Options available for VISFA

Load ranges

10kN ✓
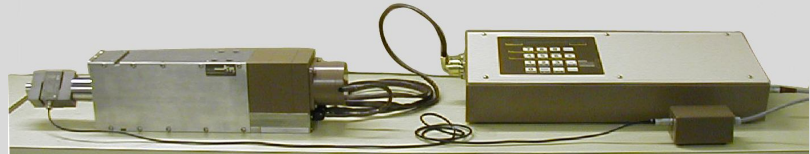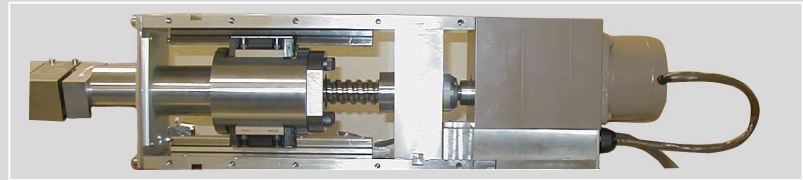25kN ✓
50kN ✓

Displacement ranges

100mm ✓

Optional functionality

VIS ✓

Force Actuator (GDSFA)

What is it?

The GDS Force Actuator (GDSFA) is a general purpose loading system with feedback control and continuous displays of force and displacement. The unit has an IEEE 488 GPIB or RS232 computer interface, and a unique GDS development as an option: Virtual Infinite Stiffness (VIS). These outstanding features coupled with our software, GDS digital pressure/ volume controllers, and the GDS Data Interface give you unlimited possibilities in conventional and advanced PC controlled testing of soil and rock.

How does it work?

The GDSFA comprises a stepping motor and gearbox which drives a ball screw. Rotation of the screw displaces a ball nut which is captive in a thrust cylinder that slides on a linear guide. The complete mechanism is rigidly fixed to a base plate. The base plate is attached to the experimental rig and the thrust is applied by the thrust cylinder.

Force is measured by a load cell which can either be fixed to the end of the thrust cylinder or which can be fixed to some other part of the apparatus under test. The motor and gearbox is fixed to the base plate. Displacement is gauged by counting the steps to the stepping motor. The base plate is located into the experimental rig using a keyway and is bolted in place.

Technical specification

- **Load ranges**: 10kN (1ton), 25kN (2.5ton) and 50kN (5ton). Custom ranges available on request
- **Load resolution**: +/- 1 in 10,000
- **Load cell accuracy:** non-linearity +/- 0.03%, hysteresis and non repeatability +/- 0.05%
- **Displacement range:** 100mm
- **Displacement resolution:** 0.1micrometre
- **Displacement accuracy:** 0.05% of full range
- **Max displacement rate:** TARGET: 3.75mm/min, RAMP: 1.20mm/mm, UP/DOWN: 6mm/min, RAMPTARGET LOAD control: 1.0mm/min
- **Min displacement rate:** there is no minimum rate
- **Weight***: approx. 50kgf
- **Nominal Size***: Actuator 0.87m x 0. 15m x 0.1 5m, Control box 0.87m x 0.23m x 0.15m
- **Resolution of measurement and control**: pressure = <0.1% full range, displacement = 0.1micrometre
- **Power**: 92-265v, A.C. 48-440Hz, 65w maximum, single phase three wire earthed supply, 2A fuse x 2
- **Control panel**: 16 keypad membrane touch panel with audio feedback. Functions include zero pressure, target pressure, zero volume, target volume, fill, empty, test, ramp, stop, continue, reset, enter, +, -, >, <, yes, no
- **User interface:** 40 character, 1-line liquid crystal display
- **Computer interface**: IEEE-488 Standard, Talker/Listener or optional serial RS232 (IEEE only with RFM)

How does VIS (Virtual Infinite Stiffness) work?

As above, the VIS option is a unique GDS development. To the observer, and in terms of the test specimen, it allows the axial loading system to appear to have infinite stiffness.

For the entire loading range, both the measurement and control of platen displacement is automatically corrected so that it corresponds to the deformation that occurs between the platen and the load button of the load cell. In this way, the platen displacement is corrected for strain in the load cell and side columns, bending flexure of the cross beams, and distortion within the motorised mechanical transmission.

The GDSFA is computer calibrated to provide precise data on the load-deformation relationship of the entire load application and load measuring system.

The calibration data is loaded into the read only memory (ROM) of the system which constantly monitors the axial load and uses the calibration to apply a correction to the displacement. Therefore, it appears to the observer (or controlling computer) that the measurement of displacement (resolved to 0.1micrometre) is derived from a machine with infinite stiffness. In this way the system has the characteristic of Virtual Infinite Stiffness.

System features

- Simple to use under either load or displacement control
- Microprocessor controlled with built-in feedback of axial load and displacement
- Optional VIS provides automatic correction for system compliance stored in ROM
- IEEE computer interface
- 10kN (1ton), 25kN (2.5ton) and 50kN (5ton) capacities
- Continuous displays of axial load and displacement
- Resolution of axial force +/- 1 in 10,000
- Resolution of displacement 0.1micrometre
- Ramp and cycle axial load or displacement through function keys on the control panel
- Supported by GDSLAB control and data acquisition software

General applications

Through the control panel or through the computer interface you can enter linear time ramps of load or displacement. These RAMP functions can also be used to cycle load or displacement in a low frequency triangular wave form. Of course, via the computer interface, any wave form is possible. Under the control of your PC almost any test can be carried out. GDS control and data acquisition and reporting software is available for a wide variety of applications.

Why buy GDSFA?

- Optional VIS (Virtual Infinite Stiffness) system is unique to GDS
- Simple to use keypad interface
- Load control by direct load cell feedback as well as the more standard displacement control functions
- May be used stand-alone or under computer control
- Compatible with the well-developed GDSLAB software which provides a consistent interface across all of your geotechnical laboratory testing
- GDS worldwide technical support for peace of mind (see testimonials at www.gdsinstruments.com)

Due to continued development, specifications may change without notice.