

Customer: ALPS EUROPE DISTRIBUTION

No. 12E2006-3028

Date: Nov. 06, 2006

Attention:

Your ref. No.:

Your Part No.: EC12E1224402

SPECIFICATIONS

ALPS' ;

MODEL: EC12E1224402

Spec. No.:

Sample No.: F 3 5 1 7 2 4 8 M

RECEIPT STATUS

RECEIVED

By Date

Signature

Name

Title

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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 EC12E1224402 ROTARY ENCODERS.

2. CONTENTS OF THIS SPECIFICATIONS.

F3517248M

LE212409

3. MARKING

- MARKING ON ALL UNITS
DATE CODE

• CAUTION

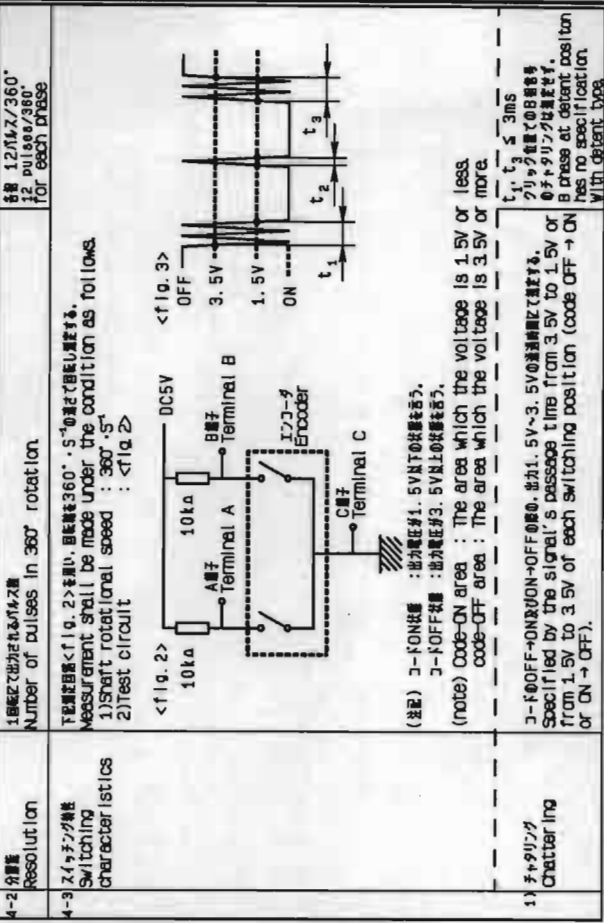
Regardless of the suggested applications of these products being introduced in the specifications, when using them for equipment and devices requiring a high degree of safety, respective manufacturers will please preserve safety of the planned equipment and devices by providing necessary protective circuits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

4. 電気的仕様 Electrical characteristics

項目 Item	条件 Conditions	規格 Specifications
4-1 出力信号 Output signal format	<p>回転方向 Shaft rotational direction</p> <p>信号 Signal</p> <p>OFF ON</p> <p>OFF ON</p> <p>OFF ON</p> <p>OFF ON</p> <p>OFF ON</p> <p>OFF ON</p>	<p>1. 2相信号の位相は図1とし、高レベルは <fig. 1> の通りとする。</p> <p>2. Phase-different signals (Signal, signal) details shown in <fig. 1>. The broken line shows that A-phase has no specific position. (The broken line shows position of with-different type.)</p>
4-2 分解能 Resolution	1回転で出力されるパルス数 Number of pulses in 360° rotation	各相 12パルス/360° 12 pulses/360° for each phase
4-3 スイッチング特性 Switching characteristics	<p>1) 回転速度 <fig. 2> を含む。回転速度は 360°・S⁻¹ の範囲で指定される。</p> <p>2) Test circuit : <fig. 2></p>	<p>1) 出力電圧 : 出力電圧が 1.5V 以下の状態を「OFF」、出力電圧が 3.5V 以上の状態を「ON」とする。</p> <p>2) 出力電圧 : 出力電圧が 1.5V 以下の状態を「OFF」、出力電圧が 3.5V 以上の状態を「ON」とする。</p>
4-4 振動 Chattering		<p>1) 出力電圧 : 出力電圧が 1.5V 以下の状態を「OFF」、出力電圧が 3.5V 以上の状態を「ON」とする。</p> <p>2) 出力電圧 : 出力電圧が 1.5V 以下の状態を「OFF」、出力電圧が 3.5V 以上の状態を「ON」とする。</p>



SYMB	DATE	APPD	CHKD	DSGD
		K. ITO	Y. KANZAKI	H. MIURA
<p>ALPS ELECTRIC CO., LTD.</p> <p>TITLE 12 相回転型エンコーダ 12mm Size Rotary Encoder</p> <p>DOCUMENT NO. F3517248M (2/9)</p>				

1. 一般事項 General
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型低電圧用 12 相回転型ロータリエンコーダに適用する。Unless otherwise specified, this specification applies to 12mm size low-profile rotary encoder (incremental type) for microcopic current circuits, used in electronic equipment.

1-2 標準仕様 Standard atmospheric conditions
測定条件は標準大気条件とし、次の範囲(行々)内、測定は行われなければならない。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
- 相対湿度 Relative humidity : 25% to 85%
- 気圧 Air pressure : 86kPa to 106kPa

1-3 使用温度範囲 Operating temperature range
測定は標準大気条件とし、次の範囲(行々)内、測定は行われなければならない。Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

- 温度 Ambient temperature : 20 ± 1°C
- 相対湿度 Relative humidity : 63% to 87%
- 気圧 Air pressure : 86kPa to 106kPa

- 動作温度範囲 Operating temperature range : -10°C to +70°C
- 保存温度範囲 Storage temperature range : -40°C to +85°C

2. 構造 Construction
2-1 寸法 Dimensions
外形寸法は図面による。Refer to attached drawing.

3. 定格 Rating
3-1 定格電圧 Rated voltage : D. C. 5V

3-2 動作電流 (抵抗性負荷) Operating current (resistive load)
各端子ごとの電流 : 0.5mA (MAX 5mA, MIN 0.5mA)
共通端子 : 1mA (MAX 10mA, MIN 0.5mA)

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5. 機械的性質 Mechanical characteristics

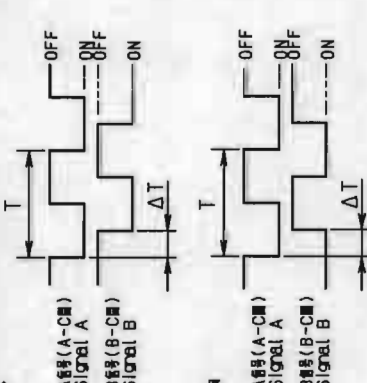
項目 Item	条件 Conditions	規格 Specifications
5-1 全回転角度 Total rotational angle		360° (インデックス) 360° (Endless)
5-2 クリックトルク Detent torque	(クリック特許の必須品) (Applied for with-detent type)	3~20mN・m
5-3 クリック点数及び位置 Number and position of detents		12点クリック 12 detents (ステップ角 30°±3°) (Step angle: 30°±3°)
5-4 軸の押し引き強度 PUSH-PULL strength of shaft	軸の押し及び引き両方向に50Nの静荷重を10秒間加える。(PCB実装時仕様) Push and pull static load of 50N shall be applied to the shaft in the axial direction for 10s. (After soldering of the PC board)	軸の破断、著しい回転しろ、永久摩耗 軸が折れる(軸の回転性能が劣化する) Without damage to or No excessive rotational play in shaft And electrical characteristics shall be satisfied.
5-5 端子強度 Terminal strength	端子先端の任意の一方に3Nの静荷重を10秒間加える。 A static load of 3N shall be applied to the tip of terminals for 10s in any direction.	著しい折れ及び接点不良を起すこと。 Without excessive play in terminals or poor contact.
5-6 軸がた Shaft wobble	軸先端から55mmの位置に50mN・mの静的モーメントを加える。 A momentary load of 50mN-m shall be applied at the point 55mm from the tip of the shaft in a direction perpendicular to the axis of shaft.	1. 0.1X/30mmp-D以内 1. 0.1X/30mmp-D MAX (Lは軸長、Dは軸径を示す。) (L: Shaft length)
5-7 軸の歪み耐力 Side thrust strength of shaft	軸先端から55mmの位置に20Nの静荷重を10秒間加える。(PCB実装時仕様) A load of 20N shall be applied at the point 55mm from the tip of the shaft in a direction perpendicular to the axis of shaft. (After soldering of the PC board)	著しい折れ及び、曲り角の大きいこと。 X、軸の歪み耐力の大きいこと。 Without excessive play or bending in shaft. No mechanical abnormality.
5-8 軸の回転方向がた Shaft play in rotational wobble	角度固定で測定する。 Measure with jig for rotational angle	4°以内。 4° MAX

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APPD.	CHKD.	DSGD.	TITLE
Apr. 22, '99	Apr. 22, '99	Apr. 22, '99	1.2 巡回転移エンコーダ
K. ITO			12mm Size Rotary encoder
Y. KANZAKI			DOCUMENT NO.
H. MIURA			F 3517248M
SYMB	DATE	APPD	CHKD

(4/9)

項目 Item	条件 Conditions	規格 Specifications
2) 振動ノイズ(バウンス) Sliding noise (Bounce)	コードONの時の1.5V以上の電圧変動時間とし、チャタリング、 t_1 、 t_2 、 t_3 の間の1ms以上の t_2 、 t_3 は、 t_1 、 t_2 、 t_3 の間の1ms未満の電圧変動は、振動ノイズと判断する。 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 chatters (t_1 or t_3), the voltage change shall be regarded as a part of chatter. When the code-ON time between 2 bounces is less than 1ms, they are regarded as 1 linked bounce.	t_2 5 JMS t_3 5 JMS
3) 振動ノイズ Sliding noise	コードOFFの時の電圧変動 The voltage change in code-OFF area.	3.5V MAX
4-4 絶縁強度 Dielectric strength	端子-端子間及びA、C、50Vに分離する。(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)	絶縁破壊のないこと。 Without arcing or breakdown.
4-5 絶縁抵抗 Insulation resistance	端子-端子間及びD、C、50Vに分離する。 Measurement shall be made under the condition which a voltage of 50V D.C. is applied between individual terminals and bracket.	端子-端子間及びD、C、50Vに分離する。 Between individual terminals and bracket: 10M Ω MIN
4-6 位相差 Phase-difference	定速度動作条件下で測定する。 Measurement shall be made under the condition which the shaft is rotated in constant speed. <Fig. 4> 時計方向 CW 反時計方向 CCW	$\Delta T < 0.08T$ MAX IN<Fig. 4>



ALPS ELECTRIC CO., LTD.

APPD.	CHKD.	DSGD.	TITLE
Apr. 22, '99	Apr. 22, '99	Apr. 22, '99	1.2 巡回転移エンコーダ
K. ITO			12mm Size Rotary encoder
Y. KANZAKI			DOCUMENT NO.
H. MIURA			F 3517248M
SYMB	DATE	APPD	CHKD

(3/9)

1. 定格電流 (定格電圧) D.C. 5V10mA (1mA MIN)

2. 電気的性質 Electrical characteristics

項目 Item	条件 Conditions	規格 Specifications
2-1 接点抵抗 Contact resistance	D. C. 5V10mA電圧降下法にて測定する。 Measured by the 1mA 5V D.C. voltage drop method.	100mA MAX.
2-2 チャタリング Chattering	1サイクル (OFF-ON-OFF)1秒で動作させる。 Switch is operated at the rate of 1 cycle 1 sec. The 1 cycle shall be OFF-ON-OFF.	10msec以下 Less than 10msec
2-3 絶縁抵抗 Insulation resistance	端子-端子間D. C. 50V1mA印加する。 Measurement shall be made under the condition which a voltage of 50V.D.C.1mA is applied between individual terminals and bracket.	端子-端子間10MΩ以上 Between individual terminals and bracket: 10MΩ MIN.
2-4 耐電圧 Dielectric strength	端子-端子間D. C. 50V1秒間又は、A. C. 60V2秒間印加する。 (リーク電流1mA) A voltage of 50V.A.C. shall be applied for 1min or a voltage of 80V.A.C. shall be applied for 2sec between individual terminals and bracket. (Leak current:1mA)	焼着・アーク・絶縁破壊がないこと。 Arcing or breakdown.

注: シャフト端子間は絶縁されております。
Note: Shaft is insulated from switch terminals.

3. 機械的性質 Mechanical characteristics

項目 Item	条件 Conditions	規格 Specifications
3-1 スイッチ回路・接点配置 Contact arrangement		標準電圧 (Push on) S. P. S. T. (Push on)
3-2 スイッチ動作距離 Switching		0.5 ^{±0.1} mm
3-3 スイッチ作動力 Switch operation force		3 ^{±1.5} N

4. 耐久性能 Endurance characteristics.

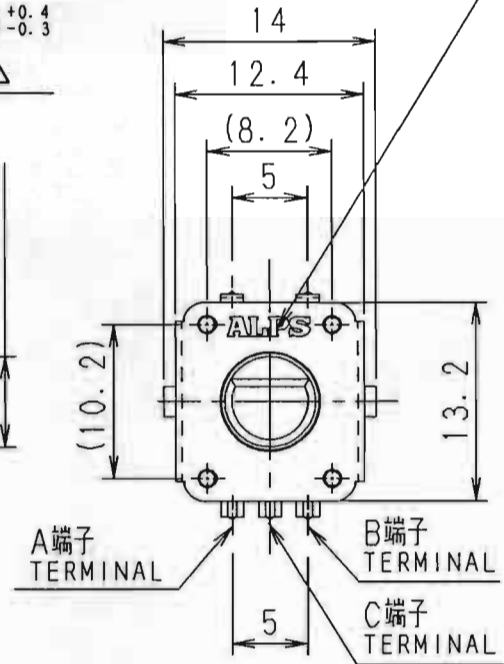
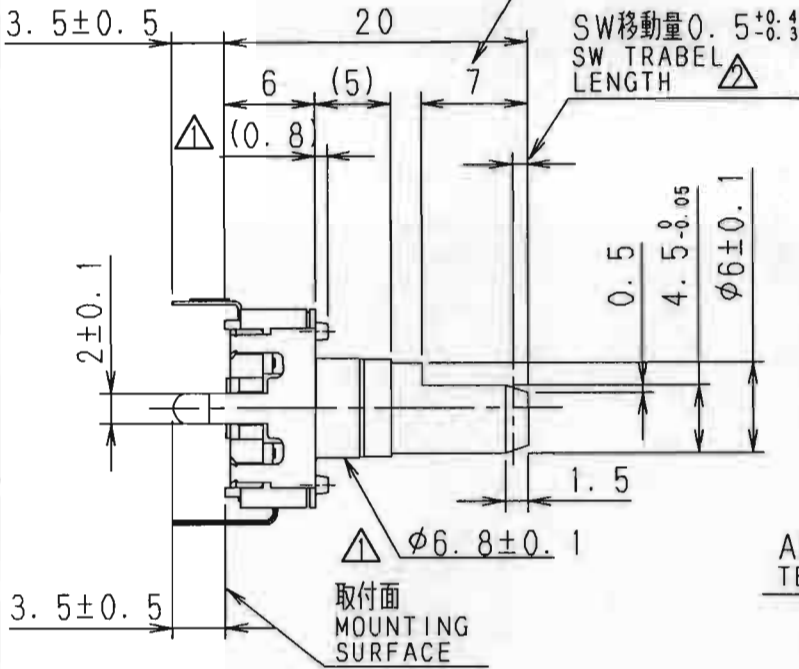
項目 Item	条件 Conditions	規格 Specifications
4-1 寿命特性 Operating life	定格電圧・定格電流500回/時の条件下で20,000回動作させる。 ただし、試験途中5,000回中間検査を行う。(備考1以外、ON以下) The shaft of switch shall be 20,000 times at a speed of 500times per hour without electrical load, after which measurements shall be made. However, an interim measurement shall be made immediately after 5,000 times. (Strength of shaft 10N max.)	寿命: 20000回以上 その他、信頼性を保証すること。 Switch contact resistance: 200mΩ MAX. Except above items, specifications in clause 2.2-4. and 3.1-3 shall be satisfied.



SYMB	DATE	APPD	CHKD	DSGD					
TITLE		12 形回転スイッチ		12mm Size Rotary Switch		DOCUMENT NO.		F3517248M (9/9)	
APPD.		CHKD.		DSGD.		TITLE		12 形回転スイッチ	
APR. 22 '99		APR. 22 '99		APR. 22 '99		12mm Size Rotary Switch		DOCUMENT NO.	
K. ITO		Y. KANZAKI		H. MIURA		F3517248M		(9/9)	

この間は $\phi 6-0.05$
WITHIN THIS LENGTH

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

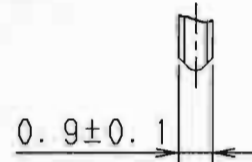
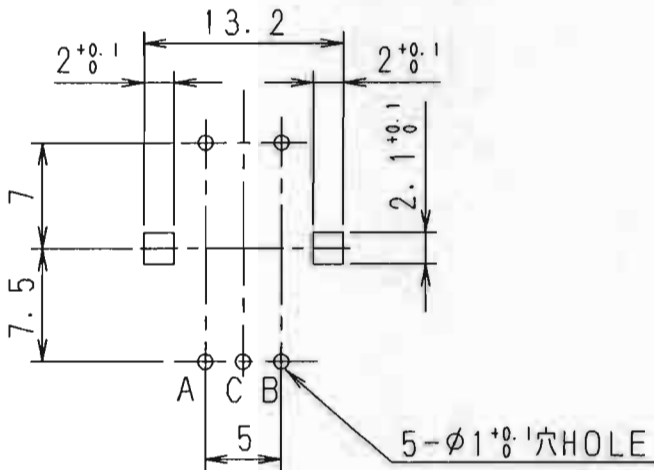


取付穴寸法図 (許容差 ± 0.1)

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

端子先端詳細図 (10:1)

△ DETAIL OF TERMINALS



基板板厚 $t = 1.6\text{mm}$
P. C. B.

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	$\pm 5^\circ$

			12パルス 12PLUSE SHAFT COLOR: BLACK		L=20 伏形 クリック付
PART NO.	NAME	MATERIAL NAME / CODE	FINISH		
ALPS ALPS ELECTRIC CO., LTD.					
DSGD. セツケイ1-8502781 Y. KANZAKI 97-10-01			SCALE 2:1	NO.	
CHKD. k. kawasaki 97-10-01			TITLE 12形薄形エンコーダ -		
APPD. M. Sato 97-10-01			UNIT mm	DOCUMENT NO. LE212409	
SYMB	DATE	APPD	CHKD	DSGD	