

SECTION 9

HYDRAULIC AND PNEUMATIC SYSTEM.

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Hydraulic and Pneumatic Systems

HYDRAULIC SYSTEM

Introduction

279. The hydraulic system, which is of the Lockheed "high pressure" type, operates the landing gear, flaps and dive brakes. A circuit diagram is shown in Fig. 97, and three piping illustrations in Figs. 33, 34 and 35. The system is described in the following paragraphs.

Power Circuit

280. An engine driven pump supplies power to the selector valves through an automatic cut-out valve and a hydraulic accumulator. When the accumulator is charged to 2,500/2,600 lb./sq. in., the automatic cut-out valve closes and diverts the fluid through the circuit to the reservoir. The selector unit is comprised of three sections, controlling the landing gear, the flaps and dive brake circuits. When the selector valves are at NEUTRAL the fluid is bypassed through the automatic cut-out valve back to the reservoir at low pressure. A non-return valve located in the hand-pump circuit prevents the fluid from the engine-driven pump from entering the hand-pump delivery line. Two coupling points located on the left-hand side of the engine bulkhead permit the use of a rig for ground test purposes.

Reservoir

281. The reservoir, which is filled with fluid to specification DTD.585, Ident K2/138, is divided into two unequal compartments by a baffle plate, the upper part of which is perforated. The hand pump supply is taken from the bottom of the larger compartment, while the engine driven pump receives its supply of fluid from the bottom of the smaller compartment. The fluid returning from the system enters the larger compartment and, when this is full, passes through the holes in the baffle plate to the smaller compartment. Therefore an ample reserve of fluid is always present for hand pump operation.

Landing Gear Circuit

282. The circuit is controlled by one section of the selector valve, which has two settings, UP and DOWN; a neutral setting

is not provided. Fluid under pressure is directed to the jacks and back to the reservoir through the selector valve.

Flaps Circuit

283. The flap selector valve provides three settings, UP, NEUTRAL and DOWN. The valve is manually returned to NEUTRAL when it is desired to set the flaps in an intermediate position suitable for take-off. Returning the valve into this position allows the pressure to pass to both sides of the jack ram and maintain it in this setting.

Emergency (Hand Pump) Circuit

284. In the event of failure of the engine pump circuit, the flaps and landing gear may be lowered by setting the respective selector levers to DOWN, and operating the hand pump. The dive brakes can only be operated by the hand pump when the aircraft is on the ground, and the manual control valve located on bulkhead No. 2 is held in the open position.

Dive Brake Circuit

285. Two settings only are provided by the dive brake selector valve, OFF and ON. The fluid under pressure passes to the jacks through a non-return valve, and is returned through the selector valve to the reservoir.

PNEUMATIC SYSTEM

General

286. The pneumatic system is used solely for providing pressure for operating the wheel brakes. A diagrammatic arrangement is shown in Fig. 98, and a piping illustration with reservoir connections in Fig. 38. Full descriptions and details of servicing components are shown in A.P.2337, Vol. I.

Supply System

287. The Heywood air compressor driven by the auxiliary gear box mounted on the engine bulkhead supplies air to the reservoir. A Hymatic RV10 relief valve set at 600 lb./sq. in. is provided adjacent to the compressor to protect the system if freezing occurs, but the reservoir is charged to a maximum pressure of 450 lb./sq. in. The maximum pressure is controlled by a regulator valve mounted at the side of the

reservoir, which relieves at 450 lb./sq. in. The reservoir may be charged on the ground by a compressed air bottle, a connection for which is provided on the pneumatic panel on the rear face of bulkhead No. 2. Access to the pneumatic panel is obtained by opening the gun bay doors. (See Figs. 38 and 98.)

NOTE: If fitting a new compressor as a replacement to existing unit, ensure that internal oil sealing ring (if fitted) is removed and discarded.

NOTE 2: The earlier aircraft are fitted with the SH6/2A type of compressor, but later aircraft have the SH6/5B type fitted; these compressors are similar in construction with the following exception: the SH6/2A type is fitted with filter type S.F.1 fitted over the cylinder head, while the SH6/5B type is fitted with a filter type S.F.2A connected to the cylinder head intake elbow by a short length of hose.

Reservoir

288. The air reservoir located below the cockpit floor comprises a cylindrical shell with hemispherical ends. Integral with each end is a boss into which is threaded a screwed connection for receiving the inlet pipe and delivery pipes to the regulator, filter and gauge. It will be found necessary to drain the reservoir periodically.

Filter

289. The air filter located on the pneumatic panel is connected into the system on the output side of the reservoir, and prevents any moisture passing from the charging point reaching the reducing valve or brake differential unit. The filter element is a thick felt pad sandwiched between perforated metal discs. The inlet pipe is connected to the side of the filter and the outlet pipe to the top cover, while the plug in the bottom is for drainage purposes.

Oil and Water Trap

290. The oil and water trap is mounted

on the pneumatic panel, and separates the air from fluids which may enter the system. The trap should be drained at daily inspection or at the conclusion of any long flights. The drain plug is a spring-loaded threaded pin with a conical end, which forms a seal when screwed into the hole in the bottom of the body. A knurled wheel forms the opposite end of the plug. The trap is drained by disconnecting at the trap the line from the compressor and connecting up a compressed air bottle, as the trap must be drained while under pressure in order to remove all deposits of oil sludge. The knurled wheel is turned and held until all fluid has drained; the wheel should then be returned to the closed position.

Pressure Regulator

291. The compressor delivers the air to the reservoir through the oil and water trap and pressure regulator which is mounted on the clip retaining the reservoir. The maximum pressure in the reservoir is controlled by the regulator which by-passes the delivery to atmosphere when a pressure in excess of 450 lb./sq. in. has been reached.

Pressure Reducing Valve

292. The reducing valve mounted on the pneumatic panel incorporates screwed connections for the inlet and outlet pipes. It is a pressure balanced valve set to reduce the pressure to 200 lb./sq. in. for delivery to the brake differential unit.

Brake Differential Unit

293. The differential unit is mounted on top of the nose wheel well in the cockpit and is connected to the brake lever on the control column by a cable. A lever on the rudder pedal layshaft is linked on to a connecting rod on the differential unit, and operates the valves to provide differential braking when manoeuvring the aircraft on the ground.

Access to the unit is obtained by opening the inspection cover located on bulkhead No. 1.

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