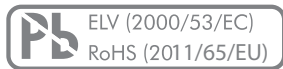


MAIN FEATURES

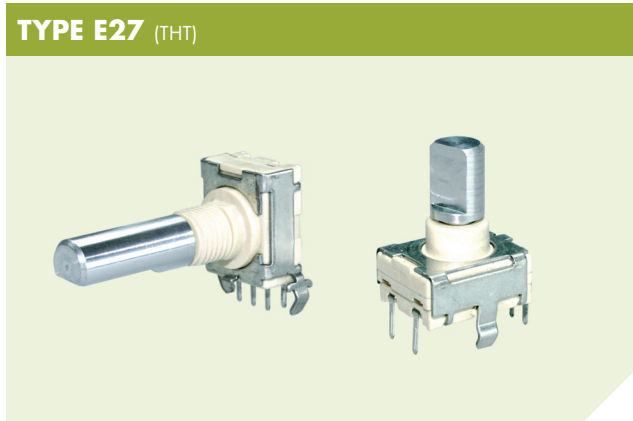
NORMAL PERFORMANCE

- 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



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

¹ For other types/options, see type key.

TYPE E20 (SMT)

TORQUE	PUSH BUTTON	PART NUMBER 30 DETENT	PART NUMBER 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	PART NUMBER 30 DETENT	PART NUMBER 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

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 M Ω min. 250 VDC
Dielectric withstanding voltage:	2 kV (optional with push button)

MATERIAL DATA

Shaft:	Aluminum
Housing:	Fiber enforced plastic
Nut:	Brass
Contact system:	CuZn gal. Ni1 Au flash / steel gal. Ni1 Au flash
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 _{rms} 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

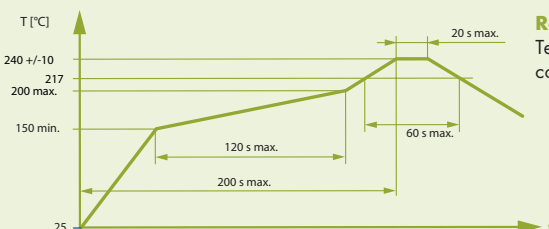
Contact bouncing time:	2 ms max.
Contact resistance:	10 Ω max. (over the entire rotational life)

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)

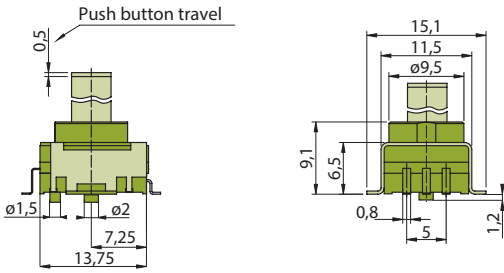
Temperatures or process duration exceeding rated maximum conditions may harm encoder function.

DRAWINGS

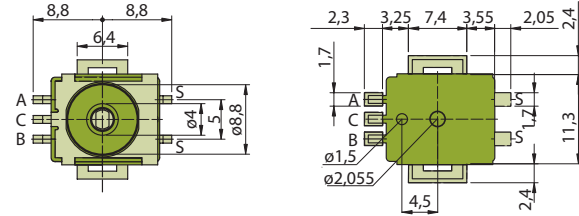
Tolerances unless otherwise specified DIN ISO 2768-1 (m)

TYPE E20 (SMT)

BASIC STYLE

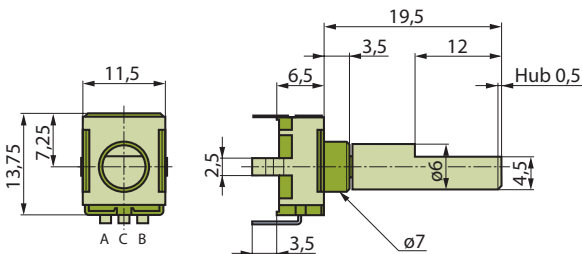


THREADED BUSHING



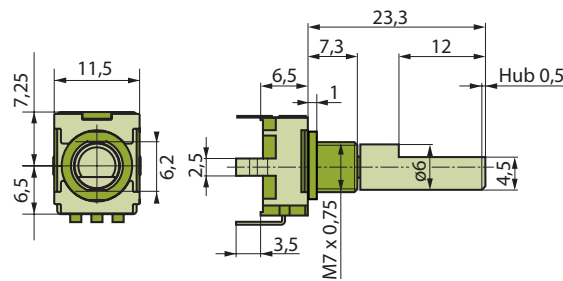
TYPE E27 (THT)

VERTICAL, NON-THREADED BUSHING

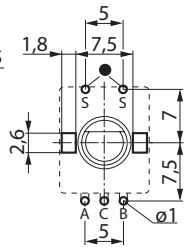


Applicable only to the version with integrated push button function. Height of switch housing is reduced from 6,5 mm to 5,3 mm for the version without integrated push button function.

VERTICAL, THREADED BUSHING



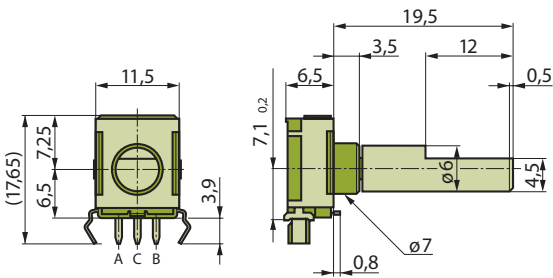
DRILLING DIAGRAM



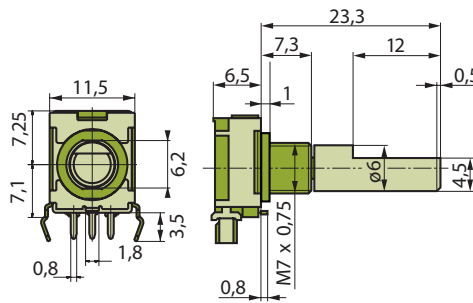
● Applicable only to integrated push button function.

View from component side of the PCB

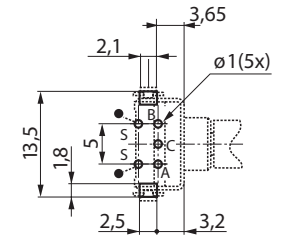
HORIZONTAL, NON-THREADED BUSHING



HORIZONTAL, THREADED BUSHING



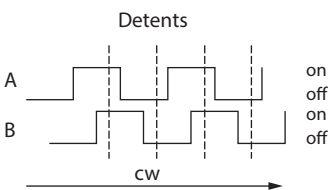
DRILLING DIAGRAM



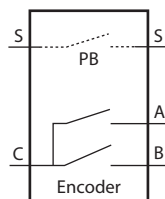
View from component side of the PCB

Signal Output

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



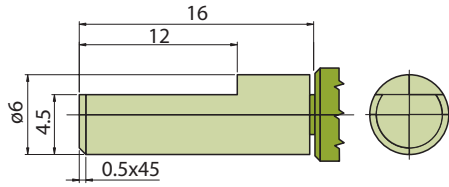
ELECTRIC DIAGRAM



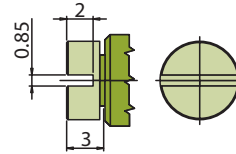
SHAFT DRAWINGS

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

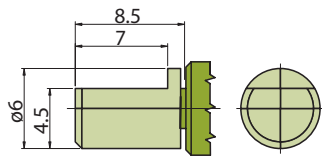
1 - STANDARD (D-SHAPE)



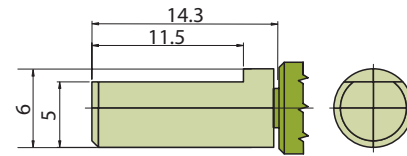
2 - SCREW DRIVER SLOT



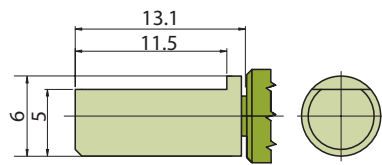
3 - D-SHAPE 8.5 mm



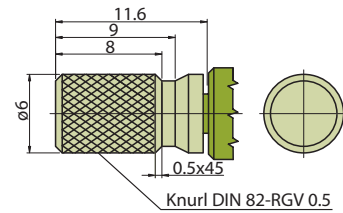
5 - D-SHAPE 14.3 mm



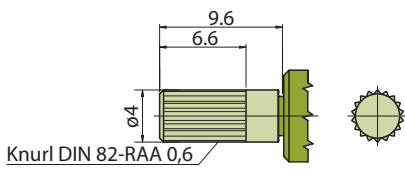
6 - D-SHAPE 13.1 mm



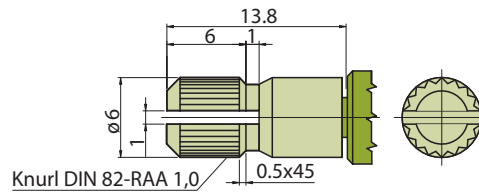
7 - CROSS-KNURL



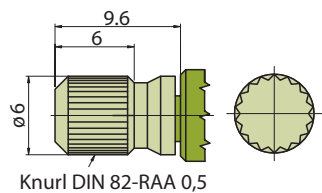
8 - KNURL



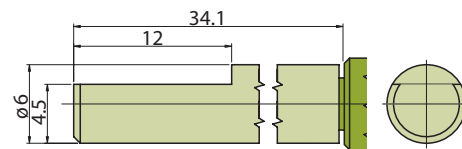
9 - SLOTTED, KNURL



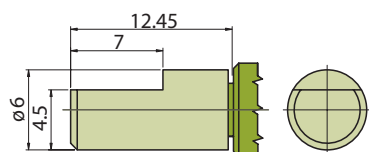
H - KNURL



I - D-SHAPE 34.1 mm



M - D-SHAPE 12.45 mm



TYPE KEY



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
0	WITHOUT SHAFT	X	X	X
1	 ¹ D-SHAPE 16 mm	X	X	X
2	 SCREW DRIVER SLOT	X		
3	 D-SHAPE 8.5 mm	X		X
5	 D-SHAPE 14.3 mm	X		
6	 D-SHAPE 13.1 mm	X		X
7	 CROSS-KNURL	X		X
8	 KNURL	X		
9	 SLOTTED, KNURL	X	X	X
H	 KNURL	X		
I	 D-SHAPE 34.1 mm	X		
M	 D-SHAPE 12.45 mm	X		

¹ Basic type