

Customer: ALGE GERMAN DISTRIBUTER

No. 12E2004-2348

Date: Oct. 18, 2004

Attention:

Your ref. No.:

Your Part No.: STEC12E05 PROMOTION

SPECIFICATIONS

ALPS;

MODEL: EC12E24202A2

Spec. No.:

Sample No.: F 1 8 8 4 6 9 3 M

RECEIPT STATUS

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Title

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Q1003#03A (EA)

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

1. THIS SPECIFICATIONS APPLY TO EC12E24202A2 ROTARY ENCODERS.

2. CONTENTS OF THIS SPECIFICATIONS.

F1884693M

LE212

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.

項目 Item	条件 Conditions	規格 Specifications
5-1 全周回転速度 Total rotational speed		3.00 (±0.1%) 300 (Endless)
5-2 クリックトルク Click torque	(クリック特許の仕様) (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		8し、-10° C~+5° Cでは、必ず 回転すること。 Shaft rotatable at -10° C~+5° C. 24スリット 24 detents (スリット角度: 15° ±3°) (Stop angle: 15° ±3°)
5-4 押し引き力 Push-pull strength of shaft	軸心及び内径方向に80Nの静荷重を10秒間加える。(PCB半田付け時) 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)	軸心傾斜、微小回転及び、滑り等の 異常な動作は認めないこと。 Without damage to, or 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.	微小回転、微小回転及び、滑り等の 異常な動作は認めないこと。 Without excessive play in terminals or poor contact.
5-6 軸の揺れ Shaft wobble	軸径5.5mmの位置に50mN・mmの軸心偏心を付与する。 A momentary load of 50mN-mm shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft.	0.7XL/30mmp-D以内 0.7XL/30mmp-D MAX (Lは軸径に等しい長さとする。) (L: Shaft length)
5-7 軸心方向の押し引き力 Push and pull strength of shaft in axial direction	軸心方向に3Nの静荷重を付与する。 A static load of 3N shall be applied to the shaft in the axial direction.	0.4mmp-D以内 0.4mmp-D MAX
5-8 軸心方向の押し引き力 Push and pull strength of shaft in axial direction	軸径5.5mmの位置に20Nの静荷重を10秒間加える。(PCB半田付け時) 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)	微小回転、微小回転及び、滑り等の 異常な動作は認めないこと。 Without excessive play or bending in shaft. No mechanical abnormality.
5-9 軸心方向の押し引き力 Push and pull strength of shaft in axial direction	角速度で測定する。 Measure with jig for rotational angle	3°以内 3° MAX

項目 Item	条件 Conditions	規格 Specifications
2) 音響ノイズ (Bounce)	コ-ONの瞬間0.1. 5V以上の電圧変動を認めない。コ-ON時の電圧変動は1ms以上0.1. 5V以上の電圧変動を認める。また、音響ノイズは1. 5V以下の電圧変動を認める。 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 chatter lines (t ₁ or t ₂), the voltage change shall be regarded as a part of chatter line. When the code-ON time between 2 bounces is less than 1ms, they are regarded as 1 linked bounce.	t ₂ ≤ 2ms
3) 音響ノイズ Sliding noise	コ-OFFの瞬間0.1. 5V以上の電圧変動を認めない。 The voltage change in code-OFF area.	3. 5V以上 3. 5V MIN
4-4 誘電率 Dielectric strength	端子-端子間電圧20. C. 50V/分間加える。(リ-ク電流1mA) A voltage of 50V/C. shall be applied for 1min between individual terminals and bracket. (Leak current 1mA)	絶縁破壊を認めないこと。 Without arcing or breakdown.
4-5 絶縁抵抗 Insulation resistance	端子-端子間電圧20. C. 50Vの間加える。 Measurement shall be made under the condition which a voltage of 50V/C. is applied between individual terminals and bracket.	端子-端子間電圧20V以上 Between individual terminals and bracket: 10MΩ MIN
4-6 位相差 Phase-difference	測定条件を参照する。 Measurement shall be made under the condition which the shaft is rotated in constant speed. <Fig. 4> 測定方向 CW 逆時計方向 CCW	<Fig. 4> 測定方向 CW 逆時計方向 CCW

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ALPS ELECTRIC CO., LTD.

APPD.	CHKD.	DSGD.	TITLE
APR. 22, '99	APR. 22, '99	APR. 22, '99	12 形回転编码器
K. ITO			Y. KANZAKI
DOCUMENT NO.			F 1884693M

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ALPS ELECTRIC CO., LTD.

APPD.	CHKD.	DSGD.	TITLE
APR. 22, '99	APR. 22, '99	APR. 22, '99	12 形回転编码器
K. ITO			Y. KANZAKI
DOCUMENT NO.			F 1884693M

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項目 Item	条件 Conditions	規格 Specifications
5-10 ばり文腐蝕 Resistance to soldering heat	7項0"ばり文付条件による。 Specified by the clause 7 "Soldering conditions".	<p>ばり文付後、電気的規格を満足する こと。また、著しい劣化や機械的劣化 のないこと。 Electrical characteristics shall be satisfied. No mechanical abnormality such as a excessive play. 腐蝕後、ばり文腐蝕の95% 以上著しさを認めていないこと。 A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed.</p>

ALPS ELECTRIC CO., LTD.

APPD.	CHKD.	DSD.	TITLE
APR. 22, '99	APR. 22, '99	APR. 22, '99	12 秒回転エンコーダ 12MM SIZE ROTARY ENCODER
K. ITO			DOCUMENT NO.
Y. KANZAKI			F 1884693M
H. MIURA			(5/8)

6. 耐久試験 Endurance characteristics.

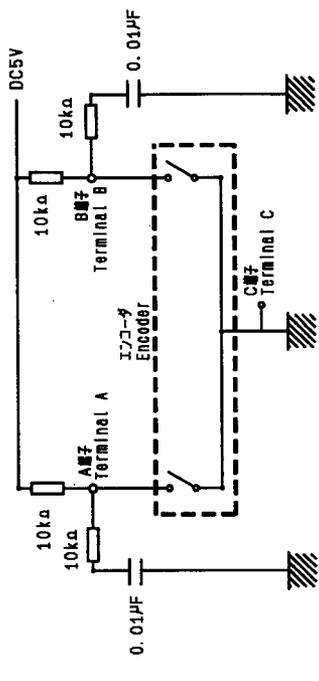
項目 Item	条件 Conditions	規格 Specifications
6-1 回転寿命試験 Rotational life	負荷速度600~1000/Hの範囲で、30,000回転後、試験機を停止し、 The start of encoder shall be rotated to 30,000 cycles at a speed of 600~1000/H without electrical load, after which measurements shall be made.	チャタリング t ₁ 、t ₂ ≤ 5ms ノイズ t ₃ ≤ 3ms Bouncing t ₄ ≤ 5ms Bounce t ₅ ≤ 3ms クランプ部が腐蝕していないこと。 Detent feeling has to remains.
6-2 湿熱 Damp heat	湿度40±2°C、電圧90~95%の範囲で、240±10時間試験後、湿度、電圧を1.5時間調整する。 The encoder shall be stored at a temperature of 40±2°C with relative humidity of 90% to 95% for 240±10H in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1.5H, after which measurement shall be made.	湿度試験 (4.1~4.5及び4.5.1) を満足すること。 Specifications in clause 4.1~4.5 and 5.1 shall be satisfied.
6-3 乾燥熱 Dry heat	湿度85±3°Cの範囲で、240±10時間試験後、湿度、電圧を1.5時間調整する。 The encoder shall be stored at a temperature of 85±3°C for 240±10H in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1.5H, after which measurements shall be made.	
6-4 低温熱 Cold	湿度-40±3°Cの範囲で、240±10時間試験後、湿度、電圧を1.5時間調整する。 The encoder shall be stored at a temperature of -40±3°C for 240±10H in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1.5H, after which measurement shall be made.	
6-5 落下試験 Free falling	60cmの高さより落下試験の方向が5°傾斜したコンクリート床に自由落下させる。 The encoder shall be fallen freely at any posture from 60cm height to the concrete floor covered with vinyl-tile, after which measurement shall be made.	著しい変形、破損等が認められないこと。 (4.1~4.5及び4.5.1)を 満足すること。 (注)、端子部の劣化は除外する。 No excessive deformation or damage. (Except the deformation of terminals.) And specifications in clause 4.1~4.5 and 5.1 shall be satisfied.
6-6 振動試験 Vibration	10~55~10Hzと定化する範囲(1周1分/振幅1.5mm)をX、Y、Z、各方向に 2時間試験する。 The following vibration shall be applied to the encoder, after which measurement shall be made: The entire frequency range, from 10Hz to 55Hz and return to 10Hz, shall be traversed in 1 min. Amplitude (total excursion): 1.5mm. This motion shall be applied for a period of 2H in each of 3 mutually perpendicular axes (A total of 6H).	湿度試験 (4.1~4.5及び4.5.1) を満足すること。 Specifications in clause 4.1~4.5 and 5.1 shall be satisfied.

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APR. 22, '99	APR. 22, '99	APR. 22, '99	12 秒回転エンコーダ 12MM SIZE ROTARY ENCODER
K. ITO			DOCUMENT NO.
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H. MIURA			(6/8)

9. その他、取扱()に注意 PRECAUTIONS IN USE

- 9-1. 保管は高温、多湿の場所及び腐食性ガス中を避けて下さい。
During operation, storage in high temperature and humidity, and in corrosive gas, should be avoided.
- 9-2. エンコーダ -01ハ・ムスカウント基準の検定においては動作スピード、サブ・リング・タイム、マスクング・タイム等記述し、実装時の上層を参照します。
In case of pulse count process design, operational speed, sampling time, and masking time etc should be taken into the consideration. Please check above matter at first on your circuit for the secure reason.
- 9-3. 本製品はクリップ位置にてA相はOFF状態で空定となりますので、ソフト検出時必ず基準で検出願います。
A phase should be design criterion prior to B phase. Because A phase has steady off signal at detent position.
- 9-4. エンコーダ -01ハ・ムスカウント基準の検定は下記のフィルタをいれることを推奨します。
For your pulse count design, it should be considered to add C/R filter on your circuit shown as below.



- 9-5. 本製品の本体に湿気水分がかりますと、ハ・ムスカウント異常が発生する可能性がありますので、製品に湿気水分がかりませんよう配慮願います。
Care must be taken not to expose this product to water or dew to prevent possible problem in pulse output wave form.
- 9-6. 医療用器械、器具へ本製品の警用は避けて下さい。
Please avoid to medical instrument because this encoder is audio use.

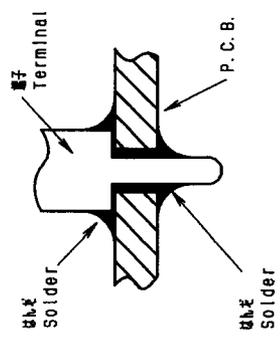
ALPS ELECTRIC CO., LTD.	
SYMB	DATE
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TITLE 12 形回転エンコーダ	
12MM SIZE ROTARY ENCODER	
DOCUMENT NO.	
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7. はんだ付け条件 Soldering conditions

- 7-1 手付けはんだ付け Manual soldering
 - 温度 350°C 以下、時間 3秒以内
 - Bit temperature of soldering iron : 350°C or less.
 - Application time of soldering iron : within 3s.
- 7-2 チップはんだ付け Dip soldering
 - 時間 1分以内
 - Printed wiring board: Single-sided copper clad laminate board with thickness of 1.6mm.
 - フラックス : 比重0.82以上のフラックスを用い、塗布厚さを均し、かつ塗布面をフラックスの浸入させないこと。
Flux:
 - Specific gravity: 0.82 or more.
 - Flux shall be applied to the board using a bubble foaming type fluxer.
 - The board shall be soaked in the flux bubble only to the middle of its thickness.
 - Flux shall not come into contact with the component side surface.

- プリヒート : 塗布厚さを100°C CNT、時間1分以内
- Preheating:
 - Surface temperature of board: 100°C or less.
 - Preheating time: within 1 min.
- はんだ : 温度260°C±5°C、時間3秒±1秒以内
- Soldering:
 - Solder temperature: 260°C ±5°C.
 - Immersion time: within 3±1s
- 以上の工程を1回または2回繰り返す。
Apply the above soldering process for 1 or 2 times.

- 8. はんだ付け時の注意事項 Note for soldering method.
- 8-1 下層のP.C.B.の上層にはんだ付けする場合は、注意してください。
Please avoid soldering on upper surface (the component side surface) of the PC board as shown below.



- 8-2 半田子、チップ等の塗布はチップ・内区フラックスを浸入させる場合があり、塗布厚さを均し、かつ塗布面をフラックスの浸入させないこと。
Please avoid cleaning of PCB board because the flux used during the dip soldering process may enter the encoder and cause poor contact.

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