

Options available for STDDPC

Pressure ranges

- 1MPa
- 2MPa
- 3MPa
- 4MPa

NB The most commonly-used pressure is 3MPa

Volume

- 200cc

# Standard Pressure/Volume Controller (STDDPC)



## What is it?

The GDS Standard Pressure/Volume Controller (STDDPC) is a general-purpose water pressure source and volume change gauge. It is designed for use in commercial and teaching soil mechanics laboratories. A stepping motor and screw-drive actuate a piston which directly pressurizes water. The pressure is regulated under closed-loop control. The change in volume is measured to 1cu mm (0.001cc) by counting the steps to the stepping motor.

## What are its uses?

The STDDPC, typically operating at 3MPa/200cc, provides a cost-effective direct replacement for conventional soil mechanics laboratory pressure sources and volume change gauges. Above all, the device has its own computer interface and so can be controlled directly from a computer. It is ideal as a back pressure source where it can also measure the change in volume of the test specimen. Also, it automatically protects itself from pressure and volume over-ranges.

In stand-alone mode, the instrument is a constant pressure source which can replace traditional laboratory pressure sources such as mercury column, compressed air, pumped oil and dead weight devices. It is also a volume change gauge resolving to 1 cu mm.

In addition, the instrument can be programmed through its own control panel to RAMP and CYCLE pressure or volume change linearly with respect to time. This means the device is also ideal for permeability testing by constant rate of flow or constant head.

A data logger can be connected to an analogue interface option which provides output readings of pressure and volume change.

Compressed air is not used with the STDDPC.

### Technical specification

- **Pressure ranges:** 1, 2, 3, 4MPa
- **Volumetric capacity (nominal):** 200cc for all pressure ranges
- **Resolution of measurement:** pressure = 1kPa, volume = 1cu mm
- **Accuracy of measurement:** pressure = <0.15% full range, Volume = < 0.25% measured value with +/- 30mm<sup>3</sup> backlash
- **Closed-loop microprocessor control of pressure:** regulated to 1kPa
- **Closed-loop microprocessor control of volume:** regulated to 1cu mm
- **Size:** 600mm x 230mm x 220mm
- **Weight:** 12kg
- **Power:** 92-265v, A.C. 48-440Hz, 65w maximum, single phase three wire earthed supply, 2A fuse x 2
- **Ambient temperature range:** 10°C to 30°C
- **Relative humidity:** 20% to 80% non condensing
- **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:** 32 character, 2-line liquid crystal display
- **Computer interface:** optional RS232 serial computer interface for computer control and logging of pressure and volume
- **Maximum operational speed:** Fill/empty speed = 500 cu mm/sec

## How do you use it?

The user interface is a control panel comprising a 32 character, 2-line liquid crystal display and a 16 keypad membrane touch panel with audio feedback.

The display is divided into three zones. The first zone shows a continually updated display of the current pressure. The second zone is used to prompt for information and to display entered information. The third zone shows a continually updated display of volume change since power-on or since the volume reading was last zeroed.

The 16 key keypad is used for entering TARGET PRESSURE, TARGET VOLUME, RAMP (linear time ramp of pressure or volume change) and CYCLE (special case of RAMP with triangular wave form) parameters, plus FILL and EMPTY for refilling pressure cylinder. The keypad also gives access to on-board diagnostics for checking out each of the major hardware components of the system.

To set a constant pressure, for example, you press the function key TARGET PRESSURE and the message display will show "TARGET PRESSURE = kPA". Pressing the numeric keys, in the sequence 1,2,3,4, changes the display to read "TARGET PRESSURE = 1234kPa". Pressing the ENTER key then causes the controller to seek to the target pressure of 1234kPa. The measured pressure is also displayed.

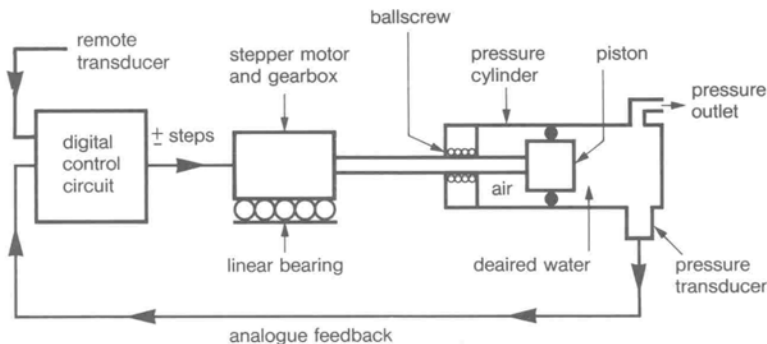


Fig. 1 Operational schematic of STDDPC

## How does it work?

Liquid (normally deaerated water) in a cylinder is pressurised and displaced by a piston moving in the cylinder. The piston is actuated by a ball screw turned in a captive ball nut by an electric motor and gearbox that move rectilinearly on a ball slide (see Fig. 1).

Pressure is measured by an integral solid state transducer. Control algorithms are built into the onboard microprocessor to cause the controller to seek to a target pressure or step to a target volume change. Volume change is measured by counting the steps of the incremental motor.

## Optional Remote Feedback Module (RFM)

Normally, the feedback to the main control circuit board comes from the internal pressure transducer. However, this input could come from a different source, such as a remote transducer. GDS has developed this into an elegantly-engineered enhancement which is the Remote Feedback Module (RFM).

The RFM (see Fig.2) enables the output of an external transducer to be measured and displayed by the controller. It also enables the piston action to be controlled from the feedback of the external transducer. Both the internal pressure transducer and the external transducer readings are displayed and transmitted over the computer interface.

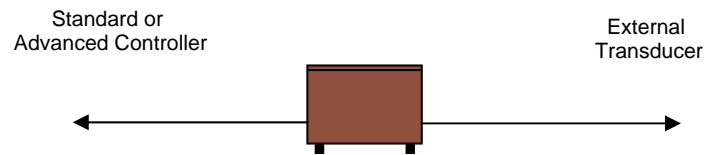


Fig. 2 Optional Remote Feedback Module (RFM)

### Useful GDS helpsheets

**Helpsheet 106:** STDDPC Quick Reference Guide

**Helpsheet 105:** De-airing a GDS Controller

**Helpsheet 97:** STDDPC Controller – What is P+V+C+R+A?

**Helpsheet 60:** Advanced and Standard Controllers - comparison.

All datasheets and helpsheets available from the GDS website at [www.gdsinstruments.com/support](http://www.gdsinstruments.com/support)

### Why buy STDDPC?

- Volume resolution = 1cu mm (0.001cc)
- Pressure resolution = 1 kPa
- Can be used stand alone, or computer controlled
- All serial communication parameters supplied to enable own software to be written if required
- Compressed air not required
- Compatible with GDSLAB control and acquisition software

Due to continued development, specifications may change without notice.