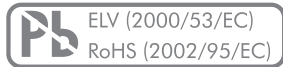


**MAIN FEATURES**

NORMAL PERFORMANCE

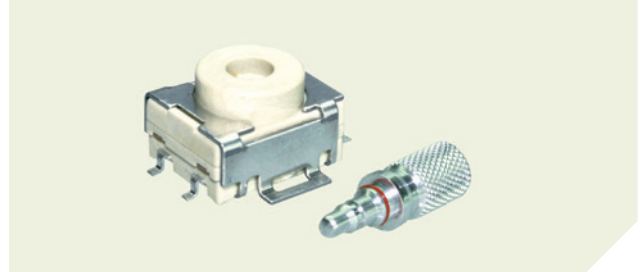
- Standard resolution 16 or 30 detent
- With or without integrated push button
- Rotational life: 100,000 revolutions
- Switching torque 0.5, 1.5 or 2.5 Ncm
- Gold plated contacts
- Optional front panel sealing IP65
- Operating temperature range: -30 to +85°C
- Various options and customizations



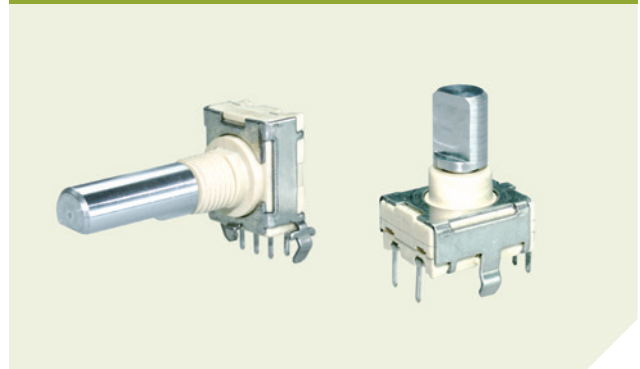
**PRODUCT VARIETY**

- Vertical or horizontal mounting
- THT or SMT reflow (vacuum pick & place)
- Threaded or non-threaded bushing
- Push button force 3 or 6 N or without push button
- Detent/pulses per revolution (PPR) 16/8 or 30/15
- Switching torque 0.5, 1.5 or 2.5 Ncm or no detent
- Front panel sealing IP50 or IP65
- Shaft mounted, separated or without shaft
- With or without shaft insulation
- With or without nut
- Various standard shafts available
- Tray or tape & reel packaging

**TYPE E20 (SMT)**



**TYPE E27 (THT)**



**TYPICAL APPLICATIONS**

- Value and menu control for industrial PLCs
- Avionics, instrumentation, test equipment
- Frequency and channel selection for two way radios
- User interface controls for medical devices
- Volume and menu setting for transportation control and entertainment systems

**1 PREFERENCE TYPES SELECTION CHART**

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

**TYPE E20 (SMT)**

TORQUE	PUSH BUTTON	30 DETENT	16 DETENT
1.5 Ncm	Yes, 6 N	E20-0-51141AL032	E20-1-51141AL032
	Yes, 3 N	E20-0-52141AL032	E20-1-52141AL032
	No	E20-0-50141AL032	E20-1-50141AL032

**TYPE E27 (THT)**

ORIENTATION	TORQUE	BUSHING	PUSH BUTTON	30 DETENT	16 DETENT
Vertical	1.5 Ncm	Threaded	Yes, 6 N	E27-0-21151AL011	E27-1-21151AL011
			No	E27-0-20151AL011	E27-1-20151AL011
	2.5 Ncm	Threaded	Yes, 6 N	E27-0-21251AL011	E27-1-21251AL011
			No	E27-0-20251AL011	E27-1-20251AL011

# INCREMENTAL ENCODERS TYPE E20 & E27

## SPECIFICATIONS

### MECHANICAL DATA

Resolution:	16 or 30 detent
Switching torque (new condition):	0.5, 1.5 or 2.5 Ncm (+/- 50%)
Rotational life:	100'000 revolutions min. with 0.5 or 1.5 Ncm 75'000 revolutions min. with 2.5 Ncm
Shaft strength:	50 N min. pull
Fastening torque of nut:	25 Ncm max.

### ELECTRICAL DATA

Coding/output:	2-bit quadrature
Resolution:	8 or 15 pulses per revolution (PPR) per channel
Operating speed:	60 RPM max.
Load current:	10 mA max. (resistive load, 15 VDC max. voltage)
Contact bouncing time:	2 ms max.
Contact resistance:	10 Ω max. (over the entire rotational life)
Insulation resistance:	100 MΩ min. 250 VDC
Dielectric withstanding voltage:	2 kV (optional with push button)

### MATERIAL DATA

Shaft:	Aluminum
Housing:	Fiber enforced plastic
Nut:	Brass
Contact system:	CuBe alloy, AuCo plated (hard gold)
Soldering leads:	CuBe alloy, tin plated
Housing clamp, retention clips:	Tin-plate

### ENVIRONMENTAL DATA

Operating temperature range:	-30 to +85°C
Storage temperature range:	-55 to +90°C
IP sealing:	IP50, optional IP65 shaft/front panel sealing
Vibration:	50 G <sub>rms</sub> max. @ 10 to 500 Hz
Flammability:	UL94-V0

## ADDITIONAL DATA FOR PUSH BUTTON SWITCH

### MECHANICAL DATA

Push button actuation force (new condition):	6 N (+/- 50%), optional 3 N (+/- 50%)
Push button switch travel:	0.5 (+0.4/-0.3) mm
Push button switch life:	100'000 actuations min.

### ELECTRICAL DATA

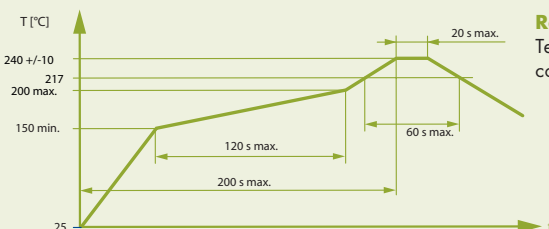
Contact bouncing time:	2 ms max.
Contact resistance:	10 Ω max. (over the entire rotational life)

### PACKAGING QUANTITY

Tray:	80 pcs.
Tape & reel:	300 pcs.

### SOLDERING CONDITIONS

Hand soldering:	300°C max. during 3 sec max.
Wave soldering:	260°C max. peak temperature during 4 sec max.



### Reflow Profile (complies with IPC/JEDEC J-STD-020C)

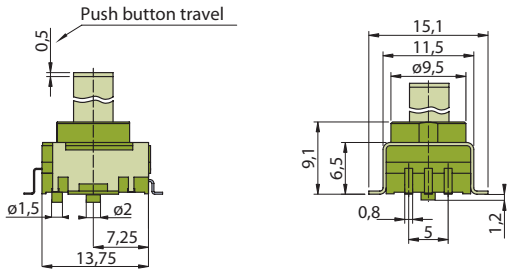
Temperatures or process duration exceeding rated maximum conditions may harm encoder function.

**DRAWINGS**

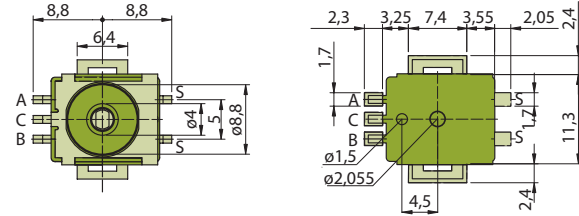
Tolerances unless otherwise specified DIN ISO 2768-1 (m)

**TYPE E20 (SMT)**

**BASIC STYLE**

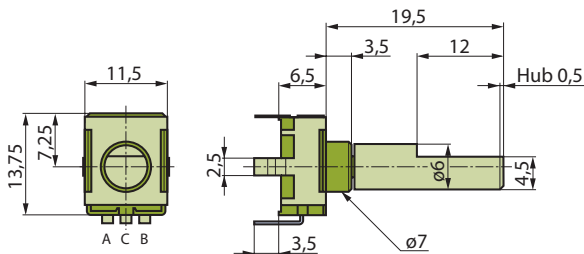


**THREADED BUSHING**



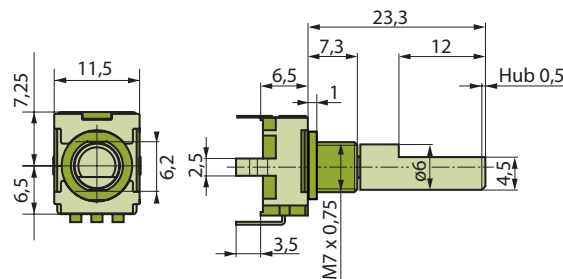
**TYPE E27 (THT)**

**VERTICAL, NON-THREADED BUSHING**

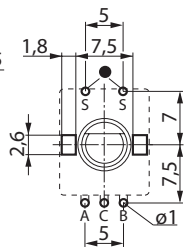


Applicable only to the version with integrated push button function. Height of switch housing is reduced from 6,5 mm to 5,3 mm for the version without integrated push button function.

**VERTICAL, THREADED BUSHING**



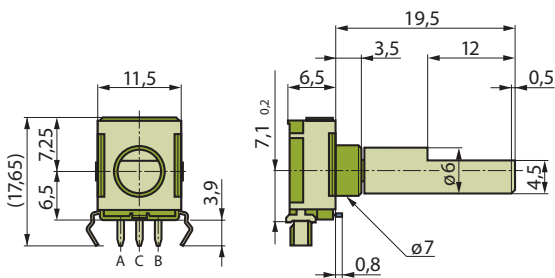
**DRILLING DIAGRAM**



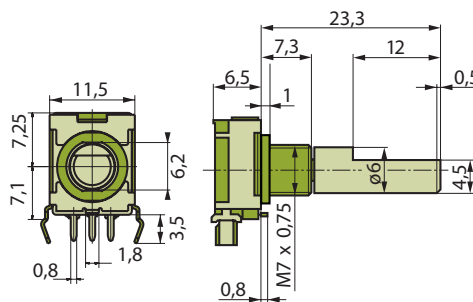
● Applicable only to integrated push button function.

View from switch mounting side of the PCB

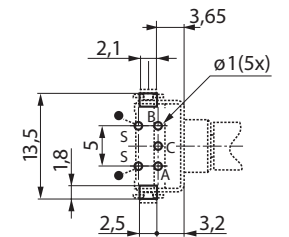
**HORIZONTAL, NON-THREADED BUSHING**



**HORIZONTAL, THREADED BUSHING**



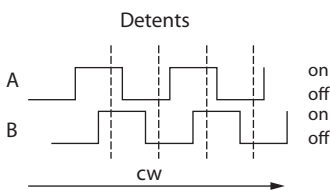
**DRILLING DIAGRAM**



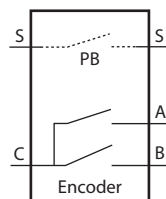
View from switch mounting side of the PCB

**Signal Output**

**30 DETENT (15 PPR)/ 16 DETENT (8 PPR)**



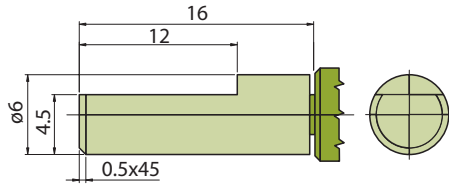
**ELECTRIC DIAGRAM**



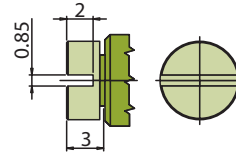
**SHAFT DRAWINGS**

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

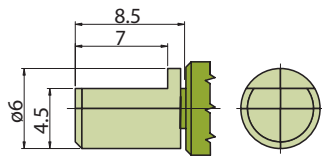
**1 - STANDARD (D-SHAPE)**



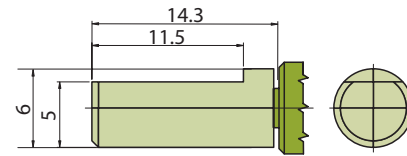
**2 - SCREW DRIVER SLOT**



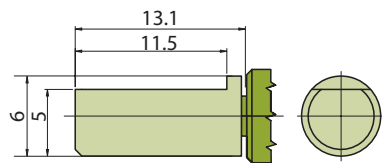
**3 - D-SHAPE 8.5 mm**



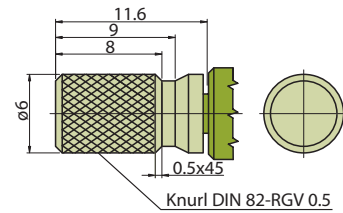
**5 - D-SHAPE 14.3 mm**



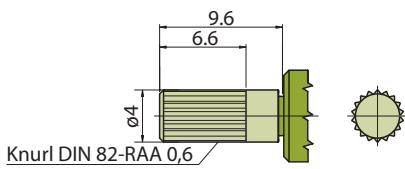
**6 - D-SHAPE 13.1 mm**



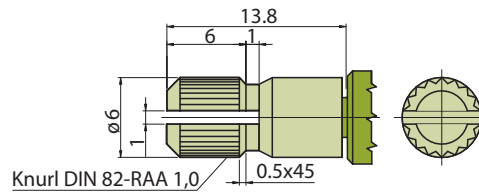
**7 - CROSS-KNURL**



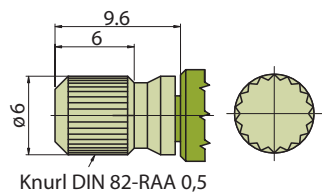
**8 - KNURL**



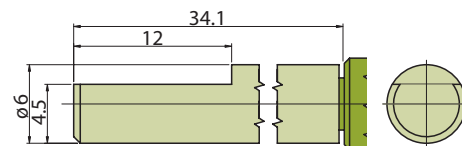
**9 - SLOTTED, KNURL**



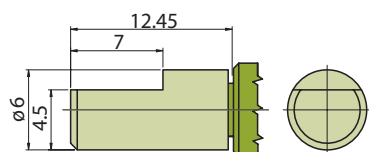
**H - KNURL**



**I - D-SHAPE 34.1 mm**



**M - D-SHAPE 12.45 mm**



**TYPE KEY**

**E 20 (E27)** - - - - - - - - - - - - -

**RESOLUTION**

- 0** 30 detent (15 PPR)
- 1** 16 detent (8 PPR)

**ORIENTATION/MOUNTING**

- 1** THT horizontal
- 2** THT vertical
- 5** SMT vertical

**PUSH BUTTON**

- 0** Without push button
- 1** 6 N
- 2** 3 N

**TORQUE**

- 0** No detent
- 1** 1.5 Ncm
- 2** 2.5 Ncm
- 3** 0.5 Ncm

**BUSHING STYLE**

- 0** THT, non-threaded  
Ø 7 mm x 3.5 mm
- 4** SMT, non-threaded  
Ø 9 mm x 2.6 mm
- 5** THT, threaded  
M7 x 0.75 x 7.3 mm

**PACKAGING**

- 1** Tray (THT or SMT, 80 pcs. )
- 2** Tape & reel (SMT only, 300 pcs., shaft separated)

**NUT, WASHER, SHAFT**

- 0** Without nut and washer
- 1** With nut
- 2** With nut and washer
- 3** Shaft separated
- 4** Shaft separated, with nut
- 5** Shaft separated, with nut and washer












**IP SEALING**

- 0** IP50
- 1** IP65 shaft sealing (O-ring)
- 2** IP65 front panel sealing (gasket)
- 3** IP65 shaft/front panel sealing

**SHAFT, SHAFT INSULATION**

- 00** Without shaft
- AL** Aluminum
- AE** Aluminum, 2 kV shaft insulation (only applicable with push button)

**SHAFT TYPE**

		FOR BUSHING STYLE		
		0	4	5
<b>0</b>	WITHOUT SHAFT	X	X	X
<b>1</b>	 <sup>1</sup> D-SHAPE 16 mm	X	X	X
<b>2</b>	 SCREW DRIVER SLOT	X		
<b>3</b>	 D-SHAPE 8.5 mm	X		X
<b>5</b>	 D-SHAPE 14.3 mm	X		
<b>6</b>	 D-SHAPE 13.1 mm	X		X
<b>7</b>	 CROSS-KNURL	X		X
<b>8</b>	 KNURL	X		
<b>9</b>	 SLOTTED, KNURL	X	X	X
<b>H</b>	 KNURL	X		
<b>I</b>	 D-SHAPE 34.1 mm	X		
<b>M</b>	 D-SHAPE 12.45 mm	X		

<sup>1</sup> Basic type