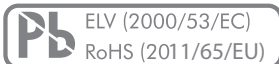


## Product description

### MAIN FEATURES

#### MECHANICAL INCREMENTAL ENCODER

- › Body size: 14.4 x 11.4 x 6.5 mm
- › Rotational life: Up to 150'000 revolutions
- › Resolution: 16, 24 or 30 detents
- › Detent torque: 0.5, 1.5 or 2.5 Ncm
- › With or without push button
- › Push force: 3 N, 6 N
- › Gold plated sliding contacts
- › IP60 and IP68 shaft sealing available
- › Various shaft types in brass and stainless steel available
- › Reflow ability
- › Various options and customizations possible



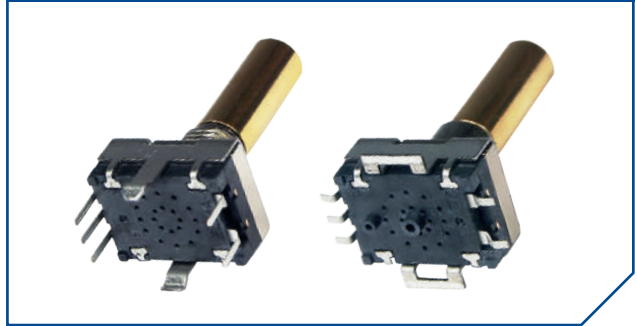
### PRODUCT VARIETY

- With and without push button
- THT or SMT reflow
- Threaded or non-threaded bushing
- Torque with 0.5, 1.5 or 2.5 Ncm
- Tray or tape & reel packaging
- Shaft mounted, separated or without shaft

### POSSIBLE CUSTOMIZATIONS

- Shaft dimension and shape
- Detent torque
- Front panel sealing

### E18



### TYPICAL APPLICATIONS

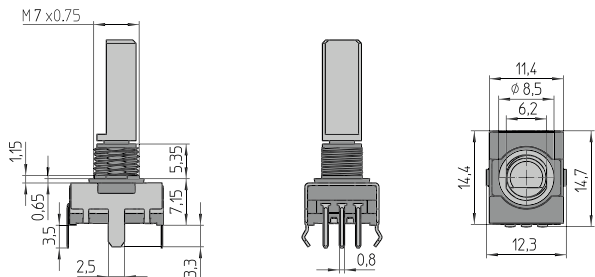
- White goods applications
- Household applications
- Home automation
- Two way radio applications
- Power and heat distribution controls
- Water distribution controls
- Industrial controllers
- Audio and entertainment systems

## Dimensions and pin assignment

### SWITCH DESIGN

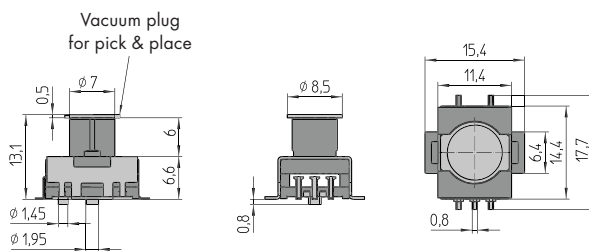
THT VERTICAL

Example of illustration with thread



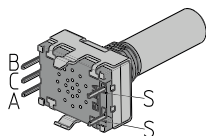
SMT

Example of illustration without thread

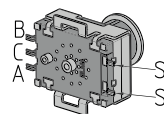


### PIN ASSIGNMENT

THT VERTICAL



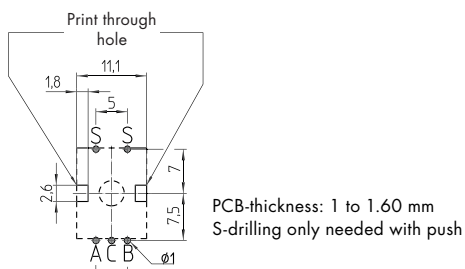
SMT



### DRILLING DIAGRAM AND FOOTPRINT

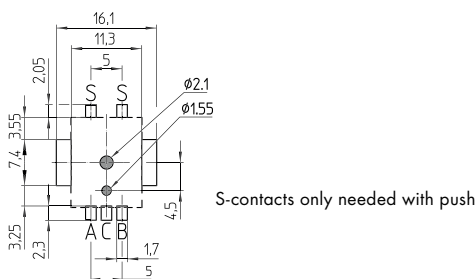
THT VERTICAL

View from component side of the PCB



SMT

View from component side of the PCB



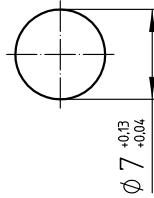
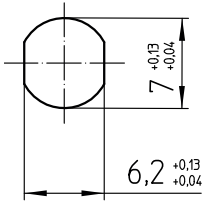
Dimensions in mm  
Tolerances according to DIN ISO 2768-1 (m), unless otherwise specified

## Dimensions and pin assignment

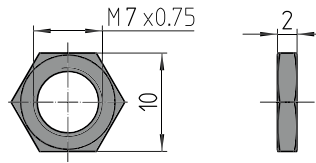
### FRONT PANEL CUT OUT

THREADED

NON-THREADED

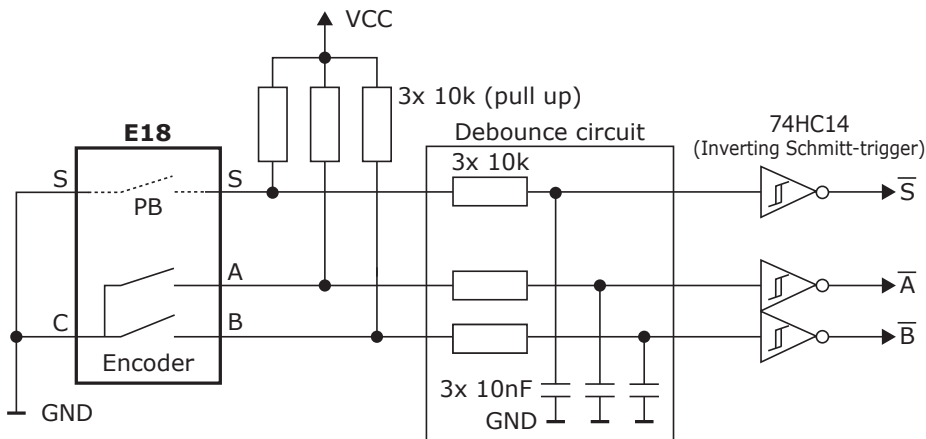


### NUT



## Circuit diagram

### RECOMMENDED SYSTEM INTERFACE



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

## Ordering information

### ORDERING CODE

E18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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**ORIENTATION | MOUNTING**

- V** THT vertical
- S** SMT vertical

**FIXING**

- A** Threaded M7 x 0.75
- E** Non-threaded Ø 7

**IP-PROTECTION<sup>1</sup>**

- 0** IP60
- 1<sup>1</sup>** IP68 shaft sealing

<sup>1</sup> Shaft sealing (O-ring) of IP68 may slightly increase switching torque

**RESOLUTION**

- 1** 8 PPR, B before A (16 detents)
- 2** 12 PPR, A before B (24 detents)
- 3** 15 PPR, A before B (30 detents)

**PACKAGING**

- T** Tray
- R** Tape & reel with vacuum plug (SMT only, shafts separated)

**SHAFT TYPE**

See the next page for all available shaft types

**SHAFT (DELIVERY CONDITION)**

- M** Mounted
- S** Separated (snap-in shaft mechanism)
- N** No shaft

**PUSH BUTTON**

- 0** Without push button
- 3** 3 N
- 6** 6 N

**SWITCHING TORQUE<sup>1</sup>**

- B** 0.5 Ncm
- C** 1.5 Ncm
- D** 2.5 Ncm

<sup>1</sup> Shaft sealing (O-ring) of IP68 may slightly increase switching torque

## Ordering information

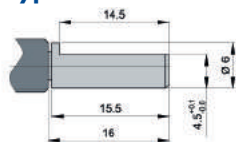
<sup>1</sup> Threaded bushing: Shaft to be ordered separately; shaft mounting after encoder assembly to front panel (nut does not fit over 1/4" shaft diameter). OTHER SHAFTS ARE AVAILABLE ON REQUEST.

### SHAFT TYPES

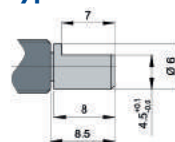
**Type 00 - no shaft**



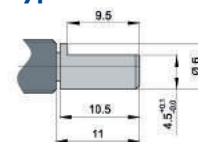
**Type 01 - brass**



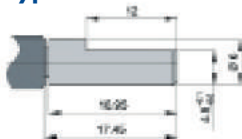
**Type 03 - brass**



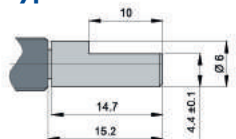
**Type 30 - brass**



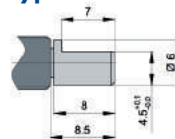
**Type 31 - stainless steel**



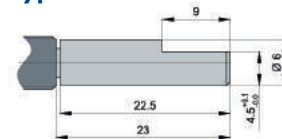
**Type 32 - brass**



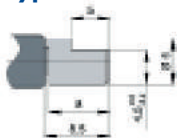
**Type 33 - stainless steel**



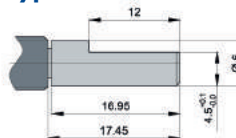
**Type 34 - brass**



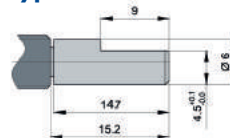
**Type 37 - stainless steel**



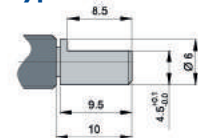
**Type 70 - brass**



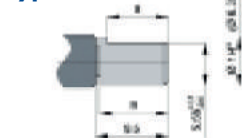
**Type 71 - brass**



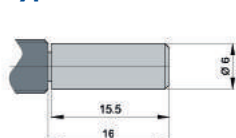
**Type 72 - brass**



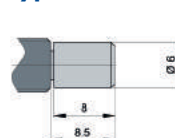
**Type<sup>1</sup> 51 - brass**



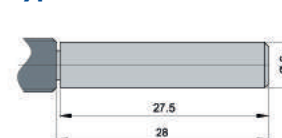
**Type 10 - brass**



**Type 11 - brass**



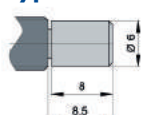
**Type 12 - brass**



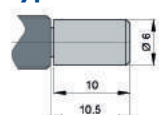
**Type 13 - stainless steel**



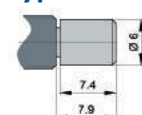
**Type 14 - stainless steel**



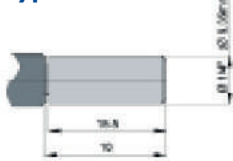
**Type 15 - brass**



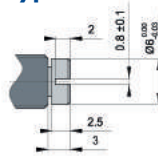
**Type 16 - brass**



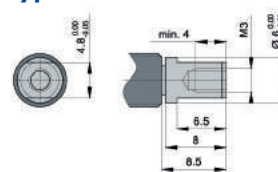
**Type<sup>1</sup> 20 - brass**



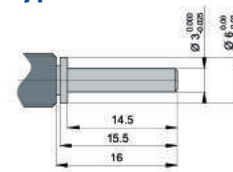
**Type 02 - brass**



**Type 43 - brass**



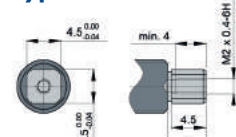
**Type 42 - brass**



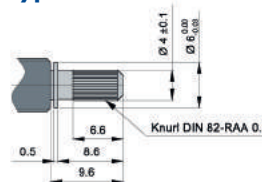
**Type 45 - stainless steel**



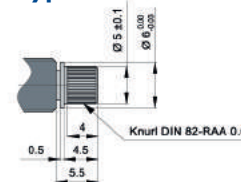
**Type 47 - brass**



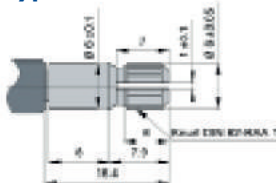
**Type 08 - brass**



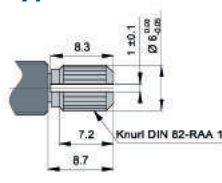
**Type 40 - brass**



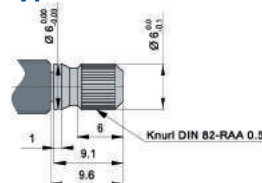
**Type 41 - brass**



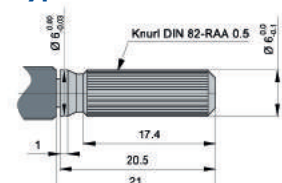
**Type 60 - brass**



**Type 0H - brass**



**Type 44 - brass**



## Ordering information

### PACKAGING

Blister box	50 pieces (nuts are supplied and packed separately)
Tape & reel	200 pieces (only SMT, shafts and nuts are packed separately)

### ACCESSORIES AND SPARE PARTS

Hex-nut M7 x 0.75:	Part number 4516-40 (50 pieces / bag), brass, nickel plated
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## Specifications

### Mechanical data

Positions:	16 positions 24 positions 30 positions
Switching torque:	0.5, 1.5 or 2.5 Ncm ( $\pm 30\%$ new condition) Shaft sealing (O-ring) of IP68 may slightly increase switching torque
Rotational life:	> 150'000 revolutions with 0.5 Ncm (tested at room temperature) > 100'000 revolutions with 1.5 Ncm (tested at room temperature) > 60'000 revolutions with 2.5 Ncm (tested at room temperature)
Allowable shaft load:	100 N push, 100 N pull and 50 N side load (static at 20 mm from the support surface)
Fastening torque of nut (front panel mounting):	M7 x 0.75: < 100 Ncm

### Electrical data

Electrical connection:	Pins 0.2 x 0.8 mm
Switching voltage:	< 15 VDC (resistive load)
Switching current:	< 10 mA (resistive load)
Contact resistance:	< 10 $\Omega$ (over the entire rotational life)
Signal   coding:	2-Bit quadrature
Resolution (pulses per revolution):	8, 12 or 15 PPR per channel
Phase shift:	90° ( $\pm 45^\circ$ )
Contact bouncing:	< 8 ms (at 15 RPM)
Dielectric strength:	500 VDC during 60 s (MIL-STD-202G, method 301, between housing and shaft)
Insulation resistance:	> 100 M $\Omega$ at 250 VDC (new condition)

### Materials

Shaft:	Brass (CuZn38Pb2) or stainless steel (1.4305)
Bushing   housing:	Zinc die casting nickel plated, fiber enforced high performance plastic
Contact surface:	Cu alloy (Au plated)
Soldering leads:	Cu alloy (tin plated)
Hex-nut:	Brass (nickel plated)
Housing clamp:	Tinplate
O-rings:	NBR (nitrile rubber), 70 shore A

## Specifications

### Environmental data

Operating temperature:	-40 to +85 °C (IEC 60068-2-14, method Nb)
Storage temperature:	-65 to +105 °C (IEC 60068-2-14, method Nb)
Humidity:	< 93 % relative humidity (MIL-STD-202G, method 103B, condition B)
IP sealing against front panel:	IP60 without sealing IP68 with shaft sealing (2 bar, 1 h)
Vibration:	9 G <sub>RMS</sub> at 100 to 1'000 Hz (MIL-STD-202G, method 214A, condition 1 h /15 min)
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
Reflow soldering:	IPC/JEDEC J-STD-020C
Wave soldering:	< 280 °C during 5 s

### Mechanical data for push button

Actuation force:	3, 6 N (± 30 % new condition)
Travel:	0.5 (± 0.2) mm
Lifecycles:	> 100'000 cycles (tested at room temperature)

### Electrical data for push button

Contact resistance:	< 10 Ω (over entire rotational life)
Switching voltage:	< 15 VDC (resistive load)
Switching current:	< 10 mA (resistive load)
Contact bouncing:	< 2 ms (at 2 Hz)

### Materials for push button

Contact surface:	Cu alloy (Au plated)
Snap dome:	Stainless steel

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Please contact our sales team for more details.

China: +86 21 5866 5908  
France: +33 388 56 72 50

Germany: +49 7231 97 34 0  
Israel: +972 3 930 50 25

Singapore: +65 6479 8552  
Switzerland: +41 44 933 41 11

United Kingdom: +44 1234 838 822  
United States: +1 510 656 3400