

## K&C Features

- ▶ Measures suspension parameters both statically and dynamically as they change due to applied road height, roll angle and horizontal forces.
- ▶ Helps carmakers improve both handling and tire wear characteristics
- ▶ Features a complete automation package
- ▶ Features fast throughput
- ▶ Measures suspension parameters both statically and dynamically (from 0 to 35 Hertz)
- ▶ Performs all static K&C tests, dynamic K&C deflections, Frequency Response Function (FRF) analysis, maneuver analysis, and inertial measurement
- ▶ Assures multi-mode control because of advanced control techniques
- ▶ Allows playback of recorded wheel-time histories or synthetic waveforms

Engineers want and need complete information on suspension system performance, including data on dynamic performance, in order to accurately evaluate and compare the effects of suspension performance on handling.

Historically, obtaining objective data on suspension performance as it relates to wheel position control has been one of the more difficult aspects of suspension design. This was overcome in many ways with the development of the first MTS Kinematics and Compliance system introduced in the mid-1990s. Now MTS has developed the Dynamic K&C.

Kinematics and compliance measurement applies known displacement or force inputs to the suspension and measures the position changes at the wheel center.

Kinematics tests measure wheel attitude changes that occur due to position changes, such as roll and ride height, while hori-

zontal forces are zero. Compliance tests measure wheel attitude changes due to horizontal force inputs. By performing kinematic and compliance deflection measurement tests, suspension designers and vehicle dynamicists can make design changes to achieve performance targets and obtain important vehicle suspension parameters.

The MTS Dynamic K&C system measures both static and dynamic kinematic and compliance deflection properties of automobile suspensions. Data from the system is used to set-up, develop and compare vehicle suspensions to optimize their handling characteristics.

It performs static kinematic and compliance deflection testing as well as a dedicated static machine. It can impose six directions of motion or force on each wheel of the test vehicle, while precisely measuring the resulting wheel displacements.



Overall view of the MTS Dynamic K&C System

MTS Dynamic K&C system can impose six directions of motion or force on each wheel of the test vehicle while precisely measuring the resulting wheel displacements.



The system performs suspension dynamic tests by moving the tire platforms at frequencies up to 35 Hz with various combinations of load and stroke control. For dynamic tests the vehicle body can be clamped, free, or restrained with an optional cg restraint system. The latter allows you to evaluate suspension performance under simulated road and body force conditions.

The MTS Dynamic K&C system has a flexible control system that allows playback of recorded wheel time histories as well as synthetic waveforms such as an idealized road profile. Software tools provided with the system allow evaluation of the following properties:

- ▶ Transient maneuver decomposition
- ▶ Frequency response
- ▶ Dynamic deflection
- ▶ Static deflection
- ▶ Inertia properties

### Installation considerations

- ▶ Mounting can be tire level pit, half pit, or no pit.
- ▶ Drive on ramps are not required.
- ▶ Access flooring around the vehicle may be desired.
- ▶ Special report formats should be specified if desired.
- ▶ Special test sequences should be specified if desired.
- ▶ Consider spindle adapters, steer motor, and analysis PC options.
- ▶ Testing should be done in a thermally stable environment.
- ▶ Overhead crane for vehicle may be desired.
- ▶ A 130-ton isolation mass is recommended

The flexibility of the system allows you to program the sequencing of events, data report formats and the user interface, all in a high level language.

### For More Information

Contact your local MTS sales engineer or call MTS at 1-800-328-2255, or 1-952-937-4000. Or contact the company by e-mail directed to: [info@mts.com](mailto:info@mts.com). Visit our web site at [www.mts.com](http://www.mts.com).



MTS Dynamic K&C System measure both static and dynamic kinematic and compliance deflection properties of vehicle suspension

Item	Specification
Wheel base adjustment	2000 - 3400 mm
Track adjustment	1100 - 1800 mm
Individual dynamic platform actuator displacement and static accuracy	±75 mm, ±0.2%
Platform force sensor	
Fx, Fy ranges & accuracy	±9000 N, ±20 N
Fz range & accuracy	30000 N, ±60 N
Mx, My ranges	±5000 Nm
Mz range & accuracy	±50000 Nm, ±10 Nm
Platform displacements & accuracy	
x, y, z	±75, ±75, ±50 mm*, ±0.2%
roll, pitch, yaw	±15, ±15, ±25 deg*, ±0.2%
Dynamic platform displacements (referenced to platform by calculation but not demonstrated)	
x, y, z	±75, ±75, ±50 mm**, ±0.4%
roll, pitch, yaw	±15, ±15, ±25 deg**, ±0.4%
Static platform displacements	
Static z, additive to platform	±200 mm ±0.2%, 350 mm/s
Static yaw, additive to platform	±25 deg ±0.2%, 70 deg/s
Platform velocities	
Vx, Vy, Vz	±4.5, ±4.0, ±2.2 m/s*
roll, pitch, yaw velocity	±11.0, ±10.1, ±18.2 rad/s*
Platform positioning bandwidth	0 - 35 Hz, 70 Hz with RPC***
Platform force capability	
Fx, Fy, Fz	±18900, ±17500, 62900 N
Mx, My, Mz	±8000, ±7000, ±7700 Nm
Dynamic wheel motion sensor	
x, y range & accuracy	±75 mm, 0.4 mm
z range & accuracy	±200 mm, 0.5 mm
Steer range & accuracy	±45 degree, 0.1 degree
Camber, spin range & accuracy	±10 degree, 0.1 degree

\* Simultaneous position envelope is defined by a double cone, ±50 mm z and 75-mm radius. Simultaneous velocity is defined by a spherical radius of 1.0 m/s, anywhere in the simultaneous position envelope.

\*\* Non simultaneous

\*\*\* Platform positioning bandwidth is the frequency range over which the test rig will deliver good closed loop control with a conventional PID controller and no iteration techniques.

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