

Upgrading fuel control systems

ONE ELECTRONIC VALVE PERFORMS BETTER THAN TWO HYDRAULICS

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As part of its efforts to upgrade control of its compressor systems, El Paso, a natural gas provider based in Houston, Texas, was looking to improve the fuel system - the main interface from the control system to the gas turbine. Over the years, development of new fuel-control valves has provided for better control of these turbines.

El Paso decided to upgrade the control systems in its installations because some of the older control system components were becoming obsolete. This drove up repair and replacement costs. Also, the company wanted to improve the performance and reliability of its systems.

In the past, hydraulic, servo-actuated valves had been the technology of choice for the fuel system. Now, with advances in electronics and smart valves, the ability to gather and process information locally at the valve has made the use of electronic fuel valves more attractive.

Not only can these valves react more quickly, they can start the turbine more reliably and control the turbine in a more stable manner than the older, servo-actuated valves. These electronic valves now have built-in diagnostics and require little or no maintenance. For example, the AGV 50, made by Continental Controls Corp. (CCC), San Diego, California, is a fuel-control valve that has an excellent turn down ratio greater than 25 to 1. Control is based on a mass flow calculation, not on just pressure or position.

Improving reliability

Last year, El Paso retrofitted the AGV 50 in five of its Frame 3 compressor stations. Originally, the Frame 3 fuel control system needed a two-valve configuration because the turn-down ratio required at start flows and maximum flow were too great for hydraulic, servo-

actuated valves. Now, with improved turn-down, and because the AGV 50 performs a mass flow calculation in the valve, it is possible to meet this requirement with a single, more reliable, electronic fuel valve.

The single AGV 50 valve has improved reliability of the packages not only by reducing the fuel control from two valves to one but also by offering more precise starting and more stable operation. The old, two-valve system would sometimes have hot starts. Starts are consistent with the new single AGV 50 system.

Because the valve is given a command signal to open to a specific flow, and not to a valve position, starting is repeatable regardless of changes in pressure, ambient temperature, gas temperature or other variable. By replacing the old hydraulic valve, El Paso has also been able to eliminate unwanted turbine flameouts and to maintain more stable combustion.

During a recent start up, Stan Brown, El Paso's chief controls coordinator, Albuquerque Division, based in Flagstaff, Arizona, says that the turbine started exactly the same 12 times in a row without even having a hard start. While the previous configuration would start the engine, it was not nearly as con-

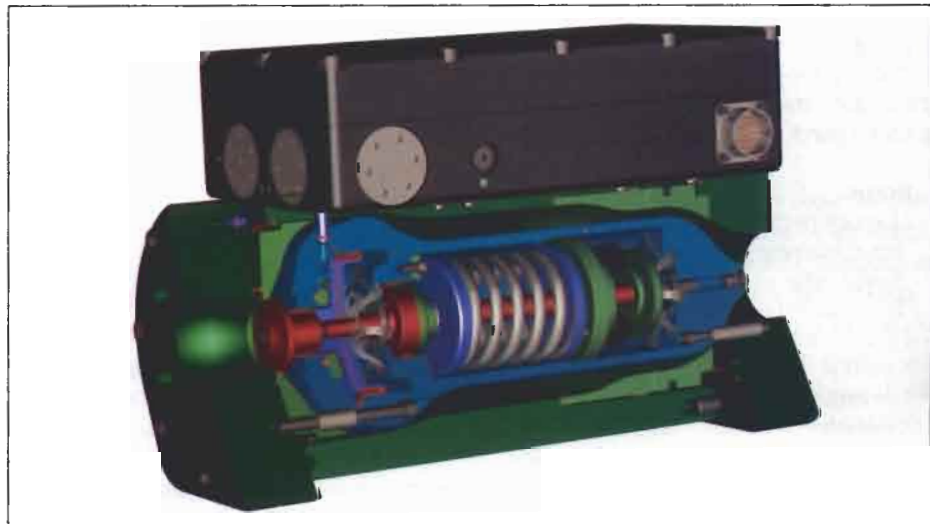
sistent or repeatable as with the AGV50.

The AGV 50 has a much smaller footprint than the large and cumbersome hydraulic valves, and installation was simple, taking less than 8 hours per turbine. The new valves also provide additional safety — they will shut down the turbine if the flow measurement is not within an expected range. This is a standard feature in the AGV 50. With the previous configuration, this safety feature would have required an additional fuel-measurement device.

Viewing the valve

For start up, and in the event of a suspected problem, CCC also has provided El Paso with software diagnostics called Valve Viewer, which allows the operating engineer to see what is being requested of the AGV 50 and what the valve is actually doing. **TI**

Rick Fisher is vice president of sales and marketing at Continental Controls Corporation (CCC). He has been working with CCC for 10 years promoting innovative solutions in Gas Turbine and Gas Engine fuel controls. Fisher joined CCC after a 10 year career with Sony where he served as general manager and director of product development for Sony Electronic Publishing.



The AGV 50, the fuel control valve, has built-in diagnostics