

**FAA APPROVED  
ROTORCRAFT FLIGHT MANUAL SUPPLEMENT  
for the  
EUROCOPTER EC135 P2+ HELICOPTER  
(EC135 HELICOPTER POWERED BY PRATT & WHITNEY PW206B2)  
and  
EQUIPPED WITH  
FDC/aerofilter ENGINE INLET BARRIER FILTER SYSTEM**

REG. NO. \_\_\_\_\_

SERIAL NO. \_\_\_\_\_

This supplement must be attached to the FAA Approved Rotorcraft Flight Manual (RFM), when the FDC/aerofilter Engine Barrier Filter System is installed in accordance with Supplemental Type Certificate (STC) SR02059SE.

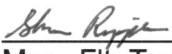
The information contained herein supplements information of the basic Flight Manual. For Operating Limitations, Normal and Emergency Procedures, and Performance Information not contained in this supplement, consult the basic Rotorcraft Flight Manual.

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\_\_\_\_\_  
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DATE: 4 MAY 2011

**RECORD OF REVISIONS**

PAGES	REV	DESCRIPTION	FAA APPROVAL
ALL	C	Initial Release – No Changes	Pat Morris for Mgr., Flt. Test Br., ANM-160S FAA, Seattle ACO Transport Airplane Directorate  Date: 2010-04-16
ALL	D	<ul style="list-style-type: none"> <li>•Extensive revisions made to Sections 1, 2, 3 and 4 to simplify and clarify description, limitations and procedures of the Filter System.</li> <li>•Section 5 revised to incorporate simple Power Check and performance methodology.</li> <li>•Updated address and company name.</li> </ul>	Pat Morris for Mgr., Flt. Test Br., ANM-160S FAA, Seattle ACO Transport Airplane Directorate  Date: 2010-11-15
1, 2, 7, 8	E	<ul style="list-style-type: none"> <li>•Section 2: Removed limitations for flight into falling and/or blowing snow.</li> <li>•Section 3: Added procedures when operating in falling and/or blowing snow.</li> </ul>	 <i>Shaun Ripple</i> Mgr., Flt. Test Br., ANM-160S FAA, Seattle ACO Transport Airplane Directorate  Date <u>4 MAY 2011</u>

**LIST OF REFERENCED DOCUMENTS**

REF	DESCRIPTION	DOCUMENT NUMBER
1	Basic Rotorcraft Flight Manual – EC135 P2+	
2	Instructions for Continued Airworthiness – EC135 P2+ Engine Inlet Barrier Filter System	1135-SERIES-ICA-5

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## **SECTION 1 - GENERAL**

This supplement provides the changes in the operating limitations, normal and emergency procedures and performance information unique to the Eurocopter EC135 rotorcraft powered by Pratt & Whitney PW206B2 Engines (EC135 P2+ models), equipped with the FDC/aerofilter Engine Inlet Barrier Filter System. This supplement must be attached to the applicable approved FAA Rotorcraft Flight Manual. For limitations, procedures, and performance information not contained in the supplement, consult the applicable Rotorcraft Flight Manual or Supplement.

The FDC/aerofilter Engine Inlet Barrier Filter System consists of two filter elements installed in front of the engine intakes. The elements consist of porous media treated with oil to enhance filtration performance. Differential pressure sensors located behind each element, measure the differential pressure across the filters and hence the level of blockage.

Blockage level is displayed as bar-graph segments to the pilot on the Barrier Filter Health Monitor (FHM). The monitor also alerts the pilot when filter element servicing is required and when unrestricted bypass air is needed. Annunciations are as follows:

A green "CHECK" annunciation is disabled for the EC135 version of the FHM.

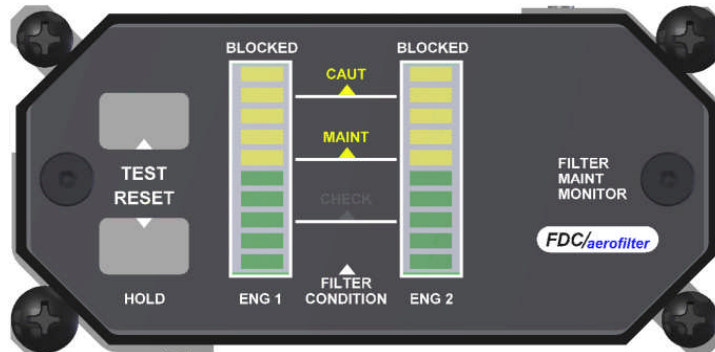
An amber "MAINT" annunciation indicates a maintenance condition exists. This annunciation will remain illuminated until extinguished by corrective maintenance action and cannot be reset by pilot action.

An amber "CAUT" annunciation indicates when the filter elements have exceeded the maximum allowable blockage level. When activated, this annunciation is magnetically latched and will be retained, even without electrical power, until reset in flight or on the ground by pressing 'RESET' on the face of the unit. Simultaneously, the "LOW INLET PRESSURE" annunciations illuminate on the Bypass Door switches installed on the instrument panel. The FHM and bypass alerts are independent of other aircraft systems – no Master Warning/Caution annunciations will illuminate.

The 'TEST' button on the monitor checks all aspects of the barrier filter monitor. Depressing the 'TEST' button will illuminate all bar-graph segments and FHM annunciations, as well as the amber "LOW INLET PRESSURE" annunciations on the bypass door switches. All annunciations illuminated indicate a successful test result. Releasing the 'TEST' button will clear all bar-graph segments but not the "CAUT" and "LOW INLET PRESSURE" annunciations, which can only be cleared by pressing and holding the 'RESET' button on the FHM for at least 5 seconds.

Power for the system is provided by two (2) dedicated 28VDC, 1 Amp circuit breakers, labeled 'IBF', on both left and right Essential or left and right Avionics Essential busses.

**Engine Inlet Barrier Filter Health Monitor (FHM)**



**Annunciations, Locations and Procedures**

	Annunciation (Color)	Condition for Illumination	Pilot Action Required	In Flight Reset?	Maintenance Action
<b>FILTER HEALTH MONITOR</b>	"CAUT" (Amber)	High Filter Blockage	Open Bypass Doors	Possible	Service Filter Elements Before Next Flight
	"MAINT" (Amber)	FHM/System Fault	Open Bypass Doors if TOT exceeds max continuous limits	No	Service Filter Monitoring System Before Next Flight
	"CHECK" (Green)	DISABLED	DISABLED	DISABLED	DISABLED
	Bar-graph Segments 1 – 5 (Green)	Normal Condition	None	Possible	None
	Bar-graph Segments 6 – 10 (Amber)	High Filter Blockage	Open Bypass Doors	Possible	Service Filter Elements Before Next Flight
<b>BYPASS DOOR SWITCH(S)</b>	"LOW INLET PRESSURE" (Amber)	High Filter Blockage	Open Bypass Doors	Possible	Service Filter Elements Before Next Flight
	"BYP DOOR OPEN" (Amber)	Alternate Air (Bypass) Doors Open	None	Possible	None

**FHM Bar-graph Segment and Alert Description:**

Green = (Bar-graph Segments 1 thru 5) Low to moderate filter blockage.

Amber = (Bar-graph Segments 6 thru 10) Filter Elements have exceeded maximum allowable blockage level. CAUT annunciation on FHM will illuminate. LOW INLET PRESSURE annunciation on bypass door switches will illuminate. *Pilot Action:* Open Bypass Doors. Monitor engine instruments. *Maintenance Action:* Clean and/or replace filter elements per ICA.

MAINT annunciation will illuminate when one or both pressure sensors have become disconnected and cannot be reset by the pilot. Maintenance is required. *Pilot Action:* Monitor engine instruments for increase in TOT. If TOT exceeds maximum continuous limits, push both Alternate Air (Bypass) Door Pushbutton Switches on Instrument Panel to open Bypass Doors. Land as soon as practicable and service the filter system before next flight. *Maintenance Action:* Refer to Inlet Barrier Filter System Instructions for Continued Airworthiness, 1135-SERIES-ICA-5, to determine maintenance action.

**Alternate Air (Bypass) Door Annunciators / Pushbutton Switches**

Two (2) Alternate Air (Bypass) Door Pushbutton Switches are located on the Instrument Panel. Pressing the Bypass Door switches open and also close the doors.

**“LOW INLET PRESSURE”**

Filter Elements have exceeded maximum allowable blockage level, pilot action and maintenance required. CAUT annunciation on FHM will illuminate. LOW INLET PRESSURE annunciation on bypass door switches will illuminate. *Pilot Action:* Open Bypass Doors. Monitor engine instruments. *Maintenance Action:* Clean and/or replace filter elements per ICA.

**“BYP DOOR OPEN”**

Inlet Barrier Filters have been bypassed and engines are being supplied with air through Open Alternate Air (Bypass) Doors.

**SECTION 2 - LIMITATIONS**

**2.1 - ENGINE OPERATIONS (GROUND AND FLIGHT)**

Engine operations with the filter elements not installed is **PROHIBITED**.

**2.2 - FLIGHT LIMITS**

The limitations of the basic flight manual remain applicable.

**NOTE:**

Operations in falling and/or blowing snow have been demonstrated in one-quarter mile or greater visibility conditions when equipped with the Engine Inlet Barrier Filter System. Minimize exposure time in ground and IGE hover operations. Snow accumulations on airframe and filter are more probable in these conditions. Exercise caution when operating in snow. Maintain visual contact with ground and any obstacles at all times.

**2.3 - AMBIENT AIR TEMPERATURE LIMITATIONS**

To maintain the engine oil temperatures within limits, observe the following environmental operating condition during flight planning:

Maximum air temperature is ..... ISA + 37.0° C  
(max. + 48° C)

**2.4 - TAKEOFF**

Takeoff is **PROHIBITED** when:

- (a) One or more amber bar-graph segments illuminated on the FHM, and/or
- (b) "CAUT" annunciation illuminated on the FHM, and/or
- (c) "LOW INLET PRESSURE" annunciation illuminated on Alternate Air (Bypass) Door Pushbutton Switches.

**NOTE:**

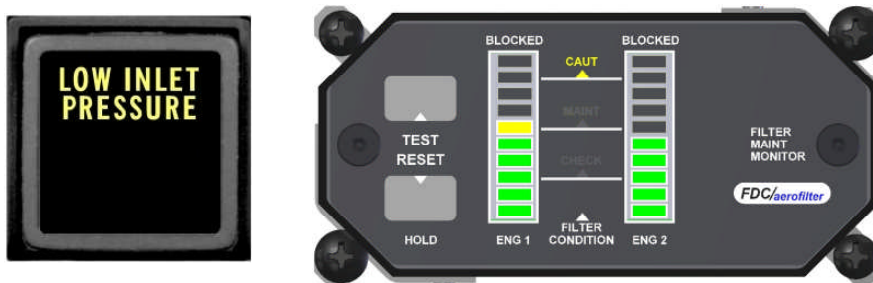
Takeoff is permitted if amber bar-graph segments extinguish with activation of Alternate Air (Bypass) Door Pushbutton Switches. "CAUT" and "LOW INLET PRESSURE" annunciations will not extinguish until reset. Reset the FHM (PUSH and HOLD FHM "RESET" button for 5 seconds) and monitor engine instruments to ensure engine parameters remain within limits (Red Lines). Service the filter system prior to next day's flight.

If engine parameters cannot be maintained within limits, land as soon as possible and conduct applicable maintenance prior to next flight.

**SECTION 3 - EMERGENCY AND MALFUNCTION PROCEDURES**

**3.1 - ONE OR MORE AMBER FHM BAR-GRAPH SEGMENTS ILLUMINATED / “LOW INLET PRESSURE” AND “CAUT” ILLUMINATED**

- One or more amber bar-graph segment(s) illuminated on the FHM, and/or
- “LOW INLET PRESSURE” annunciation illuminated on the Alternate Air (Bypass) Door Pushbutton Switches (Instrument Panel), and/or
- “CAUT” annunciation illuminated on the FHM.



**FAULT:** Filter blockage exceeds maximum allowable level.

**ACTION:** Actuate both Bypass Door switches  
 “BYP DOOR OPEN” annunciation will illuminate on both switches.

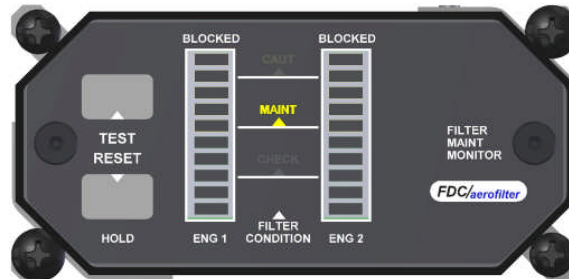
Amber bar-graph segments will extinguish with activation of Alternate Air (Bypass) Door Pushbutton Switches. “CAUT” and “LOW INLET PRESSURE” annunciations will not extinguish. Monitor engine instruments to ensure engine parameters remain within limits (Red Lines). Service the filter system before next flight.

If engine parameters cannot be maintained within limits, land as soon as possible. Perform applicable maintenance and conduct a power check prior to next flight.

If operating in falling and/or blowing snow, monitor engine instruments and land as soon as practicable. Service the filter system before next flight.

**3.2 - “MAINT” ANNUNCIATION ON FHM IS ILLUMINATED**

“MAINT” annunciation is illuminated, regardless of illumination of bar-graph segments.



**FAULT:** Differential Pressure Transducer(s) (DPT) becomes disconnected or fails.

**ACTION:** Monitor engine instruments to ensure engine parameters remain within limits (Red Lines). If engine parameters cannot be maintained within limits, Open Bypass Doors and continue to monitor engine parameters.

Refer to Inlet Barrier Filter System Instructions for Continued Airworthiness, 1135-SERIES-ICA-5, to determine maintenance action. Only maintenance action can reset the “MAINT” annunciation.

**SECTION 4 - NORMAL PROCEDURES****4.1 - EXTERIOR CHECK*****First Flight of the Day, or Each Flight if Snow or Freezing Rain Has Fallen***

Add to Section 4.3.2 Exterior Check, ④ 'Cabin Top':

**Filter Elements:**

- |                                       |   |
|---------------------------------------|---|
| Filter Elements and surrounding areas | – Check for damage and security of fasteners.   |
| Filter Element surfaces               | – Element surfaces must be free of accumulated debris, snow, ice, slush, etc. before each flight. |

**Alternate Air (Bypass) Doors:**

- |                              |  |
|------------------------------|--|
| Alternate Air (Bypass) Doors | – Closed and sealed. No ice around door edges. |
|------------------------------|--|

Add to Section 4.3.2 Exterior Check, Transmission & Engine Compartments – RH & LH

**Overhead Panel:**

- |                            |             |
|----------------------------|-------------|
| 'IBF' circuit breakers (2) | – <b>IN</b> |
|----------------------------|-------------|

**Instrument Panel:**

- |  |  |
|--|--|
| BAT MSTR switch                                | – <b>ON</b>  |
| Alternate Air (Bypass) Pushbutton Switches     | – <b>PUSH</b> both to open Alternate Air (Bypass) doors.<br>– Check "BYP DOOR OPEN" annunciation and visually check that doors open fully. |
| Transmission oil filter clogging indicator pin | – Check in   |
| Alternate Air (Bypass) Pushbutton Switches     | – <b>PUSH</b> both again to close doors.<br>– Check that annunciation extinguishes and visually check that doors close fully.              |

**EUROCOPTER EC135 P2+ ENGINE FILTER SYSTEM****1135-SERIES-RFMS-5****4.2 - ENGINE PRESTART CHECK***Each Flight***Overhead Panel:**

'IBF' circuit breakers (2) – **SET**

**Instrument Panel:**

BAT MSTR switch – **ON**

Filter Health Monitor – **PUSH and HOLD** "TEST" button.  
Verify all monitor bar-graph segments and annunciations illuminate.

– Release "TEST" button

– **PUSH and HOLD (5 seconds)** "RESET" button. Verify all monitor bar-graph segments and annunciations extinguish.

– Release "RESET" button

**NOTES:**

For any malfunction of the FHM, refer to Instructions for Continued Airworthiness 1135-SERIES-ICA-5 to determine maintenance action.

**SECTION 5 - PERFORMANCE DATA**

Engine performance is slightly reduced when the FDC/aerofilter Inlet Barrier Filter is installed and may decrease further as the filter becomes contaminated.

**5.1 - POWER CHECKS WITH IBF INSTALLED**

Except as noted below, ground and inflight power check procedures and criteria are unchanged from the basic RFM.

Performance published in the basic Rotorcraft Flight Manual is assured if ground power checks result in N1 and TOT margins that are at least zero.

**Ground Power Check:**

If results meet basic RFM power check specifications:

- Operate aircraft in accordance with basic RFM performance data.

If results do not meet basic RFM power check specifications:

- Refer to appropriate maintenance manual to determine cause of power loss and perform new power check. If results do not meet basic RFM power check criteria;
  - It is recommended that the filter element be serviced and a new power check be performed.

and/or

- If the IBF system is determined to be the single reason for power to fall below the limits specified in the basic RFM, it is permissible to continue operating using the performance data in Eurocopter Sandfilter Flight Manual Supplement FMS 9.2 -- 39 provided that subsequent power check results meet the criteria contained therein. Conduct ground power checks at intervals not to exceed 20 flight hours. Increase frequency of ground power checks if operating in dusty environments.

**Inflight Power Check:**

No change from basic Rotorcraft Flight Manual.