

# MULTI ROTARY SWITCH TYPE X4

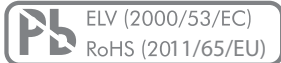
## MAIN FEATURES

HIGH PERFORMANCE, HALL-SENSED CODED SWITCH WITH PARALLEL AND UART INTERFACE

- 12, 24 or 47/48 positions, with selectable end stop
- 1.5 to 20 Ncm switching torque
- Up to 1 Mio switching cycles
- Absolute code with analog and PWM outputs, or encoder output
- Selectable parallel or UART interface
- Optional push button function
- 2.85 to 5.25 VDC operating voltage
- -30 to +85°C operation, with optional IP68 sealing

MIL-STD-202G

MIL-STD-810F



## POSSIBLE CUSTOMIZATIONS

- Shaft styles and Indexing feel
- Connectors, cabling and pinning
- Operating voltage; up to 32 VDC
- Interfacing; i.e. SPI, I<sup>2</sup>C or CAN

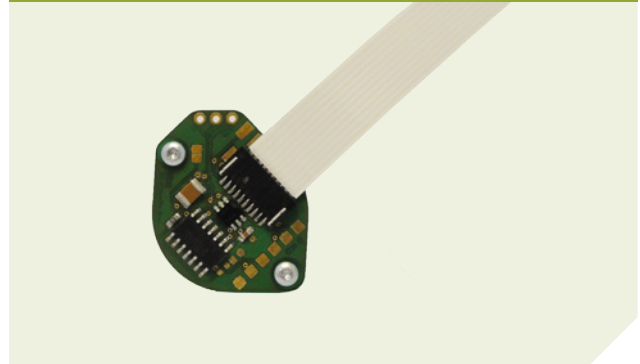
## TYPICAL APPLICATIONS

- Construction site and transportation controls
- Tool machines and defense applications

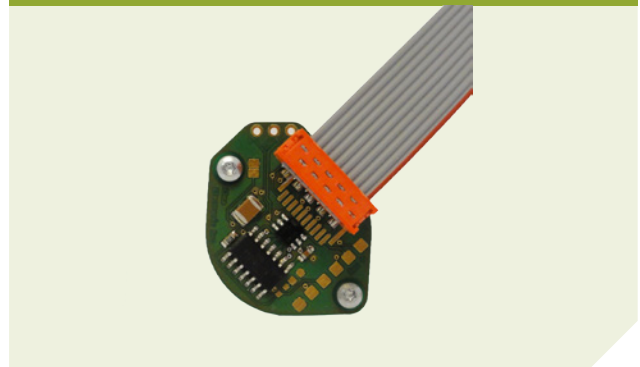
### TYPE X4



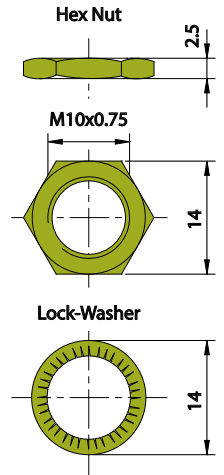
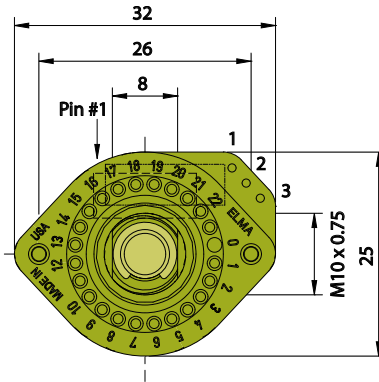
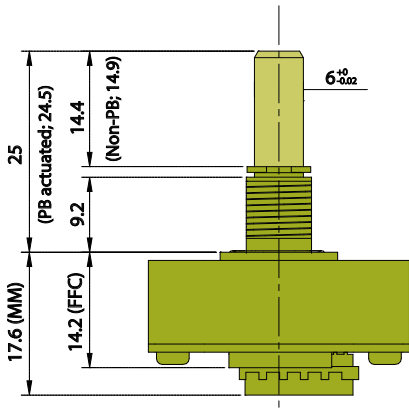
### TYPE X4 (WITH FFC CONNECTOR)



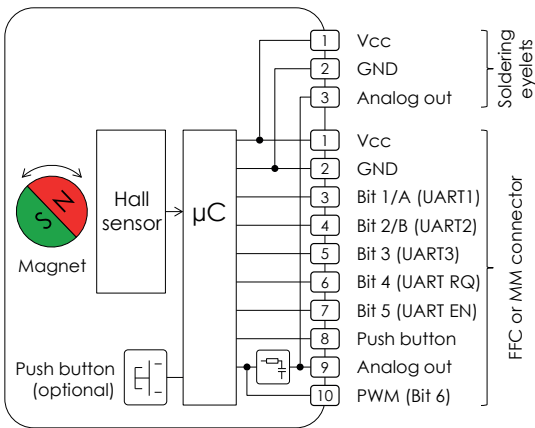
### TYPE X4 (WITH MICROMATCH CONNECTOR)



**DIMENSIONS (mm)**



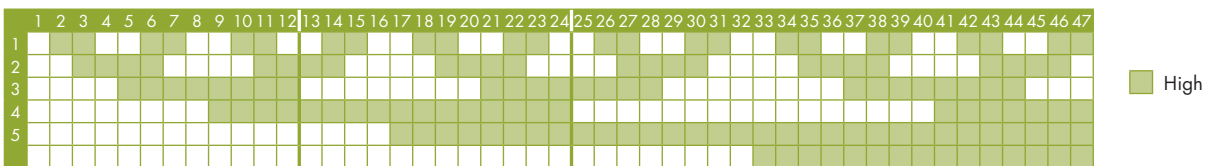
**CIRCUIT AND PIN ALLOCATION**



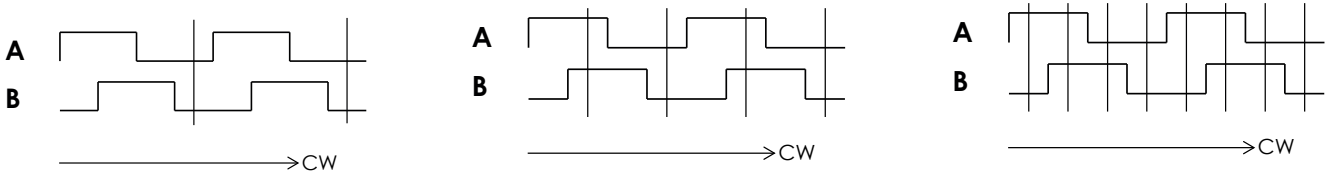
External magnetic fields may interfere function!

**ABSOLUTE CODE OUTPUT (GRAY)**

Absolute Code Output (Gray)



**ENCODER OUTPUT**



12 positions

24 positions

48 positions

Or UART1

UART 2

UART 3

(The corresponding UARTs 1, 2 and 3 send every changing position a command)

## SPECIFICATIONS

### MECHANICAL RATING

Indexing Resolution:	12 positions (30° Indexing; 330° travel), 24 positions (15° indexing; 345° travel) or 47 positions (7.5° indexing; 345° travel, continuously rotating and encoder have 48 positions)
Switching torque:	12 or 24 positions; 1.5, 4, 8, 15 or 20 Ncm (+/- 30%, over temperature range and life) 47/48 positions; 1.5, 2.5 or 5 Ncm (+/- 30%, over temperature range and life)
Rotational life:	1 Mio cycles with 1.5 Ncm switching torque or no indexing, 250k cycles with 4 or 8 Ncm switching torque, 50k cycles with 15 or 20 Ncm switching torque (over temperature range, at 120 RPM)
Shaft strength:	1000 N push, 200 N pull, 2 00 N side force min. (all static, against housing, for 60 sec. max.)
End-Stop strength:	250 Ncm min. (push button not actuated)
Connector:	FFC (10 positions, 1 mm pitch, top contacts), or MicroMaTch, (10 positions)

### ELECTRICAL RATING

Operating voltage (Vcc):	2.85 to 5.25 VDC (stabilized, 20 mVpp max. ripple). With 47/48 pos. or encoder option; 2.85 to 3.15 VDC
Current consumption:	25 mA max. (at 5 VDC, steady state, room temperature and no load condition)
Digital outputs:	Push/pull, 1 mA max. per output pin
UART interface:	38.4k baud, 1 byte non-inverted, even parity, 1 stop bit. UART mode is to be activated by soldering jumper or by setting Pin# 7 (UART EN) low. UART remains silent when switch is not operated.
Absolute code:	Parallel output; 12, 24 or 47/48 positions Gray code, toggle free. UART commands; 0 to 11/23/46/47dec depending on indexing resolution, press push button adds 100dec. A command is sent initially, approx. 500 ms after power-on, at every changing position or push button actuation, or upon request (set pin# 6 low).
Encoder:	Parallel output; 12 PPR (pulses per revolution), A leading B (in clockwise direction), toggle free. UART commands; silent=21dec, step left=22dec, step right=25dec, press push button adds 16dec.
Push button:	Active high
Analogue output:	Ratiometric; from 0 VDC to Vcc, proportional to switch position (ccw), output resistance; 1k ohm typ., ripple; 60 mVpp typ. (over temperature range, at 5 VDC), output voltage calculation (nom.) = $[V_{cc} / (\text{total positions} - 1)] \times (\text{actual position} - 1)$ . Not available with 47/48 position or encoder option.
PWM output:	10 bit resolution, 4 kHz (over temperature range), duty cycle; 0 to 100%, duty cycle is proportional to switch position (ccw). Not available with 47/48 position or encoder option.
Output accuracy:	+/-5 deg. max. non-linearity (at room temperature and 3 VDC), +/-1 deg. max. temperature drift
Response times:	Rotary operation; 100 ms max. (120 RPM max.), push button; 10 ms max.

### MATERIALS AND FINISHES

Shaft:	Stainless steel (1,4305)
Housing:	Zinc diecast, nickel plated
Nut:	Brass, nickel plated
Lock Washer:	Spring steel, zinc plated

### ENVIRONMENTAL RATING

Temperature ranges:	-30 to +85°C max. operating, -55 to +85°C max. storage
Humidity:	90% relative humidity max., non-condensing (against front panel, MIL-STD-202G, method 103B, condition B)
Salt atmosphere:	With IP68 sealing option only (against front panel, MIL-STD-810F, method 509.4; 96 hrs.)
IP sealing:	IP60, optional IP68 (against front panel, steady state, 50 m submersion for 4 hrs. max.)
Vibration:	29 G <sub>rms</sub> max. at 100 to 1,000 Hz (MIL-STD-202G, method 214A, condition 1H/15 minutes)
Shock:	100 G max. (MIL-STD-202G, method 213B, condition C)
Dielectric strength:	1,000 VDC during 60 sec. (MIL-STD-202G, method 301)

### PUSH BUTTON RATING

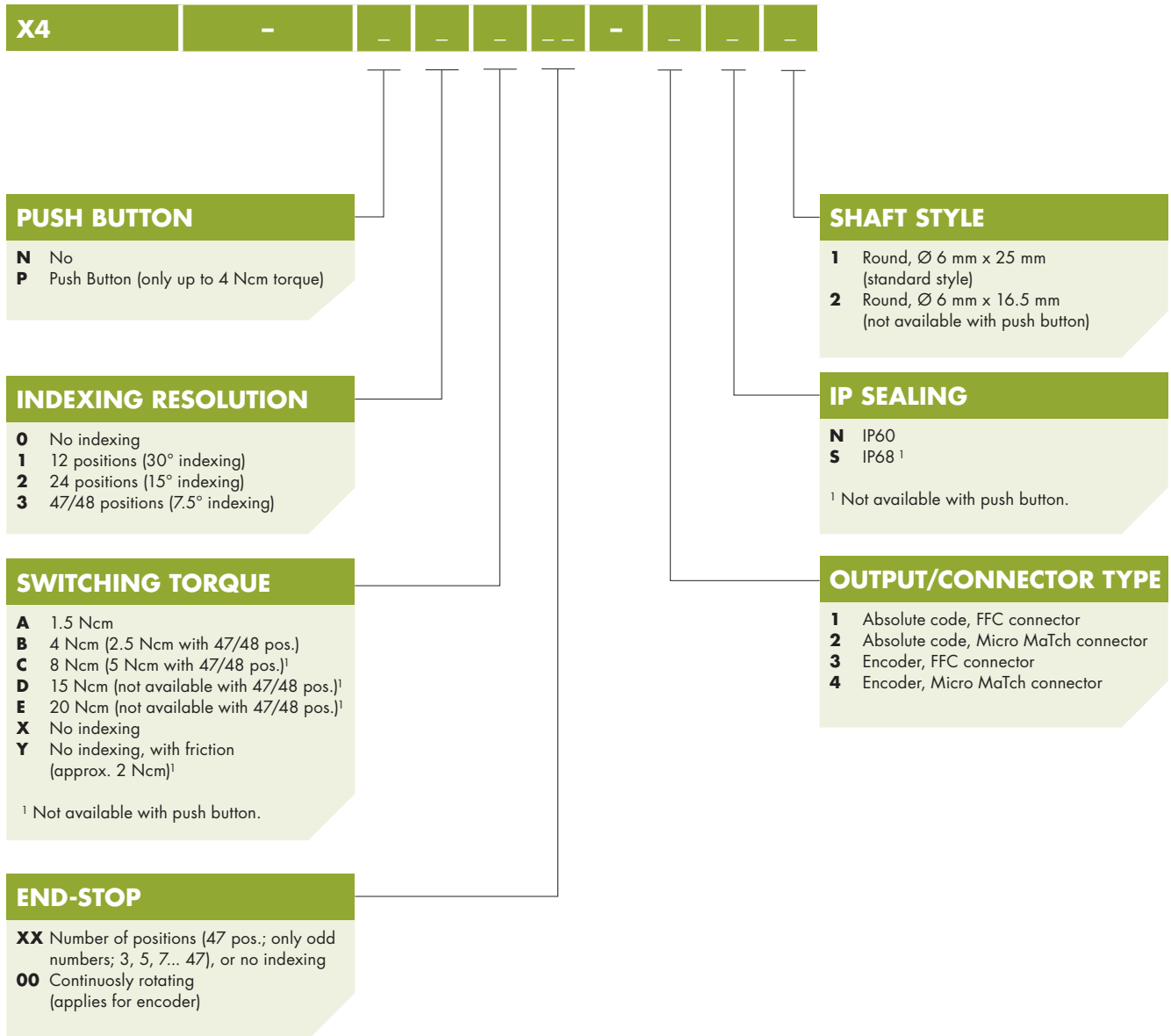
Type:	Tact switch, silver plated contacts, IP67 sealed
Actuation:	6 N (+/-30%, over temperature range and life), 0.5 mm (+/- 0.1 mm) switch travel
Actuation life:	100k cycles min. at 2 Hz max. actuation speed (over temperature range)

### PACKAGING

Packaging:	Single piece packed (ESD shielded bag), nut and lock-washer are mounted
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# MULTI ROTARY SWITCH TYPE X4

## ORDERING CODE



## ACCESSORIES TO ORDER

Spare nut:	P/N 5622-16
Stop screw:	P/N CAE038169