OPERATING INSTRUCTIONS

Triaxial Cells

25-4047, 25-4117, 25-4157

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In the interests of improving and updating its equipment, ELE reserves the right to alter specifications to equipment at any time
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1 Introduction

1.1 This range of triaxial cells is precision made and treated to prevent corrosion. Particular attention is paid to the quality of the finish between the piston and the head. Final assembly includes the fitting of an 'O' ring seal and the use of a special lubricant to reduce friction to a minimum and prevent water leakage. The piston load capacity is designed to accept high horizontal forces, present during the final stages of specimen test.

1.2 Each cell is pressure tested at 150% of the maximum working pressure, at temperatures similar to normal laboratory conditions, i.e. 18 - 24°C. It is recommended that the cells should be used under stable ambient conditions.

Note: components should not be mixed from similar vessels, otherwise the warranty is void.

If it is found necessary to replace parts such as Cell Walls, it is recommended that the devices are re-pressure tested by ELE International.

1.3 Each cell has five take-off positions drilled in the base for cell pressure, top drainage/back pressure, pore water pressure and bottom drainage. Two valves of the no volume change type are supplied with each cell and an anvil for strain gauge or transducer datum is fitted to the cell head.

1.4 When fitting additional valves or pressure transducers into the base of the cell, seal the thread with PTFE tape or a suitable liquid thread sealant.

1.5 The cells are designed to accept a single diameter piston for all three sizes of cells. The internal height of the cell is sufficient to allow the fitting of submersible load transducer assemblies without any modification.

1.6 Each cell will accept a range of base adaptors and various accessories for testing a wide range of specimen sizes.

Warning: these cells must ***not*** be filled with air or other gases, but only with water as the pressure medium.

Compatibility of base adaptors with cells

Specimen size	**Cell part no.**		
	25-4047	25-4117	25-4157
	maximum specimen size 50 mm	maximum specimen size 70 mm (2.8")	maximum specimen size 100 mm (4")
35 mm/1.4 inch	25-4164	25-4170	25-4158
38 mm/1.5 inch	25-4166	25-4172	25-4160
50 mm	25-4168	25-4174	25-4161
70 mm	-	25-4176	25-4182
2.8 inch	-	25-4178	25-4184
100 mm	-	-	25-4186
4 inch	-	-	25-4188

1.7 The two Tee connectors and elbow are used when installation is required for CU/CD triaxial tests.

2 Specification

Reference number	25-4047	25-4117	25-4157
Maximum specimen size	50 x 100 mm	70 x 140 mm (2.8” x 5.6”)	100 x 200 mm (4” x 8”)
Maximum working pressure	1700 kPa	1700 kPa	1700 kPa
Maximum piston load	45 kN	45 kN	45 kN
Vertical clearance required	380 mm	430 mm	515 mm
Horizontal clearance required	155 mm	180 mm	255 mm
Approximate weight	4 kg	7.3 kg	14.3 kg

3 Setting up Cell for a Test

3.1 Unscrew the tie rod nuts sufficiently to allow the tie rods to be removed.

3.2 Lift off the cell wall, complete with the head and base ring, from the base and place on a clean surface.

3.3 Remove, clean and inspect the base adaptor and pore pressure port ‘O’ ring seals and thoroughly clean the groove and recesses.

3.4 If the sealing rings are undamaged, lightly coat them with grease (82-7361) and refit to the base. Worn or damaged rings must be replaced.

3.5 Ensure that the piston is evenly covered with special grease by moving the piston up and down. The internal grease groove must always be kept filled with grease (82-7361). Fill through the grease nipple in the cell head using a suitable high pressure grease gun (25-8080).

3.6 Secure the required base adaptor to the base with the three socket head cap screws and hexagon wrench supplied with the cell, taking care to tighten each screw evenly until the adaptor is contacting the base.

3.7 If the test requires top drainage, remove the blanking screw from the pressure pad and connect the drainage tube assembly. (Later models have two top drains.)

3.8 Connect the other end of the drainage tube assembly to the tapped hole in the base, having first removed the blanking screw.

3.9 Build up the sample on the base adaptor using the solid disc for undrained tests or porous disc for drained tests.

3.10 Place the porous disc on top of the sample (drained test only) and fit the pressure pad.

3.11 If necessary, clean the cell wall (refer to Maintenance Section).

3.12 Remove the base ring ‘O’ ring seal, clean the groove and underside of the base ring.

3.13 Clean and inspect the sealing ring and, if undamaged, lightly coat with grease (82-7361) and replace in the groove.

3.14 With the piston fully up, lower the cell wall assembly carefully over the sample, locating the base ring on the spigot of the base.

3.15 Locate the tie rods (radius edge inwards) into the slots in the cell base and head, and then lightly tighten each tie rod nut in turn. Ensure that the tie rods are vertical and that the nuts are properly seated in the recesses in the head prior to final hand tightening.

Note: the junction between the base ring and base is designed as a metal to metal joint (the 'O' ring providing the seal) in order to provide true alignment of the piston. It should not be necessary to use any form of tool on the tie rod nuts, failure to seal under normal tightening indicates foreign matter or a damaged 'O' ring seal.

3.16 Lower the piston carefully to locate into the central dimple of the pressure pad.

3.17 Mount the cell onto the load frame platen making the required connections to constant pressure systems etc. Fill the cell with water using the bleed screw in the head to permit all air to be evacuated.

3.18 Raise the platen and cell until ball end of load ring engages with the central dimple in the piston. Set up the strain gauge/transducer on the datum bar.

3.19 Conduct triaxial test as required.

4 Maintenance

4.1 Clean and dry all parts after use. The cell wall should only be cleaned with soap and water or a solution of mild detergent followed by adequate rinsing.

4.2 If the cell is to be left unused for long periods ensure that the drainage tube assembly is removed and blanking screws are replaced.

Note: there is a possibility that the plasticising agent in the drainage tube will attack the acrylic cell wall if the two are allowed to come into contact for even a short period of time. Therefore this tubing must not be allowed to come into contact with the cell wall, or be stored inside it.

4.3 Allow the piston to drop to its lowest position to prevent exposed grease collecting dirt.

5 Fitting of Optional Piston Restraint Clamp 25-4200 (figure 3)

Note: this can only be fitted to Triaxial Cells supplied after 1996. Either a Submersible Load Transducer must be used or the piston must have a top end design as shown in figure 3.

Catalogue number 25-4200 comprises

Description	Qty
Thumb Nuts	4
Studs	2
Bridge	1
Clamp Block/Key	1

The Piston Restraint Clamp will restrain upward movement of the triaxial cell piston caused by the sample confining pressure.

When used with Submersible Load Transducer, movement in both directions can be restrained.

5.1 Fitting when used with a standard triaxial cell piston.

5.1.1 Fit the 2-off M10 studs into the threaded holes in the head, taking care to avoid damage to the threads. Use 2 thumb nuts together as locking nuts to facilitate fitting the studs. Remove one thumb nut from each stud after fitting into the head.

5.1.2 Fit the bridge with the cable entry slot downwards (clamp block/key not required). Refit the second thumb nut to each stud.

5.2 Fitting when used with a Submersible Load Transducer.

5.2.1 Unscrew the tie rod nuts sufficiently to allow the tie rods to be removed and lift off the cell wall complete with the head and base ring from the base.

5.2.2 Follow steps 5.1.1 and 5.1.2.

5.2.3 Unscrew the top cap from the Submersible Load Transducer stem, remove and discard the collar and key.

5.2.4 Fit the bridge with the cable entry slot downwards and with the new clamp block/key. Refit the top cap to the stem to hold in position. Refit the second thumb nut to each stud.

5.2.5 Refit the cell wall assembly to the base as described in section 3.15.

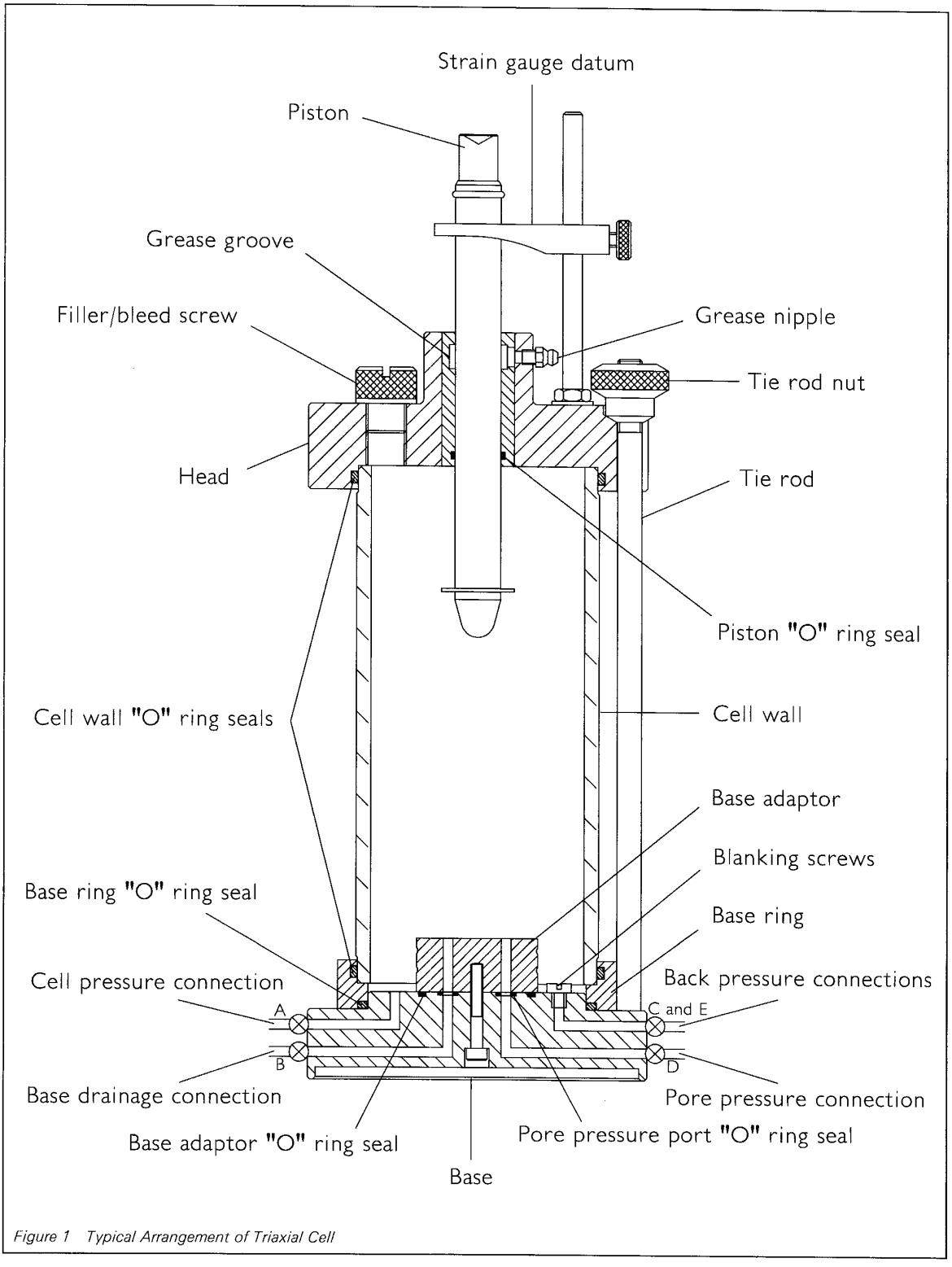


Figure 1 Typical Arrangement of Triaxial Cell

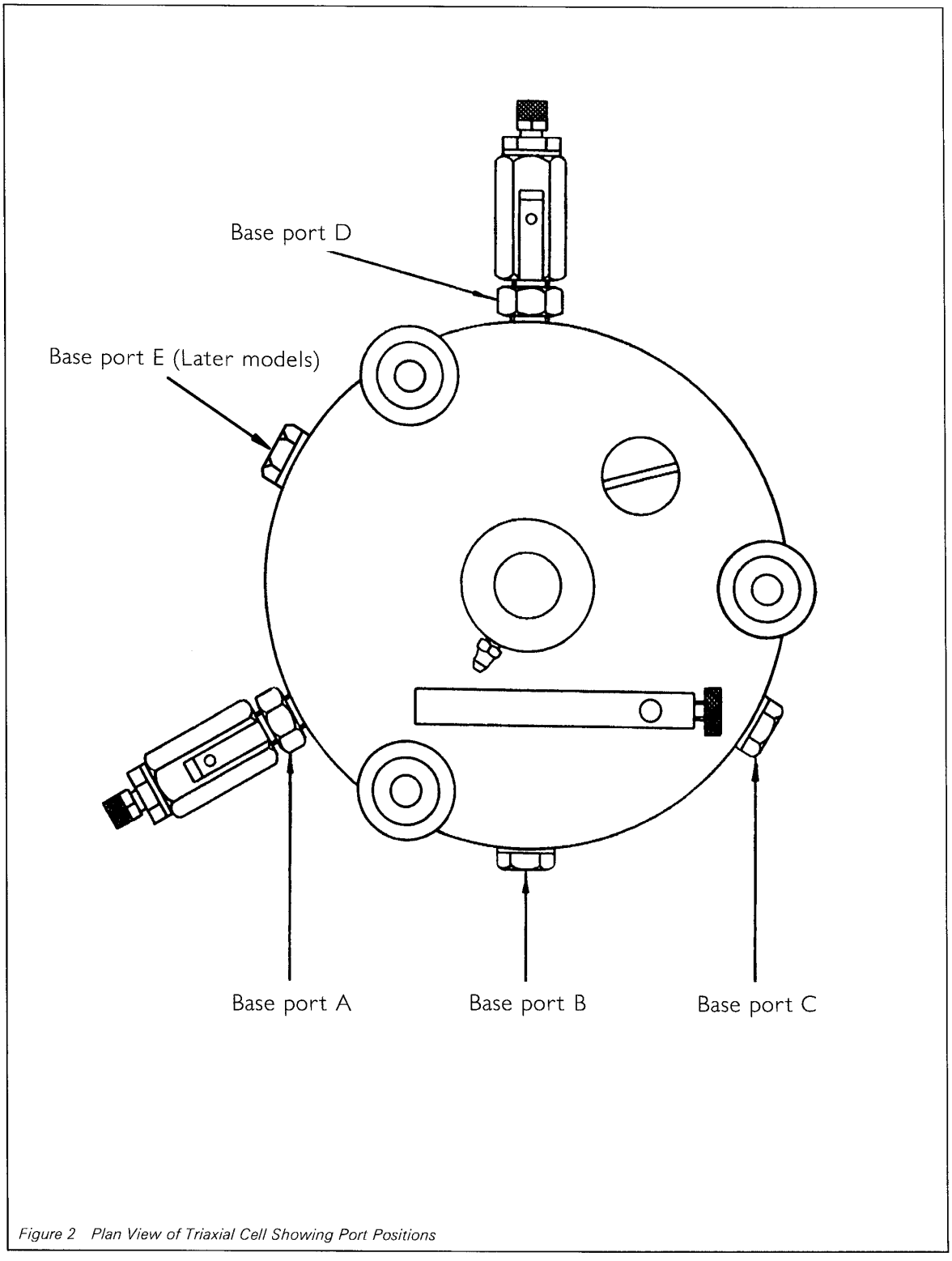


Figure 2 Plan View of Triaxial Cell Showing Port Positions

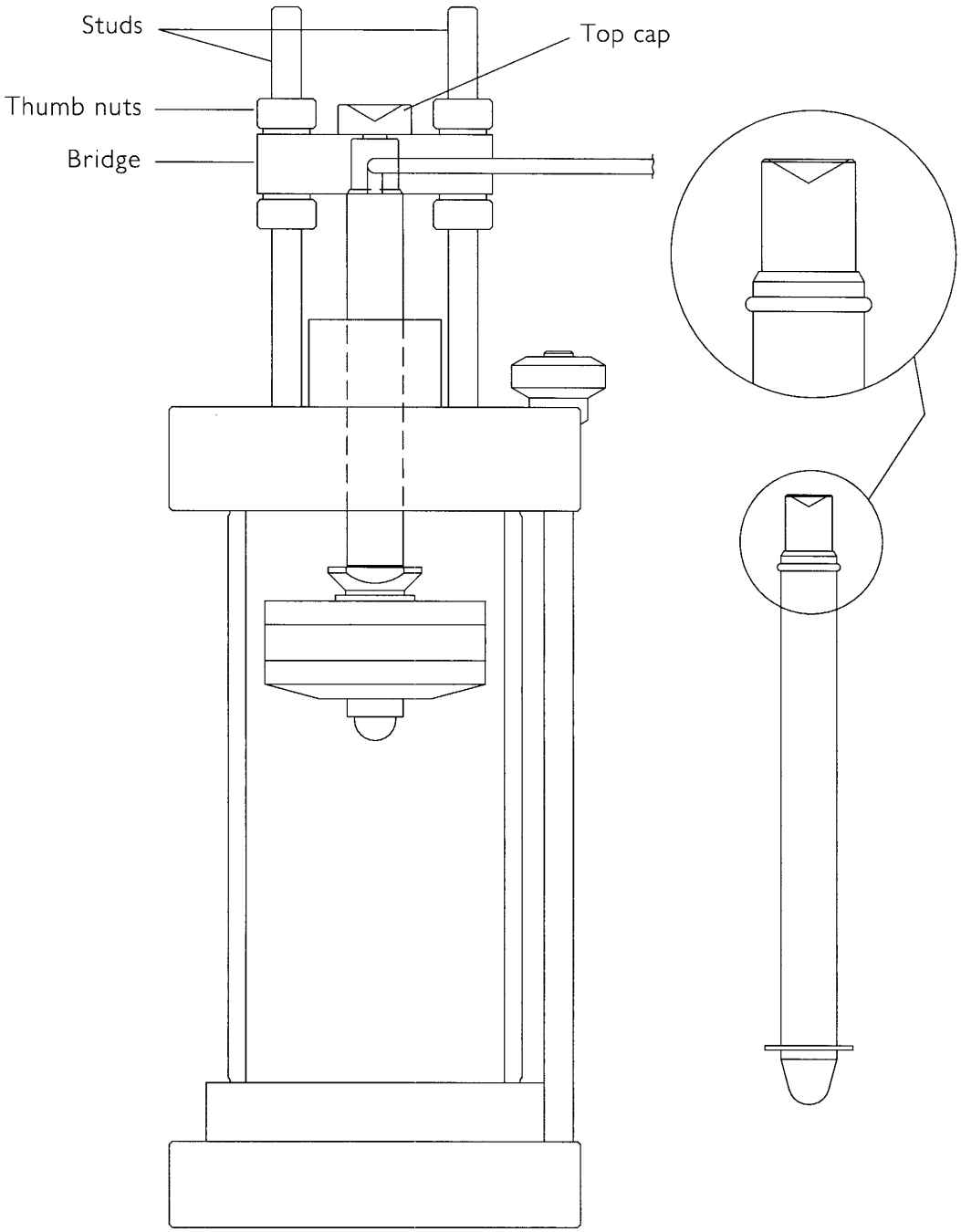


Figure 3 Typical Arrangement of Piston Restraint Clamp