CODED SWITCH TYPE C08

MAIN FEATURES

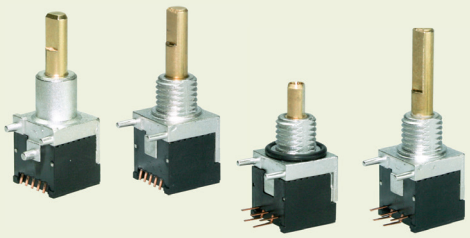
MINIATURE DESIGN, COST EFFECTIVE

- Gray coding 16 positions
- Switching mode: Shorting
- Excellent indexing feel with 2.5 Ncm switching torque (remains consistent over life)
- Body size 9 x 9 x 10 mm
- Lowest profile PCB to shaft center line: 4.65 mm
- SMT reflow version available
- Switching cycles 20,000
- Optional IP68 front panel sealing
- Operating temperature range: -40 to +85°C

SWISS CLICK INDEXING SYSTEM™

Pb ELV (2000/53/EC)
RoHS (2002/95/EC)

TYPE C08



For information about the SWISS CLICK INDEXING SYSTEM™ see chapter "Technical explanations"

PRODUCT VARIETY

- THT or SMT reflow (vacuum pick & place)
- Threaded or non-threaded bushing
- With end-stop or endless rotating
- Front panel sealing IP60 or IP68
- Various shaft types
- Tray or tape & reel packaging

POSSIBLE CUSTOMIZATIONS

- Shaft dimension and shape
- Others

TYPICAL APPLICATIONS

- Frequency and channel selection for two way radios
- Target aiming devices
- Other miniaturized mobile applications

[1] PREFERENCE TYPES SELECTION CHART

[1] For other types/options, see type key.

PACKAGING	IP SEALING	PCB MOUNTING	BUSHING	SHAFT LENGHT	WITH END-STOP	ENDLESS ROTATING
Tray	IP60	SMT	Non-threaded	15.2 mm	C08S211ST	C08S221ST
			Threaded	15.2 mm	C08S111ST	C08S121ST
		THT	Threaded	18.0 mm	C08T111LT	C08T121LT
			Threaded	15.2 mm	C08T111ST	C08T121ST
	IP68	SMT	Threaded	15.2 mm	C08S311ST	C08S321ST
		THT	Threaded	18.0 mm	C08T311LT	C08T321LT
			Threaded	15.2 mm	C08T311ST	C08T321ST

SPECIFICATIONS

MECHANICAL DATA

Resolution:	16 positions (22.5° indexing)
Switching mode:	Shorting
Switching torque (new condition):	2.5 Ncm (+/- 30%)
Rotational life:	20'000 cycles min.
Residual switching torque (end of life):	90% typical
End-Stop strength:	40 Ncm min.
Fastening torque of nut:	100 Ncm max.

ELECTRICAL DATA

Coding/output:	Gray
Switching mode:	Shorting
Contact resistance:	10 Ω max. (over the entire rotational life)
Insulation resistance (new condition):	1 GΩ min. @ 500 VDC
Load current:	10 mA max. (resistive load, 15 VDC max.voltage)
Dielectric withstanding voltage:	500 VDC during 60 seconds (pin to pin, pin to housing)

MATERIAL DATA

Shaft:	Brass
Housing:	Zinc diecast with Miralloy plating, fiber enforced high performance plastic
Nut:	Brass
Contact system:	Alloy copper, nickel plated
Soldering leads:	Alloy copper
O-rings:	NBR (nitrile), 70 shore, reflowable

ENVIRONMENTAL DATA

Operating/storage temperature range:	–40 to +85°C max.
IP sealing:	IP60, optional IP68 (2 bar, 1 h) shaft/front panel sealing
Vibration:	10 G_{rms} max. @ 10 to 2000 Hz
Flammability:	UL94-HB

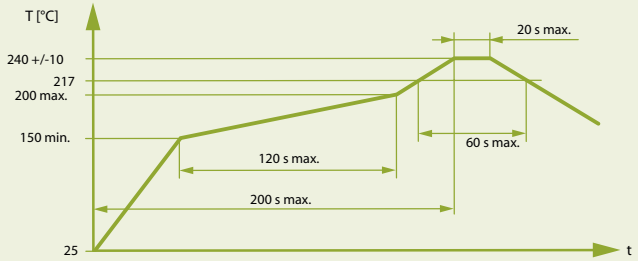
PACKAGING QUANTITY

Tray:	50 pcs.
Tape & reel:	300 pcs.

SOLDERING CONDITIONS

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

REFLOW PROFILE (COMPLIES WITH IPC/JEDEC J-STD-020C)



Temperatures or process durations exceeding rated maximum conditions may harm switch function.

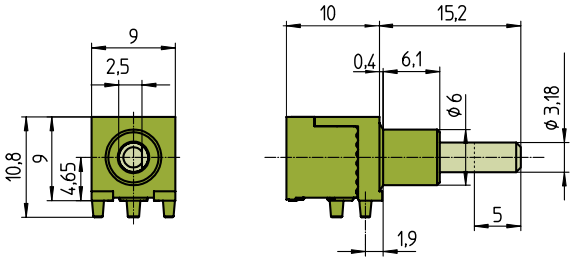
GRAY CODING

For information about Gray coding please see technical explanations at the end of the catalog.

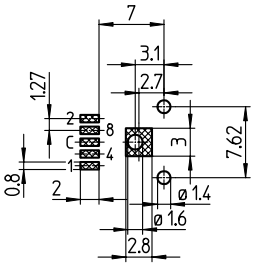
DRAWINGS

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

SMT NON-THREADED

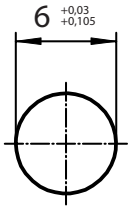


DRILLING DIAGRAM

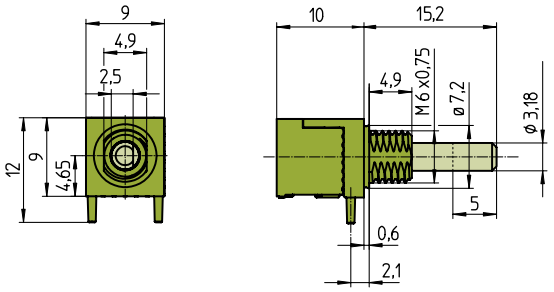


View from switch mounting side of the PCB

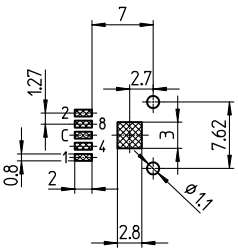
FRONT PANEL CUT OUT



SMT THREADED

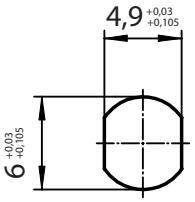


DRILLING DIAGRAM

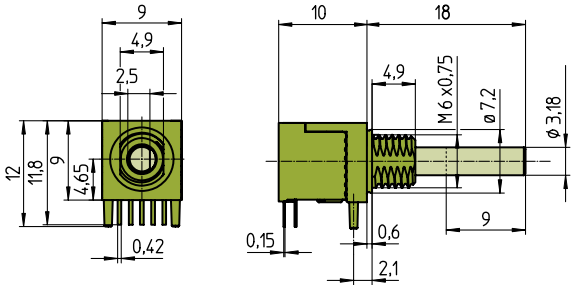


View from switch mounting side of the PCB

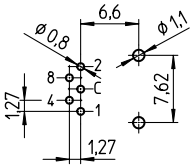
FRONT PANEL CUT OUT



THT THREADED

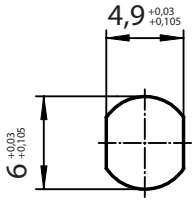


DRILLING DIAGRAM

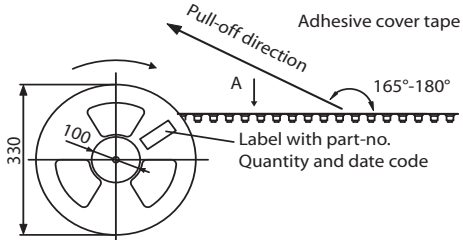


View from switch mounting side of the PCB

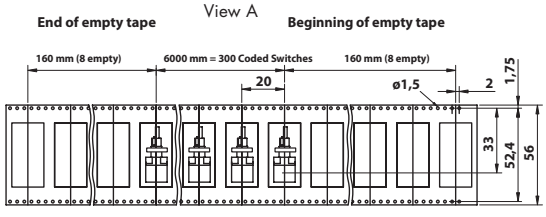
FRONT PANEL CUT OUT



TAPE & REEL PACKAGING

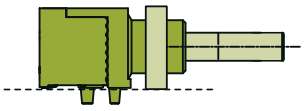


View A



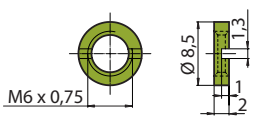
EIA 481 Norm

SOLDERING SUPPORT DONUT



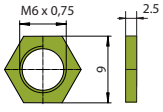
A soldering support donut is supplied on bushings with tape & reel packaging or tray packed SMT types. To be removed after soldering.

SLOTTED NUT



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

FRONT PANEL CUT OUT



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

CODED SWITCH TYPE C08

TYPE KEY

C08	_	_	_	1	_	_

PCB MOUNTING

S SMT
T THT

BUSHING

1 Threaded
(nut supplied, packed separately)
2 Non-Theaded (available for SMT only)
3 Threaded, IP68;
shaft/front panel sealing
(nut supplied, packed separately)

END-STOP

1 With End-Stop
2 Endless rotating

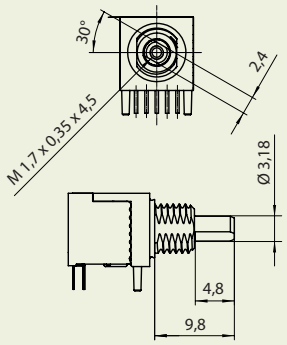
PACKAGING

T Tray (50 pcs. per tray, donut supplied for SMT types)
R Tape & reel (300 pcs. per reel, donut supplied)

SHAFT TYPE

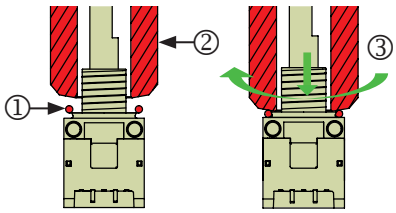
S D-shape, short; 15.2 mm
L D-shape, long; 18.0 mm

U Double-D-shape with thread



O-RING MOUNTING TOOL

Order number: C08RINGTL

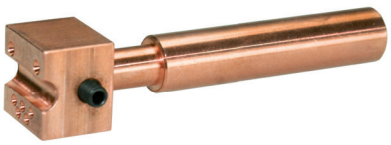


① Slip the lubricated O-ring over the bushing.

② Slide the mounting tool over the bushing.

③ While pushing down the O-ring simultaneously rotate the mounting tool.

DESOLDERING TOOL



Desoldering tool with individual soldering iron adaptor is available on request.

TECHNICAL EXPLANATIONS

GENERAL SWITCH TERMS

POSITION

A position is a mechanical detent of a switch actuation.

DETENT

A detent is a positioning device to mechanically stop the rotation of a switch. This can be achieved for instance with a spring-operated ball and an opponent chamfer.

POLE

A pole is capable of conducting a single electrical signal. Each layer is equivalent to one pole (1 layer = 1 pole). The number of poles indicates the number of electrical signals/circuits which are controlled by the switch.

WAFER, DECK OR LAYER

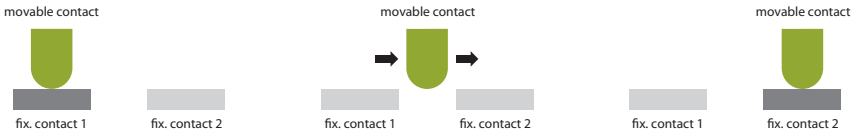
Here, a wafer is a construction of a fixed and a movable disk. One wafer consists of the necessary contacts for one pole.

INDEXING ANGLE

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

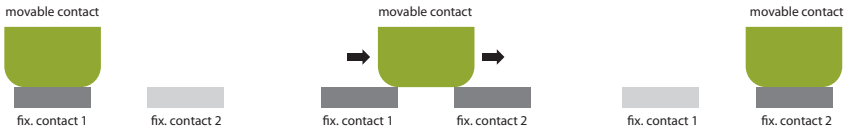
NON-SHORTING CONTACTS "BREAK BEFORE MAKE"

A non-shorting contact is also known as "break-before-make" and describes the switching action of a pole when switching to the next position. The switch will momentarily be interrupted while it changes for instance from position 1 to position 2 (see picture)



SHORTING CONTACTS "MAKE BEFORE BREAK"

A shorting contact is also known as "make-before-break" and describes the switching action of a pole when switching to the next position. The switch will momentarily short two contacts while it changes for instance from position 1 to position 2 (see picture).



CYCLE

A cycle is one rotation through all positions and back to the start position. The rotational life of coded or selector switches are usually specified by cycles.

REVOLUTION

A revolution is a 360 degree rotation through all positions. The rotational life of encoded switches is usually specified by 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 SWITCH TERMS

MECHANICAL CODED SWITCHES (BCD, HEX, GRAY)

A mechanical coded switch usually works with 4 bits (bit values 1,2,4,8). A common contact (C) shorts the circuit. With 4 bits it is possible to achieve 10 to 16 switch positions (depending on the used code, see picture below) with only 5 connection pins. It is a cost effective way to realize a rotary switch.
Coded switches need a microcontroller with corresponding software.

CODE TABLES

BCD

	8	4	2	1
0				■
1				
2			■	
3			■	■
4		■		
5		■		■
6		■	■	
7		■	■	■
8	■			
9	■			■

BCD Complementary

	8	4	2	1
0	■	■	■	■
1	■	■	■	
2	■	■		■
3	■	■		
4	■		■	■
5	■		■	
6	■			■
7	■			
8		■	■	■
9		■	■	

Hex

	8	4	2	1
0				
1				■
2			■	
3			■	■
4		■		
5		■		■
6		■	■	
7		■	■	■
8	■			
9	■			■
A	■		■	
B	■		■	■
C	■	■		
D	■	■		■
E	■	■	■	
F	■	■	■	■

Hex Complementary

	8	4	2	1
0	■	■	■	■
1	■	■	■	
2	■	■		■
3	■	■		
4	■		■	■
5	■		■	
6	■			■
7	■			
8		■	■	■
9		■	■	
A		■		■
B		■		
C			■	■
D			■	
E				■
F				

Gray

	8	4	2	1
0				
1				■
2			■	■
3			■	
4		■	■	
5		■	■	■
6		■		■
7		■		
8	■	■		
9	■	■		■
A	■	■	■	■
B	■	■	■	
C	■		■	
D	■		■	■
E	■			■
F	■			

■ On
□ Off

CONCENTRIC FUNCTION

A concentric rotary switch has two shafts (inner and outer) and logically two switching-functions packed in just one switch.

SWISS CLICK INDEXING SYSTEM™

The "Swiss click indexing system" is an Elma label, containing switches with a special indexing to ensure nearly consistent torque over life (see picture below). Switches with that feature are specially marked in the catalogue.