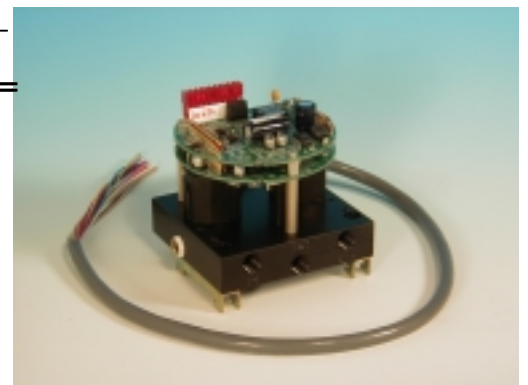
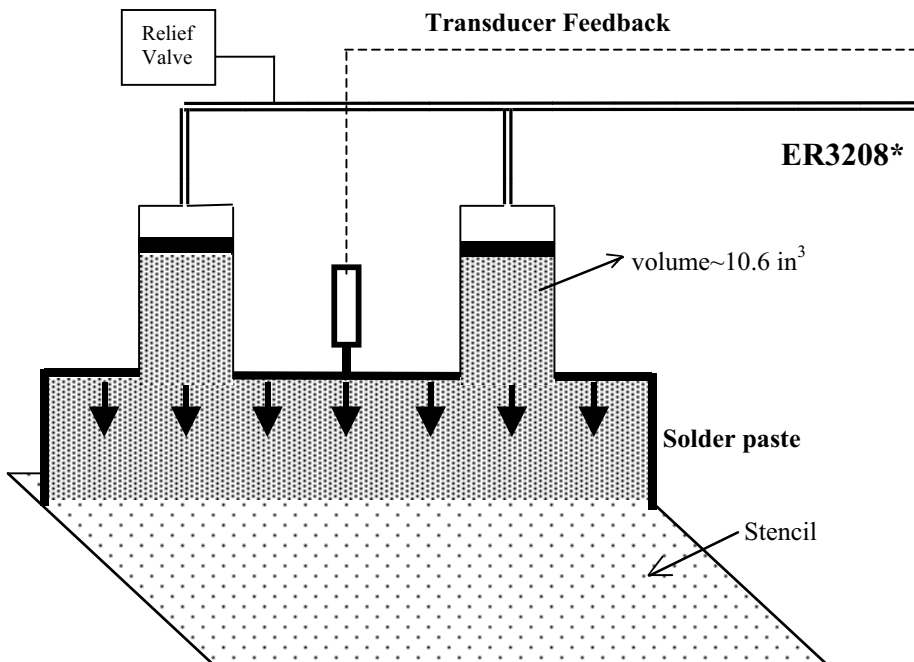


**D-MAP 1-01**  
**Precision Control of Highly Viscous Fluids**  
**Using an ER3208**

(Key Words: Head Pressure, N<sub>2</sub> Blanketing, Fluid Dispensers)

**TESCOM**  
CORPORATION  
ELECTRONIC CONTROLS DIVISION

- Customer:** Manufacturer of solder paste printers
- Application:** Apply solder paste on printed circuit boards
- Problems:**
- Poor quality of the final product
  - Waste of solder paste in every single run
  - Waste of resources for continuous setup and troubleshooting
  - Delays between runs due to continuous setup and troubleshooting
- Problems caused by lack of simultaneous control for both head pressure and solder paste pressure.
- ECD solution:** ER3208 (smaller and more economical; ER3000 for OEM) + external transducer is the only system that offers custom made software to control both head and paste pressures, especially for different paste viscosities and board sizes.
- Benefits:**
- Improved quality of the final product
  - Reduced operating and maintenance cost
  - Substantially reduced rejected boards
  - Cut consumption of solder paste by up to 90%
- Potential market:** As many as 250 systems (ER+transducer) a year
- Similar applications:** Applications that involve precision control of viscous fluids by controlling head pressure (N<sub>2</sub> blanketing), such as manufacturing of fiber optic cables, dispensing glue, etc.



\* Can be easily coupled with a regulator, in case of higher pressure or flow demands in the application

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C O R P O R A T I O N  
ELECTRONIC CONTROLS DIVISION

**INTRODUCTION:** The ER3000 family of products offers customers a versatility not available with traditional I/P's or analog controllers. The ER3000's external feedback capability allows direct control of the process pressure, not just the pilot pressure as with an I/P. The ER3000's microprocessor based control allows for customized embedded software that can solve tough application problems, a feature simply not possible with an analog controller. And, since the ER3000 handles the PID control, the customer's PLC is freed up to perform other operations in the system and the control engineer can spend the time working on solving complicated control issues, not developing a PID loop.

**APPLICATION PROBLEM:** As printed circuit board topology gets smaller and smaller, the importance of precise, consistent application of the solder paste becomes more and more important. Stencil printers apply solder paste to the contact points (pads) of the circuit board by forcing the paste through small holes in a copper stencil that is aligned with the pads. Conventional stencil printers waste a lot of solder paste because, in order to be sure there is enough paste at the end of the cycle, they must apply an excess to the board throughout the print cycle. In an effort to improve this process, manufacturers have tried controlling the paste pressure. An I/P can only control the head pressure, not the paste pressure itself, resulting in inconsistent paste application. An analog controller, using an external feedback signal, will continue to increase pressure output until the feedback signal reaches setpoint. When the controller is tuned to respond as quickly as needed for the process, the head pressure is increased far faster than the paste can compress and reach the desired dispensing pressure, and the controller overshoots, resulting in excess, wasted solder paste.

**APPLICATION SOLUTION:** The ER3000 has an internal pressure sensor that is used to measure the head pressure while the external feedback feature is used to control the paste pressure. The ER's embedded control software was modified to limit the head pressure to a predetermined level so the ER can be tuned to respond quickly without overshooting. This predetermined level can be different for different types of paste and different sized boards. With the ER3000's digital communications capabilities, the computer controlled stencil printer can download the correct PID parameters and maximum head pressure for each run of boards being manufactured.

**SIMILAR APPLICATIONS:** Similar problems exist when controlling head pressure during the production of fiber optic cable and solder particles for solder paste. Also, head pressure needs to be controlled for dispensing of glue,....