

PRATT & WHITNEY CANADA
MAINTENANCE MANUAL
MANUAL PART NO. 3013242

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AIR INLET SECTION - DESCRIPTION AND OPERATION

1. General

- A. The compressor inlet case is a component of the engine gas generator assembly and directs incoming air to the compressor rotor assembly. An air inlet screen prevents debris entering the compressor inlet.

2. Description and Operation (Ref. Fig. 1)

A. Compressor Inlet Case

The compressor inlet case consists of a circular light alloy casting; the front section of which forms an annular plenum chamber for the passage of the inlet air to the compressor. The rear section is a hollow compartment that is used to form the front section of the integral oil tank. Two mounting flanges are incorporated; flange F, at the front end of the inlet area, provides the mounting for the gas generator case, while flange G, at the rear of the oil tank area, provides the mounting flange for the accessory gearbox. A circular wire mesh screen is bolted around the air inlet area of the case to prevent foreign object ingestion by the compressor.

The No. 1 bearing, bearing support housings and compressor rear stator air seal are mounted in the centerbore of the compressor inlet case. The bearing outer housing and rear stator air seal are secured within the flange by four bolts. The No. 1 bearing outer race is secured within the bearing inner housing by an externally threaded retaining ring and locking rivet, while the inner housing is secured to the outer housing by four bolts and nuts at the rear.

A calibrated oil nozzle, installed at the end of a cored passage in the compressor inlet case at the approximate 7 o'clock position, provides lubrication for the No. 1 bearing. A cored outlet port at the 6 o'clock position allows scavenge oil to flow to the accessory gearbox diaphragm.

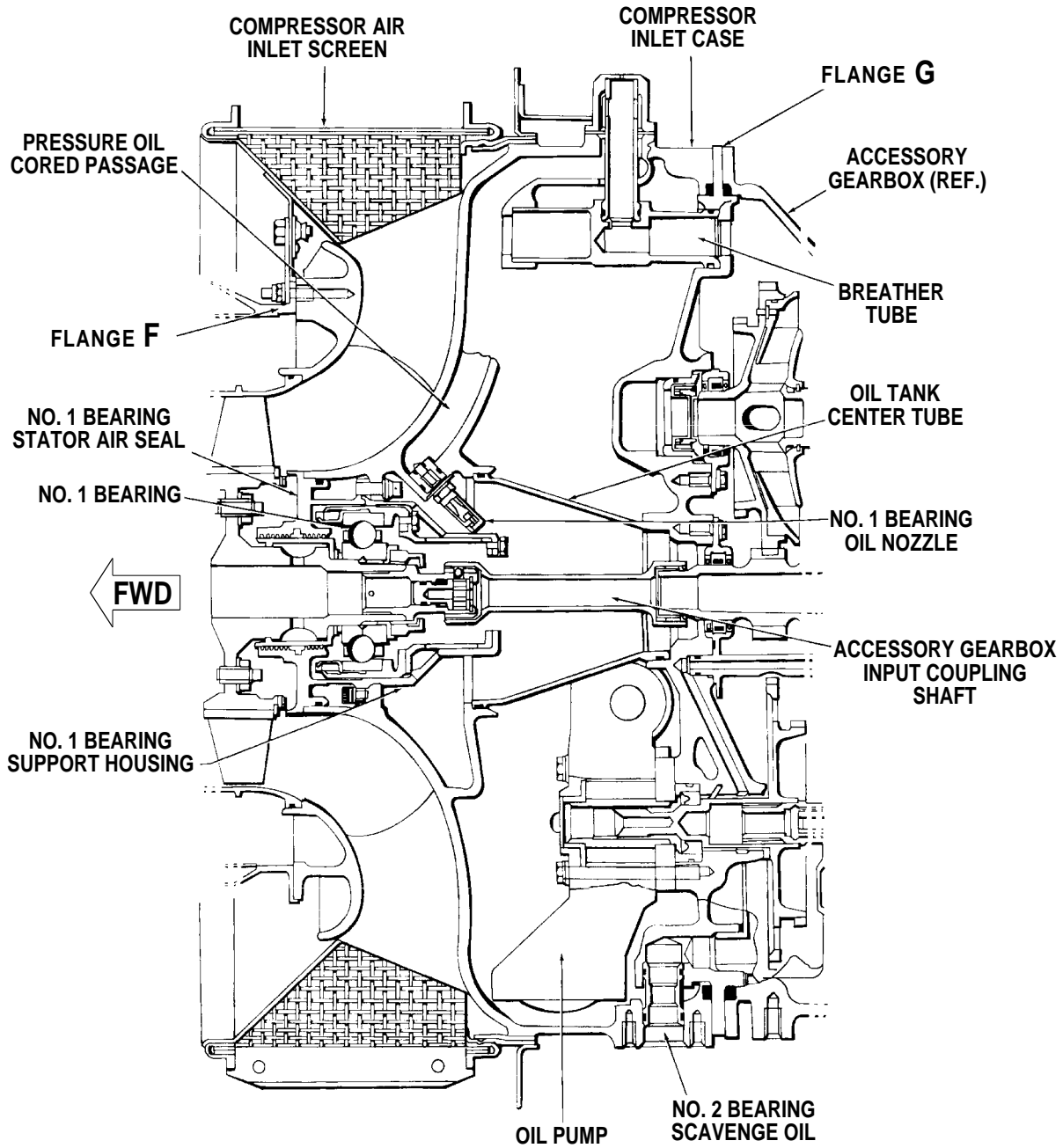
Compressor interstage air is applied to the center of the rear stator air seal to prevent oil from the No. 1 bearing area flowing into the compressor section. Part of the air, at the center of the seal, vents forward and into the inlet air stream while the remainder vents to the rear and into the accessory gearbox via the oil tank center tube.

The oil filter, oil filter housing, check and bypass valve assembly (Ref. 79-20-04) is installed at the 3 o'clock position on the inlet case with the check valve located in the outlet port of the oil pump (Ref. 72-60-00). A cover plate, with teflon spacer, bolted to the inlet case retains the oil filter and housing. A tube, with preformed packings, is installed between the centerbore of the inlet case and the accessory gearbox diaphragm to provide a passage for the accessor drive coupling shaft (Ref. 72-60-00).

B. Air Inlet Screen

The air inlet screen is a circular wire mesh screen that is bolted around the air inlet area of the inlet case to prevent foreign object ingestion by the compressor.

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Compressor Inlet Case and Air Inlet Screen
Figure 1

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AIR INLET SECTION - MAINTENANCE PRACTICES

1. General

- A. Maintenance personnel should make reference to the INTRODUCTION section and Chapter 70-00-00 STANDARD PRACTICES of this manual to familiarize themselves with general procedures.
- B. Install suitable protective caps/covers over all disconnected tubes/lines and component openings.
- C. Lockwire shall comply with specification AMS 5687, heat and corrosion resistant steel wire MS9226-03, which is 0.025 inch diameter, and will not be specified in instructions.

2. Consumable Materials

The consumable materials listed below are used in the following procedures.

<u>Item No.</u>	<u>Name</u>
PWC04-004 or PWC04-005	Compound, Anti-seize
PWC05-037	Enamel, Epoxy
PWC05-061	Cloth, Abrasive Coated Crocus
PWC05-064	Solution, Anodize Touch-Up
PWC05-101	Cloth, Abrasive
PWC08-002	Sealant, Adhesive,
PWC09-003	Compound, Sealing
PWC11-012	Acetone
PWC11-014	Alcohol, Isopropyl
PWC11-016	DELETED (Use PWC11-014)
PWC11-027	Solvent, Cleaning
PWC11-031	Cleaner, Engine
PWC13-001	Primer, Epoxy

3. Special Tools

Not Applicable

4. Fixtures, Equipment and Supplier Tools

Not Applicable

5. Removal/Installation

NOTE: The compressor inlet case and related air inlet screen support fairing are not to be removed from the gas generator case as a maintenance practice. The air inlet screen and bleed air case (agricultural airframes only), may be removed as and when required.

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A. Removal of Air Inlet Screen (Ref. Fig. 201)

- (1) For Pre-SB1242 PT6A-27 and PT6A-28 Engines (Ref. Detail A, Fig. 201):
 - (a) Remove three self-locking nuts (2), six washers (3) and three bolts (4) securing flanges of screen at 3 o'clock position.
 - (b) On engines fitted with compressor wash ring, withdraw screen from support clips of wash ring (Ref. 72-00-00).
- (2) For PT6A-21 Engines and Post-SB1242 PT6A-27/-28 Engines:
 - (a) Remove two self-locking nuts (2), washers (7) and bolts (4) securing flanges of screen at 3 o'clock position.
 - (b) On engines fitted with compressor wash ring, withdraw screen from support clips of wash ring (Ref. 72-00-00).

B. Installation of Air Inlet Screen (Ref. Fig. 201)

NOTE: Front end of wide air inlet screen (1) rests on support ring on gas generator case, while narrow air inlet screen (6) rests on flange of inlet fairing (9).

- (1) Apply thin film of compound (PWC09-003) to inner circumference of rubber rims of air inlet screen.
- (2) Carefully install inlet screen (1 or 6), as applicable, cover compressor inlet case, inserting screen between case and external fittings, lines and, where applicable, the compressor wash ring. Locate mating flanges of inlet screen at 3 o'clock position.

NOTE: On engines fitted with compressor wash ring ensure rubber rim at rear of inlet screen fits over wash ring support clips (Ref. 72-00-00).

- (3) On engines fitted with wide air inlet screens, install three bolts (4) and washers (3) through screen flanges and secure with additional washers (3) and self-locking nuts (2). Tighten nuts firmly but do not torque. Measure unstressed gap between two flanges (Ref. Detail A). If gap between flanges is between 0.000 and 0.150 inch proceed to step (5). If gap between flanges exceeds 0.151 inch, refer to Approved Repairs.
- (4) Engines fitted with narrow air inlet screen, install bolts (4) through screen flanges with self-locking nuts (2) and washers (7).
- (5) Tighten nuts at screen flanges 12 to 15 lb.in.
- (6) Attach an approved inspection seal to flange joint.

6. Cleaning/Painting

A. Air Inlet Screen

- (1) Clean the wire mesh using solvent (PWC11-027) or (PWC11-031). Dry with clean, dry compressed air.

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7. Inspection/Check

A. Air Inlet Screen

- (1) Inspect the air inlet screen wire mesh for cleanliness and/or damage. Screens with broken wire mesh must be replaced. Clean undamaged screens (Ref. Cleaning/Painting).
- (2) Inspect the rubber sealing rims and flanges of the screen for security and damage.
- (3) Check spacer (Post-SB1191) (5, Fig. 201) for security; rebond as necessary (Ref. Approved Repairs).

B. Inspection of Compressor Inlet Case

- (1) Inspect the compressor inlet case for general condition.
- (2) One crack up to 0.700 inch in one strut only is acceptable as is, provided the crack is not open more than 0.020 inch and does not progress through the filet radius.
- (3) Cracks exceeding 0.700 inch in the inlet case struts will require removal and forwarding of the inlet case to approved overhaul facility for possible repair.

8. Approved Repairs

A. Air Inlet Screen Edge Bonding

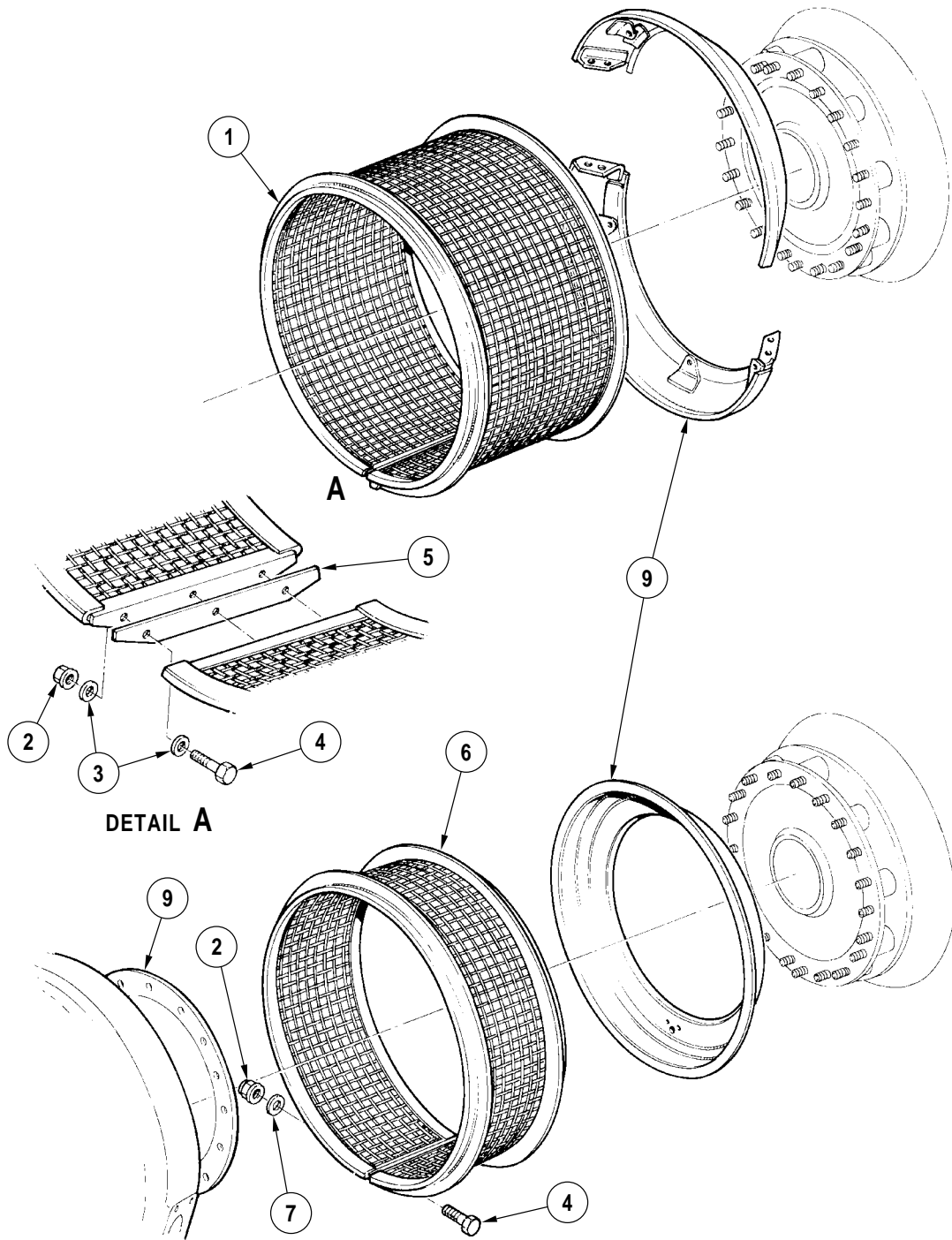
- (1) Rebond loose rims or chafing strips to the screen flanges using adhesive/sealant (PWC08-002); allow to dry for a minimum of two hours at room temperature. Full bond strength will be obtained after 72 hours.
- (2) For Post-SB1191 PT6A-27 and PT6A-28 Engines :
 - (a) Rebond the spacer (5, Fig. 201, Detail A) to the mounting flange of the air inlet screen:

NOTE: If the spacer is loose to the point of becoming detached, the mating surfaces of the flange and spacer must be cleaned prior to rebonding.

WARNING: THE SOLVENT RECOMMENDED FOR CLEANING IS HIGHLY TOXIC, AND HAZARDOUS TO EXPOSED SKIN SURFACES. USE PROTECTIVE EQUIPMENT WHEN HANDLING.

- 1 Clean the flange of the inlet screen and mating face of the spacer with isopropyl alcohol (PWC11-014).
- 2 Wipe the mating surfaces with acetone (PWC11-012).
- 3 Spread adhesive/sealant (PWC08-002) over one of the surfaces to be bonded to a uniform thickness of 0.020 to 0.040 inch.
- 4 Locate the spacer on the flange and press firmly, but avoid exerting excessive pressure.

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Removal/Installation of Air Inlet Screen
Figure 201

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Key to Figure 201

1. Air Inlet Screen (Pre-SB1242 PT6A-27 and PT6A-28)
2. Self-locking Nuts
3. Washers
4. Bolts
5. Spacer (Post-SB1191)
6. Air Inlet Screen (PT6A-21, Post-SB1242 PT6A-27 and PT6A-28)
7. Washers
8. Gas Generator Case (Ref.)
9. Inlet Fairing

- 5 Mate both flanges of the screen and secure with three bolts and nuts, fingertight. Allow to dry for a minimum of two hours at room temperature.

NOTE: Seventy-two hours is the time required to achieve the maximum bond strength. The screen may be returned to service after approximately two to four hours, but avoid exerting pressure which would tend to weaken the bond.

- (3) If screen mesh is punctured at any point, remove and replace with new screen.

B. Repair of Corrosion - Compressor Inlet Case

NOTE: Corrosion must not be deeper than 0.010 in. and must not cover an area greater than 10 percent of the total surface of the inlet case.

- (1) Apply a suitable covering material over the compressor section.
- (2) Clean the surface of the area to be repaired with a swab soaked in isopropyl alcohol (PWC11-014) and crocus cloth (PWC05-061).
- (3) Remove all traces of corrosion (aluminum oxide) using a suitable steel brush, crocus cloth (PWC05-061), abrasive cloth (PWC05-101), file or grit paper. Remove all traces of debris using a vacuum cleaner.
- (4) Flush the area with clean water at room temperature.
- (5) Locally clean the repaired surface and surrounding area using a swab soaked with isopropyl alcohol (PWC11-014) or acetone (PWC11-012) and a crocus cloth (PWC05-061). Remove all debris using a vacuum cleaner.

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- (6) Apply anodize touch-up solution (PWC05-064) using a swab or brush for three to four minutes.

NOTE: 1. Repeat the application frequently to make sure that the affected surface is continually wet with the solution.

NOTE: 2. If the solution does not wet the surface, remove the solution with a clean cloth and repeat Step (3). Also, clean the first-stage compressor if the solution has been inadvertently applied.

- (7) Allow the surface to air dry or wipe off solution with a cloth soaked in clean water.
- (8) Examine the coating and make sure that the repair surface is completely covered. Reapply the treatment again as necessary.

NOTE: After the successful completion of Step (8), the engine may be returned to service for the next 100 hours.

- (9) For a more durable repair, do the following:

- (a) Do Steps (2) through (8) again.
- (b) Dry the affected area thoroughly.
- (c) Apply two coats of primer (PWC13-001).

NOTE: The primer can be diluted with 10% solvent.

- (d) Allow the primer to air dry for eight hours before applying enamel paint. Use compressed air at 29 psig to accelerate the drying time.
- (e) Apply three to four coats of enamel (PWC05-037) to the primed surface. Allow the surface of the enamel to become tacky (approximately 15 minutes) between each coat. Allow a final coat of enamel paint to dry for 24 hours before returning the engine to service.

NOTE: Drying time can be reduced with the use of a heat gun at a low setting. Refer to the manufacturers instructions.

- (10) If the corrosion repair is more than the maximum permitted limits, inspect the repaired area again, at intervals not exceeding 10 flight hours. The engine must be returned to an approved overhaul facility within 50 flight hours for a repair to be done.