



High Pressure Static Triaxial Systems (1MN)

Overview: 1MN

GDS Static High Load frame is actuated from the base by a hydraulic actuator at loads of either 1000kN. To increase efficiency and to reduce life costs the actuator is powered by a 200cc / 64MPa GDS advanced pressure controller.

Key Features of Static Load Frame:

Benefits to the User:

To increase efficiency and to reduce whole life costs the actuator is powered by a 200cc / 64MPa GDS Advanced pressure controller:	This efficiency means that the full load of the frame can be achieved by drawing less than 1000 Watts (1kW) from mains electricity in place of a hydraulic power pack which can draw up to 50kW. Control is carried out by a GDS advanced pressure controller and as such is very stable and accurate. No special requirements are needed to host or service a powerpack or to protect system users from noise generated by a powerpack.
The static frame uses low pressure compressed air on the reverse side of the actuator to raise the actuator post compression:	This allows a simple manual regulator to be set with a small pressure in the upper chamber of the actuator. This innovation allows lower stress testing to be carried out more efficiently and more accurately without the cost implications of using a second pressure controller for the upper chamber of the actuator. Once the regulator is set it can then be left unattended for all tests, so long as a supply of clean, dry compressed air is available at a pressure greater than 0.5MPa (5 Bar).
Ideal for creep and relaxation testing:	Ideal for use where displacements are very small and loads needs to be very stable and well controlled.
Infinite Volume Controller option:	For tests where continuous displacement is required to amplitudes greater than 5mm. See diagram of set-up on the following page.

Technical Specification:

Load Range (kN):	1MN
Pressure Range:	70MPa
Sample Size:	50mm
Cell Size:	70mm
Computer Interface:	USB
Dimensions:	Frame footprint 700mm x 600mm. Height 1850mm
Weight Approx (kg):	1725

Optional Extras:

Acoustic Velocity Transducers	50mm (Max load 400kN)
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Typical 1MN Proposed Specification Using a Static Load Frame:

The typical example system is based on a GDS 1MN Static (compression only) Load frame based solution with 1 off 70MPa pressure controller.

GDSLAB Software:

The GDSLAB control and acquisition software 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.

Note: Connection via USB interface to PC.

USB 8 Channel Logger (PAD):

The USB Pad provides eight fully independent channels of simultaneously sampled ultra-high resolution 24-bit data. Each channel provides 22 software selectable gain ranges, precision ratiometric transducer excitation, monitoring and acquisition - an industry standard DIN connection allows the full-range of GDS transducers to be quickly and easily connected and configured.

Manual hand pump

Left:
controls
high
pressure
IVC

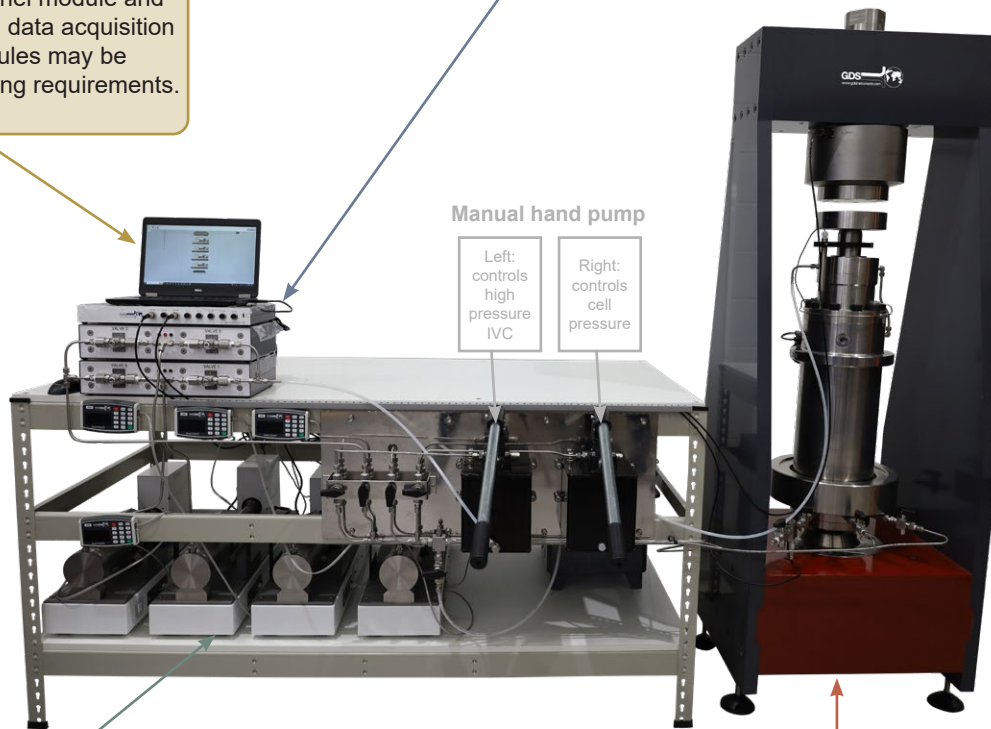
Right:
controls
cell
pressure

Triaxial Cells & Pressure Control System:

- Sample size: up to 50mm.
- Maximum cell & back pressure: 64MPa.
- Proposed cell pressure medium: Silicone / Hydraulic oil.
- Seal type: Low friction, high temperature.
- Maximum operating temperature: 100°C.
- Envisaged cell materials of construction.
- Main cell body: Austenitic 303, 304 and 316 Grades Stainless Steel, 17-4PH.
- Pedestal: 17-4PH grade Stainless steel with drainage.
- Topcap: 17-4PH grade Stainless steel with Aluminium-Bronze Spherical seat.
- Cell pressure actuation: 64MPa GDS ADVDP.
- Optional back pressure system: 1 x 64MPa GDS ADVDP.

Load Frame:

- 1MN Static.
- 64MPa GDS pressure controller for ram compression.
- Low pressure compressed air for ram return.



Triaxial Cells

Increasingly triaxial testing is becoming more common in rock mechanics. Some of the major benefits to using a triaxial cell include;

- The use of internal submersible load cells. This allows load applied to the sample to be measured directly with no errors included from seal friction. Seal friction in high pressure cells can be significant due to high sealing forces required at elevated pressures.
- The space inside the cell to allow the use of on sample transducers, such as LVDT, Seismic or Acoustic emissions.

Common Triaxial Cell Pressure Ranges Supplied by GDS:

- Up to 70MPa cell pressure range.
- Standard sample up to 70mm in diameter.

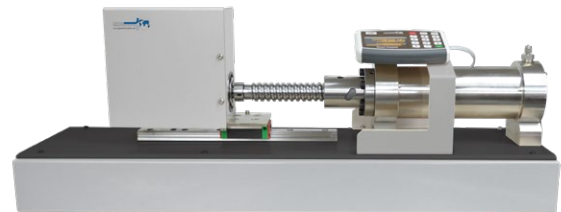
Note: All GDS triaxial cells are designed to accommodate samples with a 2:1 height to diameter ratio or smaller.



70MPa high pressure triaxial cell

Pressure Control Systems

Cell pressure and optional back pressure systems. The cell pressure will be controlled by a GDS Advanced Pressure Controller. The GDS Pressure controllers provide stable and accurate sources of pressure and volume change measurement with 0.1% FRO pressure accuracy as standard.



High pressure controller

Also Available: Dynamic Servo-Hydraulic Load Frame (HLF) for Compression and Tension

The GDS Hydraulic Loading Frame (ELCTS) is a load frame with a hydraulic dynamic actuator mounted on the cross beam for axial stress/strain cyclic dynamic loading.

The system is capable of dynamically controlling axial displacement or axial force and can be synchronised with an optional dynamic cell pressure actuator (radial stress), to give an advanced capability of dynamic stress path testing.

Technical Specification:

Frequency:	10Hz
Load Range (kN):	100kN, 250kN
Weight Approx (kg):	100kN - 670kg, 250kN - 1280kg



Dynamic Hydraulic Load Frame

USB 8 Channel Logger Used in 1MN Static Loadframes



Overview: The USB 8 channel logger is a 24 bit digital acquisition system developed specifically for use with transducers likely to be used in a geotechnical laboratory.

The device provides eight fully independent channels of simultaneously sampled ultra-high resolution 24-bit data. Each channel has 22 software selectable gain ranges, precision ratiometric transducer excitation, and industry standard DIN connection allows the full-range of GDS transducers to be quickly and easily connected and

configured.

A standard USB Interface provides direct PC connectivity and is fully supported by the GDSLab test software allowing seamless integration into new and existing test setups. With the ability to connect multiple USB Pads per PC it is possible to build, expand and customise data acquisition systems by using multiple devices to suit requirements.

Technical Specification:

Connection to PC:	USB
Acquisition Channels:	8
Multi Box Capability:	x10
Max Number of Channels:	Up to 80
Sample Rate:	500Hz*
Resolution:	24 Bit: 16,777,216
Gain Ranges:	22 (User defined in software)
Description:	For use on all static systems where logging is usually 1 point every 2 seconds or slower. *Can be configured to acquire data up to 500Hz only in certain hardware configurations.
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:	22 Independently Selectable Ranges Per Channel from (-22...+22mV) to (-11.63...+11.63V)
Excitation Current Sense:	Yes - can monitor transducer currents - alerts user of disconnected transducers
Excitation/Transducer Fault Detection:	Overvoltage, Overcurrent, Absent Transducer
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:	-22...+22mV to -11.63...+11.63V for balanced differential signals
Transducer Calibration:	Linear
Data Acquisition Options:	Digital filtering for noise reduction
Sample Docking:	Manual
Display and Monitoring:	Data acquisition in GDSLab via USB interface, High resolution real time graphs
Software:	GDSLAB
System Characteristics:	200 MHz dual core ARM Cortex-M4 CPU, 32-bit architecture, On-board flash memory, 480 Mbit/s USB connection
Minimum System Requirements:	OS: Windows 7 or later, CPU: 1.5 GHz or higher, Memory: 2 GB, USB 2.0

Why Buy GDS?

GDS have supplied equipment to over 86% of the world's top 50 Universities:

GDS have supplied equipment to over 86% of the world's top 50 Universities who specialise in Civil & Structural Engineering, according to the "QS World University Ranking 2020" report.

GDS also work with many commercial laboratories including BGC Canada, Fugro, GEO, Geolabs, Geoteko, Golder Associates, Inpijn Blokpoel, Klohn Crippen, MEG Consulting, Multiconsult, Statens Vegvesen, NGI, Ramboll, Russell Geotechnical Innovations Ltd, SA Geolabs, SGS, Wiertsema and Partners to name a few.

**TOP
50**

Would you recommend GDS equipment to your colleague, friend or associate?

100% of our customers answered "YES"

Results from our post-delivery survey asked customers for feedback on their delivery, installation (if applicable), supporting documentation, apparatus and overall satisfaction with GDS. The survey ran for two years.



Made in the UK:

All GDS products are designed, manufactured and assembled in the UK at our offices in Hook. All products are quality assured before they are dispatched.

GDS are an ISO9001:2015 accredited company. The scope of this certificate applies to the approved quality administration systems relating to the "Manufacture of Laboratory and Field Testing Equipment".

**40 YEARS OF
BRITISH
INNOVATION** 

Extended Warranties:

All GDS apparatus are covered by a 12 month manufacturers warranty. In addition to the standard warranty, GDS offer comprehensive extended warranties for 12, 24 and 36 months, for peace of mind against any repairs in the future. The extended warranties can be purchased at any time during the first 12 months of ownership.



GDS Training & Installation:

All installations & training are carried out by qualified engineers. A GDS engineer is assigned to each order throughout the sales process. They will quality assure the apparatus prior to shipping, if installation has been purchased, install the apparatus on the customers site & provide the training.



Technical Support:

GDS understand the need for ongoing after sales support, so much so that they have their own dedicated customer support centre. Alongside their support centre GDS use a variety of additional support methods including remote PC support, product helpsheets, video tutorials, email and telephone support.

