

# Large Pro Automatic Triaxial Testing System

## Related Standards

<b>British</b>	BS1377-7 & 8 (1990), BS EN ISO 17892-9-2018-CU-CD
<b>American</b>	ASTM D1883-07, D2850-03A, D4186-06, D4767-11, D6927-06, D2166/2166M-13
<b>Australian</b>	AS1289.6.4.1, 1289.6.4.2
<b>Hong Kong</b>	GEOSPEC 3

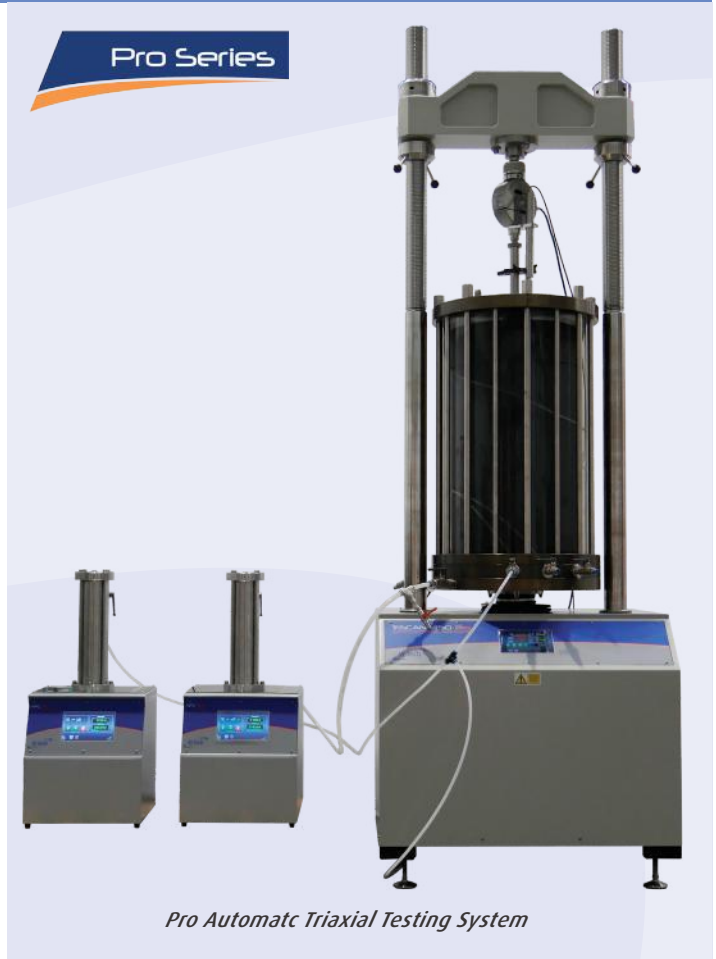
The VJ Tech Large Pro Automatic Triaxial Testing System is capable of providing fully automatic total and effective Triaxial testing including Consolidated Drained (CD), Consolidated Undrained (CU), Unconsolidated Undrained (UU) and Stress Path tests for sample sizes up to 300 mm.

There are two Large Capacity (1250cc) Automatic Pressure Controllers for Pressure and Volume control and measurement, one each for the Cell and Back Pressure.

The Pro TriSCAN 250 kN (56202 lbf) Load Frame can be connected via Ethernet or USB or to a PC or Laptop running our renowned Clisp Studio software, which provides all the necessary test configuration, control, data acquisition and results export. Once the Test has been completed, numerous different reports can be generated for results analysis.

## System Features

- USB or Ethernet Interface for PC control
- Integrated 7" Touchscreen Colour Display for Standalone use without PC Control if required
- On-board data logging with large data storage (up to 14 million records) using SD card (8GB standard)
- Data export to PC for manipulation within Excel
- High Speed ARM Processor
- Closed loop control options of load and displacement
- High Speed sensor conversion (24 bit, up to 4000 samples/sec)
- Up to 6 input channels (1 x digital & 5 x analogue)
- Built-in live data table and graphs
- Built-in Auto engaging function with definable engage value
- Auto reverse from limit switch activation
- Built-in auto protection for sensor limits
- Non-Volatile Memory for sensitive data



## Ordering Information

### Main System Components

**VJT5125-P** TriSCAN Pro 250 kN Advanced Load Frame

**VJT2266A-P** Large Capacity Automatic Pressure Controller (2000 kPa, 1250cc)

**VJT0449** Triaxial Cell (300 mm)

### Transducers

**VJT0273** LSCT Displacement Transducer (100 mm) with cable & DIN plug

**VJTS0366** 100 kN S-Beam Load Cell with cable & DIN plug

**VJT0260-G** 20 bar Pressure transducer with cable & DIN plug

### Accessories

**VJT0280** De-airing block with valve for pressure transducer

**VJT0280-SOL** Automatic Solenoid Valve

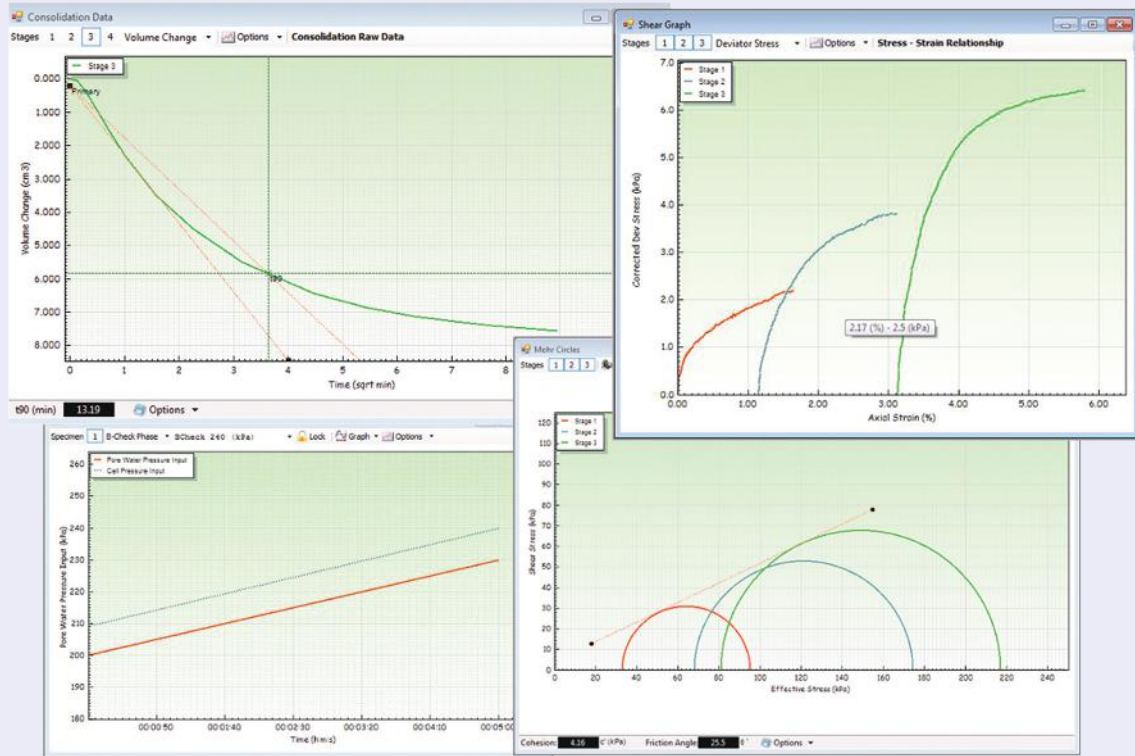
**VJT0520-DP** APC Water Distribution Panel (2-way)

### Software

**VJT-csTRIAX** Clisp Studio Triaxial Software

# Clisp Studio csTriax - Triaxial Testing Software

VJ Tech's csTriax module is widely regarded as the most user friendly and comprehensive Geotechnical software package for Triaxial testing currently in use. It has been developed to make it easy for the User to set-up, control and monitor all forms of standard Triaxial Testing in soil testing laboratories and collate and output the results in industry standard or User defined format.



## Standards

- BS1377-7 (1990)
- BS1377-8 (1990)
- ASTM D2166/D2166M- 13
- ASTM D2850-03A ( 2007)
- ASTM D4767-11
- AS1289.6.4.1 & 2;
- AS1289.6.4.1 & 2;
- GEOSPEC 3

## Ordering Information

VJT-CSTRIAX Clisp Studio Triaxial Software

The image shows the 'CLISP Test Definition' dialog box and an 'Effective Triaxial' configuration window.

**CLISP Test Definition:**

- Instruction: "To create a new Clisp Test, please select first the Type of Test (Triaxial, Oedometer, Permeability, etc) and then provide a Name by which it will be referenced."
- Test Type: csTriax
- Sub-Type: Effective Stress (selected)
- Test Name: Test 22
- Standards: BS1377-8 : 1990

**Effective Triaxial:**

- The test contains 1 2 3 4 Specimens
- Step 1: Hardware Setup (Assign Channels and Controllers to each of the hardware variables used by the current test.)
- Step 2: Specimen Details (Enter Initial specimen dimensions as well as initial moisture specifications.)
- Step 3: Saturation Method (Configure and Enter Initial Conditions for the Saturation Stages.)
- Step 4: Consolidation Setup (Configure and Enter Initial Conditions for the Consolidation Stages.)
- Step 5: Shear Conditions (Configure and Enter Initial Conditions for the Shear Stages.)
- Automation Options:
 

Specimen	1	2	3	4
Saturation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consolidation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shear	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clisp Studio csTriax comes with the easiest test creation and setup of any Geotechnical software package available today. You have complete control of Triaxial Testing for Saturation, Consolidation and Shearing. Every aspect of each stage can be configured to perform a standards based test or a custom test specific to your exact needs & you are able to monitor the status and condition of the Triaxial test as it proceeds.

When setting up the Test, the options presented to you are dependent on the standard that has been selected. This is also applicable to the other stages that have to be set up. The test can be run automatically by using an automatic solenoid valve to control the Back Pressure Valve so that NO operator intervention is necessary.

Live Views, Graphs and Tables show test progress while summary windows give Instrument, test and sample status at a glance. As well as the completed Live Data View, Graphs and Table, csTriax gives you a number of reports covering the Saturation, Consolidation and Shear stages.

### Standard results tables

- Each multi-stage test can handle up to 4 separate stages for a single specimen
- Up to 4 specimens can be handled within a multi-specimen test
- Any number or combination of multi-stage or multi-specimen tests can be run at any one time
- Selectable stage automation of specimens to enable simultaneous saturations while one test runs to completion
- Tests can be set up and run on an individual client, job, borehole and sample basis
- Easy test setup using wizard style Assistant
- Easy instrument and equipment setup and calibration
- Step or Ramp method Saturation
- Isotropic Consolidation & Optional Anisotropic Consolidation
- Shearing to failure in compression using maximum deviator stress or maximum stress ratio
- User configurable data logging
- E-mail test status
- Live view of sensor readings and status
- Live Data Views, Graphs and Tables
- User configurable views, graphs and tables
- On screen measurement of t100, cohesion & angle of friction values
- Standard predefined presentation reports
- Results Data export to Excel for external manipulation
- Export of entire Test script to allow Test to be sent to another user, imported and rerun if required in future

The screenshots illustrate the software's capabilities across three main stages:

- Saturation:** Shows a graph of Pore Water Pressure (kPa) vs Time (h:m:s) and a control panel with parameters like Cell Pressure Input (210 kPa), Back Pressure Input (200 kPa), Pore Water Pressure (200 kPa), Volume Input (227.1420 cm<sup>3</sup>), and CP Volume Input (16.118 cm<sup>3</sup>).
- Consolidation:** Features a Consolidation Table with columns for Time, Pore Water Pressure, Volume Input, PWP Dissipation %, CP Volume Input, and Volume Change. It also includes a graph of Volume Change (cm<sup>3</sup>) vs Time (h:m:s).
- Shear:** Displays a Shear Calculated Results table with columns for Axial Strain, Corrected Dev Stress, Minor Effective Stress, Major Effective Stress, Stress Ratio, Pore P Coefficient, Shear Path, and Shear Path t. It also includes a graph of Corrected Dev Stress (kPa) vs Axial Strain (%).

# Results & Reports

When you purchase Clisp Studio csTriax we provide a wide variety of Industry Standard reports (in the relevant language) for the different Triaxial Stages that would be of interest to a geotechnical engineer or end User covering the Saturation, Consolidation and Shear stages of your Test.

Clisp Studio has the ability to export the entire Test to either MS Excel for further data manipulation or to export the entire Test to a script file, which can then be imported on another PC when creating a new Test if desired. This enables Tests from the current or older versions of Clisp Studio to be cloned or even rerun if required.

## Standard results tables

- Shear Results Data View (Strain at Failure Stress at Failure, Minor Stress at Failure, Major Stress at Failure, Principal Stress at Failure, A value at Failure)
- Shear Results Table (Axial Strain, Corrected Deviator Stress, Minor Effective Stress, Major Effective Stress, Stress Ratio, Stress Path  $t'$ , Stress Path  $s'$ )

## Standard predefined presentation reports

- Summary Report
- Saturation: B-Value vs Cell Pressure
- Saturation: B-Value vs Pore Pressure
- Consolidation: Volume Change
- Consolidation: Pore Pressure
- Shear: Stress vs Strain
- Shear: Mohr Circles
- Shear: Stress Path

**Effective Stress Triaxial Compression**  
Consolidated Undrained Summary Report

Sample Details	Depth	Description	Default			
 Strain showing specimen location in original sample	Initial Length	L <sub>0</sub> (mm)	140.0			
	Initial Diameter	D <sub>0</sub> (mm)	300.0			
	Initial Weight	W <sub>0</sub> (g)	3000.0			
	Initial Bulk Density	ρ <sub>0</sub> (Mg/m <sup>3</sup> )	0.30			
	Particle Density	ρ <sub>s</sub> (Mg/m <sup>3</sup> )	2.65			
	<b>Initial Conditions</b>					
Initial Cell Pressure	σ <sub>3i</sub> (kPa)	239	230	380		
Initial Back Pressure	U <sub>3i</sub> (kPa)	200	200	200		
Strain Rate	ε̇ <sub>s</sub> (mm/min)	0.00600	0.00600	0.00500		
Membrane Thickness	h <sub>s</sub> (mm)	0.400				
Displacement Input	L <sub>ip</sub> (mm)	CH 4				
Load Input	N <sub>ip</sub> (N)	CH 1				
Pore Water Pressure Input	U <sub>wp</sub> (kPa)	CH 3				
Volume Input	V <sub>ip</sub> (cm <sup>3</sup> )	CH 2				
Initial Moisture	w <sub>i</sub> (%)	0.00				
Initial Dry Density	ρ <sub>d</sub> (Mg/m <sup>3</sup> )	0.00				
Initial Voids Ratio	e <sub>i</sub>	7.741				
Initial Degree of Saturation	S <sub>u</sub> (%)	0.00				
B Value	B	0.97				
<b>Final Conditions</b>						
Final Moisture	w <sub>f</sub> (%)	0.00				
Final Dry Density	ρ <sub>d</sub> (Mg/m <sup>3</sup> )	0.01				
Final Voids Ratio	e <sub>f</sub>	216.650				
Final Degree of Saturation	S <sub>u</sub> (%)	0.0				
Failure Criteria			Stage 1	2	3	4
Strain At Failure	ε <sub>f</sub> (%)		1.62	3.11	5.77	
Stress At Failure	(σ <sub>1</sub> - σ <sub>3</sub> ) (kPa)		2.2	3.6	6.4	
Minor Stress At Failure	σ <sub>3</sub> ' (kPa)		21.0	38.0	64.0	
Major Stress At Failure	σ <sub>1</sub> ' (kPa)		23.2	41.6	70.4	
Principal Stress At Failure	σ <sub>1</sub> ' / σ <sub>3</sub> '		1.104	1.101	1.100	
<b>Notes</b>						
Test Method	Australia	Test Name	01_001			
Site Reference	Jodite	Database	ISOLEXPRESS : PQ_Database			
Client	Tilhurst Sports Centre	Test Date	03/07/2012			
Operator	Taylor Woodrow	Sample	SS1			
Checked		Strain	BH1			
Approved						

Your logo here

The following table summarises the numerous combinations of Triaxial test types that are covered together with the applicable International Geotechnical Standards.

Applicable Standard	Test Sub-Type	Single Stage/ Multi-Specimen	Multistage/ Single Specimen	Undrained Pore	Consolidated Undrained	Consolidated Drained	Unconfined Compression
BS1377-7	Total Stress	Y	Y				Y
BS1377-8	Effective Stress	Y	Y	Y	Y	Y	
ASTM- D2850-03A	Total Stress	Y					
ASTM- D4767-11	Effective Stress	Y	Y		Y		
ASTM D2166 / D2166m-13	Total Stress						Y
ASTM1289.6.4.1	Total Stress		Y				
ASTM1289.6.4.2	Effective Stress		Y	Y	Y		
GEOSPEC 3	Effective Stress	Y	Y	Y	Y	Y	