

Customer: ALPS EUROPE DISTRIBUTION

No. 12E2006-3025

Date: Nov. 06, 2006

Attention:

Your ref. No.:

Your Part No.: EC12E1220401

## SPECIFICATIONS

ALPS' ;

MODEL: EC12E1220401

Spec. No.:

Sample No.: F 3 5 1 7 2 2 1 M

RECEIPT STATUS

RECEIVED

By Date

Signature

Name

Title

**ALPS**<sup>®</sup>  
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APP'D

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ENG. DEPT. DIVISION

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B6523

Q1003#03A (EA)

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

1. THIS SPECIFICATIONS APPLY TO EC12E1220401 ROTARY ENCODERS.

2. CONTENTS OF THIS SPECIFICATIONS.

F3517221M

LE2120N

3. MARKING

- MARKING ON ALL UNITS  
DATE CODE

• 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.

<p>1. 一般事項 General</p> <p>1-1 適用範囲 SCOPE この仕様書は主として電子機器に用いられる小容量低慣性12分割ロータリーエンコーダに適用する。 This specification applies to 12mm size low-profile rotary encoder (incremental type) for microscopical current circuits, used in electronic equipment.</p> <p>1-2 標準状態 Standard atmospheric conditions 測定状態の標準状態、次の状態で行なう。 Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows: 温度 Ambient temperature : 15°C to 35°C 湿度 Relative humidity : 25% to 85% 気圧 Air pressure : 86kPa to 106kPa</p> <p>但し、湿度等生じぬ場合は、次の標準状態で行なう。 If there is any doubt about the results, measurements shall be made within the following limits: 温度 Ambient temperature : 20 ± 1°C 湿度 Relative humidity : 63% to 67% 気圧 Air pressure : 86kPa to 106kPa</p> <p>1-3 動作温度範囲 Operating temperature range : -10°C to +70°C</p> <p>1-4 保存温度範囲 Storage temperature range : -40°C to +85°C</p>	
<p>2. 構造 Construction</p> <p>2-1 寸法 Dimensions 外形寸法は別図による。 Refer to attached drawing.</p>	
<p>3. 定格 Rating</p> <p>3-1 定格電圧 Rated voltage : D. C. 5V</p> <p>3-2 動作電流 (抵抗負荷) Operating current (resistive load) 各リード Each lead : 0.5mA (MAX) 5mA, MIN 0.5mA コモンリード Common lead : 1mA (MAX) 10mA, MIN 0.5mA</p>	

**ALPS ELECTRIC CO., LTD.**

APPD.	CHKD.	DSGD.	TITLE
Apr. 22, '99	Apr. 22, '99	Apr. 22, '99	12 分割回転エンコーダ 12mm Size Rotary Encoder
K. ITO			Y. KANZAKI
H. MIURA			DOCUMENT NO.
F 3517221M			(1/8)

<p>4. 電気的特性 Electrical characteristics</p> <p>項目 Item</p> <p>仕様 Specification</p> <p>4-1 出力信号 Output signal format</p> <p>&lt;Fig. 1&gt;</p> <p>1 Phase-different signals (A, B, C) are available. (The broken line shows default position of with-stand type.)</p> <p>2 Phase-different signals (A, B, C) are available. (The broken line shows default position of with-stand type.)</p> <p>3 Phase-different signals (A, B, C) are available. (The broken line shows default position of with-stand type.)</p>		<p>条件 Conditions</p> <p>回転方向 Shaft rotational direction</p> <p>信号 Signal</p> <p>出力状態 Output</p> <p>A (A-C端子) A(Terminal A-C)</p> <p>B (B-C端子) B(Terminal B-C)</p> <p>A (A-C端子) A(Terminal A-C)</p> <p>B (B-C端子) B(Terminal B-C)</p> <p>速度 120kV/360° 120 pulses/360° FOR EACH PULSE</p>
<p>4-2 分解能 Resolution</p> <p>1回転で出力されるパルス数 Number of pulses in 360° rotation</p>		<p>速度 120kV/360° 120 pulses/360° FOR EACH PULSE</p>
<p>4-3 スイッチング特性 Switching characteristics</p> <p>1) Shaft rotational speed : 360°/5° 2) Test circuit</p> <p>&lt;Fig. 2&gt;</p> <p>(注) コードON状態 : 出力電圧が1.5V以上の状態を示す。 コードOFF状態 : 出力電圧が3.5V以上の状態を示す。</p> <p>(note) Code-ON area : The area which the voltage is 1.5V or less. Code-OFF area : The area which the voltage is 3.5V or more.</p> <p>コードOFF→ON及びON→OFFの時の、出力は、5V±3.5Vの過渡領域で動作する。 Specified by the signal's passage time from 3.5V to 1.5V or from 1.5V to 3.5V of each switching position (code OFF → ON or ON → OFF).</p>		<p>1) チャタリング Chattering</p> <p><math>t_1, t_2 \leq 3ms</math></p>

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5. 機械的性質 Mechanical characteristics

項目 Item	条件 Conditions	規格 Specifications
5-1 全回転角度 Total rotational angle		360° (エンドレス) 360° (Endless)
5-2 クリックトルク Click torque	(クリック特定の測定) (Applied for with-detent type)	3~20mN・m
5-3 クリック位置及び位置 Number and position of detents		12本クリック 12 detents (ステップ角: 30° ± 3°) (step angle: 30° ± 3°)
5-4 軸の押し引き強度 Push-pull strength of shaft	軸の押し引き強度は80Nの標準値を1.0倍測定する。(PCB実用値) Push and pull static load of 80N shall be applied to the shaft in the axial direction for 10S. (After soldering of the PC board)	軸の押し引き強度は、押し引き方向、及び軸の押し引き方向(電圧的標準値)を、 without excessive play in shaft No excessive abnormality in rotational feeling. And electrical characteristics shall be satisfied.
5-5 端子強度 Terminal strength	端子強度は任意の方向に3Nの標準値を1.0倍測定する。 A static load of 3N shall be applied to the tip of terminals for 10S in any direction.	押し引き及び捻回方向をそれぞれ、 without excessive play in terminals or poor contact.
5-6 軸のワobble Shaft wobble	軸のワobbleは5mmの位置に50mN・mの軸荷を印加する。 A momentary load of 50mN-m shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft.	0.7xL/30mm-p以内 0.7xL/30mm-p MAX (Lは軸長(軸長測定位置、) (L: Shaft length)
5-7 軸のワobble方向 Shaft play in axial direction	軸のワobbleは任意の方向に3Nの標準値を1.0倍測定する。 Push and pull static load of 3N shall be applied to the shaft in the axial directions.	0.4mm-p以内 0.4mm-p MAX
5-8 軸の歪み強度 Side thrust strength of shaft	軸の歪み強度は5mmの位置に20Nの標準値を1.0倍測定する。(PCB実用値) A load of 20N shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft. (After soldering of the PC board)	押し引き及び、軸の歪み強度を、 without excessive play or bending in shaft. No mechanical abnormality.
5-9 軸の回転方向 Shaft play in rotational wobble	角速度で測定する。 Measure with Jig for rotational angle	3° 以内 3° MAX

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K. ITO Y. KANZAKI H. MIURA			DOCUMENT NO.
			F 3517221M

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6. 電気的性質 Electrical characteristics

項目 Item	条件 Conditions	規格 Specifications
2) 滑動ノイズ (bounce)	コ-ONの時の1.5V以上の電圧変動なし、オフ時の電圧変動は1ms以上の1.5V以上の電圧変動を許す600ms以内、また、復帰/1.5V以上の電圧変動が1ms未満の場合、最初の復帰/1.5V未満とする。 Specified by the time of voltage change exceed 1.5V in code-ON area. When the bounce has code-ON time less than 1ms between chatterings ( $t_1$ or $t_2$ ), the voltage change shall be regarded as a part of chattering. When the code-ON time between 2 bounces is less than 1ms, they are regarded as 1 linked bounce.	$t_2 \leq 2ms$
3) 滑動ノイズ Sliding noise	コ-OFFの時の電圧変動 The voltage change in code-OFF area.	3.5V以上 3.5V MIN
4-4 絶縁強度 Dielectric strength	端子-接地間電圧: C. 50V/1分間持続する。(リーク電流1mA) A voltage of 50V.A.C. shall be applied for 1min between individual terminals and bracket. (Leak current 1mA)	絶縁強度の劣化なし Without arcing or breakdown
4-5 絶縁抵抗 Insulation resistance	端子-接地間電圧: D. C. 50Vの標準値。 Measurement shall be made under the condition which a voltage of 50V.D.C. is applied between individual terminals and bracket.	端子-接地間電圧10MΩ以上 Between individual terminals and bracket: 10MΩ MIN
4-6 位相差 Phase-difference	規定の動作条件で測定する。 Measurement shall be made under the condition which the shaft is rotated in constant speed. <Fig. 4> 図4 順方向 CW 図5 逆方向 CCW	$\Delta T = 0.08T$ 以上 MIN $\Delta T < 1\mu s$

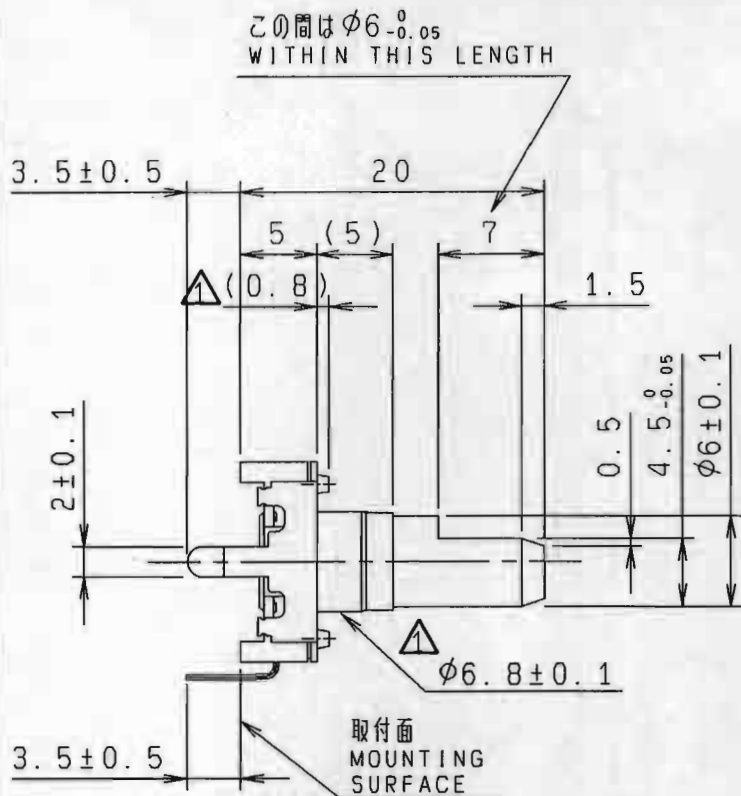
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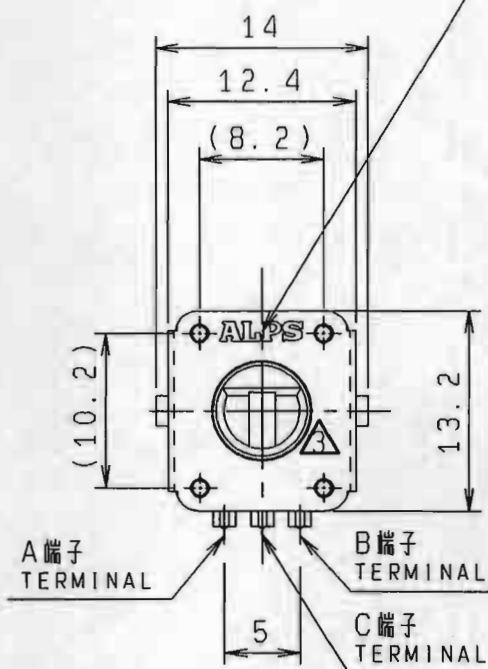
(3/8)





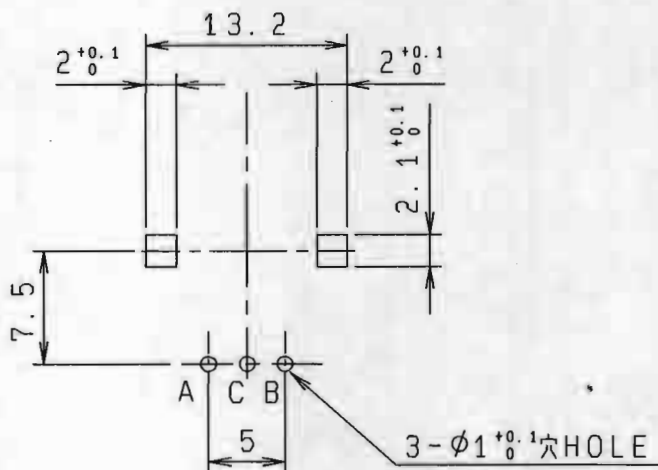


商標の位置は任意  
THE DIRECTION OF  
TRADE MARK IS OPTIONAL



取付穴寸法図 (許容差±0.1)

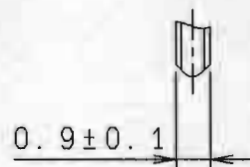
\*挿入側より見た図  
P.W.B. MOUNTING DETAIL  
(TOLERANCE±0.1)  
VIEWED FROM MOUNTING SIDE



基板板厚  $t = 1.6\text{mm}$   
P.C.B.

端子先端詳細図 (10:1)

△ DETAIL OF TERMINALS



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

			12ピン 12PLUSE SHAFT COLOR: GRAY		L=20 伏形 クリック付き	
PART NO.	NAME	MATERIAL NAME / CODE	FINISH			
<b>ALPS ELECTRIC CO., LTD.</b>						
			DSGD. ツツケ11-8501351	SCALE	NO.	
			H. Shimomura 98-01-29	2:1		
△ 1	2001/09/13	S.M. H. OY. F	CHKD.	TITLE		
△ 1	99/12/14	K. IY. KH. O	S. Inoue 98-02-02	12形薄形インコター		
△ 2	99/8/23	K. KK. IY. K	APPD.	DOCUMENT NO.		
SYMB	DATE	APPD	CHKD	DSGD	K. Kawasaki 98-02-02	UNIT mm
					LE2120N	