

回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

1,一般事項 General

1.1範圍：此規範適用於一般電子機器之微小電流回路用之12mm 迴轉式位元產生器。

Application : This specification applies to the 12mm size rotary encoder (incremental) for microscopic current circuits used in electronic equipment.

1.2 標準範圍 Standard atmospheric conditions

如無特別規定，依下述狀態測定

Unless otherwise specified the standard range of atmospheric conditions for making measurements and tests is as follows :

溫度 Ambient temperature : 15°C to 35°C

相對濕度 Relative humidity : 25% to 85%

氣壓 Air pressure : 86kpa to 106kpa

但如有疑問時，依下述基準狀態實施

If there is any doubt the results. measurement shall be made within the follow limits :

溫度 Ambient temperature : 20±1°C

相對濕度 Relative humidity : 63% to 67%

氣壓 Air pressure : 86kpa to 106kpa

1~3 使用溫度範圍

Operating temperature range : -10 to +70°C

1~4 保存溫度範圍

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

2,構造、尺寸 Construction and dimensions : 依組立圖 Refer to attached drawing.

3,額定 Rating : D.C 5V

3~2最大額定電流 (阻抗負載)Maximum operating current (resistive load)

各相導線 Each lead: 0.5mA(Max 5mA;Min 0.5mA)

公共導線Common lead:1mA(Max 10mA;Min 0.5mA)

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
					Terry	Terry	Ken	EC12PLRGSDBVBF-D-25K-24-24C-8RU(R)	
				VERSION :				A	
				PAGE :				1 OF 10	
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

可正欣有限公司
TOP-UP INDUSTRY CORP.

回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

4,使用上的事項Application Notes

4-1,避免儲藏於高溫潮濕及腐蝕的場所. 產品購入後盡可能在6個月內使用完. 拆包裝後未使用完的剩餘產品需儲藏於防潮防毒的環境下.

Avoid storing the products in a place at high temperature,high humidity and in Corrosive gases.Please use this product as soon as possible with 6 months limitation.If any remainder left after packing is opened,please store it with proper moistureproofing , gasproofing etc.

4-2,編碼器信號的計算方法應將操作的速度, 信號的取樣時間及電子回路中的微電腦軟體等考慮進去. The encoder pulses count method should be designed with taking operating speed,sampling time and esign of the microcomputer software into cosideration.

4-3,此產品在定位點的輸出波形參照 (5-1) , 因此在設計軟體時請留意其狀態, 推薦以A相位為參考基準。

With this products the detent position output consult fig.5-1.Therefore make the A phase the reference at the soft ware design stage.Recommended that use A output signal for the reference.

4-4,在設計時要考慮到雜訊, 建議使用R/C濾波電路, (圖1)

At design of the pulse count process.Using the C/R filter circuit is Recommended.(fig .1)

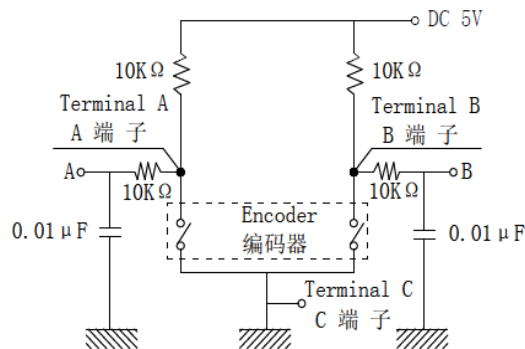


fig.1

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
					Terry	Terry	Ken	EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)	
								VERSION :	A
								PAGE :	2 OF 10
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

5. 電氣性能 Electrical Characteristics

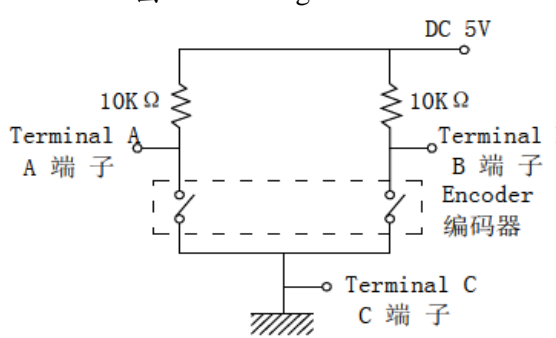
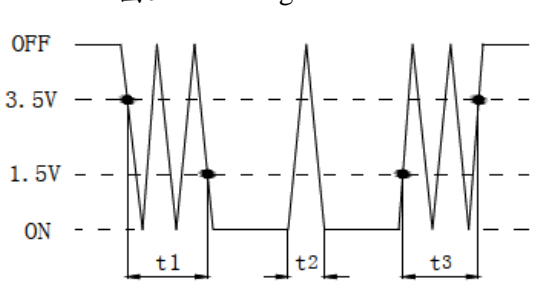
NO.	項目 item	條件 conditions	規格 specifications		
5-1	輸出信號 output signal format		A . B 二信號的輸出時間相位差, 詳細如<圖2/3>所示. (圖中虛線表示掣子點位置) 2. Phase-different signals (Signal A. & signal B) Details shown in < fig.2/3 > (The broken line shows detent position of with detent type.)		
		軸回轉方向 Shaft rotational direction	信號 Signal	輸出波形output 定速旋轉 360° < fig. 2 /3> constant speed :360°	
		順時針方向 C. W.	A (A-C 端子間) A (Terminal A-C)		
			B (B-C 端子間) B (Terminal B-C)		
反時針方向 C. C. W.	A (A-C 端子間) A (Terminal A-C)				
	B (B-C 端子間) B (Terminal B-C)				
5-2	分解能 Resolution	旋轉一圈所產生脈波數目. Number of pulses in 360° rotation .	<input type="checkbox"/> 12個脈衝/360°(圖2) 12pulses/360°(fig. 2) <input checked="" type="checkbox"/> 24個脈衝/360°(圖3) 24pulses/360°(fig. 3)		

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
								EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)	
					Terry	Terry	Ken	VERSION :	A
								PAGE :	3 OF 10
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

可正欣有限公司
TOP-UP INDUSTRY CORP.

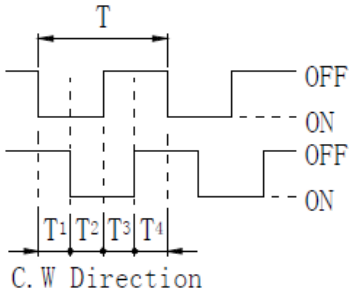
回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

NO.	項目 item	條件 conditions	規格 specifications						
5-3	切換特性 Switching characteristics	<p>切換測定回路如<圖四>所示，軸迴轉速度為每秒鐘迴轉360°測定。 Measurement shall be made under the condition as follows .</p> <p>(1). Shaft rotational speed : 360°/S (2). Test circuit : < fig. 4 > .</p> <p style="text-align: center;">< 圖四 > < fig. 4 ></p> 	<p style="text-align: center;">< 圖五 > < fig. 5 ></p> 						
		<p>(注) 編碼OFF指輸出電壓3.5V以上的狀態(fig. 5). Code-OFF area :The area which the voltage is 3.5V or more(fig. 5). 編碼ON指輸出電壓1.5V以下的狀態(fig. 5). Code-ON area : The area which the voltage is 1.5V or less(fig. 5).</p>							
5-3-1	振蕩 Chattering	<p>編碼從OFF→ON或ON→OFF時，輸出1.5V~3.5V的通過時間。應符合規定 Specified by the signal's passage time from 1.5V to 3.5V of each switching position(code OFF~ON or ON~OFF)</p>	$t1, t3 \leq 3mS$						
5-3-2	滑動雜訊(突跳) Sliding noise (Bounce)	<p>編碼ON部份的1.5V以上的電壓變動時間在振盪t1, t3之間會產生1mS以上, 1.5V以下的ON部份. 另外, 如果各突跳1.5V以下的範圍在1mS以上時, 則判定為另一個突跳. 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 chattering (t1 or t3)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.</p>	$t2 \leq 2mS$						
5-3-3	滑動噪音 Sliding noise	<p>編碼OFF部份的電壓變動。 The voltage change in code-OFF area.</p>	3.5V以上 3.5Vmin						
			DOCUMENT NO. :						
			EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)						
		Terry	VERSION :						
		Terry	A						
		Ken	PAGE :						
			4 OF 10						
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

NO.	項目 item	條件 conditions	規格 specifications
5-4	相位差 Phase-difference	<p>下(圖6)所示回路, 軸以$360^{\circ}/S$的速度轉動測定。 Measurement shall be made under the condition which the shaft is rotated at 60r/min</p> <p style="text-align: center;"><圖六> <fig.6></p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 20px;"> <p>A信号(A~C間) signal A</p> <p>B信号(B~C間) signal B</p> </div>  </div>	<p>$T1、T2、T3、T4 \geq 0.08T$ 見圖6 (fig. 6)</p>
5-5	絕緣阻抗 Insulation resistance	<p>外加電壓250VD.C 于固定板與任一端子間。 Measurement shall be made under the condition which a voltage of 250VD.C is applied between individual terminals and attaching plate.</p>	<p>100MΩ 以上. :100MΩ MIN .</p>
5-6	耐電壓強度 Dielectric strength	<p>在端子和支架間施加AC300V電壓1分鐘 A voltage of 300V AC shall be applied for 1 minute between individual terminals and frame.</p>	<p>不得有絕緣破壞 Without arcing or breakdown.</p>
5-7	端子間接觸阻 抗 Contact resistance	<p>出力信號處於ON時安定狀態條件下測定。 Measurement shall be stable condition which a output signal is ON.</p>	<p>1Ω以下 1ΩMax</p>

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
								EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)	
					Terry	Terry	Ken	VERSION :	A
								PAGE :	5 OF 10
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

6, 機械性能 Mechanical characteristics

NO.	項目 item	條件 conditions	規格 specifications
6-1	全回轉角度 Total rotational angle		360° 回轉 360° (Endless)
6-2	回轉轉距 Rotational torque		■20~60gf.cm □40~80gf.cm
6-3	掣子點數目及位置 Number and position of detents	只適用於附卡點裝置 Only suitable for C.C,equipment.	□12點定位間隔角度 $30^{\circ}\pm 2^{\circ}$ 12detents Step angle: $30^{\circ}\pm 2^{\circ}$ ■24點定位間隔角度 $15^{\circ}\pm 2^{\circ}$ 24detents Step angle: $15^{\circ}\pm 2^{\circ}$
6-4	軸擠壓引張強度 Push - pull strength of shaft	在軸端, 沿軸向施加 5Kg 的靜負荷力推和拉各10秒鐘(產品焊錫固定在PCB上。) Push and pull static load of 5Kg shall be applied to the shaft in the axial direction for 10s.(After soldering of the PC board)	軸無破損, 回轉無異常, 電氣性能無異常。 Without damage or excessive play in shaft. No excessive abnormality in rotational feeling. And electrical characteristics shall be satisfied.
6-5	端子強度 Terminal strength	在端子的先端施加3N (300g) 的力1分鐘。 A static load of 3N(300g)be applied to the tip of terminals for 1 minute in any direction.	端子無損壞或顯著鬆動, 但是端子可允許彎曲。 Without damage or excessive looseness of terminals. Terminal bend is permitted.
6-6	軸套螺紋緊固強度 Bushing Nut Tighten Strength		7.0kgf.cm以上 7.0kgf.cm Min
6-7	軸向間隙 Shaft play in axial direction		0.4mm 以下 0.4mm Max
6-8	軸鬆動 Shaft wobble	在距離軸頂端5MM處, 沿徑向瞬間施加50mN. m(500gf. cm)的力測試 A momentary load of 500gf.cm should be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft.	1*L/30mm p-p 以下 (L: 指安裝平面到軸的柄端的距離。) 1*L/30mm p-p Max L:Distance between mounting surface and measuring point on the shaft

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
								EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)	
					Terry	Terry	Ken	VERSION :	A
								PAGE :	6 OF 10
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

NO.	項目 item	條件 conditions	規格 specifications
6-9	軸的回轉方向擺動 Shaft play in rotational wobble	使用角度板測定 Measurement with jig for rotational angle .	4度以下 4° MAX.
6-10	軸垂直側壓強度 Side thrust strength of shaft	軸前端5mm處，加上2Kg重的靜荷10秒 A load of 2Kg shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft.	不可有電氣或機械上的異常 Without damage or excessive play in shaft.No excessive abnormality in rotational feeling.

7. 耐久性能 Endurance characteristics

NO.	項目 item	條件 conditions	規格 specifications
7-1	迴轉壽命 Rotational life	The shaft of encoder shall be rotated to 30000 cycles at a speed of 600~1000 cycles/H without electrical load,after with measurements shall be made. 在無負荷條件下軸以600~1000周/小時速度回轉30000周。	Chattering t1,t3≤5mS 振盪 t1,t3≤5mS Bounce t2≤3mS 突跳 t2≤3mS Detent feeling has to remains 尚餘有輕微定位感 Contact resistance 200Ω Max 端子間接觸阻抗200Ω以下
7-2	耐濕性 Damp heat	溫度40±2℃，濕度90~95%的恒溫恒濕槽中放置96±4小時後，在常溫、常濕中放置1.5小時後測試。 The encoder shall be stored at temperature of40 ±2 °C with relative humidity of 90% to95% for96±4 H in a thermostatic chamber.And the encoder shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.	所有項應滿足初期規格。 Specifications in clause all items is shall be satisfied.
7-3	耐熱性 Dry heat	溫度80±3℃的恒溫箱中放置96±4小時，常溫、常濕放置1.5小時後測試。 The encoder shall be stored at a temperature of 80±3°C for 96±4H in a thermostatic chamber.And then the encoder shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.	
7-4	低溫特性 Cold	溫度-25±3℃的恒溫箱中放置96±4小時，常溫、常濕放置1.5小時後測試。 The encoder shall be stored at a temperature of -25±3°C for 96±4H in a thermostatic chamber.And then the encoder shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.	

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
								EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)	
					Terry	Terry	Ken	VERSION :	A
								PAGE :	7 OF 10
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

回轉式位元產生器規格書

ROTATIONAL ENCODER SPECIFICATION

NO.	項 目 item	條 件 conditions	規 格 specifications
7-5	焊錫耐熱性 Resistance to Soldering heat	槽焊 Dip soldering. 使用基板:t=1.6mm的單面覆銅板. Printed wiring board:single-sided copper clad laminate board with thickness of 1.6mm. 預熱:基板表面溫度100℃以下,時間2分鐘以內. Preheating:1.Surface temperature of board:100 °C.or less 2.Preheating time:within 2 minute. 焊接:溫度260±5℃或以下,時間5±1秒以內. Soldering:Solder temperature:260±5°C or less Immersion time:within 5±1S 手焊 Manual soldering. 溫度350℃以下,時間3秒以內. Bit temperature of soldering iron:350 °C less than Application time of soldering iron:within 3S	不得有絕緣體的破損、變形、接觸無異常。 Electrical characteristics shall be satisfied No mechanical abnormality.
7-6	焊錫性 Solderability	端子在245℃±5℃溫度的焊錫槽內浸錫3秒±0.5秒。 The terminals shall be immersed into solder bath at 245°C for 3S±0.5S.	浸漬面須有75%以上焊錫附著 A new uniform coating of solder shall cover75% minimum of the surface being immersed.

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
								EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)	
					Terry	Terry	Ken	VERSION :	A
								PAGE :	8 OF 10
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

SWITCHES SPECIFICATIONS

備註：以下規格適用於EC12編碼器帶開關系列

Note : The following specification is only suitable for the one type with switch construction of EC12 encoder series

1. 額定值 Rating

1-1. 額定電壓

Rated voltage:DC 5V

1-2. 最大額定電流 (阻抗負載)

Maximum operating current (resistive load):10mA Max

2. 開關電氣性能 Switch Electrical characteristics

NO.	項目 Item	試驗條件 Test conditions	規格 Specifications
2-1	接觸阻抗 contact resistance	用DC 5V 1mA 電壓測定. Voltage test at DC 5V 1mA.	≤100mΩ 100mΩor less
2-2	絕緣阻抗 Insulation resistance	在端子和安裝板間施加電壓 250V DC. Measurement shall be made under the condition which a voltage of 250V DC is applied between individual terminals and bushing and plank.	100MΩ 以上 100MΩ Min
2-3	振蕩 Bouncing	以1秒鐘1往返(OFF-ON-OFF)按壓動作. Shaft shall be push at 1 cycles/s(OFF-ON-OFF)	≤10mS 10mS or less
2-4	耐電壓 Dielectric strength	在端子和安裝板間施加AC300V電壓1分鐘 A voltage of 300V AC shall be applied for 1 minute between individual terminals and bushing and plank.	不得有絕緣破壞 Without arcing or breakdown.

3. 開關機械性能 Switch Mechanical characteristics

NO.	項目 Item	試驗條件 Test conditions	規格 Specifications
3-1	開關回路接點數 Contact arrangement		單極單投 (PUSH ON) S.P.S.T (PUSH ON)
3-2	開關作動力 Switch strength	在軸端，沿軸向施加的按壓力。 Push static load to the shaft in the axial direction	450±200gf
3-3	開關移動量 Switch stroke		0.5±0.3 mm

4. 開關耐久性能 Switch Endurance characteristics

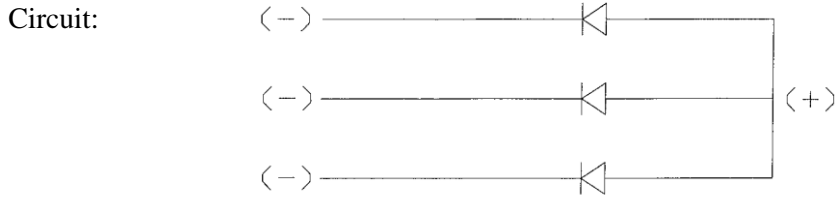
NO.	項目 Item	試驗條件 Test conditions	規格 Specifications
4-1	按壓壽命 Push-life	在無負荷條件下沿軸向施以1Kgf以下的力，以 600次/小時的速度按壓。 Push 1Kgf to the shaft of encoder in the axial direction under non-load conditions,and with a speed of 600 times/hour.	■20,000±200次。(0.5行程) 20,000±200cycles。(0.5 Travel) 接觸電阻:≤200mΩ. 其它應滿足初期 規格。 Contact resistance:200mΩ or less. Specification in clause shall be satisfied.

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
								EC12PLRGSBVDVBF-D-25K-24-24C-8RU(R)	
					Terry	Terry	Ken	VERSION :	A
								PAGE :	9 OF 10
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

SWITCHES SPECIFICATIONS

1. L.E.D.共用規格書 COMMON SPECIFICATIONS

一、回路：



二、L.E.D. 特性 Characteristic:

1 正向電壓 Forward Voltage:5V

2 使用溫度 Operating Temperature:-40°C~+85°C

ROHS COMPLIANCE

					APPD.	CHKD.	DSGD.	DOCUMENT NO. :	
					Terry	Terry	Ken	EC12PLRGBSDVBF-D-25K-24-24C-8RU(R)	
				VERSION :				A	
				PAGE :				10 OF 10	
SYMB	DATE	APPD	CHKD	DSGD	2021.5.24	2021.5.24	2021.5.24	DRAWING NO.:	EC12PSD-062

可正欣有限公司
TOP-UP INDUSTRY CORP.