

KSR 1320-90

Accuracy & Reliability

Raptor Scientific's KSR 1320 instruments are the most accurate instruments in the world for center of gravity and moment of inertia measurement. They are particularly recommended for determining mass properties of rockets, satellite and ballistic objects.

Measurement Concept

A spherical bearing supports a rotary table and acts as a pivot axis for measuring unbalance moments due to the displacement of the test part CG relative to the central axis of the bearing. The spherical gas bearing creates both a precision rotary table and a frictionless pivot.

Active force rebalance transducer measures overturning moment due to CG offset from center of rotation. Moment of inertia is determined by clamping the lower end of the torsion road attached to the gas bearing, thus converting the instrument to an inverted torsion pendulum.



Center of Gravity and Moment of Inertia Measurement Instruments

Key Features

- Best accuracy - CG to 2.5 microns & MOI to 0.1%.
- Largest payload range - the same instrument can measure payloads weighing only 4% of the machine's capacity.
- Fully automated operation - select CG or MOI and the entire measurement sequence runs automatically.
- Use of gas bearing - fully compatible with cleanrooms, no contamination risk, no high pressure, no danger of explosion.
- Enormous stiffness to overturning moment - remains stable when tall objects with high CG are measured.
- Fully programmable for metric and imperial units.
- User-defined coordinate system - CG and MOI are reported directly in the payload coordinate system.
- Calibration hardware traceable to NIST is provided
- Unbalance moment measured directly, CG changes observed immediately.
- Optional weight platform and CMM device allow direct acquisition of test part weight and coordinate system into the KSR system.

General Specifications

Max Payload Weight	1,230lb (600 kg)
Recommended Payload Weight Range	11-440 lb (5-200 kg)
Full-Scale Moment	90 lb-in (1 kg-m)
Maximum CG Height.....	400 lb @ 24 in (200 kg @ 550 mm)
Mounting Table Diameter.....	11.5 in (292 mm)
CG measurement accuracy	0.1% + 0.01 lb-in (0.6 kg-mm)
MOI measurement accuracy	0.1% + 0.2 lb-in ² (0.6 kg-cm ²)
Electrical power requirements.....	115 VAC, 60 Hz or 220 VAC 50 Hz, single phase
Pneumatic requirements.....	Clean source of dry air or nitrogen, 6 bar, 60 liters per minute
Facility requirements	Concrete floor, 6 in (15 cm) thick