

Percival Q6 P16D Petrel

For FS 2004

(Will Port Over to FSX with some exceptions)



Brief description & Operating instructions.

Designed as a six/seven seater passenger aircraft in 1936, the P16A first flew in September 1937, and was available with either a fixed (type number P16A & P16E) or a retractable undercarriage (type P16D) it also had a revised cabin window arrangement that was seen on later P16A's & the P16E.

Powered in the prototype P16A with Gipsy Six engines driving two position variable pitch propellers, the subsequent production aircraft are assumed to have had Gipsy Queen II engines & constant speed variable pitch propellers. (There are a couple of photos available of the cockpit showing propeller control levers as used for CSU operation as opposed to push/pull type control knobs).

Overall 26 aircraft were built, of which 4 had retractable undercarriages, (G-AFMT/ VH-ABL/X9454; VH-ABY;

G-AFMT/HK838 & G-AFIX) although G-AFIX is reported as being converted later, to a fixed undercarriage.

The Q4 was a proposal for a 4/5 seater powered with Gipsy Majors, but never came to fruition.

The flaps & undercarriage retraction operation was by a vacuum system driven from each engine.

Construction was of wood & fabric following the Percival standard very similar to the Vega Gull/Proctor except that the wings & tailplane were plywood covered.

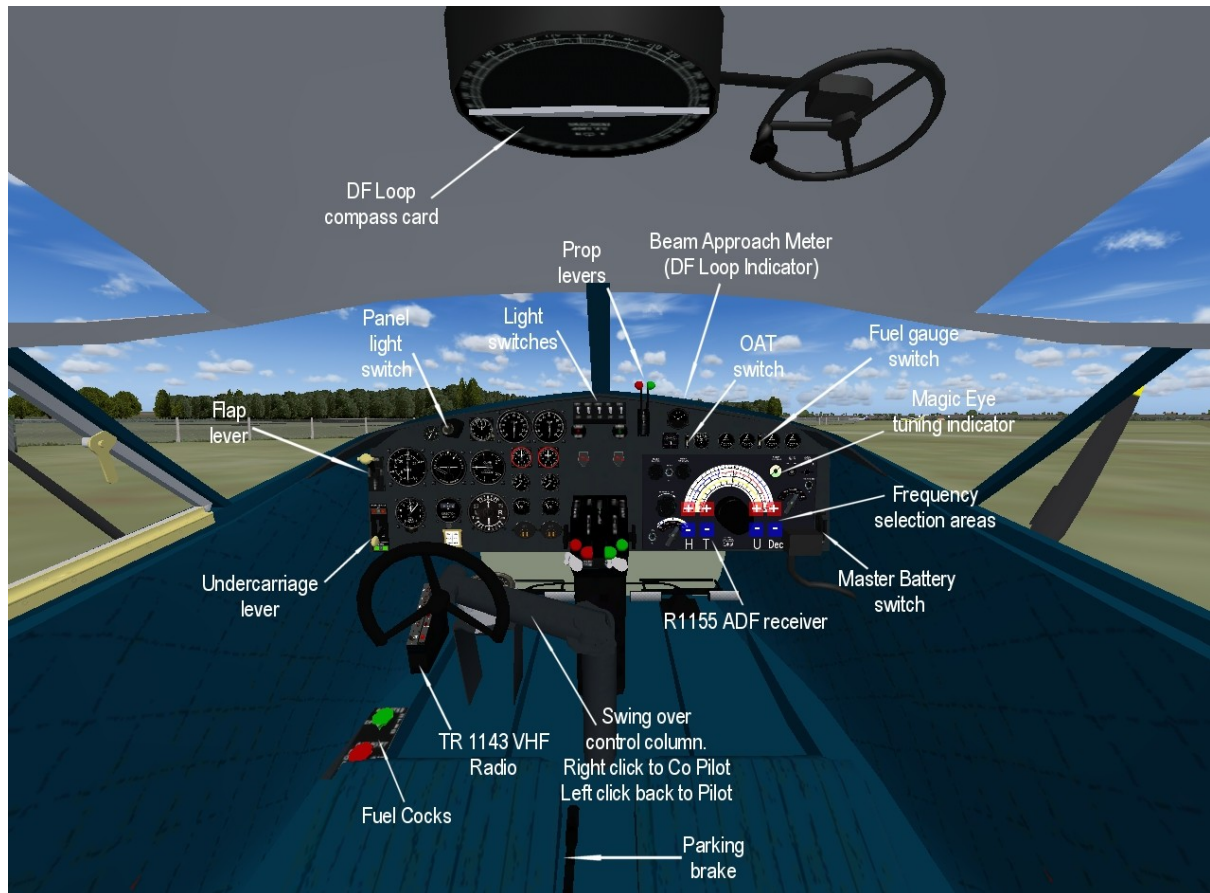
This version covers the retractable undercarriage version complete with the radio navigation/communication & ADF Loop aerials as seen in photos of G-AFMV/HK838.

No details are readily available of the interior, so a certain amount of educated guesswork has had to be applied, together with the assumption that after being impressed into RAF service the instrument layout was modified to the standard RAF type 'basic six' with a R1155 with Beam Approach meter mounted in front of the Co-pilot/ W Op & a TR1143 VHF for the Pilot.

SOUND. This has been aliased to the FS9 DH 88 Comet, so for FSX users one must either alias the sound to the Beech Baron 58 or transfer/download the FS9 Comet sound.

The Flight dynamics have been reworked & simplified (from the P16A version) to get the engine & propeller power nearer to reality, as well as revising the overall aerodynamics so that the most forward & most aft C of G can be catered for within the elevator trim limits as well as the nose down trim experienced by use of the undercarriage & flaps.

Cockpit & Controls



The Flap & undercarriage control levers are conjecture as it is not clear from photos of later aircraft what the control looked like.

In addition to the red & green undercarriage illuminated indicator lights, a green coloured mechanical indicator protrudes from the top of each engine cowling when the undercarriage is fully locked down.

The Control column will swing over to the Co-pilots position;-

In the VC, right click on the column for it to swing over to the co-pilot & the viewpoint will also change, but note that the hat switch for view panning & tilt is not available. To return to the Pilots position Left click on the control column. (Not fully compatible in FSX, so in addition one must select the Co-Pilots camera view & vice versa.)

In the 2D view click on the top Left hand Icon to change viewpoint.

(It is best if one starts off in the VC as the 2D view will then stay co-ordinated & in sync, if it does not appear, then select SHIFT+7).

General.

Only one model is available so that the passengers are only visible externally, although see below for Pilot, Co-pilot & passenger removal/addition.

The pilot can be visibly removed from the external view using SHIFT+W (Water Rudder). This action does not remove the Station load nor change the C of G.

The Co-pilot & passengers can be removed or added by opening the Aircraft menu & then the fuel & payload menu, & deleting or adding their weight. This automatically moves the C of G position.

Main door is opened/closed using SHIFT+E & the steps appear/disappear.

The Pilots DV widow can be opened/closed using SHIFT+E+2, or in the VC by clicking on the window.

Engine starting: ensure that the fuel tanks are not at OFF, & that the throttle is closed & the propeller controls are fully forward (fine pitch), then press the appropriate starter button. (This is not correct for starting Gipsy Queen engines fitted a with CSU, but this is not changeable in FS9). CTRL+E is the alternative (In FSX this is the only way to start - reason unknown).

FUEL SYSTEM.

The Fuel Cocks in the VC, will with each click, change from BOTH to OFF to PORT (or STBD) to AUX, if starting the engines using CTRL+E, otherwise BOTH is not normally selectable. The Fuel Cock pop-up has specific areas to select each tank. Clicking the VC fuel cocks cycles them: Off, Main, Aux. So if starting using CTRL+E click quickly twice, otherwise engine will stop!

Unfortunately FS9 or FSX will always use fuel from the Aux tanks first, regardless of position set!!!

R1155 radio operation.

To change frequency there are 8 areas indicated in the figure above, 4 for raising, 4 for lowering. 1 each are arranged for hundreds & tens of KHz on the left side of the central tuning knob & 1 each for units & decimals. An onscreen readout will show the frequency selected. When within range of the selected frequency the 'Magic eye' will change the amount of green area visible.

To change between audio & silent, click the RH knob between 'Visual' & the sideways figure '8' (or infinity sign).

The frequency band selector knob will change automatically with the selected frequency range.

The Beam Approach Meter (courtesy of Ted Cook) has 2 needles and will indicate when a signal is found within an arc of 45° either side of straight ahead. If one is flying towards the signal the needles will work in the logical sense, but will be reversed if flying away.

The DF compass pointer mounted in the roof will point to (or away from) the source transmitter, & automatically rotates as does the external loop aerial when tuned to a NDB station.

Behind the Co-pilot/W Op is the trailing aerial which can be operated in the VC from the pilots seat, or by using the Spoilers command (/). Don't forget to wind it in before landing!!!

TR1143 VHF radio

The VHF remote controller mounted on the left hand side, has an on/off button, labelled 'OFF'. A red indicator shows at the bottom when switched on. To change frequency, there are 4 areas around button 'A' to raise or lower the frequency. Again, an onscreen readout will display the frequency, & the remaining red indicators alongside buttons A to D will change depending upon the chosen frequency.

OTHER POP-UPS (Click on the appropriate Icon label)

A Compass pop-up is provided as is a full King air type Radio set & Nav instruments as well as a GPS for those who wish to fly airways with 'modern' equipment.

FLYING CHARACTERISTICS.

As one would expect, it is a very benign aircraft to handle, with a max level airspeed of about 205 mph. This was fast for its era with the installed power.

Max cruise speed of 195 mph is normally achieved with 2100 rpm & -1.5 psi boost @ sea level.

For the most economical speed reduce boost to -3 psi @ 2100 rpm at an altitude of 7000', which should give about 180 mph TAS.

Please note that -3 psi when set at sea level, will become at 7000' a boost gauge reading of -4.5 psi due to the relative pressure calculation made by FS9 & FSX.

Max still air range is quoted as 750 statute miles, needing 80 Imp gallons.

Quoted absolute ceiling is about 21,000 ft, & single engine altitude is about 6,000 ft. There is just about sufficient rudder trim to cope with one engine operation.

Just to make life a bit more interesting for Flight Simmers, one has to adjust rudder trim to account for the lateral C of G offset if one has an odd number of passengers - this is in effect equivalent to the propeller torque effect that the pilot will experience whilst in flight. This effect varies speed & power settings. There is also a slight power on/off pitch trim effect.

RECOMMENDATIONS. (from experience of the sim model, as I have not been able to locate any Pilots Notes, but they appear logical with respect to the Proctor Pilots Notes).

For TAKE-OFF.

Set the Rudder Trim to about 3° left. (About 25% in FSX).

With Max AUW the C of G is at max aft position, so to compensate for this & the drag of the undercarriage & flaps (if selected) the elevator trim must be set for about +6° (nose up).

With just Pilot & Co-pilot/W Op, C of G is at max forward position, so about 9° nose up trim is required.

Just after take off nose down trim will need to be applied & continued adjustment will be required as speed increases.

In zero crosswind, some additional left rudder is needed during take off with the tailwheel in ground contact to counteract torque effect, but this reduces as speed is increased & separation has occurred.

For a short take off run, set flaps to 'Take Off' – normally only used on grass or dirt runways.

The tail can be raised using down elevator during the take off run, but beware with a fully forward C of G, as it is easy to dig the nose in! Likewise, heavy braking at fwd C of G can do likewise unless the elevator is held fully up.

Once airborne keep the nose down to increase airspeed to about 80 mph IAS, then raise the undercarriage. Allow speed to increase to 90 mph IAS into the climb & then raise the flaps at a safe height (normally quoted as 300 ft above airfield height).

Maximum undercarriage down speed is set for 120 mph IAS, with flaps 100 mph IAS.

Reduce engine speed to 2100rpm & boost to -1.5 psi, & when at cruise altitude for best range throttle back to - 3 psi sea level equivalent.

When cleaned up, best climb speed is 90 mph IAS, although it will be more comfortable for the passengers if a higher speed & shallower attitude is adopted.

One needs to apply progressive nose down trim as speed increases.

A reasonable amount of trim change is necessary throughout the speed range but note that for fine control it is better to use the mouse wheel in the VC, as the keyboard/joystick trim switches are quite coarse. (-1.7/-1.8° nose down at aft C of G at cruise speed; +0.5/+0.6° nose up at fwd C of G at cruise speed).

Trim the rudder as required to counteract torque, normally about

- 2.3° (nose left) at cruise speed; at aft C of G; 0° at fwd C of G, but note that the amount required depends upon airspeed, & with power off in a glide, quite a lot of adjustment is needed.

LANDING

Lower the undercarriage at about 110 /115mph IAS, then flaps to Take Off position at about 90 mph IAS, & adjust trim - more Nose up. When closer to the runway, lower to Full flap at about 80 mph, trimming again nose up. Aim to cross the threshold, power off at 70 to 75mph (any higher & she floats!) & she stalls at about 58 to 60 mph.

OPERATING SUMMARY

Stall speed clean ----- 60/63 mph IAS

Stall speed full flaps----- 58/62 mph IAS

Cruise-----195 mph TAS @ 7000'

Economic cruise-----182 mph TAS @ 7000'

Max speed @ sea level-----205 mph IAS

Never exceed speed-----250mph IAS

Max undercarriage down speed----120 mph IAS

Max Flaps down speed-----100 mph IAS

Engine limitations-----2400 rpm for 60 mins max*,
2600 rpm for 20 secs max*.

Aerobatics are forbidden.

*Data taken from AP 1075 Proctor Pilots Notes

KEYBOARD COMMAND SUMMARY

CTRL+E+1 = Start port engine

CTRL+E+2 = Start Stbd engine

SHIFT+E = Open/close main door

SHIFT+E+2= Open/close Pilots DV window

SHIFT+3 = Bendix radios & nav instruments Popup

SHIFT+4 = TR1143 radio Popup

SHIFT+5= R1155 radio Popup

SHIFT+6 = GPS Popup

SHIFT+8 = P8 compass Popup

SHIFT+9 = Fuel Cocks Popup

NOTE that Shift+2 & Shift +7 are for the 2D view backgrounds that should not normally need to be operated.

Acknowledgements: Many thanks to Dave Molyneaux for passing on to me his library of Q6 data, & to the Beta testers at BritSim for their comments which I have attempted to incorporate, & to 'FS Aviator' for guiding me in adjusting the Flight Dynamics for engine & propeller power.

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Keith Paine .