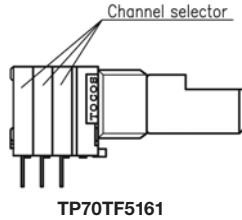


TP7 CODED SWITCHES (Absolute Encoders)

1. For Pro-use. Channel selector is preset to assigned frequencies:

TP70TF5161 (Single shaft, Triple unit, 16 channels)



Electrical Characteristics

	Specification	Conditions
• Contact resistance	ON: 1Ω max. OFF: 1MΩ min.	Detent position
• Dielectric strength	No dielectric breakdown	300VAC at 1 minute Between terminal - case Between terminal - shaft
• Insulation resistance	100MΩ min.	250VDC at 1 minute Between terminal - case Between terminal - shaft

Mechanical Characteristics

	Specification	Conditions																								
• Operating force	9.8-58.8mN • m (100-600gf • cm) 19.6-39.2mN • m (200-400gf • cm) for P'GRID products																									
• Step angle	<table border="1"> <thead> <tr> <th></th> <th>2 CH</th> <th>3 CH</th> <th>4 CH</th> <th>8 CH</th> <th>16 CH</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>30° ± 3°</td> <td></td> <td>22.5° ± 3°</td> <td>*20° ± 3°</td> </tr> <tr> <td>• Rotational angle</td> <td>30° ± 5°</td> <td>60° ± 5°</td> <td>90° ± 5°</td> <td>157.5° ± 5°</td> <td>*300° ± 5°</td> </tr> <tr> <td>• Terminal strength</td> <td colspan="4">No damage to case and terminal fall-off Bent terminals shall be acceptable No abnormality to be seen in electrical characteristics after testing</td> <td>Endless</td> </tr> </tbody> </table>		2 CH	3 CH	4 CH	8 CH	16 CH			30° ± 3°		22.5° ± 3°	*20° ± 3°	• Rotational angle	30° ± 5°	60° ± 5°	90° ± 5°	157.5° ± 5°	*300° ± 5°	• Terminal strength	No damage to case and terminal fall-off Bent terminals shall be acceptable No abnormality to be seen in electrical characteristics after testing				Endless	Static load of 4.9N (0.5kgf) shall be applied to the tip of the terminals for 15 secs. in vertical direction (1 time/terminal)
	2 CH	3 CH	4 CH	8 CH	16 CH																					
		30° ± 3°		22.5° ± 3°	*20° ± 3°																					
• Rotational angle	30° ± 5°	60° ± 5°	90° ± 5°	157.5° ± 5°	*300° ± 5°																					
• Terminal strength	No damage to case and terminal fall-off Bent terminals shall be acceptable No abnormality to be seen in electrical characteristics after testing				Endless																					
• Strength	Shaft pull: 98.1N min. (10kgf min.) Shaft push: 98.1N min. (10kgf min.) Nut tightening: 0.98N • m min. (10kgf • cm min.)	Static load																								
• Soldering heat resistance	There shall be no mechanical abnormality such as excessive play	Soldering iron: 3 sec. max. at 350° ± 5°																								
• Shaft stopper strength	0.39N • m min. (4kgf • cm min.) Not applicable for products with endless rotational angle.																									
• 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

	Specification	Conditions
• Life (without load)	5,000 cycles 30,000 cycles for P'GRID products	Contact resistance (ON): 10Ω max. Contact resistance (OFF): 1MΩ min.
• Operating temperature range	-20°C to +70°C	
• Shaft Seal (Optional O-ring seal between the bushing and shaft)	After mounting a coded switch to a panel and exposing it to water under a maximum hydraulic pressure of 9.8kPa (0.1kgf/cm²) for 30 minutes, there shall be no leak between the shaft and bushing (IP67).	

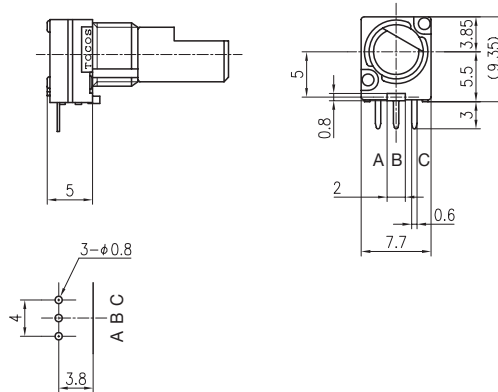
(*) Also applies to P'GRID products.

♦ All products in this catalog are not for use in life support equipment.

TP/RH Series are NOT board washable.

TP70NF121

Coded Switch, Single Shaft, Single Unit, 1 Circuit, 2 Channel



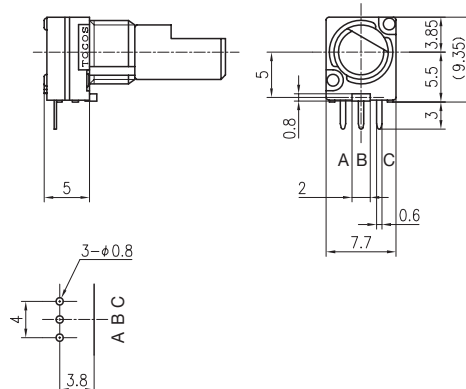
Unit: mm

● : ON
○ : OFF

2CH CODE	
	A-C or B-C
1	○
2	●

TP70NF232

Coded Switch, Single Shaft, Single Unit, 2 Circuit, 3 Channel

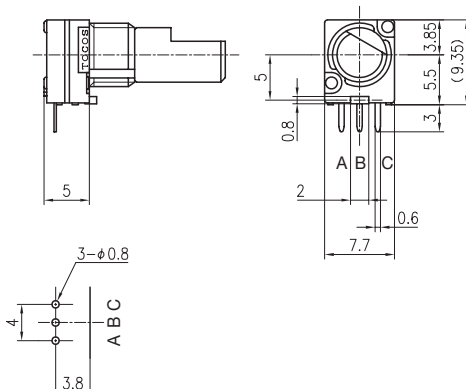


● : ON
○ : OFF

3CH CODE		
	A-B	B-C
1	●	●
2	●	○
3	○	○

TP70NF243

Coded Switch, Single Shaft, Single Unit, 2 Circuit, 4 Channel

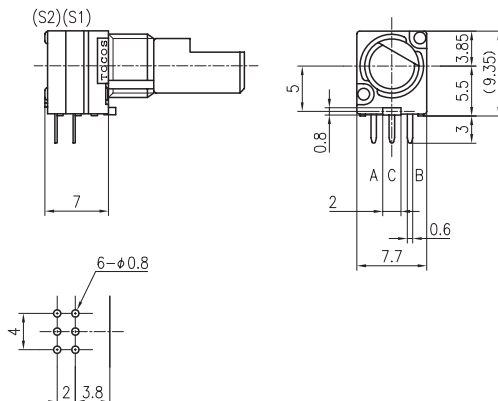
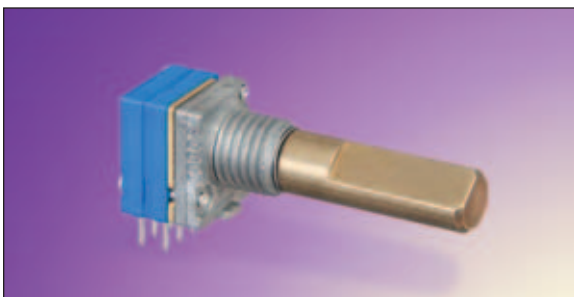


● : ON
○ : OFF

4CH CODE			
	A-B	B-C	
1	●	●	○
2	●	○	○
3	○	○	○
4	○	○	●

TP70GF482

Coded Switch, Single Shaft, Dual Unit, 4 Circuit, 8 Channel



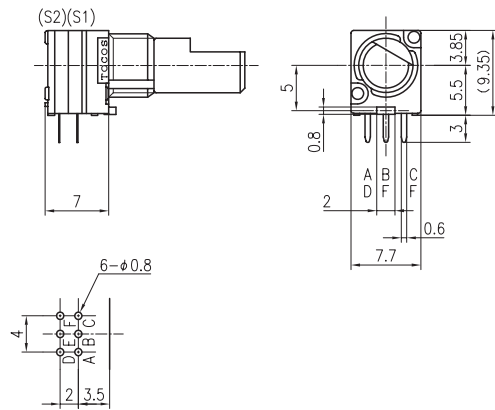
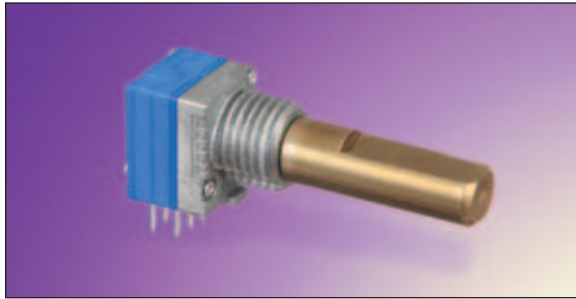
CODE

Detent position	S1		S2	
	A-C	B-C	A-C	B-C
FULL CCW	1	○	●	○
CW ↓	2	○	●	○
	3	○	●	○
	4	○	●	○
	5	○	○	○
	6	○	○	○
	7	○	○	○
	8	○	○	○

● : ON
○ : OFF

TP70GF484

Coded Switch, Single Shaft, Dual Unit, 4 Circuit, 8 Channel



Unit: mm

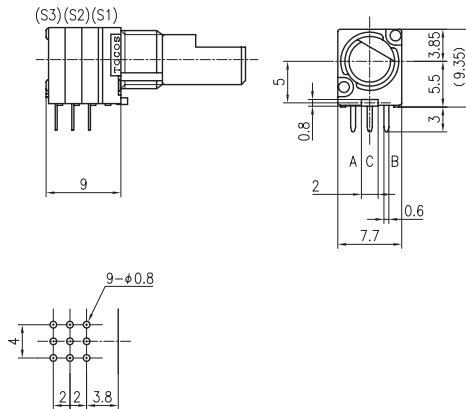
BCH CODE

	A-B	B-C	B-D	B-F
1	●	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○
7	○	○	○	○

● :ON
○ :OFF

TP70TF5161

Coded Switch, Single Shaft, Triple Unit, 5 Circuit, 16 Channel



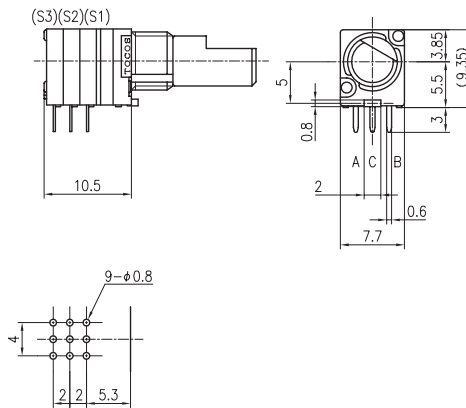
CODE

Detent position	S1		S2		S3
	A-C	B-C	A-C	B-C	A-C
FULL CCW	1	○	○	○	○
2	○	○	○	○	○
3	○	○	○	○	○
4	○	○	○	○	○
5	○	○	○	○	○
6	○	○	○	○	○
7	○	○	○	○	○
8	○	○	○	○	○
9	○	○	○	○	○
10	○	○	○	○	○
11	○	○	○	○	○
12	○	○	○	○	○
13	○	○	○	○	○
14	○	○	○	○	○
15	○	○	○	○	○
16	○	○	○	○	○

● :ON
○ :OFF

TP70TF5163

High Torque Coded Switch, Single Shaft, Triple Unit, 5 Circuit, 16 Channel



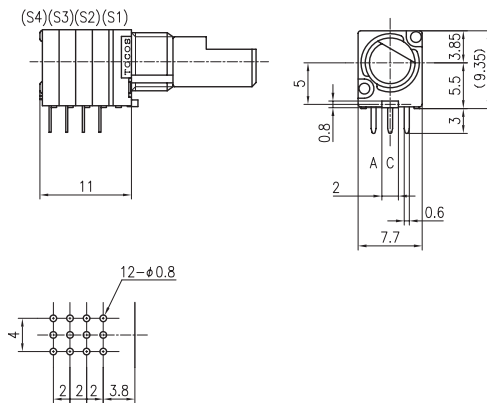
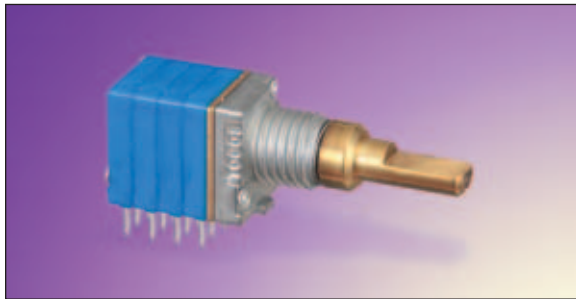
CODE

Detent position	S1		S2		S3
	A-C	B-C	A-C	B-C	A-C
FULL CCW	1	○	○	○	○
2	○	○	○	○	○
3	○	○	○	○	○
4	○	○	○	○	○
5	○	○	○	○	○
6	○	○	○	○	○
7	○	○	○	○	○
8	○	○	○	○	○
9	○	○	○	○	○
10	○	○	○	○	○
11	○	○	○	○	○
12	○	○	○	○	○
13	○	○	○	○	○
14	○	○	○	○	○
15	○	○	○	○	○
16	○	○	○	○	○

● :ON
○ :OFF

TP70QF4161

Coded Switch, Single Shaft, Quad Unit, 4 Circuit, 16 Channel



CODE

Detent position	S1	S2	S3	S4
	A-C	A-C	A-C	A-C
FULL CCW	1	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○
10	○	○	○	○
11	○	○	○	○
12	○	○	○	○
13	○	○	○	○
14	○	○	○	○
15	○	○	○	○
16	○	○	○	○

● :ON
○ :OFF

P'GRID 16 Channel Rotary Coded Switches for 2-Way Radio Applications

New P'GRID Design Provides Amazingly Smooth and Crisp Detent Feel and Response... Even Through Thick Work Gloves

TOCOS has developed a unique and new switch detent structure... **P'GRID**... that provides accurate and smooth switching operations for 2-way radios and transceivers that operate under severe and challenging environments.

■ **Compact 7mm design**

■ **Crisp Switching**

P'GRID provides a secure ON-OFF feeling even when turning the knob slowly

■ **Silky Smooth Switching**

Two special rollers provide smooth detent travel

■ **Strong Detent Response**

Crisp switching feel even under difficult conditions and through thick work gloves

■ **Longer Rotational Life**

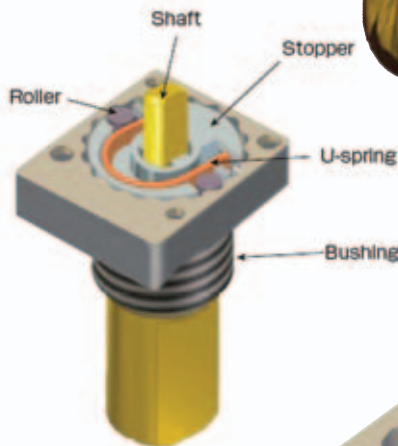
P'GRID: 30,000 cycles (without load)
vs. Standard: 5,000 cycles (without load)

■ **Increased Shaft Strength**

Increased inner shaft diameter provides a shaft strength on par with the TP9 Series.

■ **Unique Bushing Design for Panel Sealing**

The M6 bushing and shaft are contoured for optimum panel sealability.

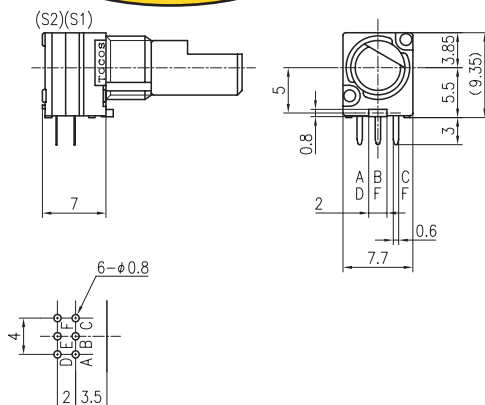
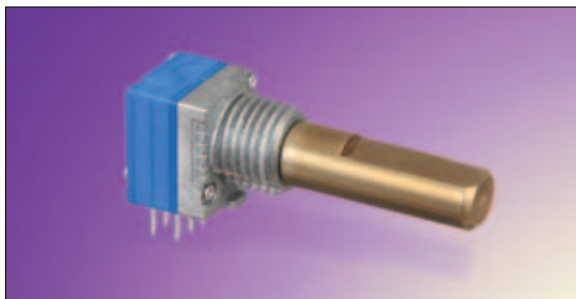


Our P'GRID Detent Design is now available on other TOCOS products, and the availability of P'GRID models is increasing monthly.



TP7NBPT16

Coded Switch, P'GRID Detent Design, Single Shaft, Dual Unit, 4 Circuit, 16 Channel



Unit: mm

CODE		S1		S2		
Detent position		A-B	B-C	B-D	B-F	
FULL	CCW	1	●	○	●	○
		2	○	○	○	○
		3	○	○	○	○
		4	●	○	○	○
		5	○	○	○	○
		6	○	○	○	○
		7	○	○	○	○
		8	●	○	○	○
		9	○	○	○	○
		10	○	○	○	○
		11	○	○	○	○
		12	○	○	○	○
		13	○	○	○	○
		14	○	○	○	○
		15	○	○	○	○
		16	○	○	○	○

● :ON
○ :OFF