

# Data Sheet for Precision Potentiometer

TDS Precision Products GmbH  
Industriestrasse 1a  
CH-8157 Dielsdorf

T + 41 44 885 30 80  
info@tds-pp.com  
www.tds-pp.com

Multiturn Wirewound Potentiometer

Series AL13



The potentiometers of the AL13 series in 13 mm housing are for applications that require a miniaturized multiturn potentiometer.

- Miniaturized and precise 10-turn potentiometer
- 2 x ball bearings
- $\geq 2$  million revolutions

Electrical Data	5-turn	10-turn
Effective electrical angle of rotation 1.)	1800° $\pm 5^\circ$	3600° $\pm 5^\circ$
Total resistance 1.)	20 Ohm..70 kOhm	20 Ohm..170 kOhm
Resistance tolerance	$\pm 3\%$ ( $\pm 1\%$ )	
Independent linearity (best straight line) 1.)	$\pm 0,35\%$ ( $\pm 0,2\%$ ) [ $\pm 0,25\%$ R < 5k]	$\pm 0,3\%$ ( $\pm 0,1\%$ ) [ $\pm 0,15\%$ R < 5k]
Theoretical resolution 1.)	Depends on resistance value (see table below)	
Backlash (Hysteresis) 1.)	$\leq 2^\circ$	
Rotational noise (ENR) 1.) (Method C)	100 Ohm	
Max. / recommended wiper current 1.)	35 mA / 2 $\mu$ A	
Power rating @ 70°C (0W @ 105°C)	0,75 W	1,5 W
Insulation Voltage 1.)	1000 VAC, 1min	
Insulation Resistance 1.)	1000 MOhm @ 500 VDC	

Mechanical Data, Environmental Conditions, Miscellaneous	5-turn	10-turn
Mechanical angle of rotation	1800° +15°	3600° +15°
Lifetime (90% el. eff. angle half sine) 2.)	1 Mio. rotations	2 Mio. rotations
Max. operational speed	40 rev. / min.	
Bearing	2 x ball bearing	
Operational torque @ 1.) 2.)	2 Nmm	
End stop torque 1.) 2.)	15 Ncm	
Operating temperature range	-20..+105°C	
Storage temperature range	-55..+105°C	
Protection grade (IEC 60529)	IP40	
Vibration (IEC 68-2-6, Test Fc)	15g 10..2000Hz x 12h	
Shock (IEC 68-2-27, Test Ea)	49g bei 11 ms x 18	
Housing diameter	13 mm	
Housing depth	28,2 mm	
Shaft diameter	3,175 mm	
Shaft type	Solid shaft	

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Mechanical Data, Environmental Conditions, Miscellaneous	5-turn	10-turn
Max. radial load	≤1 N	
Max. axial load	≤1 N	
Connection type	Soldering lugs	
Connection position	Radial	
Sensor mounting	Servo flange	
Mass	ca. 10 g	
Fastening parts included in delivery	2 x servo clamps SFN3	
Material shaft	Stainless steel	
Material housing	Plastic	

1.) According IEC 60393

2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

Please note: Max. permissible supply voltage <75 VDC respectively <50 VAC in addition the max. power rating must be observed

Number of wire turns / resolution												
Resistance value Ohm	20	50	100	200	500	1k	2k	5k	10k	20k	50k	100k
Number of wire turns (AL13-5-turn)	760	815	920	1190	1250	1510	1790	2380	3120	3800	5430	-
Number of wire turns (AL13-10-turn)	1430	2000	1690	1850	2560	2500	3030	4170	4760	6250	8330	10870

Resolution in degree E.g. R5k 5-turn =  $1800^\circ / 2380 = 0,756^\circ$  per winding resistive wire

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## Order code

Description		Selection: standard=black/bold, possible options=grey/cursive					
<b>Series:</b>	<b>AL13</b>						
<b>Revolutions with stop:</b>							
<b>5-turn</b>		<b>5</b>					
<b>10-turn</b>		<b>10</b>					
<b>Resistance value:</b>							
<i>Option 20 Ohm</i>				<i>R20</i>			
<i>Option 50 Ohm</i>				<i>R50</i>			
<i>Option 100 Ohm</i>				<i>R100</i>			
<i>Option 200 Ohm</i>				<i>R200</i>			
<i>Option 500 Ohm</i>				<i>R500</i>			
<b>1 kOhm</b>				<b>R1k</b>			
<i>Option 2 kOhm</i>				<i>R2k</i>			
<b>5 kOhm</b>				<b>R5k</b>			
<b>10 kOhm</b>				<b>R10k</b>			
<i>Option 20 kOhm</i>				<i>R20K</i>			
<i>Option 50 kOhm</i>				<i>R50K</i>			
<i>Option 70 kOhm (only 5 Turn)</i>				<i>R70K</i>			
<i>Option 100 kOhm (only 10 Turn)</i>				<i>R100K</i>			
<i>Option 150 kOhm (only 10 Turn)</i>				<i>R150K</i>			
<b>Resistance tolerance:</b>							
<b>±3%</b>					<b>W3%</b>		
<i>Option ±1%</i>					<i>W1%</i>		
<b>Independent linearity:</b>							
<b>±0,35% (5-turn)</b>						<b>L0,35%</b>	
<i>Option ±0,25% (5-turn R &lt; 5kOhm)</i>						<i>L0,25%</i>	
<i>Option ±0,2% (5-turn)</i>						<i>L0,2%</i>	
<b>±0,25% (10-turn)</b>						<b>L0,3%</b>	
<i>Option ±0,15% (10-turn R &lt; 5kOhm)</i>						<i>L0,15%</i>	
<i>Option ±0,1% (10-turn)</i>						<i>L0,1%</i>	
<b>Front shaft:</b>							
<b>Standard Ø3,175 x 9,525 mm</b>						-	
<i>Option shaft length in mm</i>						<i>Ax,xx</i>	
<i>Option shaft diameter in mm (≤4 mm)</i>						<i>DMx,xx</i>	
<i>Option screwdriver slot:</i>							<i>B</i>

### For higher quantities or on-going demand, additional options are available as described below on request

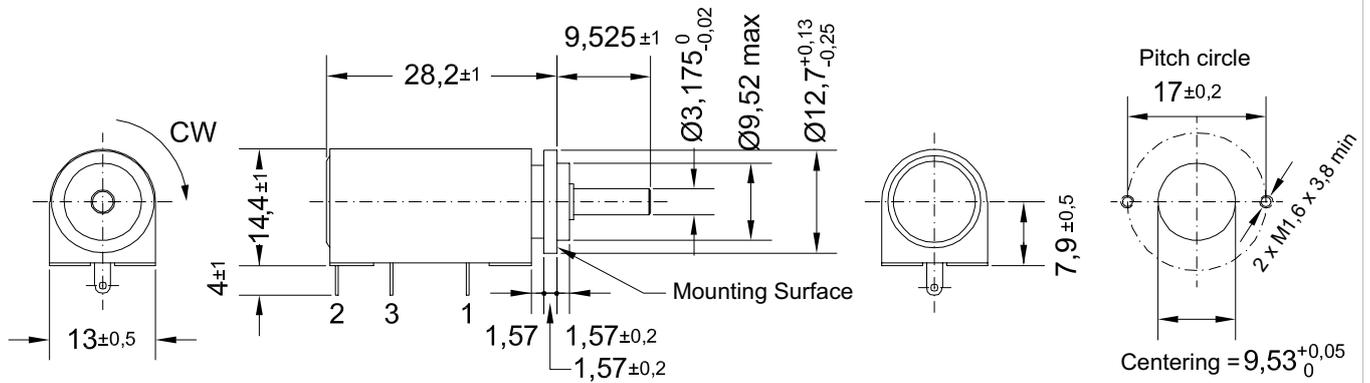
For Example: Sealed housing case (+1,8 mm housing length), version for PCB mounting, special electrical and mechanical angles of rotation, and special resistance and linearity tolerances. Furthermore we can mount gear wheels or attach cable assemblies with or without connectors and much more.

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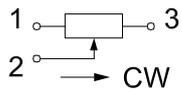
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## Drawing



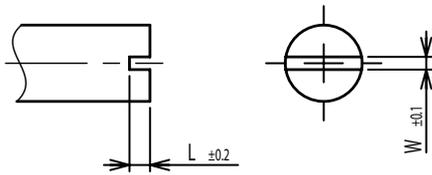
Connection diagram



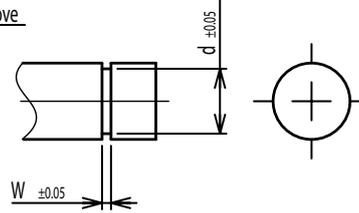
Dimension in mm

### On Request: Special machining on shaft

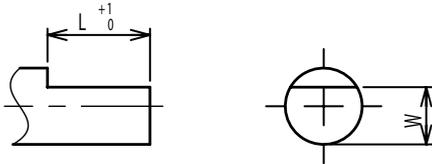
Slot



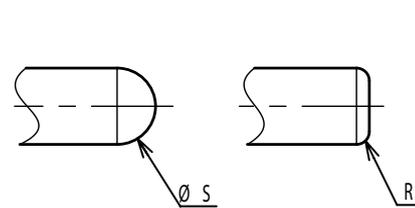
Groove



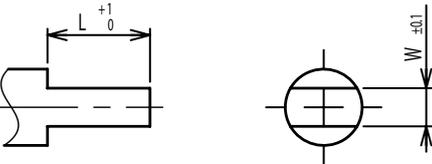
Flat



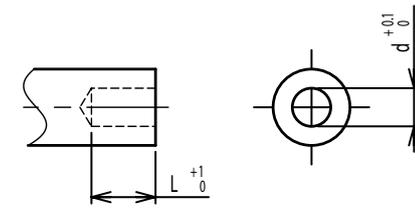
Round top



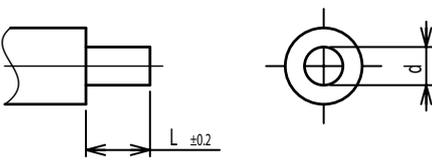
Double side flat



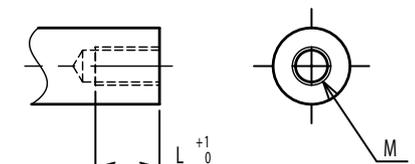
Counterbore hole



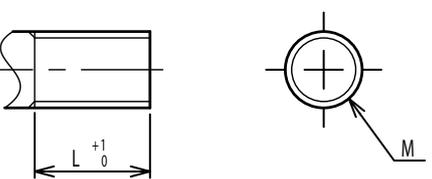
Step



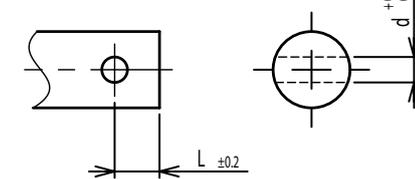
Counterbore screw hole



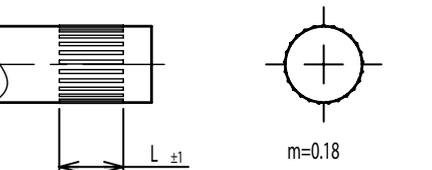
Screw Thread



Pin hole



Knurled(Parallel)



Screw thread inside hole

