

## INTRODUCTION

### General

1. The Mk. 10301 airborne auxiliary power plant comprises a Rover gas turbine engine driving a 40 kVA a.c. generator through a train of gears. A supply of compressed air may be bled off if required.

### Casings

2. The power plant is enclosed within six stainless steel panels that form a rectangular box; the engine and a.c. generator are suspended from the top panel or rail; the bifurcated air intake duct is rigidly secured to the bottom panel so that the top panel and the bottom one together with the front and rear end panels, form a chassis for the unit. The rear end panel carries an outlet duct that pipes the turbine gases to atmosphere. The two side panels are secured by locking peg fasteners and are detachable for servicing.

### Engine

3. The engine consists of a single-sided centrifugal compressor driven by a single stage axial turbine mounted on a common shaft and supported in two bearings. Air is admitted from the underside of the power plant and ducted to the compressor rotor where it is compressed and passed to a single, reverse-flow, combustion chamber. Fuel is injected from a spill-type burner and the resultant mixture initially ignited by an igniter plug fitted in the side of the combustion chamber. Above approximately 13,000 rev/min, which is termed the self-sustaining speed, ignition is self-supporting. Combustion gases pass from the chamber downwards through a volute to a fixed nozzle ring assembly that directs them against the blades of the turbine rotor. The combustion gases are then exhausted to atmosphere via a fabricated exhaust cone and cylinder assembly and the outlet duct.

### Fuel System (Pre Mod. M.182)

4. A fuel control unit provides automatic control for starting, maximum speed and temperature. The unit consists of a twin fuel pump, containing separate metering and re-circulating pumps, a temperature control, and an overspeed governor. In addition the system is provided with an air/fuel ratio control, a combined metering and pressurizing unit and a fuel pressure transmitter. The supply to the pump is taken from the aircraft fuel tanks via a booster pump in the aircraft and a low pressure filter mounted on the exterior of the front end panel.

5. As the electrical application of the engine requires it to be operated at a constant rotor speed, no throttle valve is necessary, the fuel flow being controlled automatically by spill valves in the air/fuel ratio control unit, the governor and the temperature control unit.

### ◀Fuel System (Mod. M.182)

6. A Lucas altitude and temperature compensated pump, supplied from the aircraft fuel tanks through a boost pump and the L.P. filter on the front end panel, contains an overspeed governor, together with the altitude and temperature controls required to regulate the fuel flow to maintain constant speed and acceptable j.p.t. at varying altitudes and electrical loadings. The fuel is injected by a Lucas air-assisted burner. ▶

### Lubrication system

7. Engine lubrication is provided by a gear type pressure pump which draws its supply from an oil sump formed by the lower part of the compressor casing.

8. The a.c. generator and engine oil cooler are supplied with cold air ducted from a blower unit mounted immediately below the a.c. generator. The air intake to the oil cooler is controlled by an electrically actuated butterfly valve. The engine is also equipped with a sump heater to assist starting at altitude.

### Starting

9. Two starting systems are provided; an electric starter for normal conditions, and a cartridge starter for emergency conditions. A 24 volt battery mounted in the aircraft provides the power for the electric starter motor. The cartridge system, which provides for two emergency starts, is mounted beneath the power plant and consists of two cartridges discharging via two pipes directly on to the blades of the turbine rotor.

10. The power plant is also provided with oxygen enrichment equipment to assist starting at extreme altitudes. The equipment consists of two oxygen bottles together with a reducing valve mounted on the exterior of the rear end panel. When the controlling solenoid is operated oxygen is piped to the combustion chamber via the burner.

### Fire prevention

11. The fire prevention system of the power plant consists of a series of fire detector heads mounted on the interior of the chassis which, in the event of fire, energize a warning device in the aircraft. A methyl bromide bottle manually controlled by a button in the aircraft discharges into the power plant through two nozzles mounted on the interior of the forward end panel.

