

Code No.	Title	Previous designation
101B-1703-1B	Aircraft servicing manual	A.P.4267E, /ol. 1
<i>Issued in three books as follows:-</i>		
101B-1703-1B1	Sect.1 to 5	A.P.4267E, V1.1, Book 1
101B-1703-1B2... ..	Sect.6	A.P.4267E, sl.1, Book 2
101B-1703-1B3... ..	Sect.7 to 9	A.P.3267E, sl.1, Book 3
101B-1703-2	General orders	A.P.4267E/ol.2
101B-1703-3A2	Illustrated parts catalogue	A.P.4267E/ol.3, Part 1
101B-1703-3B2	Appendix 'A'	A.P.4267E/ol.3, Part 2
101B-1703-3C2	Scales of unit equipment	A.P.4267E/ol.5, Part 3
101B-1703-3D2	Scales of servicing spares	A.P.4267E/ol.3, Part 4
101B-1703-4B	Not applicable	A.P.4267E/ol.4
101B-1703-5B	Basic servicing schedule	A.P.4267E/ol.5
101B-1700-6A	Aircraft repair manual	A.P.4267, 1.6
101B-1700-7	Modifications list	A.P.4267, L.
101B-1703-12B	Ground handling notes	A.P.4267E.H.N.
101B-1703-15B	Pilot's notes	A.P.4267E.N.
101B-1703-16B	Operating data manual	A.P.4267D.D.

Until notice of the changeover is promulgated in D.C.I's the required A.P. should be requisitioned under the old A.P. numbr.

RESTRICTED

ditions
ys
engin
ind bra

NOTE TO READERS

The subjectmatter of this publication may be affected by Defence Council Instructions, or by Servicing schedules (Vol.5), or General Orders and Modifications leaflets in this A.P., in the associated publications listed below, or even in some others. Where possible, Amendment Lists are issued to correct this publication accordingly, but it is not always practicable to do so. When an Instruction, Servicing schedule or leaflet contradicts any portion of this publication, the Instruction, Servicing schedule or leaflet is to be taken as the overriding authority. The inclusion of references to items of equipment does not constitute authority or demanding the items.

Each leaf, except the original issue of preliminaries, bears the date of issue and the number of the Amendment List with which

it was issued. New or amended technical matter will be indicated by triangles in the text thus: ◀...▶ to show the extent of amended text, and thus: ▶◀ to show where text has been deleted. When a Section or Chapter is issued in a completely revised form, the triangles will not appear.

If more than one copy of this publication is held, each set of covers should be given an identifying number and be kept together.

◀ The reference number of this publication was altered from A.P.4267E to A.P.101B-1703 in January 1967. No general revision of page captions has been undertaken, but the code number appears in place of the earlier A.P. reference on new or amended leaves issued subsequent to that date. ▶

LIST OF ASSOCIATED PUBLICATIONS

Aircraft fuel and oil tanks	4117A
Aircraft pneumatic equipment	4303
Aircraft pressurising and air conditioning	4340
Aircraft undercarriage equipment - Dowty	1803E
Aircraft undercarriage equipment - Electro Hydraulics	1803F
Automatic pilot A10	1469E
Bomb carriers	1664
Dunlop equipment fitted to Shackleton aircraft	4515C
Electrical manual	4343
Engine Griffon M8	2234E & F
Gun, nose mount, B.P., Type N, Mk.1	2796N
Hydraulic equipment - Dowty	1803D
Instrument manual	1275
Missile storage, paration, transportation, loading and off-loading procedures	2852B
Power plant Griffon Mk.58	4275A
Rotol accessory boxes and drives	2240A
Servicing of aircraft and associated equipment in low temperature conditions	1441B
Servicing of aircraft and associated equipment in tropical conditions	1441C
Servicing trolleys	2306
Viper Mk.20301 engine change unit	102C-0804-1
Wheels, tyres and axles	2337

LIST OF AIR DIAGRAMS

	A.D.
Access panels	8086Q
Electrical installation circuits	8086L
Electrical installation location	8086Z
Flying controls	8086C
Flying controls lubrication	4915
Fuel and nitrogen system	8086F
Hydraulic system	6023H

LEADING PARTICULARS

NAME SHACKLETON MR MK.3 PHASE 3
 TYPE FOUR-ENGINE MID-WING MONOPLANE
 DUTY ... MARITIME RECONNAISSANCE AND ANTI-SUBMARINE
 CREW TEN, INCLUDING TWO PILOTS

GENERAL DATA AND CONTROL SURFACE AREAS

For main aircraft dimensions refer to Fig.1 - General Arrangement.
 For the settings and range of movement of control surfaces refer to
 Sect.3, Chap.4.

MAIN PLANE DATA

Aerofoil section at root N.A.C.A. 23018
 Incidence (nominal) 4 deg.
 Dihedral (outboard of centre plane)
 Rear spar datum (nominal) 4 deg.
 (actual) 3 deg. 30 min.
 Top surface rear spar
 (nominal) 2 deg. 40 min.
 (actual) 2 deg. 10 min.

Areas (in sq.ft.)

Main plane, including ailerons
 (gross) 1,459
 Ailerons, including tabs (total) 133.2
 Spring tabs, four (total) 7.8
 Geared tabs, two (total) 3.75
 Trim tab (port only) 2.53
 Flaps (total) 146.96

TAIL PLANE AND ELEVATOR DATA

Incidence 1 deg. 15 min.
 Dihedral NIL

Areas (in sq.ft.)

Tail plane, including elevators and tabs 285.4
 Elevators, including tabs (total) 86.24
 Geared tabs, two (total) 4.36
 Trim tabs, two (total) 2.86

FIN AND RUDDER DATA

Areas (in sq.ft.)

Fins and rudders, including tabs (total) 222.4
 Rudders, including tabs (total) 106.4
 Spring tabs, two (total) 5.04
 Trim tabs, two (total) 6.30

LANDING GEAR

MAIN-WHEEL UNITS

Type Two forward-retracting
 twin-wheel units with
 single shock-absorber
 Electro-Hydraulic 1693/7

Radius rod

Type Electro-hydraulic 1698/4

Shock-absorber strut

Type Direct action oleo-pneumatic
 Electro-hydraulic 5039

Air pressure (no load) 700 p.s.i.

Inflation pressure (loaded) Refer to Sect.2, Chap.2

Oil OM-15 (Ref.No. 34B/9100572)

N.A.T.O. Code No. H-515

Wheels (two) A.H. 51290

Tyres D.C. 4420, 48 x 15.00-21

(Ref.No. 27A/3587)

or D.R. 4421, 48 x 15.00-21

(Ref.No. 27A/3452)

Tubes D.T. 4406, 48 x 15.00-21

(Ref.No. 27A/3589)

Inflation Refer to Vol.5 of this A.P.

Brakes A.H. 51162 (port outer and starboard inner)

(Ref.No. 27/G4178)

A.H. 51163 (port inner and starboard outer)

(Ref.No. 27G/4179)

Maxaret units A.C.11512 L.C.M. (port outer and

starboard inner)

(Ref.No. 27G/2420)

A.C. 11518 R.A.M. (port inner and

starboard outer)

(Ref.No. 27G/2421)

Normal working pressure 1,500 p.s.i.

NOSE-WHEEL UNIT

Type Rearward retracting, twin-wheel
 steerable
 Dowty 2.00090.003

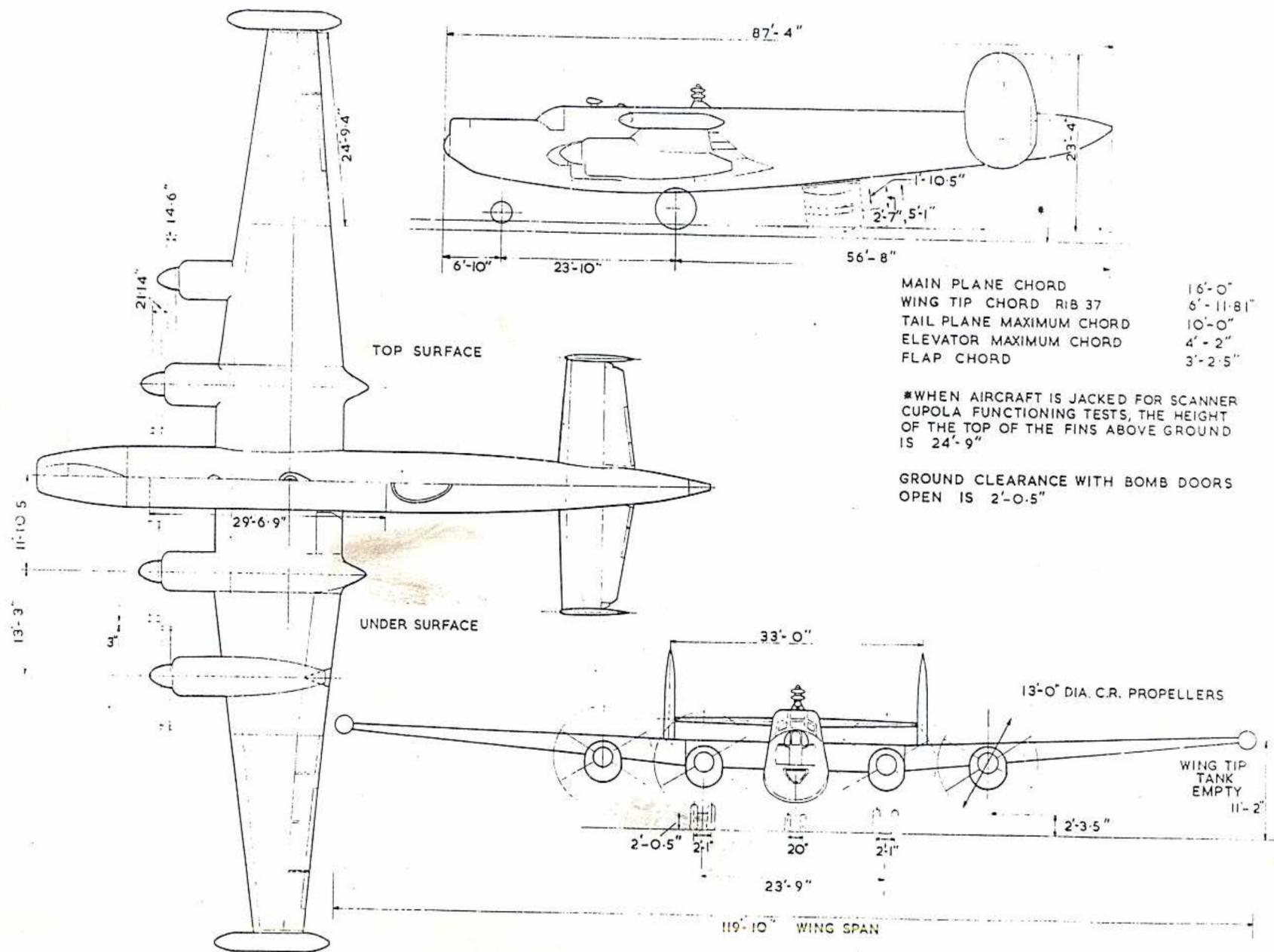


Fig. 1. General arrangement.

(Mod 1105)

Shock-absorber strut									
Type	...	...	...	...	...	...	...	...	Liquid spring
Charge pressure (no load)	...	...	...	...	...	...	...	...	1,500 p.s.i.
Static load deflection	...	...	...	...	...	...	...	...	Refer to Sect.2, Chap.2
Oil	...	...	...	...	...	...	...	...	OM-15 (Ref.No. 34B/9100572)
									N.A.T.O. Code No. H-515
Wheels (two)	...	...	...	...	...	...	...	...	A.H. 9527 (Ref.No. 27A/3548)
Tyres	...	...	...	...	...	...	...	...	D.C. 4983, 30 x 9.00-15
									(Ref.No. 27A/3588)
									or FE-EN-59N, 30 x 9.00-15
									(Ref.No. 27A/3755)
Tubes	...	...	...	...	...	...	...	...	F.E.3, 30 x 9.00-15
									(Ref.No. 27A/3527)
Inflation	...	...	...	...	...	...	...	...	Refer to Vol.5 of this A.P.

POWER UNITS

Type	Griffon Mk.58 power plant
------	-----	-----	-----	-----	-----	-----	-----	-----	---------------------------

ENGINES

Name	...	...	...	...	...	...	...	...	Griffon Mk.58
Type	...	...	...	...	...	...	...	...	12 cylinder, 60 deg.Vee, pressure-liquid cooled with two-speed single stage supercharger (Ref.No. 57A/50).
Number	...	...	...	...	...	...	...	...	Four

ACCESSORIES GEARBOXES

Number	...	...	...	...	...	...	...	...	Four
No.1	...	...	...	...	...	...	...	...	6.0214.0001 (Ref.No. 37L/5060)
No.2	...	...	...	...	...	...	...	...	6.0214.0003 (Ref.No. 37L/5063)
No.3	...	...	...	...	...	...	...	...	6.0214.0004 (Ref.No. 37L/5061)
No.4	...	...	...	...	...	...	...	...	6.0214.0005 (Ref.No. 37L/5062)
Oil	...	...	...	...	...	...	...	...	OM-270 (Ref.No. 34A/9100554)
									N.A.T.O. Code No. 0-117
Capacity	...	...	...	...	...	...	...	...	4 pints
After engine run	...	...	...	...	...	...	...	...	4-3 pints

ENGINE TACHOMETER GENERATOR

(four-one to each gearbox)	Ref.No. 6A/2237
----------------------------	-----	-----	-----	-----	-----	-----	-----	-----	-----------------

PROPELLERS

Type	...	...	...	...	...	...	...	...	...
Front	...	...	...	...	...	...	...	...	D.F. 178/334/1 (Ref.No. 25A/748)

Rear	...	...	...	...	...	...	...	...	D.B. 229/336/1 (Ref.No. 25A/772)
Control	...	...	...	...	...	...	...	...	Hydromatic, constant speed and feathering
Diameter (front half)	...	...	...	...	...	...	...	...	13 ft.

PITCH SETTINGS

Front propeller									
Basic	...	...	...	...	...	...	...	...	23 deg.
Fine	...	...	...	...	...	...	...	...	23 deg.
Feathered	...	...	...	...	...	...	...	...	90 deg.
Rear propeller									
Basic	...	...	...	...	...	...	...	...	24 deg.
Fine	...	...	...	...	...	...	...	...	24 deg.
Feathered	...	...	...	...	...	...	...	...	91 deg.
Direction of rotation									
Front propeller	...	...	...	...	...	...	...	...	Right-hand tractor
Rear propeller	...	...	...	...	...	...	...	...	Left-hand tractor

TRANSLATION UNIT

Type	...	...	...	...	...	...	...	...	P.36674 (Ref.No. 27L/6943)
Oil	...	...	...	...	...	...	...	...	OEP-70 (Ref.No. 34B/9100539)
									N.A.T.O. Code No. 0-155
Tank capacity (each tank)	...	...	...	...	...	...	...	...	750 c.c.

FUEL SYSTEM

FUEL

Type	...	...	...	...	...	...	...	...	Aviation gasoline 100/130 grade
									(Ref.No. 34A/9100444)
									N.A.T.O. Code No. F-18

Fuel pumps

Main tanks	...	...	...	...	...	...	...	...	S.P.E. 418, Mk.3
Auxiliary tank	...	...	...	...	...	...	...	...	B.P.1, Mk.3, (Ref.No. 5UE/3751)
									or F.B.6, Mk.3, (Ref.No. 5UE/4986)

Fuel tank capacities

No.1 tanks (each)	...	...	...	...	...	...	...	...	534 gall.
No.2 tanks (each)	...	...	...	...	...	...	...	...	541 gall.
No.3 tanks (each)	...	...	...	...	...	...	...	...	297 gall.
No.4 tanks (each)	...	...	...	...	...	...	...	...	311 gall.
No.5 tanks (each)	...	...	...	...	...	...	...	...	185 gall.
No.6 tanks (wing tip) (each)	...	...	...	...	...	...	...	...	256 gall.
Total fuel capacity (normal)	...	...	...	...	...	...	...	...	4,248 gall.
Auxiliary fuel tank	...	...	...	...	...	...	...	...	400 gall.
Maximum total fuel capacity	...	...	...	...	...	...	...	...	4,648 gall.

WATER/METHANOL

Type	A.L.-24 (Ref.No.34B/9440428)
------	-----	-----	-----	-----	-----	-----	-----	-----	------------------------------

Tanks Two
Capacity (each) 26 gall.
Pumps S.P.M.7 (Ref.No. 5UE/5272)
Pressure regulating valves 301/3/025/1

OIL SYSTEMS

◀ OIL
Type OMD-370 (Ref.No.34A/2201096)
N.A.T.O. Code No.0-128 ▶
Tanks Four
Capacity (each):- Oil 32.5 gall.
Air space 7.5 gall.
Total oil capacity 130 gall.

OIL DILUTION SYSTEMS

Valve (Ref.No. 27V/2800)
Jet No.3 (Ref.No. 27V/2691)
Diameter of jet orifice 0.089 in.
Delivery pressure (nominal) 18 p.s.i.

COOLING SYSTEM

Coolant A.L.-3 (Ref.No. 34B/9100470)
N.A.T.O. Code No. S-735
Capacity (per system) 8 gall. approx.

HYDRAULIC SYSTEM

PUMPS
Type Dowty Vardel A.8003/Y/2450
Number Two
Working pressure 2,450 p.s.i.

RESERVOIR

Capacity - Fluid 10.5 pints
Air space 6.9 pints
System fluid capacity 7 gall. approx.
Fluid Oil OM-15 (Ref.No. 34B/9100572)
N.A.T.O. Code No. H-515

BRAKE ACCUMULATORS

Type A.C. 14058 (Ref.No. 27VA/4959)
Number Two
Air charging pressure 1,550 p.s.i.

EMERGENCY AIR SYSTEM

CYLINDERS

Type Mk.5F (Ref.No. 6D/9429887)
Number Three
Capacity 1,250 litres
Charging pressure 2,700 p.s.i.

PNEUMATIC SYSTEMS

MAIN SYSTEM

Compressor (No.2 gearbox) S.H.6/10C. (Ref.No. 37G/508)
Storage cylinder (main)

Number One
Type A.C.O. 3147 (Ref.No. 27VA/2948)
Capacity 620 cu.in.
Charging pressure 1,000 p.s.i.

Storage cylinder (backing)

Number One
Type Mk.5F (Ref.No. 6D/9429887)
Capacity 1,250 litres
Charging pressure 3,000 p.s.i.

Regulator valve

Type A.R. 16/1000 (Ref.No. 27VB/3002)
Operating pressure - Cut-out 1,060 p.s.i.
Cut-in 850 p.s.i.

Reducing valve pressures

Camera and engine services 1,000/350 p.s.i.
Hydraulic reservoir 350/7 p.s.i.
Vision de-icing fluid tank 350/7 p.s.i.
Secondary fuel jettison system 350/50 p.s.i.

A.S.V. PRESSURISATION SYSTEM

Storage cylinder

Number One
Type Mk.5D (Ref.No. 6D/9429885)
Capacity 750 litres
Charging pressure 1,800 p.s.i.

RESTRICTED

RESERVE AIR SYSTEM

Storage cylinders

Number Two
 Type 26767B (Ref.No. 6D/2776)
 Capacity (each) 4,260 litres
 Charging pressure 3,500 p.s.i.

VACUUM SYSTEM

Pump Pesco B3X, Mk.2 (Ref.No. 37J/6)

NITROGEN SYSTEM

CYLINDERS

Number Six
 Type Mk.10A (Ref.No. 6D/9429892)
 Capacity (each) 2,250 litres
 Charging pressure 1,800 p.s.i.

REDUCING VALVES

High pressure (1,800/400 p.s.i.) A.C.M.16390 (Ref.No. 27VA/4816)
 Medium pressure and relief valve (400/25 p.s.i.) ... P.A.S.264-001
 Low pressure (50/5.5 p.s.i.) ... A.C.M.20156 (Ref.No. 27VA/5760)

DE-ICING SYSTEMS

AEROFOIL SURFACES

System Modified T.K.S.
 Pump X.A.9500/120 TYPE B (Ref. No.5UE/6216)
 Distributors Porous panels
 Tank capacity - Fluid 23 gall.
 Air space 4 gall.
 Fluid A.L.- 7 (Ref.No. 34B/9100474)

TRANSFER SYSTEM

Pump Type 28000/11 (Ref. No.5UE/6859)
 Tank capacity - Fluid 33 gall.
 Air space 3 gall.
 Fluid A.L.- 7 (Ref.No. 34B/9100474)

WINDSCREENS

Tank capacity - Fluid 9 gall.
 Air space 0.5 gall.
 Fluid A.L.- 8 (Ref.No. 34B/9100475)
 N.A.T.O. Code No.S-738
 Delivery pressure 7 p.s.i.

WINDSCREEN WATER-SPRAY SYSTEM

Tank capacity - Water 6 gall.
 Air space 0.5 gall.
 Delivery pressure 7 p.s.i.

FRESH WATER SYSTEMS

Tank capacity (galley) 15 gall.
 Tank capacity (toilet compartment) 5 gall.

AIR CONDITIONING SYSTEM

Heater

Name Dragonair
 Type D.Y.A.100 (Ref.No. 27U/539)
 Number Four
 Fan units (two) Type 55A0141
 Fuel controller Ref.No. 27U/553
 Fuel pumps Ref.No. 5UE/5648

OXYGEN SYSTEM

MAIN SYSTEM

Storage cylinders

Number Eight
 Type Mk.10A (Ref.No. 6D/9429900)
 Capacity 2,250 litres
 Charging pressure 1,800 p.s.i.
 Regulator Mk.10A (Ref.No. 6D/1395)

SUBSIDIARY SYSTEM

Storage cylinders

Number Two
 Type Mk.10A (Ref.No. 6D/9429900)
 Capacity 2,250 litres
 Charging pressure 1,800 p.s.i.

FIRE PROTECTION SYSTEMS

GRIFFON ENGINES

Extinguishers

Type Mk.12A, methyl bromide, 6lb.
 (Ref.No. 27N/100)
 Mk.13A, methyl bromide, 12lb.
 (Ref.No. 27N/99)

Number One Mk.12A and one Mk.13A
 for each engine

Flame selector switches Ref.No. 27N/72

FUEL AND WATER/METHANOL SYSTEMS

Extinguishers

Type Mk.12A, methyl bromide, 6lb, (Ref.No. 27N/100)
 Number Eighteen

AIR CONDITIONING SYSTEM

Extinguishers

Type Mk.12A, methyl bromide, 6lb.
 (Ref.No. 27N/100)

Number Four - one to each heater compartment

VIPER ENGINES

Extinguishers

Type Mk 12A, methyl bromide, 6lb. (Ref.No. 27N/100)
 Number One for each engine

HAND OPERATED EXTINGUISHERS

Type 34H, B.C.F., (Ref.No. 27N/299)
 Number Five

ARMAMENT

BOMBING GEAR

Main carrier positions Twelve
 Number of carriers fitted (maximum) Four

Normal system

Preselector unit Type B
 Bomb distributor Type 6
 Auto-selector, 4.5 in. flares Ref.No. 5D/1769
 Auto-selector, marine marker Ref.No. 5D/1297

A.S. bombs

Stores controller (two off) D.C.U. 77A

Carriers

Heavy carrier AV.210 (Ref.No. 11A/4130)
 A.S. bombs and torpedo carrier AV.270 (Ref.No. 11A/6368)
 Medium carrier AV.211 (Ref.No. 11A/4131)
 Torpedo and sonobuoy carrier AV.271 (Ref.No. 11A/6369)
 Sonobuoy carrier AV.272 (Ref.No. 11A/6370)
 Marine marker adapter carrier AV.275 (Ref.No. 11A/6371)
 Practice bomb carrier AV.247 (Ref.No. 11A/4128)
 Marine marker adapter AV.193 (Ref.No. 11A/3875)

GUNS

Mounting Type N
 Guns (two) Hispano 20 mm., No.4, Mk.5 (Ref.No. 7G/783)
 Rounds 300
 Power operation Electro-hydraulic

PYROTECHNICS

Flare chute

Number One
 Type AV.276

Flame float ejector Ref.No. 26FP/4075

CARTRIDGE DISCHARGERS

Illuminator flare dischargers

Number Four
 Type 1.75 in. (Ref.No. 7B/1402)
 Distributor Mk.1 (Ref.No. 5D/1556)

Photoflash discharger

Number One
 Type 1.75 in. (Ref.No. 7B/1402)
 Distributor (Ref.No. 5D/1741)

ELECTRICAL SYSTEM

Wiring system Earth return, single-pole
 Type S.B.A.C. (Modified)
 Generators 24-volt, 12 k.W.
 Number Four

RESTRICTED

Type English Electric 527, A.E.2505/3 (Ref.No.5UA/8330)
Voltage control panel (four)... Type A.E.7307/2
(Ref.No.5UC/7601)

Batteries

Number ... Two
Type ... K, 24-volt, 40 amp./hr. (Ref.No.5J/3364)

Emergency batteries

Turn and slip indicator (two) ... 24-volt, 0.4 amp./hr.
Lighting ... 2.4-volt, 3 amp./hr. Connected
2.4-volt, 1.3 amp./hr. in parallel

Alternator ... 200-volt, 7.3 k.V.A.

Type ... N-0504

Voltage regulator ... Type 23/4784

Transformer/rectifier unit ... Type U/1801

Alternator protection unit ... Type V/12524

Inverters (rotary)

Type (four) ... 103C (Ref.No.5UB/8397)

(one) ... 103D (Ref.No.5UB/9290)

(two) ... 201B (Ref.No.5UB/6475)

(one) ... 108 (Ref.No.5UB/5953)

Inverter (static) ... Plessey (509/1/01230)

(Ref.No.5UB/8462)

ASSISTED TAKE-OFF UNITS**ENGINE**

Name ... Viper Mk.20301

Type ... Straight-flow turbo-jet

Number ... Two

Oil system

Type ... Integral with engine

Oil ... OX-38 (Ref.No.34A/9100591)

N.A.T.O. Code No.0-149

Tank capacity ... 6.5 pints oil, 3.5 pints air

Engine capacity ... 1 pint oil

Total oil capacity ... 7.5 pints

Starting system

Type ... Electrical

Starter ... Rotax Type C.13102

Starter panel ... Rotax Type U.1110

INTRODUCTION

1. THE SHACKLETON MR. MK.3, PHASE 3 is a four-engined monoplane designed for long range patrol and reconnaissance duties and extensively equipped to detect and destroy submarines. Bomb bay sealing and heating are provided to give the aircraft a mixed weapon capability. A crew of ten is carried which includes first and second pilots, flight engineer, signaller, tactical navigator and routine navigator, the remaining crew can be distributed as, master, secondary and subsidiary sonics operators, A.S.V. operator and two rear look-outs. Relief crew members or passengers can be carried as required.

2. Constructed in four sections to facilitate transportation, the ovoid section fuselage, of light alloy monocoque construction, incorporates transverse formers braced by longitudinal stringers. Two main longerons carry the floor, bomb door hinges and attachment fittings for the transverse bomb carriers.

3. THE MID-WING MAIN PLANE, tapers in plan and thickness outboard of the centre plane and consists of five main sections, four trailing-edge sections and two wing-tip tanks, all of light-alloy construction. Split-trailing-edge flaps extend from each side from the fuselage to the ailerons, except for gaps where each inner and outer nacelle extends rearward. Each aileron, comprising four sections coupled together, is fitted with a geared and a spring tab. In addition a trim tab is fitted to the port aileron.

4. THE TAIL PLANE, similar in construction to the main plane, has a fin and rudder at each extremity. Elevators extend from the fuselage to the end of the rear spar and are fitted with a trim and balance tab. Each rudder is fitted with a trim and spring tab.

5. AN ENTRANCE DOOR is provided on the starboard side, rear fuselage centre section and opens inwards.

6. DUAL FLYING CONTROLS are provided. Rudder control is by pendulum pedals incorporating toe-operated brake pedals. Hand-wheel control columns operate the ailerons and elevators. With the exception of parts of the aileron controls in the fuselage comprising chains, tie-rods and cables, tubular push-pull control rods are used throughout. Trim, geared, and fixed tabs are operated by cables, fixed levers, control rods and torsion bars respectively. A Mk.10 automatic pilot is fitted.

7. THE LANDING GEAR comprises two forward retracting main-wheel units, housed in each inboard nacelle, and a rearward retracting, steerable, nose-wheel unit, all of which are hydraulically operated. When retracted, all three units lie within the normal contours of the nacelles and nose of the aircraft with the structure apertures faired in by hydraulically-operated doors. Nose-wheel steering is controlled by a hand-wheel and push button on the first pilot's control column.

8. FOUR GRIFFON MK.58 engines, equipped with two-speed single-stage superchargers and fuel injection units, are housed in quickly-detachable power units bolted to sub-frames. A water/methanol system enables high boost to be used for take-off under full load. The engines are started electrically and detachable hand turning gear is provided for use during servicing.

9. ASSISTED TAKE-OFF UNITS, in the form of two Viper 203 straight-flow turbo-jet engines, are mounted one in each outboard nacelle, at the rear of the Griffon engines. This additional power allows

the Griffon engines to be operated at a lower boost pressure on take-off so improving their reliability.

10. FUEL is carried in twelve tanks, ten being flexible and housed five in each main plane, and two of rigid-streamline shape attached to each wing-tip. Provision is made for a jettisonable overload tank to be installed in the bomb compartment. Two air-operated jettison systems serve the main and wing-tip tanks respectively, independently of each other. Six fuel pumps, housed one in each inner three main tanks, supply fuel to the Griffon and Viper engines, while the outer No.4 and 5 tanks gravity feed into the associated No.3 tank. Fuel transfer from the tip-tank is by nitrogen pressure. Three cross-feed cocks enable fuel to be used from various tank groups.

11. A separate OIL SYSTEM for each Griffon engine has a connection to the appropriate propeller feathering system. The outboard oil tanks are mounted in the outboard nacelles and the inboard tanks at the inboard main plane joints, between the spars. An oil dilution system is provided and oil coolers are mounted with the engine coolant radiators. The Viper engine oil system is completely integral with the engine.

12. AN ACCESSORIES GEARBOX, driven by the Griffon engine, is mounted on the aft face of each firewall, and drives a 12 k.W. generator and a three-phase tachometer generator. An alternator, fitted to the No.1 engine gearbox, supplies power for E.C.M. aerial and plinth de-icing. Additional components driven by the gearboxes are as follows:-

No.2 engine	An air compressor.
No.3 engine	A hydraulic pump and a vacuum pump.
No.4 engine	A hydraulic pump.

RESTRICTED

13. ELECTRICAL POWER is supplied by four 12 k.W. Type 52/A generators, one driven by each Griffon engine. All four generators have a static voltage control panel controlling the output to 28 volts. The main bus-bar is split into two sections, the two port generators feed one section and the other section is fed by the two starboard generators. If required, these two bus-bar sections may be connected together by operation of a bus-bar couple contactor. A 24-volt, 40 amp.hr. Type K2 Nickel Cadmium battery is connected to each bus-bar via a contactor. Two battery isolation switches, one each for port and starboard, are fitted on the engineer's auxiliary panel. An external ground supply socket, located in the nose of the aircraft, enables a ground supply trolley to be used for starting and ground servicing. Provision is made for connecting an A.A.P.P. unit to the aircraft main bus-bars.

14. A.C. POWER is required for certain equipment. This power is supplied by eight rotary inverters; four Type 103C, one Type 103A, two Type 201B, and one Type 108. In addition, a Type 509/1/01230 static inverter supplies 250 volts at 50 c/s to the crew's razor socket. All circuits are protected by fuses or circuit breakers and where fuses are situated remote from the main fuse panels, their supply cables are protected by circuit breakers or fuses within the main distribution panel.

15. Electrical control is employed for operation of hydraulically-operated services, fuel cocks, pneumatically-powered engine services, wing-tip and main tank fuel jettisoning, cameras, pyrotechnics and bomb release gear.

16. AIR CONDITIONING and heating of the aircraft cabin and bomb bay is provided by N.A.C.A. intakes and fans working in conjunction with four Dragonair heaters, one of which maintains the bomb compart-

ment at an even temperature to provide for the carriage of stores critical to temperature changes. Heat loss from the bomb compartment is prevented by tubular seals. Warm air supply for demisting the transparent tail cone, pilots', front gunner's, and air bomber's windscreens is taken from the heating system.

17. WIRELESS EQUIPMENT comprises A.R.I.'s 18089, 5874, 23126, 23117, 18120/4 and 18124/1, 23084, 18011, 18125/1, 18107/4, 18157, 18108/1 and 18103 (master), 18108/1 and 18103 (second) 18101 and 18208/1.

18. RADAR EQUIPMENT comprises A.R.I.5878, 5848 C.2.P.7, 5885, 18144, 5816 and 5771.

19. DE-ICING SYSTEMS are provided for the aerofoil surfaces, front gunner's windscreen, air bomber's window and the pilots' dry air sandwich windscreen. Electrically-powered hydraulically driven wipers and windscreen washing facilities are provided at the air bomber's and front gunner's position in addition to those fitted to the pilots' windscreens.

20. A COMPRESSED AIR SYSTEM is installed to operate the landing gear down, flaps, bomb doors, and A.S.V. scanner cupola in an emergency, and also to operate the emergency exit. A further compressed air system is provided to operate the camera installation, fuel jettison systems, Griffon engine services, Viper intake door, and to pressurize certain fluid tanks. To cater for non-availability of compressed air for servicing, under certain local conditions, a reserve air supply is provided. An independent pneumatic system is provided to pressurize the A.S.V. equipment.

21. FIRE PROTECTION for the Griffon engines, Viper engines, fuel system and cabin heaters is provided by methyl-bromide extinguisher installations. Hand-

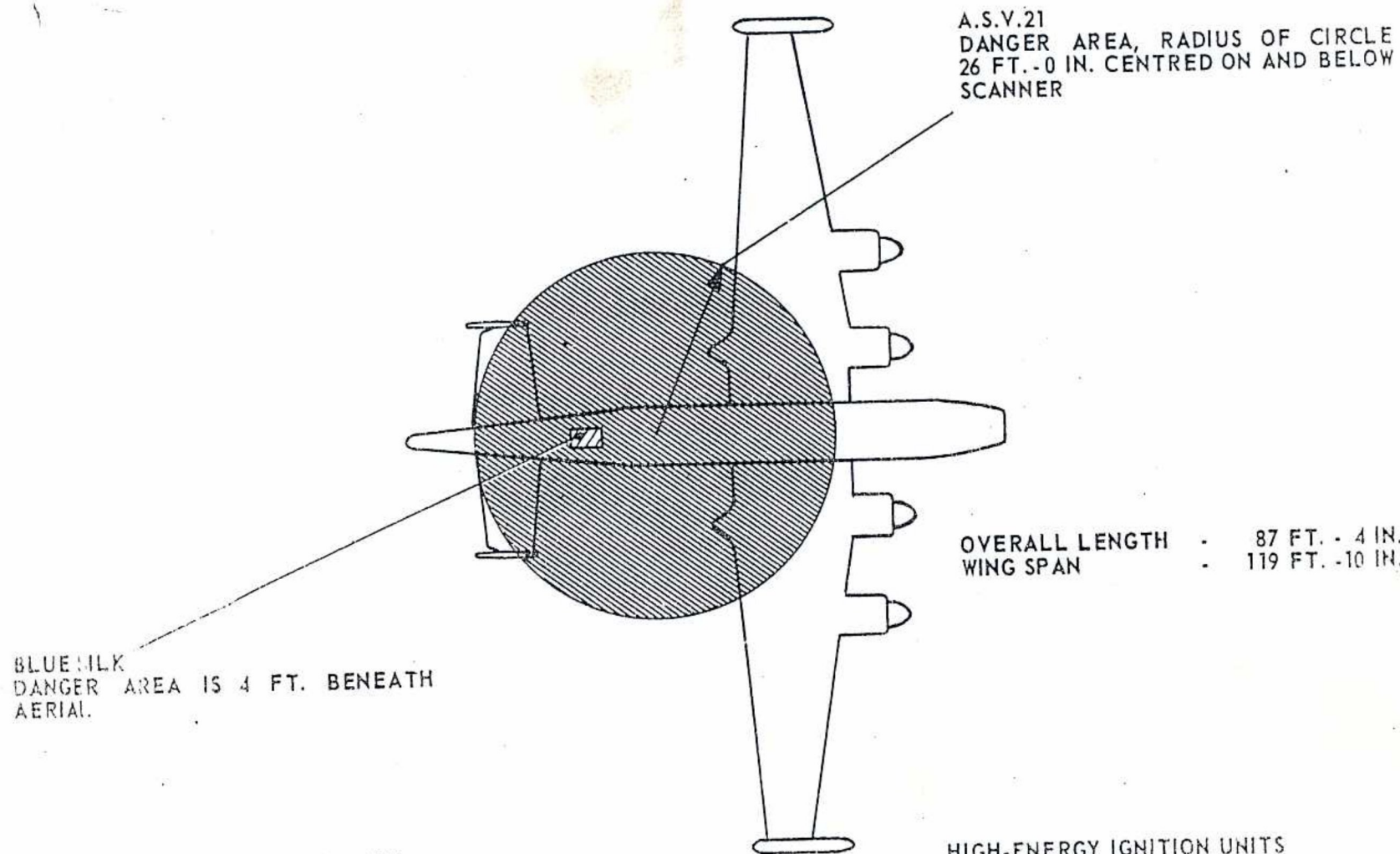
operated Bromochlorodifluoromethane extinguishers are provided at various points in the fuselage.

22. EMERGENCY EQUIPMENT includes Type MS-9 self-inflating dinghies, Type SS dinghies, crash axes, fireproof gloves and first aid kits. A parachute exit is in the floor adjacent to the pilots, ditching and escape hatches are also provided in the fuselage.

23. ARMAMENT consists of two 20 m.m. cannon fitted in a nose installation. A maximum of four main stores carriers can be fitted to the bomb bay suspension points at one time, the suspension points used being dependent on the type of stores used. Pyrotechnic stores, carried inside the aircraft, include reconnaissance flares, photo flashes, illuminator flares, smoke floats, and marine markers. A flare chute is fitted in the step in the nose of the aircraft and a flame float ejector and a flame float launching tube are fitted in the rear fuselage. A battery of illuminator flare dischargers is fitted in the starboard side and a photo-flash discharger is fitted in the roof of the fuselage.

24. The pilots' panel is illuminated by tubular ultra-violet lamps in conjunction with red flood lamps. Emergency panel lighting is also provided. Provision is made for carrying oxygen with supplies to all crew stations. Miscellaneous equipment includes two cameras, for vertical and oblique photography, a hand camera, a signalling lamp, a signal pistol, and binoculars. The galley, with its associated water system, is equipped with refrigerated cupboards, an electrically-heated water boiler, a hot plate and oven, an infra-red grill, and a sink unit. Adjacent to the galley is the war room containing three bunks, a folding table, and a seat. An Etkan chemical closet is provided in a toilet compartment in the rear fuselage.

LETHAL WARNING



There is a MICROWAVE RADIATION HAZARD from certain equipment in this aircraft. To avoid injury to health, all personnel are to keep away from the areas indicated on the diagram. The aircraft is to be kept clear of personnel to be cleared.

The energy stored in the capacitors of the high-energy ignition units can, under certain circumstances be of a lethal nature. No servicing is to be attempted, on the Viper engines, until at least one minute has elapsed from the disconnection of the L.T. input plug.

RESTRICTED