

Rapid Communication

ADAPTATION OF BALZERS SPECIMEN STAGES FOR RAPID-ENTRY USE

W. BARRY VANWINKLE^{1*} AND JOHN E. RASH²

¹Section of Cardiovascular Sciences, Department of Medicine
Baylor College of Medicine
Houston, Texas 77030

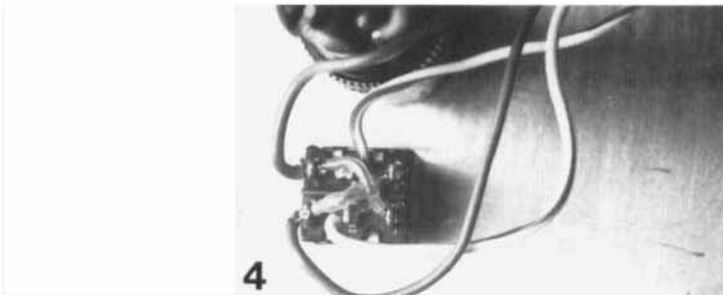
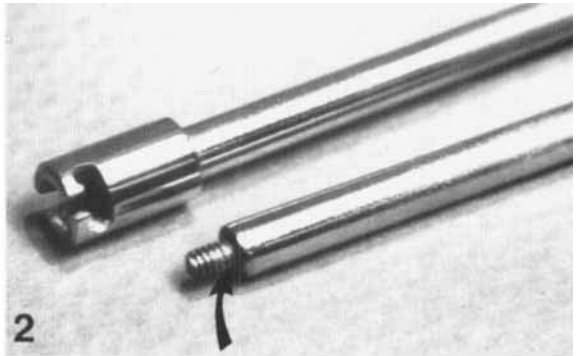
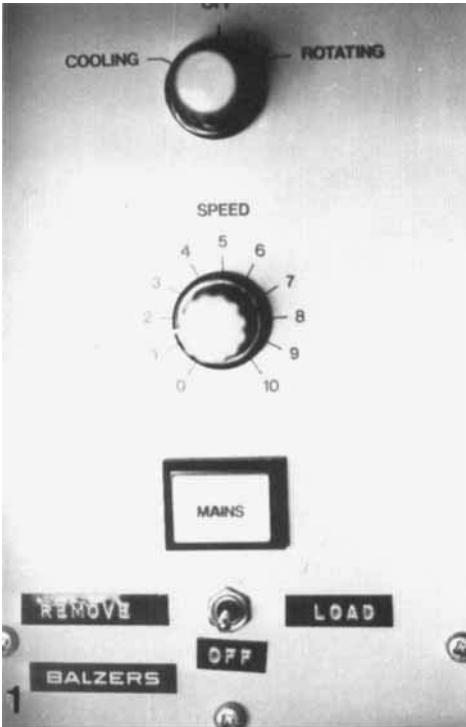
²Department of Anatomy and Neurobiology and Program in Cell and
Molecular Biology
Colorado State University
Ft. Collins, Colorado 80523

*Division of Cardiovascular Disease
Department of Medicine, University of Alabama at Birmingham
Birmingham, Alabama 35294

The addition of either a dry nitrogen flush rapid-entry port to Balzers 400 freeze fracture instruments or modification of external ports on Balzers 300-301 devices permits specimen loading without exposing the chamber to room atmosphere, thereby greatly reducing the time for specimen insertion, and minimizing the buildup of frost on the chilled mounting support. For those of us in more humid climates, this frost not only increases the time to reach ultimate vacuum but increases the risk of water contamination on subsequently cleaved specimen surfaces. We describe below a simple modification to Balzers 300,301 and 400 series instruments equipped with a rotary specimen table which permits the rapid insertion of a variety of specimen stages, including three and four-position stages as well as complimentary replica devices. In 400 series with a rapid exchange port, a single modification is necessary. On 300 and 301 series instruments, the small port cover on the lower right side of the chamber door must be replaced with a hinged port cover. Since the motor drive for the Balzers rotary specimen cold table is DC, reversing the electrical polarity results in reverse revolution. The addition of an inexpensive polarity reversing switch (DP/DT or double pole, double toggle available from many parts houses such as Radio Shack) wired as shown in Figure 4, allows rapid "loading" or "unloading" of the screw-based stages. For loading, we modified an extra mounting rod (Figure 2) supplied with the three-position stage used in conjunction with the rapid entry port. The mounting "head" is cut off and a hole drilled and tapped to accept a 4-40 screw. Nearly all Balzers stages which screw mount are easily adapted for rapid mounting. A hole is drilled and tapped in the base (Figure 3) to accept the 4-40 screw of the tool. These alterations are easily carried out in most machine and electronics shops accessible to many freeze-fracture electron microscopists.

To load samples, the chamber is vented and the LN-cooled stage is placed on top of the screw of the cold table with the motor turning counter clockwise (position switch in the "load" position). When the stage is tightly fastened, the loading tool is easily unscrewed. The reverse procedure is employed to remove the stage after fracturing and replication of specimens. This easy modification permits expanded use of other stages via the rapid entry port. Alternatively, Balzers now sells a kit with bayonet-loading, counter flow rapid exchange device, 3-position specimen holder, and port modification hardware, which accomplishes these same goals. Current price for the Balzers kit is \$850.00 while the simple modification depicted here is \$5.00.

This work supported in part by NIH grants 13870, (BVW) and 15991(JER) and grants-in-aid from the American Heart Association (BVW) and the Muscular Dystrophy Association (JER).



- Figure 1. Front panel showing switch position.
- Figure 2. Modification of Balzers rapid entry tool (bottom) with 4-40 screw inserted in tapped hole (arrow).
- Figure 3. Three different specimen stages modified for screw mounting. Arrow: Threaded hole in complimentary replica device to accept loading tool screw.
- Figure 4. Back of front panel of rotary stage control showing wiring for three position switch.