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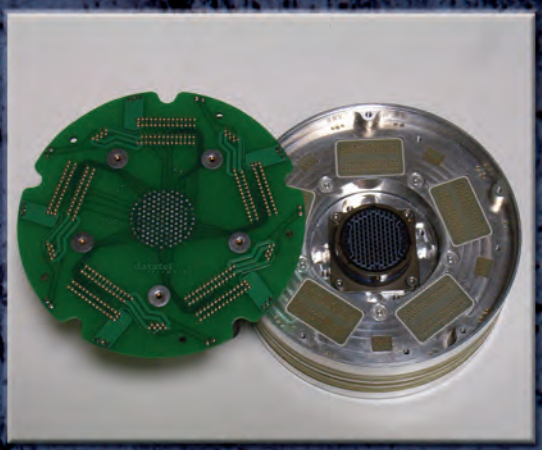

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BY MIKE MERCER

The new ALV10 liquid fuel metering valve from Continental Controls Corp. is designed for use on gas turbines with outputs of 250 kW to 35 MW. The valve design is capable of metering kerosene, Jet A, Diesel Fuel #2 and other similar liquid fuels (including various biofuels) with a closed-loop servo valve.

Fuel Valves Fill Out Gas Turbine-Specific Product Line

In a move that allows the company to provide a more complete family of liquid and gaseous fuel valves for gas turbine applications, Continental Controls Corp. has upgraded its existing fuel metering valves for gas turbines and added two more models. The updates cover the company's AGV10 gas valve for small to medium gas turbines and the AGV 50 gas metering valve for mid to large gas turbines. The new valves include the ALV10 liquid fuel metering valve, and the new AGV50 Pilot gas valve for low NO_x applications.

Continental Controls Corp. (CCC) reports that it has more than 2000 fuel metering valves in use on gas turbines in the field worldwide (most for five to 10 years) with more than 20 million hours of operation. These valves have been installed on turbines operating in a number of mechanical drive and electric power generation applications in all manner of conditions.

As for the improvements, all of the company's electronic fuel valves include internal flow measurement and feedback accomplished by including a mass flow measurement capability. All the valves operate on 24 Vd.c. power supplies, so there is no requirement for a high-voltage power source on-site.

In addition, the control housings of the valves are now sealed — offering an IP 66 or NEMA 4 Environmental rating. The valves are all available with conduit entry to meet hazardous area certifications. These include the ATEX: II 2G EEx d IIA; T4, the CSA: Canada and U.S. Class I, Division 1, 2 Group D; T4.

Also, the valves can include acceleration control for the gas turbine that is based on compressor discharge pressure as an option.

The two newest valves from CCC are the ALV10 liquid fuel metering valve and AGV50 Pilot gas valve that is designed for low-NO_x applications. The ALV10 is intended for use on gas turbines with outputs of 250 kW to 35 MW in either power generation or mechanical drive applications. It is an electronic servo valve consisting of a throttling orifice in series with a turbine flowmeter.

The ALV 10's internal flowmeter and microprocessor provide accurate confirmed flow and repeatability for starting. The valve design is capable of metering kerosene, Jet A, Diesel Fuel #2 and other similar liquid fuels (including various biofuels) with a closed-loop servo valve.

"One of the key features of this valve is that it measures fuel flow internally with flowmeter accuracy," said Rick Fisher, vice president, sales and marketing at Continental Controls Corp. "The valve is also electronically controlled so there are no linkages to adjust, and it also includes reporting functions to help operators determine fuel consumption and also turbine health."

Because of its fuel flow measuring capability, the valve can control the acceleration of a turbine based on PCD and is designed for use with gas valves, in dual-fuel applications.

"The ALV 10 eliminates start problems associated with inaccurate metering of fuel," said Fisher. "This valve, like our other electronic valves, are ideally suited for use with PLCs or older analog control systems for gas turbine engines. The fast response ability enhances the generator's capability to respond to step changes in load."

The valve has a high degree of connectivity with an RS-232 serial port or Modbus compatibility. It also has 4 to 20 mA position and fuel flow outputs. It can receive 4 to 20 mA inputs for com-

The AGV50 Pilot gas valve for gas turbines in low NO_x applications is designed for the precise flow requirements of such applications.

pressor discharge and fuel demand. Optional inputs include zero to 50 mA or zero to 200 mA for fuel demand.

The valve has a failsafe closed design with a fast response of less than 50 ms from fully open to fully closed or fully closed to fully open. The cycle time for the onboard computer is less than 5 ms. It is directly actuated electrically and eliminates the pilot stage for faster actuation, and it is not as susceptible to fuel contamination. The valve has a step response of 10 to 90% and 90 to 10% of max flow in 40 ms.

"This valve can be used on a wide range of turbines because of the large turndown ratio," said Fisher. "The turndown ratio is greater than 100/1 and allows for excellent flow control during starting or for maximum acceleration and load transients."

It weighs 13.6 kg and is constructed of anodized 6061 T6 aluminum alloy 440C stainless steel. It can handle a maximum fuel pressure of 103 bar and has a flow rating of 15.8 kg/hr to 4536 kg/hr. The operating temperature range is from -40 to 85°C.

Installation kits are available for most small to midsized gas turbines including Rolls-Royce, Ruston/Siemens, GE frame 3 and 5 machines, as well as most other turbines in this class.

The newly designed pilot version of the AGV50 valve is designed for low-NO_x applications. The precise flow requirements in low-NO_x combustion systems create problems with fuel flow because the turbine is running lean.

"The basis of this valve is our existing AGV 50 valve," said Fisher. "We started out there and designed a specially modified version that is intended for low-NO_x applications. These applications place additional demands on a fuel system because of the lean nature of the combustion process.

"The pilot valve application is demanding because of the high backpressure and low fuel flow," continued Fisher. "The valve is always subsonic — if the flow goes supersonic, it creates different flow equations that need to be worked out to produce appropriate fuel flow."

In the new design, the length of the valve has been increased to improve measurement capabilities and decrease backpressure problems. The valve went back to a more traditional length for use with a venturi for flow measurement, according to the company. This valve also requires only a low-voltage 24 Vd.c., 1 amp power supply and not a high-voltage power source.

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