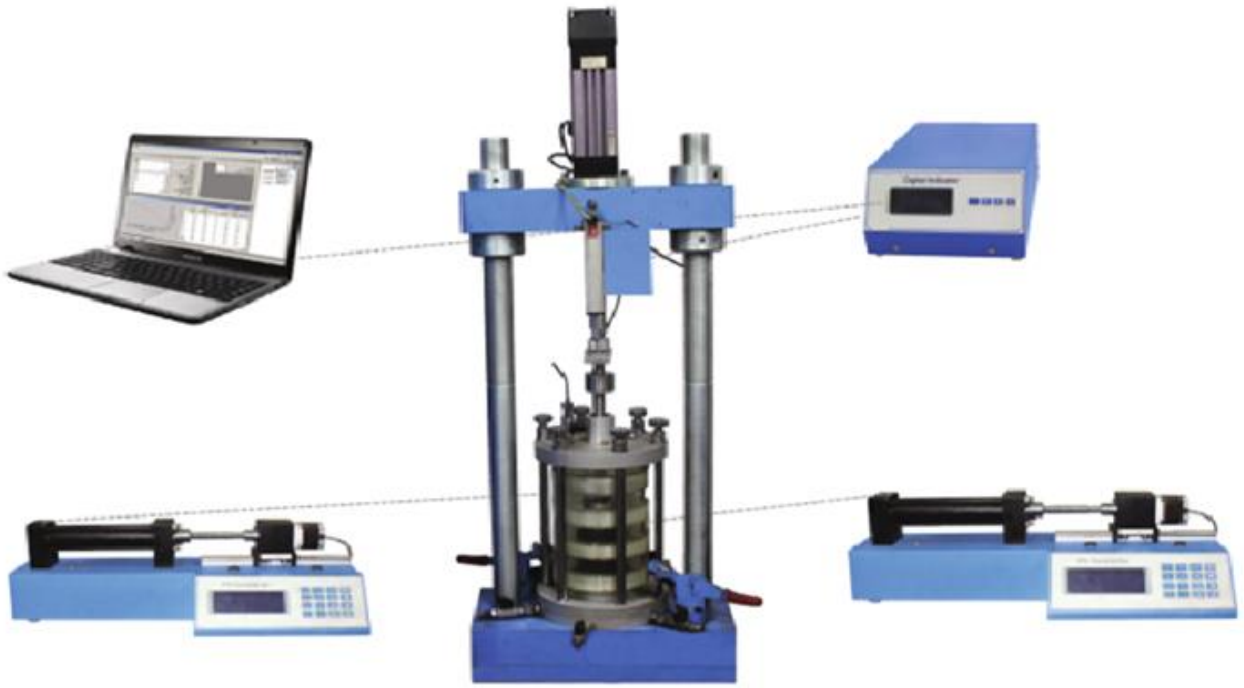
# Cyclic / Static Triaxial Apparatus with Electromechanical Actuator

Code: 90-1088

ELE Dynamic Electromechanical Triaxial Testing System is a triaxial system, based on an axially-stiff load frame with a beam mounted electro- mechanical actuator. It has been designed to fulfil the demand within the geotechnical laboratory testing industry for a lower cost, more basic dynamic triaxial testing system

This system superseded systems using pneumatic actuators in terms of life costs and overall usable performance. Electro-mechanical systems can carry out full load dynamic testing to the stated frequency. Electro-mechanical systems are environmentally friendly as they only draw the energy required to do the test, resulting in lower life costs. Electro- mechanical systems are also safer to run due to no high pressure air or hydraulic pipelines being required.



## Specifications

| Technical Specification | |
|---|---|
| Actuators: | Highly accurate dynamic electro-mechanical actuator |
| Axial Displacement Encoder: | Yes |
| Displacement Resolution: | 1 micron |
| Axial Load: | +/- 5 kN at 5Hz (upgradeable to +/-10kN) |
| Computer Interface: | USB/Serial |
| Waveforms: | Sinusoidal.triangular,square,haversine,sawtooth,random |
| Data Acquisition: | 24 Bit |
| Load Range (kN): | 5(optional upto 10 kN) |

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| Operating Frequency (Hz): | Upto 5 Hz |
| Pressure Range (MPa): | 1 |
| Sample Sizes (mm): | Customised |
| Power supply | 230 v,50 Hz |

### System consist of following elements

- Load frame
- Triaxial cell
- PV controller
- Data Acquisition system
- DAQ software

### Data Acquisition System

ELE DAQ provides 4 channels of ultra-high resolution 24-bit having 500 samples per second. A standard USB Interface provides direct PC connectivity and is fully supported by the Test Software allowing Seamless integration into new and existing test setups.

| Technical Specification | |
|---|---|
| Connection to PC: | USB |
| Acquisition Channels: | 4 Analogue + 1 Quadrature Decoder |
| Control Channels: | 1 Analogue |
| Multi Box Capability: | x4 |
| Max Number of Channels: | Up to 16 analogue + 4 quadrature channels with synchronised data acquisition |
| Sample Rate: | 500Hz |
| Resolution: | 24 bit, 16,777,216 |
| Gain Ranges: | 8 (preconfigured at factory) |
| Description: | Enterprise level solution for dynamic acquisition and control. |
| Voltage Resolution: | ~ 0.000001 mVolts (1 nanovolt) |
| Voltage Input Type: | Fully Differential, Balanced Precision Inputs with Integrated Signal Conditioning |
| Transducer Excitation Voltage: | Differential, Fixed Precision +/-5V, Independent (not Ganged), Ratiometric Excitation |
| Number of Input Ranges: | Pre-Configured Single Fixed Gain per Channel. Each channel can be individually customized at the factory to meet application requirements from +/- 10mV to +/- 10V. Standard setup is 1 channel +/-10V, 2 channels +/- 200mV, 1 channel +/- 30mV. |
| Excitation Fault Tolerance: | Independent Per Channel, if any channel is shorted the other channels will continue to operate normally |
| Current Input Mode: | Yes - Via resistor fitted in cable termination (different ranges possible) |
| Differential Measurement Range: | -10mV…+10mV to -10V…+10V for balanced differential signals |
| Transducer Calibration: | Linear |
| Data Acquisition Options: | Digital filtering for noise reduction |
| Digital Control: | 500 Hz 32-bit floating point control loop |
| Analogue Control: | Support for Analogue motor drives only |
| Compliance Estimation: | Set by user |
| Adaptive Control: | Cycle-by-Cycle Reference Adaptation |
| Custom Waveforms: | Repetitive custom waveforms with 256 points per cycle. Waveform streaming direct from file. |

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|---|---|
| Sample Docking: | Manual |
| Display and Monitoring: | Data acquisition via USB interface, High resolution real time graphs |
| Software: | Analysis Software |
| System Characteristics: | 40MHz 16-Bit Digital Signal Controller with Analogue Control Outputs |
| Minimum System Requirements: | OS: Windows 7 or later, CPU: 1.5 GHz or higher, Memory: 2 GB, USB 2.0 |

**Triaxial Cell**

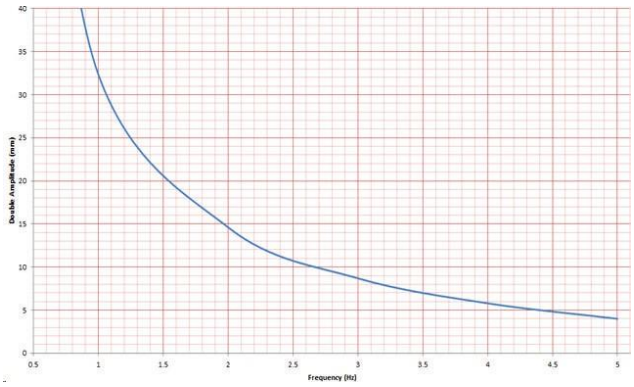
- Conforms to IS:2720 (Part 11) & (Part 12) standards.
- Made from corrosion-resistant material with acrylic plastic cell cylinders.
- High-pressure capacity with reinforcement bands for applications up to 20 bar.
- Multiple take-off positions for cell pressure, pore water pressure, drainage, or back pressure.

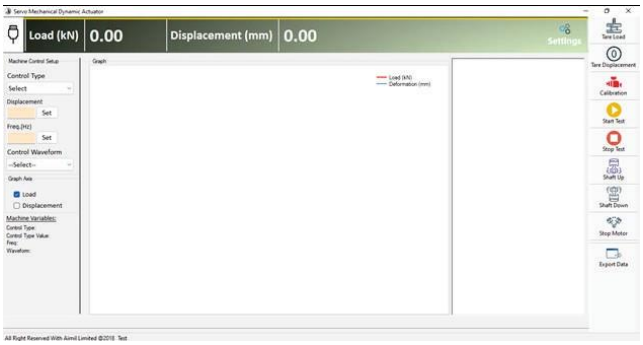
**Pressure Volume (PV) Controller**

- Pressure Control Range: 0-1000 kPa with 1 kPa resolution.
- Volume Capacity: 200 cc with 1 mm³ resolution.
- Operational Modes: Standalone or computer- controlled.
- Precision Measurement: Includes high-accuracy pressure and volume control for soil mechanics laboratories.

**Key Features:**

- Stepper motor with screw-type mechanism for precise pressure application.
- High-precision Gems pressure sensor with 0-25 bar range.
- Fast and slow fill/empty cylinder options.
- Memory status, date/time setting, and logging interval configuration.

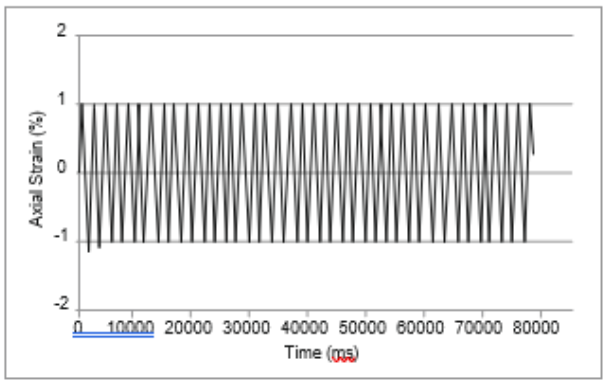


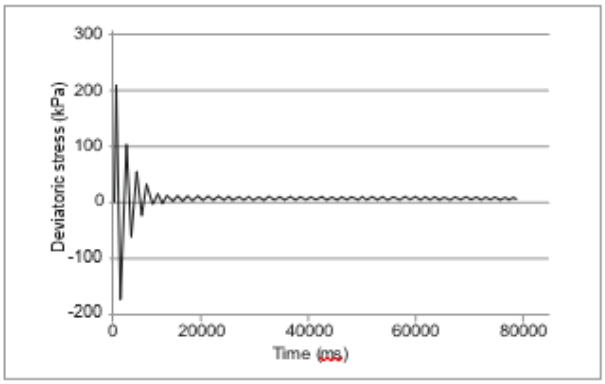



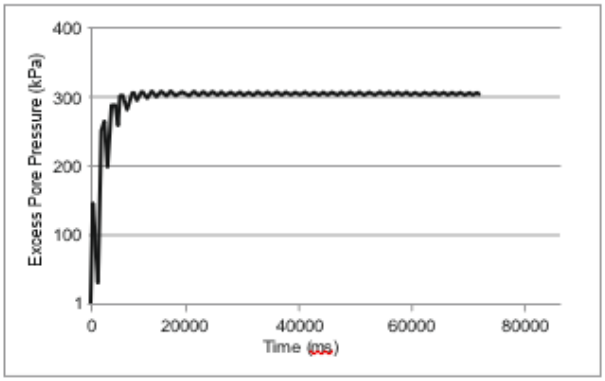

**Cyclic Electromechanical Software**

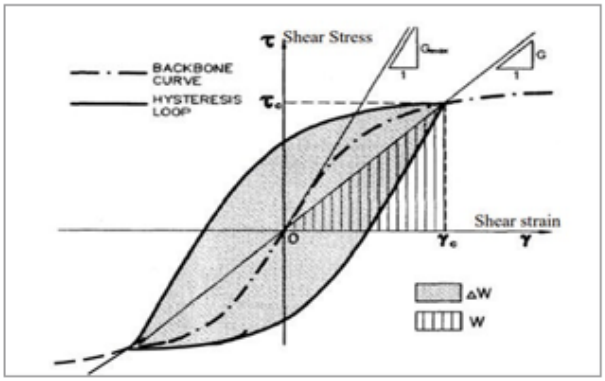
The Cyclic Electromechanical software provides powerful capabilities for dynamic testing and data acquisition, featuring:

- Custom Waveform Streaming: Allows repetitive custom waveforms with 256 points per cycle.
- Real-Time Data Monitoring: High-resolution graphs with real-time updates.
- User-Friendly Interface: Seamless integration with the DAQ system via USB interface.




(Hysteresis Loop) Curve

## Wave Forms