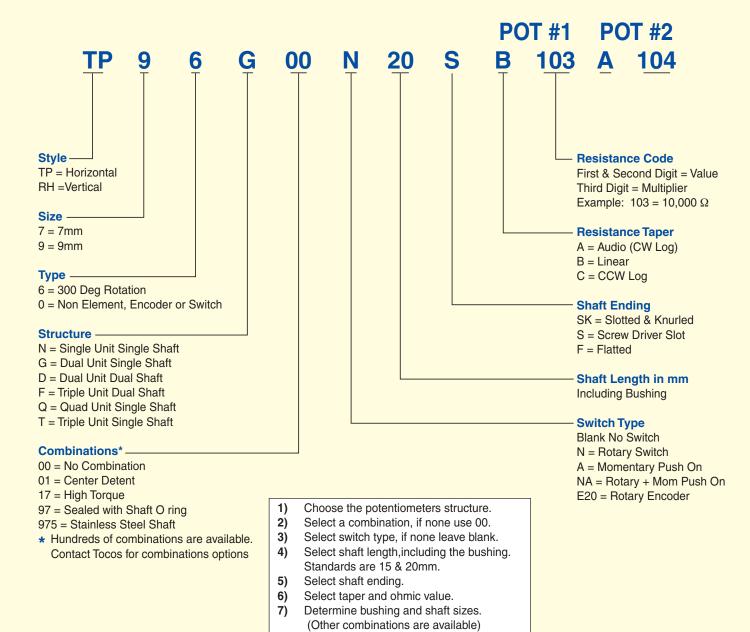


## **TP7 & 9 Series Part Numbering System**

Example: TP96G00N 20S B103 A104 M7-5mm Shaft-6mm dia



ISO9000, ISO14000 Certified



**SELECTION GUIDE** 

2-268 Sobudai, Zama Kanagawa 228-8510 Japan TEL 81-46-253-2116 FAX 81-46-253-3640 Web: www.tocos-j.co.jp E-mail: int@tocos-j.co.jp

#### TOCOS AMERICA, INC.

1177 East Tower Road, Schaumburg, IL 60173 TEL 847-884-6664 FAX 847-884-6665 Web: www.tocos.com E-mail: sales@tocos.com

#### **Taiwan Tocos Electric Co., Ltd.**

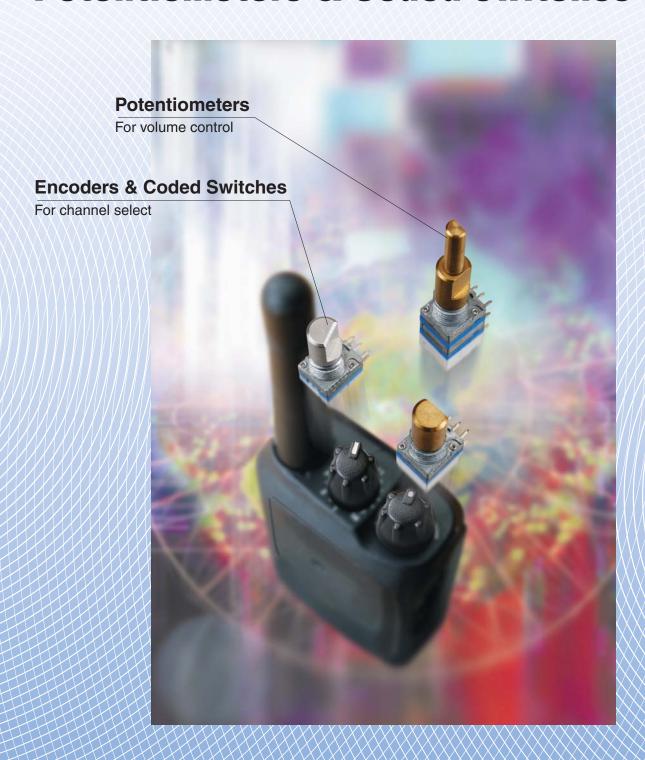
No.66-9F, Sec. 1, Chengde Rd., Datong District, Taipei City 10355, Taiwan, R.O.C. TEL +886-2-2555-1811 FAX +886-2-2550-5927 Web: www.tocos.com.tw E-mail: sales@tocos.com.tw

#### Rev.11-16-2008



## TOCOS®

# TP7 & TP9 Series Potentiometers & Coded Switches



**Tokyo Cosmos Electric Co., Ltd.** 

## World's smallest potentiometers !!



- Compact & light design optimize customers' space saving requirements
- Industry-proven robustness

Flexibility to custom design(Shaft & Bushing)

#### **Features**

- Compactness:
- **Robustness:** Stainless shafts are optionally available:

1.5 times stronger than brass & aluminum shaft compared to conventional TOCOS shafts. Stainless shafts are ideal for hand-held 2-way radio to avoid accidental drop risks.

#### • Variations of switches :

Either rotary or push-momentary types can be optionally installed. Multifunction: On-off switch function and band selector function can be combined into one unit.

 Sealed with O ring in between shaft and bushing (Option): Waterproof meets with

A seal rubber is installed in between a bushing and shaft to prevent water intrusion.

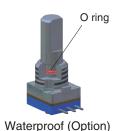
- High torque models are optionally available
- Both vertical mount and horizontal types are available.
- Temp. range: Good in use in wide temp. range

Standard: -20 to  $+70^{\circ}$ C Also optionally available with  $-30^{\circ}$ C





Vertical types





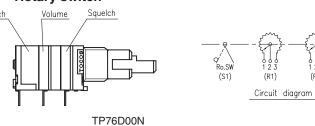
**TOCOS**®

## Major Applications For Volume & Encoders / Switches

#### **Potentiometers**

- 1. For Volume + power On-off switches
  TP76N00N TP96N00N
- 2. For Volume + squelch + power On-off switches
  TP76D00N TP96D00N

#### Rotary switch



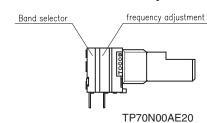


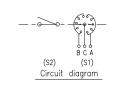
See Page 3 for dwg.

#### **Encoders**

- 1. For random frequency adjustment TP70N00E20 TP90N00E20
- 2. For random frequency adjustment + frequency band selector TP70N00AE20 TP90N00AE20

#### **Push momentary switch**



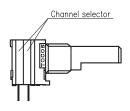




See Page 4 for dwg.

#### **Coded Switches**

1. For Pro-use: Channel selector preset to assign frequencies, a particular channel is assigned and fixed when other parties are already known. TP70GF (Dual units with 1 shaft, 16 channels)





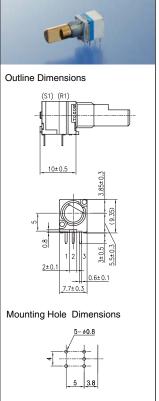
See Page 5 for dwg.

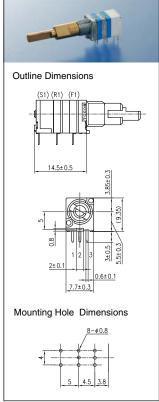
### **Potentiometers**



#### TP7 Series (7mm)

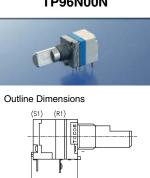
#### **TP76N00N** TP76D00N

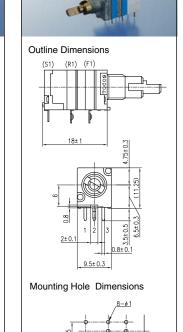




#### TP9 Series (9mm)

#### **TP96N00N**





TP96D00N

### 1,2,5,10,20,50,100,200,500(k $\Omega$ ) A • B • C 50Ω max. 100mV max. 100MΩ min. at DC250V

Derating curve

Electrical

• Nominal total resistance

• Resistance tolerance

• Insulation resistance

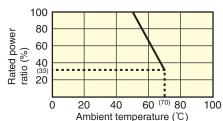
Max. operating voltage

Dielectric strength

Resistance taper

• End resistance

 Power rating Noise



1 minute at AC300V

DC10V, AC50V

Environment	
Soldering heat resistance	350±5℃ at 3 sec
Operating temperature range	-20 to +70°C
Rotational life	15,000 cycles without load
Sealability	After mounting a pot on the
(Optional)	product. There shall be no leak
	on shaft & bushing at 9.8kpa
	(0.1kgf/cm²) by a hydraulic
	pressure for 30minutes.

±20%

0.05W

#### Mechanical

Mounting Hole Dimensions

<ul> <li>Total rotational angle</li> </ul>	300° (Mechanical)
Rotational torque	2 to 24.5mN • m at +20°C
	(20 to 250gf • cm)
	49.1mN • m at -20°C
	(500gf • cm max.)
Shaft wobble and bend	
Radial direction	0.5x Shaft length / 30mm max.

- 0.5mm max. Thrust direction Detent position Center, 11, etc.
- Detent torque 2.9-29.4mN • m (30 to 300gf • cm)
- Shaft stopper strength

TP7 inner shaft of the dual shaft type	0.3N • m (3kgf • cm) min.
TP7 others	0.4N • m (4kgf • cm) min.
TP9	0.5N • m (5kgf • cm) min.
Shaft push- pull strength	98.1 N (10kgf) min.

0.98N • m (10kgf • cm) min.

#### **Switch Specifications**

• Nut tightening strength

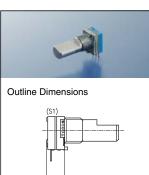
Rotary switch, N:	S.P.S.T.: DC16V-3A; 50° max.
Momentary push, A:	S.P.S.T.:DC12V-0.5A; 0.5mm Stroke
Switch life	10,000 cycles without load
Switch contact resistance:	Initial 50m $\Omega$ max.
	After 10,000 cycles-200m $\Omega$ max.

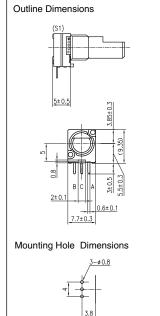
#### **Encoders**

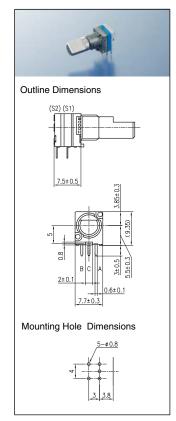
## Compliant

#### TP7 Series (7mm)

#### TP70N00E20





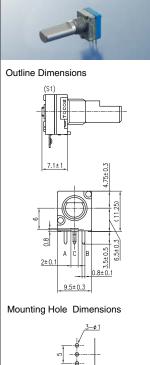


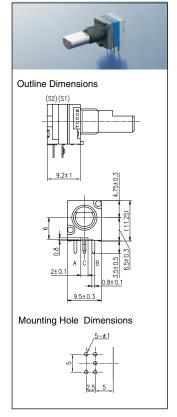
TP70N00AE20

## TP9 Series (9mm)

#### TP90N00E20



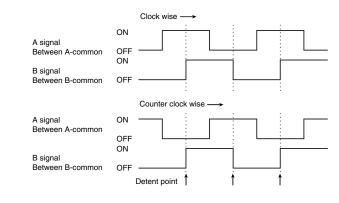




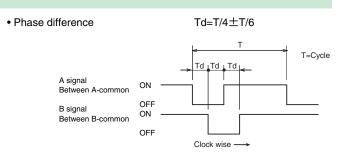
#### **Specifications**

<ul> <li>Voltage rating</li> </ul>	DC 5V
Current rating	1mA
Max. Operating Current	2.5mA
Chattering	10ms max.(15r.p.m)
Contact resistance	TP7 10 Ω max.
	TP9 200 Ω max.

Output signal



<ul> <li>Resolution</li> </ul>	10 pulses
Detent point	20 detents
	A-common: ON or OFF
	B-common: Non provisions

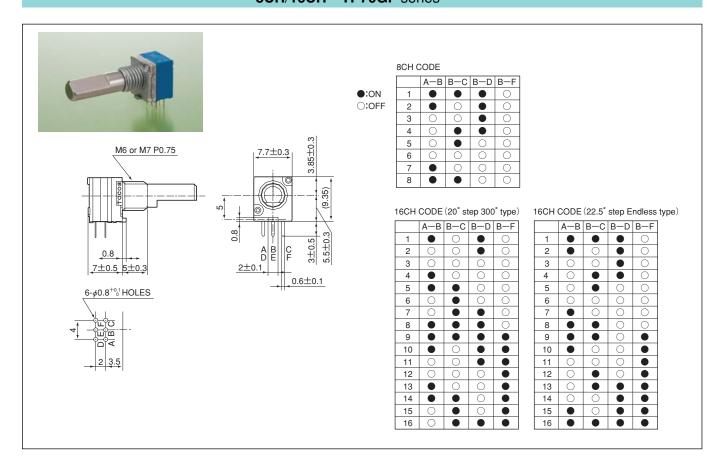


Duty ratio	50%±5% (18° ±5.4°)	
Step angle	18° ±3°	
Rotational Life	50,000 cycles	
Rotational torque	2 to 24.5mN • m (0 to +70°C)	
	(20 to 250gf • cm)	
	49.1mN max. (0 to -20°C)	
	(500gf • cm max.)	

• Please refer to Page 3 for other specifications.



#### **8CH/16CH TP70GF** series



<b>Electrical characteris</b>	tics
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Items	Spec.	Conditions
	2CH 3CH 4CH 8CH 16CH	
Contact resistance	ON:1 Ω max. OFF:1M Ω min.	Detent position
Dielectric strength	No dielectric strength	AC300V at 1 minute
		Between terminal-Case
		Between terminal-Shaft
Insulation resistance	100M Ω min.	DC250V at 1 minute
		Between terminal-Case
		Between terminal-Shaft

#### Mechanical characteristics

	~				
Items	Spec.			Conditions	
Operating force	9.8-58.8mN • m(100-600gf • cm)				
Step angle	30±3°   22.5±3°   20±3°   22.5±3°				
Rotational angle	30±5° 60±5° 90±5°	157.5±5°	300±5°	Endless	
Terminal strength	No damage to case and terminal fall-off.				Static load of 4.9N(0.5kgf)
	Bent terminals shall be ac	ceptable			shall be applied to the tip of the terminals for 15secs.
	No abnormality in electrical				in vertical direction(1 time/terminal)
	characteristics after testing to be seen				
Strength	Shaft pull:98.1N min.(10kgf min.)				Static load
	Shaft push:98.1N min.(10kgf min.)				
	Nut tightening:0.98N • m	min.(10kgf	· cm min.)		
Shaft stopper strength	0.39N · m min.(4kgf · cm min.)				
Shaft wobble and bend	Radial:0.5×Shaft length/30mm max.(Single shaft, Dual outer shaft)				
	Radial:0.7×Shaft length/30mm max.(Dual inner shaft)				
	Thrust:0.5mm max.				
	2.5N(250gf) applied to tip of the shaft				

#### **Durability characteristics**

· · · · · · · · · · · · · · · · · · ·		
Items	Spec.	Conditions
Life(Without load)	5,000 cycles	Contact resistance(ON):10 Ω max.
		Contact resistance(OFF):1M Ω min.

#### \*Please refer to Page 3 for other specifications

#### 2CH/3CH/4CH TP70NF series

#### **Dual shaft type TP70F & TP70D** series

