



Differences Training for the EC-135P1





Topics for Discussion

- Gross Weight Difference
- Hi Rotor RPM- **Not installed** (will NR remain at 100% at all times?)
- CDS (Cockpit Display System) vs CPDS (P2+)
- **Analogue vs FLI AEO and OEI Limits**
- **Twist Grip Controls**
- Electric Differences with 2 Inverters Installed
- **Lead Acid Battery installed-no overtemp light**
- Night Vision Goggle STC
- Lighting Differences in the P1
- Air Conditioning and Bleed Air Heating

Maximum Gross Mass

- Performance planning is found in this supplement for Gross mass of 2835 kg.
- Section 5 in the RFM is for Gross Mass of 2720 kg



FLIGHT MANUAL EC 135 P1 (CDS)

Flights with Gross Mass above 2720 kg and up to 2835 kg

F M S 9.1-3

SUPPLEMENT FOR

FLIGHTS WITH GROSS MASS ABOVE 2720 KG AND UP TO 2835 KG

This supplement shall be attached to the EC 135 Flight Manual (Section 9.1) when performing flights with gross mass above 2720 kg and up to 2835 kg.

Date: 29. Nov. 99

Luftfahrt-Bundesamt
Braunschweig

EASA APPROVED
date – see entry above

9.1-3 – 1

Maximum Gross Mass

- Gross Weight Difference
 - 2720 kg for the P1.....unless
 - FMS 9.1-3 is observed, then **2835 kg** is the Max Gross Weight
 - Floor Loading and Tie-down limits are the same as the P2+

Cockpit Display System (CDS) Operation

- Battery Switch –On
- CDS runs a self check and checks for the presence of the following engine cautions for Sys1 and Sys2
 - ENG FAIL
 - ENG OIL P
 - FUEL PRESS
 - HYD PRESS
 - XMSN OIL P
 - GEN DISCON

CDS Operation-Continued

- Successful self check will be indicated with “INP PASSED” below the message “CDS PASSED”
- “INP FAIL” will display if a caution is not detected
- The pilot has to acknowledge the messages by pushing the CDS/AUDIO RES button.
- There is a CDS TEST SWITCH on the overhead Console.

CDS Display Priority



FLIGHT MANUAL EC 135 P1 (CDS)

Systems Description

PRIORITY	SYSTEM I	MISC	SYSTEM II
1	ENG FAIL	CDS PWR	ENG FAIL
2	ENG OIL P	XMSN CHIP	ENG OIL P
3	ENG CHIP	TRGB CHIP	ENG CHIP
4	FADEC FAIL	XMSN OIL T	FADEC FAIL
5	FUEL PRESS	ROTOR BRK	FUEL PRESS
6	FUEL FILT	AUTOPILOT*	FUEL FILT
7	ENG O FILT	XMSN OFILT	ENG O FILT
8	ENG IDLE	DOORS*	ENG IDLE
9	TRAINING	AP TRIM*	TRAINING
10	TRAIN IDLE	F PUMP AFT	TRAIN IDLE
11	AUTOPILOT*	F PUMP FWD	AUTOPILOT*
12	ENG MANUAL	F QTY FAIL	ENG MANUAL
13	TWIST GRIP	F QTY DEGR	TWIST GRIP
14	FUEL VALVE	HTG OVTEMP*	FUEL VALVE
15	F VALVE CL	EPU DOOR	F VALVE CL
16	FADEC MINR	BAT DISCON	FADEC MINR
17	PRIME PUMP	EXT POWER	PRIME PUMP
18	HYD PRESS	SHED EMER	HYD PRESS
19	XMSN OIL P	DG	XMSN OIL P
20	OVSP FAIL*	HOR BAT*	OVSP FAIL*
21	GEN OVHT	CA CUT ARM*	GEN OVHT
22	GEN DISCON	CA CUT TEST*	GEN DISCON
23	INVERTER*	FLOATS ARM*	INVERTER*
24	FIRE EXT*	SAND FILT*	FIRE EXT*
25	FIRE E TST*	AVAD FAIL*	FIRE E TST*
26	BUSTIE OPN	P/R SAS*	BUSTIE OPN
27	STARTER	YAW SAS	STARTER
28	ENG CHP CT	XMSN CHP CT	ENG CHP CT
29	ENG OF CT	XMSN OF CT	ENG OF CT
30	F FILT CT	XMSN OT CT	F FILT CT
31		TRGB CHP CT	
32		MM FAIL	
33		ACTUATOR	
34		GYRO	

* can only be activated if respective equipment is installed

Fig. 7-9 CDS cautions and their priority

CDS Select Knob

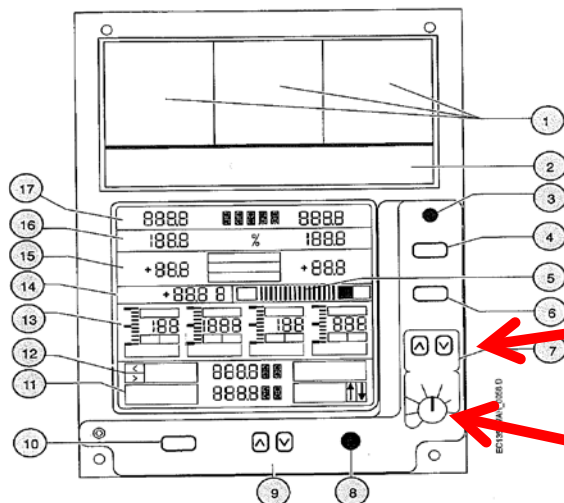


FLIGHT MANUAL EC 135 P1 (CDS)

Systems Description

7.3 COCKPIT DISPLAY SYSTEM (FIG. 7-7)

The cockpit display system (CDS) provides indication of several aircraft status information such as caution and advisory messages to the crew accomplished by operating data and indication of special operation modes. It consists of one self contained unit installed in the center section of the instrument panel.



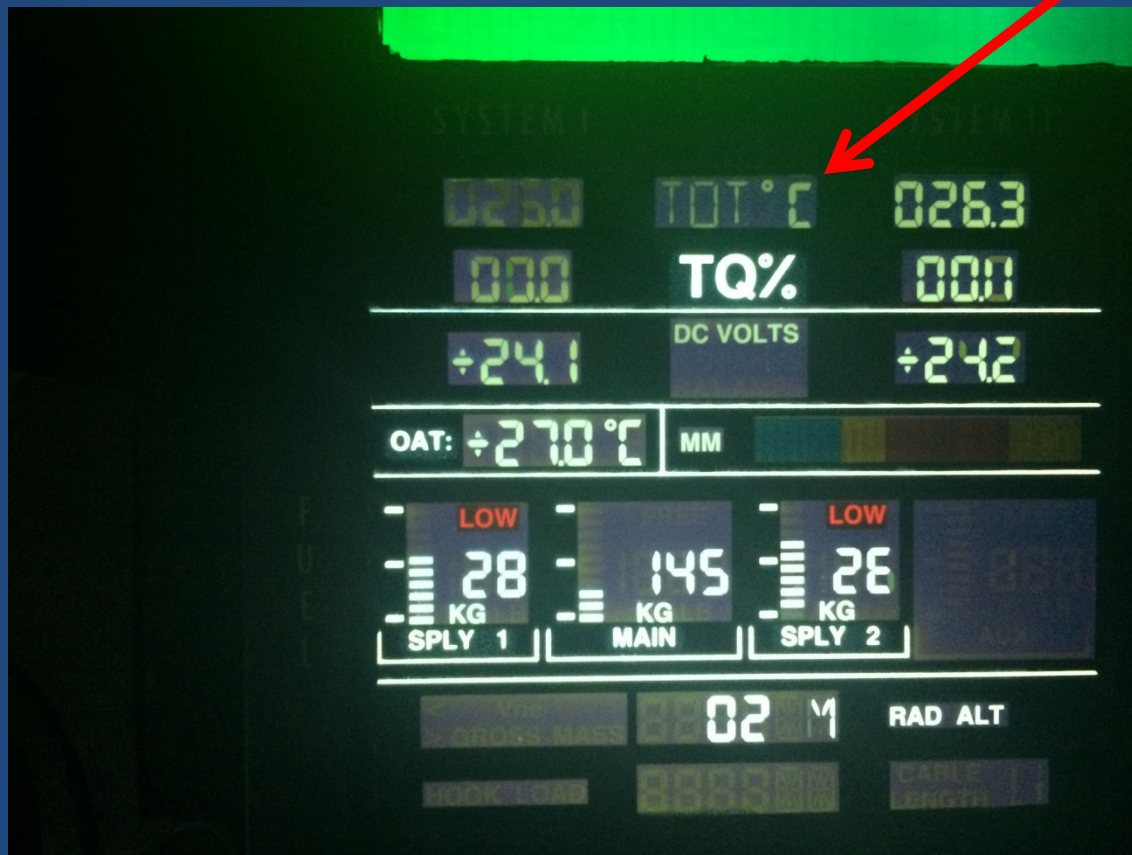
- | | |
|--|---|
| 1 Caution display SYS I, MISC, SYS II | 9 BRIGHTNESS buttons |
| 2 Advisory display | 10 WEIGHT select key for VNE indication |
| 3 PAGE light | 11 Lower option line |
| 4 CAUTION PAGE select key | 12 Upper option line |
| 5 Mast moment bargraph and LIMIT light | 13 FUEL quantity indication |
| 6 VOLT/AMP select key | 14 OAT indication |
| 7 SCROLL buttons and DISPLAY SELECT switch | 15 Electrical power indication |
| 8 CDS FAIL light | 16 Torque display |
| | 17 Operating data line (Engine parameter display) |

Fig. 7-7 Cockpit display system



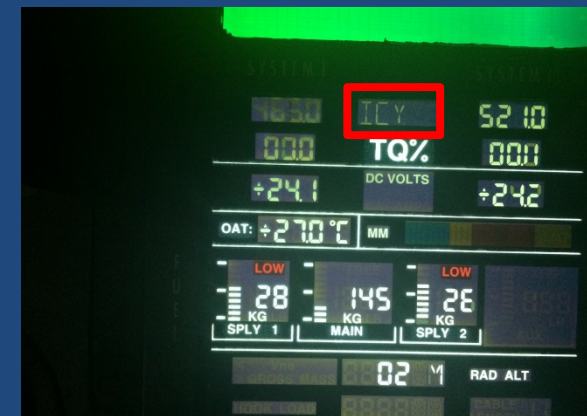
Cockpit Display System (CDS) Operation

- Upon completion of a successful Self-Test, TOT is the default display.



Cockpit Display System (CDS) Operation

- Other available FADEC Parameters include:
 - N1,N2,T1,T4T,QTB,QGT,PO,N2T,TQT,CLP
- As a pilot, you need to log the cycle count.
 - CCY-Cycle Counter-Compressor Turbine
 - PCY-Cycle Counter-Pressure Turbine
 - ICY-Cycle Counter-Impeller
 - (FADEC must be on to get the information for the cycle count)

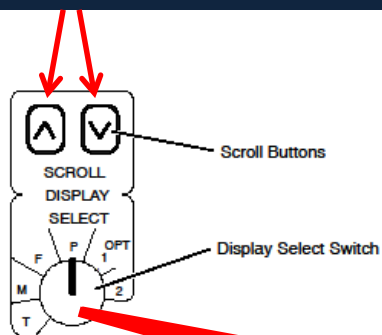


Cockpit Display System (CDS) Operation (Fuel)

- Fuel is measured in Kg not GALS
- Max fuel is 544 Kg (180 Gals) not 187 Gals on the P2+



Scroll Up and Down to select desired Information



Position	Parameter	Description
P	PARAMS (Normal flight position)	Real time FADEC parameters can be sequentially selected by means of the scroll buttons. They are displayed on the engine parameter display. The display default upon power is N1 (TM) and TOT (PW) The possible parameters are listed below.
	N1	Gas generator turbine RPM [%]
	N2	Power turbine RPM [%]
	TQT	Torque trim values of both engines [%] (TM only)
	QMAT	Torque trim values of both engines [%] (P&W only)
	EGT	Exhaust gas temperature [°C] (TM only)
	TOT	Turbine outlet Temperature [°C] (P&W only)
	T1	Air temperature measured at the compressor air inlet and provided to the engine control unit. [°C]
	CLP	Collective pitch resp. Linear-Voltage-Differential-Transducer-Position (LVDT) [%]
	P0	Air pressure measured in both FADEC boxes [hPa]
	N2T	Power turbine reference speed trim value [%]
	N1C	N ₁ Cycle counter
	N2C	N ₂ Cycle counter
F	MEM CODES	Numerical Failure Codes
	FAIL MSG	The Fail Message provides abbreviated messages for active failure codes. They are displayed on the advisory display. When viewing the FADEC failure messages and no fail code exists, a blank is displayed continuously. The indication scrolls automatically for 3 seconds each when more than one exists. All of the malfunction codes are stored. They are deleted with the next engine start when the N ₁ RPM exceeds 20 %.

CDS Failure

- 3.6.1 pg 3-56
 - Conditions/indications
 - Complete CDS inoperative
 - Procedure
 - Carefully monitor remaining indicators.

LAND AS SOON AS PRACTICABLE

Analogue vs FLI AEO and OEI Limits

FLI / VEMD P2 +



Analogue P1



Analogue vs FLI Limit's Differences

Analogue P1 Limits

- AEO T/O 5min <VYSE-75% Tq
- AEO T/O Unintended-NA
- OEI 2.5 Min – 100% TQ
- OEI 30 Sec – 125% TQ / 20 Sec
- OEI Max Continuous – 86%
- N1 Trans Max- 103.4% / 20 Sec
- N2 OEI-Trans Max-NA

FLI P2+ Limits

- AEO T/O 5min <VYSE-78% Tq
- AEO T/O Unintended-82% Tq / 10 Sec
- OEI 2 Mim – 125% TQ
- OEI 30 Sec – 128% / 30 Sec
- OEI Max Continuous – 89.5% TQ
- N1 Trans Max-102.0% / 5 Sec
- N2 OEI-Trans Max-107% / 7 Sec

Collective Twist Grip Differences

P2+



- Has longer Textile Texturing grips.
- Has Red metal stop.
- Stop must be lifted and folded back to twist counter clockwise.

P1



- Has shorter non-Textile Texturing grips.
- No guarded stop, can easily twist into over speed condition.

Dual Inverters Installed in 312SA



Overhead Panel



N253SA is single inverter set up

Emergency Procedure

- From the Emergency Procedure Checklist for 2 inverters and INV SEL AC BUS SPLY sw installed

Effectivity If two inverters installed
(AC power system Bus I and Bus II)

INVERTER
(SYSTEM I)

or

INVERTER
(SYSTEM II)

(optional)

Procedure

1. INV 1 or INV 2 sw (affected inverter) – OFF

Effectivity If two inverters and INV SEL AC BUS SPLY sw installed
(AC power system Bus I and Bus II)

INVERTER
(SYSTEM I)

or

INVERTER
(SYSTEM II)

(optional)

Procedure

1. INV SEL AC BUS SPLY sw – Switch over to normal inverter INV 1 or INV 2
2. INV 1 or INV 2 sw (affected inverter) – OFF

Effectivity All

Effectivity H/C with S/N 121 and subsequent

Lead Battery Supplement

 **eurocopter**
an EADS Company
American Eurocopter
2701 Forum Drive
Grand Prairie, Texas 75052-7099

FLIGHT MANUAL SUPPLEMENT

FOR

EUROCOPTER-DEUTSCHLAND MODEL EC135P1/T1/P2/T2

WITH

LEAD ACID BATTERY INSTALLATION

Registration No. 13555

Serial No. 0054

This supplement must be attached to the applicable LBA Approved rotorcraft flight manual when the Concorde RG-390E, Lead Acid Battery has been installed in accordance with STC No. SR09105RC-D.

The information contained herein supplements the information of the basic rotorcraft flight manual. For limitations, procedures, and performance data not contained in this supplement, consult the basic flight manual.

APPROVE


Carl F. Mittag
Manager, Rotorcraft Certification Office
Federal Aviation Administration
Fort Worth, Texas 76193-0170

DATE: OCT 31 2003

Battery for P1



No
Temp
Indicator

Battery Switch- ON

- Rotor
- TQ
- N1
- TOT
- All display full scale deflection once power is applied to the aircraft



Night Vision Goggle Supplement



Aviation Specialties Unlimited, Inc.
4632 W. Aeronca Street
Boise, Idaho 83705

Rotorcraft Flight Manual Supplement

No. FMS-135004-6

For

Eurocopter Deutschland GmbH

**Models EC-135 P1, EC-135 P2, EC-135 P2+,
EC-135 T1, EC-135 T2, EC-135 T2+ Rotorcraft**

Night Vision Goggle Compatible Lighting System

STC No. SR01207SE

S/N: 0054

This supplement shall be attached to the basic FAA Approved Rotorcraft Flight Manual and kept on board the aircraft at all times when the aircraft is modified by installation of the Supplemental Lighting System in accordance with the above-referenced STC.

The information contained herein supplements or supersedes the basic manual only on those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the basic FAA Approved Rotorcraft Flight Manual.

FAA Approved By: 
Chief Manager, Seattle Aircraft Certification Office

Date of Approval: JUL 24 2012

Revision: G

Night Vision Goggle Supplement

4. Normal Procedures

4.1 Night Vision Goggles

Operators shall perform a daily check of the Night Vision Goggle (NVG) for serviceability and function in accordance with the NVG manufacturer's operator's manual before each NVG operation. The manufacturer recommends that the NVG undergo an inspection and validation check every 180 days in accordance with RTCA DO-275, Chapter 5.

Daily Check includes:

- Check overall condition of the NVG equipment. Inspect for cracks and/or damaged or missing parts.
- Check all mechanical functions. Inspect fore and aft adjustment system, tilt adjustment system, and interpupillary adjustment system and ocular/objective lens focus systems for correct range of motion, or for problems like binding or looseness.
- Check condition of optic surfaces. Clean as necessary. Excessive chips or scratches that degrade visual acuity with the NVG may require replacement of component affected.
- Check low battery warning system/indicator for proper operation.
- Check electrical contacts for excessive dirt and/or wear.
- Check all NVG accessories such as battery pack, power lead, helmet mount, etc., for proper operation/function.
- Refer to operator's manual for further information. Implement repair or replacement as necessary.

4.2 NVG Lighting System

The NVG Lighting System is comprised of a series of High Intensity NVG compatible LED Pod Lights, special filter material used to cover radio displays, light switches, annunciator and caution/warning lights. Individual aircraft installations may vary. The supplemental lighting system is energized by the use of a single toggle switch labeled either NVG or SUPP Lights.

Typical adjustment are as follows:

- **LED Pod Lights:** Rotate Instrument Panel Rheostat Clock-wise until achieving desired illumination level and instruments are fully visible.
- **Magnetic Compass:** Rotate Magnetic Compass Rheostat Clock-wise until achieving desired illumination level.

****Note -** For aircraft configured with only a DAY and NIGHT switch which do not have a separate rheostat for the magnetic compass, the OEM dimmer may be utilized to achieve desired illumination level.

JUL 24 2012

FAA Approval Date

- **Filtered Displays:** Increase/Decrease internal lighting utilizing OEM lighting system until achieving desired illumination level.
- **STBY Instruments:** Adjust lighting.
- **Radio Nav/Com, transponder, GPS, etc:** Avionics and instruments with auto dimming capabilities require no action from the operator.
- **High Intensity Utility Light:** The utility light is a high intensity LED with built-in rheostat for adjusting the light intensity. The light is mounted on a movable "Goose Neck" extension for ease of adjustment and light placement.

4.3 OEM Lighting

For aircraft configured with only a DAY and NIGHT switch, the OEM lighting must be in the NIGHT mode for NVG operations.

For all other aircraft configurations, ensure that the OEM lighting switch is in the OFF, or NVG switch mode prior to NVG operations.

5. Performance Data

No change in performance.

6. Weight and Balance

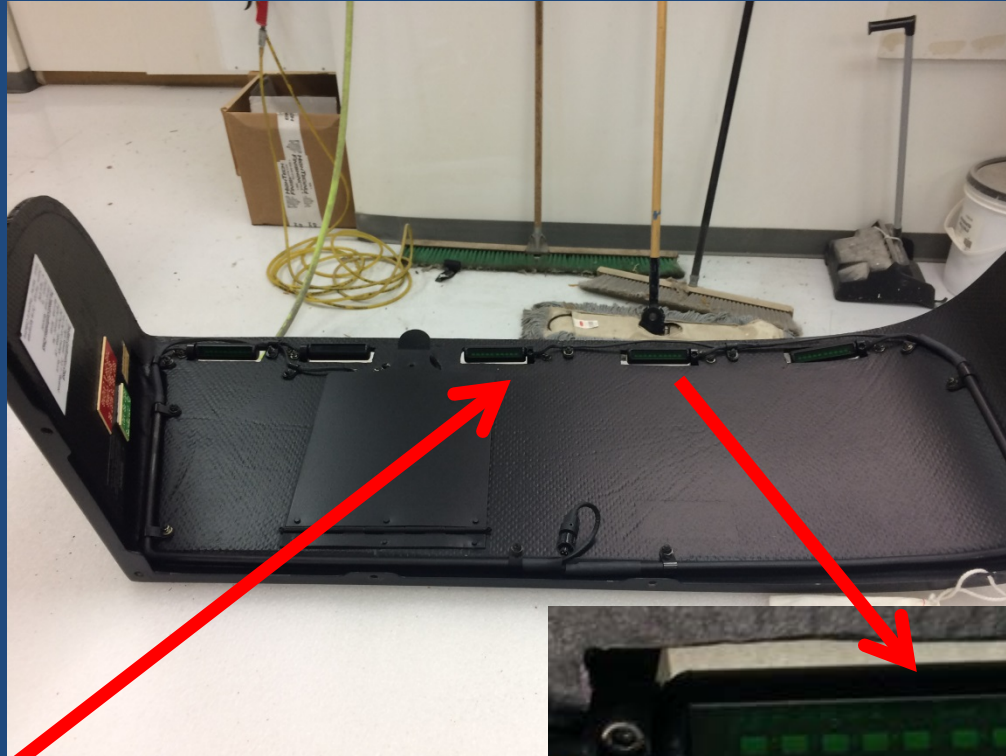
The total weight added to the aircraft with this installation is less than two pounds. Since this weight is spread between numerous stations at various locations, the effect on the weight and balance of the aircraft is deemed to be negligible.

JUL 24 2012

FAA Approval Date

NVG Lighting and Load Light

NVG Position- Illuminates
Compass, Overhead and
Flood Lights.



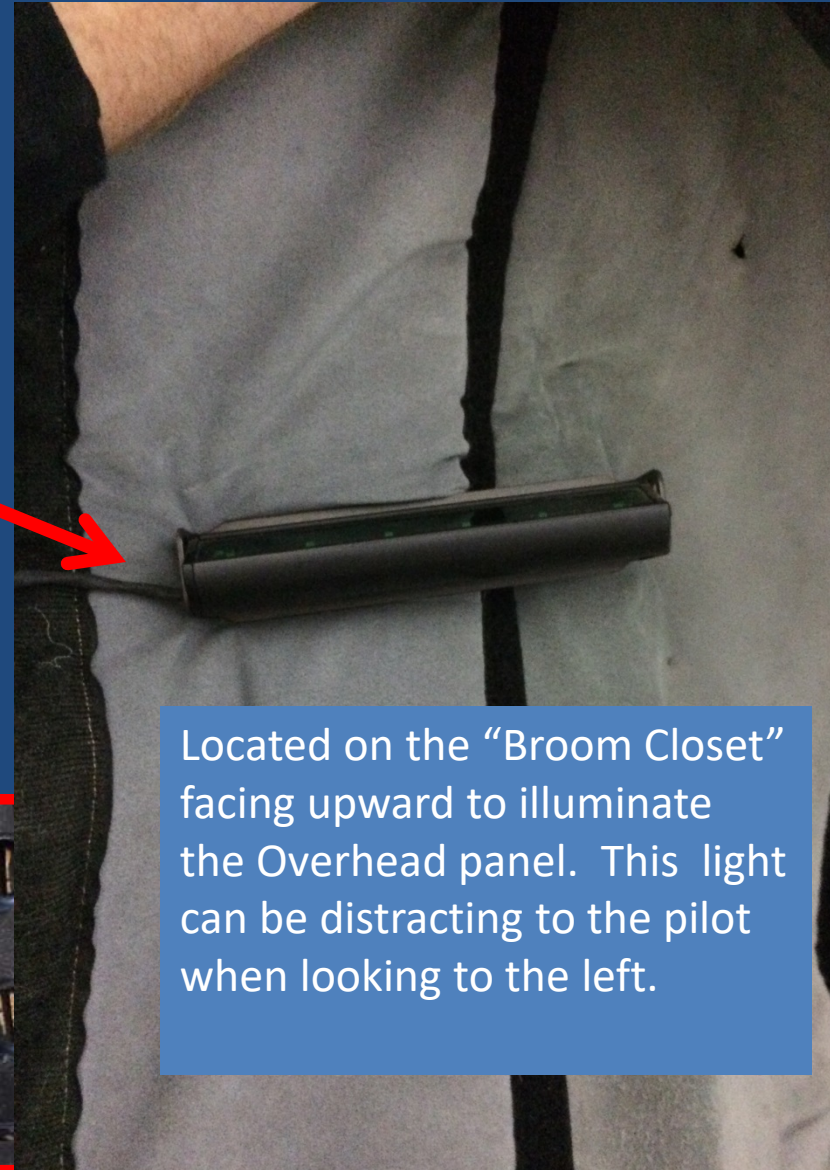
NVG Lighting and Load Light

NVG Position- Illuminates
Compass, Overhead and
Flood Lights.



NVG Lighting and Load Light

NVG Position- Illuminates
Compass, Overhead and
Flood Lights.



Located on the "Broom Closet" facing upward to illuminate the Overhead panel. This light can be distracting to the pilot when looking to the left.

A red arrow originates from a blue rectangular area in the upper left and points towards a photograph of a white aircraft wing in the lower right. The photograph shows a close-up of the wing's leading edge and a small sensor or probe mounted on its surface.



Instrument Lighting

There is not a Day/Night/NVG Lighting Switch, all in one switch, Installed in the aircraft.

Adjust the INSTR Rheostat to illuminate backlighting of the instruments and turn the switch to-ON



Air Conditioning

135AC-7
Rev E
15 Mar 2007
1 of 10

METRO AVIATION, INC.
P.O. BOX 7008
SHREVEPORT, LA 71137

FAA APPROVED

HELICOPTER FLIGHT MANUAL SUPPLEMENT 135AC-7

FOR

EUROCOPTER HELICOPTER CORPORATION
EQUIPPED WITH THE VAPOR CYCLE AIR-CONDITIONER
KIT# 135AC-00-011 IR
And
Kit 135AC-00-011 -1

MODEL: EC 135 (T1, P1, P2, P2+, T2, T2+)

REGISTRATION NO.: N355J

SERIAL NO.: 0054

This supplement must be attached to the LBA/FAA approved Rotorcraft Flight Manual, dated June 14, 1996 or later FAA Approved revisions when an Metro Aviation, Inc., vapor cycle air-conditioning system is installed in accordance with STC SR09163RC. The information contained herein supplements or supersedes the basic Rotorcraft Flight Manual only in those areas listed. For limitations, procedures, and performance information not contained in this supplement, consult the basic Rotorcraft Flight Manual.

FAA APPROVED: 

DATE: March 15, 2007

LANCE T. GANT

Manager Southwest Region
Certification Office

Fort Worth, Texas 76193-0170

Air Conditioning

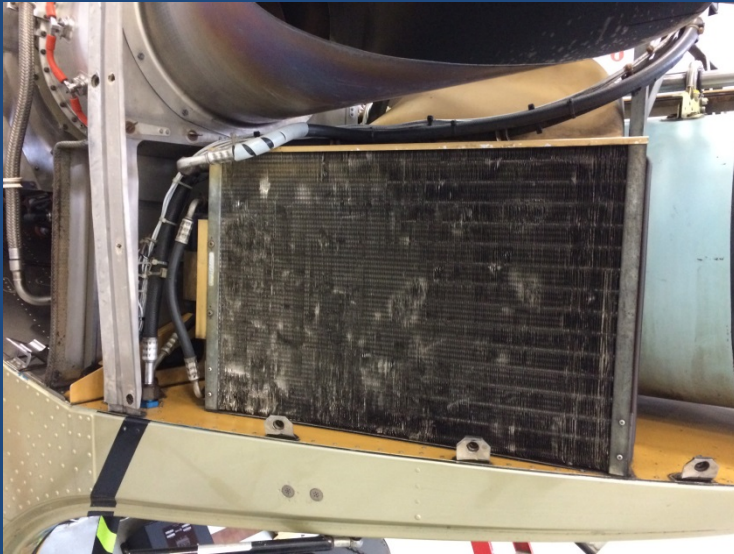
- Supplement 9.2-23
- Performance Data
 - HIGE/HOGE Gross Wt- Reduce by 40kg
 - Rate of Climb- Reduce by 140ft/min

Air Conditioning

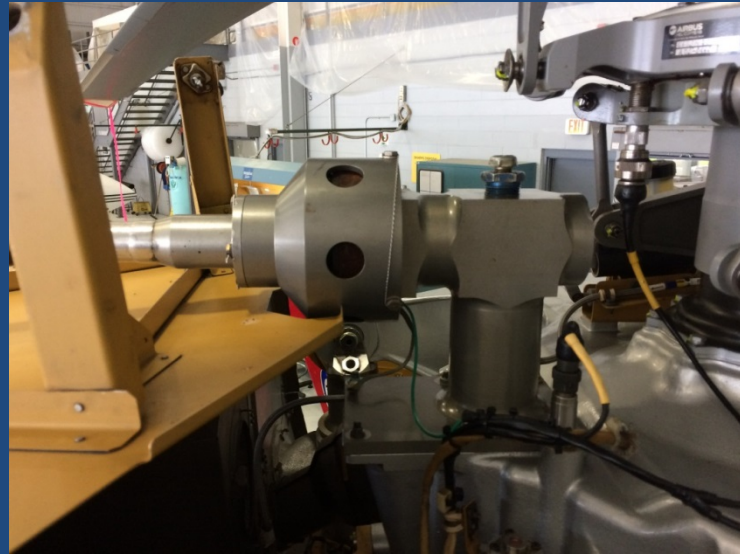
- Emergency and Malfunction Procedures
- GEN DISCON I and/or GEN DISCON II
GEN OVHT I and/or GEN OVHT II
 - Reduce electrical consumers as much as possible
 - AIR COND switch-OFF
 - AIR COND advisory light- Check off

Air Conditioning Differences

Flex Cable Driven P1



Mechanically Driven P2+



Bleed Air Heating

Simple, Turn the rheostat to the right to turn ON the Bleed Air Heating System

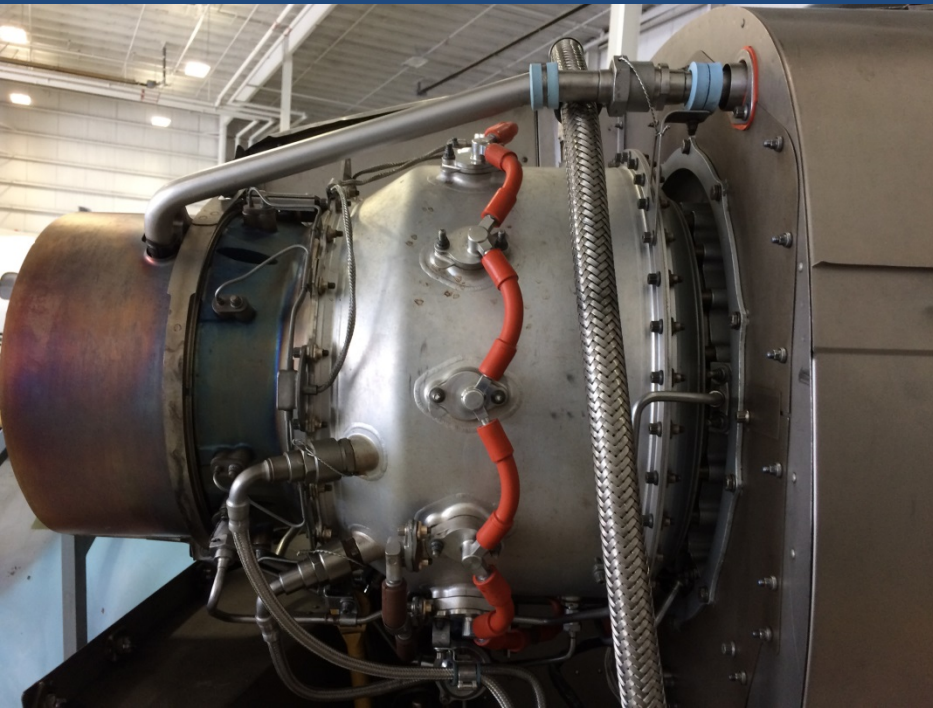


N312SA does not have "PULL FOR HEAT" Knob like the P2+, but does have "PULL FOR AIR"

Engine Differences

Both Engines are PW206B, but fuel lines are different

P1



P2+



Questions, Comments, Concerns?

