Detergent	Trichloroethylene

Aluminum Electrolytic Capacitor Specification

Series	PKRM	400 V 220 μ F	Part No.	PKRM-400V221MN400
Customer No.	/		Case size	Φ D 25 X L40
Specification	Items		Standard	
	Operating temperature range		- 40 ~ + 105 $^{\circ}$ C	
	Capacitance tolerance		\pm 20% (20 $^{\circ}$ C , 120Hz)	
	Dissipation factor (MAX)		(Less than) 0.15 (20 $^{\circ}$ C , 120Hz)	
	Leakage current (MAX)		(Less than) 2640 μ A (20 $^{\circ}$ C 400 V 1 min)	
	Impedance (MAX)		/	
	Ripple current (MAX)		860 mArms (120Hz , 105 $^{\circ}$ C)	
	Load life		2000 hrs	
Outline	Sleeve color		Black PET	
	Marking color		White	
	(Dimensions)			
	<p>The drawing shows a side view and an end view of the capacitor. The side view labels include: 'Vent' at the top left, 'Sleeve' pointing to the main body, 'Markings' on the side, and 'Copper clad steel wire (tinned)' pointing to the leads. Dimensions for the side view are: height 25+0.5 MAX, length 40 + 2.0 max, lead length 15min, and lead diameter Φ1.0\pm0.05. The end view shows a circular capacitor with 'Flat Rubber' at the top and 'Lead space 10\pm0.5' between the leads. Polarity symbols (+ and -) are shown on the leads. The unit is specified as 'Unit:mm'.</p>			
Recorder	(The first edition) : 2019-9-16			
Wrote by: LUOLI		Checked by: CAOGUIHUA		Approved by: SHENZHIHONG