

# High-Speed, High-Torque Precision Rotation Stage

RGV100HL-S



The RGV100HL-S Compact Rotation Stage provides ultra-fast rotation, very high resolution, and outstanding positioning performance. Applications include semiconductor wafer inspection, micro-robotics, and precision metrology. Direct-drive technology eliminates the worm gear of traditional rotation stages providing higher speeds, superior reliability, and enhanced position sensitivity. Speed, resolution, and repeatability are increased by a factor of up to ten times. A high efficiency brushless DC torque motor with rare earth magnets supplies an optimum ratio of torque per inertia for high acceleration, with minimal stage heating. At maximum continuous torque, the temperature of the motor increases by only 30 °C. Precision is ensured by a high-resolution glass scale with 15,000 line pairs per revolution that directly measures the position of the rotating platen. The flat encoder is mounted on a precision ground reference surface and is perfectly aligned with the stage's rotation axis to minimize position errors induced by eccentricity, wobble, or axial runout. The RGV100HL-S features a proprietary 4-point contact ball bearing. This unique, 2-piece design minimizes the number of parts resulting in a more compact stage with superior stiffness, high reliability and outstanding wobble and eccentricity specifications. A 30 mm diameter through-hole allows easy routing of cables and vacuum lines through the stage. A once-per revolution index pulse permits precision homing to a unique home position. The RGV100HL-S also features two limit switches that can be enabled or disabled by an external switch.

- Direct drive for outstanding speed of 720 °/s and high reliability
- Large diameter, steel ball bearings for stiffness, low runout and high load capacity
- Precision glass scale encoder for high position repeatability, MIM, and high accuracy
- High torque DC brushless motor

## DESIGN DETAILS

Base Material	Aluminum
Bearings	Large diameter steel ball bearings
Motor	High-torque brushless DC motor with rare earth magnets (no Hall effect sensors)
Motor Initialization	Has to be done by the controller (without using Hall effect sensors)
Motor Commutation	Done by the XPS controller on encoder signals
Feedback	Glass scale encoder with 15,000 line pairs per revolution, 1 VPP, 32768-fold signal subdivision when used with XPS controller
Limit Switches	Two optical limit switches at approx. ±168°, disabled by external switch No hard stops included
Origin	Optical, fixed at position 0°, including mechanical zero signal
ESP Compatibility	Yes
Cable Length	The appropriate 5 m cable kit must be ordered separately

## LOAD CHARACTERISTICS AND STIFFNESS

Cz,	Normal centered load capacity	100 N
Kα,	Transversal compliance	15 μrad/Nm
Jz,	Maximum Inertia	0.032 kg.m <sup>2</sup>
Q,	Off-center load (N)	$Q \leq Cz \div (1 + D/35)$ and $Q \leq (Jz - Jq)/D^2$

Where D = Cantilever distance (mm)

Jq = Inertia of payload



