



**INSTRUCTIONS FOR
CONTINUED AIRWORTHINESS
STC SR01191SE
1120 SERIES-ICA-1**



**ENGINE INLET AIR FILTER SYSTEM
EUROCOPTER EC120B SERIES HELICOPTERS**

This supplement must be attached to the applicable Eurocopter EC120B, FAA Approved Maintenance Manual when the Engine Filtration System, P/N 1120IN1-1001/-1003 is installed in accordance with Supplemental Type Certificate (STC) SR01191SE. The information in this manual supplements or supersedes the basic manual only in those areas listed.

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RECORD OF REVISIONS

REV	DATE	DESCRIPTION	BY
IR	02/27/03	Initial Release	A.G.
A	08/18/06	Minor text corrections only. Revised text description of oil color from 'red' to 'dye', Page 10, Section 4.4.	J.W.
B	10/18/07	Added text and procedures for 1120IN1-1003 Filter System. Expanded Section 4.3 for clarity. Added Sections 4.5, 4.6, 4.7, 4.8, 4.9 Minor text corrections. Updated format.	S.Y. / R.L.
C	12/19/07	Section 4.7.2: Revised Table 1 for clarity	R.L.
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LIST OF EFFECTIVE PAGES

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1.0 Introduction

1.1 General Product Information

The Eurocopter EC120B Engine Filter System is available in two (2) configurations:

- Engine Filter System P/N 1120IN1-1001 consists of a Filter Housing Assembly, a Filter Element, an Alternate Air Assembly, a Differential Pressure Switch, a Low-Pressure LED Annunciator System, and minor components to complete the installation.
- Engine Filter System P/N 1120IN1-1003 consists of a Filter Housing Assembly, a Filter Element, an Alternate Air Assembly, a Differential Pressure Transducer, a Filter Maintenance Monitor, and minor components to complete the installation.

The Engine Filter System is designed to protect the turbine engine from foreign object damage and erosion due to fine particulate when operating in normal and dusty environments. A specially formulated polymerized oil, suspended by a pleated wire cloth and fabric matrix, attracts and holds dust particles within the filter element. It is serviced by cleaning and re-oiling at regular intervals, per the operators approved maintenance program or 'on-condition'.

A pilot actuated alternate air system is provided to bypass the filter element in the event that filter blockage exceeds a pre-selected level demonstrated in flight tests. The alternate air system should be inspected at regular intervals as part of the operator maintenance program.

1.2 Scope of Installation Instructions

This manual describes the airworthiness limitations, service instructions, inspection procedures, and testing of the engine filter system and its individual components. Adherence to the information given herein will assure maximum filtration benefit and increased component life. These data are intended to aid the operator in formulating an acceptable maintenance program in accordance with FAR 91.403(c).

1.3 Precautions

The following precautions are 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 a statement which needs to be highlighted.

1.4 Definitions, Abbreviations, Acronyms and Symbols

The following are used throughout the manual.

fl. oz.	Fluid Ounce
in. lb.	Inch Pound (Torque)
ΔP	Differential Pressure
in-H ₂ O	Inches of Water (Pressure)
EFS	Engine Filter System
STC	Supplemental Type Certificate
FAR	Federal Aviation Regulation
ICA	Instructions for Continued airworthiness
RFMS	Rotorcraft Flight Manual Supplement
LACU	Lighting and Ancillaries Control Unit
DPS	Differential Pressure Switch
DPT	Differential Pressure Transducer

1.5 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 he or she is using the most current information available. Additionally, you may register to receive these updates when they are released. When revised pages are received, insertions should be logged on the Record of Revisions page and the List of Effective Pages log should be updated. Additional copies of this and other related documents, as well as revisions and up dates may be obtained by contacting the following:

Filtration Development Corporation (FDC)
8 Digital Drive, Suite 104
Novato, CA 94949
Tel: 415-884-0555 Fax: 415-883-8071
<http://www.fdc-aerofilter.com>

2.0 Airworthiness Limitations

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

Life Limit of the filter element is 1500 hours of engine operation. The element must be removed from service if the wire mesh on the downstream side of the element is broken or damaged.

Life Limit of the filter for the 'ambient pressure' port of the Differential Pressure Transducer (filter p/n A590-1 used with 1120IN1-1003 Filter System Only) is 1500 hours of engine operation. This transducer filter must be removed from service if the porous element is broken or damaged.

No other limitations are associated with this STC.

3.0 Inspection/Test Requirements

3.1 General

This section covers the basic maintenance and service requirements necessary for safe operation and continued airworthiness of the EC120B Engine Filter System. Service and inspection intervals designated herein are recommended by the manufacturer and should be combined with the operators experience to form an acceptable maintenance program under FAR 91.403 as applicable. It is to the operators benefit to maintain the filter element in a clean condition to assure maximum engine protection with minimum performance losses.

3.2 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 filter, an important criterion for safe and successful operation is an unobstructed inlet/filter system. This can be accomplished by visual inspection of the filter 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 paragraphs 4.3.1 and 4.3.2 for post cleaning inspections.

Recommended Service Intervals

ITEM		EACH FLIGHT	100 ± 10 HR INTERVAL	300 ±10 HR INTERVAL	ANNUAL INTERVAL
a	Visual inspection of filter element (remove debris and note condition of element and associated screens) (1120IN1-1001 and 1120IN1-1003 Systems) and differential pressure transducer filter (1120IN1-1003 System only).	•			
b	Inspect, clean and re-oil filter element. * Ref. to 4.3.1 & 4.3.2 for additional cleaning interval information.		*		
c	Inspect and clean differential pressure transducer filter. (1120IN1-1003 System only)		•		•
d	Inspect and cycle alternate air door.		•		•
e	Inspect differential pressure switch / warning annunciator components for condition, security, and corrosion. (1120IN1-1001 System only) Inspect differential pressure transducer and monitor components for condition, security, and corrosion. (1120IN1-1003 System only)		•		•
f	Inspect wiring harnesses and electrical connections for condition, security, and corrosion.		•		•
g	Inspect attachment hardware, mounting brackets, and inlet seal for condition, security, and corrosion.			•	•
h	Inspect filter housing structure and associated hardware for cracks and general security.			•	•
i	Leak and pressure test differential pressure switch / warning annunciator system. (1120IN1-1001 System only) Leak and pressure test differential pressure transducer and monitor components. (1120IN1-1003 System only) ** Perform Leak and Pressure Test if a defect is discovered and/or the system integrity is in doubt.		**		•

4.0 Filter Element Servicing

4.1 General

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

4.2 Removal and Reinstallation of Element

- (a) Remove the element by unlatching the six latches on the top and sides of the element.
- (b) Reinstallation is reverse of above. Be sure to latch the secondary latch springs.

4.3 Filter Element Cleaning

- (a) Holding the element clean side up, gently tap the element edges to dislodge any large imbedded debris and dirt.
- (b) **Severe conditions:** Soak element, dirt side down, in a pan of sufficient depth to allow complete coverage. Soak with filter cleaner P/N 40-15. Allow filter to soak for 20 to 60 minutes, depending on condition. Remove element and shake thoroughly to remove dirty cleaner then flush.

Normal conditions: Spray filter cleaner P/N 40-15, with spray bottle provided or similar hand-held sprayer, liberally onto the entire element for ten minutes. Alternatively, soak element in a shallow pan of filter cleaner for ten minutes.

NOTE:

Use only filter cleaner, P/N 40-15.

NOTE:

DO NOT use Gasoline
DO NOT use Jet A or Kerosene
DO NOT use Caustic Cleaning Solution
DO NOT use Detergents
DO NOT use Parts Cleaning Solvents
DO NOT use Pressure or Steam Cleaners
DO NOT use High Pressure Hose Nozzles

- (c) Flush the cleaner fluid from the element 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.
- (d) After rinsing, gently shake off the excess water and set filter aside. Allow the element to dry naturally. It is permissible to set in direct sunlight for drying.

NOTE:

When drying the filter:
DO NOT use Compressed Air
DO NOT use Open Flame
DO NOT use Hair Dryers or Heat Guns

CAUTION:

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

4.3.1 Inspection – Severe Conditions

In severe environments, it may be necessary to clean and inspect the element more frequently than recommended in Section 3. An element subject to frequent cleaning should be replaced after **1000** hours of operation. Regardless of the actual time in service, the physical condition of the element is the most important factor in determining the serviceability of the element.

At each cleaning carefully inspect the elements as follows:

- (a) Inspect the fine mesh on the forward surface of the element pleats. Complete erosion of more than .50 in. is cause for element rejection.
- (b) Inspect the course mesh on the aft surface of the element. Any evidence of mesh wire wear or general signs of mesh breakage or deterioration are cause for element rejection.
- (c) After cleaning and before re-oiling, hold the element up to a light and check for holes in the element material greater than .020. (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 0.030 will reduce the filtration efficiency and are cause for element rejection.
- (d) Check the condition of the element assembly:
 - Frames for security
 - Seal strips for deterioration and evidence of gaps between the element and duct flange
 - Fasteners for security, loose rivets, or worn pins.

Repair any defects as required.

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

4.3.2 Inspection – Normal Conditions

At each 100 ± 10 hours of operation or upon activation of the LED low inlet pressure warning light (for 1120IN1-1001 filter system) or Filter Health Monitor amber warning flag (for 1120IN1-1003 filter system), remove the elements and inspect in accordance with paragraphs 4.3.1a, b, c, and d.

Elements should be replaced after **1500** hours in service.

4.4 Oiling the Filter Element**CAUTION:**

Use only AeroFilter Oil, PN 40-10 or PN 40-10CW

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

CAUTION:

Never use the filter element without AeroFilter oil.

DO NOT use Engine Oil

DO NOT use Transmission Oil

DO NOT use Hydraulic Fluid

DO NOT use Lightweight Oils (WD 40, LPS, etc)

- (a) Fill sprayer with recommended quantity of AeroFilter oil (15 Fluid Ounces).
- (b) Charge sprayer with compressed air.
- (c) Apply oil to the filter element with smooth, complete passes parallel to pleats.
- (d) Repeat 90 degrees to pleats.
- (e) Use all of the measured quantity of oil.
- (f) Wait 30 minutes for proper wicking and *lightly* re-oil any light areas.

NOTE:

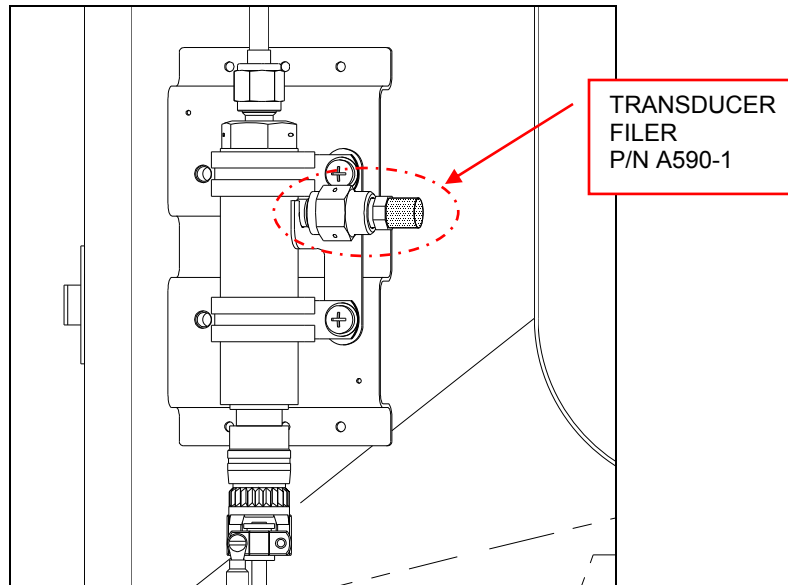
Do NOT over-oil the element. Proper absorption is achieved when the filter media is completely wicked and any surplus oil has been allowed to drip from the element.

The filter element is now ready for installation. Ref. Par. 4.2

4.5 DPT Filter Removal, Cleaning, and Installation

- (a) For 1120IN1-1003 System Only.
- (b) Disconnect DPT Filter (p/n A590-1) from 'ambient pressure' port.

NOTE:
Porous element and B-nut fitting comprise an integral unit.
Do NOT disassemble fitting and element.



- (c) Clean porous element with MEK or isopropyl alcohol, cleaning from the outside. Clean out any dirt or debris from inside the porous element. Gently wipe dry.
- (d) Re-install DPT Filter onto transducer 'ambient pressure' port fitting. Install with anti-seize compound per MIL-PRF-83483.

CAUTION:
Do NOT block port or porous element.

- (e) Torque DPT Filter on B-nut hex to 100-140 in-lbs. Secure DPT Filter to DPT with MS20995C32 Lockwire.

4.6 Functional Check of Bypass Door

4.6.1 1120IN1-1001 System Only

- (a) Push the “ENGINE ALTERNATE AIR” switch. Observe the alternate air door for smooth operation as it opens. The annunciator should read “BYPASS DOOR OPEN”.

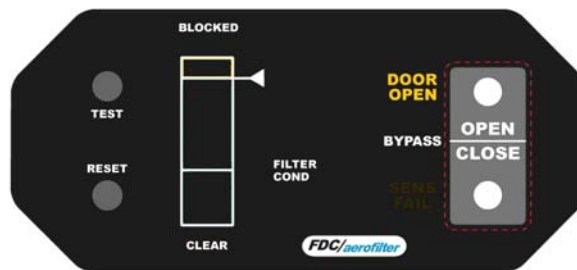


- (b) Push the “ENGINE ALTERNATE AIR” switch again. Observe the alternate air door for smooth operations as it closes. The annunciator should be OFF.
- (c) Repeat for several cycles.

Replace actuator if not operating properly.

4.6.2 1120IN1-1003 System Only

- (a) Push the “OPEN” button. Observe the alternate air door for smooth operation as it opens. The “DOOR OPEN” advisory light should be illuminated.



- (b) Push the “CLOSE” button. Observe the alternate air door for smooth operations as it closes. The “DOOR OPEN” advisory should be extinguished.
- (c) Repeat for several cycles.

Replace actuator if not operating properly.

4.7 Functional Check of Pressure Sensor

4.7.1 1120IN1-1001 System Only

- (a) Remove the pressure sensing tube between the plenum port and the Differential Pressure Switch (DPS) and attach a hose to the DPS port.
- (b) Connect the other end of the hose to a manometer and a low pressure vacuum source.
- (c) With the aircraft power on, slowly reduce the pressure in the line until the "LOW INLET PRESSURE" light comes on at 6.0 ± 1.0 in-H₂O.



Contact FDC for further information if the system is out of adjustment.

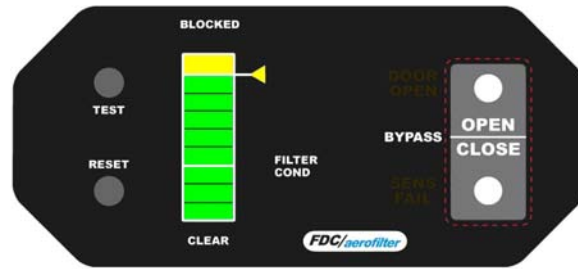
- (d) Remove test equipment and replace filter element. Replace the tube after completion of the test.

4.7.2 1120IN1-1003 System Only

- (a) Remove the pressuring sensing tube between the plenum port and the Differential Pressure Transducer (DPT) and attach a hose to the DPT port.
- (b) Connect the other end of the hose to a manometer and a low pressure vacuum source.
- (c) With the aircraft power on, using Table 1, carefully apply LIGHT suction to the DPT while noting manometer readings. At each reading, note associated light segments and when advisory light illuminates on the Filter Maintenance Monitor.

CAUTION:

**Do NOT apply over 25 in-H₂O (0.9 psi) Δ P to the DPT.
Do NOT apply pressure to the ambient port.
Damage to DPT could result.**



Monitor LED Segment	ΔP across Filter (in-H ₂ O)	Monitor Advisory
9	≥ 6.75	Amber Triangle Flag
8	≥ 6.00	Amber Triangle Flag
7	≥ 5.25	-
6	≥ 4.50	-
5	≥ 3.75	-
4	≥ 3.00	-
3	≥ 2.25	-
2	≥ 1.50	-
1	≥ 0.75	-
0	< 0.75	-

Table 1

Contact FDC for further information if the system is out of adjustment.

- (d) Amber Triangle Flag should remain illuminated when the suction has been removed. Press and hold “RESET” button for 5 to 10 seconds. Amber Triangle Flag should extinguish.
- (e) Remove test equipment and replace filter element. Replace the pressure sensing tube after completion of the test.

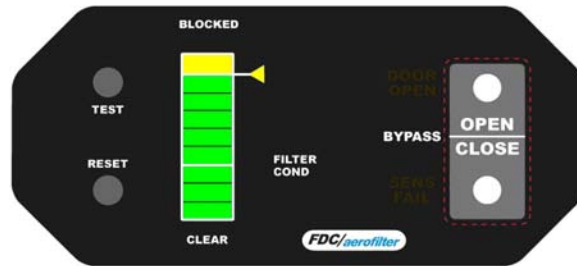
4.8 Leak Test of Pressure Sensing Tube

- (a) Disconnect pressure sensing tube at DPS (for 1120IN1-1001 System) or at DPT (for 1120IN1-1003 System).
- (b) Remove DPS or DPT from the mounting base plate.
- (c) Cap off plenum port.
- (d) Apply light suction to the pressure sensing tube at the end disconnected from the DPS or DPT.

- (e) Ensure system maintains vacuum for 15 seconds.
- (f) Remove cap from plenum port.
- (g) Install DPS or DPT on to the mounting base plate, and connect pressure sensing tube.

4.9 Functional Check of Filter Maintenance Monitor

- (a) For 1120IN1-1003 System Only.
- (b) Press and hold the “TEST” button. The bar-graph should rise to full scale within 3 seconds (at full intensity), and that all flags should illuminate.



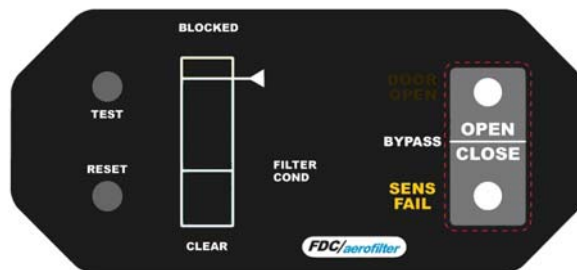
- (c) Release the “TEST” button. The bar-graph should extinguish, but all flags should stay illuminated.
- (d) Press and hold “RESET” button for 5 to 10 seconds. All flags should extinguish.
- (e) Press and hold the LACU “LIGHT TEST” button. The bar-graph should rise to full scale within 3 seconds (at full intensity), and that all flags should illuminate.
- (f) Release the “LIGHT TEST” button. The bar-graph should extinguish, but all flags should stay illuminated.
- (g) Press and hold “RESET” button for 5 to 10 seconds. All flags should extinguish.
- (h) On the LACU, set the selector switch to “NIGHT”. All 5 backlighting locations (“CLEAR”, “FILTER COND”, “BYPASS”, “OPEN/CLOSE”, and triangle flag) are illuminated. Adjust the LACU Console Dimming control to adjust the brightness of the backlighting



- (i) Press and hold Press and hold the “TEST” button. The bar-graph should rise to full scale within 3 seconds (at half intensity), and all flags should illuminate (at half intensity).

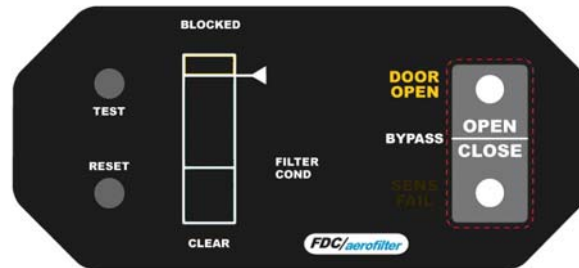


- (j) Release the “TEST” button. The bar-graph should extinguish, but all flags should stay illuminated.
- (k) Press and hold “RESET” button for 5 to 10 seconds. All flags should extinguish. Set LACU Selector Switch to “DAY”.
- (l) Disconnect Filter harness from the bulkhead connector. “SENS FAIL” flag should be illuminated.



- (m) Press and hold “RESET” button for 5 to 10 seconds. “SENS FAIL” flag should stay illuminated.
- (n) Reconnect Filter Harness to the bulkhead connector. “SENS FAIL” flag should extinguish.

- (o) Check the differential pressure transducer by applying a light suction to the static port installed in the duct assembly. The Filter Health Monitor bar graph should illuminate along with the triangle flag when ΔP reaches 6.0 inches of water. Remove the suction from the static port in the duct assembly and the bar graph should extinguish.
- (p) Press and hold “RESET” button for 5 to 10 seconds. All flags should extinguish.
- (q) Press “OPEN” button. Observe the alternate air door for smooth operation as it opens. The “DOOR OPEN” advisory light should be illuminated.



- (r) Press “CLOSE” button. Observe the alternate air door for smooth operation as it closes. The “DOOR OPEN” advisory light should be extinguished.