

Aircraft Hydraulic System Maintenance Manual

1. Overview of Aircraft Hydraulic Systems

Aircraft hydraulic systems provide the power necessary to operate critical flight control components and auxiliary systems. These systems are designed to deliver high-force actuation with reliability and redundancy. Hydraulic power is commonly used for landing gear operation, flight control surfaces, brakes, nose wheel steering, thrust reversers, and cargo doors.

Modern commercial aircraft typically operate hydraulic systems at pressures ranging from **3000 to 5000 psi**. To ensure safety, aircraft are equipped with multiple independent hydraulic systems, usually labeled as **System A, System B, and Standby System**.

2. Major Components of the Hydraulic System

The hydraulic system consists of the following primary components:

- **Hydraulic Reservoir**
Stores hydraulic fluid and supplies it to the system. Reservoirs are pressurized to prevent pump cavitation at high altitudes.
 - **Hydraulic Pumps**
Pumps may be engine-driven, electrically driven, or air-driven. Engine-driven pumps are the primary source of pressure during flight.
 - **Hydraulic Fluid**
Aviation-approved hydraulic fluids such as phosphate ester-based fluids are used due to their fire-resistant properties.
 - **Filters**
Filters remove contaminants from the hydraulic fluid. Contamination is a leading cause of hydraulic system failure.
 - **Actuators**
Convert hydraulic pressure into mechanical motion to operate control surfaces and landing gear.
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3. Hydraulic Pump Replacement Procedure

Safety Precautions

- Ensure aircraft is parked, chocked, and hydraulics are depressurized.

- Wear protective gloves and eye protection.
- Hydraulic fluid is hazardous and must not contact skin.

Replacement Steps

1. Depressurize the hydraulic system using the maintenance panel.
 2. Disconnect electrical and hydraulic connections from the pump.
 3. Remove mounting bolts securing the pump.
 4. Carefully extract the pump to avoid fluid spillage.
 5. Install the new pump and torque mounting bolts as specified.
 6. Reconnect hydraulic lines and electrical connectors.
 7. Re-pressurize the system and check for leaks.
 8. Perform operational test according to maintenance manual.
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4. Common Hydraulic System Faults

- Low system pressure
- Fluid leakage at fittings
- Pump overheating
- Contaminated hydraulic fluid
- Abnormal actuator movement

Corrective action must be taken immediately to prevent system failure.