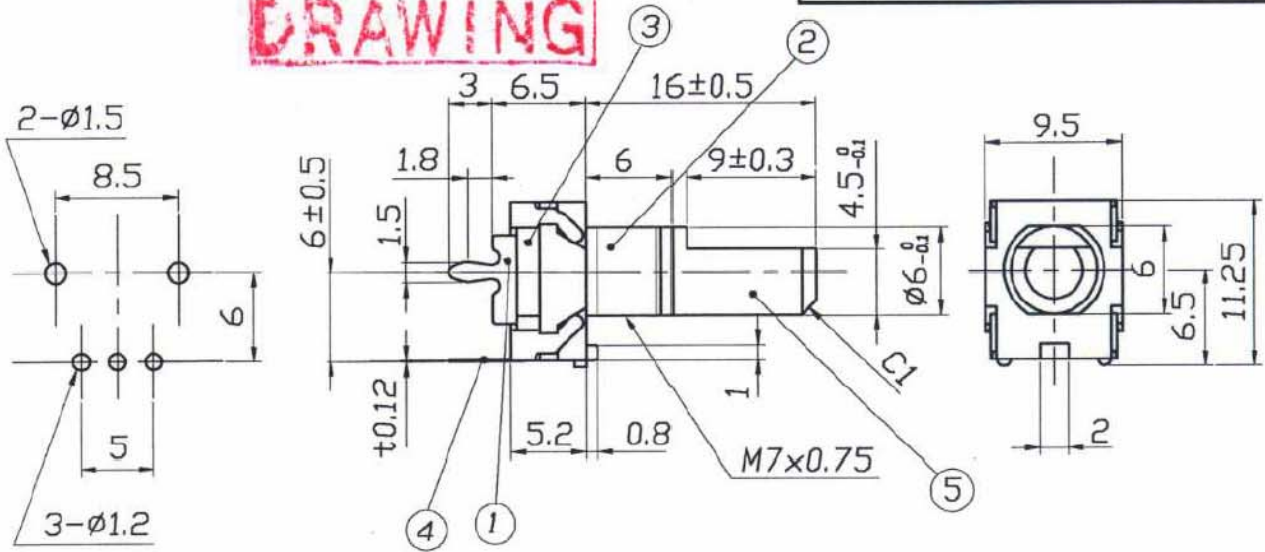


Rotary Encoder EC09P2005 Spezifikation

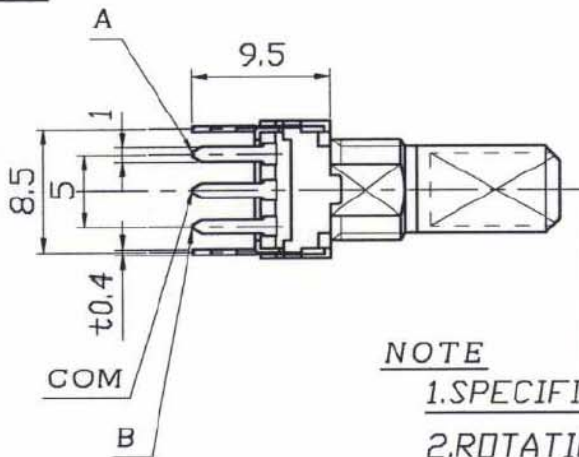
PRODUCT CODE

NN01205

REFERENCE
DRAWING



PCB Mounting hole
Diagram



ISSUED
NOV 1 1, 2005
SANSEI
ELECTRIC CO. LTD

承認担当

技術部 05.11.14 渡辺
技術部 05.11.14 根岸

技術
05.11.14
佐藤

NOTE

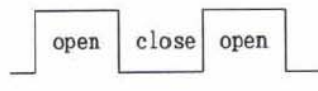
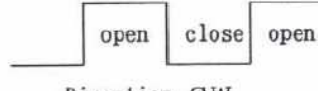
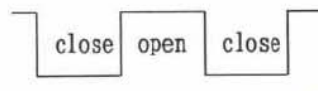
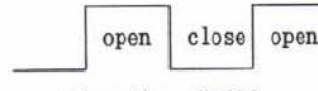
1. SPECIFICATION No. EC-S-016
2. ROTATION TORQUE: 30~200gf·cm
3. CHANGE OVER ANGLE: 30° $\pm 1.5^\circ$

		11	FLAT WASHER	1	STEEL	MFZn-C	(ACCESSORY)	
		10	HEXAGONAL NUT	1	STEEL	MFZn-C	(ACCESSORY)	
		9	STOPPER	1	PHOSPHOR BRONZE		(BUILT IN)	EC1
		8	BALL	1	STEEL		(BUILT IN)	
		7	SPRING	1	STEEL	MFZn-C	(BUILT IN)	EC3
		6	ROTOR	1	PDM		(BUILT IN)	EC10
ANGLE	$\pm 3'$	5	SHAFT	1	BRASS			EC204
ABOVE 100	± 0.8	4	TERMINAL	3	PHOSPHOR BRONZE	MBAg		EC3
ABOVE 50 TO 100	± 0.5	3	TERMINAL BOARD	1	PBT			EC14
ABOVE 5 TO 50	± 0.3	2	CASE	1	ZINC ALLOY			EC9
UP TO 5	± 0.2	1	FLAME	1	TIN PLATE			EC15

TOLERANCES UNLESS OTHERWISE SPEC.		LTR	PART NAME	QTY	MATERIAL	REMARK	NOTE
			PROJ.		UNIT	SCALE	MODEL No.
					mm	2/1	EC09P20-205
			APVD.	CHKD.	DRAWN.	DSGD.	TITLE
			Jun. 4 '96		Jun. 3 '96	K. Kojima	PRODUCT DRAWING
			S. Kotani		Jun. 04 '96		DRAWING No.
							C96S0401
SYMB.	DESCRIPTION	DATE	APVD.				

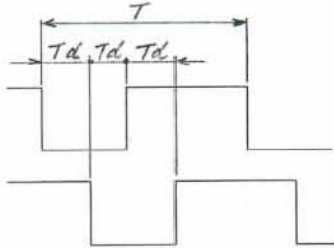
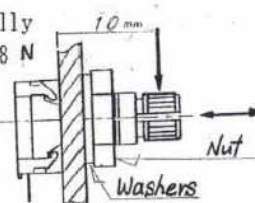
<p style="text-align: center;">ROTARY ENCODER SPECIFICATION</p>		APVD.	CHKD.	DSGD.
		<p style="text-align: center;">EC</p>	<p><i>S. Kato</i> JUN. 10 '96</p>	<p><i>S. Kato</i> JUN. 10 '96</p>

1. General
 - 1.1 Scope : This specification is applied for ROTARY ENCODER [EC09].
 - 1.2 Operating temperature : -10~+60°C
 - 1.3 Test conditions : Standard test conditions shall be 5 to 35°C in temperature, 45 to 85%RH and 860 to 1060 hpa in barometric pressure.
Should any doubt arise in judgement, tests shall be conducted at 20±2°C, 65±5%RH and 860 to 1060 hpa.
2. Appearance, structure and dimension
 - 2.1 Appearance : Functionally free from rust, crack and bad plating.
 - 2.2 Structure and dimension : As per attached outline drawing.
3. Rating
 - 3.1 [10] V DC, [1] mA (resistive load)
 - 3.2 Maximum operating current : [2.5] mA (resistive load)
4. Electrical performance

Property	Test conditions	Performance		
4.1 Contact Resistance	1 KHz±200Hz (MAX.20mV,MAX.5mA)	MAX. [1] Ω		
4.2 Bounce	[10] V DC, [1] mA (Sliding speed : 60rpm)	MAX. [5] mS		
4.3 Output Signal	<p>A and B (2 signal)</p> <p>A signal (A-COM) </p> <p>B signal (B-COM) </p> <p style="text-align: center;">Direction CW</p> <p>A signal (A-COM) </p> <p>B signal (A-COM) </p> <p style="text-align: center;">Direction CCW</p>	<div style="border: 2px solid red; padding: 5px; text-align: center; color: red;"> <p>ISSUED</p> <p>NOV 11 2005</p> <p>SANSEI</p> <p>ELECTRIC CO. LTD.</p> </div> <div style="border: 1px solid red; padding: 5px; margin-top: 10px; text-align: center;"> <p>承認担当</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; border-radius: 50%; padding: 5px; text-align: center;"> 技術部 05.11.14 渡辺 </td> <td style="border: 1px solid black; border-radius: 50%; padding: 5px; text-align: center;"> 技術 05.11.14 根岸 </td> </tr> </table> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-left: 20px; text-align: center;"> 技術 05.11.14 佐藤 </div> </div>	技術部 05.11.14 渡辺	技術 05.11.14 根岸
技術部 05.11.14 渡辺	技術 05.11.14 根岸			
4.4 Resolution	Output pulses/rotation	[20] pulses (endless)		
	Click points	[20] clicks A-COM, B-COM : off at click position		

SYMB.	DATE/NAME	DESCRIPTION
△	Jun. 10. 1996 M. Negishi	設計値10名も子為, 変更可也

EC-S-016

	Property	Test conditions	Performance			
4.6	Phase Difference	<p>T=cycle</p>  <p>A-signal (A-com)</p> <p>B-signal (B-com)</p>	$T_d = 1/5 T \pm 1/10 T$ (A state of Non-click)			
4.7	Voltage proof	[250] V AC(50~60Hz,2mA sensitvty current) is applied between the terminal and shaft reseptacle for 1 minute.	Not breaking insulation.			
4.8	Insulation Resistance	[500] V DC is applied between the terminal and shaft receptacle for 1 minute ± 5 seconds.	More than [100] M Ω			
4.9	Duty ratio		[40] % (A state of Non-click)			
5. Mechanical performance						
	Property	Test conditions	Performance			
5.1	Operating Force		As per individual specification.			
5.2	Changeover Angle		As per individual specification.			
5.3	Terminal Strength	A static load 4.9 N (0.5Kgf) is added to vertical direction on the tip of the terminal for 1 minute. One time per terminal.	The terminal may be deformed, but shall not sustain any trouble as deviation and breaking of insulation material. Electeical performance shall be assured.			
5.4	Actuator Strength	1:A static load 29.4 N (3Kgf) is added pushing the shaft and to the stretch direction for 15 minutes. 2:Pushing the shaft vertically is added a static load 9.8 N (1Kgf) to the position of [10] mm from the fixing face as per this drawing for 15 minutes.	Free from noticeable looseness or bending. Also an actuator shall mechanically work normally. Electrical performance shall be assured.			
5.5	Actuator Swing	A static load 4.9 N (0.5Kgf) is applied to vertical direction on the tip of the shaft and to messure swing width.(maximum)		measurement dimension	measurement position	swing width (maximum)
			15 mm	10 mm	less than 0.17mm	
			20	15	0.25	
			25	20	0.35	
			30	25	0.42	
more than 35	30	0.50				

	Property	Test conditions	Performance
5.6	Solderability	1. Temperature of solder : $230 \pm 5^{\circ}\text{C}$ 2. Duration of dipping : 3 ± 0.5 seconds	More than 75% of the dipping part shall be covered by solder.
5.7	Soldering heat resistance	1. Temperature of solder : $260 \pm 5^{\circ}\text{C}$ ($300 \pm 10^{\circ}\text{C}$ manually) 2. Duration of dipping : 5 ± 1 seconds (3 ± 1 seconds manually)	There shall not be deforming in appearance. Electrical performance shall be assured.
6. Endurance			
	Property	Test conditions	Performance
6.1	Operating life (without load)	[100,000] cycle operations at a rate of 10 cycles per minute without load.	Contact resistance :Max 1Ω Insulation resistance :More than $10\text{M}\Omega$
6.2	Operating life (with load)	[100,000] cycle operations at a rate of 10 cycles per minute with (10)v dc, (1)mA. (Resistive load)	Voltage proof :100V AC, 1 minute not breaking insulation. Rotation torque :5.1 shall be assured. There shall be no defects in appearance or in the mechanical functions.
7. Weatherability			
	Property	Test conditions	Performance
7.1	Cold proof	Switch for test being kept in the conditions at $-20 \pm 2^{\circ}\text{C}$ for 96 hours and in a normal ambient condition for 1 hour then to be measured within 1 hour. Drops of water being taken away.	Contact resistance :Max 1Ω Insulation resistance :More than $10\text{M}\Omega$ Voltage proof :100V AC, 1 minute not breaking insulation.
7.2	Dry heat proof	Switch for test being kept in the conditions at $70 \pm 2^{\circ}\text{C}$ for 96 hours and in a normal ambient condition for 1 hour then to be measured within 1 hour. Drops of water being taken away.	Rotation torque :5.1 shall be assured. There shall be no defects in appearance or in the mechanical functions.
7.3	Damp heat proof	Switch for test being kept in the conditions at $40 \pm 2^{\circ}\text{C}$ and 90~95%RH for 96 hours, and in a normal ambient condition for 1 hour then to be measured within 1 hour. Drops of water being taken away.	
<p>Notice</p> <ol style="list-style-type: none"> Please pay special attention at the time of soldering not to give an extra force on terminals as to cause any deforming of them and resulting in bad effects on the electrical properties. Please use manual soldering instead of automatic dip soldering because there are possibilities to structually flow flux into switch inside. Please pay attention not to give over-force to an actuator as specified on the specification. Please request us an official approved drawing prior to operation. <p style="text-align: center;">Subject to change of specifications without advance notice.</p>			

INSTRUCTIONS ON SAFETY PRODUCT

The quality product keeps every possible effort, but owing to its life some increase for short, open or bouncing might generate.

Therefore, as long as any set design needed safety is concerned, check any affect to the set beforehand against single trouble of part and attempt ;

- 1) any safety with protection circuit or protection device,
- 2) any safety with redundant circuit to avoid single trouble,

Secure further safety along with fail-safe design.

Please have our advanced instructions whenever any appliance related to safety is used, such as ;
medical, automobile, electric decoration, transportation, electric generator, gas fittings,
calamity prevention, crime prevention, equipment/work, industrial.....etc.