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No. KK-2006-2120

Date: Oct. 23, 2006

Attention:

Your ref. No.:

Your Part No.: RK27112MC009A 194449

SPECIFICATIONS

ALPS' ;

MODEL: RK27112MC009
(10kAX2)

Spec. No.:

Sample No.: F 3 4 7 7 4 2 4 M

RECEIPT STATUS

RECEIVED

By Date

Signature

Name

Title

ALPS
ALPS ELECTRIC CO., LTD.

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DSG'D

Y. Ohya

APP'D

S. Ikenane

ENG. DEPT. DIVISION

Sales

B6523

Q1003#03A (EA)

S P E C I F I C A T I O N S

1. THIS SPECIFICATIONS APPLY TO RK27112MC009 POTENTIOMETER.

2. CONTENTS OF THIS SPECIFICATIONS.

5K272AMS-4

K272AMC002

4K16M-1

4K-1

3. MARKING

• MARKING ON ALL UNITS

DATE CODE, RESIST. VALUE, TAPER

4. REMARKS

• FURNISH PACKAGE

NUT:1 WASHER:1

• NOTES

• Silver printed patterns are coated with carbon as a protection against sulphuration.

• Marking \Rightarrow in specifications shows standard and condition for application.

• CAUTION

Regardless of the suggested applications of these products being introduced in the specifications, when using them for equipment and devices requiring a high degree of safety, respective manufacturers will please preserve safety of the planned equipment and devices by providing necessary protective circuits and redundancy circuits and reconfirm if safety is being duly preserved.

Products being introduced in the specifications have been designed and manufactured for applications to ordinary electronic equipment and devices such as the AV equipment, electric home appliances, office machines and communications equipment. Consequently, when employing these products for applications requiring a high degree of safety and reliability such as the medical equipment, aviation and aircraft equipment, space equipment and burglar alarm equipment, the using manufacturers will please thoroughly study the proprieties of these products for the planned applications.

Although we are exerting our best efforts to maintain the quality of these products, we cannot guarantee that they will never cause short circuiting and open circuitry. Therefore, when designing an equipment or device with which the priority is given to the safety, you will please carefully study the influences to the whole equipment of a single function failure of Potentiometers and Encoders in advance to make out a fail-safe design providing.

TITLE	SPECIFICATIONS
1. TITLE	1. TITLE
2. DATE	2. DATE
3. TIME	3. TIME
4. LOCATION	4. LOCATION
5. WEATHER	5. WEATHER
6. WIND	6. WIND
7. TEMPERATURE	7. TEMPERATURE
8. HUMIDITY	8. HUMIDITY
9. PRESSURE	9. PRESSURE
10. VISIBILITY	10. VISIBILITY
11. CLOUDS	11. CLOUDS
12. PRECIPITATION	12. PRECIPITATION
13. SURFACE	13. SURFACE
14. UNDERLAY	14. UNDERLAY
15. OBSTRUCTIONS	15. OBSTRUCTIONS
16. LIGHTS	16. LIGHTS
17. SOUNDS	17. SOUNDS
18. SIGHTS	18. SIGHTS
19. TASTE	19. TASTE
20. SMELL	20. SMELL
21. TOUCH	21. TOUCH
22. HEARING	22. HEARING
23. FEELING	23. FEELING
24. THOUGHT	24. THOUGHT
25. EMOTION	25. EMOTION
26. ACTION	26. ACTION
27. REACTION	27. REACTION
28. INTERACTION	28. INTERACTION
29. COMMUNICATION	29. COMMUNICATION
30. RELATIONSHIP	30. RELATIONSHIP
31. SOCIETY	31. SOCIETY
32. CULTURE	32. CULTURE
33. ECONOMY	33. ECONOMY
34. POLITICS	34. POLITICS
35. LAW	35. LAW
36. ETHICS	36. ETHICS
37. RELIGION	37. RELIGION
38. PHILOSOPHY	38. PHILOSOPHY
39. SCIENCE	39. SCIENCE
40. TECHNOLOGY	40. TECHNOLOGY
41. ARTS	41. ARTS
42. LITERATURE	42. LITERATURE
43. HISTORY	43. HISTORY
44. GEOGRAPHY	44. GEOGRAPHY
45. CLIMATE	45. CLIMATE
46. ECOSYSTEM	46. ECOSYSTEM
47. BIODIVERSITY	47. BIODIVERSITY
48. ENVIRONMENT	48. ENVIRONMENT
49. CONSERVATION	49. CONSERVATION
50. SUSTAINABILITY	50. SUSTAINABILITY
51. QUALITY OF LIFE	51. QUALITY OF LIFE
52. WELL-BEING	52. WELL-BEING
53. HEALTH	53. HEALTH
54. MEDICINE	54. MEDICINE
55. PSYCHOLOGY	55. PSYCHOLOGY
56. SOCIOLOGY	56. SOCIOLOGY
57. ANTHROPOLOGY	57. ANTHROPOLOGY
58. LINGUISTICS	58. LINGUISTICS
59. PHILOLOGY	59. PHILOLOGY
60. CLASSICS	60. CLASSICS
61. MODERNISM	61. MODERNISM
62. POSTMODERNISM	62. POSTMODERNISM
63. DECONSTRUCTION	63. DECONSTRUCTION
64. CRITICAL THEORY	64. CRITICAL THEORY
65. HUMANISM	65. HUMANISM
66. CAPITALISM	66. CAPITALISM
67. SOCIALISM	67. SOCIALISM
68. COMMUNISM	68. COMMUNISM
69. ANARCHISM	69. ANARCHISM
70. ENVIRONMENTALISM	70. ENVIRONMENTALISM
71. FEMINISM	71. FEMINISM
72. GAY RIGHTS	72. GAY RIGHTS
73. LESBIAN RIGHTS	73. LESBIAN RIGHTS
74. TRANSGENDER RIGHTS	74. TRANSGENDER RIGHTS
75. DISABILITY RIGHTS	75. DISABILITY RIGHTS
76. SENIORS RIGHTS	76. SENIORS RIGHTS
77. YOUTH RIGHTS	77. YOUTH RIGHTS
78. WORKERS RIGHTS	78. WORKERS RIGHTS
79. CONSUMERS RIGHTS	79. CONSUMERS RIGHTS
80. CIVIL RIGHTS	80. CIVIL RIGHTS
81. HUMAN RIGHTS	81. HUMAN RIGHTS
82. INTERNATIONAL LAW	82. INTERNATIONAL LAW
83. DIPLOMACY	83. DIPLOMACY
84. WAR	84. WAR
85. PEACE	85. PEACE
86. SECURITY	86. SECURITY
87. DEFENSE	87. DEFENSE
88. INTELLIGENCE	88. INTELLIGENCE
89. SPYING	89. SPYING
90. TERRORISM	90. TERRORISM
91. CRIME	91. CRIME
92. JUSTICE	92. JUSTICE
93. LAWYERS	93. LAWYERS
94. JUDGES	94. JUDGES
95. PROSECUTORS	95. PROSECUTORS
96. DEFENDERS	96. DEFENDERS
97. WITNESSES	97. WITNESSES
98. JURORS	98. JURORS
99. VOTERS	99. VOTERS
100. CITIZENS	100. CITIZENS

This is a potentiometer with D.C. magnet motor and it is adjustable by both manual shaft and motor.

1.Dimensions : See attached drawing

2. Operating temperature : -10 °C ~ +70 °C
3. Storage temperature : -20 °C ~ +80 °C
4. Motor : D.C. magnet motor

1.Operation : manual operation and motor drive

- 2.Total rotational angle : $300^{\circ} \pm 5^{\circ}$
3.Rotational speed : 12 ± 3 sec/300°

- (at 4.5V D.C. applied to motor)
4. Direction of rotation : C.W. rotation at normal polarity.

- ## 5. Mechanical noise :

Continuous, monotonous, not unpleasant sound to be heard.
To be mutually discussed when questionable.

6. Rotational torque : $15 \sim 45 \text{ m} \cdot \text{N}$ (Rotational speed $60^\circ / \text{sec.}$)

- With manual operation : No damage with an application of $0.9N \cdot m$ ⁴³³ ~~at the shaft~~
With motor drive : Shaft must be slipped at the

8. Bushing nut tightening strength: Δ
Tightening torque to be no greater than 1.5 N·m (140 kgf·cm).

- (Pay attention otherwise the strength may not be assured.)

- No damages with an application of push or pull force 100 N ~~at~~ for 10 sec.

10. Resistance to soldering heat :

After soldering there shall be no evidence of poor contact between resistance element and terminals, or any physical damage as a result of the test.

The terminal of the potentiometer

less than 350 °C and within 5 sec.

The terminal of the motor

less than 350 °C and within 2 sec.

CLASS. NO.	TITLE	SPECIFICATIONS

POK

- 1.Total resistance : Nominal total resistance $\pm 20\%$ (10K Ω $\leq R \leq 2M\Omega$).
- 2.Rated voltage : 30V A.C. This potentiometer is designed
- 3.Resistance taper : See (HSA02) for A.C. voltage only.
- 4.Maximum attenuation level at full C.C.W. position :

Total resistance	Attenuation level
$R \geq 100k\Omega$	100 dB min.
$100k\Omega > R \geq 50k\Omega$	90 dB min.
$50k\Omega > R \geq 10k\Omega$	80 dB min.

5. Insertion loss at full C.W. position : 0.1 dB max (Measure between (A1, A2))
6. Gang error :
- Turn 1-2 output V

Total resistance	Gang error
$R \geq 50k\Omega$	3 dB max. between -70 dB less than -60 dB 2 dB max. between -60 dB \sim 0 dB
$50k\Omega > R \geq 20k\Omega$	3 dB max. between -60 dB less than -40 dB 2 dB max. between -40 dB \sim 0 dB
$20k\Omega > R \geq 10k\Omega$	3 dB max. between -60 dB \sim 0 dB

7. Sliding noise : Less than 47mV measured by JIS C 6443
(Neglected a impulsive noise at the C.W. and C.C.W.
ends of position.)

- ### 8. Insulation resistance

Potentiometer section : More than 100M Ω at 500V D.C.
 Motor section : More than 1M Ω at 100V D.C.

- ### 9. Withstand voltage

Potentiometer section : 500V A.C. for 1 minute.

10. Supply voltage of motor : 4~6V D.C.

11. Motor current (at 4.5V D.C. applied to motor)

Normal operation : 100mA max.

Slipping operation

at both ends : 150mA max.

4.5V D.C.

Endurance specifications

1. Rotational life : 15,000 cycles min

[illegible]

CLASS NO.	TITLE	SPECIFICATIONS
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Note

1.The standard test shall be subject to a temperature from 5 °C to 35 °C and relative humidity from 45% to 85%. Test shall be done under environmental requirements of a temperature of 20' ± 2 °C and relative humidity of 65 ± 5% if a decision is in question.

2.Notice on motor

1)Motor terminals shall not be bent more than twice.

2)Soldering to the motor terminals shall be within a few second, not to cause the transformation of terminal base plastics. And, avoid that the flux flows into the motor.

Pay special attention to the terminals when they are wave soldered.

If the flux flows into the motor, it may cause a poor contact.

3)Motor terminal should not be pressed inside the motor.

It may cause a poor contact in the motor.

4)Pay attention that a piece of iron and an alien substance are not crept into the motor.

5)In operation, temperature around the motor produce an effect on the performance and life. Pay special attention in high temperature and humidity. Storage in high temperature and humidity, and in corrosive gas, shall be avoided.

6)In case, using the adhesive agent and the seal agent etc.for fit up, make sure that there is no generation of the harmful gas for motor.(including all chemicals around the motor.) Pay special attention to cyanogen system adhesive agent and organically system silicone.

CLASS NO.	TITLE	SPECIFICATIONS
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3.Power supply


Regulated D.C. power supply shall be used.
(ripple to be 1% max.)Motor terminal shall not be connected with fixed resistors in series.

And supply current is to be 350mA min.

4.Knob

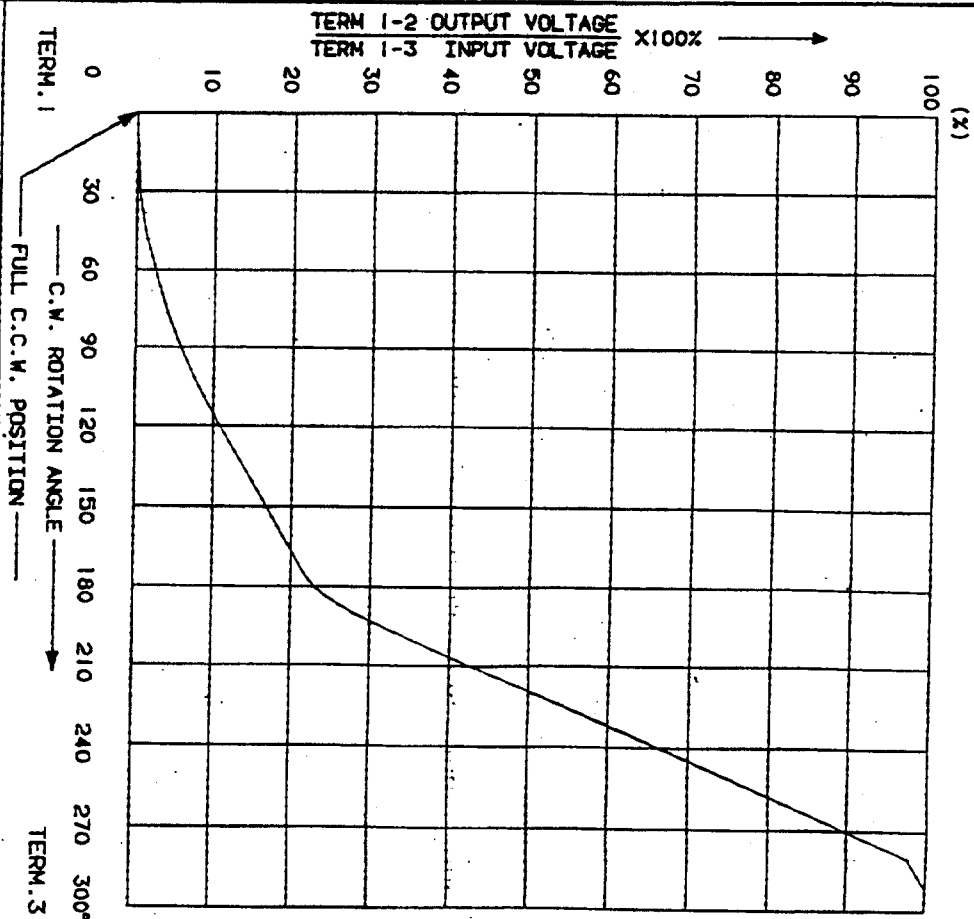
The material of the knob shall be insulation material.
As potentiometer is not grounded, conductive material of the knob may cause a earth noise.

5.The items except above mentioned items shall meet or exceed JIS C 6443.

SYMB	DATE	APPR	CHKD	DSGD	<div>  ALPS ELECTRIC CO., LTD. </div>
					<div> APPR'D BY CHKD. DSGD BY TITLE </div>
					<div> 5/11/10 10:00 AM 5/11/10 10:00 AM 5/11/10 10:00 AM </div>
					<div> DOCUMENT NO. </div>
					<div> 4K16M-1 </div>



ALPS ELECTRIC CO., LTD
1-7 YUKIGAYA OTSUKA-CHO OTA-KU TOKYO JAPAN

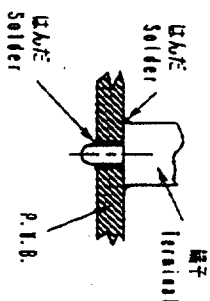


AT 180° C.W. SHAFT ROTATION FROM FULL C.C.W. POSITION, VOLTAGE PERCENT SHALL FALL WITHIN THE LIMITS OF 15 - 30PERCENT.

OSGD	SCALE	TITLE
CHKD.	RESISTANCE TAPER	DOCUMENT NO.
15-05-81	18.0000	HSA02
DATE	UNIT	
APPO	DATE	
CHKD	DATE	
OSGD	DATE	

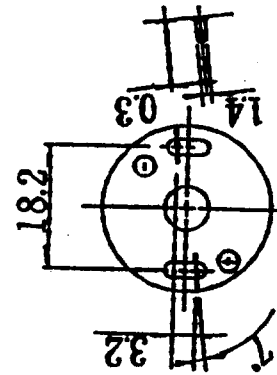
< はんだ付け時の注意事項 >
図のようにP. W. Bの上に はんだ付けをする配線は、
お断り下さい。

Caution for soldering
Please avoid soldering on upper surface of P. W. B. as shown



ALPS ELECTRIC CO., LTD.	TITLE
CHKD.	RESISTANCE TAPER
15-05-81	18.0000
DATE	UNIT
APPO	DATE
CHKD	DATE
OSGD	DATE

SHAFT SLOT IS OPTIONAL ANGLE



片寄差の許定なき寸法の公差	TOLERANCES UNLESS OTHERWISE SPEC
BASIC DIMENSIONS TOL. GRADCE	
$L \leq 10$	± 0.3
$10 < L \leq 100$	± 0.5
$100 \leq L$	± 0.8
角度 ANGULAR DIMENSION	$\pm 5'$

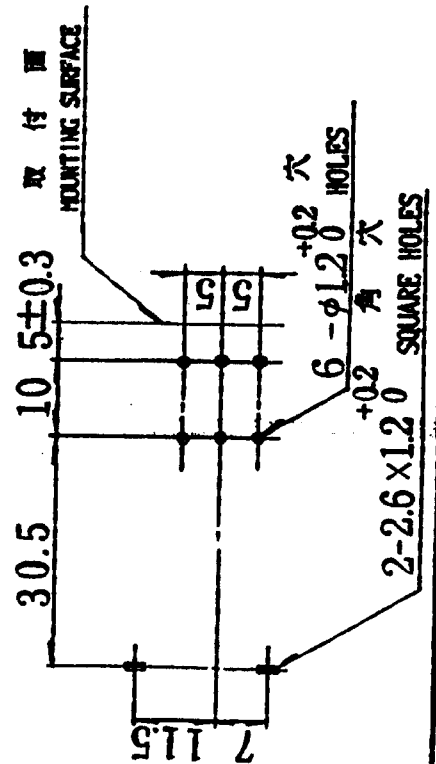





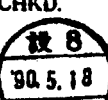

P.W.B. MOUNTING DETAIL

TOLERANCE ± 0.1

VIEWED FROM MOUNTING SIDE

挿入例より



PART NO.		NAME			MATERIAL NAME & CODE		FINISH	
					 ALPS ELECTRIC CO., LTD.			
						UNIT mm	SCALE 1/	
					APPD. 	CHKD. 	DSGD. 	TITLE 27形1軸2連 モータ駆動ボリュウム組立図
FORM REV	342-4	相沢 佐藤 木矢			DOCUMENT NO.			
SYMB.	DATE	APPD.	CHKD.	DSGD.	K272AMC002			