

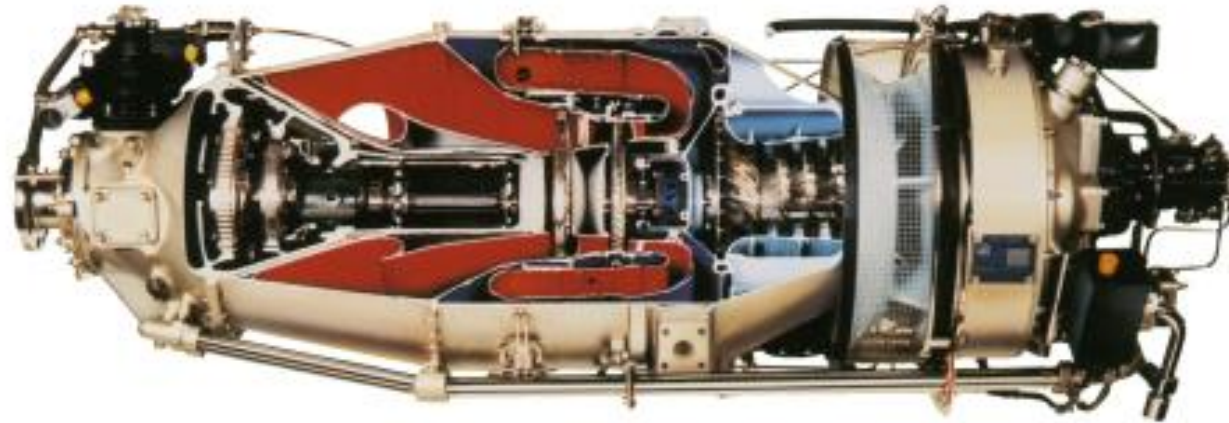
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# TECHSAVIATION

Training Center

## *PT6A Série* - Training Manual

72-50-00- TURBINE SECTION



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72-50-00

## TURBINES SECTION - DESCRIPTION AND OPERATION

### 1. General

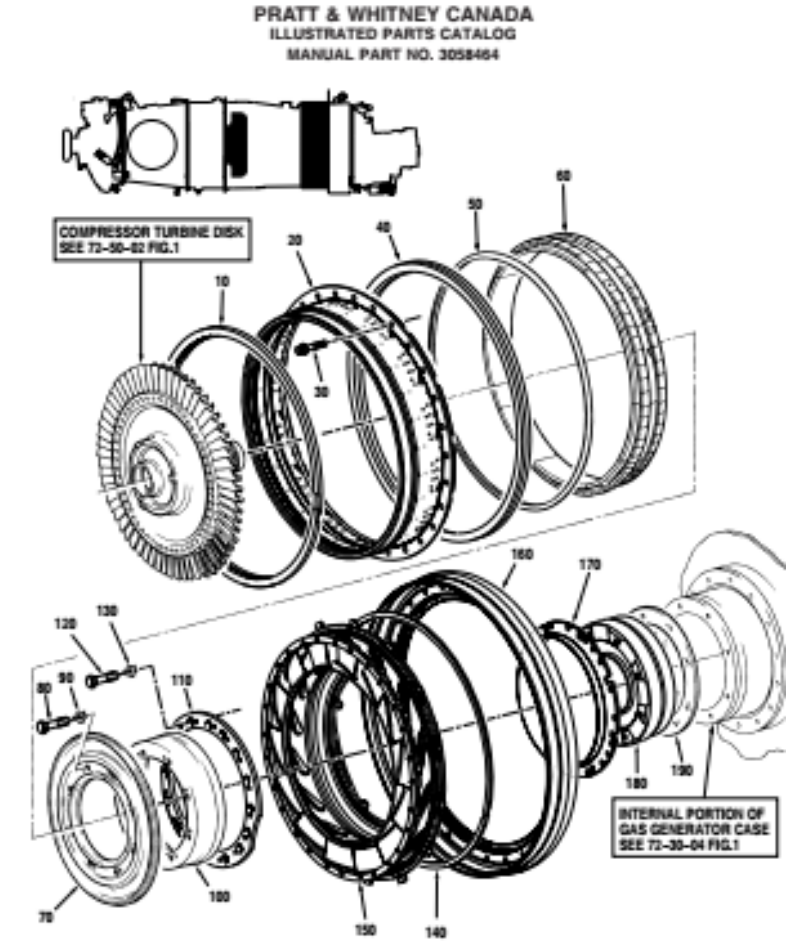
The engine incorporates two turbines, one for the compressor section and the other for the power section. The compressor turbine is splined to the compressor front stubshaft, while the power turbine is splined to the power turbine shaft assembly, which, in turn, drives the reduction gearbox (Ref. 72-11-00, REDUCTION GEARBOX - DESCRIPTION AND OPERATION).

Each turbine is preceded by an inlet guide vane assembly which directs the gas flow onto its associated turbine at the most efficient angle. The compressor turbine inlet guide vanes are provided with cored cooling air passages (Ref. 75-30-00). The compressor turbine rotates within a shroud housing which incorporates nine shroud segments. The segments are ground to provide the necessary blade tip clearance.

The power turbine vane ring and interstage baffle, which form part of the power turbine stator assembly, are contained within the power turbine stator housing which is bolted at its front end, together with power turbine containment ring, to the exhaust duct.

The gas flow from the combustion chamber liner is directed into the engine turbine area via the annular passage between the small and large exit ducts. This passage changes the gas flow 180 degrees to provide a forward flow.

# Curso de Motor PT6A - Séries



C88090  
Compressor Turbine Stator Assembly, Shroud And Duct  
Installation  
Figure 1

72-50-01  
Figure 1  
Page 2  
Aug 18/2006

72-50-00

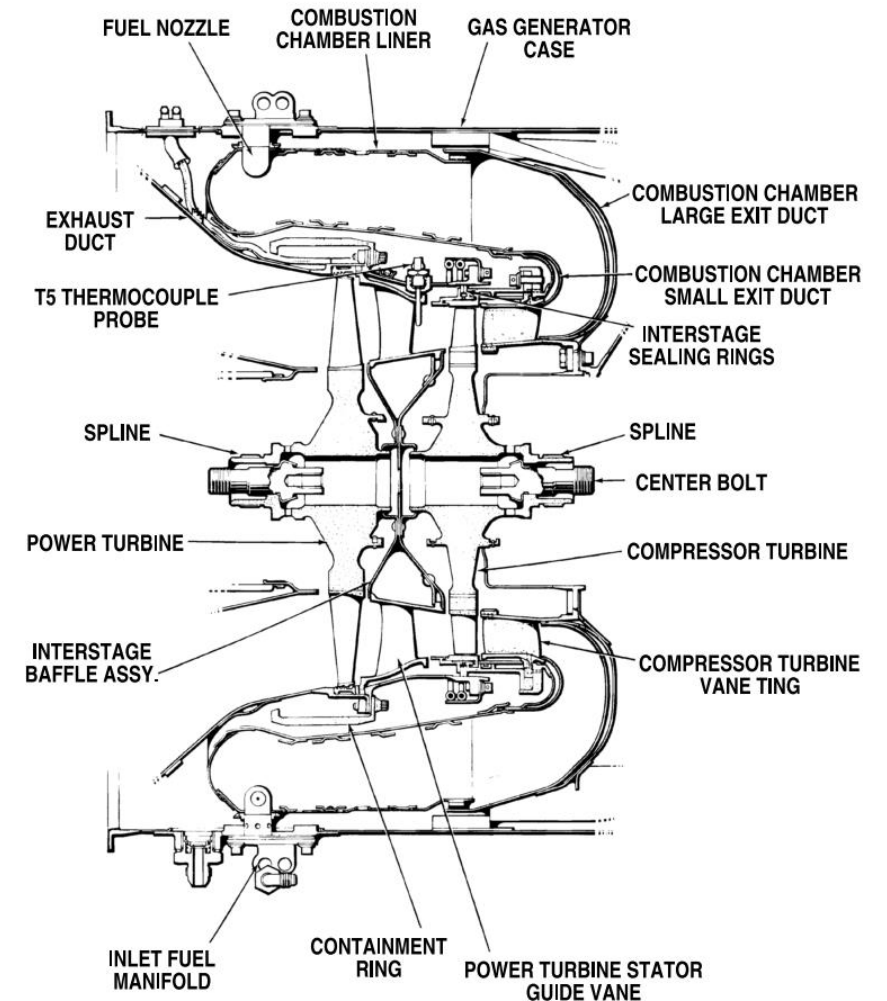
## TURBINES SECTION - DESCRIPTION AND OPERATION

### 2. Description and Operation

The compressor turbine is driven by the gas flow from the combustion section being deflected onto the turbine blades by a stator assembly. The compressor turbine comprises a bladed disk assembly running in a shroud housing assembly.

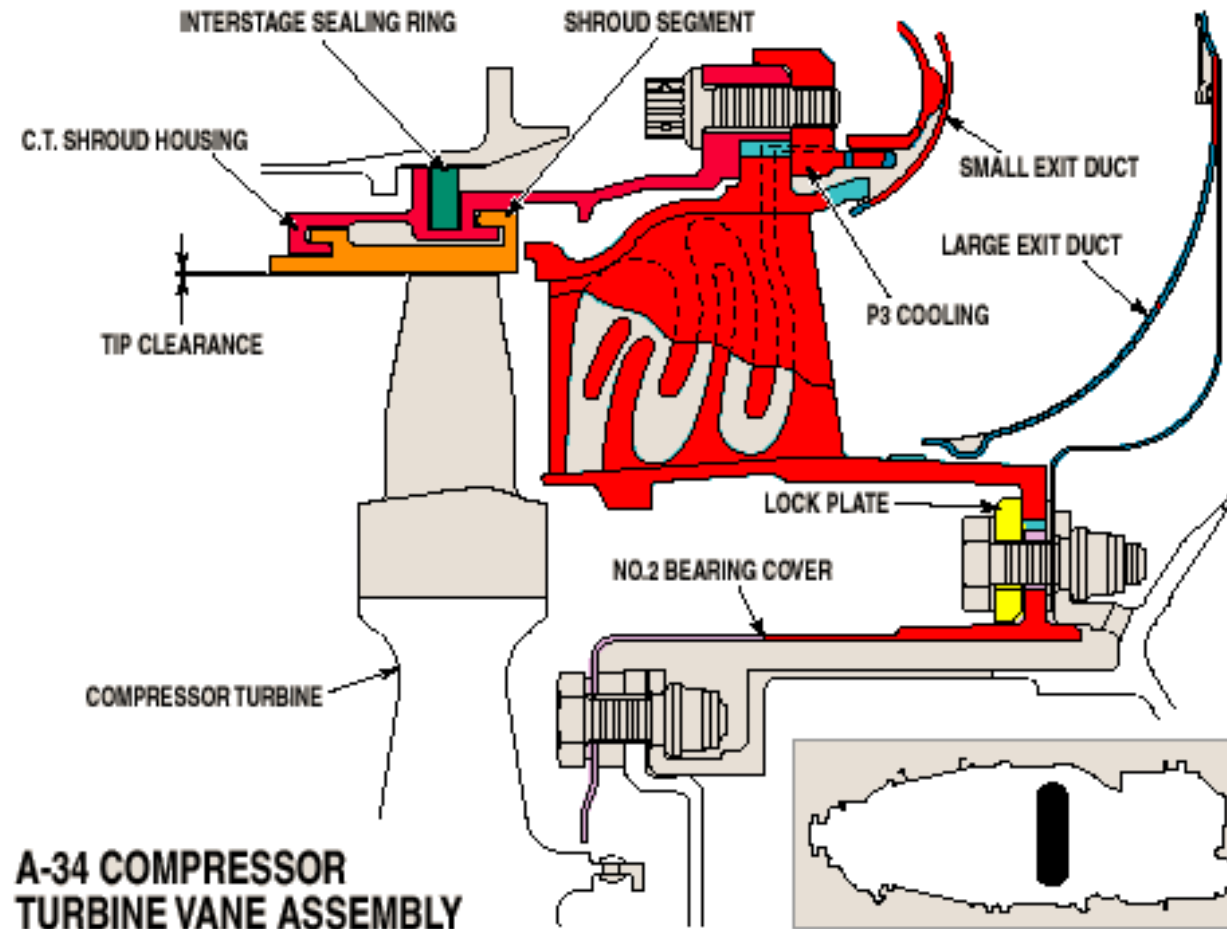
The power turbine is rotated by the remaining energy in the gas flow from the compressor turbine being deflected on to each power turbine disk by their respective stator assemblies.

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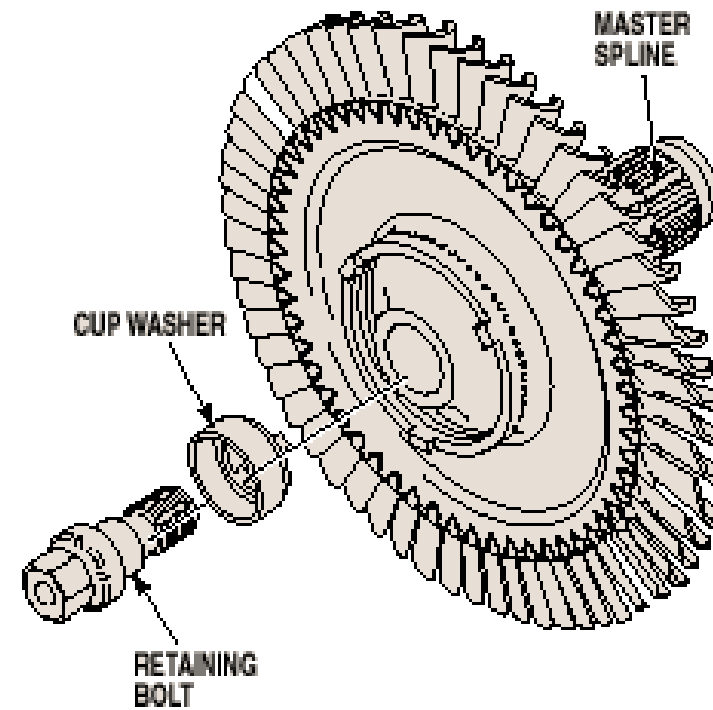
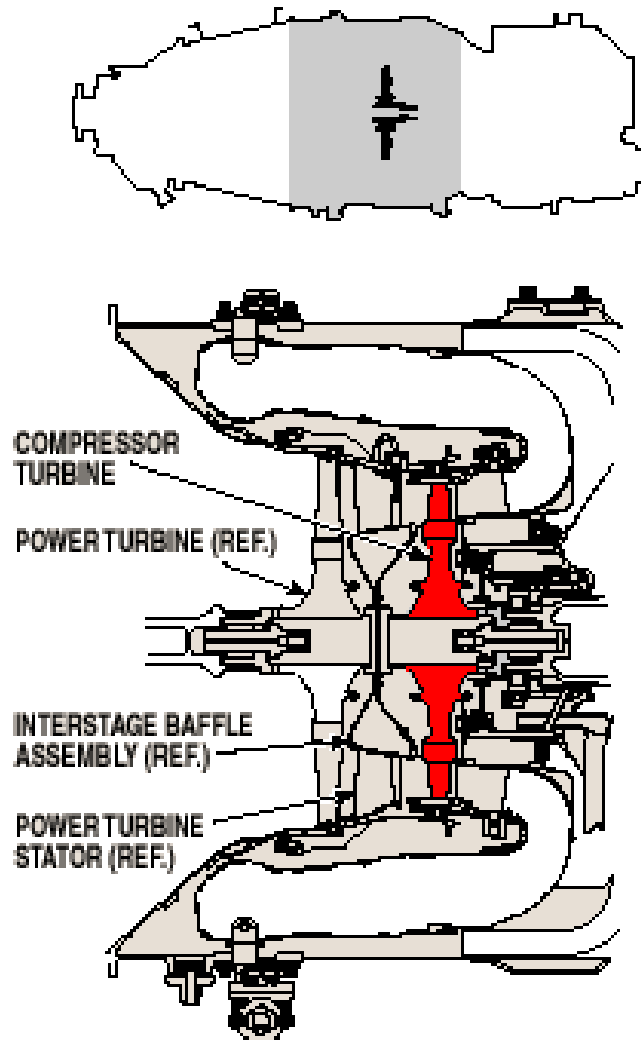
## TURBINES SECTION - DESCRIPTION AND OPERATION



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## TURBINES SECTION - DESCRIPTION AND OPERATION

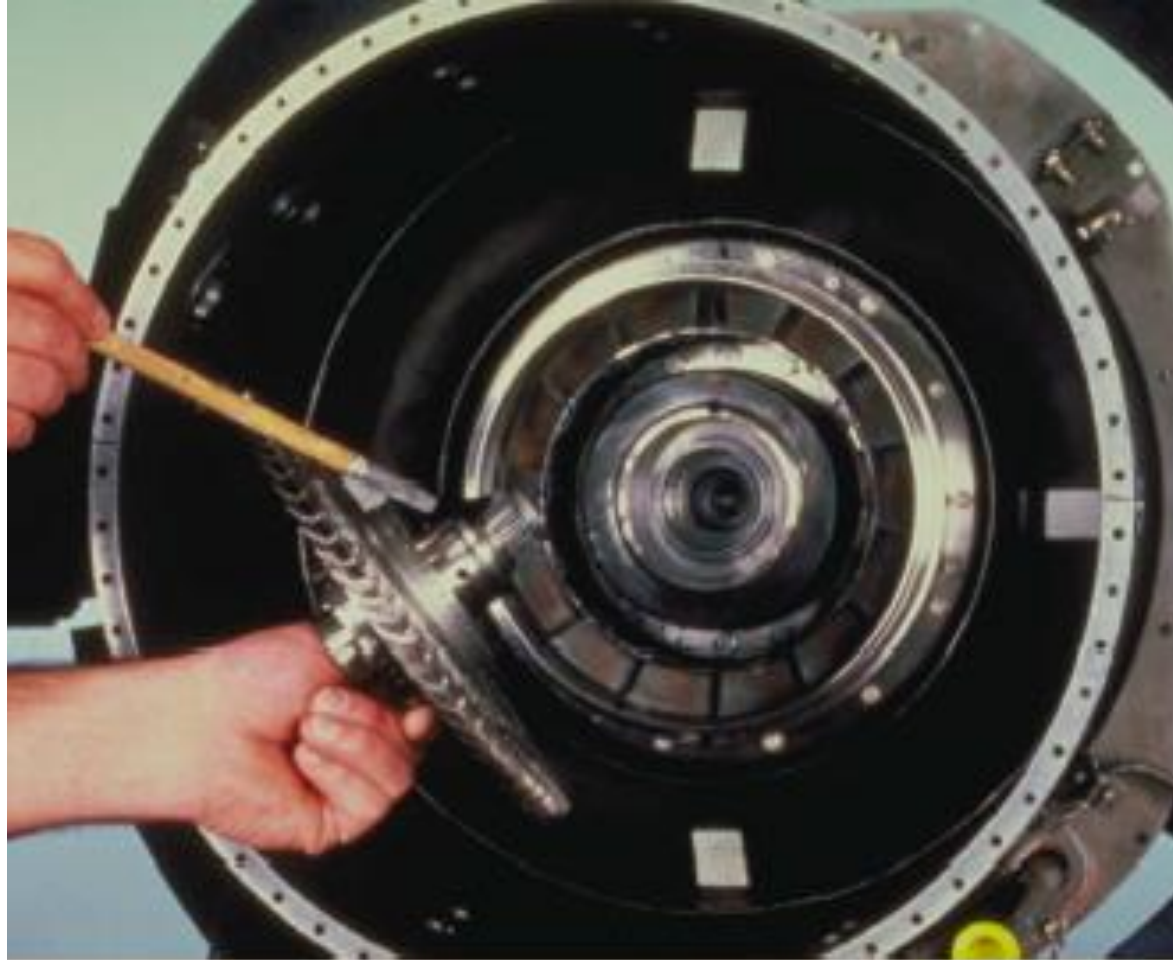
# Curso de Motor PT6A - Séries



72-50-00

**TURBINES SECTION - DESCRIPTION AND OPERATION**

***Curso de Motor PT6A - Séries***



72-50-01

## COMPRESSOR TURBINE STATOR - DESCRIPTION AND OPERATION

### 1. Description and Operation (Ref. 72-50-00, Fig. 1)

The compressor turbine guide vane ring consists of 14 air-cooled vanes, cast integrally and located between inner and outer rings. The airfoil section of the vanes directs the expanding gases from the combustion chamber to the compressor turbine blades at the optimum angle for maximum efficiency. The inner ring is cast with an extended rearward platform and internal flange. Lugs on the flange engage with slots in the No. 2 bearing cover.

An annular lockplate and 16 bolts secure the vane ring, No. 2 bearing cover and large exit duct to the gas generator case. The outer ring locates the compressor turbine shroud housing and small exit duct.

The compressor turbine shroud housing extends forward toward the power section. The extension provides two features: the outer diameter incorporates a circumferential groove which accommodates the interstage sealing ring(s) while the inner diameter is machined to accommodate the classified compressor turbine shroud segments. The segments are held in position by a retaining ring seated inside, and riveted to, the shroud housing. The shroud segments act as a seal and provide running clearance for the compressor turbine. The interstage sealing rings [Pre-SB1320](#) seal the mechanical separation between the combustion section and the interturbine area. The two sealing rings may be replaced with a single wider sealing ring [Post-SB1320](#).



72-50-01

## COMPRESSOR TURBINE STATOR - DESCRIPTION AND OPERATION

### 1. Description and Operation (Ref. 72-50-00, Fig. 1)

The large exit duct is located at the rear of the combustion chamber liner, adjacent to the diffuser in the front section of the gas generator case. The duct forms the outer section of an envelope to change direction of gas flow 180 degrees and directs it to the compressor turbine guide vanes. The duct, fabricated from nickel alloy, incorporates a heatshield at the rear. Compressor discharge air (P3) is routed into the space formed by the heatshield to cool the duct. The outer flange of the duct incorporates a "wobble strip" [Pre-SB1434](#) or sliding joint [Post-SB1434](#) to provide a mating flange for the outer wall of the combustion chamber liner and ports for the passage of cooling air over the duct wall. The inner section of the duct incorporates a bolting flange for mounting at the gas generator case centerbore.

The small exit duct locates in the rear of the combustion chamber liner via a sliding joint and slotted seal ring and attaches to the compressor turbine guide vane ring. The duct forms the inner section of an envelope that changes the direction of gas flow 180 degrees and directs it to the compressor turbine inlet guide vanes. The duct is fabricated from nickel alloy and incorporates a heatshield and mounting flange at the front. Holes in the heatshield allow cooling air to be routed through the space between the duct wall and heatshield; the air then passes out of the space and into the gas stream at the ID of the duct wall. Air entry ports, incorporated in the mounting flange, enable cooling air to be directed into cored passages in the compressor inlet guide vanes.



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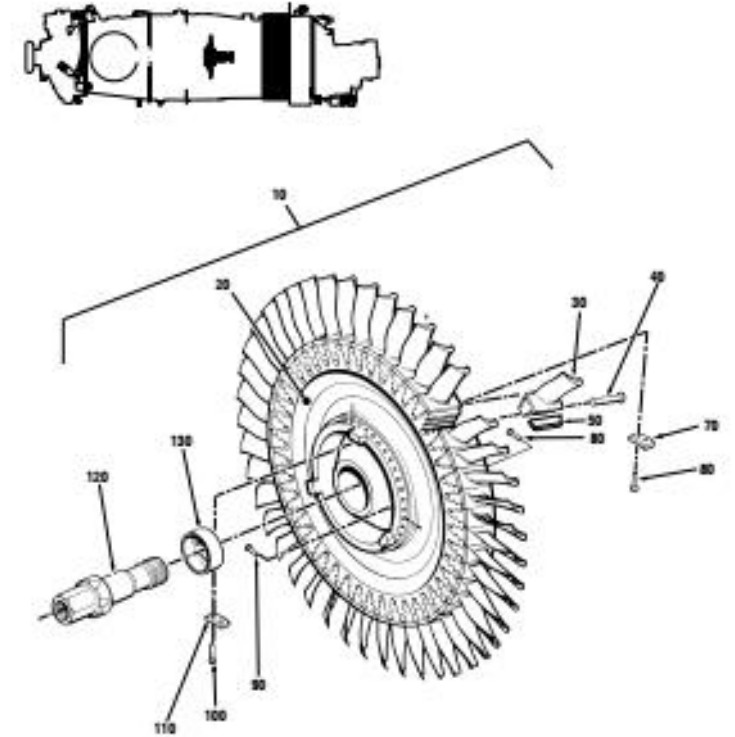
## COMPRESSOR TURBINE - DESCRIPTION AND OPERATION

### . Description and Operation

The compressor turbine installation consists of a two-plane balanced turbine disk with an integral shaft extension, turbine blades, and classified weights. The assembly is an independently balanced unit which can be replaced by another balanced unit without affecting the compressor rotor assembly balance.

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PRATT & WHITNEY CANADA  
ILLUSTRATED PARTS CATALOG  
MANUAL PART NO. 3058464



Compressor Turbine Installation  
Figure 1

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72-50-02

Figure 1

Page 2

Aug 18/2006

72-50-02

## COMPRESSOR TURBINE - DESCRIPTION AND OPERATION

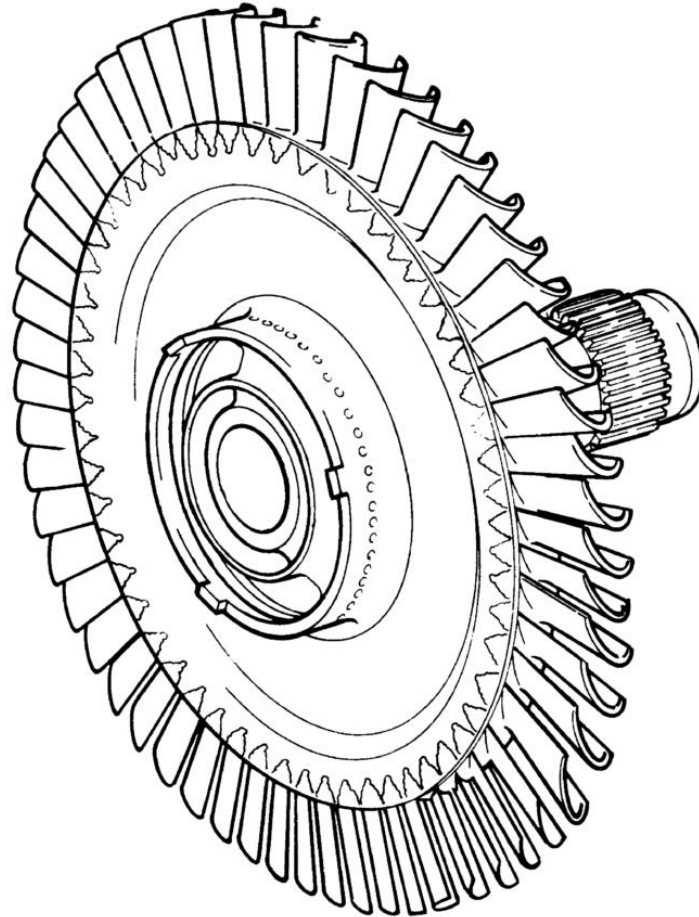
### . Description and Operation

The turbine drives the compressor rotor assembly in a counterclockwise direction through the shaft extension, which is externally splined to fit into the internally splined compressor stubshaft. A master spline ensures positive location of the turbine assembly to retain original balance. A center bolt and keywasher secure the turbine assembly to the compressor rotor assembly.

The turbine disk embodies a circumferential groove to enable disk growth to be checked. The blades are secured to fir-tree serrations machined in the disk circumference and retained in position by rivets. Blades are of cast high temperature alloy and are parallel or tapered according to requirements of individual engine model. They incorporate squealer tips to make sure minimum rub should they contact the shroud segments. Classified balance weights are riveted, as necessary, to the front and rear disk flanges during turbine balancing

72-50-02

## COMPRESSOR TURBINE - DESCRIPTION AND OPERATION



## **BIBLIOGRAPHY**

- PRATT WHITNEY. **Maintenance Manual:** PT6A-114/-114A/-116/-135/-135A. PN3043512.  
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