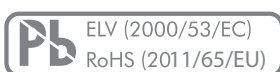


Product description

MAIN FEATURES

VERY ROBUST, MULTI WAFER,
UP TO 24 POSITIONS

- › 25'000 switching cycles with up to 20 Ncm switching torque
- › Gold plated contacts: 3 micron
- › IP68 front panel sealing
- › Operating temperature range: -40 to +85 °C
- › Various options and customizations



PRODUCT VARIETY

- Soldering eyelets or pins for PCB
- From 1 x 24 to 6 x 3 poles x positions per wafer
- Up to 8 wafers
- Detent angle 15° or 30°
- Shorting or non-shorting
- Switching torque: 1.5, 8, 15 or 20 Ncm
- Front panel sealing IP60 or IP68
- Configurable end stops
- Shaft diameter: 6 mm or 1/4"
- Shaft length

04



POSSIBLE CUSTOMIZATIONS

- Shaft dimension and shape
- Bushing dimensions
- Switching torque
- Hollow shaft, inner shaft
- Others

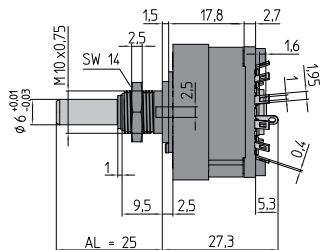
TYPICAL APPLICATIONS

- Industrial controls
- Avionics, instrumentation, test systems
- Medical and audio equipment
- Transport and construction machinery

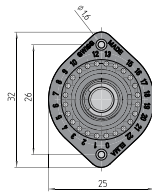
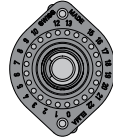
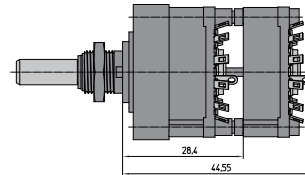
Dimensions and pin assignment

SWITCH DESIGN

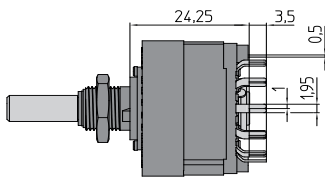
WITH SOLDERING EYELETS



SW = key spanner

IP60 version
(with locating lug)IP68 version
(without locating lug)

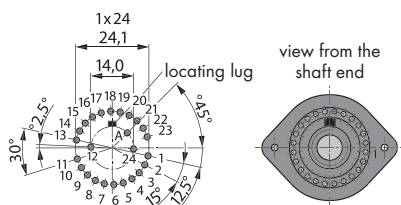
WITH PINS FOR PCB MOUNTING



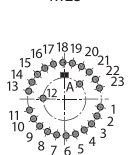
Dimensions and pin assignment

PIN ASSIGNMENT AND DRILLING DIAGRAM

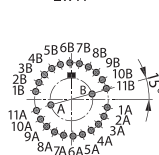
15° DETENT ANGLE



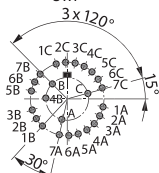
1x23



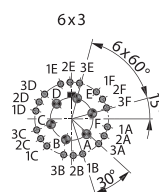
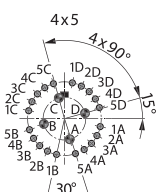
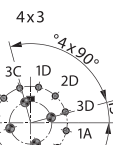
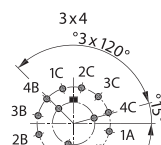
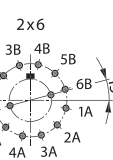
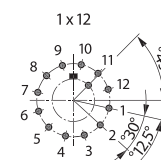
2x11



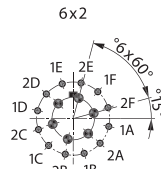
3x7



30° DETENT ANGLE



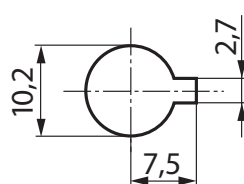
● = $\varnothing 1,3 \text{ mm}$
 ● = $\varnothing 2,3 \text{ mm}$



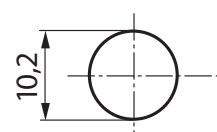
● = $\varnothing 1,3 \text{ mm}$
 ● = $\varnothing 2,3 \text{ mm}$

FRONT PANEL CUT OUT

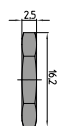
IP60-VERSION (WITH LOCATING LUG)



IP68-VERSION (WITHOUT LOCATION LUG)



NUT

HEX NUT (SUPPLIED) SHAFT $\varnothing 6 \text{ mm}$ 

Screw wrench
 14 mm 10 x 0.75

Dimensions in mm

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

Ordering information

ORDERING CODE

04	-	-	-	-	-	-	-	-	-	-	-	-	-	-
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---

BASIC CODE

See standard types

NUMBER OF WAFERS

See standard types

NUMBER OF POLES

See standard types

FACTORY SET CHARACTER

See standard types

SWITCHING MODE

- 3** Shorting
- 4** Non-shorting (not for 15° index. angle)

SWITCHING TORQUE

- 15 Ncm (standard)
- M** 8 Ncm
- N** 20 Ncm
- R** 1.5 Ncm

SHAFT DIAMETER

- 0** 6 mm
- Z** 1/4" (6.35 mm)

NUMBER OF POSITIONS

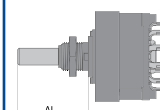
- 00** Standard
- 23** 23 positions
- 22** 22 positions
- 21** 21 positions
- 20** 20 positions
- 19** 19 positions
- 18** 18 positions
- 17** 17 positions
- 16** 16 positions
- 15** 15 positions
- 14** 14 positions
- 13** 13 positions
- 12** 12 positions
- 11** 11 positions
- 10** 10 positions
- 09** 9 positions
- 08** 8 positions
- 07** 7 positions
- 06** 6 positions
- 05** 5 positions
- 04** 4 positions
- 03** 3 positions
- 02** 2 positions

SHAFT LENGTH (AL)

- 000** 25 mm
- xxx**¹ customized
(shaft length rounded to next 0.5 mm,
e.g. 10.3 mm = 10.5 mm or 10 mm)

¹ Customized shaft length (AL)
AL measured from mounting face (see picture below)

Max. shaft length (AL):
 $\varnothing 1/4" = 25 \text{ mm}$
 $\varnothing 6 \text{ mm} = 50 \text{ mm}$



PIN STYLE | IP-SEALING

- 00** Soldering eyelets | IP60
- 20** Pins for PCB | IP60
- 30** Soldering eyelets | IP68
- 70** Pins for PCB | IP68

Ordering information

STANDARD TYPES¹

DETENT ANGLE 15°, SHORTING (NON-SHORTING NOT AVAILABLE)

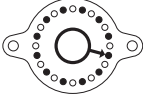
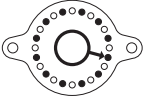
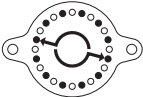
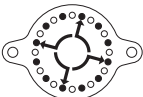
CONTACT ARRANGEMENT	NUMBER OF WAFERS	FUNCTION (POLES X POSITIONS)	PART NUMBER	
			WITH SOLDER EYELETS	WITH PINS FOR PCB
	1—H	1 x 24 endless rotating	04-1103	04-1103-20
	2—HH	2 x 24 endless rotating	04-2103	—
	3—HHH	3 x 24 endless rotating	04-3103	—
	4—HHHH	4 x 24 endless rotating	04-4103	—
	1—H	1 x 24	04-1133	04-1133-20
	2—HH	2 x 24	04-2133	—
	3—HHH	3 x 24	04-3133	—
	4—HHHH	4 x 24	04-4133	—
	1—H	2 x 11	04-1213	04-1213-20
	2—HH	4 x 11	04-2213	—
	3—HHH	6 x 11	04-3213	—
	4—HHHH	8 x 11	04-4213	—
	1—H	3 x 7	04-1373	04-1373-20
	2—HH	6 x 7	04-2373	—
	3—HHH	9 x 7	04-3373	—
	4—HHHH	12 x 7	04-4373	—
	1—H	4 x 5	04-1453	04-1453-20
	2—HH	8 x 5	04-2453	—
	3—HHH	12 x 5	04-3453	—
	4—HHHH	16 x 5	04-4453	—
	1—H	6 x 3	04-1633	04-1633-20
	2—HH	12 x 3	04-2633	—
	3—HHH	18 x 3	04-3633	—
	4—HHHH	24 x 3	04-4633	—

¹ For other types | options see ordering code

Ordering information

STANDARD TYPES¹

DETENT ANGLE 30°, NON-SHORTING (SHORTING ON REQUEST)

CONTACT ARRANGEMENT	NUMBER OF WAFERS	FUNCTION (POLES X POSITIONS)	PART NUMBER	
			WITH SOLDER EYELETS	WITH PINS FOR PCB
	1—H	1 x 12 endless rotating	04-1104	04-1104-20
	2—HH	2 x 12 endless rotating	04-2104	—
	3—HHH	3 x 12 endless rotating	04-3104	—
	4—HHHH	4 x 12 endless rotating	04-4104	—
	1—H	1 x 12	04-1124	04-1124-20
	2—HH	2 x 12	04-2124	—
	3—HHH	3 x 12	04-3124	—
	4—HHHH	4 x 12	04-4124	—
	1—H	2 x 6	04-1264	04-1264-20
	2—HH	4 x 6	04-2264	—
	3—HHH	6 x 6	04-3264	—
	4—HHHH	8 x 6	04-4264	—
	1—H	3 x 4	04-1344	04-1344-20
	2—HH	6 x 4	04-2344	—
	3—HHH	9 x 4	04-3344	—
	4—HHHH	12 x 4	04-4344	—
	1—H	4 x 3	04-1434	04-1434-20
	2—HH	8 x 3	04-2434	—
	3—HHH	12 x 3	04-3434	—
	4—HHHH	16 x 3	04-4434	—
	1—H	6 x 2	04-1624	04-1624-20
	2—HH	12 x 2	04-2624	—
	3—HHH	18 x 2	04-3624	—
	4—HHHH	24 x 2	04-4624	—

¹ For other types | options see ordering code

Ordering information

PACKAGING

Foam polystyrene box: 10 pieces

ACCESSORIES AND SPARE PARTS

Hex nut M10 x 0.75:

Part number 4124-21 (10 pieces / bag), brass, galvanized and passivated

Stop screw M1.4 :

Part number 4124-21 (10 pieces / bag), steel

Part number 4124-20 (100 pieces / bag), steel

Spacer:

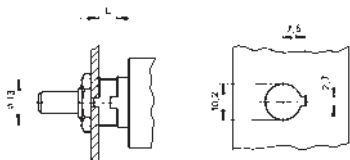
Spacers can be used in many cases instead of shortened bushes; made of glass-fibre reinforced plastic to compensate the front panel thickness; available in two standard lengths. Can not be used for IP68 versions.

Part number 4124-31 (10 pieces / bag), 3.5 mm length (L)

Part number 4124-30 (100 pieces / bag), 3.5 mm length (L)

Part number 4124-36 (10 pieces / bag), 5.5 mm length (L)

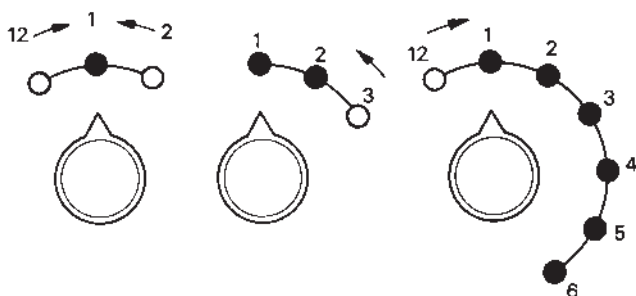
Part number 4124-35 (100 pieces / bag), 5.5 mm length (L)



Customized solutions

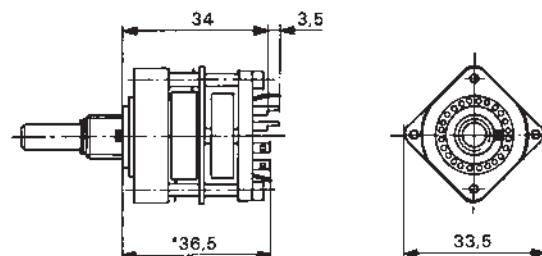
SWITCH WITH MOMENTARY CONTACT

EXAMPLES



● Detent position
○ Momentary contact

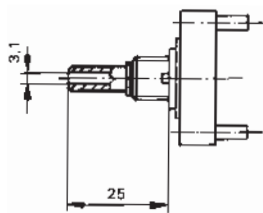
DIMENSIONS



*17.5 mm extra per wafer

HOLLOW SHAFT SYSTEM

HOLLOW SHAFT



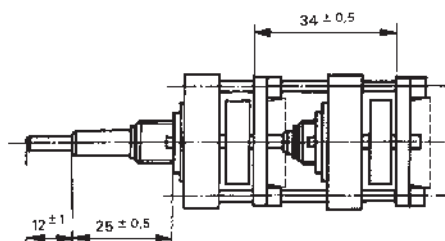
Available for switches up to 5 wafers.
Inner shaft ($\varnothing 3$ mm) must be ordered separately.

INNER SHAFT



For switches with mounting plate or hollow shaft.
Hollow shaft must be ordered separately.
Please state exact length.

SWITCHES WITH CONCENTRIC SHAFTS



Consisting of a hollow outer and inner shaft.
The inner shaft driving a max. of 3 wafers with 6 wipers each.
Please give type description of each switch.

Specifications

MECHANICAL DATA

Detent angle positions:	15° detent angle 24 positions 30° detent angle 12 positions
Rotary limitation end stop:	Configurable
Switching torque:	1.5, 8, 15 or 20 Ncm ($\pm 25\%$ in new condition)
Rotational life:	> 25'000 cycles (tested at room temperature)
Rotational stop strength:	> 250 Ncm
Fastening torque of nut (front panel mounting):	M10 x 0.75: < 300 Ncm

ELECTRICAL DATA

Electrical connection:	Soldering eyelets Pins for PCB
Switching voltage:	< 42 VDC (resistive load)
Switching current:	< 2'000 mA (resistive load)
Contact resistance:	< 10 m Ω (in new condition)
Switching capacity:	< 1 pF (between the contacts)
Switching function:	1 x 24 to 6 x 3 poles x positions per wafer, max. 8 wafers
Switching mode:	Shorting (for 15° and 30° detent angle) Non-shorting (for 30° detent angle)
Dielectric strength:	500 VDC during 60 s (pin-to-pin, pin-to-housing)
Insulation resistance:	> 1 G Ω at 500 VDC (pin-to-pin, pin-to-housing, in new condition)

MATERIALS

Shaft:	Stainless steel 1.4305
Bushing housing:	Zinc die casting (zinc plated and passivated)
Contact surface:	Cu alloy (Au plated)
Insulation material:	Wafer: PEAK or ceramic Rotor: Polybutylen (PB)
Soldering leads:	Cu alloy (Au plated)
Hex nut:	Brass (zinc plated and passivated)

ENVIRONMENTAL DATA

Operating temperature:	-40 to +85 °C (IEC 60068-2-14)
Storage temperature:	-40 to +85 °C (IEC 60068-2-14)
IP sealing against front panel:	IP60 without sealing IP68 with shaft and front panel sealing (2 bar, 1 h)
Vibration:	10 G _{RMS} at 10 to 2'000 Hz
Flammability:	UL94-HB

SOLDERING CONDITIONS

Hand soldering:	< 340 °C during 2 s
Wave soldering:	< 280 °C during 5 s

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ROTARY SWITCHES

CUSTOMIZED SOLUTIONS FOR YOUR APPLICATION

SYSTEM SOLUTIONS
BACKPLANES
ENCLOSURES & CABINETS
ROTARY SWITCHES

ROTARY SWITCHES FOR YOUR APPLICATION

CUSTOMER-SPECIFIC SOLUTIONS ARE STANDARD AT ELMA

Elma's Rotary Switches encompasses a broad range of switching and indicating solutions, control knobs, LEDs and terminals. They are the haptic and optical interface between human and machine. Our products appeal with high quality standards, reliability and performance. They are designed for demanding applications.

We serve all markets worldwide where rotary switches, knobs, LEDs and terminal solutions are needed. Whether your application is in audio, aircraft, industrial automation, construction, laboratory or test & measurement, Elma has the solution.

ENCODER



Are you looking for an encoder switch with high performance and broad variety? With Elma encoder switches you are at the right place. We provide mechanical and optical contact system solutions.



CODED SWITCHES



If your application calls for a coded switch, Elma's range includes various standard versions from simple and cost-effective, to multi-functional and even concentric versions.



MULTI FUNCTIONAL SWITCHES



Elma's multi-functional rotary switches offer hall effect or mechanical contact systems solutions to meet evolving technical requirements.



SELECTOR SWITCHES



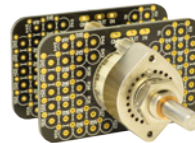
Elma's original range of mechanical selector switches contains the experience and know-how of more than 50 years. The innovative and robust design of the switches was made to meet the requirements of a wide range of possible applications.



AUDIO SOLUTIONS



Elma's audio solutions for perfection in sound. Our audio solutions provide unique control products to our customers.



KNOBS



Beautiful, rugged and functional knobs for every application: Knobs play an enormously important role in a product's user accessibility and its overall esthetics. Elma's plastic and soft touch collet knobs and metal setscrew knobs work with all industry-standard switches and controls. Our wide assortment ensures you will find a design that is perfect for your application.



Developing and producing rotary switches since 1960 we offer you our know how for your application. With millions of switches sold globally every year, Elma is sure to have the right switch available off the shelf. We can also work with your engineers to create just the right solution for your specific requirements. Our experts will answer your open questions and help you find a customized solution for your product.

Contact us at: www.elma.com/about/offices/

YOUR LOCAL SOLUTION PARTNER



Rotary Switches

- Coded Switches
- Encoders
- Selector Switches
- Knobs & Accessories
- LED Arrays & Terminals

System Solutions

Integrated Systems Chassis Platforms Backplanes Embedded Products Cabinets

Enclosures & Components

Enclosures Front Panels Handles

Rotary Switches

Switches/Encoders Knobs LEDs

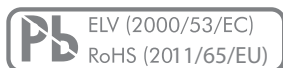
ELMA
Your Solution Partner

Product description

MAIN FEATURES

1/2" SELECTOR SWITCH

- › Dimensions Ø 1/2"
- › Switching mode: Shorting or non-shorting
- › 10, 12 and 16 selector switch positions
- › 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
- Switching torque with 3 or 6 Ncm
- Front panel sealing IP60 and IP68

TYPICAL APPLICATIONS

- Shaft style and material
- Bushing style
- Switching torque
- Number of poles
- Customizable end position

POSSIBLE CUSTOMIZATIONS

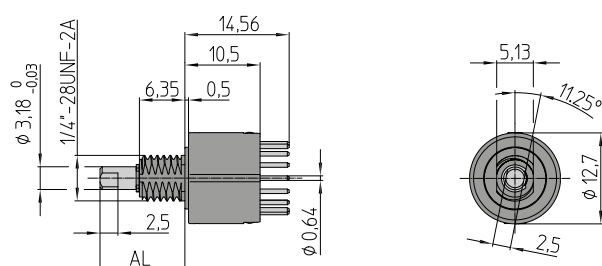
- Target aiming devices
- Night vision devices
- Interface solutions (socket plug)
- Shaft diameter
- Two way radios
- Cockpit applications (aircraft, automotive, construction machines, military vehicles)
- Portable devices (communication, medical, rescue, sports, transportation, measuring, photo / video)
- Test equipment

Dimensions and pin assignment

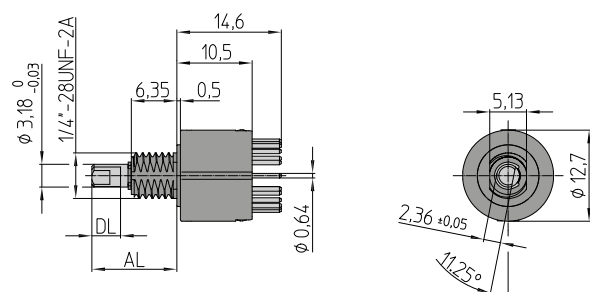
SWITCH DESIGN

	DL
	11.85 mm ± 0.3 mm
AL	4 mm
	16.35 mm ± 0.3 mm
	8.5 mm
	21.35 mm ± 0.3 mm
	13.5 mm

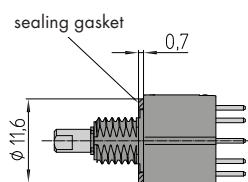
ROUND SHAFT



D-SHAFT



FRONT PANEL SEALING IP68



Dimensions in mm

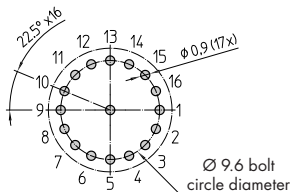
Tolerances according to DIN ISO 2768-1 (m), unless otherwise specified

Dimensions and pin assignment

DRILLING DIAGRAM AND FOOTPRINT

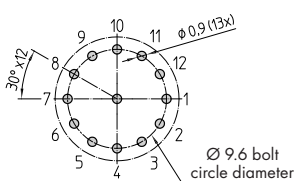
16 POSITIONS | 1 POLE

View from the PCB



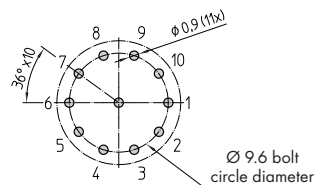
12 POSITIONS | 1 POLE

View from the PCB



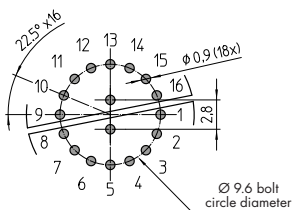
10 POSITIONS | 1 POLE

View from the PCB



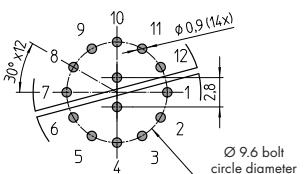
8 POSITIONS | 2 POLE

View from the PCB



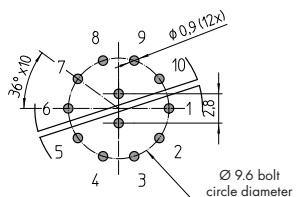
6 POSITIONS | 2 POLE

View from the PCB



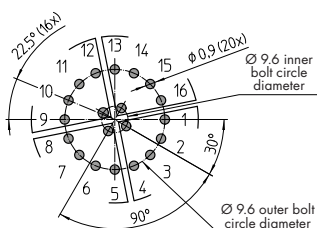
5 POSITIONS | 2 POLE

View from the PCB



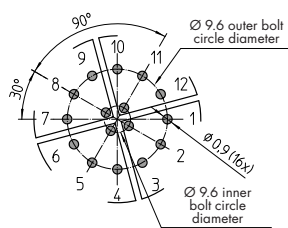
4 POSITIONS | 4 POLE

View from the PCB



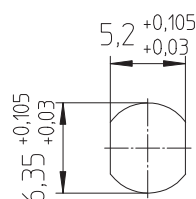
3 POSITIONS | 4 POLE

View from the PCB



FRONT PANEL CUT OUT

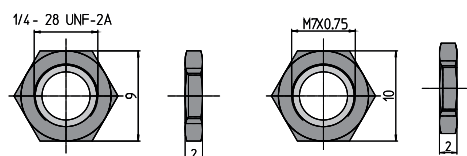
FOR BUSHING 1/4"-28 UNF-2A



Dimensions in mm
Tolerances according to DIN ISO 2768-1 (m), unless otherwise specified

NUT

HEX NUT (SUPPLIED)



Ordering information

ORDERING CODE

MR50	-	-	-	-	-	-	-	-	-
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DETENT ANGLE | POLE | SWITCHING MODE

A1	22.5°	1 pole	shorting
A2	22.5°	1 pole	non-shorting
A3	22.5°	2 pole	shorting
A4	22.5°	2 pole	non-shorting
A5	22.5°	4 pole	shorting
A6	22.5°	4 pole	non-shorting

B1	30°	1 pole	shorting
B2	30°	1 pole	non-shorting
B3	30°	2 pole	shorting
B4	30°	2 pole	non-shorting
B5	30°	4 pole	shorting
B6	30°	4 pole	non-shorting

C1	36°	1 pole	shorting
C2	36°	1 pole	non-shorting
C3	36°	2 pole	shorting
C4	36°	2 pole	non-shorting

Explanation see chapter «Technical explanations»

SHAFT STYLE (AL) AND MATERIAL

12	Ø 1/8" x 11.85 mm	round	stainless steel
13	Ø 1/8" x 11.85 mm	D-shaft	stainless steel
16	Ø 1/8" x 16.35 mm	round	stainless steel
17	Ø 1/8" x 16.35 mm	D-shaft	stainless steel
21	Ø 1/8" x 21.35 mm	round	stainless steel
22	Ø 1/8" x 21.35 mm	D-shaft	stainless steel

XX Customized solutions on request

Shaft dimensions and shape see drawing
 Ø 1/8" = Ø 3.18 mm

FACTORY SET CHARACTER

1

SWITCHING TORQUE

B	3 Ncm
D	6 Ncm

X Customized solutions on request

NUMBER OF POSITIONS

0	No end position (endless rotation)
1	End position between position 1 and last position
2	Positions
3	Positions
4	Positions
5	Positions
6	Positions
7	Positions
8	Positions
9	Positions
A	10 Positions
B	11 Positions
C	12 Positions
D	13 Positions
E	14 Positions
F	15 Positions

PACKAGING

- Antistatic tray (50 pieces)

MOUNTING | SWITCH ORIENTATION | STOP CONTACTS | IP-SEALING

Hex nut (supplied)

A	1/4"-28 UNF-2A x 6.35 mm	vertical THT	PCB assembly	IP60
B	1/4"-28 UNF-2A x 6.35 mm	vertical THT	PCB assembly	IP68

X Customized solutions on request

Central mounting dimension and shape see drawing
 1/4" = 6.35 mm

Ordering information

PREFERENCE TYPES SELECTION CHART¹

IP-SEALING	SWITCHING MODE	DETENT ANGLE POSITIONS	SWITCHING TORQUE	PART NUMBER
IP68	Shorting	22.5° 16	3 Ncm	MR50-A11B-B113
			6 Ncm	MR50-A11B-D113
		30° 12	3 Ncm	MR50-B11B-B113
			6 Ncm	MR50-B11B-D113
		36° 10	3 Ncm	MR50-C11B-B113
			6 Ncm	MR50-C11B-D113
	Non-shorting	22.5° 16	3 Ncm	MR50-A21B-B113
			6 Ncm	MR50-A21B-D113
		30° 12	3 Ncm	MR50-B21B-B113
			6 Ncm	MR50-B21B-D113
		36° 10	3 Ncm	MR50-C21B-B113
			6 Ncm	MR50-C21B-D113

PACKAGING

Antistatic blister box: 50 pieces

ACCESSORIES AND SPARE PARTS

Hex nut: 1/4"-28 UNF-2A
Part number 4516-50 (50 pieces / bag), brass, nickel plated

¹ For other types | options see ordering code

Specifications

MECHANICAL DATA

Detent angle positions:	22.5° detent angle 16 positions 30° detent angle 12 positions 36° detent angle 10 positions
Rotary limitation end stop:	Configurable
Switching torque:	3 or 6 Ncm (±30 % over life time)
Rotational life:	> 20'000 cycles (tested at room temperature)
Allowed shaft load:	400 N push, 400 N pull and 200 N side force (static at 10 mm from supporting surface)
Rotational stop strength:	> 85 Ncm
Fastening torque of nut (front panel mounting):	1/4"-28 UNF-2A: < 170 Ncm

ELECTRICAL DATA

Electrical connection:	Pins Ø 0.9 mm
Switching voltage:	< 28 VDC (resistive load)
Switching current:	< 200 mA (resistive load)
Contact resistance:	< 50 mΩ (in new condition)
Switching mode:	Shorting or non-shorting
Dielectric strenght:	500 VDC during 60 s (pin-to-pin, pin-to-housing)
Insulation resistance:	> 1 GΩ at 500 VDC (pin-to-pin, pin-to-housing, in new condition)

MATERIALS

Shaft:	Stainless steel 1.4305
Bushing housing:	Zinc die casting (nickel plated)
Contact surface:	Cu alloy (Au plated)
Soldering leads:	Cu alloy (nickel and tin plated)
Hex nut:	Brass (nickel plated)
Snap ring:	Spring steel (nickel plated)
O-rings:	FPM (Viton), 70 shore
Front panel sealing:	MVQ (silicone), 60 shore

ENVIRONMENTAL DATA

Operating temperature:	-45 to +85 °C (IEC 60068-2-14)
Storage temperature:	-50 to +125 °C (IEC 60068-2-14)
Humidity:	< 93 % relative humidity (MIL-STD-202G, method 103B, condition B)
IP sealing against front panel:	IP60 without sealing IP68 with shaft and front panel sealing (2 bar, 1 h)
Vibration:	10 G _{RMS} at 10 to 2'000 Hz (MIL-STD-202G, method 214A, condition 1/C)
Shock:	100 G (MIL-STD-202G, method 213B, condition C)
Flammability:	UL94-V0 Gaskets UL94-HB

SOLDERING CONDITIONS

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

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