Axial Torsion Electrodynamic Test Machines

For Biaxial Static, Dynamic & Fatigue Test Applications

- *Orthopedic research of bones, tissues, and joints (spine, hip, knee, shoulder, finger, ankle & osteosynthesis).*

- *Medical device and implant certification for static and fatigue life endurance.*

- *Characterization of biomaterials including polymers, metals, ceramics, cement and adhesives, shape memory alloys, coatings,ceramics and composites.*

- *Product component combined loading of linear and rotary loads and motions.*

- *Ultra-Micro mechanical tests involving small loads and micro position control.*

System Overview

Electro Dynamic Test Technology offers advantages over traditional servo hydraulic test technology:

- More reliable with low maintenance, low audible noise and lower purchase price than hydraulic technology.

- Improved 24 bit machine control makes it possible to control sub gram level loads and sub-micron positions.

Modular Approach – makes it possible to swap elements and configure to specific test goals (speeds, loads, strokes, channels). The 830L can be user re-configured as a single biaxial station or two separate axial and torsion test stations. Modularity makes customization affordable.

Online Customer Support – for customers who place their machine online, our engineers can access the system and operate it remotely, quickening the support process – at virtually no charge.

530 Series - Miniature Axial Torsion System for low force dynamic testing - vertical & horizontal mounting.

Several Controllers to choose from …

830L's include a 2360 or 2370 advanced digital servo controller. Both units feature industry leading 24 bit hardware resolution, which delivers 256 times better resolution than competing 16 bit controllers. High resolution improves accuracy and increases the bandwidth of load and strain sensors, so fewer load cells and transducers are needed. Our servo controllers are compatible with electro mechanical, servo hydraulic and electro dynamic actuators

2360 Controllers are expansive with plug in cards that handle multiple test stations beyond the 830L. They are needed where versatility is important, because they can measure up to 80 sensors and control as many as 16 actuators. Consider these attributes:

2360 – Configurable to 16 actuators

- Up to 16 actuators or test stations
- Up to 96 channels high resolution (24 bit) Data Acquisition
- Up to 80 channels of analog transducer signal conditioning (LVDT. Load or torque cells, extensometer, etc)
- Up to 8 digital position encoders (angular or linear)

2370 Controllers are compact and even more affordable. Each 2370 includes two channels of control and 5 feedback channels for the load cell, torque cell/channel, LVDT stroke, angular encoder and a spare strain bridge). The 2370 line also includes an expansion mode that increases the feedback channel count.


2370 small box

2300 Series Software Suite

Each 830L includes the 2300 software suite which is based on an open architecture Global Data Sharing (GDS) platform. GDS enables rapid development of new applications using industry standard software development tools (such as Visual Basic and C++ National Instruments LabWindows platforms). GDS provides a core platform for 2300 Series applications. GDS enables real time data to simultaneously be made "visible" or accessible to unlimited tasks or applications for control and data acquisition usage. GDS is unique because there is no software performance degradation when used. In addition, a Microsoft Office interface permits real time data transfer into Word, Excel, PowerPoint, Outlook and Access.

TestBuilder enables users to
- create and store test setups
- produce standard and custom static or dynamic wave-shapes
- switch control modes
- calibrate transducers
- collect and store real time data
- set limit conditions
- tune actuators
- generate test reports
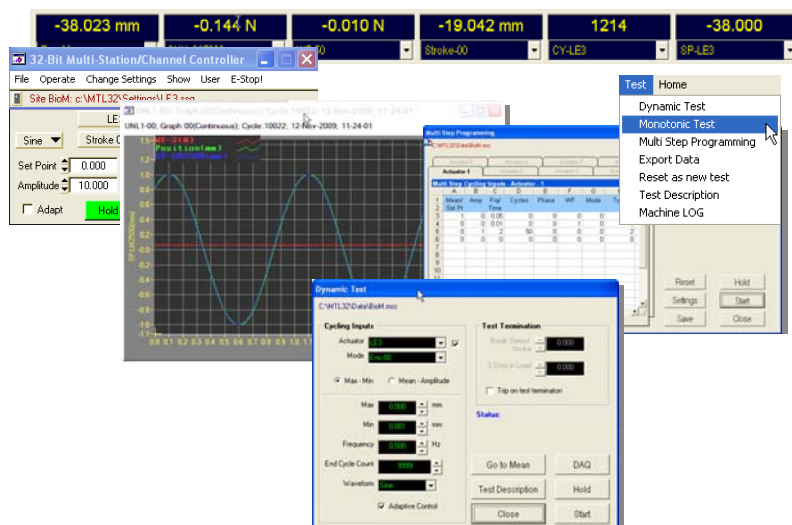
MachineBuilder enables the test machine administrator to configure actuators and sensors to the needs of the user, or to TestBuilder.

ReportBuilder is a separate application that imports the data being exported by TestBuilder into a data plotting, analysis and report generation package. ReportBuilder is needed for custom application requirements – contact us for more information.

Force, Speed and Stroke matched to requirements

Load Frames

Standard 830 dual column floor standing load frames feature 16 inch (400 mm) or 22 inch (550 mm) spacing between columns. Single Station Conversion Kits expand a biaxial single station system by splitting the actuators and mounting them into two separate frames – one axial and the second torsional. The controller can operate each station separately.

Linear Actuators - Overview

The following list shows popular actuator ratings. Other actuators are available to match up to specifications that Select a linear actuator to match long term force, speed and stroke requirements. Linear actuators include a digital position encoder with 1 micron or better resolution. The table below highlights standardized configurations.

Family	E2	E3	E4	E5	E6
Peak Force	± 3.5 kN (810 lb)	± 8.4 kN (1900 lb)	± 25 kN (5500 lb)	± 53 kN (11,700 lb)	± 77 kN (17350 lb)
Peak Velocity	850 mm/s (33 in/s)	625 mm/s (25 in/s)	950 mm/s (37 in/s)	1 m/s (40 in/s)	1 m/s (40 in/s)
Stroke	± 75 mm (6 in) – optional stroke ± 225 mm (18 in)				
Position Resolution	0.1 micron				
Max Frequency	15 Hz				

Note – Actuator family ratings provide overview of product family attributes. Specific models within a family will vary specifications. Fatigue rating information is available separately.

Torsion Actuators

830L Test systems include either an electro dynamic or electro mechanical torsion motor sized for speed and test application. Quasistatic applications with low cycling torque levels and speeds are served by TG Series. High cycle fatigue tests and higher speed tests are served by T Series. All actuators include a digital high resolution position encoder.

| Family	TGA	TG	T	TD
Max Torque	± 12 Nm (107 in-lb)	± 565 Nm (5000 in-lb)	± 135 Nm (1190 in-lb)	± 281 Nm (2493 in-lb)
Max Velocity	360 deg/s	180 deg/s	Fast	Fast
Max Frequency	To 2 Hz	To 2 Hz	To 30 Hz	To 30 Hz
Stroke	Continuous rotation – default settings are 10 revolutions			
Position Resolution	1.5 arc min typical – contact us for specific needs			

TESTRESOURCES

Accessories for Axial Torsion Testing

TestResources offers over 1000 different accessories for your test machine, including fatigue and static grips, extensometers, fixtures, ovens, biomedical baths, furnaces and special ASTM or ISO fixtures.
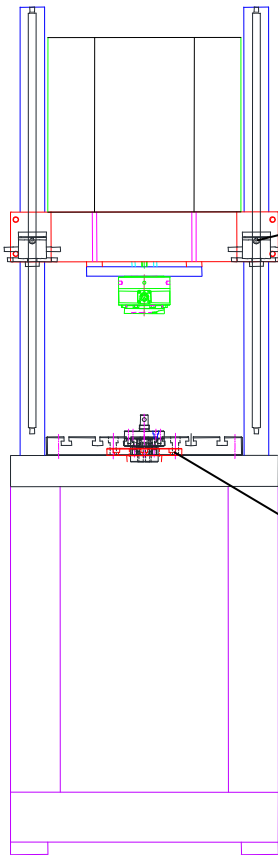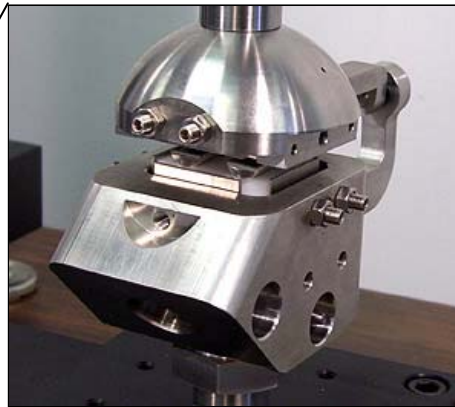
**Crosshead lift option** - load frame crosshead weighs approximately 100 pounds.
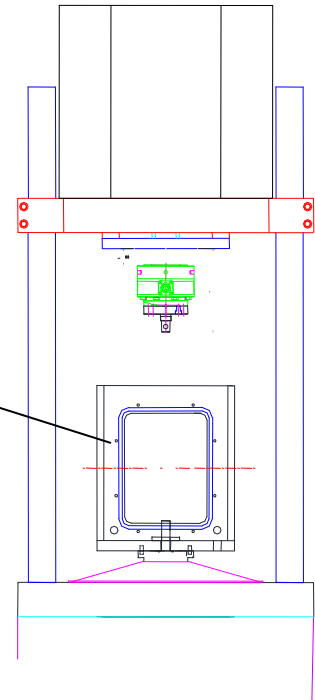
37C Biomedical baths, grips, and test fixtures

T slotted baseplate

Special Test Fixtures to match Test Standards:

ASTM F2346 Spinal Discs
ASTM F543 Bone Screws
ASTM F2118 Bone Cement
ASTM F382 Bone Plates
ISO 14801 Dental Implants
ISO 7206 - Hip joint prostheses

We design and manufacture custom fixtures as a service to our customers.
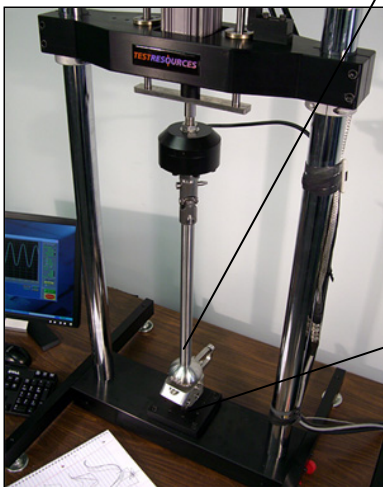
800LE Test System fatigue testing of spinal disc implants

Users may convert a single station machine into two station configurations

The 830 system, with the addition of several inexpensive components, can be optionally reconfigured to become an independent axial station and a torsion station. This alternative path makes it possible to buy a single station 830 and later expand it to a second station later, as budget permits. The other scenario that the option serves is when the testing volume of uniaxial work expands to require two machines.

Biaxial Single Station

Axial Station (#1)

Linear Actuator

Torsion Actuator

Torsional Station (#2)
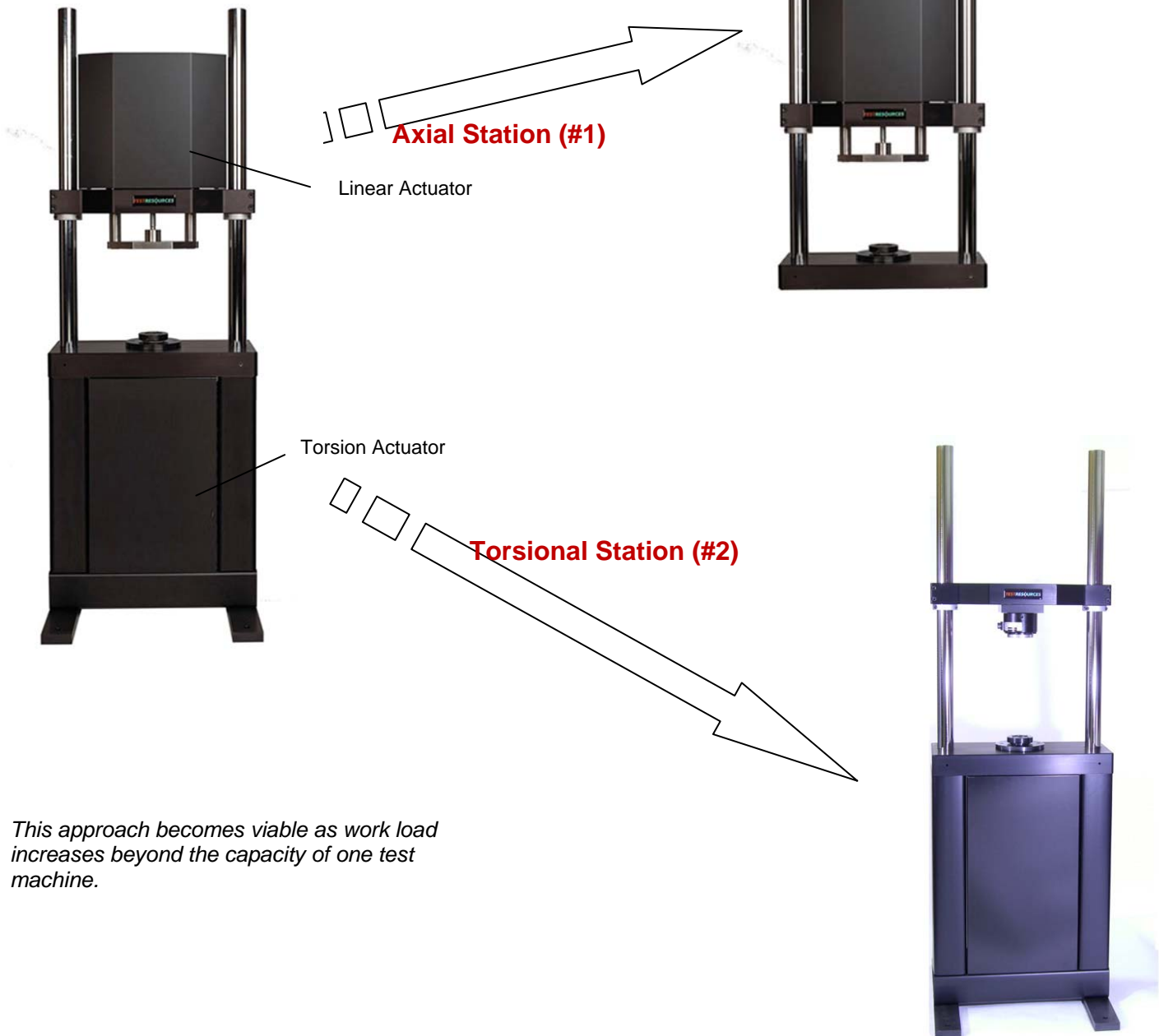
This approach becomes viable as work load increases beyond the capacity of one test machine.