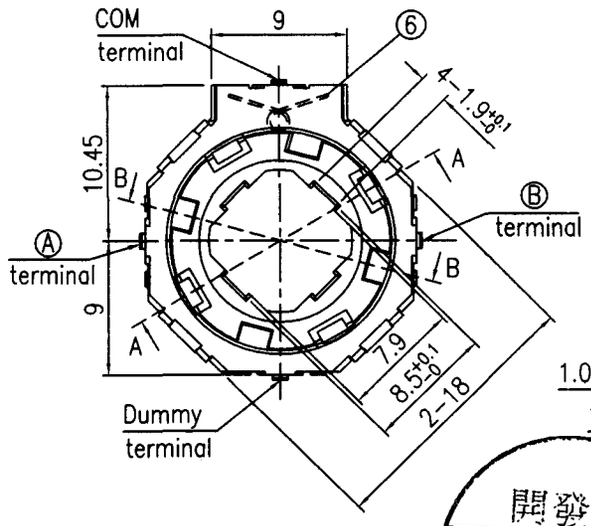
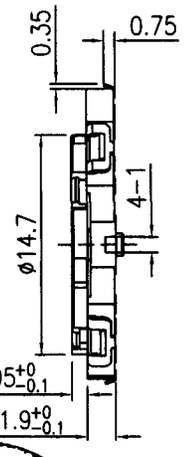
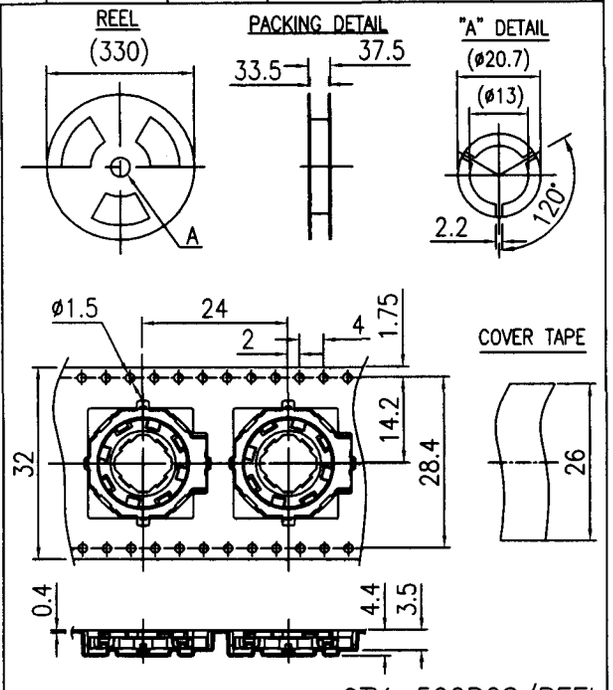
SYMB	REVISION	DATE	APVD.	SYMB	REVISION	DATE	APVD.	VERSION: 1	F21-02-1/1
								MODE	
								TIMING	
								LINE(S)	CIRCUIT / STROKE

Without any banned substance! Compliance with RoHS!







QTY: 500PCS/REEL

PART NO.	SPEC. NO.	ROTATIONAL TORQUE
EC180102	A2992-01	3±0.5 mN·m
EC180102-1.5	A2992-03	1.5±0.5 mN·m

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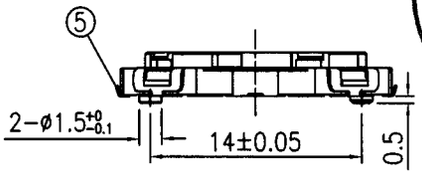
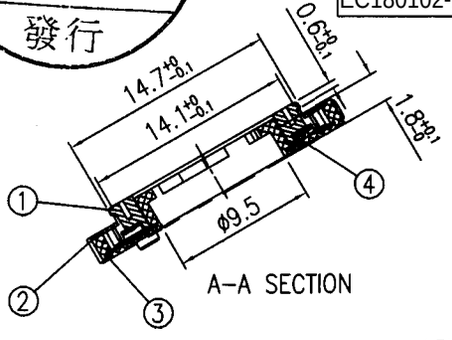
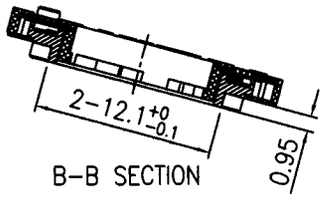
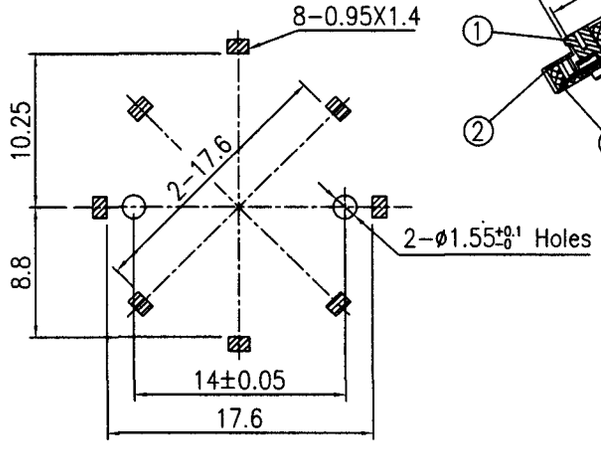




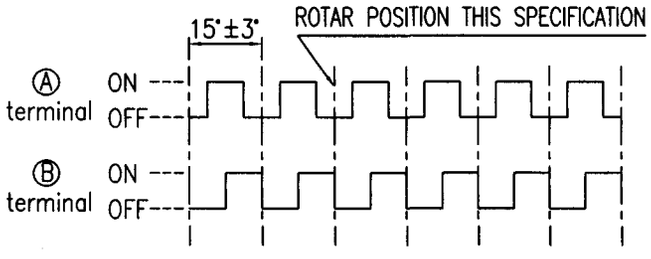
A-A SECTION



B-B SECTION



PCB LAND DIMENSION ⊕ 0.05



CW
CCW

OUTPUT WAVE (24 POSITION)

CIRCUIT DIAGRAM

TYPE	ROTARY ENCODER	UNIT	mm
SERIES	EC180102	SCALE	2 : 1
PART NO.		DATE	18/01/07
SPEC. NO.		PAGE	1/4

DRAWN	CHECKED	APVD.
孫斌	孫斌	趙元利

TOLERANCE	
ANGLE	±3°
UP TO 10	±0.2
ABOVE 10 ~ 50	±0.3
ABOVE 50 ~100	±0.5

GKKG

NO.	NAME	MATERIAL	QTY.	FINISHING
9				
8				
7				
6	SPRING	SUS	1	NATURAL
5	TERMINAL	C5191	4	Ag
4	CONTACT	C5210	1	Ag
3	HOUSING	PA46	1	BLACK
2	COVER	SUS	1	Ag
1	SLIDER	PA46	1	GREY

KKG

SPECIFICATION				No. A2992-01		P. 2/4
Type	ROTARY ENCODER			Prepared	Checked	Approved
Series	EC180102	Version	02	F.Z.ZENG	B.SUN	Y.L.ZHAO
Part No.	EC180102	Date	2010-12-22			

1. General Scope

1-1 THE SCOPE OF APPLICATION

This specification is to cover the general requirements of mechanical and electrical characteristics of ROTARY ENCODER series used as signal switch of electric devices.

1-2 TEST CONDITIONS

Test and measurements shall be made in the following standard conditions unless otherwise specified :

Normal temperature : 5~35°C

Normal humidity :Relative humidity 20~85%

Air pressure : 86kPa to 106kPa

In case any question arises from the judgment made,tests shall be conducted in the following conditions:

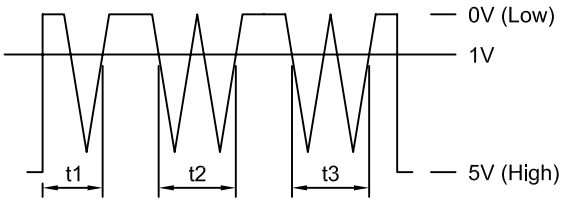
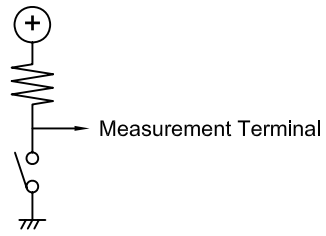
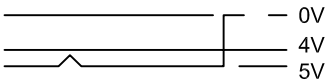
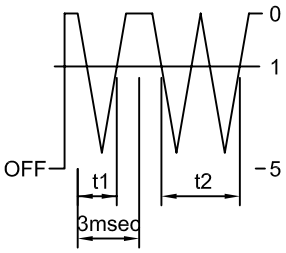
Temperature : 20±2°C

Normal humidity : Relative humidity 60~70%

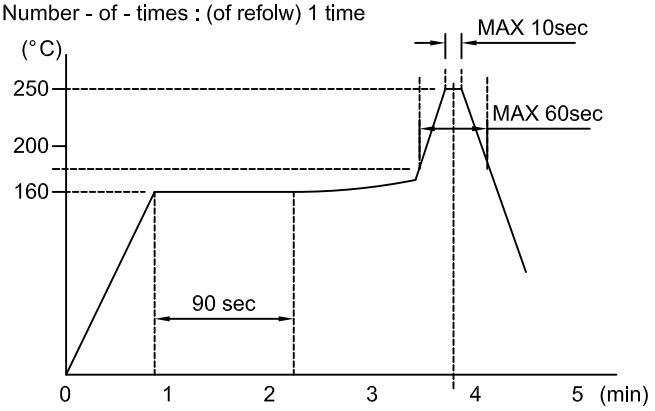
Air pressure : 86kPa to 106kPa

2.Rating : 10mA , 5V D.C., (Resistive load)

3.Electrical Characteristics

	Item	Conditions	Specifications
3-1	Contact resistance	It measures using a contact resistance meter	1Ω or less
3-2	Insulation resistance	100 V D.C. 1minute ± 5 seconds	100 MΩ or more
3-3	Withstanding voltage	It is for 1 minute about the current of AC 100V (50~60Hz,sensitivity current 2mA).It impresses between open patterns.	Not breaking insulation
3-4	Chattering (Noise)	The noise shall be measured with a condition specified below. 10 mA 5V D.C. (Resistive load) Operating speed : 2π rad/3 seconds  Measurement Circuit  Measurement decomposition ability is taken as 200microsec. The noise in the code - off range carries out to more than 4V.  	1) t1,t2 and t3 shall be the time of voltage regulation which shall be 1V and more 2) Chattering : t1,t3 5 msec or less 3) Noise (Bounce) : t2 3msec or less 4) The case of the range of 1V or less shall be more than 250μ sec between noises,which shall be other noises. 5) As if it shall be 1V or less at the point of 5msec passed from OFF→ON or ON→OFF of cord,afterwares voltage regulation parts with 1V and more shall be measured as the noise. 

4.Mechanical performance

	Item	Conditions	Specifications
4-1	Rotational torque	Revolved in the direction CW , CCW. 1/4 π rad/s (Rate of operation)	3±0.5 mN.m
4-2	Control strength	1) A static load of 20 N shall be applied in the push and pull direction of the shaft for 15 sec. 2) A static load of 30 N shall be applied for 15 sec. in direction perpendicular to the tip of the shaft.	1) Without damage or excessive looseness of shaft. 2) Clause 3 and 4-1 shall be satisfied.
4-3	Displacement of shaft	1) Run - out (P - P) shall be measured by applying a static load of 3N in the perpendicular direction of actuator. 2) Run - out (P - P) shall be measured by applying a static load of 3N in the axial direction of actuator.	0.3mm or less
4-4	Soldering	1) Soldering Temperature : 230 ± 5°C 2)Duration of Solder Immersion : 3 ± 0.5 s Solder : JIS Z3282 H63A Flux mass ratio : Rosin (JIS K 3902) 25% Methyl alcohol (JIS K 1501) 75%	More than 75% of the dipped part shall be covered with solder.
4-5	Resistance to soldering heat	Hand solder (1) Solder point temperature : 380 ± 10°C (2) Time with solder : 3 ± 1 s A solder tip should guess at the tip of a terminal and should not apply impossible power . A solder tip should use what has small heat capacity (about 15W). Refolw solder (1) Heating Method : Far - infrared heating (2) Heat profile (MAX value) (3) Number - of - times : (of refolw) 1 time  Refolw condition table (MAX conditions)	1) There are no abnormalities, such as a remarkable damage , looseness, and omission, and satisfy the electric performance of the 4th clause. 2) Operation Power : Less than ± 30% of 4-1 clause standard value.
4-6	Vibration proof	The range of vibration : 10~55Hz Total width : 1.5mm The proportion of vibration : 10 - 55 - 10Hz about 1 min The vibration of the number of vibration : Logarithmic of approximately straight line. The directions : 3 vertical directions including the direction of operation. Test time : 2 hours each(Total 6 hours)	Clause 3 and 4-1 shall be satisfied. Be mechanically normal.
4-7	Impact proof	Acceleration : 490m/s^2 Action time : 11msec Testing direction : 6 sides Test cycles : 3 times in each direction.(Total 18)	

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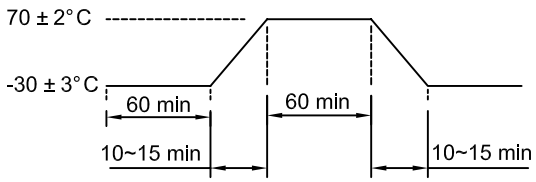
SPECIFICATION	No. A2992-01	P. 4/4

5.Durability

	Item	Conditions	Specifications
5-1	Operating life (Without load)	Measures shall in made following the test set forth below: (1) Without load (2) Rate of operating : 2π rad/sec. (3) Cycles of operating : 100,000 cycles CW 1 rotation and CCW 1 rotation are 1 cycle	1) Contact Resistance : less than 1Ω 2) Clause 3-2 shall be satisfied. 3) Withstanding voltage Clause 3-3 shall be satisfied. 4) Rotational torque: Within ±30% of Initial value(4-1) 5) Chattering 5msec.or less 6) Bounce 3msec.or less
5-2	Operating life (With load)	Measures shall in made following the test set forth below: (1) With load(5V , 10mA DC) (2) Rate of operating : 2π rad/sec. (3) Cycles of operating : 100,000 cycles CW 1 rotation and CCW 1 rotation are 1 cycle	

6.Weather proof

	Item	Conditions	Specifications
6-1	Cold proof	After testing at -40 ± 2 °C for 168 hours, the sample is allowed to stand under normal temperature and humidity conditions witin 1 hour, then measurement shall be made.	1) Contact Resistance : less than 1Ω 2) Clause 3-2 shall be satisfied. 3) Withstanding voltage Clause 3-3 shall be satisfied. 4) Rotational torque: Within ±30% of Initial value(4-1) 5) Clause 3-4 shall be satisfied.
6-2	Hot proof	After testing at 85 ± 2 °C for 96 hours, the sample is allowed to stand under normal temperature and humidity conditions witin 1 hour, then measurement shall be made.	
6-3	Resistance of humidity	After testing at 60 ± 2 °C and 90 to 95% in relative humidity for 168 hours the sample is allowed to stand under normal temperature and humidity conditions witin 1 hour, then measurement shall be made.	
6-4	Change of temperature	10 cycles testing is performed, using the following table as 1 cycle.  	
6-4	Resistance to sulfuration	Measurement after testing is performed on the following conditions. H_2S : 3 ±1 ppm Temperature : 40°C Humidity : 65%RH Times : 48H	
6-5	Salt mist	Measurement after testing is performed on the following conditions. PH : 6.5-7.2 Temperature : 35°C Speed : 2 ± 1 mL ，80 cm^2 Times : 6H	

7.Operating environment
7-1 Operating temperature : -10°C~60°C
7-2 Operating humidity : 35~85%RH
8.Condition in storage
8-1 Storage temperature : -40°C~85°C
8-2 Storage humidity : 35~85%RH