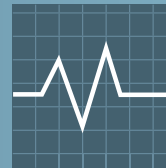


Carbon/Sulfur Determinator

- ① Integrated the original 8-station valve package, plus all previously separate components.
- ② HK5 valve functions with wide range of inert gases (O<sub>2</sub>, Nitrogen, CO<sub>2</sub> and compressed air).
- ③ Centrally located, smaller manifold permits higher sample throughput.
- ④ Integral Regulator
- ⑤ Multiple Size Ports

## Carbon/Sulfur Determinator

*Improved Performance, Reduced Costs  
Using Smaller Custom Manifold*



**TESTING & MEASUREMENT**  
SIC:3826

### THE CUSTOMER'S PRODUCT

- Portable carbon/sulfur determinator determines the chemical composition of a specimen of metal by burning a sample and analyzing the gases given off.
- Original design included an 8-station valve package, three remote-mounted valves and a regulator.
- Utilizing 45 different models of valves from 23 suppliers, plus manufacturing their own custom manifolds for all products.

### THE REQUIREMENTS

- Reduce inventory costs by standardizing on fewer pneumatic valves from fewer suppliers.
- Reduce the expense of maintaining the inventory and tracking purchases.
- Increase robustness of valve package.
- Allow customer to concentrate on its core competency in instrument design.

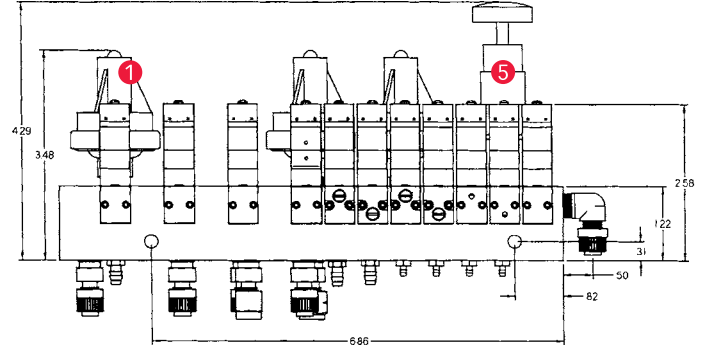
### THE HUMPHREY ENGINEERED SOLUTION

- Reduced the size and complexity of the pneumatic control valve manifold.
- Standardizing on the Humphrey HK5 valve for all instruments eliminated multiple valve acquisition costs.
- Each unit 100% fully tested.
- Manufactured in clean environment.
- New manifold assembly enhanced the product's robustness and versatility for field applications.

## THE SOLUTION

Utilizing Humphrey's proven HK5 valve in pairs to function as a single 4-way valve, the Engineered Solutions team incorporated the customer's original system design into a single assembly. The result was a single manifold assembly that was one-third the size of just the original 8-station manifold.

In addition to reducing the size, the new manifold assembly enhanced the product's robustness and versatility for field applications. Due to the critical leak specifications that needed to be maintained, the new portable unit had to meet stringent performance standards.

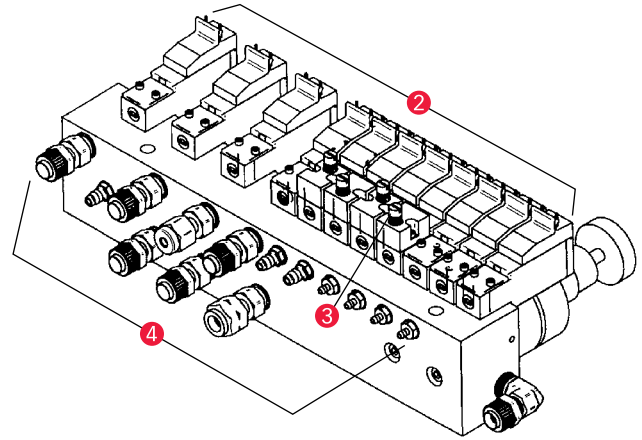


## THE PROCESS

Starting with the initial desire to reduce costs by standardizing its inventory, the customer discovered a broad range of other benefits to the Humphrey Engineered Solutions approach.

The versatile HK5 valve would fit virtually all the control requirements, reducing both the purchasing costs and the design costs. Humphrey's core competency in pneumatic design also enabled the customer to concentrate on its core competency – instrument design, not valve manifold manufacturing.

In addition, utilizing Humphrey to supply a completed sub-assembly further reduced the cost of materials, assembly and testing. Instead of a maze of tubing, connectors and separate components that had to be installed and tested, the customer now could simply install a 100% pre-tested sub assembly.



- 1 Pressure Switch
- 2 Humphrey HK5 Valves
- 3 Knurled Brass Needle Valve for Fine Adjustment Flow Control
- 4 Multiple Size Ports
- 5 Regulator

*Humphrey*