Eaton's Vickers AC Electric Motor-Driven Hydraulic Pump, Model MPEV3-056-7A thru 10A, provides auxiliary hydraulic power for inflight operations and ground operation on the Boeing 727 and 737 series aircraft.

The hydraulic pump that supplies power to the flight controls on today’s modern aircraft is a critical component. Determining the best pump for the job involves three basic considerations:

• Reliability
• Performance
• Economy

The Model MPEV3-056 series is a high performance, low noise motorpump design that relies on proven technology and innovative concepts to achieve long life and low operation cost. This AC motorpump was developed specifically for Boeing’s fuel-efficient 737-series aircraft and can also be used on the Boeing 727 aircraft. The motorpump consists of an AC motor, variable displacement inline hydraulic pump, gearbox and boost pump.

Electric Motor

The drive motor is a 3 phase 400Hz, 115V AC driven which provides 12hp at 11,300rpm. The integral motor is cooled externally by a fluid jacket. The motor converts electrical energy to rotary shaft motion to drive the gearbox, boost pump and inline piston pump. This electric motor has proven very reliable through many years of airline service. The motor is cooled with the system’s hydraulic fluid circulated through a cooling jacket. The rate of cooling flow is set by an orifice in the cooling jacket discharge line and cooling flow is maintained at all piston pump flows from maximum to full cutoff. This assures adequate cooling at all times.

Overheat protection for the electric motor is provided by a thermal switch which automatically opens when the motor temperature exceeds 210°F (99°C) to 230°F (110°C). The thermal switch will automatically reset when the temperature reaches 160°F (71°C) to 140°F (60°C).

The motor can be provided with either a bayonet quick disconnect type electrical receptacle or a threaded type receptacle having larger pins for greater current capacity.

Hydraulic Pump

The hydraulic pump is an inline piston design which incorporates the latest state-of-the-art technology in a package with fewer parts and simplified assembly. The rotating parts of the inline pump are common with Eaton’s Vickers AC motorpump, used in the Boeing 757/767 and 747-400 aircraft.

The basic rotating group has a maximum design displacement of 0.56 C.I.R. and a rated speed of 8200rpm. In this application (MPEV3-056-7A), the nominal displacement is 0.452 C.I.R. with drive speed of 3200rpm. The combination of reduced displacement and lower speed provides improved reliability and longer life. The pump is equipped with a pressure compensator to regulate pump discharge flow above a nominal pressure of 2850psig (197bar). A minimum delivery of 5.7gpm (21.57l/min) will be maintained at pressures up to 2700psig (186bar). Full cutoff (zero flow) is reached at 3025± 25psig (209bar).

Gearbox and Boost Section

The gearbox does not exist as a separate sub-assembly, but is formed by assembly of the boost section to the motor sub-assembly. A 57-tooth gear assembled on the impeller drive shaft is driven by a 16-tooth pinion located on the motor shaft. Yielding a ratio of 3.56:1. The reduction gear is utilized to optimize electric motor size and weight. The gearbox is lubricated and cooled with system fluid circulated through the gearbox by the boost impeller.

The boost section uses a centrifugal pump impeller to supercharge the fluid pressure available at the motorpump inlet. This allows the piston pump to operate at inlet pressures well below atmospheric, down to 5.0 inches of mercury absolute. The boost pump also provides a continuous source of cooling flow for the electric motor, shaft seal and gearbox cavity.