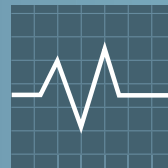


A custom manifold developed by Humphrey enabled a major manufacturer of laboratory test equipment to meet their requirements for zero leakage in an extremely small space envelope.

- ① A custom manifold developed by Humphrey enabled a major manufacturer of laboratory test equipment to meet their requirements for ultra-low leakage in an extremely small space envelope.
- ② The virtually zero leakage HK5 valve met the customer's critical specifications.
- ③ Special manifold design interconnects certain valves.

Ultra-Low Leakage Custom Manifold Assembly

For Compact Analytical Instrument



TESTING & MEASUREMENT
SIC:3826

THE CUSTOMER'S PRODUCT

- The customer designs and manufactures a wide range of laboratory analytical instruments.
- A new device incorporated advanced automated technologies to increase accuracy and testing efficiency.
- The instrument utilizes a single stroke pump to provide compressed air to the instrument, eliminating the need for an air compressor.
- The miniature valves the customer originally selected proved to have contributed to an unacceptable leak rate.

THE REQUIREMENTS

- The valve must have a leak rate as close to zero as possible because the system is highly sensitive to any leakage.
- The manifold assembly must fit into the extremely tight space of the original valve package.
- The manifold must have minimal non-functional volume (dead space).

THE HUMPHREY ENGINEERED SOLUTION

- Humphrey utilized the proven HK5 valve and modified it to achieve virtually zero leakage.
- Instead of a straight-line manifold, Humphrey designed a manifold to facilitate interconnectivity and minimize dead space.
- Utilizing the customer's extremely precise testing methodology, Humphrey certified every assembly for a 1 PSI pressure drop at 100 PSI over five minutes.

THE SOLUTION

Starting with Humphrey's virtually zero leakage HK5 valve, the Engineered Solutions team designed a cube shaped manifold with special passages to interconnect the valves. The shape of the manifold contributed to the reduced dead space.

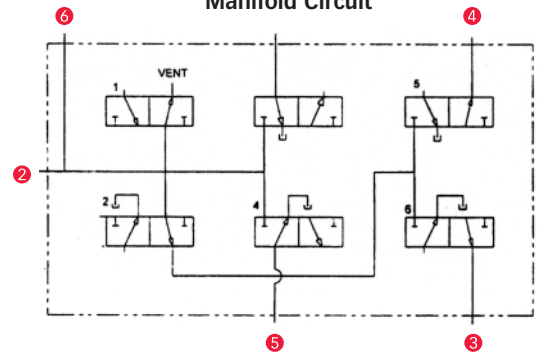
The customer was measuring leak rates as pressure decay rather than the more traditional method of air volume. Because of the extremely small leak rate that could be tolerated, Humphrey set up the measuring equipment in a special area of their factory. This enabled Humphrey to certify each assembly prior to shipping, ensuring that the customer achieved the desired performance of their equipment.

THE PROCESS

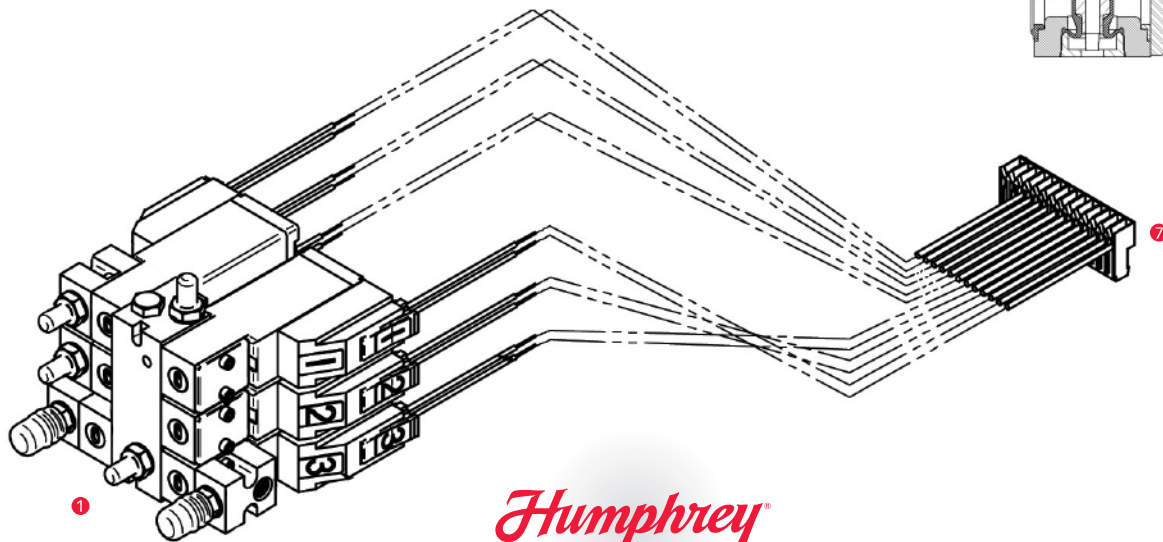
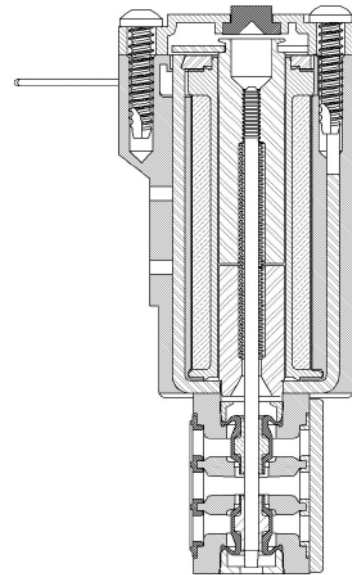
The customer had embraced the Humphrey Engineered Solutions Team approach to develop their initial manifold design. As the project evolved, the customer discovered that they needed a leak rate as close to zero as possible to enable their piston pump process to function precisely. Humphrey worked with the customer to understand their ultra-precise testing methodology.

Then the Engineered Solutions team suggested the HK5 valve, which they modified to achieve an ultra low leak rate. Because the space for the manifold had already been allocated, and a straight line manifold with HK5 valves would be too large, Humphrey designed a cube-shaped manifold. This also permitted machining interconnected passages and keeping dead space to a minimum to achieve the customer's desired functionality and operating efficiency.

Manifold Circuit



- 1 3-Way HK5 Valve
- 2 Pressure Inlet
- 3 Outlet
- 4 Inlet
- 5 To Differential Pressure Transducer
- 6 To High Pressure Transducer
- 7 Electrical Connector



Humphrey

BUILD ON OUR EXPERIENCE