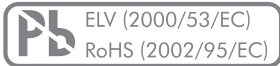


**MAIN FEATURES**

## COST EFFECTIVE

- 2 to 16 positions BCD, Hex or Gray coding
- Switching mode: Shorting or non-shorting
- For rugged environments
- Switching torque up to 3.5 Ncm
- Gold plated contacts
- THT (reflow version on request)
- Washable (sealed contact system)
- Optional IP68 front panel sealing (up to 5 bar)
- Operating temperature range: -40 to +85°C
- Various options and customizations

**PRODUCT VARIETY**

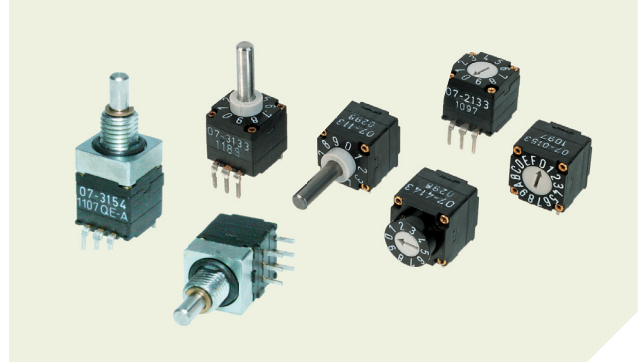
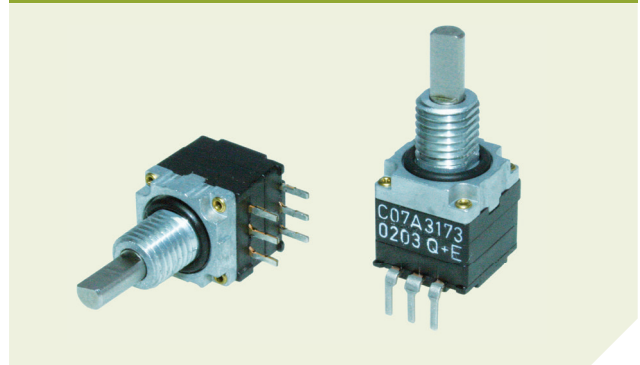
- Vertical or horizontal mounting
- Bushing style
- BCD, Hex or Gray coding
- Shorting or non-shorting
- Number of positions
- Switching torque BCD: 2.2 or 3.5 Ncm
- Switching torque Hex & Gray: 3.2 or 3.5 Ncm
- With end-stop or endless rotating
- Front panel sealing IP60 or IP68
- Various shaft styles and lengths

**POSSIBLE CUSTOMIZATIONS**

- Shaft dimension and shape
- Bushing, mounting
- Switching torque
- Others

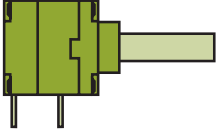
**TYPICAL APPLICATIONS**

- Frequency and channel selection for two way radios
- Target aiming devices
- Aircraft transponders
- Medical equipments
- Industrial automation

**TYPE 07****TYPE C07A** (THREADED BUSHING & COMPACT SIZE)

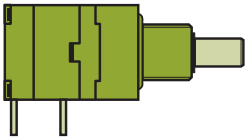
## 1 PREFERENCE TYPES SELECTION CHARTS

### 07 HORIZONTAL



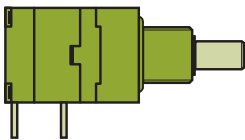
#### BASIC STYLE WITHOUT THREADED BUSHING

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP	ENDLESS ROTATING
BCD	Shorting	10 (0-9)	36°	07-1133	07-1033
	Non-shorting	10 (0-9)	36°	07-1134	07-1034
BCD compl.	Shorting	10 (0-9)	36°	07-1143	07-1043
Hex	Shorting	16 (0-F)	22.5°	07-1153	07-1053
	Non-shorting	16 (0-F)	22.5°	07-1154	07-1054
Hex compl.	Shorting	16 (0-F)	22.5°	07-1163	07-1063
Gray	Shorting	16 (0-F)	22.5°	07-1173	07-1073



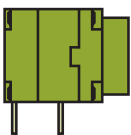
#### BASIC STYLE WITH THREADED BUSHING, IP68, WITH END-STOP

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP
BCD	Shorting	10 (0-9)	36°	07-1133-300000
	Non-shorting	10 (0-9)	36°	07-1134-300000
BCD compl.	Shorting	10 (0-9)	36°	07-1143-300000
Hex	Shorting	16 (0-F)	22.5°	07-1153-300000
	Non-shorting	16 (0-F)	22.5°	07-1154-300000
Hex compl.	Shorting	16 (0-F)	22.5°	07-1163-300000
Gray	Shorting	16 (0-F)	22.5°	07-1173-300000



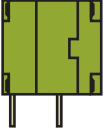
#### BASIC STYLE WITH THREADED BUSHING, IP68, ENDLESS ROTATING

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	ENDLESS ROTATING
BCD	Shorting	10 (0-9)	36°	07-1033-300000
	Non-shorting	10 (0-9)	36°	07-1034-300000
BCD compl.	Shorting	10 (0-9)	36°	07-1043-300000
Hex	Shorting	16 (0-F)	22.5°	07-1053-300000
	Non-shorting	16 (0-F)	22.5°	07-1054-300000
Hex compl.	Shorting	16 (0-F)	22.5°	07-1063-300000
Gray	Shorting	16 (0-F)	22.5°	07-1073-300000

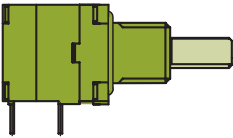


#### SCREWDRIVER WITH BEZEL / FRONT PANEL OPERATION

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP	ENDLESS ROTATING
BCD	Shorting	10 (0-9)	36°	07-4133	07-4033
	Non-shorting	10 (0-9)	36°	07-4134	07-4034
BCD compl.	Shorting	10 (0-9)	36°	07-4143	07-4043
Hex	Shorting	16 (0-F)	22.5°	07-4153	07-4053
	Non-shorting	16 (0-F)	22.5°	07-4154	07-4054
Hex compl.	Shorting	16 (0-F)	22.5°	07-4163	07-4063
Gray	Shorting	16 (0-F)	22.5°	07-4173	07-4073

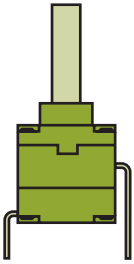
**07** HORIZONTAL**SCREWDRIVER WITHOUT BEZEL**

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END- STOP	ENDLESS ROTATING
BCD	Shorting	10 (0-9)	36°	07-0133	
	Non-shorting	10 (0-9)	36°	07-0134	07-0034
BCD compl.	Shorting	10 (0-9)	36°	07-0143	
Hex	Shorting	16 (0-F)	22.5°	07-0153	07-0053
	Non-shorting	16 (0-F)	22.5°	07-0154	07-0054
Hex compl.	Shorting	16 (0-F)	22.5°	07-0163	
Gray	Shorting	16 (0-F)	22.5°	07-0173	07-0073

**C07A** HORIZONTAL**THREADED BUSHING, IP68, WITH END-STOP**

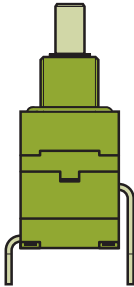
CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP
Hex	Shorting	16 (0-F)	22.5°	C07A1153-300000
	Non-shorting	16 (0-F)	22.5°	C07A1154-300000
Hex compl.	Shorting	16 (0-F)	22.5°	C07A1163-300000
Gray	Shorting	16 (0-F)	22.5°	C07A1173-300000

**07 VERTICAL**



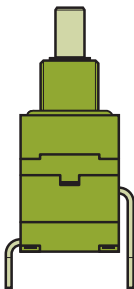
**BASIC STYLE WITHOUT THREADED BUSHING**

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP	ENDLESS ROTATING
BCD	Shorting	10 (0-9)	36°	07-3133	07-3033
	Non-shorting	10 (0-9)	36°	07-3134	07-3034
BCD compl.	Shorting	10 (0-9)	36°	07-3143	07-3043
Hex	Shorting	16 (0-F)	22.5°	07-3153	07-3053
	Non-shorting	16 (0-F)	22.5°	07-3154	07-3054
Hex compl.	Shorting	16 (0-F)	22.5°	07-3163	07-3063
Gray	Shorting	16 (0-F)	22.5°	07-3173	07-3073



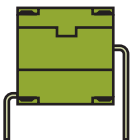
**BASIC STYLE WITH THREADED BUSHING, IP68, WITH END-STOP**

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP
BCD	Shorting	10 (0-9)	36°	07-3133-300000
	Non-shorting	10 (0-9)	36°	07-3134-300000
BCD compl.	Shorting	10 (0-9)	36°	07-3143-300000
Hex	Shorting	16 (0-F)	22.5°	07-3153-300000
	Non-shorting	16 (0-F)	22.5°	07-3154-300000
Hex compl.	Shorting	16 (0-F)	22.5°	07-3163-300000
Gray	Shorting	16 (0-F)	22.5°	07-3173-300000



**BASIC STYLE WITH THREADED BUSHING, IP68, ENDLESS ROTATING**

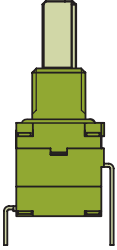
CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	ENDLESS ROTATING
BCD	Shorting	10 (0-9)	36°	07-3033-300000
	Non-shorting	10 (0-9)	36°	07-3034-300000
BCD compl.	Shorting	10 (0-9)	36°	07-3043-300000
Hex	Shorting	16 (0-F)	22.5°	07-3053-300000
	Non-shorting	16 (0-F)	22.5°	07-3054-300000
Hex compl.	Shorting	16 (0-F)	22.5°	07-3063-300000
Gray	Shorting	16 (0-F)	22.5°	07-3073-300000



**SCREWDRIVER WITHOUT BEZEL**

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP	ENDLESS ROTATING
BCD	Shorting	10 (0-9)	36°	07-2133	07-2033
	Non-shorting	10 (0-9)	36°	07-2134	07-2034
BCD compl.	Shorting	10 (0-9)	36°	07-2143	
Hex	Shorting	16 (0-F)	22.5°	07-2153	07-2053
	Non-shorting	16 (0-F)	22.5°	07-2154	
Hex compl.	Shorting	16 (0-F)	22.5°	07-2163	07-2063
Gray	Shorting	16 (0-F)	22.5°	07-2173	

**C07A** VERTICAL



**THREADED BUSHING, IP68, WITH END-STOP**

CODING	SWITCHING MODE	POSITIONS	INDEXING ANGLE	WITH END-STOP
Hex	Shorting	16 (0-F)	22.5°	C07A3153-300000
	Non-shorting	16 (0-F)	22.5°	C07A3154-300000
Hex compl.	Shorting	16 (0-F)	22.5°	C07A3163-300000
Gray	Shorting	16 (0-F)	22.5°	C07A3173-300000

## SPECIFICATIONS

### MECHANICAL DATA

Resolution:	BCD: 10 positions max. (36° indexing) Other Coding: 16 positions max. (22.5° indexing) End-Stop can be set from 2 to 16 (10) positions
Switching mode:	Shorting or non-shorting
Switching torque (new condition):	BCD: 2.2 or 3.5 Ncm (+/- 25%) Other Coding: 3.2 or 3.5 Ncm (+/- 25%)
Rotational life:	10'000 cycles min.
End-stop strength:	BCD: 45 Ncm min. Other Coding: 35 Ncm min.
Fastening torque of nut (front panel mounting):	100 Ncm max.

### ELECTRICAL DATA

Coding/output:	BCD, BCD complementary, Hex, Hex complementary or Gray
Switching mode:	Shorting or non-shorting
Contact resistance (new condition):	50 mΩ max.
Insulation resistance (new condition):	1 GΩ min. @ 500 VDC
Max. switching/breaking capacity:	5 VA
Switching current:	0.2 A (resistive load) max.
Switching voltage:	42 V (resistive load) max.
Dielectric withstanding voltage:	500 VDC during 60 seconds (pin to pin, pin to housing)

### MATERIAL DATA

Shaft:	Stainless steel
Housing:	Zinc diecast, fiber enforced high performance plastic
Nut:	Brass
Contact system:	CuBe alloy, AuCo plated (hard gold)
Soldering leads:	CuBe alloy, tin plated
O-rings:	NBR (nitrile), 70 shore

### ENVIRONMENTAL DATA

Operating/storage temperature range:	-40 to +85°C max.
IP sealing:	IP60, optional IP68 (2 bar, 1 h) shaft/front panel sealing (up to 5 bar, 4 h on request) Washable (sealed contact system)
Vibration:	10 G <sub>rms</sub> max. @ 10 to 2000 Hz
Flammability:	UL94-HB

### PACKAGING QUANTITY

Tray:	50 or 200 pcs. (antistatic tray: 100 pcs.)
-------	--

<sup>1</sup> The packaging size depends on shipment quantity. If the shipment quantity is  
 < 200 pcs. then standard tray 50 pcs.  
 ≥ 200 pcs. then standard tray 200 pcs.

### SOLDERING CONDITIONS

Hand soldering:	280°C max. during 2 sec max.
Wave soldering:	280°C max. peak temperature during 2 sec max.

## CODING

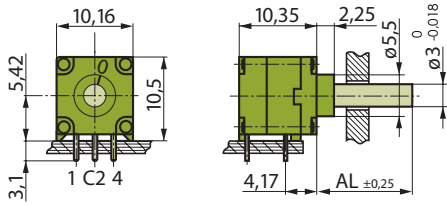
For all available Coding please see technical explanations at the end of the catalog

Tolerances unless otherwise specified DIN ISO 2768-1 (m)

**DRAWINGS**

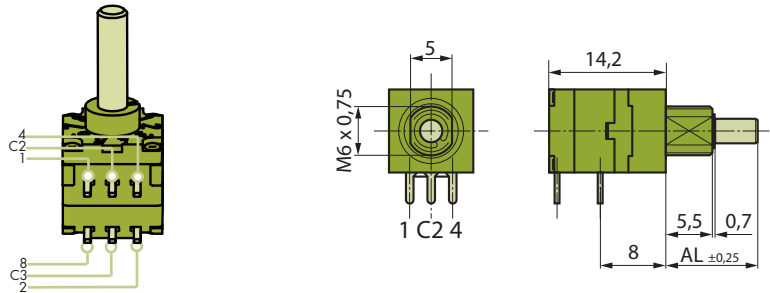
**07 HORIZONTAL**

**BASIC STYLE WITHOUT THREADED BUSHING**

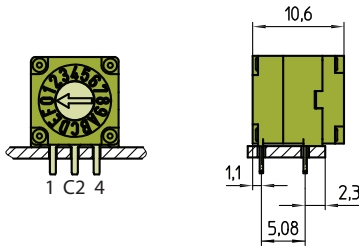


AL: See type key

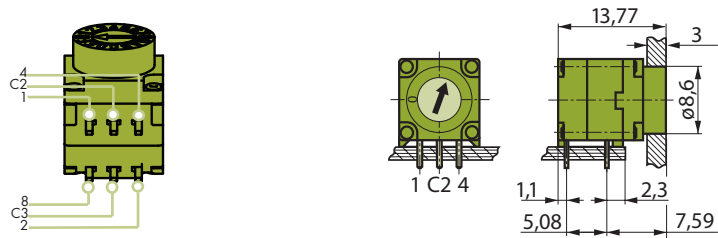
**BASIC STYLE WITH THREADED BUSHING**



**SCREWDRIVER WITHOUT BEZEL**



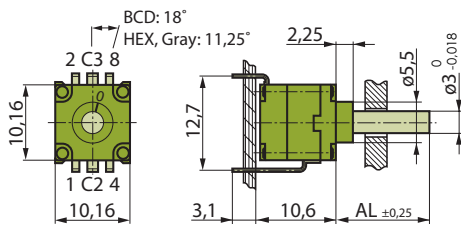
**SCREWDRIVER WITH BEZEL**



**DRAWINGS**

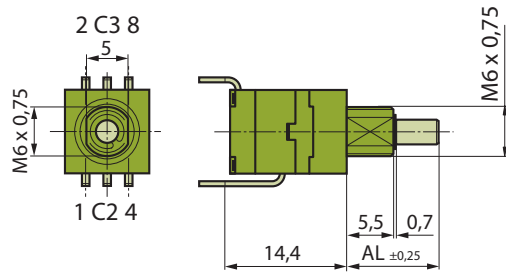
**07 VERTICAL**

**BASIC STYLE WITHOUT THREADED BUSHING**

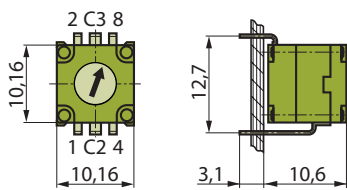


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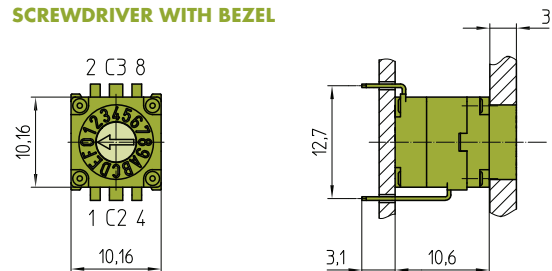
**BASIC STYLE WITH THREADED BUSHING**



**SCREWDRIVER WITHOUT BEZEL**



**SCREWDRIVER WITH BEZEL**

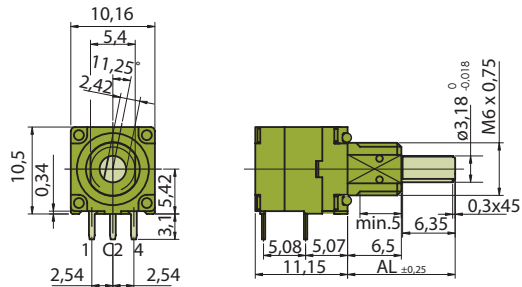


**DRAWINGS**

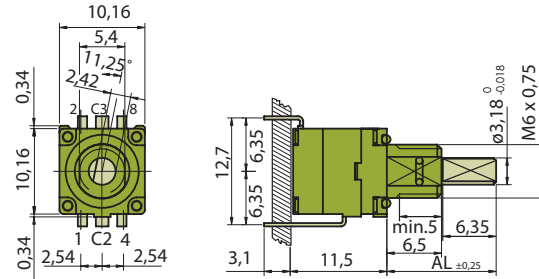
Tolerances unless otherwise specified DIN ISO 2768-1 (m)

**C07A**

**HORIZONTAL**



**VERTICAL**

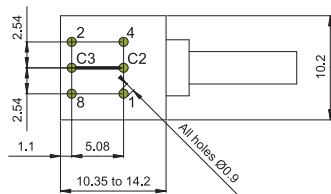


AL: See type key

**07 & C07A DRILLING DIAGRAMS**

**HORIZONTAL 07**

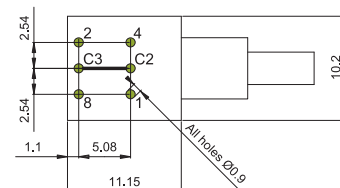
Commons (C2, C3) must be connected together on the PCB



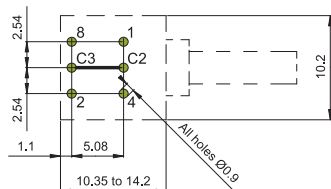
View from switch mounting side of the PCB

**HORIZONTAL C07A**

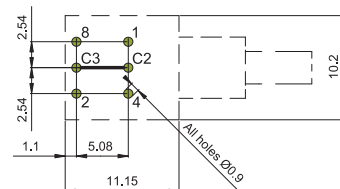
Commons (C2, C3) must be connected together on the PCB



View from switch mounting side of the PCB



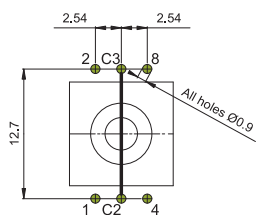
View from soldering side of the switch



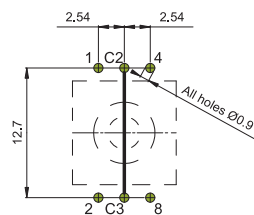
View from soldering side of the switch

**VERTICAL 07 & C07A**

Commons (C2, C3) must be connected together on the PCB



View from switch mounting side of the PCB

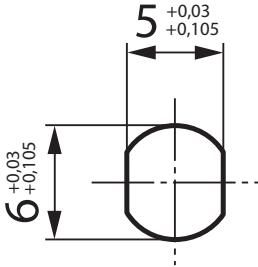


View from soldering side of the switch

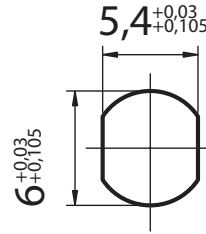
**DRAWINGS**

FRONT PANEL CUT OUT

**07 (THREADED BUSHING)**

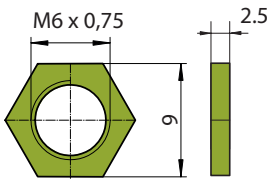


**C07A**

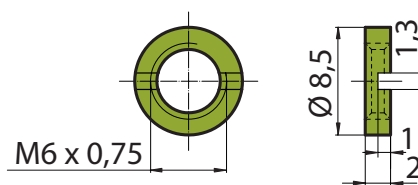


NUT

**HEX NUT (SUPPLIED)**



**SLOTTED NUT**



Spare Part  
Order number (50 pcs. bag)  
- Brass: 4424-22

Order number (50 pcs. bag)  
- Brass: 4424-28  
- Stainless steel (cross slot): 4424-31

**TYPE KEY**



**2 STYLE**

- 0** Horizontal; screwdriver without bezel
- 1** Horizontal; basic style
- 2** Vertical; screwdriver without bezel
- 3** Vertical; basic style
- 4** Horizontal; screwdriver with bezel
- 5** Vertical; screwdriver with bezel

<sup>2</sup> C07A only available in style 1 and 3

**END-STOP**

- 0** Endless rotating (without C07A-BCD o.A.)
- 1** With End-Stop

**3 CODING**

- 3** BCD (max. 10 pos.)
- 4** BCD compl. (max. 10 pos.)
- 5** Hex
- 6** Hex compl.
- 7** Gray

[Explanation: see chapter technical explanation at the end of the catalog]

<sup>3</sup> C07A only available with code 5, 6 and 7

**4 SWITCHING MODE**

- 3** Shorting
- 4** Non-shorting

[Explanation: see chapter technical explanation at the end of the catalog]

<sup>4</sup> Non-shorting not possible with "Gray Code"

**1 NUMBER OF POSITIONS**

- 0** Standard (10 or 16 pos.)
- E** 15 pos. (0 – E)
- D** 14 pos. (0 – D)
- C** 13 pos. (0 – C)
- B** 12 pos. (0 – B)
- A** 11 pos. (0 – A)
- 9** 10 pos. (0 – 9)
- 8** 9 pos. (0 – 8)
- 7** 8 pos. (0 – 7)
- 6** 7 pos. (0 – 6)
- 5** 6 pos. (0 – 5)
- 4** 5 pos. (0 – 4)
- 3** 4 pos. (0 – 3)
- 2** 3 pos. (0 – 2)
- 1** 2 pos. (0 – 1)

<sup>1</sup> C07A; only available with standard number of positions.

**SHAFT LENGTH (AL)**

- 000** Basic style without threaded bushing: 12.8 mm  
Basic style with threaded bushing: 11.5 mm  
Basic style with C07 bushing: 13 mm
- XXX** <sup>2</sup> Custom (e.g. 10.5 mm = 105; not available for C07A)

<sup>2</sup> Customized shaft length/shaft length (AL) description measured from mounting face (see picture below). (max. shaft length for basic style: 30 mm, for threaded bushing: 26 mm, for C07A: 20 mm).

**BUSHING, IP SEALING**

- 00** None (type 07 only)
- 20** Threaded (nut supplied)
- 30** Threaded, IP68 (Hex nut supplied)

**TORQUE, PACKAGING**

- 3.2 Ncm (BCD: 2.2 Ncm), tray (50/200 pcs.)
- V** 3.2 Ncm (BCD: 2.2 Ncm), antistatic tray (100 pcs.)
- T** 3.5 Ncm (BCD: 3.5 Ncm), tray (50/200 pcs.)
- S** 3.5 Ncm (BCD: 3.5 Ncm), antistatic tray (100 pcs.)

# TECHNICAL EXPLANATIONS

## GENERAL SWITCH KNOWLEDGE

### POSITION

A position is the mechanical detent of a switch actuator.

### DETENT

A detent is a mechanical positioning device for stopping actuator travel at each successive electrical circuit; for example, a spring-operated ball and groove.

### POLE

A pole is a single common electrical input having one or more outputs.

### WAFER, DECK OR LAYER

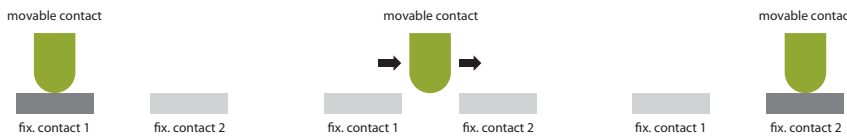
A wafer/deck or layer is a section what the contacts are mounted on.

### INDEXING ANGLE

An indexing angle is the number of degrees between each position.  
For example: 12 positions for a total of 360 degrees result a 30 degrees indexing angle.

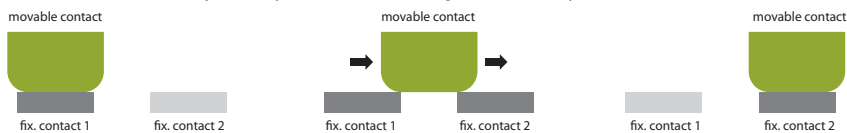
### NON-SHORTING CONTACTS "BREAK BEFORE MAKE"

A non-shorting contact is also known as "break before make" and describes the action of one circuit of a pole before interrupting another of the same pole. The switch will be momentarily interrupted before it changes from position 1 to position 2 during actuation (see picture).



### SHORTING CONTACTS "MAKE BEFORE BREAK"

A shorting contact is also known as "make before break" and describes the action of one circuit of a pole before interrupting another of the same pole. The switch will momentarily "short" position 1 and 2 during actuation (see picture).



### CYCLE

A cycle is the complete sequence of indexing through all successive switch positions and returning to the original position. The rotational life from coded or selector switches are usually specified with cycles.

### REVOLUTION

A revolution is the complete sequence of indexing through all successive switch positions in the same direction. The rotational life from encoded switches are usually specified with revolutions.

### BENEFITS OF GOLD-PLATED CONTACTS

Gold-plated contacts should be used for longer rotational life, in corrosive environment or in case the switch will not be actuated for a long period of time.

**ELMA SPECIFIC SPECIFICATIONS**

**MECHANICAL CODED SWITCHES (BCD, HEX, GRAY)**

A mechanical coded switch usually works with a 4 Bit (4 signals/contacts 1,2,4,8) system. A common contact (C) shortens the circuit. With this contact-system it is possible to achieve 10 to 16 switch positions (depending on which coding is used, see picture below) with only 5 connection-pins. It is a cost effective way to realize a rotary switch.

Disadvantage to use such a system is the need of a microcontroller with a corresponding software and that only low current and voltage can be shorted.

**DIFFERENT CODINGS**

BCD	BCD Complementary	Hex	Hex Complementary	Gray	
0	0	0	0	0	<input checked="" type="checkbox"/> On <input type="checkbox"/> Off
1	1	1	1	1	
2	2	2	2	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	5	
6	6	6	6	6	
7	7	7	7	7	
8	8	8	8	8	
9	9	9	9	9	
A		A	A	A	
B		B	B	B	
C		C	C	C	
D		D	D	D	
E		E	E	E	
F		F	F	F	

**CONCENTRIC FUNCTION**

A concentric rotary switch provides two shafts (inner and outer shaft) and analogical to that two switching-functions in one and the same switch.

**SWISS CLICK INDEXING SYSTEM™**

The "Swiss click indexing system" is an Elma label indicating switches which have a special indexing system to ensure nearly consistent torque over life (see picture below). The appropriate switches are market in our catalogue with that description. The Swiss Click Indexing System™ = ensures consisten torque over life

