

RESTRICTED

LIGHTNING F Mk. 53 & T Mk. 55 AIRCRAFT
ROYAL SAUDI AIR FORCE

OPERATING DATA MANUAL

BRITISH AIRCRAFT CORPORATION
MILITARY AIRCRAFT DIVISION

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LIGHTNING

F MK.53 & T MK.55 AIRCRAFT

OPERATING DATA MANUAL

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AMENDMENT RECORD SHEET

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NOTES TO USERS

1. The information contained in this Publication in respect of aircraft and engine speeds, all-up weights and manoeuvres is subject to the limitations and restrictions given in the Lightning F Mk.53 and T Mk.55 Pilot's Notes and the respective B.A.C. Release Documents which are to be regarded as the overriding authority.

2. The performance information in this Publication applies to Lightning F Mk.53 and T Mk.55 aircraft fitted with Rolls-Royce Avon Mk.302C engines. Data for T Mk.55 are printed on coloured leaves and, where applicable, are included at the end of each Part. Unless reproduced specifically for T Mk.55, data presented on the white leaves should be used for both Marks of aircraft. Some pages are reprinted from the Lightning F Mk.6 O.D.M. based on Avon Mk.301 engines. In general Avon Mk.301 and Mk.302C engines have identical performance but the Mk.302C engines have improved handling characteristics.

INTRODUCTION

The data are given primarily for two configurations, i.e., either without guided missiles or with two Red Top missiles but, in some instances, the carriage of overwing fuel tanks is included. The data are identified by the aircraft outline drawing depicting the cambered leading edge wing and 610-gal ventral fuel pack, with or without Red Top missiles and with overwing fuel tanks, if applicable. Where configuration has little effect on performance, both outlines are included. Performance with Firestreak missiles is similar to that with Red Tops, Firestreak data are not, therefore, included. If a flight refuelling probe is fitted, the effect of the probe may be taken as one quarter of the difference due to two missiles.

2. Unless otherwise stated all information is based on the International Standard Atmosphere as defined by the International Civil Aviation Organisation (ICAO). In data for non-standard temperature, height refers to altimeter or pressure height, not geometrical height. Fuel is assumed to be AVTUR at a specific gravity of 0.78. The data are based on flight test evidence.

3. Symbols used include:-

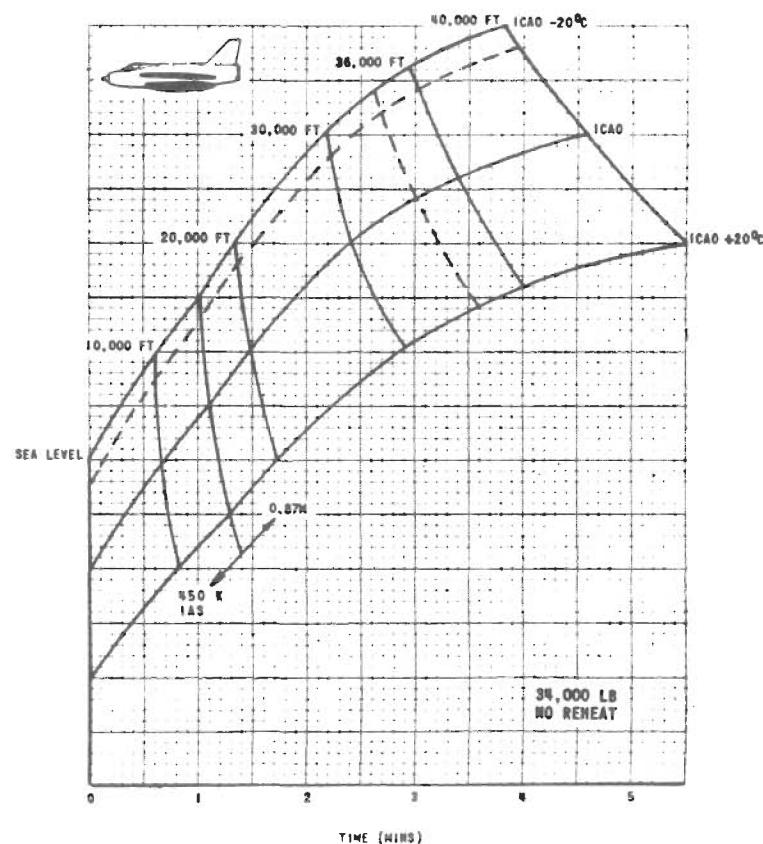
OAT	-	Outside air temperature
t	-	Relative temperature
	-	<u>OAT in degrees absolute</u>
		288
θ	-	Angle of elevation, given by the attitude indicator
ANM	-	air nautical miles
mb	-	millibars
$^{\circ}\text{K}$	-	degrees Kelvin = $^{\circ}\text{C} + 273.2$

4. The graphs have been made as self-explanatory as possible but notes and examples are included in the text

where necessary. In some cases the graphical data are presented in the form of 'carpets' to separate the individual curves and to assist interpolation to intermediate values of variables.

The advantage of this form of presentation is demonstrated from the following example taken from Part 3, Fig.3.1.2.1

In the example, the horizontal (time) scale has been made two large squares to 1 minute and the vertical (height) scale two large squares to 10,000 ft. To form the 'carpet' graph the curve for a temperature of ICAO +20°C has been lowered two large squares and that for



ICAO -20°C raised two large squares. Points corresponding to the same height on adjacent temperature curves have then been staggered at vertical intervals of two large squares. Curves for varying temperature at constant height (with a temperature scale of two large squares representing 20°C) have then been drawn as shown.

We now have two intersecting families of curves - one family showing the effect of height at various temperatures, the other showing the effect of temperature at various heights - forming a 'carpet' from which the

performance at any temperature and height can be obtained. For example, the time to climb from sea level to 34,000 ft, without reheat, in an atmosphere of ICAO -16°C would be obtained as follows:-

A curve is drawn through the points corresponding to 34,000 ft on the three curves for ICAO +20°C, ICAO and ICAO -20°C. A second curve is then drawn through the point corresponding to ICAO -16°C on each of the curves for constant height. The point where these two curves intersect gives the required conditions; it will be seen that it takes 2.7 minutes to climb to 34,000 ft.

LOADING PARTICULARS

The following weight data applies to a particular aircraft in various representative configurations. Minor variations may be caused by modification state, crew weight and fuel specific gravity. More detailed information is contained in Book 1, Section 2, Chapter 3A of the relevant Servicing Manual. Fuel weights are calculated at 7.8 lb/gal.

LIGHTNING T MK.55

Aircraft Configuration	AUW Less usable fuel (lb)	T.O. weight Full fuel (lb)	Weight with half fuel (lb)	Landing weight with 1,600 lb fuel (Stores retained)
2-inch Rockets	29,070	39,328	34,200	30,670
Two Firestreaks	29,284	39,540	34,413	30,884
Two Red Tops	29,520	39,777	34,650	31,120

LIGHTNING F MK.53

Aircraft Configuration	AUW Less usable fuel (lb)	T.O. Weight Full fuel (lb)	Weight with half fuel (lb)	Landing weight with 1,600 lb usable fuel (stores retained)
2-inch Rockets only	28,110	38,368	33,240	29,710
Two Firestreaks	28,324	38,580	33,453	29,924
Two Red Tops	28,560	38,817	33,690	30,160
2-inch Rockets & gun pack	29,304	38,968	34,136	30,904
Two Firestreaks & gun pack	29,517	39,180	34,350	31,117
Two Red Tops & gun pack	29,793	39,417	34,585	31,353
2-inch Rockets & two 1,000 lb bombs	30,839	41,096	35,968	32,440
2-inch Rockets & underwing pylons only	28,760	39,016	33,888	33,360
2-inch Rockets, two 1,000 lb bombs & gun pack	31,918	41,582	36,750	33,518
2-inch Rockets, underwing pylons & gun pack	29,838	39,502	34,670	31,438
2-inch Rockets & Matra launchers	29,563	39,820	34,692	31,163
2-inch Rockets, Matra launchers & gun pack	30,642	40,306	35,474	32,242
Reconnaissance pack	27,773	38,030	32,902	29,373
Recce pack & gun pack	28,966	38,630	33,798	30,566
Recce pack & two 1,000 lb bombs	30,500	40,758	35,630	32,100
Recce pack & underwing pylons	28,420	38,678	33,550	30,020
Recce pack, two 1,000 lb bombs & gun pack	31,580	41,244	36,412	33,180
Recce pack, underwing pylons & gun pack	29,500	39,164	34,332	31,100
Recce pack & Matra launchers	29,225	39,482	34,354	30,825
Recce pack, Matra launchers & gun pack	30,304	39,968	35,136	31,904

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