

# Important Facts on Switches

## Contact Material

Elma Switches designed for electronic applications are available with gold flash and 3µm gold contacts. 3µm gold contacts display the highest contact corrosion resistance and thus provide the highest switch reliability. They are especially suitable for

- very small currents (dry switch circuits)
- infrequent switching
- high reliability

Gold flash contacts can also be used in applications with regular switching intervals.

**If switches are stored for longer periods, we recommend vacuum packing.**

## Durability

We base the durability (life expectancy) of our switches on the assumption that the specified load values are not exceeded. A higher load triggers a deterioration of the contact surface which reduces life considerably. Also,

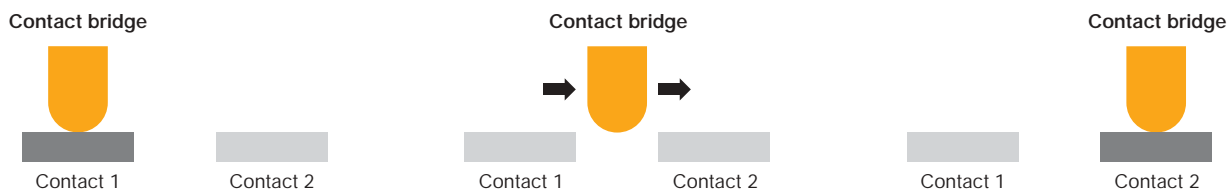
- one full switching cycle consists of a rotation across all positions and back again
- one rotation (switch without end stop) equals 360°
- one detent defines a rotation from one position to the next

## Cleaning of soldered printed circuit boards

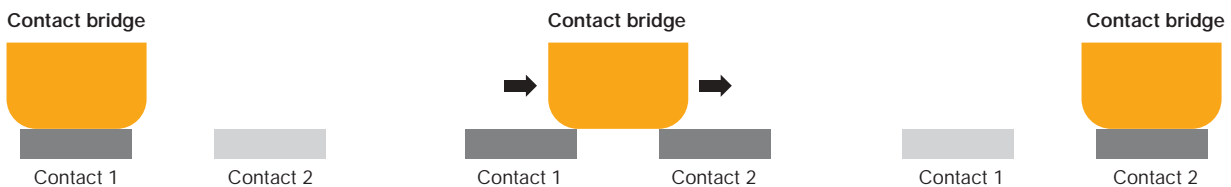
With the use of modern flow mediums, a cleaning of the PCB after soldering has often become unnecessary. However, if you plan on a cleaning, please see page 58 or contact us for information regarding the recommended approach for that particular product.

## Switching modes

Non-shorting (break before make):



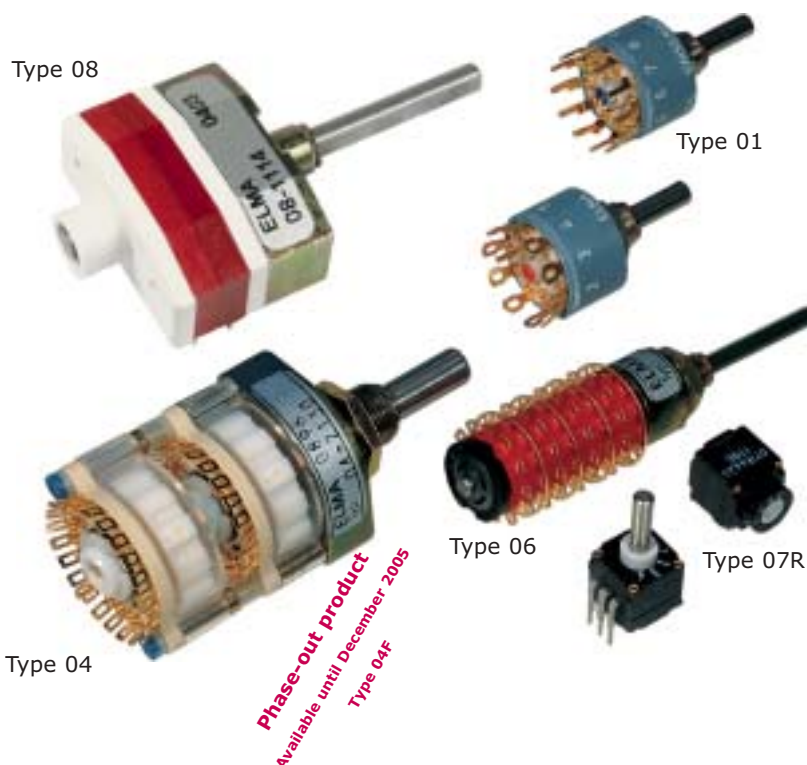
Shorting (make before break):



# Rotary Switches Overview

- with steel spindle-shaft and high grade plastic housing suitable for hand or wave soldering
- for rugged applications

Our ability to adapt existing components to your application, makes Elma your preferred solution partner.



## Technical Data

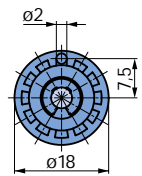
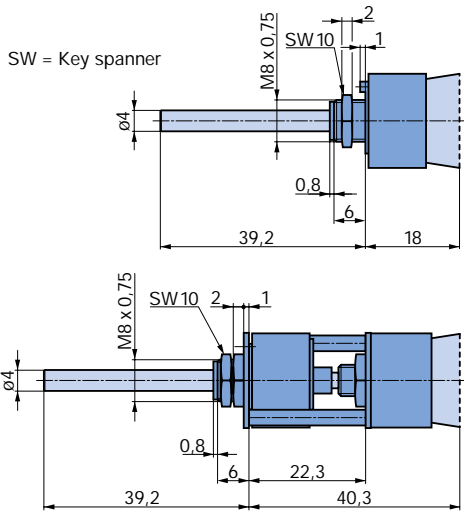
Designation	Type 01	Type 04	Type 04F	Type 06	Type 07R	Type 08
<b>Dimension</b>	Ø 18 mm	Ø 32 mm	41 x 34 mm	Ø 17 mm	10 x 10 mm	31 x 13 mm
<b>Number of positions</b>	12	24	24	12	4	12
<b>Function (Pole x Position)</b>	1 x 12 2 x 6 3 x 4 4 x 3 1 x 10 1 x 6 2 x 3 4 x 2	1 x 24 2 x 11 3 x 7 4 x 5 6 x 3	1 x 24 2 x 12 1 x 12 u. 2 x 6 u.	1 x 12 2 x 6 3 x 4 4 x 3	1 x 4	1 x 12 2 x 6 3 x 4 4 x 3
<b>Max. number of wafers</b>	2	any	any	8	1	8
<b>Indexing angle</b>	30°, 36°, 60°	15°, 30°	15°, 30°	30°	36°	30°
<b>Processing</b>	hand and wave soldering	hand and wave soldering		hand soldering	wave soldering reflow (on req.)	wave soldering
<b>Assembly on print (PCB)</b>	vertical	vertical	IDC-cabel with connector	-	horizontal/vertical	horizontal
<b>Contact material</b>	gold flash, gold 3µm	gold flash, gold 3µm	gold 3µm	gold flash, gold 3µm	gold 3µm	gold 3µm
<b>Life expectancy (switching cycles)</b>	> 25 000	> 25 000	> 25 000	> 25 000	> 40 000	> 25 000
<b>max. switch load</b>	2V/1,0A 24V/0,5A 42V/0,4A	2V/2,0A 24V/0,6A 42V/0,4A	2V/1,0A 24V/0,6A 42V/0,4A	1V/1,5A 24V/0,3A 42V/0,2A	<24V/5VA 2V/0,2A 24V/0,2A 42V/0,12A	1V/1,5A 24V/0,3A 42V/0,2A
	page 23-24	page 25-26	page 27-28	page 29-30	page 31-32	page 33-34
<b>Technical Data</b>	page 94-99	page 100-106	page 107-113	page 114-119	page 120-124	page 125-130

# Rotary Switches Type 01

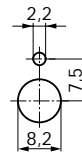
- 12 position switch
- life expectancy > 25 000 switching cycles
- steel spindle-shaft and metal bush for rugged applications
- modular system allows easy adaptation of standard products
- gold flash contact standard



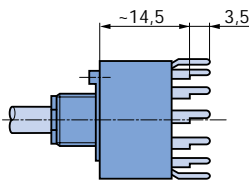
## With solder eyelets



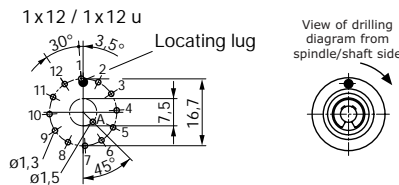
Front panel cut out



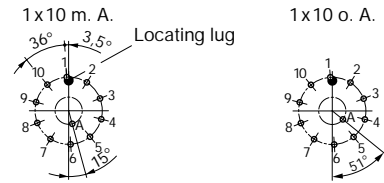
## With solder pins for PCB mounting



Drilling diagram for indexing angle 30°



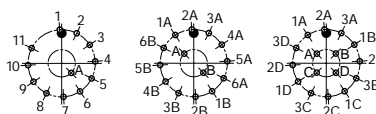
Drilling diagram for indexing 36°



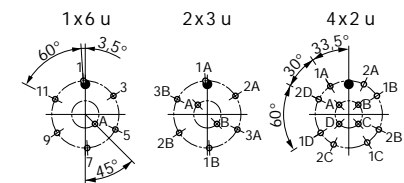
## Possible modifications on request

- special type of shaft (length, diameter, form)
- special torque
- waterproof
- special end stop
- shortened bush
- hollow shaft/inner shaft

1x11 / 1x11 u 2x6 / 2x6 u 4x3 / 4x3 u



Drilling diagram for indexing angle 60°




### Indexing angle 30°, shorting

Contact arrangement	Construction	Function (Pole x Position)	with solder eyelets		with pins for PCB	
			gold flash	gold 3 µm	gold flash	gold 3 µm
		1 x 12 o.A.	01-1120	01-1123	01-1120-20	01-1123-20
		2 x 12 o.A.	01-2120	01-2123	-	-
		1 x 12	01-1180	01-1183	01-1180-20	01-1183-20
		2 x 12	01-2180	01-2183	-	-
		1 x 11	01-1110	01-1113	01-1110-20	01-1113-20
		2 x 11	01-2110	01-2113	-	-
		2 x 6	01-1260	01-1263	01-1260-20	01-1263-20
		4 x 6	01-2260	01-2263	-	-
		4 x 3	01-1430	01-1433	01-1430-20	01-1433-20
		8 x 3	01-2430	01-2433	-	-

packing unit : 10 pieces

### Indexing angle 30°, non-shorting


Contact arrangement	Construction	Function (Pole x Position)	with solder eyelets		with pins for PCB	
			gold flash	gold 3 µm	gold flash	gold 3 µm
		1 x 12 u.o.A.	01-1121	01-1124	01-1121-20	01-1124-20
		1 x 12 u.	01-1181	01-1184	01-1181-20	01-1184-20
		1 x 11 u.	01-1111	01-1114	01-1111-20	01-1114-20
		2 x 6 u.	01-1261	01-1264	01-1261-20	01-1264-20
		4 x 3 u.	01-1431	01-1434	01-1431-20	01-1434-20

 available on request

packing unit : 10 pieces

### Indexing angle 36°, shorting

Contact arrangement	Construction	Function (Pole x Position)	with solder eyelets		with pins for PCB	
			gold flash	gold 3 µm	gold flash	gold 3 µm
		1 x 10 o.A.	01-1100	01-1103	01-1100-20	01-1103-20
		1 x 10	01-1190	01-1193	01-1190-20	01-1193-20

 available on request

packing unit : 10 pieces

### Indexing angle 60°, non-shorting

Contact arrangement	Construction	Function (Pole x Position)	with solder eyelets		with pins for PCB	
			gold flash	gold 3 µm	gold flash	gold 3 µm
		1 x 6 u.o.A.	01-1101	01-1104	01-1101-20	01-1104-20
		1 x 6 u.	01-1161	01-1164	01-1161-20	01-1164-20
		2 x 3 u.	01-1231	01-1234	01-1231-20	01-1234-20
		4 x 2 u.	01-1421	01-1424	01-1421-20	01-1424-20

 available on request

packing unit : 10 pieces

### Stop pins

Packing unit	Order Number
10 pieces	4007-36
50 pieces	4007-35

 Contact arrangement from the spindle side  
 u. = non-shorting, o.A. = without end stop, can **not** be adjusted subsequently!

Items available from stock!

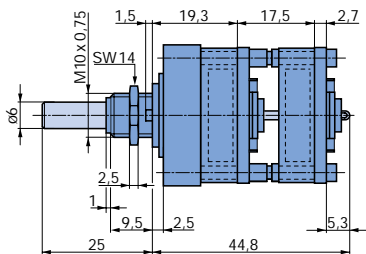
# Rotary Switches Type 04

- 24 position switch
- life expectancy > 25 000 switching cycles
- steel spindle-shaft and metal bush for rugged applications
- modular system allows easy adaptation of standard products
- gold flash contact standard

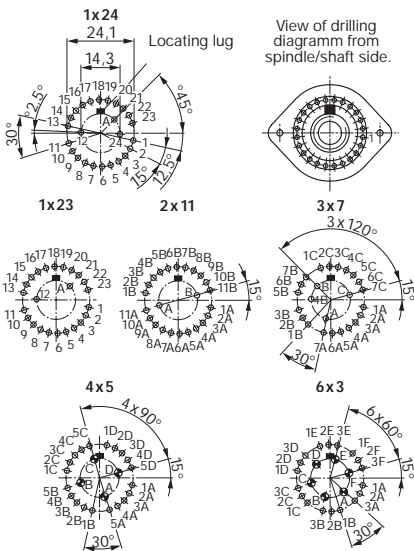


## With solder eyelets

SW = key spanner



Drilling diagram for indexing angle 15°

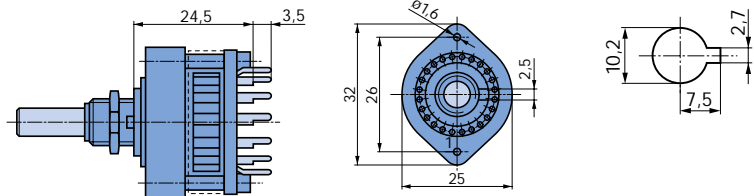


## Possible modifications on request

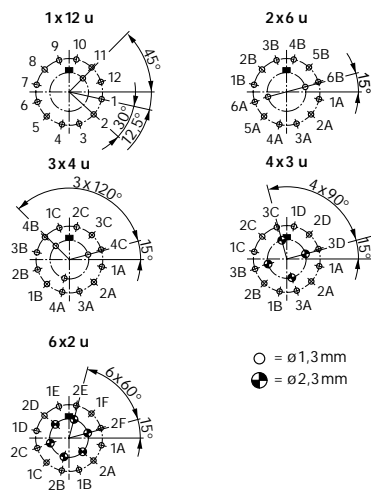
- special type of shaft (length, diameter, form)
- special torque
- waterproof
- special end stop
- shortened bush
- hollow shaft/inner shaft

## With solder pins for PCB mounting

Front panel cut out









Drilling diagram for indexing angle 30°









Stop screws M 1,4	(package of 10 pieces)	4124-21
Stop screws M 1,4	(package of 100 pieces)	4124-20
Bushing Nut	(package of 10 pieces)	4124-41

**Indexing angle 15°, shorting (non-shorting on request)**

Contact arrangement	Construction	Function (Pole x Position)	with solder eyelets		with pins for PCB	
			gold flash	gold 3 µm	gold flash	gold 3 µm
	1—H	1 x 24 o.A.	04-1100	04-1103	04-1100-20	04-1103-20
	2—HH	2 x 24 o.A.	04-2100	04-2103	—	—
	3—HHH	3 x 24 o.A.	04-3100	04-3103	—	—
	4—HHHH	4 x 24 o.A.	04-4100	04-4103	—	—
	1—H	1 x 24	04-1130	04-1133	04-1130-20	04-1133-20
	2—HH	2 x 24	04-2130	04-2133	—	—
	3—HHH	3 x 24	04-3130	04-3133	—	—
	4—HHHH	4 x 24	04-4130	04-4133	—	—
	1—H	2 x 11	04-1210	04-1213	04-1210-20	04-1213-20
	2—HH	4 x 11	04-2210	04-2213	—	—
	3—HHH	6 x 11	04-3210	04-3213	—	—
	4—HHHH	8 x 11	04-4210	04-4213	—	—
	1—H	3 x 7	04-1370	04-1373	04-1370-20	04-1373-20
	2—HH	6 x 7	04-2370	04-2373	—	—
	3—HHH	9 x 7	04-3370	04-3373	—	—
	4—HHHH	12 x 7	04-4370	04-4373	—	—
	1—H	4 x 5	04-1450	04-1453	04-1450-20	04-1453-20
	2—HH	8 x 5	04-2450	04-2453	—	—
	3—HHH	12 x 5	04-3450	04-3453	—	—
	4—HHHH	16 x 5	04-4450	04-4453	—	—
	1—H	6 x 3	04-1630	04-1633	04-1630-20	04-1633-20
	2—HH	12 x 3	04-2630	04-2633	—	—
	3—HHH	18 x 3	04-3630	04-3633	—	—
	4—HHHH	24 x 3	04-4630	04-4633	—	—

packing unit : 10 pieces

**Indexing angle 30°, non-shorting**

Contact arrangement	Construction	Function (Pole x Position)	with solder eyelets		with pins for PCB	
			gold flash	gold 3 µm	gold flash	gold 3 µm
	1—H	1 x 12 u.o.A.	04-1101	04-1104	04-1101-20	04-1104-20
	2—HH	2 x 12 u.o.A.	04-2101	04-2104	—	—
	3—HHH	3 x 12 u.o.A.	04-3101	04-3104	—	—
	4—HHHH	4 x 12 u.o.A.	04-4101	04-4104	—	—
	1—H	1 x 12 u.	04-1121	04-1124	04-1121-20	04-1124-20
	2—HH	2 x 12 u.	04-2121	04-2124	—	—
	3—HHH	3 x 12 u.	04-3121	04-3124	—	—
	4—HHHH	4 x 12 u.	04-4121	04-4124	—	—
	1—H	2 x 6 u.	04-1261	04-1264	04-1261-20	04-1264-20
	2—HH	4 x 6 u.	04-2261	04-2264	—	—
	3—HHH	6 x 6 u.	04-3261	04-3264	—	—
	4—HHHH	8 x 6 u.	04-4261	04-4264	—	—
	1—H	3 x 4 u.	04-1341	04-1344	04-1341-20	04-1344-20
	2—HH	6 x 4 u.	04-2341	04-2344	—	—
	3—HHH	9 x 4 u.	04-3341	04-3344	—	—
	4—HHHH	12 x 4 u.	04-4341	04-4344	—	—
	1—H	4 x 3 u.	04-1431	04-1434	04-1431-20	04-1434-20
	2—HH	8 x 3 u.	04-2431	04-2434	—	—
	3—HHH	12 x 3 u.	04-3431	04-3434	—	—
	4—HHHH	16 x 3 u.	04-4431	04-4434	—	—
	1—H	6 x 2 u.	04-1621	04-1624	04-1621-20	04-1624-20
	2—HH	12 x 2 u.	04-2621	04-2624	—	—
	3—HHH	18 x 2 u.	04-3621	04-3624	—	—
	4—HHHH	24 x 2 u.	04-4621	04-4624	—	—
PCB wafer switch	1—H	0 – 9 BCD u.				04P1913

 Contact arrangement from the spindle side u. = non-shorting, o.A. = without end stop, can **not** be adjusted subsequently!

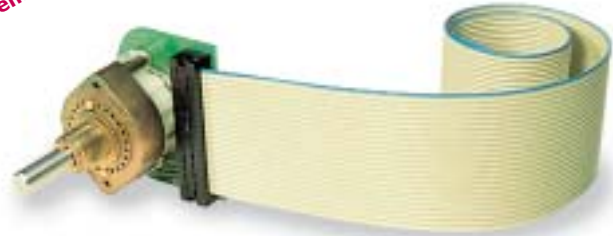
packing unit : 10 pieces

**1 mm = 0.04 inch, 1 inch = 25.4 mm**

# Rotary Switches Type 04F with IDC Cable

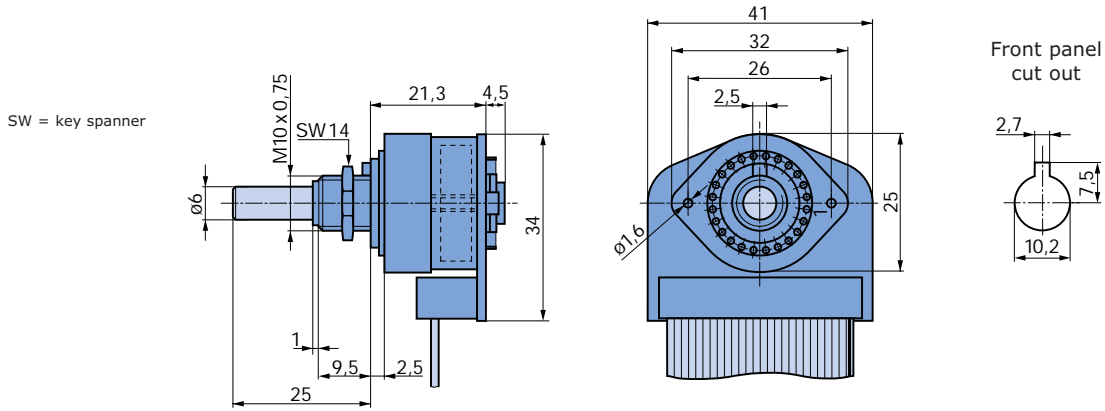
- 24 position switch
- plug-in instead of soldering
- reduces your production cost
- no errors due to incorrect wiring
- facilitates maintenance and reduces downtime

**Phase-out product**  
Available until December 2005



**Plug and Switch!**

## With IDC cable



IDC-Cable: AWG 28, pitch 0,05", 26 pole

## Possible modifications on request

- special type of shaft (length, diameter, form)
- special torque
- waterproof
- special end stop
- shortened bush
- hollow shaft/inner shaft

Phase-out product  
Available until December 2005

**Indexing angle 15°, shorting**

Connection diagram	Number of wafer	Function (Pole x Position)	Order number
	1	1 x 24	04F1133
	1	2 x 12	04F1213

packing unit : 4 pieces

**Indexing angle 30°, non-shorting**

Connection diagram	Number of wafer	Function (Pole x Position)	Order number
	1	1 x 12 u.	04F1124
	1	2 x 6 u.	04F1264

u. = non shorting  
incl. 30 cm cable

packing unit : 4 pieces

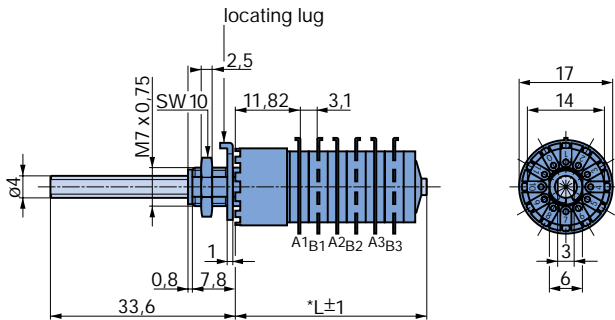


# Rotary Switches Type 06

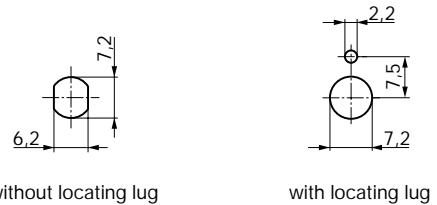
- 12 position switch
- compact multi wafer switch for front panel mounting
- life expectancy > 25 000 switching cycles
- steel spindle-shaft and metal bush for rugged applications
- gold flash contact standard



## With solder eyelets



Front panel cut out



SW = Key spanner

Ax = common contact half of wafer x  
 Bx = discrete contact half of wafer x















*L = 1 wafer	21 mm
2 wafers	28 mm
3 wafers	35 mm
4 wafers	42 mm
per wafer more	+7 mm

### Possible modifications on request

- special type of shaft (length, form)
- special torque
- special end stop
- shortened bush
- hollow shaft/inner shaft















Stop screws M 1,2 (package of 10 pieces)	4224-11
Stop screws M 1,2 (package of 100 pieces)	4224-10

### Indexing angle 30°, shorting

Contact arrangement from spindle/shaft side common contact half	discrete contact half	Function (Pole x Position)	Number of wafers	gold flash	gold 3 μm
		1 x 12 o.A. 2 x 12 o.A. 3 x 12 o.A. 4 x 12 o.A.	1 2 3 4	06-1100 06-2100 06-3100 06-4100	06-1103 06-2103 06-3103 06-4103
		1 x 12 2 x 12 3 x 12 4 x 12	1 2 3 4	06-1110 06-2110 06-3110 06-4110	06-1113 06-2113 06-3113 06-4113
		2 x 6 4 x 6 6 x 6 8 x 6	1 2 3 4	06-1260 06-2260 06-3260 06-4260	06-1263 06-2263 06-3263 06-4263
		3 x 4 6 x 4 9 x 4 12 x 4	1 2 3 4	06-1340 06-2340 06-3340 06-4340	06-1343 06-2343 06-3343 06-4343
		4 x 3 8 x 3 12 x 3 16 x 3	1 2 3 4	06-1430 06-2430 06-3430 06-4430	06-1433 06-2433 06-3433 06-4433
   	jumper	Binary code 0-11	2	06-2910	06-2913

packing unit : 10 pieces

### Indexing angle 30°, non-shorting

Contact arrangement from spindle/shaft side common contact half	discrete contact half	Function (Pole x Position)	Number of wafers	gold flash	gold 3 μm
		1 x 12 u.o.A. 2 x 12 u.o.A. 3 x 12 u.o.A. 4 x 12 u.o.A.	1 2 3 4	06-1101 06-2101 06-3101 06-4101	06-1104 06-2104 06-3104 06-4104
		1 x 12 u. 2 x 12 u. 3 x 12 u. 4 x 12 u.	1 2 3 4	06-1111 06-2111 06-3111 06-4111	06-1114 06-2114 06-3114 06-4114
		2 x 6 u. 4 x 6 u. 6 x 6 u. 8 x 6 u.	1 2 3 4	06-1261 06-2261 06-3261 06-4261	06-1264 06-2264 06-3264 06-4264
		3 x 4 u. 6 x 4 u. 9 x 4 u. 12 x 4 u.	1 2 3 4	06-1341 06-2341 06-3341 06-4341	06-1344 06-2344 06-3344 06-4344
		4 x 3 u. 8 x 3 u. 12 x 3 u. 16 x 3 u.	1 2 3 4	06-1431 06-2431 06-3431 06-4431	06-1434 06-2434 06-3434 06-4434
   	jumper	Binary code 0-11 u.	2	06-2911	06-2914

 Contact arrangement from the spindle side u. = non-shorting, o.A. = without end stop, can **not** be adjusted subsequently!

packing unit : 10 pieces

1 mm = 0.04 inch, 1 inch = 25.4 mm

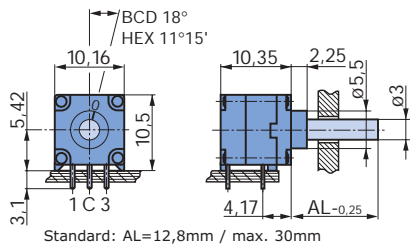
Items available from stock!

# Rotary Switches Type 07R

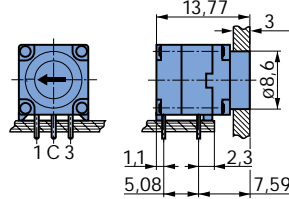
- 4 position switch
- life expectancy > 40 000 switching cycles
- steel spindle-shaft
- screwdriver actuation
- sealable up to IP 68 (2bar)
- reflow version available



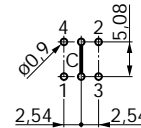
## Horizontal



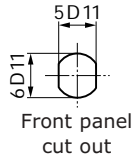
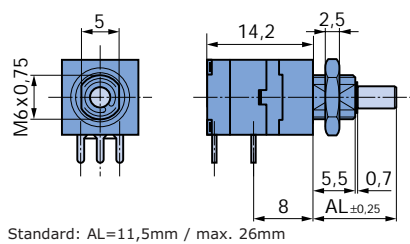
## Front panel operation



View of drilling diagram from component side

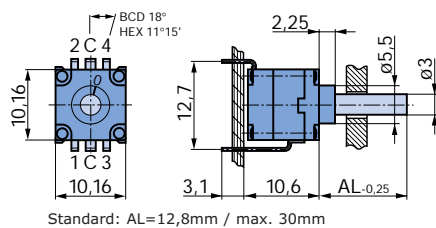


## Horizontal for panel mounting

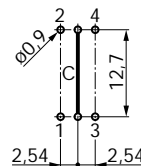


Waterproof (WD)  
O-Ring and nut supplied

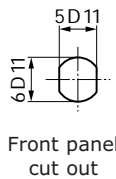
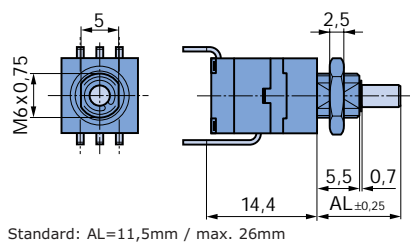
## Vertical



View of drilling diagram from component side



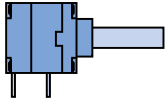
## Vertical for panel mounting



### Possible modifications on request

- special type of shaft (length, form)
- special torque
- waterproof
- different number of positions (internal stop)
- shortened bush
- panel mounting
- anti-static packaging

## Horizontal

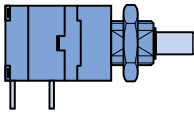


### With spindle-shaft

Contact arrangement	Switching function Indexing angle	Function (Pole x Position)	Order number
	shorting 36°	1 x 4	07R1423
	non-shorting 36°	1 x 4 u.	07R1424

packing unit : 50 pieces

### With spindle-shaft panel mounting / waterproof IP 68 / 2bar

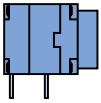


Contact arrangement	Switching function Indexing angle	Function (Pole x Position)	Order number
	shorting 36°	1 x 4	07R1423-30000
	non-shorting 36°	1 x 4 u.	07R1424-30000

O-Ring and nut supplied

packing unit : 50 pieces

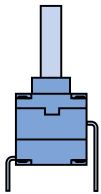
### For front panel operation / screwdriver actuation



Contact arrangement	Switching function Indexing angle	Function (Pole x Position)	Order number
	shorting 36°	1 x 4	07R4423
	non-shorting 36°	1 x 4 u.	07R4424

packing unit : 50 pieces

## Vertical

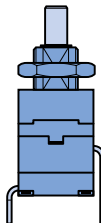


### With spindle-shaft

Contact arrangement	Switching function Indexing angle	Function (Pole x Position)	Order number
	shorting 36°	1 x 4	07R3423
	non-shorting 36°	1 x 4 u.	07R3424

packing unit : 50 pieces

### With spindle-shaft panel mounting / waterproof IP 68 / 2bar

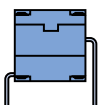


Contact arrangement	Switching function Indexing angle	Function (Pole x Position)	Order number
	shorting 36°	1 x 4	07R3423-30000
	non-shorting 36°	1 x 4 u.	07R3424-30000

O-Ring and nut supplied

packing unit : 50 pieces

### Screwdriver actuation



Contact arrangement	Switching function Indexing angle	Function (Pole x Position)	Order number
	shorting 36°	1 x 4	07R2423
	non-shorting 36°	1 x 4 u.	07R2424

packing unit : 50 pieces

1 mm = 0.04 inch, 1 inch = 25.4 mm

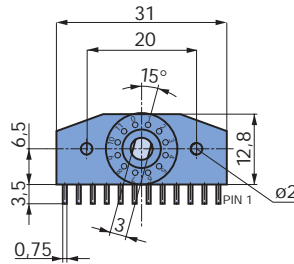
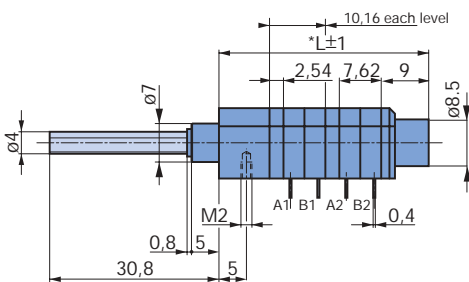
Items available from stock!

# Rotary Switches Type 08

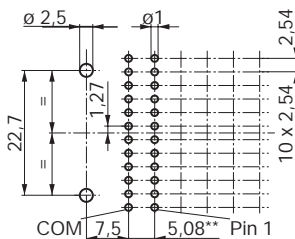
- 12 position switch
- life expectancy > 25 000 switching cycles
- steel spindle-shaft and metal bush for rugged applications
- for PCB mounting
- temperature range (-40 °C to +85 °C)
- gold 3µm contact standard



## With pins for PCB mounting



Contact arrangement



Ax = common contact half of wafer x  
Bx = discrete contact half of wafer x

\*L = 1 wafer 28 mm  
2 wafers 38,16 mm  
3 wafers 48,32 mm  
4 wafers 58,48 mm  
per wafer more + 10,16 mm

\*\* All further steps are in 5,08mm

## Possible modifications on request

- special type of shaft (length, form)
- special torque
- special end stop
- hollow shaft/inner shaft

Stop Screws M 1,2 (package of 10 pieces)	4224-11
Stop Screws M 1,2 (package of 100 pieces)	4224-10
Fixing screws M 2 x 6 (package of 10 pieces)	4224-01