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BURLY Racing

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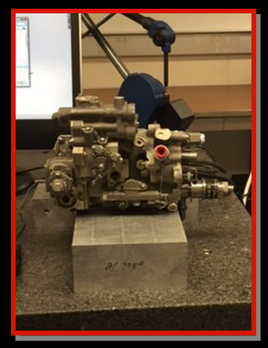
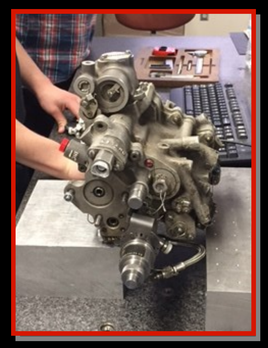
Existing Mechanical Fuel Control:

The mechanical fuel control uses gears and a complex system to manage the fuel supply to both the nozzles and stator vane actuator.



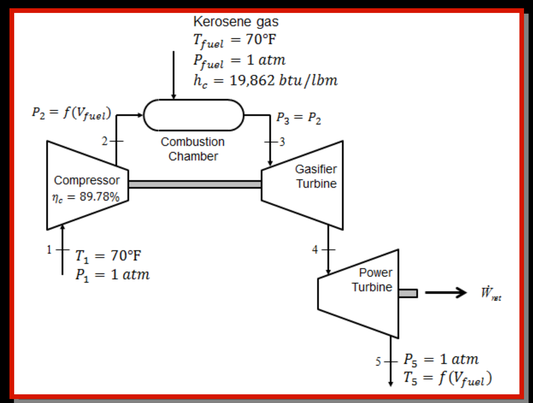


Problem Statement:

Replace a mechanical fuel controller for a racing gas turbine engine with an electronically controlled fuel controller that will measure exhaust gas temperature, turbine speeds, throttle position, and thermocouple readings. Develop a programmed controller that will respond to these readings and output fuel to the nozzles and stator vane actuator. The fuel supply to the nozzles and stator vane actuator will be controlled via 2 and 4 way valves, respectively. The valves will be packaged within an aluminum manifold that will bolt into the proper location on the engine.

Analysis:

The turbine was analyzed using a gasifier/power turbine system. The known states are from a given dynamometer test.



Fuel Nozzles:

The fuel nozzles inject the fuel into the combustion chamber

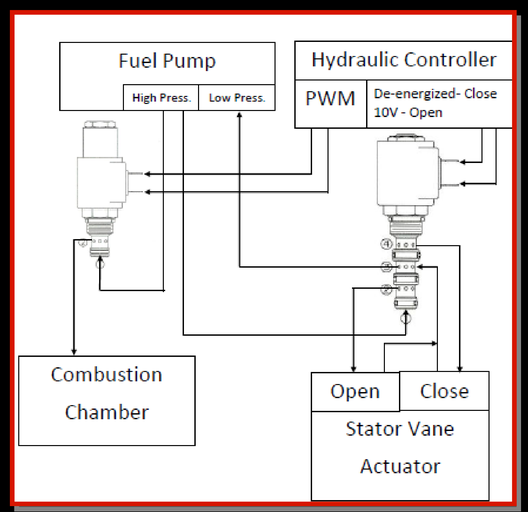
Stator Vane Actuator:

The stator vane actuator controls the first three stages of compressors. They are either open or closed

Manifold:

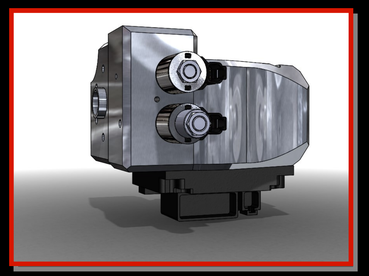
- Directs fuel flow
- Accommodates valves
- Mounting brackets for fuel pump and tach generator
- Mounts controller and other hardware

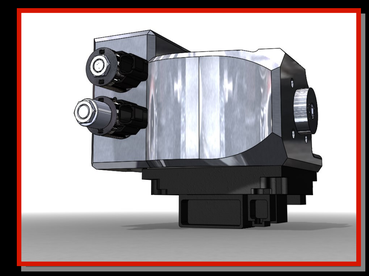
Valve Schematic:

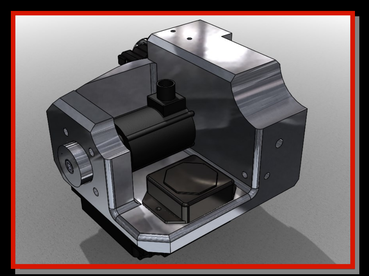


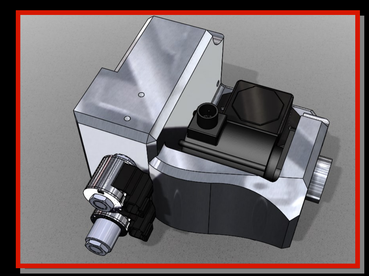
Benefits:

- Cheaper—the mechanical fuel control is roughly $15,000.00 to rebuild due to its complexity.
- Tune ability—the electronic control can be programmed on the go.
- Repair—the electronic control is constructed with off the shelf components so repairs are fast and simple.
- Response — The mechanical fuel control has multiple gears and shafts to spin before the proper output is made. The electronic fuel control will use a 70 HZ pulse-width modulation to control both of the valves.









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