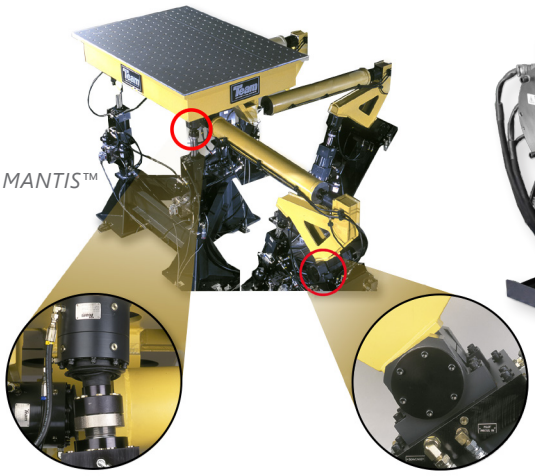
Multi-Axis Test Systems

Specifications

Historically, the lack of effective multi-axis hardware and control software has limited the availability and capability of multi-axis test systems. By applying lessons learned in other vibration test environments and using time proven technologies in innovative ways, Team Corporation has created a suite of multi-axis test systems that accommodate a range of test articles with different physical and test environment needs for use in a variety of product market testing. Replication of real world environments demands the use of systems that realistically reproduce actual field conditions. Multi-axis vibration environments require multi-axis systems to replicate them.

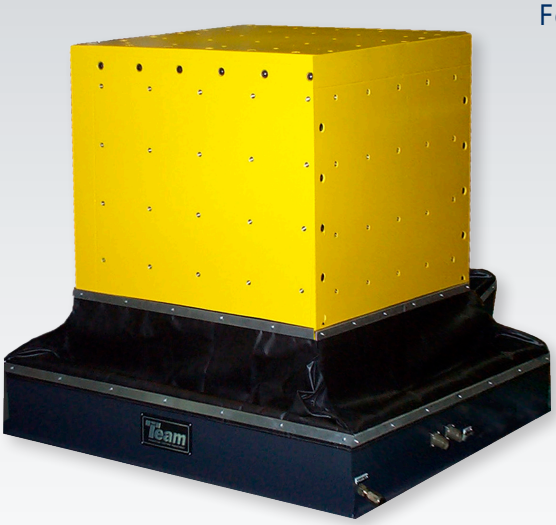
Transportation canister testing with dual CUBE™s



MANTIS™

Tensor 18kN™

CUBE™



Features:

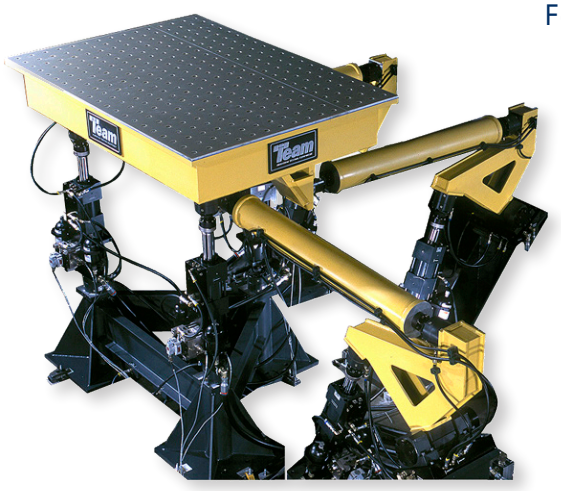
- Standard force rating of 14,000 lbf. in each axis
- Six patented Integrated servo-hydraulic shakers provide precise, simultaneous or sequential control of all 6 Degrees of Freedom to beyond 500 Hz*
- Excellent replication of measured data to higher frequencies than ever before*
- Fluid film bearings assure long life and low maintenance
- Small footprint minimizes required lab space
- Available head expanders increase the mounting surface according to your test article requirements
- Five active mounting surfaces allow simultaneous unit testing

**Model 4*

Applications:

- Replication of recorded motions
- Squeak and rattle testing of seats, instrument panels, and other interior components
- Durability and suspension testing
- Simulation of engine block motion for engine mounted components and exhaust systems
- Tire or spindle coupled four post road simulation with simultaneous vertical, lateral and longitudinal loading as well as application of braking and steering torques
- Multi-axis screening of electronic components and modules
- Military under-wing component testing
- Transportation canister testing

MANTIS™



Features:

- Frequency 0-200Hz
- Six servo-hydraulic actuators
- Force Ratings up to 34,000 (150 kN)
- Single axis to 6 Axis Vibration
- Displacements up to 6 in. (150mm)
- Table Size 60 in. x 82 in. (1.5m x 2.1m)
- Friction free hydrostatic bearings
- Hydrostatic bearings for bell cranks
- HydraBall connections on all actuators

Applications:

- Automotive BSR (Buzz Squeak & Rattle) testing
- Seat testing
- Automotive component testing
- Recreation equipment rack testing

Tensor 18kN™

Features:

- 12 Custom designed electrodynamic shakers
- Simultaneous or sequential excitation of X, Y, and/or Z axis
- Peak Sine force rating of 4,800 lb-f (21.4 kN) per axis.
- Peak Random force rating of 3600 lbf (16kN) per axis.
- Complete control of rotations around all axis
- Velocity of 50 ips (1.3 m/sec)
- Displacement +/- 0.5 in (12.7 mm) dynamic
- Bandwidth from 10 Hz through 2 kHz
- 30 in (762 mm) x 30 in (762 mm) working surface
- Sine Acceleration 12-g peak
- Random acceleration 9-grms
- Angular rotation +/- 4 degrees

Applications:

- Accurate replication of true, real-world vibration environments in all 6DoF
- Accelerated Durability, Life Cycle and Fatigue cycling
- Precise Product Development investigation
- Rapid screening of electrical components and modules
- Addresses new multi-axis testing protocol in MIL STD 810(G)

Tensor 900™

Features:

- 12 Custom designed electrodynamic shakers
- Simultaneous or sequential excitation of X, Y, and/or Z axis
- Force Rating of 200 lb-f (900 N) Sine and 135 lb-f (600 N) in Random
- Complete control of rotations around all axes
- Bandwidth from 10 Hz through 5 kHz
- 10 grms acceleration on nominal payload
- Fully contained system (electrical power only requirement)
- Sine acceleration 22-g peak
- Random acceleration 15-grms peak

Applications:

- Accurate replication of true, real-world vibration environments in all 6DoF
- Accelerated Durability, Life Cycle and Fatigue cycling
- Precise Product Development investigation
- Rapid screening of electrical components and modules
- Addresses new multi-axis testing protocol in MIL STD 810(G)

English Specifications

SYSTEM	MANTIS™	TENSOR 900™	TENSOR 18kN™
Top Surface	59 in x 83 in	7.8 in x 7.8 in	30 in x 30 in
Side Surface	n/a	n/a	n/a
Bare Table Moving Mass	1642 lbs	9 lbs	430 lbs
Max recommended Payload	1433 lbs	9 lbs	300 lbs
Table First Mode Frequency	25 Hz	530 Hz	300 Hz
Operational Frequency Range:			
Test Frequency Bandwidth	0-200 Hz	10-5,000 Hz	5-2,000 Hz
Translation Performance Vertical:			
Displacement - P-P Dynamic	6.0 in	0.5 in	1.0 in
Velocity - Peak	30 ips	60 ips	50 ips
Acceleration**	5.6 g	10.0 g	5.0 grms
Force/Axis (RMS)	33,000 lbf	200 lbf	3,600 lbf (RMS)
Translation Prefomance Lateral:			
Displacement - P-P Dynamic	6.0 in	0.5 in	1.0 in
Velocity - Peak	30 ips	60 ips	50 ips
Acceleration**	3.8 g	10.0 g	5.0 grms
Force/Axis (RMS)	22,480 lbf	200 lbf	3,600 lbf (RMS)
Longitudinal Displacement			
Displacement - P-P Dynamic	6.0 in	0.5 in	1.0 in
Velocity - Peak	30 ips	60 ips	50 ips
Acceleration**	3.8 g	10.0 g	5.0 grms
Force/Axis (RMS)	15,062 lbf	200 lbf	3,600 lbf (RMS)
Rotational Performance:			
Roll Displacement	+/- 8.5 degrees	+/- 5 degrees	+/- 4 degrees
Pitch Displacement	+/-6.8 degrees	+/- 5 degrees	+/- 4 degrees
Yaw Displacement	+/- 8.5 degrees	+/- 5 degrees	+/- 4 degrees
Thermal Protection:			
Standard	4C to 65C	Call Team	Call Team
With Thermal Barriers	-40C to 121C	Call Team	Call Team
Heat Load:			
At -40C	0 kW	Call Team	Call Team
At 121 C	0 kW	Call Team	Call Team
Head Expanders			
CEH - 48	n/a	n/a	n/a
CEH - 60	n/a	n/a	n/a

**Frequency & Acceleration dependant*
***With Max Payload*

CUBE™ 2		CUBE™ 3		CUBE™ 4
2-DV	**2-DV-LS**	**3S**	**3-LS**	**4S**
32 in x 32 in	32 in x 32 in	32 in x 32 in	32 in x 32 in	32 in x 32 in
32 in x 20 in	32 in x 20 in	32 in x 20 in	32 in x 24 in	32 in x 20 in
1200 lbs	1430 lbs	1200 lbs	1430 lbs	1120 lbs
1000 lbs	1000 lbs	992 lbs	992 lbs	992 lbs
300 Hz	300 Hz	300 Hz	300 Hz	450 Hz
0-250 Hz	0-250 Hz	0-250 Hz	0-250 Hz	0-500 Hz
1.8 in	3.8 in	1.8 in	3.8 in	1.77 in
30 ips	30 ips	38 ips	38 ips	38 ips
10.4 g	8.2 g	6.0 g	5.1 g	6.0 g
14,000 lbf	14,000 lbf	14,000 lbf	14,000 lbf	14,000 lbf
1.8 in	1.8 in	1.8 in	3.8 in	1.8 in
30 ips	30 ips	38 ips	38 ips	38 ips
7.6 g	7.0 g	3.2 g	2.7 g	3.2 g
14,000 lbf	14,000 lbf	14,000 lbf	14,000 lbf	14,000 lbf
1.8 in	1.8 in	1.8 in	1.8 in	1.8 in
30 ips	30 ips	38 ips	38 ips	38 ips
11.4 g	9.2 g	11.4 g	9.2 g	11.4 g
14,000 lbf	14,000 lbf	14,000 lbf	14,000 lbf	14,000 lbf
+/-6 degrees	+/- 4 degrees	+/-6 degrees	+/- 4 degrees	+/-6 degrees
+/-6 degrees	+/- 4 degrees	+/-6 degrees	+/- 4 degrees	+/-6 degrees
+/-6 degrees	+/-4 degrees	+/-6 degrees	+/-4 degrees	+/-6 degrees
4C to 65C	4C to 65C	4C to 65C	4C to 65C	4C to 65C
-40C to 121C	-40C to 121C	-40C to 121C	-40C to 121C	-40C to 121C
5.9 kW	5.9 kW	5.9 kW	5.9 kW	5.9 kW
-3.5 kW	-3.5 kW	-3.5 kW	-3.5 kW	-3.5 kW
48 in x 48 in	48 in x 48 in	48 in x 48 in	48 in x 48 in	48 in x 48 in
60 in x 60 in	60 in x 60 in	60 in x 60 in	60 in x 60 in	60 in x 60 in

Metric Specifications

SYSTEM	MANTIS™	TENSOR 900™	TENSOR 18kN™
Top Surface	1.5 m x 2.1 m	0.2 m x 0.2 m	0.76 m x 0.76 m
Side Surface	n/a	n/a	n/a
Bare Table Moving Mass	745 kg	4.1 kg	195 kg
Max recommended Payload	650 kg	4.1 kg	130 kg
Table First Mode Frequency	25 Hz	530 Hz	300 Hz
Operational Frequency Range:			
Test Frequency Bandwidth	0-200 Hz	10-5,000 Hz	5-2,000 Hz
Translation Performance Vertical:			
Displacement - P-P Dynamic	150 mm	13 mm	25 mm
Velocity - Peak	0.76 m/sec	1.5 m/sec	1.3 m/sec
Acceleration**	5.6 g	10.0 g	5.0 grms
Force/Axis (RMS)	147 kN	900 N	16.0 kN (RMS)
Translation Prefomance Lateral:			
Displacement - P-P Dynamic	45 mm	13 mm	25 mm
Velocity - Peak	0.76 m/sec	1.5 m/sec	1.3 m/sec
Acceleration**	3.8 g	10.0 g	5.0 grms
Force/Axis (RMS)	100 kN	900 N	16.0 kN (RMS)
Longitudinal Displacement			
Displacement - P-P Dynamic	45 mm	13 mm	25 mm
Velocity - Peak	0.76 m/sec	1.5 m/sec	1.3 m/sec
Acceleration**	3.8 g	10 g	5.0 grms
Force/Axis (RMS)	67 kN	900 N	16.0 kN (RMS)
Rotational Performance:			
Roll Displacement	+/- 8.5 degrees	+/- 5 degrees	+/- 4 degrees
Pitch Displacement	+/-6.8 degrees	+/- 5 degrees	+/- 4 degrees
Yaw Displacement	+/- 8.5 degrees	+/- 5 degrees	+/- 4 degrees
Thermal Protection:			
Standard	4C to 65C	Call Team	Call Team
With Thermal Barriers	-40C to 121C	Call Team	Call Team
Heat Load:			
At -40C	0 kW	Call Team	Call Team
At 121 C	0 kW	Call Team	Call Team
Head Expanders			
CEH - 48	n/a	n/a	n/a
CEH - 60	n/a	n/a	n/a

**Frequency & Acceleration dependant*
***With Max Payload*

CUBE™ 2		CUBE™ 3		CUBE™ 4
2-DV	**2-DV-LS**	**3**	**3-LS**	**4S**
0.81 m x 0.81 m	0.81 m x 0.81 m	0.81 m x 0.81 m	0.81 m x 0.81m	0.81 m x 0.81 m
0.81 m x 0.51 m	0.81 m x 0.61 m	0.81 m x 0.51 m	0.81 m x 0.61 m	0.81 m x 0.51 m
544 kg	648 kg	544 kg	648 kg	508 kg
450 kg	450 kg	450 kg	450 kg	450 kg
300 Hz	300 Hz	300 Hz	300 Hz	450 Hz
0-250 Hz	0-250 Hz	0-250 Hz	0-250 Hz	0-500 Hz
46 mm	97 mm	46 mm	97 mm	46 mm
0.76 m/sec	0.76 m/sec	0.96 m/sec	0.96 m/sec	0.96 m/sec
10.4 g	8.2 g	6.0 g	5.1 g	6.0 g
62 kN	62 kN	62 kN	62 kN	62 kN
46 mm	46 mm	46 mm	46 mm	46 mm
0.76 m/sec	0.76 m/sec	0.97 m/sec	0.97 m/sec	0.97 m/sec
7.6 g	7.0 g	3.2 g	2.7 g	3.2 g
62 kN	62 kN	62 kN	62 kN	62 kN
46 mm	46 mm	46 mm	46 mm	46 mm
0.76 m/sec	0.76 m/sec	0.97 m/sec	0.97 m/sec	0.97 m/sec
11.4 g	9.2 g	11.4 g	9.2 g	11.4 g
62 kN	62 kN	62 kN	62 kN	62 kN
+/-6 degrees	+/- 4 degrees	+/-6 degrees	+/- 4 degrees	+/-6 degrees
+/-6 degrees	+/- 4 degrees	+/-6 degrees	+/- 4 degrees	+/-6 degrees
+/-6 degrees	+/-4 degrees	+/-6 degrees	+/-4 degrees	+/-6 degrees
4C to 65C	4C to 65C	4C to 65C	4C to 65C	4C to 65C
-40C to 121C	-40C to 121C	-40C to 121C	-40C to 121C	-40C to 121C
5.9 kW	5.9 kW	5.9 kW	5.9 kW	5.9 kW
-3.5 kW	-3.5 kW	-3.5 kW	-3.5 kW	-3.5 kW
1.2 m x 1.2 m	1.2 m x 1.2 m	1.2 m x 1.2 m	1.2 m x 1.2 m	1.2 m x 1.2 m
1.5 m x 1.5 m	1.5 m x 1.5 m	1.5 m x 1.5 m	1.5 m x 1.5 m	1.5 m x 1.5 m

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