

## **RSR100 Direct Drive Rotary Stage**



The RSR100 is a low profile, high precision rotary stage driven directly by an integrated brushless motor in place of a mechanical worm gear or belt drive. Benefits include no backlash, better positioning sensitivity, higher speeds, smaller envelope, and no drive wear and maintenance. This makes the RSR's well suited for applications that require high rotational accuracy, excellent positioning sensitivity and repeatability, and fast move and settle times.

For high torque and minimal heat output in a very compact stage the RSR100 is equipped with an ultra-thin, single slot, 24 pole motor with NdFeB magnets. Internal Hall switches are included to support trapezoidal commutation, and with some controllers can also be used for sine commutation initialization and phase error checking.

Position feedback is provided by a high resolution, hysteresis free, non-contact encoder mounted directly to the rotary stage hub. Multiple RS422A interpolation options are available with resolutions down to 0.021 arc-sec. For very high resolution feedback without sacrificing speed an encoder with an analog 1 volt p-p output is available for interpolation by the controller.

A preloaded, matched angular contact bearing set gives the RSR100 good stiffness and load capacity within a very low profile. This precision bearing set also gives the RSR its low axial radial runout errors, and low wobble errors. Angular contact bearings have a long life, and are well suited to higher rotational speeds.

To accommodate routing of wires or vacuum lines, or an optical pathway, the RSR100 has a large, 2 inch open aperture.

<b>Stage Specifications</b>			
Encoder Ring	15,744 Cycles per Revolution		
Digital Encoder Resolution, RS422A	0.021 – 20.6 arc-sec		
Analog Encoder Signal Period, 1Vp-p	82.32 arc-sec		
Repeatability (@ 0.41 arc-sec resolution or finer)	±1.0 arc-sec		
Rotational Accuracy	±20 arc-sec		
Tilt Error (Wobble)	10 arc-sec		
Radial Error (Eccentricity)	4 µm		
Axial Error	2 µm		
Load Capacity	10 Kg		
Maximum Velocity (Resolution Dependent)	240 rpm		
Rotary Hub Inertia	0.0015 Kg-m <sup>2</sup>		
Stage Weight	1.6Kg		
<b>Motor Specifications</b>			
Torque Constant, Kt	0.31 N-m/amp pk	Poles	24
Back EMF, Ke	32.5 v/krpm	Resistance	2.5 Ω
Continuous Torque	1.6 N-m	Inductance	5 mH
Continuous Current	5.0 amps pk	Commutation Halls	Internal

<b>Encoder, Max Velocity (50MHz)</b>		
Resolution, Arc-Sec	Max Slew Rate, RPM	Quad Count Rate, Hz
4.12	240	1,259,520
2.06	240	2,519,040
0.82	240	6,297,600
0.41	240	12,595,200
0.21	240	25,190,400
0.08	124	32,537,600
0.04	62	32,537,600



