

Piher is recognised as a world leader in custom controls and sensor solutions by the top Land Vehicle/Automotive and Appliance players.

In this catalogue you will find a selection of the most prolific of our rotary switches and incremental encoders for these applications.

The pursuit of the most cost-effective total solution for your needs is firmly embedded in our business philosophy, so whatever your requirements may be, be sure that Piher will deliver.

Two more catalogues are available depending on the technology used:

- Sensors
- Control potentiometers

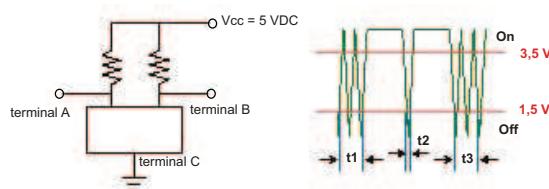
Should you be interested in any of these catalogues or require further information please do not hesitate to contact your nearest Piher supplier.

	Series	Size	SMD
Encoder	E-15	15	YES
	S-15	15	YES
	TS-1146	6	YES
Switches	PTs	10/15	-
	PCR	-	-

TEST CIRCUIT DIAGRAM FOR ENCODERS

Measurements shall be made under the following conditions.

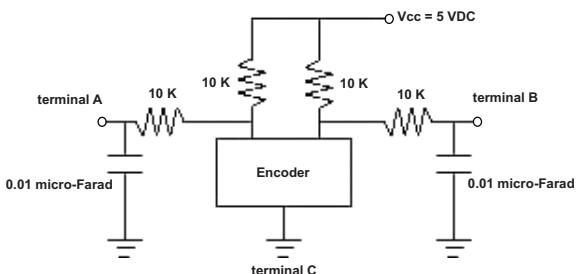
- (1) Shaft rotational speed: 360 degrees/second
- (2) Test circuit as follows:



On area: The area which the voltage is 3.5V or more
Off area: The area which the voltage is 1.5V or less

R/C FILTER TEST CIRCUIT FOR ENCODERS

The R/C filter circuit as shown is recommended in the pulse count process design



All models of this catalogue can be adapted to meet customer's requirements. Request full datasheets from your nearest Piher supplier or visit www.piher.net



NOTE: The information contained in this catalogue should be used for reference purposes only. Due to continuous product improvements, we reserve the right to make specification and/or product changes without prior notification. Please refer to www.piher.net for updated information.

E-15 15mm incremental encoder



Main features

Operating temperature range	-40°C to +120°C
Contact current	10µA – 100mA
Pulse/Detents	3 or 6 pulse / no detents version / others upon request
Low profile	yes (4.4 mm)
Hybrid variable resistor and pulse generator	under request
Customisation possibilities	infinite
Mounting	SMD, through hole, horizontal adjust
Reflow Soldering capability	yes
Shaft insertable from both sides	yes
All PT/ PTC 15 shafts compatible	yes

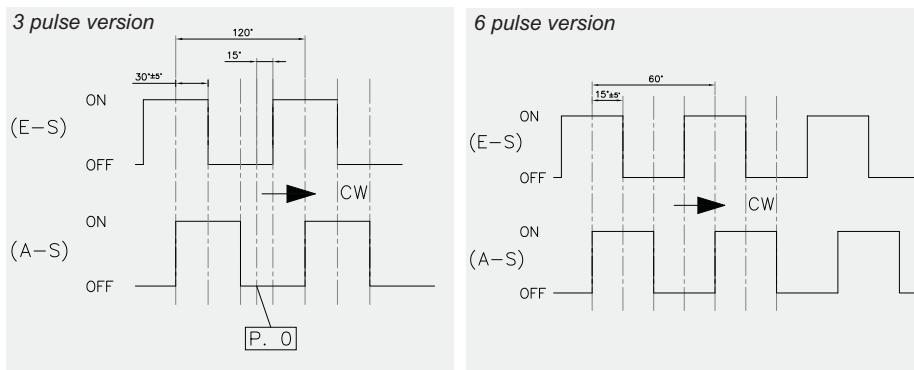
Electrical specifications

Closed contact resistance	<5Ω
Open contact resistance	>10MΩ

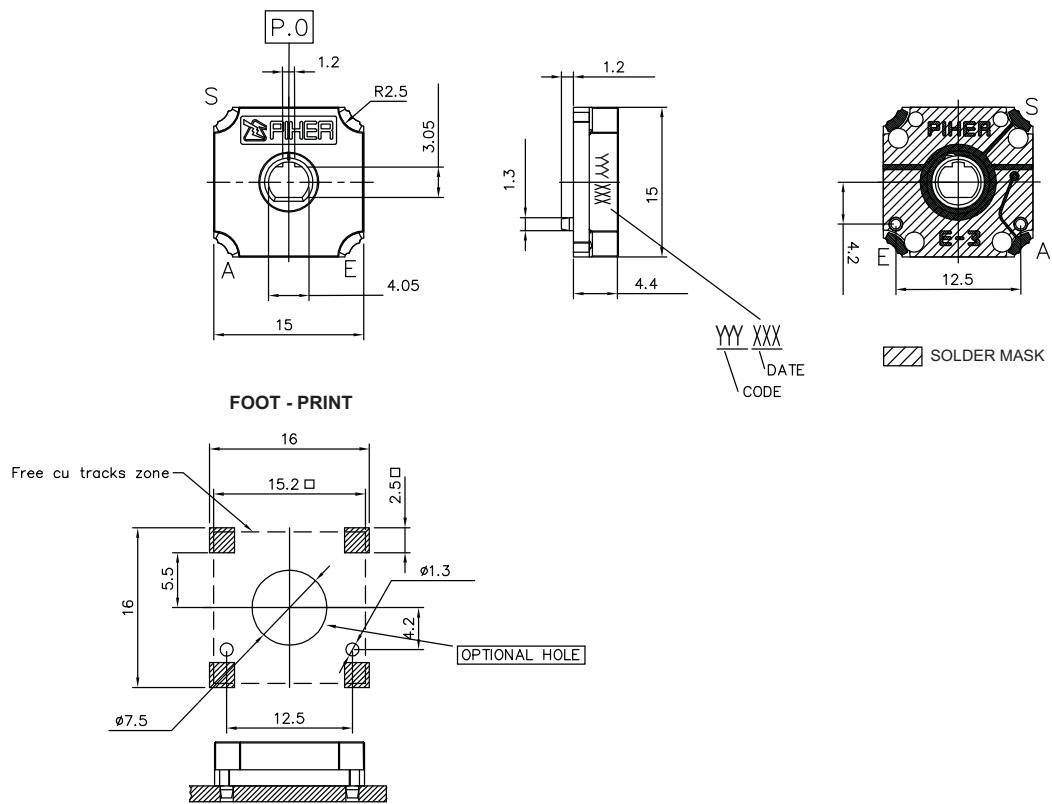
Mechanical specifications

Rotational torque	<2Ncm
Rotational life	3 pulse version: 36K cycles; 6 pulse version: 10K cycles
Resistance to soldering heat	see drawings

Graph code

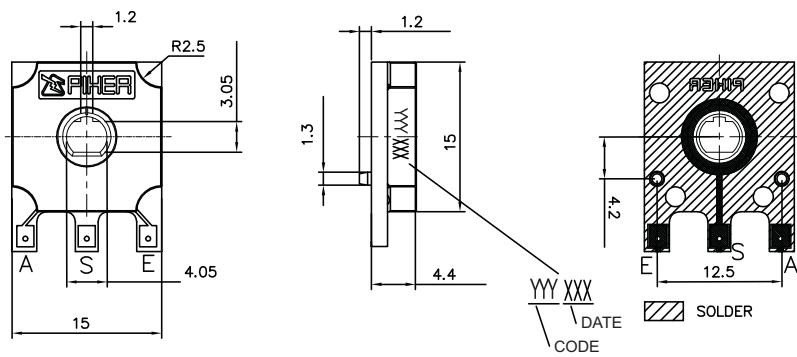


Standard dimensions (SMD)

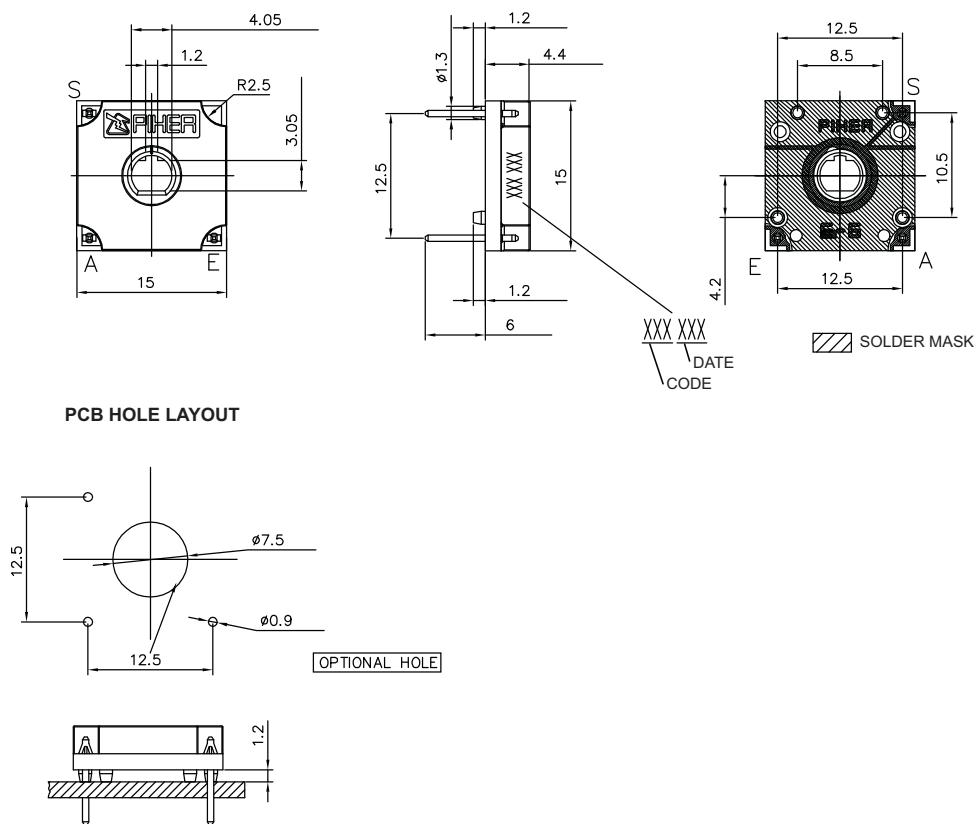


Standard dimensions (horizontal adjust)

* This drawing is just an example, horizontal adjust versions will be studied case by case



Standard dimensions (through hole)



Packaging

BULK

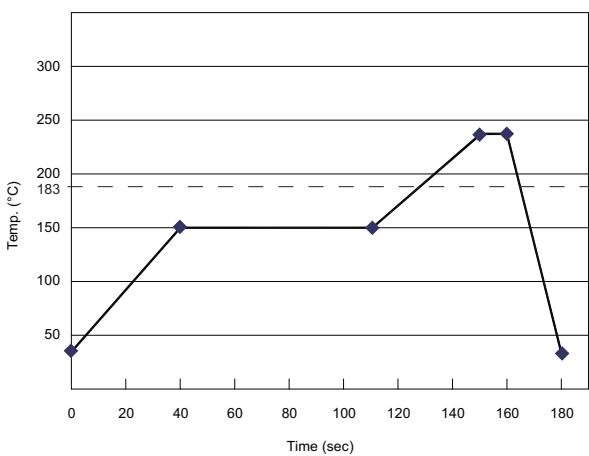
150 Units per box.
Through hole version only.

TAPE ON REEL

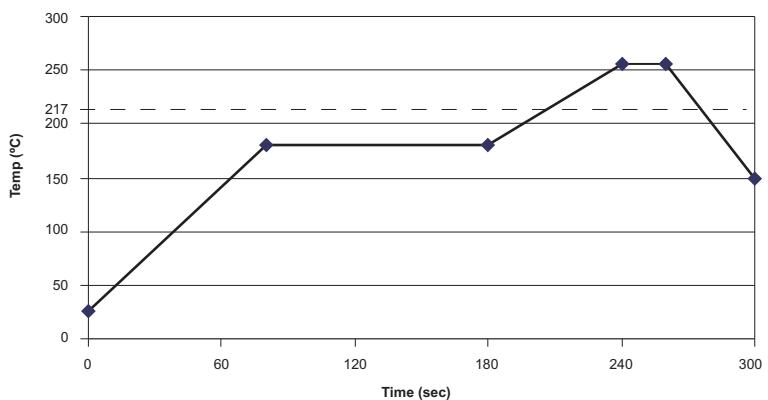
500 Units per reel.
SMD type only.

Recommended reflow profile (SMD)

SnPb Reflow Profile



Lead Free Reflow Profile



S-15 15mm rotary switch



Main features

Number of positions (standard)	2, 6, others upon request
Operating temperature range	-40°C to +85°C
Customisation possibilities	infinite
Low profile	yes (4.4 mm)
Mounting	SMD, through hole, horizontal adjust
Reflow Soldering capability	yes
Shaft insertable from both sides	yes
All PT/ PTC 15 shafts compatible	yes

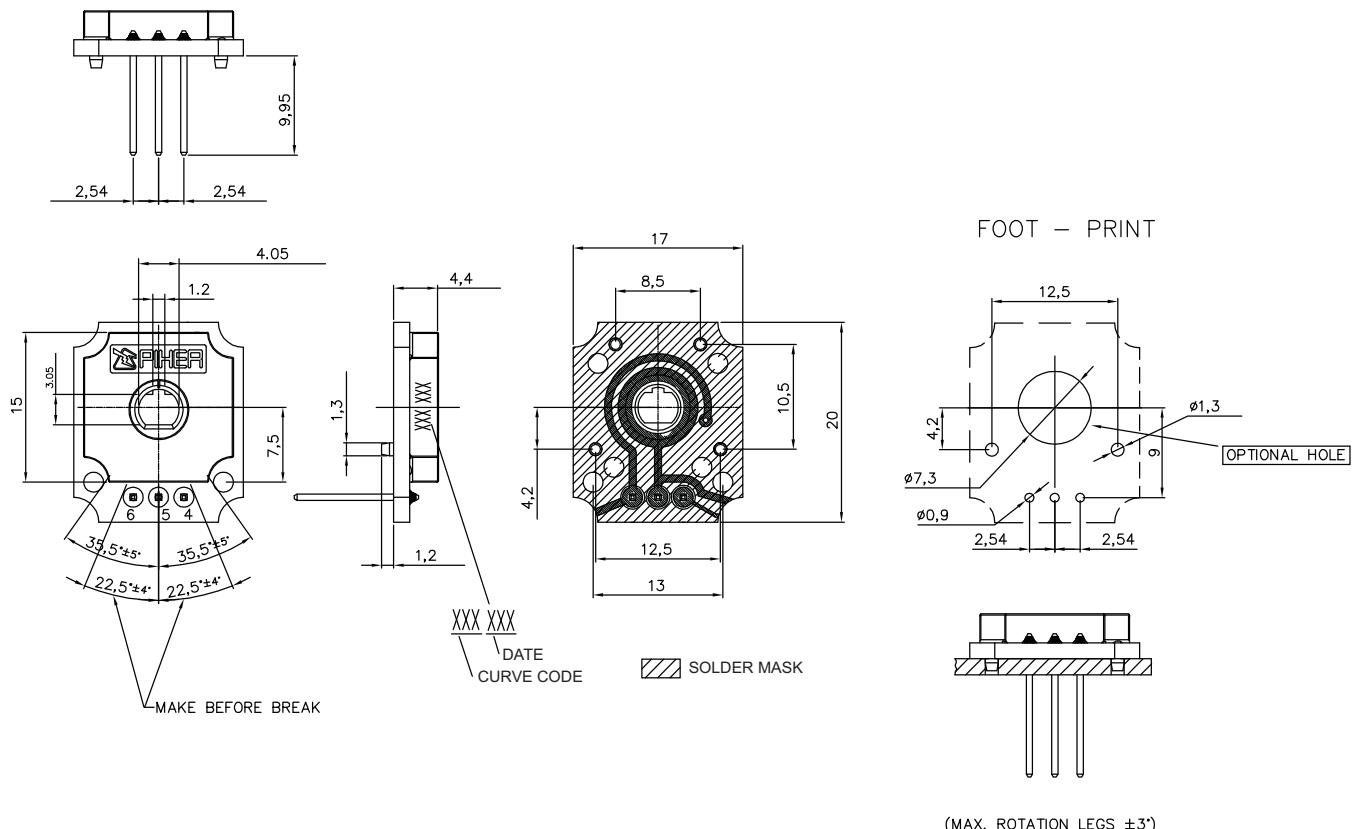
Electrical specifications

Closed contact resistance	<5Ω
Open contact resistance	>10MΩ
Contact current	10µA – 100mA
Operating voltage	16 VDC (6 positions); 13.5±0.2 VDC (2 positions)

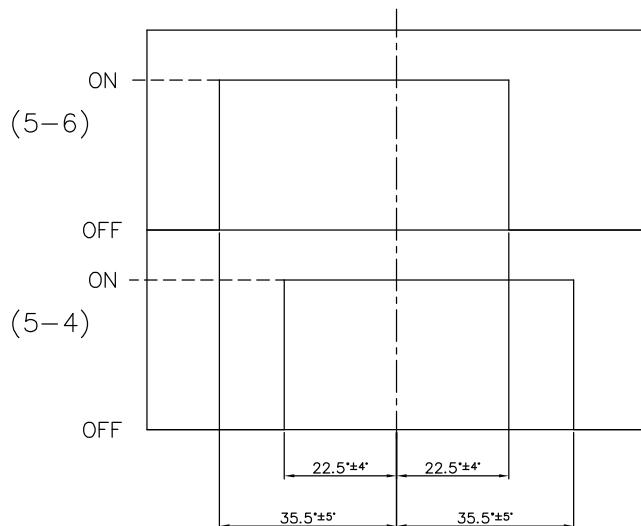
Mechanical specifications

Rotational torque	<2Ncm
Rotational life	6 positions: 35K cycles; 2 positions: 15K cycles
Mechanical rotation angle	360° (endless)

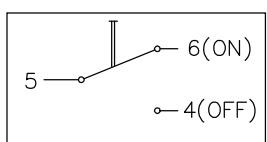
Standard dimensions (2 positions)



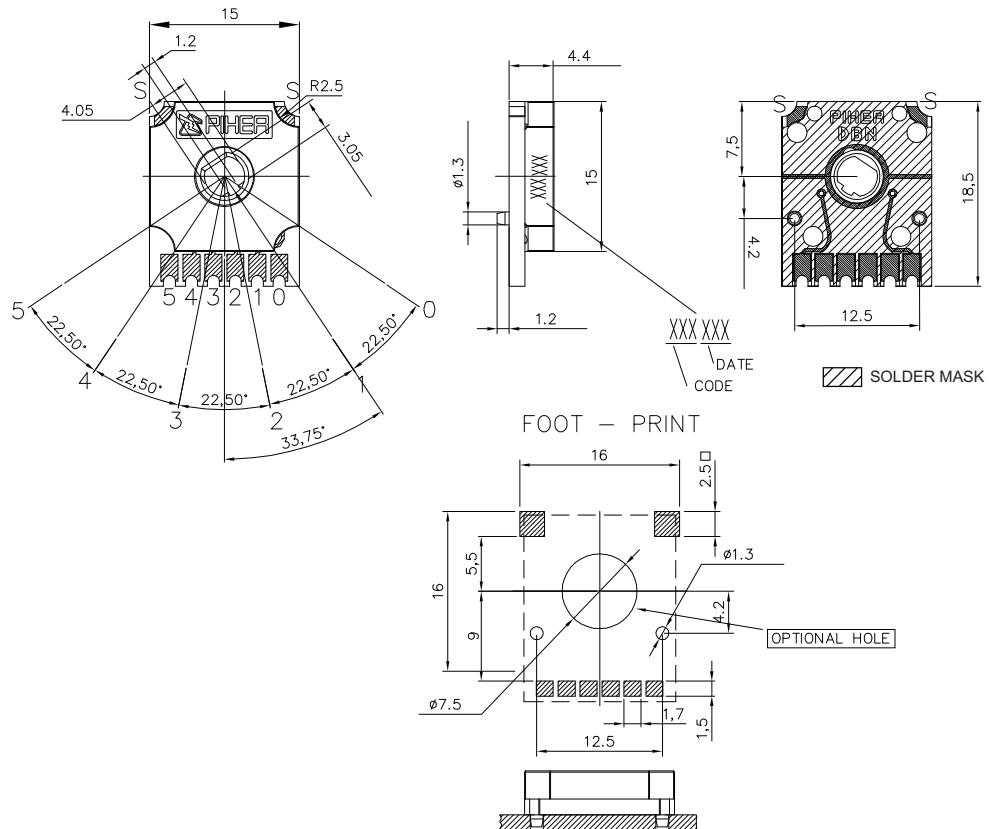
Switch sequence (2 positions version)



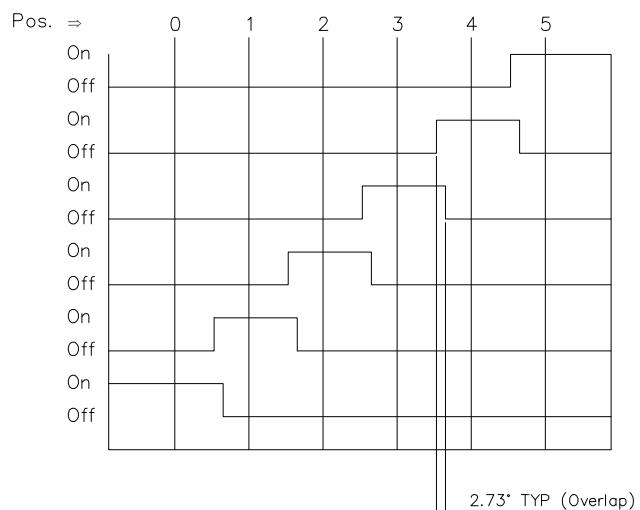
CIRCUIT DIAGRAM



Standard dimensions (6 positions)

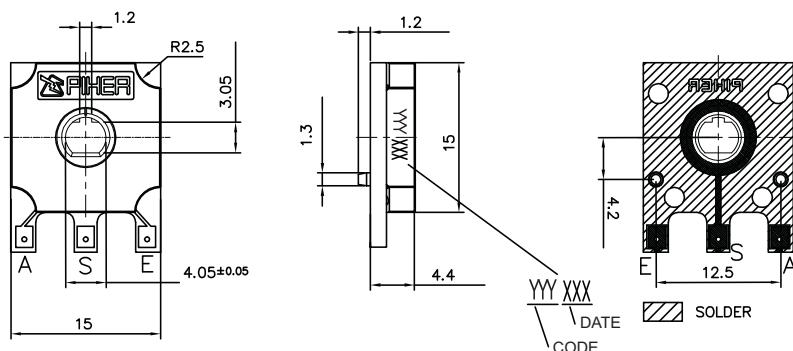


Switch sequence (6 positions version)



ALL ANGLES REFERRED TO SHIPPING POSITION			
POSITIVE ANGLE INDICATES CW			
POS.	INITIAL ANGLE	END ANGLE	TOLERANCE
0	-42.5	-12	±5°
1	-14.72	10.5	±5°
2	7.78	33	±5°
3	30.28	55.5	±5°
4	52.78	78	±5°
5	75.28	110	±5°

Standard dimensions* (horizontal adjust)

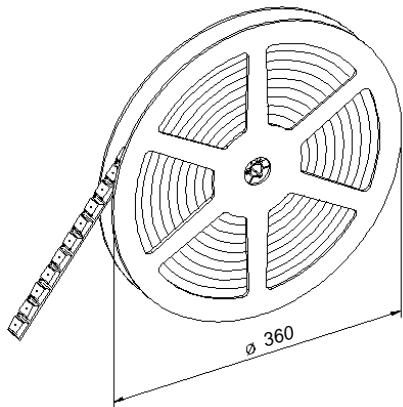


* This drawing is just an example, horizontal adjust versions will be studied case by case

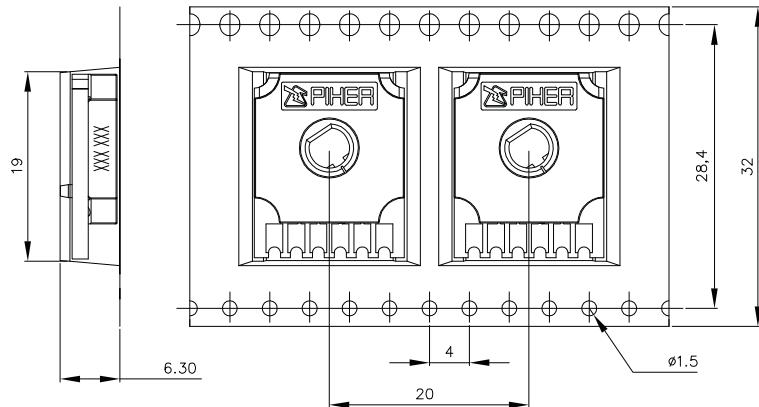
Packaging

2 positions version is only available in BULK packaging

Tape on reel (6 positions version)

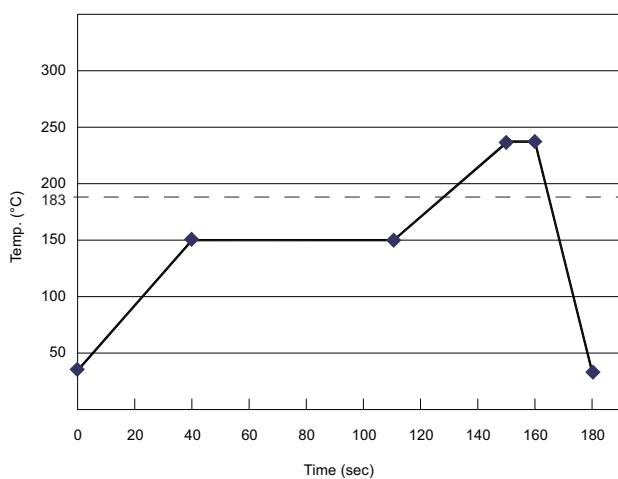


Units per reel: 650

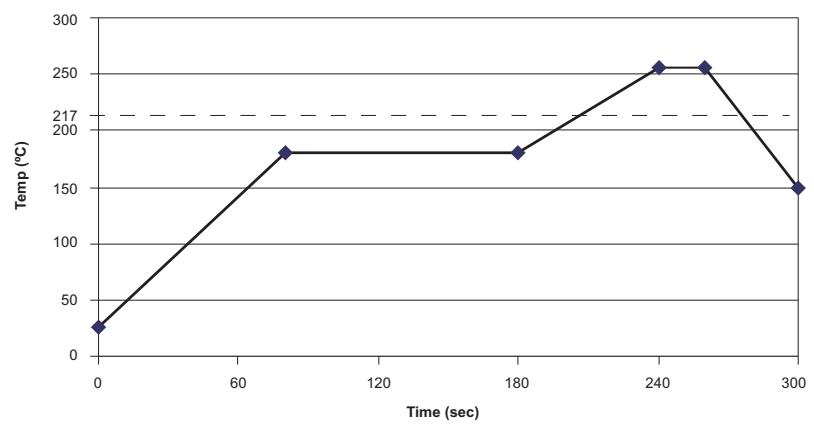


Recommended reflow profile (SMD)

SnPb Reflow Profile

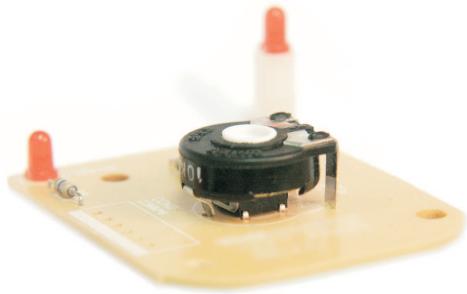


Lead Free Reflow Profile



TS SERIES

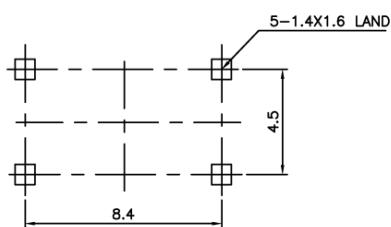
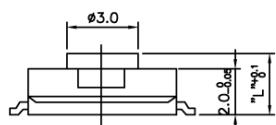
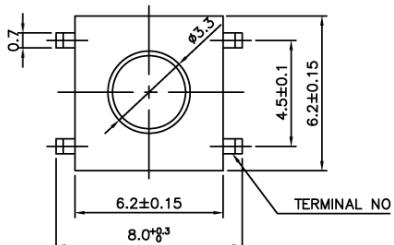
tact switches



Operating temperature	-20°C to +70°C
Operating life	100K cycles
Rating	12V D.C. 50mA
Contact resistance	100 mΩ max.
Insulation resistance	100 MΩ min.
Dielectric strength	250 VAC for 1 minute
Switch travel	0.25 ± 0.1 mm
Bounce	less than 100 msec.
Mounting	SMD, with terminals
Crimping option	yes

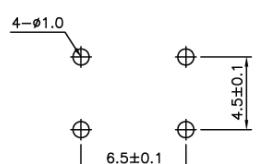
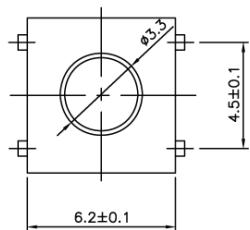
Standard dimensions

TS-1110

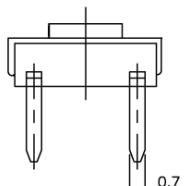
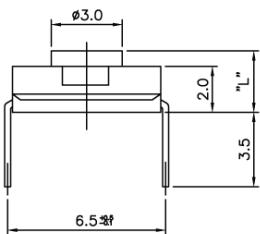


P.C.B. Hole Detail

TS-1126S



P.C.B. Hole Detail



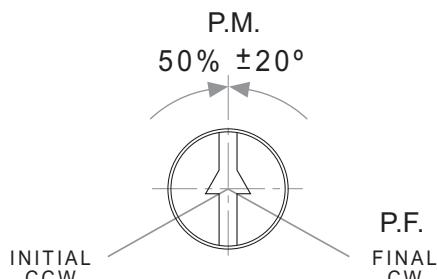
Rotary switches

10/15mm rotary switches



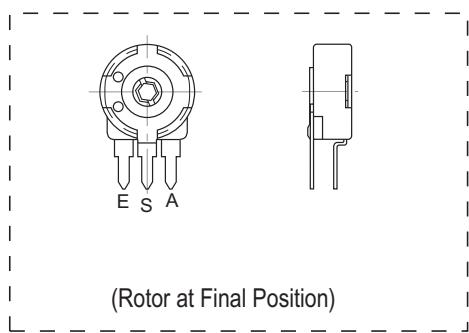
Power rating	24V / 15mA
ON position resistance	$\leq 5 \Omega$
Insulation Resistance	$\geq 30 \text{ M}\Omega$
Resistive element	carbon or cermet
Dust proof enclosure	yes
Mechanical detents available	yes
Supplied in magazines for automatic insertion	upon request
Customisation according to customer's needs	yes
Pb-Free according to ELV 2000/53/EC / RoHS 2002/95/EC	yes
Plastic material according to UL94V-0	upon request
Long life model PT-10 (10K cycles)	upon request
Wiper positioned at 50% or fully clockwise	upon request

Positioning

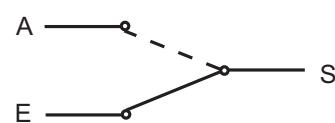


(Std. Position = CCW)

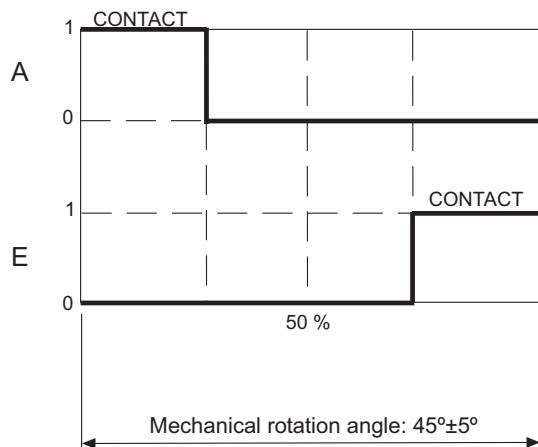
Standard configurations



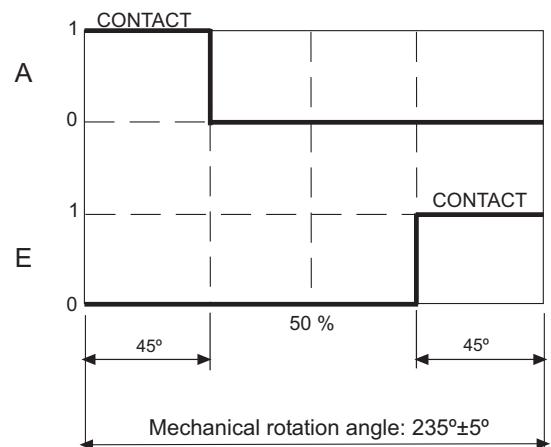
A = Initial
 S = Wiper
 E = Final



Standard configuration for PT10 model

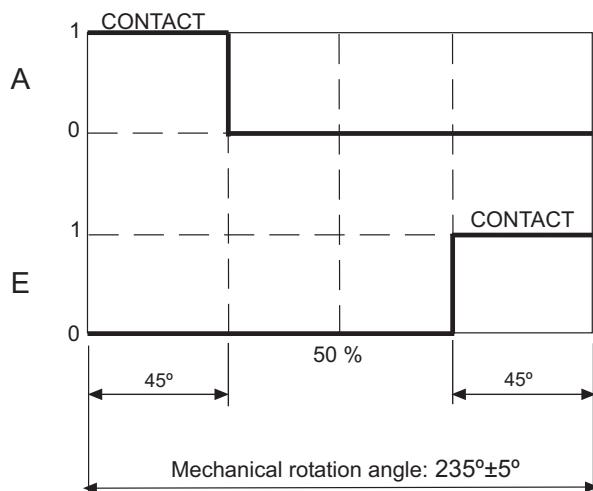


D48 Switch code (Housing colour: green)
PT-10LH01-CONMUTADOR-000D48

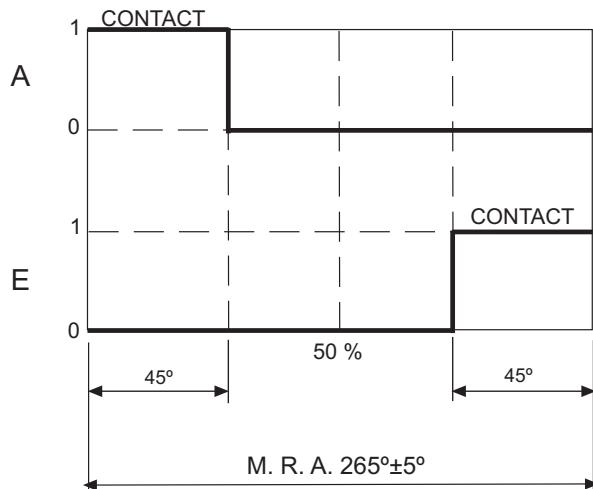


A80 Switch code
PT-10LH01-CONMUTADOR-000A80

Standard configuration for PTC10 model (PTC-10LH01-000)

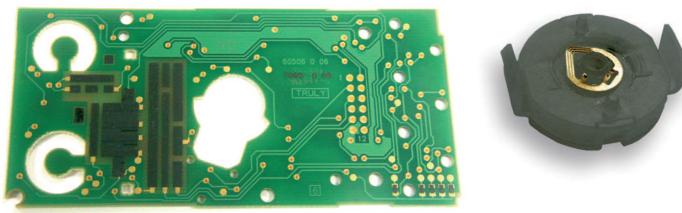


Standard configuration for PTC15 model (PTC-15LH01-000)



PCR

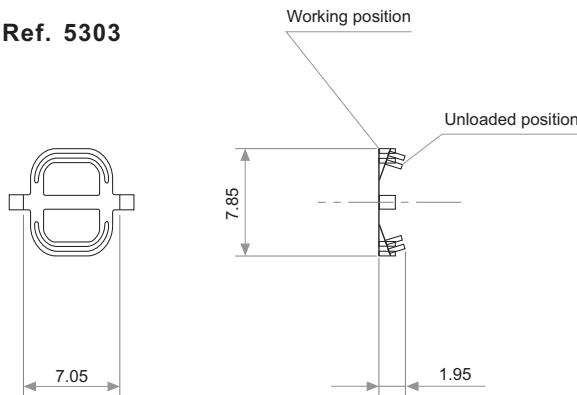
Printed circuit resistors



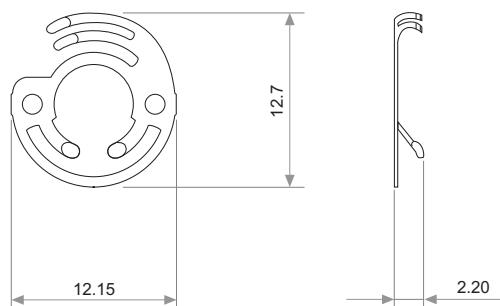
Description	PCB based / screen printed encoders, switches and potentiometers
Resistance range	10Ω to 1MΩ
TCR	Better than 300 ppm/°C
Ohmic value tolerances (others upon request)	<ul style="list-style-type: none"> -Non-trimmed resistors: ± 30%, ±20% (depending on values, shapes and substrates) -Trimmed resistors: ±5% -Matching capability: ±2%
Voltage ratio tolerances	<ul style="list-style-type: none"> - Non-trimmed resistors: ±10% - Trimmed resistors: ±2%, ±3%, ...
Mechanical life (voltage dividers only) (others upon request)	From 10 thousand to 100 thousand cycles (depending on each individual case)

Wiper examples (technical specifications upon request)

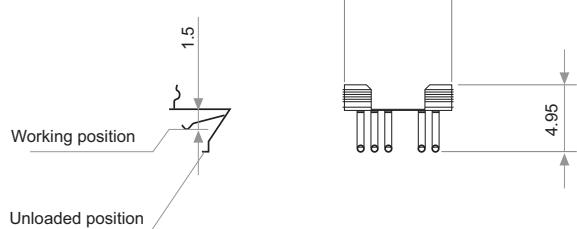
Ref. 5303



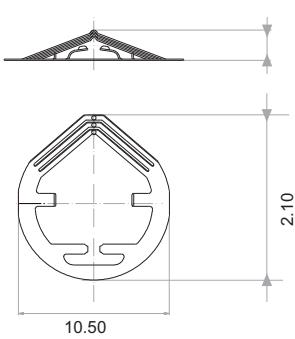
Ref. 5382



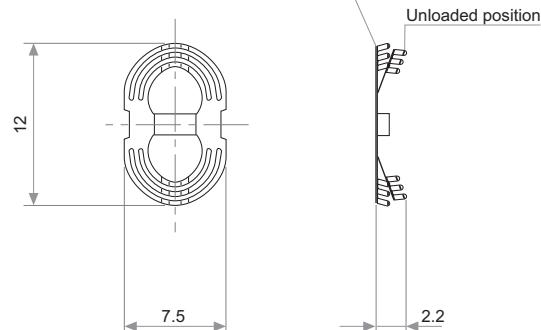
Ref. 5076



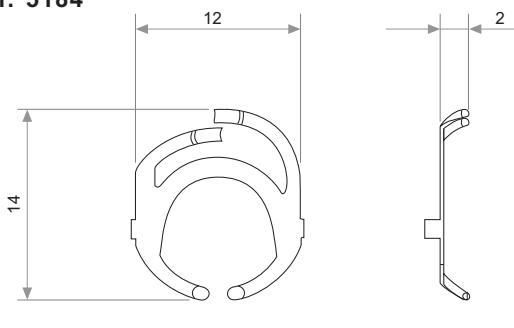
Ref. 5738



Ref. 5093



Ref. 5184



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