GEOCOMP PRODUCTS
Automated Laboratory Testing Systems for Soil, Rock, and Geosynthetics

Introducing our newest Version 5
- Load and strain control
- Multi-language support
- Software and firmware upgrades by internet
- Remote diagnostics and technical support
Geocomp Laboratory Systems are automated universal testing stations which measure the mechanical properties of soil, rock, and geosynthetics. These state-of-the-art systems are capable of production work as well as high-quality research.

Our laboratory testing systems have been successfully used for more than 30 years by government agencies, universities, and private companies worldwide.

We are pleased to release Version 5 of our systems, a complete upgrade of electronics and software that provides more features and support of additional test types.

All components of our systems are designed, developed and supported by our dedicated, in-house professionals who continuously research new products and publications to provide upgrades as testing technology advances.

All systems produced by Geocomp deliver the winning combination of ease-of-use and technical sophistication.

ON THE COVER:

**Geocomp’s RC-TS: An entirely new and better approach to Resonant Column-Torsional Shear Testing**

Geocomp’s RC-TS pioneers a new approach to resonant column testing in which rotation of the top of the specimen is measured very precisely by two accelerometers and torque is measured directly at the base. Measured rotation and torque are used to directly calculate shear modulus and damping. This system eliminates errors associated with back EMF factors present in other devices. The theory and design behind the Geocomp RC-TS is described in a paper published in the ASTM Geotechnical Testing Journal, New Approach to Resonant Column Testing. This paper received ASTM’s highest award, the Hogentogler Award in 2013. The newly revised ASTM standard D4015 includes the new method.

**LoadTrac II + FlowTrac II**
Incremental Consolidation  
ASTM D2435 / D4546, AASHTO T 216  
Unconfined Compression  
ASTM D1663 / D2166, AASHTO T 208  
Constant Rate of Strain Consolidation  
ASTM D4186  
CBR

**LoadTrac II + 2 FlowTrac II**
Constant Rate of Strain Consolidation  
ASTM D4186  
Unconsolidated Undrained Rowe Consolidation  
Hydraulic Consolidations  
Stress Path Triaxial  
Permeability  
ASTM D5084 / D2434  
CBR

**LoadTrac II + Cyclic RM**
Resilient Modulus  
AASHTO T 294, T 307  
SHRP Protocol P46  
NCHRP RTT 285

**ShearTrac II**
Direct Shear  
ASTM D3080, AASHTO T 236  
ASTM D6528  
ASTM D5321, BS 1377  
ASTM D6243  
Residual Shear  
ASTM D3080  
Incremental Consolidation  
ASTM D2435 / D4546, AASHTO T 216  
Rock Shear Interface  
ASTM D5607

**ShearTrac II DSS, Cyclic Simple Shear**
Direct Shear  
ASTM D3080, AASHTO T 236  
Direct Simple Shear  
ASTM D6528  
Cyclic Simple Shear Stress and Strain Control  
Residual Shear  
ASTM D3080  
Incremental Consolidation  
ASTM D2435 / D4546, AASHTO T 216  
Post Cyclic Residual Strength  
ASTM D5321, BS 1377  
Rock Shear Interface  
ASTM D5607

**WaveMe Box**
P- and S-wave measurement. PC-based digital storage oscilloscope (DSO). USB-connected with a built-in signal excitation

**Geolog 6 Data Acquisition**
Data acquisition on analog sensors
Cyclic ShearTrac III Large Shear Box
Direct Shear
ASTM D3080, AASHTO T 236
Direct Simple Shear
ASTM D6528
Interface Shear of Geosynthetics
ASTM D5321, BS 1377
Internal Shear of Geosynthetic Clay Liners
ASTM D6243
Cyclic Direct Simple Shear of Soils

Resonant Column-Torsional Shear
Resonant Column
ASTM D4015
Torsional Shear
Post Cyclic Residual Strength
ASTM D4767 / D7181, AASHTO T 297, COE EM 1110
Stress Path Triaxial

Cyclic Triaxial
Cyclic Triaxial Stress and Strain Control
ASTM D3999 / D5311
Post Cyclic Residual Strength
ASTM D4767 / D7181, AASHTO T 297, COE EM 1110

About Us
Geocomp provides comprehensive geostructural design and performance monitoring services to clients across the United States and around the globe. Our professional staff combine in-depth understanding of structural and geotechnical material behavior with the latest in performance monitoring technologies to provide innovative and sound geostructural solutions – resulting in better control of risk and cost of projects.

Our subsidiary company, GeoTesting Express Inc. (GTX), provides state-of-the art testing facilities to measure the mechanical and physical properties of soil, rock, geosynthetics, concrete, and other geo-materials. GTX also provides field testing services to inspect, sample, test, document, and monitor quality projects.

Geocomp Products manufactures, sells and supports remote monitoring systems for both static and dynamic applications worldwide. These systems provide web-based GIS access to instrument data used for real-time monitoring of structural performance during construction and operation. We also manufacture automated soil testing systems, custom-designed pavement sensors, and load cells used by commercial, governmental, and university laboratories.

Geocomp equipment is in hundreds of locations in the United States, Canada and 50 countries internationally, including:
Departments of Transportation
Commercial Labs
Academic Institutions
Government Institutions.

FOR MORE INFORMATION, CONTACT FINN MWAPE AT 978.893.1227 OR FMWAPE@GEOCOMP.COM

www.geocomp.com
Full Automation, Fast, and Reliable
- Fully-automated from test start to test report printing for high productivity.
- Multiple test types run from one test station to maximize utilization.
- Common user-interface across all test types to simplify training.
- One PC runs multiple test stations to save space and simplify operations.
- Software and firmware updates via Internet keeps your system current.
- Context-sensitive help at the press of a key.
- Continuously increasing multiple language support for test menus, test reports, help, and user’s manuals.
- Networkable to permit viewing data and controlling test remotely.
- Modular design to support upgrades and add-ons.
- Remote access facilitates technical support.
  - All systems run Microsoft operating systems to provide long life.
  - Consistent, user-friendly Windows interface across all products to reduce user’s learning time.
  - Complete test reports and raw and processed data files provided which can be read into your own spreadsheets.
  - Smart system with built-in protection devices to minimize chance of damage to equipment.

Standards Compatible
- Full reports of graphs and tables compatible with ASTM, AASHTO, ISO, and BS.
- Labs using our systems have passed accreditations and certifications government agencies and institutions including: USACE, AASHTO, A2LA, and GAI-LAP.

Industry Experts, Excellent Technical Support
- Our support staff consists of leading industry experts including civil, geotechnical, and electrical engineers.
- Expert technical support via web, telephone, or on-site.
- Comprehensive hardware and software catalogues, and user’s manuals, in electronic and hard-copy formats.
We design and manufacture automated laboratory testing systems and remote monitoring devices. We focus on creating products that help our clients accomplish their goals efficiently and quickly, whether it be in teaching, research, commercial, or other applications. We design our automated testing systems to help the user perform tests efficiently and quickly and produce high-quality results. Our remote monitoring systems are robust, versatile, and are easy to use in varying environmental settings. We serve numerous clients in over 50 countries. Join our many satisfied customers and make us your trusted source for remote monitoring equipment and automated laboratory testing systems.

Contact us to be added to our orders list.
Automated Triaxial, Resilient Modulus, and Resonant Column-Torsional Systems

Automated Triaxial Stress Path

Triaxial

Cyclic Triaxial

Resilient Modulus

Resonant Column - Torsional Shear
Benefits and Features

- Choose load capacity to fit user needs from 45 and 90 kN (10,000 and 20,000 lbs.) models
- Total automation, control, data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Geo-NET compatibility lets unit be accessed and controlled over a computer network
- Generate columns of data for easy reduction using your own spreadsheet software
- Accurate displacement rate control from 0.00003 to 35 mm per minute (0.000001 to 1.3 inches per minute)
- Stand alone through front keypad and LCD menu capability

Applicable Test Standards

- ASTM D4767 / D7181 / D2850
- AASHTO T297
- COE EM1110 Consolidated Undrained Compression / Extension Tests, Consolidated Drained Compression / Extension tests, Stress Path Tests
- BS (British Standard)

The LoadTrac II / FlowTrac II system for triaxial testing fully automates the conduct of CU, CD and any possible stress path triaxial test on soils. Once a soil sample is in place, and the test conditions are selected, the LoadTrac II / FlowTrac II system will run the entire triaxial test from start to finish. This system is operated by software which automates the initialization, saturation, consolidation (isotropic, anisotropic or \(K_o\)) and shear phases of the test.

The system comes as a complete, self-contained unit with all of the equipment required to perform fully automated triaxial and stress path tests. The LoadTrac II / FlowTrac II system utilizes high speed, precision micro stepper motors to apply the vertical load and pressures to the soil specimen. It includes one load frame for vertical stress, one flow pump for cell pressure and one flow pump for back pressure. The system is capable of applying a constant rate of strain at any displacement rate from 0.00003 up to 15 mm per minute (0.000001 to 0.6 inches per minute).

Sensor readings are displayed in SI or English units and stored in memory. With the network communications module and appropriate software, the entire test can be automatically controlled, data captured and displayed in real-time, and test reports prepared on a PC.
Technical Specifications

Motor  Stepper motor with built-in controls
Travel  Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution
Displacement  Control from 0.00003 to 35 mm per minute (0.000001 to 1.3 in. per minute)
Flow Range  0.000006 to 3 cc per second
Power  110/220 V, 50/60 Hz, 1 phase

Dimensions

LoadTrac II  464 x 546 x 1206 mm (18 x 21.5 x 47.5 inches)
FlowTrac II  203 x 406 x 470 mm (8 x 16 x 18.5 inches)

Weight

LoadTrac II  55 kg (120 lbs.)
FlowTrac II  14 kg (30 lbs.)

Models

FlowTrac II Models
FTII-250-nn  250 cc capacity and 1400 kpa (200 psi) pressure
FTII-750-1400  750 cc capacity and 1400 kpa (200 psi) pressure

LoadTrac II Models
LTII-10,000  45 kN (10,000 lbs.)
LTII-20,000  90 kN (20,000 lbs.)

Accessories

Triaxial cells up to 305 mm (12 in.) diameter, membranes, porous stones and sample preparation accessories upon request.
Triaxial Semi-Automated LoadTrac II with Manual Pressure Volume Panel System

User Benefits

• Choose load capacity to fit user needs from 45 and 90 kN (10,000 and 20,000 lbs.) models
• Total automation, control, data collection and reporting of test results
• Prepare tables and plots of report quality within minutes of completing a test
• Geo-NET compatibility lets unit be accessed and controlled over a computer network
• Generate columns of data for easy reduction using your own spreadsheet software
• Accurate displacement rate control from 0.00003 to 35 mm per minute (0.000001 to 1.3 inches per minute)
• Stand alone through front keypad and LCD menu capability

Applicable Test Standards

• ASTM D4767
• AASHTO T297
• COE EM 1110

The LoadTrac II with manual pressure volume panel system for triaxial testing automates the shear phase of UU, CU, CD triaxial tests on soils and soft rocks. Once a soil sample is in place, and the test shear parameters conditions are selected, the LoadTrac II system will automatically shear the soil sample. This system is operated by software which displays in real time the test progress, and stores the data for subsequent editing and reporting.

The system comes as a complete, self-contained unit with all of the equipment required to perform the automated shear phase of any triaxial test. The LoadTrac II system utilizes a high speed, precision micro-stepper motor to apply the vertical load to the soil specimen.

The system is capable of applying a constant rate of strain at any displacement rate from 0.00003 up to 35 mm per minute (0.000001 to 1.3 inches per minute).

Sensor readings are displayed in SI or English units and stored in memory. With the network communications module and appropriate software, the entire test can be automatically controlled, data captured and displayed in real time, and test reports prepared on a PC.
**Technical Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor</strong></td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td><strong>Travel</strong></td>
<td>Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution</td>
</tr>
<tr>
<td><strong>Displacement</strong></td>
<td>Control from 0.00003 to 35 mm per minute (0.000001 to 1.3 in. per minute)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>464 x 546 x 1206 mm (18 x 21.5 x 47.5 inches)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>55 kg (120 lbs.)</td>
</tr>
</tbody>
</table>

**Models & Frame Capacity**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTII-10,000</td>
<td>45 kN (10,000 lbs.)</td>
</tr>
<tr>
<td>LTII-20,000</td>
<td>90 kN (20,000 lbs.)</td>
</tr>
</tbody>
</table>

**Accessories**

- Manual pressure volume control panel for back pressure saturation and consolidation
- Triaxial cells, membranes, porous stones and sample preparation and set-up accessories available upon request.
- Geo-NET PC network card and cable to link LoadTrac II/FlowTrac II

**Options**

- Two Flow pumps (FlowTrac II units) to fully automate back pressure saturation consolidation (isotropic, anisotropic, and $K_o$), shear undrained, drained, and along any stress path
The LoadTrac II / FlowTrac II Cyclic system automated test unit completely automates cyclic triaxial testing of soils. Minimum man-time is required.

The LoadTrac II / FlowTrac II Cyclic consists of a triaxial cell to retain the sample, a load frame with computer-controlled platen for static loading, two computer-controlled flow pumps to control chamber pressure and back pressure, a high performance linear actuator servo control actuator for cyclic loading with update rates of 500 times per second, a micro-processor for accurately controlling cyclic loading, a PC with a Pentium processor to control the test and to log test data. Editing and reporting is built in to the test and control software program. The unit arrives in a completely self-contained system with all necessary equipment.

The LoadTrac II / FlowTrac II Cyclic system is menu driven. The Windows® XP, Vista, 7 based software allows users to define the conditions for running the test, logging test data and reporting results. Users can specify the values for controlling the saturation, consolidation and cyclic loading of a test. During testing, current data and system status information is displayed. Collected data are written to a file on the system’s hard drive. The reporting software performs all required calculations and permits users a variety of options in graphing and generating test data.
## Cyclic Triaxial
### LoadTrac II / FlowTrac II

<table>
<thead>
<tr>
<th><strong>Technical Specifications</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cyclic Loading System</strong></td>
<td>• High performance custom linear actuator</td>
</tr>
<tr>
<td></td>
<td>• 1.8 kW peak, low inertia servo-drive system for fast response time</td>
</tr>
<tr>
<td></td>
<td>• High resolution feedback system for precise and accurate control of load and speed</td>
</tr>
<tr>
<td></td>
<td>• 4.5 kN (1,000 lbs. force) continuous load at speeds in excess of 200 mm (8 in.) /sec</td>
</tr>
<tr>
<td></td>
<td>• Self-contained and maintenance free</td>
</tr>
<tr>
<td></td>
<td>• Single Phase 208 VAC/60Hz (US) / 220 VAC/50Hz (international)</td>
</tr>
<tr>
<td><strong>Type of Cyclic Loading</strong></td>
<td>Load-controlled sinusoidal shape</td>
</tr>
<tr>
<td><strong>Cyclic Rate</strong></td>
<td>Up to 10 Hz</td>
</tr>
<tr>
<td><strong>Options to End Test</strong></td>
<td>• Maximum number of cycles</td>
</tr>
<tr>
<td></td>
<td>• Maximum strain</td>
</tr>
<tr>
<td><strong>Reporting Options</strong></td>
<td>• Load, displacement, sample, and cell vs. cycle number</td>
</tr>
<tr>
<td></td>
<td>• Shear stress, strain, p-p strain, excess pore pressure vs. cycle number</td>
</tr>
<tr>
<td></td>
<td>• Shear stress vs. axial strain</td>
</tr>
<tr>
<td></td>
<td>• Shear stress vs. normal stress</td>
</tr>
<tr>
<td></td>
<td>• Automatic or user specified scaling on any of the above plots</td>
</tr>
<tr>
<td></td>
<td>• Plotting to monitor, printer, plotter, or file</td>
</tr>
<tr>
<td><strong>Test Cell</strong></td>
<td>Modified triaxial cell with accessories</td>
</tr>
<tr>
<td><strong>Unit Systems</strong></td>
<td>U.S., English, metric and SI changeable at any time before, during and after test</td>
</tr>
<tr>
<td><strong>Sample Diameter</strong></td>
<td>50, 70, up to 100 mm (2, 2.8, 4 in.) custom sizes by special order</td>
</tr>
<tr>
<td><strong>Transducers</strong></td>
<td>Force: 2.2, 4.5,11 kN (500, 1000, 2500 lbs.)</td>
</tr>
<tr>
<td></td>
<td>Displacement: 50 mm (2.0 in.) range</td>
</tr>
<tr>
<td></td>
<td>Cell and sample pressures: 0-1400 kPa (0-200 psi)</td>
</tr>
</tbody>
</table>
Geocomp’s LoadTrac II Resilient Modulus unit fully automates resilient modulus tests on base / subbase / subgrade materials. The LoadTrac II meets or exceeds all specifications for Resilient Modulus Testing of Base / Subbase / Subgrade Materials by AASHTO T294 / T307, SHRP Protocol P46 and NCHRP Report 285. It minimizes man time during testing and offers a versatile platform for performing additional geotechnical tests. The LoadTrac II performs resilient modulus tests from beginning to end according to the latest AASHTO standards without human intervention.

Resilient modulus testing is a complicated test in which the stiffness of the sample changes with loading. Since the performance of cyclic loading systems depends on the stiffness of the sample, most systems fail to apply the correct load throughout the test. Our system uses real-time adjustment of a PID controller to adjust the system control parameters as the stiffness of the specimen changes. This feature permits our system to apply an accurate load from the beginning to the end of the test.

Training time is short, as most people are familiar with the Windows® operating environment. Users can configure a wide variety of graphical screens to display the test results including tabular and graphical display of channel values with time, graphical display of stresses, strains, displacements and resilient modulus values.
### Technical Specifications

<table>
<thead>
<tr>
<th><strong>Cell Pressure</strong></th>
<th>Automatically applied, maintained and incremented with electro-pneumatic air pressure regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Cyclic Loading</strong></td>
<td>Haversine pulse</td>
</tr>
<tr>
<td><strong>Cyclic Rate</strong></td>
<td>0.1 sec per pulse, 1 pulse per sec and any slower values given by user</td>
</tr>
</tbody>
</table>
| **Cyclic Loading**         | • High performance custom linear actuator  
                               • 2.8 kW peak, low inertia servo-drive system for fast response time  
                               • High resolution feedback system for precise and accurate control of load and speed  
                               • 4.5 kN (1,000 lbf.) continuous load at speeds in excess of 200 mm (8 in.)/sec  
                               • Self-contained and maintenance free  
                               • Single phase 208 VAC/60 Hz (US) / 220 VAC/50 Hz (international) |
| **Options to End Test**    | • Maximum number of cycles  
                               • Maximum strain |
| **Reporting Options**      | • Shear stress versus pulse number  
                               • Axial strain versus pulse number  
                               • Resilient modulus versus pulse number  
                               • Resilient modulus versus deviator stress  
                               • Resilient modulus versus confining stress  
                               • Automatic or user specified scaling on any of above plots  
                               • Plotting to monitor, printer, plotter, or file |
| **Test Cell**              | Modified triaxial cell with sample preparation accessories                                       |
| **Unit Systems**           | U.S., English, metric and SI changeable at any time before, during and after test              |
| **Sample Diameter**        | 70, 100, and 150 mm (2.8, 4, and 6 in.) custom sizes by special order                          |
| **Transducers**            | Force: 2.2, 4.5, 11 kN (500, 1000, 2500 lbf.)  
                               Displacement: 0.5 in. range, +25.4 mm (+1.00 in.)  
                               Cell pressure: 0 - 500 kPa (0 - 70 psi) |
| **System Requirements**    | System is delivered complete to perform tests, store data, reduce data and report the test results.  
                               System will be calibrated and ready to begin testing immediately after installation. |

### Typical Test Output

### User-friendly Interface

Full documentation and user's manuals are provided. HELP screens are available at every point in all software. Complete reporting software is included. This software creates reduced test results that are printed in tabular and graphical form instantly after testing. Results are available in any set of units, regardless of which set of units the test was run.
Complete system capable of performing the following tests:

- Resonance in torsion
- Damping ratio in torsion
- Torsional shear up to 2 Hz
- Triaxial or stress path after torsional shear

Applicable Test Standards

- ASTM D4015
- ASTM D4767
- AASHTO T297

Resonant Column Torsional Shear

Geocomp’s resonant column and torsional system is based on the Long-Tor Resonant Column apparatus developed by Dr. Vincent P. Drnevich (patent 1974) at Purdue University. The term Long-Tor denotes the capability of the apparatus to vibrate specimens in either a longitudinal or torsional mode of vibration. The basic principle of the resonant column device is to excite one end of a confined cylindrical soil specimen in a fundamental mode of vibration by means of torsional or longitudinal excitation. Once the fundamental mode of resonance frequency is established, measurements are made of the resonance frequency and amplitude of vibration from which wave propagation velocities and strain amplitudes are calculated using the theory of elasticity. The shear modulus is determined from the derived velocity and the density of the specimen.

The resonant column test is used to measure shear modulus (G) and the damping ratio (D) at small shear strains. These values are a function of strain level. In the test, the shear strain level is increased step-by-step and the shear modulus and damping ratio are measured. The result of the test is a relationship between shear modulus and shear strain and between damping ratio and shear strain over a shear strain magnitude of $10^{-6}$ to $10^{-4}$ percent. Higher strain levels associated with extreme loads such as earthquakes and wave loading cannot be achieved by resonant column testing using the electromagnetic force actuator to twist the specimen. For higher shear strains, our device can be switched to shearing in torsion. The torsional shear phase can be run to obtain shear modulus and damping up to shear strains of 10% depending on the stiffness of the soil. We can also subsequently shear the specimen along any stress path possible in a triaxial cell. Specimens can be consolidated isotropically or anisotropically.

A typical resonant column torsional shear test on a specimen involves the following steps:

1. Consolidation to the first stress condition
2. Measurement of G and D versus shear strain at end of primary consolidation and at 3 times during secondary consolidation
3. Consolidation to the second stress condition
4. Measurement of G and D versus shear strain at end of primary consolidation and at 3 times during secondary consolidation
5. Repeat above through final stress condition
6. Run torsional shear test to 10% strain to measure G and D for higher shear strain levels
7. Run triaxial compression test to measure shear strength of the specimen, drained or undrained
TECHNICAL SPECIFICATIONS

MOTOR
Stepper motor with built-in controls

TRAVEL
Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution

DISPLACEMENT
Control from 0.00003 to 35 mm per minute (0.00001 to 0.6 in. per minute)

FLOW RANGE
0.000006 to 3 cc per second

POWER
110/220 V, 50/60 Hz, 1 phase

DIMENSIONS
LoadTracII
464 x 546 x 1206 mm
(18 x 21.5 x 47.5 inches)

FlowTracII
203 x 406 x 470 mm
(8 x 16 x 18.5 inches)

WEIGHT
LoadTracII
55 kg (120 lbs.)

FlowTracII
14 kg (30 lbs.)

MODELS
LoadTracII Models: Frame Capacity
LTII-10,000: 45 kN (10,000 lbs.)
LTII-20,000: 90 kN (20,000 lbs.)

FlowTracII Models: Frame Capacity
FTII-250-nn: 250 cc capacity
FTII-750-nn: 750 cc capacity
nn: Maximum pressure range for system: 1400 and 3500 kPa (200 and 500 psi) available (resolution of pressure will be 0.00005 times the range)

ACCESSORIES
Triaxial cells to test samples up to 305 mm (12.00 in.) diameter, membranes, porous stones and sample preparation accessories upon request.

GEOCOMP RCTS TURNKEY SYSTEM CONSISTS OF:

- LoadTrac-II
- One sample FlowTrac II
- Pneumatic controller for cell pressure controls
- Electro-magnetic drive system
- Torsional shear system
- Full built-in electronics and high speed data acquisition
- Full automation through all phases of a test

Typical Test Output

User-friendly Interface

www.geocomp.com
Automated Consolidation Systems

Incremental Consolidation – Loadtrac III
Incremental Consolidation – Loadtrac II
Controlled-Strain Loading Consolidation - LoadTrac III
Controlled-Strain Loading Consolidation - LoadTrac II
Rowe Consolidation
Benefits and Features

• Total automation of data collection and reporting of test results

• Prepare tables and plots of report quality within minutes of completing a test

• Generate columns of data for easy reduction using your own spreadsheet software

• Ability to access and control the unit over a computer network using Geo-Net option

Applicable Test Standards

• ASTM D2435 Incremental Consolidation

• AASHTO T216 Incremental Consolidation

• ASTM D4546 One-Dimensional Swell or Settlement Potential of Cohesive Soils

LoadTrac III system for incremental consolidation and swell testing fully automates an entire consolidation test. Constant load and constant volume swell tests can be run automatically. Once a sample is placed into the load frame, the test conditions programmed, and the test started, the LoadTrac III system performs the complete test up to 32 steps without intervention by the user. The computer automatically increments to the next stress by using conditions specified by the user. Incremental consolidation test can be completed in 24 to 48 hours on most materials.

The LoadTrac III system utilizes a high speed, precision micro-stepper motor to apply the vertical load to the soil specimen. An embedded control board with a dedicated CPU takes readings from the force transducer and displacement transducer to control the stepper motor.

The base unit includes built-in data acquisition and display capability. Sensor readings are displayed in SI or English units and stored in memory. For incremental consolidation, the base unit is linked to a PC using the network communications module and the appropriate software.

Optional software running in Windows® completely automates the test, reducing the data and preparing test results.

Other options include running constant rate of consolidation, unconfined compression and triaxial on a 50 mm (2 in.) or less diameter sample.
Technical Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>11 kN (2,500 lbs.)</td>
</tr>
<tr>
<td>Motor</td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td>Travel</td>
<td>25 mm (1 in.) resolved to 0.0025 mm (0.0001 in.)</td>
</tr>
<tr>
<td>Clearance</td>
<td>180 mm (7 in.) horizontal between uprights, 150 mm (6 in.) vertical platen to crosshead standard</td>
</tr>
<tr>
<td>Power</td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
<tr>
<td>Dimensions</td>
<td>305 x 381 x 838 mm (12 x 15 x 33 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>20 kg (44 lbs.)</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1220</td>
<td>All stainless steel consolidation cell includes 63.5 mm (2.5 in.) sample ring, top cap, top and bottom porous stones.</td>
</tr>
<tr>
<td>1230</td>
<td>Consolidation cell with back pressure saturation capability, 62.5 mm (2.5 in.) sample diameter standard. Other sizes available upon request with optional external stainless steel pressure sensor.</td>
</tr>
<tr>
<td></td>
<td>Geo-NET™ Network / communication card and cable to link load frame to PC.</td>
</tr>
<tr>
<td></td>
<td>ICONP Software package to automatically run incremental consolidation test and swell tests with built-in editing reporting option.</td>
</tr>
</tbody>
</table>

Typical Test Output

User-friendly Interface
Benefits and Features

- Choose capacity to fit user needs from 45 to 90 kN (10,000 to 20,000 lbs.) models
- Total automation, control, data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Geo-NET compatibility lets unit be accessed and controlled over a computer network
- Generate columns of data for easy reduction using your own spreadsheet software

Applicable Test Standards

- ASTM D2435 Incremental Consolidation
- AASHTO T216 Incremental Consolidation
- ASTM D4546 One Dimensional Swell or Settlement Potential of Cohesive Soils

LoadTrac II system for incremental consolidation and swell testing fully automates an entire consolidation test. Constant load and constant volume swell tests can be run automatically. Once a sample is placed into the load frame, the test conditions programmed, and the test started, the LoadTrac II system performs the complete test without intervention by the user. The computer automatically increments to the next stress by using conditions specified by the user. Incremental consolidation test can be completed in 24 to 48 hours on most materials.

The LoadTrac II system utilizes a high speed, precision micro-stepper motor to apply the vertical load to the soil specimen. An embedded control board with a dedicated CPU takes readings from the force transducer and displacement transducer to control the stepper motor.

The base unit includes built-in data acquisition and display capability. Sensor readings are displayed in SI or English units and stored in memory. For incremental consolidation, the base unit is linked to a PC using the network communications module and the appropriate software.

Optional software running in Windows® completely automates the test, reducing the data and preparing test results.
## Technical Specifications

<table>
<thead>
<tr>
<th>Motor</th>
<th>Stepper motor with built-in controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution</td>
</tr>
<tr>
<td>Displacement</td>
<td>Control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td>Power</td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
</tbody>
</table>

## Dimensions

| LoadTrac II   | 464 x 546 x 1206 mm (18 x 21.5 x 47.5 inches) |

## Weight

| LoadTrac II   | 55 kg (120 lbs.) |

## Models

<table>
<thead>
<tr>
<th>LoadTrac II Models</th>
<th>Frame capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTII-10,000</td>
<td>45 kN (10,000 lbs.)</td>
</tr>
<tr>
<td>LTII-20,000</td>
<td>90 kN (20,000 lbs.)</td>
</tr>
</tbody>
</table>

## Accessories

<table>
<thead>
<tr>
<th>1220</th>
<th>All stainless steel consolidation cell includes 63.5 mm (2.5 in.) sample ring, top cap, top and bottom porous stones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geo-NET™</td>
<td>Network / communication card and cable to link load frame to PC</td>
</tr>
<tr>
<td>ICONP</td>
<td>Software package to automatically run incremental consolidation test and swell tests with excess pore water pressure measurements capability</td>
</tr>
<tr>
<td>Options</td>
<td>Consolidation cell with back pressure and pore pressure measurements capabilities</td>
</tr>
</tbody>
</table>
Benefits and Features

• Total automation of data collection and reporting of test results
• Prepare tables and plots of report quality within minutes of completing a test
• Generate columns of data for easy reduction using your own spreadsheet software
• Ability to access and control the unit over a computer network using Geo-Net option

Applicable Test Standards

• ASTM D4186 One-Dimensional Consolidation Properties of Soils Using Controlled-Strain Loading

The LoadTrac III / FlowTrac II system fully automates the performance of a Controlled Strain Loading Consolidation (CSL) test. Once a soil sample is in place, and the test conditions selected, the LoadTrac III / FlowTrac II system will run the entire CRCS test from start to finish. The LoadTrac III / FlowTrac II system consolidates the sample through a loading path specified by the user using constant rate of strain loading. To avoid running the test too fast (excess pore pressures become too large for the transducer) or too slow (the test takes too long), LoadTrac III/FlowTrac II uses Excess Pore Pressure Ratio Limits. If the measured excess pore pressure divided by the current total vertical stress exceeds the Upper Pore Pressure Ratio Limit, the current strain rate is automatically decreased by a factor of 2. If the measured excess pore pressure divided by the current total vertical stress falls below the Lower Pore Pressure Ratio Limit, the current strain rate is increased by a factor of 2. These limits give the user a great deal of control over how a constant strain rate test is run.

The FlowTrac II is used during back pressure saturation as well as maintaining a constant cell pressure during the consolidation phase of the test.

A typical consolidation test can be completed in 24 to 36 hours on most materials.
## Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor</strong></td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td><strong>Travel</strong></td>
<td>25 mm (1.0 in.) resolved to 0.0025mm (0.0001 in.)</td>
</tr>
<tr>
<td><strong>Displacement</strong></td>
<td>Control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
</tbody>
</table>

## Dimensions

<table>
<thead>
<tr>
<th>Machine</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadTrac-III</td>
<td>305 x 381 x 838 mm (12 x 15 x 33 inches)</td>
</tr>
<tr>
<td>FlowTrac II</td>
<td>203 x 406 x 470 mm (8 x 16 x 18.5 inches)</td>
</tr>
</tbody>
</table>

## Weight

<table>
<thead>
<tr>
<th>Machine</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadTrac III</td>
<td>20 kg (44 lbs.)</td>
</tr>
<tr>
<td>FlowTrac II</td>
<td>14 kg (30 lbs.)</td>
</tr>
</tbody>
</table>

## Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTII-250-nn</td>
<td>250 cc capacity</td>
</tr>
<tr>
<td>FTII-750-nn</td>
<td>750 cc capacity</td>
</tr>
</tbody>
</table>

**nn** Maximum pressure range for system: 700, 1000, 2000 and 3500 kPa (150, 300 and 500 psi) available (resolution of pressure will be 0.00005 times the range)

## Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1230</td>
<td>All stainless steel consolidation cell with backpressure saturation capability, 62.5 mm (2.5 in.) sample diameter standard. External stainless steel pressure sensor. Other sample sizes are available upon request.</td>
</tr>
</tbody>
</table>
Benefits and Features

- Choose capacity to fit user needs from 45 and 90 kN (10,000 and 20,000 lbs.) models
- Total automation of data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Generate columns of data for easy reduction using your own spreadsheet software
- Ability to access and control the unit over a computer network using Geo-Net option

Applicable Test Standards

- ASTM D4186 One-Dimensional Consolidation Properties of Soils Using Controlled-Strain Loading

The LoadTrac II / FlowTrac II system fully automates the performance of a Controlled Strain Loading Consolidation (CSL) test. Once a soil sample is in place, and the test conditions selected, the LoadTrac II / FlowTrac II system will run the entire CRCS test from start to finish. The LoadTrac II / FlowTrac II system consolidates the sample through a loading path specified by the user using constant rate of strain loading. To avoid running the test too fast (excess pore pressures become too large for the transducer) or too slow (the test takes too long), LoadTrac II / FlowTrac II uses Excess Pore Pressure Ratio Limits. If the measured excess pore pressure divided by the current total vertical stress exceeds the Upper Pore Pressure Ratio Limit, the current strain rate is automatically decreased by a factor of 2. If the measured excess pore pressure divided by the current total vertical stress falls below the Lower Pore Pressure Ratio Limit, the current strain rate is increased by a factor of 2. These limits give the user a great deal of control over how a constant strain rate test is run.

The FlowTrac II is used during back pressure saturation as well as maintaining a constant cell pressure during the consolidation phase of the test.

A typical consolidation test can be completed in 24 to 36 hours on most materials.
## Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor</strong></td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td><strong>Travel</strong></td>
<td>Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution</td>
</tr>
<tr>
<td><strong>Displacement</strong></td>
<td>Control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
</tbody>
</table>

## Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadTrac II</td>
<td>464 x 546 x 1206 mm (18 x 21.5 x 47.5 inches)</td>
</tr>
<tr>
<td>FlowTrac II</td>
<td>203 x 406 x 470 mm (8 x 16 x 18.5 inches)</td>
</tr>
</tbody>
</table>

## Weight

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadTrac II</td>
<td>55 kg (120 lbs.)</td>
</tr>
<tr>
<td>FlowTrac II</td>
<td>14 kg (30 lbs.)</td>
</tr>
</tbody>
</table>

## Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTII-250-nn</td>
<td>250 cc capacity</td>
</tr>
<tr>
<td>FTII-750-nn</td>
<td>750 cc capacity</td>
</tr>
</tbody>
</table>

- **nn** Maximum pressure range for system: 700, 1000, 2000 and 3500 kPa (150, 300 and 500 psi) available (resolution of pressure will be 0.00005 times the range)

## Accessories

- **1230**
  - All stainless steel consolidation cell with backpressure saturation capability, 62.5 mm (2.5 in.) sample diameter standard.
  - External stainless steel pressure sensor. Other sample sizes are available upon request.
  - **Accessories**
    - All stainless steel consolidation cell with backpressure saturation capability, 62.5 mm (2.5 in.) sample diameter standard.
    - External stainless steel pressure sensor. Other sample sizes are available upon request.
**Benefits and Features**

- Displacement transducers with up to 50 mm (2.0 in.) range and 0.0013 mm (0.00005 in.) resolution
- Choose capacity from 250 and 750 cc models
- Choice of pressure range to obtain required gradients and pressure resolution
- Built-in pressure transducer and electronics
- Accurate flow rate control from 0.000006 to 3 cc per second
- Built-in electronic controls for automatic display of data and control of test
- Geo-NET compatibility allows unit to be accessed and controlled over a computer network

**Applicable Test Standards**

- ASTM D2435 One-Dimensional Consolidation Properties of Soils
- BS 1377 Part 6 Consolidation and Permeability Tests in Hydraulic Cells and with Pore Pressure Measurements

The hydraulic Rowe Cell system is used because of its multiple drainage (up to eight conditions) options as well as the capability of testing large diameter samples through the use of water pressure on a flexible diaphragm. Furthermore, free strain and equal strain can be applied by applying the water pressure on the top of the sample through a flexible platen or a rigid one.

The FlowTrac II system for consolidation testing using the hydraulic Rowe-type consolidation cell automates an entire consolidation test. Once a sample is placed into the Rowe cell, the test conditions programmed and the test started, FlowTrac II performs the entire test without intervention. The system automatically initializes, back pressure saturates, and consolidate incrementally by using conditions specified by the user. A typical incremental consolidation test can be completed in 36 to 48 hours on most materials.

This system may be programmed with a series of steps. At the end of each step, the system will automatically move to the next step based on the computer determining that the specified conditions for completion of consolidation for the previous step are reached. Any load-unload-reload pattern may be specified. FlowTrac II consolidation system lets you complete tests faster with less man time. An entire test can usually be completed in 12 to 24 hours. Complete detailed tabular and graphical reports can be prepared in minutes after completing the test using a PC and a printer or plotter.
### Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>250 and 750 cc</td>
</tr>
<tr>
<td>Motor</td>
<td>Micro-stepper motor with built-in controls</td>
</tr>
<tr>
<td>Flow Range</td>
<td>0.000006 to 3 cc per second</td>
</tr>
<tr>
<td>Power</td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
<tr>
<td>Dimensions</td>
<td>203 x 406 x 470 mm (8 x 16 x 18.5 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>14 kg (30 lbs.)</td>
</tr>
</tbody>
</table>

### Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTII-250-nn</td>
<td>250 cc capacity</td>
</tr>
<tr>
<td>FTII-750-nn</td>
<td>750 cc capacity</td>
</tr>
</tbody>
</table>

- Maximum pressure range for system: 350, 700, 1,000, 2,000 and 3,500 kPa (50, 150, 300 and 500 psi) available (resolution of pressure will be 0.00005 times the range)

### Cell Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Sample Diameter</th>
<th>Sample Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>RWE-63.5</td>
<td>63.5 mm (2.5 in.)</td>
<td>30 mm (1.2 in.)</td>
</tr>
<tr>
<td>RWE-150</td>
<td>150 mm (6 in.)</td>
<td>50 mm (2 in.)</td>
</tr>
</tbody>
</table>

### Set-up Diagram

![Set-up Diagram](image)

### Typical Test Output

![Typical Test Output](image)

### User-friendly Interface

![User-friendly Interface](image)
Automated Direct Shear and Direct Simple Shear Systems

- Direct Shear
- Residual Shear
- Rock Interface Shear
- Large Direct Shear
- Large Interface Shear
- Direct Simple Shear
- Cyclic Simple Shear
- Large Cyclic Simple Shear
Testing Capabilities

- 1-D incremental consolidation up to 32 steps
- Constant volume swell
- Constant stress swell (free swell)
- Constant displacement rate control shear
- Constant load control rate shear
- Fully automated residual shear up to 32 independent steps where each step can be controlled with any displacement or load
- Direct simple shear up to 32 independent steps with addition of DSS module (hardware and software)

Technical Specifications

- Fully automated
- Stand alone capability for manual control and data acquisition
- Up to 4.4 kN (1,000 lbs.) load capacity
- High precision micro-stepper motors for both vertical and horizontal load and displacement applications
- Two (2) built-in displacement transducers +/- 12.5 mm (+/- 0.50 in.) horizontal and 25.45 mm (1.00 in.) vertical with 0.0013 mm (0.00005 in.) resolution
- Built-in electronic controls for automatic display of data and control of test; accurate displacement rate control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)
- Geo-NET™ compatibility for network accessibility and control
- Does not require dead weights or compressed air
The ShearTrac II system is capable of performing the consolidation and shearing phases of a standard direct shear and residual shear test under full automatic control. The system consists of a computer-controlled unit that utilizes micro-stepper motors to apply the vertical and horizontal loads to the soil specimen. Versions of the unit are available to produce vertical and horizontal loads up to 8.9 kN (2,000 lbs.).

The system is capable of running a consolidation phase for up to 32 increments automatically. Horizontal shearing can be applied at a specified rate of deformation or at a specified rate of horizontal force change, or at a specified set of force steps of a specified duration. The system is capable of displaying the current status of a test and graphically portraying the progress of the test in real time. The system includes the capability for the operator to alter the test process and conditions at any stage of the test. The system is also capable of performing repeated direct shear tests to determine residual strength based on a specified number of repeated cycles.

The system comes complete with hardware and software for recording all test input data and settings of selected test parameters, performing standard engineering calculations on the data, and producing graphically plotted and printed output in the standard Corps format, in accordance with Engineer Manual (EM 1110-2-1906), Laboratory Soils Testing, Appendix IX and Appendix IXa.

<table>
<thead>
<tr>
<th>Benefits and Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Choose load capacity to fit user needs up to 8.9 kN (2,000 lbs.)</td>
</tr>
<tr>
<td>• Total automation, control, data collection and reporting of test results</td>
</tr>
<tr>
<td>• Prepare tables and plots of report quality within minutes of completing a test</td>
</tr>
<tr>
<td>• Geo-NET compatibility lets unit be accessed and controlled over a computer network</td>
</tr>
<tr>
<td>• Generate columns of data for easy reduction using your own spreadsheet software</td>
</tr>
<tr>
<td>• Accurate displacement rate control from 0.00003 to 7.5 mm per minute (0.000001 to 0.3 inches per minute)</td>
</tr>
<tr>
<td>• Full automation of residual shear testing</td>
</tr>
<tr>
<td>• Stand alone through front keypad and LCD menu capability</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicable Test Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ASTM D3080 / T236 Direct Shear Testing of Soils under Consolidated Drained Conditions</td>
</tr>
</tbody>
</table>
## Technical Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>Up to 8.9 kN (2,000 lbs.)</td>
</tr>
<tr>
<td>Vertical Motor</td>
<td>Stepper motor with built-in controls for vertical load</td>
</tr>
<tr>
<td>Horizontal Motor</td>
<td>Stepper motor with built-in controls for horizontal load</td>
</tr>
<tr>
<td>Speed Range</td>
<td>0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td>Horizontal Travel</td>
<td>±12.5 mm (±0.50 in.) resolved to 0.0013 mm (0.00005 in.)</td>
</tr>
<tr>
<td>Vertical Travel</td>
<td>25.45 mm (1.00 in.) resolved to 0.0013 mm (0.00005 in.)</td>
</tr>
<tr>
<td>Power</td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
<tr>
<td>Dimensions</td>
<td>228 x 560 x 762 mm (9 x 22 x 30 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>63 kg (140 lbs.)</td>
</tr>
<tr>
<td>ShearTrac II Load</td>
<td>ST-1000 4.5 kN (1,000 lbs.)</td>
</tr>
</tbody>
</table>

## Accessories

- ShearTrac II accessories including ShearTrac II box to test square or round samples up to 101 mm (4 in.) dimension/diameter, includes top and bottom porous stones.
- Geo-NET-PC Network card and cable to link ShearTrac II to PC.
- SHEAR Software package to automatically run and report direct/residual shear test on ShearTrac II.
The Rock Shear Interface (RSI) is a versatile system capable of performing the consolidation and shearing phases for natural and artificial rock joints on rock cores up to 83 mm (3.26 in.) in diameter, direct and residual shear on soils as well as for determining the interface frictional properties of soil and geosynthetics on sample sizes up to 150 x 150 mm (6 x 6 in.).

The system consists of a computer controlled unit that utilizes micro stepper motors to control and apply verticals load and horizontal displacements. Built-in electronics control test and display data in real time. The computer controlled program runs under the latest Windows® platform. It includes the capability to display the current status and graphically portray the progress of the test in real time. The system also includes the capability for the operator to alter the test process and conditions at any stage during the test.

This is a turnkey system that includes hardware and software for recording all test input data and settings of selected test parameters, performing standard engineering calculations on the data, and producing graphically plotted and printed output in accordance with current testing standards.
**Technical Specifications**

| **Capacity** | 11 kN (2,500 lbs.) vertical and horizontal |
| **Motor** | Stepper motor with built-in controls |
| **Vertical Motor** | Stepper motor with built-in controls for vertical load |
| **Horizontal Motor** | Stepper motor with built-in controls for horizontal load |
| **Speed Range** | 0.00003 to 10 mm per min. (0.000001 to 0.40 in. per min.) |
| **Dimensions** | width = 432 mm (17 in.)<br>length = 902 mm (35.5 in.) |
| **Horizontal Travel** | 75 mm (3 in.) resolved to 0.002 mm (0.00008 in.) |
| **Vertical Travel** | 50 mm (2 in.) resolved to 0.002 mm (0.00008 in.) |
| **Power** | 110/220 V, 50/60 Hz, 1 phase |

**Model**

| **RSI-ShearTrac-II** | 11 kN (2,500 lbs.) frame capacity |

**Accessories**

| **Geo-NET™-PC** | Network card and cable to link RSI-ShearTrac-II frame to PC |
| **RSI-SHEAR** | Software package to automatically run consolidation and direct residual shear test either load or displacement control |
| **SHEAR.REPORT** | Editing/reporting software package |
| **150 mm (6 in.) shear rings** | For direct residual and interface shear test |

**Typical Test Output**

**User-friendly Interface**
Testing Capabilities

- Interface frictional properties of soil & geosynthetics
- Internal friction of GC
- Direct shear on soil and aggregates
- 1-D incremental consolidation up to 32 steps
- Constant volume swell
- Constant stress swell (free swell)
- Constant displacement rate control shear
- Constant load control rate shear
- Direct shear up to 32 independent steps
- Capability to upgrade to DSS testing

Technical Specifications

- Fully automated
- Stand alone capability for manual control and data acquisition
- Up to 44.5 kN (10,000 lbs.) load capacity
- High precision micro-stepper motors for both vertical and horizontal load and displacement applications
- Two (2) built-in displacement transducers +/- 90 mm (+/-3.5 in.) horizontal and 90 mm (3.5 in.) vertical with 0.002 mm (0.00008 in.) resolution
- Built-in electronic controls for automatic display of data and control of test; accurate displacement rate control from 0.00003 to 7.5 mm per minute (0.000001 to 0.3 in. per minute)
- Geo-NET™ compatibility for network accessibility and control
- Does not require dead weights or compressed air
Benefits and Features

- Built-in end clamps for geosynthetics testing
- Optional grip plates for true internal friction determination for GCLs
- Linear bearings for minimum horizontal friction
- Two sets of limit switches to prevent over traveling
- Built-in 4-channel data acquisition with 16-bit resolution
- Two LCD display
- Two displacement transducers with 100 mm (4.00 in.) range and 0.002 mm (0.00008 in.) resolution
- Two universal shear web type load cells
- Accurate displacement rate control from 0.00003 to 10 mm per minute (0.000001 to 0.4 in. per minute)
- Built-in electronic controls for automatic display of data and control of test
- Windows® friendly user interface
- Fully incremental consolidation test capability

Applicable Test Standards

- ASTM D5321 / D6243
- ASTM D3080 / T236
- BS 1377

The ShearTrac III™ system is capable of performing the consolidation and shearing phases of a 305 x 305 x 200 mm (12 x 12 x 8 in.) height direct shear test under automatic control for soils and geosynthetics (geomembrane, geotextile, GCL, geogrid, etc.), as well as for determining the interface frictional properties of soil and geosynthetics, and internal friction of GCLs.

The system consists of a computer controlled unit that utilizes a micro stepper motor to apply the horizontal loads. Versions of the unit are available to test loads up to 44.5 kN (10,000 lbs.). Built-in electronics control test and display data in real time. The system is capable of applying a constant rate of strain or stress at any displacement rate up to 15 mm (0.6 in.) per minute. The computer controlled program runs under latest Windows® software. It includes the capability to display the current status of latest and graphically portray the progress of the test in real time. The system also includes the capability for the operator to alter the test process and conditions at any stage during the test.

This is a turnkey system that includes hardware and software for recording all test input data and settings of selected test parameters, performing standard engineering calculations on the data, and producing graphically plotted and printed output in the standard Corps format, in accordance with ASTM D5321, D6243 and BS 1377 standards.
Interface Shear
ShearTrac III

### Technical Specifications

<table>
<thead>
<tr>
<th>Capacity</th>
<th>44.5 kN (10,000 lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Motor</td>
<td>Stepper motor with built-in controls for vertical load</td>
</tr>
<tr>
<td>Horizontal Motor</td>
<td>Stepper motor with built-in controls for horizontal load</td>
</tr>
<tr>
<td>Speed Range</td>
<td>0.00003 to 7 mm per min. (0.000001 to 0.3 in. per min.)</td>
</tr>
<tr>
<td>Horizontal Travel</td>
<td>90 mm (3.5 in.) resolved to 0.002 mm (0.00008 in.)</td>
</tr>
<tr>
<td>Vertical Travel</td>
<td>90 mm (3.5 in.) resolved to 0.002 mm (0.00008 in.)</td>
</tr>
<tr>
<td>Power</td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
</tbody>
</table>

### Model

| Model   | ST-10000 44.5 kN (10,000 lbs.) frame capacity in both directions |

### Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geo-NET™-PC</td>
<td>Network card and cable to link ShearTrac III to PC</td>
</tr>
<tr>
<td>SHEAR</td>
<td>Software package to automatically run consolidation and direct shear test on ShearTrac III</td>
</tr>
<tr>
<td>SHEAR.REPORT</td>
<td>Editing / reporting software package</td>
</tr>
<tr>
<td>GRIPPING PLATES</td>
<td>Optional for GCL testing</td>
</tr>
</tbody>
</table>

### Typical Test Output

![Typical Test Output Image]

### User-friendly Interface

![User-friendly Interface Image]
Testing Capabilities

- 1-D incremental consolidation up to 32 steps and load capacity of the load cell (4.4 kN)
- Constant volume swell where load is increased to maintain sample height for swell potential soil samples
- Shear by displacement or load control
- Fully automated residual shear up to 32 independent steps where each step can be controlled with any displacement or load
- Direct simple shear up to 32 independent steps with addition of DSS module (hardware and software)

Technical Specifications

- Fully automated
- Stand alone capability for manual control and data acquisition
- Up to 4.4 kN (1,000 lbs.) load capacity
- Two (2) built-in displacement transducers with 0.0013 mm (0.00005 in.) resolution
- Built-in electronic controls for automatic display of data and control of test; accurate displacement rate control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)
- Geo-NET™ compatibility for network accessibility and control
Benefits and Features

- Choose load capacity to fit user needs up to 4.4 kN (1,000 lbs.)
- Total automation, control, data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Geo-NET compatibility lets unit be accessed and controlled over a computer network
- Generate columns of data for easy reduction using your own spreadsheet software
- Accurate displacement rate control from 0.00003 to 15 mm per minute (0.000001 to 0.6 inches per minute)
- Select number of data points logged per cycle form 10 to 500 readings per second
- Manual control capability through front keypad and LCD menus
- Versatile system

Applicable Test Standards

- ASTM D6528 Consolidated Undrained Direct Simple Shear Testing of Cohesive Soils
- ASTM D2435 / T216 One-Dimensional Consolidation Properties of Soils

The ShearTrac II-DSS system is a universal shear system capable of performing the consolidation, static and cyclic direct simple shear phases under full automatic control. This system is of the type developed at NGI in the mid-1960’s. The DSS test generates a fairly homogeneous state of shear stress throughout the specimen, which provides initial stress condition, stress path, and deformation configuration that models numerous field loading conditions more closely than any other strength tests such as triaxial. The system consists of a computer-controlled unit that utilizes micro-stepper motors to apply the vertical and horizontal loads to the soil specimen.

The system is capable of running a consolidation phase for up to 32 increments automatically. Stress controlled cyclic can be applied up to a frequency of 1 Hz that can be followed by simple shearing at a specified rate of deformation or force. The constant volume condition is maintained through a closed loop computer control with the vertical displacement sensor as the feed back. The system is capable of displaying the current status of a test and graphically portraying the progress of the test in real time. The system includes the capability for the operator to alter the test process and conditions at any stage of the test.

The system comes complete with hardware and software for recording all test input data and settings of selected test parameters, performing standard engineering calculations on the data, and producing graphically plotted and printed output.
Cyclic Simple Shear
ShearTrac II-DSS

**Technical Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>Up to 11 kN (2,500 lbs.) vertical and horizontal</td>
</tr>
<tr>
<td>Vertical Force</td>
<td>Stepper motor with built-in controls for vertical load and displacement</td>
</tr>
<tr>
<td>Horizontal Force</td>
<td>Stepper motor with built-in controls for horizontal load and displacement</td>
</tr>
<tr>
<td>Speed Range</td>
<td>0.00003 to 15 mm per min (0.000001 to 0.6 in./per min)</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>Up to 1 Hz</td>
</tr>
<tr>
<td>Horizontal Travel</td>
<td>±12.5 mm (=0.50 in.) resolved to 0.0013 mm (0.00005 in.)</td>
</tr>
<tr>
<td>Vertical Travel</td>
<td>25.45 mm (1.0 in.) resolved to 0.0013 mm (0.00005 in.)</td>
</tr>
<tr>
<td>Power</td>
<td>Single Phase 208 VAC/60Hz (US) / 220 VAC/50 Hz (international)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>228 x 560 x 762 mm (9 x 22 x 30 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>63 kg (140 lbs.)</td>
</tr>
</tbody>
</table>

**Soft Soil Dimensions**

| Diameter            | 2.5 in. (63.5 mm) up to 4.0 in. (101.5 mm)                                 |

**Accessories**

Geo-NET-PC Network / Communication card to link ShearTrac II-DSS to PC.
Teflon-coated stacked rings, and stainless steel trimming ring.

**Software Module**

Cyclic DSS software package to automatically run and edit cyclic and static direct simple shear test.

**Options**

Direct / Residual Shear, Incremental Consolidation, and CRC options available upon request.
Benefits and Features

• Choose load capacity to fit user needs up to 45 kN (10,000 lbs.)

• Total automation, control, data collection and reporting of test results

• Prepare tables and plots of report quality within minutes of completing a test

• Geo-NET compatibility lets unit be accessed and controlled over a computer network

• Generate columns of data for easy reduction using your own spreadsheet software

• Accurate displacement rate control from 0.00003 to 15 mm per minute (0.000001 to 0.6 inches per minute)

• Select number of data points logged per cycle form 10 to 500 readings per second

• Manual control capability through front keypad and LCD menus

• Versatile system

Applicable Test Standards

• ASTM D6528 Consolidated Undrained Direct Simple Shear Testing of Cohesive Soils

• ASTM D2435 / T216 One-Dimensional Consolidation Properties of Soils

The Cyclic ShearTrac III-DSS system is a universal shear system capable of performing the consolidation, static and cyclic direct simple shear phases under full automatic control. This system is of the type developed at NGI in the mid 1960’s. The DSS test generates a fairly homogeneous state of shear stress throughout the specimen, which provides initial stress condition, stress path, and deformation configuration that models numerous field loading conditions more closely than any other strength tests such as triaxial. The system consists of a computer-controlled unit that utilizes micro-stepper motors to apply the vertical and horizontal loads to the soil specimen.

The system is capable of running a consolidation phase for up to 32 increments automatically. Stress controlled cyclic can be applied up to a frequency of 1 Hz that can be followed by simple shearing at a specified rate of deformation or force. The constant volume condition is maintained through a closed loop computer control with the vertical displacement sensor as the feedback. The system is capable of displaying the current status of a test and graphically portraying the progress of the test in real time. The system includes the capability for the operator to alter the test process and conditions at any stage of the test.

The system comes complete with hardware and software for recording all test input data and settings of selected test parameters, performing standard engineering calculations on the data, and producing graphically plotted and printed output.
## Technical Specifications

<table>
<thead>
<tr>
<th></th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td>45 kN (10,000 lbs.)</td>
</tr>
<tr>
<td><strong>Vertical Motor</strong></td>
<td>Stepper motor with built-in controls for vertical load</td>
</tr>
<tr>
<td><strong>Horizontal Motor</strong></td>
<td>Stepper motor with built-in controls for horizontal load</td>
</tr>
<tr>
<td><strong>Speed Range</strong></td>
<td>0.00003 to 7.5 mm per min. (0.00001 to 0.3 in per min.)</td>
</tr>
<tr>
<td><strong>Horizontal Travel</strong></td>
<td>90 mm (3.5 in.) resolved to 0.002 mm (0.00008 in.)</td>
</tr>
<tr>
<td><strong>Vertical Travel</strong></td>
<td>90 mm (3.5 in.) resolved to 0.002 mm (0.00008 in.)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
</tbody>
</table>

## Models

- **Cyclic DSS-10000**: 45 kN (10,000 lbs.) frame capacity in both directions

## Accessories

- **Geo-NET™-PC**: Network card and cable to link ShearTrac III to PC
- **SHEAR**: Software package to automatically run consolidation and direct shear test on Cyclic ShearTrac III-DSS
- **SHEAR.REPORT**: Editing / reporting software package
- **GRIPPING PLATES**: Optional for GCL testing

## Typical Test Output

![Typical Test Output Diagram]

## User-friendly Interface

![User-friendly Interface Diagram]
Automated Permeability Systems
Benefits and Features

- Choose load capacity to fit user needs from 45 and 90 kN (10,000 and 20,000 lbs.) models
- Total automation, control, data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Geo-NET compatibility lets unit be accessed and controlled over a computer network
- Generate columns of data for easy reduction using your own spreadsheet software
- Choose volume capacity to fit user needs from 250 and 750 cc models
- Accurate displacement rate control from 0.00003 to 15 mm per minute (0.000001 to 0.6 inches per minute)
- Accurate pressure and volume measurements with integrated sensors
- Stand alone through front keypad and LCD menu

Applicable Test Standards

- ASTM D5084 Flexible Wall Permeability
- ASTM D2434 Rigid Wall Permeability

The LoadTrac II / FlowTrac II flow pump provides a unique and versatile way to run flexible wall permeability tests on a wide variety of materials quickly and accurately. By adjusting the gradient or the flow rate across the sample, the system can measure permeabilities of cohesive soils varying from $10^{-4}$ to $10^{-9}$ cm/sec. With the appropriate test cells, this one system can determine the permeability of some silty clays within minutes.

The FlowTrac II base unit includes a stepper motor, lead screw, pressure chamber and piston, pressure transducer, electronic controls and network communications. Versions of the unit are available with flow volumes of 250 and 750 cc. Flow rates can be set to any value between 0.000006 and 3.0 cc/sec. Flexible wall tests are run in a fully automated mode with three flow pumps and one LoadTrac II; the FlowTrac II’s controls cell pressure and flow of cell, bottom sample and top sample. This configuration allows great versatility to run fully automated permeability tests with isotropic, anisotropic or $K_o$ consolidation.

With the network communications module and the appropriate software, the entire test can be automatically controlled, data captured and displayed in real time, and test reports prepared on a PC. With GeoNet-LAN option, the test can be monitored and data reported from any PC located on a LAN to which the LoadTrac II / FlowTrac II system is connected.

Control and editing software runs in Windows®.
Technical Specifications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor</strong></td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td><strong>Travel</strong></td>
<td>Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution</td>
</tr>
<tr>
<td><strong>Displacement</strong></td>
<td>Control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td><strong>Flow Range</strong></td>
<td>0.000006 to 3 cc per second</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
</tbody>
</table>

Dimensions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LoadTrac II</strong></td>
<td>464 x 546 x 1206 mm (18 x 21.5 x 47.5 inches)</td>
</tr>
<tr>
<td><strong>FlowTrac II</strong></td>
<td>203 x 406 x 470 mm (8 x 16 x 18.5 inches)</td>
</tr>
</tbody>
</table>

Weight

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LoadTrac II</strong></td>
<td>55 kg (120 lbs.)</td>
</tr>
<tr>
<td><strong>FlowTrac II</strong></td>
<td>14 kg (30 lbs.)</td>
</tr>
</tbody>
</table>

Models

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FlowTrac II Models</strong></td>
<td></td>
</tr>
<tr>
<td>FTII-250-nn</td>
<td>250 cc capacity</td>
</tr>
<tr>
<td>FTII-750-nn</td>
<td>750 cc capacity</td>
</tr>
<tr>
<td><strong>nn</strong></td>
<td>Maximum pressure range for system: 1400 and 3500 kPa (200 and 500 psi) available (resolution of pressure will be 0.00005 times the range)</td>
</tr>
<tr>
<td><strong>LoadTrac II Models</strong></td>
<td></td>
</tr>
<tr>
<td>LTII-10,000</td>
<td>45 kN (10,000 lbs.)</td>
</tr>
<tr>
<td>LTII-20,000</td>
<td>90 kN (20,000 lbs.)</td>
</tr>
</tbody>
</table>

Accessories

- Triaxial / permeability cells up to 150 mm (6 in.) diameter, membranes, porous stones and sample preparation accessories upon request
- Geo-NET PC network card and cable to link LoadTrac II/FlowTrac II to PC

User-friendly Interface

Typical Test Output
Benefits and Features

- Total automation, control, data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Geo-NET compatibility lets unit be accessed and controlled over a computer network
- Generate columns of data for easy reduction using your own spreadsheet software
- Choose volume capacity to fit user needs from 250 and 750 cc models
- Accurate pressure and volume measurements with integrated sensors
- Stand alone through front keypad and LCD menu capability

Applicable Test Standards

- ASTM D5084 Flexible Wall Permeability

The FlowTrac II flow pump provides a unique and versatile way to run flexible wall permeability tests on a wide variety of materials quickly and accurately. By adjusting the gradient or the flow rate across the sample, the system can measure permeabilities of cohesive soils varying from $10^{-4}$ to $10^{-8}$ cm/sec. With the appropriate test cells, this one system can determine the permeability of some silty clays within minutes.

The FlowTrac II base unit includes a stepper motor, lead screw, pressure chamber and piston, pressure transducer, electronic controls and network communications. Versions of the unit are available with flow volumes of 250 and 750 cc. Flow rates can be set to any value between 0.000006 and 3.0 cc/sec. Flexible wall tests are run with two flow pumps; first one controls cell pressure and flow, and second one sample pressure and flow. This system requires an external source of compressed air to be used during the flow phase of the permeability test to replace the FlowTrac II controlling the cell pressure which is switched to controlling top sample pressure and flow to establish a constant gradient or a constant flow across the soil sample.

With the network communications module and the appropriate software, the entire test can be automatically controlled, data captured and displayed in real time, and test reports prepared on a PC. With GeoNet-LAN option, the test can be monitored and data reported from any PC located on a LAN to which the FlowTrac II system is connected.
### Technical Specifications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td>Flow Range</td>
<td>0.000006 to 3 cc per second</td>
</tr>
<tr>
<td>Power</td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
<tr>
<td>Dimensions</td>
<td>203 x 406 x 470 mm  (8 x 16 x 18.5 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>14 kg (30 lbs.)</td>
</tr>
</tbody>
</table>

### Models

- FTII-250-nn  250 cc capacity
- FTII-750-nn  750 cc capacity

nn  Maximum pressure range for system:  1400, 2100 and 3500 kPa  (200, 300, and 500 psi) available  (resolution of pressure will be 0.00005 times the range)

### Accessories

- Triaxial cells, membranes, porous stones and sample preparation and set-up accessories upon request.
- Geo-NET PC network card and cable to link LoadTrac II/FlowTrac II to PC.
Components & Accessories

Loadtrac II - Loadframe
Loadtrac III - Loadframe
Flowatrac II – Pressure Volume Control
Unconfined Accessories for Loadtrac II & III
California Bearing Ratio
Geolog Acquisition System
Consolidation Cells
Triaxial Cell 3400
Triaxial Cell 3500
Triaxial Cell 3600
Pressure Panel
Testing Capabilities

- Unconfined compression (UC)
- California bearing ratio
- Incremental consolidation and swell
- Resilient modulus

Testing Capabilities with the addition of one (1) FlowTrac II

- Controlled strain loading consolidation (CSL)

Testing Capabilities with the addition of two (2) FlowTrac II

- Triaxial and stress path
- Cyclic triaxial with addition of an electromechanical actuator

Testing Capabilities with the addition of three (3) FlowTrac II

- Fully automated permeability

Technical Specifications

- Stand alone capability for manual control and data acquisition
- Choose capacity from 45 and 90 kN (10,000 and 20,000 lbs.) models
- Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution
- Built-in electronic controls for automatic display of data and control of test; accurate displacement rate control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)
- Geo-NET™ compatibility for network accessibility and control
Testing Capabilities

- Incremental consolidation and swell with pore pressure measurements capability.
- Unconfined compression (UC) on samples up to 70 mm (2.80 in.) in diameter

Testing Capabilities with the addition of FlowTrac II

- Controlled strain loading consolidation
- Triaxial and stress path tests on 35 mm (1.40 in.) diameter samples.

Technical Specifications

- Fully automated
- Force and displacement control
- Up to 11 kN (2,500 lbs.) load capacity
- Displacement transducer with 50 mm (2 in.) range and 0.0025 mm (0.0001 in.) resolution
- Built-in electronic controls for automatic display of data and control of test
- Geo-NET™ compatibility for network accessibility and control
- Stand alone capability for manual control and data acquisition
Testing Capabilities

- Fully Automated Permeability
- Semi-Automated Permeability
- Rowe Cell Hydraulic Consolidation

Testing Capabilities with the addition of LoadTrac II

- Triaxial and Stress Path
- Fully Automated Permeability
- Cyclic Triaxial with Elecromechanical Actuator

---

Technical Specifications

- Full automation for control of volume and pressure
- Stand alone or computer control unit
- Pressure capacity of 1400 kPa (200 psi) standard
- Up to 3500 kPa (500 psi) per request
- Pressure resolution of 0.00005 times the max. range
- Pump capacity 250 cc standard, 750 cc upon request
- Flow range from 0.000006 to 3 cc per second
- Volume accuracy of 1 mm³
- Limit micro-switches to prevent pump piston over travel
- Embedded controller
- Integrated signal conditioning, data acquisition
- Built-in solenoid valves for true full automation
- Arcnet network and communication with PC and other units
- Remote network access, monitoring, and control
- Does not require compressed air
Unconfined Compression
Mini LoadTrac III

Benefits and Features

• 11 kN (2,500 lbs.) load capacity and 50 mm (2.0 in.) travel
• Total automation of data collection and reporting of test results
• Prepare tables and plots of report quality within minutes of completing a test
• Generate columns of data for easy reduction using your own spreadsheet software
• Ability to access and control the unit over a computer network using Geo-Net option

Applicable Test Standards

• ASTM D2166 / AASHTO T208
  Unconfined Compression Testing of Soils
• ASTM D1663 Compressive Strength of Molded Soil-Cement Cylinders

The Mini LoadTrac III load frame provides compression/extension testing for a number of geotechnical tests that must have accurate control of the rate of displacement during loading. With accessories, the unit can perform unconfined compression, and triaxial shear phase testing.

The base unit includes a stepper motor, lead screw, vertical tension rods and crosshead, displacement transducer, electronic controls and network communications. Versions of the unit are available to test loads up to 11 kN (2,500 lbs.). Displacement rates can be set to any value between 0.00003 and 15 mm per minutes (0.000001 to 0.6 inches per minute).

The base unit can run in stand-alone mode without a computer. It includes built-in data acquisition and display capability. Sensor readings are displayed in S1 or English units and stored in memory.

Optional software running in Windows® completely automates the test, reducing the data and preparing test results.
### Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor</strong></td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td><strong>Travel</strong></td>
<td>External displacement transducer with 50 mm (2 in.) range and 0.0013 mm (0.00005 in.) resolution</td>
</tr>
<tr>
<td><strong>Displacement</strong></td>
<td>Control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>464 x 546 x 1206 mm (18 x 21.5 x 47.5 in.)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>55 kg (120 lbs.)</td>
</tr>
</tbody>
</table>

### Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC Report</td>
<td>Editing / reporting software for multiple tests</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7020</td>
<td>75 mm (3 in.) platen with load cell adaptor</td>
</tr>
<tr>
<td>Geo-NET™</td>
<td>Network / communication card and cable to link load frame to PC</td>
</tr>
<tr>
<td>UC</td>
<td>Software package to automatically run and report UC tests</td>
</tr>
</tbody>
</table>

### Typical Test Output

![Typical Test Output Image]

### User-friendly Interface

![User-friendly Interface Image]
Benefits and Features

- Choose capacity to fit user needs from 45 and 90 kN (10,000 and 20,000 lbs.) models
- Total automation of data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Generate columns of data for easy reduction using your own spreadsheet software
- Ability to access and control the unit over a computer network using Geo-Net option

Applicable Test Standards

- ASTM D2166 / AASHTO T208 Unconfined Compression Testing of Soils
- ASTM D1663 Compressive Strength of Molded Soil-Cement Cylinders

The LoadTrac II load frame provides compression / extension testing for a number of geotechnical tests that must have accurate control of the rate of displacement during loading. With accessories, the unit can perform unconfined compression, CBR, and triaxial shear phase testing.

The base unit includes a stepper motor, lead screw, vertical tension rods and crosshead, displacement transducer, electronic controls and network communications. Versions of the unit are available to test loads up to 90 kN (20,000 lbs.). Displacement rates can be set to any value between 0.00003 and 15 mm per minutes (0.000001 to 0.6 inches per minute).

The base unit can run in stand-alone mode without a computer. It includes built-in data acquisition and display capability. Sensor readings are displayed in SI or English units and stored in memory.
Technical Specifications

<table>
<thead>
<tr>
<th><strong>Motor</strong></th>
<th>Stepper motor with built-in controls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel</strong></td>
<td>Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution</td>
</tr>
<tr>
<td><strong>Displacement</strong></td>
<td>Control from 0.00003 to 15 mm per minute (0.00001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>464 x 546 x 1206 mm (18 x 21.5 x 47.5 in.)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>55 kg (120 lbs.)</td>
</tr>
</tbody>
</table>

Models & Capacities

- LTII-10,000: 45 kN (10,000 lbs.)
- LTII-20,000: 90 kN (20,000 lbs.)

Accessories

- 7020: 75 mm (3.0 in.) platen with load cell adaptor
- Geo-NET™: Network / communication card and cable to link load frame to PC
- UC: Software package to automatically run and report UC tests

Options

- UC Report: Editing / reporting software for multiple tests
Benefits and Features

- Choose capacity to fit user needs from 45 and 90 kN (10,000 and 20,000 lbs.) models
- Total automation of data collection and reporting of test results
- Prepare tables and plots of report quality within minutes of completing a test
- Generate columns of data for easy reduction using your own spreadsheet software
- Ability to access and control the unit over a computer network using Geo-Net option

Applicable Test Standards

- ASTM D1883
- AASHTO T193 Standard Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils

The LoadTrac II loadframe provides compression/extension testing for a number of geotechnical tests that must have accurate control of the rate of displacement during loading. With accessories, the unit can perform CBR, unconfined compression and triaxial shear phase testing.

The base unit includes a stepper motor, lead screw, vertical tension rods and crosshead, displacement transducer, electronic controls and network communications. Versions of the unit are available to test loads up to 90 kN (20,000 lbs.). Displacement rates can be set to any value between 0.00003 and 15 mm/min (0.000001 to 0.6 in./min). CBR displacement rate is set through software at 1.27 mm/min (0.05 in./min) in accordance with ASTM D1883.

The base unit can run in stand-alone mode without a computer. It includes built-in data acquisition and display capability. Sensor readings are displayed in SI or English units and stored in memory.

Optional software running in Windows® completely automates the test, reducing the data and preparing test results.
## Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>Stepper motor with built-in controls</td>
</tr>
<tr>
<td>Travel</td>
<td>Built-in displacement transducer with 76 mm (3 in.) range and 0.0013 mm (0.00005 in.) resolution</td>
</tr>
<tr>
<td>Displacement</td>
<td>Control from 0.00003 to 15 mm per minute (0.000001 to 0.6 in. per minute)</td>
</tr>
<tr>
<td>Power</td>
<td>110/220 V, 50/60 Hz, 1 phase</td>
</tr>
</tbody>
</table>

## Dimensions

| LoadTrac II     | 464 x 546 x 1206 mm (18 x 21.5 x 47.5 inches) |

## Weight

| LoadTrac II     | 55 kg (120 lbs.) |

## Accessories

<table>
<thead>
<tr>
<th>7010</th>
<th>CBR plunger with load cell adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geo-NET™</td>
<td>Network / communication card and cable to link load frame to PC</td>
</tr>
<tr>
<td>CBR</td>
<td>Software package to automatically run and report CBR tests</td>
</tr>
<tr>
<td>OPTIONS</td>
<td>UC, consolidation, and triaxial testing modules</td>
</tr>
</tbody>
</table>

## Typical Test Output

![Typical Test Output](image1)

## User-friendly Interface

![User-friendly Interface](image2)
Benefits and Features

- Runs in a Windows® environment
- 16-bit analog to digital resolution
- Number of channels now expandable to 256
- Tests can be accessed and controlled over a computer network
- Monitors multiple tests and test types simultaneously with one computer

GEOLOG6 is based on the successful GEOLOG3, 4, and 5 systems introduced in 1984, 1988, and 1992 respectively. The software has been reworked to improve speed and performance of the system and to provide many features that GEOLOG customers have suggested over the years.

GEOLOG6 is shipped pre-assembled and ready to use. We wire and calibrate sensors and run actual tests on all systems prior to shipping. When the system arrives, a few simple connections and mounting of sensors is all that is required.

GEOLOG6 is so easy to use that a technician with a few basic computer skills can learn to use the system in a short amount of time. Clear documentation and pull down HELP menus are provided to guide new users through the different test screens.

GEOLOG6 is a low maintenance system that uses commercially available components. If there is a component failure, replacements can normally be provided from local sources to get you up and running again in a minimum amount of time.

Geocomp fully supports the system from our own in-house resources. General questions on the use of the system or specific questions on performing individual tests are answered promptly by our engineering staff.
**Standard Features**

- Windows® software
- Up to 256 channels in increments of 4 channels of 16 bit analog-to-digital conversion
- GEOLOG6 data acquisition software for data collection, data file manipulation, test and project information management.
- Software for input and output in U.S. Customary, SI and mixed units
- Built-in menus for sensors calibration
- Count down test start function for consolidation tests
- Detailed users manual and HELP screens throughout software
- Sensor power supply adjustable up to 15 VDC channel
- Software selectable gains in multiple of 2

**Typical Test Output**

**Setup Diagram**

**User-friendly Interface**
# Consolidation Cells

**Model 1220**

**Fixed Ring Consolidometer**

- 63.5 mm (2.5 in.) diameter standard and up to 101 mm (4.0 in.) per request

- Stainless steel construction with sel-trimming sample ring, includes stainless steel loading pad, load bearing ball, and two (02) porous stones

<table>
<thead>
<tr>
<th>Pressure Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>All stainless pressure sensor with vent and bleed port</td>
</tr>
</tbody>
</table>

| Standard pressure range is 1400 kPa (200 psi) other ranges up to 3500 kPa (500 psi) per request |

![Fixed Ring Consolidometer Image]

---

**Model 1230**

**Back Pressure Consolidometer**

- Designed so that pore pressure and permeability measurements can be taken during consolidation testing.

- Includes stainless steel top cap with piston passing through linear bearings and connecting to top pad.

| Take-off ports allow for application of confining pressure, up to 1400 kPa (200 psi), and bottom port for pressure/flow rate monitoring. |

![Back Pressure Consolidometer Image]

**NOTE:** This type of consolidometer requires the use of a pressure application/monitoring system like the Geocomp FlowTrac-II system and an external pore pressure transducer that can be supplied by Geocomp.

---

**Model 1214**

**Calibration Disc**

- Stainless steel calibration disc for 62.48 mm (2.460 in.) diameter, 25.4 mm (1 in.) high per ASTM D2435.

| Used for determining the load frame deformation at various loads. |

![Calibration Disc Image]
The Model 3400 is designed for triaxial and stress path testing of samples up to 76 mm (3 in.) diameter. It can also be used for flexwall permeability testing of samples up to 101 mm (4 in.) diameter. The chamber is acrylic with a circular base, which provides a solid support for applying heavy load and also prevents tipping. All aluminum parts are anodized.

Standard available sizes are 35 mm (1.4 in.), 50 mm (2 in.), and 71 mm (2.8 in.) diameter; other sizes are available upon request. Each cap has two drain ports and a groove for sealing the membrane. Standard top caps are made of acrylic; black anodized aluminum top caps are available upon request. The top cap features quick connect fittings. The pedestal has flow through lines and is keyed to prevent turning during installation.

Standard valves and fittings are brass. Stainless steel valves and fittings, as well as Teflon tubing, are also available on Model 3400SS. High quality Whitey ball valves and Swagelok fittings are used throughout.

A stainless steel ground and polished piston is sealed with an internally lubed u-cup noted for its extremely low breakaway friction. A piston lock is also provided. Stainless steel linear ball bearings guide the piston with minimal friction.

<table>
<thead>
<tr>
<th>Dimensions and Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (with piston extended)</td>
</tr>
<tr>
<td>Width</td>
</tr>
<tr>
<td>Pressure capacity</td>
</tr>
<tr>
<td>Weight</td>
</tr>
</tbody>
</table>
The Model 3500 is designed for triaxial and stress path testing of samples up to 100 mm (4 in.) diameter. Double drainage lines for both top and bottom allowing more flexibility and versatility.

It can also be used for flexwall permeability testing. The chamber is acrylic with a circular base, which provides a solid support for applying heavy load and also prevents tipping. All aluminum parts are anodized.

Standard available sizes are 71 mm (2.8 in.) and 101 mm (4 in.) diameter; other sizes in between these two diameters are available upon request. Each cap has two drain ports and a groove for sealing the membrane. Standard top caps are made of acrylic; black anodized aluminum top caps are available upon request. The top cap features quick connect fittings. The pedestal has flow through lines and is keyed to prevent turning during installation.

Standard valves and fittings are brass. Stainless steel valves and fittings, as well as Teflon tubing, are also available on Model 3500SS. High quality Whitey ball valves and Swagelok fittings are used throughout.

A stainless steel ground and polished piston with 19 mm (0.75 in.) diameter is sealed with an internally lubed u-cup noted for its extremely low breakaway friction. A piston lock is also provided. Stainless steel linear ball bearings guide the piston with minimal friction.

Accessories for extension tests are available upon request. They consist of a split coupling, triaxial piston with threaded hole and stud with matching metal top cap.

Pressure Capacity: 1400 kPa standard up to 3500 kPa (500 psi) with reinforcement

<table>
<thead>
<tr>
<th>Dimensions and Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (with piston extended)</td>
</tr>
<tr>
<td>Width</td>
</tr>
<tr>
<td>Pressure capacity</td>
</tr>
<tr>
<td>Weight</td>
</tr>
</tbody>
</table>
The Model 3600 is designed for triaxial, stress path, and resilient modulus testing of samples up to 150 mm (6 in.) diameter. It can also be used for flexwall permeability testing of samples. The chamber is acrylic with a circular base, which provides a solid support for applying heavy load and also prevents tipping. The outside diameter is 267 mm (10.5 in.) and the inside diameter is 241 mm (9.5 in.). All aluminum parts are anodized.

Standard available sizes are 100 mm (4 in.), and 150 mm (6 in.) diameter; other sizes are available upon request. Each cap has two drain ports and a groove for sealing the membrane. Standard top caps are made of black anodized aluminum. The top cap features quick connect fittings. The pedestal has flow through lines and is keyed to prevent turning during installation.

Standard valves and fittings are brass. Stainless steel valves and fittings, as well as Teflon tubing, are also available on Model 3600SS. High quality Whitey ball valves and Swagelok fittings are used throughout.

A stainless steel ground and polished piston is sealed with an internally lubed u-cup noted for its extremely low breakaway friction. A piston lock is also provided. Stainless steel linear ball bearings guide the piston with minimal friction.

There are three (3)¼ in. NPT ports on the top to allow for internal instrumentation when used with liquid tight feed-through fittings.

<table>
<thead>
<tr>
<th>Dimensions and Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (with piston extended)</td>
</tr>
<tr>
<td>Width</td>
</tr>
<tr>
<td>Depth</td>
</tr>
<tr>
<td>Pressure capacity</td>
</tr>
<tr>
<td>Weight</td>
</tr>
</tbody>
</table>
Model 3230 LOGIC PANEL combines precise control, logical layout and quality components for use in triaxial, consolidation and flexwall permeability testing of soils. It is designed to function either by itself as a master panel or as an add on to existing panels.

One panel can be set up and used as the master panel and fitted with the optional digital readout for setting pressures. Additional panels can then utilize the readout from the master panel. The cabinet is built to survive laboratory environments and is constructed of aluminum with a hard coat paint and durable screen lettering.

All controls are laid out in a logical order. The upper half of the panel contains controls for air pressures while the lower half contains the water controls. Precision regulators set and control pressures. Whitey ball valves are used for positive shut-off. Two (2) 50 cc burettes, graduated by .1 cc., for flow measurement and two (2) 4 cc pipets, graduated to .008 cc., are also included. These are located inside two storage chambers which have an additional 400 cc capacity each.

Cell water interface utilizes a 20 cc burette. The operator is able to fill and drain the panel and cell conveniently from the front panel. A bias control feature allows the user to set the effective cell pressure and also increase both the cell and sample back pressure using only one regulator. This is useful when saturating the specimen and causes no change in effective stress. It also minimizes air consumption during saturation as only two of the three regulators are utilized at this time.

Easy access air, water, vacuum and drain connectors are located on the rear of the panel. All connections and tubing for the cell are conveniently located on the front of the panel.

<table>
<thead>
<tr>
<th>Model Description</th>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>3230M Master panel with pressure readout</td>
<td>3300 Flexwall chamber 100 mm (4 in.) dia. sample capacity</td>
</tr>
<tr>
<td>3230A Basic panel with connection for master panel readout</td>
<td>3400 Triaxial chamber 76 mm (3 in.) dia. sample capacity</td>
</tr>
<tr>
<td>32306 Master filter/regulator</td>
<td>3872 Deairing tank 5.67 liters (1.5) gal. capacity</td>
</tr>
<tr>
<td>32307 Built-in venturi type vacuum pump</td>
<td>6630 Pore pressure transducer and readout with moveable cabinet</td>
</tr>
<tr>
<td>32308 Pore pressure readout and transducer mounted in panel</td>
<td></td>
</tr>
</tbody>
</table>
Field Measurements

*iSite Wireless Data Loggers*

*iSite Highspeed Data Loggers*

*iNoise for Noise Monitoring*

Dynamic Concrete Strain Gages

Dynamic Asphalt Strain Gages

Soil Compression Gages
Remote Data Acquisition System Specifications

The iSite™ system is designed for monitoring applications where the user needs access to data from remote instrumentation quickly and inexpensively. The system consists of standalone data loggers which take and store readings at programmed intervals. Each unit is networked wirelessly through our unique iSite™ Remote Area Network (RAN). Any unit can be reached from any location within the network. The RAN can be accessed from any unit via a RS232 connection, or externally via an IP modem. The RAN uses miniature, low power radio transceivers placed in each unit to provide a wide area communications network among all units.

The built-in radios broadcast at 10mW of power and require no FCC license for operation. They can reach up to 200 m in line-of-site applications. Each cell radio acts as a repeater within the remote radio network.

The RAN is accessed by the user in several ways. Any device that supports RS232 communications can be connected to any unit to access the RAN. Software is available for WINDOWS based systems. Alternatively, the RAN can be accessed externally via modem and a land line or a cell-modem option. External access is done via dial up or the iSite Central™ Web server service. Data are available immediately from iSite Central™ through any Web browser.

With the iSite™ Alarm option, the iSite Central™ Web server will monitor each sensor to detect any reading which exceeds a programmed threshold value. This event triggers the Web server to send a preprogrammed message to an email address, pager or cell phone to indicate which instrument triggered an alarm and the data for that instrument.

The iSite™ system is compatible with any sensor with DC voltage output of up to 4 volts, strain gages, or any vibrating wire type sensor. Each unit can excite and read up to 4, 8 or 16 sensors, depending on the model. The unit provides sensor excitation that is user adjustable between 5.5 and 10 Vdc for each channel. An option provides built-in lightning and surge protection on each sensor. All components, including options, are preassembled inside a weather resistant NEMA 4 metal enclosure.

Installation is simple and quick. Program the unit for communications. Adjust the excitation level to that required by a particular sensor and connect the sensor. Install the unit. Set the reading interval. Start the logger.

Each unit can store up to 512 kbytes of data in nonvolatile memory. Each unit runs for up to 14 days on the standard rechargeable battery. Options are available to power the unit with an external battery, AC power, or a solar cell.

The iSite™ system removes the need for wires connecting sensors to a central data logging unit. This greatly lowers the materials and installation costs for most field monitoring applications. iSite™ is useful in most field monitoring applications that use DC or vibrating wire based sensors. Some of these include monitoring weather, groundwater, ground movements, temperature, industrial flow and pressure, tilt, and structural strains.

Versions are available to monitor sensors at frequencies up to 1000 Hz, noise and vibrations.
**Remote Data Acquisition System Specifications**

### Inputs

**Number of Channels:** 8 differential, individually configured

**Analog Inputs**

**Accuracy:** ± 0.002% of FSR (−40E to 85EC)

<table>
<thead>
<tr>
<th>Input Range (mV)</th>
<th>Resolution (μV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 2500</td>
<td>0.15</td>
</tr>
<tr>
<td>± 1250</td>
<td>0.075</td>
</tr>
<tr>
<td>± 625</td>
<td>0.037</td>
</tr>
<tr>
<td>± 313</td>
<td>0.019</td>
</tr>
<tr>
<td>± 156</td>
<td>0.009</td>
</tr>
<tr>
<td>± 78</td>
<td>0.005</td>
</tr>
<tr>
<td>± 39</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**Sample Rates for Resolution:** 3,840 for 13 bits
7.5 for 23 bits

**Sample and Store:** 1 per 5 seconds

**Sampling Frequency:** User programmable for values of 1, 2, 4, 8, 16, 32 and 64

**Input Polarity:** User programmable unipolar or bipolar

**Input Noise GAIN=64):**
1.36 μV at 3,840 Hz sample rate
0.009 μV at 7.5 Hz sample rate

**Noise Free Resolution GAIN=64):**
13 bits at 3,840 Hz sample rate
20 bits at 7.5 Hz sample rate

**Noise Free Resolution (GAIN=1):**
13 bits at 3,840 Hz sample rate
23 bits at 7.5 Hz sample rate

**Common Mode Rejection:** 0-5 volts at gain of 1
0.7 to 3.3 volts for gain > 1

**DC Common Mode Rejection:** 120 dB

**Input Current:** 0.5 nA for gain>1

**Input Resistance:** 2.5 Gohms typical

**Sensor Excitation:** 5-9 Vdc adjustable for each channel; 100 mA maximum

### Frequency Inputs

**Sample Rate:** 16 kHz

**Maximum Frequency:** 8,000 Hz

**Minimum Frequency:** 400 Hz

**Frequency Resolution:** ± 2 Hz

**FFT Conversion:** 4,000 samples in 15 seconds with Dedicated Signal Processor

**Accuracy:** ±0.003% of reading

### CPU and Interface

**Processor:** WINBOND W77LE58

**Program Storage:** 32 kbytes

**Data Storage:** 512 kbytes FLASH with zero power backup with circular FIFO storage (4 Mbytes optional)

**Alarms:** User programmable high and low on each input channel

**Peripheral Interface:** RS232

**Baud Rate:** 19,200 baud ASCII protocol with one start bit, one stop bit, eight data bits, no parity.

**Clock Accuracy:** ±1 minute per month

**Temperature Sensor:** 0.5EC resolution, ±2EC accuracy

**Battery Backup:** CR2032 lithium battery for 220 with mAhr for up to 2 months reserve

**Main Internal Battery:** 3.6 Vdc 3600 mAhr NiMH rechargeable

**Typical Current Drain:** 15 mA idle, 45 mA during analog measurement, 75 mA during sensor excitation

**External Charging Power Source:** 9 to 16 Vdc

**Optional Chargers:**
- AC/DC adaptor - 100 mA at 9 volts max
- 12 volt battery with 60 mA adaptor
- Solar panel 6.7 x 13.7 inch 290 mA at 11.5 volts max

### Sensor Connectors

MIL-C-26482 12-10 size circular bayonet lock connector

### Enclosure

**Size:**
- 7.8 x 7.8 x 4.7 inches
- 195 x 195 x 120 mm
- 7.1 l (3.2 kgm)

**Lightening And Surge Protection (Optional):**
1st stage: tripolar plasma surge arrestors
2nd stage: SiDactor™ medium voltage surge arrestors
3rd stage: SiDactor™ low voltage surge arrestors

### Radio Transceiver (optional)

**Frequency:** 915 MHz ISM band 2 way
2.5 GHz Spread Spectrum

**Range:**
- 600 ft line of site

**Modulation:**
- OOK proprietary Manchester-Encoded protocol

**Interference:**
- Collision detection
- Automatic retry with error checking

**Antenna:**
- Tamper proof

### Remote Access Communications

Optional and requires local availability of appropriate public phone network

- CDMA cell module
- GSM tri-band world-wide cell module
- AMPS cell module
- Land line modem module
- Satellite modem

### Warranty

Three years against defects in materials and workmanship. Damage from abuse, misuse or direct lightening strike excluded.

Specifications subject to change without prior written notice. Visit www.iSiteCentral.com to configure unit to meet your exact requirements.

Customized units can be built to order in many but not all cases.

www.geocomp.com
Remote Instrumentation Monitoring System for Structural Health Monitoring

The iSite™ HS system is designed for high speed monitoring applications where the user needs access to data from remote instrumentation quickly and inexpensively. The system consists of standalone eight-channel dataloggers, which take and store readings at programmed intervals up to 1,000 readings per second per channel. Units are networked with Ethernet connections and can be connected directly to a computer for fast streaming of data. By connecting the units through a switch to a G3 cell modem, data can be streamed to a remote location at up to maximum speed of the modem. Alternately units may be connected to an onsite computer with WiFi modules attached to each data logger. Software operating on a networked workstation can receive data in a streaming mode and save to files. The only limit to the number of dataloggers placed into the network is communications bandwidth of the network to download the data. Any channel on any datalogger can be remotely configured using the included software.

The iSite™ HS system can be programmed to run multiple data logging sessions simultaneously. A common use of this option is to run one session to log readings of each sensor every hour over a long time period; then run a second session to take readings at a high sampling rate when a trigger is set. High speed data logging can be controlled by one reading on any sensor exceeding a preset threshold value, an external trigger that sets one of the digital inputs high, or a preset start time.

The datalogger is housed in a NEMA-4 plastic enclosure that provides protection against moisture. One version provides push pin connectors with through-box gland cable connectors to allow direct connection of sensor cables. The other version provides Amphenol bayonet connectors on the exterior of the enclosure for plug type connection of sensors to the data logger.

The iSite™ system is compatible with any sensor with DC voltage output of up to ±2.5 volts, including ¼-, ½-, and full-bridge strain gages. Each datalogger can excite and read up to eight sensors. The unit provides sensor excitation that is adjustable by software between 5 and 10 VDC for each channel. An option provides built-in, three-staged lightening and surge protection on each sensor. All components, including options, are preassembled inside the weather resistant NEMA 4 metal enclosure. Installation is simple and quick. Adjust the excitation level by software to that required by a particular sensor and connect the sensor. Install the unit. Set the reading interval and initiate data logging.

The iSite™ HS removes the need for wires connecting sensors to a central data logging unit. This greatly lowers the materials and installation costs for most field monitoring applications. The iSite™ HS is useful in many field monitoring applications that use DC based sensors and require high speed data logging. Some of these include monitoring structural loads and strains, effects of impact loads, effects of extreme weather events, vibrations and blast monitoring.
# Remote Data Acquisition System Specifications

## Inputs

<table>
<thead>
<tr>
<th>Number of Channels</th>
<th>8 differential, individually configured</th>
</tr>
</thead>
</table>

## Analog Inputs

| Accuracy | \( \pm 0.002\% \) of FSR \((-40^\circ C \text{ to } 85^\circ C)\) |

## Range and Resolution

<table>
<thead>
<tr>
<th>Software selected by channel</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Range</td>
<td>Resolution</td>
</tr>
<tr>
<td>(mV)</td>
<td>(μV)</td>
</tr>
<tr>
<td>( \geq 2500 )</td>
<td>0.15</td>
</tr>
<tr>
<td>( \leq 1250 )</td>
<td>0.075</td>
</tr>
<tr>
<td>( \leq 625 )</td>
<td>0.037</td>
</tr>
<tr>
<td>( \leq 313 )</td>
<td>0.019</td>
</tr>
<tr>
<td>( \leq 156 )</td>
<td>0.009</td>
</tr>
<tr>
<td>( \leq 78 )</td>
<td>0.005</td>
</tr>
<tr>
<td>( \leq 39 )</td>
<td>0.002</td>
</tr>
<tr>
<td>( \leq 20 )</td>
<td>0.001</td>
</tr>
</tbody>
</table>

## Sample Rates for Resolution

| 16 bits at 1,000 Hz |  |
| 18 bits at 150 Hz |  |

## Sampling Frequency

Programmable from 25 to 1,000 Hz in high speed mode. User programmable from 1 per day to 25 Hz in normal sampling mode.

## Input Polarity

User programmable unipolar or bipolar.

## Common Mode Rejection

1.2 to 4.05 volts.

## DC Common Mode Rejection

120 dB.

## Input Current

0.5 nA for gain >1.

## Input Resistance

2.5 Gohms typical.

## A/D Output Noise

| 3mV at 2 gain and 150 Hz sampling |  |
| 6mV at 2 gain and 1,000 Hz sampling |  |
| 0.2mV at 128 gain and 150 Hz sampling |  |
| 0.6mV at 128 gain and 1,000 Hz sampling |  |

## Noise Free Resolution

| 17 bits at 2 gain and 150 Hz sampling |  |
| 16 bits at 2 gain and 1,000 Hz sampling |  |
| 15 bits at 128 gain and 150 Hz sampling |  |
| 14 bits at 128 gain and 1,000 Hz sampling |  |

## Sensor Excitation

Programmable per channel 5-10 VDC, 100 mA maximum.

## Digital Input/Output

4 lines programmable for input or output.

## CPU and Interface

Processor: ARM 9.

## Program Storage

512 KB.

## Data Storage

4 MB FLASH with zero power backup with circular FIFO storage.

## Alarms

User programmable high and low on each input channel.

## Peripheral Interface

Ethernet using 100 Mbit TCP/IP protocol.

## Clock Accuracy

\( \leq 1 \) minute per month.

## Operating Temperature

-25\(^\circ\)C to +60\(^\circ\)C.

## Battery Backup

CR1225 lithium battery for clock; up to 2 months reserve.

## Typical Current Drain

70 mA @ 12 VDC.

## External Power Source

12 to 18 VDC or 9 to 12 VAC.

## Sensor Connectors

MIL-C-26482 12-10 size circular bayonet lock connector, or Molex push pin header.

## Enclosure

NEMA 4 plastic with lock cover.

## Lightening and Surge Protection

1st stage: tripolar plasma surge arrestors.

2nd stage: SiDactor™ medium voltage surge arrestors.

3rd stage: SiDactor™ low voltage surge arrestors.

## Remote Access

TCP/IP via wired ethernet.

Optional WiFi using IP access point.

Optional IP cell phone.

## Warranty

Three years against defects in materials and workmanship. Damage from abuse, misuse or direct lightning strike excluded.

Specifications subject to change without prior written notice.

Visit www.geocomp.com for most up-to-date information.

Customized units can be built to order in many but not all cases.
The iNoise 3400 noise monitoring system provides automated remote outdoor noise monitoring capabilities to not only determine when noise exceeds established limits but also provide a recording of the triggered event. Information about the event is transmitted via Internet or WiFi to provide near instant information anywhere it is needed. This capability allows one to determine the cause of the noise exceedance.

The unit contains an internal Digital Engine computer with Intel Atom N270 CPU, 2 GB of RAM and 40 GB solid state hard drive running with Ubuntu Linux operating system. Communications are via the built in WiFi network or through a 3G/4G wireless modem. Communications and control software are provided to program the unit and receive the recorded events. The noise meter measures from 30 to 140 dBA. Sound Pressure Level (SPL), Maximum SPL (L_{max}), Minimum SPL (L_{min}), Peak SPL (L_{pk}) and Integrated SPL (L_{eq}/L_{avg}) are recorded along with the complete sound event.

When integrated with Geocomp’s iSiteCentral™ system, email and SMS alert messages can be provided each time an exceedance occurs. All events are maintained in a data management system.

The iNoise 3400 is ideal for continuous monitoring of construction work, traffic, airport, concerts, recreational activities and other noisy activities. The device’s unique ability to record only events that exceed preset thresholds greatly simplifies the effort required to monitor compliance with noise standards.

### Specifications

| Power Supply | External Mains: 120 VAC  
<table>
<thead>
<tr>
<th></th>
<th>Main Internal Battery: Tripp Lite LCD1000 Online UPS 1000VA</th>
</tr>
</thead>
</table>
| Power Consumption | Average current in continuous mode: 1A @ 14VDC  
|                | Average current in standby mode: 0.8A @ 14VDC |
| Operating Environment | Temperature: -10º to +50ºC  
|                     | NEMA 4 moisture resistant enclosures |
| Peripheral Interfaces | WiFi 802.11G  
|                    | IP 3G/4G wireless modem |

---

**Standard Packages i3400-xx-yy-zz**

<table>
<thead>
<tr>
<th>XX - Sound Class Accuracy</th>
<th>1</th>
<th>Precision class / type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>General purpose class / type 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YY - Radio Option</th>
<th>NO</th>
<th>No radio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WF</td>
<td>802.11G WiFi connection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZZ - Modem Option</th>
<th>NO</th>
<th>No modem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3G/4G</td>
<td>3G/4G (NA only)</td>
</tr>
</tbody>
</table>

**Example Part Numbers**

- For noise logging with Type 1 accuracy via a wireless modem and local access by WiFi order i3400-1-WF-3G/4G.
Dynamic Concrete Strain Gages (CSG) - measure axial strain in rigid pavement under long-term static (slab curling) or high-frequency dynamic (pavement response to trafficking) conditions. These ruggedized sensors are built to withstand the harsh conditions of concrete placement and vibration.

Utilizing four active elements of a Wheatstone Bridge circuit, this gage is easily adaptable to most data acquisition systems. Each sensor is individually calibrated with overall lead wire length attached and is provided with QC documentation and Calibration plots.

**Specifications:**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Circuit</td>
<td>Four active 350-ohm strain gages</td>
</tr>
<tr>
<td>Range</td>
<td>±2000 microstrain</td>
</tr>
<tr>
<td>Sensitivity at 1000 ME</td>
<td>~ 1.3 mV&lt;sub&gt;out&lt;/sub&gt;/V&lt;sub&gt;exc&lt;/sub&gt;</td>
</tr>
<tr>
<td>Excitation</td>
<td>up to 10 Volts</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-34°C to 100°C</td>
</tr>
<tr>
<td>Lead Wire</td>
<td>24 AWG, twisted four-wire with shielding</td>
</tr>
</tbody>
</table>

For More Information Contact:
Tom Weinmann  
*Practice Area Leader - Structural Monitoring*  
139 Busch Parkway  
Buffalo Grove, IL 60089  
T 224.676.1371  
F 224.676.1375  
TWeinmann@geocomp.com  

www.geocomp.com
Dynamic Asphalt Strain Gages (ASG/VASG) - measure axial strain in flexible pavement under high frequency (dynamic) conditions. These low modulus, ruggedized sensors are built to withstand the high temperature and vibratory rolled compaction required for asphalt placement.

Utilizing four active elements of a Wheatstone Bridge circuit, this gage is easily adaptable to most data acquisition systems. Each sensor is individually calibrated with high temperature resistant lead wire attached and is provided with QC documentation and Calibration plots.

**Specifications:**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Circuit</td>
<td>Four active 350-ohm strain gages</td>
</tr>
<tr>
<td>Range Greater</td>
<td>±3000 microstrain</td>
</tr>
<tr>
<td>Sensitivity at 1000 µε</td>
<td>~ 1.3 mV/µε/V$_{exc}$</td>
</tr>
<tr>
<td>Excitation</td>
<td>up to 5 Volts</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-34°C to 200°C</td>
</tr>
<tr>
<td>Lead Wire</td>
<td>30 AWG, twisted four-wire with sheilding</td>
</tr>
</tbody>
</table>

For More Information Contact:

Tom Weinmann  
**Practice Area Leader - Structural Monitoring**  
139 Busch Parkway  
t 224.676.1371  
Buffalo Grove, IL 60089  
t 224.676.1375  
TWeinmann@geocomp.com
Soil Compression Gages (SCG) - measure horizontal or vertical displacements in soils or subgrade material. SCGs are ruggedized to withstand the harsh environment in soils and construction fill material during placement and compaction. They are moisture proof and can function to measure compaction or expansion of soils in various subsurface layers. Gages utilize displacement transducers over 1 to 6 inch travel ranges and can be used to measure dynamic response. Standard wiring configurations adapt to most data acquisition systems.

**Specifications:**

<table>
<thead>
<tr>
<th></th>
<th>Customer specified (up to 24 inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gage Length</strong></td>
<td>Customer specified (up to 6 inches)</td>
</tr>
<tr>
<td><strong>Measurement Range</strong></td>
<td>up to 10 Volts</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>Proportional to excitation over measurement range</td>
</tr>
<tr>
<td><strong>Wiring</strong></td>
<td>3 or 4 wire potentiometer</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>-30 to 140 deg F</td>
</tr>
</tbody>
</table>

For More Information Contact:
Tom Weinmann
**Practice Area Leader - Structural Monitoring**
139 Busch Parkway  t 224.676.1371
Buffalo Grove, IL 60089  f 224.676.1375
TWeinmann@geocomp.com
We design and manufacture automated laboratory testing systems and remote monitoring devices. We focus on creating products that help our clients accomplish their goals efficiently and quickly, whether it be in teaching, research, commercial, or other applications. We design our automated testing systems to help the user perform tests efficiently and quickly and produce high-quality results. Our remote monitoring systems are robust, versatile, and are easy to use in varying environmental settings. We serve numerous clients in over 50 countries. Join our many satisfied customers and make us your trusted source for remote monitoring equipment and automated laboratory testing systems.

Contact us to be added to our orders list.