HTI BOW INVERSION.

Customer: ALGE DISTRIBUTOR

No. ECR2004-5951

Date: Nov. 25, 2004

Attention:

Your ref. No.: 22 F022

Your Part No.: STEC11B01

SPECIFICATIONS

ALPS' ;

MODEL EC11B15242

Spec. No.:

Sample No.: F1979708M

RECEIPT STATUS

RECEIVED

By Date

Signature

Name

Title

DSG'D K. Abe

APP'D S. Sato

ENG. DEPT. DIVISION

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No. ECR2004-5951

SPECIFICATIONS

1. THIS SPECIFICATIONS APPLY TO EC11B2020201 ROTARY ENCODERS.

2. CONTENTS OF THIS SPECIFICATIONS.
   F1979708M

3. MARKING
   - MARKING ON ALL UNITS
     EIA DATE CODE

4. REMARKS
   - FURNUSH PACKAGE
     NUT:1 WASHER:1

- 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 protectve 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 properties 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.

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CLASS No.	TITLE 11ミリ回転型エンコーダ規格書 11mm Size Rotary Encoder Specification

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微小電流用11ミリ型ロータリーエンコーダに適用する。

This specification applies to 11mm size low-profile rotary encoder (incremental type) for microscopic current circuits. used in electronic equipment.

1-2 標準気候 Standard atmospheric conditions

測定する上で支障のない限り、次の範囲とする。

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 : 88kPa to 106kPa

但し、疑問を生じた場合は、次の範囲内とする。

If there is any doubt about the results. measurements shall be made within the following limits:

温度 Ambient temperature : 20 ± 1°C

相対湿度 Relative humidity : 63% to 67%

気圧 Air pressure : 86kPa to 106kPa

1-3 使用温度範囲

Operating temperature range : -40°C to +85°C

1-4 保存温度範囲

Storage temperature range : -40°C to +85°C

2. 構造 Construction

2-1 寸法 Dimensions

添付図面参照。

Refer to attached drawing.

3. 定格 Rating

3-1 定格電圧(SW01)

Rating : D.C. 5V 10mA (1mA MIN)

4. 電気的特性 Electrical characteristics(SW01)

項目 Item	条件 Conditions	規格 Specifications
4-1 出力信号 Output signal format	<Fig 1>	A. 位相差のある信号とし、詳細は<fig. 1>の通りとする。(破線はクリック位置を示す。) 2 Phase-different signals (SignalA. signalB) Details shown in <fig.1>. (The broken line shows detent position of with-detent type.)

<Fig 1>

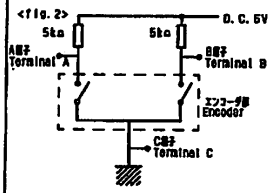
軸回転方向 Shaft rotational direction	信号 Signal	出力波形 Output
時計方向 C. W.	A(A-C端子間) A(Terminal A-C)	OFF / ON
	B(B-C端子間) B(Terminal B-C)	OFF / ON
反時計方向 C. C. W.	A(A-C端子間) A(Terminal A-C)	OFF / ON
	B(B-C端子間) B(Terminal B-C)	OFF / ON

ALPS ELECTRIC CO., LTD.					
	APPD. Mar.22.'96 Y.YOSHIOKA	CHKD. Mar.22.'96 M. SATOH	DSGD. Mar.22.'96 Y. ISAWA	TITLE 11ミリ回転型エンコーダ 11mm Size Rotary encoder	
SYMB DATE APPD CHKD DSGD				DOCUMENT NO. F1979708M	(1/5)

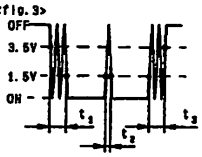
CLASS No.	TITLE 11ミリ回転型エンコーダ規格書 11mm Size Rotary Encoder Specification

項目 Item	条件 Conditions	規格 Specifications
4-2 分解能 Resolution	1回転で得られるパルス数 Number of pulses in 360° rotation.	分解能 20パルス/360° 20 pulses/360° for each phase (12クリック 1パルス) (1Click 1Pulse)
4-3 スイッチング特性 Switching characteristics	下記測定条件<fig. 2>を用い、軸回転360°-5°の間で測定し規定する。 Measurement shall be made under the condition as follows. 1)Shaft rotational speed : 360°-5° 2)Test circuit : <fig.2>	

<fig. 2>



<fig. 3>



(注記) コードOFF領域 :出力電圧が3.5V以上の領域をいう。
コードON領域 :出力電圧が1.5V以下の領域をいう。

(note) Code-OFF area : The area which the voltage is 3.5V or more.
code-ON area : The area which the voltage is 1.5V or less.

1) チャタリング Chattering	コードOFF→ON及びON→OFFの間の、出力1.5V~3.5Vの遷移時間で規定する。 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).	$t_1, t_3 \leq 2ms$
2) 摺動ノイズ (バウンス) Sliding noise (Bounce)	コードON領域の1.5V以上の電圧変動時とし、チャタリングでt_1, t_3間隔が1ms以上の1.5V以下ON状態を有するものとする。尚、摺動ノイズとは、1.5V以下の間隔が1ms以下の場合は、連続摺動ノイズと解釈する。 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_3). 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) 摺動ノイズ Sliding noise	コードOFF領域の電圧変動 The voltage change in code-OFF area.	3.5V以上 3.5V MIN

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	APPD. Mar.22.'96 Y.YOSHIOKA	CHKD. Mar.22.'96 M. SATOH	DSGD. Mar.22.'96 Y. ISAWA	TITLE 11ミリ回転型エンコーダ 11mm Size Rotary encoder	
SYMB DATE APPD CHKD DSGD				DOCUMENT NO. F1979708M	(2/5)

CLASS No.

TITLE 11形回転形エンコーダ規格書
11mm Size Rotary Encoder Specification

	項目 Item	条件 Conditions	規格 Specifications
4-4	位相差 Phase-differenc	360°・S⁻¹の定速で軸を回転する。 Measurement shall be made under the condition which the shaft is rotated in 360°・S⁻¹ (constant speed). <fig. 4> A相(A-CH) Signal A B相(B-CH) Signal B OFF / ON / OFF / ON ΔT 回転方向 Rotational direction 注意事項 電気負荷でかつ手動操作時の負荷状態などを確認されるようご注意。手動操作は実使用によって評価します。 実使用状態は別途確認します。 Note : Above specification (4-4) is changeable. When operate by manual. Please check performance using actual circuit and knob.	<fig. 4>によりて ΔT≥24msec in<fig. 4>
4-5	絶縁抵抗 Insulation resistance	端子一括対軸間D. C. 250V1mAを印加する。 Measurement shall be made under the condition which a voltage of 250VD. C. 1mA is applied between individual terminals and bushing.	端子一括対軸間で100MΩ以上 Between individual terminals and bushing: 100MΩ MIN.
4-6	耐電圧 Dielectric strength	端子一括対軸間A. C. 300V1分間又は、A. C. 360V2秒間印加する。(リーク電流≦1mA) A voltage of 300VA. C. shall be applied for 1min or a voltage of 360VA. C. shall be applied for 2sec between individual terminals and bushing. (Leak current:≦1mA)	絶縁・アーク・破壊発生がないこと。 Without damage to parts, arcing or breakdown.

5. 機械的特性 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 Detent torque		12±7mN・m
5-3	クリック数及び位置 Number and position of detents.		20点クリック 20 detents (ステップ角度 18°±3°) (Step angle:18°±3°)
5-4	端子強度 Terminal strength	端子先端の任意の一方向に5Nの荷重を1分間加える。 A static load of 5N be applied to the tip of terminals for 1minute in any direction.	端子の変形、緩みしかがないこと。 但し、端子の過度の緩みは認めない。 Without damage or excessive looseness of terminals. Terminal bend is permitted.
5-5	軸方向押し引き強度 Push-pull strength of shaft	軸方向押し引き荷重を100Nの荷重を10秒間加える。(セット固定後) Push and pull static load of 100N shall be applied to the shaft in the axial direction for 10S. (After installing)	軸の変形、緩みしかがないこと。 過度な異常がないこと。 Without damage or excessive play in shaft. No excessive abnormality in rotational feeling.

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APPD.	CHKD.	DSGD.	TITLE
Mar. 22. '96 Y. YOSHIOKA	Mar. 22. '96 M. SATOH	Mar. 22. '96 Y. ISAWA	11形回転形エンコーダ 11mm Size Rotary encoder

DOCUMENT NO. F1979708M (3/5)

SYMB | DATE | APPD | SD | DRWD

CLASS No.

TITLE 11形回転形エンコーダ規格書
11mm Size Rotary Encoder Specification

	項目 Item	条件 Conditions	規格 Specifications
5-6	軸ナット締付強度 Bushing nut tightening strength	<fig. 5>を規定するように締める。 Tighten the nut according to <fig. 5> ブッシュ Chassis ナット Nut <fig. 5> 1mm MIN	1N・m以下で締付けること。 Tightening torque to be no greater than 1N. m.
5-7	軸ガタ Shaft wobble	軸端部から5mmの位置に50mN・mの瞬間モーメントを加える。 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.	軸ガタ Wobble MT (max-p less) 0. 7×L/90 Lは取付面からの測定値を示す。 L:Measurement point from mounting surface of bushing.
5-8	軸のスラスト方向ガタ Shaft play in axial direction		0. 4mm-p以下 0. 4mm-p MAX.
5-9	軸の回転方向ガタ Rotation play at the pilot position	専用治具で測定する。 Measure with Jig for rotational angle.	5度以内 5° MAX.
5-10	はんだ耐熱 Resistance to soldering heat	7項"はんだ付け条件"による。 Specified by the clause 7 "Soldering conditions".	変形・割れがないこと。 過度な異常がないこと。 There shall be no deformation or cracks. In molded part. No excessive abnormality in rotational feeling.
5-11	取付上の注意 Notice for mounting	本部品単体でスイッチを付ける為上下で使用不可。セット側でスイッチを固定する 為ブッシュ部にネジ構造がなく、はんだ付けなどの熱でとかり、はんだ付け後取付 用のスイッチを強度がなく安定性をなる可能性があります。 Hold the bushing use front panel or light pipe. Because this switch not has thread. If don't hold the bushing. the switch maybe become intermittent or rough mounting after soldering by knob stopper force. SWITCH MOUNTING DETAIL FRONT PANEL OR LIGHT PIPE	

6. 耐久特性 Endurance characteristics.

	項目 Item	条件 Conditions	規格 Specifications
6-1	レバー操作の寿命 Rotational life	軸端部で毎時6000サイクルを選択で、15, 000サイクル操作後測定を行う。 但し、測定前に5, 000サイクル測定を行う。(1サイクル=0度, 360°1往復) The shaft of encoder shall be rotated to 15.000 cycles at a speed of 6000cycles per hour without electrical load. After which measurements shall be made. However, an interim measurement shall be made immediately after 5.000 cycles. 1 cycle: rotate 355° CCW rotate 355° CW)	クリックトルク:規格値を超えないこと。 チャタリング:t_1, t_2≦3ms 以内。 Detent torque:Relative to the previously specified value. Chattering:t_1, t_2≦3ms Except above items. specifications in clause 4.1~4 and 5.1.6.2 shall be satisfied.

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APPD.	CHKD.	DSGD.	TITLE
Mar. 22. '96 Y. YOSHIOKA	Mar. 22. '96 M. SATOH	Mar. 22. '96 Y. ISAWA	11形回転形エンコーダ 11mm Size Rotary encoder

DOCUMENT NO. F1979708M (4/5)

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CLASS NO.	TITLE 11形回転形エンコーダ規格書 11mm Size Rotary Encoder Specification

7. はんだ付け条件 Soldering conditions

7-1 手はんだ付け Manual soldering

ビット温度350°C以下、作業時間3秒以内
Bit temperature of soldering iron :350°C or less.
Application time of soldering iron : within 3s.

7-2 ディップはんだ付け Dip soldering

プリント基板 :t1.6両面銅箔張積層板
Printed wiring board: Both-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泡状にする泡式フラクサーにて基板厚の2/3まで浸漬すること。基板厚t1.6の場合。
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 2/3 of its thickness.

プリヒート :基板表面温度100°C以下、時間2分以内
Preheating:
- Surface temperature of board: 100°C or less.
- Preheating time: within 2 min.

はんだ付け :温度260±5°C、時間5±1秒
Soldering:
- Solder temperature: 260±5°C.
- Immersion time: 5±1 sec.

上記の工程を1回または2回実施すること。
Apply the above soldering process for 1 or 2 times.

SYMB	DATE	APPD	CHKD	DSGD

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APPD.	CHKD.	DSGD.	TITLE 11形回転形エンコーダ 11mm Size Rotary encoder
Mar. 22. '86	Mar. 22. '86	Mar. 22. '86	
Y. YOSHIOKA	M. SATOH	Y. ISAWA	DOCUMENT NO. F197970BM (5/5)

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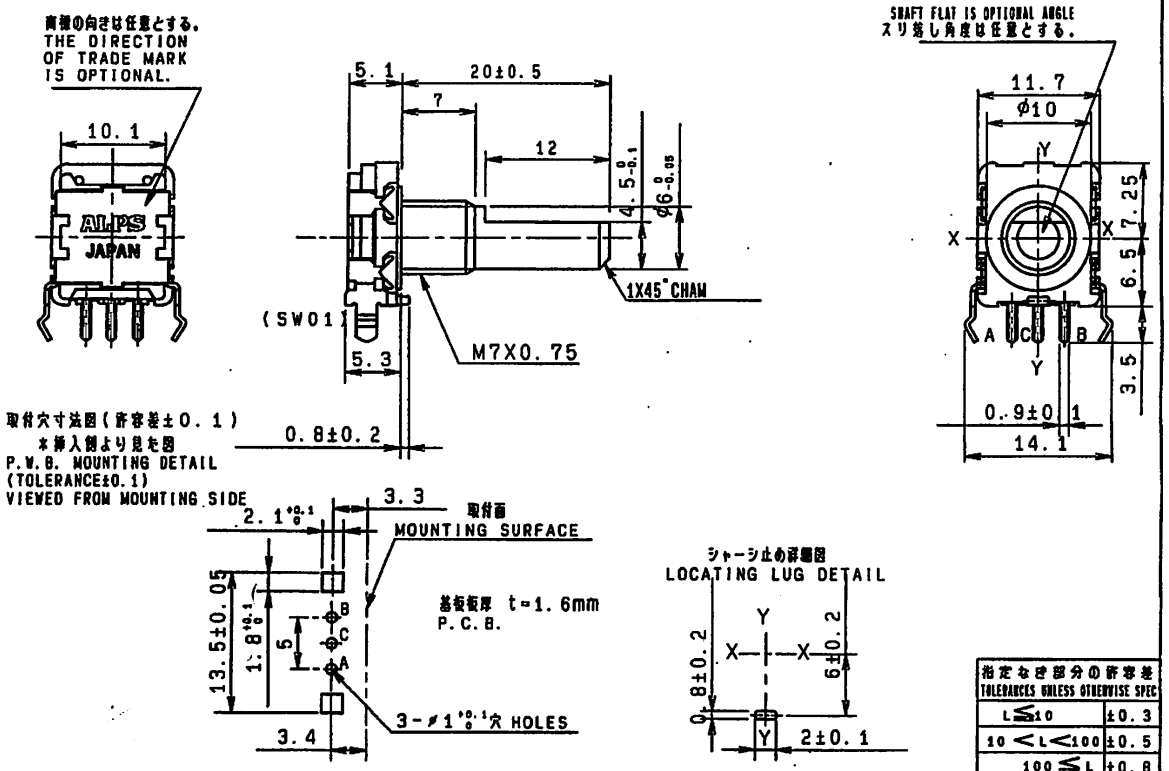
注記　軸受材質：亜鉛ダイキャスト　，　軸材質：アルミニウム
NOTES BUSHING MATERIAL: ZINC ALLOY DIE CASTING
SHAFT MATERIAL: ALMINIUM



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

SYMB	DATE	APPD	CHKD
DSGD.			
DRWN.	H.MIURA	'95-12-08	
CHKD.	M.ENDOU	'95-12-08	
APPD.	S.MIZOBUTI	'95-12-08	
SCALE	2:1		
UNIT	mm		
DOCUMENT NO.	LA21102		
TITLE	11型1連 電子ボリューム		

PART NO.	
NAME	
MATERIAL NAME / CODE	
FINISH	
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