

Options available for ADVDPC

Pressure ranges

500kPa	✓	16MPa	✓
1MPa	✓	20MPa	✓
2MPa	✓	32MPa	✓
3MPa	✓	64MPa	✓
4MPa	✓	128MPa	✓
8MPa	✓	150MPa	✓

Volume ranges

200cc	✓	
1000cc	✓	(up to 2MPa only)

1000cc option for dedicated air pressure device up to 2MPa

Advanced Pressure/Volume Controller (ADVDPC)



What is it?

The GDS Advanced Pressure/Volume Controller (ADVDPC) is a microprocessor-controlled screw pump for the precise regulation and measurement of fluid pressure and volume change. As a standard research device in commercial and teaching soil mechanics laboratories, it offers the highest level of accuracy, resolution and control. The ADVDPC may be used with water, oil or air.

What are its uses?

In stand-alone mode, the ADVDPC 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.

Accordingly, the ADVDPC can be used in the geotechnical laboratory as a general-purpose source of water pressure as well as a volume change gauge. For example, the device is ideal as

a back pressure source where it can also measure the change in volume of the test specimen.

For unsaturated soil testing, the fluid in the cylinder is air. Air pressure is precisely regulated under closed-loop control. In addition, air volume change is measured 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.

Above all, the device has its own computer interface and can be controlled directly from a computer. Thus, the ADVDPC is the essential link between computer and test cell in GDS computer-controlled testing systems as well as in computer-controlled testing systems of your own devising.

Technical specification

- **Pressure ranges:** 500kPa, 1, 2, 3, 4, 8, 16, 20, 32, 64, 128 or 150MPa
- **Volumetric capacity (nominal):** 200 cc for all pressure ranges. Optional 1000cc for pressure ranges < 2MPa
- **Resolution of measurement and control:** pressure = <0.1% full range, volume = 0.5cu mm (<8MPa) or 1cu mm (8MPa or higher)
- **Accuracy of measurement:** pressure = <0.1% full range, volume =< 0.1% measured value, or <0.25% for 1000cc (with +/-12mm³ backlash up to 16MPa and +/-5mm³ above 16MPa)
- **Weight & Size:** 20kg, 860mm x 230mm x 220mm
- **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:** 40 character, 1-line liquid crystal display
- **Computer interface:** IEEE-488 Standard, Talker/Listener or optional serial RS232, USB available as long as a RS232/USB Converter is used.
- **Controlled Flow Rates:** (The minimum controlled flow rate is 0.1cu mm / any time)
 - The maximum controlled flow rate for 2,4,8,16 and 32MPa is 500cu mm /sec for volume and 250 cu mm for pressure.
 - The maximum controlled flow rate for 64MPa is 100cu mm /sec for volume and 50cu mm for pressure.

How do you use it?

The user interface is a control panel comprising a 40 character, 1-line liquid crystal display and a 16 key 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 parameters. 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 1234 kPa. The measured pressure is also displayed.

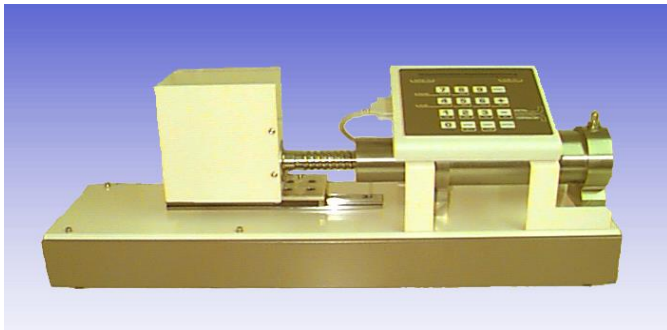


Fig. 1 The 64MPa/200cc ADVDPc

Useful GDS helpsheets

Helpsheet 107: ADVDPc Quick Reference Guide.

Helpsheet 60: Advanced and Standard Controllers - comparison.

All datasheets and helpsheets available from the GDS website at www.gdsinstruments.com/support

Maximum operational speeds

All controllers have two basic stepping rates. The higher rate is 1000 steps/sec and applies to the functions of target volume and fill/empty. The lower rate is 500 steps/sec and applies to all other functions. Controllers with a pressure range below 5MPa have a step volume change of 0.5cu mm. Controllers with a pressure range of 8MPa and above have a step volume change of 0.1cu mm. For example, the 2MPa/200 cc controller has a fill/empty speed of $1000 \times 0.5 \text{ cu mm/sec} = 500 \text{ cu mm/sec}$; whereas the 64MPa/200 cc controller has a fill/empty speed of $1000 \times 0.1 \text{ cu mm/sec} = 100 \text{ cu mm/sec}$.

How does it work?

Liquid (normally de-aerated 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. 2).

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.

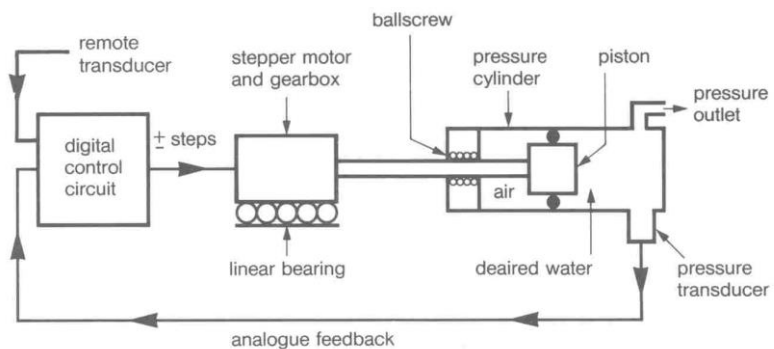


Fig. 2 Operational schematic of ADVDPc

Why buy ADVDPc?

- Volume resolution = 1cu mm (0.001cc)
- Pressure resolution = 0.1 kPa
- Can be used stand alone, or computer controlled
- All serial or IEEE 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.