



## MTS Direct Shear Package for Rock Mechanics Test Systems

Gain the ability to apply normal and shearing stresses simultaneously

MTS offers a direct shear package designed to extend the utility of MTS 816 Rock Mechanics Test Systems. With an integrated MTS Direct Shear Package researchers can subject cylindrical, prismatic or irregularly shaped specimens of intact or jointed rock or concrete to both normal and shearing stresses, simultaneously.

### Precision Mechanical Design

The MTS Direct Shear Package integrates seamlessly with new or existing MTS Rock Mechanics Test Systems. Key design features include:

- » Stiff, compact load reaction frame
- » Shearing actuator with coaxially mounted LVDT inside piston rod for more accurate displacement measurement

- » Load cell optimized for direct shear
  - Strain-gauged for accurate measurement of shear stress
  - Low profile, high stiffness, shear web design includes attachment for non-cyclic reversed loading capability
- » Shear box (specimen container) with 6 LVDTs to measure normal displacement, pitch, roll, shear displacement and yaw

Horizontal motion is guided by a precision linear bearing, which is designed for low friction, and a single degree of freedom (translation only). The long guide of the bearing provides outstanding resistance to overturning moments that might be induced by joint asperities. The bearing also provides more accurate shear-strength data from intact specimens by resisting overturning moments that can cause premature tensile failure.

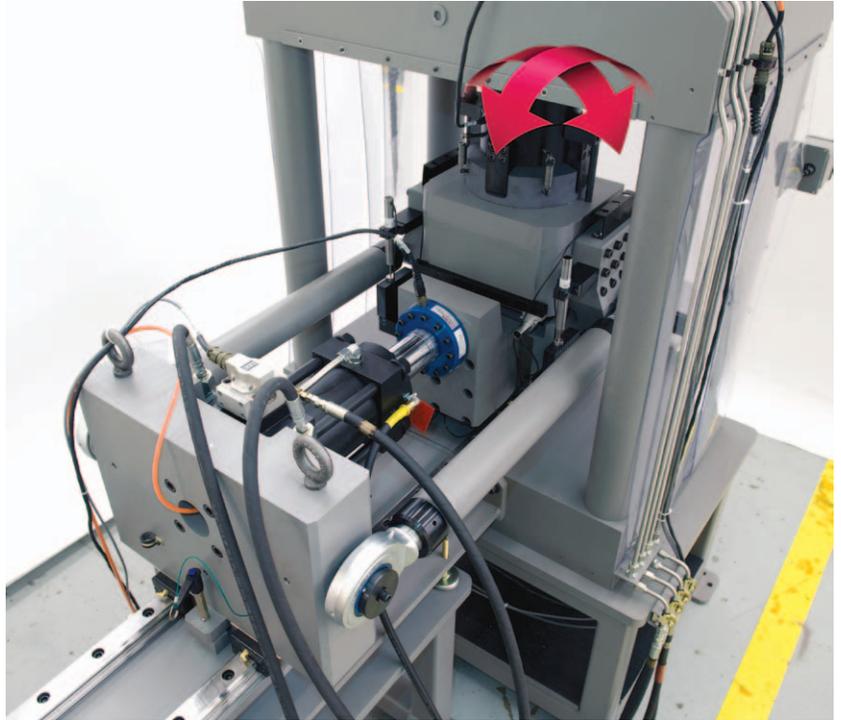
be certain.



#### Advanced Digital Control

Precise control of forces and motions is achieved with a versatile MTS FlexTest® digital controller. The recently introduced FlexTest platform allows test labs to more easily scale testing activities up or down, depending on their needs. FlexTest controllers are based on a modular architecture that features uniquely field-upgradeable processors. The ability to upgrade the processors makes it easy to adapt the controllers to future test requirements and accommodate lab expansion and updates.

Driven by advanced FlexTest control technology and MTS Geomechanics software, the MTS Direct Shear Package enables test engineers to accommodate user-specified normal boundary conditions easily and accurately. Constant stress or constant strain normal boundary conditions can be maintained by running feedback control mode on the vertical axis load cell or the lateral LVDT, respectively. Alternatively, a calculated stiffness can be held constant or controlled as a function of dilation to simulate strain softening or hardening conditions.



#### Configuration Flexibility

The MTS Direct Shear Package can be tuned for the number of degrees of freedom of specimen shear plane motion. The spherically seated upper platen can be configured to provide unconstrained rotations in one or both of the roll and pitch axes (limited to  $\pm 3$  degrees), or it can be locked so that no shear-plane rotations are allowed. Detailed vertical and horizontal measurements of shear box displacement are made with multiple LVDTs positioned at the initial specimen joint shear plane.

#### Productivity-Enhancing Accessories

The MTS Direct Shear Package also includes a set of special tools for quickly and easily installing and removing shear-boxes, as well as a detailed set of instruction manuals covering grouting, specimen insertion and shear-testing procedures. Additionally, MTS has identified a high-strength, non-shrinking grout that is suitable for potting specimens in shear boxes.

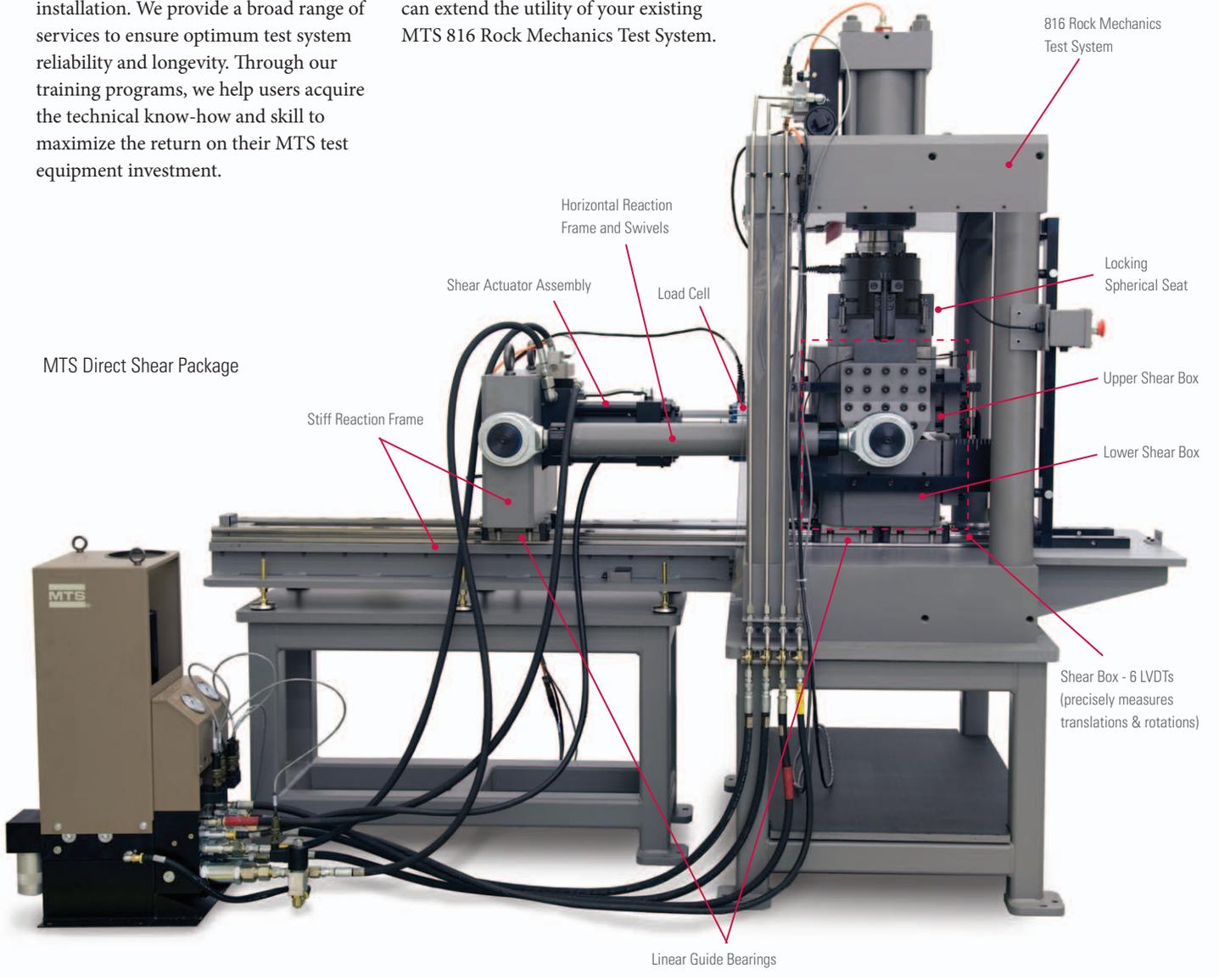
Description	816 Direct Shear Package
MTS Load Frame Models	316.01 316.02 316.03 316.04
Maximum Normal Force	500 kN
Maximum Shear Force	250 kN (55 kip)
Maximum Shear Displacement	100 mm (4 in)
Roll Rotation	± 3 degrees or fully locked
Pitch Rotation	± 3 degrees or fully locked
Yaw Rotation	Constrained (no rotation)
Shear Box Dimensions (length x width x height)	200 mm x 200 mm x 340 mm (8 in x 8 in x 13.38 in)

**MTS Service, Training and Support**

MTS' commitment to its customers continues long after system delivery and installation. We provide a broad range of services to ensure optimum test system reliability and longevity. Through our training programs, we help users acquire the technical know-how and skill to maximize the return on their MTS test equipment investment.

**To Learn More**

Consult an MTS engineer to learn more about how the MTS Direct Shear Package can extend the utility of your existing MTS 816 Rock Mechanics Test System.



MTS Direct Shear Package

Stiff Reaction Frame

Shear Actuator Assembly

Horizontal Reaction Frame and Swivels

Load Cell

816 Rock Mechanics Test System

Locking Spherical Seat

Upper Shear Box

Lower Shear Box

Shear Box - 6 LVDTs (precisely measures translations & rotations)

Linear Guide Bearings



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ISO 9001 Certified QMS

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