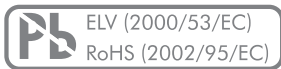


# MULTI ROTARY SWITCH MR50

## MAIN FEATURES

### 1/2" SELECTOR SWITCH

- Dimensions Ø 1/2" (12.7 mm)
- Switching mode: Shorting or non-shorting
- Selector switch positions up to 16
- Switching torque up to 6 Ncm
- Gold plated contacts
- Rugged design
- Sealing up to IP68
- Operating temperature range: -45 to +85°C
- Not ITAR related
- Various options and customizations



## MR50



## PRODUCT VARIETY

- Number of selector positions/indexing angles
- Shaft styles
- Shorting or non-shorting
- Bushing style
- Switching torque
- IP60 or IP68 front panel sealing

## POSSIBLE CUSTOMIZATIONS

- Shaft style and material
- Bushing style
- Adjustable End-Stop in any position
- Switching torque
- Number of poles
- Integrated customer electronic
- Special high pressure IP-Sealing

## ON REQUEST

- Different coding: BCD, Hex or Gray
- Pull to turn function
- Terminal style
- Integrated flexprint connection
- Horizontal mounting concept
- Low noise function

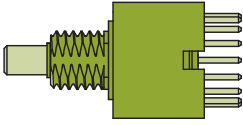
## TYPICAL APPLICATIONS

- Target aiming devices
- Night vision devices
- Weapon lights
- Two way radios
- Cockpit applications (aircraft, automotive, nautic, construction-machines, military vehicles)
- Portable outdoor devices (communication, medical, rescue, sports, transportation, measuring, photo/video)
- Test equipment

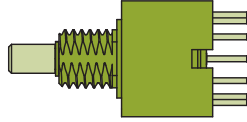
**1 PREFERENCE TYPES SELECTION CHARTS**

<sup>1</sup> For other types/options, see type key.

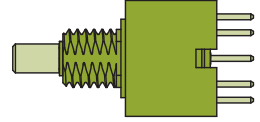
**16 POSITIONS**



**12 POSITIONS**



**10 POSITIONS**



**VERTICAL; THT/PCB MOUNT; 1 POLE; BUSHING 1/4"-28 UNF-2A x 6.35 mm**

IP SEALING	POSITIONS / INDEXING ANGLES	SWITCHING MODE	TORQUE	SHAFT Ø x LENGTH 1/8" x 11.5 mm
IP60	16 / 22.5°	Shorting	3 Ncm	MR50-A11A-B112
			6 Ncm	MR50-A11A-D112
	12 / 30°	Shorting	3 Ncm	MR50-B11A-B112
			6 Ncm	MR50-B11A-D112
	10 / 36°	Shorting	3 Ncm	MR50-C11A-B112
			6 Ncm	MR50-C11A-D112
IP68	16 / 22.5°	Shorting	3 Ncm	MR50-A11B-B112
			6 Ncm	MR50-A11B-D112
	12 / 30°	Shorting	3 Ncm	MR50-B11B-B112
			6 Ncm	MR50-B11B-D112
	10 / 36°	Shorting	3 Ncm	MR50-C11B-B112
			6 Ncm	MR50-C11B-D112

## SPECIFICATIONS

### MECHANICAL DATA (at 25°C ± 2°C)

Positions/Indexing:	16/22.5°; 12/30°; 10/36° with End-Stop between position 1 and the last position
Poles:	1
Switching mode:	Shorting or non-shorting
Switching torque (new condition):	3 or 6 Ncm (± 30%)
Residual switching torque (end of life):	60-70% typical
Rotational life:	20'000 cycles min.
End-stop strength:	85 Ncm min.
Fastening torque of nut (front panel mounting):	170 Ncm max.

### ELECTRICAL DATA (at 25°C ± 2°C)

Contact resistance (new condition):	1 Ω max.
Electrical ratings:	200 mA @ 28 VDC resistive load max. 100 mA @ 28 VDC inductive load max. 100 mA @ 28 VDC lamp load max.
Dielectric withstanding voltage:	500 VDC during 60 seconds (pin to pin, pin to housing)
Insulation resistance (new condition):	1 GΩ min. @ 500 VDC
Switching mode:	Shorting or non-shorting

### MATERIAL DATA

Shaft:	Nickel silver
Snap-Ring:	Stainless steel
Housing:	Zinc diecast with glossy nickel plating
Contact wafer:	Fiber enforced plastic (UL94-V0)
Nut:	Brass, nickel plated
Contact system:	CuBe alloy, AuCo plated (hard gold)
Soldering leads:	Copper alloy, nickel-tin plated
Inner sealings:	NBR (nitrile), 70 shore, reflowable
Front panel sealing:	EPDM (cell rubber)

### ENVIRONMENTAL DATA

Operating temperature range:	-45 to +85°C (IEC 60068-2-14)
Storage temperature range:	-65 to +125°C (IEC 60068-2-14)
IP sealing:	IP60, IP68 (1 bar, 1 h)
Flammability:	UL94-V0 (sealings are UL94-HB)

### PACKAGING QUANTITY

Tray:	50 pcs.
	Antistatic tray available on request

### SOLDERING CONDITIONS

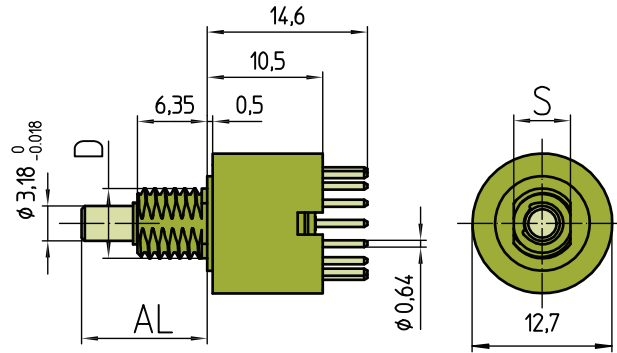
Hand soldering:	300°C max. during 3 s max.
Wave soldering:	280°C max. during 5 s max.

**DRAWINGS**

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

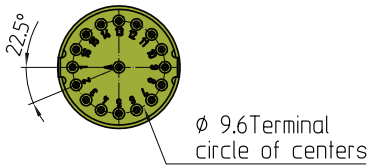
SWITCH DESIGN

<b>AL</b>	11.5 mm ± 0.3 mm
	16 mm ± 0.3 mm
	21 mm ± 0.3 mm
<b>D ; S</b>	¼"-28UNF-2A ; 5.16 mm
	M7x0.75 ; 6.2 mm

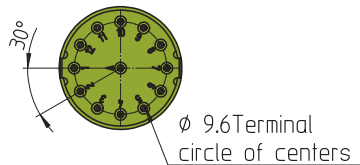


REAR VIEW

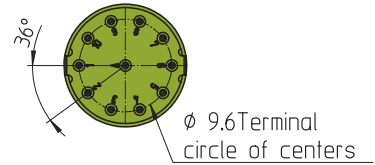
**16 POSITIONS / 1 POLE**



**12 POSITIONS / 1 POLE**

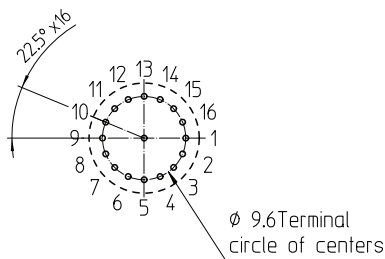


**10 POSITIONS / 1 POLE**



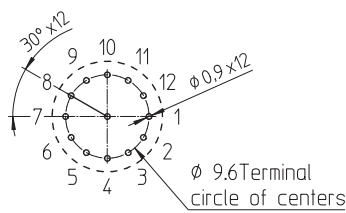
DRILLING DIAGRAMS

**16 POSITIONS / 1 POLE**



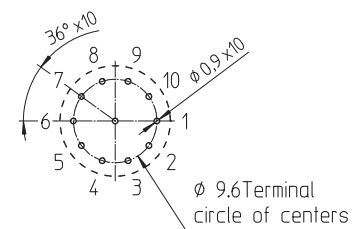
View from switch mounting side of the PCB

**12 POSITIONS / 1 POLE**



View from switch mounting side of the PCB

**10 POSITIONS / 1 POLE**

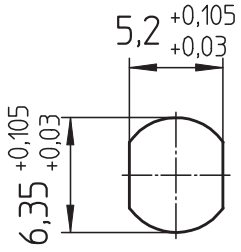


View from switch mounting side of the PCB

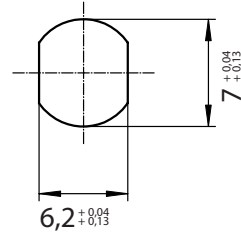
**DRAWINGS**

FRONT PANEL CUT OUT

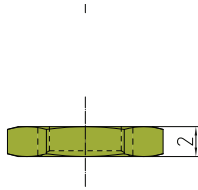
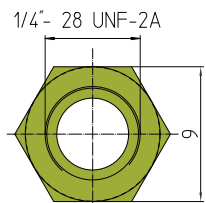
**FOR BUSHING 1/4" - 28 UNF - 2A**



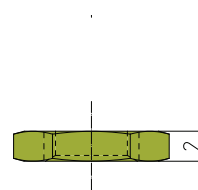
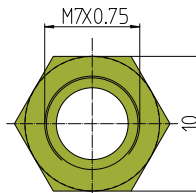
**FOR BUSHING M7 X 0.75**



HEX-NUT (SUPPLIED)



Spare Part:  
Order number (50 pcs. bag)  
- Brass, nickel plated: 5622-30



Spare Part  
Order number (50 pcs. bag)  
- Brass nickel plated: 4516-40

**TYPE KEY**



**SWITCH TYPE; RESOLUTION; SWITCHING MODE**

**A1** Selector:  
16 pos. (22,5° indexing); Shorting

**A2** Selector:  
16 pos. (22,5° indexing); Non- Shorting

**B1** Selector:  
12 pos. (30° indexing); Shorting

**B2** Selector:  
12 pos. (30° indexing); Non-Shorting

**C1** Selector:  
10 pos. (36° indexing); Shorting

**C2** Selector:  
10 pos. (36° indexing); Non-Shorting

**XX** Ask for customized solution

End-Stop between Pos.1 and the last position.

(Explanation: see chapter technical explanation at the end of the catalog)

**SWITCH ORIENTATION; TERMINAL STYLE**

**1** Vertical; THT/PCB Mount

**X** Ask for customized solution

**BUSHING (Ø, LENGTH); BUSHING-DRILL-Ø; IP SEALING**

(Hex nut supplied)

**A** 1/4"-28 UNE-2A x 6.35 mm;  
Shaft-Ø 1/8"; IP60

**B** 1/4"-28 UNE-2A x 6.35 mm;  
Shaft-Ø 1/8"; IP68

**E** M7 x 0.75 x 6.35 mm;  
Shaft-Ø 1/8"; IP60

**F** M7 x 0.75 x 6.35 mm;  
Shaft-Ø 1/8"; IP68

(bushing dimension and shape see drawing)

**X** Ask for customized solution

1/4" = 6.35 mm  
1/8" = 3.18 mm

**PACKAGING**

- Standard tray 50 pcs.

**1** Antistatic tray 50 pcs.

**SHAFT STYLE (AL) & MATERIAL**

**12** Ø 1/8" x 11.5 mm, round; Nickel silver

**13** Ø 1/8" x 11.5 mm, round; Brass

**16** Ø 1/8" x 16 mm, round; Nickel silver

**17** Ø 1/8" x 16 mm, round; Brass

**21** Ø 1/8" x 21 mm, round; Nickel silver

**22** Ø 1/8" x 21 mm, round; Brass  
(shaft dimension and shape see drawing)

**XX** Ask for customized solution  
1/8" = 3.18 mm

**POLES**

**1** 1 Pole (Standard)

**X** Ask for customized solution

**TORQUE**

**B** 3 Ncm

**D** 6 Ncm

**X** Ask for customized solution

# 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

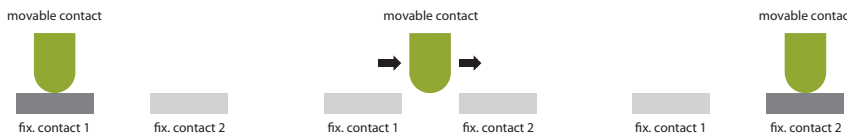
A wafer/deck or layer is a section what the contacts are mounted on.

### 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.

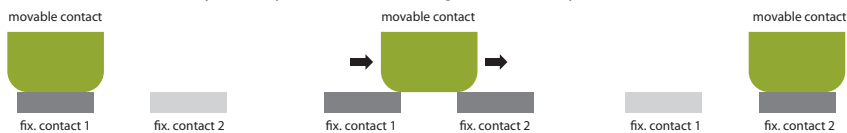
### NON-SHORTING CONTACTS "BREAK BEFORE MAKE"

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**

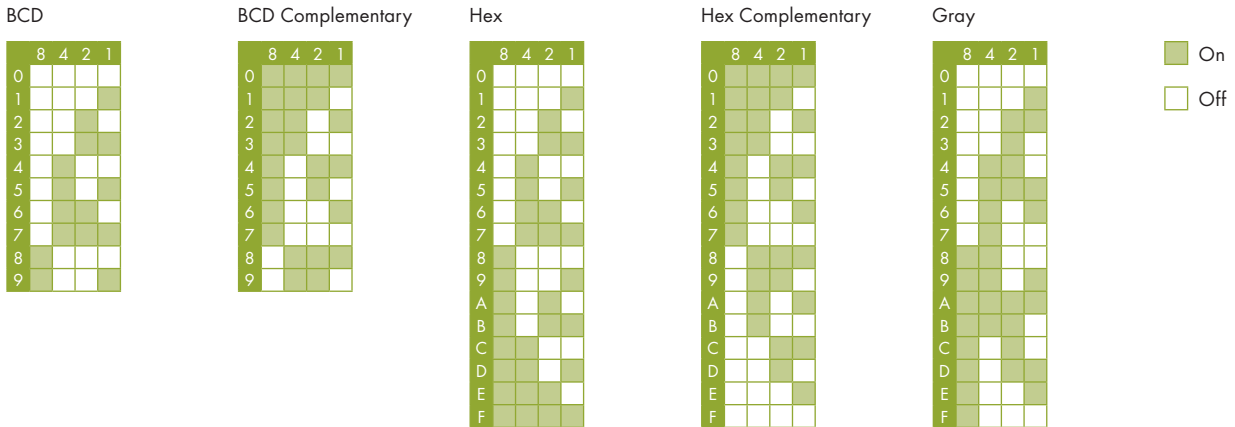
**MULTI ROTARY SWITCH**

Switches with different switch-functions in the same switch-body.  
Possible switch functions: Selector switch, coded switch, encoder or potentiometer

**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**



**MECHANICAL ENCODER SWITCHES**

A mechanical encoded switch usually works with an incremental 2 Bit (2 signals/contacts A,B) system. A common contact (C) shorts the circuit.  
With this contact-system it is possible to achieve 8 to 16 PPR (Pulses Per Revolution) (alternating ON-OFF) with only 3 connection-pins and the corresponding incremental-disc (see picture)

8 PPR incremental disc

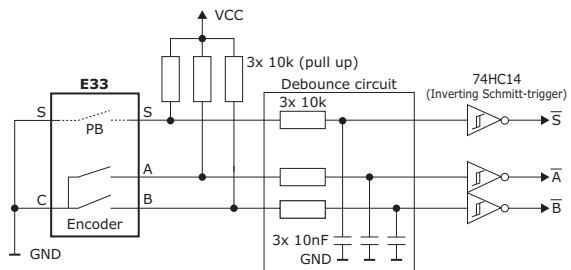
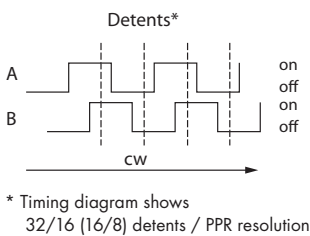


16 PPR incremental disc



Encoders give us a simple digital way to realize a very cost effective rotary switch.  
It provides a digital indication of position with a binary output.

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. The following pictures show typical diagrammatic plans.





## TECHNICAL EXPLANATIONS

### ELMA SPECIFIC SPECIFICATIONS

#### SELECTOR SWITCHES

A mechanical selector switch usually works with to the amount of switch positions correspondent contacts. A common contact (Pole) shortens the circuit. With this contact system it is possible to achieve 4 to 24 switch positions. Advantages to use a selector switch is, that it could be connected directly to an application (it don't need a microcontroller with a corresponding software) and that higher current/voltage can be shorted. Disadvantage of such a system is, that it is not cost effective in reference to a coded or encoded switch.

#### 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

