

Manually-Operated Gate Valves

A single selector valve is not used in complex fuel systems of transport category aircraft. Fuel flow is controlled with a series of ON/OFF, or shutoff, type valves that are plumbed between system components. Hand-operated gate valves can be used, especially as fire control valves, requiring no electrical power to shutoff fuel flow when the emergency fire handle is pulled. The valves are typically positioned in the fuel feed line to each engine. Hand-operated gate valves are also featured as ground-operated defuel valves and boost pump isolation valves, which shut off the fuel to the inlet of the boost pump, allowing it to be changed without emptying the tank.

Gate valves utilize a sealed gate or blade that slides into the path of the fuel, blocking its flow when closed. *Figure 14-43* shows a typical hand-operated gate valve.

When the handle is rotated, the actuating arm inside the valve moves the gate blade down between seals and into the fuel flow path. A thermal relief bypass valve is incorporated to relieve excess pressure buildup against the closed gate due to temperature increases.

Motor-Operated Valves

The use of electric motors to operate fuel system valves is common on large aircraft due to the remote location from the cockpit of fuel system components. The types of valves used

are basically the same as the manually operated valves, but electric motors are used to actuate the units. The two most common electric motor operated fuel valves are the gate valve and the plug-type valve.

The motor-operated gate valve uses a geared, reversible electric motor to turn the actuating arm of the valve that moves the fuel gate into or out of the path of the fuel. As with the manually operated gate valve, the gate or blade is sealed. A manual override lever allows the technician to observe the position of the valve or manually position it. *[Figure 14-44]* Less common is the use of a motorized plug-type fuel valve; an electric motor is used to rotate the plug or drum rather than it being rotated manually. Regardless of the type of valve used, large aircraft fuel system valves either allow fuel to flow or shut off flow.

Solenoid-Operated Valves

An additional way to operate a remotely located fuel valve is through the use of electric solenoids. A poppet-type valve is opened via the magnetic pull developed when an opening solenoid is energized. A spring forces a locking stem into a notch in the stem of the poppet to lock the valve in the open position. Fuel then flows through the opening vacated by the poppet. To close the poppet and shut off fuel flow, a closing solenoid is energized. Its magnetic pull overcomes the force of the locking stem spring and pulls the locking

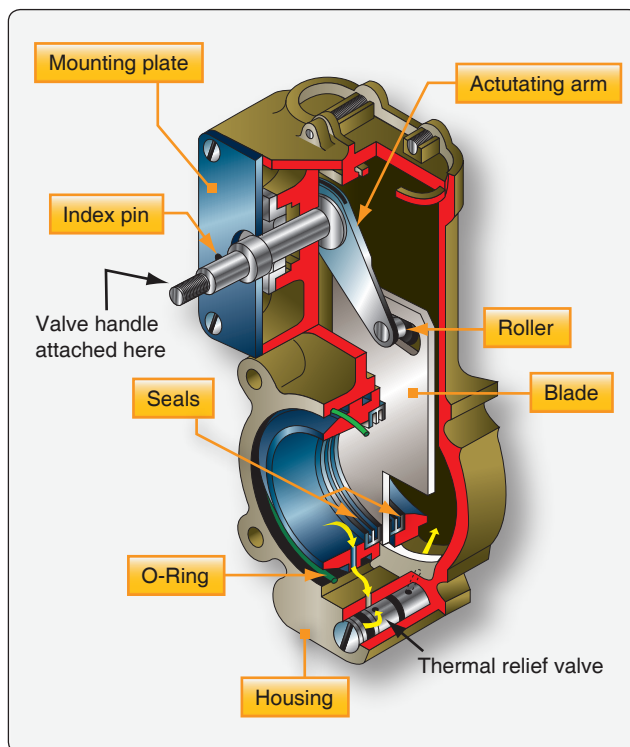


Figure 14-43. A hand-operated gate valve used in transport category aircraft fuel systems.

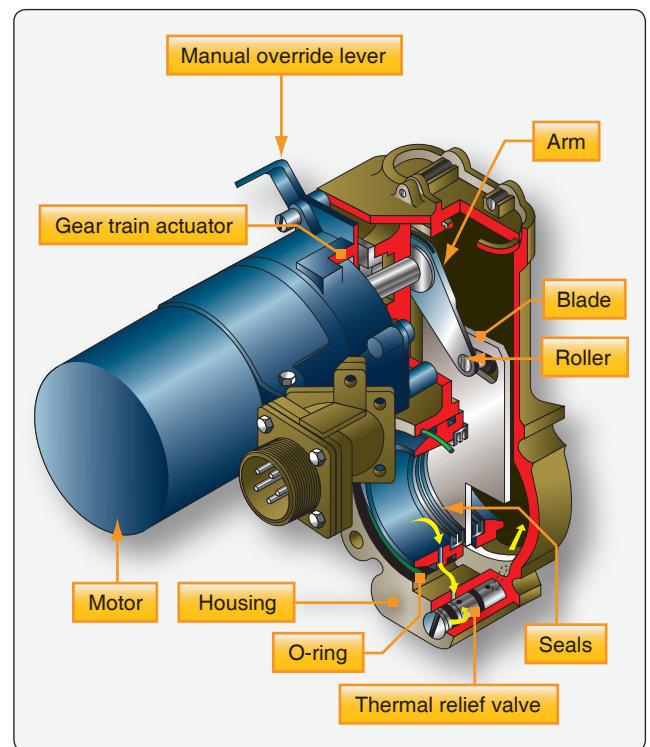


Figure 14-44. An electric motor-driven gate valve commonly used in large aircraft fuel systems.