

# MTS Series 353.10 High-Frequency Multi-Axial Simulation Table (MAST™)



## High Frequency (Up to 500 Hz) MAST Delivers Unmatched Service Environment Replication and Best Model Correlation

Like all proven MTS simulation systems, the Model 353 High-Frequency MAST delivers accurate and repeatable simulation results and compresses test times. This system, however, pushes the state-of-the-art one step further by delivering intuitively controlled excitation at very high frequencies through the repeatable and simultaneous application of force and motion in all six degrees of freedom. This enables the accurate simulation of difficult-to-characterize service environments through the inclusion of key high-frequency content and the excitation of critical non-linear response effects. Meticulously engineered to be very stiff, the Model 353 delivers stable, coherent response at up to 500 Hz giving it unique potential in both durability and noise & vibration testing of vehicle and aerospace components and subassemblies.

## Robust, Compact System

The system's simulation platform is driven through six degrees of freedom by six robust servo-hydraulic actuators. The unique inverted design of these seal-less actuators, coupled with hydrostatic bearings, provides an ultra-stiff, low-friction configuration that enhances controllability and extends system life. Close-coupled accumulation maximizes frequency response. The actuators are joined to the internally damped table by unique (patent pending) high-frequency swivel and strut assemblies. Platform position is controlled by an advanced digital servo-controller, using feedback from both displacement and acceleration sensors. The unit ships fully-assembled and mounted to a single compact base, enabling quick installation and set-up.

## Intuitive Command and Control

The Model 353 employs an MTS FlexTest MAST System Controller, and is driven by Degree-of-Freedom Control software. Native to the Microsoft Windows operating environment, this easy-to-use software provides intuitive command and control of the simulation platform throughout the six major modes of motion vertical, lateral, longitudinal, roll, pitch, and yaw. Other capabilities include function generation for sine-sweep and sine-dwell studies, and adaptive compensation algorithms for optimized simulation control. Adaptive compensation algorithms offered with the standard controller include:

- ▶ Amplitude Phase Control (APC) for adaptive compensation of sinusoidal waveforms to ensure that desired amplitude and phase relationships are maintained;

- ▶ Adaptive Inverse Control (AIC), which provides continuous compensation of random or time history commands for linear systems without significant cross coupling;
- ▶ Adaptive Harmonic Canceller (AHC), which injects input harmonics into the controller command waveform with the right phase and amplitude to reduce or cancel the spurious feedback harmonics when programming sine waves.

## Advanced Software Add-Ons

In addition to Degree-of-Freedom Control, MTS offers several other advanced software tools that can be added on to maximize Model 353 utility and return on investment, these include:

## MTS RPC® Pro Software for Time History Reproduction

- ▶ World-renowned RPC Pro software brings the service environment to the laboratory for accurate and reli-



able real time durability and performance testing of components;

- ▶ Enables engineers to make accurate design, performance, NVH, and durability decisions about their products;
- ▶ Leverages revolutionary simulation technologies such as Adaptive Inverse Modeling (Turbo RPC) for more accurate, faster results.

#### **MTS RPC® Pro for Ride-Comfort Analysis**

- ▶ Measures ride-comfort levels and evaluates discomfort using an objective, accurate and repeatable methodology supported by industry-recognized standards;
- ▶ Evaluates changes in ride comfort through adjustments in system configuration;
- ▶ Benchmarks ride and comfort performance of competitive products.

#### **MTS I-DEAS® Pro Software for Noise and Vibration Analysis**

- ▶ From data collection to modal analysis, I-DEAS Pro software provides the broadest scope of noise and vibration application functionality in the industry;
- ▶ Intuitive, convenient application toolbars focused on specific noise and vibration testing and data analysis tasks;
- ▶ Tightly integrated with SDRC's industry-leading CAD and FEA solutions;
- ▶ Native Windows user interface allows full customization of layout, user-defined commands, toolbars, and pull-down menus.

#### **MTS Reporter Software**

- ▶ MTS Reporter Software is an easy-to-use, Windows-native application that allows you to create, generate and distribute active documents containing measurements, complex geometric shapes and animations

based on MTS I-DEAS Pro and RPC data;

- ▶ Leverages ActiveX® technology to achieve "live data" inside of Microsoft Office documents;
- ▶ Free MTS I-DEAS Pro Reporter Viewer allows colleagues to view and interact with the information.

#### **MTS Sound Quality Software**

- ▶ MTS Sound Quality software is a powerful suite of sound engineering and analysis modules that lets you synthesize and analyze product sounds and helps you set targets for improving sound quality;
- ▶ Simple-to-use tool for recording, analyzing, quantifying, auditioning, dissecting and synthesizing sounds;
- ▶ Can be used in conjunction with mechanical testing and simulation systems from MTS to accelerate the engineering of desirable sound characteristics.

#### **MTS Jury Evaluation Software**

- ▶ MTS Jury Evaluation Software is an easy-to-use tool for performing powerful statistical data collection and analysis of human responses to product sound characteristics;
- ▶ Enables precise control of sound characteristics, real time response tally and error detection, and statistical analysis of jury responses;
- ▶ Incorporates commonly used jury evaluation methods into a software environment that allows easy customization and independent development of evaluation and analysis methods.

#### **Facilities Information**

MTS recommends installing the Model 353 on a reinforced concrete seismic mass; seismic mass design services are offered by MTS if required. A concrete mass of up to 60 tons may be required, depending on the application.

MTS also recommends the use of an MTS Silent Flo® hydraulic power unit (HPU). Suitable for almost any lab, this HPU has the lowest sound power emissions rating in the industry, eliminating the need for a separate acoustically isolated pump room.

#### **Model 353 Specifications**

##### **Mounting Surface**

Table Size (diameter)	1 m
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##### **Displacement**

Translational – (not simultaneous)

Vertical	± 37 mm
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Longitudinal, Lateral	± 35 mm
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##### **Rotational**

Roll	± 4.7 degrees
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Pitch	± 4.2 degrees
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Yaw	± 3.5 degrees
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##### **Velocity**

Vertical	0.8 m/s
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Longitudinal, Lateral	0.6 m/s
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##### **Acceleration (bare table)**

Vertical	20.6 g
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Longitudinal	14.8 g
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Lateral	12.8 g
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##### **Acceleration (135 kg payload)**

Vertical	13.6 g
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Longitudinal	10.0 g
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Lateral	8.7 g
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##### **Control Bandwidth (bare table)**

System Bandwidth	500 Hz
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##### **Maximum Payload 500 kg**

Evaluated at rated velocity. Larger payloads can be accommodated.

##### **IMPORTANT**

These specifications are examples for illustration purposes only. The exact specifications of the system relative to your application are established during presale engineering meetings.