

E230 Aircraft Systems

The Gimli Glider

6th Presentation

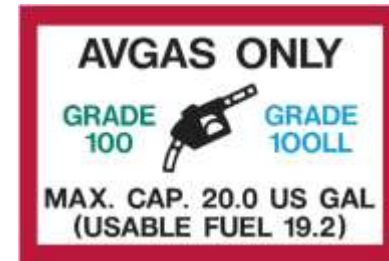
School Of
Engineering

Components of Aircraft Fuel System

- Fuel tanks for storing fuel at correct pressure
- Pipelines for channeling fuel to engine
- Measuring system to measure remaining fuel quantity during flight
- Filters and strainers to remove impurities from fuel
- Fuel heating system
- Fuel trim system
- Fuel jettison system

Types of Aircraft Fuel

- Piston engines
 - Uses high-octane petrol known as avgas (aviation gasoline)
 - Different grades of avgas are differentiated by their colour
- Turbine engines use jet fuel (kerosene-based)



Requirements of Aircraft fuel

- Resistance to the following
 - Icing at low temperatures
 - Explosion at high temperatures
 - Vaporization
 - Pre-detonation
- Consistency in quality

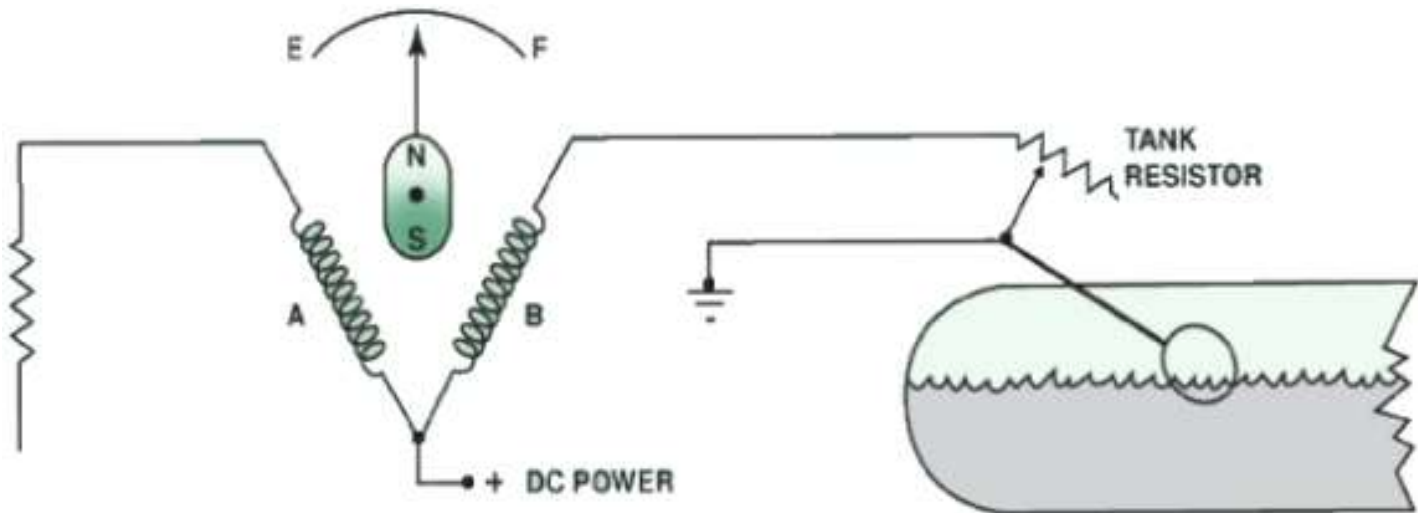
Importance of Fuel Quantity Indicating System (FQIS)

- Avoid fuel low conditions
- Facilitate contingency planning, e.g. flight diversion due to weather.
- Flying aircraft at maximum efficiency
- Assessment of engine performance

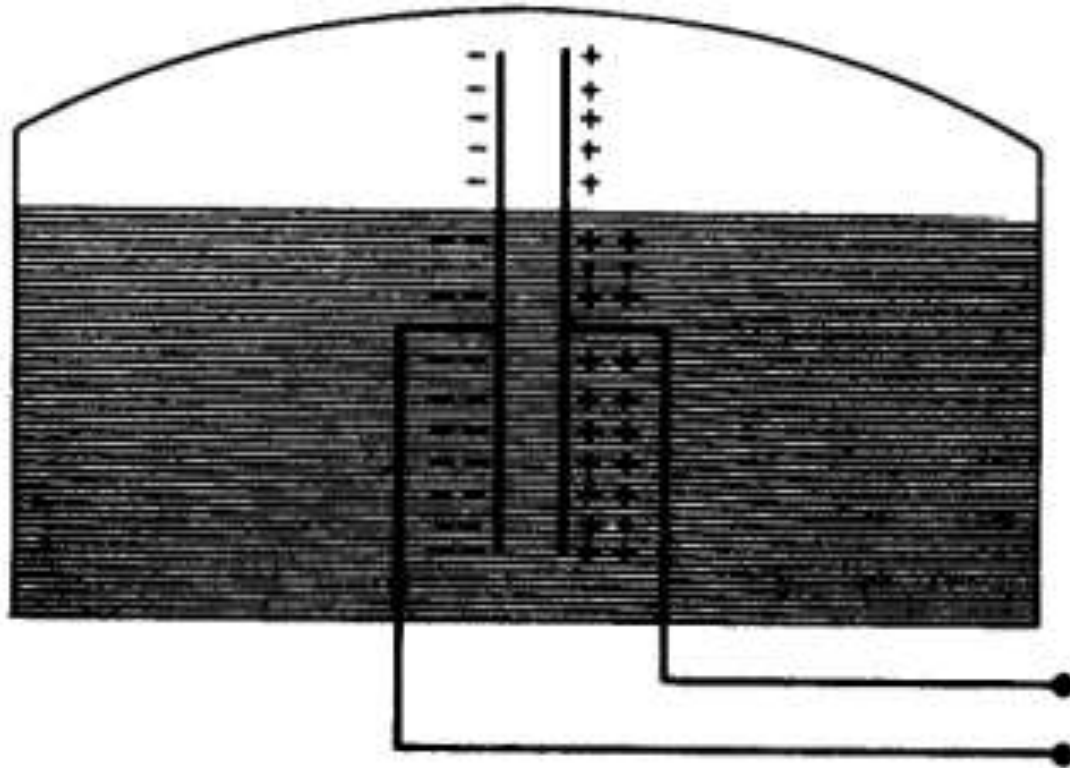


Float-type fuel level sensor

- Sense fuel level and hence, accuracy is affected by a change in
 - Attitude
 - Acceleration
 - Temperature



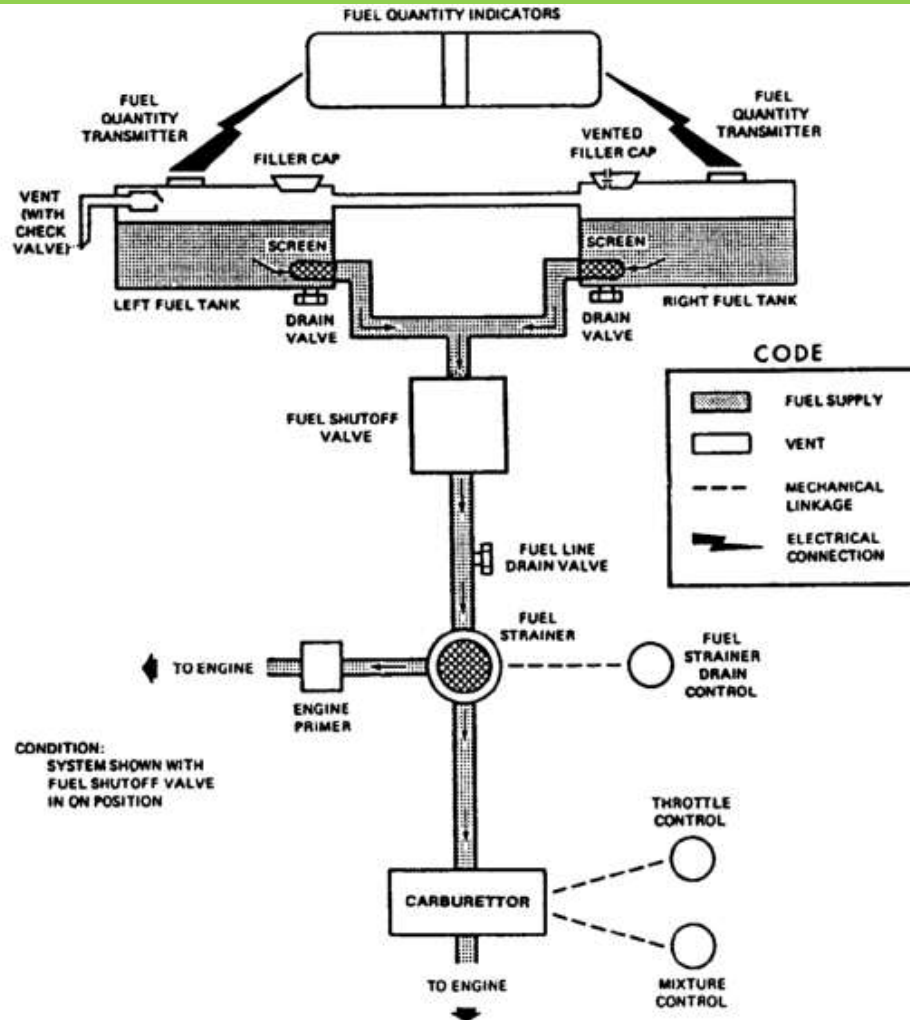
Capacitance-type fuel level sensor



Capacitance-type

- Consist of two concentric metal tube that serves as plate of the capacitor.
- When tank is empty, the dielectric constant is 1; when full about 1.6
- Capacitance varies with the level of fuel in tank.
- Can measure tanks of all sizes and shapes.
- Unaffected by attitude and acceleration.
- Compensator cancels the change in dielectric constant due to temperature variation.
- Measures the fuel in terms of mass.

Schematic of Fuel System in light engine aircraft



Learning Objectives

- List the components of aircraft fuel system and describe their functions
- State the requirements of fuel in aircrafts
- Describe the working principles of the Fuel Quantity Indicating System (FQIS)
 - Float-type
 - Capacitance-type