

SERVOTEST

TEST AND MOTION SIMULATION

Hexapod MAST



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SERVOHYDRAULIC TEST AND MOTION SIMULATION SYSTEMS

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Servotest Testing Systems Ltd

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The Servotest hexapod is a 6-degree-of-freedom general purpose Multi-Axis Simulation Table (MAST) system which is suitable for a broad range of test applications. The system combines:

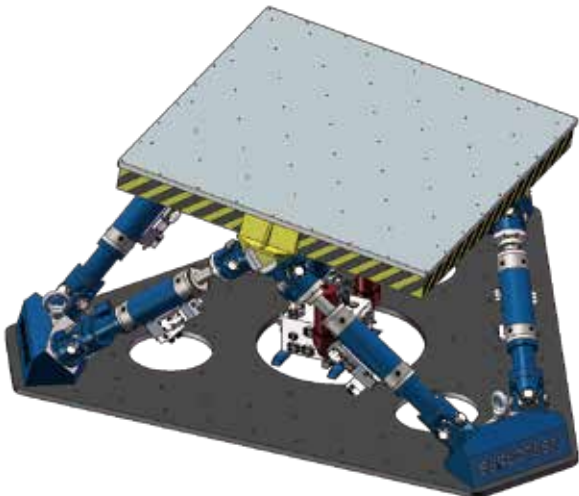
- Proven high-performance low-friction hydrostatic bearing actuators
- Rugged backlash-free Cardan universal joints
- A high-strength Ø2 m steel motion platform
- Powerful Pulsar digital control hardware & software

Based upon a well-established ‘Stewart platform’ mechanical design the Servotest hexapod offers:

- Significantly higher payload, displacement, acceleration and low-frequency performance than electrodynamic shaker systems as well as offering motion in individual degrees-of-freedom or simultaneous motion in any combination of, or all, 6-degrees-of-freedom
- Higher frequency performance than traditional ‘orthogonal’ MAST system designs
- A compact configuration that lends itself to integration with 3rd-party environmental chambers for high/low temperature testing, anarhic chambers & driving simulators

The system is suitable for use in simulation and vibration test applications within:

- Automotive, off-highway, marine, railway and aerospace vehicle development
- Packaging and transport simulation
- Verification of electronic system robustness & qualification testing
- Small-scale civil structural studies
- Human-factors research (man-rated versions)



Fundamental to the operation and performance of the Servotest hexapod is the versatile Pulsar digital servo-control platform. Pulsar uses a unique internal database which supports advanced control using a combination of physical (measured) data channels and virtual (calculated) channels, including:

- Base level modal transformations which convert ‘actuator’ coordinate motions seamlessly for all six actuators in real-time into ‘table’ coordinate motions. This enables test operators to request independent displacements or accelerations in any of the six linear (x/y/z) and rotational (pitch/roll/yaw) degrees-of-freedom either independently or in combination
- Layered on top of this are optional Iterative Control Software (ICS) capabilities to support high-fidelity replication of time-domain responses and random-vibration control algorithms for applying vibration inputs based upon Power Spectral Density (PSD) energy profiles without the need for an external vibration control system
- Where required higher-levels of advanced control are also available through the unique Pulsar ‘sockets’ capability which enables customer-specific Simulink® models to be run within the control system real-time front-end during test execution. For even more advance applications SCRAMNet®-based Pulsar open control system architectures can be supplied where needed.

Combining the above versatility with the power of the EzFlow test sequencer and schematic operator interface displays, tailored around each customer’s application, delivers a system that is suitable for use by either novice or experienced test users.

Hexapod installations are more straightforward than for more traditional orthogonal MAST systems as the hexapod only needs to be bolted down to a suitable seismic foundation. This helps to reduce facility integration costs and installation time. Hexapod MAST installation can be complemented by Servotest SP series quiet hydraulic power supplies that are designed for ‘in-laboratory’ use. These offer further savings in infrastructure costs by eliminating the need for a separate pump-room, plus the costs and operating losses associated with long runs of hydraulic hardline.

For advanced applications Servotest hexapod systems can be used in conjunction with other items of test equipment. For example the motion platform could be used to apply road vibration loads to automotive powertrain components while torque loads are applied by an external device via a flexible coupling. This approach could be used to simulate additional loading inputs from engines, gearboxes or other drive-train components to provide a comprehensive assessment of test specimen durability. Although intended primarily as a standardized product offering, Servotest is happy to consider customized or entirely bespoke versions of our hexapod systems or other MAST platform configuration to suit specific customer needs. Please contact us to discuss your requirements.

| Table Size | 2m*2m |
|--------------------------|------------------------|
| Rated Specimen Weight | 680kg |
| Operation Frequency | 0.1~120Hz |
| Max Linear Displacement* | Vertical(Z): ±145mm |
| | Longitude(Y): ±115mm |
| | Horizontal(X): ±130mm |
| Max Angle Displacement* | roll: ±11° |
| | pitch: ±9.5° |
| | yaw: ±7° |
| Max Linear Velocity* | Vertical(Z): 1.17m/s |
| | Longitude(Y): 0.95m/s |
| | Horizontal(X): 1.08m/s |
| Max Acceleration* | Vertical(Z): 9.75g |
| | Longitude(Y): 5.88g |
| | Horizontal(X): 6.89g |

*The performance index above is evaluated based on the rated inertia specimen weight.

