

## ***FMVSS 202 Seat Back Test System with Seat Load-Deflection Measurement***



### ***Purpose***

Federal Motor Vehicle Safety Standard (FMVSS) 202 specifies requirements for head restraints to reduce the frequency and severity of neck injury in rear-end and other collisions. The equipment described will perform tests according to the FMVSS 202 specification, plus other Research and Developmental Testing, such as seat back and seat cushion Load-Deflection (stiffness) measurements.

### ***Description***

Test equipment consists of a seat mounting test bed plate, A-frame loading stand with moveable crosshead, and three dual electrohydraulic actuator loading frames to apply the prescribed loads. Although designed primarily for FMVSS 202 testing, it can also be used for the appropriate sections of European Regulation ECE-17.

The Seat Reference Point (SRP) location for each test station is adjustable in the vertical, lateral, and fore/aft positions for proper location of test actuation. The seat backform is (SAE J826 manikin) is mounted on a load cell and 500 mm actuator for application of the primary load. This actuator is also equipped with a linear position transducer for angular measurement of the load application arm. A second 300 mm actuator is flange-mounted to the upper length of the loading arm and is equipped with a headform, load cell, and linear displacement transducer, also.

During testing, the loads and displacements of all cylinders in use are monitored. In addition, the angular displacements for the lower cylinder and rotating portion of the loading arm are also recorded. Through these measurements, the load vectors are resolved so that the moment about the SRP caused by the loading of the seat is known at any given time during the test.

In addition to FMVSS 202 testing, this system can perform seat back and seat cushion Load-Deflection Tests in order to measure the stiffness of seat frames and cushions. This is accomplished by the ability to rotate the load frame cross-head through an angle of  $\pm 135^\circ$  in order to apply vertical loads through the headform actuator directly onto the seat cushion.

System pressure is provided by a 1500 psi Hydraulic Power Supply, which is interlocked with the computer for full automatic control and will run only when the test is under full control by the computer.

### ***TMSI***

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Sales: (888) TMSI-USA • Tel: (330)668-2010 • Fax: (330) 668-2365  
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Computer, printer, and control electronics are housed in a vertical rack enclosure especially prepared for electronic instrumentation

### ***Control System***

All electronic control and data acquisition systems provided by **TMSI** are integrated completely for control by a single PC with Windows® based software for intuitive operation with minimal operator training.

**TMSI MicroTeStation™** housed in 20.5 W x 72 H x 24 D inch instrument rack enclosure. Includes:

- An Intel Pentium® Based Microprocessor Industrial Computer
- Standard Hard Disk Drive
- Single 3.5 in. Floppy Disk Drive
- A Removable Disk Drive for Data Archival and Storage
- Random Access Memory
- SVGA Color Monitor
- Windows® 95/NT Operating System
- 16+ Chnl A/D, DIO On-board data acquisition/reduction system
- 6+ Chnl Anti Alias Filters
- Telephone Modem
- Color Printer

### ***Data Acquisition/Control***

Parallel full-time data acquisition/control processing is accomplished by MicroStar Data Acquisition Processors (DAP) which feature on-board CPU and memory as well as Analog to Digital and Digital to Analog converters. Closed-loop PID control is achieved on-board the DAP unit for full software tunability of hydraulic actuators in both load and position feedback control.

- MicroStar DAP Data Acquisition Processor to operate in parallel with the Pentium Based Microprocessor
- ComputerBoards CIO/DIO 24 SSR, Solid State Relays for sensing and controlling digital inputs and outputs

### ***Software***

**MiniCrashTEST™** is TMSI's data acquisition/reduction program to operate the on-site MicroTeStation in Windows 95/NT presentation, control tests according to FMVSS 202, reduce and present tabular and graphical reports, and archive tests results to hard or floppy disk.

**DeflectTEST™** is TMSI's Seat Load/Deflection Test Program to operate the MicroTeStation in Windows 95/NT and acquire, present, print, and archive Load/Deflection Test data. Both programs were created and are owned by **TMSI** and are custom tunable according to Customer requirements.

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