Data Acquisition and Reporting Software

We offer data acquisition systems for the soil testing laboratory:

- WinSAS, a Windows®-based serial acquisition system used in conjunction with E-405 Smart Digital Indicators which are modified for serial port communication.
- A suite of reporting software to present the information in a way that conforms with the relevant ASTM standard.
- EZ-Daq 8-channel data acquisition system (see p.46).

WinSAS™ — Windows®-based collecting software

- Increased production. Sensor readings are automatically saved and available 24 / 7 if necessary.
- Data accuracy: Automated data collection eliminates operator errors.
- Ease of use: Having digital readouts at the work station makes it easy for the user to set up samples and visually monitor test progress.
- Flexibility to use the readouts without the PC if desired.
- Easy to retrofit on older load frames.

WinSAS™ is a Windows®-based serial acquisition software used in conjunction with E-405 Smart Digital Indicators which have been modified for serial port communication. The software is pre-configured for common laboratory tests such as shear strength, consolidation and penetration. However, the user can use the software to collect data from a wide range of tests limited only by the communication speed of the E-405 Smart Digital Indicators.

WinSAS™ gives the user the convenience of having digital indicators at the test stand with the ability of transferring the test data to a standard ASCII text file. Multiple E-405 Smart Digital Indicators may be linked together via a standard phone (RJ-45) cable to a multiple plug connector. An RS-485/RS-232 converter is connected to the user's computer via a standard DB-9 COMM port connection.

WinSAS™ software permits the user to create a "test machine" by grouping sensors from a user defined library to perform a specific task, such as a CBR test. The sensor library contains the sensor type, maximum range, calibration, date and serial number. WinSAS™ software includes a library of common soil tests from which the user selects the type of test to be performed. The user has the ability to change the suggested intervals on the fly. The user can create custom logging profiles and intervals containing up to 9999 data points.

Output of each channel assigned to the "test machine" is displayed with the elapsed time and reading. Also, any channel can be graphically displayed with the sensor value plotted on the ordinate and the elapsed time on the abscissa or user-defined graphs such as load versus deformation.

E-40521	WinSAS™ Collecting Software w/ Printer Port Dongle
Related Items	
602430	WinSAS™ USB Software Key
E-405	Smart Digital Indicator (5 Digits)
E-40504	RS-485 card for E-405 (one for each E-405)
E-40508	RS-485-to-RS-232 Converter (only one E-40508 is necessary per computer)
E-45010	E-405 Support Brackets

Data Reduction and Reporting Software for Laboratory Soil Testing

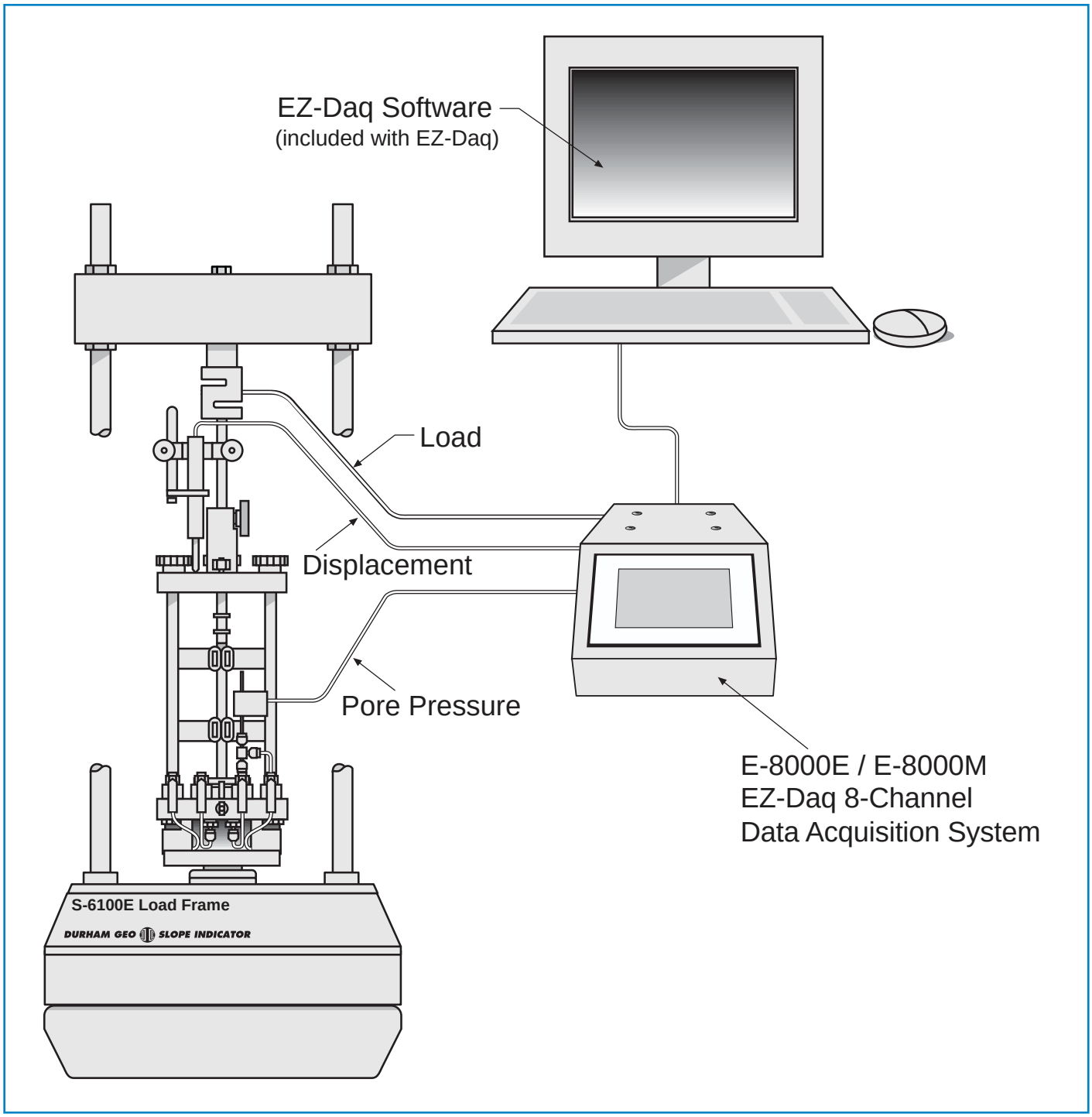
Our suite of Windows®-compatible software programs read data, perform calculations and generate graphical and tabular output as well as test reports conforming to the respective ASTM standard. The various programs have a common rationale that makes it easy to move from one program to another.

Principal features are:

- Windows® 98 through XP compatible.
- Powerful data base manager automatically saves input files by project ID.
- Uses data from WinSAS™ output file.
- User-selectable engineering units for input and output.
- Software pre-configured to show company or agency name in the output report.

E-41524	Reporting Software, Unconfined Compression (UCC)
E-41525	Reporting Software, California Bearing Ratio (CBR)
E-41525A	Reporting Software, Florida's Limerock Bearing Ratio (LBR)

Download data sheets, manuals, and technical notes from **www.durhamgeo.com**



Typical Data Acquisition Set Up for Triaxial Compression with Pore Pressure.

Download data sheets, manuals, and technical notes from **www.durhamgeo.com**

Digital Transducer Readouts

The E-405 programmable Smart Digital Indicator is a single-channel digital readout with a “99999” display. It sends a direct voltage of 5 or 10 V to a load cell, pressure or displacement transducer or temperature transducer. The transducer then sends a millivolt signal back to the readout, based on the amount of stress or strain applied to the transducer. The E-405 then takes the millivolt signal and converts it into engineering units based on the calibration factors stored in memory. The direct display of readings in engineering units is very convenient for the operator, increases productivity and minimizes the potential for recording errors in the lab.

The E-405 has fast control responses (60 readings/sec), true peak reading capability and an analog output that accurately tracks the signal input. It has an adaptive digital filter that automatically selects the best time constant for minimum noise, and yet responds rapidly to an actual change in signal level.

When purchased with a DGSI transducer, the E-405 is supplied with a NIST Traceable Certificate of Calibration. The front panel allows user set-up and re-calibration by using push buttons.

Optional accessories include RS-232, Relay Board and Analog “plug in” boards which allow the E-405 to output data to plotters or computers. An RS-485 board is also available to connect up to 31 indicators using 4-wire phone cable (also known as daisy chaining). This feature allows the laboratory manager to customize the data acquisition from 1 to 31 channels and use the RS-485 to RS-232 converter to bring the data into the “Com Port” on his computer.

The E-405 can be customized for a wide variety of industry testing tasks. If you have a special application, please call us to discuss your requirements.

Smart Digital Indicator (E-405) shown with optional transducers

Standard Features

- Plug-in Option Boards
- Five Full Digits
- 50-60 Readings Per Second
- True-Peak Hold, Auto Tare and Automatic Adaptive Digital Filter
- Isolated 5, 10, or 24 V (dc) Excitation
- Worldwide AC/DC Power with auto-select
- NEMA 4 Lens Cover
- 0.56” High Digits
- User Selectable Scaling, Front Panel Programming

Optional Features

- Dual Relay Alarm Board, 10 A
- Open Collector Outputs
- Isolated RS-232 or RS-485 or Parallel BCD Computer Interface
- Analog Outputs; 0-20 mA, or 5 to 10 V (dc)

E-405	Smart Digital Indicator	5 lb
Accessories		
E-40501	Dual Range Analog Output Board, 5 or 10 V (dc)	
E-40502	Relay Output Board, 10 A	
E-40503	RS-232 Output Board	
E-40504	RS-485 Output Board w/ 20 ft phone cable	
E-40505	Precision Strain Gauge Board, ranges 25, 50, 150, 250 mV	
E-40506	BCD Output Board (for printers)	
E-40507	DC Power Board, 9-37 V (dc)	
E-40508	RS-485 to RS-232 Converter	
600504	5 Port, RJ11-4, Phone Outlet	
Related Items		
E-1xx	Pressure Transducers	
E-2xx	Load Cells	
E-3xx	Displacement Transducers	
E-40521	WinSAS™ Data Collecting Software, includes software security key (fits parallel printer port). USB software key, 602430 available upon request.	

Specifications for Digital Transducer Readouts, E-405	
Display:	5 digits, 0.56 in (14 mm), 3 LED indicators
A-to-D Conversion:	60/s for 60 Hz NMR, 50/s for 50 Hz NMR
RMS Accuracy at 25° C:	0.1% FS
Operating Temperature:	0°C to 55°C
Operating Power (standard):	95 to 240 V ac, 90 to 300 V dc
Operating Power (optional):	10 to 34 V ac, 10 to 48 V dc
Excitation Output:	5 V dc, 100 mA maximum
	10 V dc, 120 mA maximum
	24 V dc, 40 mA maximum

Have your proving rings, load cells, pressure gauges and other measuring devices in the laboratory been calibrated recently? If not, give our calibration department a call. They will be glad to provide a quotation for your calibration needs.

EZ-DAQ™

Basic 8-Channel Data Acquisition for the Laboratory

Benefits:

- **Eight 16-bit analog inputs for eight channels of real-time data acquisition**
- **10 V dc instrumentation excitation supply**
- **mV, V, mA instrumentation output types**
- **Multiple instrumentation output ranges**
- **Instrument calibration in English or SI units**
- **Sample rate of 10 per second**
- **Simple USB connection to the computer.**
- **Program storage and instrument calibrations stored in nonvolatile memory**
- **Bright touch screen for improved visibility and easy data entry. 3.8-inch, 256 color TFT display.**
- **View live test data on color screen**
- **Windows-based software available for data viewing and exporting**
- **Easy data "dump" to Excel for performing custom data reduction/manipulation**
- **Real-time graphing capabilities for each test**
- **Quick sample interval changing**

EZ-DAQ device showing, in this photograph, live data for three tests and six sensors. Data from up to eight sensors may be acquired and displayed simultaneously using the EZ-DAQ.

Description:

Now you can collect data easily from your current laboratory equipment with the EZ-DAQ System. EZ-DAQ is an 8-channel, 16-bit data acquisition unit* that is easy to use and configure. The EZ-DAQ can perform locally all data acquisition functions (sampling, signal conditioning, A/D conversions), and when connected to a PC, can capture data and display real-time graphs. Designed specifically for the needs of today's soils labs, the unit is flexible, reliable, and robust.

The bright, color screen is easy to read and has a high performance CPU for ultra-fast screen refresh. The screen is rugged for use in dirty, dusty conditions and incorporates a touch-panel for easy data entry. No openings to get clogged or jammed.

In addition, connections for up to eight industry-standard sensors are conveniently located on the rear of the unit.

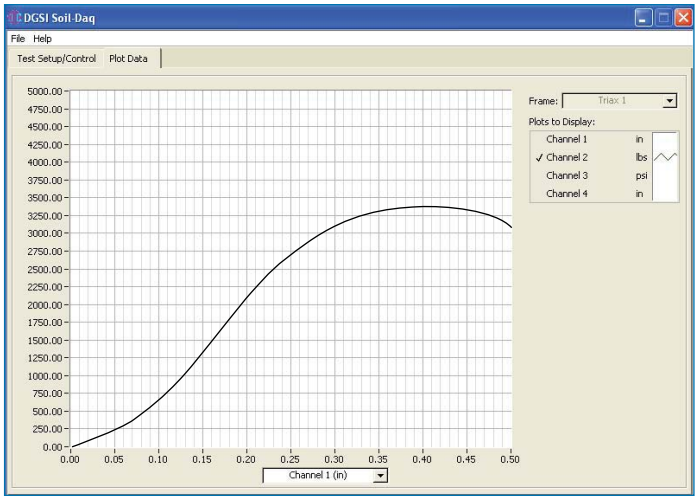
These connections supply the common 10 V dc excitation required by most of today's sensors. Along with the excitation, the connections also handle the sensor return signals. The flexibility designed into the EZ-DAQ System allows for the return signals to be configured in mV, V, or mA, and a multitude of ranges.

The EZ-DAQ-Soft software, which is included with the unit, is highly configurable and simple to use. It gives the ability to display up to eight active channels of data simultaneously on a PC. The system can support as many as six individual tests with each test capable of having its own sampling rate. The test files are saved as delimited text which may be imported easily in a spreadsheet program or simply opened as an ASCII text file.

Communication from the EZ-DAQ to the user's PC is done with standard Ethernet protocol. Set up is uncomplicated because it uses a static IP address.

*** EZ-DAQ is not a data logger because it does not store data.**

SPECIFICATIONS	
FUNCTIONAL SPECIFICATIONS:	
Display:	
Size	3.8 inch
Type	Touch screen LCD, color, TFT (thin film transistor) technology.
Colors	256 Colors (No blink) 64 Colors (3 speed blink)
Backlight	Maintenance free LED back lit
Resolution	320×240 pixels
Brightness	Control 16 levels of adjust available via touch panel
Touch Panel	Resistive Film (analog) 1024 x 1024 resolution
Memory - Application	Flash EPROM 6 MB
Memory - Data Backup	Lithium battery backup
Ethernet Interface	IEEE 802.3u, 10BASE-T/100BASE-TX, RJ-45 jack
Analog Input:	
Resolution	16-bit
Channels	8 differential
Input Type	mV, V, mA
Input Range	±150 mV, ±500 mV, ±1 V,±5 V, ±10 V, ±20 mA, 4~20 mA
Rear Connections:	
Supply Power (1)	AC Power inlet IEC320 110/220 V ac, 50/60 Hz
Ethernet Interface (1)	IEEE 802.3u, 10BASE-T/100BASE-TX, RJ-45 jack
Sensors (8)	Bulkhead connections (Amphenol type) Number of contacts – 5 Contact arrangement – IEC130-9 Rated voltage – 150 V Current rating – 5 A / +400°C
Instrumentation Supply:	10 V dc



Example of EZ-DAQ-Soft real-time graphing capabilities.

SPECIFICATIONS (continued)	
FUNCTIONAL SPECIFICATIONS (continued):	
Environmental:	
Ambient Operating Temp.	0 to +50°C
Storage Temperature	-20 to +60°C
Computer requirements:	
	Windows® 2000/XP compatible, Pentium® III or better, 512 MB RAM, 30 MB available hard drive space. Software not compatible with Windows® 95, Windows® ME. Not recommended for Windows® XP-Home Edition.
	Installation requires administrator access.
GENERAL SPECIFICATIONS:	
Mechanical:	
Dimensions (l x w x h)	9.5 in x 6.37 in x 4.75 in
Weight	10 lb
Electrical:	
Supply Power	110/220 V ac, 50/60 Hz
LIMITATIONS:	
1. EZ-DAQ is not capable of performing data reduction.	
2. EZ-DAQ is not compatible with WinSAS software.	

ORDERING INFORMATION		
	EZ-DAQ System, 110/220 V ac, 50/60 Hz. Includes EZ-DAQ device, Ethernet/USB adaptor, 5-ft Ethernet cable and EZ-DAQ-Soft software for PC.	
E-8000E	As above, with US Customary units	11 lb
E-8000M	As above, with SI units	11 lb

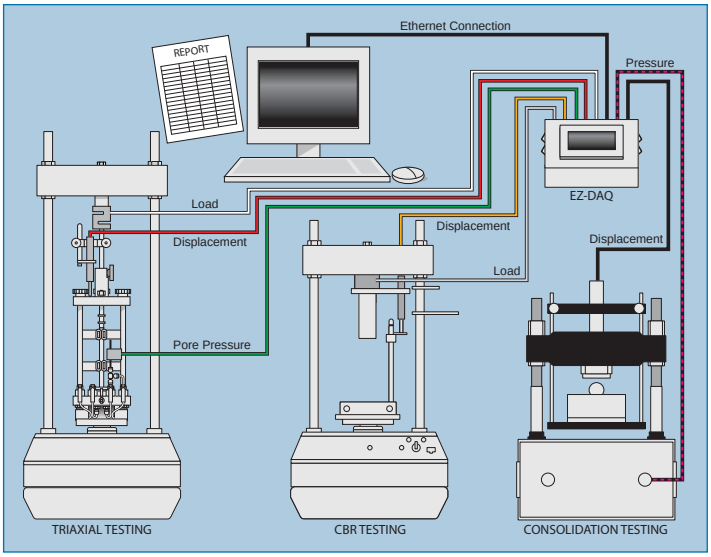


Illustration shows EZ-DAQ acquiring data from three tests while utilizing seven channels. Up to eight channels may be used and data from up to six tests may be acquired simultaneously.