

No. KK-2008-5666

Date: May. 30, 2008

Attention:

Your ref. No.:

Your Part No.:

SPECIFICATIONS

ALPS';

MODEL: RK16812MG
(10kBx2)

Spec. No.:

Sample No.: F 5 9 6 3 2 6 1 M

RECEIPT STATUS

RECEIVED

By Date

Signature

Name

Title

ALPS
ALPS ELECTRIC CO., LTD.

DSG'D

G. Ashida

APP'D

Y. Ohya

ENG. DEPT. DIVISION

Sales

Head Office
1-7, Yukigaya-otsuka-cho, Ota-ku, Tokyo, 145-8501 Japan
Phone, +81(3)3726-1211

B6523

Q1003#03A (EA)

SPECIFICATIONS

1. THIS SPECIFICATIONS APPLY TO RK16812MG POTENTIOMETER

2. CONTENTS OF THIS SPECIFICATIONS.

5K162FMG-6
T-K16MG-B06
4K16M-42
4K16M-2
K162FMG03H
4K-1

3. MARKING

- MARKING ON ALL UNITS
DATE CODE, RESIST. VALUE, TAPER

4. REMARKS

- FURNISH PACKAGE
NUT:1 WASHER:1
- NOTES
• Marking \Rightarrow in specifications shows standard and condition for application.

• CAUTION

There is a possibility that might be affected by contact resistance of resistive element and wiper in case of low impedance of output side in voltage regulation circuit.
For this reason, we require that you adjust to impedance of output side more than 100 times of total resistance.

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.

This product has been designed and manufactured for general electronic devices, visual devices, home electronics, information devices and communication devices. In case this product is used for more sophisticated equipment requiring higher safety and reliability, such as life support system, space & aviation devices, disaster prevention & security system, please make verification of conformity or check on us for the details.

It is prohibited to use this product for flight control purposes in avionics 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.

<Storage>

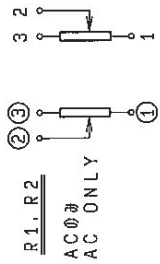
- 1) Store the products as delivered, at a normal temperature and humidity, without direct sunshine and corrosive gas ambient.
Use them at an earliest possible timing, not later than six months upon receipt.
- 2) After breaking the seal, keep the products in a plastic bag to shut out ambient air, store them in the same environment as above, and use them up as soon as possible.
- 3) Do not stack too many cartons.

CLASS.NO.	TITLE	SPECIFICATIONS
Feature		
This is a potentiometer with D.C. magnet motor and it is adjustable by both manual shaft and motor.		
Temperature for operating and storage		
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 (With 6V Disk Varistor)	
Mechanical specifications		
1.Operation :	Manual operation and motor drive	
2.Total rotational angle :	300°±5°	
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. (When the potentiometer is looked at from the shaft side.)	
5.Mechanical noise :	Continuous, monotonous, not unpleasant sound to be heard. To be mutually discussed when questionable.	
6.Rotational torque :	(at 4.5V D.C. applied to motor) 10 - 40 mN·m(Rotational speed 60° /sec.)	
7.Stopper strength of shaft	with manual operation : No damage with an application of 0.9 N·m. with motor drive : Shaft must be slipped at the both ends of manual rotation.	
8.Bushing nut tightening strength:	Tightening torque to be no greater than 1.2 N·m. *Pay attention otherwise the strength may not be assured.	
9.Push / pull strength :	No damages with an application of push or pull force 100 N 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 300 °C and within 3 sec.		
The terminal of the motor less than 350 °C and within 2 sec.		

CLASS.NO.	TITLE	SPECIFICATIONS										
		Electrical specifications										
1.	Total resistance and tolerance :	Nominal total resistance $\pm 20\%$ (Total resistance range : $5k\Omega \leq R \leq 250k\Omega$)										
2.	Rated power :	-0.05W										
3.	Rated voltage :	The rated voltage shall be the voltage of D.C. or A.C. (commercial frequency, effective value) corresponding to the rated power (dissipation), and be obtained from the following formula. When the obtained rated voltage exceeds the maximum working voltage given in the following, however, the maximum working voltage of the following shall be the rated voltage. $E = \sqrt{P \cdot R} \text{ (V)}$										
	Where	E : Rated voltage (V) P : Rated power (dissipation) (W) R : Nominal total resistance (Ω)										
	Maximum working voltage :	50V A.C.										
	This potentiometer is designed for A.C. voltage only.											
4.	Resistance taper :	(See taper figure)										
5.	Residual resistance between terminals :	(1&2, 2&3)										
		<table> <tr> <th>Nominal total resistance(Ω)</th><th>Minimum resistance between terminals</th></tr> <tr> <td>$100k < R \leq 250k$</td><td>-300 Ω max.</td></tr> <tr> <td>$50k < R \leq 100k$</td><td>100 Ω max.</td></tr> <tr> <td>$10k < R \leq 50k$</td><td>40 Ω max.</td></tr> <tr> <td>$5k \leq R \leq 10k$</td><td>30 Ω max.</td></tr> </table>	Nominal total resistance(Ω)	Minimum resistance between terminals	$100k < R \leq 250k$	-300 Ω max.	$50k < R \leq 100k$	100 Ω max.	$10k < R \leq 50k$	40 Ω max.	$5k \leq R \leq 10k$	30 Ω max.
Nominal total resistance(Ω)	Minimum resistance between terminals											
$100k < R \leq 250k$	-300 Ω max.											
$50k < R \leq 100k$	100 Ω max.											
$10k < R \leq 50k$	40 Ω max.											
$5k \leq R \leq 10k$	30 Ω max.											
6.	Sliding noise :	Less than 100mV. (Measured by JIS C 6443)										
7.	Gang error :	2 dB max. at 150°										
	(*with respect to terminal 3)	*C, *RD, *E										
8.	Insulation resistance	Potentiometer section : More than 100M Ω at 250V D.C. Motor section : More than 1M Ω at 100V D.C.										
9.	Withstand voltage	Potentiometer section : 300V A.C. for 1 minute.										
10.	Supply voltage of motor :	4 ~ 6V D.C.										
11.	Rated voltage for motor :	4.5V D.C.										
12.	Motor current (at 4.5V D.C. applied to motor)	Normal operation : 100mA max. Slipping operation : 150mA max. at both ends :										
	Endurance specifications											
1.	Rotational life :	15,000 cycles min.										

[illegible]
$$\frac{1}{(1 - K)}$$

CIRCUIT




DUAL
UNIT
2連

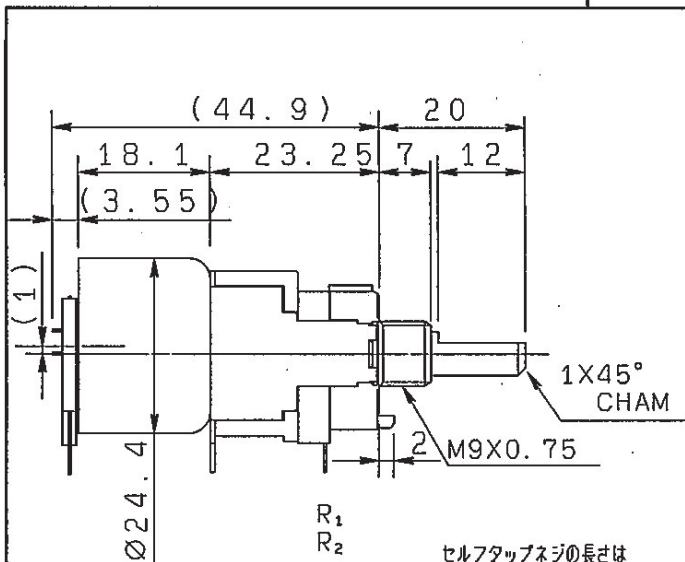
[illegible]

CLASS.NO.	TITLE	SPECIFICATIONS
	Note	<p>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.</p> <p>2.Notice on motor</p> <p>1)Motor terminals shall not be bent more than twice.</p> <p>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.</p> <p>Pay special attention to the terminals when they are wave soldered.</p> <p>If the flux flows into the motor, it may cause a poor contact.</p> <p>3)Motor terminal should not be pressed inside the motor.</p> <p>It may cause a poor contact in the motor.</p> <p>4)Pay attention that a piece of iron and an alien substance are not crept into the motor.</p> <p>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.</p> <p>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.)</p> <p>Pay special attention to cyanogen system adhesive agent and organically system silicone.</p>

CLASS.NO.	TITLE	SPECIFICATIONS
	3.Power supply	<p>Regulated D.C. power supply shall be used.</p> <p>(ripple to be 1% max.)Motor terminal shall not be connected with fixed resistors in series.</p> <p>And supply current is to be 350mA min.</p> <p>4.The items except above mentioned items shall meet or exceed JIS C 6443.</p>

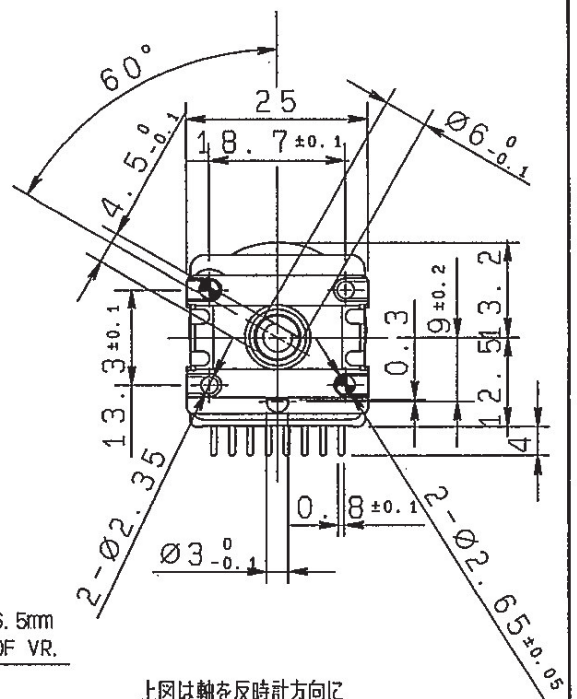
 ALPS ELECTRIC CO., LTD.	
APD. 279 Not 279 H. Higuchi	JSCD-91 TITLE DOCUMENT NO. 4K16M-2 (91)
SYMR DATE APD CHKD INSD	

107



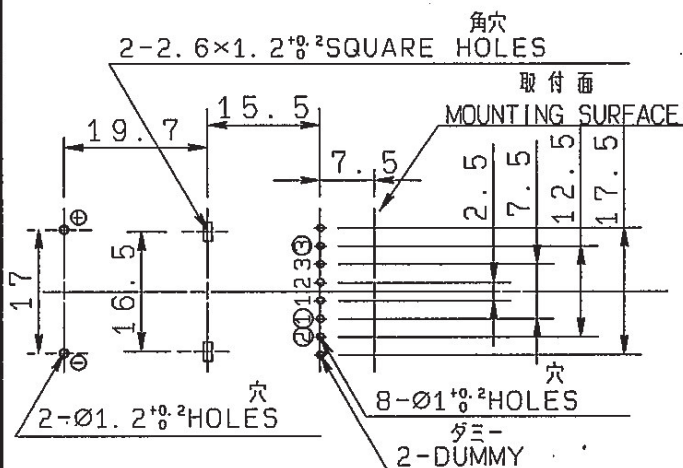
セルフタッピングネジの長さは
取付面より6.5mm以下のこと
LENGTH OF SELF-TAPPING
SCREW SHALL BE WITHIN 6.5mm
FROM MOUNTING SURFACE OF VR.

取付穴寸法図 許容差±0.1
挿入側からみた図
P. W. B. MOUNTING DETAIL
TOLERANCE±0.1
VIEWED FROM MOUNTING SIDE



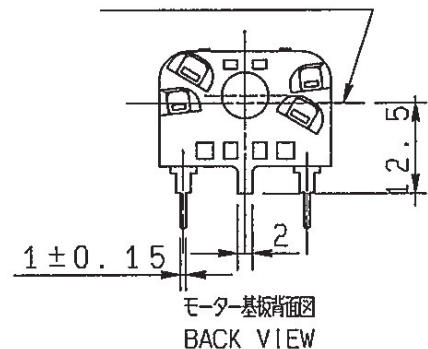
上図は軸を反時計方向に
回し切った状態を示す

SHAFT SHOWN
IN FULL CCW POSITION



R1 ① ② ③
R2 1 2 3

ポリウム軸センター
SHAFT CENTER



指定なき部分の許容差 TOLERANCES UNLESS OTHERWISE SPEC	
$L \leq 10$	±0.3
$10 < L < 100$	±0.5
$100 \leq L$	±0.8
角度 ANGULAR DIMENSION	±5°

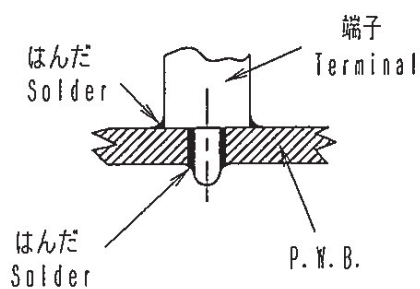
						基板付	
PART NO.		NAME		MATERIAL NAME / CODE		FINISH	
				ALPS		ALPS ELECTRIC CO., LTD.	
				DSGD. セツケイ1-906011		SCALE 1 : 1	
				Y. SAITOH 94-05-07		1軸2連 照光無し 1端子独立	
				CHKD. <i>M. Saitoh</i> 94-05-07		TITLE FIGURE	
				APPD. <i>K. Yamazaki</i> 94-05-07		UNIT m m	
SYMB		DATE		APPD		DOCUMENT NO. K162FMG03H	

< はんだ付け時のご注意事項 >

図のようにP. W. B.の上面に はんだ付けをする配線は、
お避け下さい。

Caution for soldering

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



					ALPS ELECTRIC CO., LTD.				
					APPRO. 1-設1 '96.1.11 吉岡	CHKD. 1-設1 '96.1.11 佐藤	DSGO. 1-設1 '96.1.11 大矢	TITLE	
					DOCUMENT NO.			4K-1	
SYMB	DATE	APPO	CHKD	DSGO					