GDS

2023

LABORATORY SYSTEMS
FOR SOIL AND ROCK

GDS INSTRUMENTS PRODUCT CATALOGUE 2023

GDS
www.gdsinstruments.com

GDS Instruments designs, develops and manufactures material testing machines and software used for the computer-controlled testing of soils and rocks.

COMMERCIAL TESTING SOLUTIONS

All GDS apparatus are designed, built and assembled in the UK. GDS do not compromise on build quality, ensuring the results from our apparatus are accurate every time. Accurate consistent results are key to reducing foundation / construction costs in the early phases of any project.

All GDS apparatus are automated, meaning tests can be set-up to run each phase without user input, whilst all data is recorded in our software. Interchangeable system parts including loadcells, topcaps and pedestals allow apparatus to be used for a multitude of tests. Most systems can be upgraded to allow for small strain measurement, unsaturated testing and temperature control.

GDS apparatus are used by some of the most renowned commercial testing companies in the world and continues to lead the way.

GDS apparatus continue to be used for infrastructure projects around the world, from renewable energy such as offshore windfarms, to tailing storage design. As commercial laboratories invest in more advanced apparatus, GDS have developed their range of products to suit these specific requirements. In fact many of our products have been revised/designed based on feedback from our customers.

GDS are well known for their ongoing technical support, in fact they pride themselves on it. Service Level Agreements for technical support and maintenance are available and with a network of agents in over 40 countries, to provide local support if required. With remote and on-site installations available GDS can make sure your laboratories are up and running as soon as possible.

(Cover image courtesy of Structural Soils Ltd)

RESEARCH TESTING SOLUTIONS

GDS has been at the forefront of research testing apparatus since it started producing the automated stress path system back in 1979. It is estimated that GDS products have been used to help achieve over 1000 PhDs. The simple nature of use of the pressure/volume controllers, and the fact that a complete stress path system can be used on a bench top without the need for compressed air, provides a quiet, stand alone system that is ideal for teaching students.

The flexible nature of GDS' systems, means that each one can be easily upgraded with appropriate transducers and software where necessary, to provide a system that is capable of being used for post graduate research. "Back in 1996 when I was doing my MSc in geotechnical engineering, we performed a number of triaxial tests as part of our labs which included a stress path test and a K0 test. I specifically remember the system was using some very old GDS pressure controllers that the University had obviously been using for many years. Sometimes we ran tests with the assistance of software, sometimes we ran tests manually because it was considered important that we fully understood the methods and should not allow the software to do the work for us! These controllers were used at the University of Surrey for research, undergraduate teaching and for MSc labs." Karl Snelling, MD of GDS Instruments.

At GDS, our experienced engineers are on hand to assist with any technical issues. The technical support is a function of the Geotechnical Systems Engineers, with installations and Quality Assurance (on equipment prior to shipping) making up the other areas of their roles. As part of our technical support we can provide remote support where necessary which has proved to be a valuable tool in resolving those more difficult technical issues in a timely manner.

PREFER TO VIEW THE PRODUCTS ONLINE? visit www.gdsinstruments.com

WELCOME

DEAR READER

Welcome to our 2023 brochure. Offshore wind farm projects are certainly a prominent feature for the geotechnical community currently, with the number of projects increasing by 15% in 2022 across 275 international projects. The GDS DSS simple shear test is extensively used for this purpose in a number of guises (static, dynamic, multi directional and confined) and continues to be the core of our flagship range, with in-house development to these machines occurring year on year reacting to demand from these projects.

As a company we continue to grow and 2023 is set to continue that trend as we increase our staffing levels by 10% to enable us to deal with the ongoing industry demand. A number of laboratories of significant size were opened in 2022 populated exclusively with GDS advanced testing equipment.

The world started to open up for travel last year, but 2023 feels it will be the real start of almost unhindered global travel to exhibitions and exciting customer installations post covid, something we are very happy about.

In the 2022 brochure I mentioned that we had been nominated for an award that celebrates companies that take significant steps towards staff wellness, and I am pleased and proud to announce that we won that award.

Karl Snelling, Managing Director

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linkedin.com/company/gds-instruments

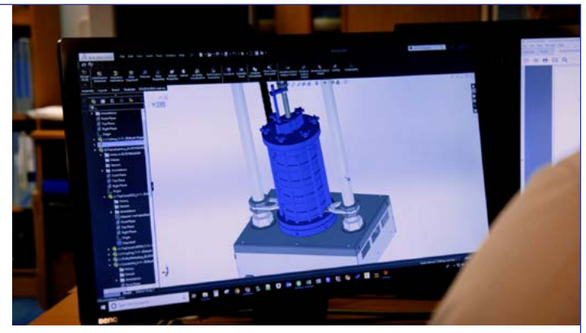
YouTube GDS Instruments

WHY GDS?

Product Design & Development

All GDS apparatus is designed by our in-house team of design engineers who together form our engineering department. This team is responsible for the mechanical components, software, firmware, control & acquisition systems and new product development.

Having the capabilities to design all aspects of the apparatus and software, allows GDS to be responsive to customer & market needs whilst maintaining complete autonomy. GDS have utilised these competences whilst working with Fugro on systems specifications and upgrades options featured in this brochure.



Manufacturing & Quality Assurance

GDS build all their apparatus at their factory in Hook, Hampshire. Components are sourced from local suppliers to ensure quality can be monitored. GDS are ISO9001:2015 compliant, meaning their management system, manufacturing process, services and documentation procedures meet the requirements of an international standard.

Prior to delivery, all apparatus undertakes comprehensive quality assurance checks by one of our geotechnical system engineers.

WHY GDS?

Installations

Where installations are required, all are carried out by GDS engineers. The installation dates are generally booked at a convenient time with the customers once shipping dates have been confirmed.

Product Training

GDS can carry out comprehensive on-site product training if required. Usually the same engineer who completes QA of the apparatus before shipping is deployed to carry out the training. This means they are familiar with any upgrades or modifications made to the system prior to arrival.

Post Sales 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.

Extended 1, 2, 3 Year Warranties

All GDS apparatus is 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.

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STATIC TRIAXIAL TESTING

TRIAXIAL TESTING SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range / Sample Size (Diameter):	7kN / 38 or 50mm 25kN / 70 or 100mm
Cell Pressure Range:	2MPa
Optional Extras:	
Vertical Bender Elements	50, 70, 100mm
Horizontal Bender Elements	50, 70mm
LVDT Local Strain Transducers	50, 70mm
Hall Effect Local Strain Transducers	38, 50, 70mm
Unsaturated Testing	38, 50mm (HKUST Method)
Permeability Testing	Available

LOAD FRAMES

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	10, 50, 64, 128, 256kN
Sample Size (Diameter):	38, 50, 54, 70, 76, 100, 150, 300mm
Optional Extras:	
Vertical Bender Elements	50, 70, 100, 150mm
Horizontal Bender Elements	50, 70, 100mm
LVDT Local Strain Transducers	50, 70, 100mm
Hall Effect Local Strain Transducers	38, 50, 70, 100mm
Unsaturated Testing	38, 50mm (HKUST Method)

TRIAXIAL AUTOMATED SYSTEM FEATURING GDSVIS LOAD FRAME

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	250, 400kN
Sample Size (Diameter):	38, 50, 54, 70, 76, 100, 150, 300mm
Optional Extras:	
P-S Wave Measurement	Dependant on triaxial cell
LVDT Local Strain Transducers	50, 70, 100mm
Hall Effect Local Strain Transducers	38, 50, 70, 100, 150mm
Temperature Control	-20°C to +65°C -20°C to +80°C

PERMEABILITY SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Cell Pressure Range:	2MPa
Sample Size (Diameter):	38, 50, 70, 100mm

FEATURED STATIC TRIAXIAL SYSTEM

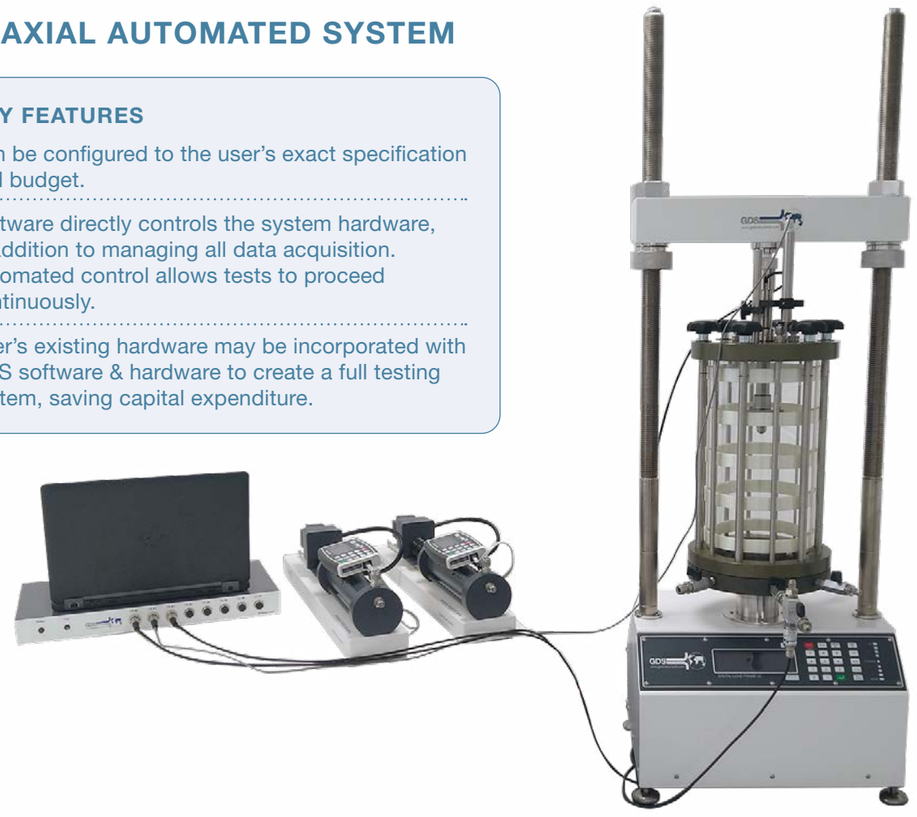
TRIAXIAL AUTOMATED SYSTEM

KEY FEATURES

Can be configured to the user's exact specification and budget.

Software directly controls the system hardware, in addition to managing all data acquisition. Automated control allows tests to proceed continuously.

User's existing hardware may be incorporated with GDS software & hardware to create a full testing system, saving capital expenditure.



TECHNICAL SPECIFICATION:	OPTIONS:
Load Frame:	50, 64kN
Cell Sizes:	76, 100, 150mm
Cell Pressure:	2MPa standard (alternatives available, dependant on triaxial cell chosen)
Top Caps and Base Pedestals:	50, 70, 100 or 150mm (dependant on triaxial cell)
Optional Extras:	
Alternative Load Cell	2, 4, 5, 10, 25, 38, 40, 50, 64kN
Vertical Bender Elements	50, 70, 100, 150mm
Horizontal Bender Elements	50, 70, 100mm
LVDT Local Strain Transducers	50, 70, 100mm
Hall Effect Local Strain Transducers	38, 50, 70, 100mm
Mid Plane Pore Pressure & Suction Probe	up to 100mm
Stainless Steel (Toxic / Marine)	50, 70, 100mm
Permeability Upgrade	Available
Lifting System	Available
Unsaturated Testing	Available
Dynamic Testing	Upgrade to Quasi-Dynamic Testing (0.1Hz)

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DYNAMIC TRIAXIAL TESTING

GDS IS ONE OF THE MOST EXPERIENCED MANUFACTURERS OF DYNAMIC TRIAXIAL SYSTEMS IN THE WORLD, HAVING SUPPLIED MORE THAN 350 SYSTEMS TO COMMERCIAL AND RESEARCH LABORATORIES DURING THE LAST 35 YEARS.

ENTERPRISE LEVEL DYNAMIC TRIAXIAL TESTING SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	5, 10kN
Operating Frequency:	5, 10Hz
Cell Pressure Range:	1MPa (Air)
Cell Size:	76, 100, 150mm
Sample Size (Diameter):	38, 50, 70, 100, 150mm
Optional Extras:	
Vertical Bender Elements	50, 70, 100, 150mm
Horizontal Bender Elements	50, 70, 100mm
LVDT Local Strain Transducers	50, 70, 100mm
Hall Effect Local Strain Transducers	38, 50, 70, 100mm
Unsaturated Testing	50, 70, 100mm
Permeability	Available

RESILIENT MODULUS TESTING SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	5, 10kN
Operating Frequency:	10Hz
Cell Pressure Range:	1MPa
Sample Size (Diameter):	70, 71, 100, 150mm
Optional Extras:	
Vertical Bender Elements	50, 70, 100, 150mm
Horizontal Bender Elements	50, 70, 100mm
LVDT Local Strain Transducers	50, 70, 100mm
Unsaturated Testing	50, 70, 100mm

TRUE TRIAXIAL APPARATUS

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	20kN
Operating Frequency:	5Hz
Cell Pressure Range:	1MPa
Data Acquisition:	24 Bit
Sample Size (Diameter):	75x75x150mm
Optional Extras:	
Unsaturated Testing	Available

FEATURED DYNAMIC TRIAXIAL SYSTEM

ADVANCED DYNAMIC TRIAXIAL TESTING SYSTEM

KEY FEATURES

Adaptive Control Firmware for increased testing precision & user-defined loading waveforms to mimic specific conditions.

High accuracy electro-mechanical control allows the user to perform very small strain static tests through to large strain dynamic tests.

In-built balanced ram (for up to 5Hz systems) keeps cell pressure constant during cyclic loadings.

Sophisticated feedback control firmware and 5kHz data acquisition enables specimen response at high loading frequency to be captured.

TECHNICAL SPECIFICATION:					
Operating Frequency:	5Hz	5Hz	5Hz	5Hz	5Hz
Load Range:	10kN	40kN	40kN	40kN	60kN
Cell Pressure Range:	2MPa	2MPa	2MPa	4MPa	1MPa
Sample Size (Diameter):	up to 100mm	up to 100mm	up to 150mm	up to 100mm	up to 300mm
Optional Extras:					
Vertical Bender Elements	50, 70, 100, 150mm				
Horizontal Bender Elements	50, 70, 100mm				
LVDT Local Strain Transducers	50, 70, 100mm				
Hall Effect Local Strain Transducers	38, 50, 70, 100mm				
Mid Plane Pore Pressure & Suction Probe	50, 70, 100mm				
Lifting Frame	Available				
Unsaturated Testing	50, 70, 100mm				
Temperature Control	-10°C to +60°C, -20°C to +65°C, -20°C to +85°C (For 5Hz / 40kN / 4MPa only)				
Permeability	Available				
Dynamic Cell Pressure Control	5Hz / 1MPa				

PREFER TO VIEW THE PRODUCTS ONLINE? **visit www.gdsinstruments.com**

SHEAR SYSTEMS

SHEARBASE SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	5, 10kN (both axes)
Max Speed:	0.25mm/s
Sample Size Simple Shear:	50, 63.5, 66, 70, 100mm
Sample Size Direct Shear:	60, 100mm Square 63.5mm Circular
Optional Extras:	
Vertical Bender Elements (Simple Shear)	50, 63.5, 66, 70, 100mm

CONFINED ELECTRO-MECHANICAL DYNAMIC CYCLIC SIMPLE SHEAR

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	5kN (both axes)
Operating Frequency:	0 (static) to 5Hz
Sample Size (Diameter):	50, 63.5, 66, 70, 100mm
Optional Extras:	
Vertical Bender Elements	66mm

VARIABLE DIRECTION DYNAMIC CYCLIC SIMPLE SHEAR

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	5kN Axial Axis, 2kN Shear Axis
Operating Frequency:	0 (static) to 1Hz
Sample Size (Diameter):	50, 70mm

CONFINED VARIABLE DIRECTION DYNAMIC CYCLIC SIMPLE SHEAR

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	10kN Axial Axis, 5kN Shear Axis
Operating Frequency:	0 (static) to 1Hz
Sample Size (Diameter):	50, 100mm

FEATURED SIMPLE SHEAR SYSTEM

ELECTROMECHANICAL DYNAMIC CYCLIC SIMPLE SHEAR DEVICE

KEY FEATURES

Electro-mechanical actuators for greater accuracy.

Passive / Active height control, means no intervention is required between stages.

Little or no effects of vertical compliance due to the extremely stiff system design.

Adaptive Control Firmware for increased testing precision and Constant Normal Stiffness testing included as standard.

TECHNICAL SPECIFICATION:	OPTIONS:
Load Ratings:	5, 10kN
Sample Sizes (Diameter):	50, 63.5, 66, 70, 100, 150mm
Frequency:	5Hz
Optional Extras:	
Vertical Bender Elements	50, 63.5, 66, 70, 100, 150mm
Local Horizontal LVDT Displacement Measurement	Available
Local Vertical LVDT Displacement Measurement	Available
Load Calibration Jig and Load Cell (5, 10kN)	Available
Direct Shear Sample	60mm Square, 63.5mm Circular
Water Reservoir to Aid Sample Saturation	Available

DIRECT & ROTATIONAL SHEAR

BACK PRESSURED SHEARBOX

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	25kN Normal & Shear Force
Pressure Range:	2MPa
Sample Size:	50, 60, 100mm (Circular) 75 x 75 or 100 x 100mm (Square)
Optional Extras:	
Unsaturated Testing	Available

DYNAMIC BACK PRESSURED SHEARBOX

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	25kN Axial 10kN Shear
Operating Frequency:	0 (static) to 5Hz
Pressure Range:	2MPa
Sample Size:	50/75/100mm square, 20mm height

LARGE AUTOMATED DIRECT SHEAR

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	100kN Axial, 100kN Shear
Max Speed:	0.1mm/s
Sample Size:	300 x 300mm Square 300mm Circular
Optional Extras:	
Rock Sample Set	150mm Circular

RING SHEAR APPARATUS 5KN/200Nm

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	5kN
Torque Range:	200Nm
Sample Size:	100mm OD x 70mm ID
Speed Range:	0.01^0 to 720^0/min
Optional Extras:	
Interface Shear	Available

FEATURED SHEAR SYSTEM

INTERFACE SHEAR TESTER 5kN/200Nm

KEY FEATURES

Infinitely rotating base platen to allow application of very large rotational deformations.

Low range load cell for accurate measurement of applied vertical load and torque.

Can be used for interface friction studies, for example between geomembranes, pipeline footings and natural materials.

Available in stainless steel for corrosive sample testing.

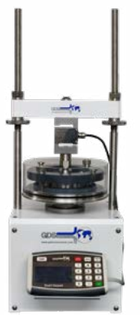
Small laboratory footprint.

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	5kN
Torque Range:	200Nm
Pressure Range:	1MPa
Sample Size:	70 x 22mm
Speed Range:	0.01^0 to 720^0/min
Optional Extras:	
Ring Shear	Available

CONSOLIDATION TESTING

ONE-DIMENSIONAL CONSOLIDATION TESTING APPARATUS, AS WELL AS MORE ADVANCED CONSOLIDATION SYSTEMS THAT CAN INCLUDE BACK PRESSURE CONTROL, HIGH CONSOLIDATION FORCES, UNSATURATED TESTING AND BENDER ELEMENTS.

AUTOMATIC OEDOMETER SYSTEM



TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	10kN (Using Standard load frame, horizontal daylight 184mm)
Sample Size (Diameter):	50, 63.5, 70, 100mm
Optional Extras:	
Wide Load Frame: (Horizontal daylight 224mm)	10kN

CONSTANT RATE OF STRAIN CONSOLIDATION CELL

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	10kN (Wide load frame required) 50kN (Requires LF50 load frame)
Back Pressure Range:	1, 3, 20MPa
Sample Size:	50, 63.5, 70, 100mm x 22mm
Optional Extras:	
Unsaturated Testing	1MPa cell only
Temperature Control	20MPa cell only
Permeability	Available

ROWE & BARDEN CONSOLIDATION TESTING SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Stress Range:	3MPa
Sample Size (Diameter):	50, 63.5, 76.2, 100mm
Optional Extras:	
Permeability	Available
Unsaturated Testing	Available

UNSATURATED SOIL TESTING

GDS PROVIDES A NUMBER OF SOLUTIONS FOR THE TESTING OF UNSATURATED SOIL, THAT CAN BE SEEN AS OPTIONAL EXTRAS ON MANY SYSTEMS IN THE CATALOGUE. EACH IS BASED AROUND THE REQUIREMENT TO EITHER DEFINE, OR EXPLORE AREAS AROUND THE STRESS DEPENDENT SOIL WATER CHARACTERISTIC CURVE (SDSWCC) BY VARYING THE MATRIC SUCTION OF THE SOIL. THE MATRIC SUCTION IS THE PRINCIPAL VARIABLE IN DEFINING THE STATE OF STRESS IN AN UNSATURATED SOIL.

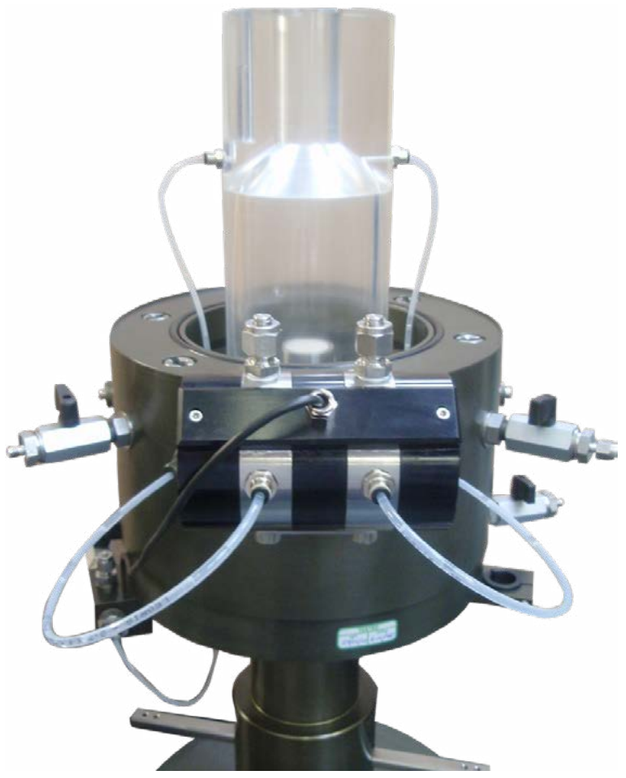
KEY FEATURES

Axis translation method used to control matric suction.

Various air entry values available for ceramic porous discs.

Options to upgrade consolidation, triaxial, direct shear and small-strain systems.

Unsaturated soil calculations automatically handled by GDSLAB.



OPTIONS:	DESCRIPTION:
Method A:	Direct volume measurement using an air pressure/volume controller
Method B:	HKUST inner cell (As shown above)
Method D:	On-sample strain transducers (Can be combined with method A)
Note: Please check system configuration.	

TEMPERATURE CONTROL TESTING

GDS OFFERS A RANGE OF TEMPERATURE CONTROL SYSTEMS TO ACCURATELY CONTROL THE TEMPERATURE OF SOIL AND ROCK SPECIMENS, FROM FROZEN CONDITIONS TO HEATED STATES.

ENVIRONMENTAL TRIAXIAL AUTOMATED SYSTEM

TECHNICAL SPECIFICATION:				
Pressure Range:	4MPa	20MPa	64MPa	70MPa
Cell Size:	150mm	100mm	100mm	70mm
Balanced Ram:	No	No	Yes	No
Heating Only: Ambient to 60°C Ambient to 100°C	Yes	Yes	Yes	Yes
Heating & Cooling: -20°C to +65°C -30°C to +85°C -30°C to +100°C	No	Yes	No	No
Load Frame:	100kN	50, 64, 128, 256kN	128, 256kN	1MN

BISHOP & WESLEY ENVIRONMENTAL TRIAXIAL TESTING SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	100kN
Pressure Range:	10MPa
Sample Size (Diameter):	50mm
Temperature Range:	-20°C to +65°C
Optional Extras:	
LVDT	50mm
Cell Top Lifting Frame	Available
Also available without temperature options.	

CONSTANT RATE OF STRAIN CONSOLIDATION

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	50, 64kN
Back Pressure Range:	20MPa
Sample Size:	50 x 20mm
Temperature Options:	
Heating Only:	Ambient 65°C or 100°C
Heating & Cooling:	-20°C to +65°C
Optional Extras:	
Sample Height	40mm

FEATURED TEMPERATURE SYSTEM

TEMPERATURE CONTROLLED HIGH PRESSURE SYSTEM SUITABLE FOR THE TRIAXIAL TESTING OF GAS HYDRATES

KEY FEATURES

Gas hydrates require high pressure and low temperature, from this respect this system is a standard GDS high load temperature controlled system.

Additional ports are available so that pore fluids such as methane can be introduced and controlled, as well as argon for flushing.

Computer controlled gaseous pressure controller used to control the relevant pore gases.

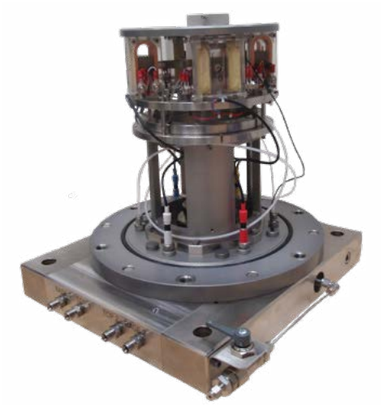
Available as a resonant column Gas Hydrate system.

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	128, 256kN
Pressure Range:	20MPa
Sample Size (Diameter):	50, 70, 100mm
Temperature Range:	-20°C to +65°C
Gaseous Pressure Control:	20MPa
Optional Extras:	
Lifting Solution	Available

RESONANT COLUMN TESTING

WE MANUFACTURE BOTH A STOKOE TYPE RCA (ISOTROPIC RESONANCE IN TORSION AND FLEXURE, DAMPING BY FREE VIBRATION, AND TORSIONAL SHEAR TESTING) AND A HARDIN TYPE RCA (ANISOTROPIC OR ISOTROPIC TORSIONAL RESONANCE). WE CONSIDER THE INDUSTRY STANDARD RCA AS THE STOKOE VERSION.

RESONANT COLUMN APPARATUS



TECHNICAL SPECIFICATION:	OPTIONS:
Cell Sizes:	73, 100mm
Pressure Range:	1, 2MPa
Sample Size (Diameter):	50, 70, 100mm
Lifting Frame:	As standard
Optional Extras:	
Vertical Bender Elements	50, 70mm
Torsional Shear (Slow speed torsional shear test) upgrade	Up to 1MPa only
Unsaturated Testing	50mm

A HARDIN TYPE IS CHOSEN SPECIFICALLY FOR ITS CAPABILITY TO PERFORM ANISOTROPIC TORSIONAL RESONANCE AS THIS IS NOT POSSIBLE IN THE STOKOE VERSION.

HARDIN OSCILLATOR

TECHNICAL SPECIFICATION:	OPTIONS:
Triaxial Cell:	100mm
Pressure Range:	1, 2MPa
Load Range:	2kN
Sample Size (Diameter):	50, 70,100mm
Lifting Frame:	As standard
Optional Extras:	
Vertical Bender Elements	50, 70mm
Torsional Shear (Slow speed torsional shear test) upgrade	1MPa only

HOLLOW CYLINDER TESTING

GDS SPECIALISES IN DESIGNING AND MANUFACTURING ADVANCED TESTING SYSTEMS FOR RESEARCH, WHICH INCLUDES A NUMBER OF HOLLOW CYLINDER APPARATUS CONFIGURATIONS.

KEY FEATURES

Combined internal submersible load cell measures vertical load and torque while eliminating error from confining pressure variation and ram friction.

Flexibility in system loading capacity, specimen size, and applied pressures ensures the system is configured to suit testing and budgetary requirements of the user.

Options available to include local displacement transducers for small strain measurement, and dynamic cell pressure/ volume controllers.

Can be used for triaxial tests.

TECHNICAL SPECIFICATION:			
Operating Frequency:	2Hz	5Hz	5Hz
Load Range:	10kN	10kN	10kN
Axial/Torque Force Range:	100Nm	100Nm	200Nm
Pressure Range:	2MPa	2MPa	2MPa
Sample Size:	100mm OD/ 60mm ID	100mm OD/ 60mm ID	100mm OD/ 60mm ID
Lifting Frame:	As standard	As standard	As standard

Optional Extras:	
Unsaturated Testing	Available
Triaxial Sample Upgrade	50, 70mm

ROCK SYSTEMS

GDS HAS MANUFACTURED HIGH PRESSURE AUTOMATED TRIAXIAL TESTING SYSTEMS FOR ROCK FOR OVER 25 YEARS, WITH SYSTEMS INSTALLED AT LEADING RESEARCH AND COMMERCIAL INSTITUTES AROUND THE WORLD.

1MN STATIC TRIAXIAL ROCK TESTING SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	1MN
Pressure Range:	70MPa
Sample Size:	50mm
Cell Size:	70mm
Optional Extras:	
Acoustic Velocity Transducers	50mm (Max load 400kN)

LARGE AUTOMATED DIRECT SHEAR SYSTEM

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	100kN Axial, 100kN Shear
Max Speed:	0.1mm/s
Sample Size:	Max 150mm Circular
Optional Extras:	
Soil Sample Set	300 x 300mm Square 300mm Circular

BACK PRESSURE SHEARBOX (HIGH PRESSURE)

TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	100kN Axial, 75kN Shear
Pressure Range:	10MPa
Sample Size:	50 or 100mm (Circular) x 50mm high, 40mm Square x 40mm high

ROCK SYSTEMS

HYDRAULIC LOAD FRAMES

KEY FEATURES

Systems are configured to the customers' test specifications and budgets.

Stiff load frames to avoid backlash and spring effects.

Automated system control and data acquisition via GDSLAB software.

Load frames with electro-mechanical or hydraulic actuation available.

HLF100 TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	100kN
Pressure Range:	2, 4, 20MPa
Sample Size:	70, 100, 150mm
Optional Extras:	
Heating Only	Ambient to 60°C

HLF250 TECHNICAL SPECIFICATION:	OPTIONS:
Load Range:	250kN
Pressure Range:	1MPa
Sample Size:	300mm
Lifting Arrangement:	Included
Optional Extras:	
Sample Table Assembly	Available

PRESSURE/VOLUME CONTROLLERS

ENTERPRISE LEVEL PRESSURE VOLUME CONTROLLER
ELDPC

General purpose water pressure source and volume change gauge. 1MPa pressure rating and 200cm³ volumetric capacity. Typically used in commercial testing, teaching applications and lower cost systems.

STANDARD PRESSURE VOLUME CONTROLLER
STDDPC

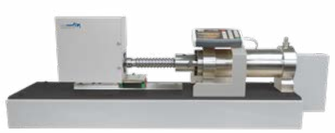
Our mid-range water pressure source and volume change gauge. 1, 2, 3 & 4MPa pressure ratings available all with 200cm³ volumetric capacity. Can also use DigiRFM interface. Typically used in advanced commercial testing and research systems.

ADVANCED PRESSURE VOLUME CONTROLLER
ADVDPC

Advanced water pressure source and volume change gauge. 1, 2, 3, & 4MPa pressure ratings available in 200cm³ model or 1 & 2MPa available with 1000cm³ volumetric capacity. Compatible with DigiRFM interface. Typically used in research systems. (1000cc shown).

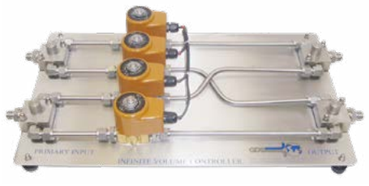
HIGH PRESSURE VOLUME CONTROLLER
HPDPC

Advanced water pressure source and volume change gauge. 8, 10, 16, 20, 32, 64 & 70MPa ratings available with 200cm³ volumetric capacity. Compatible with DigiRFM interface. Typically used in offshore or rock mechanics applications.



HIGH PRESSURE / VOLUME CONTROLLER (CORROSIVE FLUID)
HPDPC-H

Similar to the HPDPC but with upgraded materials for all wetted components. Typically used when unknown contaminants may be present or when actions of corrosive materials are being investigated. Made of Hastelloy, the controller is available in 32 or 64MPa pressure ratings.



INFINITE VOLUME CONTROLLER
GDSIVC

Compatible with all GDS controllers up to 4MPa this automatic switching unit is used to provide seamless pressure or volumetric flow between an external reservoir and test station. Two similar controllers are used with this system. High pressure 64MPa version also available.

PNEUMATIC PRESSURE CONTROLLER (1MPa OR 2MPa)
GDSPPC

An economical computer controlled air pressure regulator, available in 1MPa or 2MPa ranges and in single or dual output. This can be used from a compressor fed airline or compressed gas cylinder. Typically used in unsaturated testing and in low cost dynamic applications.

HIGH PRESSURE GASEOUS CONTROLLER
DCHGP

This high pressure gaseous controller has a capacity up to 20MPa. This allows gases to be used in much higher pressure systems than in traditional systems. It is typically used where confining fluid viscosity is of importance such as in resonant column testing. Available in single or dual output.

DIGITAL REMOTE FEEDBACK MODULE
DIGIRFM

DigiRFM's can provide an additional single channel of data acquisition. They can be added to standard and advanced controllers (not compatible with Enterprise) and GDS' range of load frames. The DigiRFM's can also be used to provide closed loop communication with GDS load cells and displacement transducers.

TRANSDUCERS AND LOAD CELLS

HORIZONTAL BENDER ELEMENTS
GDSBES-H

Enables measurement of the maximum shear modulus of soil. Can perform S- and P- wave testing with the same elements. Vertical and horizontally propagating elements available.

VERTICAL BENDER ELEMENTS
GDSBES-V

Use of horizontally propagating elements, in addition to axial elements, allows the user to quantify the degree of stiffness anisotropy present in the soil specimen.

ACOUSTIC VELOCITY
GDSAV

Systems to measure the P- and S- Wave velocities within a sample. AV sensors are generally used where pressures and load exceed those where bender elements can be used.

LVDT LOCAL STRAIN TRANSDUCERS
LVDT

Mounted locally on a specimen to measure small strain vertical and radial deformations. Working pressures of up to 3.5MPa or 100MPa version for use in non-conducting oil.

HALL EFFECT LOCAL STRAIN TRANSDUCERS
GDSHE

Mounted locally on a specimen to measure small strain vertical and radial deformations. Lightweight to minimise specimen disturbance. Working pressures up to 2MPa.

MID PLANE PORE PRESSURE AND MID PLANE SUCTION PROBES
GDSM4P

Provides direct measurement of the pore pressure or suction at the specimen mid-height. Available for 1.5 or 3.5MPa.

ULTRA LOW RANGE WET-WET PRESSURE TRANSDUCER
ULR-WW

Calibrated to directly measure specimen volume change during saturated and/or unsaturated soil testing. Requires use of HKUST internal cell. Range ± 1kPa.

INTERNAL SUBMERSIBLE LOAD CELL
GDSISLC

Unique two part submersible load cells, designed for measuring compressive loads ranging from 0.5, 1, 2, 4, 5, 8, 10, 12, 16, 20, 25, 32, 40, 50 & 64kN. Unaffected by variations in confining pressure.

EXTERNAL S-BEAM LOAD CELL
S-BEAM

Mounted externally to provide measurements of force. Available in 1, 2, 4, 5, 10, 16, 25, 50, 64 or 100kN ranges.

FORCE ACTUATOR
GDSFA

General purpose loading system with continuous readout of force and displacement. 10kN, 25kN & 50kN options are available.

BENDER ELEMENT CORE HOLDER
GDSBCH

Facilitates an aligned measurement of S- and P- wave through an unconfined cylindrical soil specimen.

TOXIC INTERFACE
GDSTI

Provides a separation chamber with a free flowing bellofram rolling diaphragm, to prevent toxic/contaminated fluids and vapours from entering the aluminium base of the cell or pressure/volume controller.

PREFER TO VIEW THE PRODUCTS ONLINE? visit www.gdsinstruments.com

GDSLAB: THE ULTIMATE IN FLEXIBILITY

Our laboratory software package, GDSLAB, starts with a core application known as the kernel. The GDSLAB kernel allows for data acquisition from your hardware, but no test control. Simply add the appropriate module or modules to complete the test suite functionality you require.

START WITH OUR CORE GDSLAB KERNEL...

THEN ADD IN THE MODULES FOR YOUR SPECIFIC TASK:

- TRIAXIAL TESTING
- SHEAR TESTING
- OEDOMETER LOGGING
- HOLLOW CYLINDER
- CONSOLIDATION

TRIAXIAL TESTING SOFTWARE MODULES

DATA ACQUISITION, LOGGING AND RETRIEVAL:
Provided free of charge with every GDSLAB kernel. Provides all data related functions but no test control.

SATURATION & CONSOLIDATION PROCEDURES:
Cell and back pressure control for saturation (stepped or ramp), consolidation and B-check tests.

STANDARD TRIAXIAL TESTING:
Constant rate of strain control for Unconsolidated Undrained (UU), Consolidated Undrained (CU) and Consolidated Drained (CD) shearing tests.

STRESS PATH CONTROLLED TESTS:
Independent linear control of p, q or s, t stress space with unlimited number of linked paths.

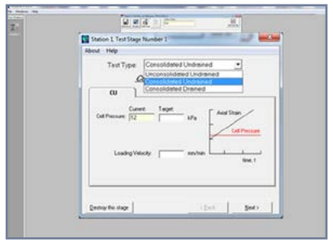
ADVANCED LOADING (USER DEFINED TEST SEQUENCES):
Independent user control over the axial (load, stress or strain), radial and back pressure axes with control options of constant value, ramp or quasi-static sinusoidal cyclic applied separately to each axis.

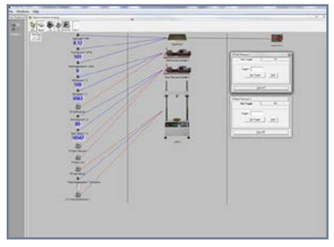
K-ZERO CONTROLLED CONSOLIDATION/SWELLING:
Maintains zero diameter change (K0 conditions) by two methods, either from a direct reading of the specimen diameter or using specimen volume change calculations.

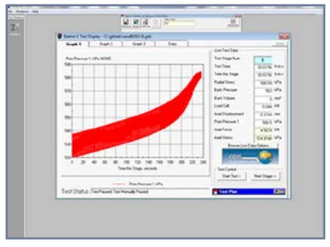
TRIAXIAL PERMEABILITY EVALUATION:
Controls either a constant head permeability test, or a constant flow permeability test with controlled hydraulic gradient control.

UNSATURATED TESTS USING AXIS TRANSLATION - 4D STRESS/STRAIN PATH:
Independent control of the axial axis (load, stress or strain), radial stress, pore water pressure and pore air pressure for complete flexibility of control for unsaturated triaxial tests.

DYNAMIC TRIAXIAL TESTS:
High speed dynamic cyclic triaxial testing with high speed data acquisition. Test control of dynamic axial load or axial displacement, with static cell and back pressure control. Dynamic control of axial stress and/or radial stress is available dependant on hardware.

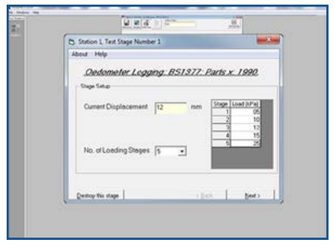


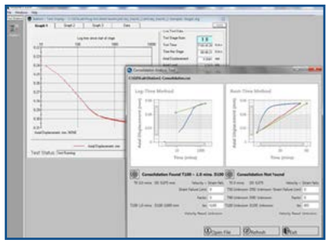




OEDOMETER LOGGING MODULE

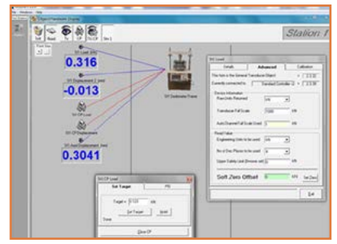
HANGING WEIGHT SYSTEM (OEDOMETER LOGGING):
Uses a datalogger and displacement transducer to take settlement readings from hanging weight oedometer frames.





CONSOLIDATION SOFTWARE MODULE

STANDARD CONSOLIDATION PROCEDURES:
This test module allows the user to perform; B-check, saturation, constant stress, traditional stepped loading test, constant rate of strain and constant rate of loading tests. Versions of our consolidation cells that allow unsaturated tests to be performed using the axis translation technique are available.

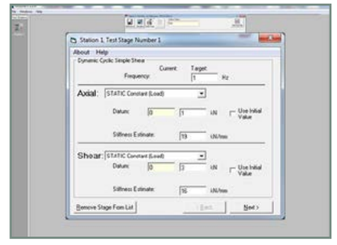


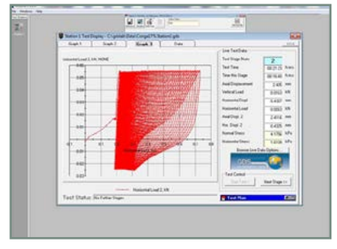
SHEAR TESTING SOFTWARE MODULES

DIRECT SHEAR BOX CONTROL:
Generally used with direct shear or ring shear devices. Provides acquisition only or control where hardware permits for linear or linear cyclic reversal of a shear box or a ring shear machine. Ideal for upgrading manually logged equipment.

ADVANCED DIRECT AND DIRECT SIMPLE SHEAR MODULE:
Independent control over the axial axis (load, stress or strain) and shear axis (load, stress or strain) with constant, ramp or quasi-static sinusoidal cyclic control on either axis. Unsaturated tests may be performed using the axis translation technique.

DYNAMIC SIMPLE SHEAR:
High speed dynamic cyclic simple shear testing with high speed acquisition. Test control of dynamic axial and shear axes under load or displacement. Allows modulus, damping and liquefaction studies to be carried out.



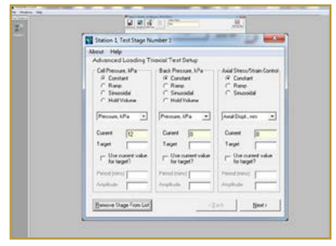


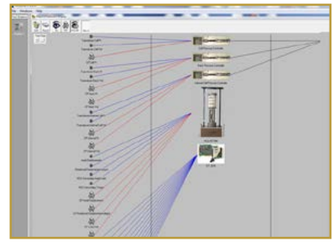
HOLLOW CYLINDER SOFTWARE MODULES

HCA GENERALISED STRESS PATH:
Provides independent linear control of p, q, b and alpha under stress or strain control. This module provides the fundamental HCA stress path control functions that test specifications demand, with unlimited number of linked paths.

ADVANCED HCA LOADING PROCEDURES:
Allows quasi-static independent control of the five axes; Axial (load, stress, strain, deformation), Rotational (torque, rotation), Outer Cell pressure (kPa), Inner Cell pressure (kPa) and Back pressure (kPa) using either constant, ramp or slow speed sinusoidal control.

DYNAMIC HCA LOADING:
High speed dynamic cyclic testing with high speed data acquisition. Test control of dynamic axial load or axial displacement, and dynamic control of torque or rotation. Optional dynamic control of inner and outer cell pressures depending on system specification.





GDS PRODUCT SPECIFIC SOFTWARE

- BENDER ELEMENT SOFTWARE
- RESILIENT MODULUS SOFTWARE MODULE
- RESONANT COLUMN SOFTWARE MODULE
- GDSLAB REPORTS

GDS CORE VALUES

- PRIDE: We take pride in our work and work space.
- QUALITY: We share a right first time attitude but acknowledge and rectify our mistakes.
- SERVICE: We supply accurate, knowledgeable, professional and timely pre and post-sales service, based on our understanding of customer needs and requirements.
- SUPPORT: We offer timely, accurate, knowledgeable & friendly support to customers and colleagues.
- ACCOUNTABILITY: We accept personal accountability for our own actions and results.
- RESPECT: We treat colleagues and customers with the care and respect as we would expect to be treated ourselves.

GDS
www.gdsinstruments.com

V A L U E

VERSATILE: Our passion for R&D enables us to apply our geotechnical knowledge to our bespoke systems.

ACCOMPLISHED: Being a leader in the sector, our high standards ensure that our quality and knowledge speaks for itself.

LIFETIME: With our LIFETIME SUPPORT, once a customer, always a customer.

UNDERSTANDING: Our customers can trust us to be approachable, professional and to be treated with care and respect.

EXPECTATIONS: Working in close partnership with our customers we strive to exceed expectations.

LABORATORY SYSTEMS FOR SOIL & ROCK

GDS Instruments
Unit 32 Murrell Green Business Park,
London Road, Hook, Hampshire,
RG27 9GR, UK

Tel: **+44 (0) 1256 382450**
Email: **info@gdsinstruments.com**
Web: www.gdsinstruments.com