TESTRESOURCES

800L Servo-All-Electric™ Test System
### For Static, Fatigue, Dynamic Testing
Force Range: 0.0001 N to 6000 N (1350 lb)
Speed Range: Static to 15 Hz (800LE), to 50 Hz (800LM)

System Overview

The 800L test system is used to characterize and test materials, devices and components over a wide spectrum of load, strain and stroke. Each system is configured from a wide number of actuators and transducers to serve specific customer needs. When configured with short travel LVDT's or small load cells – the package delivers unmatched accuracy and control in micromechanical test applications.

800L Systems include:
- Dual Column load frame
- E2 or E3 Series Actuators with 220V Power Pack
- Load cell and encoder
- Optional extensometer and LVDT
- 2370 Servocontroller with MS Control Software
- PC with USB port
- Accessories - Grips, Extensometers, Baths, Software
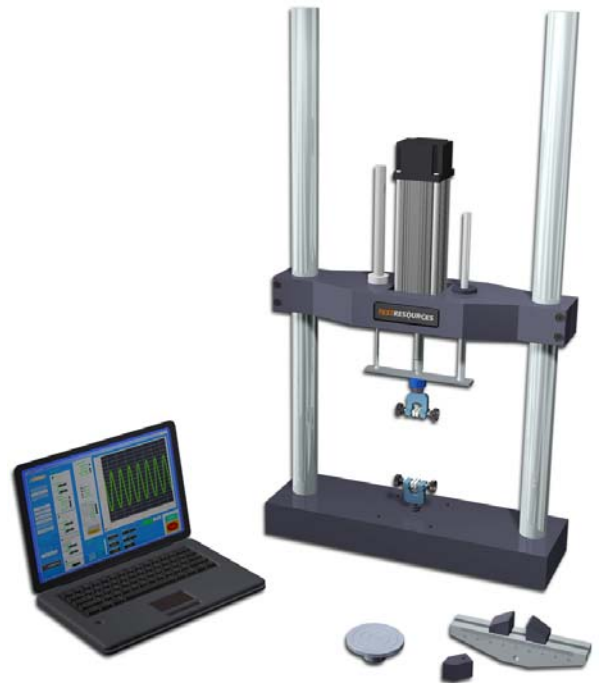
Perform Standard or Special Static, Dynamic or Fatigue Tests

Monotonic Static and Dynamic Tests
Tensile, Compressive, Flexural, Stress Relaxation, Indentation or Creep Tests

Slow or quick ramps in load, strain or position control. Set up and collect force, strain, and displacement data for materials characterization, stress – strain plotting, and calculate strength properties. Special applications software products available to automate multi-step creep and stress relaxations tests to get more data out of each test run. Generate impact loads and capture high speed force, strain, and displacement data for materials characterization or product performance.
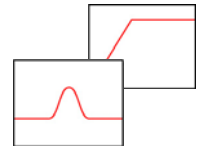
Fatigue, Fracture & Cyclic Tests
Tension / Tension, Compression / Compression, Tensile / Compression (thru zero) Fatigue Tests

Run load or strain controlled cyclic fatigue tests to determine cycles to failure or to prove your device meets endurance requirements. Adaptive peak valley control feature adjusts amplitude as test sample responds. Optional metals research application software includes full suite of LCF and fracture mechanics software programs.
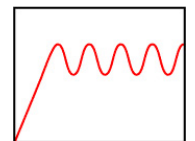
### Dynamic Characterization Tests
Tension, Compression, Shear

Sweep time and temperature, change strain and load rates and gather accurate stress and strain data to measure time-dependent characteristics of viscoelastic materials using special test software. Analyze and report the full dynamic properties of gels, elastomers, polymers, tissues and biomaterials.
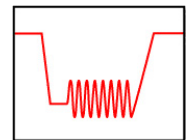
Multiaxial Tests
Planar Biaxial Characterization and Fatigue Tests, Combined Axial / Torsion Tests

Combine Tension, Compression, Torsion, Pressure or whatever channels you wish with the expansive 2370 controller **and** characterize your new material by testing it in the final application. Use as many modes of control as you wish and perform in-phase or out of-phase modeling,
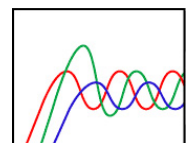
Random Spectrum

Point loading - Create your own test, Mix n' match - Import your loading profile from a spreadsheet and produce customized point by point waveforms. You can mix ramps and sinusoids, switch control modes during a test condition, or customize your data collection process.
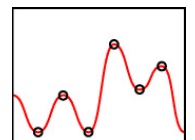
Load Frame

Flexible dual column load frames occupy ~ 2 square feet of lab space. A moveable crosshead provides adjustable test space. Multiple column widths are available for large test samples. Compact system powered by single phase 220V (or 110V) power pack. Actuator stroke options to 18 inches.

2370 Control Hardware

- High Speed (300 MIPS) Digital Signal Processor
- 24 bit Analog Data Conversion
- 32 bit Digital Data acquisition
- 40 bit Servo-Loop Calculations

The 2370 Series offers the latest in electronic performance, functionality and cost savings. 2370 hardware, combined with Global Data Sharing (GDS) software, offers the test engineer a unique, flexible, and modular test control system. Each 2370 includes two strain bridge feedback channels for load cells or extensometers and one circuit to provide user choice of AC type signal conditioner for an LVDT position transducer or any transducer that can provide a high level 10V analog input signal. A digital encoder is included as the fourth feedback and control channel. Two servo-output channels provide 10V signals to actuators. Eight channels of digital input and output provide drive and device control including hydraulic pump on/off or high/low pressure in servohydraulic applications.

Data can be acquired to 12.5 kHz on all feedback channels concurrently (50 kHz total). The 50 mm (2") full scale LVDT could be set to a 500 micron expanded range, with reliable measurements to 0.5 micron resolution. The same ratios are true of strain bridges as well. An optional expansion module (-303) increases the controllers reach to include up to four potential control stations to as many as four data acquisition and signal conditioning options.

2370 Software Technology & Products

2370 Software Products are all compatible with Global Data Sharing (GDS) which requires a PC with Microsoft Operating System (XP or Vista).
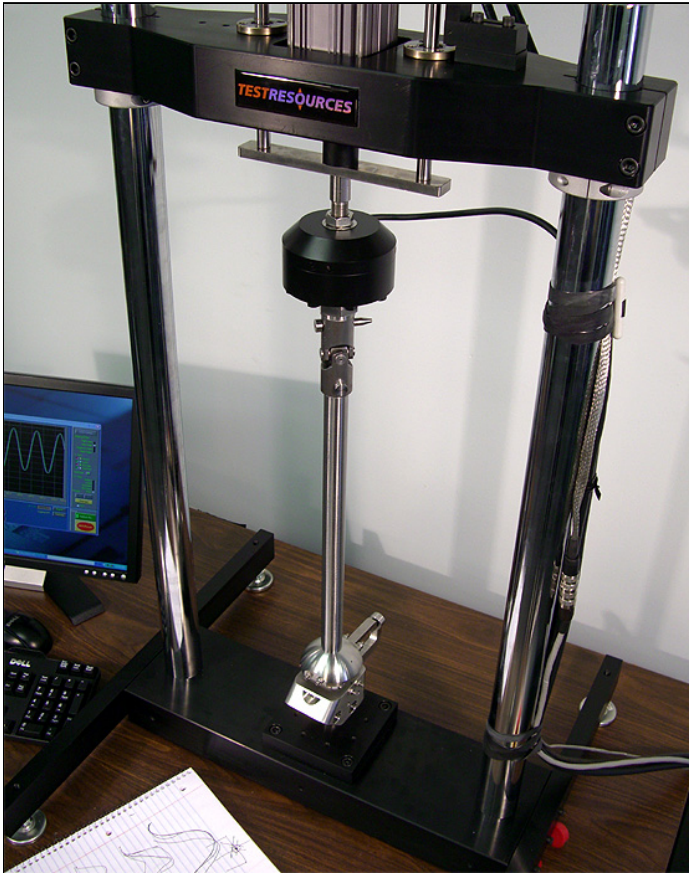
MachineBuilder Software (MTL32) enables user setup and application of machine resources (e.g. transducers) to test actuators. Panels for servotuning, calibration, and global limit setting make it possible to set up and switch test station configurations easily.

TestBuilder Software (MS32) enables users to set up, launch, and monitor tests. Test data may be saved and exported for reports. Separate user panels are available for static and fatigue tests. Users create, store and execute tests including command signal, data acquisition and export of data to Excel.

GDS Toolkit is an optional application developer's support program that facilitates software components and full applications development. GDS is a powerful capability that shortens the test development process and brings significant advantages to customers.

Standard Test Application programs are available for common test methods.

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Performance Specifications

Model	800LE216	…E326	…E316	…M80
Max Static Force	± 2.5 kN (575 lb)	±3 kN (675 lb)	± 6 kN (1350 lb)	± 206 N (46 lb)
Fatigue Rating	± 1.2 kN (270 lb)	±3 kN (675 lb)	±2.2 kN (500 lb)	± 285 N (65 lb)
Velocity Max	200 mm/s (8 in/s)	250 mm/s (10 in/s)	125 mm/s (5 in/s)	3.8 m/s (150 in/s)
Example Performance at 5 Hz:	± 6 mm (± 0.24 in)	± 8 mm (± 0.3 in)	± 4 mm (± 0.15 in)	± 25 mm (± 1")
Stroke	±63 mm (±2.5")			± 25 mm (±1")
Cyclic Range	Static to 15 Hz			Static to 50 Hz

* Actuators are matched to specific test requirements and specifications shown are general in nature. Multiple options are available to satisfy specific customer needs. Performance curves and life predictions for fatigue testing applications are available. Discuss all critical specifications with an application engineer.

Dimensional and Utility Requirements

| Load Frame Model	800	801
Column Clearance	405 (16 inches)	508 (20 inches)
Test space	0 to 810 mm (32")	0 to 810 mm (32")
Footprint	165 mm (6.5") D x 560 mm (22") W	165 mm (6.5") D x 660 mm (26") W
Weight	36 kg (80 lb)	36 kg (100 lb)

Applications

Orthopedic devices implanted in the body must undergo static and fatigue tests that mimic ten years of product life to be considered acceptable. Spinal implants and constructs are tested according to various ASTM and ISO standards and typically require static tension, compression and torsion testing, and fatigue tests. The typical medical device developer needs a versatile proven test system that can do both types of tests and one that can expand to combined axial torsional loading.

Ultra high resolution load control possible with 2370 Controller

Plot shows control of load at ± 0.5% of load cell full scale.

810LE4 with T slotted baseplate – rated to 4000 lb.
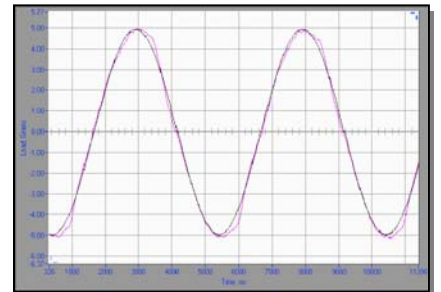
Vascular devices are tested for fatigue life up to 400 million cycles. 800L system shown is designed for high speed high frequency tests in a saline bath with 15 test samples all tested simultaneously.