Chapter 3 LOADING AND C.G. DATA

LIST OF CONTENTS

	Para.
Introduction	1
Datum point	3
Weight and C.G. limitations	5
Fuel loading and use	7
Mandatory wing/fuselage fuel proportions	8
Fuel in the transfer tank	9
Basic weight	10
Operating weight	14
Expendable load	15
All-up weight	16
Use of loading tables to determine the All-up weight	17
The C.G. Computor	
Description	18
Loading procedure	19
Checking the effect of using expendable load	22
◀ **Preparation for weighing**	23A ▶
Weighing procedure	24
Calculation of aircraft C.G. after weighing	27
The effect of engine replacement	27A
Modifications	28

LIST OF ILLUSTRATIONS

	Fig.
Wing/fuselage fuel proportion, 10,000 lb. store and under	1
C.G. Computor	1A
C.G. reference point	2
Bomb loading point diagram	3
P.R. equipment location diagram	4
Equipment location diagram	5
Flight refuelling equipment diagram	6

LIST OF TABLES

	Table
Weight and C.G. limits	1
Variable load	2
Armament-carrying equipment and controls	2A
Equipment common to roles	2B
Equipment for P.R. Day role	2C
Equipment common to P.R. Night roles	2D
Equipment for P.R. Night role, Case 1	2E
Equipment for P.R. Night role, Case 2	2F
Equipment for P.R. Night role, Case 3	2G
Disposition of crew	2H
Personal issue to crew	2J
◀ *"Window" installation*	2K
Anti-flash screens	2L
Miscellaneous	2M
In-flight refuelling receiver equipment	2N
In-flight refuelling tanker equipment	2P
Auxiliary bomb-bay tank—P.R. roles	2Q
Long-range equipment	2R
Transporters and panniers	2S
Radio and instruments not included in Basic Weight	2T ▶
Expendable load	3
Fuel	3A
Water-methanol	3B
De-icing fluid	3C
Oxygen	3D
Nitrogen	3E
"Window" bundles	3F
Stores	3G
Photo-flashes (P.R. Night roles)	3H
R.A.T.O.G.	3J
Equipment included in Basic Weight	4
Typical loading examples—Bomber, P.R. Day, P.R. Night and Tanker roles	5
Approved modifications	
Negligible modifications	6
Modifications affecting aircraft weight and C.G.	6A

Introduction

1. This chapter deals with the loading of the aircraft and the effect of different loads on the position of the centre of gravity (C.G.) of the aircraft. For general information on the determination of C.G. and loading, reference should be made to A.P.4747A.

2. The C.G. position is calculated with the aircraft in the rigging attitude, i.e., with the fuselage datum horizontal, by taking moments about a fixed point known as the datum point.

Datum point

3. The datum point is at the nose of the aircraft and lies at the intersection of fuselage Station O and the fuselage datum line.

4. The datum point must not be confused with the C.G. reference point (*fig.* 2) which is only used in connection with C.G. calculation when weighing the aircraft (para. 24 Weighing procedure).

Weight and C.G. limitations

5. Table 1 gives the maximum permissible take-off and landing weights and the approved C.G. limits, and calculations must show that the weights are never exceeded and that the C.G. always remains within the approved limits.

6. It is necessary to examine the effect of using expendable load (fuel consumption, dropping of bombs, etc.) in order to ensure that the C.G. limits are not exceeded at any stage of the flight.

Fuel loading and use

7. Fuel must be loaded and used to conform with the following requirements.

(1) Maintenance of C.G. within approved limits.

(2) Maximum wing relief.

(3) Selection of tank pumps to pass sufficient fuel for engine requirements.

Note . . .

Reference should be made to Pilot's Notes (A.P.4377A-P.N.) for further details.

Mandatory wing/fuselage fuel proportions

8. The wing/fuselage fuel proportions take no account of All-Up Weight or C.G. position and the distribution of fuel when loading must be arranged to meet these requirements (para. 7). The loading conditions in this paragraph apply during operation of the aircraft up to Normal All-Up Weight. When the under-wing fuel tanks are fitted the load carried in them does not count towards the internal wing/fuselage fuel proportions. The following is a summary of fuel loads with various bomb loads.

(1) 10000 *lb. bomb in fuselage.*—The 10000 lb. Bomb Load (Table 3G, load (a) and (b)) decides the loading and proportionate use of the fuel. At all stages of flight, when a 10000 lb. bomb is carried in the fuselage, the mandatory conditions are that *at least* 30 per cent. of the total fuel carried must be contained in the wing tanks. The loading is given below:—

Bomb load	Fuel tank capacities (gal.)		
Fuselage 10000 lb.	Wing 2052	Fuselage 4690	Total 6742

These fuel quantities represent:—

Wing 30·5 per cent. of total capacity.
Fuselage 69·5 per cent. of total capacity.

(2) *Fuselage bomb load of less than 10000 lb*—When a fuselage bomb load is less than 10000 lb, a reduction in the percentage of wing fuel to fuselage fuel is allowed in proportion to the reduced bomb load under 10000 lb carried. The amount of wing fuel and fuselage fuel in a total fuel load for various bomb loads, can be determined by reference to fig. 1.

(3) *Fuselage bomb load in excess of 10000 lb*—When fuselage bomb loads in excess of 10000 lb are carried, the excess bomb load over 10000 lb and the weight of the bomb gear (carriers, crutching gear, etc.), must be considered for loading purposes as though it were fuselage fuel, and the overriding condition of 30/70 per cent. wing/fuselage fuel distribution still applies. This is amplified by the following example, in which a fuselage bomb load of 21000 lb (Table 3G, Load (d)) is carried and 4000 gal. of fuel are required for the flight.

Example

Fuselage bomb load	21000 lb
Fuselage bomb gear	1600 lb
Total fuel....	4000 gal.

Method .... lb

Fuselage bomb load	=21000
Bomb gear	= 1600
	22600
Deduct 10000 lb load	10000
Bomb load excess	12600
Bomb load excess equivalent fuel	$=\frac{12600}{8}=1575$ gal.

Therefore total fuel plus bomb load excess equivalent fuel

=4000+1575=5575 gal.

Mandatory fuel in wing=30 per cent. of 5575=1673 gal.

Fuel in fuselage=4000−1673=2327 gal.

The proportion, wing fuel/fuselage fuel plus bomb load excess equivalent fuel, must not be less than 30/70 throughout the flight. The fuel distribution is shown in stages in the adjacent table.

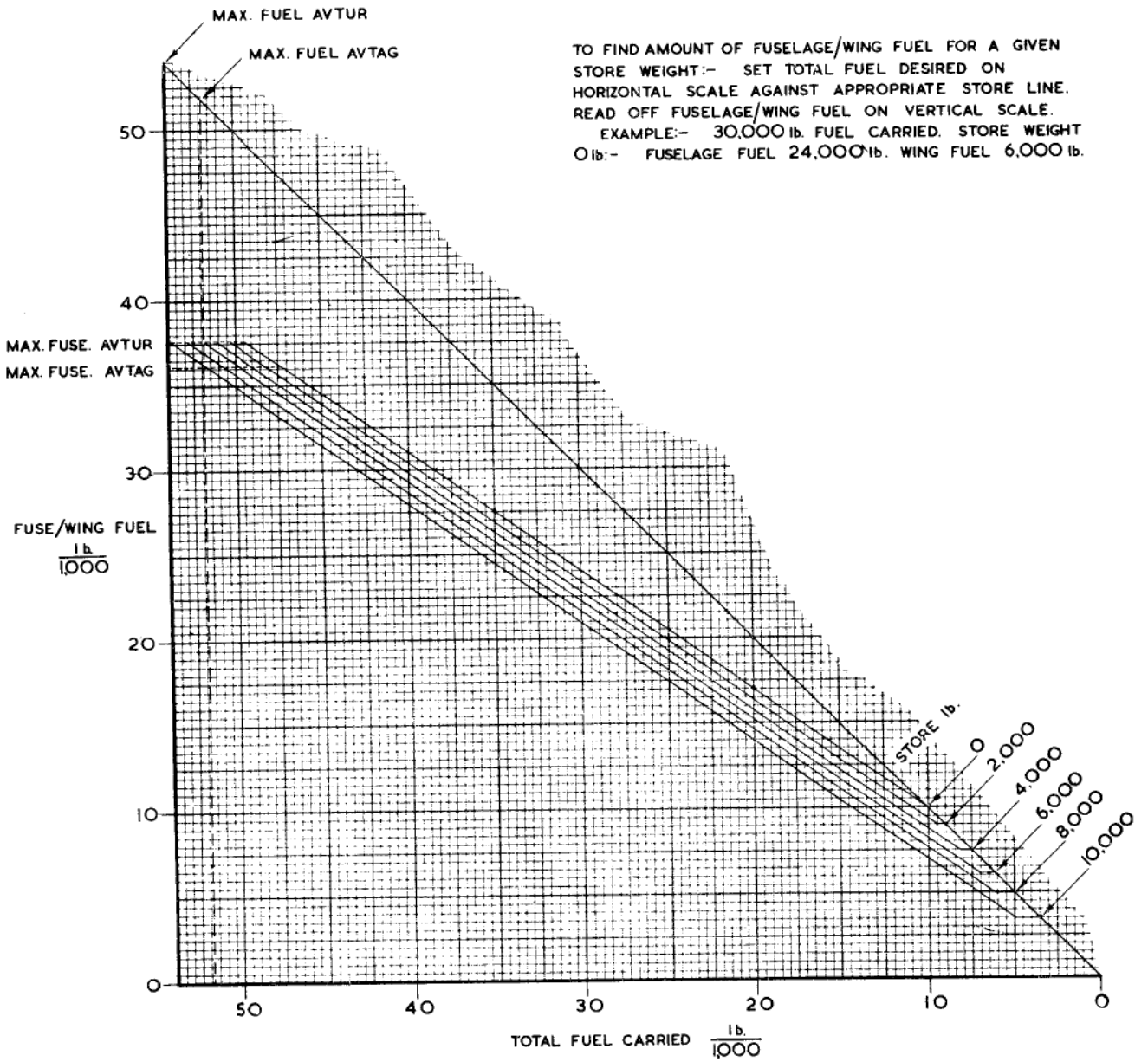


Fig. 1. Wing/fuselage fuel proportion, 10 000 lb. store and under

Fuel contents during use

Stage	Wing fuel	Fuselage fuel: Actual fuel carried	Bomb load excess equivalent fuel		Total	Proportion Wing/Fuselage
Start	1673 gal.	2327 gal.	+ 1575 gal.	=	3902 gal.	30/70
Intermediate	1000 gal.	758 gal.	+ 1575 gal.	=	2333 gal.	30/70
End	675 gal.	Nil gal.	+ 1575 gal.	=	1575 gal.	30/70

Fuel in the transfer tank

9. Subject to the conditions given in para. 7 and 8, the quantity of fuel which may be carried in the transfer tank is controlled by the load carried on Bomb Loading Point No. 6 and also by the carriage of photo flashes in the fuselage flash crate in the P.R. Night role. The weight of fuel which may be carried is as follows:—

(1) Aircraft at take-off or during flight

Load on No. 6 bomb hoist (lb)	Fuel load (maximum) in transfer tank (lb)
Nil	5680
1000	4700
2000	3700
3000	2700
4000	1700
5000	Nil
Flash crate	Nil
Flight refuelling H.D.U.	5680

*Where a full photo-flash load is not carried, fuel may be carried in the transfer tank; the total weight of flashes and fuel must not exceed the maximum permissible weight of flashes.

(2) Aircraft landing

Load on No. 6 bomb hoist (lb)	Fuel load (maximum) in transfer tank (lb)
Nil	3200
Flight refuelling H.D.U.	1600

Basic Weight

10. During production of the Valiant the term Tare Weight, together with the associated Appendix "A" entries, was in current use, R.A.F. Form 4801 being used to record the Tare Weight and C.G. position of an aircraft as delivered. The layout of the chapter dealing with Loading and C.G. Data was accordingly arranged to conform to these conditions. Subsequently, the term Tare Weight was discontinued and the Appendix "A" revised to a new layout which does not indicate which equipment is "Removable". The layout and contents of this chapter have therefore been revised, the included tables being for use in checking the condition of the aircraft at the time of weighing and for calculating the weight and C.G. condition with various fuel and bomb loads.

11. ◀Basic Weight is as defined in A.P.4747A, that is for an aircraft equipped to Appendix "A" column 7, with the exception of:—items introduced by modifications not embodied in the aircraft, all "Not Airborne" items, variable load and expendable load. Included in the Basic Weight are:—fuel trapped between engine master cocks and engines at the time of weighing, fuel unusable in flight attitude and oil in engines.▶ The Basic Weight for each aircraft is now recorded on R.A.F. Form 4908 and is determined by weighing, or by computing from the Basic Weight of the nearest previously-produced aircraft and making allowances for any modification differences. The Basic Weight will vary, among other reasons, according to the approved equipment standard at the time of weighing; Table 4 details the installations which are taken into account in this chapter.

12. The Valiant B/PR Mk. 1 is basically the same as the B Mk. 1; similarly the B/K/PR Mk. 1 is basically the same as B/K Mk. 1. The Basic Weight of ◀Valiant aircraft does not include the weight of bomb doors and deflector for Bomber roles or PR belly doors and PR deflector for PR roles. Bomb doors and deflector or PR belly doors and PR deflector are included as "variable load" in the Operating Weight.▶

13. The B/K Mk. 1 and B/K/PR Mk. 1 incorporate in construction, all the equipment necessary to receive fuel in flight irrespective of the operational role of the aircraft. Their Basic Weight is accordingly greater than B Mk. 1 and B/PR Mk. 1 aircraft. Tanker equipment is listed in Table 2P as "variable load" and, if fitted, is deducted to obtain a Basic Weight.

Operating Weight

14. The Operating Weight is obtained by adding to the Basic Weight those variable items which remain substantially constant for the type of mission. These include ◀bomb doors and deflector, armament-carrying equipment (or for PR roles—belly doors and deflector, cameras and camera crates),▶ crew, emergency equipment and long-range equipment if carried.

Expendable load

15. The Expendable load is made up of such items as bomb load, "window" bundles, ◀(or for PR night roles—photo-flashes), fuel, water/methanol, de-icing fluid, etc.▶

All-up Weight

16. The All-up Weight is the total weight of an aircraft ready for flight. It is obtained by adding the Expendable load to the Operating Weight.

Use of loading tables to determine the All-up Weight

17. (1) to obtain the Basic Weight, weigh or compute the weight of the aircraft equipped to Appendix "A", Col. 7, ◀ as stated in para. 11. Include fuel unusable in flight attitude (*Table* 4).

Note . . .

Tables 2 *and* 4 *are provided to cater for correction of the Basic Weight where deficiencies or surpluses exist.* ▶

(2) To obtain the Operating Weight, add selected items from Table 2A—Armament-carrying equipment, ◀ Table 2B—Bomb doors and deflector (or for PR roles Belly doors and deflector), ▶ (or for the appropriate camera equipment, etc., from 2C or 2D, and 2E or 2F or 2G), Table 2H—Crew ,Table 2K —◀"Window" installation, Table 2L—Anti-flash screens,▶Table 2R—Long-range equipment (if required) and equipment selected from other parts of Table 2.

(3) To obtain the All-up Weight, add items selected from Table 3G—Bomb load (or for PR night roles, Table 3H—Photo-flashes), Table 3A—Fuel, Table 3C—De-icing fluid, and appropriate items selected from other parts of Table 3.

Examples of the complete process are given in Table 5, it being noted that the typical Basic Weight quoted does not necessarily refer to an aircraft equipped to this standard.

THE C.G. COMPUTOR

Description

18. The C.G. computor supplied with each aircraft is of the slide rule type and is illustrated in fig. 1A. The following scales are incorporated, the most important being Scales B and D.

(1) The slide, or scale "B", comprising various moment scales representing all the loads of fuel, bombs, etc., which may be carried in the aircraft.

(2) Scale D comprises a C.G. grid or vector diagram on which the horizontal lines represent weight and the radial lines represent the C.G. position measured in feet from the nose datum point. It is always necessary to ascertain the approximate weight of the aircraft in order to read off the C.G. position from this scale.

(3) Scale A is a simplified form of Scale D; this scale shows the forward and aft C.G. limits and enables the approximate C.G. to be determined without removing the slide.

(4) Scale C is a moment scale graduated in thousands of lb ft about the Computor Datum. The Computor Datum is 47·5 feet aft of the Datum Point.

Loading procedure

19. The Operating Weight of the aircraft is obtained as in para. 14 and the weights of the various load items required from Table 3 are added on the loading form to obtain the All-Up Weight. To find the C.G. position, proceed as follows:—

(1) Move slide to R.H. end of rule to expose Scale D, and set cursor hairline over intersection of Operating Weight line and Basic C.G. line on Scale D. The Operating Weight and C.G. may also be set by using the Computor Moment on Scale C. Computor Moment

$$= \frac{\text{Operating Weight lb} \times (\text{Arm} - 47 \cdot 5)}{1000}$$

(Where Arm=Operating Weight C.G. position in feet from Nose Datum.) The cursor hairline should then be set over the computor moment thus obtained on Scale C.

(2) Move slide until zero of selected load on Scale B is under hairline.

(3) Move cursor in direction of arrow until hairline is over load required.

(4) Starting at last setting of cursor, repeat operations (2) and (3) for each load item until all the items on the loading form are included.

20. Selected loads may be dealt with on the C.G. computor in any desired sequence but it is most important that each item of load is checked against the entries on the loading form for each movement of the slide.

21. The final position of the cursor hairline must be between the appropriate limits on Scale A, and the actual C.G. position may be read under the hairline on Scale D at its intersection with the appropriate weight line.

Checking the effect of using expendable load

22. The effect of use of fuel should be checked by setting the quantity of fuel to be used under the cursor hairline and moving the cursor to the zero point of the particular fuel scale.

23. Repeat for each fuel tank in the sequence required and check that at all stages the cursor hairline is within the appropriate limits. The effect of dropping bombs, etc., may be determined in a similar manner. The weight of each item used must be deducted at each setting.

◀ PREPARATION FOR WEIGHING

23A. To obtain satisfactory weighing results, attention must be given to the following points:—

(1) The aircraft must be checked against an agreed equipment standard, so that the equipment condition at the time of weighing is recorded.

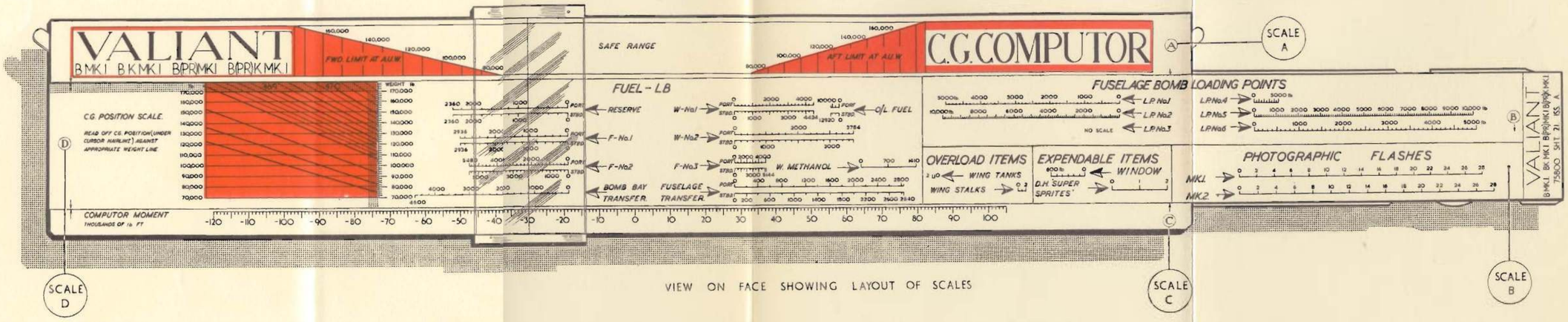
(2) Fuel must be drained in accordance with approved procedure, i.e., with engine master cocks OFF and the aircraft on wheels and in flight attitude, the water sediment drains being opened at the final stage.▶

WEIGHING PROCEDURE

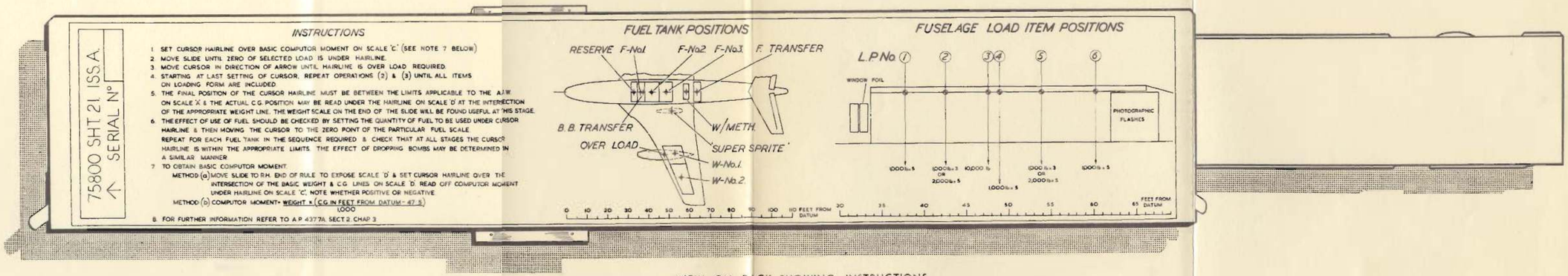
24. Due to the design of the main undercarriage it is not always possible to obtain equal reactions on the front and rear wheels of each undercarriage. For this reason the aircraft must be supported on the nose wheels and the inner wing spar jacking points and reactions taken at these three points to determine the C.G. position.

25. The fuselage datum line angle must be checked with a clinometer reading on the rigging blocks in the upper servicing bay or on the crew seat rails on the cabin floor; if necessary, the supporting jacks must be adjusted to give a horizontal fuselage datum. It may be necessary to provide a supporting block or trolley between the nose wheel and the weighbridge platform in order to obtain the required attitude.

26. The wing jacking points are jigged positions (Fuselage Stn. 631·55) and need not be measured. Due to the inclination of the nose wheel oleo, the fore-and-aft position of the nose wheel centre will vary with the weight of the aircraft; its position relative to the Datum Point must therefore be



VIEW ON FACE SHOWING LAYOUT OF SCALES



VIEW ON BACK SHOWING INSTRUCTIONS

Fig. 1 A.C.G. Computor

8930 361522 3/59 625 C B&S LTP GP.924.

determined. A suitable dimension is obtained by determining the distance "d" feet between nose wheel axle centre line and a plumb line suspended from the C.G. Reference Point at Stn. 365·3 (fig. 2) with the fuselage Datum Line horizontal. (Nose wheel axle diameter = 3·05 in.)

Calculation of aircraft C.G. after weighing

27. After weighing the aircraft as described above, with the Datum Line horizontal, the C.G. position is calculated as follows:—

Let x be the unknown C.G. position in feet from the Nose Datum. Then by taking moments about the Nose Datum, we have:—

$$Wx = Wn\left(\frac{365\cdot3}{12} - d\right) + Wj\frac{631\cdot55}{12}$$

$$= Wn\,(30\cdot443 - d) + Wj\ 52\cdot629$$

$$\text{Thus } x = \frac{Wn\,(30\cdot443 - d) + Wj\ 52\cdot629 \text{ ft}}{W}$$

Where

'd' is the distance measured in feet from the nose wheel axle centre line to the plumb line at Stn. 365·3

'Wn' is the nett nose wheel reaction in lb.

'Wj' is the nett total main wing jack reactions in lb.

'W' is the nett aircraft weight in lb. (Wn + Wj).

THE EFFECT OF ENGINE REPLACEMENT

27A. A change of aircraft basic weight and moment may arise on engine replacement due to interchangeability of some types of Avon engines/E.C.U's or different modification states of similar types of engines. The following example shows a method of calculation on the replacement of one Avon Mk. 20401 engine/E.C.U. by an Avon Mk. 20501. Similar calculation is necessary for each additional engine changed.

27B. The engine manufacturer's datum point for Avon Mk. 20101, 20401 and 20501 engines/E.C.U's is at the centre line of each engine front suspension, the C.G. being quoted in inches aft of this datum.

Example:—

The engine datum point is 46·41 in. forward of the engine trunnions centre line (fuselage Stn. 575·88 in.)

Therefore, the engine datum is (575·88 in. −46·41 in.) 529·47 in. aft of the fuselage nose datum.

Extracts from R.A.F. Forms 1125				C.G. relative to nose datum
Type	Serial No.	Weight	C.G.	
20501	.....	2855 lb	20·65 in.	20·65 + 529·47 = 550·12 in. = 45·843 ft
20401	.....	2834 lb	20·50 in.	20·50 + 529·47 = 549·97 in. = 45·831 ft

	Weight (lb)	Arm (ft)	Moment (lb/ft)
Engine/E.C.U. installed	2855	45·843	130882
Engine/E.C.U. removed	2834	45·831	129885
Additional weight and moment effect	+21		+997

Note . . .

The example covers E.C.U's only and does not include external parts. The additional effect of companion airframe modifications must also be taken into account.

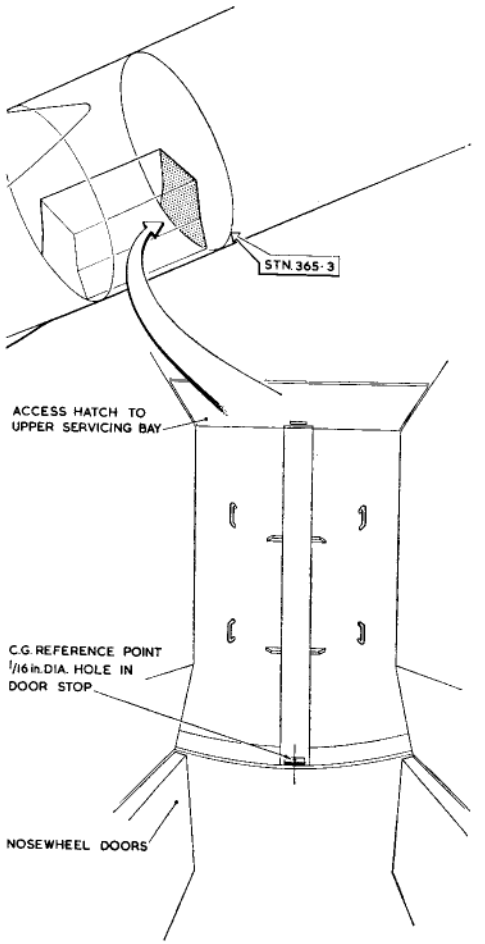


Fig. 2. C.G. reference point

MODIFICATIONS

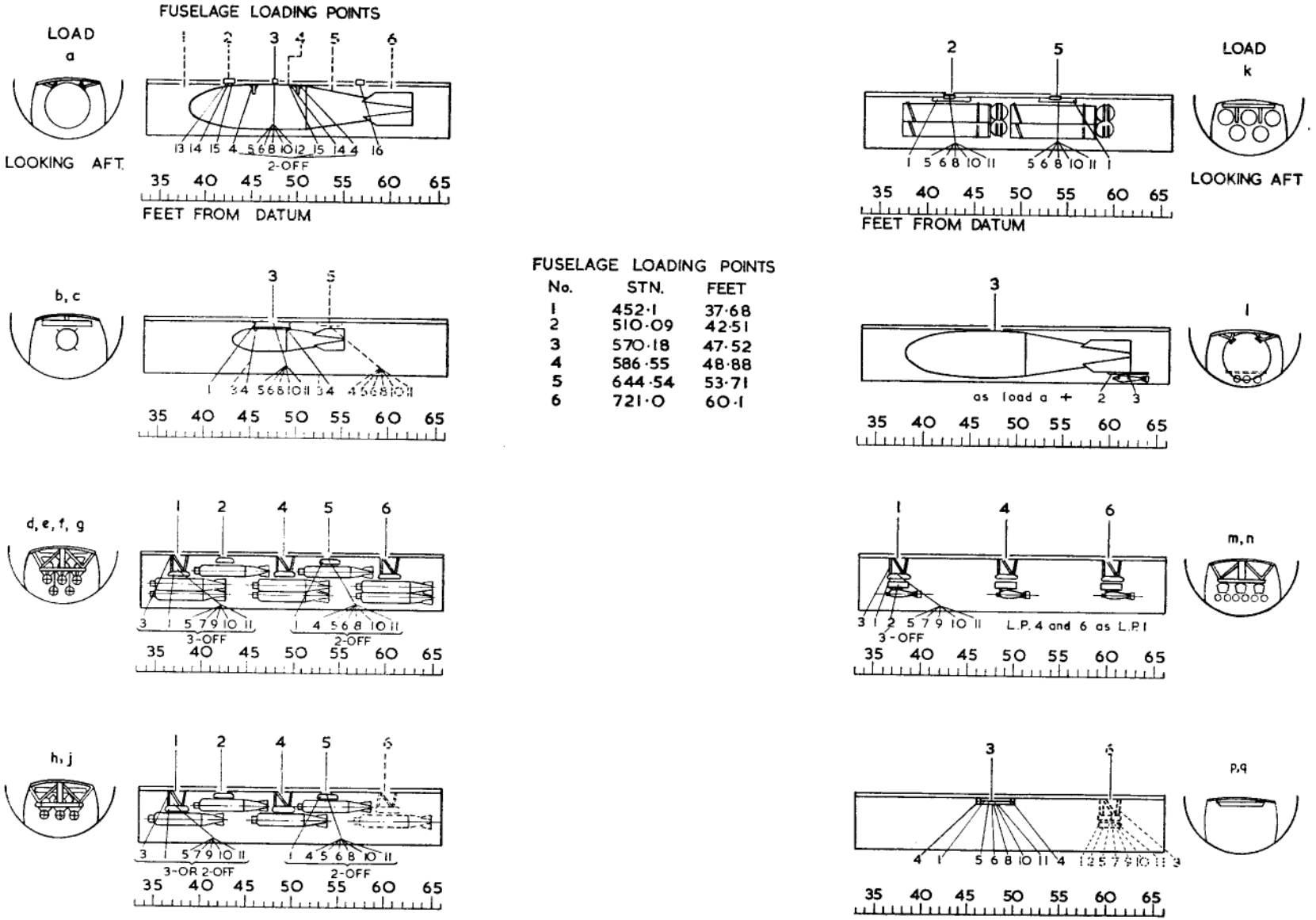
◀**28.** A list of approved modifications covering all roles is given at the end of this chapter, those modifications which have a negligible effect on weight and moment being grouped in Table 6 and details of the remainder in Table 6A. This list covers modifications as stated in Appendix "A" Serial No. 1991 and 2102 amended to A.L.575 and A.L.632 respectively only. For details of subsequent modifications reference should be made to A.P.4377A, Vol. 2 leaflets.▶

TABLE 1

Weight and C.G. limits (*without restrictions)

Weights	Pounds
Maximum permissible A.U.W. (Normal)	138000
Maximum permissible A.U.W. (Overload)	167000
Maximum permissible landing weight	98000
C.G. limits	**Feet from datum**
Take-off and landing	46·93 to 47·97
Flying	46·93 to 47·97

*For other conditions see A.P.4377A-P.N.



FUSELAGE LOADING POINTS

No.	STN.	FEET
1	452·1	37·68
2	510·09	42·51
3	570·18	47·52
4	586·55	48·88
5	644·54	53·71
6	721·0	60·1

Fig. 3. Bomb loading point diagram

◀ Loads p and q added ▶

TABLE 2—Variable load

A. ARMAMENT-CARRYING EQUIPMENT AND CONTROLS

Item No. (*fig.* 3)	Description	Load (a)				Load (b)			
		No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)	No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
	Equipment:—								
1	Carrier	—	—	—	—	1	339	47·7	16 170
4	Crutch, crutch assembly on crutch pad	4	50	46·66	2 333	3 sets	57·4	52·72	3 026
5	Pawl operating rod	1	0·7	47·52	33	2	1·4	50·62	71
6	Load retaining mechanism, short	1	14	47·52	665	2	28	50·62	1 417
8	Lifting eye assembly, short	1	9·3	47·52	442	2	18·6	50·62	942
10	'H' piece	1	10	47·52	475	2	20	50·62	1 012
11	Bomb slip adapter	—	—	—	—	2	20	50·62	1 012
12	Release unit	1	10·8	47·52	513	—	—	—	—
13	Fuzing unit assembly and bracket	1	5·2	42·5	221	—	—	—	—
14	Mounting c/w snatch plug latches	2	6·3	47·54	300	—	—	—	—
15	Cable retraction assemblies and mounting	3	33·5	47·25	1 583	—	—	—	—
16	Lanyard packs, plate and brackets	1	10·4	56·84	591	—	—	—	—
17	Miscellaneous		2·1	47·52	100	—	—	—	—
	TOTAL		152·3		7 256		484·4		23 650
	Controls:—								
	Control panel, No. 1	—	—	—	—	1	28·1	20·2	568
	Control panel, No. 3A c/w 5D/1782	1	17·4	20·2	351	—	—	—	—
	F.C.U., 5D/1780 or 1956	1	19·5	21	410	—	—	—	—
	Control panel No. 4 (PR Types); deduct on change of role to Bomber	1	(−1·7)	(20·2)	(− 34)	1	(−1·7)	(20·2)	(− 34)
	TOTAL		36·9		761		28·1		568

TABLE 2

A. ARMAMENT-CARRYING EQUIPMENT AND CONTROLS (*Contd.*)

Item No. (*fig.* 3)	Description	Load (c)				Load ( ), (e), (f) and (g)			
		No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)	No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
	Equipment:—								
1	Carrier	1	215	47·7	10 256	5	1 127	48·6	54 772
3	Carrier adapter	1 set	28	47·7	1 336	3	195	48·89	9 534
4	Crutch, crutch assembly on crutch pad ..	2 sets	9·1	47·7	434	2	4·6	43·35	199
5	Pawl operating rod	1	0·7	47·52	33	5	3·5	48·58	170
6	Load retaining mechanism, short	1	14	47·52	665	2	28·1	48·11	1 352
7	Load retaining mechanism, long	—	—	—	—	3	72	48·89	3 520
8	Lifting eye assembly, short	1	9·3	47·52	442	2	18·6	48·11	895
9	Lifting eye assembly, long	—	—	—	—	3	44·1	48·89	2 156
10	'H' piece	1	10	47·52	475	5	50	48·58	2 429
11	Bomb slip adapter	1	10	47·52	475	5	50	48·58	2 429
	TOTAL ..		296·1		14 116		1 592·9		77 456
	Controls:—								
	◀ Control panel, No. 2B	1	17·2	20·2	347	—	—	—	—
	Control panel, No. 3A c/w 5D/1482 ▶ ..	—	—	—	—	1	18·9	20·2	382
	C.U., 5D/1742..	—	—	—	—	1	20·2	21	424
	Control panel, No. 4 (PR Types); deduct on change of role to Bomber	1	(−1·7)	(20·2)	(− 34)	1	(−1·7)	(20·2)	(− 34)
	TOTAL ..		17·2		347		39·1		806

TABLE 2

A. ARMAMENT-CARRYING EQUIPMENT AND CONTROLS (*Contd.*)

Item No. (*fig.* 3)	Description	Load (h)				Load (j)			
		No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)	No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
	Equipment:—								
1	Carrier	5	1 055	48·58	51 252	4	844	45·7	38 568
3	Carrier adapter	3	195	48·89	9 534	2	130	43·28	5 626
4	Crutch, crutch assembly on crutch pad	2	4·6	43·35	199	2	4·6	43·35	199
5	Pawl operating rod	5	3·5	48·58	170	4	2·8	45·7	128
6	Load retaining mechanism, short	2	28·1	48·11	1 352	2	28·1	48·11	1 352
7	Load retaining mechanism, long	3	72	48·89	3 520	2	48	43·28	2 077
8	Lifting eye assembly, short	2	18·6	48·11	895	2	18·6	48·11	895
9	Lifting eye assembly, long	3	44·1	48·89	2 156	2	29·4	43·28	1 272
10	'H' piece	5	50	48·58	2 429	4	40	45·7	1 828
11	Bomb slip adapter	5	50	48·58	2 429	4	40	45·7	1 828
	TOTAL		1 520·9		73 936		1 185·5		53 773
	Controls:—								
	◀ Control panel, No. 3A c/w 5D/1482 ▶	1	18·9	20·2	382	1	18·9	20·2	382
	C.U., 5D/1742	1	20·2	21	424	1	20·2	21	424
	Control panel No. 4 (PR Types); deduct on change of role to Bomber	1	(−1·7)	(20·2)	(− 34)	1	(−1·7)	(20·2)	(− 34)
	TOTAL		39·1		806		39·1		806

TABLE 2

A. ARMAMENT-CARRYING EQUIPMENT AND CONTROLS (*Contd.*)

Item No. (*fig.* 3)	Description	Load (k)				Load (l)			
		No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)	No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
	Equipment:—								
1	Carrier	2	810	48·19	39 030	—	—	—	—
2	Carrier, practice bomb	—	—	—	—	1	13	61·77	803
3	Carrier adapter	—	—	—	—	1	25	61·77	1 544
4	Crutch, crutch assembly on crutch pad	—	—	—	—	4	50	46·66	2 333
5	Pawl operating rod	2	1·4	48·11	67	1	0·7	47·52	33
6	Load retaining mechanism, short	2	28·1	48·11	1 352	1	14	47·52	665
8	Lifting eye assembly, short	2	18·6	48·11	895	1	9·3	47·52	442
10	'H' piece	2	20	48·11	962	1	10	47·52	475
11	Bomb slip adapter	2	20	48·11	962	—	—	—	—
12	Release unit	—	—	—	—	1	10·8	47·52	513
13	Fuzing unit assembly and bracket	—	—	—	—	1	5·2	42·5	221
14	Mountings c/w snatch plug latches	—	—	—	—	2	6·3	47·54	300
15	Cable retraction unit assemblies and mounting	—	—	—	—	3	33·5	47·25	1 583
16	Lanyard packs, plate and brackets	—	—	—	—	1	10·4	56·84	591
17	Miscellaneous	—	—	—	—		2·1	47·52	100
	TOTAL		898·1		43 268		190·3		9 603
	Controls:—								
	Control panel No. 3A c/w 5D/1782	—	—	—	—	1	17·4	20·2	351
	F.C.U., 5D/1780 or 1956	—	—	—	—	1	19·5	21	410
◀	Control panel, No. 3A c/w 5D/1482 ▶	1	18·9	20·2	382	—	—	—	—
	C.U., 5D/1742	1	20·2	21	424	—	—	—	—
	Control panel No. 4 (PR Types); deduct on change of role to Bomber		(−1·7)	(20·2)	(− 34)		(−1·7)	(20·2)	(− 34)
	TOTAL		39·1		806		36·9		761

TABLE 2

A. ARMAMENT-CARRYING EQUIPMENT AND CONTROLS (*continued*)

Item No. (*fig.* 3)	Description	Load (m) and (n)			
		No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
	Equipment:—				
1	Carrier	3	633	48·89	30 947
2	Carrier, practice bomb	9	216	48·89	10 560
3	Carrier adapter	3	195	48·89	9 534
5	Pawl operating rod	3	2·1	48·89	103
7	Load retaining mechanism, long	3	72	48·89	3 520
9	Lifting eye assembly, long	3	44·1	48·89	2 156
10	'H' piece	3	30	48·89	1 467
11	Bomb slip adapter	3	30	48·89	1 467
	TOTAL		1 222·2		59 754
	Controls:—				
	Control panel No. 3A c/w 5D/1482	1	18·9	20·2	382
	C.U., 5D/1742	1	20·2	21	424
	Control panel No. 4 (PR Types); deduct on change of role to Bomber		(−1·7)	(20·2)	(− 34)
	TOTAL		39·1		806

Item No. (*fig.* 3)	Description	Load (p)				Load (q)			
		No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)	No. off	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
	Equipment:—								
1	Carrier	1	368	47·925	17 636	2	444	50	22 200
2	Carrier practice bomb					2	48	60·1	2 885
3	Carrier adapter					1	65	60·2	3 913
4	Crutch pad set	2	9	47·76	430	2	9	47·76	430
5	Pawl operating rod	1	0·7	47·22	33	2	1·4	53·33	75
6	Load retaining mechanism, short	1	13·5	47·514	641	1	13·5	47·514	641
7	Load retaining mechanism, long					1	24	60·1	1 442
8	Lifting eye assembly, short	1	9·3	47·514	442	1	9·3	47·514	442
9	Lifting eye assembly, long					1	14·7	60·1	884
10	'H' piece	1	10	47·514	475	2	20	53·8	1 076
11	Bomb slip adapter	1	8·3	47·514	394	2	16·6	53·82	893
	Special electrical cables					2	5	53	265
	TOTAL		418·8		20 051		670·5		35 146
	Controls:—								
	Control panel No. 5A complete		24	20·2	485		24	20·2	485
	Control panel No. 4 (PR Types); deduct on change of role to Bomber		(−1·7)	(20·2)	(−34)		(−1·7)	(20·2)	(− 34)
	TOTAL		24		485		24		485

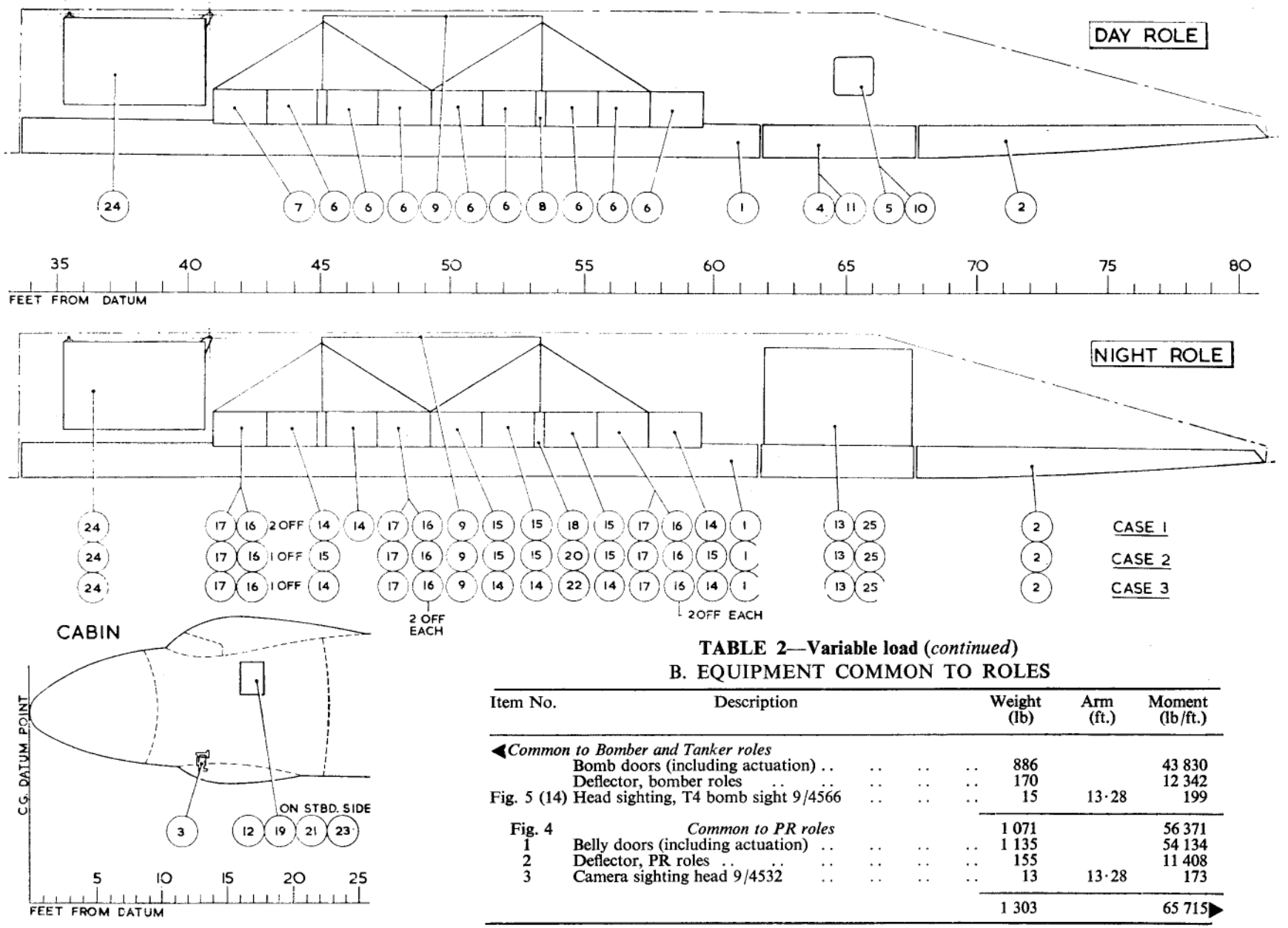


TABLE 2—Variable load (*continued*)

B. EQUIPMENT COMMON TO ROLES

Item No.	Description	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
	◀*Common to Bomber and Tanker roles*			
	Bomb doors (including actuation)	886		43 830
	Deflector, bomber roles	170		12 342
Fig. 5 (14)	Head sighting, T4 bomb sight 9/4566	15	13·28	199
		1 071		56 371
Fig. 4	*Common to PR roles*			
1	Belly doors (including actuation)	1 135		54 134
2	Deflector, PR roles	155		11 408
3	Camera sighting head 9/4532	13	13·28	173
		1 303		65 715▶

Fig. 4. P.R. equipment location diagram

TABLE 2—Variable load (*continued*)

C. EQUIPMENT FOR P.R. DAY ROLE

Item No. (fig. 4)	Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
4	Window fairings, camera vertical, Ref. Drg.71079-Sht.215	103	64·52	6 646
5	Windows, camera oblique including actuators, Ref. Drg.71079-Sht.135/6 ◀(conversion of door panel assemblies 71027 Sht.143/4 to role)▶	31·2	64·55	2 014
	Total, window fairings and windows	134·2	64·53	8 660
	Equipment in camera crate:—			
6	Camera, F.52 Mk. 3, 36 in. lens (8 off)	754	51·48	38 816
	Mounting, Type 84 (8 off)	115·5	51·48	5 947
	Adapter (8 off)	44·2	51·48	2 273
	Motor, camera driving, Type B (8 off)	32	51·48	1 647
	Camera drive, Type B, 3ft. 6in. long (8 off)	6	51·48	309
	Camera control lead (8 off)	2·8	51·48	144
7	Camera F.49 (1 off)	43	42·08	1 809
	6 in. lens unit (1 off)	26·5	42·08	1 115
	Mounting, Type 104 (1 off)	3·5	42·08	147
	Total, cameras in crate	1 027·5	50·81	52 207
8	Bottom crate, including all struts, etc., not detailed above, Ref. Drg.71079-Sht. 243	254·4	49·15	12 504
	Top crate and hoist fittings	280·8	49·8	13 983
	Total, crate and cameras	1 562·7	50·36	78 694
	Alternative oblique camera installations:—			
10	Camera F.49 (2 off)	86	65·25	5 612
	6 in. lens unit (2 off)	53	65·25	3 482
	Mounting, Type 104 (2 off)	7	65·25	456
	Miscellaneous fittings	7	65·25	456
	Total, F.49 oblique camera	153	65·25	10 006
10	Camera, F.52, 20 in. lens (2 off)	105·6	65·25	10 473
	Motor, camera driving, Mk. 2 (2 off)	8	65·25	522
	Camera drive (2 off)	1·5	65·25	98
	Camera, control lead (2 off)	0·5	65·25	33
	Mountings, etc.	51·5	65·25	3 360
	Total, F.52 oblique cameras	222	65·25	14 486
	Equipment in fairing:—			
11	Camera, F.49 Mk. 2 (1 off)	43	63·75	2 741
	6 in. lens unit (1 off)	26·5	63·75	1 689
	Mounting, Type 80 (1 off)	30	63·75	1 913
	Total, F.49 camera in fairing	99·5	63·75	6 343
	Controls:—			
12	Camera, remote control, Type 35	4·6	17	78
	Control panel, day	38·9	17	661
	Remote control and wedge plates, F.49 camera in fairing	6·2	17	106
	Total, controls	49·7	17	845

TABLE 2—Variable load (*continued*)

D. EQUIPMENT COMMON TO P.R. NIGHT ROLES (CASE 1, 2 AND 3)

Item No. (Fig. 4)	Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
13	Fuselage photo-flash container	1 063	63·9	67 926
	Flare hoist beam and attachments	70	62·3	4 361

E. EQUIPMENT FOR P.R. NIGHT ROLE, CASE 1

14	Camera, FX.89, Mk. 3, 24 in. lens (3 off)	285	49·31	14 054
15	Camera, FX.89, Mk. 3, 36 in. lens (3 off)	315	51·99	16 377
16	Photo-electric cell (6 off)	39	48·92	1 908
17	Mounting for photo-electric cells (3 off)	18·8	48·92	917
		657·8	50·56	33 256
18	Bottom crate, including all struts, etc., not detailed above, Ref. Drg.71079-Sht.251	328·1	49·8	16 319
9	Top crate and hoist fittings	280·8	49·8	13 983
	Total, crates and cameras	1 266·7	50·18	63 558
	Controls:—			
19	Controls, Type FX.89 cameras	12	17	204
19	Control panel, night	39·5	17	672
	Total	51·5	17	876

F. EQUIPMENT FOR P.R. NIGHT ROLE, CASE 2

15	Camera, FX.89, Mk. 3, 36 in. lens (5 off)	525	52·45	27 011
16	Photo-electric cell (5 off)	32·5	50·33	1 636
17	Mounting for photo-electric cells (3 off)	18·8	48·92	917
		576·3	51·30	29 564
20	Bottom crate, including all struts, etc., not detailed above, Ref. Drg. 71079-Sht.255	309·2	50	15 452
9	Top crate and hoist fittings	280·8	49·8	13 983
	Total, crates and cameras	1 166·3	50·59	58 999
	Controls:—			
21	Controls, Type FX.89 cameras	10	17	170
21	Control panel, night	39·5	17	672
	Total	49·5	17	842

G. EQUIPMENT FOR P.R. NIGHT ROLE, CASE 3

14	Camera, FX.89, Mk. 3, 24 in. lens (5 off)	475	51·45	24 439
16	Photo-electric cell (5 off)	32·5	50·33	1 636
17	Mounting for photo-electric cell (3 off)	18·8	48·92	917
		526·3	51·29	26 992
22	Bottom crate, including all struts, etc., not detailed above, Ref. Drg.71079-Sht.257	309·2	50	15 452
9	Top crate and hoist fittings	280·8	49·8	13 983
	Total, crates and cameras	1 116·3	50·55	56 427
	Controls:—			
23	Controls, FX.89 cameras	10	17	170
23	Control panel, night	39·5	17	672
	Total	49·5	17	842

TABLE 2—Variable load (*continued*)

H. DISPOSITION OF CREW

Item No. (Fig. 5)	Description	Weight (lb)	Arm (ft)	Moment (lb./ft)
	1st Pilot, parachute and dinghy	200	14	2 800
	2nd Pilot, parachute and dinghy	200	14	2 800
	1st Navigator, parachute and dinghy	200	18	3 600
	2nd Navigator, parachute and dinghy	200	18	3 600
	Wireless operator, parachute and dinghy	200	18	3 600
	Total (crew of 5)	1 000	16·4	16 400
	Ground crew chief, parachute and dinghy	200	17·2	3 440
	Total (crew of 6)	1 200	16·5	19 840

J. PERSONAL ISSUE TO CREW

	Wrist watch, Mk. 11, tropicalised (Navigator)	0·2	20	4
	Wrist watch, Mk. 7A (Pilots—2 off)	0·4	14	6
	Wrist watch, Mk. 8 (W/T operator)	0·2	20	4
	Computor, dead reckoning, B.2645	*Information not yet available*		
	Protractors, Douglas 5 in.	0·1	20	2
	Navigation rules, Mk. 1	0·1	20	2
	Compass set (2 off)	0·3	20	6
	Straight-edge, 20 in. Mk. 3, 6B/349	0·2	20	4
	Mask, oxygen, Type A13A/1 (large)	—	—	—
	Mask, oxygen, Type A13A/1 (medium)	—	—	—
	Mask, oxygen, Type A13A/1 (small)	—	—	—
	Oxygen emergency set, Mk. 3A (3 off)	10·5	18	189
	Oxygen emergency set, Mk. 4A (2 off)	8	14	112
	Bag cylinder (3 off)	—	—	—
	Straps, one pair (3 off)	—	—	—
	Pockets, for release handle (3 off), 6D/1382	—	—	—
	Sockets, operating, outer housing (3 off)	—	—	—
	Dinghy, Type K (3 off)	*Included in crew weights*		
	Jacket, life-saving, Mk. 3 (normal—5 off)			
	Astrograph, Mk. 2 c/w Star slide sets			
	Cases, carrying, Navigator's equipment	*Information not yet available*		
	Ultra rescue beacon reserve c/w battery			

◀ K. "WINDOW" INSTALLATION

56	Stripper units (4 off)	144	32	4 610
57	Control unit, dual Type 7122	16	20·7	331
	"Window" boxes c/w lid and chute (4 off)	98	32·1	3 146
		258		8 087

L. ANTI-FLASH SCREENS

	Screens stowed	7	16·7	117
	Screens in position	7	11·4	80

M. MISCELLANEOUS

	Ground crew chief's seat and lap strap	21·2	16·1	342
	Ground crew chief's folding seat	7·5	15·4	116
	Crew ration box, empty	16·75	13·1	219
	Pilot's Notes c/w case	1	11	11
	Pilot's knee writing pad	2·8	13·7	38
	Literature	1·5	20·8	31

N. IN-FLIGHT REFUELLING RECEIVER EQUIPMENT

	Probe tube sub-assembly	23	−2·4	−55 ▶

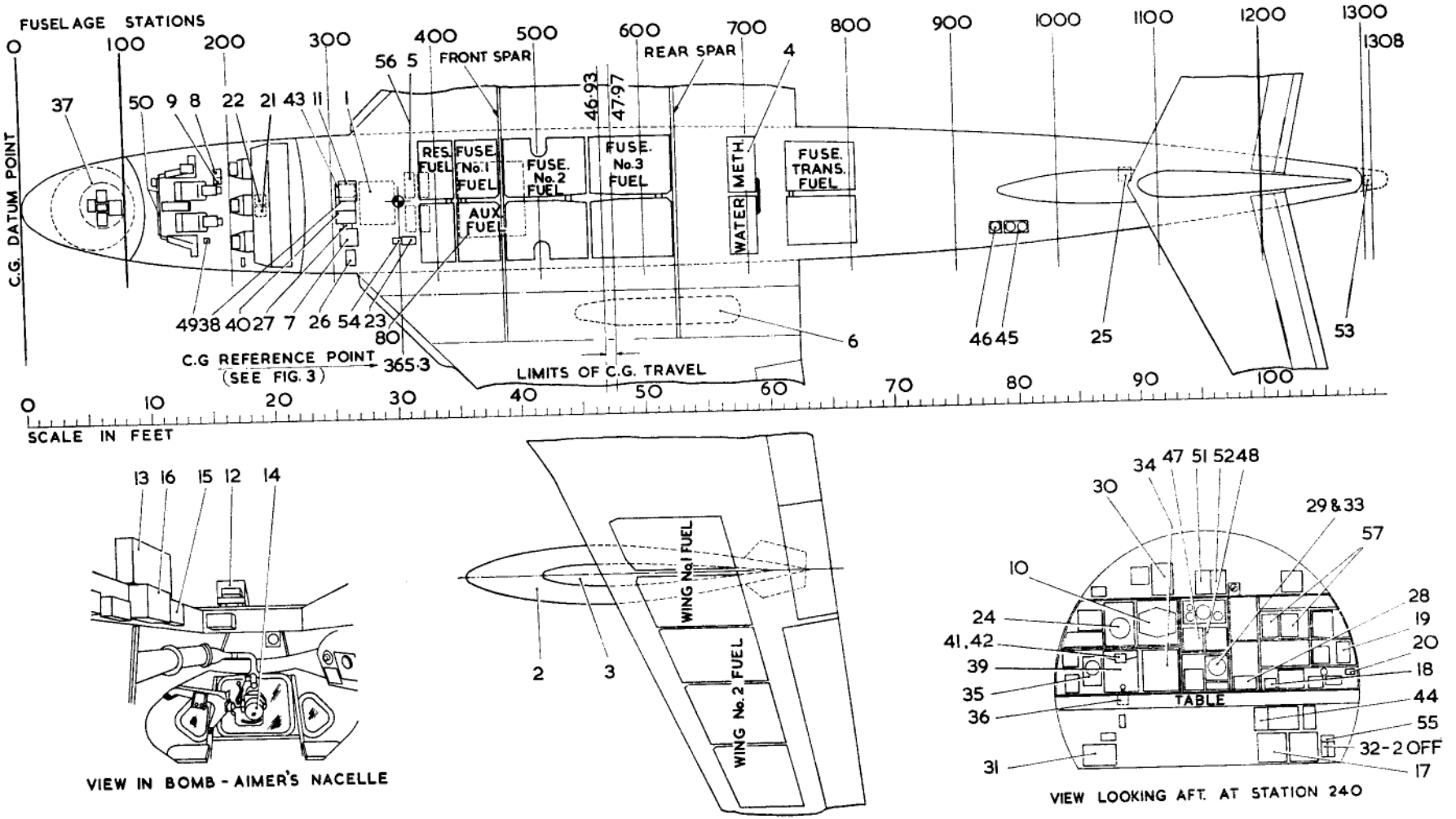


Fig. 5. Equipment location diagram

TABLE 2—Variable load (*continued*)

P. IN-FLIGHT REFUELLING TANKER EQUIPMENT

Item No. (Fig. 6)	Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
1	H.D.U. (dry) and suspension (less main fuel pump)	1 783	58·5	104 305
	Fuel trapped in H.D.U. (approx. 60 gall.)	480	58·5	28 080
2	Tanker operator's panel	62	17	1 054
3	◀Bomb-bay auxiliary tank (less package) including unusable fuel▶	466	37·95	17 685
4	Bomb-bay fairing (For fairing panniers see Table 2S)	280	44·5	12 460
	Total	3 071	53·27	163 584
	Add for "Dry-contacts"—Training role:—			
	Blank for hose end and gravity feed and piping from transfer tank	12	62	744
	Total, "Dry-contacts"	3 083	53·5	164 328
	OR			
	Add for "Wet contacts"—full standard role:—			
5	Auxiliary fuel pump packages (No. 3 cells, Transfer and Bomb-bay tanks) and N.R.V. assembly	138	52	7 176
6	Fuel pump for H.D.U. and equipment	140	58·5	8 190
	Bomb-bay fuel and air piping	148	50·4	7 459
	Total "Full standard"	3 497	53·31	186 409

Q. AUXILIARY FUEL TANK—P.R. ROLES

(For Tanker *see* Table P)

(Fig. 4)				
24	Bomb-bay auxiliary fuel tank including 5 gall. unusable fuel	466	37·95	17 685

R. LONG-RANGE EQUIPMENT

(Fig. 5)				
2	Tank, auxiliary (2 off) including 30 gall. unusable fuel	2 632	47·3	124 517
3	Stalk (2 off)	1 147	49·2	56 408
	Total	3 779		180 925

S. TRANSPORTERS AND PANNIERS

Airborne E.C.U. carrier (not airborne operationally):—			
Adapter set	144	48·5	6 984
Upper portion	305	48·65	14 837
Trolley portion	743	47·73	35 463
204 E.C.U.	2 834	47·3	134 044
Stowage rack with equipment	353	37·72	13 315
Fatigue meter bracket	7	44	308
Total	4 386	46·73	204 951
Containers, special			
A. Arm D104374 (empty)	113	91·66	10 358
B. Arm D104428 (empty)	55	Arm 37·87 or 61·22 ft. according to role	
Mounting c/w attachments for container B	33.5		
Panniers:—			
Carriage of loose equipment 26SR/10415 (loaded)	290	Arm depends on loading point used	
Carriage of heavy-duty components 26SR/95477 (empty)	415	48·11	19 966
Adapter for 26SR/95477 and securing rods	239	47·97	11 464
Note:—Max. weight of pannier 26SR/95477 and load is 4 480 lb.			
Fairing pannier 1 000 lb 26SR/15736 (empty)	414·5	45·75	18 962
Fairing pannier 4 000 lb. 26SR/— (empty)			
Pannier hoist beam c/w Sect. 11A items	255·4	45·13	11 525
Fairing c/w struts and fixings	184·8	39·16	7 235
Pannier to Mod. 3176 standard (less casters)	573·6	47·61	27 306
Total	1 013·8	45·44	46 066
Add—Casters (stowed)	200	As at lashing points selected	

TABLE 2—Variable load (*continued*)

T. RADIO AND INSTRUMENTS

(Installations not included in Basic Weight)

Item No. (Fig. 5)	Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
	A.R.I.5810 or 5910 common equipment:—			
34	Control unit Type 585 (10LB/6366)	55	20·8	1 144
35	Control unit Type 595 (10LB/6376)	9·5	20·8	198
36	Control unit Type 626 (10L/16060)	1·6	20·1	32
37	Scanner equipment, comprising:—	486·5	5·5	2 676
	Scanner unit Type 121 (10B/16327)	(277)		
	Modulator Type 2 (10D/18638)	(50)		
	Transmitter/Receiver, Type 3702 (10D/18637)	(58)		
	Amplifier Type A3703 (10U/16761)	(39·5)		
	Gyro unit Mk. 6 (6W/5)	(9)		
	Analyzer unit co-ordinate (10AD/703)	(53)		
	Twin amplidyne MG D3XX1/A2 (5UB/7394)	39·2	5·7	223
	or			
	Amplidyne generator (5UB/5748)	(38·8)	(5·7)	(221)
38	Automatic calculator, Type 5 (10D/18640)	38·5	27	1 040
39	Indicating unit, Type 301 (10QB/6493)	51	20·8	1 061
40	Waveform generator, Type 68 (10VB/6250)	37·8	27·5	1 040
41	Control unit, Type 903 (10L/16154)	6·6	20·8	137
43	Power unit, Type 729 (10DB/8811)	33	27·5	908
	Control unit, Type 12558 (10L/16493)	7	18·8	132
	A.R.I.5810 only:—	765·7		8591
	Control unit, Type 1250 (10L/16495)	1·7	18·4	31
42	Camera, Type R.88 (14A/4260)	12	20·8	250
		13·7		281
	A.R.I.5910 only:—			
	Camera, Type R.110 (14A/51066)	12	20·8	250

TABLE 2—Variable load (*continued*)

Item No. (Fig. 5)	Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
	A.R.I.5910 only (*continued*):—			
	Camera, Type 4757 (14A/4891)	5	16·2	81
	Automatic observer, Type 4611 (10Q/16257)	60	16·2	972
	Power unit, Type 4612 (10K/18626)	26·5	16·7	443
	Voltage regulator, Type 4613 (10AE/802)	10·5	16·4	172
	Control unit, Type 6204 (10L/16429)	2·5	20·6	52
	Control unit, Type 12580A (10L/16790)	1·7	20·6	35
	Time base unit X6338 (10D/19554)	17	15·3	260
	Waveform generator, Type 4614 (10V/16269)	17·8	15·3	272
		153		2 537
	A.R.I.5829 (not required when A.R.I.18107/13 is fitted):—			
28	Control unit, Type 426A (10LB/6299)	16·7	20·8	348
29	Indicating unit, Type 166A (10QB/6370)	29	20·8	603
30	Receiver 3582A (10DB/8373)	33·5	20·8	697
31	Strobe unit, Type 61A (10QB/8807)	50	20·8	1 040
32	R.F. unit, Type 24B or (Type according to requirements)	7·3	20·8	151
	R.F. unit, Type 25B or (Type according to requirements)	10	20·8	208
	R.F. unit, Type 26B or (Type according to requirements)	15·5	20·8	322
	R.F. unit, Type 139 (Type according to requirements)	7·3	20·8	152
33	Visor, Type 25 (10AB/4149)	0·2	20·8	4
	A.R.I.18124/1 (only when Mod. 2437 is introduced):—			
	Transmitter/receiver, Type 5 (10D/9428542)	48·5	26·2	1 271
	Mounting (10D/9428544)	3·25	26·2	85
	Control unit, Type C1607/ARC-52 (10L/9428543)	3	12·6	38
	Aerial, Type 140-LRU-10 1B S.T.C. (10B/9326363)	6	26·2	157

TABLE 2—Variable load (*continued*)

Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
◀ A.R.I.5922 (only when Mod. 2741 is introduced):—			
Transmitter/receiver, Type X6645 (10D/21473)	43	93·4	4 016
Coder unit, Type 6648 (10D/21476)	6·5	94·56	615
Control unit, Type 6646 (10L/16496)	1·5	20·8	31
Monitor R.F., Type 12718 (10T/13210)	15	94·1	1 412
Mounting A-V, Type X6698 (10AJ/943253)	3·07	94·1	289
A.R.I.5922-5924 Power supplies (only when Mod. 2796 is introduced):—			
Rotary inverter, Type 153A (5UB/6730)	30·5	60·57	1 847
Control panel, Type 19 (5UB/5503)	16·5	59·4	987
Rectifier unit, Type C.P.19 (5UC/6013)	9·25	59·8	553
Filter unit, Type 16437 (10P/16255)	2	26·2	52
A.R.I.18107/13 (only when Mod. 3165 is introduced, non-tanker role):—			
Indicator, Type 9547 (10Q/16355)	3	15·5	47
Coupling unit, Type 9546 (10D/22534)	7·5	85	638
Control unit, Type 7750 (10L/16310)	1·2	20	24
Transmitter/receiver R.T.636/ARN72	50·4	85·2	4 294
Phase correction unit (5UC/6483)	4·5	85	383
A.R.I.18107/13 with A.R.I.23120 (only when Mod. 3166 is introduced, tanker role):—			
Indicator, Type 9547 (10Q/16355)	3	15·5	47
Coupling unit, Type 9546 (10D/22534)	7·5	69·1	518
Control unit, Type 7750 (10L/16310)	1·2	19·1	23
Transmitter/receiver R.T.636/ARN72	50·4	68·2	3 437
Phase correction unit (5UC/6483)	4·5	69·1	311
Relative bearing indicator (331/E1/W)	1·5	20·8	31
Control amplifier (198C/1)	2·5	27·5	69
	70·6		4 436 ▶

TABLE 2—Variable load (*continued*)

Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
◀ A.R.I.18107/13 Power supplies (only when Mod. 3168 is introduced):—			
Inverter, Type 153A (5UB/6730)	30·5	60·57	1 847
Panel control, Type 19 (5UC/5503)	16·5	59·8	987
Rectifier unit (5UC/6013)	9·25	59·8	553
	56·25		3 387
Part of A.R.I.5800 not required when A.R.I. 18107/13 is installed:—			
Indicator unit, Type 27 (10Q/16073)	3	11	33
Topographical display:—			
Display unit (6B/3674)	16·5	20·8	344
Control unit, Type B (6B/3675)	6·25	21	131
Scale change unit (6B/3676)	5	21	105
	27·75		580 ▶

TABLE 3—Expendable load

A. FUEL

Tank	Capacity (gall.)	Usable (gall.)	AVTUR (at 8 lb/gall) Weight (lb)	AVTUR Arm (ft)	AVTUR Moment (lb/ft)	AVTAG (at 7·7 lb/gall) Weight (lb)	AVTAG Arm (ft)	AVTAG Moment (lb/ft)
Fuselage reserve, port	295	295	2 360	33·54	79 154	2 271·5	33·54	76 186
Fuselage reserve, starboard	295	295	2 360	33·54	79 154	2 271·5	33·54	76 186
Fuselage No. 1, port	367	367	2 936	36·85	108 192	2 825·9	36·85	104 134
Fuselage No. 1, starboard	367	367	2 936	36·85	108 192	2 825·9	36·85	104 134
Fuselage No. 2, port	685	685	5 480	42·32	231 913	5 274·5	42·32	223 217
Fuselage No. 2, starboard	685	685	5 480	42·32	231 913	5 274·5	42·32	223 217
Fuselage No. 3, port	643	643	5 144	49·23	253 239	4 951·1	49·23	243 743
Fuselage No. 3, starboard	643	643	5 144	49·23	253 239	4 951·1	49·23	243 743
Wing No. 1, port	553	545	4 360	52·59	229 292	4 196·5	52·59	220 694
Wing No. 1, starboard	553	545	4 360	52·59	229 292	4 196·5	52·59	220 694
Wing No. 2, port	473	465	3 720	56·53	210 292	3 580·5	56·53	202 406
Wing No. 2, starboard	473	465	3 720	56·53	210 292	3 580·5	56·53	202 406
Under-wing tank, port	1 615	1 600	12 800	47·32	605 696	12 320	47·32	582 982
Under-wing tank, starboard	1 615	1 600	12 800	47·32	605 696	12 320	47·32	582 982
Transfer tank	710	710	5 680	64·25	364 940	5 467	64·25	351 255
Total fuel (Bomber role)	9 972	9 910	79 280	47·94	3 800 496	76 307	47·94	3 657 979
Bomb-bay auxiliary tank	575	570	4 560	37·95	173 052	4 389	37·95	166 563
Total fuel (Tanker or PR. role)	10 547	10 480	83 840	47·39	3 973 548	80 696	47·39	3 824 542

For details of unusable fuel see Table 4 ▶

B. WATER-METHANOL

Item No. (Fig. 5)	Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
4	Water-methanol tanks (145 gall.)	1 410	58	81 780

C. DE-ICING FLUID

	Pilot's windscreen tank (4·5 gall.)	36	11	396
	Bomb-aimer's window tank (2·25 gall.)	18	11	198
	Total	54	11	594

D. OXYGEN

	Oxygen charge	49·2	13·9	684

E. NITROGEN

	Nitrogen charge	43·3	16·4	710

F. "WINDOW" BUNDLES

5	Bundles	600	32	19 200

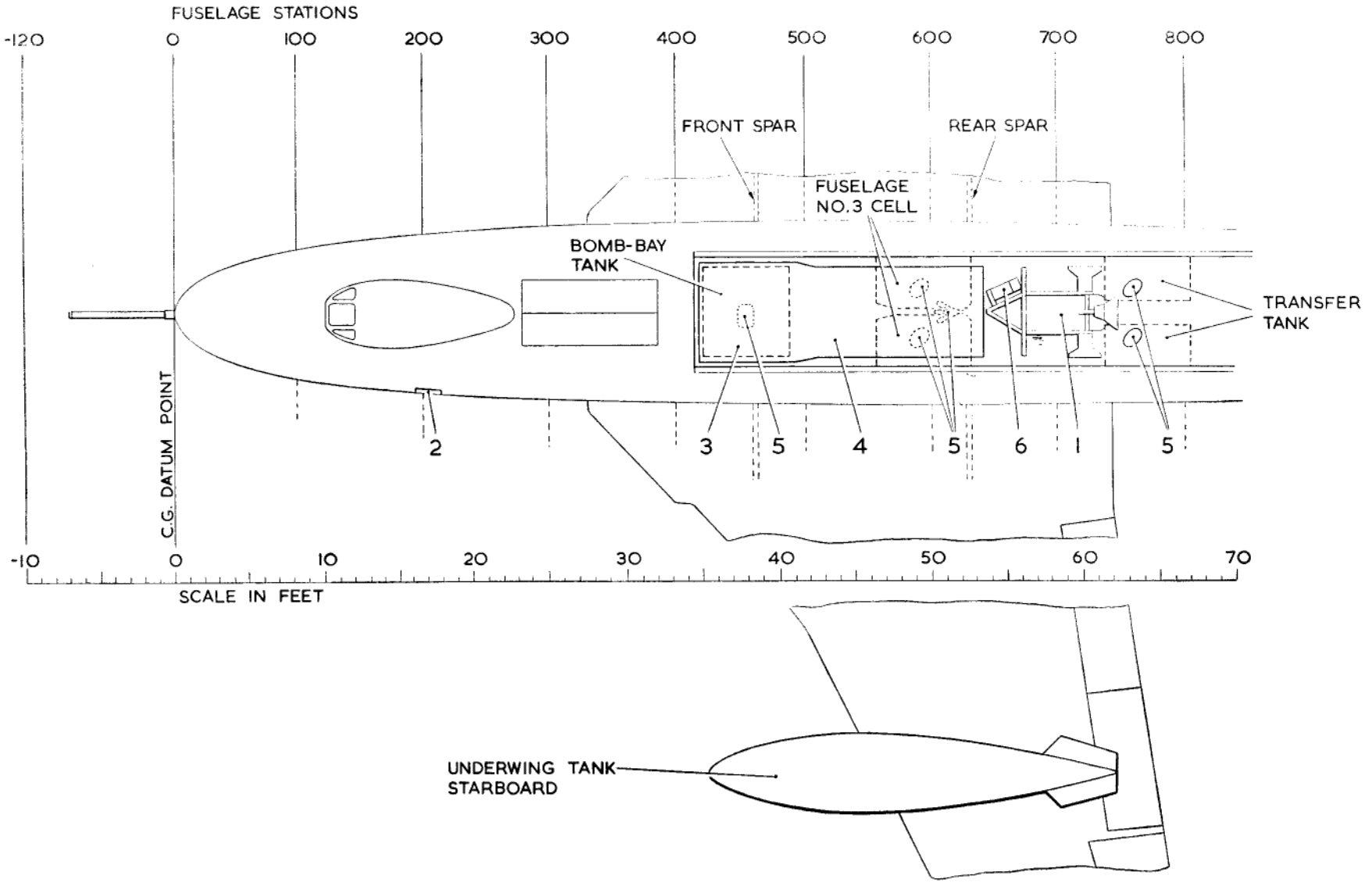


Fig. 6. Flight refuelling equipment diagram

Table 3—Expendable load

◀ G. STORES

Load	Store(s)	Loading Point No.	Weight of store(s) complete (lb)	Arm (ft.)	Moment (lb/ft.)
(a)	1 × 10 000 lb M.C. Mk. 1 (Special)	3	10 250	47·89	490 873
(b)	Control panel No. 1 Role (*see* Appendix " A " serial No. 2102, item 241A	3	—	—	—
(c)	1 × 2 000 lb H.E./M.C. (Special)	3	1 680	47·52	79 834
	5 × 1 000 lb M.C., Mk. 6, Mk. 11 or Mk. 12	1	5 100	37·68	192 168
	3 × 1 000 lb M.C., Mk. 6, Mk. 11 or Mk. 12..	2	3 060	42·51	130 081
	5 × 1 000 lb M.C., Mk. 6, Mk. 11 or Mk. 12	4	5 100	48·88	249 288
	3 × 1 000 lb M.C., Mk. 6, Mk. 11 or Mk. 12	5	3 060	53·21	162 823
	5 × 1 000 lb M.C., Mk. 6, Mk. 11 or Mk. 12..	6	5 100	60·1	306 510
(d)	21 × 1 000 lb M.C., Mk. 6, Mk. 11 or Mk. 12		21 420	48·59	1 040 870
(e)	21 × 1 000 lb T.I. H.A./H.S. and M.C. Mk. 6 mixed load		As load (d)		
	5 × 600 lb Cluster No. 38, Mk. 1	1	3 000	37·68	113 040
	3 × 600 lb Cluster No. 38, Mk. 1	2	1 800	42·51	76 518
	5 × 600 lb Cluster No. 38, Mk. 1	4	3 000	48·88	146 640
	3 × 600 lb Cluster No. 38, Mk. 1	5	1 800	53·21	95 778
	5 × 600 lb Cluster No. 38, Mk. 1	6	3 000	60·1	180 300
(f)	21 × 600 Cluster No. 38, Mk.1		12 600	48·59	612 276
	5 × 1 000 lb T.I. H.A./H.S.	1	5 100	37·68	192 168
	3 × 600 lb Cluster No. 38, Mk. 1	2	1 800	42·51	76 518
	5 × 600 lb Cluster No. 38, Mk. 1	4	3 000	48·88	146 640
	3 × 600 lb Cluster No. 38, Mk. 1	5	1 800	53·21	95 778
	5 × 600 lb Cluster No. 38, Mk. 1	6	3 000	60·1	180 300
(g)	5 × 1 000 lb T.I. H.A./H.S. and 16 × 600 lb Cluster No. 38, Mk. 1, mixed load		14 700	47·03	691 404
	3 × 1 000 lb T.I. H.A./H.S.	1	3 060	37·68	115 301
	3 × 1 000 lb T.I. H.A./H.S.	2	3 060	42·51	130 081
	3 × 1 000 lb T.I. H.A./H.S.	4	3 060	48·88	149 573
	3 × 1 000 lb T.I. H.A./H.S.	5	3 060	53·21	162 823
	3 × 1 000 lb T.I. H.A./H.S.	6	3 060	60·1	183 906
(h)	15 × 1 000 lb T.I. H.A./H.S.		15 300	48·48	741 684
	3 × 1 000 lb M.C. Mk. 7 star	1	3 150	37·68	118 692
	3 × 1 000 lb M.C. Mk. 7 star	2	3 150	42·51	133 907
	3 × 1 000 lb M.C. Mk. 7 star	4	3 150	48·88	153 972
	3 × 1 000 lb M.C. Mk. 7 star	5	3 150	53·21	167 612
(j)	12 × 1 000 lb M.C. Mk. 7 star		12 600	45·57	574 183

TABLE 3—Expendable load (*continued*)

G. STORES (*continued*)

Load	Store(s)	Loading Point No.	Weight of store complete (lb)	Arm (ft.)	Moment (lb/ft.)
	5 × 2 000 lb Mk. 12 Mines	2	10 000	42·51	425 100
	5 × 2 000 lb Mk. 12 Mines	5	10 000	53·71	537 100
(k)	10 × 2 000 lb Mk. 12 Mines		20 000	48·11	962 200
	1 × 10 000 lb M.C.	3	10 250	47·89	490 873
	3 × 25 lb Practice..	On fin of M.C. store	75	61·77	4 633
(l)	1 × 10 000 lb M.C. and 3 × 25 lb Practice		10 325	47·99	495 506
	6 × 25 lb Practice..	1	150	37·68	5 652
	6 × 25 lb Practice..	4	150	48·88	7 332
	6 × 25 lb Practice..	6	150	60·1	9 015
(m)	18 × 25 lb Practice..		450	48·89	21 999
	6 × 100 lb Practice	1	648	37·68	24 417
	6 × 100 lb Practice	4	648	48·88	31 674
	6 × 100 lb Practice	6	648	60·1	38 945
(n)	18 × 100 lb Practice		1 944	48·89	95 036
(p)	Control panel No. 5A role	3	—	—	—
(q)	Control panel No. 5A practice role	3 and 6	—	—	—

H. PHOTO-FLASHES (P.R. NIGHT ROLES)

Item No.	Description	Weight (lb)	Arm (ft.)	Moment (lb/ft.)
(Fig. 4)	Flash, photographic, Mk. 1, 8 in. (28 off)	4 200	63·9	268 380
25	Flash, photographic, Mk. 2 (28 off)	4 396	63·9	280 904

J. R.A.T.O.G.

(Fig. 5) 6	Motor, rocket, Type Super Sprite (2 off)	2 150	52·35	112 552
	Fuel	1 700	50·88	86 493
	TOTAL	3 850	51·7	199 045

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TABLE 4—Equipment included in Basic Weight

Description	Weight (lb)	Arm (ft)	Moment (lb/ft)
Destructor, aircraft	3	21	63
Detonator No. 108 Mk. 1 (46 off)	6·8	12	82
Dinghy, Type MS.5 Mk. 1 with complementary equipment	38	27·5	1 045
Standardized associated equipment to dinghy	50	27·5	1 375
Fatigue meter, post-Mod. 2833	4	44·3	177
Fireman's axe (2 off)	5	17·3	87
Fire extinguisher, hand (5 off)	26	16	416
Fluorescent clock Mk. 2D	0·5	20·8	10
Fluorescent clock Mk.4	0·4	11	4
Fuel:—			
Trapped on weighing, engines to engine master cocks 5 gall.			
*AVTUR/AVTAG	40	38·6	1 544
Unusable in flight attitude:—			
AVTUR/AVTAG (gall.) (lb) (ft) (lb/ft)			
Wing No. 1 tanks 16 128 52·59 6 732			
Wing No. 2 tanks 16 128 56·53 7 236			
Total for basic aircraft 32 gall.	256	54·56	13 968
Gauntlets, asbestos, pair (2 off)	2	17·5	35
Heaters, ration (5 off)	8	16·8	134
Jacking pads (4 off) c/w removable stowage	14	83·6	1 170
First-aid kit (2 off)	6	17·3	104
Leak stoppers (5 off)	1	19·5	20
Periscope, rear viewing (stowed)	6	15·7	94
Sextant c/w case (stowed)	12	20·8	250
Sextant stool (stowed) post-Mod. 1308	8	15·3	122
Signal pistol Mk. 2	4	17·7	71
Signal cartridges (10 off)	3	18·5	56
Torches, electric (5 off)	3·6	16	58
Vacuum flasks, 1 pint, filled (5 off)	10	16	160

***Note . . .**

The weight of the heavier fuel (AVTUR) at 8 lb/gall. is used. In effect the difference of 10 lb between AVTUR and AVTAG is ignored in the total unusable fuel for the basic aircraft. The weight of unusable fuel in variable load fuel tanks is taken into account in Table 2Q and 2R.

TABLE 4—Equipment included in Basic Weight

◀*Radio*:—The following installations are included in Basic Weight. Installations for specific roles, or for which there are alternatives, are listed as variable load in Table 2T.▶

Item No. (Fig. 5)	Description		Weight (lb)	Arm (ft)	Moment (lb/ft)
	N.C.B. Mk. 2:—				
7	Calculator, Type 1, Mk. 1	9D/2	44	27	1 188
8	Calculator, Type 2, Mk. 1	9D/3	60	14·8	884
9	Calculator, Type 3, Mk. 1	9D/4	85	14·8	1 258
	Calculator, Type 7 (Time of fall) Mk. 2A	9D/1110	19	20·7	393
	Control unit, Remote Mk. 2A	9D/1111	4·25	11	47
	Indicator, directional Mk. 1	9D/8	1·5	11·1	17
	Indicator unit	9D/757	1·5	20·5	31
10	Panel, navigation, Mk. 1B	9D/1803	33	20·8	686
11	Power unit, Mk. 1	9D/11	55	27	1 485
	Resistance unit, Mk. 1	9D/12	3	27	81
	Wind monitor Mounting tray	9D/756 9D/1131	10	21	210
	BOMB SIGHT T.4:—				
12	Amplifier	9/4579	11·5	11·3	132
13	Computor	9/4567	48	12·6	605
14	Head, sighting (see Table 2B)	—	—	—	—
	Bracket, mounting	9/3350 or 9/3905	1·5	13·2	20
15	Control panel	9/4578	0·3	13·1	4
16	Gyro control panel	9/4816	2·5	13·6	34
	A.R.I.5874 (S.T.R.18.B.2):—				
17	Transmitter unit, Type T4188	10D/19065	16	20·8	333
18	Control unit, Type 7216	10L/293	1·9	20·8	36
	Receiver, Type R4187	10D/19064	26	20·8	540
	Power and ratio unit, Type 4192	10D/19067	34	20·8	707
	A.1961:—				
19	Amplifier A.1961	10U/16596	6·5	20·8	135
20	Junction box, Type 154	10D/17805	0·8	20·8	17
	Control unit, Type 702	10L/260	0·6	14	8
	Volume control, Type 11	10L/240	3·5	20·8	73
	A.R.I.18064:—				
21	Transmitter/receiver TR.1985	10D/17937	27	19·1	516
22	Transmitter/receiver TR.1986	10D/17938	27	19·1	516
	Control unit, Type 382	10L/246	1	11	11
	A.R.I.18090:—				
23	Transmitter/receiver, Type 7923	10D/19806	28	32·5	910
24	Indicating unit C.R.T., Type 7921	10Q/93	10	20·8	208
	A.R.I.5378:—				
25	Transmitter/receiver, Type 1576	10D/2585	19·69	88·9	1 750
	Indicator, electric, Type 10	10Q/73	2·9	11	32
	Power unit, Type 814	10K/17035	10·75	90	970
	Reflector, Type 37	10B/16804	1·8	89	160
	A.R.I.5848D3-P-7:—				
26	Receiver/transmitter, Type 4585	10D/20334	33	26·4	871
27	Coder unit, Type KY95A/APX-25	16K/1660	10·44	26·4	276
	Control unit for Coder, Type C.1128/APX-25		2	19·4	39
	Control unit, Type C.1158/APX-6A		1·37	19	26

TABLE 4—Equipment included in Basic Weight (*continued*)

Item No. (Fig. 5)	Description		Weight (lb)	Arm (ft)	Moment (lb/ft)
	A.R.I.23023 (A.D.7092D):—				
44	Receiver, Type AD.7092D	10D/19598	15·7	20·8	327
	Controller master receiver, Type 1274	10L/16073	2·8	20·8	58
	Indicator, bearing and timing (Pilot's)	10Q/16314	0·91	16·2	15
	Indicator, bearing & timing (Navigator's)	10Q/16314	0·91	20·8	19
	Sense amplifier, Type 1628	10U/16964	1·75	26·6	47
	Voltage regulator, Type 1555A ..	5UC/6007	1·4	20·8	29
	Power factor transformer, Type 1571	10K/16244	1·3	20·8	27
	A.D.F. Loop 1324A	10B/16446	6·6	29·2	193
	Loop, controller, Type 1342	10J/13152	1·2	20·8	27
	A.R.I.5851:—				
	Aerial, Type 501	10B/16389	40	78·2	3 130
45	Transmitter/receiver T.R.3710 ..	10D/18843	110	80	8 880
46	Tracking unit, Type 100	10Q/16094	45·5	78·1	3 554
47	Indicating unit, Type 101	10Q/16095	21	20·8	437
48	Amplifier	6B/633	2·8	20·8	58
	Indicator, ground position, Mk. 4 ..	6B/541	25	20·8	520
	A.R.I.18011:—				
49	Control unit, Type 705	10L/263	2·5	12	30
50	Indicator, electrical, Type 7 ..	10Q/61	5	11	55
51	Receiver R.1964 Localiser/marker ..	10D/17818	17·75	20·8	369
52	Receiver R. 1965 Glide path ..	10D/17819	16·5	20·8	343
	A.R.I.5800:—				
53	Radar head, Type 1	10D/18501	65	109	7 085
54	Waveform generator, Type 76 ..	10V/16057	24·75	30·1	745
	Indicator unit, Type 27 ◀(see Table 2T)▶				
	Control unit, Type 611	10L/16043	2·75	11	30
	Auxiliary control unit, Type 912 ..	10L/16169	1·25	11	14
	Suppressor, false warning	10AE/690	2·75	20·8	57
	Indicator 4575 (B. Scope)	10Q/16283	10	20·8	208
	Control unit 4577 (B. Scope) ..	10F/16419	2	20·8	42
55	Power unit 4576 (B. Scope)	10K/19335	10	20·8	208
	Relay, Type 4827	10F/18144	1	20·8	21
	◀(For A.R.I.18051 see Table 2K)▶				

TABLE 5—Typical loading examples

1. BOMBER ROLE

Reference Table	Description		Weight (lb)	Arm (ft)	Moment (lb/ft)
◀	Basic Weight (example only, see para. 17)		76 491·5	47·697	3 648 412
	Add variable load:—				
2A	Armament-carrying equipment load (a)		189·2		8 017
2B	Equipment common to bomber and tanker roles		1 071		56 371
2H	Crew of five		1 000		16 400
2J	Personal issue to crew		1·5		28
2K	"Window" installation		258		8 087
2L	Anti-flash screens		7		117
2M	Miscellaneous		5·3		80
2T	A.R.I.18107/13		66·6		5 386
	A.R.I.18107/13 power supplies		56·3		3 387
	A.R.I.5810		779·4		8 872
	Operating weight as Bomber		79 925·8		3 755 157
	Add expendable load:—				
3A	AVTAG fuel at 7·7 lb/gall.	Gall.			
	Fuselage reserve tanks* (−300)	290	2 233	33·54	74 895
	Fuselage No. 1 tanks	734	5 651·8	36·85	208 268
	Fuselage No. 2 tanks	1 370	10 549	42·32	446 434
	Fuselage No. 3 tanks	1 286	9 902·2	49·23	487 486
	Wing No. 1 tanks	1 090	8 393	52·59	441 388
	Wing No. 2 tanks	930	7 161	56·53	404 812
	Transfer tank* (−202)	508	3 911·6	64·25	251 320
		6 208	47 801·6		2 314 603
	*Note.—*Reserve and transfer tank fuel is reduced to keep within max. permissibffe A.U.W. (Normal)*				
3C	De-icing fluid		54		594
3D	Oxygen charge		49·2		684
3E	Nitrogen charge		43·3		710
3F	"Window" bundles		600		19 200
3G	Special store		10 250		490 873
	All-up weight as Bomber		138 723·9	47·445	6 581 821
	Use 100 gall. from selected tanks for taxi		−770		
	TAKE-OFF WEIGHT		137 953·9	▶	

TABLE 5—Typical loading examples (*continued*)

2. PR DAY ROLE

Reference Table	Description		Weight (lb)	Arm (ft)	Moment (lb/ft)
	Basic Weight (example only, see para. 17)		76 491·5	47·697	3 648 412
	Add variable load:—				
2B	Equipment common to PR roles		1 303		65 715
2C	Window fairings and windows		134·2		8 660
	Crate and cameras		1 562·7		78 694
	Oblique camera installation, F.49		153		10 006
	F.49 camera in fairing		99·5		6 343
	Controls		49·7		845
2D	Hoist beam and attachments		70		4 361
2H	Crew of five		1 000		16 400
2J	Personal issue to crew		1·5		28
2M	Miscellaneous		50·8		757
2N	Probe sub-assembly		23		−55
2Q	Bomb-bay tank		466		17 685
2R	Long range equipment		3 779		180 925
2T	A.R.I.18107/13		66·6		5 386
	A.R.I.18107/13 power supplies		56·3		3 387
	A.R.I.5910		918·7		11 128
	Operating weight, PR Day role		86 225·5	47·071	4 058 677
	Add expendable load:—				
3A	AVTAG fuel at 7·7 lb/gall.	Gall.			
	Fuselage reserve tanks	590	4 543		152 372
	Fuselage No. 1 tanks	734	5 651·8		208 268
	Fuselage No. 2 tanks	1 370	10 549		446 434
	Fuselage No. 3 tanks	1 286	9 902·2		487 486
	Wing No. 1 tanks	1 090	8 393		441 388
	Wing No. 2 tanks	930	7 161		404 812
	Underwing tanks	3 200	24 640		1 165 964
	Transfer tank	710	5 467		351 255
	Bomb-bay auxiliary tank	570	4 389		166 563
		10 480	80 696		3 824 542
3C	De-icing fluid		54		594
3D	Oxygen charge		49·2		684
3E	Nitrogen charge		43·3		710
	All-up weight, PR Day role		167 068	47·198	7 885 207
	Use 100 gall. from selected tanks for taxi		−770		
	TAKE-OFF WEIGHT		166 298 ▶		

TABLE 5—Typical loading examples (*continued*)

3. PR NIGHT, ROLE Case 1

Reference Table	Description		Weight (lb)	Arm (ft)	Moment (lb/ft)
◀	Basic Weight (example only, see para. 17)		76 491·5	47·697	3 648 412
	Add variable load:—				
2B	Equipment common to PR roles		1 303		65 715
2D	Fuselage photo-flash crate		1 063		67 926
	Hoist beam and attachments		70		4 361
2E	Crates and cameras		1 266·7		63 558
	Controls		51·5		876
2H	Crew of five		1 000		16 400
2J	Personal issue to crew		1·5		28
2M	Crew ration box		16·8		219
	Pilot's Notes, pad and literature		5·3		80
2Q	Bomb-bay tank		466		17 685
2R	Long-range equipment		3 779		180 925
2T	A.R.I.18107/13		66·5		5 386
	A.R.I.18107/13 power supplies		56·3		3 387
	A.R.I.5910		918·7		11 128
	Operating weight, PR Night role, Case 1		86 555·8	47·208	4 086 086
	Add expendable load:—				
3A	AVTAG fuel at 7·7 lb/gall	Gall.			
	Fuselage reserve tanks	590	4 543		152 372
	Fuselage No. 1 tanks	734	5 651·8		208 268
	Fuselage No. 2 tanks	1 370	10 549		446 434
	Fuselage No. 3 tanks	1 286	9 902·2		487 486
	Wing No. 1 tanks	1 090	8 393		441 388
	Wing No. 2 tanks	930	7 161		404 812
	Underwing tanks	3 200	24 640		1 165 964
	Transfer tank* (−360)	350	2 695	64·25	173 154
	Bomb-bay auxiliary tank	570	4 389		166 563
		10 120	77 924		3 646 441
	*Transfer fuel reduced for photo-flash load				
3B	Water methanol		1 410		81 780
3C	De-icing fluid		54		594
3D	Oxygen charge		49·2		684
3E	Nitrogen charge		43·3		710
3H	Photo-flash Mk. 1 (10 off)		1 500		95 850
	All-up weight, PR Night role, Case 1		167 536·3	47·227	7 912 145
	Use 100 gall. from selected tanks for taxi		−770		
	TAKE-OFF WEIGHT		166 766·3 ▶		

TABLE 5—Typical loading examples (*continued*)

4. TANKER ROLE (Full standard)

Reference Table	Description		Weight (lb)	Arm (ft)	Moment (lb/ft)
	Basic Weight (example only, see para. 17)		76 491·5	47·697	3 648 412
	Add variable load :—				
2B	Equipment common to bomber and tanker roles		1 071		56 371
2H	Crew of six		1 200		19 840
2J	Personal issue to crew		1·5		28
2M	Ground crew chief's seat and lap strap		21·2		342
	Ground crew chief's folding seat		7·5		116
	Pilot's Notes, pad and literature		5·3		80
2N	Probe sub-assembly		23		−55
2P	Full standard Tanker equipment		3 497		186 409
2R	Long-range equipment		3 779		180 925
2T	A.R.I.18107/13 with A.R.I.23120		70·6		4 436
	A.R.I.18107/13 power supplies		56·3		3 387
	A.R.I.5810		779·4		8 872
	Operating weight as Tanker		87 003·3	47·23	4 109 163
	Add expendable load:—	Gall.			
3A	AVTAG fuel at 7·7 lb/gall.				
	Fuselage reserve tanks	590	4 543		152 372
	Fuselage No. 1 tanks	734	5 651·8		208 268
	Fuselage No. 2 tanks	1 370	10 549		446 434
	Fuselage No. 3 tanks	1 286	9 902·8		487 486
	Wing No. 1 tanks	1 090	8 393		441 388
	Wing No. 2 tanks	930	7 161		404 812
	Underwing tanks	3 200	24 640		1 165 964
	Transfer tank	710	5 467		351 255
	Bomb-bay auxiliary tank	570	4 389		166 563
		10 480	80 696		3 824 542
3C	De-icing fluid		54		594
3D	Oxygen charge		49·2		684
3E	Nitrogen charge		43·3		710
	All-up weight as Tanker		167 845·8	47·28	7 935 693
	Use 100 gall. from selected tanks for taxi		−770		
	***TAKE-OFF WEIGHT**		167 075·8		

*See Pilot's Notes for restrictions ▶

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TABLE 6

Negligible modifications

The following modifications have a negligible effect on the aircraft weight and C.G. position—

27, 31, 62, 116, 118, 119, 143, 149, 160, 167, 220, 221, 248, 250, 324, 325, 390, 429, 443, 462, 466, 467, 469, 475, 484, 491, 504, 505, 516, 540, 554, 568, 569, 570, 574, 579, 581, 593, 594, 596, 604, 615, 620, 623, 634, 645, 650, 654, 665, 666, 667, 682, 699, 701, 706, 708, 709, 716, 719, 720, 728, 731, 740, 747, 778, 779, 786, 787, 794, 797, 799, 800, 804, 807, 813, 817, 818, 822, 823, 831, 832, 840, 841, 842, 843, 856, 858, 861, 869, 871, 883, 888, 889, 891, 892, 894, 900, 903, 905, 908, 910, 917, 924, 926, 929, 939, 943, 947, 948, 949, 951, 952, 956, 961, 964, 965, 968, 972, 973, 976, 977, 983, 984, 985, 990, 991, 995, 1003, 1006, 1018, 1024, 1027, 1030, 1032, 1041, 1046, 1047, 1051, 1052, 1054, 1056, 1063, 1068, 1073, 1074, 1083, 1097, 1102, 1109, 1111, 1123, 1124, 1125, 1128, 1138, 1139, 1140, 1142, 1143, 1149, 1153, 1158, 1160, 1161, 1167, 1169, 1170, 1172, 1178, 1184, 1185, 1187, 1190, 1191, 1193, 1197, 1199, 1200, 1205, 1207, 1208, 1212, 1215, 1220, 1223, 1225, 1227, 1234, 1235, 1237, 1244, 1246, 1249, 1250, 1251, 1255, 1259, 1266, 1269, 1273, 1274, 1278, 1279, 1281, 1282, 1283, 1285, 1287, 1290, 1294, 1298, 1299, 1301, 1312, 1324, 1325, 1330, 1332, 1333, 1335, 1336, 1339, 1344, 1347, 1348, 1355, 1358, 1361, 1373, 1377, 1381, 1384, 1393, 1397, 1401, 1405, 1406, 1407, 1411, 1415, 1423, 1428, 1435, 1441, 1442, 1456, 1459, 1466, 1472, 1478, 1479, 1480, 1481, 1497, 1498, 1508, 1517, 1518, 1526, 1529, 1531, 1537, 1538, 1544, 1545, 1554, 1559, 1564, 1566, 1576, 1577, 1580, 1594, 1600, 1616, 1622, 1624, 1637, 1641, 1642, 1643, 1644, 1651, 1653, 1658, 1659, 1660, 1661, 1664, 1670, 1678, 1685, 1693, 1696, 1697, 1705, 1707, 1718, 1725, 1727, 1731, 1732, 1733, 1737, 1742, 1743, 1746, 1747, 1748, 1750, 1752, 1758, 1763, 1775, 1786, 1790, 1803, 1806, 1811, 1812, 1815, 1825, 1832, 1842, 1844, 1848, 1849, 1851, 1857, 1863, 1867, 1869, 1870, 1872, 1873, 1883, 1884, 1895, 1906, 1921, 1929, 1930, 1931, 1933, 1938, 1941, 1944, 1946, 1947, 1948, 1954, 1958, 1959, 1960, 1961, 1964, 1970, 1976, 1982, 1985, 1997, 2001, 2002, 2003, 2005, 2007, 2010, 2016, 2021, 2022, 2030, 2034, 2036, 2038, 2039, 2040, 2041, 2048, 2050, 2056, 2060, 2068, 2070, 2073, 2076, 2079, 2081, 2082, 2088, 2101, 2103, 2104, 2106, 2114, 2126, 2127, 2136, 2139, 2145, 2150, 2151, 2152, 2153, 2155, 2156, 2157, 2162, 2165, 2171, 2175, 2180, 2182, 2186, 2193, 2196, 2199, 2202, 2209, 2210, 2213, 2214, 2219, 2220, 2222, 2230, 2233, 2234, 2235, 2237, 2238, 2241, 2242, 2248, 2249, 2255, 2256, 2261, 2262, 2269, 2270, 2272, 2275, 2279, 2287, 2289, 2298, 2301, 2314, 2316, 2329, 2332, 2339, 2344, 2347, 2348, 2350, 2352, 2358, 2359, 2360, 2363, 2368, 2372, 2373, 2379, 2380, 2382, 2384, 2388, 2395, 2401, 2411, 2418, 2419, 2420, 2439, 2445, 2447, 2449, 2452, 2458, 2461, 2462, 2469, 2475, 2477, 2479, 2480, 2485, 2487, 2497, 2499, 2505, 2508, 2513, 2515, 2516, 2519, 2522, 2524, 2525, 2526, 2527, 2528, 2530, 2533, 2534, 2536, 2540, 2545, 2551(a), 2556, 2558, 2561, 2565, 2567, 2574, 2576, 2585, 2591, 2595, 2596, 2597, 2604, 2605, 2615, 2620, 2623, 2624, 2625, 2632, 2636, 2654, 2669, 2670, 2671, 2672, 2674, 2677, 2682, 2685, 2692, 2694, 2707, 2714, 2718, 2723, 2728, 2729, 2731, 2752, 2753, 2769, 2772, 2775, 2776, 2777, 2778, 2781, 2786, 2798, 2800, 2803, 2807, 2811, 2814, 2821, 2834, 2839, 2844, 2850, 2854, 2860, 2863, 2869, 2880, 2891, 2894, 2898, 2901, 2902, 2905, 2909, 2912, 2917, 2918, 2931, 2932, 2936, 2943, 2949, 2952, 2953, 2956, 2971, 2972, 2975, 2977, 2978, 2980, 2982, 2984, 2997, 2998, 3002, 3004, 3010, 3013, 3014, 3022, 3024, 3030, 3033, 3034, 3039, 3041, 3047, 3050, 3051, 3054, 3059, 3060, 3061, 3062, 3063, 3064, 3066, 3069, 3070, 3071, 3076, 3080, 3081, 3083, 3085, 3102, 3111, 3114, 3115, 3124, 3125, 3129, 3133, 3138, 3150, 3159, 3171, 3173, 3174, 3186, E.C.2, E.C.5, E.C.10, E.C.12, E.C.14, E.C.19

◀**Note . . .**

*From the date of this A.L. no addition will be made to this table. For details of weight and C.G. change of future modifications reference should be made to A.P.*4377A, Vol. 2 leaflets.▶

TABLE 6A. Modifications affecting aircraft weight and C.G.

No.	Title	Weight change (lb)	Moment change (lb ft)
1	Control lock run revised to ensure positive mechanical withdrawal	51·39	2476
2	Hoisting point for chassis cross tube and actuator	1·2	13
3	Retractable airflow spoiler at front end of bomb bay	42·21	1428·5
4	To make structural provision for window installation	10·7	343
5	To make structural provision for water methanol system	21·17	1253·3
7	Strap type handle in lieu of rubber handgrips for pilot's seat entry	1·6	23
8	To revise toilet system	2·5	35
9	To revise rear fuselage aft of Stn. 1155·9	35·4	3328
10	Ration heaters	13·3	176·9
11	To introduce Smith's Type D automatic pilot	201	5179
12	Quick-release pins at chassis door	32·1	1577
14	Low Level Radio Altimeter	5·2	61
15	High Level Radio Altimeter	69·63	2032
16	Radio Compass	90·3	2227
17	New landing flaps No. 2 and 3	−31·3	−1948
18	Luminisation of emergency equipment	1·7	67
21	To arrange vertical parking of windscreen wiper	1·7	17·7
22	To revise intercommunication system	2·23	45·7
23	To introduce the type 4 and 6 calculators	23·6	310
24	Blanking plate across front of hood fairing	7·9	134
25	Fixed fittings for conversion to PR role	Not available	
28	To revise bomb aimer's nacelle	202·7	4894
29	To introduce the inverter type 350	59	1763
30	Circuit breaker in lieu of fuse in camera supply circuit	0·25	5
32	To revise battery charging installation	22·7	720
33	To cater for the increase in dimensions of the indicator type 301	1·3	26
34	To revise control run in fuselage to standardise with P.R. aircraft	1	83
35	To provide stowage for RE/W signal cartridges	0·2	9
53	Window launching installation	40	1253
78	I.F.F. Mk. 10 AN/APX6 installation	74·5	1113
84	To introduce STR 18 B1.HF. installation	−24·1	−549
86	To provide for 20-way butt connectors	2·86	132·3
89	Window launching equipment	246·6	7529
98	To introduce Dunlop Maxaret brake system	67·67	2624·8
106	Inertia switches piston type Mk. 1	−1·47	−36·8
108	Additional fuselage fuel tanks	343·16	20732·8
117	To introduce Hymatic Reducing Valve PS 29/7 in pressure system	−0·57	−11·8
144	To provide check cables for H2S indicator and control unit	0·37	7·7
146	To introduce a two stage air cylinder in main U/C	40·5	2025
163	To revise auxiliary jacking point at Stn. 293·5 to cater for spherical type jacking	11·5	554·7
178	To delete cooling air supply on H2S scanner unit	−1·41	−9·64
188	To delete photo flash and camera installation	−160·09	−12202·3
189	Stowage for C.G. computor	0·8	11
197	Fixed fittings for refuelling in flight	327·673	9298·6
224	Ground connections for Cabin Cooling	5·4	109·7
225	To introduce Radar Equipment System	22·7	619·9
231	To cater for Super-Sprite	1·8	35·3
236	Ducting for engine bleed valve outlet	24·71	991·7

TABLE 6A (*continued*)

No.	Title	Weight change (lb.)	Moment change (lb. ft.)
245	To make provision for external operation of defuelling selector valve	2·64	67·9
273	Ducting for H2S and N.B.C. connectors	7·05	205·5
284	Access to fuel distributor box	2·72	96·3
298	To cater for Calculator type 7 Mk. 1	5·68	74·8
302	To improve accessibility of bomb door motor panel	2·95	168·6
303	Fuel system recuperator with integral N.R.V.	0·42	18
313	Compass sighting posts	0·32	27
314	Access to sprockets and chain connections of elevator lock mechanism	1·12	106·3
316	To introduce single type flap transmitter and indicator	−1·33	−60
317	To provide by-pass drain pipe to fuel vent ducts	2·91	169
318	To revise mountings for fuselage tank pacitor rectifiers	0·6	20·7
319	Dessicator for fuel tank pressure reducing valve	4·3	242
339	Circuit for wing nacelle roller blind door operation	4·58	206·9
343	To introduce pumps S.P.E.1204, Mk. 1 and 1207, Mk. 1	−1·5	−91
346	To achieve interchangeability of main chassis side stay tube	−1·7	−84
352	Alterations to fuselage centre beam	2	94·4
371	To cater for No. 1 Mark 1 fuse units and fin release unit for alternative store	2·1	110·5
372	To introduce fuel distributor box 67445 Sht. 39/40	2·28	97·4
373	To introduce a cockpit Mk. 1A lamp behind radio crate to facilitate servicing	0·55	12·1
389	To delete generator slinging installation	−13	−360
391	Mounting of landing lamp type L	0·75	39
392	To revise electrical control for landing lamp type L	3·44	203·7
414	Stop tube in lieu of stop collar for oleo ram	21·7	1 096
423	To introduce Mk. 2 cold air unit	3·4	101·4
430	To split inner jet pipe and shrouds	13·56	154·7
442	To provide lateral adjustment for nose chassis up and downlock	1·74	46·1
444	Cockpit lighting to latest requirements	8·7	130·8
447	To revise tail plane actuator lubrication	1·45	139·7
461	To enlarge hatch in nose wheel bay	−1·9	−53
468	To increase discharge rate of engine bay fire extinguishers	26·31	1 278·9
474	To revise elevator control lock run 1st 10 M/C	−1·28	−102·4
	26th & subs. M/C		
	11-25th M/C incl.	−0·95	−69·1
447	Extension to reducing valve sensing lines	0·35	19·7
479	To revise fuel transfer system	14·38	511·9
481	Fuel jettison system for under-wing tanks	0·37	5·25
483	Hand operation of flap gearbox	0·6	33
486	To change design of front spar booms station 93	267·5	13 053·5
490	To introduce ARI.5428	118·05	3 433·5
502a	To revise V.T. and E.M. fusing to latest R.A.E. requirements	47·49	1 843·6
502b		47·33	1 836
510	Interim scheme for engine generator cooling	10·4	450·8
511	To revise electrical installation for alternative store to suit latest R.A.E. requirements	66·9	2 140
527	Removable equipment for flight refuelling tanker role	Not available	
528	Additional attachment bolts for false work to No. 2 flap unit	0·8	47

TABLE 6A (*continued*)

No.	Title	Weight change (lb.)	Moment change (lb. ft.)
534	To improve air intake sliding joint	1·61	63·7
538	To provide test point for type 350 inverter	2·07	75·3
539	Conduits for fire detector cables	1·63	85·6
541	Fuel vent manifold increased to 16 s.w.g.	0·78	41·6
545	To cater for type 153 inverter power supplies installation	10·57	264·5
547	Walk way along top surface of fuselage		
	B Mk. 1	26·18	1 189·3
	B (PR) Mk. 1	30	1 431·5
548	To improve replacement of front fairing bottom surface panel	3·4	117·5
549	Strengthened flap gearbox mounting at Stn. 0	0·6	31·5
550	To revise topping up air system for H2S. Mk. 9 scanner unit	5·54	73·9
551	Pitot and static test point in feel unit ducting	0·35	26·5
575	To provide adjustment for attachment of main chassis fixed door	9·91	524
576	To facilitate removal of lower portion of window chute	1·08	34·5
584	Cockpit canopy with side windows	8·07	212
585	To obviate backlash in aileron control circuit	1·5	16·5
589	To provide alcohol injection for fuel filter de-icing	53·26	2 461·1
595	To improve non-return valve in fuel vent system	0·32	16·3
598	To introduce nose-wheel oleo damper valve	1·04	25·8
599	Conduit in fin for Radio Compass connectors	1·6	154·5
600	Protection guards for A.R.I. 5851 waveguides	6·66	533·4
605	To change cold air duct to steel	5·64	248
606	Demisting for side windows	2·21	28·3
607	To make provision for autostabilizer Mk. 2	19·2	569
613	To reduce backlash at aileron operating lever	0·55	34·3
616	Anchorage for tail support strut	1·53	133·9
627	Extra link on 112V. distributor panel J	0·51	16·5
632	To provide R.T. facilities in radio operator's position in conjunction with intercom.	0·93	18
635	Access door in the starboard fixed chassis door	1·05	53·2
642	Wider conduit for I.L.S. marker aerial connector	0·36	7·2
651	To increase engagement of flap roller in No. 3 flap unit	0·26	14·5
653	To improve duct down stream of constant flow valve	1·95	60
655	Access panels in console side panels	0·35	4·5
662	Overlap joint for jet pipe outer shroud	3	184
664	To introduce periscope stowage	1·33	20·6
674	To improve fastening of windscreen de-icing tank cover plate	0·6	6·6
675	Clearance between heat shield and rear spar	6·2	338
684	Stay for aileron control group on rear pressure bulkhead	0·3	7·2
688	Larger access panel for G.H. Mk. II aerial	0·97	102·5
693	EL type fusing in addition to VT and EM	29·08	1 381·6
694	Insulated plug-socket in rear pressure bulkhead (For H2S connector)	0·48	16·8
698	To cater for use of window box hoist	2·1	73·6
703	Cover plate for access holes in aileron power unit mounting	0·43	23·4
705	To improve servicing of radio equipment	0·55	24·8
710	To reposition oxygen and nitrogen external charging connections	1·1	28·6
712	To re-run ducts and cables in loft to provide greater clearance for heat insulation	1·89	60·8
724	To introduce a 300-amp. fuse in engine starter circuit	0·76	23·6

TABLE 6A—(contd.). **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
725	To change rubber sealing strip around engine bay	2·45	113·5
733	To delete voltage pick-up relays in 28V rotary transformer circuit	—2·25	—82·2
734	To reroute port brake piping	—1·4	—36·4
736	To change shear link to steel	0·55	53·8
737	Introducing Single Pump in oil pump drive	0·38	36·3
739	Additional connector blocks on panel K and P	1·43	42·9
746	Adjustable plates for aileron control lock housing	0·52	34·2
749	To introduce STR.18 B2	—5·25	—39·4
752	To introduce brake unit AH.50286, 50287 and 50295	175·1	8790
753	To introduce main wheel AH.50285	35	1757
755	Improved connector runs on radio crate	5·77	118·6
763	Cover in lower surface intake panel	0·74	25·7
767	To shield H2S Mk. 9 Indicator Type 301 from cockpit lighting	1·2	24·9
780	Revised system of rheostatic braking	—10·75	—542·2
785	To introduce Auto Pilot Mk. 10 if no autopilot previously fitted. (The fitment of this Mod. requires in addition the weight and moment effect of Mod. 11)	21·1	405·4
795	Improved collet assembly for flap and dive brake universal couplings	4	216
796	Guide for main engine door slinging	0·26	12·4
802	Steel bushes in main undercarriage side stay knuckle joint	0·79	39·5
805	To introduce windows with $\frac{3}{16}$ in. outer glass	13·3	166·4
806	To facilitate checking oil level of cold air unit	1·4	50
808	Split collets on tail plane actuator torque shaft	—0·92	—110·4
814	To introduce lengthened tail cone and provide for fitment of radome for ARI.5800		
	When radar head available	—0·25	—117
	When radar head not available	5·34	470·4
815	Guard over connectors at rear bulkhead port side	0·37	9
816	Guard over V.H.F. equipment	1·57	20·8
826	To improve engine ventilation doors	0·5	36
833	To introduce additional flap indicator	1·22	63·4
839	To improve jet pipe thermo-couple seal	1·28	71·4
848	To introduce Mk. 4 portable oxygen set	8·5	139
849	To cater for differences in dimensions of oxygen and nitrogen cylinders	1·07	9·6
851	New main chassis doors	6·79	362·6
853	To introduce diaphragms between ribs and increase gauge thickness of skin plating	19·61	2009·3
855	Modified radio compass loop	—1	—31·6
857	Drains in pitot and static lines in outer plane	1·74	92·2
862	Engine change unit plus external parts (per aircraft)	11·6	585
866	Improved guide rail bush at No. 1 flap unit	0·35	19·6
867	To eliminate fuel venting from wing tanks	9·4	506
868	To reduce suction of wing tank vent outlet	1·84	117·6
875	To revise electrical installation for alternative store and provide test socket to latest R.A.E. requirements	9·25	314
876	To provide locks for cabin entrance door, hatch to loft and fuselage access door aft of bomb bay	3·20	160·9
877	To improve clearance between main chassis and doors	—0·92	—47·5
880	To improve spring return action of hand brake cable	0·1	1·2
882	To rerun 2 pitot and static pipes	0·27	3
887	Ki-Gass oil pump at tailplane actuator	—1·52	—146·9

TABLE 6A—(contd.). **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
893	To improve removal of section of artificial feel unit ducting	1	84
901	To provide protection for wing tip vent pipes from lightning strike	1·75	114
906	Sun blind for canopy windows	10·75	150·5
911	To provide stowage for cabin leak stoppers	3·4	70
912	To facilitate removal of Radio Altimeter Mk. 6 indicator	0·51	10·6
918	To reduce flow of hot air to bomb cell	0·1	4·8
920	To introduce over-ride switch for jet pipe fuel flow system	2·23	50
◀925	To change material of cabin pressure and de-icing ducts	5·79	413
932	To provide seal for "Window" chute	4·7	151·3
940	To introduce chain pulleys with ball races in control lock runs	—0·59	—31
962	To introduce 90° outlets for leads to bomb door motors	1	49
963	To reposition Mk. 6 High Level Altimeter transmitter at fwd. end of bomb bay	1	46·5
967	New rigging check positions	—1·1	—95
969	To change valve plate to steel and reinforce actuator mounting bracket on de-icing valve elbow	1·73	90·5
974	To make provision for A.R.I.5851 aerial alignment	4·4	340
978	Horn balance weights in heavy metal	2·7	269
979	Isolation cock for windscreen de-icing tanks	0·59	6·4
988	To revise wiring and regrouping of fuses in AC/DC junction box	0·6	15
992	Additional access in bomb bay side-wall port side	1·2	38
994	To facilitate servicing of equipment in scanner bay	3	33
1005	To provide equipment for low-level radio altimeter Mk. 5 in rear fuselage	77·1	5354
1007	Larger access panels in outboard chassis door	—0·68	—34·4
1012	Non-return valve in fuel feed line from reserve tank	8·46	355·9
1017	Guard for control lock and release cable between pilot's and cabin floors	1·34	17·6
1021	To divorce bomb door safety switch from bomb release and fusing circuit	—3·39	—290
1026	Jet pipe with improved double bubble section	—1·28	—67·3
1034	To introduce A.R.I.5800 installation	185·64	11802·6
1036	Guide plate for withdrawal of panel housing on forward face of No. 1 hoist	0·5	16·5
1057	To reroute wiring through lower fin and tailplane	0·5	45·3
1064	To prevent water entering tailplane actuator gearbox	1·5	144·5
1066	To introduce strengthened main chassis spring box 67407 sht. 861	2·01	95·9
1075	Adjustable aileron control rod between power unit and guide block at stn. 93 starboard side	0·68	36
1078	Horn balance weights in heavy metal	7·75	771·1
1079	Radio interference suppressors type G.5	1·6	33·6
1080	To seal lower rib of top fin	6·68	545·1
1081	To delete crutching points for 5000 lb bomb	—3·9	—189
1082	Pip pins for crutch pad assembly at stn. 520	4·26	104·5
1092	Glasscloth inner skin panels on chassis doors	—20·8	—1054
1094	Hose coupling joint for vent ducting between stations 653–673	0·78	45
1095	Larger "C" duct on side of fuselage stns. 390·5–443	—6	—97·8
1103	To reposition dive brake gearbox	1·64	85·5
1105	To provide "DOWN" indicator for navigator and an inching switch in bomb bay for alternative store circuit	0·33	10·6
1106	To introduce thermometer exhaust gas temperature system Type C—ground test facilities	15·3	649·6
1108	To reinforce pillar "C" of windscreen	1·76	23·6
1110	Grid protection over rectifier units for type 350 inverters	2·08	58·9
1117	To stiffen skin edge on port side of fin	1·28	120
1118	To introduce water methanol installation less tanks	284	16839

Table 6A—contd.

No.	Title	Weight change (lb)	Moment change (lb ft.)
1 121	To improve sealing at dinghy hatch	0·25	6·8
1 122	To provide water drain pipes from lower fin	0·91	87·8
1 129	Flanged bushes for bomb door hinge bracket	0·64	31·9
1 137	To rearrange lamps for bomb-aimer's panel	0·38	4·8
1 141	To provide a lock to feel units release mechanism	0·6	44
1 144	To introduce aileron tab control 67411 Shts. 77, 79/80	0·4	26·4
1 146	To revise runs of electrical cables at rear spar stabiliser	1·05	56·3
1 147	Lighting at Navigator's position	4·21	85·1
1 154	To introduce vent and relief valves FLP/A7 & A8 and associated dessicator	14·56	830·5
1 156	To delete attachment fittings for 2 stage amber panels	—0·4	—5·6
1 159	To introduce fork ends 70633–5, 7, 13	—0·3	—13
1 162	Self aligning rollers on No. 4 flap unit	5·2	301
1 165	To improve assembly of carrier adapter to fuselage	0·46	22·4
1 171	To introduce Mk. 19A altimeter	0·2	4
1 174	To improve cockpit lighting	1·3	17
1 181	Additional footrest for pilot	—3·5	—37
1 182	To reposition instrument panels in cabin	0·3	4
1 189	Additional pitot and static water drains aft of rear spar	2·64	145·8
1 196	To introduce pitot-operated switch in VT, EM and EL fusing circuits	Not available	
1 198	Guard over transformers and cooling duct in loft	16·76	435·7
1 202	To introduce Dowty cabin pressurising switch	0·2	2·6
1 206	To introduce sextant case mounting tray	3·2	59·8
1 213	Signal lamp and filter stowage deleted	—5·1	—78
1 216	Improved pressure head mounting	0·68	39·6
1 217	Guard for windscreen wiper resistances	0·68	7·48
1 218	Adjustable bomb door micro switch brackets	0·73	35·3
1 219	Adjustable outlet for air from engine bearings	4·2	202·3
1 224	No. 5 and No. 6 bomb hoist housings extended	6·2	484·3
1 228	To provide bomb bay illumination	9·8	582·2
1 233	To reposition Gyro Unit	1·2	45·5
1 239	To delete cooling fins for amplifier Mk. 1	—2·40	—61
1 241	To reroute bomb-aimer's windscreen demisting pipe	0·6	7·1
1 243	Drain cocks for hydraulic filters	0·43	12·6
1 245	To introduce A.G.S.606 clips for flexible pipes	0·8	26
1 254	To obviate foul between navigator's N.B.C. panel and mounting	0·6	11·3
1 257	To revise wiring to suit switch magnetic for type 350 inverters	0·5	14·3
1 260	To bring alternative store circuit in line with equipment and test gear	1·7	77·5
1 265	Winged bolts for N.B.S. units	0·3	7·9
1 268	To introduce $\frac{1}{8}$th power switch for H.F. installation	0·2	4
1 270	To revise run of duct for H2S modulator	0·3	2·4
1 280	Dunlop de-icing pumps AC/13000 and 13002 in lieu of AC/12300 and 12302 respectively	0·2	2·2
1 289	To introduce relief valve	4	105·6
1 291	Engine drains tank deleted, and drains re-routed	11·91	665
1 293	Pressure equaliser valve between chambers of U/C air cylinder	18·07	903·5

Table 6A—contd.

No.	Title	Weight change (lb)	Moment change (lb ft.)
1 295	Rubbing pads for No. 2 & 3 flaps	0·9	53
1 297	To introduce bomb release toggle and clip	—0·15	—3·1
1 300	To increase adjustment of main undercarriage sidestay cross tube	7·2	361
1 302	To revise chute for "window" dispensation	3·86	125·7
1 303	"C" duct in wings at stn. 93 in lieu of conduit	—3·36	—148
1 306	To improve accessibility of emergency oxygen control	1·7	24
1 308	To provide an adjustable stool for sextant station	8·25	149·7
1 310	To introduce the pistol Mk. 2 and mounting in lieu of Mk. 1	1·2	21·4
1 314	To rerun cables to "P" panel in loft	0·7	21·3
1 315	To strengthen mounting of bomb door relays (Pre Mod. 302 M/c)	1·44	72·4
1 316	To strengthen mounting of bomb door relays (Post Mod. 302 M/c)	1·59	79·5
1 323	Blind flying panels revised	0·44	4·8
1 328	Door in bomb-bay roof	2·3	158·5
1 329	To introduce lighter skew bar	—22·7	—1 466·4
1 331	Tailplane actuator lubrication improved	—0·22	—20·7
1 334	To introduce a pannier	73·5	3 493
1 338	To provide stowage for jacking pads	1·23	103
1 343	To introduce microswitches ref. 5C/4638, 4639	0·06	3
1 345	Underwing stalk with 112V. transfer circuit	1 053·5	51 4160
1 350	To transfer oil pressure gauge supply to 350 inverter	0·6	4
1 353	To improve lubrication of tailplane actuator	0·1	9·7
1 354	Flap angle indicator mechanism improved	0·15	69
1 357	Drain cocks in transfer tank piping	1·42	7
1 360	To introduce low level altimeter indicator lights	1·08	12·3
1 368	To reduce diameter of ports in valve seat	—0·13	—3·2
1 374	To rerun oxygen pipe beneath second pilot's seat	0·10	1·3
1 378	To stiffen A.R.I.5810 power unit amplifier and calculator Mk. 1 mounting	2·78	73·6
1 382	To delete A.R.I.5428	—116·2	— 3 391
1 387	To facilitate replacement of guide rail track No. 1 flap	0·1	6
1 392	Flanged bushes for bomb door bogie hinge brackets on PR	0·91	45·6
1 394	To introduce cushions for crew seats	13·8	248
1 396	To provide separate static control piping for cabin pressure controller and safety valve	0·5	10
1 408	To introduce "B" Scope for A.R.I.5800	29·9	632·8
1 409	To revise the run of waveguide	1·65	132·1
1 413	Strengthened nose chassis door	3·2	86·5
1 416	Titanine sealing inside nose fairing	0·1	0·9
1 418	To improve elevator out-of-trim indication		
	(a) Interim	0·46	41·4
	(b) Production	1·34	120·6
1 419	To introduce aileron and rudder control rods with reduced diameter at rear pressure bulkhead lever group	0·33	8·6
1 422	To revise attachments for scanner davit	0·27	1·5
1 424	To bring I.F.F. Mk. 10 installation into line with agreed layout, Pre Mod. 28	—4	-112
1 425	To bring I.F.F. Mk. 10 installation into line with agreed layout, Post Mod. 28	5·4	671
1 426	Coiled metal pipe to tailplane actuator Post Mod. 1353	0·23	21·5
	Pre Mod. 1353	0·62	58
1 427	To improve operation of N.R.V.'s in fuselage pump housing	1	43·3
1 429	To introduce upper piston head seal spreader spring 67450–607	0·3	15·1

TABLE 6A—(contd.). **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
1431	Strengthened cleats on aileron shroud	1·21	73·4
1432	To introduce Dunlop accumulator AC.14046	1·5	39
1448	To change stay tube of main entrance door to steel	0·26	4·2
1449	Windscreen de-mister ducts lagged	3	46
1452	Connection of N.B.S. Calculator Type 3 to 2nd Pilot's static system	1·3	16·5
1461	To introduce socket 5X/6064 for type 100A Inverter	0·16	4
1462	To increase cable to 24 amps on No. 3 slip jettison	0·64	32
1463	To introduce air intake lower fairing panel Sht. 855/6	—2·4	—93·6
1467	Engine control amplifier Ref. EC1/3 with external adjustment for drift error	1	32·5
1469	Resistances on power panel protected	0·1	3·2
1470	Quick-release type straps and brackets for five extinguisher bottles	2·6	122
1471	To revise electrical system to suit under-wing tanks	2·9	59·4
1473	To improve rigidity of rudder/elevator feel units	1·34	104·5
1482	To provide split pin locking to bolts in aileron control bearing blocks in outer plane	0·15	8·6
1486	To strengthen detachable flush air intakes	0·25	8·5
1487	Revised V.H.F. and H.F. frequency cards	0·1	3·2
1489	To introduce bombing coupling unit mounting for Auto Pilot Mk. 10	0·65	9
1492	Pressure relief valve FLP/A7 and dessicator	2	111
1496	Intercom. point at sextant station	1·3	23
1499	To improve adjustment of rollers on handwheel shaft	1·2	15
1500	To introduce AD7092D radio compass	60·6	1378
1501	Wiring of transfer tank low pressure revised warning	0·15	2
1502	To increase deflection of guide plate at No. 4 hoist	0·6	2·3
1505	Straps for H.2S connectors on spider	0·26	2
1509	To secure No. 5 and 6 hoist covers in open position	0·1	4·5
1510	Journal assembly unit without tapped lubricator hole for tailplane torque shaft	0·72	72
1512	Underwing tank with 112V system	2440·5	116013
1513	Suspension links for underwing tanks	32	1516
1514	To introduce bomb bay tank	428·3	15167
1516	To change co-axial R.F. cables between R.F.D.C. and the R.F. amplifiers to Uniradio 70	—7·5	—470
1519	Guard over bomb door microswitches at positions 6 and 10, 7 and 11	0·31	16·3
1521	Rear view mirror aft D.V. windows	0·24	3
1522	To strengthen de-icing system ducting in outer plane (Pre-Mod. 925)	36·9	1637·7
1530	To revise H.F. aerial installation	7·45	181
1541	To revise stowage position and to provide additional links for electrical circuit forward of No. 3 hoist	0·5	23·2
1542	To revise A.S.I. lines at fwd. end of nose-wheel bay	0·15	5
1547	Flexible mounting for service lamps in fuselage	0·1	3
1550	To introduce outer plane leading edge diffuser duct 67482 Sht. 47/8	16·2	618
1558	To provide cuff for wing tank refuelling valve assemblies	—0·3	—1·4
1565	To reinforce landing flap unit station O outer side plate,		
	A/C embodying repair scheme 70692 Sht. 03/12	4·37	244
	A/C not embodying repair scheme	1·27	62
1567	To provide drains for A.M.U. pitot static lines in fuselage	0·75	38
1568	To strengthen dive brakes stiffeners	1·4	77

TABLE 6A—(contd.). **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
1571	Flexible mounting for tail navigation lights	0·18	18·6
1579	To improve selection and parking of windscreen wiper	0·1	1·2
1581	To introduce Plessey Type Mk. 4 plugs and sockets on control panel	3	39
1582	To introduce pitot operated switch in VT, EM and EL fusing circuits. (Post Mod. 28 Aircraft)	1·6	103
1583	To provide static piping for Auto Pilot approach coupling unit	1	16
1584	To reduce gap between navigator's crate table tops	—0·16	—3·4
1586	To revise run of cables from K panel to battery platform	1·07	33·7
1588	To rerun static control piping to give greater clearance for camera control panel	—0·16	—3
1590	De-icing pipe between fixed and movable tail plane now fibre glass	—0·2	—19
1597	Packing washer behind cabin-to-fuselage attachments	0·16	3·6
1599	To tilt "gallons gone" indicators at 2nd pilot's panel	1·2	18
1602	To introduce Mk. 4 artificial horizon	3·5	38
1603	To strengthen air intake	0·8	33·8
1604	To introduce Mk. 17c regulator	1	13
1607	To change material of bomb door radius rod trunnion pin nuisance bar to mild steel tube	0·14	4·7
1608	To introduce air brake indicator	3·6	120
1609	To introduce holder for compass deviation card	0·13	1·5
1610	To provide protection caps to sockets on wing stalk junction box	0·15	9
1611	To provide for lighting of underwing nacelle	2	67·5
1615	To strengthen rudder and elevator servo mountings	0·59	47·2
1617	To introduce master light for power control motor warning lights (*Estimated Cable wt)	(3·1)* 5·2	 190
1619	To delete R.A.T.O.G. installation	—27·2	—1153
1620	To revise bomb release circuit to obviate N.B.C. signal operating bomb doors until main switch is selected AUTO	0·5	10
1623	To strengthen nose undercarriage downlock body	6·54	170
1625	To introduce main chassis door jack fitting 67407–9025/6	1·54	65·5
1626	To delete aircraft heating circuit	—23	—1304
1628	To provide testpoint in high pressure ducting	0·52	41·8
1634	To provide wiring for selection of V-g Recorder	1·1	42
1646	To strengthen hoist fitting in loft	0·1	1·6
1647	To secure fuel drains to fuselage skin	0·48	21
1648	To provide for and introduce the T.4 bomb-sight	252·83	9084
1650	To strengthen hydraulic pump mountings	0·32	8
1656	Introduce accelerometer 6A/3451	1·4	16·8
1662	Stop plate for control release lever	0·1	1·1
1663	To increase thickness of Neoprene di-electrics	0·74	38
1665	Wiring for fire detector at 15th stage engine vent	2·9	132
◀1669	To provide fire detection and protection for bomb-bay forward servicing bay	30·172	1448▶
1673	To delete V.S.A. from aircraft Removable Fixed	—247·3 —94·5	—3776 —1499
1674	To strengthen attachment lugs of rib cooling ducts in engine doors	0·1	4
1675	To strengthen attachment of bottom angles to outboard side plates of No. 3 flap units	0·1	5·5
1676	Stainless steel shroud for the air thermometer bulb	0·1	3·3
1680	To introduce strengthened pitot head Mk. 9b	0·5	28·2
1681	To introduce choke valves	0·17	4·6
1682	Adjustable gap plate for jet pipe outer shroud joint	0·44	23
1688	Nylon net to support sound-proofing	0·13	2·2

Table 6A (*continued*)

No.	Title	Weight change (lb.)	Moment change (lb. ft.)
1 690	Copper gasket for flap gearbox main motor clutch assembly	0·1	3
1 692	To improve load distribution at sextant station boundary member	0·24	4·3
1 695	To introduce pressure control switch A5738-Sht. 1	0·1	2·7
1 699	To reposition chassis door sealing strip	1·2	62
1 701	To reposition chassis door sealing strip	0·06	3·4
1 706	Felt seal between flap gearbox and emergency motor	0·18	9·7
1 708	To stiffen tailplane fairing flaps	1·95	191
1 709	To introduce frame liners at stringers 21, frame 893 and stringers 22 and 23 frame 923	0·1	7
1 710	To reposition contactors and start units for hydraulic pump motors from starboard servicing bay to loft	23·36	606·5
1 711	Swaged ends in lieu of sweated ends on Bowden cables operating cabin door	0·1	1·6
1 712	To insulate H2S units in organ loft	1·4	35·0
1 713	To provide a heat shield over radio cables	1·08	22·7
1 720	To improve sealing of inner and outer plane joint front spar	0·15	5·8
1 724	To delete 90° outlet to brake unit on rear starboard bomb door motor	−0·08	−1·7
1 726	To provide label for circuit breaker panel in battery bay	0·1	3·3
1 734	To provide locking plate for tailplane screwjack end-nut	−0·25	−24·5
1 741	To improve removal of D.F. loop container and di-electric cover	1·41	44·6
1 749	To provide secondary lighting of fuel panel	2·71	37·5
1 751	To reposition rudder and elevator manual idler levers at Stn. 734	—	−2·4
1 753	To revise and reposition the aileron feel unit ducting brackets at Stn. 853	0·74	52·7
1 756	To make structure provision for R.A.T.O. installation on inner plane	109·1	5 675·3
1 769	To introduce float type N.R.V. to fuselage pump housing vent	5·6	241
1 778	To add parachute support and retaining clips	5·8	102·1
1 780	Door in bomb bay roof	3·7	254
1 783	Anti-vibration block for A.R.I.5851 waveguide	0·35	28
1 784	Anti-vibration mountings for N.B.S. resistance unit in loft	0·24	5
1 787	To introduce valve A5747 Sht. 1 in bomb bay heating system	0·38	18
1 788	To improve anchorage for air intake panel	0·5	16
1 789	To revise attachment of control panel in bomb-aimer's position	0·15	2
1 791	To improve guard at engine start relays to include cables	0·82	24·8
1 792	To introduce liners to frames and stringers Stn. 913 to 1033 between stringers 21 and 28, and frame and stringers Stn. 1054 between stringers 6 and 28 (Port side)	7·65	632·3
1 793	To reposition upper I.F.F. aerial to forward of dinghy hatch in lieu of aft		
	Pre-Amend. 1553	0·59	6·4
	Post-Amend. 1553	0·49	3·3
1 794	To introduce unifire red—7 cable in lieu of Dupren 6, Unipren and Uniglasil—9 on fire warning system in engine bays	0·1	5·5
1 796	To revise aileron hinge bracket " B "	0·1	6
1 797	To provide stowage socket in bomb door forward starboard radius rod	0·06	2·2
1 798	To sequence operation of closing and opening of P.R. bomb doors	1	63
1 799	To delete brackets for No. 1 Mk. 1 fuse units	−0·75	−30·5
1 800	To introduce A.S.I. Type K.A.B.1401 K.50/490 knots (6A/4380) and Mk. 9.GP. 50/490 knots (6A/3146)	0·35	4·6
1 801	To reinforce elevator skins	1·7	172·7

Table 6A (*continued*

No.	Title	Weight change (lb.)	Moment change (lb. ft.)
1 805	To provide a main circuit breaker in camera supply feed	4·5	120
1 807	To introduce 2nd warning point for GEE/H Mk. 2 installation	12·54	260·9
1 808	Physical stops on aileron	1·1	70·5
1 809	Physical stops on rudder	0·62	61·4
1 810	To provide negative switching (elevator trim tab)	4·4	232
1 813	To provide negative switching system for rudder trim actuator	0·7	35
1 814	To provide negative switching system for aileron trimmer actuator	1·2	59
1 818	Compass repeater at bomb-aimer's position	4	73
1 824	Longer eye bolt to operating shaft	0·21	11
1 828	To provide remote switch of GEE/H Mk. 2 R.F. Units	4·3	89·4
1 830	To reposition transfer tank contents gauge rectifier unit	0·7	44·7
1 831	To delete type 4274 (10AJ/598) mounting for IFF Mk. 10 aerial switch unit	−0·25	−5·2
1 833	To introduce locking plate for flap telescope tie rod attachment bolts, No. 1 and 5 units	0·3	15·4
1 835	Crimped in-line connections at wing break joint Stn. 93	0·73	38·5
1 837	Wiring for camera door position indicators	0·8	50·7
1 838	To provide strengthening cleat for feel unit mounting adjacent to elevator auto-pilot servo-motor	0·1	7·7
1 840	To introduce Pressure Relay Valve A.C.M. 18570 or 18798	0·1	2·4
1 843	To introduce S.P.E. Recuperator P.R.C. 60A Mk. 2	1·54	63·7
1 845	Type 35 controller and camera pulse indicators at bomb-aimer's position	8·77	176·4
◀1 850	To introduce rollers to bomb door bogie slippers	−8·72	−445 ▶
1 855	Steel tube for rudder and elevator input stops	0·66	47·1
1 858	Steel outer sleeve for assembly of refuelling valve selection actuator	0·6	12·8
1 860	Non-return valve 67438 Sht. 225 in de-icing and cabin pressure system	0·1	2·5
1 861	To provide check washers on equiflex mountings of various radio units	0·52	11·3
1 864	To change pipe clips for tailplane screw jack oil pipes	0·13	12
1 865	To provide lock for cabin entrance door	0·45	7·7
1 868	To introduce improved brake roller carrier assembly	−0·06	−3·2
1 876	To reposition plug/socket for bomb-bay tank	0·2	9·7
1879	To delete special bolt 66003-1003	0·1	3·6
1 880	Steel outer sleeve for assembly of refuelling valve selection actuator	0·15	8·5
1 882	Plessey Mk. 4 panel mounting coupler plug and socket on bomb bay side wall to facilitate quick interchangeability of camera roles	2·1	147
1 888	Longer connector from bulkhead to NBC resistant unit	0·35	8·4
1 889	To stiffen intercostal members in lower fin	0·55	50·7
1 894	To improve cabin door jettison mechanism	0·13	2·1
1 900	To record Boulton-Paul Mod. P.107 (Mod. 18 to rudder-elevator power control unit)	0·5	42·7
1 901	To reposition contactors and start units for hydraulic pump motors from starboard servicing bay to loft	1·33	31·5
1 902	To introduce Teddington FLP/A/5 pressure relief valve for bomb-bay tank	0·1	4
1 907	Drain taps in differential pressure ratio switch pipelines	0·36	11·1
1 911	To introduce rudder trim tab 70623 Sht. 65	0·18	19
1 913	Anchor nuts for fuel pipe conduits beneath jet pipes	0·1	5·3
1 914	To record introduction of Boulton-Paul Mod. P.107/Mod. 19 to rudder-elevator power control unit	0·13	11·4
1 917	To introduce non-return valve 67438 Sht. 223 for de-icing and cabin pressure system	0·43	19
1 918	To introduce ducts Part No. 70655—161/162	4	156·8

Table 6A—contd.

No.	Title	Weight change (lb.)	Moment change (lb. ft.)
1 919	To introduce fire extinguisher push button 5CW/5763 and associated test push switch 5CW/5057	0·15	1·7
1 920	To introduce elevator trim tab 70620 Sht. 25	0·15	15·4
1 925	Larger conduit for cables between port coaming and console	0·1	1·2
1 926	To introduce rudder balance tab 70623 Sht. 67	0·23	24·5
1 927	To introduce elevator balance tab 70620 Sht. 27	0·4	41·3
1 932	Mounting for ballast in nose	446	1 615
1 934	Cabin: To provide steadying handles	2·78	40·1
1 939	Detachable stowage for jacking pads	3·63	303·1
1 942	To introduce air spoiler indicator	1·9	42
1 951	Brackets and fittings reinforced Stn. 833 to 1054	3	228
1 955	To introduce landing flap torque shafts 67407 Sht. 1043/1049	0·2	11
1 962	To provide packing to flap units No. 3, 4 and 5	1·46	86·3
1 968	Deflector added to crew seat	1·64	30·5
1 974	Improved runs for electrical cables	6·04	211·3
1 975	Thiocol compound for sealing in cabin	—0·3	—5·7
1 977	To reposition joints in pressure refuelling pipes behind rear pressure bulkhead	1·47	33·7
1 978	19 s.w.g. skins for No. 2 and 3 flaps	72·3	4 310
1 980	To provide wired plug stowage for protective relay supplies of bomb circuit when relay is not fitted	0·14	7·6
1 984	To provide protection for No. 11 explosive bolts in coaming of cabin canopy	0·2	2·9
1 988	A.V. mountings for heading selector unit	0·1	1·3
1 991	To improve operation of oblique camera gear assembly	—1·26	—80·8
1 992	Additional vent and pump drain lines to bomb-bay tank	1·3	57·6
1 994	Dog clutch and dog clutch plates in S106	0·1	5·4
1 998	A.V. mountings for Heading selector unit	0·1	1·3
1 999	Drain for pump glands of bomb-bay tank	0·2	6·7
2 000	To introduce physical stops for the elevator trim tab	0·86	85·4
2 004	To revise hood detonation circuit	7·25	112·5
2 006	Master light for power control motor	3·2	95
2 009	Larger cable for B/A control	0·5	6·5
2 012	To introduce the refuelling-in-flight probe	38·34	—136·32
2 014	Rudder tab operating shaft in L/E	0·21	21·7
2 015	To improve ventilation duct slide, Zone 3	0·7	40·8
2 019	To introduce spark suppression equipment for torque switch EAP.2312	0·5	9·7
2 023	Improvements in cabin heating and window de-misting	3·77	50·9
2 024	Introduce AGS 1174 bleed screw	0·1	5·1
2 027	Static piping for pressure ratio switch	0·45	24·3
2 028	20 s.w.g. skins for ailerons	2·02	128·3
2 029	Increased gauge shroud stiffeners and butt straps for top fin	0·54	53·7
2 035	To introduce underwing tank pump motor fuses and to provide stowages for either underwing tank or nacelle fuses, dependent upon aircraft role	Not available	
2 037	To introduce H.L. altimeter Mk. 6A	0·7	19·3
2 042	Provide isolation of camera supplies	1·4	91·7
2 043	To introduce duplicate ratio selector reset push and warning light and revise working for door selector switch and power supply at bomb-aimer's position	1·2	20

Table 6A—contd.

No.	Title	Weight change (lb.)	Moment change (lb. ft.)
2 049	To introduce air spoiler indicator	0·3	4·1
2 052	To strengthen flap unit adjacent to flap indicator transmitter	0·23	14·5
2 055	Common piping and fittings for bomb bay tank	11·5	585
2 057	To obviate automatic operation of flood flow system when depressurising at altitude	0·6	12
2 062	To introduce autopilot indicator on centre panel	3	41
2 063	Cables re-run to rear B/D radius rod blocks	0·4	23·6
2 069	To introduce improved balance tab adjuster rod	0·65	68·1
2 071	To provide secondary lighting of fuel panel, etc.	3·05	40·5
2 080	12-amp. cable for engine start master and extreme emergency chassis switches	—0·75	—10·4
◀ 2 083	To provide illumination for fuse panels D and E	1·4	18·3 ▶
2 084	To introduce magnetic indicator 5CZ/5074 in lieu of C.5165Y Mk. 23 and to revise hydraulic electrical system circuit to show when pumps are running	0·4	10·6
2 085	Double-pole switching for rudder and aileron feel trim circuits	2	70
2 086	Vortex generators forward of ailerons	2·23	123·7
2 089	To introduce double pole switching and additional relay for control lock/power control circuits	3·97	102·7
2 090	To provide bolt keeper for I.F.L. chimney and No. 3 hoist point covers	0·33	18·3
2 093	To introduce seal 70679 Sht. 9 for window chute	—2·76	—88·3
2 094	To provide platform for rear camera fairing (Day role equipment)	24·3	1 581
2 095	To provide modified brackets for camera reco. sight	0·16	2·2
2 096	To provide fore-and-aft level and label in nose compartment and label for level at Nav's station and stowage for protective covers of camera sight	0·55	6·8
2 097	Fore-and-aft level and label in nose compartment and label for level at Nav. Station	0·64	8
2 098	To revise ratio selection of the tri-camera and survey camera installations to a rate of 1-1, 4-1, 8-1	0·4	7
2 099	To provide pilots' survey camera indicator	0·44	5·1
2 105	To provide fuel and vent piping in bomb bay	0·34	17·1
2 107	To provide a heater muff around the wing air/nitrogen reducing valve	5·81	262·1
◀ 2 108	To strengthen and provide additional attachments for de-icing and cabin pressure system pre-Mod. 925	17·9 (pre-Mod. 108) or 26·1 (post-Mod. 108)	1 153 1 638 ▶
2 116	To provide special bolts for F.52 camera mountings	0·2	10·3
2 118	To introduce A.S.I. Type K.A.B. 1401.K 50-490 Knots for 2nd pilot	0·1	1·3
2 119	New connectors for A.R.I.5874	1·1	25·3
2 122	To provide pilot's indicator for survey camera (Removable equipment)	1·2	31
2 123	To improve tail-plane incidence control selection system	4	103·6
2 125	To improve air intake forward expansion joint	1·48	57·4
2 129	To strengthen fixed tail plane anti-icing plates	0·36	32·9
2 131	To introduce steel fuel vent brackets	0·69	54·9
2 132	To strengthen the operating mechanism of starboard escape hatch	0·32	5·9
2 158	To introduce sight mounting support	—1·14	—15·1
2 163	To introduce rudder 70623 Sht. 77 with increased gauge thicknesses	56·31	5 639·4
2 164	To introduce probe de-icing pump AC. 13002	0·41	0·8
2 166	To blank off front two camera windows, P.R. bomb-bay doors	—64·8	—2 530
2 168	Dust shields for tail plane port hinge	0·1	7
2 174	To cleat rudder tip stiffeners	0·4	42

TABLE 6A—(contd.). **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2178	To revise source of static supply and re-run associated piping to sylphon unit	−2·35	−43
2181	To introduce elevator and rudder torque limiters	7·04	507·7
2183	To introduce wing de-icing overheat control	5·46	194·8
2188	To introduce rheostat Type L.50 for bomb-aimer's de-icing pump	0·2	2·2
2189	Improved clamp ring, nose oleo shimmy damper		
	(a) Salvage scheme	0·52	12·9
	(b) Production scheme	0·18	4·4
2190	To introduce relay for radio compass switching	2·9	70
2192	To introduce water extractor to cabin pressure system	18·66	468
2195	To introduce 2-way terminal block in bomb-bay roof to facilitate removal of forward lamps when fitting bomb-bay tank	0·15	6
2197	To introduce heat shields BA.94605 and BA.94604 in lieu of BA.52731 and BA.52723	−0·56	−25·65
2198	To stiffen intercostal members forward of lower fin front spar	0·14	12·9
2211	To increase clearance between electrical cables, front spar below air intakes Part (a) Production	0·214	8
2212	To provide test point in high pressure ducting	0·52	41·8
2216	To introduce N.B.C. control unit X6223	6·4	132·7
2217	To provide a deflector for oblique camera windows	0·5	32·2
2218	To introduce zero reader Type 212	16·4	−62·5
2221	To improve movement of rudder lock	0·1	10·2
2223	To introduce Simmons pacitor equipment for bomb-bay tank	4	151·8
2229	To obviate feed back into bomb gear from camera control	0·96	32·5
2232	To introduce Teddington flasher mechanism (Ref. No. 5CZ/5134) for navigation lights	2·5	52·9
2236	To extend upper edge member of door in dorsal fairing	1·07	91·6
2240	To revise generator and rotary transformer circuits	−2·5	−67·5
2246	To reduce thickness of distance plates on fusing unit mounting bracket 67479 Sht. 723	−0·07	−2·8
2252	To introduce autostabilizer Mk. 2	20·5	707
2254	To cleat stiffeners and butt straps on starboard fin shroud	1·1	109·3
2257	To add extra microswitch on main undercarriage	0·97	40
2258	To provide earth leads for P.R. bomb doors	0·3	10·3
2259	To introduce a crash switch in generator circuits	7·35	188·6
2260	To revise 96v battery control switching	0·3	6
2263	To introduce improved auto-pilot coupling unit	−0·5	−7
2265	To provide de-icing gate valve	5·77	260
2267	To provide physical protection for the equalising busbar lines between the main generator contactors	0·25	8·1
2271	To change the external finish from silver to white	382	21850
2277	To introduce pilots' windows 67431-659/660 with thicker outer glass	3·1	36·3
2280	To introduce revised connecting plates and matching strips for impedance matching unit	0·25	6·9
2281	To reposition ration heater on rear of pilot's seat	0·08	1·2
2286	To provide a relay for V.H.F. switching	1·01	20·3
2292	To introduce a wind monitor for N.B.C. Mk. 2	17·9	365
2293	To introduce a bomb-bay pannier:—		
	(a) Adapter	239	11464
	(b) Pannier	415	19966
2294	To introduce a fuse tester for main fuse panels	0·9	18·5
◀2296	To provide facilities for reading fuel contents of bomb-bay tank	4·82	93▶

TABLE 6A—(contd.). **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2300	To re-run piping forward for blind flying panel	0·73	7·5
2304	To introduce additional oxygen reducing value	2·63	56
2308	To reposition bomb-aimer's pressure gauge	0·34	5
2309	To introduce additional reducing valve (Ref. No. 6D/1616) into oxygen system	1·73	34·2
2310	To provide separate release line to by-pass arming relay	0·43	14·7
2315	To introduce improved explosive-bolt guard	0·1	1
2328	To introduce valve plate 67450 Sht 77	—0·4	—20·3
2331	To revise electrical circuit and cockpit layout for R.A.T.O. installation	34·99	1102
2335	To introduce chest cushion for bomb-aimer	8·4	127
2340	To provide a deflector for fairing camera window	0·39	24·6
2341	To introduce crew chief's seat (a)	0·12	2
	(b)	21·23	341·3
2346	To improve cable run for relief valve	0·1	2
2353	To revise wiring to pilot's hand wheel	0·68	11·7
2356	Inner plane; to introduce reinforced fuel filter access doors	3·28	140
2357	To introduce dust caps for wing stalk plugs	0·3	14·7
2364	To prevent inadvertent operation of deflector	1·6	71·3
2369	To introduce water methanol tank	110	6380
2370	To strengthen rudder pedal adjustment guard	0·27	3·1
2374	To provide audio output from compass	1·31	21·7
2376	To provide separate fusing for 96-volt indicator	0·1	3·2
2378	To introduce bolt H2S control unit	0·07	1·5
2381	To introduce starter C6810	—8	—328
2385	To prevent operation of "window" dispenser when bomb doors or flash crate doors are open	1·59	35
2397	To make provision for calculator Type 7 Mk. 2A remote control unit	16·9	397 (pre-Mod. 1410)
		or	
		16·45	401 (post-Mod. 1410)
2398	To introduce Mk. 17D oxygen regulator	0·9	15
2400	To extend demisting of windscreen to cover centre panel	0·38	3·9
2403	I.F.F. Mk. 10; to make full provision for A.R.I.5848-D-2-P-7 and introduce control unit C1158/APX instead of C.629/APX-6	22·6	572·6
2404	I.F.F. Mk. 10; to introduce A.R.I.5848/D/3/P/7 by fitting T.R.4585 in place of R.T.82 or 279/APX-6, and by removing provision for barometric pressure switch	—26·2	—634·3 (pre-Mod. 2403)
		or	
		—9·1	—478·7 (post-Mod. 2403)
2407	To improve sealing of window stripper unit	0·26	8·4
2413	To improve deflector seal to photo-flash container	0·17	11·7
2414	To provide cooling air for V.H.F. equipment	9·5	757·1
2421	To introduce reinforced bleed valve duct 67438-1577 in lieu of 67438-955 and bleed valve seating flange 67438-1579 in lieu of 67438-953	1·1	47·7
2424	To provide and introduce roll error cut-out and mounting for Mk. 10 auto-pilot installation	11·14	184·5
2425	To provide jet pipe thermocouple fairleads	0·16	8·9
2426	To revise time switch firing circuit	0·8	16
2432	To introduce side windows 67431-247/8	1·32	18·5

TABLE 6A—(contd.) **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2433	To strengthen and provide attachments for cabin pressure system (pre-Mod. 925 aircraft)	9·74 (pre-Mod. 1918 or	391·4
		5·55 (post-Mod. 1918)	229·4
2434	To re-route flex drive of T4 bomb sight	0·76	9·8
2435	To introduce a drift smoothing cut-out switch		
	(a) To introduce D.S.C. switch	0·36	5·3
	(b) To make provision for D.S.C. switch	0·042	0·6
2437	To introduce UHF/AN-ARC-52 installation	119	2869
2440	To introduce an additional 2250 litre oxygen bottle: without charge	45·05	1125
	with charge	52·05	1300
2443	To provide a stand-by pump in transfer fuel tank	18·82	1126·8
2444	To make electrical provision for stand-by fuel pump in bomb-bay tank	2·2	55·6
2451	To alter bolts securing pilots' fuel panel	0·1	1·3
2454	To introduce ammeters for 24-volt and 112-volt circuits	2·84	58
2456	To introduce NBS/Bomb release isolating switches, test plugs for NBS test gear and 1000 Cylic signals and warning lights for bomb release and door opening NBS signals	0·9	18·4
2457	To delete wiring and indicators for engine failure warning system (a) Fuse indicator	−2·65	−61·9
	(b) Wiring	−5·35	−125
2463	To introduce auxiliary display unit	6·54	216·3
2464	To introduce resin-bonded paper clamps	0·29	24·8
2465	To strengthen bomb-bay roof at Stn. 673	0·07	3·9
2466	To revise wiring for under-wing tank selection	0·25	3
2467	To improve lighting	−0·52	8·4
2468	To provide steel reinforcing ring	19·46	997
2470	To introduce rubbing strips between bomb-doors and deflector	0·21	14·15
2471	To introduce a fabricated joint piece	1·05	93·1
2472	To provide additional jettison protection for bomb circuit	3·9	104·2
2473	Special equipment: To introduce stand-by fuel pump in bomb-bay tank	21·88	798·4
2483	To increase engagement of spigot on dinghy stowage	0·07	1·9
2484	To provide additional jettison protection for bomb circuit	7·29	228·3
2486	To provide facilities for ground conditioning of bomb bay	2	61·7
2489	To introduce Western ERJ. 60 Mk. 31 actuators for fuel cocks	3	130
2490	To introduce warning light for cabin over-pressurisation	1·4	25·5
2494	To introduce new A.R.I.5800 connectors	1·04	53·1
2498	To add reinforcing plate to No. 3 flap	0·2	12
2500	To introduce strengthened power control mounting	0·06	5·2
2512	To provide a support bracket for altimeter indicator	0·4	4·7
2514	To introduce Uniglaze 150 cable on chassis actuator	0·41	20·5
2521	To provide retaining cords for rear crew parachutes when seats are not occupied	2·5	43
2532	To provide anchorage for hoisting bomb-bay tank	0·73	27·7
2535	To introduce hydraulic pressure switch Teddington No. FPH/A/6	−1·47	−38·3
2537	To delete "H" function and warning point of the Gee H Mk. 2 installation	−147·76	−3290·3
2539	To provide a static line escape system for rear crew members	4·03	70·8

TABLE 6A—(contd.) **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2542	To introduce Green satin aerial di-electrics 70657 Sht. 53	0·06	4·7
2546	To reposition A.R.I.5800 auxiliary control unit Type 912	0·19	2·5
2550	Outer plane: To provide locking washer for flap telescope tie-rod eye and locknut	0·07	3·9
2551	Part (b): To improve sealing of scanner bonnet	0·71	4·7
2552	Cabin: To provide steadying handle	1·9	26·6
2553	To revise wiring of fuel system	0·17	8·8
2554	To reposition fuel system fuses	3·04	66·2
2557	To re-route flexible drive of T4 bomb-sight computor	0·05	0·7
2562	To introduce and make provision for an 18-way plug Type Z560392 to cater for alternative fit of A.R.I.5800 equipment	41·7	12·8
2568	Fuel system: To modify bomb-bay vent system	0·05	1·7
2570	To provide attachment points on bomb-bay roof for H.D.U. deflector supports	0·26	16·1
2573	To revise and reposition Day/Night control panel at Visual bomb-aimer's station	11·2	188·2
2575	Controls: B.P. Mod. P.108/Mod. 27	0·2	10·8
2577	Controls: B.P. Mod. P.107/36	0·18	14·7
2578	Rear fuselage: To introduce feel unit inlet 75829-19	0·21	18
2579	Fuel system: To introduce a N.R.V. aft of F.R. probe	1·79	4·3
2580	To make provision for and introduce a sensitive air speed indicator (6A/3360) in lieu of KAB1402 at 1st Pilot's position	0·1	1·4
2584	To separate hose jettison circuit from other wiring of hose drum unit	1·69	61
2586	To provide refuelling-in-flight probe lighting	3·4	15
2588	To make provision for lighting for tanker aircraft refuelling in flight, external	16·366	1020
2590	Special electrical equipment; to introduce external lighting removable equipment for Tanker B/K Mk. 1 aircraft	8·31	678·4
2593	To provide "steady" facilities for navigation lights	0·158	2·1
2594	To introduce a stronger fastener between "window" magazine and chute	0·5	16·1
2599	To introduce a Sangamo Weston type thermal ice detector	3·46	70
2600	(a) Special equipment: To improve operation of P.R. bomb-bay camera window sliding panel operating mechanism	1·23	61·9
	(b) To provide warning notice in bomb-gear trolley	0·88	43·9
2602	To improve operation of camera door in rear fairing	6·34	404
2603	To introduce (a) Longer attachment bolts	0·12	5·0
	(b) Packing blocks for start units (5CW/4401, 4399 and 5036) incorporating Mod. ELEC/B/227	1·16	30·6
2609	To introduce removable equipment for No. 1 Control Panel role	13·88	280
2610	To introduce removable equipment for 2000 lb. T.M.B.	15·31	309
2611	To render 10000 lb and 21 × 1000 lb stores removable	18·94	383
2612	To make provision for No. 1 Control Panel role, 2000 lb or 10000 lb. and 21 × 1000 lb stores	118·3	4595
2613	To introduce common removable equipment for No. 1 Control Panel role and 2000 lb. stores:—		
	No. 1 Control Panel store	401	19113
	2000 lb	305	14534
2614	To revise common piping for bomb bay tank to suit aircraft with Mod. 2612, 2645, or 2725	0·69	42
2618	To reposition oscillator tuning switch of radio altimeter Mk. 6A	0·03	0·6
2621	To provide additional support for aileron feel unit duct	0·27	22·5
2622	Outer plane: To strengthen gauze of vent pressure equalising assembly in chassis door	0·18	8·8
2628	To revise internal structure of bomb bay tank to improve sealing	25	948·75
2631	To make provision for and introduce BNA-3 nitrogen charging valve as an alternative to valve 6D/223	1·04	36·8

TABLE 6A—(contd.) **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2634	To introduce additional air bottle in underwing tank pressurization system and to isolate jettison system from pressurization system	2·4	97·7
2635	Main chassis: To improve operation of equalising valve in main air cylinder	0·7	35·4
2637	Rear fuselage de-icing: To reinforce flamestat mounting in fin ducting	0·05	4·0
2638	To provide for isolating tail navigation lights for flight refuelling	0·7	14·5
2639	To introduce seals 67450-733 and 735 in lieu of GACO "U" 725600 and "U" 206131 for H.P. air cylinder pistons	−0·36	−18
2643	To provide a stowage bag for "Jumper" cables for Pacitor system	0·13	2·5
2645	To make provision for alternative carriage of No. 1 Control Panel role, 2000 lb or 10000 lb and 21 × 1000 lb stores	118·3	4595
2646	To make provision for No. 1 Control Panel role, 2000 lb or 10000 lb and 21 × 1000 lb stores	118·3	4595
2647	To provide additional 12-way fuse block on navigator's crate "G" panel	1·17	23·9
2648	To make provision for and introduce relay 5CW/6853 in lieu of 5C/3944 in A.C. relay box, and provide against inadvertent loss of artificial horizon	◀0·281▶	6
2650	To introduce ammeter in the battery circuit 112V and 28V d.c. systems at A.E.O. position	13·96	395
◀ 2678	To reposition water/methanol control switch	0·597	7 ▶
2680	To provide contactors for fitting in generator field circuit	6·431	214·4
2681	Special equipment under-wing stalk: To delete under-wing store locating spigot from stalk	−0·73	−33·7
2684	To introduce pressure gauge to record flight-refuelling galley pressure	3·66	317·5
2688	To introduce tail plane incidence operating gear assembly 67429 Sht. 507	0·44	43
2689	To rearrange heavy-duty connections on bulkhead at Stn. 370	−0·34	−10·4
2690	To reposition H.F. aerial from fin to wing root	25·34	1867
2691	To revise aircraft wiring to suit Final Conference requirements of P.R. Night role panel	N.C.	18
2695	To introduce crew ration box	17·28	226
2696	To make provision for crew ration box	7·59	100
2699	To provide stowages for cups, etc., on refuelling-in-flight aircraft	0·59	7·2
2702	Special equipment: To introduce Night P.R. role camera indicator lights and flash-pulse indicator as removable equipment at V.B.A. station	0·71	8·7
2705	To revise run of refuelling-in-flight drain pipes in scanner compartment	3·24	30·65
2708	To provide anti-icing system indication for pilot	6·17	246
2710	To reposition ration heater, compass amplifier and cabin pressure switch controller terminal block on starboard side of cabin	0·53	10·55
2711	To reduce length of cable conduit at Stn. 693 for additional clearance of hose unit fairing	−0·13	−7·6
◀ 2715	To reposition water/methanol warning lights and to reduce the number off to two	−5·33	−273 ▶
2716	To provide additional earth connection for undercarriage earth blocks	0·1	5·1
2719	To introduce bomb-aimer's controller to make provision for drift smoothing cut-out switch	3·3	46·8
2720	To provide I.P. facilities for I.F.F. Mk. 10 installation	0·43	12·5
◀ 2722	To make provision for 48 inch lens F.52 camera as alternative to 36 inch lens (removable)	0·604	31 ▶
2724	To provide foot-walk along centre beam of night camera crate	6	303
2725	To make provision for alternative carriage of No. 1 Control Panel role, 2000 lb or 10000 lb and 21 × 1000 lb stores	118·4	4661
2729	To bring the electrical cables to the pilot's hand wheel outside of same and change them to Uniflexpren 6	0·7	8·4
2730	To provide rubbing strip on forward end of bomb-bay deflector and rear inner face of bomb-bay doors in flight-refuelling role	1·9	125

TABLE 6A—(contd.) Modifications affecting aircraft weight and C.G.

No.	Title	Weight change (lb)	Moment change (lb ft)
2734	Special equipment: To provide fuel drain from pump and control unit on H.D.U. to bomb-bay tank drains system		
	(a) Bomb-bay tank and H.D.U. fairing	1·91	88·3
	(b) Bomb-bay tank	0·06	2·3
2735	To make provision for and introduce a duel-feed oxygen coupling and oxygen hose assembly in lieu of Mk. 4 system, and to provide a stowage	—6	—98·08
2738	To provide grease nipples for flap telescopic tie-rod eye ends (pre-Mod. 1746 aircraft)	1·03	60·24
2741	To make structural provision for A.R.I.5922	125·33	11031
2742	To make provision for A.R.I.5924	105·05	2110
2743	To provide anti-vibration mounting for low level altimeter power unit, and reinstate di-pole aerials	1·25	112·8
2744	To provide anti-flash screens for crew (a) To make provision for	8·422	101
	(b) To introduce screens	7·548	92
2745	To strengthen cold air inlet and duct to de-icing mixing chamber in rear fuselage	1·0	81·8
2748	To make provision for forward throw indicator in N.B.C. installation	0·99	20
2750	To reposition V.H.F. radio in pressure cabin and introduce aerial system Type 12535 and regulator Type 60	17·83	—3604
2754	To introduce a fuel/range computor and stowage		
	(a) Computor for aircraft without underwing tanks	0·25	3·3
	(b) Computor for aircraft with underwing tanks	0·25	3·3
	(c) Common stowage for both computors	0·678	8·9
2755	To make structural provision for carriage of special container "A"	36·895	3356·4
2756	To provide grease nipples for flap telescopic tie-rod eye ends (post-Mod. 1746 aircraft)	1·21	70·1
2757	Elevator inboard ribs of 22 in lieu of 24G.—pre-Mod. 1801	0·708	67·8
	post-Mod. 1801	0·616	59
2758	To reverse pins A and P on No. 3 socket in cable for No. 1 Control panel role, and wire pins R and S on 18-pin plug/socket between FCU and PRU for 2000 lb store	0·1	5·3
2759	To revise electrical circuits introduced by Mod. 2612, 2645, 2646 and 2725	8·77	461
2764	To reposition roll error cut-out detector mounting and reorientate unit to suit repositioning of V.H.F. equipment in cabin	—0·33	—5·7
2766	To introduce aileron feel unit duct with sliding joint 70653 Sht. 103 in lieu of duct 67433-433	0·372	76
2773	To introduce removable equipment for special container "B":—		
	B.D. Role	23·83	806
	T.M.B. Role	23·83	1459
2779	To reposition aileron power unit cooling air intake	1·44	78
2783	To introduce flying control seals in Silicone coated glass cloth	—1·01	—83·4
2784	To introduce magnetic indicator for underwing fuel pump motors	0·26	3·04
2785	To make provision for 30-amp. fuse in lieu of 40 amp., for N.B.C. 112-volt supply	—0·25	—5·6
2787	To provide additional terminal blocks on "G" panel	0·632	12·9
2788	To provide separate static vent for height lock of Mk. 10 auto pilot	1·317	16·5
2790	To introduce pawl operating handle for underwing tank (73379 Sht. 559)	0·6	32·2
2791	To make provision for and introduce E.2B compass, Ref. No. 6B/2754 (2 off) in lieu of P.12 (1 off)	—2·4	—28·7
2793	To introduce a 250-amp. fuse and reposition same to battery compartment floor	1·59	54
	P.R. Types only	2·56	85
2794	To provide separate earths for engine relight relays	0·02	0·55
2796	To provide power supplies for A.R.I.5922 and A.R.I.5924	100·3	5354
2799	To introduce a stowage for emergency oxygen cylinder pin	0·138	2·5
2801	To introduce "window" chute extractor:— Interim Scheme	1·38	44·6
	Final Scheme	—0·87	—28
2804	To revise attachment of T.4 bomb-sight computor to aircraft mounting	0·46	6

TABLE 6A—(contd.) **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2805	To introduce an additional oxygen regulator Mk. 17D	8·77	117·6
2808	To provide ram air cooling for electrical cables forward of spar adjacent to Stn. 93		
	pre-Mod. 486	10·474	458
	post-Mod. 486	10·834	472
2813	To provide a more positive seal for "window" chutes	4·18	134
2817	To introduce contactor in lieu of relay 5CW4377 in generator field circuit	—3·69	—106
2818	To introduce separate switch control for bomb-bay tank refuelling valve, to provide independent refuelling facility	1·113	38
2824	Parachute support cushion to crew seats	9·186	165·4
2828	To introduce visual warning sign "Abandon aircraft" to rear crew members		
	Part (a)	14·652	187
	Part (b), (c) or (d)	14·63	187
2833	To make provision for Mk. 1B fatigue meter	6·41	240
2836	To reposition temperature sensing unit in bomb bay	0·082	4
2840	To introduce accurate voltmeters in generator and rotary transformer circuits	1·2	22·8
2841	To introduce power failure indicator and manual change-over switch in artificial horizon power supply; also phase failure indicator into the G.4B compass supply	4·65 (pre-Mod. 2840) or 4·5 (post-Mod. 2840)	97 94
2842	To introduce shorting plug and stowage at No. 6 bomb station	0·481	29
2846	To revise material of connecting rods in elevator balance tab mechanism	2·907	293·4
2847	To revise common piping for bomb bay tank to suit aircraft with Mod. 2612, 2645 or 2725 (further to Mod. 2614)	5·765	262·47
2849	Inner plane spar repair scheme		
	Outboard front, each side	11·47	447
	Outboard rear, each side	6·8	357
	Inboard front, each side	6·12	238
	Inboard rear, each side	6·57	345
2851	To revise mounting bracket for F.49 camera installation to make provision for camera mounting Type 125	0·618	39
2852	To reposition integrated wiring cable stowage (Mod. 2612 and 2725) from spar stabilizer to floor to facilitate fit of refuelling piping	—0·1	—6
2853	To provide a drain in the flight refuelling probe pipeline in scanner compartment	2·62	11
2857	To improve cable clipping for rudder, elevator and aileron servo units	0·11	9
2858	To revise locking of No. 4 flap unit guide roller end caps	0·413	6·93
2859	To revise cable ducting in bomb bay starboard side wall to cater for additional cables	2·9	118
2864	Modified trunnion pin on nose wheel door master hinge to reduce load on lugs	0·28	5·8
2865	To make provision for control unit T.12558 in the N.B.S.	13·36	259
2866	To make provision for and introduce control unit T.12580 in the N.B.S. and delete control unit T.6223 (R.A.R.I.2381)	—0·3	1
2867	To reinforce attachment of No. 3 telescopic rod at No. 3 flap unit	0·63	35
2871	To revise external night lighting system:—		
	pre-Mod. 2638 (Type 706, 710, 733 and 758)	3·85	317
	post-Mod. 2638 (Type 758)	4·66	332
2874	To provide additional intercommunication facilities	17·22	364

TABLE 6A—(contd.) **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2876	To provide emergency lighting in rear of cabin for crew escape	3·349	49
2877	To reposition depressurization cock to within reach of seated crew for escape	2·001	46
2878	To provide seat locking in rearmost position at A.E.O's seat for crew escape	2·222	43
2879	To provide lock release lever on centre of centre seat and to provide fully-aft locking. Also to revise locking of nav/radar seat for crew escape	5·697	141
2885	To strengthen guard to A.R.I.5851 wave guide	1·19	96
2889	To revise entry and exit of double skin in engine air-intake for anti-icing	−0·6	−19
2890	To remove double skinning at engine intakes	−18·36	−604
2899	To provide independent cooling for the amplidyne generator unit in H2S scanner bay	1·97	12
2900	To remove the azimuth ballast resistor units from H2S scanner bay and reposition them in pressure cabin	3·52	39
2906	To revise camera control circuit to pre-pulse indicator to cater for either negative or positive prepulse switching (removable equipment)	1·52	26
◀ 2907	To revise mounting of Grimes Beacon in tail cone	5·166	555 ▶
2908	To install cocking test facilities when using E.M. jettison unit in conjunction with heavy store release slip	1·28	61
2920	To introduce side stay forward end with increased bend radius—Pt. No. 751-67450 in lieu of Pt. No. 66050 (further to Mod. 2468)	0·84	41
2922	To standardize the radio V.H.F. installation when provision is made for V.H.F. under Mod. 2437	2·32	35
2925	To uprate wiring and associated fuse for radio D.C. supplies from Panel Z to Panel G to cater for the introduction of additional equipment	0·318	7
2929	To introduce tail plane anti-icing system diffuser duct with strengthened vane	0·26	19
2933	To revise sensing control of 112-volt generator to aircraft bus-bar and layout of 112 and 28-volt control panel	3·38	91
2934	To introduce fuse protection of 28-volt system between output side of rotary transformer and 28-volt bus-bar	4·57	125
2935	To revise camera control circuit for pre-pulse indicator to cater for either negative or positive prepulse switching (fixed equipment)	0·25	4
2939	To introduce spraymats for engine intake guide vanes	10·38	296
2940	To revise hot air supply to the feel pitot air intake at base of fin	0·39	37
2941	To reposition wind monitor in N.B.S. installation, further to Mod. 2292	−0·51	−11
2945	To provide aircraft wiring to cater for introduction of fire bottle detonators Ref. 12K/1306 and 1307 in lieu of Ref. 12K/1248 and 1249 in fire bottle installation	16·54	402
2947	To increase clearance between engine control bracket and engine	1·365	63
2954	To strengthen chordal members in area of lower fin	16·19	1512
2958	To revise interim version of Mod. 1500 to cater for Mod. 2218	2·006	42
◀ 2960	To make provision for carriage of spares and equipment in tanker aircraft—fixed fittings for 4,000 lb fairing pannier	23·18	1131 ▶
2961	To introduce a removable folding seat for use by crew chief whilst aircraft is in flight	7·5	120
2986	To introduce pressure bung in fuel pump motor cable conduit in underwing tank (per tank)	0·75	35·6
2989	To reposition and reorientate tail plane incidence motor change-over switch		
	Part (a) pre-Mod. 2331	−0·475	−5
	Part (b) post-Mod. 2331	−0·314	−6
2992	To introduce morse key Type 51 in lieu of Type F	0·16	4
2993	To tap the stand-by fuel pump gland drain into drain system for bomb-bay tank	0·176	6·4
2994	To introduce nozzle Mk. 8 and adapter in lieu of nozzle Mk. 6 and probe unit		
	pre-Mod, 2705	0·125	−66
	post-Mod. 2705	1·54	−65

TABLE 6A—(contd.) **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
2996	To introduce a release lock with cockpit indicators	44·19	1620
2999	To revise aircraft wiring	22·25	450
3000	To provide waterproof sealing glands for sockets in main and nose actuator systems	0·163	6
3003	To introduce additional indicator at Nav./Plotter position, for oxygen regulator in bomb-aimer's prone position	0·131	3
3004	To reposition water methanol switch at starboard side of top instrument panel and delete R.A.T.O. thrust indicators in aircraft post-Mod. 2331	—0·894	—10·6
3007	To make provision for and introduce additional rudder balance weights	12·86	1366
3008	To make provision for increasing elevator balance weights (per aircraft):—		
	(a) Interim	5·02	506
	(b) Final scheme	8·85	861
	(c) Conversion from (a) to (b)	3·83	355
3009	To introduce front bulkhead and nose ring casting in aluminium alloy in lieu of magnesium in underwing tank (per aircraft)	4·85	167
3012	To revert aircraft to pre-Mod. 1915 out-of-trim indicator in elevator control run	—0·81	—69
3019	To provide fire detection and protection for bomb bay and forward servicing bay	36·41	1707
3021	To introduce guide blocks to the fixed link for under-wing tanks	1·652	78
3022	To introduce baffle plates and P.V. covering for electrical cables to standard finish	10·8	661
3025	To introduce additional balance weights on the outer ailerons (per aileron):—	5·205	328
3027	To make provision for fitment of cable loom between simulator and practice bomb carrier	0·293	17
3029	To introduce resistors in hood detonator circuit	0·341	6
3031	To reposition NBC bomb gear isolating panel and cabin altimeter	0·2	5
3032	To provide an I.L.S. indicator on port instrument panel	2·53	28
3035	To make provision for pressure regulating valve FRK/A/28 in anti-icing system	—33·16	—1509
3037	To revise ducting to engine intakes to increase hot air supply to intakes and delete wing supply	63·1	2081
3042	To revise locking of eyebolt in telescopic tie-rod of landing flap units	—0·1	—6
3046	To introduce revised attachment plate for securing type 123 camera mounting to night camera crate	—0·24	—12
3049	To modify u/w tank pump assembly, deleting pressure relief valve in Rotax motor, adding Mod. plate and resistance label	0·125	5
3052	To introduce N.B.S. pulse relay 5CW/6853 with improved contacts in lieu of relay 5CW/3945	0·762	16
◀ 3053	To introduce a Mk. 8A in lieu of a Mk. 6 coupling in tanker hose assembly (Removable)		
	Part (a) pre-Mod. 1053	3	184
	(b) post-Mod. 1053	5	307 ▶
3055	To introduce a guard for N.B.S. gyro unit Mk. 6	7·07	41
◀ 3058	To reposition fuses and introduce crew control switches for manual feel unit heaters	4·375	85 ▶
3065	To make provision for carriage of spares and equipment in tanker role aircraft. Removable equipment Pt. (b) 1000 lb pannier	414·5	18962
3068	To introduce generator type 551, 5UA/7440 in lieu and by conversion of 5UA/5505	9	391
3073	To introduce tail plane anti-icing system diffuser duct with strengthened vane, Pt. No. 70682 Sht. 159	3·711	320
◀ 3074	To provide access panels to spar joints		
	Part (a) Front and rear spar top and bottom	3·579	164
	(b) Front spar only outboard of Stn. 93	8·42	328
	(c) Front spar outer joint of Stn. 93	0·982	35
3075	To incorporate a detachable lower portion of fin anti-icing duct		
	Part (a) Aircraft with Com. Mod./Val/94	0·69	62
	(b) Aircraft without Com. Mod./Val/94	2·182	195 ▶

TABLE 6A—(contd.) **Modifications affecting aircraft weight and C.G.**

No.	Title	Weight change (lb)	Moment change (lb ft)
3077	To introduce improved material anti-flash screens for crew		
	post-Mod. 2744 (a) and (b)	0·843	10
	post-Mod. 2744 (a), pre-Mod. 2744 (b)	8·391	102
3082	To introduce cannister assembly 5004192 in underwing tank pump assembly (per side)	0·05	2
◀ 3087	To make provision for and introduce a quick-release Sim-Start connection, 112V system	46·11	1313
3088	To make provision for and introduce a 28V ground supply quick-release connection	25·68	701
3089	To make provision for and introduce a quick-release Telebriefing socket	7·99	319
3090	To make provision for and introduce a true airframe earth connection	0·868	25 ▶
3093	To make provision for and introduce sensitive airspeed indicator at 2nd pilot's position	0·38	4
3094	To introduce an engine overheat warning system		
	(a) pre-Mod. 1756 and 2331	9·43	312
	(b) post-Mod. 1756 and 2331	8·18	279
3095	To revise clipping of firewire	0·087	4
3096	To delete the P.E.J. wiring	−0·864	−39
3097	To introduce main wheels AH52020	12·8	640
3103	To revise fire detection piping in bomb bay further to Mod. 1669 and 3019	1·875	62
3105	To revise external finish of engine doors, areas to D.T.D.900/4740	−0·69	−32
3106	To introduce additional straps in bomb-bay roof for release safety lock cable	0·151	7
◀ 3107	To make provision for a M.L. quick-release connection in the aircraft cabin air conditioning system	13·02	247
3109	To provide Eureka audio output to Air Electronics Officer's position	0·268	5 ▶
3116	To revise hinge arms for rudder to cater for renewal of hinge bearings	0·08	1
◀ 3118	To strengthen bulkhead plate in firewall assembly on rear main engine door		
	(a) Starboard inner assembly	0·425	18
	(b) Starboard outer assembly	0·617	27
	(c) Port inner assembly	0·627	28
	(d) Port outer assembly	0·617	27
3127	To prevent inadvertent loss of flood flow cooling air discharge cover	−0·146	−2
3128	To provide security of attachment for V.H.F. aerial connector to aerial Type 12535	0·03	0·6 ▶
3132	To introduce a pressure relief valve to prevent excessive pressures in engine intake structure	31·2	1410
◀ 3135	To introduce hand fire extinguisher Ref. 27N/299 in lieu of Ref. 27N/70	14·7	241
3140	To introduce an improved periscopic sextant mounting Mk. 1F in lieu and by conversion of existing Mk. 1A	0·125	2 ▶
3142	To provide an earthing point for servicing use	0·169	6
3160	To introduce matt black finish of bomb bay for PR aircraft engaged on PR duties	22·52	1165
E.C.4	To revise main fuel feed pipe fun to cater for engines with air bleed	0·5	21·2
E.C.6	To provide a rear bearing cooling air duct support bracket	0·71	31·2
E.C.7	To reduce size of engine starter cables and lug	−1·8	−57·3
E.C.8	To delete bracket introduced by E.C.6	−1·42	−68
E.C.11a	To provide cover for positive connection of engine-starter leads (pre-Mod. E.C.7)	0·73	33·4
E.C.11b	(Post-Mod. E.C.7)	0·86	39·4
E.C.13	To record introduction of Avon 204 engine	104	4764·8
E.C.15	To make provision for the introduction of Avon 205 engine and thereby form Avon 20501 E.C.U. (covered by Avon Mod. 1267) combined figure per aircraft—see also airframe companion Mod. 343, 862, 1118 and 2369	84	3988
E.C.16	To improve rear bearing outlet duct (aircraft incorporating Mod. E.C.6)	0·74	35·8
E.C.17	To improve rear bearing outlet duct (aircraft incorporating Mod. E.C.8)	0·44	20·1

TABLE 6—A(contd.) Modifications affecting aircraft weight and C.G.

No.	Title	Weight change (ft)	Moment change (lb ft)
E.C.28	To delete starter cable heat shield and clamp, Pt. No. 67437–169 and 171, from E.C.U. (See also Avon Mod. 2066)	—0·684	—29·4
E.C.29	To introduce an engine overheat warning system		
	(a) pre-Mod. E.C.8	5·632	272
	(b) post-Mod. E.C.8	5·288	256
VAW/PC/3	To introduce identification plate on flare hoist beam assembly to ensure correct assembly of the 2-way butt connectors	0·05	3·16
J.P.10	To revise channel support for jet pipe expansion roller	0·762	44
J.P.11	To delete circumferential stiffeners of jet pipe double-bubble section	—8·16	—430

◀**Note . . .**

*From the date of this A.L. no addition will be made to this table. For details of weight and C.G. change of future modifications reference should be made to A.P.*4377A, *Vol. 2 leaflets.*▶

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