

# Data Sheet for Precision Potentiometer

Multiturn Wirewound Potentiometer

Series AL25



The AL25 series potentiometers are used as multi-turn sensors or manual adjusters with outstanding linearity and resolution for measuring ranges from 3 to 20 revolutions.

- Multiturn 3..20 turns
- Optional limit switch (CW, CCW)
- Optional rear shaft
- Optional tandem version

Despite the compact housing diameter of only 25 mm, the potentiometer offers an angular range of up to 20 rev. and exceptional additional options such as galvanically isolated limit switches for the limit positions and up to 5 taps of the resistance element. For applications with the requirement for redundant and / or galvanically isolated signals, the tandem variant can be selected.

Electrical Data	3-turn	5-turn	10-turn	15-turn	20-turn
Effective electrical angle of rotation 1.)	1080° ±5°	1800° ±5°	3600° ±5°	5400° ±5°	7200° ±5°
Total resistance 1.)	0,1..50 kOhm	0.1..100 kOhm	0.1..200 kOhm		
Resistance tolerance	±3% (±1%)				
Independent linearity (best straight line) 1.)	±0.25%	±0.25% (±0.2%) [±0.25% R< 5k]	±0.25% (±0.1%) [±0.15% R< 5k]		
Theoretical resolution 1.)	Depending on the resistance value (see table)				
Backlash (Hysteresis) 1.)	≤ 2°				
Rotational noise (ENR) 1.) (Method C)	100 Ohm				
Max. / recommended wiper current 1.)	35 mA / 2 µA				
Power rating @ 70°C (0W @ 105°C)	1 W	1.5 W	2 W		
Insulation Voltage 1.)	1000 VAC, 1min				
Insulation Resistance 1.)	100 MOhm @ 1000 VDC				

Mechanical Data, Environmental Conditions, Miscellaneous	3-turn	5-turn	10-turn	15-turn	20-turn
Mechanical angle of rotation 1.)	1080° +10°	1800° +10°	3600° +10°	5400° +10°	7200° +10°
Lifetime (90% el. eff. angle half sine) 2.)	0.6 Mio. rev.	1 Mio. rev.	2 Mio. rev.		
Max. operational speed	40 rev. / min.				
Bearing	Sleeve bearing				
Operational torque @ ambient temperature 1.) 2.)	8 Nmm				
End stop torque 1.) 2.)	90 Ncm				
Operating temperature range	-20 °C up to +105 °C				
Storage temperature range	-55 °C up to +105 °C				
Protection grade (IEC 60529)	IP40				
Protection option D shaft sealing (IEC 60529)	IP65 optional				
Vibration (IEC 68-2-6, Test Fc)	15g 10Hz up to 2000Hz x 12h				
Shock (IEC 68-2-27, Test Ea)	49g @ 11 ms x 18				
Housing diameter	25 mm				
Housing depth	29 mm		37.5 mm	46 mm	55 mm
Shaft diameter	4.00 mm				
Shaft type	Solid shaft				

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Mechanical Data, Environmental Conditions, Miscellaneous	3-turn	5-turn	10-turn	15-turn	20-turn
Max. radial load	≤1 N				
Max. axial load	≤1 N				
Connection type	Soldering lugs				
Connection position	Radial				
Sensor mounting	Bushing				
Mass	ca. 50 g		ca. 60 g	ca. 70 g	ca. 80 g
Fastening parts included in delivery	Nut, toothed washer				
Fastening torque mounting nut	< 100 Ncm				
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	100	200	500	1k	2k	5k	10k	20k	50k	100k	200k
Number of windings (AL25-3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	-
Number of windings (AL25-5)	1300	1700	2000	2400	2500	3200	4000	5000	7000	8800	-
Number of windings (AL25-10)	2000	2600	3100	4000	4800	5000	6500	8000	10000	14000	18000
Number of windings (AL25-15)	2100	3000	4500	5000	7400	6500	7100	9300	17000	22000	24000
Number of windings (AL25-20)	2900	4300	5300	6900	9100	8500	10000	11500	17500	23000	28000

Resolution in degrees e. g. R5k 5-turn =  $1800^\circ / 3200 = 0.553^\circ$  per turn of the resistance wire

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## Order code

Description	Selection: <b>standard=black/bold</b> , possible <i>options=grey/italic</i>									
<b>Series</b>	<b>AL25</b>									
<b>Revolutions with stop:</b>										
Option 3-turn		03								
<b>5-turn</b>		<b>05</b>								
<b>10-turn</b>		<b>10</b>								
Option 15-turn		15								
Option 20-turn		20								
<b>Resistance value / Option Tandem:</b>				<i>Tandem</i>						
Option 100			R100	/100						
Option 200			R200	/200						
Option 500			R500	/500						
Option 1 kOhm			R1k	/1k						
Option 2 kOhm			R2k	/2k						
<b>5 kOhm</b>			<b>R5k</b>	/5K						
<b>10 kOhm</b>			<b>R10k</b>	/10K						
Option 20 kOhm			R20K	/20K						
Option 50 kOhm			R50K	/50k						
Option 100 kOhm (not 3-Turn)			R100K	/100k						
Option 200 kOhm (not 3..5 Turn)			R200K	/200k						
Option rear shaft:										
Standard Ø3,00 x 10 mm					RA					
Shaft length in mm					RAxx,xx					
Shaft diameter in mm (≤3 mm)					RADMx,xx					
<b>Resistance tolerance:</b>										
<b>±3%</b>							<b>W3%</b>			
Option ±1%							W1%			
<b>Independent linearity:</b>										
<b>±0,25%</b>								<b>L0,25%</b>		
Option ±0,20% (5 Turn)								L0,2%		
Option ±0,10% (10 Turn)								L0,1%		
Option ±0,25% R< 5k (5-turn)								L0,25%		
Option ±0,15% R< 5k (10-turn)								L0,15%		
Option center tap:									CT	
<b>Front shaft:</b>										
<b>Standard Ø4,00 x 25 mm</b>										
Option shaft diameter 6 mm									-	
Option shaft diameter 6,35 mm									DM6	
Option shaft diameter 3,175 mm									DM6,35	
Option shaft length in mm									DM3,175	
Option shaft diameter in mm (≤6,35 mm)									Ax,xx	
									DMx,xx	
Option screwdriver slot:										B
Option limit switch:										
Type CW+CCW ("n"=number Turns)										LS"n"252
Type CCW ("n"=number Turns)										LS"n"251
Type CW ("n"=number Turns)										LS"n"253
<b>Shaft sealing:</b>										
<b>Standard is without sealing</b>										-
Option D with shaft sealing										D

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

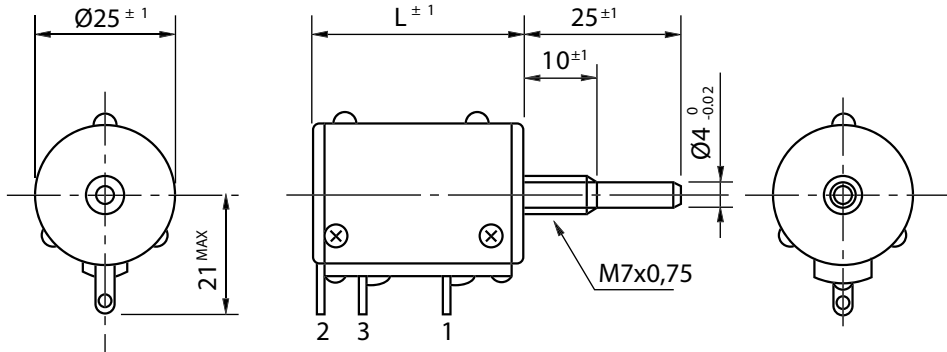
For Example: Multi ganged potentiometers (max. 2), more center tap max. 5, sealed housing case, special electrical and mechanical angles of rotation, and special resistance and linearity tolerances. Furthermore we can mount gear wheels or attach cable assemblies with or without connectors and much more.

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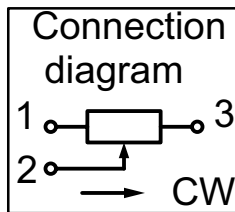
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## Drawing

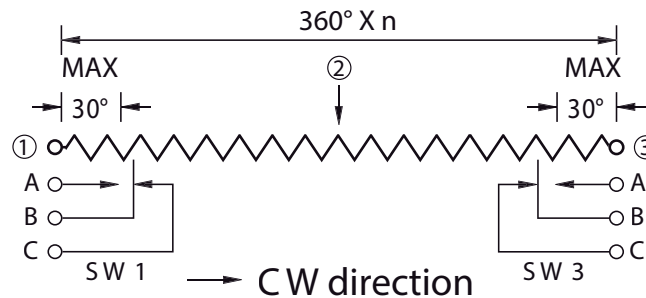
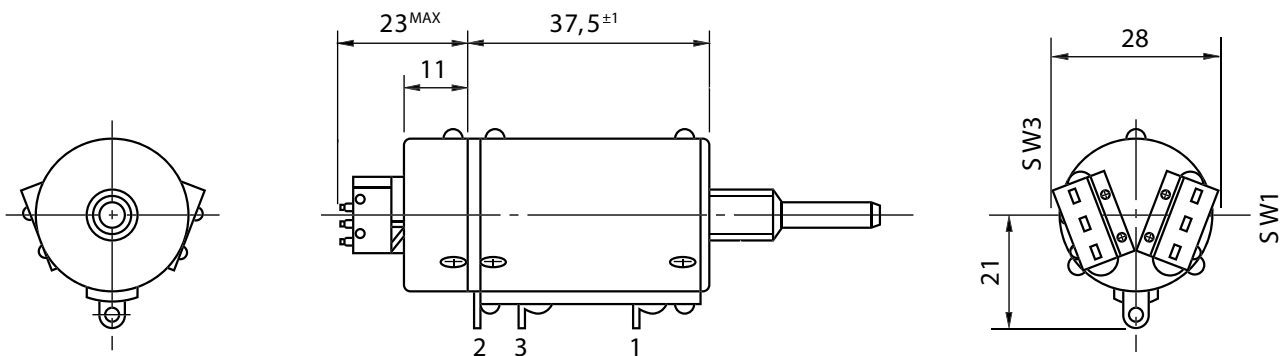


Dimensions in mm



Model No.	L
AL2503/05	29
AL2510	37,5
AL2515	46
AL2520	55

Option: limit switch



Unless otherwise specified, the limit-switch is of inscription type on both ends.

- Rating of limit-switch 1A, 125V.A.C. (resistance load)
- Life expectancy of limit-switch: 50,000 operations
- Operating temperature range:  $-55^\circ \text{C} \dots +105^\circ \text{C}$

NOTE: In case of model AL2515..20 the limit-switch adaptor is also available as a special version.

### On Request: Special machining on shaft

Slot



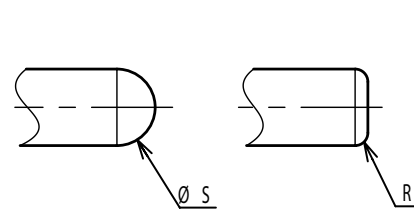
Groove



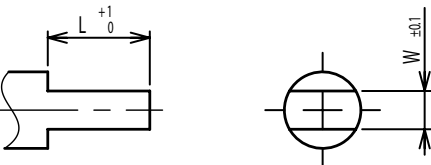
Flat



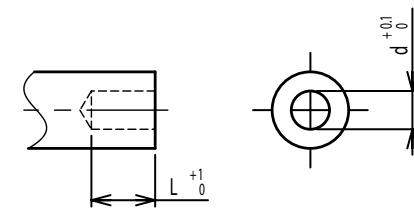
Round top



Double side flat



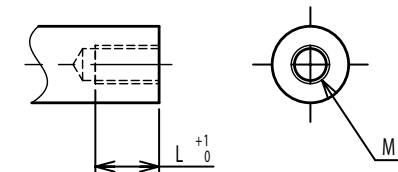
Counterbore hole



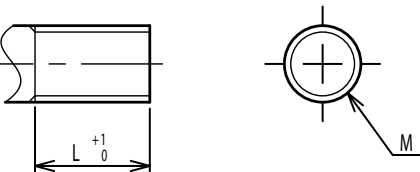
Step



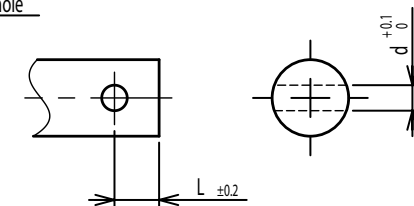
Counterbore screw hole



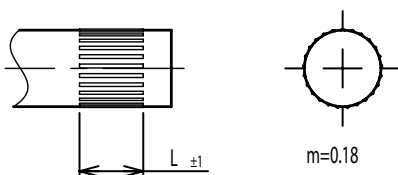
Screw Thread



Pin hole



Knurled(Parallel)



Screw thread inside hole

