

## Part 2—Limitations

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## Part 2—Limitations

### Chapter 1—Airframe Limitations

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#### 1 General

(a) The aircraft is designed for manoeuvres appropriate to a long-range aircraft, in temperatures from  $-26^{\circ}\text{C}$  to  $+41^{\circ}\text{C}$ . In order to provide a wing-relieving load at higher weights, fuel in the outboard tanks should be used last.

(b) From strength considerations, the aircraft is restricted to a maximum normal indicated acceleration of:

- (i)  $+1.75\text{G}$  at weights above 89,000 lb.
- (ii)  $+2.0\text{G}$  at weights below 89,000 lb.

These limits include any accelerations due to turbulence and are subject to fuel being kept outboard. If the correct fuel drill is not observed, ► only gentle manoeuvres are permitted.

(c) From stalling considerations, the accelerations quoted in (b) are to be reduced as follows:

- (i) Above 89,000 lb., below 165 knots, reducing to  $1.5\text{G}$  at 155 knots and  $1.0\text{G}$  at 130 knots.
- (ii) Below 89,000 lb., below 170 knots, reducing to  $1.5\text{G}$  at 150 knots and  $1.0\text{G}$  at 125 knots.

(d) Intentional stalling in accelerated flight is prohibited and approach to accelerated stalls must be limited to the onset of buffet. Rolling pull-outs are to be avoided.

#### ◄(e) Arrestor gear trampling

The aircraft is cleared to trample the supported and tensioned centre-span of the following arrestor gears:

- (i) RHAG Mk. 1
- (ii) SPRAG Mk. 1
- (iii) PUAG Mk. 21
- (iv) CHAG
- (v) BAK 9
- (vi) BAK 12
- (vii) Bliss 500S

Speed should not exceed 40 knots; above this speed the radome may be damaged. ►



## 2 Maximum speeds

The maximum speeds (in knots) for the operation of the aircraft are as follows:

◀ Above 82,000 lb. . . . .	260 ▶
Below 82,000 lb. . . . .	300

Maximum speeds for the operation of:

Bomb doors . . . . .	250
Undercarriage . . . . .	225
Flaps . . . . .	153
Scanner } . . . . .	Unrestricted
Cameras }	

The maximum speed for the operation of a service also applies to flight with the service extended.

## 3 Weight and CG data

### (a) Weight limitations

(i) Maximum for take-off . . . . .	96,000 lb.
Maximum normal landing weight . . . . .	80,000 lb.
Emergency landing weight . . . . .	96,000 lb.

(ii) Whenever a landing has to be made at weights above 80,000 lb., fuel should be jettisoned if practicable and the landing should be as gentle as possible.

(iii) Any landing made with a bomb bay load in excess of 9,020 lb. must be treated as an emergency.

### (b) CG limitations

Aft limit . . . . .	60 ins. aft of datum
Forward limit at 70,000 lb. and below . . . . .	44 ins. AOD
Forward limit at 96,000 lb. . . . .	52 ins. AOD
with linear variation between these points.	

## 4 Aircraft approach limitations

The aircraft approach limitations, subject to the standard conditions, are as follows:

	True height (ft.)	Indicated height (ft.)	
		1st pilot	Co-pilot
Precision radar (GCA) . . . . .	200	200	200
Manual ILS . . . . .	300	300	300
ILS/Zero Reader . . . . .	200	200	200
GCA (no glide path) . . . . .	400	400	400

} above  
run-  
way  
level

## 5 Fuel jettison

### (a) Bomb bay tank

(i) The bomb bay tank can be jettisoned at any fuel state, whether or not any other stores are in the bomb bay. It may not be jettisoned at the same time as other stores.

(ii) Conditions for jettison are as follows:

No smoking

All heaters and galley services off

Bomb bay tank transfer pump off and cock closed

Bomb doors open

Altitude 200 feet minimum

Speed 130 to 165 knots, straight and level  $\pm 5^\circ$

Radome retracted.

### (b) Internal fuel

Conditions for jettison are as follows:

Straight and level flight or turns up to rate half, provided that the aircraft does not fly through jettisoned fuel

Undercarriage and flaps up, bomb doors closed

Heaters and galley equipment off

No smoking

Steady engine power settings throughout

Minimum height 2,000 feet AGL/ASL

No switches to be operated except those required for the fuel jettison drill.

## 6 Smoking

Subject to local regulations, smoking is permitted except in the following circumstances:

During take-off and landing

While fuel is being transferred from the bomb bay tank

During bomb bay tank jettison

During wing tank fuel jettison

When heaters are on with the bomb doors open.

## 7 Cross-wind limitations

Maximum cross-wind component:

for take-off . . . . . 25 knots

for landing . . . . . 20 knots

## 8 ADD

When the ADD stall warning system is embodied, the following restrictions apply:

(a) When not in use, the guns are to be in the fully elevated position.

(b) For all normal flight conditions, recovery must be initiated at the onset of initial warning. The aircraft must not be flown intentionally within the audio warning range.

(c) In all stages of flight, if the final audio/stick shaker warning is given, full stall recovery action must be taken immediately.

(d) The engineer's cut-out button may only be used on instructions from the pilot and only during the landing run. It may not be used in any other phase of flight.

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## Part 2—Limitations

### Chapter 2—Engine Limitations

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#### 1 Fuel, oil and water/methanol specifications

##### (a) Fuel

The Griffon Mk. 58 engines are cleared for use with AVGAS 100/130 (stores reference 34A/9100444, NATO reference F-18). The acceptable substitute is F-22 (AVGAS 115/145).

##### (b) Oil

The type of oil used is OMD-370 (NATO O-128) or OMD-250 (NATO O-125).

##### (c) Water/methanol

The water/methanol fluid used is AL-24 (stores reference 34B/9440428).

#### 2 Engine operating limitations

The principal maximum engine limitations are as follows:

<i>Engine condition</i>	<i>Time limit</i>	<i>Super-charger gear</i>	RPM	<i>Ins. Hg.</i>	<i>Temp °C</i>	
					<i>Coolant</i>	<i>Oil</i>
Take-off	5 minutes	Low *High	2,750 2,750	67 80	135 135	105 105
Intermediate	1 hour	Low High	2,600	58	125	95
Continuous weak	Unrestricted	Low High	2,400	48	115	90
†Operational necessity	5 minutes	Low High	2,750	67	135	105
Overspeed	20 seconds	Low High	3,000	The time-limit of 20 seconds applies to RPM between 2,750 and 3,000		

\* With water/methanol injection.

† This rating may be used in emergency, if necessary immediately after five minutes at take-off power, either 67 or 80 ins. Hg.

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**3 Oil pressure limitations**

Normal minimum pressure at 2,400 RPM and 90°C . . . 55 PSI\*  
 Flight emergency minimum . . . . . 35 PSI

\* In some instances the oil pressure may fall to 35 PSI when the engine is throttled back to 1,550 RPM. This is acceptable, provided that the normal minimum oil pressure is available at maximum continuous conditions.

**4 Minimum temperatures**

Oil (for opening up) . . . . . +15°C  
 Coolant (for take-off) . . . . . +40°C

**5 Maximum air-intake temperatures**

(a) No air-intake temperature gauges are fitted. In order to keep below the air-intake temperature limitations, the charge temperatures must be maintained below the following figures:

RPM	Ins. Hg. .	Temperature °C
2,750	80	90
2,750	67	150
2,600	58	145
2,400	48	135
Below 2,400	Below 48	100

(b) The air-intake limitations are as follows:

In low gear, or at max. power with water/methanol  
     in high gear . . . . . +45°C  
 In high gear, all conditions without water/methanol . . . +35°C

**6 Propeller limitations**

Because of propeller limitations, continuous operation between 1,350 and 1,550 RPM and between 2,200 and 2,400 RPM is not allowed.



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### Chapter 3—Equipment Limitations

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#### 1 Electrical equipment

##### (a) Generators

The following table of generator maximum loadings (in amps) takes into account the cross-drive shaft limitations, the generator cooling limitations and the generator heat-sink diode limitations.

Condition	Generators		
	No. 1 with alternator	No. 1 without alternator	Nos. 2, 3, 4
On the ground:			
continuous . . .	270	270	270
8 minutes . . .	290	300	300
2 minutes . . .	290	400	400
In flight:			
continuous . . .	400	400	400

##### (b) Ground supply diodes

The ground supply diodes can take a continuous load of 400 amps in an ambient temperature of 41°C. At higher temperatures, loads must be restricted to the following:

Load (amps)	Time (mins.)
450	16
425	30
400	50
390	continuous

*(c) Ground supply socket*

The ground supply socket has the following rating:

<i>Load (amps)</i>	<i>Time (mins.)</i>
450	continuous
550	20
850	5
1,500	1

*(d) Inverters*

- ◀ (i) The maximum period for ground running inverters is one hour. Their use is unrestricted in flight. ▶
- (ii) Under tropical conditions, simultaneous ground running of all inverters is restricted as follows:

OAT °C	<i>Time limit (mins.)</i>	
	<i>Normal load</i>	<i>Max. rated</i>
40	5	3
30	13	7½
20	27	13

**2 Radio and radar**

Both the HF installations, the intercomm, the UHF and the VHF are cleared for use. Ground running is limited to 1 hour in temperatures below 41°C and to 5 minutes in temperatures between 41°C and 50°C.

**WARNING:** When on the ground with certain stores in the bomb bay, radio transmitters are not to be operated while the bomb doors are open. See Command armament clearances.

**3 Navigational equipment**

The following are cleared for operation: AD 712, Gee, ILS, Loran, Tacan, Blue Silk, ASV, IFF, Sonics, TPI, Autolycus. The Mk. 5A radio altimeter is not to be used. When the Mk. 7B radio altimeter is introduced, it may be used. ▶

**4 Oxygen**

Both the wing and bomb bay installations are cleared for use.

**5 Armament limitations**

Refer to Service Release.