

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS 1135-SERIES-ICA-5



ENGINE INLET BARRIER FILTER EUROCOPTER EC135 SERIES HELICOPTERS

This supplement must be attached to the applicable Eurocopter EC135 FAA Approved Maintenance Manual when the Engine Inlet Air Filter System 1135N5-1 is installed in accordance with the applicable Supplemental Type Certificate (STC). Information in this manual supplements or supersedes the basic manual only in those areas listed.

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RECORD OF REVISIONS

When updated, this document is changed in its entirety.

REV	DATE	DESCRIPTION	BY	RELEASE
NC	11/05/2009	Initial Release	RhIB	REG
A	10/06/2010	Updated to reflect revised STC configuration: <ul style="list-style-type: none">• Removed Forward Filter Elements• Added Oil Cooler Intake Ducts• Relocated ΔP Transducers forward Updated contact information. Section 1.5: Changed Primary Units of Measurement to US Standard	BV	DMN

DOCUMENTATION SUPPORT

It is the responsibility of the user of this document to verify that this is the latest revision released by FDC/aerofilter. It is FDC/aerofilter's intention to provide our customers with the best possible support and assistance with our products. Please contact us using the information below to get the latest version of this and other documents.

FDC/aerofilter

3920 Sandstone Drive
El Dorado Hills, CA 95762 USA
Tel: 415-884-0555
Fax: 415-884-0505
Toll-Free (US & Canada): 800-350-6674

www.fdcaerofilter.com

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1.0 INTRODUCTION

1.1. General Product Information

The engine Inlet Barrier Filter system (IBF) is designed to protect the turbine engine from foreign object damage and micro erosion when operating in normal and severe environmental conditions. The IBF includes a pilot-activated bypass system to maintain airflow to the engines in the event of significant filter blockage. A cockpit display gives the pilot real-time blockage monitoring capability.

1.2. Scope of ICA

This manual describes the airworthiness limitations, service instructions, inspection procedures, and testing of the IBF and its individual components. Strict adherence to the information given herein will assure maximum filtration benefit and increased component life. The data listed in this Instructions for Continued Airworthiness (ICA) is intended to aid the operator in formulating an acceptable maintenance program in accordance with 14 CFR 91.403(c).

1.3. Arrangement

This manual is written in accordance with USA Federal Aviation Administration (FAA) Order 8110.54 for Instructions for Continued Airworthiness as required by 14 CFR 21.50. The order of presentation of each of the 16 sections is varied from USA FAA, Order 8110.54, for the sake of clarity.

1.4. Precautions

The following precautions may be used throughout this manual and are defined as follows:

WARNING:

Maintenance procedure, practice, condition, etc. which if ignored could result in personal injury or loss of life.

CAUTION:

Maintenance procedure, practice, condition, etc. which if ignored could result in damage or destruction of equipment.

NOTE:

Maintenance procedure, practice, condition, etc. or statement which needs to be highlighted.

1.5. Units of Measurement

The following units of measurement are used throughout this manual and are as follows:

- Primary – US Standard, “Standard” or “Imperial”
- Secondary – International System (SI), “Metric”

Where a specification is given for a given quantity, the primary unit of measurement shall govern. Wherever possible, the secondary units equivalent of the primary units will be given as an aid.

1.6. Definitions, Abbreviations, Acronyms and Symbols

The following are used throughout the manual:

fl. oz.	Fluid Ounce
ml	Milliliter
in. lb.	Inch-Pound (Torque)
N•m	Newton-Meter (Torque)
ΔP	Differential Pressure
in-H ₂ O	Inches of Water (Pressure)
kPa	Kilopascals (Pressure)
CFR	Code of Federal Regulations
TC	Type Certificate
STC	Supplemental Type Certificate
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
IBF	Inlet Barrier Filter
FHM	Filter Health Monitor
DPT	Differential Pressure Transducer
AMM	Aircraft Maintenance Manual
ICA	Instructions for Continued Airworthiness
TOT	Turbine Outlet Temperature
VDC	Volts DC

1.7. Distribution

From time to time it may be necessary to revise or update information contained in this ICA. Although best efforts will be made to distribute revisions and updates to the registered owner of the product, it is ultimately the responsibility of the current user to ensure the most current information available is being used. Additional copies of this ICA as well as revisions and updates may be obtained by contacting FDC/aerofilter (refer to “DOCUMENTATION SUPPORT” on page 2 for full contact information, including the website address). Additionally, it is **highly recommended** to register your FDC/aerofilter installation to receive these updates when they are released. Please complete and return the “NOTICE OF AEROFILTER SYSTEM INSTALLATION AND COMMENCEMENT OF WARRANTY PERIOD” form located in the Documentation Package shipped with the kit to register your installation.

When the latest update is received, the previous revision in its entirety should be discarded. Ensure that all pages of the document are marked as the latest revision.

1.8. Applicability

Eligible EC135 models for the installation of the Filter System:

MODEL	DESCRIPTION	FILTER SYSTEM KIT NO. & INSTALLATION P/N
EC135 P2+	EC135 equipped with Pratt & Whitney PW206B2 Engines	Kit: 1135K5-1 Installation: 1135N5-1

1.9. Referenced Documents

Document Title	Document Number
Aircraft Maintenance Manual, EC135 Series Aircraft; Referenced as [AMM XX-XX-XX, X-X]	
Illustrated Parts Catalogue, EC135 Series Aircraft; Referenced as [IPC XX-XX-XX-XX]	
Drawing – Installation, EC135 Filter System	1135N5

2.0 AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations section is FAA approved and specifies maintenance required under 43.16 and 91.403 of the Federal Aviation Regulations (FAR) unless an alternate program has been approved.

There are no Life Limited Parts in the FDC/aerofilter Inlet Barrier Filter System (IBF). Part life is based on condition per inspection.

There are no limitations associated with this Supplemental Type Certificate.

3.0 DESCRIPTION OF FDC/AEROFILTER INLET BARRIER FILTER (IBF) SYSTEM

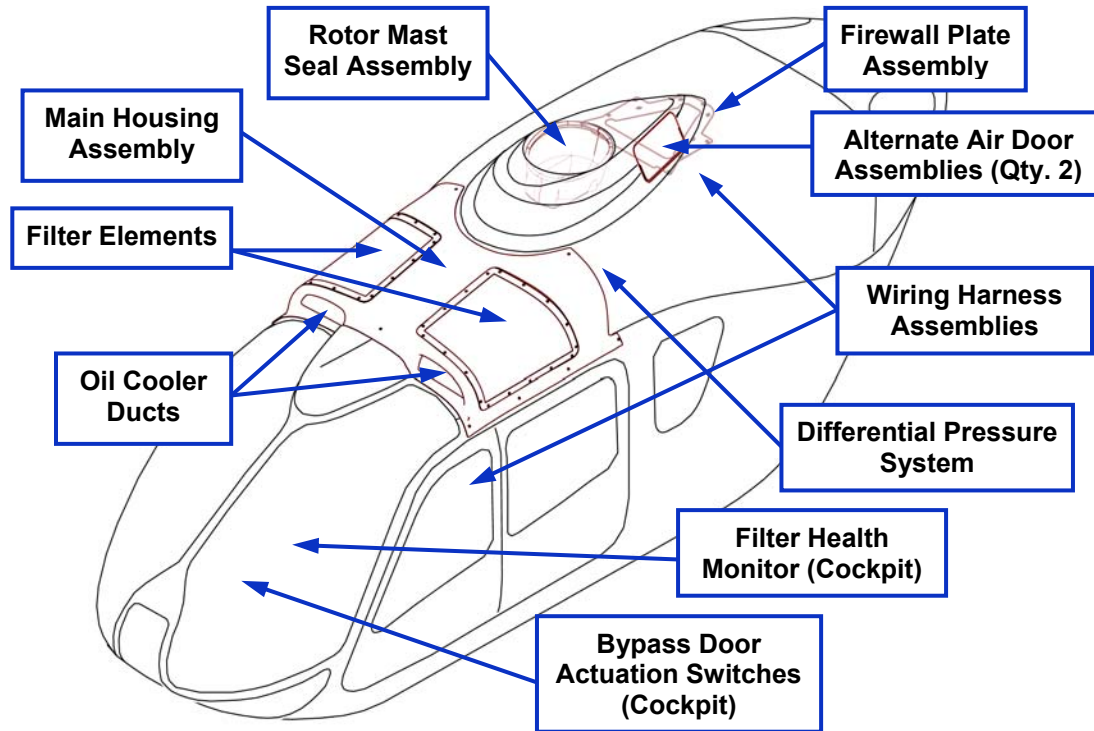
3.1. IBF System Overview

3.1.1. System Components

The 1135N5-1 Engine IBF System consists of:

- a) Main Housing Assembly,
- b) Rotor Mast Seal Assembly,
- c) Two Alternate Air Door Assemblies,
- d) Two Filter Elements,
- e) Two Oil Cooler Duct Assemblies,
- f) A cockpit-mounted dual-channel Filter Health Monitor and two Bypass Door actuation switches,
- g) A Firewall Plate Assembly,
- h) Differential Pressure System, including two Differential Pressure Transducers,
- i) Other parts and wiring to complete the system.

Figure 3.1 – IBF Components Overview



3.1.2. System Power

Power for the system is provided by 2 dedicated 28 VDC, 1 Amp circuit breakers, labeled “IBF”. System power is routed on the aircraft Essential busses.

3.1.3. Filter Elements

Each Filter Element is comprised of a specially formulated polymerized oil suspended by a pleated wire cloth and cotton fabric matrix for the purpose of attracting and holding airborne dust particles. Filter Elements are serviced by cleaning and re-oiling at regular intervals or as required based on Filter Health Monitor indicators or by visual determination that engine performance could be adversely affected prior to the next scheduled servicing.

3.1.4. Alternate Air (Filter Bypass) System

The pilot-actuated Alternate Air Systems are mounted on the aft gear fairing. These are provided to bypass the Filter Elements in the event that engine performance is degraded due to filter blockage. Each Alternate Air (Bypass) Door is opened or closed by a dedicated 28 VDC linear actuator. The Alternate Air Systems should be inspected at regular intervals or prior to flight into environmental conditions that may require their use.

3.1.5. Filter Health Monitor (FHM) & Bypass Door Switches / Annunciators

Real-time filter blockage levels are indicated in the cockpit by the Filter Health Monitor (FHM) bar-graph displays. More bar-graph display segments illuminated indicates a higher differential pressure (ΔP) under the filter elements, which indicates greater filter blockage. This allows maintenance conditions to be anticipated for scheduling flexibility. When the blockage limit is reached, the “CAUT” annunciation on the FHM and “LOW INLET PRESSURE” annunciations on Bypass Door actuation pushbutton switches inform the pilot that the Bypass Doors need to be activated to increase airflow to the engines. The “MAINT” annunciation on the FHM can illuminate to indicate a fault in the Differential Pressure Transducers or associated wiring.

3.1.6. Main Filter Housing & Rotor Mast Seal

The Main Filter Housing serves as an interface between the Filter Elements and the aircraft while giving the system a clean aerodynamic profile. To ensure the entire upper plenum around the main gear box remains isolated from outside air, the rotor mast is sealed off from the base at the transmission to the gear fairings by the Rotor Mast Seal. Additional seals on the Main Gearbox (MGB) Cowl enhance this isolation.

3.1.7. Differential Pressure Transducers (DPTs)

Two DPTs translate the lower pressure inside the filter system into electrical signals. These electrical signals are processed by the Filter Health Monitor in the cockpit into a dynamic visual display of the filter blockage. These sensors are sensitive assemblies, and care should be taken when handling this equipment.

3.1.8. Oil Cooler Ducts

Two Oil Cooler Ducts provide outside air to the two aircraft oil cooler blowers. Each duct is made up of three components: Forward Oil Cooler Duct, Center Oil Cooler Duct, and Aft Oil Cooler Duct. The Forward Oil Cooler Duct attaches to the Main Filter Housing and is supported by the Duct Support Assembly which attaches to the aircraft cabin roof. The Aft Oil Cooler Duct is installed on the inlet of the aircraft oil cooler blower. The Center Oil Cooler Duct connects the Forward and Aft Ducts.

4.0 CONTROL & OPERATION INFORMATION

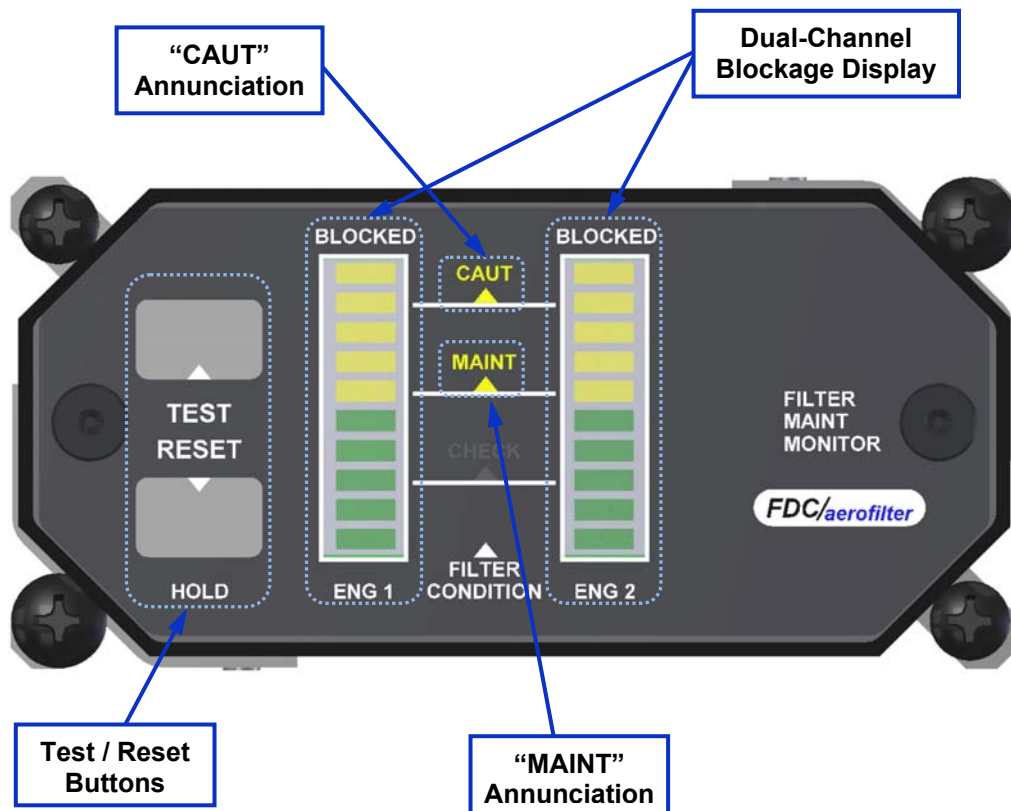
4.1. Filter Health Monitor (FHM)

4.1.1. Overview

The Filter Health Monitor (FHM) has multiple functions contained in one cockpit-mounted unit. The functions are:

- a) Dual-Channel Blockage Display,
- b) Test / Reset Switches,
- c) “MAINT” Annunciation,
- d) “CAUT” Annunciation.

Figure 4.1 – Filter Health Monitor Functions



4.1.2. Dual-Channel Display

Two bar-graph displays (10 segments each), one bar-graph display for each filter element, give maintenance personnel filter blockage information. When the bottom-most amber segment of each bar-graph display illuminates and the Alternate Air (Bypass) Door Switches indicate “LOW INLET PRESSURE”, the Filter Elements must be cleaned and re-oiled per Section 6.1 prior to next flight.

4.1.3. Test / Reset Switches

The “TEST” switch allows for a full test of all bar-graph display segments and annunciators. The “RESET” switch is pushed and held for 2 to 5 seconds to restore the FHM unit to initial conditions after pushing the “TEST” switch or upon the reinstallation of cleaned and oiled Filter Elements.

If the “MAINT” annunciation is illuminated prior to pressing “TEST”, there is a faulty transducer or disconnected transducer wiring. It cannot be reset with the “RESET” switch; the fault must be corrected.

4.1.4. “MAINT” Annunciation

The “MAINT” annunciation illuminates in the event of a transducer fault or transducer wiring fault. The transducer and transducer wiring must be checked and any faults corrected. When the faults have been cleared, the “MAINT” annunciation will extinguish.

4.1.5. “CAUT” Annunciation

The “CAUT” annunciation illuminates when the 6th through 10th segments of the bar-graph displays illuminate. This occurs when the differential pressure at the engine inlets indicate a fully blocked filter. This reading is given in real-time on the Filter Health Monitor bar-graph displays, so blockage information can be obtained when the engines are in operation.

The “LOW INLET PRESSURE” annunciators on the Alternate Air (Bypass) Door Switches (refer to Section 4.2.3) will illuminate when “CAUT” illuminates.

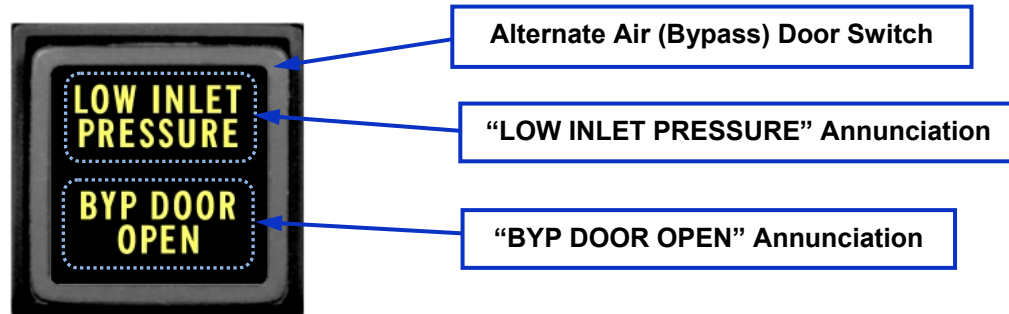
4.2. Alternate Air (Bypass) Door Switches

4.2.1. Overview

The Alternate Air (Bypass) Door Switches have three functions contained in both (left engine and right engine) instrument panel-mounted units. The functions are:

- a) “LOW INLET PRESSURE” annunciation,
- b) “BYP DOOR OPEN” annunciation,
- c) Alternate Air (Bypass) Door Actuation.

Figure 4.2 – Alternate Air (Bypass) Door Switch



4.2.2. “LOW INLET PRESSURE” Annunciation

The “LOW INLET PRESSURE” annunciation illuminates when the filter blockage is at its maximum level. This alerts the pilot to press the switch to open the Alternate Air Doors. The “LOW INLET PRESSURE” annunciation will remain illuminated until reset by pressing the “RESET” button on the FHM.

4.2.3. “BYP DOOR OPEN” Annunciation

The “BYP DOOR OPEN” annunciation illuminates when the switches are pressed to open the Alternate Air (Bypass) doors. The “BYP DOOR OPEN” annunciation will extinguish when the switches are pressed to close the Alternate Air (Bypass) doors.

4.2.4. Alternate Air (Bypass) Door Actuation

Pressing the switch (in) opens the Alternate Air (Bypass) Doors. Pressing the switch again (out) will close the Alternate Air Doors.

5.0 REMOVAL & REPLACEMENT OF SYSTEM COMPONENTS

5.1. Filter Elements

5.1.1. Filter Element Removal

- a) Loosen the ¼-turn fasteners (18 per Element) securing each of the Filter Elements, lift each element up off the housing and remove to the side.
- b) Inspect the Filter Element seal (under fastening flange on the Filter Element) for condition and security.

5.1.2. Filter Element Reinstallation

- a) Remove any debris that may fall out of the dirty elements onto the main housing, aircraft or into the inlet area. Ensure a clean mating surface for both Filter Elements.
- b) Carefully place the Filter Elements onto the Main Filter Housing and tighten the ¼-turn fasteners (18 per Element).

5.2. Oil Cooler Ducts

5.2.1. Forward Oil Cooler Duct Removal

- a) Remove Filter Elements from Main Filter Housing per Section **5.1.1**.
- b) Loosen clamps securing Center Oil Cooler Duct to Forward and Aft Oil Cooler Ducts. Compress and remove Center Oil Cooler Duct.
- c) Loosen ¼-turn fastener securing Forward Duct Support Bracket to Duct Support Assembly and 3ea ¼-turn fasteners securing Forward Duct to Main Housing. Remove Forward Oil Cooler Duct.

5.2.2. Forward Oil Cooler Duct Reinstallation

- a) Reinstall Forward Oil Cooler Duct onto support on Main Filter Housing. Tighten ¼-turn fasteners to secure Forward Oil Cooler Duct to Main Filter Housing.
- b) Tighten ¼-turn fastener to secure Forward Duct Support Bracket to Duct Support Assembly.
- c) Compress Center Oil Cooler Duct and install onto Forward Oil Cooler Duct and Aft Oil Cooler Duct. Tighten clamps.
- d) Reinstall Filter Elements on Main Filter Housing per Section **5.1.2**.

5.2.3. Aft Oil Cooler Duct Removal

- a) Remove Filter Elements from Main Filter Housing per Section 5.1.1, remove Forward Oil Cooler Ducts per Section 5.2.1, remove Main Filter Housing per Section 5.3.1, and remove gear fairings per Section 5.4.1 and EC135 AMM Section 71-11-00, 4-4.
- b) Remove safety wire and from Aft Oil Cooler Ducts and remove screws and clipped washers (4 ea per duct) from outer flange. Retain screws and clipped washers for reinstallation.

CAUTION:

In addition to the screws and washers on the flange of the Aft Oil Cooler Duct, there are shim washers behind the oil cooler blower bellmouth. Take care not to let these washers drop into the oil cooler inlet. If removing bellmouth, note locations that individual shim washers were removed from.

- c) Remove Aft Oil Cooler Duct from oil cooler blower bellmouth.

5.2.4. Aft Oil Cooler Duct Reinstallation

- a) Reinstall Aft Oil Cooler Duct onto oil cooler blower bellmouth.

CAUTION:

In addition to the screws and washers on the flange of the Aft Oil Cooler Duct, there are shim washers behind the OEM oil cooler bellmouth. Take care not to let these washers drop into the oil cooler inlet. If bellmouth was removed, ensure that individual shim washers are reinstalled in the same locations that they were removed from.

- b) Reinstall clipped washers and screws on flange of duct. Torque screws to 27-44 in-lbs (3-5 Nm).
- c) Secure screw heads with new MS20995C32, or equivalent, safety wire. Shield twisted portion of safety wire with PVI-S14-1100-CLR, or equivalent, PVC tubing.
- d) Reinstall gear fairings per Section 5.4.2, Main Filter Housing per Section 5.3.2, Forward Oil Cooler Ducts per Section 5.2.2, and Filter Elements per Section 5.1.2.

5.3. Main Filter Housing**5.3.1. Main Filter Housing Removal****CAUTION:**

Do **NOT** handle Main Filter Housing with Filter Elements installed.
Damage to the Main Housing may result.

- a) Remove Filter Elements from Main Filter Housing per Section **5.1.1**.
- b) Remove Oil Cooler Ducts per Section **5.2.1**.
- c) Loosen ¼-turn fasteners (quantity 15; refer to Figure **5.1** for locations) securing the Main Filter Housing to the aircraft.
- d) Unhook knife disconnects behind both Filter Elements to disconnect Main Housing grounding strap from the aircraft.
- e) Lift Main Filter Housing directly up off the cabin roof and remove to the side.

CAUTION:

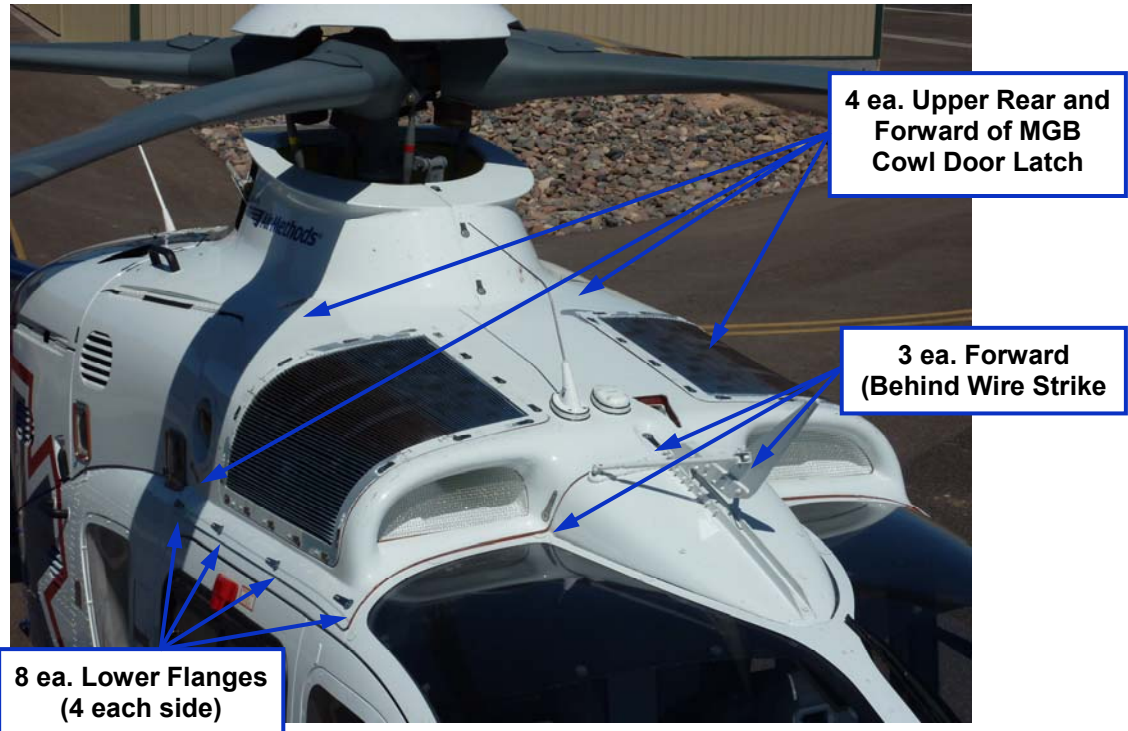
Use care when removing Main Filter Housing to prevent housing from coming in contact with rotor blades or canopy glass, as damage may result. It is advisable for two people, one on each side of the aircraft, to perform this procedure.

CAUTION:

Alternate Air Actuator wiring harnesses must be disconnected at system disconnect locations on both sides of the aircraft if gear fairings are to be removed (refer to Section **5.3.1(c)**).

- f) Gear fairings may now be removed per EC135 Aircraft Maintenance Manual (AMM) 71-11-00 4-4 and Section **5.4.1**. Gear fairings should be removed upward and then outward to clear the Rotor Mast Seal rim and Pressure Sensing Tubes (refer to Figures **5.5** and **5.7**).

Figure 5.1 – Main Filter Housing Fastening Locations



5.3.2. Main Filter Housing Reinstallation

NOTE:
Gear fairings and engine cowls must be replaced and fastened completely per EC135 AMM 71-11-00 4-4 and Section 5.3.6 before Main Filter Housing may be reinstalled.

- a) If gear fairings are not already in place on the aircraft, replace both fairings per EC135 AMM 71-11-00, 4-4 and Section 5.3.6. Reconnect Alternate Air Actuator wiring harnesses at system disconnect locations on both sides of the aircraft.

CAUTION:
Use care when placing Main Filter Housing on top of cabin roof to prevent housing from coming in contact with rotor blades or canopy glass, as damage may result. It is advisable for two people, one on each side of the aircraft, to perform this procedure.

- b) Place Main Filter Housing on top of the cabin roof, taking care to line up ¼-turn fastener studs with receptacle holes in the aircraft.

NOTE:

Take care to ensure all the seals are aligned correctly before tightening ¼- turn fasteners. The NACA Duct Seal on the Main Housing should not block the NACA duct on top of the aircraft cabin.

- c) Tighten ¼-turn fasteners (quantity 15; refer to Figure 5.2 for locations) securing the Main Filter Housing to the aircraft.
- d) Reconnect knife disconnects behind both Filter Elements to reattach Main Housing grounding strap to the aircraft. Check resistance of grounding strap per drawing 1135N5, sheet 2.
- e) Reinstall Oil Cooler Ducts per Section 5.2.2.
- f) Reinstall Filter Elements on Main Filter Housing per Section 5.1.2

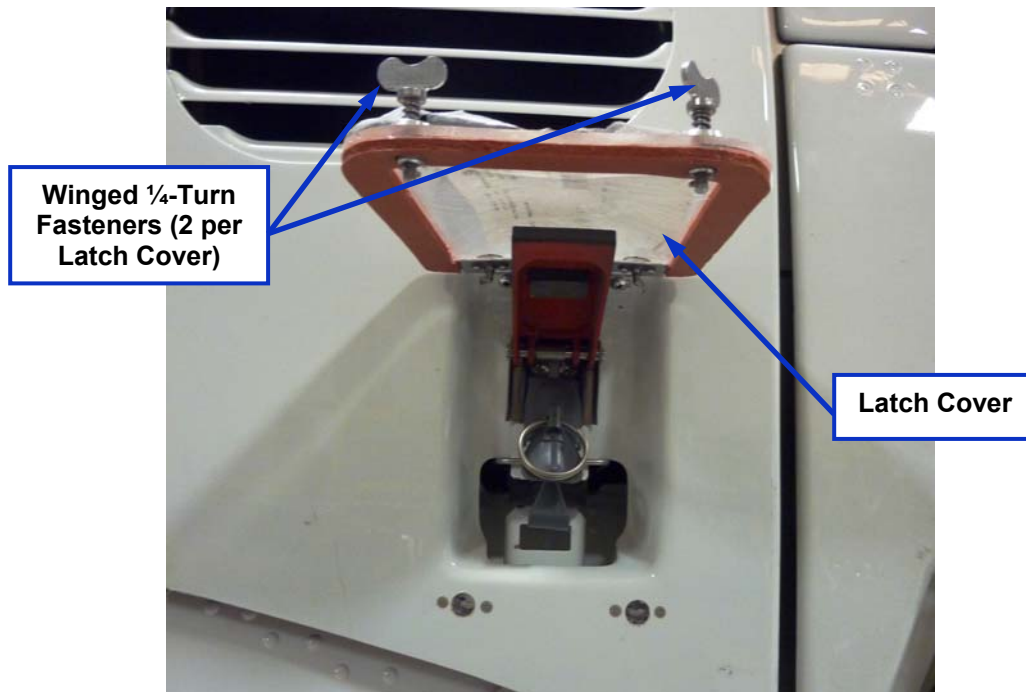
CAUTION:

Do **NOT** handle Main Filter Housing with Filter Elements installed. Damage to the Main Housing may result.

5.4. Engine Intake Plenum Components**5.4.1. Gear Fairing Removal**

- a) Remove Filter Elements from Main Filter Housing per Section 5.1.1.
- b) Remove Oil Cooler Ducts per Section 5.2.1.
- c) Remove Main Filter Housing per Section 5.3.1.
- d) Loosen winged ¼-turn fasteners securing Fairing Door Latch Covers (refer to Figure 5.2). The gear fairing door latches can now be disengaged. Open both gear fairing doors to access the system disconnect locations on both sides of the aircraft.

Figure 5.2 – MGB Cowl Door Latch Cover (Left Side Aft Shown, Typical)



- e) Disconnect Alternate Air Actuator wiring harnesses at system disconnect points on both sides of the aircraft (refer to Figure 5.4).

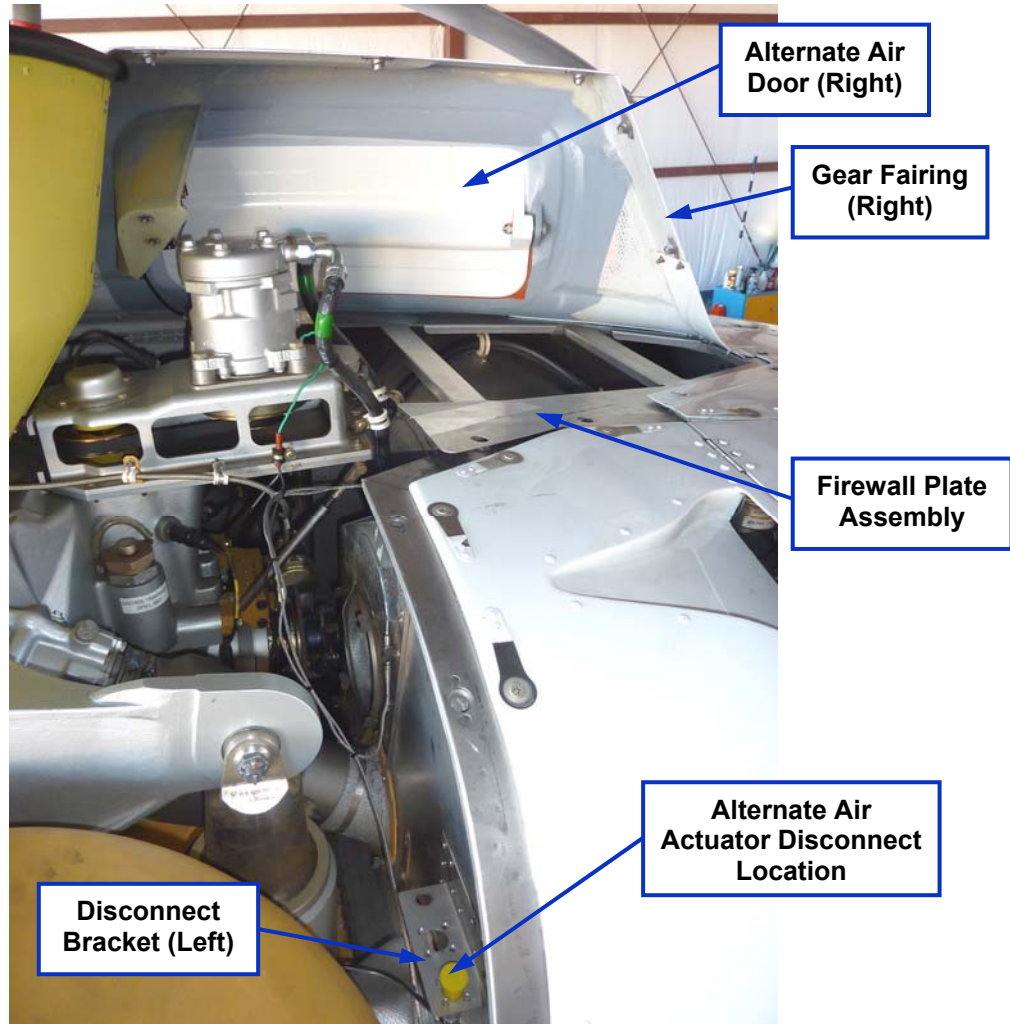
CAUTION:
 Alternate Air Actuator wiring harnesses **MUST BE DISCONNECTED** prior to removing gear fairings. Damage can result to Alternate Air Actuator, gear fairings, and/or firewalls if this step is omitted.

- f) Remove gear fairings per EC135 AMM Section 71-11-00 4-4 and Section 5.4.1. Gear fairings should be removed upward and then outward to clear the Rotor Mast Seal rim and Pressure Sensing Tubes (refer to Figures 5.5 and 5.7).

5.4.2. Gear Fairing Reinstallation

- a) Replace gear fairings and engine cowls per EC135 AMM Section 71-11-00, 4-4.
- b) Reconnect right and left Alternate Air System wiring harnesses at system disconnect locations (refer to Figure 5.3)
- c) Conduct functional check of Alternate Air Doors per Section 7.3.3.
- d) Reinstall Main Filter Housing per Section 5.3.2.
- e) Reinstall Oil Cooler Ducts per Section 5.2.2.
- f) Reinstall Filter Elements on Main Filter Housing per Section 5.1.2.

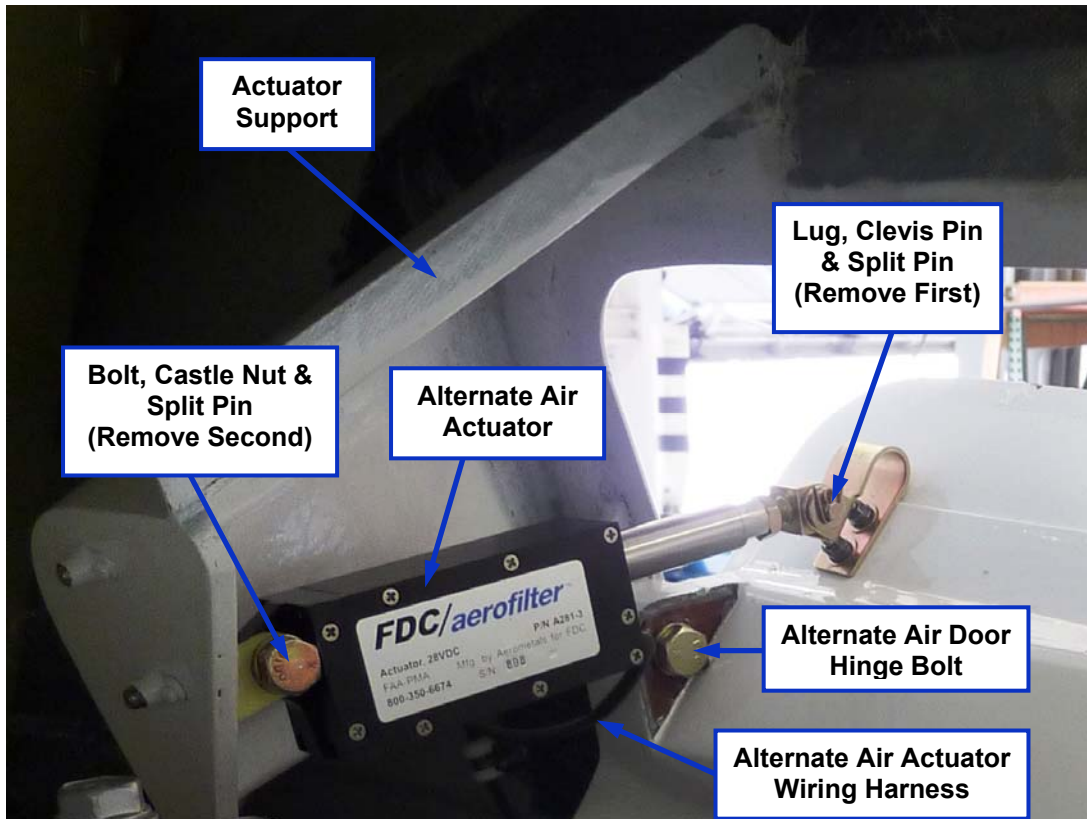
**Figure 5.3 – Alternate Air Door System and System Disconnect Location
(Left Side Gear Fairing Removed)**



5.4.3. Alternate Air (Bypass) Actuator Removal

- a) Remove split pin from the end of the lug / door bracket clevis pin at the output shaft end of the Actuator. Remove clevis pin to release Alternate Air Door from Actuator. Retain hardware for reinstallation.
- b) Remove split pin from the end of the Actuator Support bracket clevis bolt. Remove castle nut and bolt to release Actuator from Alternate Air Door Frame. Retain hardware for reinstallation, ensuring washers are in order of removal.
- c) Remove cable clamps, screws, washers, and nuts (quantity 2 ea) holding Alternate Air Actuator wiring harness to the inside of the gear fairing. Retain hardware for reinstallation. Alternate Air Actuator may now be removed from gear fairing.

Figure 5.4 – Alternate Air (Bypass) Actuator



5.4.4. Alternate Air (Bypass) Actuator Reinstallation

- a) Attach Alternate Air Actuator to Actuator Support bracket with clevis bolt, ensuring washers are replaced in order of removal. Thread castle nut onto bolt and secure with new split pin (P/N MS24665-132, or equivalent).
- b) Attach lug at the output shaft end of the Actuator with clevis pin and washer. Secure with new split pin (P/N MS24665-132, or equivalent).
- c) Attach Alternate Air Actuator wiring harness to the inside of the gear fairing using cable clamps, screws, washers, and nuts (quantity 2 ea).

5.4.5. Firewall Plate Assembly Removal

- a) Filter Elements, Forward Oil Cooler Ducts, Main Filter Housing, gear fairings must be removed before removing Firewall Plate Assembly.
- b) Remove engine cowl per AMM 71-11-00, 4-1.
- c) Remove center engine cowling per AMM 71-11-00, 4-2.
- d) If there is any non-FDC equipment installed IAW the aircraft Type Certificate (TC) or Supplemental Type Certificate (STC) that uses the Firewall Plate Assembly for support, remove that equipment per TC or STC manufacturer's instructions.
- e) Lift the Firewall Plate Assembly up and off of the engine firewall plenum.

5.4.6. Firewall Plate Assembly Reinstallation

- a) Set the Firewall Plate Assembly onto the engine firewall plenum.
- b) Align ¼-turn receptacle clearance holes with firewall flanges.
- c) If there was any non-FDC equipment installed IAW the aircraft TC or STC that uses the Firewall Plate Assembly for support, reinstall that equipment per TC or STC manufacturer's instructions.
- d) Engine cowls, gear fairings, Main Filter Housing, Forward Oil Cooler Ducts, and Filter Elements may now be reinstalled.

5.5. Differential Pressure Transducer (DPT)**5.5.1. Differential Pressure Transducer Removal**

- e) Remove Filter Elements from Main Filter Housing per Section 5.1.1, remove Forward Oil Cooler Ducts per Section 5.2.1, remove Main Filter Housing per Section 5.3.1, and remove gear fairings per Section 5.4.1 and EC135 AMM Section 71-11-00, 4-4.
- f) Disconnect wiring harness from DPT at forward end of DPT. Disconnect the Static Tube with adapter from the side port of the DPT and the Low Pressure Tube from the aft port of the DPT. (Refer to Figures 5.5 and 5.6)
- g) Remove screws and washers securing clamps to the Transducer Bracket Assembly. Carefully remove DPT, with clamps attached, from Transducer Bracket Assembly and remove clamps from DPT. Retain all hardware for reassembly. (Refer to Figure 5.6)

Figure 5.5 – Differential Pressure System

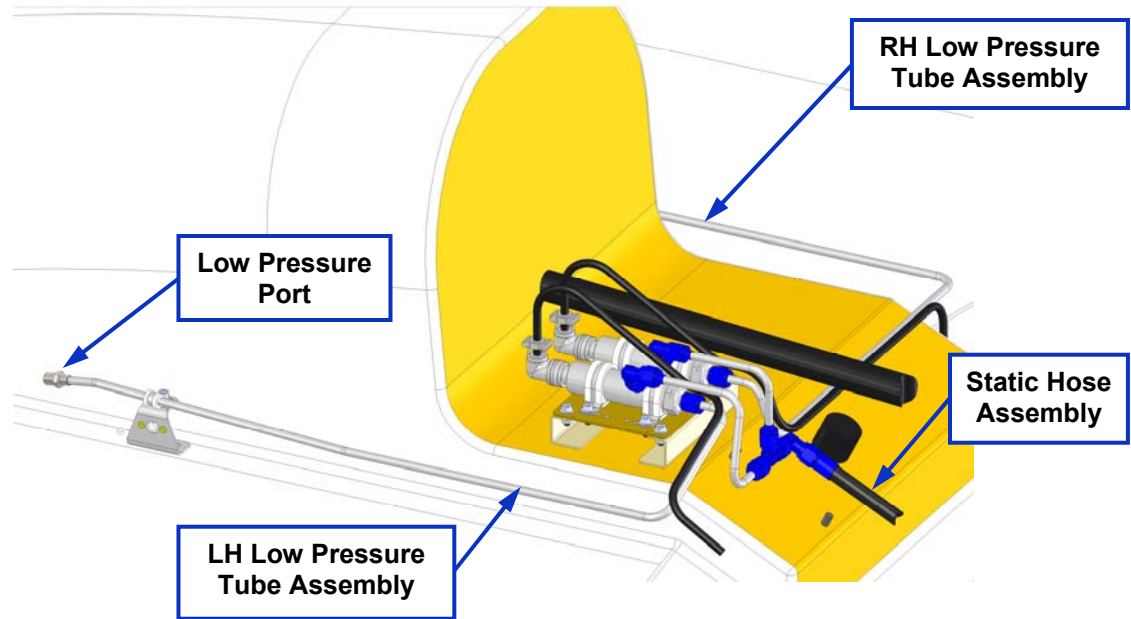
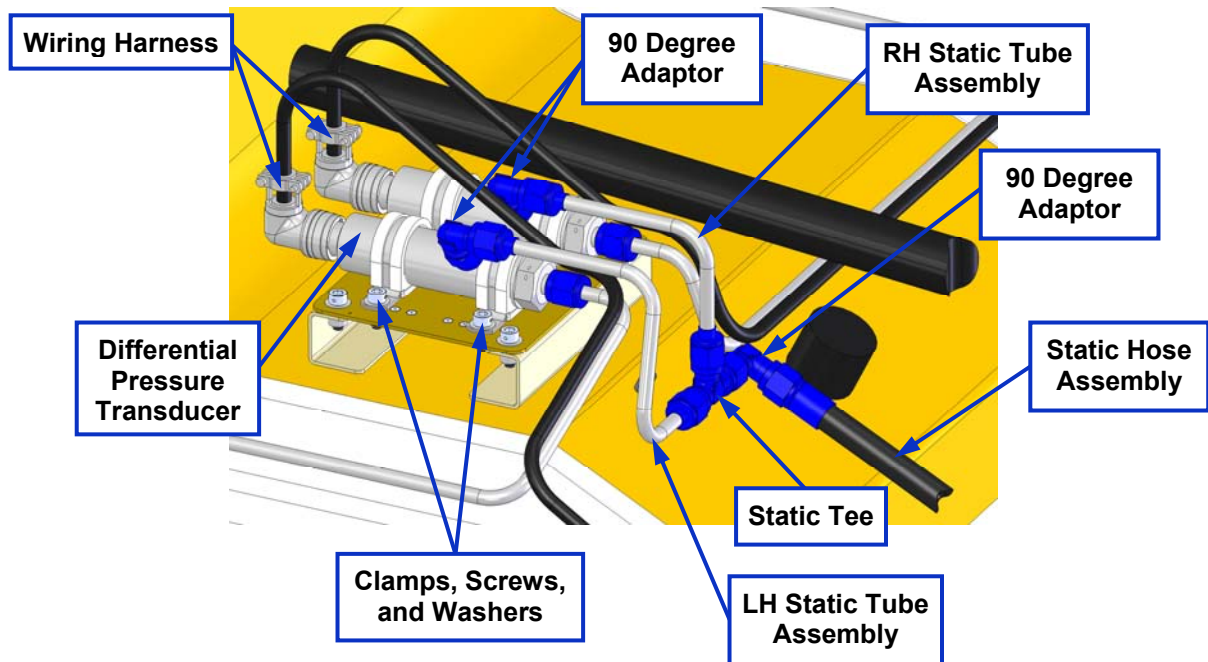


Figure 5.6 – Differential Pressure Transducer Assembly



5.5.2. Differential Pressure Transducer Reinstallation

- a) Re-attach DPT to Transducer Bracket Assembly using retained screws, washers, and clamps. (Refer to Figure 5.6)
- b) Re-attach Static Tube with adapter and Low Pressure Tube to the DPT. Reconnect wiring harness to DPT at forward end of DPT. (Refer to Figures 5.5 and 5.6)
- c) Gear fairings and engine cowls may now be replaced per Section 5.4.2 and EC135 AMM Section 71-11-00, 4-4. Reinstall the Main Filter Housing per Section 5.3.2. Reinstall Forward Oil Cooler Ducts per Section 5.2.2. Reinstall Filter Elements per Section 5.1.2.

5.6. Rotor Mast Seal

5.6.1. Rotor Mast Seal Removal

- a) Remove Filter Elements from Main Filter Housing per Section 5.1.1, remove Forward Oil Cooler Ducts per Section 5.2.1, remove Main Filter Housing per Section 5.3.1, and remove gear fairings and engine cowls per Section 5.4.1, and EC135 AMM Section 71-11-00, 4-4.
- b) Disconnect Static Hose Assembly from elbow on Static Port Manifold (refer to Figure 5.7).
- c) Remove Static Hose Assembly from Forward Support by removing screws, nuts, and clamps (2ea). Retain hardware for reassembly.
- d) Loosen ¼-turn fasteners along flanges of each fiberglass Rotor Mast Seal Shell Half (3 places forward, 5 places aft, 16 places lower flanges). Ensure that fiberglass shell halves are supported while loosening ¼-turn fasteners to prevent undue stress on shell flanges.

NOTE:

The 4 forward lower fiberglass shell flange ¼-turn fasteners also hold the forward Rotor Control Linkage Gasket Assembly to the Rotor Mast Seal Baseplates (refer to Figure 5.8).

- e) Remove forward Rotor Control Linkage Gasket Assembly.
- f) Rotor Mast Rim Seal halves can be separated with finger pressure. Remove right side Rotor Mast Seal fiberglass shell half before removing left side.

NOTE:

Use care when lifting Rotor Mast Rim Seal halves off of Rotor Mast Seal Baseplates as there is minimal clearance between transmission oil system / tail rotor brake cylinder components and the rotor mast.

CAUTION:

Do not allow aluminum plates of Rotor Control Linkage Gaskets to come into contact with rotor control parts when removing.

- g) Loosen the 2 central ¼-turn fasteners on Aft Rotor Control Linkage Gasket and remove.
- h) Loosen Drain Hose Clamp at aft right corner of right side Rotor Mast Seal Baseplate and move hose free of Drain Hose Boss (refer to Figure 5.9).
- i) Remove split pins, washers, and clevis pins holding Forward Supports at the forward outboard corners of both Rotor Mast Seal Baseplates. Retain clevis pins and washers for reinstallation.

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- j) Loosen and remove M6 bolts (4 each Left and Right Baseplates) holding the Baseplates to the rotor mast support tube flange.
- k) The Baseplates may now be removed. Replace M6 bolts in rotor mast support tube flange.

CAUTION:

Do **NOT** allow stainless steel plates of Rotor Mast Seal Baseplates to come into contact with rotor mast support tube, transmission oil components, tail rotor brake cylinder components, or rotor control parts when removing.

Figure 5.7 – Rotor Mast Seal Assembly, View From Forward RH

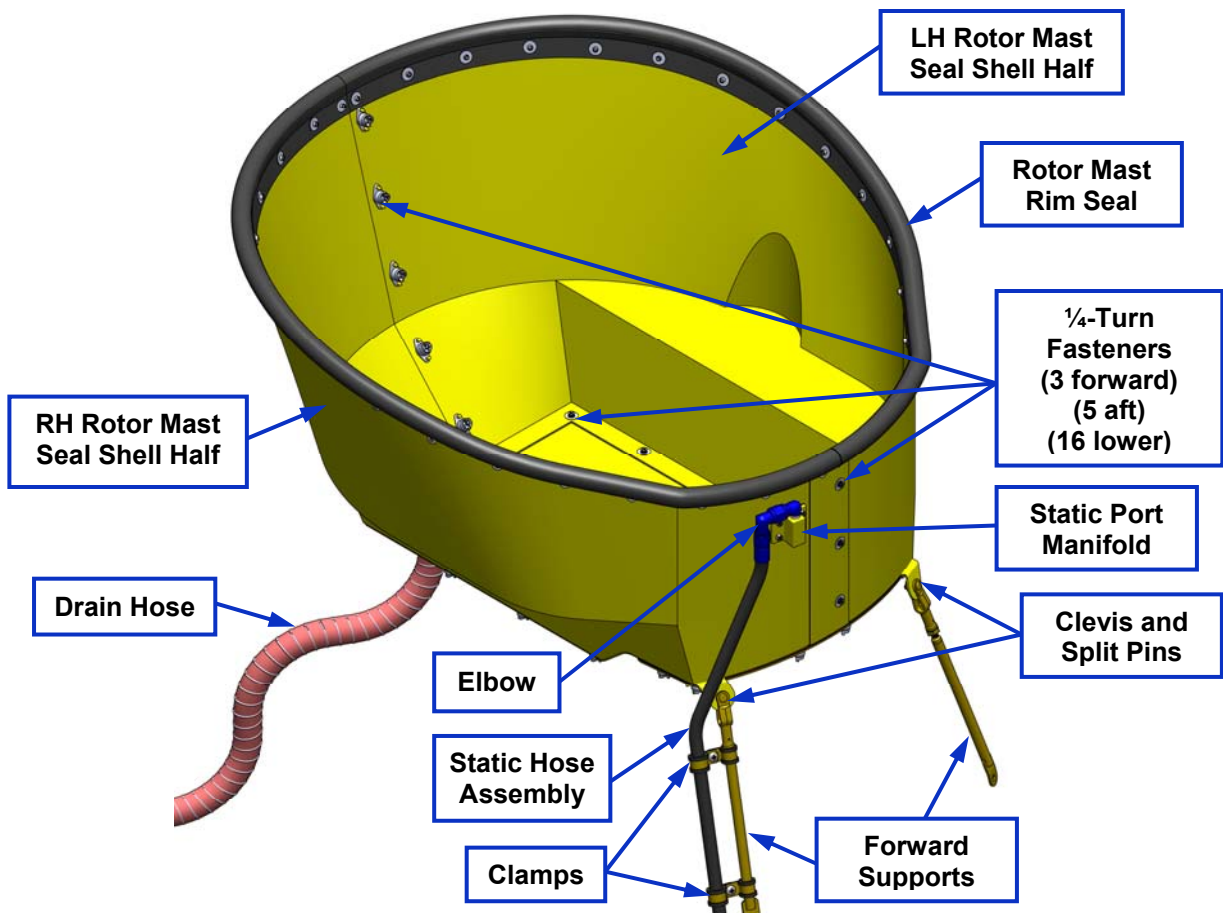


Figure 5.8 – Rotor Control Linkage Gasket Assemblies, View From Forward RH

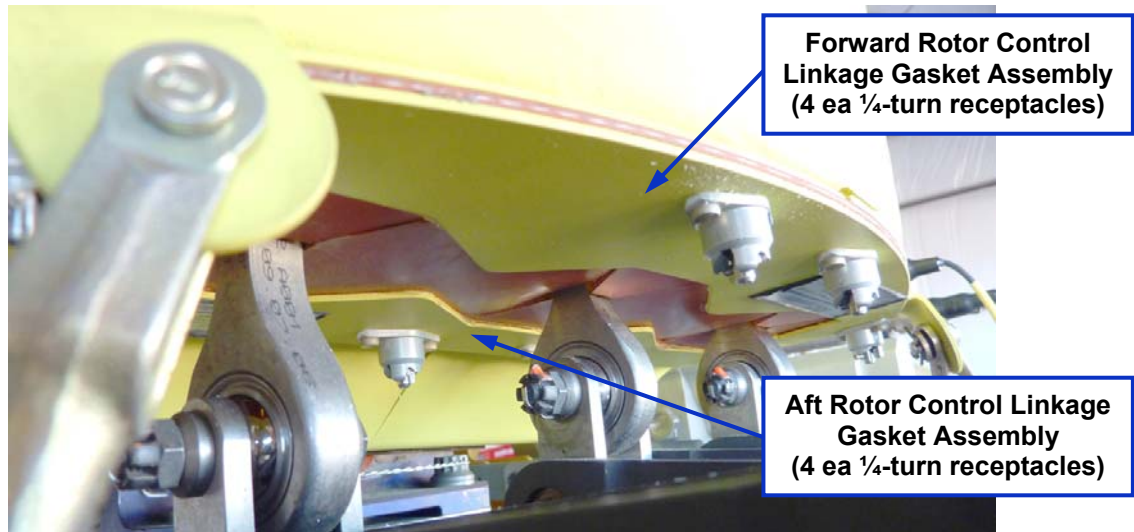


Figure 5.9 – Rotor Mast Seal Drain Hose Attachment, View From Right Aft

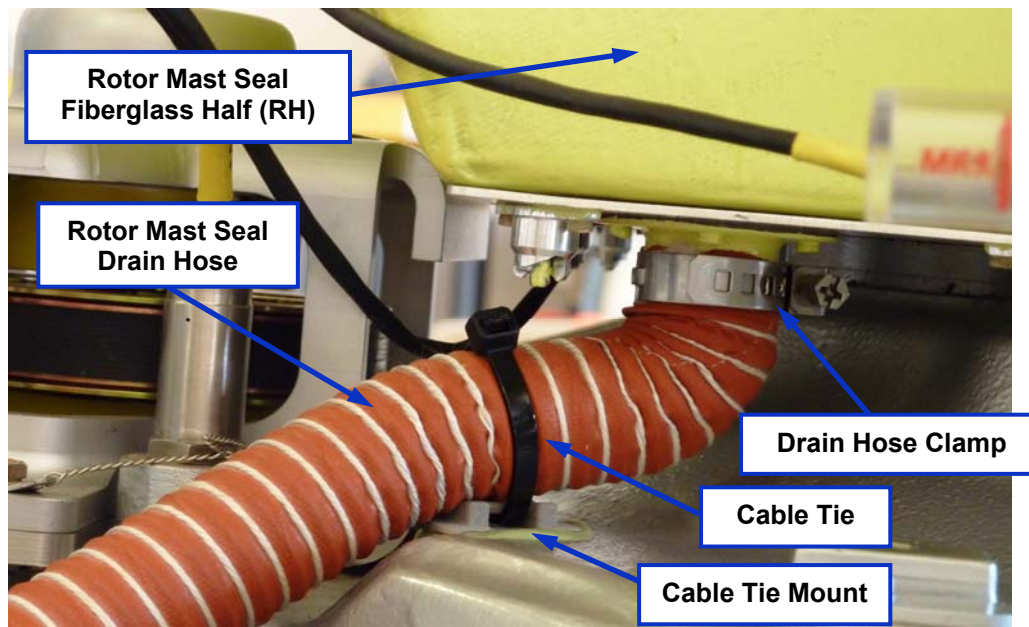
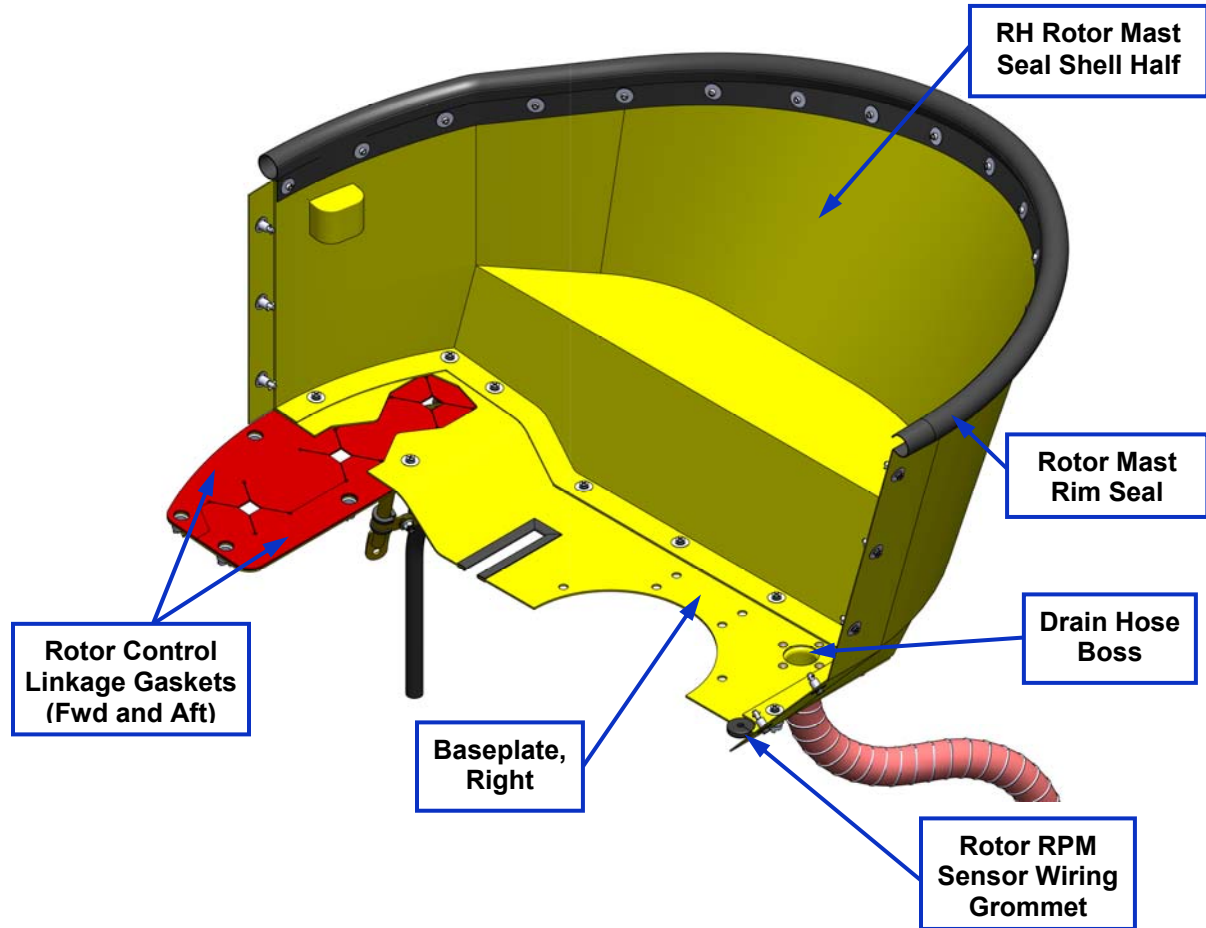


Figure 5.10 – Rotor Mast Seal Components, View From Above



5.6.2. Rotor Mast Seal Reinstallation

- a) Remove M6 bolts (8 on rotor mast support tube flange). Carefully place both Left and Right Baseplates onto the top of the transmission casing on either side of the rotor mast support tube.

CAUTION:
Do **NOT** allow stainless steel plates of Rotor Mast Seal Baseplates to come into contact with rotor mast support tube, transmission oil components, tail rotor brake cylinder components, or rotor control parts when removing.

- b) Reinstall M6 bolts around rotor mast support tube. The M6 bolts must be re-torqued in accordance with the EC135 AMM 62-31-00, 4-4.

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- c) Re-attach Forward Supports at the forward outboard corners of both Rotor Mast Seal Baseplates and secure with retained clevis pins and washers and new MS24665-132 split pins.
- d) Reattach Drain Hose Clamp at aft right corner of right side Rotor Mast Seal Baseplate and secure Drain Hose cable tie mounts on transmission with MS3367-1-9 cable ties (refer to Figure 5.9).
- e) Replace Aft Rotor Control Linkage Gasket and tighten the 2 central ¼-turn fasteners to hold Gasket in place.
- f) Replace right side Rotor Mast Seal fiberglass shell half, then left side Rotor Mast Seal fiberglass shell half. Tighten the 10 ¼-turn fasteners on the main aft section of the Rotor Mast Seal.

CAUTION:

Do **NOT** allow aluminum plates of Rotor Control Linkage Gaskets to come into contact with rotor control parts when reinstalling.

NOTE:

The 4 forward lower fiberglass shell flange ¼-turn fasteners also hold the forward Rotor Control Linkage Gasket Assembly to the Rotor Mast Seal Baseplates (refer to Figure 5.8).

- g) Reattach Forward Rotor Control Linkage Gasket and tighten the 6 remaining ¼-turn fasteners to hold both Rotor Control Linkage Gaskets in place. Check clearance of hydraulic rotor control linkages using hydraulic pump drive (P/N L135M2905101 or L135M2901101 – REF EC135 IPC 13-29-01-01) after reattaching Rotor Control Linkage Gaskets. Adjust clevis forks at upper ends of Forward Supports to ensure sufficient linkage clearance through both Rotor Control Linkage Gaskets.
- h) Reattach Static Hose Assembly to Forward Support using clamps, screws, and nuts retained during disassembly.
- i) Reconnect Static Hose Assembly to elbow on Static Port Manifold.
- j) Gear fairings and engine cowls may now be replaced per Section 5.3.2 and EC135 AMM Section 71-11-00, 4-4. Reinstall the Main Filter Housing per Section 5.3.2. Reinstall Forward Oil Cooler Ducts per Section 5.2.2. Filter Elements may now be reinstalled per Section 5.1.2.

6.0 SERVICING INFORMATION

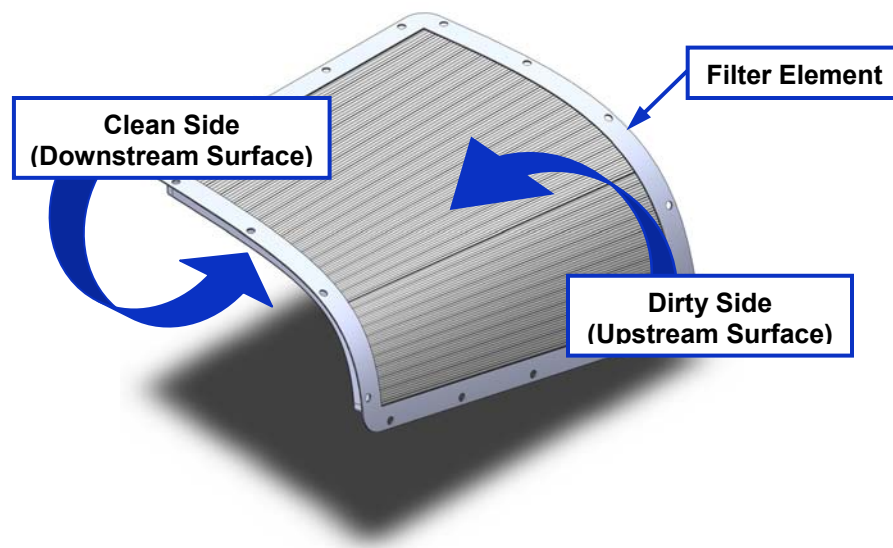
6.1. Filter Element Servicing

6.1.1. General Information

To ensure proper function and maintain a high level of filtration efficiency, great care should be taken when handling the elements. The elements are more likely to be damaged during servicing than in operation. Special care should be taken when removing and reinstalling the elements. The pleated material's wire mesh is easily damaged or deformed when allowed to scrape against other components. Careful attention to the following section will assure full service from the filter element.

When operating in the most severe conditions it is highly recommended that an additional, serviceable set of pre-oiled elements are available. This will allow continued service while the previously installed set is being cleaned, inspected and re-oiled.

Figure 6.1 – Filter Element



6.1.2. Filter Element Cleaning – General

Remove Filter Elements from the Main Housing (refer to Section 5.1.1). Hold each element clean side up and gently tap the element to dislodge any large embedded debris and dirt.

NOTE:

Use only FDC/aerofilter cleaner (P/N 40-15) to clean the filter element.

DO NOT use any other solvents or materials to clean filter element, no other substitutes are authorized.

DO NOT use Pressure or Steam Cleaners

DO NOT use High Pressure Hose Nozzles

CAUTION:

Failure to service the element correctly will harm the filter media by reducing its filtration efficiency, restricting airflow, and/or a reduction in service life.

6.1.3. Filter Element Cleaning – Severe Conditions

Severe Conditions are operating environments with high levels of contaminants (dust, sand, pollutants) which may result in higher amounts of filter debris than normal. In this case the following additional cleaning steps may be required.

- a) Soak each element dirty side down in a pan of FDC/aerofilter filter cleaner to a depth to allow complete coverage of filter element.
- b) Allow cleaner to permeate for 20 to 60 minutes, depending on condition. Use caution to ensure that dirt is not transferred to the clean side of the element.
- c) Remove element and shake thoroughly to remove dirty cleaner.
- d) Resoak for five minutes in clean FDC/aerofilter filter cleaner.

6.1.4. Filter Element Cleaning – Normal Conditions

Normal Conditions are operating environments with lower to moderate levels of contaminants (dust, sand, pollutants) trapped in the filter media. Normal cleaning procedures may be used when the Filter Element contains less debris.

- a) Lay element on a flat, clean surface, dirty side down.
- b) Spray FDC/aerofilter filter cleaner liberally onto the entire element and allow cleaner to permeate for ten minutes. Do not use any powered device to spray the filter element.
- c) Alternatively, soak element clean side up in a shallow pan of filter cleaner and allow cleaner to permeate for ten minutes.

6.1.5. Rinsing and Drying the Filter Elements

Rinse the elements with low pressure water from a garden hose. Always flush from the clean side to the dirty side to avoid driving particles further into the filter media.

After rinsing, gently shake off the excess water and set elements aside. Allow the elements to dry naturally. It is permissible to set the Filter Elements in direct sunlight to aid drying. The Filter Elements must be completely dry before oiling. Inspect elements per Section 7.2.3 before oiling.

DO NOT use Compressed Air

DO NOT use Open Flame

DO NOT use Hair Dryers or Heat Guns

CAUTION:

Excess heat will cause the filter media to shrink and high pressure air will open small holes that allow dirt to pass through.

6.1.6. Oiling the Filter Elements**CAUTION:**

Use only FDC/aerofilter Oil, P/N 40–10 or PN 40–10CW, no other substitute is authorized.

FDC/aerofilter Oil is a compounded mineral-based blend, formulated with special polymers to form the tack barrier. A blue dye has been added to show where the oil has been applied. Eventually the blue color will fade but the oil will remain.

CAUTION:

Never use the filter element without FDC/aerofilter Oil.

- a) Fill sprayer with recommended quantity of FDC/aerofilter Oil: 16 fl. oz. (475 ml) per Element.
- b) Charge sprayer with compressed air.
- c) Apply oil to each Filter Element with smooth, complete passes parallel to pleats.
- d) Repeat above, applying oil with smooth, complete passes 90 degrees to pleats.
- e) Use all of the measured quantity of oil recommended in (a).
- f) Wait 30 minutes for proper wicking and lightly re-oil any light areas.

NOTE:

Do **NOT** over-oil the element. Proper absorption is achieved when the filter media is completely wicked and any surplus oil has been allowed to drip from the element. This process may take 12 - 24 hours.

The filter element is now ready for installation (refer to Section **5.1.2**). Reset the Filter Health Monitor in cockpit using “RESET” switch (refer to Section **4.1.3**).

6.2. DPT Pressure and Static Port Filter Servicing

6.2.1. General Information

The DPT Pressure and Static Port Filters serve to baffle the low pressure static ports as well as to protect the DPT from FOD. The DPT Pressure Port Filters are located at the end of the Low Pressure Tubes under the Filter Elements. The Static Port Filter is located under the Static Port Shroud on the RH Rotor Mast Seal Shell Half. The Pressure and Static Port Filters can become clogged with oils and debris or damaged when the Main Filter Housing is not installed on aircraft, such as during maintenance activity.

6.2.2. DPT Pressure Port Filter Cleaning

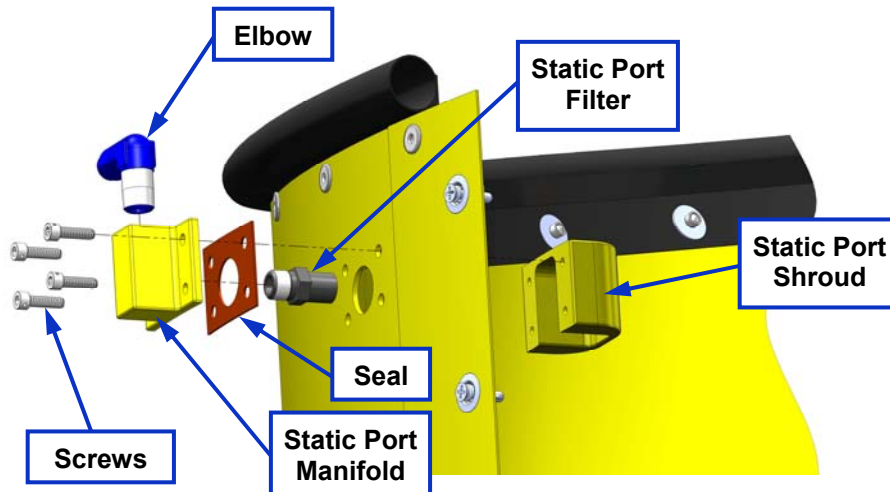
The DPT Pressure Port Filters should be cleaned periodically (refer to Table 7.1 for service intervals) to maintain the accuracy of the differential pressure system.

- a) Remove Gear Fairings per Section **5.4.1**.
- b) Remove screws and clamps securing Low Pressure Tube to Duct Support Assembly. Retain hardware for reassembly. Remove any cable ties securing tube to fuselage. Disconnect Low Pressure Tube from DPT.
- c) Place Pressure Port Filter, porous side down, into a container with solvent to loosen trapped debris. Alternately, solvent can be sprayed into the porous element from the Low Pressure Tube to loosen and expel any debris.
- d) It is permissible to use compressed air to dry the Pressure Port Filter. The air should be introduced from the Low Pressure Tube of the Filter to expel any loosened debris from the inside out.
- e) Re-attach Low Pressure Tube to DPT and secure to Duct Support Assembly using retained screws and clamps. Ensure that end of Low Pressure Tube is correctly located per Drawing **1135N5, sheet 6**.
- f) Reinstall Gear Fairings per Section **5.4.2**.

6.2.3. DPT Static Port Filter Cleaning

The DPT Static Port Filter should be cleaned periodically (refer to Table 7.1 for service intervals) to maintain the accuracy of the differential pressure system.

Figure 6.2 – Filter Element



- a) Remove Gear Fairings per Section 5.4.1.
- b) Disconnect Static Hose Assembly from elbow on Static Port Manifold.
- c) Remove Static Port Manifold and Seal from forward face of RH Rotor Mast Seal Shell Half by removing 4 screws. Retain hardware for reassembly.

NOTE:
Support the Shroud located on the aft face of RH Rotor Mast Seal Shell Half to ensure that it does not drop when screws are removed.

- d) Place Static Port Filter, porous side down, into a container with solvent to loosen trapped debris. Alternately, solvent can be sprayed into the porous element from the thread side to loosen and expel any debris. Static Port Filter may be removed from Static Port Manifold to be cleaned. If Filter is removed, replace Teflon tape on threads before reinstalling it into Static Port Manifold.
- e) It is permissible to use compressed air to dry the Pressure Port Filter. The air should be introduced from the Low Pressure Tube of the Filter to expel any loosened debris from the inside out.
- f) Reinstall Static Port Manifold, Seal, and Shroud onto RH Rotor Mast Seal Shell Half using retained screws. Secure screw heads using MS20995C32 safety wire.
- g) Reconnect Static Hose Assembly to elbow on Static Port Manifold.

7.0 MAINTENANCE INSTRUCTIONS

7.1. Inspection & Test Requirements

7.1.1. General Information

This section covers the basic maintenance and service requirements necessary for safe operation and continued airworthiness of the 1135N5-1 Engine IBF. The service and inspection intervals designated herein are the maximum allowable and should not be exceeded.

7.1.2. Service Intervals

When severe or unusual environmental conditions exist or as flight requirements dictate, it is the responsibility of the operator to increase the frequency and scope of inspections necessary to ensure safe operation. Due to the operational nature of a barrier-type inlet filter, an important criterion for safe operation is an unobstructed inlet/filter. This can be accomplished by visual inspection of the filter on the sides and on top of the cabin and the Oil Cooler Duct inlet screen above the canopy glass prior to each flight. Small suspended particles on the outside of the filter element do not cause an appreciable airflow restriction. However, large, obvious debris such as leaves, brush, litter, etc., should be removed prior to flight. Good judgment and practice will ensure safe operation as well as long filter life.

Inspections, scheduled and conditional, shall be performed by qualified personnel and in accordance with standard aircraft practice. Compliance with all applicable Service Bulletins and Airworthiness Directives is mandatory.

Refer to Sections 7.2.2 and 7.2.3 for post-cleaning inspections.

Table 7.1 - Recommended Service Intervals

ITEM	INSPECTION REQUIREMENT (Reference Sections)	PRE-FLIGHT	300 ± 10 HRS OR 1 YEAR OR AS REQ'D*	300 ± 10 HRS OR 1 YEAR*
a	Visual inspection of installed filter elements. Remove debris and note condition of element and associated screens. (7.2.1)	•		
b	Remove and inspect filter elements. (7.2.2 and 7.2.3)		•	
c	Clean and re-oil filter elements. (6.1.2 – 6.1.6)		•	
d	Inspect alternate air doors and actuators. (7.2.6)			•
e	Inspect Main Filter Housing structure, Rotor Mast Seal and associated hardware for cracks and general security. Inspect Main Housing & Rotor Mast soft seals. (7.2.4 and 7.2.5)			•
f	Inspect electrical connections. (7.2.7)			•
g	Inspect and clean Pressure and Static Port Filters on Differential Pressure System. (6.2.2, 6.2.3, and 7.2.8)			•
h	Calibration check Differential Pressure Transducer / Functional test Filter Health Monitor. (7.3.1 and 7.3.4)			•
i	Leak test Low Pressure Tubes and Static Hose and Tubes. (7.3.2 and 7.3.3)			•

* Flight hours, calendar time, or as required, whichever comes first.

7.2. Inspection Procedures**7.2.1. Visual / Preflight Inspection (Prior to first flight of the day)**

- a) Inspect Filter Elements for large obstructions and damage.
- b) Inspect for security of all ¼-turn fasteners (Main Housing: 8 on left & right flanges, 3 forward center, 4 at aft corners; Filter Elements: 18 per Element).
- c) Open MGB Cowl Door and inspect System Disconnect Location for security of electrical connection (refer to Figure 5.4).
- d) Inspect both Alternate Air Doors for icing or other conditions that may prevent the doors from opening.

7.2.2. Filter Element Inspection – Severe Conditions

In these conditions it may be necessary to clean and inspect the elements more frequently than recommended in Table 7.1. Elements used in such conditions should be replaced if element filter media or fine mesh screen is severely degraded. They may be cleaned and serviced as many times as required during the element life. Regardless of the actual time in service of the elements, the physical condition of the elements, when exposed to these harsh conditions, must remain the most important factor used to determine the serviceability of the elements.

7.2.3. Filter Element Inspection – Normal Conditions

At each cleaning carefully inspect the elements as follows:

- a) Inspect the fine mesh on the upstream surface of the element pleats.
- b) Complete erosion of more than .50" (12 mm) is cause for element rejection.
- c) Inspect the course mesh on the downstream surface of each element. Any evidence of mesh wire wear or general signs of mesh breakage or deterioration are cause for element rejection.
- d) After cleaning and before re-oiling, hold each element up to a light and check for holes in the element material greater than .020" (0.5 mm) (it is normal to observe pinholes in the filter media particularly at the pleat folds. These pinholes will not allow the passage of dirt once the element is oiled). Close the holes if present using a fine pick to reposition the media material to cover the hole. Numerous holes in the media greater than .030" (0.75 mm) will reduce the filtration efficiency and are cause for element rejection.
- e) Check the condition of each element assembly and it's mating surface on the filter housing:
 - Element frames for security,
 - Element seals on Filter Element mounting flange for deterioration and evidence of gaps between the element flange and main housing,
 - ¼-turn fastener studs and springs on each element for security, loose rivets or damaged pins,
 - ¼-turn fastener receptacles on the Main Filter Housing for security and loose rivets.

Defects found are to be rectified. Consult FDC Engineering in the event any repair cannot be performed using standard practices.

When operating in the most severe conditions it is highly recommended that an additional set of serviceable, pre-oiled elements be available. This will allow continued service while the dirty set of elements is being cleaned, inspected and re-oiled.

7.2.4. Main Housing Inspection

- a) Remove Main Filter Housing per Section **5.3.1**, and inspect the Main Housing for the following:
- Main Housing Perimeter Seal for deterioration and evidence of gaps between the seal and the surface of the aircraft,
 - The fiberglass structure for integrity,
 - Inspect NACA Duct Seal for deterioration and evidence of gaps between the seal and the surface of the aircraft,
 - Elements for wear and integrity,
 - ¼-turn fastener receptacles on the Main Filter Housing for security and loose rivets,
 - ¼-turn fastener studs and springs for security, loose rivets or damaged pins, and
 - ¼-turn fastener receptacles in the aircraft for security and loose rivets.
 - Reinstall the Main Housing per Section **5.3.2**.

7.2.5. Rotor Mast Seal Assembly Inspection

- a) Remove the gear fairings per Section **5.4.1** and inspect the Rotor Mast Seal Assembly for the following:
- All soft gaskets or P-bulb seals for cracks and general security,
 - The fiberglass halves for security and integrity, and
 - Evidence of interference between rotor control linkage arms and Rotor Control Linkage Gaskets or Brackets. If there is evidence of interference, adjust the Forward Supports as required per Section **5.6.2 (g)**. Inspect rotor control linkage arms per AMM Section **67-13-00, 6-1** "Inspection - Mixing Lever Gear Unit".
 - Inspect welds on Forward Supports for integrity and absence of cracks or pitting.
- b) Reinstall the gear fairings per Section **5.4.2**.
- c) Check for evidence of gaps between the inside rim of the rotor mast opening in the fairings and the Rotor Mast Rim Seals.

7.2.6. Alternate Air (Bypass) Door and Actuator Inspection

- a) Remove the gear fairings per Section **5.4.1** and inspect the Alternate Air Assemblies for the following:
 - Actuator for corrosion, free movement of rod; verify condition of connecting hardware and integrity of wiring harness.
 - Verify sealing surface around perimeter of door and frame for integrity and positive door/frame contact when door is closed (Gaps of up to 1 mm (.040") are permissible),
 - Alternate Air Door for fit inside Alternate Air Frame,
 - Alternate Air Door Actuator Bracket for wear and integrity,
 - Actuator Support Enclosure for integrity and delamination from Alternate Air Frame, and
 - Alternate Air Frame for integrity and delamination from gear fairing.
- b) Reinstall the gear fairings per Section **5.4.2**.
- c) Perform Functional Check of Alternate Air Door per Section **7.3.3**.

7.2.7. Wiring Harness Inspection

- a) Disconnect each connector of the wiring harnesses and inspect for the following:
 - Corrosion on electrical contacts and shells,
 - Excessive wear at the strain relief.
- b) Inspect wire bundles for damaged insulation, excessive chafing and wear.
- c) Reconnect each connector for all wiring harnesses.

7.2.8. DPT Pressure and Static Port Filter Inspection

- a) Remove gear fairings per Section **5.4.1**.
- b) Disconnect Static Hose Assembly from elbow on Static Port Manifold located on forward face of RH Rotor Mast Seal Shell Half.
- c) Remove Static Port Manifold per Section **6.2.3 (c)**.

NOTE:

Support the Shroud located on the aft face of RH Rotor Mast Seal Shell Half to ensure that it does not drop when screws are removed.

- d) Inspect the DPT Pressure and Static Port Filters for the following:
 - Damage to the porous elements
 - Inspect bonds at junctions of Pressure Port Filters and Low Pressure Tubes for integrity
 - Clogging of the porous elements with grease, oil, or dirt.
- e) Reinstall Static Port Manifold per Section **6.2.3 (f)**.
- f) Reconnect Static Hose Assembly to elbow on Static Port Manifold.
- g) Reinstall gear fairings per Section **5.4.2**.

7.3. Test and Functional Check Procedures**7.3.1. Calibration Check of Differential Pressure System****CAUTION:**

Do not apply over 25 in-H₂O ΔP to the Differential Pressure Transducer (DPT) or apply any pressure to the ambient port. Damage to DPT could result.

CAUTION:

Do not tap on Filter Health Monitor (FHM) faceplate or apply excessive force to FHM buttons, damage to the faceplate and FHM could result.

- a) Energize aircraft power and push both circuit breakers "IBF".
- b) Disconnect the Low Pressure Tube from the Differential Pressure Transducer (DPT) vacuum port (marked "Main Pressure" on DPT).
- c) Attach a Tygon R-3606 or equivalent hose to the DPT vacuum port (refer to Figure 7.1).

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- d) Connect the other end of the hose to a manometer and a low pressure vacuum source, such as a deadweight tester (refer to Figure 7.1). If a syringe is used as a low pressure vacuum source, ensure a 3 to 6 ft (1 to 2 meter) length of tubing is used between the syringe and the DPT / manometer.
- e) Using Table 7.2, carefully apply LIGHT suction to the DPT while noting manometer readings. At each reading, note associated bar-graph display segments and when advisory light illuminates on the Filter Maintenance Monitor.

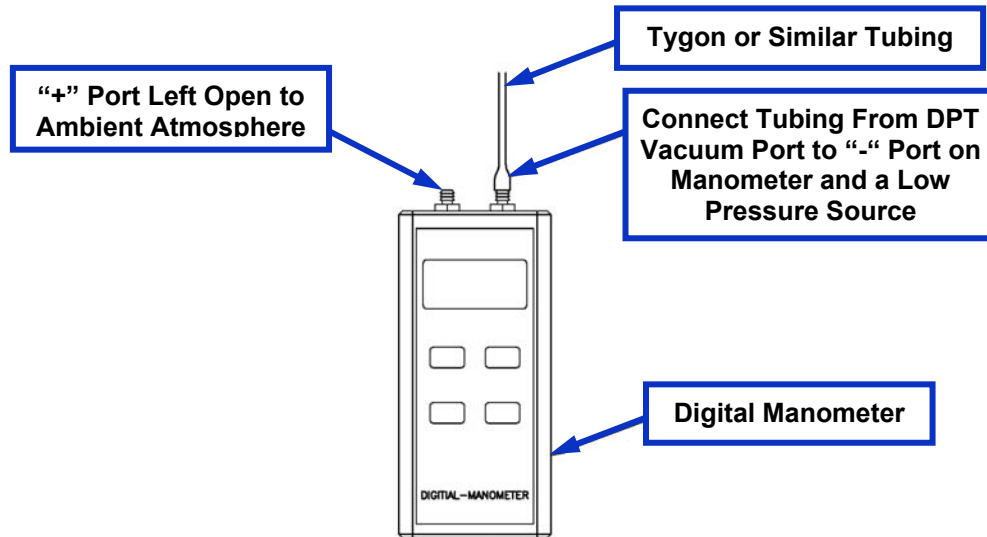
Table 7.2 – Differential Pressure Transducer Pressure Readings

Monitor Bar-graph Display Segment	ΔP across Filter (in-H ₂ O)	Monitor Advisory
10	≥ 7.2	“CAUT” Annunciation
9	≥ 6.5	“CAUT” Annunciation
8	≥ 5.7	“CAUT” Annunciation
7	≥ 5.0	“CAUT” Annunciation
6	≥ 4.3	“CAUT” Annunciation
5	≥ 3.6	-
4	≥ 2.9	-
3	≥ 2.2	-
2	≥ 1.4	-
1	$\geq .7$	-
0	$< .7$	-

- f) Amber “CAUT” annunciation should remain illuminated when the suction has been removed. Press and hold “RESET” button for 2 to 5 seconds. Amber “CAUT” annunciation should extinguish.
- g) Remove test equipment and reattach the Low Pressure Tube to the DPT port marked “Main Pressure”
- h) De-energize aircraft power.

NOTE:
Contact FDC/aerofilter Technical Support if the system is out of adjustment.

Figure 7.1 – Manometer Test Setup



7.3.2. Leak Test of Low Pressure Tubes

CAUTION:
Do not apply over 25 in-H₂O ΔP to the Differential Pressure Transducer (DPT) or apply any pressure to the ambient port. Damage to DPT could result.

- a) Remove Gear Fairings per Section 5.4.1.
- b) Disconnect Low Pressure Tubes from the DPTs.
- c) Temporarily seal off Low Pressure Tubes at the ends disconnected from the DPTs (suggested method: AN806-4D Flared Tube Plug or equivalent).
- d) Apply light suction to one Low Pressure Tube at the filter end (suggested method: Slip flexible tubing over pressure port filter and tighten with a tie wrap or safety wire). Ensure Low Pressure Tube maintains vacuum for 15 seconds.
- e) Repeat steps (d) and (e) for other Low Pressure Tube.
- f) Remove temporary seals from Low Pressure Tubes.
- g) Reconnect Low Pressure Tubes to the DPTs.
- h) Reinstall Gear Fairings per Section 5.4.2.

7.3.3. Leak Test of Static Hose and Tubes**CAUTION:**

Do not apply over 25 in-H₂O ΔP to the Differential Pressure Transducer (DPT) or apply any pressure to the ambient port. Damage to DPT could result.

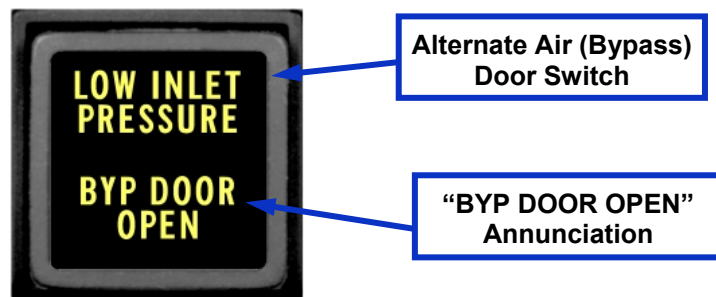
- h)** Remove gear fairings per Section **5.4.1**.
- i)** Disconnect Static Hose Assembly from elbow on Static Port Manifold located on forward face of RH Rotor Mast Seal Shell Half.
- j)** Disconnect Static Tubes with Adapters from DPTs.
- k)** Temporarily seal off Static Tubes at the ends of the Adapters disconnected from the DPTs (suggested method: AN806-4D Flared Tube Plug or equivalent).
- l)** Apply light suction to the Static Hose Assembly at the end disconnected from the Static Port Manifold on the Rotor Mast Seal.
- m)** Ensure Low Pressure Tube maintains vacuum for 15 seconds.
- n)** Remove temporary seals from Static Tubes.
- o)** Reconnect Static Tubes with Adapters to DPTs and Static Hose Assembly to elbow on Static Port Manifold.
- p)** Reinstall Gear Fairings per Section **5.4.2**.

7.3.4. Functional Check of Alternate Air (Bypass) Door

- a) Energize aircraft power and push both circuit breakers labeled “IBF”.
- b) Push each Alternate Air (Bypass) Door Switch. Observe the alternate air doors for smooth operation as each one opens. The “BYP DOOR OPEN” advisory light on the face of the switch should be illuminated (refer to Figure 7.3).
- c) Push each Alternate Air (Bypass) Door Switch again. Observe the Alternate Air Doors for smooth operation as both doors close. The “BYP DOOR OPEN” advisory should be extinguished.
- d) Repeat for several cycles to confirm results.
- e) De-energize aircraft power.

Replace actuators if not operating properly (refer to Sections 5.4.3 and 5.4.4).

Figure 7.3 – Alternate Air (Bypass) Doors Switch and Annunciations

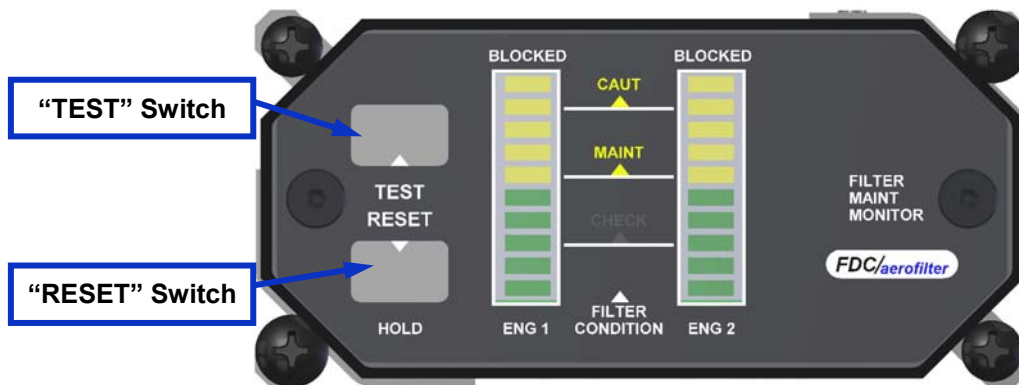


7.3.5. Full Functional Check of Filter Health Monitor (FHM)

CAUTION:
Do not tap on Filter Health Monitor (FHM) faceplate or apply excessive force to FHM buttons, damage to the faceplate and FHM could result.

- a) Energize aircraft power and push both circuit breakers labeled “IBF”.
- b) Push and hold the “TEST” button. Both bar-graph displays should rise to full scale within 3 seconds (at full intensity), and “CAUT” annunciation and both “LOW INLET PRESSURE” annunciation on Alternate Air (Bypass) Door switches should illuminate (refer to Figure 7.4).
- c) Release the “TEST” button. The bar-graph displays should extinguish, but “CAUT” annunciation and both “LOW INLET PRESSURE” annunciations on Alternate Air (Bypass) Door switches should stay illuminated.
- d) Press and hold “RESET” button for 2 to 5 seconds. All annunciations should extinguish.

Figure 7.4 – FHM Test Switches and Full Bar-graph Display Illumination

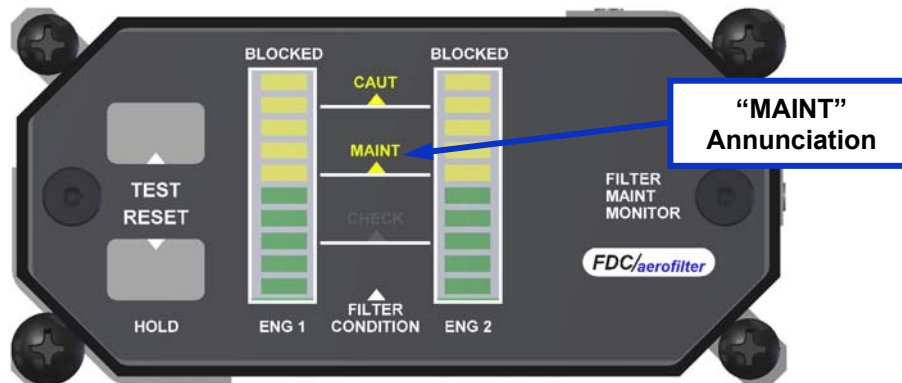


- e) Push circuit breakers INSTR LT 1 & INSTR LT 2 on overhead panel. It may be helpful to install cabin cover to get obscurity in the cabin.
- f) Set toggle switch INSTR LIGHTS on overhead panel to ON.
- g) All 5 backlighting locations – “TEST” / “RESET”, “ENG 1”, “ENG 2” (below both bar-graph displays), “FILTER CONDITION”, and “FILTER MAINT MONITOR” – should be illuminated.
- h) Adjust dimmer INSTR LIGHTS on overhead panel from minimum to full deflection. The brightness of the backlighting should change from weak illumination to full intensity.

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- i) Push and hold the “TEST” button. Both bar-graph displays should rise to full scale within 3 seconds, and “CAUT” annunciation should illuminate. “LOW INLET PRESSURE” should illuminate on both Alternate Air (Bypass) Door switches.
- j) Release the “TEST” button. The bar-graph displays should extinguish, but “CAUT” annunciation should stay illuminated.
- k) Press and hold “RESET” button for 2 to 5 seconds. “CAUT” annunciation should extinguish.
- l) Set toggle switch INSTR LIGHTS to OFF. Remove cabin cover if used in (e).
- m) Remove gear fairings per Section 5.4.1.
- n) Disconnect left side DPT wiring harness from the DPT electrical connector. “MAINT” annunciation should be illuminated (refer to Figure 7.1).

Figure 7.5 – FHM “Maintenance” Annunciation Illumination



- o) Press and hold “RESET” button for 5 seconds. “MAINT” annunciation should stay illuminated.
- p) Reconnect left side DPT wiring harness to the DPT electrical connector. “MAINT” annunciation should extinguish.
- q) Repeat (m), (n), & (o) for right side DPT wiring harness.

CAUTION:
Do not apply over 25 in-H₂O ΔP to the Differential Pressure Transducer (DPT) or apply any pressure to the ambient port. Damage to DPT could result.

- r) Disconnect both Low Pressure Tubes from DPTs.

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- s) Apply a light suction to the left side DPT Pressure Sensing port on the aft end of the DPT (Refer to Figure 7.1). The Filter Health Monitor bar-graph display for Engine #1 should illuminate along with the “CAUT” annunciation when differential pressure reaches 4.3 inches of water.
- t) Remove the suction from the left side DPT Pressure Sensing port and the bar-graph display should extinguish.
- u) Press and hold “RESET” button for 2 to 5 seconds. “CAUT” annunciation should extinguish.
- v) Repeat (s), (t) and (u) for Engine #2 on right side DPT Pressure Sensing port.
- w) Reconnect Low Pressure Tubes to DPTs. Reinstall gear fairings per Section 5.4.2.
- x) De-energize aircraft power.

8.0 LIST OF SPECIAL TOOLS

8.1. Pressure Testing

For certain tests and checks of the Filter Health Monitor and DPTs, it is helpful to have the following:

- A manometer, either u-tube or digital (preferred Example: Dwyer 47x series, see Figure 8.1),
- Tygon or similar tubing,
- A deadweight tester for use as a low differential pressure vacuum source.
- Alternately, a small volume syringe (0.5 cc – 1.0 cc) and a length of tubing may be used.

Figure 8.1 – Dwyer 47x Series Digital Manometer



8.2. Filter Element Pleat Straightening

Over the service life of a Filter Element, pleats can become deformed or bowed. The following tools can be used to gently re-straighten Filter Element pleats:

- Klein Tools Klein 86552 Offset Hand Seamer or equivalent (Figure 8.2),
- Klein Tools Klein 86553 Straight Hand Seamer or equivalent. (Figure 8.2)

Figure 8.2 – Klein Hand Seamer Tools



9.0 TROUBLESHOOTING INFORMATION

Table 9.1 – Troubleshooting

SYMPTOM	PROBABLE CAUSE	MAINTENANCE ACTION
Bar-graph display segments lit up when engine is not running.	DPT stuck in maximum position or faulty wiring.	Inspect Wiring Harnesses and DPT. Reconnect, repair or replace as required.
Bar-graph display segments range higher or lower at various power settings.	This is a normal condition.	Monitor progressive blockage to ensure that no amber bar-graph display segments illuminate and “CAUT” / “LOW INLET PRESSURE” annunciators do not illuminate.
Bar-graph display segments indicating high ΔP and “CAUT” / “LOW INLET PRESSURE” annunciators illuminated.	Filter elements are dirty.	Clean filter element before next mission.
Bar-graph display segments indicating high ΔP stay on when Alternate Air (Bypass) switches are set to OPEN.	Actuator failed in retracted position.	Inspect Bypass Doors, Actuator Wiring Harnesses and Actuator. Reconnect, repair or replace as required.
FHM shows high ΔP even with freshly cleaned and re-oiled filter.	Filter Elements are over-oiled.	Remove, clean and re-oil Filter Elements, taking care to use prescribed amounts of oil (Ref Section 6.1.6(a)).
Bar-graph display segments indicating high ΔP and “CAUT” / “LOW INLET PRESSURE” annunciators illuminate at high power with known clean filter element installed.	Out of Limits DPT	Conduct Calibration Check of Differential Pressure System (Ref Section 7.3.1).
“LOW INLET PRESSURE” annunciators on Instrument Panel do not illuminate when “TEST” button is depressed on FHM.	Damaged or disconnected wiring or plugs between FHM and Alternate Air (Bypass) Door Switches.	Inspect cockpit Wiring harnesses and plugs. Reconnect, repair or replace as required.
“LOW INLET PRESSURE” annunciators on Instrument Panel remain illuminated after “RESET” button is depressed on FHM.	Damaged or disconnected wiring or plugs between FHM and Alternate Air (Bypass) Door Switches or FHM internal fault.	Inspect cockpit Wiring harnesses and plugs. Reconnect, repair or replace as required. If all wiring and plugs are known to be good, replace FHM to clear fault.

SYMPTOM	PROBABLE CAUSE	MAINTENANCE ACTION
<p>“LOW INLET PRESSURE” annunciators on Instrument Panel illuminate without “TEST” button on FHM being depressed.</p>	<p>Damaged or disconnected wiring or plugs between FHM and Alternate Air (Bypass) Door Switches or FHM / Alternate Air (Bypass) Door Switch internal fault.</p>	<p>Inspect cockpit wiring harnesses and plugs. Reconnect, repair or replace as required. If all wiring and plugs are known to be good, replace FHM and/or switches to clear fault.</p>
<p>Alternate Air (Bypass) Doors do not open when switches are pressed.</p>	<p>Damaged or disconnected wiring or plugs between switches and Alternate Air (Bypass) Door actuator(s), faulty switches or faulty actuator(s).</p>	<p>Inspect wiring harnesses and plugs. Reconnect, repair or replace as required. If all wiring and plugs are known to be good, replace switches and/or actuators to clear fault.</p>

10.0 DIAGRAMS & SCHEMATICS

No additional diagrams and schematics required for maintenance.

11.0 DATA

No additional data required for maintenance.

12.0 SPECIAL INSPECTION REQUIREMENTS

Special inspection event defined in the Eurocopter Maintenance Manual.

1. Hard Landing.
2. Sudden Stoppage of Main or Tail Rotors.*
3. Water Immersion.*
4. Lightning Strike.*

*In event of any/all of the above, carry out 100/300 hour inspection tasks per Section 7.1.2, Table 7.1.

13.0 RECOMMENDED OVERHAUL PERIODS

No Recommended Overhaul Periods required for this STC.

14.0 APPLICATION OF PROTECTIVE TREATMENTS

No Protective Treatments required for this STC.

15.0 SUPPLEMENTAL INFORMATION FOR COMMUTER CATEGORY AIRCRAFT

This STC is only applicable to Normal or Transport Category rotorcraft, therefore no Supplemental Information is required for Commuter Category aircraft.

16.0 REVISIONS TO THE ICA

Revisions to this ICA will be made by FDC/aerofilter, the STC holder, as required. For updates, please see page 2, and Section 1.7 for contact and distribution information.