POWER PLANT (PT6A-140) - DESCRIPTION AND OPERATION

1. General

A. The power plant installed in Model 208B Airplane 208B2197 and Airplanes 208B5000 and On is a Pratt and Whitney Aircraft of Canada, Ltd., PT6A-140 (867 SHP) engine. The PT6A-140 power plant is a lightweight free turbine engine. The engine is self-sufficient because the oil system is gas generator driven and supplies lubrication for all areas of the engine. The oil system also supplies pressure for the torquemeter and power for propeller pitch control.

2. Description

A. The inlet air enters the engine through an annular plenum chamber, that is formed by the compressor inlet case. The chamber directs the air forward to the compressor. The engine uses a three-stage axial, single-stage centrifugal compressor, driven by a single-stage turbine (free turbine). A second single-stage turbine, counter rotating with first, drives propeller through a reduction gearbox. Fuel is supplied to the engine from the fuel reservoir and is pressurized by an engine-driven fuel pump. The fuel flow to the fuel manifold is controlled by the fuel control unit (FCU). Fuel is sprayed into an annular combustion chamber by 14 individually removable fuel nozzles installed around the gas generator case. An ignition unit and two spark igniter plugs are used to start combustion. A hydro-pneumatic fuel control unit (FCU) schedules fuel flow to maintain power setting selected by the power control lever. Propeller speed remains constant at any selected propeller control lever position through action of a propeller governor. When engine power lever is moved aft into beta range (reverse), maximum propeller speed is limited by pneumatic section to propeller governor. For an illustration of engine components refer to Figure 1. For an engine air flow diagram refer to Figure 2.

B. Most of the engine-driven accessories are mounted on the accessory gearbox at the rear of the engine. This component installation location helps with the ease of component maintenance.

C. For more detailed data concerning the PT6A-140 power plant refer to the Pratt & Whitney Canada Maintenance Manual P/N 3075742, found in the Introduction List of Publications.

Figure 1 : Sheet 1 : Engine Components

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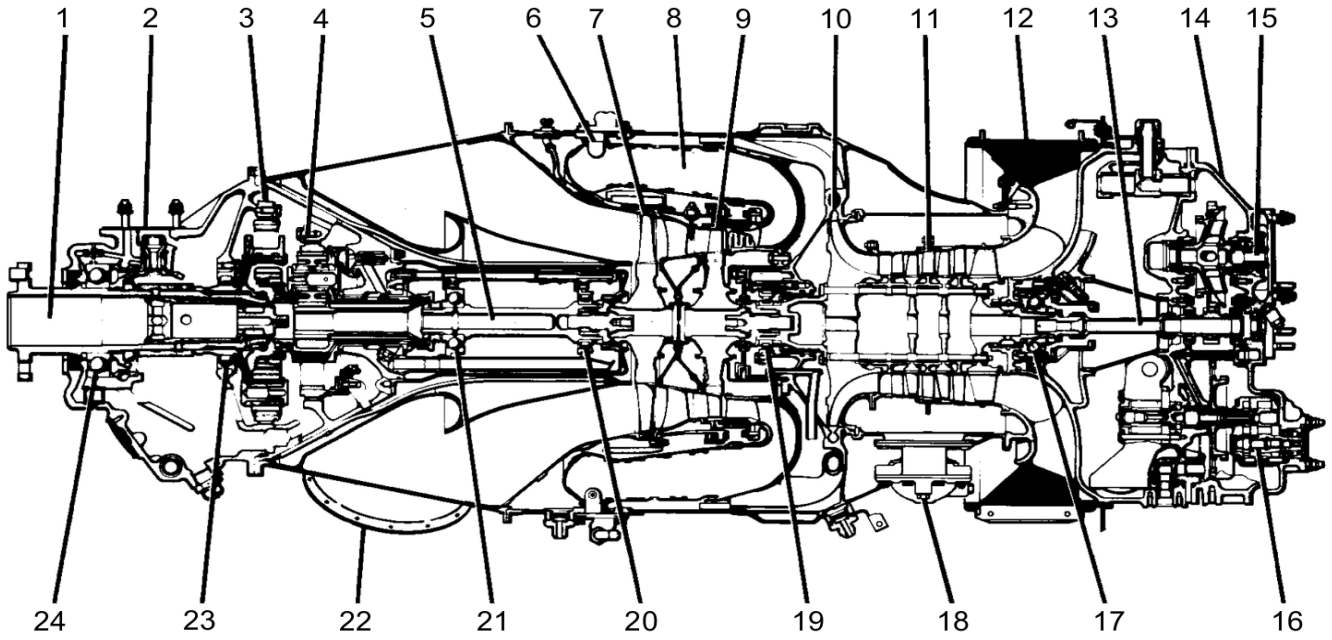

1. PROPELLER SHAFT
2. PROPELLER GOVERNOR DRIVE PAD
3. SECOND STAGE PLANETARY GEAR
4. FIRST STAGE PLANETARY GEAR
5. POWER TURBINE SHAFT
6. FUEL NOZZLE
7. POWER TURBINE
8. COMBUSTION CHAMBER
9. COMPRESSOR TURBINE
10. CENTRIFUGAL COMPRESSOR IMPELLER
11. AXIAL–FLOW COMPRESSOR IMPELLERS (3)
12. COMPRESSOR AIR INLET
13. ACCESSORY GEARBOX DRIVE SHAFT
14. ACCESSORY GEARBOX COVER
15. STARTER–GENERATOR DRIVE SHAFT
16. OIL SCAVENGE PUMP
17. NUMBER 1 BEARING
18. COMPRESSOR BLEED VALVE
19. NUMBER 2 BEARING
20. NUMBER 3 BEARING
21. NUMBER 4 BEARING
22. EXHAUST OUTLET
23. ROLLER BEARING
24. THRUST BEARING

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Figure 2 : Sheet 1 : Engine Air Flow

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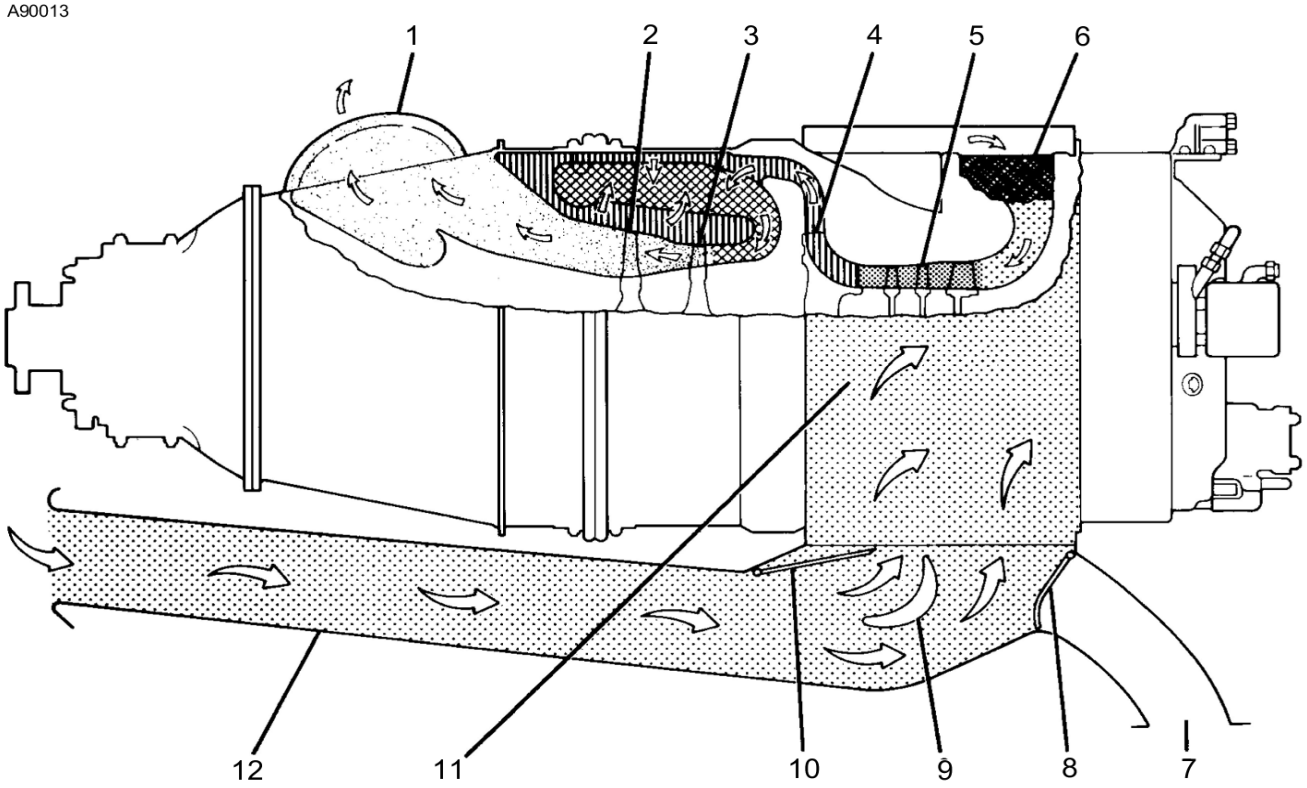
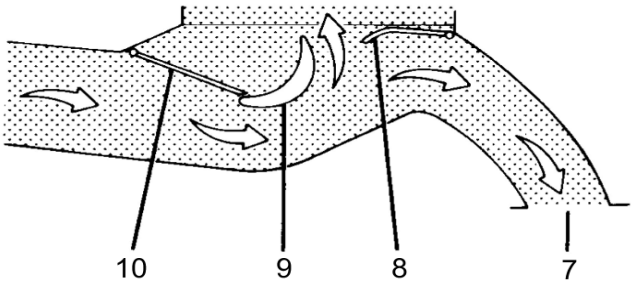


NOTE: ABOVE VIEW SHOWS INERTIAL SEPARATOR IN NORMAL POSITION. AUXILIARY VIEW SHOWS INERTIAL SEPARATOR IN BYPASS POSITION.



CODE

RAM AIR

RAM AIR COMPRESSED WHILE FLOWING THROUGH THREE STAGES OF AXIAL–FLOW IMPELLERS

RAM AIR COMPRESSED WHILE FLOWING THROUGH CENTRIFUGAL IMPELLERS

COMPRESSED AIR INJECTED WITH FUEL AND IGNITED

BURNED FUEL–AIR MIXTURE IS EXPANDED AND DRIVES COMPRESSOR TURBINE AND POWER TURBINE, AND IS THEN EXHAUSTED

1. PRIMARY EXHAUST PIPE
2. POWER TURBINE
3. COMPRESSOR TURBINE
4. CENTRIFUGAL IMPELLER
5. AXIAL–FLOW IMPELLERS (3)
6. ENGINE AIR INLET
7. INERTIAL SEPARATOR OUTLET
8. INERTIAL SEPARATOR REAR VANE
9. INERTIAL SEPARATOR AIRFOIL
10. INERTIAL SEPARATOR FRONT VANE
11. INDUCTION AIR INLET PLENUM
12. INDUCTION AIR INLET DUCT

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