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Find the *Newport RGV100BL* at our website: *Click HERE*

High-Speed Precision Rotation Stages

RGV SERIES



The RGV can be used in applications like semiconductor wafer inspection, microrobotics, precision metrology and motion simulators, specifically for MEMS, gyros and accelerometer testing.

High Efficiency, Brushless DC Torque Motor

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.

High-Resolution Glass Scale Encoder

To ensure precision, the glass encoder is mounted on a ground reference surface. For example, the RGV160's 28,800 pt encoder allows for outstanding MIM. It is perfectly aligned with the stage's rotation axis to minimize position errors induced by eccentricity, wobble, or axial runout.

Direct Drive Technology

Due to direct-drive technology, the RGV series gains superior speeds and enhanced positioning. The direct-drive motor is non-contact, providing no wear and boosted reliability.

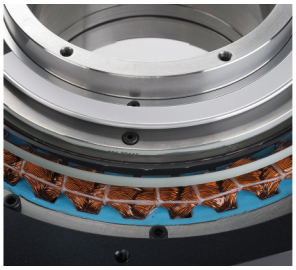
Large Diameter Through Hole

A 30 mm or 110 mm diameter through-hole allows convenient routing of cables and vacuum lines through the stage.

Compact Design

The RGV series features a proprietary 4-point contact ball bearing and a 2-piece design which integrates multiple functions, like the bearing ways and the direct drive motor, minimizing the number of parts. The result is a more compact rotation stage with superior stiffness, high reliability and outstanding wobble and eccentricity specifications.

- Direct drive for outstanding speed of up to 1000 °/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 with a maximum torque of 112 Nm



DESIGN DETAILS

Base Material	Aluminum
Bearings	Large diameter steel ball bearings
Motor	High-torque brushless DC motor with rare earth magnets
Motor Initialization	Done by the XPS controller by a patented process that avoids major motion during initialization and that does not require Hall effect sensors
Motor Commutation	Done by the XPS controller on encoder signals
Feedback	Glass scale encoder RGV100: 15,000 line pairs per revolution, 1 Vpp, 32,768-fold signal subdivision RGV160: 28,800 line pairs per revolution, 1 Vpp, 1,250-fold signal subdivision
Limit Switches	RGV100: Two optical limit switches at approx. ±168°, disabled by external switch RGV160: None
Origin	Optical, fixed at position 0°, including mechanical zero signal
Cable Length (m)	5

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Metrology Report Included at No Additional Cost

Newport guarantees specification values which are measured and recorded following ASME B5.57 and ISO 230-2 standards. The typical performance values are two times better than the guaranteed specifications.

Need Higher Accuracy?

For critical positioning applications, Newport offers micropositioning calibration services. We will create, implement and verify an electronic compensation process to improve the absolute position accuracy of RGV100 stages when commanded by our XPS advanced motion control system. Compensation is performed at 20.0 °C, ±0.2 °C, for linear and non-linear errors, ensuring accuracy of up to 0.002°. A certificate of calibration per Newport Metrology Procedure A167 and measured error maps are provided.

SPECIFICATIONS

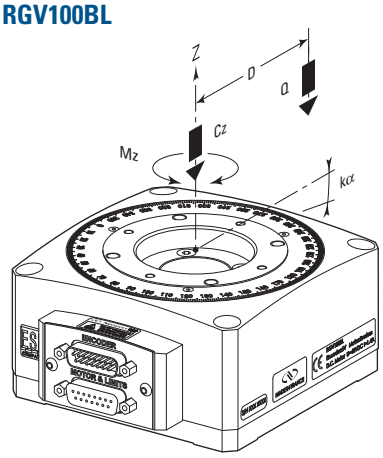
	RGV100BL	RGV100HL	RGV160BL
Travel Range (°)		360 continuous	
Minimum Incremental Motion (mdeg)	0.10	0.10	0.04
Uni-directional Repeatability, Typical (Guaranteed) [1] (mdeg)	±0.08 (±0.15)	±0.10 (±0.15)	±0.05 (±0.15)
Bi-directional Repeatability, Typical [1] (mdeg)	±0.15	±0.15	±0.15
Accuracy, Typical (Guaranteed) [1] (mdeg)	±3.0 (±5.0)	±3.0 (±5.0)	(±7.5)
Maximum Speed [no load] (°/s)	720	720	1,000
Maximum Acceleration (°/s²)	1,000	5,000	30,000
Inertia (kg.m²)	0.00104	0.00123	0.024
Wobble, Typical (Guaranteed) [1] [2] (µrad)	±5.0 (±10)	±7.0 (±20)	±5.0 (±10)
Eccentricity, Typical (Guaranteed) [1] (µm)	±1.0 (±1.5)	±1.0 (±1.5)	±0.8 (±2.0)
MTBF (h)	20,000 with 5 kg load, max. speed and a duty cycle of 30%		

[1] *Shown are peak to peak, guaranteed specifications or ±half the value as sometimes shown. For the definition of typical specifications which are about 2X better than the guaranteed values, visit www.newport.com for the Motion Control Metrology Primer.*

[2] *To obtain arcsec units, divide µrad value by 4.8.*

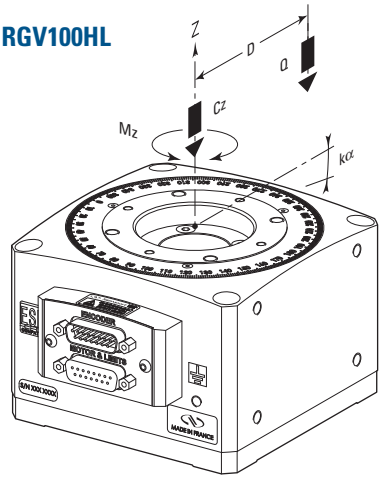
LOAD CHARACTERISTICS AND STIFFNESS

RGV100BL



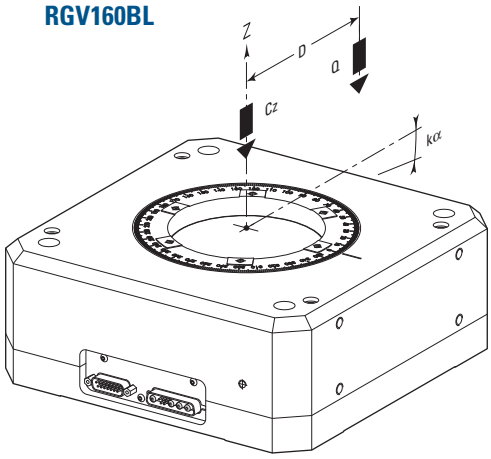
Cz,	Normal centered load capacity	100 N
Kα,	Transversal compliance	15 µrad/Nm
Mz,	Maximum torque	0.42 Nm @ 0 °/s
Jz,	Maximum Inertia	0.032 kg.m²
Q,	Off-center load (N)	Q ≤Cz ÷ (1 + D/35) and Q ≤(Jz - Jq)/D²
	Where D = Cantilever distance (mm) Jq = Inertia of payload	

RGV100HL



Cz,	Normal centered load capacity	100 N
Kα,	Transversal compliance	15 µrad/Nm
Jz,	Maximum Inertia	0.032 kg.m²
Q,	Off-center load (N)	Q ≤Cz ÷ (1 + D/35) and Q ≤(Jz - Jq)/D²
	Where D = Cantilever distance (mm) Jq = Inertia of payload	

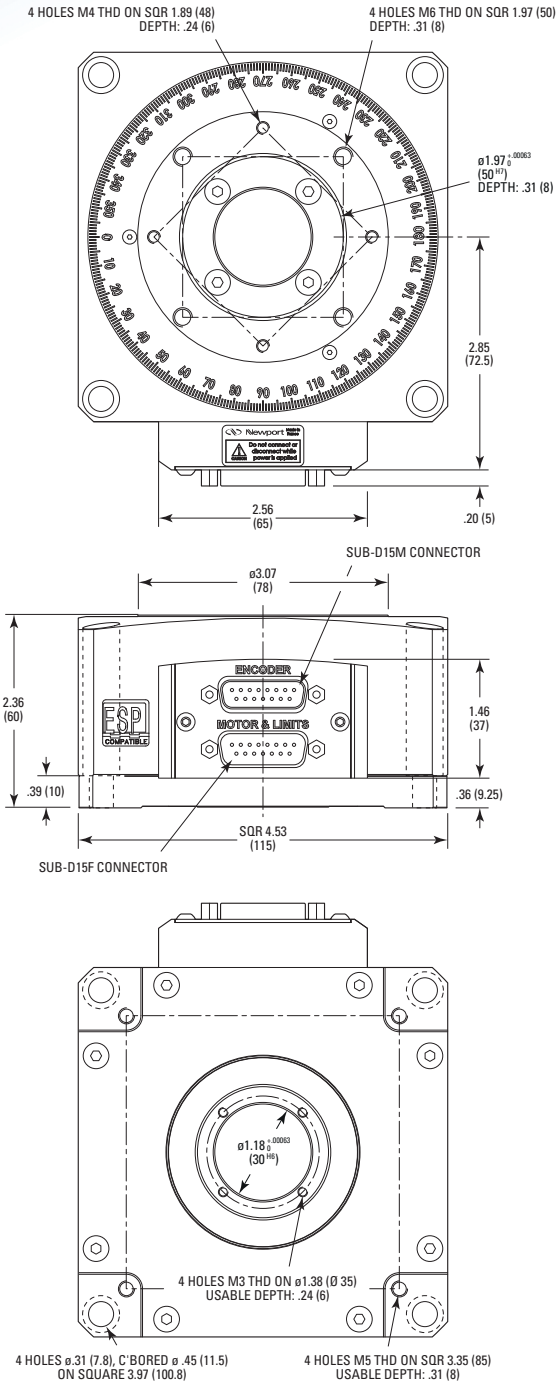
RGV160BL



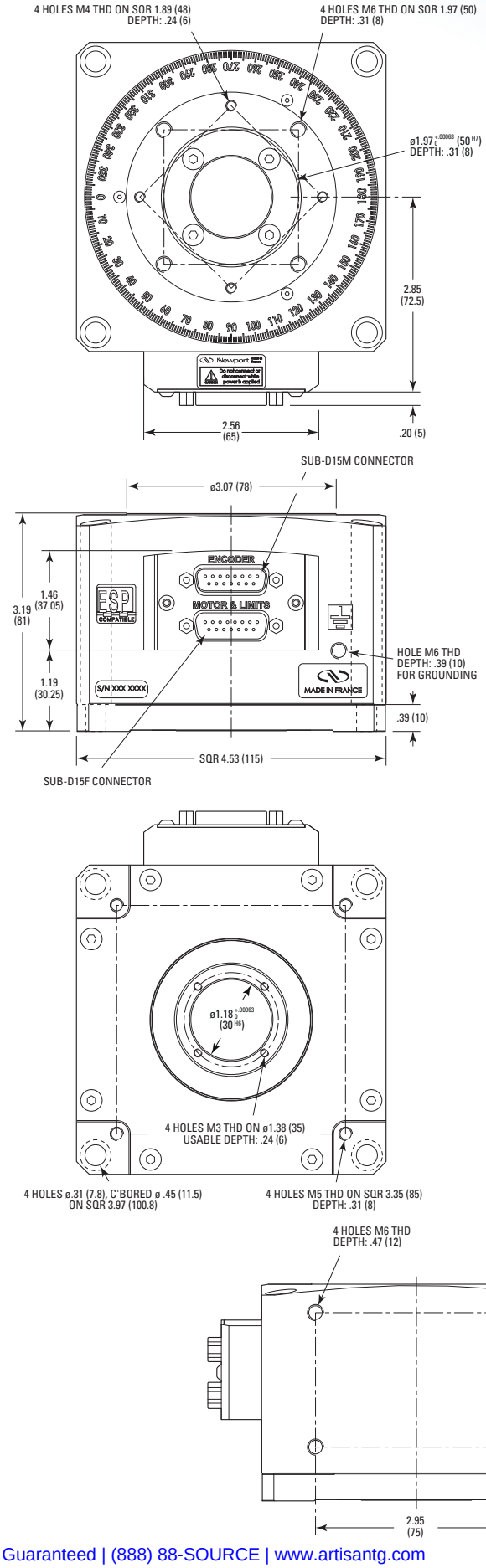
Cz,	Normal centered load capacity	2700 N
Kα,	Transversal compliance	1 µrad/Nm
Q,	Off-center load (N)	Q ≤Cz ÷ (1 + D/50)
	Where D = Cantilever distance (mm)	

DIMENSIONS

RGV100BL



RGV100HL

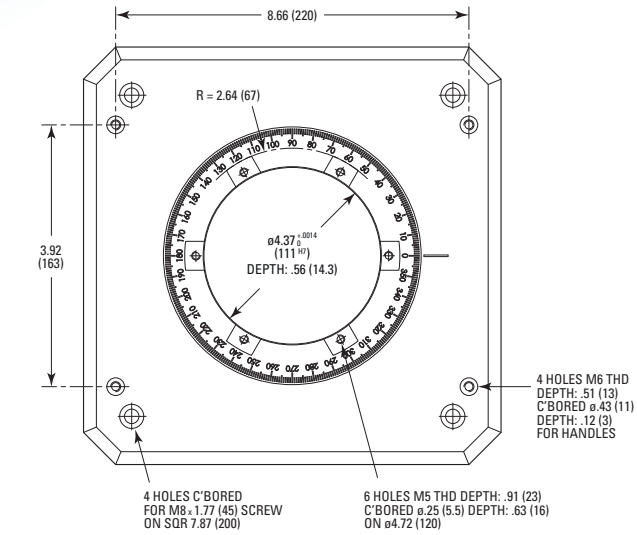


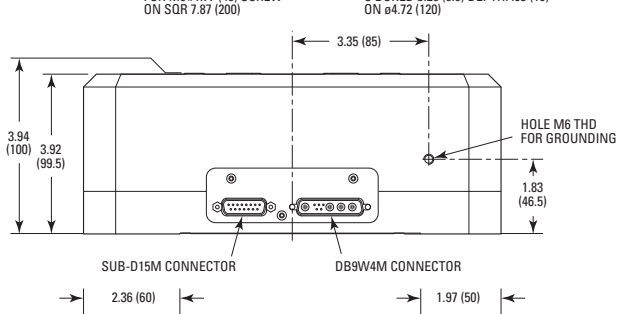
ORDERING INFORMATION

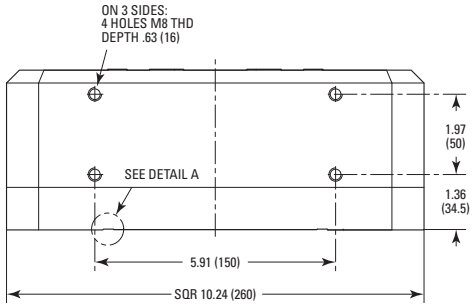
Model	Description
RGV100BL	High Speed 360° Rotation Stage, Brushless Direct, Ultra-Compact
RGV100BL-S	RGV100BL Rotation Stage without cables
RGV100HL	High Precision & Torque Rotation Stage, 360°, Brushless, Ultra-Compact
RGV100HL-S	RGV100HL Rotation Stage without cables
RGV160BL	High Speed, High Load Rotation Stage, 360°, Brushless Direct, Compact
RGV160BL-S	RGV160BL Rotation Stage without cables

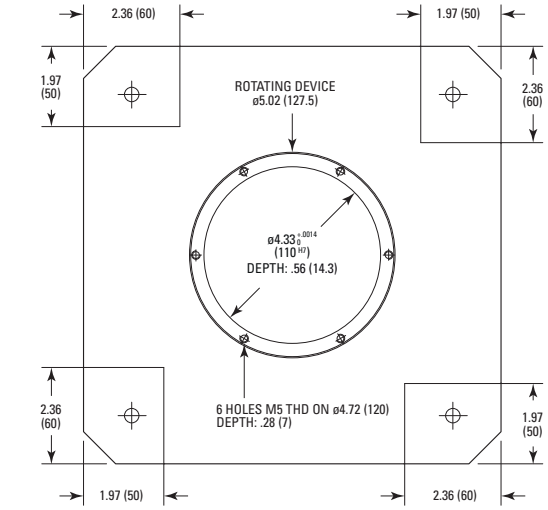
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RGV160BL









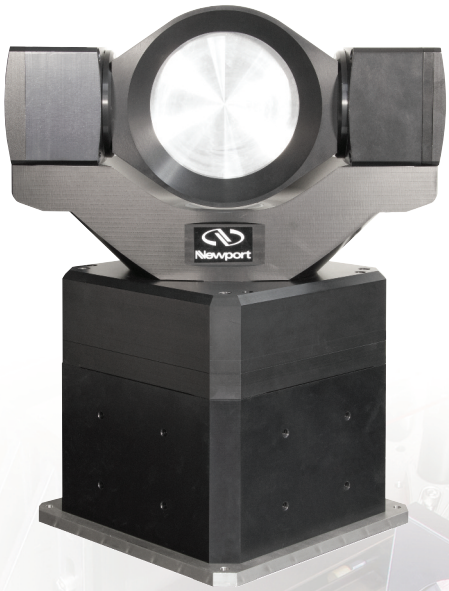
RECOMMENDED CONTROLLERS/DRIVERS

Model	Description
XPS-D	1- to 8-axis universal high-performance motion controller/driver
XPS-DRV11	Universal digital driver card for stepper, DC, brushless and direct motors
XPS-RL	1- to 4-axis universal high-performance motion controller/driver
XPS-EDBL	High-power, 3-phase, sinusoidal DC brushless motor driver
XPS-DRV02	PWM drive module for brushless motors, 5 A/44 VPP max.

CABLE KITS FOR -S VERSIONS

Model	Description
XPS-RK11	Motorized stage cable kit, for stages ILS-LM-S, RGV100BL-S, RGV100HL-S and XPS-DRV02 driver module
XPS-RK13	Motorized stage cable kit, for stages ILS-LM-S, RGV100HL-S and XPS-EDBL driver module
XPS-DK21	Motorized stage cable kit, for stages ILS-LM-S, RGV100HL-S, RGV100BL-S, and XPS-DRV11 driver module
XPS-DK23	Motorized stage cable kit, for stages ILS-LM-S, RGV100HL-S, and XPS-EDBL driver

High-Speed Motion Simulators



Newport's 2-axis motion simulators provide high speed, precision rotation and positioning for test and calibration in aerospace and defense, industrial and research markets. Constructed with RGV100HL in Elevation and custom RGV160BL in Azimuth, the motion simulators address high acceleration, high torque needs in various applications such as stability, accuracy test and measurement for accelerometers, MEMS devices, Inertial Guidance Sensors and Gyroscopes.

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Newport Corporation, Irvine, California and Franklin, Massachusetts; Evry and Beaune-la-Rolande, France and Wuxi, China have all been certified compliant with ISO 9001 by the British Standards Institution. Santa Clara, California is DNV certified.

RGV_DSE (02/18)

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