

AW139

Max 17 Seats

MTOW with "basic" version is 6 400 kg
(supplement 50 for 6 800 and supplement 90 for 7 000 kg)

Engines Pratt and Whitney PT6C-67C

- o Tricycle retractable landing gear
- o CAT A and B, single, dual pilot VFR/IFR

228 kg then tanks are separate

Hydraulic system 4 pumps, one electrically driven only for flight control checks on ground.

Safe OEI - Minimum 50 KIAS, positive ROC at acceptable power levels and sufficient clearance from ground/obstacles.

The structure is a Semi-Monocoque structure.

Engine has 4 stage axial compressors, and one stage centrifugal compressor.

167 KIAS VNE

3 hydraulic pumps and 1 electrical one.

The main battery or the external power unit feeds the starter. The AUX battery sends power to the essential buss and the other components.

The cockpit canopy is made of Kevlar

6 emergency exit in the cabin (two pr. sliding door).

The Engine has 14 fuel nozzles, 7 duplex and 7 simplex.

60 knots windspeed limitation rotor start/stop

Rotor start/stop in windspeed above 33 knots must be recorded in the logbook.

ENGINE

Pratt and Whitney PT6C-67C

Four axial compression stages and one centrifugal stage.

The engine has 14 fuel nozzles (7 simplex and 7 duplex)

Exhaust is 57° up LH or RH configuration.

Two spark igniters per engine, only used during starting.

Oil lubricated system, Oil tank is integrated with the engine.

ITT is monitored at station 5, at the gas generator outlet, between the compressor and power turbine.

Engine starting

ITT Maximum 870° C

ITT start 2 sec 1000°C

ITT start max 5 sec 950°C

ITT Start max 870°C 10 second

Start and IGN disengages at 49% NG.

With both engine at idle they are stabilized at 65% +/- 1% NF.

At 102% NR VNE 90 knots.

102% NR mandatory in Category A

Torque limiter on for OEI training

The NF / TQ sensor is located on the output section of the engine.

5 Engine Bearings (Nr. 1 and 5 ball bearings. Nr. 2,3 and 4 roller bearings)

BIG arrow in checklist means that it has to be done first flight of the day.

Compressor bleed valve prevents the compressor to stalls at low compressor speeds.

The purpose of piccolo holes is dumping 2.8 air into engine inlet during low rpm to prevent compressor stall.

The system has three scavenge pumps and one pressure pump.

One engine chip detector on each engine, It is NO way to burn the engine chip.

Engine Oil pressure low CAS when below 4,2 bar (resets above 4,7 bar). Only Low pressure sensor.

The purpose of the Ecology Fuel Accumulator is to prevent fuel nozzle cooking after shutdown, it stores the remaining fuel in the nozzles to be stored instead of spit it out on the ground.

How is the fuel flow controlled during normal flight? By the EEC.

When does the EEC overspeed activate? 111% NF active and 109% NF deactivate .

2 spark igniters 4 and 8 o clock

Engine starter must be disengaged by 49% Ng (Start and ignition).

When should an engine start be aborted?

- light up is not within 10 seconds of ENG MODE to IDLE
- abnormal noise heard
- ITT increases beyond engine limits (HOT START caution illuminated)
- engine hangs (stagnation in NG below 54%)
- the main rotor has not begun to rotate when the gas generator (NG) reaches 40%
- engine starter fails to disengage by 49% NG.

Electrical power during start up is supported by the essential bus.

FIRE PROTECTION

If you receive a overpressure in the bottle or discharge it manually, the green “guard” on the side of the helicopter will be pushed out. NO indication will be shown in the cockpit, only “MAINTENANCE” when on ground (WOW switch)

There is one fire element gas expansion pr. engine

Smoke detector in the baggage department is a photoelectric device. It senses the amount of light emitter by an LED source.

Fire wire filled with helium in the engine compartment

BAG fire test:

- BAG FIRE light, on fire panel
- Audio
- Master Warning
- CAS **BAG FIRE**

Engine fire Test:

- ENG 1(2) fire on fire panel
- Audio
- FIRE light near engine switches
- Throttles in roof lights up (ECL)
- Master Caution WARNING
- CAS **1 ENG FIRE** AND **1 ENG FIRE DET**

There are two portable fire extinguishers are Halon 1301 and pressurized with nitrogen.

Engine Bay fire on ground vs Engine exhaust fire after shutdown?

Main Rotor, Main Rotor Drive System, Tail Rotor, Tail Rotor Drive System, Flight Controls

The NR sensor has three coil connector. 2 coils to 1 and 2 EEC and 1 coil to MAU.

The elastomeric bearing permits the blade to lead-lag, flap and for pitch change movements (Flight control)

The lead-lag damper is filled with oil.

[ROTOR LOW] "ROTOR LOW - ROTOR LOW" (Priority number 1 aural warning)

ROTOR HIGH] "ROTOR HIGH - ROTOR HIGH" (Priority number 3 aural warning)

[NR MISCOMPARE] when discrepancy of 3% between EEC Nr data and backup analog sensor.

The MGB can be run without oil for 30 minutes.

CAS messages for [MBG OIL LOW], [IGB OIL LOW] and [TBG OIL LOW] will only be shown on ground when Nr is below 2%.

MGB has 3 chip detectors (2 in sump and 1 in the collector tray of the mast bearing).
(Total 5 in the aircraft (2 MGB sump, 1 MGB mast, 1 IGB and 1 TGB)
Allowed to burn chips 3 times.

Can the oil pressure be monitored in the TGB? No

Where is the NF torque sensor located? On the output housing of the engine.

How is the MGB cooled? It's cooled by an oil cooler via the MGB system and ram air.

How many free wheeling units are there and where are they located? 2, located on the MBG input modules.

- o Rotor brake reservoir is located on top of PCM2
- o Rotor brake display panel only on captain side
- o Two long shaft one small shaft – first shaft steel (high temp) new titanium – second two aluminium alloy

What is the purpose of the anti flail? (Tail boom) It will prevent damage to the hydraulic lines and structure.

The MGB oil low level warning can be tested: On ground with NR <2%.

Where are the MGB lubrication switches located? On the MGB input models.

How many main rotor blades? 5

How is the lead lag damper on the main rotor? Oil damper

During an autorotation, how does the indicators show? Wider than normal.

Which hyd system powers the rotor brake? It has its own system

When will the rotor brake caliper move down? Weight of wheels and engine to idle or flight.

When the rotor is at a full stop, the brake pressure must be increased by pumping to a pressure of 40bars. This will guarantee a brake operation of 8 hours.

Landing gear limitations - Flight manual, section 1 Limitations.

How many wheels? 5

How can the nose wheel be unlocked in flight? It can't.

How is the landing gear locked down? It's locked down mechanically.
When ever the landing gear are in fully up positions they are held up by hydraulic pressure system number 2.

What is the indication in the landing gear panel when the gear is up? The panel is black.

Two hydraulic system - fully independent and electrically connected.

Hydraulic system nr.1 supply power to 3 main rotor servo actuators and to the emergency landing gear function.

Can you switch off one hydraulic system when you have no pressure on the other one?
No.

Hydraulic system nr. 2 uses pump nr. 2 and 4.

Hydraulic system nr.1 uses pump nr.1 and 3. Nr. 3 is electrical and only used on ground for flight controls check.

What happens at the different levels when the hyd system nr. 2 reservoir has a leak?

- 50% UTIL SOV 2 = closed → landing gear free fall - [HYD UTIL PRESS]....
- 28% UTIL SOV 2 = open → landing gear circuit repressurized.
TRSOV = closed [2 SERVO].
- 22% [2 HYD MIN].
UTIL SOV 2 = closed → landing gear free fall
[HYD UTIL PRESS].
TRSOV = closed
[2 SERVO].

How is the TRSOV closed? Only automatically.

How are the starter generators cooled? Air cooled by a fan mounted at the end the starter-generator.

If you want to start the engine nr. 2 first you have to put the Bus Tie switch on.

Each generator is controlled buy the GCU (generator control unit).

During normal operation how is he battery charged?
Main battery via GEN 1 and AUX battery via GEN 2.

What is the minimum Volt to start? 23V

With EXT. PWR on the generators does not come online before the EXT PWR is disconnected.

With the Bus Tie in AUTO, is it open or closed with both generators online? Open.

When is the non essential busses online? With both generators online or EXT PWR connected.

In between the two fuel tanks there is an interconnection.

What is the fuel quality below the interconnection flange? 228kg.

What is the purpose of the booster pumps? Feed the engine during normal operation and during start.

How many fuel probe sensors are the fuel tanks provided with?

4, 2 main probes and 2 secondary probes.

With the X-FEED selectors in normal and one boost pump fail the X-FEED opens automatically.

Usable FUEL 1588 L

Unusable FUEL 20 L, 10 L / 8kg per tank

Minimum AFCS configuration for IFR flight.....2 AP in ATT mode Intentional ATT MODE de-selection during IFR flight is prohibited.

How is pitch control on tailrotor – push pull rods and linear activators.

What is missing on the left hand side compared to right hand side collective – rpm selector and governor switches.

How many trim motors in the 4 axis autopilot – 4 – 2 cyclic 1 collective 1 pedal/yaw.

Which statement regarding trim motors and linear activators is correct – linear activators will operate whenever the respective autopilot is engaged regardless of force trim switches ATT/SAS mode, etc.

What does CPL light mean – flight director coupled to the autopilot.

What is the minimum AFCS configuration for IFR flight – 2 AP in ATT mode.

What is the minimum speed to engage ALT-A after takeoff – 60kt.

Which autopilot controls the trim motors for flight controls – the autopilot trim master -> the first Autopilot engaged.

1P trim fail caution – fail of pitch trim while AP1 has priority - QRH p40.

Where are the MAU located – front long nose – baggage com short nose.

What will you lose when MAU1 fail – AP1 and Flight Director 1.

Which system does not have a synoptic page on MDF – fuel system.

What statement is correct about CAS – warning red, caution amber, advisory green, mx white.

What statement is correct about the CAS – all cas messages can be scrolled out of view except warning.

Where are flux valves located – on the aircraft tail section.

What does the amber AHRS1 message on PFD mean – both PFDs are using information from AHRS1 (only when AHRS1 selected on RCP).

What does the amber arrow on top of the copilot display unit 1 indicate – at least one on side flight director parameter is invalid (Flight Director Failure – emg checklist – S34-28).

What does the amber RAD on either PFD mean – rad alt miscompare (+-10ft)

MAUs receive heading information from the AHRS and ESIS (standby instrument system).

What does the amber ALT caution on the altitude tape on the left side mean? – miscompare in ALT +- 150ft - Page 3-177.

When does the pitot heater caution come visible - when temp is 4 or below and pitot heat is off.

How are the windscreen wipers activated – panel (fast/slow-single/dual) + pushbutton on cyclic.

What is the time limit PI 101-110 TO power - 5 min.

What is the maximum PI OEI?

- 140% Max Continuous
- 141-160 % 2,5 min
- 176% Max transient 5s

Max windspeed for rotor start and stop – 60kt – has to be recorded above 33kt.

During engine starting what is the max allowable ITT for 2 seconds 1000 degrees

What is the max allowable grossweight for taxi standard weight – 6450kg

What is the max TO power PIA EO –110%-5min

At what PI in OEI does the NR start drooping - @160Tq (if Tq limiter on)

What is the maximum indicated airspeed for opening cabindoors – 80kt operating limitation for both Locked open right door is 100kt – Locked open left door is 80kt

Max AS with NR 102% - 90kt

Max Grossweight for Cat A vertical procedure takeoff – 6400kg

Max taxispeed on paved surface below 6400kt – 40kt GS nose wheel locked

Max emergency landing speed on prepared grass surface – 40kt GS

Max slope for standard AW139 – 5 degrees all directions (10 degrees sup 6 sliding ring upgrade)

Max speed for landing gear extension – 150kt or Vne if less

After the CAS AP caution appears – Vne-27 – 140kt or Vne

Where can we find the performance chart for the CATA clear area takeoff if cert 6800kg – Sup50

Power assurance check is required every 25hrs but need to be written down every 50 hours?

Where can we find the data required to determine lat and long to compute weight and balance before flight – section 6 weight and balance

Where can you check the OEI rate of climb for a given combination of altitude and temp – RFM og QRH