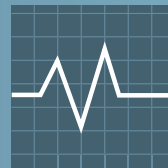


Humphrey developed a custom valve manifold assembly with virtually zero leakage for a customer building test equipment that could detect and calculate exceptionally low leak rates in a variety of products

- ❶ Custom manifold with redesigned Humphrey cartridge insert valves.
- ❷ Humphrey's special higher pressure Mizer valve.
- ❸ Humphrey modified the poppet in the valve to hold the O-ring in place under high pressure.
- ❹ Manifold assemblies had a leak rate 20 times lower than the customer's specifications.

## A Custom Valve Manifold Assembly *For High Performance Leak Testing Instruments*



**TESTING & MEASUREMENT**  
SIC:3826

### THE CUSTOMER'S PRODUCT

- The customer designs and manufactures high performance pressure and vacuum decay leak testing instruments used in production applications.
- Range of systems for single and multi-test functions.
- Units can detect pressure changes to 0.00001 PSI, then calculate the leak rate.
- The customer was experiencing serious leakage with previous supplier's valves, producing erratic test results.

### THE REQUIREMENTS

- Provide a valve manifold assembly for high pressure testing and virtually zero leakage.
- Assembly must fit inside existing equipment space envelope.

### THE HUMPHREY ENGINEERED SOLUTION:

- The Engineered Solutions team developed a custom manifold with redesigned Humphrey cartridge insert valves pilot operated by Humphrey's proven, low current consumption Mizer valve.
- Humphrey engineers modified the basic poppet design to hold the O-ring poppet in place under high pressure.
- The customer tested the manifold assemblies and reported that the leak rate was 20 times lower than the customer's specifications.

## THE SOLUTION

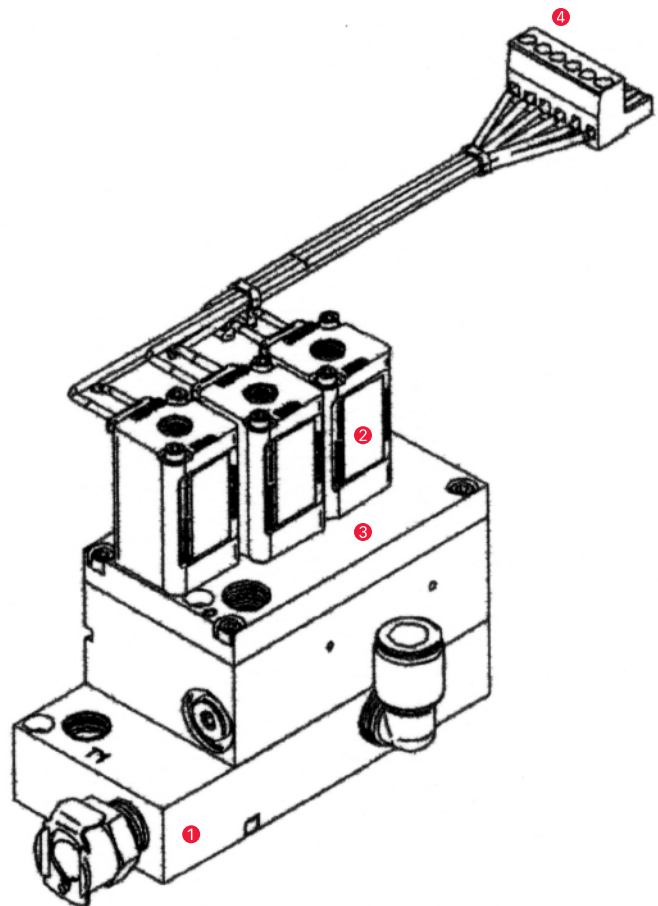
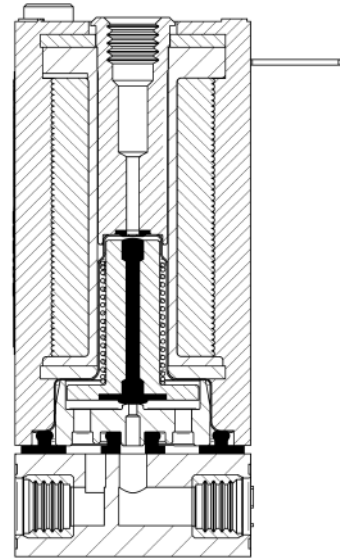
After the initial meeting with the customer, the Humphrey Engineered Solutions team went to work directly with the customer's engineering department, and together they identified the critical sealing issues.

Humphrey took their standard cartridge insert valve and developed a new stem for the O-ring. The stem effectively "trapped" the O-ring, keeping it from being blown out or distorted under the high pressures used during the testing. Then the Engineered Solutions team utilized the proven Humphrey Mizer valve as a pilot operator. The Mizer's low current consumption meant low heat dissipation, ensuring that it would not affect the accuracy of the customer's instrumentation.

## THE PROCESS

The Humphrey Engineered Solutions team, working with the customer's engineering department, began by developing their own highly sensitive transducer system to measure extremely low leak rates. This enabled Humphrey to identify the leak points in their standard cartridge insert valves.

The Engineered Solutions team worked with the customer to test various prototype valve and manifold iterations until the customer's exact requirements had been met. The final version was subjected to 200,000 cycles. Every 50,000 cycles the customer ran a precision leak test on each of them. On each test the pressure drop due to leaks was less than 0.002 psi over 30 seconds at 100psi—the equivalent of a 0.0025 scc/min flow rate. This exceeded the customer's specification by a factor of twenty. At this point, Humphrey began manufacturing and 100% testing each module before shipping.



- ① Custom Manifold
- ② Humphrey Mizer Valve
- ③ Modified Poppet Insert Valve
- ④ Electrical Connection

*Humphrey*

BUILD ON OUR EXPERIENCE

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