

CQS Innovation, Inc.

Precise testing of small pump performance

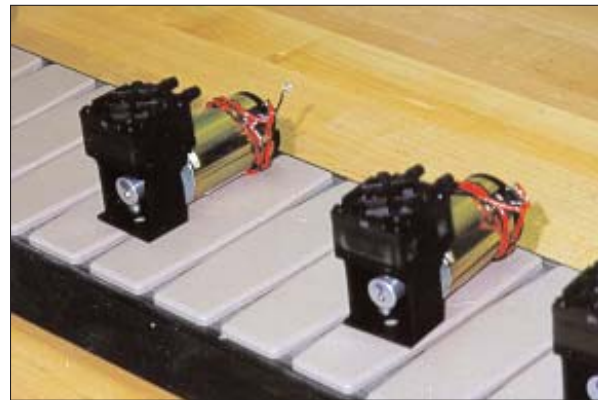


Low-volume vacuum pump testing provides:

- touch screen test selection.
- testing of 100% of units.
- immediate results and record keeping.

◀ Test system devised by CQSI

- ▼ Pumps small enough to fit in your hand have a volume so small it makes measuring variations difficult.



PROBLEM— Document performance of pumps so small that they may be safely used in medical devices.

BACKGROUND

Small pumps are difficult to measure

Basic technology for manufacturing pumps has been rock-solid for years. However, the technology for very low flow pressure or vacuum pumps is quite new, and small pumps (the palm-of-your-hand size so popular in medical devices) are difficult to test.

Gast Manufacturing, a wholly owned subsidiary of IDEX Corporation, produces a wide variety of very-low-flow pressure and vacuum pumps for industrial, medical, laboratory and scientific uses. Meeting reliability and performance demands for each different product requires special materials and a strict regime of testing for each unit. Test results must be recorded for review by buyers and by Quality Assurance.

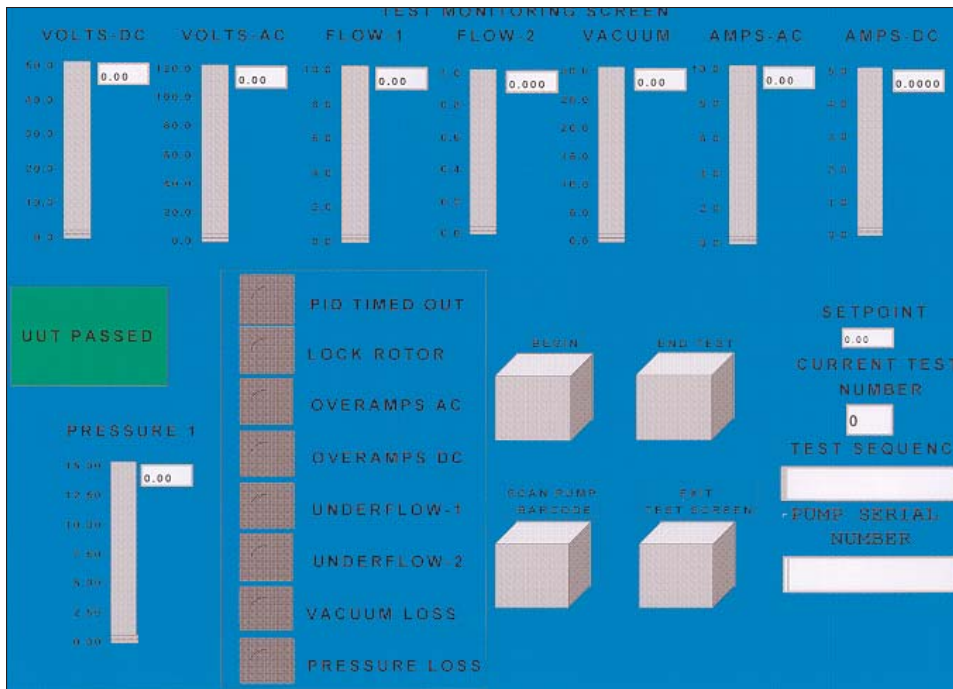
As with so many products today, pumps are not acceptable without a “pedigree” of recorded test results. Failure to properly archive pump test data can result in a liability claim against any manufacturer that uses the pumps in their product. Hence the supplier is forced to invest production resources in the time consuming task of running test, recording test results and filing the paperwork of the test results. The testing and verification process are production bottle necks in Gast’s production process and affect Gast’s ability to fulfill orders.

CHALLENGE

Test EVERY pump properly, quickly, accurately.

The pumps’ small size presented a special engineering challenge to accomplish consistent production rates. CQSI had to develop the test standards to measure small flows and accurately measure small variations in power, pressure and vacuum as well as AC/DC current and volts with a voltage of plus or minus two percent. Gast provided much of the pneumatic technology and the system piping and flow-path size requirements. CQSI provided overall system design for controls and mechanical, equipment/ instrumentation selection, construction, software development, system testing and installation.

The challenge sequence was (1) gather specific data to identify the type and serial number of the unit to be tested, (2) set up the proper test for that unit type, and (3) match the recorded test data to the correct unit identity. Record storage, test instrument calibration and assisting the operator demanded a well-designed control and information system combination.



SOLUTION

◀ The operator touches a pad to enter the pump type and which tests to run. Screen displays results and PASS/FAIL indication

SOLUTION Efficient testing, accurate records

System-controlled testing with improved record keeping.

Applying current technologies in PLCs, PCs, BarCode input, and software packages, CQSI built a compact system that identifies unit type from its bar code and sets up the tests required for that type pump. A computer-control test stand automatically measures the micro-pump's flow, AC/DC current and voltage, as well as pressure and vacuum within a plus or minus two percent factor - with an overall system repeatability of 98 percent. This allowed Gast Manufacturing to design and manufacture micro-pumps with a high consistency of pressure and vacuum. The test stand also has the capability to automatically calibrate the instrumentation prior to each test. This feature allowed the instrumentation to be checked for accuracy thus insuring repeatable test stand operation.

With the unit in the test fixture and the serial number entered, the system offers a list of "recipes" for testing. The operator selects the recipe and the system provides the specified power, executes the sequence of individual tests and shows the data being measured and used in the control loops. Sensors automatically collect results and compare them with recipe's expected values to make decisions on unit compliance.

When the test sequence is complete, graphic indicators on the computer screen notify the operator of the pass/fail status of each pump, and the unit is removed. The system then sends the test results data on to the host system to be stored with the identity of the tested pump.

RESULTS

Test ALL pumps and improve production speed.

The CQSI system allows Gast Manufacturing to increase production while testing a hundred percent of their micro-pumps. In addition, the test results were more accurate with reduced documentation cost and handling. Since the system automatically executes all required tests, time spent recording test data, evaluating results and making pass/fail decisions has been eliminated. Time spent waiting for each pump to be tested is now devoted to other activities.

Management reports that test results are accurate, error-free and easy to analyze. Pump serial numbers are recorded accurately so test results are always identified to the specific pump. The thorough documentation is opening more opportunities in the medical devices market. The software provided makes creating new test sequences for new products easy. Field failures have become nonexistent.

Gast Manufacturing reports their customers are so confident of the pump quality they have abandoned their incoming inspection operations for these units.

Making your manufacturing world-class.

From plant-wide systems to customized solutions for specific needs, CQS Innovation, Inc. has the experience in automation systems to meet your project's goals.

For more information on how our integration of computer systems, controllers, networks and software systems can improve your manufacturing site's product quality, production flexibility and quality-control tracking, call (800)860-1968, ext. 385.



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