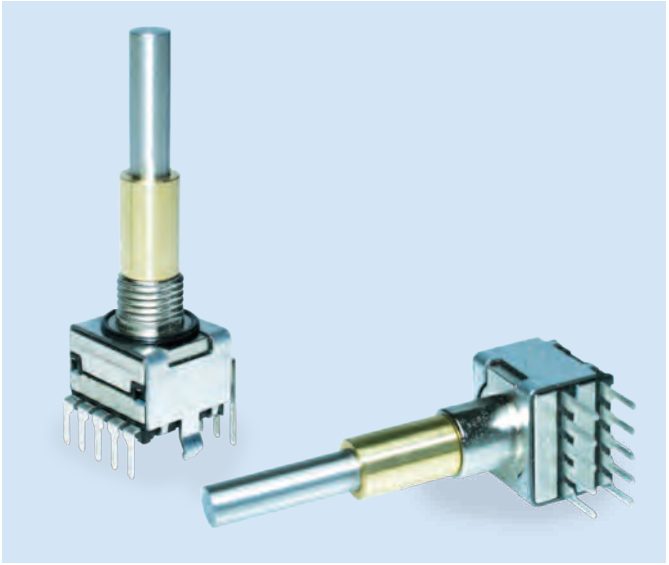
Dual Concentric Encoder Type E37

- **Dual concentric: Two encoders - one space**
- **16 or 32 detents standard resolution**
- **With or without integrated push button**
- **Rotational life: Up to 1,000,000 revolutions**
- **Excellent indexing feel with 0.5, 1.0, 1.5, 2.0 or 2.5 Ncm switching torque (remains consistent over life)**
- **Gold plated contacts**
- **Robust metal housing with metal shaft**
- **11.5 x 12.3 x 9.1 mm body size**
- **Optional IP68 front panel sealing**
- **Operating temperature range: -40 to +85°C**
- **Various options and customization**

MIL-STD-202G compliant

SWISS CLICK INDEXING SYSTEM™

ELV (2000/53/EC)
RoHS (2002/95/EC)



Standard Product Variety

- Vertical or horizontal mounting
- Threaded or non-threaded bushing
- 3 or 6 N push button force or without push button
- 32/16, 32/8, 16/16, 16/8 detents/pulses per rev. (PPR)
- 0.5, 1.5, 2.0 or 2.5 Ncm switching torque or no detents
- IP60 or IP68[1] front panel sealing

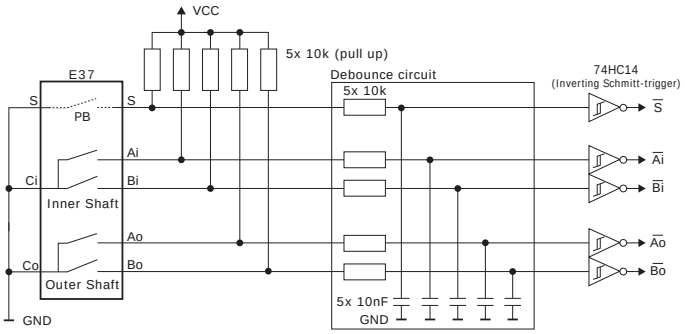
Possible Customization

- Shaft dimensions and shape
- Switching torque and push button actuation force
- Indexing resolution and PPR
- Others

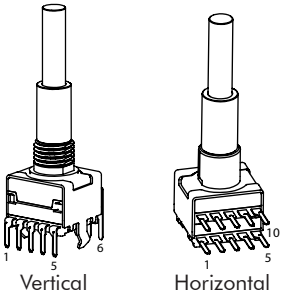
Typical Applications

- Cockpit controls; radios and navigation
- Desktop and mobile radios
- Professional, portable audio equipment
- Applications where user interface is space critical

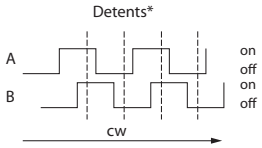
Recommended System Interfacing



*Timing diagram shows 32/16 (16/8) detents/PPR resolution



Pin#	1	2	3	4	5
	Bi	S	S	Ci	Ai
	6	7	8	9	10
	Bo	NC	NC	Co	Ao



Preference Types Selection Chart[2]

Push Button	Inner Shaft	Outer Shaft	IP Sealing	THT Vertical (Threaded bushing[3])	THT Horizontal (Threaded bushing[3])
Yes, 6 N	16 detents (8 PPR) 2.5 Ncm	16 detents (8 PPR) 2.5 Ncm	IP60	E37-VT6330-1	E37-CT6330-1
			IP68	E37-VT6332-1	E37-CT6332-1
		32 detents (16 PPR) 2.0 Ncm	IP60	E37-VT6310-1	E37-CT6310-1
			IP68	E37-VT6312-1	E37-CT6312-1

[1] Non-threaded bushing; gasket provides IP65
[2] For other types/options, see type key.
[3] Nut supplied.

Specifications

Mechanical Data

Inner shaft[1]:	16 detents with 2.5 Ncm (+/- 30%) or no detents
Outer shaft[1]:	32, 16 or no detents For 32 detents: 0.5, 1.0 or 2.0 Ncm (+/- 30%) For 16 detents: 1.5 or 2.5 Ncm (+/- 30%)
Rotational life:[2]	1,000,000 revolutions min. with 0.5, 1.0 or 1.5 Ncm switching torque or with no detents 500,000 revolutions min. with 2.0 Ncm switching torque 300,000 revolutions min. with 2.5 Ncm switching torque
Residual switching torque (end of life):	90% typ.
Shaft strength:	100 N min. push, 100 N min. pull, 50 Ncm min. bending
Fastening torque of nut:	100 Ncm max.

Electrical Data

Coding/output:	2-bit quadrature
Resolution:	16 or 8 pulses per revolution (PPR) per channel
Phase shift (A leads B clockwise):	90° (+/- 70°)
Pulse width per channel:	180° (+/- 36°)
Operating speed:	60 RPM max.
Contact bouncing time:	2 ms max.
Contact resistance:	10 Ohms max. (over the entire rotational life)
Dielectric withstanding voltage to housing/shaft:	500 VDC during 60 seconds (MIL-STD-202G, method 301)

Material Data

Shaft:	Aluminum
Housing:	Zinc diecast with glossy nickel plating, fiber enforced high performance plastic
Nut:	Brass with glossy nickel plating
Contact system:	Alloy copper, AuCo plated (hard gold)
Soldering leads:	Alloy copper, tin plated
Housing clamp, retention clips:	Tin-plate
O-rings:	NBR (Nitril), 70 shore, reflowable
Gasket (non-threaded bushing):	Closed-cell EPDM based rubber, 45 shore A, complies to SAE J 18-79, reflowable

Environmental Data

Operating temperature range:[2]	-40 to +85°C (IEC 60068-2-14)
Storage temperature range:	-65 to +125°C (IEC 60068-2-14, MIL-STD202G, method 107G, condition B-3)
Humidity (non condensing):	93% RH max. (MIL-STD-202G, method 103B, condition B)
IP sealing:	IP60, optional IP68[1] (1 bar, 1 hour) shaft/front panel sealing (non-threaded bushing; gasket provides IP65[1])
Vibration:	29 G_{rms} max. @ 100 to 1000 Hz (MIL-STD-202G, method 214A, condition 1H/15 minutes)
Shock:	100 G max. (MIL-STD-202G, method 213B, condition C)
Flammability:	UL94-V0 (IP65/IP68: O-rings and non-threaded bushing gasket are UL94-HB)

Packaging Sizes

Tray:	20 pcs. (nuts are supplied and packed separately)

Additional Data for Push Button Switch

Mechanical Data

Push button actuation force (new condition):	6 N (+/- 30%)
Push button switch travel:	0.5 (+/- 0.2) mm
Push button switch life:[2]	200,000 actuations min.
Residual push button actuation force (end of life):	90% typ.

Electrical Data

Contact bouncing time:	2 ms max.
Dielectric withstanding voltage to housing/shaft:	500 VDC during 60 seconds (MIL-STD-202G, method 301)

Material Data

Contact pads:	Alloy copper, AuCo plated (hard gold)
Membrane switch:	Stainless steel, AuCo plated (hard gold)

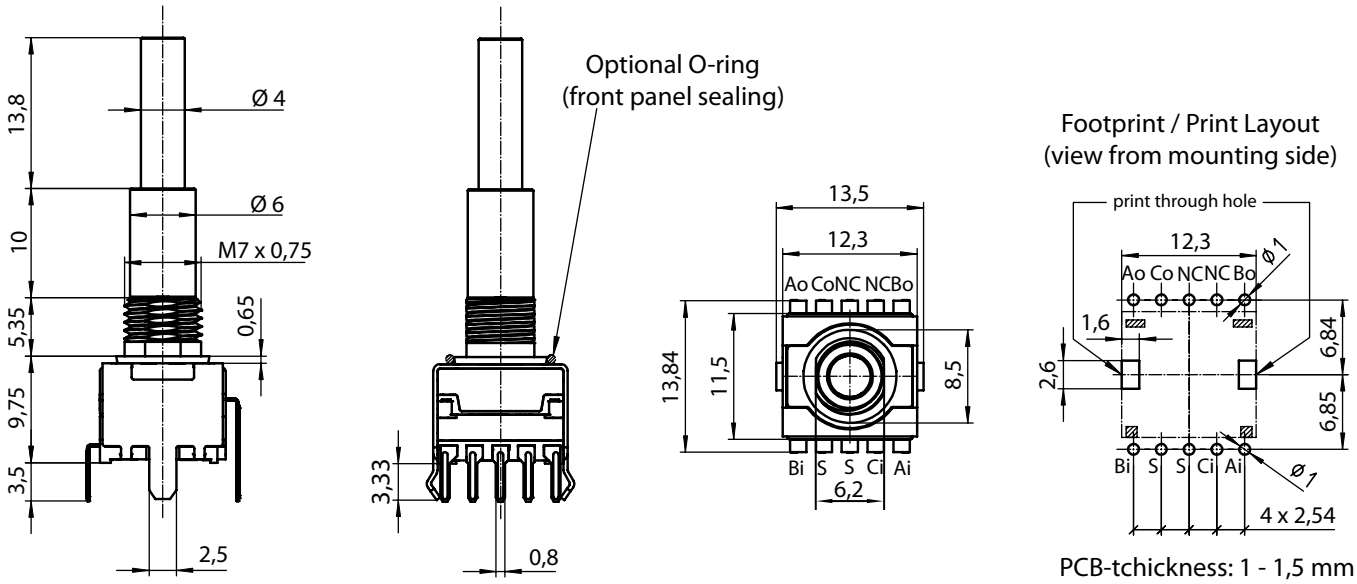
Soldering Conditions

Hand soldering:	340°C max. during 2 s max.
Wave soldering:	280°C max. peak temperature during 5 s max.

[1] O-ring of IP65/IP68 shaft sealing may slightly increase switching torque.
[2] Rotational/actuation life is tested at room condition (+25°C, 50 to 60% RH). Operating speed is 60 RPM (encoder) and 2 Hz (push button). Different operating conditions may decrease life expectation dramatically.

Drawings

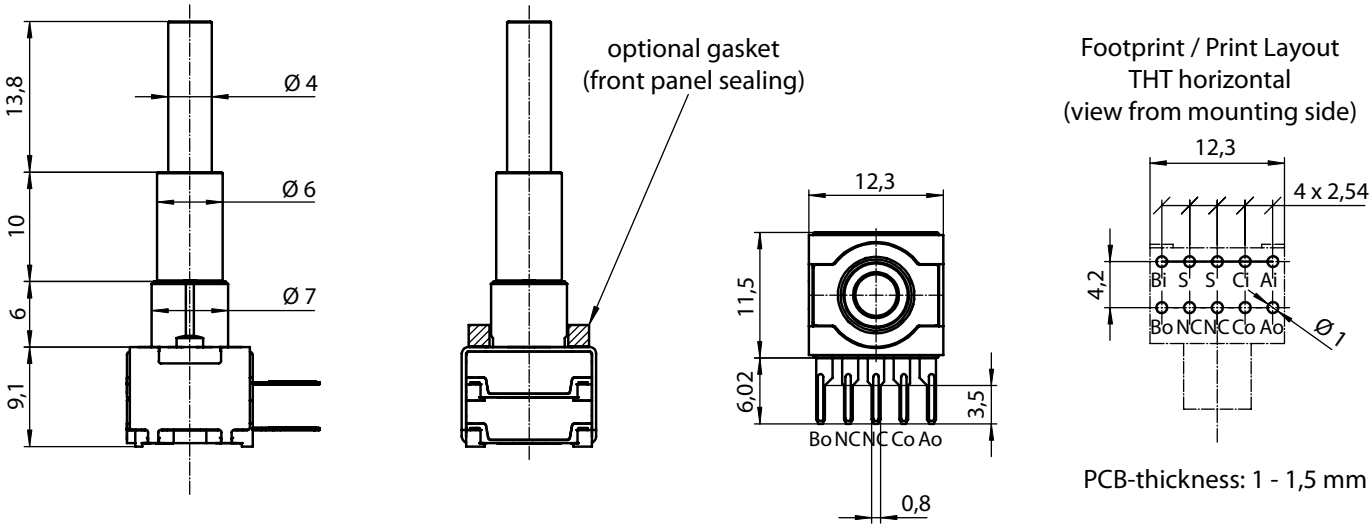
THT Vertical



PCB-tchickness: 1 - 1,5 mm

Both threaded and non-threaded bushings are available for all versions; THT vertical or THT horizontal (see type key).

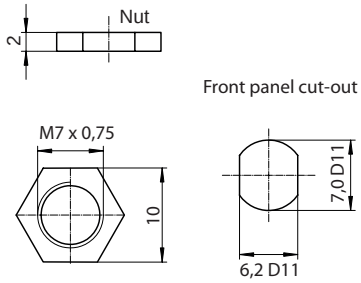
THT Horizontal



PCB-thickness: 1 - 1,5 mm

Both threaded and non-threaded bushings are available for all versions; THT vertical or THT horizontal (see type key).

Nut and Front Panel Cut Out (Threaded Bushing)



Recommended Knob Systems

#1 - Soft Touch Collets; 15/21 mm (for shaft type 1)			
Inner shaft	Cap	15 mm black	K51-C150-01
	Knob	15 mm, soft touch, collet	K60-S150-004
Outer shaft	Knob	21 mm, soft touch, collet	K60-S210-006

Also see Rotary Switches main catalog; page 87 (soft touch collet knobs; K60 series).

#2 - Classic Collets; 10/14.5 mm (for shaft type 2)			
Inner shaft	Cap	10 mm black, glossy	040-1020
	Knob	10 mm black, glossy	020-2120
Outer shaft	Knob	14.5 mm black, glossy	020-3420

Also see Rotary Switches main catalog; page 75 & 77 (classic collet knobs).

Type Key

E	3	7	-	X	X	X	X	X	X	-	X

Orientation/Mounting
V - THT vertical
C - THT horizontal

Bushing
T - Threaded M7 x 0.75 x 6 mm
(nut supplied, packed separately)
N - Non-threaded Ø 7 x 6 mm

Push Button
6 - 6 N
0 - Without push button

Inner Shaft (Resolution, Torque)[1]
3 - 16 detents (8 PPR) 2.5 Ncm
6 - 16 detents (16 PPR) 2.5 Ncm
8 - No detents (16 PPR)
9 - No detents (8 PPR)

[1] O-ring of IP65/IP68 shaft sealing may slightly increase switching torque.

Outer Shaft (Resolution, Torque)[1]
1 - 32 detents (16 PPR) 2.0 Ncm
2 - 16 detents (8 PPR) 1.5 Ncm
3 - 16 detents (8 PPR) 2.5 Ncm
4 - 32 detents (8 PPR) 2.0 Ncm
5 - 16 detents (16 PPR) 1.5 Ncm
6 - 16 detents (16 PPR) 2.5 Ncm
8 - No detents (16 PPR)
9 - No detents (8 PPR)
A - 32 detents (16 PPR) 0.5 Ncm
B - 32 detents (16 PPR) 1.0 Ncm[2]

[1] O-ring of IP65/IP68 shaft sealing may slightly increase switching torque.

[2] Available with non-threaded bushing only.

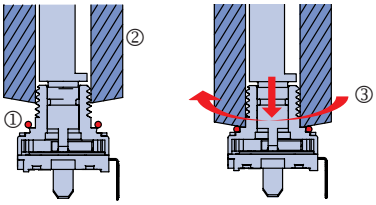
Shaft Type
1 - Basic type (see drawing)
2 - Inner shaft; Ø 3.0 mm,
same length as basic type

IP Sealing
0 - IP60
1 - IP68[1] shaft sealing
2 - IP68[1] shaft/front panel sealing
(non-threaded bushing gasket provides IP65, O-ring/gasket is mounted)

[1] O-ring of IP65/IP68 shaft sealing may slightly increase switching torque.

O-Ring Mounting Tool

Order number: E33-ORING-TOOL



① Slip the lubricated O-ring over the bushing.

② Slide the mounting tool over the bushing.

③ While pushing down the O-ring, rotate the mounting tool simultaneously.