Actuator System:

Electro-mechanical ✓

5Hz Fequency ✓

Available Load ranges:

5kN ✓

10kN *(optional)* ✓
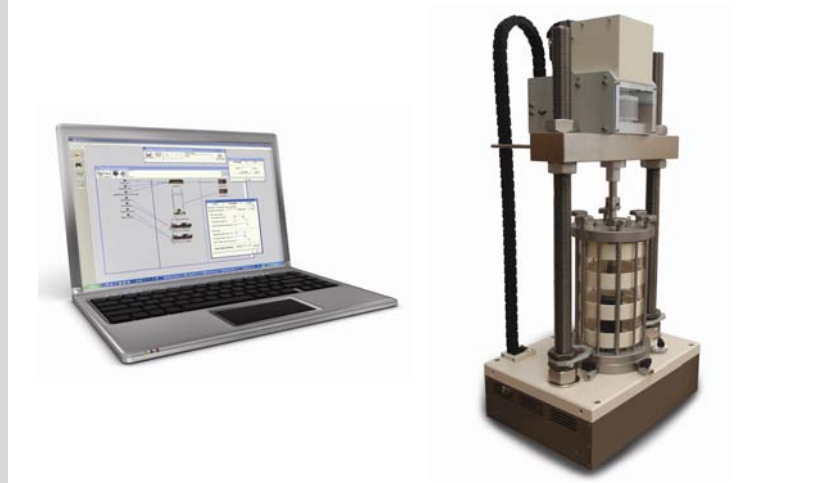
Optional Cell Sizes:

76mm ✓

100mm ✓

150mm ✓

Software

Fully automated ✓

Available options

Bender Elements ✓

Unsaturated ✓

Entry Level Dynamic Triaxial System (ELDyn)

What is it?

The GDS Entry level Dynamic triaxial testing system has been designed to fulfill the demand within the geotechnical laboratory testing industry for a lower cost, more basic dynamic triaxial testing system. ELDyn provides a simple route to allow cyclic loading of triaxial samples under either load or strain control while monitoring the effects on the specimen pore pressure.

Features

The ELDyn triaxial testing system builds on over 15 years of GDS experience in designing, manufacturing, controlling and supporting electro-mechanical dynamic systems.

Based on an axially-stiff load frame with a beam mounted electro-mechanical actuator which has a full stroke capability of 100 mm and a maximum axial load capability of +/- 5 kN at 5Hz (upgradeable to +/-10 kN).

The ELDCS, Dynamic Control System, provides a 4-channel dynamic data logger with 16 bit data acquisition for an Internal Submersible Load Cell and a Pore Pressure Transducer. An optional displacement transducer can be fitted and logged on one of the spare channels, although not entirely necessary due to the encoder on the axial actuator.

Further data acquisition channels may be added using a synchronized data bus connection.
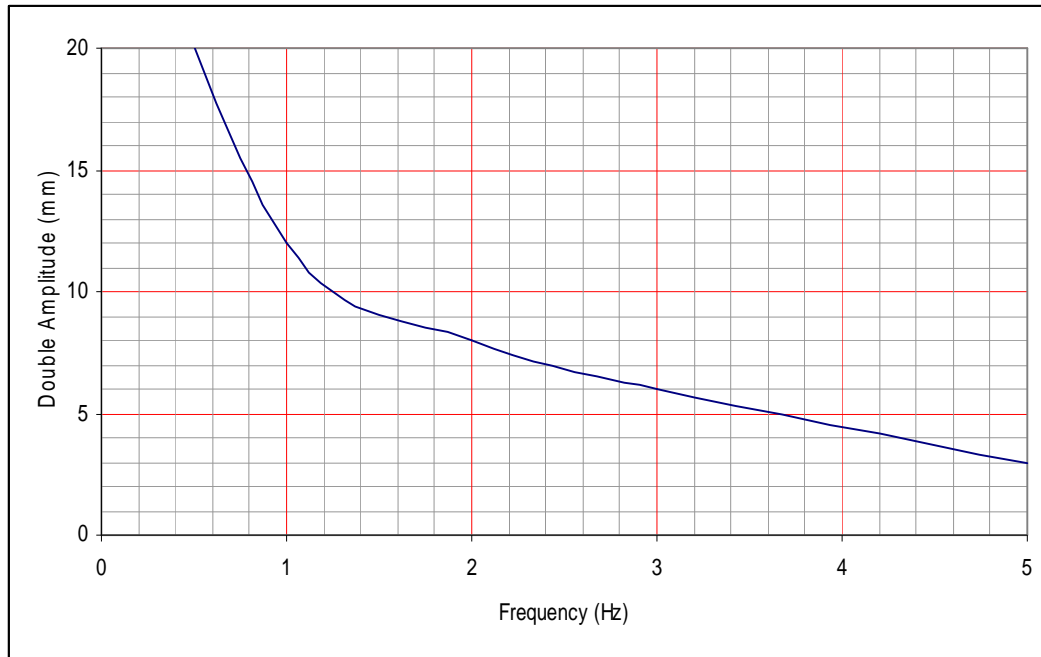
As well as dynamic triaxial tests, the ELDyn system can be utilised to carry out traditional triaxial tests such as UU, CU and CD as well as more advanced tests such as stress paths, K0 and Resilient Modulus tests.

Due to the high precision electro-mechanical actuator the ELDyn system supersedes most systems using pneumatic actuators in terms of life costs and overall useable performance.

Technical Specifications

- **Maximum Operating Frequency**: 5Hz
- **Minimum Operating Frequency**: Static tests, i.e. < 0.001Hz
- Highly accurate dynamic, electro-mechanical actuator
- Standard Triaxial cells can be used (upgraded to dynamic seals and bearings)
- Available sample sizes (depending on cell selection):
  - Φ38 x 76mm (or Φ39.1 x 78.2mm)
  - Φ50 x 100mm
  - Φ70 x 140mm (or Φ61.8 x 123.6mm)
  - Φ100 x 200mm (or Φ101 x 202)mm
  - Φ150 x 300mm
- 16-Bit dynamic data logging
- 16 Bit dynamic actuator control channel
- Cell pressure range to 2MPa (dependent of cell choice)
- Small laboratory foot print
- No hydraulic power pack required

Typical system performance, showing frequency and amplitude

GDSLAB dynamic test module

- Dynamic cyclic loading tests at frequencies up to 5Hz.
- Provides sinusoidal cyclic control of axial displacement or axial force.
- Plotting saved results gives cyclic stress paths based on average cross-sectional area i.e. the area of the volumetrically equivalent right cylinder
- A complete cycle of data can be saved every N cycles where the value of N is defined by the user
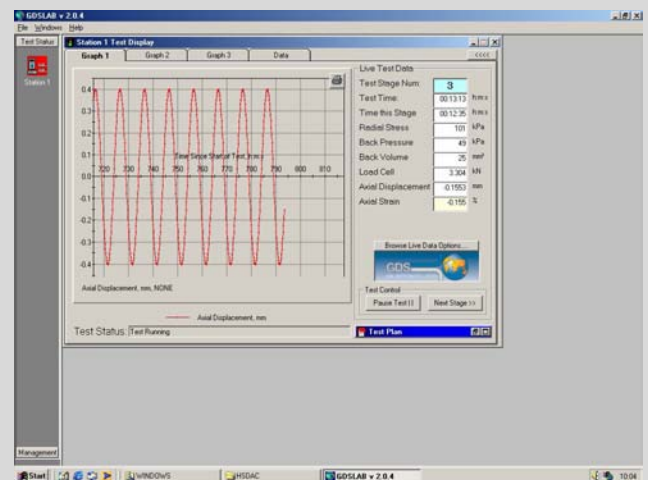- Controlled data displayed in real-time, as in Fig. 3.

Fig.3 Test display showing a dynamic test in progress

Why buy ELDyn?

- GDS ELDCS – no requirement for manual tuning
- As well as extremely good control of axial displacement and axial load for dynamic testing, the ELDCS system is excellent for performing static and small strain triaxial tests
- With GDS software and hardware, there are unlimited possibilities for upgrading the system in the future (i.e. bender elements, unsaturated testing, mid plane PWP, local strain and so on)
- Optional on-site training by experienced geotechnical engineers
- Reputation for world class technical support – check the website for testimonials
- 24 hour technical support by e-mail

GDSLAB control software

The GDSLAB control and acquisition software from GDS is a highly developed, yet extremely flexible software platform. Starting with the Kernel module and the ability to perform data acquisition only, additional modules may be chosen for your testing requirements. Some currently available modules available are as follows:

- SATCON (saturation and consolidation)
- Standard triaxial
- Stress path testing (p, q and s, t)
- Advanced loading tests
- Unsaturated testing
- K0 consolidation
- Permeability

GDSLAB has the ability to be configured to your hardware choice, no matter how unique the arrangement. A text file (*.ini) or initialisation file is created that describes the hardware connectivity to the PC. The hardware layout is available in graphical format via the GDSLAB 'object display'. This makes setting up the devices and checking the connectivity extremely simple, as in Fig. 2.
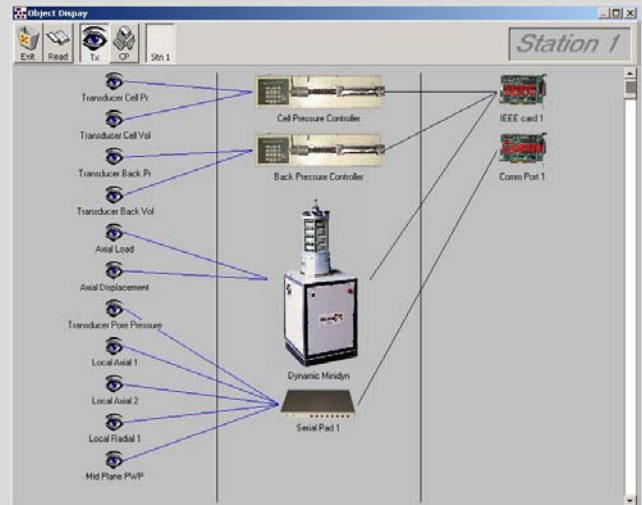

Fig. 2 GDSLAB object display showing a DYNTTS setup

For further information on GDSLAB, please refer to the dedicated GDSLAB datasheet.

Upgrade to bender element testing

Any DYNTTS system may be upgraded to perform P and S wave bender element testing with the addition of the following items (see Fig. 4):

- Bender element pedestal with *new* inserted element
- Bender element top cap with *new* inserted element
- High-speed data acquisition card

Signal conditioning unit, amplification of source and received signals (P and S wave) with user-controlled gain levels (via software).
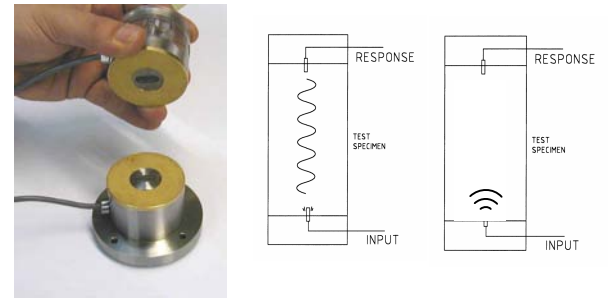

Fig. 4 P and S wave elements
For further information on bender element testing, please refer to the dedicated Bender Element Testing datasheet.

Upgrade to unsaturated testing

Any DYNTTS system may be upgraded to perform unsaturated triaxial testing with the addition of the following items:

- Unsaturated pedestal with high air entry porous stone.
- 1000cc digital air Pressure/volume controller (ADVDPC) for the application of pore air pressure and measurement of air volume change (see Fig. 5).
- Optional HKUST double cell (for more information on this please see the data sheet 'Unsaturated Triaxial Testing of Soil (UNSAT).
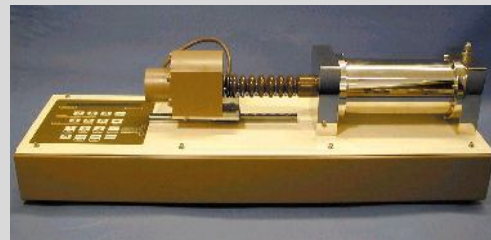- Optional double walled cell.

Fig. 5 1000cc air pressure controller (ADVDPC)

For further information on unsaturated testing, please refer to the dedicated Unsaturated datasheet.